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Application for Amendment to Texas Commission on Environmental Quality

Permit No. 95754

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Intercontinental Terminals Company LLC
Pasadena Terminal
Pasadena, Harris County, Texas

December 2018

DiSorbo
Environmental Consulting Firm

1010 Travis St. | Suite 916 | Houston, TX 77002
713.955.1230 (P) | 713.955.1201 (F) | www.disorboconsult.com

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Section 1
Project Information

1.1 Introduction

Intercontinental Terminals Company LLC (ITC) owns and operates a for-hire bulk liquid storage terminal (Pasadena Terminal) located in Pasadena, Harris County, Texas that is authorized to receive, store, and transfer chemicals, crude, and petroleum products. The Pasadena Terminal storage tanks and associated loading, piping, control, and support facilities are authorized by Permit No. 95754. A permit amendment was issued on July 11, 2017 that included updates to previous construction plans as well as authorized new tanks and ancillary equipment.

1.2 Project Description

This document constitutes an "as-built" permit amendment application for storage tanks, marine vessel loading/unloading docks, railcar/tank truck loading/unloading racks, vapor control devices, piping components, emergency fire water pumps and generators, wastewater treatment system, and associated maintenance, startup, and shutdown (MSS) emissions currently authorized by Permit No. 95754.

As part of this "as-built" permit amendment application, ITC is requesting the following changes and/or updates to the existing permit. Proposed revisions to previously submitted emission calculations and current Permit No. 95754 Special Conditions are and included in Appendix A, B, and C.

1. Update Special Condition No. 2 to include the Group ID C facilities authorized by this permit. ITC proposes to update the format of the special condition to be consistent with the overall format of the permit and simplify the required compliance demonstration requirements. The intent of the SC is to document the Federal New Source Review (NSR) applicability associated with three unique projects identified as Group ID A, B, and C. Compliance with the applicable VOC annual caps is demonstrated on a project basis as required by the SC.

2. Update Special Condition No. 2 to reflect the currently authorized wastewater treatment facilities (EPNs: T-101, T-201, T-301, and T-401) included in Group ID A.

3. Clarify Special Condition No. 3 to address the permitting of future projects through amendment and/or PBR to provide certainty on the applicability of federal review. As it stands, it is not clear what constitutes 'relaxation' of an enforceable limit applicable to facilities authorized by this permit. Note that the proposed updates are consistent with the source obligation requirements of 40 CFR 51.166(r)(2).

4. Update Special Condition No. 8 to move the "product synonym clause" to Attachment 1 which includes the list of approved products. An updated Attachment 1 will be submitted as part of the subsequent modeling exercise.

5. Update Special Condition No. 10 to reflect appropriate reference to the MAERT.

6. Update Special Condition No. 11 to reflect the loading rack as a whole vs. individual spot. Note the emission limitations are based on the rack vs. individual spot.

7. Update Special Condition No. 12.B. to remove seal gap measurements requirements which apply to external floating roof (EFR) tanks. Note there are no EFR tanks authorized in this permit.

8. Update Special Condition No. 12.D. to reflect recent TCEQ boilerplate language associated with tank exterior surface paint requirements.

9. Remove Special Condition No. 13 as the tank fitting details associated with the noted tanks are included in previous and current permit representations which are considered enforceable. The proposed revision is consistent with TCEQ storage tank boilerplate special conditions and recently issued permits.

10. Update Special Condition No. 15 (new SC 14) to account for loading operations associated with direct pipeline moves.

11. Update to Special Condition No. 18 (new SC 17) to remove US Coast Guard (USCG) requirements that apply to the third-party marine vessel owner and operator. The noted USCG requirements are safety driven and do not impact the emissions associated with the loading of products with VOC vapor pressures greater than 0.10 psia onto inerted marine vessels. More specifically, the low-end threshold of 0.2 psia ensures that the inerted marine vessel remains inerted by restricting a vacuum from being pulled on the vessel. The high-end threshold of 80% of the lowest vessel PRV threshold is tied to an automatic transfer shut

down system. In either case, pressures outside of these safety specific bounds have no emissions specific basis; therefore, these USCG requirements should be removed. ITC maintains that the vapor recovery connection pressure should not be limited to 80% of the vessel PRV threshold as limiting the upper bound of the vapor recovery system unnecessarily limits the vapor collection capacity and actually increases the potential for emissions rather than reduces the potential.

12. Update Special Condition No. 24.D. (new SC 23.D.) to reflect most recent PI-1 submittal.

13. Update Special Condition No. 29 (new SC 28) to include "In VOC Service" to reflect current TCEQ boilerplate language and reflect the hybrid monitoring program.
→ what's hybridized? 1/4-ly monitoring / connectors?

- weekly AVO: VHP
+
- 1/4ly mon/conn: → LAER
- 1/4 mon / conn → A+B only

14. Update Special Condition No. 29.E. (new SC 28.E.) to reflect the applicability of the quarterly monitoring of connectors only to Group ID A and B. Note that connectors associated with Group ID C where represented in previous applications as being applicable to 28VHP; however, an oversight occurred in the issuance of the Group ID C permit action which inadvertently included the Group ID C connectors in the 28LAER monitoring program.
→ supports that higher should've been used
→ ∴ lower emissions but higher ones accounted for @ FA

15. Update to Special Condition No. 30 (new SC 29) to clarify the applicable monitoring requirements associated with maintaining a VCU DRE of at least 99.9%. ITC proposes to remove residence time requirement as it is an irrelevant parameter in maintaining a DRE of at least 99.9%. Note the applicable parameters are the outlet stack temperature and maximum VCU loading rates demonstrated as part of the initial stack test required by Special Condition No. 44.

16. Update Special Condition No. 34 (new SC 33) to clarify control requirements associated with the wastewater system.

17. Update Special Condition No. 35 (new SC 34) to reflect the proposed format of the MAERT.

18. Updated Special Condition No. 41 (new SC 40) to reflect the use of portable emissions controls in lieu of the permanent emissions controls authorized by this permit during periods when the permanent controls are off line and/or out or service for MSS. The portable emissions controls may be utilized to control both routine and MSS activities.

19. Remove Special Condition No. 43 as refined modeling will be submitted as part of this permitting action which demonstrates the noted limitations are no longer warranted.

20. Update Special Condition No. 44 (new SC 42) to clarify applicability of the chemical flexibility requirements applicable to the facilities authorized by this permit.

21. Update Special Condition No. 44.A. (new SC 42.A.) to reflect PI-1 submittal date associated with this submittal.

22. Update Special Condition No. 45.E. (new SC 43.E.) to clarify the stack test conditions associated with the VCUs authorized by this permit.

23. Remove Special Condition No. 46 as the requirement to continuously monitor waste gas flow rates to the vapor control system associated with loading activities, tank roof landings, and the wastewater system is not warranted. More specifically, ITC monitors various parameters (i.e., pump rates, vapor pressures, etc.) that are utilized to calculate emissions on a monthly basis to satisfy the requirements of Special Condition No. 47. ITC maintains that the continuous waste gas flow monitor is redundant to systems utilized to calculate emissions on a monthly basis; therefore, requests that the requirement to install and maintain a flow meeting be removed from Permit No. 95754.

24. Update to Special Condition No. 47. (new SC 44) to clarify the scenarios in which a Permit-By-Rule (PBR) and Standard Permits may be utilized to authorize new, modified, or affected facilities. More specifically, ITC proposes to maintain the ability to utilize Standard Permits to authorize pollution control projects in addition to project types which competitors are allowed to utilized PBRs as the authorization mechanism.

25. Remove Special Condition Nos. 50 – 55 as the applicable requirements associated with the Group ID C facilities have been incorporated into SC Nos. 1-49 and Attachment 1.

26. Update the Special Condition references throughput the permit upon completion of the above noted updates.

27. Update MAERT/emission calculations associated to reflect the as-built pump rates and overall facility design.

28. Incorporate Emergency Generator Nos. 4, 5 and 6 (EPNs: EGEN-4, EGEN-5 and EGEN-6) currently authorized by PBR into Permit No. 95754 as part of this permitting action. EPNs: EGEN-4, EGEN-5 and EGEN-6 are currently authorized via PBR and ITC inadvertently

4,5,6

duplicated the EPNs as part of the most recent permit action rather than referencing the new EPNs: EGEN-7, EGEN-8, and EGEN-9.

29. Update the format of the MAERT to clarify applicable emission limits and simply the compliance demonstration associated with this permit.

ITC is submitting an updated Prevention of Significant Deterioration (PSD) and Non-Attainment New Source Review (NNSR) applicability analysis associated with the unique projects identified as Group IDs A, B, and C in Special Condition Nos. 2 and 50. The updated NNSR/PSD analysis included in Section 7 of this application is an update to the analysis that was completed in support of the permit issuance associated with TCEQ Project Nos. 235981 and 243313. Table 1-1, included at the end of this section, summarizes the emissions associated with each project ID. Table 7-1, included at the end of Section 7, presents a summary of the Pasadena Terminal project emissions compared to PSD and NNSR applicability thresholds. As shown in Table 7-1, the updated project emission increase for each regulated pollutant do not change the previous NNSR/PSD applicability analysis determinations. Therefore, NNSR and PSD are not applicable to the proposed permit amendment application. the

1.3 Application Organization

This application is organized into the following sections:

Section 1 presents the application objectives and organization.

Section 2 contains the TCEQ Form PI-1 and Table 30; as well as a copy of the fee check.

Section 3 contains an Area Map showing the terminal location and a Plot Plan showing the location of the facilities referenced in this application.

Section 4 contains a process description for the Pasadena Terminal.

Section 5 contains a discussion of the emissions calculation methodologies for the facilities included in this application and a TCEQ Table 1(a).

Section 6 presents the best available control technology (BACT) and/or lowest achievable emission rate (LAER) analysis for the facilities included in this application.

Section 7 addresses applicability of the federal Nonattainment New Source Review (NNSR) and Prevention of Significant Deterioration (PSD) permitting requirements.

Section 8 presents the General Application Requirements that address the applicability of state and federal air regulations to the proposed facilities included in this application.

Appendix A contains detailed routine emission calculations.

Appendix B contains detailed MSS emission calculations.

Appendix C contains proposed revisions to Permit No 95754.

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

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: Intercontinental Terminals Company LLC		
Texas Secretary of State Charter/Registration Number (if applicable):		
B. Company Official Contact Information: (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:) _____		
Name: Mike J. Gaudet		
Title: Environmental Compliance Manager		
Mailing Address: P.O. Box 698		
City: Deer Park	State: TX	ZIP Code: 77536
Telephone No.: (281) 884-0360	Fax No.:	
E-mail Address: mgaudet@interm.com		
All permit correspondence will be sent via electronic copies unless hard copies are specifically requested through regular mail. The company official must initial here if hard copy correspondence is requested. _____		
C. Technical Contact Name Information: (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:) _____		
Name: Neal A. Nygaard		
Title: Chief Operating Officer, Principal		
Company Name: DiSorbo Consulting, LLC		
Mailing Address: 1001 Louisiana Street, Suite 3250		
City: Houston	State: TX	ZIP Code: 77002
Telephone No.: 713-955-1221	Fax No.: 713-955-1201	
E-mail Address: nnygaard@disorboconsult.com		
D. Site Name: ITC Pasadena Terminal		
E. Area Name/Type of Facility: Liquid Storage Tank Farm and Marine Terminal		☒ Permanent ☐ Portable
For portable units, please provide the serial number of the equipment being authorized below.		
Serial No:	Serial No:	
F. Principal Company Product or Business: Bulk Liquid Storage Terminal		
Principal Standard Industrial Classification Code (SIC): 4226 ✓		
Principal North American Industry Classification System (NAICS): 493190 ✓		
G. Projected Start of Construction Date: 10/01/2016		
Projected Start of Operation Date: 10/01/2017		

Project 294773 Permit 95754 SOS ADFC NO APNL NOD DOC 612164 Large

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendment
Page 2

I.	**Applicant Information (continued)**	
H.	Facility and Site Location Information (If no street address, provide clear driving directions to the site in writing.):	
Street Address: 1030 Ethyl Road		
City/Town: Pasadena	County: Harris	ZIP Code: 77503
Latitude (nearest second): 29 43' 24" N ✓	Longitude (nearest second): 95 09' 44" W ✓	
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): 601470222	
L.	Regulated Entity Number (RN): 106119175	
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?	☐ YES ☒ NO
If Yes, attach a copy of any correspondence from the agency and provide the RN in section I.L. above.		
C.	Number of New Jobs: 27	
D.	Provide the name of the State Senator and State Representative and district numbers for this facility site:	
State Senator: Sylvia R. Garcia		District No.: 6
State Representative: Gilbert Pena		District No.: 144
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): 95754	
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 (PSD)		☐ Hazardous Air Pollutant Major Source
☐ PSD for greenhouse gases (GHGs)		☐ Other: _____

III. Type of Permit Action Requested *(continued)*			
D. Is a permit renewal application being submitted in conjunction with this amendment in accordance with 30 TAC § 116.315(c).			☐ YES ☒ NO
E. Is this application for a change of location of previously permitted facilities?			☐ YES ☒ NO
If Yes, complete all parts of III.E.			
Current Location of Facility (If no street address, provide clear driving directions to the site in writing.):			
Street Address:			
City:	County:	ZIP Code:	
Proposed Location of Facility (If no street address, provide clear driving directions to the site in writing.):			
Street Address:			
City:	County:	ZIP Code:	
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
Is the site where the facility is moving considered a major source of criteria pollutants or HAPs?			☐ YES ☐ NO
F. Are there any standard permits, standard exemptions, or PBRs to be incorporated by reference?			☐ YES ☒ NO
If Yes, list any PBR, standard exemptions, or standard permits that need to be referenced. *(attach pages as needed)*			
NA			
Are there any PBR, standard exemptions, or standard permits associated to be incorporated by consolidation?			☒ YES ☐ NO
If Yes, list any PBR, standard exemptions, or standard permits that need to be consolidated. *(attach pages as needed)*			
106.511			
If Yes, are emission calculations, a BACT analysis, and an impacts analysis attached to this application for any authorization to be incorporated by consolidation.			☒ YES ☐ NO
G. Are you permitting planned maintenance, startup, and shutdown emissions?			☒ YES ☐ NO
If Yes, attach information on any changes to emissions under this application as specified in VII and VIII.			

III. Type of Permit Action Requested	
H. Federal Operating Permit Requirements (30 TAC Chapter 122 Applicability)	
Is this facility located at a site required to obtain a federal operating permit?	☒ YES ☐ NO ☐ To Be Determined
If Yes, list all associated permit number(s), attach pages as needed).	
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	
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 all parts of V.D.	☐ 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. If this is an application for emissions of GHGs, select one of the following:	
☐ Separate Public Notice (requires a separate application) ☐ Consolidated Public Notice	
E. 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).	

State	Class I Area

IV. Public Notice Applicability *(continued)*	
F. Is this a state permit amendment application? If Yes, complete all parts of IV.F.	☒ YES ☐ NO
Is there any change in character of emissions in this application?	☐ YES ☒ NO
Is there a new air contaminant in this application?	☐ YES ☒ NO
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):***	
Volatile Organic Compounds (VOC): >5 tpy ✓	
✓ Sulfur Dioxide (SO_2): < 10 tpy	
✓ Carbon Monoxide (CO): < 50 tpy	
✓ Nitrogen Oxides (NO_x): < 5 tpy	
✓ Particulate Matter (PM): < 5 tpy	
✓ PM 10 microns or less (PM_{10}): < 5 tpy	
✓ PM 2.5 microns or less ($PM_{2.5}$): < 5 tpy	
✓ Lead (Pb): N/A	
✓ Hazardous Air Pollutants (HAPs): < 5 tpy	
Below list other speciated air contaminants not listed above:	
H2S < 5 tpy	

V. Public Notice Information *(complete if applicable)*		
A. Responsible Person: (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:) _____		
Name: Mike J. Gaudet		
Title: Environmental Compliance Manager		
Company Name: Intercontinental Terminals Company LLC		
Mailing Address: P.O. Box 698		
City: Deer Park	State: TX	ZIP Code: 77536
Telephone No.: (281) 884-0360	Fax No.:	
E-mail Address: mgaudet@interm.com DW		

V. Public Notice Information *(complete if applicable) (continued)*		
B. Technical Contact: (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:)		
Name: Neal A. Nygaard		
Title: Chief Operating Officer, Principal		
Mailing Address: 1001 Louisiana, Suite 3250		
City: Houston	State: TX	ZIP Code: 77002
Telephone No.: (713) 955-1221	Fax No.: (713) 955-1201	
E-mail Address: nnygaard@disorboconsult.com		
C. Name of the Public Place: TCEQ Region 12 Office ✓		
Physical Address *(No P.O. Boxes)*: 5425 Polk St., Suite H		
City: Houston	County: Harris	ZIP Code: 77023
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
D. Concrete Batch Plants, PSD, and Nonattainment Permits		
County Judge Information (For Concrete Batch Plants and PSD and/or Nonattainment Permits) for this facility site.		
The Honorable: Ed Emmit		
Mailing Address: 1001 Preston, Suite 911		
City: Houston	State: TX	ZIP Code: 77002
For Concrete Batch Plants		
Is the facility located in a municipality or an extraterritorial jurisdiction of a municipality?		☐ YES ☐ NO
Presiding Officers Name(s): NA		
Title: NA		
Mailing Address: NA		
City: NA	State:	ZIP Code: NA
Provide the name, mailing address of the chief executive for the location where the facility is or will be located.		
Chief Executive: NA		
Mailing Address: NA		
City: NA	State:	ZIP Code: NA

V.	**Public Notice Information *(complete if applicable) (continued)***	
D.	Concrete Batch Plants, PSD, and Nonattainment Permits ***(continued)***	
Provide the name, mailing address of the Indian Governing Body for the location where the facility is or will be located.		
Indian Governing Body: NA		
Mailing Address: NA		
City: NA	State:	ZIP Code:
Identify the Federal Land Manager(s) for the location where the facility is or will be located.		
Federal Land Manager(s):		
E.	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)***	
☒ Current Area Map	
☒ Plot Plan	
☒ Existing Authorizations	
☒ Process Flow Diagram	
☒ Process Description	
☒ Maximum Emissions Data and Calculations	
☒ Air Permit Application Tables	
☒ Table 1(a) (Form 10153) entitled, Emission Point Summary	
☐ Table 2 (Form 10155) entitled, Material Balance	
☐ Other equipment, process or control device tables	
B. Are any schools located within 3,000 feet of this facility?	☐ YES ☒ NO
C. Maximum Operating Schedule:	
Hour(s): 24	Day(s): 7
Week(s): 52	Year(s):
Seasonal Operation? If Yes, please describe in the space provide below.	☐ YES ☐ NO
Hour(s):	Day(s):
Week(s):	Year(s):
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.	

MSS Facility(s) or Activity	Year(s)

VII.	Technical Information *(continued)*	
E.	Does this application involve any air contaminants for which a disaster review is required?	☐ YES ☒ NO
If Yes, list which air contaminants require a disaster review		
F.	Does this application include a pollutant of concern on the Air Pollutant Watch List (APWL)?	☐ YES ☒ NO
G.	Are emissions of GHGs associated with this project subject to PSD?	☐ YES ☒ NO
If Yes, provide a list of all associated applications for this project:		
H.	Does this project require an impacts analysis?	☒ YES ☐ NO
If No, is a description of why an impacts analysis is not required attached?		☐ YES ☐ NO
For Non-Federal Projects		
Is an attachment included detailing how the project meets all applicable impacts requirements, including which MERA step was met (if applicable), how the modeling was conducted (if applicable), and the results demonstrating compliance with all applicable impacts requirements following the Initial Modeling Summary guidance document?		☐ YES ☒ NO
Note: for projects with modeling, utilizing APD's Electronic Modeling Evaluation Workbook to complete this analysis will help streamline the modeling review and is strongly encouraged.		
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
C.	Does 40 CFR Part 63, Maximum Achievable Control Technology (MACT) standard apply to a facility in this application?	☒ YES ☐ NO

IX.	**Federal Regulatory Requirements *(continued)*** **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.*	
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: $ 900		
Paid online?		☒ YES ☐ NO
Company name on check: NA		
Is a Table 30 (Form 10196) entitled, Estimated Capital Cost and Fee Verification, attached?		☒ YES ☐ NO ☐ N/A
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/financial/fees/delin.		
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; the Texas Health and Safety Code, Chapter 382, the Texas Clean Air Act (TCAA) the air quality rules 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: Michael J. Gaudet		
Signature: _____ *Original Signature Required*		
Date: 21 DEC 18		

Save Form Reset Form

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

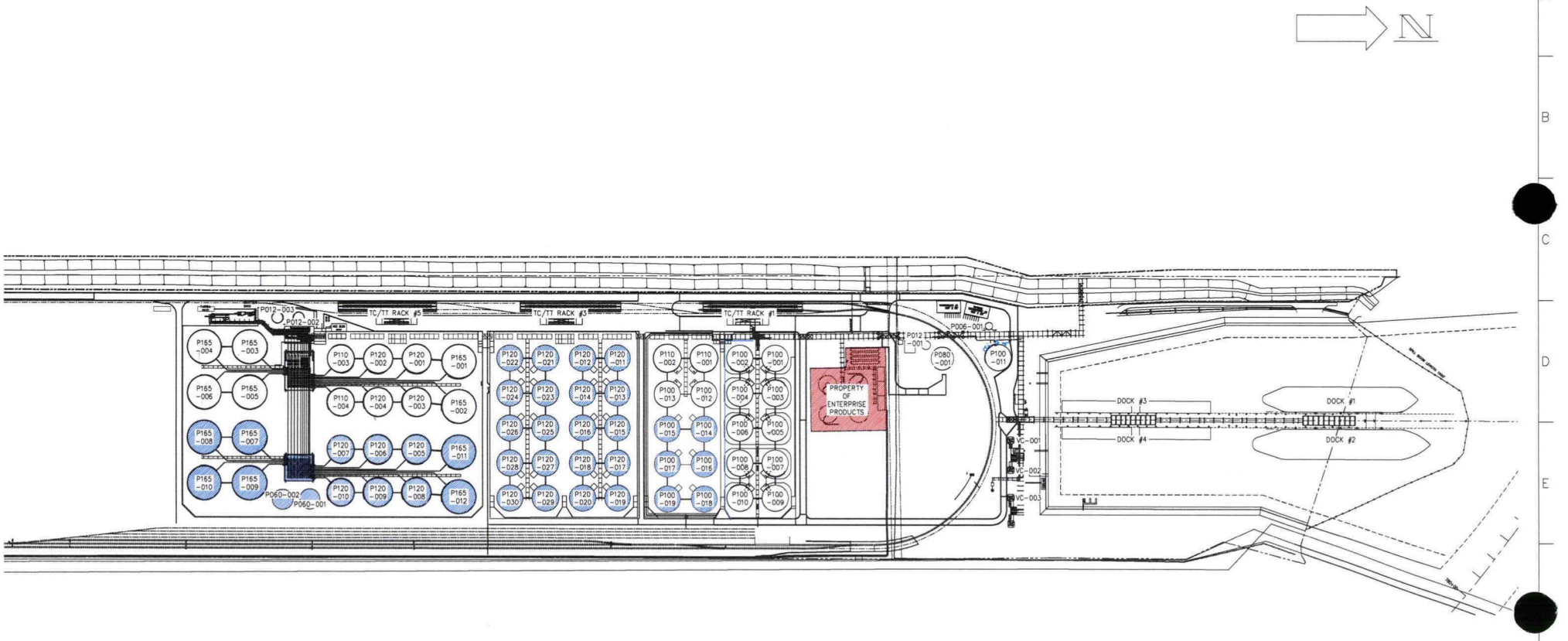
Include estimated cost of the equipment and services that would normally be capitalized according to standard and generally accepted corporate financing and accounting procedures. Tables, checklists, and guidance documents pertaining to air quality permits are available from the Texas Commission on Environmental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

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

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: Intercontinental Terminals Company, LLC.			
Company Representative Name *(please print)*: Michael J. Gaudet			
Title: Environmental Compliance Manager			
Company Representative Signature:			
Estimated Capital Cost		**Permit Application Fee**	**GHG*/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)
*A single PSD fee (calculated on the capital cost of the project per 30 TAC § 116.163) will be required for all of the associated permitting actions for a GHG PSD project. Other NSR permit fees related to the project that have already been remitted to the TCEQ can be subtracted when determining the appropriate fee to submit with the GHG PSD application; please identify these other fees in the GHG PSD permit application.			
Permit Application Fee (from table above) =		$ 900.00	Date: 21 Dec 18

Section 3
Location Information

The Pasadena Terminal is located in Pasadena, Harris County. A site location map is included as Figure 3-1 and a plot plan of the site is presented as Figure 3-2.



REV	DATE	BY	DESCRIPTION	CHK'D	APP'D	REV	DATE	BY	DESCRIPTION	CHK'D	APP'D

ENGINEERING & TERMINAL SERVICES
411 N. Sam Houston Parkway E.
Suite 130
Houston, Texas 77060
Tel: (281) 405-0023
web: www.etsllc.com
Texas Registered Engineering Firm F-12468

DRAWN BY:	DATE:
CHECKED BY:	DATE:
22x34 SCALE	11x17 SCALE
PROJECT NO.	

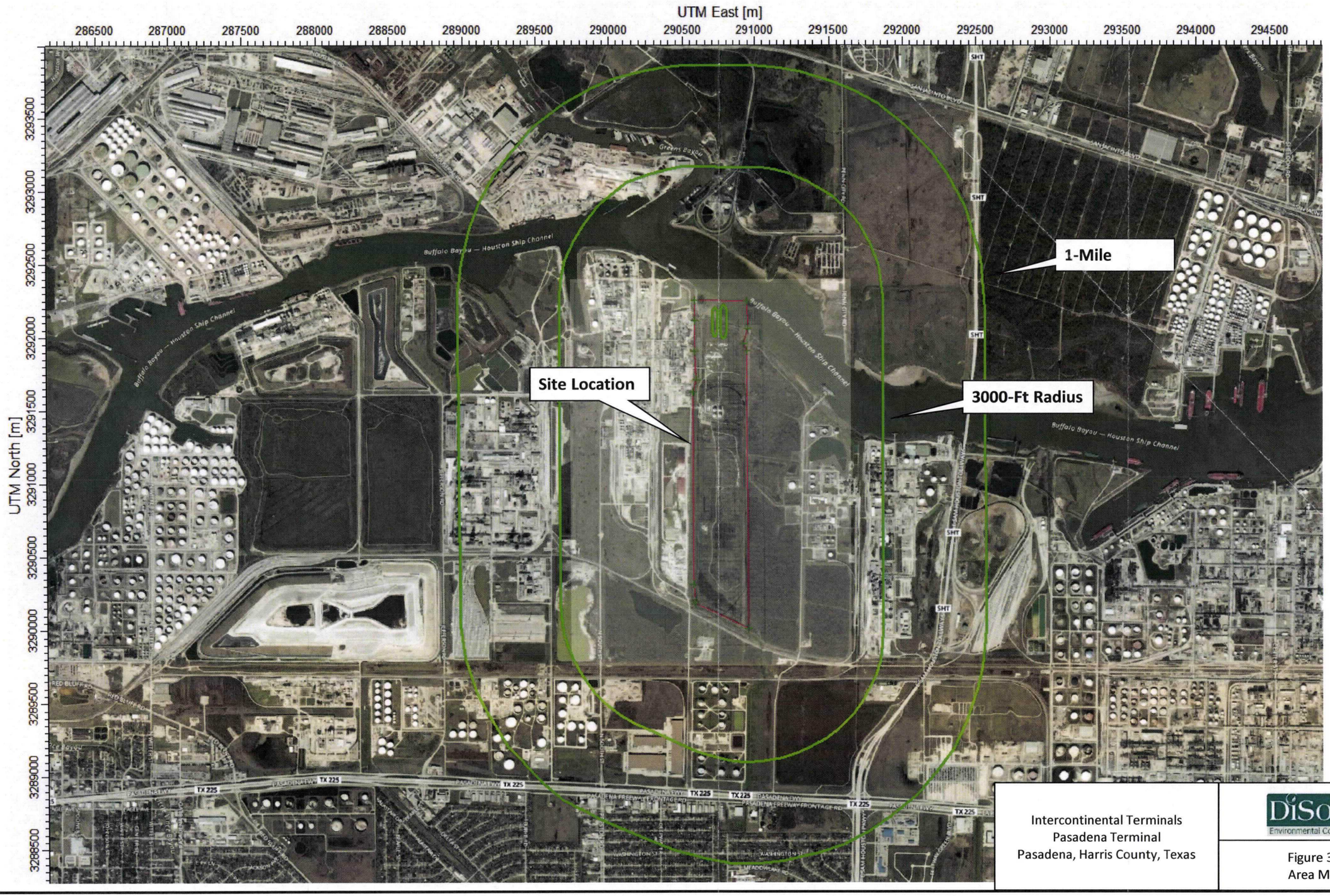
CLIENT
Intercontinental Terminals Pasadena, LLC
P.O. Box 698 Deer Park, Tx. 77536

PROJECT TITLE

DRAWING TITLE

DRAWING NO.

ISSUE NO.



Intercontinental Terminals
Pasadena Terminal
Pasadena, Harris County, Texas

DiSorbo
Environmental Consulting Firm

Figure 3-1
Area Map

Section 4
Process Description

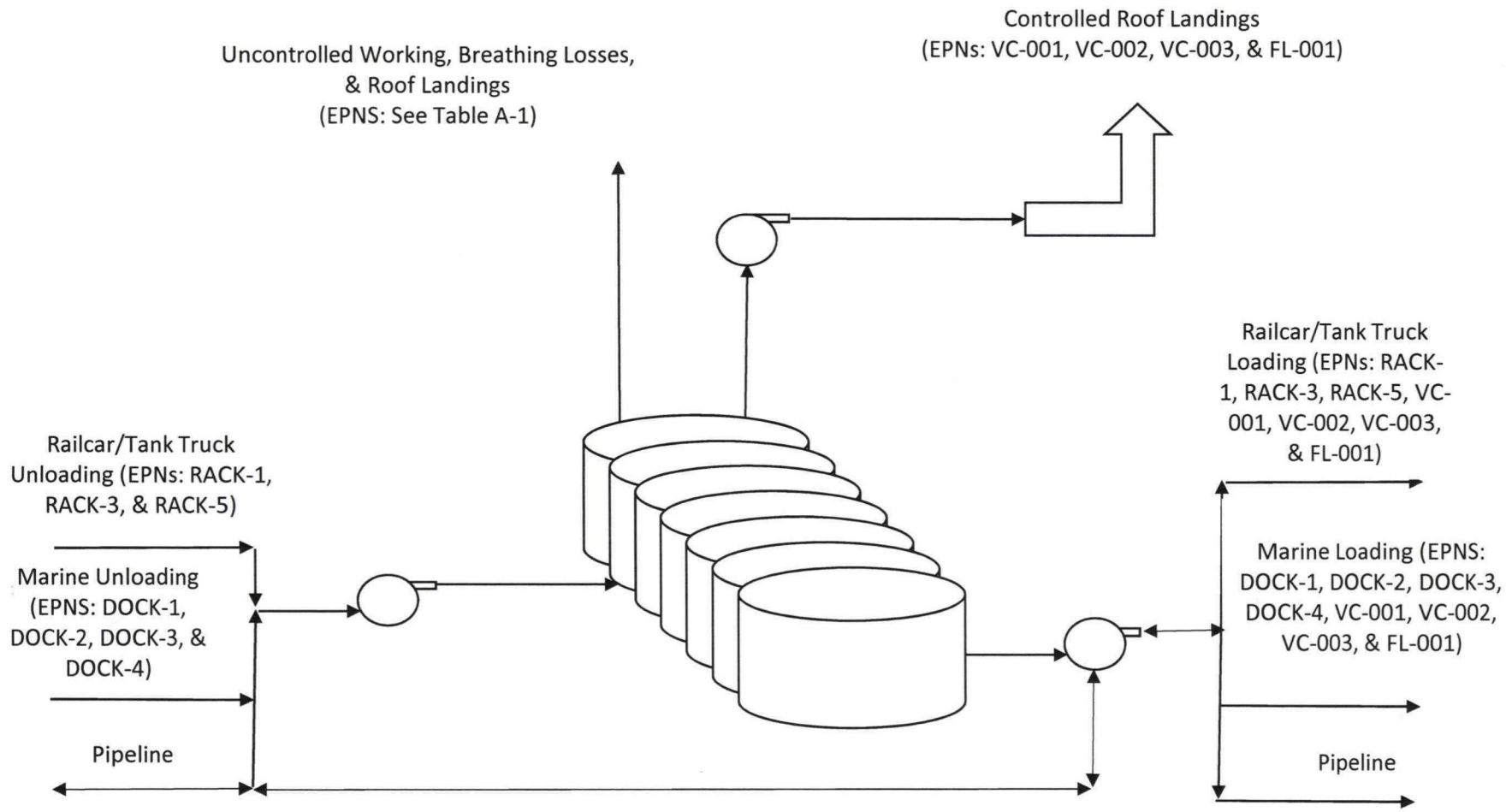
The Pasadena Terminal is a for-hire bulk liquid storage terminal. Chemicals, crude and petroleum products are stored in various storage tanks and transferred in and out of the terminal tankage by external customers via pipeline, marine vessel, railcar, and tank truck. A simplified process flow diagram for the facilities included in this application is included as Figure 4-1. The following describes each of the main process areas of the terminal.

4.1 Storage Tanks

The storage tanks will be utilized to receive products which are transferred in and out of the terminal tankage via pipeline, marine vessel, railcar, and tank truck depending on market conditions. The storage tanks will be equipped with vapor recovery and control equipment for floating roof landing emissions controls. Product is transferred to and from the terminal tanks via pumps located both offsite (i.e., pipeline pumps, etc.) and onsite (i.e., docks, racks, storage tank, pump pits, etc.).

4.2 Marine and Land Based Loading and Unloading

The four marine docks and three tank truck/rail car racks will be utilized to transfer approved products to and from the terminal storage tanks. A combination of barges and/or ships may be loaded at each marine dock while a combination of tank trucks and/or railcars may be loaded at each rack. Each marine dock and tank truck/railcar loading rack consists of multiple loading arms and vapor recovery and control equipment for control of products with vapor pressures > 0.1 psia. Product is transferred to and from the marine docks and tank truck/railcar racks via pumps located throughout the terminal (i.e., docks, racks, storage tank, pump pits, etc.).



Intercontinental Terminals Company, LLC Pasadena Terminal	DiSorbo Environmental Consulting Firm Figure 4-1 Process Flow Diagram

Section 5
Emission Calculations

The following describes the calculation methodologies utilized to determine the emission rates from routine operations and MSS activities associated with each facility type included in this amendment application. A summary of the proposed emissions are included in Table 1(a) at the end of this section. The emission calculations submitted in support of the issuance of Permit No. 95754, TCEQ Project Nos. 235981 and 243313, have been updated to reflect the proposed updates noted in Section 1 of this application. Updates to the previously submitted emission calculations are noted by red text and are presented in Appendices A, B, and C of this application.

The Pasadena Terminal manages a wide range of products and organic liquids including gasoline, gasoline blendstocks, kerosene/jet fuel, distillate and residual fuel oils/distillate blendstocks, crude oil/condensate, and chemicals. Detailed lists of the proposed products and organic liquids to be authorized by this amendment are included in Permit No. 95754, Attachment 2. The Reid Vapor Pressure (RVP) of the products and organic liquids managed at the terminal vary from month to month; however, a maximum TVP of 11 is the basis for the proposed short-term emission limits.

Hydrogen Sulfide (H_2S) emissions were estimated using EPCON International's THERMATM Flash/Mixture Calculation software, which is based on the API's Technical Data Book (8th Edition). The factors derived from the program are provided in Table A-12 and used to estimate the ratios of H_2S to VOC from each of the facility source types included in this application. Green House Gas (GHG) emissions were estimated based on factors from 40 CFR 98, Table C-1 and C-2 and Table A-1 Global Warming Potentials where appropriate for PSD applicability determination purposes only.

ITC proposes to establish emission caps for the proposed facilities rather than individual throughput limits due to the varying nature of products and customer markets at this terminal. Specifically, rather than limiting product throughputs, ITC proposes to manage the facilities included in this application such that the permitted emission limits are not exceeded. Managing to emissions caps allows ITC the operational flexibility to respond to market changes and customer demands.

5.1 Routine Emissions

The following describes the routine emission calculations associated with each facility type included in this application.

5.1.1 Storage Tanks

For storage tanks, emission calculations are estimated using the emission calculations methods in *Compilation of Air Pollutant Emission Factors: Volume I Stationary Point and Area Sources* (AP-42, Fifth Edition, US EPA, November 2006 (hereafter referred to in this application as AP-42) Section 7.1. Short-term and annual emission rates are calculated using AP-42 Section 7 equations using maximum and average temperatures and vapor pressures.

In addition to routine storage tank working and breathing emissions, routine storage tank roof-landing events occur for periods of inventory control and product changes (EPNs: VCU-001, VCU-002, VC-003, & FL-001). Floating roof landing emissions are estimated using the methods in Subsection 7.1.3.2.2 Roof Landings of Section 7.1 Organic Liquid Storage Tanks of AP-42. For a given roof-landing event, total landing loss emissions are therefore the sum of the filling losses and the daily standing idle losses over the entire period that the roof remained landed. Landing losses are inherently episodic in nature and must be determined each time a tank's floating roof is landed.

Landing losses occur from floating roof tanks whenever the tank is drained to a level where its roof lands on its legs or other supports (including roof suspension cables). When a floating roof lands on its supports or legs while the tank is being drained, the floating roof remains at the same height while the product level continues to lower. This creates a vapor space underneath the roof. Liquid remaining in the bottom of the tank provides a continuous source of vapors to replace those expelled by breathing (in the case of internal floating roof tanks) or wind action (in the case of external floating roof tanks). These emissions, referred to as standing idle losses (LSL), occur daily as long as the floating roof remains landed. Additional emissions occur when incoming stock liquid fills a tank with a landed roof. The incoming volume of liquid not only displaces an equivalent volume of vapors from below the floating roof, but also generates its own set of product vapors that are displaced during the filling process. These two types of emissions are collectively referred to as filling losses (LFL). The calculation methodology used of the standing loss and refilling emissions is discussed in further detail below.

Similar to breathing losses under normal operating conditions, standing idle losses occur during that period a roof is landed with product still in the tank. Emission calculation equations for these losses are from Subsection 7.1.2.2.1 Standing Idle Losses in Section 7.1 of AP-42. The quantity of emissions is dependent upon the number of days idle, tank type (IFR/EFR), type of product stored, and the time of the year. Maximum hourly VOC emissions for tanks with idle standing losses were determined by calculating the losses for one day and then dividing by twelve hours/day. Twelve hours were used since the tanks breathe out for twelve hours/day and breathe in the other twelve hours.

Similar to loading losses, refilling losses occur while a tank is being filled with product during that period of time a roof is landed. Emission calculation equations for these losses are from Subsection 7.1.3.2.2.2 of AP-42. The quantity of emissions is dependent upon the tank type (IFR/EFR), type of product stored, time of year, and fill rate. The maximum refilling loss is based on: (1) the tank re-fill rate; and (2) the month resulting in the highest emission as a function of vapor pressure (July). Maximum hourly VOC emissions were determined by dividing the filling emissions (LFL) by the maximum pumping rate. The calculation assumes that the product vapors within the vapor space under the tank roof are emitted from the tank at the same rate as the liquid coming into the tank.

Tank roof landing emissions associated with materials with a vapor pressure greater than 0.5 psia will be collected via vapor recovery equipment and routed to vapor combustion devices (EPNs: VC-001, VC-002, VC-003, & FL-001). Tank roof landing emissions associated with materials with a true vapor pressure greater than 0.1 psia that are not completely drained will be collected via vapor recovery equipment and routed to vapor combustion devices (EPNs: VC-001, VC-002, VC-003, & FL-001). Emissions from the vapor combustion devices have been estimated using the methods outlined in the TCEQ's Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers, October 2002. VOC, NO_X, SO_2, $PM/PM_{10}/PM_{2.5}$ and CO emissions were estimated from the vapor combustion due to tank roof landing in the VCU system. VOC emissions are based on vendor guaranteed destruction efficiency of at least 99.9%. NO_X and CO emissions were based on vendor guaranteed emission factors and an estimated roof landing vapor heat content of 20,000 Btu/lb. SO_2 and $PM/PM_{10}/PM_{2.5}$ emissions were based on emission factors from AP-42, Section 3.2-7. In addition to fixed thermal vapor control, ITC also proposes to utilize alternate portable control options (i.e., VCU, carbon, scrubber, etc.) and manage the controlled emissions to the proposed emissions cap.

Detailed storage tank emission calculations are included in Appendices A, B, and C.

5.1.2 Marine and Land Based Loading

The loading losses (EPNs: DOCK-1, DOCK-2, DOCK-3, DOCK-4, RACK-1, RACK-3, RACK-5, VCU-001, VCU-002, VC-003, & FL-001) are comprised of the total vapors displaced and generated by loading liquids into the marine vessels and/or tank truck and railcars. The uncontrolled loading losses have been calculated using Equation 1 from AP-42, Section 5.2:

$$L_L = 12.46 \frac{SPM}{T}$$

where:

L_L = loading loss, lb/1000 gallons of product loaded.

S = AP 42 saturation factor.

P = True Vapor Pressure at maximum temperature, psia.

M = Molecular weight of gasoline vapor, lb–lbmol

T = Temperature of product loaded, degrees Rankine.

The loading loss vapors from liquids with true vapor pressures > 0.10 psia at 95°F will be captured and routed to a control device for VOC removal/destruction. Uncollected fugitive loading emissions for liquids with a true vapor pressure > 0.10 psia are calculated based on a collection efficiency of 99.865% for inerted ship and ocean going barge loading. A collection efficiency of 100% is utilized for loading activities which allow for vacuum loading. Loading losses associated with tank truck and railcar loading is expected to achieve a collection efficiency of at least 99.2%.

↳ this means higher for RC (100%)

In addition to the routine loading emissions, hoses utilized to transfer products to and from tank trucks, railcars, ships, and barges experience two additional components. The additional loading related emissions occur when the transfer hoses are purged of product and disconnected from the receiving vessel. Emissions associated with hose disconnects are calculated based on the Ideal Gas Law and whether control is applied and/or the loading loss equation noted above should the hose require draining. Hose disconnect emissions which are routed to control are calculated as noted below.

The vapor control device will have a destruction removal efficiency (DRE) of 99.9%. Emissions from the vapor combustion devices have been estimated using the methods outlined in the TCEQ's Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers, October 2002. VOC, NO_X,

SO_2, $PM/PM_{10}/PM_{2.5}$ and CO emissions were estimated from the vapor combustion of collected loading vapors in the VCU system. VOC emissions are based on a vendor guaranteed destruction efficiency of at least 99.9%. NO_X and CO emissions were based on vendor guaranteed emission factors and an estimated roof landing vapor heat content of 20,000 Btu/lb. SO_2 and $PM/PM_{10}/PM_{2.5}$ emissions were based on emission factors from AP-42, Section 3.2-7. Loading losses associated with liquids with true vapor pressures < 0.10 psia are vented to the atmosphere uncontrolled.

Detailed marine and land based loading emission calculations are included in Appendices A, B, and C.

5.1.3 Piping Component Fugitives

The fugitive emissions from piping components and ancillary equipment (EPN: FUG) were estimated using methods outlined in the TCEQ's guidance web page for Equipment Leak Fugitives[1]. Each fugitive component was classified first by equipment type (valve, pump, relief valve, etc.) and then by material type (gas/vapor, light liquid, heavy liquid). Total emission rates were obtained by multiplying the number of fugitive components of a particular type by the appropriate emission factor and control credit per TCEQ guidance.

Detailed piping component fugitive emission calculations are included in Appendix A, as Table A-10.

5.1.4 Emergency Firewater Pumps and Generators

Emissions of VOC, NO_X, and CO from the natural gas-powered emergency generators (EPNs: EGEN-1, EGEN-2, EGEN-3, EGEN-4, EGEN-5, EGEN-7, EGEN-8, & EGEN-9) and the diesel-powered emergency generators and firewater pumps (EPNs: EGEN-6, EGEN-10, EFWP-1, EFWP-2, & EFWP-3) are based on manufacturer's data. Emissions of PM and SO_2 are based on AP-42, Section 3.2, Table 3.2-2.

Detailed emergency generator emission calculations are included in Appendices A, B, and C.

[1] https://www.tceq.texas.gov/permitting/air/guidance/newsourcereview/fugitives/nsr_fac_eqfug.html

5.1.5 Hose Venting

Hose venting associated with routine product transfers (EPNs: HOSEVENT, HOSEDRAIN, VC-001, VC-002, VC-003, and FL-001) occur upon the completion of product transfer activities when loading/unloading hoses are disconnected from the transport vessel. There are three components to the emissions associated with hose venting activities; depressurizing, draining residual material, and vapor control header purging to control.

The first component of the emissions estimate is from the depressurizing of loading hoses and piping. Emissions from the depressurizing of loading hoses and piping were estimated using the Ideal Gas Law. After the transfer is complete, the loading line/hose/piping is isolated at the connections to the marine vessel and shore piping. Pressurized nitrogen or air is connected to one end of the line/hose to transfer (blow) from the loading line into the facility piping system or marine vessel per the site operating procedure. A marine vessel vented to control (EPNs VC-001, VC-002, VC-003, FL-001) is the preferred receiving vessel for the liquid.

The second component of the emission estimate is from pumping residual material remaining in the loading hoses and/or piping to a portable container or operational area sump and/or drain. These emissions were estimated as described in TCEQ's *Air Permit Technical Guidance for Chemical Sources, Loading Operations, October 2000* using the following equations:

$$L = 12.46 * S * P * M / T$$

Where:

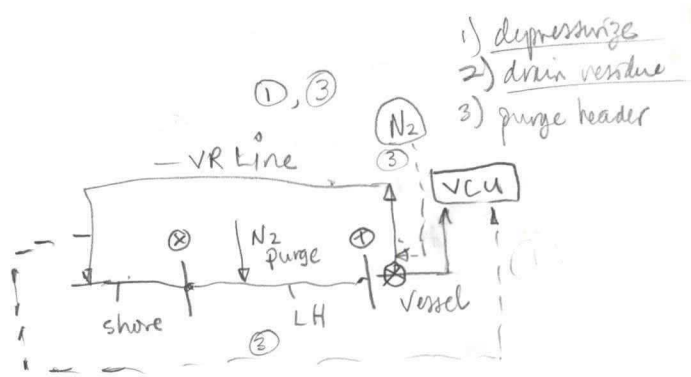
L = Loading Loss (lb/10^3 gal of liquid loaded)

S = Saturation factor

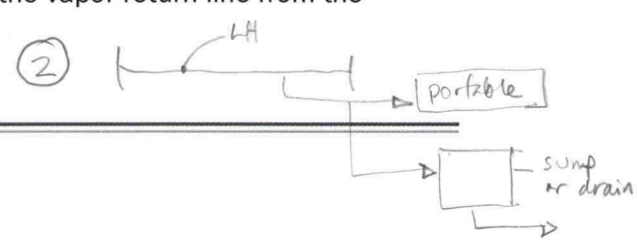
P = True vapor pressure of liquid loaded (psia)

M = Molecular weight of vapors (lb/lb-mol)

T = Temperature of bulk liquid loaded (R)



The third component of the emission estimate is from purging the marine vessel vapor return line to vapor control (EPNs: VC-001, VC-002, VC-003, FL-001). The marine vessel vapor return line is isolated at the marine vessel. If the VOC vapor pressure of the liquid loaded was greater than 0.10 psia at 95oF, at least 5 volumes of nitrogen are vented through the vapor return line from the



connection at the marine vessel to the on shore vapor control system prior to disconnecting the vapor return line.

Emissions from the vapor combustion device have been estimated using the methods outlined in the TCEQ's *Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers, October 2002.* VOC, NO_X, SO_2, $PM/PM_{10}/PM_{2.5}$ and CO emissions were estimated from the vapor combustion in the VCU system associated with vapor collection header purging. VOC emissions are based on vendor guaranteed destruction efficiency of at least 99.9%. NO_X and CO emissions were based on vendor guaranteed emission factors and an estimated roof landing vapor heat content of 20,000 Btu/lb. SO_2 and $PM/PM_{10}/PM_{2.5}$ emissions were based on emission factors from AP-42, Section 3.2-7.

Detailed hose venting emission calculations are included in Appendices A, B, and C. Note there are no updates to the wastewater emission calculations being proposed as part of this application. The emission calculations are included for completeness purposes only.

5.1.6 Wastewater Treatment System

Residual material may be drained and/or pumped from tanks, process equipment, piping, portable tanks, portable containers, etc. into operational area sumps and/or drains as part of routine activities associated with facility operations. The primary source of wastewater collected within the system is operational area washdown water and stormwater that is collected in operational/secondary containment areas. The sumps and/or drains are drained to four centralized lift stations (EPSNs: T-101, T-201, T-301, & T-401) which flow to an IFR holding tank (EPN: PW12-001) for initial storage, or are pumped directly to PW12-001. IFR Tank PW12-001 vents to the atmosphere uncontrolled. Wastewater collected in PW12-001 may be routed either to oil/water separators (FINs: OWS-01A & OWS-1B), IFR holding tank (EPN: PW80-001) which vents to the atmosphere uncontrolled, or directly through the carbon adsorption treatment system. Oil from either the holding tank or OWS may be drained to an oil tank (FIN: PW-H20-01) while sludge may be drained to a sludge tank (FIN: PW-S20-01). Oil and sludge removal will be episodic in nature and only conducted on an as needed basis. Water is discharged from either the holding tank to the Houston Ship Channel through an activated carbon adsorption system.

Wastewater collection and treatment system emissions associated with the oil/water separators, oil tank, and sludge tank are collected and routed to vapor control equipment (EPNs: VCU-001, VCU-002, VC-003, & FL-001). The VOC flow rates to the vapor control equipment were calculated based on the Ideal Gas Law. The vapor control equipment will have a destruction removal efficiency (DRE)

of 99.9%. Emissions from the vapor combustion devices have been estimated using the methods outlined in the TCEQ's *Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers, October 2002.* VOC, NO_X, SO_2, $PM/PM_{10}/PM_{2.5}$ and CO emissions were estimated from the vapor combustion of collected loading vapors in the VCU system. VOC emissions are based on a vendor guaranteed destruction efficiency of at least 99.9%. NO_X and CO emissions were based on an emission factors based on an estimated roof landing vapor heat content of 20,000 Btu/lb and emission factors for high Btu air assisted flares. SO_2 and $PM/PM_{10}/PM_{2.5}$ emissions were based on emission factors from AP-42, Section 3.2-7.

Detailed wastewater system emission calculations are included in Appendix A. Note there are no updates to the wastewater emission calculations being proposed as part of this application. The emission calculations are included for completeness purposes only.

5.2 Maintenance, Startup, and Shutdown Emissions (MSS)

MSS activities and associated emissions will occur to support the facilities included in this application. The following describes the calculations used to determine the MSS emissions associated with each facility type included in this application.

5.2.1 Storage Tanks

Roof-landing events occur for predictable MSS activities in addition to the routine roof landing events described in Section 5.1.1 for periods of inventory control and routine product changes. Floating roof landing MSS emissions are estimated using the methods in Subsection 7.1.3.2.2 Roof Landings of Section 7.1 Organic Liquid Storage Tanks of AP-42. For a given roof-landing event, total landing loss emissions are therefore the sum of the filling losses and the daily standing idle losses over the entire period that the roof remained landed. Landing losses are inherently episodic in nature and must be determined each time a tank's floating roof is landed.

Landing losses occur from floating roof tanks whenever the tank is drained to a level where its roof lands on its legs or other supports (including roof suspension cables). When a floating roof lands on its supports or legs while the tank is being drained, the floating roof remains at the same height while the product level continues to lower. This creates a vapor space underneath the roof. Liquid remaining in the bottom of the tank provides a continuous source of vapors to replace those expelled by breathing (in the case of internal floating roof tanks) or wind action (in the case of external floating roof tanks). These emissions, referred to as standing idle losses (LSL), occur daily as long as

the floating roof remains landed. Additional emissions occur when incoming stock liquid fills a tank with a landed roof. The incoming volume of liquid not only displaces an equivalent volume of vapors from below the floating roof, but also generates its own set of product vapors that are displaced during the filling process. These two types of emissions are collectively referred to as filling losses (LFL). The calculation methodology used of the standing loss and refilling emissions is discussed in further detail below.

Similar to breathing losses under normal operating conditions, standing idle losses occur during that period a roof is landed with product still in the tank. Emission calculation equations for these losses are from Subsection 7.1.2.2.1 Standing Idle Losses in Section 7.1 of AP-42. The quantity of emissions is dependent upon the number of days idle, tank type (IFR/EFR), type of product stored, and the time of the year. Maximum hourly VOC emissions for tanks with idle standing losses were determined by calculating the losses for one day and then dividing by twelve hours/day. Twelve hours were used since the tanks breathe out for twelve hours/day and breathe in the other twelve hours.

Similar to loading losses, refilling losses occur while a tank is being filled with product during that period of time a roof is landed. Emission calculation equations for these losses are from Subsection 7.1.3.2.2.2 of AP-42. The quantity of emissions is dependent upon the tank type (IFR/EFR), type of product stored, time of year, and fill rate. The maximum refilling loss is based on: (1) the tank re-fill rate; and (2) the month resulting in the highest emission as a function of vapor pressure (July). Maximum hourly VOC emissions were determined by dividing the filling emissions (LFL) by the maximum pumping rate. The calculation assumes that the product vapors within the vapor space under the tank roof are emitted from the tank at the same rate as the liquid coming into the tank.

Tank roof landing emissions associated with materials with a vapor pressure greater than 0.5 psia will be collected via vapor recovery equipment and routed to vapor combustion devices (EPNs: MSS-CON). Tank roof landing emissions associated with materials with a true vapor pressure greater than 0.1 psia that are not completely drained will be collected via vapor recovery equipment and routed to vapor combustion devices (EPNs: MSS-CONT). Emissions from the vapor combustion device have been estimated using the methods outlined in the TCEQ's Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers, October 2002. VOC, NO_X, SO_2, $PM/PM_{10}/PM_{2.5}$ and CO emissions were estimated from the vapor combustion due to tank roof landing in the VCU system. VOC emissions are based on vendor guaranteed destruction efficiency of at least 99.9%. NO_X and CO emissions were based on vendor guaranteed emission factors and an estimated roof landing

vapor heat content of 20,000 Btu/lb. SO_2 and $PM/PM_{10}/PM_{2.5}$ emissions were based on emission factors from AP-42, Section 3.2-7. In addition to fixed thermal vapor control, ITC also proposes to utilize alternate portable control options (i.e., VCU, carbon, scrubber, etc.) and manage the controlled emissions to the proposed emissions cap.

Tank roof landings associated with MSS activities experience three additional components. The additional emissions that occur during a tank degassing are; degassing to a control device, residual product removal, and venting the dilute residual VOC to the atmosphere.

After the tank roof is landed (i.e., standing idle), the vapor under the landed roof from products with a true vapor pressure greater than 0.5 psia or 0.1 psia if a liquids heel remains, are collected and controlled with a system that is at least 99.9% efficient in reducing VOC emissions. The first component of the MSS VOC estimate (EPN: MSS-CONT) is included in the emission calculations described above. Emission controls are applied until the vapor space concentration is < 5,000 ppm.

The second component of the MSS emission estimate (EPN: MSS-ATM) is from pumping residual material remaining in the storage tank to an air mover, vacuum truck, and/or frac tank. The air mover, vacuum truck, and frac tank emission calculation details are discussed in Sections 5.2.4 and 5.2.5.

The third component of the MSS emission estimate (EPN: MSS-ATM) is from venting the tank vapor space of the landed roof to atmosphere after it is degassed to a concentration of 5,000 ppmv (as VOC). The third component of the emissions was estimated by assuming that one landed tank volume at an initial concentration of 5,000 ppmv is vented to the atmosphere.

Total emissions from the tank MSS activities were calculated as the sum of the components described above. Calculations were performed for each of the tanks using landed roof volumes calculated from the tank diameters and landed roof height. Short-term MSS emission rates are estimated based upon the refill rate of the tanks. Annual MSS emission rates are based on the assumption that each tank will undergo an MSS event each year.

Detailed storage tank MSS emission calculations are included in Appendices A, B, and C.

5.2.2 Equipment Venting

On occasion, process equipment and/or piping is degassed in preparation for an MSS and/or inspection activity. There are four components to the emissions associated with process equipment

and/or piping MSS activities; depressurizing and degassing, draining residual material, venting to atmosphere, and refilling activities.

The first component of the emissions estimate is from the depressurizing and degassing of equipment and/or piping. Emissions from the depressurizing and degassing of equipment and piping were estimated the Ideal Gas Law. Equipment and/or piping with an isolated volume of < 85 ft^3 are vented to atmosphere uncontrolled while equipment and/or piping with an isolated volume > 85 ft^3 are routed to portable control devices provided by contractor. The controlled depressurizing and degassing emissions from equipment and/or piping are described in more detail in Section 5.2.6.

The second component of the emission estimate is from pumping residual material remaining in the equipment and/or piping to a portable tank/container. Residual material remaining in the equipment and/or cleaning agents are drained to portable tanks/containers prior to vessel venting to the atmosphere. These emissions were estimated as described in TCEQ's Air Permit Technical Guidance for Chemical Sources, Loading Operations, October 2000 using the following equations:

$$L = 12.46 * S * P * M / T$$

Where:

L = Loading Loss (lb/10^3 gal of liquid loaded)

S = Saturation factor

P = True vapor pressure of liquid loaded (psia)

M = Molecular weight of vapors (lb/lb-mol)

T = Temperature of bulk liquid loaded (R)

Note that materials are often transferred from the portable tanks/containers to an air mover, vacuum truck, and/or frac tank upon completion of the draining activity. Emissions associated with the transfer of the materials from the portable tanks/containers to an air mover, vacuum truck, or frac tank are included in Sections 5.2.3 and 5.2.4.

The third component of the emission estimate is from venting the equipment and/or piping to atmosphere after it is degassed (if applicable) to a concentration of 5,000 ppmv (as VOC). The emissions were estimated by assuming that one equipment and/or piping volume at an initial concentration of 5,000 ppmv is vented to the atmosphere.

The fourth component of the emissions estimate is from pumping material into equipment and/or piping following the completion of an MSS and/or inspection activity. The emissions from the equipment loading activities associated with liquids having a true vapor pressure > 0.5 are vented to the control devices described in Section 5.2.6. These emissions were estimated as described in TCEQ's Air Permit Technical Guidance for Chemical Sources, Loading Operations, October 2000 using the following equations:

$$L = 12.46 * S * P * M / T$$

Where:

L = Loading Loss (lb/10^3 gal of liquid loaded)

S = Saturation factor

P = True vapor pressure of liquid loaded (psia)

M = Molecular weight of vapors (lb/lb-mol)

T = Temperature of bulk liquid loaded (R)

Detailed equipment venting MSS emission calculation details are included in Appendices A, B, and C.

5.2.3 Air Mover, Vacuum Truck, and Frac Tank Activities

VOC vapor are displaced as a result of air mover, vacuum truck, and frac tank activity to collect and remove materials from tanks, process equipment, piping, frac tanks, and portable tanks/containers. Air mover, vacuum truck, and frac tank emission are calculated based on the loading method and control device in use (if applicable). The first loading method involves a vacuum being pulled during loading operations. These emissions are estimated using the loading loss equation from AP-42, Section 5.2 using the parameters presented in Appendix A. Loading materials with a true vapor pressure > 0.5 psia are routed to a control device which may include, but are not limited to, thermal control, carbon control, etc. Emissions are controlled via thermal control device are estimated as described above and in Section 5.2.6. It should be noted that emissions controlled via carbon control are estimated based on vapor flow rates and a carbon breakthrough concentration of 100 ppmv.

The second loading method involves a vacuum being pulled on an empty truck and then liquid filled with the vacuum pump turned off. The vacuum draw emissions are estimated using the Ideal Gas

Law, assuming the vacuumed material displaces an equivalent of one vacuum truck vapor space to the atmosphere.

Detailed air mover, vacuum truck, and frac tank activity MSS emission calculations are included in Appendices A, B, and C.

5.2.4 MSS Vapor Control

The controlled MSS emissions described in Sections 5.2.1, 5.2.2, 5.2.3, and 5.2.4 will be collected via vapor recovery equipment and routed to fixed and/or portable control devices. Emissions from the thermal control devices were estimated using the methods outlined in the TCEQ's *Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers, October 2002.* VOC emissions are based on a vendor guaranteed destruction efficiency of at least 98% for flares and 99.8% for VCUs. NO_x and CO emissions are based on vendor guaranteed emission factors and an estimated vapor heat content of 20,000 Btu/lb. The $PM/PM_{10}/PM_{2.5}$ and SO_2 emissions were estimated based on AP-42, Section 3.2-7. In addition to fixed and/or portable thermal vapor control, ITC also proposes to utilize alternate portable control options (i.e., VCU, carbon, scrubber, etc.) and manage the controlled emissions to the proposed MSS emissions cap.

Detailed MSS vapor control emissions are included in Appendices A, B, and C.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Table 1(a) Emission Point Summary

Permit Number:	95754	RN Number:	106119175	Date:	Dec. 2018
Company Name:	Intercontinental Terminals Company LLC				

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. Height Above	6. Stack Exit Data			7. Fugitives		
										Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
P100-001	P100-001	Tank P100-001	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-002	P100-002	Tank P100-002	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-003	P100-003	Tank P100-003	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-004	P100-004	Tank P100-004	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-005	P100-005	Tank P100-005	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-006	P100-006	Tank P100-006	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-007	P100-007	Tank P100-007	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-008	P100-008	Tank P100-008	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-009	P100-009	Tank P100-009	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-010	P100-010	Tank P100-010	VOC	3.85	2.00	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										

oct 2015

major modification @ 25 tpy
triggered N/A
expedited review
- rule change → thresholds changed
- 28LAER but backed off
- modeling turned in still in 25 tpy threshold
  1/2017 - updated "no longer →
  no more 1/4-ly monitoring @ that pt. 5/2/2017
  - LAER requirement
  - bumped up to 40 tpy NSR threshold
  - 5/
  - represented @ T V(a), emission calcs
  - 5/4/2017 → e-mail

observes:
SC 50 C1 → pc in svc. group C takes
no other equipment @ C has tag.
(? accurate)
→ if there are, they aren't included in the CINAmt.
Δ is from retrofitted 1/4-ly monitoring
— component counts s/b same, credits different
- no other specificity besides "group" @ current app.

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. Height Above	6. Stack Exit Data			7. Fugitives		
										Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
P12-001	P12-001	Tank P12-001	VOC	11.25	1.44	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.06	0.01										
P12-002	P12-002	Tank P12-002	VOC	9.23	1.47	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.01										
P12-003	P12-003	Tank P12-003	VOC	9.23	1.47	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.01										
P80-001	P80-001	Tank P80-001	VOC	4.45	1.77	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.02	0.01										
P100-12	P100-12	Tank P100-12	VOC	7.38	2.17	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.04	0.01										
P100-13	P100-13	Tank P100-13	VOC	7.38	2.17	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.04	0.01										
P165-003	P165-003	Tank P165-003	VOC	26.74	3.04	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.02										
P165-004	P165-004	Tank P165-004	VOC	26.74	3.04	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.02										
P165-005	P165-005	Tank P165-005	VOC	26.74	3.04	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.02										
P165-006	P165-006	Tank P165-006	VOC	26.74	3.04	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.02										
P110-001	P110-001	Tank P110-001	VOC	7.38	2.31	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.04	0.01										
P110-002	P110-002	Tank P110-002	VOC	7.38	2.31	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.04	0.01										

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. Height Above	6. Stack Exit Data			7. Fugitives		
										Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
P110-003	P110-003	Tank P110-003	VOC	26.74	2.31	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.01										
P110-004	P110-004	Tank P110-004	VOC	26.74	2.31	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.01										
P120-001	P120-001	Tank P120-001	VOC	26.74	2.46	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.01										
P120-002	P120-002	Tank P120-002	VOC	26.74	2.46	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.01										
P120-003	P120-003	Tank P120-003	VOC	26.74	2.46	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.01										
P120-004	P120-004	Tank P120-004	VOC	26.74	2.46	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.01										
P165-001	P165-001	Tank P165-001	VOC	26.74	3.04	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.02										
P165-002	P165-002	Tank P165-002	VOC	26.74	3.04	15	-	-	-	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	0.02										
P060-001	P060-001	Tank P060-001	VOC	12.22	2.02	15	290860.72	3290813.21	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.07	0.01										
P060-002	P060-002	Tank P060-002	VOC	12.22	2.02	15	290860.70	3290779.06	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.07	0.01										
P100-014	P100-014	Tank P100-014	VOC	9.43	2.46	15	290767.34	3291302.67	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.01										

C

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. Height Above	6. Stack Exit Data			7. Fugitives		
										Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
P100-015	P100-015	Tank P100-015	VOC	9.43	2.46	15	290766.42	3291255.93	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.01										
P100-016	P100-016	Tank P100-016	VOC	9.43	2.46	15	290811.64	3291301.80	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.01										
P100-017	P100-017	Tank P100-017	VOC	9.43	2.46	15	290810.72	3291255.06	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.01										
P100-018	P100-018	Tank P100-018	VOC	9.43	2.46	15	290855.94	3291300.92	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.01										
P100-019	P100-019	Tank P100-019	VOC	9.43	2.46	15	290855.02	3291254.19	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.01										
P120-005	P120-005	Tank P120-005	VOC	20.59	2.79	15	290783.34	3290937.99	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.11	0.02										
P120-006	P120-006	Tank P120-006	VOC	20.59	2.79	15	290782.38	3290889.22	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.11	0.02										
P120-007	P120-007	Tank P120-007	VOC	20.59	2.79	15	290780.67	3290841.49	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.11	0.02										
P120-008	P120-008	Tank P120-008	VOC	20.59	2.79	15	290838.57	3290936.90	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.11	0.02										
P120-009	P120-009	Tank P120-009	VOC	20.59	2.79	15	290837.61	3290888.13	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.11	0.02										
P120-010	P120-010	Tank P120-010	VOC	20.59	2.79	15	290835.90	3290840.41	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.11	0.02										

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. Height Above	6. Stack Exit Data			7. Fugitives		
										Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
P120-011	P120-011	Tank P120-011	VOC	9.43	2.79	15	290675.34	3291193.45	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-012	P120-012	Tank P120-012	VOC	9.43	2.79	15	290674.47	3291149.15	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-013	P120-013	Tank P120-013	VOC	9.43	2.79	15	290719.64	3291192.58	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-014	P120-014	Tank P120-014	VOC	9.43	2.79	15	290718.77	3291148.28	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-015	P120-015	Tank P120-015	VOC	9.43	2.79	15	290763.94	3291191.71	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-016	P120-016	Tank P120-016	VOC	9.43	2.79	15	290763.07	3291147.41	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-017	P120-017	Tank P120-017	VOC	9.43	2.79	15	290808.24	3291190.84	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-018	P120-018	Tank P120-018	VOC	9.43	2.79	15	290807.37	3291146.54	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-019	P120-019	Tank P120-019	VOC	9.43	2.79	15	290852.54	3291189.96	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-020	P120-020	Tank P120-020	VOC	9.43	2.79	15	290851.67	3291145.66	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-021	P120-021	Tank P120-021	VOC	9.43	2.79	15	290673.57	3291103.33	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-022	P120-022	Tank P120-022	VOC	9.43	2.79	15	290672.70	3291059.03	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										

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. Height	6. Stack Exit Data			7. Fugitives		
									Above	Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
P120-023	P120-023	Tank P120-023	VOC	9.43	2.79	15	290717.87	3291102.46	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-024	P120-024	Tank P120-024	VOC	9.43	2.79	15	290717.00	3291058.16	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-025	P120-025	Tank P120-025	VOC	9.43	2.79	15	290762.17	3291101.58	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-026	P120-026	Tank P120-026	VOC	9.43	2.79	15	290761.29	3291057.28	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-027	P120-027	Tank P120-027	VOC	9.43	2.79	15	290806.47	3291100.71	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-028	P120-028	Tank P120-028	VOC	9.43	2.79	15	290805.60	3291056.41	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-029	P120-029	Tank P120-029	VOC	9.43	2.79	15	290850.77	3291099.84	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P120-030	P120-030	Tank P120-030	VOC	9.43	2.79	15	290849.90	3291055.54	75	0.003	0.003	Amb.	-	-	-
			H_2S	0.05	0.02										
P165-007	P165-007	Tank P165-007	VOC	16.04	3.01	15	290782.15	3290738.63	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.09	0.02										
P165-008	P165-008	Tank P165-008	VOC	16.04	3.01	15	290781.05	3290682.54	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.09	0.02										
P165-009	P165-009	Tank P165-009	VOC	16.04	3.01	15	290838.24	3290737.52	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.09	0.02										

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. Height	6. Stack Exit Data			7. Fugitives		
									Above	Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
P165-010	P165-010	Tank P165-010	VOC	16.04	3.01	15	290837.14	3290681.44	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.09	0.02										
P165-011	P165-011	Tank P165-011	VOC	16.04	3.01	15	290787.12	3290990.30	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.09	0.02										
P165-012	P165-012	Tank P165-012	VOC	16.04	3.01	15	290843.20	3290989.20	65	0.003	0.003	Amb.	-	-	-
			H_2S	0.09	0.02										
TANKCAP	TANKCAP	Tank Cap	VOC	-	59.06	-	-	-	-	-	-	-	-	-	-
			H_2S	-	0.32										
FUG	FUG	Piping Fugitive Components	VOC	5.49	24.04	15	290580	3290650	3.28	-	-	-	4950	970	1.5
			H_2S	0.03	0.13										
DOCK-1	DOCK-1	Uncontrolled/Uncollected Marine Vessel Loading Dock No. 1	VOC	86.51	-	15	290751.582	3292125.4	15	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	-										
DOCK-2	DOCK-2	Uncontrolled/Uncollected Marine Vessel Loading Dock No. 2	VOC	86.51	-	15	290767.873	3291990.652	15	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	-										
DOCK-3	DOCK-3	Uncontrolled/Uncollected Marine Vessel Loading Dock No. 3	VOC	86.51	-	15	290746.497	3291895.883	15	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	-										
DOCK-4	DOCK-4	Uncontrolled/Uncollected Marine Vessel Loading Dock No. 4	VOC	86.51	-	15	290779.948	3291895.085	15	0.003	0.003	Amb.	-	-	-
			H_2S	0.15	-										
RACK-1	RACK-1	Uncontrolled/Uncollected Truck and Railcar Loading Rack No. 1	VOC	66.92	-	15	290607.66	3291365.36	12	0.003	0.003	Amb.	-	-	-
			H_2S	0.12	-										
RACK-3	RACK-3	Uncontrolled/Uncollected Truck and Railcar Loading Rack No. 3	VOC	66.92	-	15	290600	3291126	12	0.003	0.003	Amb.	-	-	-
			H_2S	0.12	-										

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. Height Above	6. Stack Exit Data			7. Fugitives		
										Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
RACK-5	RACK-5	Uncontrolled/Uncollected Truck and Railcar Loading Rack No. 5	VOC	66.92	-	15	290593.19	3290905	12	0.003	0.003	Amb.	-	-	-
			H_2S	0.12	-										
LOADUNC	LOADUNC	Uncontrolled/Uncollected Loading Annual Emissions Cap	VOC	-	23.81	-	-	-	-	-	-	-	-	-	-
			H_2S	-	0.04										
TK-LAND	TK-LAND	Uncontrolled Routine Tank Roof Landings	VOC	137.51	8.26	-	-	-	-	-	-	-	-	-	-
			H_2S	0.75	0.04										
VC-001	VC-001	Controlled Loading, Hose Venting, Wastewater System, & Routine Roof Landdings VC-001	VOC	32.37	-	15	290783.73	3291689.85	70	13	33	1450	-	-	-
			NOx	5.94	-										
			CO	19.80	-										
			H_2S	0.59	-										
			SO_2	23.11	-										
			$PM/PM_{10}/PM_{2.5}$	0.74	-										
VC-002	VC-002	Controlled Loading, Hose Venting, Wastewater System, & Routine Roof Landings VC-002	VOC	32.37	-	15	290821.48	3291689.08	70	13	33	1450	-	-	-
			NOx	5.94	-										
			CO	19.80	-										
			H_2S	0.59	-										
			SO_2	23.11	-										
			$PM/PM_{10}/PM_{2.5}$	0.74	-										

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. Height	6. Stack Exit Data			7. Fugitives		
									Above	Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
VC-003	VC-003	Controlled Loading, Hose Venting, Wastewater System, & Routine Roof Landings VC-003	VOC	32.37	-	15	290880.18	3291687.53	70	13	33	1450	-	-	-
			NOx	5.94	-										
			CO	19.80	-										
			H_2S	0.59	-										
			SO_2	23.11	-										
			$PM/PM_{10}/PM_{2.5}$	0.74	-										
FL-001	FL-001	Controlled Loading Flare FL-001	VOC	108.15	-	15	290845.44	3291664.83	100	0	65.61	1832	-	-	-
			NOx	20.88	-										
			CO	41.69	-										
			H_2S	0.27	-										
			SO_2	25.33	-										
VC-001, VC-002, VC-003 & FL-001	VC-001, VC-002, VC-003 & FL-001	Controlled Loading, Hose Venting, Wastewater System, & Routine Roof Landing Annual Emissions Cap	VOC	-	10.45	-	-	-	-	-	-	-	-	-	-
			NOx	-	30.37										
			CO	-	105.99										
			H_2S		0.44										
			SO_2	-	35.19										
			$PM/PM_{10}/PM_{2.5}$	-	3.77										

loading
HW
WW
routine RL
2.69
10.45

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. Height	6. Stack Exit Data			7. Fugitives		
									Above	Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
HOSEVENT	HOSEVENT	Hose Depressurizing and Venting to Atmosphere	VOC	52.55	11.18	15	2907750	3291750	3.28	-	-	-	1500	65	1.5
			H_2S	0.29	0.06										
HOSEDRAIN	HOSEDRAIN	Drain ~~House~~ hose to Sump	VOC	3.00	5.45	15	2907750	3291750	3.28	-	-	-	1500	65	1.5
			H_2S	0.02	0.03										
T-101	T-101	Lift Station T-101	VOC	0.97	0.04	15	-	-	-	-	-	-	-	-	-
T-201	T-201	Lift Station T-201	VOC	0.97	0.03	15	-	-	-	-	-	-	-	-	-
T-301	T-301	Lift Station T-301	VOC	0.97	0.03	15	-	-	-	-	-	-	-	-	-
T-401	T-401	Lift Station T-401	VOC	0.97	0.03	15	-	-	-	-	-	-	-	-	-
EFWPTK-1	EFWPTK-1	EFWPTK No. 1	VOC	0.03	7.08E-05	15	-	-	-	-	-	-	-	-	-
EFWPTK-2	EFWPTK-2	EFWPTK No. 2	VOC	0.03	7.08E-05	15	-	-	-	-	-	-	-	-	-
EFWPTK-3	EFWPTK-3	EFWPTK No. 3	VOC	0.04	7.08E-05	15	-	-	-	-	-	-	-	-	-
EFWP-1	EFWP-1	Emergency Firewater Pump No. 1	VOC	0.10	2.64E-03	15	-	-	-	-	-	-	-	-	-
			NO_x	2.64	6.86E-02										
			CO	0.51	1.32E-02										
			SO_2	0.01	2.75E-04										
			$PM/PM_{10}/PM_{2.5}$	0.09	2.37E-03										
EFWP-2	EFWP-2	Emergency Firewater Pump No. 2	VOC	0.10	2.64E-03	15	-	-	-	-	-	-	-	-	-
			NO_x	2.64	6.86E-02										
			CO	0.51	1.32E-02										
			SO_2	0.01	2.75E-04										
			$PM/PM_{10}/PM_{2.5}$	0.09	2.37E-03										

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. Height Above	6. Stack Exit Data			7. Fugitives		
										Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
EFWP-3	EFWP-3	Emergency Firewater Pump No. 3	VOC	0.12	3.01E-03	15	-	-	-	-	-	-	-	-	-
			NO_x	3.01	7.82E-02										
			CO	0.58	1.50E-02										
			SO_2	0.01	3.14E-04										
			$PM/PM_{10}/PM_{2.5}$	0.10	2.71E-03										
EGEN-1	EGEN-1	Emergency Generator No. 1	VOC	0.31	8.11E-03	15	-	-	-	-	-	-	-	-	-
			NO_x	0.08	1.99E-03										
			CO	0.31	8.11E-03										
			SO_2	0.00	3.17E-05										
			$PM/PM_{10}/PM_{2.5}$	0.00	4.14E-06										
EGEN-2	EGEN-2	Emergency Generator No. 2	VOC	0.01	2.29E-04	15	-	-	-	-	-	-	-	-	-
			NO_x	0.14	3.65E-03										
			CO	11.61	3.02E-01										
			SO_2	0.00	5.04E-06										
			$PM/PM_{10}/PM_{2.5}$	0.00	6.61E-07										
EGEN-3	EGEN-3	Emergency Generator No. 3	VOC	0.01	2.29E-04	15	-	-	-	-	-	-	-	-	-
			NO_x	0.14	3.65E-03										
			CO	11.61	3.02E-01										
			SO_2	0.00	5.04E-06										
			$PM/PM_{10}/PM_{2.5}$	0.00	6.61E-07										

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. Height	6. Stack Exit Data			7. Fugitives		
									Above	Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
EGEN-4	EGEN-4	Emergency Generator No. 4	VOC	0.02	4.07E-04	15	-	-	-	-	-	-	-	-	-
			NO_x	0.25	6.47E-03										
			CO	20.60	5.36E-01										
			SO_2	0.00	1.05E-05										
			$PM/PM_{10}/PM_{2.5}$	0.00	1.38E-06										
EGEN-5	EGEN-5	Emergency Generator No. 5	VOC	0.10	2.64E-03	15	-	-	-	-	-	-	-	-	-
			NO_x	1.61	4.19E-02										
			CO	133.46	3.47E+00										
			SO_2	0.00	6.82E-05										
			$PM/PM_{10}/PM_{2.5}$	0.00	8.93E-06										
EGEN-6	EGEN-6	Emergency Generator No. 6	VOC	0.06	1.60E-03	15	-	-	-	-	-	-	-	-	-
			NO_x	1.60	4.16E-02										
			CO	0.31	8.00E-03										
			SO_2	0.01	1.67E-04										
			$PM/PM_{10}/PM_{2.5}$	0.06	1.44E-03										
EGEN-7	EGEN-7	Emergency Generator No. 7	VOC	0.02	4.07E-04	15	290619	3291144	5.6	0.292	336	1378	-	-	-
			NO_x	0.25	6.47E-03										
			CO	20.60	5.36E-01										
			SO_2	0.00	1.05E-05										
			$PM/PM_{10}/PM_{2.5}$	0.00	1.38E-06										
EGEN-8	EGEN-8	Emergency Generator No. 8	VOC	0.02	4.07E-04	15	290117	3291106	5.6	0.292	336	1378	-	-	-
			NO_x	0.25	6.47E-03										
			CO	20.60	5.36E-01										
			SO_2	0.00	1.05E-05										
			$PM/PM_{10}/PM_{2.5}$	0.00	1.38E-06										

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. Height	6. Stack Exit Data			7. Fugitives		
									Above	Diameter	Velocity	Temp	Length	Width	Axis
EPN (A)	FIN (B)	NAME (C)		Pounds per Hour (A)	TPY (B)	Zone	East (Meters)	North (Meters)	Ground (Feet)	(Feet) (A)	(fps) (B)	(°F) (C)	(ft) (A)	(ft) (B)	Degrees (C)
EGEN-9	EGEN-9	Emergency Generator No. 9	VOC	0.01	2.29E-04	15	290874	3290658	4	0.292	50.64	1100	-	-	-
			NO_x	0.14	3.65E-03										
			CO	11.61	3.02E-01										
			SO_2	0.00	5.93E-06										
			$PM/PM_{10}/PM_{2.5}$	0.00	7.77E-07										
EGEN-10	EGEN-10	Emergency Generator No. 10	VOC	0.01	2.29E-04	15	-	-	-	-	-	-	-	-	-
			NO_x	0.23	5.96E-03										
			CO	0.04	1.15E-03										
			SO_2	0.00	2.39E-05										
			$PM/PM_{10}/PM_{2.5}$	0.01	2.06E-04										
MSS-CONT	MSS-CONT	Controlled MSS Emissions Cap	VOC	5.25	1.25	-	-	-	-	-	-	-	-	-	-
			NOx	7.34	2.00										
			CO	9.79	2.67										
			H_2S	0.08	0.02										
			SO_2	8.15	2.10										
			$PM/PM_{10}/PM_{2.5}$	0.37	0.10										
MSS-ATM	MSS-ATM	Uncontrolled MSS Emissions Cap	VOC	209.48	10.33	-	-	-	-	-	-	-	-	-	-
			H_2S	1.14	0.01										
All EPNs	All EPNs	Site Wide Emission Caps	Individual HAP	-	< 10.00	-	-	-	-	-	-	-	-	-	-
			All HAPs	-	< 25.00										

Section 6
Best Available Control Technology

ITC is submitting this permit application to update the information previously submitted and approved for the permit application associated with the issuance of Permit No. 95754, TCEQ Project Nos. 235981 and 243313. The BACT analysis is included in this application for completeness purposes and reflects the control technology that was previously approved as BACT as part of the noted projects.

Per 30 TAC §116.111(a)(2)(C), new or modified facilities must utilize best available control technology (BACT), with consideration given to the technical practicability and economic reasonableness of reducing or eliminating the emissions from the facility. Each facility is evaluated on a case-by-case basis. Engineering principles and agency experience, concerning the practicality and reasonableness of an emission reduction option, are used in this determination.

As described in TCEQ's guidance document entitled Evaluating Best Available Control Technology (BACT) in Air Permit Applications (April 2001), the State BACT evaluation is to be conducted using a tiered analysis approach. The evaluation begins at the first tier and continues sequentially through subsequent tiers only if necessary as determined by the evaluation process described in this document. In each tier, BACT is evaluated on a case-by-case basis.

In the first tier, controls accepted as BACT in a recent permit review for the same process in the same industry are approved as BACT in a current review if no new technical developments have been made that would justify additional controls as economically or technically reasonable. According to the TCEQ, the second tier takes into account controls that have been accepted as BACT in recent permits for similar facilities in a different process or industry. The third tier of the TCEQ BACT approach consists of a detailed technical and economic analysis of all control options available for the process under review.

The following sections of the application describe the BACT Analysis for the facilities included in this application.

6.1 Routine Operation

The following facility types are addressed in the BACT analysis for routine operation:

- Storage Tanks;
- Marine and Land Based Loading;
- Piping Component Fugitives;
- Emergency Firewater Pumps and Generators;
- Hose Venting; and
- Wastewater Treatment System.

6.1.1 Storage Tanks

TCEQ's current BACT guidelines for storage tanks were obtained from its Technical Guidance Package for Chemical Sources: Storage Tanks, June 2015. The TCEQ BACT guidelines for internal floating roof (IFR) tanks storing materials with a vapor pressure greater than 0.5 psia and greater than 25,000 gallon capacity, require a mechanical or liquid mounted primary seal or vapor mounted primary seal with a rim mounted secondary seal. The storage tanks included in this application will be equipped with a primary mechanical shoe and secondary rim-mounted seal. Additionally, IFR tank convenience landings associated with products with true vapor pressures greater than 0.5 psia will be controlled by a vapor combustion unit with a minimum DRE of 99.9%. Products with true vapor pressures < 0.5 psai will be stored in fixed roof tank, which meets the current BACT guidelines of no control for storage of organic liquids with vapor pressures less than 0.5 psia. This level of control exceeds current BACT guidelines.

6.1.2 Marine and Land Based Loading

ITC proposes to use submerged loading and a vacuum collection system while loading barges with liquids with a true vapor pressure of 0.1 psia at 95°F or as required by Permit No. 95754, Attachment I. ITC proposes to use submerged loading and hard pipe connections while loading railcars. The use of a vacuum collection system and/or hard pipe connections while loading non-inerted inland barges and/or railcars is expected to achieve a 100% collection of loading losses. Vapors generated during the loading of inerted ships/ocean going barges, inerted inland barges, and tank trucks are collected and routed to controls in a similar manner; however, due to U.S. Coast Guard Regulations, equipment safety limitations, and/or customer product handling specifications, the collection efficiency for inerted ships/ocean going barges, inerted inland barges, and tank trucks is expected to be at least 95%.

100%

99.2%

▷ consistent only w/ representations for 1243 (95%

The collected emissions from all marine vessels, railcars, and tank trucks are routed to a vapor combustion system with a minimum DRE of 99.9%. Note that vapors associated with loading liquids with true vapor pressures less than 0.1 psia will be vented to the atmosphere uncontrolled. ITC proposes to implement the above control system that meets or exceeds current BACT control requirements.

6.1.3 Piping Component Fugitives

TCEQ's BACT guidance for fugitive emissions requires implementing a fugitive LDAR Program, the stringency of which varies depending on the amount of uncontrolled fugitive VOC emissions. For the ITC Pasadena Terminal, uncontrolled fugitive VOC emissions are more than 25 tpy. Per TCEQ's guidance, BACT for that emission level is the implementation of TCEQ's 28VHP LDAR Program. Therefore, the use of the 28VHP LDAR program is proposed as BACT. Note that flange/connectors associated with Project IDs No. 1 and 2 are monitored quarterly on a voluntarily basis and the appropriate control credit is applied (i.e., 28LAER). 28 VHP

6.1.4 Emergency Firewater Pumps and Generators

The proposed emergency firewater pumps and generators will be operated during emergencies and up to 52 hours per year for testing purposes (i.e., annual flow, etc.). Due to the minimal operation and very low level of emissions of all pollutants, operating in accordance with manufacturer's specifications constitutes BACT for all pollutants.

6.2 Hose Venting

ITC proposes the use of Best Management Practices (BMP) to minimize emissions during routine hose venting activities. Specifically, BMP includes the following:

- Minimizing the number and duration of the hose venting events.
- Manage residual products with vapor pressures > 0.1 psia that are removed from hoses in a controlled manner. ⇒ venting these hoses b4 draining implies controls for the venting.

Due to the insignificant level of emissions associated with the hose venting activities included in this application, ITC proposes to implement the above described BMP as part of the project to satisfy BACT control requirements no incr. to GV emissions, but ≠ "insignificant"

6.3 Wastewater Treatment System

Consistent with TCEQ BACT guidance, the wastewater treatment system oil/water separators, oil tank, and sludge tank VOC vapors are collected and routed to vapor control equipment which achieves a DRE of at least 99.9%. This level of control exceeds current BACT guidelines.

6.2 MSS Activities

The BACT analysis addresses the following MSS activities and sources:

- Storage Tanks;
- Equipment Venting
- Air Mover, Vacuum Truck, and Frac Tank Activities; and
- MSS Vapor Control.

BACT listings were found in the EPA RBLC search for some of the MSS activities listed above. TCEQ has no published BACT guidelines applicable to the other MSS sources or activities discussed in this application. The BACT candidates for MSS activities are based on the RBLC BACT listings included in Appendix D, Table D-4 and past TCEQ permitting actions.

Best Management Practices (BPM) for MSS activities includes the following:

- Minimizing the number and duration of all planned MSS events;
- Beginning tank degassing with 72 hours after the roof has been landed and the tank completely drained;
- Degassing tanks, process equipment, and piping with volumes > 85 ft^3 to a maximum outlet concentration of 5,000 ppmv, measured as VOC, and maintaining that concentration (or less) until maintenance activities are completed or refilling begins;
- Routing the degassed vapors to a control system capable of reducing emissions by 99.8 %, such as a portable thermal oxidizer or internal combustion engine; and
- Managing residual products with vapor pressures > 0.5 psia that are removed from equipment and piping as a result of an MSS activity in a controlled manner. Specifically, ITC will utilize air movers, vacuum trucks, and frac tanks equipped with vapor controls when handling materials with vapor pressures > 0.5 psia. All frac tanks will be loaded via submerged fill pipes.

Due to the insignificant level of emissions associated with the MSS activities included in this application, ITC proposes to implement the above described BMP to satisfy the BACT control requirements.

Section 7
Federal New Source Review

Non-attainment New Source Review (NNSR) permitting is required for each non-attainment pollutant for which a modification of an existing source will result in a significant net emissions increase. Prevention of Significant Deterioration (PSD) permitting is required for a modification of an existing major source for each attainment pollutant and other regulated pollutants (such as H_2S and H_2SO_4) for which the modification will result in a significant net emissions increase. The emission increases associated with this permit application are summarized and compared to the NNSR/PSD applicability thresholds in Table 7-1, which is included at the end of this section. Harris County is designated non-attainment for the eight-hour ozone standard and attainment/unclassified for all other criteria pollutants.

As noted in Section No. 1 of this application, this permit amendment proposes updates to the representations associated with the facilities authorized by Permit No. 95754. The updated NNSR/PSD analysis is an update to the analysis that was completed in support of the noted permit issuances. As shown in Table 7-1, the updated project emission increase for each regulated pollutant do not change the previous NNSR/PSD applicability analysis determination. Specifically, the Pasadena Terminal was considered a minor source prior to the submittal of the applications associated with the issuance of Permit No. 95754, TCEQ Project Nos. 235981 and 243313, and the proposed updates included in this "as built" application did not constitute a major source in and of themselves; therefore, NNSR and PSD was/is not applicable to the proposed permit "as built" amendment application.

Table 7-1
NNSR/PSD Applicability Analysis Summary
Intercontinental Terminals Company LLC
December 2018

Group ID	Pollutant	Project Increase [1] (tpy)	Major Source Threshold [2] (tpy)	Federal NSR Applicable (Yes/No)
A	VOC	24.90	25	No
	NOx	10.26	25	No
	CO	32.53	100	No
	SO2	6.72	100	No
	PM/PM10/PM2.5	1.20	100	No
	H2S	0.21	100	No
B	VOC	24.90	25	No
	NOx	10.32	25	No
	CO	36.54	100	No
	SO2	7.10	100	No
	PM/PM10/PM2.5	1.21	100	No
	H2S	0.26	100	No
C	VOC	97.21	100	No
	NOx	12.60	100	No
	CO	46.25	100	No
	SO2	23.47	100	No
	PM/PM10/PM2.5	1.50	100	No
	H2S	0.77	100	No

Notes:

1. Federally Enforceble Permit No. 95754, Special Condition No. 2, Group ID A and B project VOC emission limits of 24.9 tpy less than the appliable major source threshold.
2. Federal NSR major source thresholds applicable at the time of Group ID project issuance.

Section 8
Rule Applicability Analysis

Pursuant to 30 TAC §116.111, ITC proposes to meet the rules and regulations of the TCEQ and the intent of the Texas Clean Air Act (TCCA). This section addresses each of those requirements.

8.1 Protection of Public Health and Welfare – 30 TAC §116.111(a)(2)(A)

The emissions from the facilities included in this application will comply with all air quality rules, regulations, and the intent of the TCAA; including protection of public health and welfare. Applicable regulations for the Pasadena Terminal are as follows:

8.1.1 Chapter 101 – General Air Quality Rules

The facilities included in this application will be operated in accordance with the General Rules relating to circumvention, nuisance, traffic hazard, notification requirements for emissions events and scheduled maintenance, startup and shutdown activities, sampling, sampling ports, emissions inventory requirements, sampling procedures, compliance with Environmental Protection Agency standard, the National Primary and Secondary Air Quality Standards, inspection fees, emissions fees, and all other applicable General Rules.

8.1.2 Chapter 106 – Permits by Rule

Facilities included in this application are not currently subject to requirements of 30 TAC Chapter 106. In the event these facilities do become subject to the requirements of this chapter, they will be operated in compliance with the applicable requirements.

8.1.3 Chapter 111 – Visible Emissions and Particulate Matter

Facilities included in this application are subject to and will operate in compliance with all requirements of 30 TAC Chapter 111.

8.1.4 Chapter 112 – Sulfur Compounds

Facilities included in this application are subject to and will operate in compliance with all requirements of 30 TAC Chapter 112.

8.1.5 Chapter 113 – Toxic Materials

This chapter references the regulations under 40 CFR Part 63. Applicability for those regulations is addressed in Section 8.5

8.1.6 Chapter 114 – Motor Vehicles

Facilities included in this application are not subject to requirements of 30 TAC Chapter 114.

8.1.7 Chapter 115 – Volatile Organic Compounds (VOC)

Facilities included in this application are subject to and will operate in compliance with the following subchapters of 30 TAC 115:

- 30 TAC §115.112 – Control Requirements for Storage of Volatile Organic Compounds;
- 30 TAC §115.542 – Control Requirements for Degassing of Storage Tanks, Transfer Vessels, and Marine Vessels.

8.1.8 Chapter 116 – New Construction or Modification

Facilities included in this application are subject to and will operate in compliance with the applicable requirements of 30 TAC 116.

8.1.9 Chapter 117 – Nitrogen Compounds

Facilities included in this application are subject to and will operate in compliance with the applicable requirements of 30 TAC Chapter 117.

8.1.10 Chapter 118 – Air Pollution Episodes

The facilities included in this application are subject to and will operate in compliance with all requirements of 30 TAC Chapter 118.

8.1.11 Chapter 122 – Federal Operating Permits

ITC will submit a Title V permit application to incorporate applicable regulatory requirements for the facilities included in this application as necessary.

8.1.12 Impact on Schools

There are no schools located within 3,000 ft of the ITC Pasadena Terminal.

8.2 Measurement of Emissions – 30 TAC §116.111(a)(2)(B)

Emissions will be sampled upon request of the Executive Director of the TCEQ.

8.3 BACT Technology – 30 TAC §116.111(a)(2)(C)

Section 6 of this application provides a detailed best available control technology analysis.

8.4 NSPS – 30 TAC §116.111(a)(2)(D)

The proposed facilities will be subject to 40 CFR Part 60, Subparts A, Kb, XX, IIII, and JJJJ (New Source Performance Standards).

8.5 NESHAP – 30 TAC §116.111(a)(2)(E)

The proposed facilities will be subject to 40 CFR Part 61, Subparts A, J, V, Y, BB (National Emission Standards for Hazardous Air Pollutants).

8.6 NESHAP for Source Categories – 30 TAC §116.111(a)(2)(F)

The proposed facilities will be subject to 40 CFR Part 63, Subparts A, ZZZZ, and BBBBBB (National Emission Standards for Hazardous Air Pollutants for Source Categories).

8.7 Performance Demonstration – 30 TAC §116.111(a)(2)(G)

The facilities included in this application will perform as represented in the application and as required by the permit.

8.8 Nonattainment Review – 30 TAC §116.111(a)(2)(H)

The NNSR analysis is discussed in Section 7.

8.9 Prevention of Significant Deterioration – 30 TAC §116.111(a)(2)(I)

The PSD analysis is discussed in Section 7.

8.10 Air Dispersion Modeling – 30 TAC §116.111(a)(2)(J)

ITC will provide air dispersion modeling results demonstrating compliance with all applicable air quality standards and guidelines, if requested by the TCEQ.

8.11 Hazardous Air Pollutants – 30 TAC §116.111(a)(2)(K)

Facilities included in this application are subject to the MACT standards referenced in Section 8.6; therefore, it is not an affected source subject to the requirements of FCCA §112(g).

8.12 Mass Cap and Trade Allowances – 30 TAC §116.111(a)(2)(L)

Facilities included in this application are subject to and will comply with the applicable requirements of the Mass Emissions Cap and Trade (MECT) program. Pursuant to 30 TAC §101.352(b), ITC will have the required NO_X allocations in the compliance account no later than March 1st after each control period.

8.13 Public Notice – 30 TAC §116.111(b)

The project will result an emissions increase that will exceed public notice thresholds; therefore, public notice required for this amendment application.

retro : minor
current : MS

Appendix A

Routine Emission Calculation Details

Table 1-1
Project Emissions Summary
Intercontinental Terminals Company LLC
December 2018

		VOC			NOx			CO			SO2			PM/PM10/PM2.5			H2S		
		Baseline	Proposed	Change	Baseline	Proposed	Change	Baseline	Proposed	Change	Baseline	Proposed	Change	Baseline	Proposed	Change	Baseline	Proposed	Change
EPN	Project No.	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy
P100-001	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P100-002	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P100-003	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P100-004	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P100-005	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P100-006	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P100-007	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P100-008	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P100-009	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P100-010	1	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62E-03	3.62E-03
P12-001	1	-	0.48	0.48	-	-	-	-	-	-	-	-	-	-	-	-	-	2.60E-03	2.60E-03
P12-002	1	-	0.49	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-	2.67E-03	2.67E-03
P12-003	1	-	0.49	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-	2.67E-03	2.67E-03
P80-001	1	-	0.59	0.59	-	-	-	-	-	-	-	-	-	-	-	-	-	3.21E-03	3.21E-03
P100-12	2	-	0.72	0.72	-	-	-	-	-	-	-	-	-	-	-	-	-	3.92E-03	3.92E-03
P100-13	2	-	0.72	0.72	-	-	-	-	-	-	-	-	-	-	-	-	-	3.92E-03	3.92E-03
P165-003	2	-	1.01	1.01	-	-	-	-	-	-	-	-	-	-	-	-	-	5.50E-03	5.50E-03
P165-004	2	-	1.01	1.01	-	-	-	-	-	-	-	-	-	-	-	-	-	5.50E-03	5.50E-03
P165-005	2	-	1.01	1.01	-	-	-	-	-	-	-	-	-	-	-	-	-	5.50E-03	5.50E-03
P165-006	2	-	1.01	1.01	-	-	-	-	-	-	-	-	-	-	-	-	-	5.50E-03	5.50E-03
P110-001	2	-	0.77	0.77	-	-	-	-	-	-	-	-	-	-	-	-	-	4.19E-03	4.19E-03
P110-002	2	-	0.77	0.77	-	-	-	-	-	-	-	-	-	-	-	-	-	4.19E-03	4.19E-03
P110-003	2	-	0.77	0.77	-	-	-	-	-	-	-	-	-	-	-	-	-	4.19E-03	4.19E-03
P110-004	2	-	0.77	0.77	-	-	-	-	-	-	-	-	-	-	-	-	-	4.19E-03	4.19E-03
P120-001	2	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.45E-03	4.45E-03
P120-002	2	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.45E-03	4.45E-03
P120-003	2	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.45E-03	4.45E-03
P120-004	2	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.45E-03	4.45E-03
P165-001	2	-	1.01	1.01	-	-	-	-	-	-	-	-	-	-	-	-	-	5.50E-03	5.50E-03
P165-002	2	-	1.01	1.01	-	-	-	-	-	-	-	-	-	-	-	-	-	5.50E-03	5.50E-03
P060-001	3	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.66E-03	3.66E-03
P060-002	3	-	0.67	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3.66E-03	3.66E-03
P100-014	3	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.44E-03	4.44E-03
P100-015	3	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.44E-03	4.44E-03
P100-016	3	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.44E-03	4.44E-03
P100-017	3	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.44E-03	4.44E-03
P100-018	3	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.44E-03	4.44E-03
P100-019	3	-	0.82	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	4.44E-03	4.44E-03
P120-005	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-006	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-007	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-008	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-009	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-010	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-011	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-012	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-013	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-014	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-015	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-016	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-017	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-018	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-019	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-020	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-021	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-022	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-023	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-024	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-025	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-026	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-027	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-028	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-029	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P120-030	3	-	0.93	0.93	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05E-03	5.05E-03
P165-007	3	-	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	5.45E-03	5.45E-03
P165-008	3	-	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	5.45E-03	5.45E-03
P165-009	3	-	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	5.45E-03	5.45E-03

Table 1-1
Project Emissions Summary
Intercontinental Terminals Company LLC
December 2018

		VOC			NOx			CO			SO2			PM/PM10/PM2.5			H2S		
		Baseline	Proposed	Change	Baseline	Proposed	Change	Baseline	Proposed	Change	Baseline	Proposed	Change	Baseline	Proposed	Change	Baseline	Proposed	Change
EPN	Project No.	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy
P165-010	3	-	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	5.45E-03	5.45E-03
P165-011	3	-	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	5.45E-03	5.45E-03
P165-012	3	-	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	5.45E-03	5.45E-03
FUG	1	-	1.81	1.81	-	-	-	-	-	-	-	-	-	-	-	-	-	9.85E-03	9.85E-03
FUG	2	-	3.63	3.63	-	-	-	-	-	-	-	-	-	-	-	-	-	1.97E-02	1.97E-02
FUG	3	-	18.60	18.60	-	-	-	-	-	-	-	-	-	-	-	-	-	1.01E-01	1.01E-01
LOADUNC	1	-	4.46	4.46	-	-	-	-	-	-	-	-	-	-	-	-	-	2.42E-02	2.42E-02
LOADUNC	2	-	2.97	2.97	-	-	-	-	-	-	-	-	-	-	-	-	-	1.61E-02	1.61E-02
LOADUNC	3	-	16.38	16.38	-	-	-	-	-	-	-	-	-	-	-	-	-	8.89E-02	8.89E-02
TK-LAND	1	-	1.72	1.72	-	-	-	-	-	-	-	-	-	-	-	-	-	9.33E-03	9.33E-03
TK-LAND	2	-	1.46	1.46	-	-	-	-	-	-	-	-	-	-	-	-	-	7.91E-03	7.91E-03
TK-LAND	3	-	5.08	5.08	-	-	-	-	-	-	-	-	-	-	-	-	-	2.76E-02	2.76E-02
VC-001, VC-002, VC-003 & FL-001	1	-	2.16	2.16	-	9.25	9.25	-	30.83	30.83	-	6.07	6.07	-	1.15	1.15	-	7.07E-02	7.07E-02
VC-001, VC-002, VC-003 & FL-001	2	-	2.32	2.32	-	9.44	9.44	-	31.48	31.48	-	6.44	6.44	-	1.17	1.17	-	9.92E-02	9.92E-02
VC-001, VC-002, VC-003 & FL-001	3	-	5.97	5.97	-	11.68	11.68	-	43.68	43.68	-	22.68	22.68	-	1.45	1.45	-	2.68E-01	2.68E-01
HOSEVENT	1	-	2.96	2.96	-	-	-	-	-	-	-	-	-	-	-	-	-	1.61E-02	1.61E-02
HOSEVENT	2	-	2.08	2.08	-	-	-	-	-	-	-	-	-	-	-	-	-	1.13E-02	1.13E-02
HOSEVENT	3	-	6.13	6.13	-	-	-	-	-	-	-	-	-	-	-	-	-	3.33E-02	3.33E-02
HOSEDRAIN	1	-	1.75	1.75	-	-	-	-	-	-	-	-	-	-	-	-	-	9.52E-03	9.52E-03
HOSEDRAIN	2	-	1.68	1.68	-	-	-	-	-	-	-	-	-	-	-	-	-	9.11E-03	9.11E-03
HOSEDRAIN	3	-	2.02	2.02	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10E-02	1.10E-02
T-101	1	-	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00E+00	0.00E+00
T-201	1	-	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00E+00	0.00E+00
T-301	1	-	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00E+00	0.00E+00
T-401	1	-	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00E+00	0.00E+00
EFWPTK-1	1	-	7.08E-05	7.08E-05	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00E+00	0.00E+00
EFWPTK-2	1	-	7.08E-05	7.08E-05	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00E+00	0.00E+00
EFWPTK-3	1	-	7.08E-05	7.08E-05	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00E+00	0.00E+00
EFWP-1	1	-	2.64E-03	2.64E-03	-	6.86E-02	6.86E-02	-	0.01	0.01	-	2.75E-04	2.75E-04	-	2.37E-03	2.37E-03	-	0.00E+00	0.00E+00
EFWP-2	1	-	2.64E-03	2.64E-03	-	6.86E-02	6.86E-02	-	0.01	0.01	-	2.75E-04	2.75E-04	-	2.37E-03	2.37E-03	-	0.00E+00	0.00E+00
EFWP-3	1	-	3.01E-03	3.01E-03	-	7.82E-02	7.82E-02	-	0.02	0.02	-	3.14E-04	3.14E-04	-	2.71E-03	2.71E-03	-	0.00E+00	0.00E+00
EGEN-1	1	-	8.11E-03	8.11E-03	-	1.99E-03	1.99E-03	-	0.01	0.01	-	3.17E-05	3.17E-05	-	4.14E-06	4.14E-06	-	0.00E+00	0.00E+00
EGEN-2	1	-	2.29E-04	2.29E-04	-	3.65E-03	3.65E-03	-	0.30	0.30	-	5.04E-06	5.04E-06	-	6.61E-07	6.61E-07	-	0.00E+00	0.00E+00
EGEN-3	1	-	2.29E-04	2.29E-04	-	3.65E-03	3.65E-03	-	0.30	0.30	-	5.04E-06	5.04E-06	-	6.61E-07	6.61E-07	-	0.00E+00	0.00E+00
EGEN-4	2	-	4.07E-04	4.07E-04	-	6.47E-03	6.47E-03	-	0.54	0.54	-	1.05E-05	1.05E-05	-	1.38E-06	1.38E-06	-	0.00E+00	0.00E+00
EGEN-5	2	-	2.64E-03	2.64E-03	-	4.19E-02	4.19E-02	-	3.47	3.47	-	6.82E-05	6.82E-05	-	8.93E-06	8.93E-06	-	0.00E+00	0.00E+00
EGEN-6	2	-	1.60E-03	1.60E-03	-	4.16E-02	4.16E-02	-	0.01	0.01	-	1.67E-04	1.67E-04	-	1.44E-03	1.44E-03	-	0.00E+00	0.00E+00
EGEN-7	3	-	4.07E-04	4.07E-04	-	6.47E-03	6.47E-03	-	0.54	0.54	-	1.05E-05	1.05E-05	-	1.38E-06	1.38E-06	-	0.00E+00	0.00E+00
EGEN-8	3	-	4.07E-04	4.07E-04	-	6.47E-03	6.47E-03	-	0.54	0.54	-	1.05E-05	1.05E-05	-	1.38E-06	1.38E-06	-	0.00E+00	0.00E+00
EGEN-9	3	-	2.29E-04	2.29E-04	-	3.65E-03	3.65E-03	-	0.30	0.30	-	5.93E-06	5.93E-06	-	7.77E-07	7.77E-07	-	0.00E+00	0.00E+00
EGEN-10	3	-	2.29E-04	2.29E-04	-	5.96E-03	5.96E-03	-	0.00	0.00	-	2.39E-05	2.39E-05	-	2.06E-04	2.06E-04	-	0.00E+00	0.00E+00
MSS-CONT	1	-	0.39	0.39	-	0.78	0.78	-	1.05	1.05	-	0.66	0.66	-	0.04	0.04	-	6.56E-03	6.56E-03
MSS-CONT	2	-	0.40	0.40	-	0.78	0.78	-	1.05	1.05	-	0.66	0.66	-	0.04	0.04	-	6.56E-03	6.56E-03
MSS-CONT	3	-	0.46	0.46	-	0.90	0.90	-	1.19	1.19	-	0.79	0.79	-	0.04	0.04	-	7.88E-03	7.88E-03
MSS-ATM	1	-	2.18	2.18	-	-	-	-	-	-	-	-	-	-	-	-	-	1.18E-02	1.18E-02
MSS-ATM	2	-	2.05	2.05	-	-	-	-	-	-	-	-	-	-	-	-	-	1.11E-02	1.11E-02
MSS-ATM	3	-	6.10	6.10	-	-	-	-	-	-	-	-	-	-	-	-	-	3.31E-02	3.31E-02
Project No. 1 Increase (tpy)				***26.31***			***10.26***			***32.53***			***6.72***			***1.20***			***0.21***
Project No. 2 Increase (tpy)				***30.46***			***10.32***			***36.54***			***7.10***			***1.21***			***0.26***
Project No. 3 Increase (tpy)				***97.21***			***12.60***			***46.25***			***23.47***			***1.50***			***0.77***

Notes:
1. The emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Table A-1A
Floating Roof Tank Emissions - Annual Basis
Intercontinental Terminals Company LLC
December 2018

4.2 MMgal x18TO

				P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010
FIN				P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010
EPN				P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010
Project No.				1	1	1	1	1	1	1	1	1	1
Material				GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)
Material Type				PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity		bbl		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Paint Color	-	-		White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α	-		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank		(Yes / No)		No	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	Q max	bbl/hr		10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Throughput	Q	bbls/yr		1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000
Shell Clingage	C	bbl/ft^2		0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
No. of Columns	N_C	-		1	1	1	1	1	1	1	1	1	1
Column Diameter	F_C	ft		1	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	F_F	lb-mole/yr		113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	-	-		Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	K_D	lb-mole/ftyr		0	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	S_D	ft/ft^2		0	0	0	0	0	0	0	0	0	0
Product Factor	K_C	-		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Tank Rim Seal Factor, Kra	K_{ra}			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	K_{Rb}			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	n			1	1	1	1	1	1	1	1	1	1
Rim Seal Factor	K_R	lb-mole/ftyr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period		-		Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	v	mph	Equal 0 for IFR Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	I	Btu/ft^2-d		1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	T_{AX}	°F		79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	T_{AN}	°F		57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	DT_A	°R	T_{AX} - T_{AN}	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	T_{AA}	°F	$((T_{AX}+459.67)+(T_{AN}+459.67))/2$	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	T_b	°F	$T_{AA} + 6α - 1$	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	T_{LA}	°F	$0.44T_{AA}+0.56T_{Tb}+0.0079(α*I)$	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	°F	$T_{LA}+0.25*DT_V$	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	$T_{LA}-0.25*DT_V$	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	DT_V	°R	$0.72*DT_A+0.028*α*I$	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	-	Y/N		N	N	N	N	N	N	N	N	N	N
Liquid Molecular Wt.	M_L	lb/lb-mole		92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00
Vapor Molecular Wt.	M_V	lb/lb-mole		66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00
Liquid Density	W_l	lb/gal		5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
Vapor Pressure Method		-		RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	RVP	psi		8	8	8	8	8	8	8	8	8	8
Slope	Sl	°F/vol %		3	3	3	3	3	3	3	3	3	3
Vapor Pressure Constant A	A	dimensionless		11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792
Vapor Pressure Constant B	B	°C		5402	5402	5402	5402	5402	5402	5402	5402	5402	5402
Vapor Pressure Constant C	C	°C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	P_{VA}	psia @ T_{LA}		4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474
True Vapor Pressure @ T_{LN}	P_{VN}	psia @ T_{LN}		4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170
Daily Vapor Pressure Range	DP_V	psia	$P_{VX} - P_{VN}$	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698
Rim Seal Loss	L_R	lbs/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0
Deck Fitting Loss	L_F	lbs/yr	$(F_F)(P^*)(M_V)(K_C)$	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5
Deck Seam Loss	L_D	lbs/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lbs/yr	$[(0.943)(Q)(C)(W_l)/(D)][1+[(N_c)(F_C)]/D)$	132.01	132.01	132.01	132.01	132.01	132.01	132.01	132.01	132.01	132.01
Total VOC Loss	L_T	lbs/yr	$(L_R+L_F+L_D+L_{WD})$	1333.50	1333.50	1333.50	1333.50	1333.50	1333.50	1333.50	1333.50	1333.50	1333.50
Total VOC Loss	L_T	**ton/yr**	$L_t/2000$	**0.67**	**0.67**	**0.67**	**0.67**	**0.67**	**0.67**	**0.67**	**0.67**	**0.67**	**0.67**
Rim Seal Factor	K_R	lb-mole/ftyr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	P*	dimensionless	$P_{VX}/P_A/(1+(1-(P_{VX}/P_A))^{0.5})^2$	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	L_R	lb/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71
Deck Fitting Loss	L_F	lb/yr	$(F_F)(P^*)(M_V)(K_C)$	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89
Deck Seam Loss	L_D	lb/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lb/yr	$[(0.943)(Qmax*8760)(C)(W_l)/(D)](1+[(N_c)(F_C)]/D)$	6424.43	6424.43	6424.43	6424.43	6424.43	6424.43	6424.43	6424.43	6424.43	6424.43
Total VOC Loss	L_T	**lb/hr**	$(L_R+L_F+L_D+L_{WD})/8760$	**1.18**	**1.18**	**1.18**	**1.18**	**1.18**	**1.18**	**1.18**	**1.18**	**1.18**	**1.18**

	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005
FIN	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005
EPN	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005
Project No.	1	1	1	1	2	2	2	2	2
Material	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)
Material Type	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID
Diameter	37.00	45.00	45.00	94.00	84.00	84.00	84.00	84.00	84.00
Tank Type	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity	12,000	12,000	12,000	80,000	100,000	100,000	160,000	160,000	160,000
Paint Color	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	10,000	10,000	10,000	10,000	15,000	15,000	55,000	55,000	55,000
Throughput	216,000	216,000	216,000	480,000	2,000,000	2,000,000	3,200,000	3,200,000	3,200,000
Shell Clingage	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
No. of Columns	1	1	1	1	1	1	1	1	1
Column Diameter	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	0	0	0	0	0	0	0	0	0
Product Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Tank Rim Seal Factor, Kra	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	1	1	1	1	1	1	1	1	1
Rim Seal Factor	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	N	N	N	N	N	N	N	N	N
Liquid Molecular Wt.	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00
Vapor Molecular Wt.	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00
Liquid Density	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
Vapor Pressure Method	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	8	8	8	8	8	8	8	8	8
Slope	3	3	3	3	3	3	3	3	3
Vapor Pressure Constant A	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792
Vapor Pressure Constant B	5402	5402	5402	5402	5402	5402	5402	5402	5402
Vapor Pressure Constant C	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928
True Vapor Pressure @ T_{LX}	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474
True Vapor Pressure @ T_{LN}	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427
Vapor Pressure Function	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170
Daily Vapor Pressure Range	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698
Rim Seal Loss	149.0	181.2	181.2	378.6	338.3	338.3	338.3	338.3	338.3
Deck Fitting Loss	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5
Deck Seam Loss	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	47.49	38.87	38.87	40.88	190.85	190.85	305.35	305.35	305.35
Total VOC Loss (lbs/yr)	959.01	982.61	982.61	1181.96	1291.65	1291.65	1406.16	1406.16	1406.16
Total VOC Loss (ton/yr)	**0.48**	**0.49**	**0.49**	**0.59**	**0.65**	**0.65**	**0.70**	**0.70**	**0.70**
Rim Seal Factor	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
True Vapor Pressure @ T_{LX}	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	485.99	591.07	591.07	1234.69	1103.34	1103.34	1103.34	1103.34	1103.34
Deck Fitting Loss	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89
Deck Seam Loss	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	19260.84	15762.60	15762.60	7460.41	12538.53	12538.53	45974.62	45974.62	45974.62
Total VOC Loss (lb/hr)	**2.54**	**2.15**	**2.15**	**1.28**	**1.84**	**1.84**	**5.66**	**5.66**	**5.66**

Notes:
1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the products listed in the comprehensive product list included this permit application and the proposed emission caps rather than throughput limits.
2. Actual tank deck fitting details may vary; however, maximum short-term and annual tank emissions will comply with the proposed emission limits.

1 → 10

initial:
100 K bbl
1.8 MM bbl/yr
18 To

P100-001:
4.2 E+6 gal x 18 TO x bbl / 42 gal = 1,800,000 bbl/yr

here:
100 K bbl
1.8 MM bbl/yr
no Δ TP
prov. calc: 1310.50 = 0.65 tpy
SSTP

initial:
72K bbl/yr
6 TO
12K bbl
here:
216 K bbl/yr
vol: = 12000 bbl
⇒ TO = 18 TO

initial:
144 K bbl/yr
(12 TO)
12K bbl
here:
216 K bbl/yr
Vol: 12 K bbl
⇒ TO = 18 TO

initial:
480 K bbl/yr
(6 TO)
80K bbl
here:
480 K bbl/yr
vol: 80 K bbl
⇒ TO = 6
no Δ TP

initial calc:
18 TO; 4.2 MM gal = 80K bbl
= 1.44E+6 bbl/yr
⇒ 0.69 tpy
here:
2E+6 bbl/yr
vol: = 100K bbl
⇒ TO = 20
0.65 tpy
size Δ: +20K bbl

V-d:
- 16 of 30 A+B tks (14, 16)
- 5 have +TP Δ; 2A, 3B
- 11: no Δ, size or TP
- 1: 20K bbl +Δ
- no size, TP Δ / Grp. C tks.; √ 20 of 40

②

Table A-1A
Floating Roof Tank Emissions - Annual Basis
Intercontinental Terminals Company LLC
December 2018

✓ 5 6

FIN				P165-006	P110-001	P110-002	P110-003	P110-004	P120-001	P120-002	P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	P100-014	P100-015	P100-016	P100-017	P100-018	P100-019
EPN				P165-006	P110-001	P110-002	P110-003	P110-004	P120-001	P120-002	P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	P100-014	P100-015	P100-016	P100-017	P100-018	P100-019
Project No.				2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3
Material				GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	LIGHT FUEL OIL	LIGHT FUEL OIL	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)
Material Type				PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID
Diameter	D	ft		84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	109.00	109.00	109.00	109.00	109.00	109.00
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity		bbl		160,000	110,000	110,000	110,000	110,000	120,000	120,000	120,000	120,000	160,000	160,000	60,000	60,000	✓ 100,000	100,000	100,000	100,000	100,000	100,000
Paint Color	-	-		White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α	-		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank		(Yes / No)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	Q max	bbl/hr		55,000	15,000	15,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Throughput	Q	bbls/yr		3,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,400,000	2,400,000	2,400,000	2,400,000	3,200,000	3,200,000	1,800,000	1,800,000	✓ 3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Shell Clingage	C	bbl/ft^2		0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
No. of Columns	N_C	-		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Column Diameter	F_C	ft		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	F_F	lb-mole/yr		113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	-	-		Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	K_D	lb-mole/ft^{2}yr		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	S_D	ft/ft^2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Factor	K_C	-		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Tank Rim Seal Factor, Kra	K_{ra}			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	K_{rb}			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	n			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rim Seal Factor	K_s	lb-mole/ft^{2}yr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period				Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	v	mph	Equal 0 for IFR Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	I	Btu/ft^2-d		1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	T_{AX}	°F		79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	T_{AN}	°F		57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	DT_A	°R	$T_{AX} - T_{AN}$	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	T_{AA}	°F	$((T_{AX}+459.67)+(T_{AN}+459.67))/2$	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	T_b	°F	$T_{AA} + 6\alpha - 1$	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	T_{LA}	°F	$0.44T_{AA}+0.56T_b+0.0079(\alpha*I)$	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	°F	$T_{LA}+0.25*DT_V$	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	$T_{LA}-0.25*DT_V$	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	DT_V	°R	$0.72*DT_A+0.028*\alpha*I$	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?		Y/N		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Liquid Molecular Wt.	M_L	lb/lb-mole		92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	0.00	0.00	92.00	92.00	92.00	92.00
Vapor Molecular Wt.	M_V	lb/lb-mole		66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	130.00	130.00	66.00	66.00	66.00	66.00
Liquid Density	W_L	lb/gal		5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	7.10	7.10	5.60	5.60	5.60	5.60
Vapor Pressure Method		-		RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	RVP	psi		8	8	8	8	8	8	8	8	8	8	8	8	8	0.1	0.1	8	8	8	8
Slope	SI	°F/vol %		3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3	3
Vapor Pressure Constant A	A	dimensionless		11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	13.963	13.963	11.792	11.792	11.792	11.792
Vapor Pressure Constant B	B	°C		5402	5402	5402	5402	5402	5402	5402	5402	5402	5402	5402	5402	5402	9100	9100	5402	5402	5402	5402
Vapor Pressure Constant C	C	°C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	P_{VA}	psia @ T_{LA}		4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	0.040	0.040	4.928	4.928	4.928	4.928
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	0.048	0.048	5.474	5.474	5.474	5.474
True Vapor Pressure @ T_{LN}	P_{VN}	psia @ T_{LN}		4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	0.034	0.034	4.427	4.427	4.427	4.427
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.00068	0.00068	0.10170	0.10170	0.10170	0.10170
Daily Vapor Pressure Range	DP_V	psia	$P_{VX} - P_{VN}$	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	0.01442	0.01442	1.04698	1.04698	1.04698	1.04698
Rim Seal Loss	L_R	lbs/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	338.3	338.3	338.3	338.3	338.3	338.3	338.3	338.3	338.3	338.3	338.3	338.3	338.3	5.8	5.8	439.0	439.0	439.0	439.0
Deck Fitting Loss	L_F	lbs/yr	$(F_F)(P^*)(M_V)(K_C)$	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	10.1	10.1	762.5	762.5	762.5	762.5
Deck Seam Loss	L_D	lbs/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lbs/yr	$[(0.943)(Q)(C)(W_L)/(D)][1+[(N_C)(F_C)]/D)]$	305.35	209.93	209.93	209.93	209.93	229.01	229.01	229.01	229.01	305.35	305.35	171.76	171.76	278.95	278.95	220.01	220.01	220.01	220.01
Total VOC Loss	L_T	lbs/yr	$(L_R+L_F+L_D+L_{WD})$	1406.16	1310.74	1310.74	1310.74	1310.74	1329.82	1329.82	1329.82	1329.82	1406.16	1406.16	1272.57	1272.57	294.87	294.87	1421.51	1421.51	1421.51	1421.51
Total VOC Loss	**L_T**	**ton/yr**	**$L_T/2000$**	**0.70**	**0.66**	**0.66**	**0.66**	**0.66**	**0.66**	**0.66**	**0.66**	**0.66**	**0.70**	**0.70**	**0.64**	**0.64**	**0.15**	**0.15**	**0.71**	**0.71**	**0.71**	**0.71**
Rim Seal Factor	K_s	lb-mole/ft^{2}yr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	L_R	lb/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	1103.34	1103.34	1103.34	1103.34	1103.34	1103.34	1103.34	1103.34	1103.34	1103.34	1103.34	1103.34	1103.34	2820.04	2820.04	1431.71	1431.71	1431.71	1431.71
Deck Fitting Loss	L_F	lb/yr	$(F_F)(P^*)(M_V)(K_C)$	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	4898.41	4898.41	2486.89	2486.89	2486.89	2486.89
Deck Seam Loss	L_D	lb/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lb/yr	$[(0.943)(Qmax*8760)(C)(W_L)/(D)][1+[(N_C)(F_C)]/D)]$	45974.62	12538.53	12538.53	45974.62	45974.62	45974.62	45974.62	45974.62	45974.62	45974.62	45974.62	20897.55	20897.55	20363.16	20363.16	16061.08	16061.08	16061.08	16061.08
Total VOC Loss	**L_T**	**lb/hr**	**$(L_R+L_F+L_D+L_{WD})/8760$**	**5.66**	**1.84**	**1.84**	**5.66**	**5.66**	**5.66**	**5.66**	**5.66**	**5.66**	**5.66**	**5.66**	**2.80**	**2.80**	**3.21**	**3.21**	**2.28**	**2.28**	**2.28**	**2.28**

Notes:
1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the produ
2. Actual tank deck fitting details may vary; however, maximum short-term and annual tank emissions will compl

initial:
110 K bbl
1.98 mm bbl/yr
(18 TO) (.67 tpy)

here:
2.20 mm bbl/yr
110 K bbl
⇒ 20 TO, .66 tpy

B

initial:
120K bbl
2.16 mm bbl/yr
(18 TO)(.68 tpy)

here:
120 K bbl
2.4 MM bbl/yr
⇒ 20 TO, .66 tpy

C

Same size
Same TP

SSTP

Same S, TP

SSTP

SS, TP

(3)

Table A-1A
Floating Roof Tank Emissions - Annual Basis
Intercontinental Terminals Company LLC
December 2018

FIN				P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018	P120-019	P120-020	P120-021	P120-022	P120-023
EPN				P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018	P120-019	P120-020	P120-021	P120-022	P120-023
Project No.				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Material				LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)	GASOLINE (RVP-8)
Material Type				PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity		bbl		120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Paint Color	-	-		White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank		(Yes / No)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	Q max	bbl/hr		55,000	55,000	55,000	55,000	55,000	55,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Throughput	Q	bbls/yr		3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000
Shell Clingage	C	bbl/ft^2		0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
No. of Columns	N_C	-		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Column Diameter	F_C	ft		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	F_F	lb-mole/yr		113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction				Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	K_D	lb-mole/ft$\cdot$yr		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	S_D	ft/ft^2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Factor	K_C	-		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Tank Rim Seal Factor, Kra	K_{ra}			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	K_{rb}			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	n			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rim Seal Factor	K_R	lb-mole/ft$\cdot$yr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period				Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	v	mph	Equal 0 for IFR Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	I	Btu/ft^2-d		1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	T_{AX}	°F		79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	T_{AN}	°F		57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	DT_A	°R	T_{AX} - T_{AN}	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	T_{AA}	°F	$((T_{AX}+459.67)+(T_{AN}+459.67))/2$	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	T_B	°F	T_{AA} + 6α -1	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	T_{LA}	°F	$0.44T_{AA}+0.56T_B+0.0079(\alpha*I)$	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	°F	$T_{LA}+0.25*DT_A$	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	$T_{LA}-0.25*DT_A$	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	DT_V	°R	$0.72*DT_A+0.028*\alpha*I$	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	-	Y/N		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Liquid Molecular Wt.	M_L	lb/lb-mole		0.00	0.00	0.00	0.00	0.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00	92.00
Vapor Molecular Wt.	M_V	lb/lb-mole		130.00	130.00	130.00	130.00	130.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00
Liquid Density	W_L	lb/gal		7.10	7.10	7.10	7.10	7.10	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
Vapor Pressure Method		-		RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	RVP	psi		0.1	0.1	0.1	0.1	0.1	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Slope	SI	°F/vol %		2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Vapor Pressure Constant A	A	dimensionless		13.963	13.963	13.963	13.963	13.963	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792	11.792
Vapor Pressure Constant B	B	°C		9100	9100	9100	9100	9100	5402	5402	5402	5402	5402	5402	5402	5402	5402	5402	5402	5402	5402	5402
Vapor Pressure Constant C	C	°C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	P_{VA}	psia @ T_{LA}		0.040	0.040	0.040	0.040	0.040	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928	4.928
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		0.048	0.048	0.048	0.048	0.048	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474	5.474
True Vapor Pressure @ T_{LN}	P_{VN}	psia @ T_{LN}		0.034	0.034	0.034	0.034	0.034	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427	4.427
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.00068	0.00068	0.00068	0.00068	0.00068	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170
Daily Vapor Pressure Range	DP_V	psia	P_{VX} - P_{VN}	0.01442	0.01442	0.01442	0.01442	0.01442	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698
Rim Seal Loss	L_R	lbs/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	5.8	5.8	5.8	5.8	5.8	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0
Deck Fitting Loss	L_F	lbs/yr	$(F_F)(P^*)(M_V)(K_C)$	10.1	10.1	10.1	10.1	10.1	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5	762.5
Deck Seam Loss	L_D	lbs/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lbs/yr	$[(0.943)(Q)(C)(W_L)/(D)][1+[(N_C)(F_C)]/D)$	334.74	334.74	334.74	334.74	334.74	264.02	264.02	264.02	264.02	264.02	264.02	264.02	264.02	264.02	264.02	264.02	264.02	264.02	264.02
Total VOC Loss	L_T	lbs/yr	$(L_R+L_F+L_D+L_{WD})$	350.66	350.66	350.66	350.66	350.66	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51
Total VOC Loss	**L_T**	**ton/yr**	**L_T/2000**	**0.18**	**0.18**	**0.18**	**0.18**	**0.18**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**
Rim Seal Factor	K_R	lb-mole/ft$\cdot$yr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	P*	dimensionless	$P_{VX}/P_A/(1+(1-(P_{VX}/P_A))^{0.5})^2$	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	L_R	lb/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	2820.04	2820.04	2820.04	2820.04	2820.04	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71
Deck Fitting Loss	L_F	lb/yr	$(F_F)(P^*)(M_V)(K_C)$	4898.41	4898.41	4898.41	4898.41	4898.41	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89
Deck Seam Loss	L_D	lb/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lb/yr	$[(0.943)(Qmax*8760)(C)(W_L)/(D)][1+[(N_C)(F_C)]/D)$	44798.94	44798.94	44798.94	44798.94	44798.94	35334.38	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08
Total VOC Loss	**L_T**	**lb/hr**	**$(L_R+L_F+L_D+L_{WD})/8760$**	**6.00**	**6.00**	**6.00**	**6.00**	**6.00**	**4.48**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**

Notes:
1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the produ
2. Actual tank deck fitting details may vary; however, maximum short-term and annual tank emissions will compl

SSTP SSTP SSTP SSTP SSTP SSTP SSTP SSTP SSTP SSTP

(4)

Table A-1A
Floating Roof Tank Emissions - Annual Basis
Intercontinental Terminals Company LLC
December 2018

FIN				**P120-024**	**P120-025**	**P120-026**	**P120-027**	**P120-028**	**P120-029**	**P120-030**	**P165-007**	**P165-008**	**P165-009**	**P165-010**	**P165-011**	**P165-012**
EPN				**P120-024**	**P120-025**	**P120-026**	**P120-027**	**P120-028**	**P120-029**	**P120-030**	**P165-007**	**P165-008**	**P165-009**	**P165-010**	**P165-011**	**P165-012**
Project No.				**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Material				**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**	**LIGHT FUEL OIL**	**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**	**GASOLINE (RVP-8)**
Material Type				PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID	PETROLEUM LIQUID
Diameter	D	ft.		109.00	109.00	109.00	109.00	109.00	109.00	109.00	140.00	140.00	140.00	140.00	140.00	140.00
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity		bbl		120,000	120,000	120,000	120,000	120,000	120,000	120,000	165,000	165,000	165,000	165,000	165,000	165,000
Paint Color	-	-		White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank		(Yes / No)		No	No	No	No	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	Q max	bbl/hr		25,000	25,000	25,000	25,000	25,000	25,000	25,000	55,000	55,000	55,000	55,000	55,000	55,000
Throughput	Q	bbls/yr		3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	4,950,000	4,950,000	4,950,000	4,950,000	4,950,000	4,950,000
Shell Clingage	C	bbl/ft^2		0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
No. of Columns	N_C	-		1	1	1	1	1	1	1	1	1	1	1	1	1
Column Diameter	F_C	ft		1	1	1	1	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	F_F	lb-mole/yr		113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	-	-		Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	K_D	lb-mole/ft/yr		0	0	0	0	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	S_D	ft/ft^2		0	0	0	0	0	0	0	0	0	0	0	0	0
Product Factor	K_C	-		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Tank Rim Seal Factor, Kra	K_{ra}			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	K_{rb}			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	n			1	1	1	1	1	1	1	1	1	1	1	1	1
Rim Seal Factor	K_s	lb-mole/ft/yr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period	-	-		Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	v	mph	Equal 0 for IFR Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	I	Btu/ft^2d		1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	T_{AX}	°F		79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	T_{AN}	°F		57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	DT_A	°R	T_{AX} - T_{AN}	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	T_{AA}	°F	$((T_{AX}+459.67)+(T_{AN}+459.67))/2$	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	T_B	°F	T_{AA} + 6α -1	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	T_{LA}	°F	$0.44T_{AA}+0.56_{TB}+0.0079(\alpha*I)$	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	°F	$T_{LA}+0.25*DT_V$	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	$T_{LA}-0.25*DT_V$	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	DT_V	°R	$0.72*DT_A+0.028*\alpha*I$	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	-	Y/N		N	N	N	N	N	N	N	N	N	N	N	N	N
Liquid Molecular Wt.	M_L	lb/lb-mole		92.00	92.00	92.00	92.00	92.00	92.00	92.00	0.00	92.00	92.00	92.00	92.00	92.00
Vapor Molecular Wt.	M_V	lb/lb-mole		66.00	66.00	66.00	66.00	66.00	66.00	66.00	130.00	66.00	66.00	66.00	66.00	66.00
Liquid Density	W_L	lb/gal		5.60	5.60	5.60	5.60	5.60	5.60	5.60	7.10	5.60	5.60	5.60	5.60	5.60
Vapor Pressure Method		-		RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	RVP	psi		8	8	8	8	8	8	8	0.1	8	8	8	8	8
Slope	Sl	°F/vol %		3	3	3	3	3	3	3	2	3	3	3	3	3
Vapor Pressure Constant A	A	dimensionless		11.792	11.792	11.792	11.792	11.792	11.792	11.792	13.963	11.792	11.792	11.792	11.792	11.792
Vapor Pressure Constant B	B	°C		5402	5402	5402	5402	5402	5402	5402	9100	5402	5402	5402	5402	5402
Vapor Pressure Constant C	C	°C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	P_{VA}	psia @ T_{LA}		4.928	4.928	4.928	4.928	4.928	4.928	4.928	0.040	4.928	4.928	4.928	4.928	4.928
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		5.474	5.474	5.474	5.474	5.474	5.474	5.474	0.048	5.474	5.474	5.474	5.474	5.474
True Vapor Pressure @ T_{LN}	P_{VN}	psia @ T_{LN}		4.427	4.427	4.427	4.427	4.427	4.427	4.427	0.034	4.427	4.427	4.427	4.427	4.427
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.10170	0.00068	0.10170	0.10170	0.10170	0.10170	0.10170
Daily Vapor Pressure Range	DP_V	psia	P_{VX} - P_{VN}	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	1.04698	0.01442	1.04698	1.04698	1.04698	1.04698	1.04698
Rim Seal Loss	L_R	lbs/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	439.0	439.0	439.0	439.0	439.0	439.0	439.0	7.5	563.8	563.8	563.8	563.8	563.8
Deck Fitting Loss	L_F	lbs/yr	$(F_F)(P^*)(M_V)(K_C)$	762.5	762.5	762.5	762.5	762.5	762.5	762.5	10.1	762.5	762.5	762.5	762.5	762.5
Deck Seam Loss	L_D	lbs/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lbs/yr	$[(0.943)(Q)(C)(W_L)/(D)][1+[(N_C)(F_C)]/D]$	264.02	264.02	264.02	264.02	264.02	264.02	264.02	357.63	282.07	282.07	282.07	282.07	282.07
Total VOC Loss	L_T	lbs/yr	$(L_R+L_F+L_D+L_{WD})$	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	1465.51	375.20	1608.41	1608.41	1608.41	1608.41	1608.41
Total VOC Loss	L_T	**ton/yr**	**L_T/2000**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.19**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**
Rim Seal Factor	K_s	lb-mole/ft/yr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	L_R	lb/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	1431.71	3622.07	1838.89	1838.89	1838.89	1838.89	1838.89
Deck Fitting Loss	L_F	lb/yr	$(F_F)(P^*)(M_V)(K_C)$	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	2486.89	4898.41	2486.89	2486.89	2486.89	2486.89	2486.89
Deck Seam Loss	L_D	lb/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lb/yr	$[(0.943)(Qmax*8760)(C)(W_L)/(D)][1+[(N_C)(F_C)]/D]$	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08	16061.08	34808.97	27454.96	27454.96	27454.96	27454.96	27454.96
Total VOC Loss	L_T	**lb/hr**	**$(L_R+L_F+L_D+L_{WD})$/8760**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**2.28**	**4.95**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**

Notes:
1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the produ
2. Actual tank deck fitting details may vary, however, maximum short-term and annual tank emissions will compl

✓SSTP → ✓ ✓ ✓ ✓ ✓

Table A-1B
Floating Roof Tank Emissions - Short-Term Basis
Intercontinental Terminals Company LLC
December 2018

FIN				**P100-001**	**P100-002**	**P100-003**	**P100-004**	**P100-005**	**P100-006**	**P100-007**	**P100-008**	**P100-009**
EPN				**P100-001**	**P100-002**	**P100-003**	**P100-004**	**P100-005**	**P100-006**	**P100-007**	**P100-008**	**P100-009**
Project No.				**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Material				**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**
Material Type				CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity		bbl		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Paint Color	-	-		White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α	-		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank		(Yes / No)		No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	Q max	bbl/hr		10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Throughput	Q	bbls/yr		1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000
Shell Clingage	C	bbl/ft^2		0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
No. of Columns	N_C	-		1	1	1	1	1	1	1	1	1
Column Diameter	F_C	ft		1	1	1	1	1	1	1	1	1
Deck Fitting Factor	F_F	lb-mole/yr		113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	-	-		Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	K_D	lb-mole/ftyr		0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	S_D	ft/ft^2		0	0	0	0	0	0	0	0	0
Product Factor	K_C	-		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Tank Rim Seal Factor, Kra	K_{Ra}			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	K_{Rb}			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	n			1	1	1	1	1	1	1	1	1
Rim Seal Factor	K_R	lb-mole/ftyr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period		-		Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	v	mph	Equal 0 for IFR Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	I	$Btu/ft^2 d$		1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	T_{AX}	°F		79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	T_{AN}	°F		57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	DT_A	°R	$T_{AX} - T_{AN}$	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	T_{AA}	°F	$((T_{AX}+459.67)+(T_{AN}+459.67))/2$	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	T_b	°F	$T_{AA} + 6\alpha - 1$	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	T_{LA}	°F	$0.44T_{AA}+0.56T_b+0.0079(\alpha*I)$	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	°F	$T_{LA}+0.25*DT_V$	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	$T_{LA}-0.25*DT_V$	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	DT_V	°R	$0.72*DT_A+0.028*\alpha*I$	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	-	Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y
Liquid Molecular Wt.	M_L	lb/lb-mole		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vapor Molecular Wt.	M_V	lb/lb-mole		50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Liquid Density	W_l	lb/gal		7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Vapor Pressure Method		-		RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	RVP	psi		8	8	8	8	8	8	8	8	8
Slope	SI	°F/vol %		0	0	0	0	0	0	0	0	0
Vapor Pressure Constant A	A	dimensionless		10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809
Vapor Pressure Constant B	B	°C		4732	4732	4732	4732	4732	4732	4732	4732	4732
Vapor Pressure Constant C	C	°C		NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	P_{VA}	psia @ T_{LA}		6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152
True Vapor Pressure @ T_{LN}	P_{VN}	psia @ T_{LN}		5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557
Daily Vapor Pressure Range	DP_V	psia	$P_{VX} - P_{VN}$	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383
Rim Seal Loss	L_R	lbs/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4
Deck Fitting Loss	L_F	lbs/yr	$(F_F)(P^*)(M_V)(K_C)$	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7
Deck Seam Loss	L_D	lbs/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lbs/yr	$[(0.943)(Q)(C)(W_l)/(D)][1+[(N_C)(F_C)]/D)]$	669.47	669.47	669.47	669.47	669.47	669.47	669.47	669.47	669.47
Total VOC Loss	L_T	lbs/yr	$(L_R+L_F+L_D+L_{WD})$	1190.60	1190.60	1190.60	1190.60	1190.60	1190.60	1190.60	1190.60	1190.60
Total VOC Loss	L_T	**ton/yr**	$L_T/2000$	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	P*	dimensionless	$P_{VX}/P_A/(1+(1-(P_{VX}/P_A))^{0.5})^2$	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	L_R	lb/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85
Deck Fitting Loss	L_F	lb/yr	$(F_F)(P^*)(M_V)(K_C)$	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60
Deck Seam Loss	L_D	lb/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lb/yr	$[(0.943)(Qmax*8760)(C)(W_l)/(D)][1+[(N_C)(F_C)]/D)]$	32,581.05	32,581.05	32,581.05	32,581.05	32,581.05	32,581.05	32,581.05	32,581.05	32,581.05
Total VOC Loss	L_T	**lb/hr**	$(L_R+L_F+L_D+L_{WD})/8760$	**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**3.85**

FIN	**P100-010**	**P12-001**	**P12-002**	**P12-003**	**P80-001**	**P100-12**	**P100-13**	**P165-003**	**P165-004**
EPN	**P100-010**	**P12-001**	**P12-002**	**P12-003**	**P80-001**	**P100-12**	**P100-13**	**P165-003**	**P165-004**
Project No.	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**2**	**2**
Material	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**
Material Type	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL
Diameter	109.00	37.00	45.00	45.00	94.00	84.00	84.00	84.00	84.00
Tank Type	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity	100,000	12,000	12,000	12,000	80,000	100,000	100,000	160,000	160,000
Paint Color	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	10,000	10,000	10,000	10,000	10,000	15,000	15,000	55,000	55,000
Throughput	1,800,000	216,000	216,000	216,000	480,000	2,000,000	2,000,000	3,200,000	3,200,000
Shell Clingage	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
No. of Columns	1	1	1	1	1	1	1	1	1
Column Diameter	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	0	0	0	0	0	0	0	0	0
Product Factor	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Tank Rim Seal Factor, Kra	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	1	1	1	1	1	1	1	1	1
Rim Seal Factor	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Liquid Molecular Wt.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vapor Molecular Wt.	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Liquid Density	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Vapor Pressure Method	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	8	8	8	8	8	8	8	8	8
Slope	0	0	0	0	0	0	0	0	0
Vapor Pressure Constant A	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809
Vapor Pressure Constant B	4732	4732	4732	4732	4732	4732	4732	4732	4732
Vapor Pressure Constant C	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524
True Vapor Pressure @ T_{LX}	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152
True Vapor Pressure @ T_{LN}	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939
Vapor Pressure Function	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557
Daily Vapor Pressure Range	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383
Rim Seal Loss	190.4	64.6	78.6	78.6	164.2	146.7	146.7	146.7	146.7
Deck Fitting Loss	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7
Deck Seam Loss	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	669.47	240.85	197.11	197.11	207.31	967.86	967.86	1548.57	1548.57
Total VOC Loss	1190.60	636.21	606.44	606.44	702.24	1445.31	1445.31	2026.03	2026.03
Total VOC Loss	**0.60**	**0.32**	**0.30**	**0.30**	**0.35**	**0.72**	**0.72**	**1.01**	**1.01**
True Vapor Pressure @ T_{LX}	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	433.85	147.27	179.11	179.11	374.15	334.34	334.34	334.34	334.34
Deck Fitting Loss	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60
Deck Seam Loss	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	32,581.05	97,679.98	79,938.91	79,938.91	37,834.96	63,588.27	63,588.27	233,156.99	233,156.99
Total VOC Loss	**3.85**	**11.25**	**9.23**	**9.23**	**4.45**	**7.38**	**7.38**	**26.74**	**26.74**

Notes:
1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the products listed in the comprehensive product list included this permit application and the proposed emission caps rather than throughput limits.
2. Actual tank deck fitting details may vary, however, maximum short-term and annual tank emissions will comply with the proposed emission limits.

Table A-1B
Floating Roof Tank Emissions - Short-Term Basis
Intercontinental Terminals Company LLC
December 2018

FIN				P185-005	P185-006	P110-001	P110-002	P110-003	P110-004	P120-001	P120-002	P120-003	P120-004	P185-001	P185-002	P060-001	P060-002	P100-014	P100-015	P100-016	P100-017	P100-018
EPN				**P185-005**	**P185-006**	**P110-001**	**P110-002**	**P110-003**	**P110-004**	**P120-001**	**P120-002**	**P120-003**	**P120-004**	**P185-001**	**P185-002**	**P060-001**	**P060-002**	**P100-014**	**P100-015**	**P100-016**	**P100-017**	**P100-018**
Project No.				**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Material				**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**
Material Type				CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL
Diameter	D	ft		84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	109.00	109.00	109.00	109.00	109.00
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity		bbl		160,000	160,000	110,000	110,000	110,000	110,000	120,000	120,000	120,000	120,000	160,000	160,000	60,000	60,000	100,000	100,000	100,000	100,000	100,000
Paint Color	-	-		White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank		(Yes / No)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	Q max	bbl/hr		55,000	55,000	15,000	15,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Throughput	Q	bbls/yr		3,200,000	3,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,400,000	2,400,000	2,400,000	2,400,000	3,200,000	3,200,000	1,800,000	1,800,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Shell Clingage	C	bbl/ft^2		0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
No. of Columns	N_C	-		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Column Diameter	F_C	ft		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	F_F	lb-mole/yr		113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	-	-		Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	K_D	lb-mole/ft/yr		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	S_D	ft/ft^2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Factor	K_C	-		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Tank Rim Seal Factor, Kra	K_{ra}			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	K_{rb}			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	n			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rim Seal Factor	K_s	lb-mole/ft/yr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period				Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	v	mph	Equal 0 for IFR Tanks.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	I	Btu/ft^2-d		1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	T_{AX}	°F		79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	T_{AN}	°F		57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	DT_A	°R	$T_{AX} - T_{AN}$	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	T_{AA}	°F	(T_AX+460.67)+(T_AN+460.67)/2	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	T_b	°F	T_{AA} + 6α-1	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	T_{LA}	°F	$0.44T_{AA}+0.56t_b+0.0079(\alpha*I)$	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	°F	$T_{LA}+0.25*DT_V$	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	$T_{LA}-0.25*DT_V$	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	DT_V	°R	$0.72*DT_A+0.028*\alpha*I$	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	-	Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Liquid Molecular Wt.	M_L	lb/lb-mole		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vapor Molecular Wt.	M_V	lb/lb-mole		50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Liquid Density	W_L	lb/gal		7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	RVP	psi		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Slope	SI	°F/vol %		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vapor Pressure Constant A	A	dimensionless		10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809
Vapor Pressure Constant B	B	°C		4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732
Vapor Pressure Constant C	C	°C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	P_{VA}	psia @ T_{LA}		6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152
True Vapor Pressure @ T_{LN}	P_{VN}	psia @ T_{LN}		5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557
Daily Vapor Pressure Range	DP_V	psia	$P_{VX} - P_{VN}$	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383
Rim Seal Loss	L_R	lbs/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	146.7	146.7	146.7	146.7	146.7	146.7	146.7	146.7	146.7	146.7	146.7	146.7	146.7	146.7	190.4	190.4	190.4	190.4	190.4
Deck Fitting Loss	L_F	lbs/yr	$(F_F)(P^*)(M_V)(K_C)$	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7
Deck Seam Loss	L_D	lbs/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lbs/yr	$[(0.943)(Q)(C)(W_L/D)](1+[(N_C)(F_C)]/D)$	1548.57	1548.57	1064.64	1064.64	1064.64	1064.64	1161.43	1161.43	1161.43	1161.43	1548.57	1548.57	871.07	871.07	1115.79	1115.79	1115.79	1115.79	1115.79
Total VOC Loss	L_T	lbs/yr	$(L_R+L_F+L_D+L_{WD})$	2026.03	2026.03	1542.10	1542.10	1542.10	1542.10	1638.89	1638.89	1638.89	1638.89	2026.03	2026.03	1348.53	1348.53	1636.91	1636.91	1636.91	1636.91	1636.91
Total VOC Loss	**L_T**	**ton/yr**	**L_T/2000**	**1.01**	**1.01**	**0.77**	**0.77**	**0.77**	**0.77**	**0.82**	**0.82**	**0.82**	**0.82**	**1.01**	**1.01**	**0.67**	**0.67**	**0.82**	**0.82**	**0.82**	**0.82**	**0.82**
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	L_R	lb/yr	$(K_R)(P^*)(D)(M_V)(K_C)$	334.34	334.34	334.34	334.34	334.34	334.34	334.34	334.34	334.34	334.34	334.34	334.34	334.34	334.34	433.85	433.85	433.85	433.85	433.85
Deck Fitting Loss	L_F	lb/yr	$(F_F)(P^*)(M_V)(K_C)$	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60
Deck Seam Loss	L_D	lb/yr	$(K_D)(S_D)(D^2)(P^*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lb/yr	$[(0.943)(Qmax*8760)(C)(W_L/D)](1+[(N_C)(F_C)]/D)$	233,156.99	233,156.99	63,588.27	63,588.27	233,156.99	233,156.99	233,156.99	233,156.99	233,156.99	233,156.99	233,156.99	233,156.99	105,980.45	105,980.45	81,452.63	81,452.63	81,452.63	81,452.63	81,452.63
Total VOC Loss	**L_T**	**lb/hr**	**$(L_R+L_F+L_D+L_{WD})/8760$**	**26.74**	**26.74**	**7.38**	**7.38**	**26.74**	**26.74**	**26.74**	**26.74**	**26.74**	**26.74**	**26.74**	**26.74**	**12.22**	**12.22**	**9.43**	**9.43**	**9.43**	**9.43**	**9.43**

Notes:
1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the produ
2. Actual tank deck fitting details may vary, however, maximum short-term and annual tank emissions will comply

Table A-1B
Floating Roof Tank Emissions - Short-Term Basis
Intercontinental Terminals Company LLC
December 2018

FIN				P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014
EPN				P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014
Project No.				3	3	3	3	3	3	3	3	3	3	3
Material				**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**
Material Type				CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity		bbl		100,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Paint Color	-	-		White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α	-		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank		(Yes / No)		No	No	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	Q max	bbl/hr		25,000	55,000	55,000	55,000	55,000	55,000	55,000	25,000	25,000	25,000	25,000
Throughput	Q	bbls/yr		3,000,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000
Shell Clingage	C	bbl/ft^2		0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
No. of Columns	N_C	-		1	1	1	1	1	1	1	1	1	1	1
Column Diameter	F_C	ft		1	1	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	F_F	lb-mole/yr		113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	-	-		Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	K_D	lb-mole/ftyr		0	0	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	S_D	ft/ft^2		0	0	0	0	0	0	0	0	0	0	0
Product Factor	K_C	-		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Tank Rim Seal Factor, Kra	K_{Ra}			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	K_{Rb}			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	n			1	1	1	1	1	1	1	1	1	1	1
Rim Seal Factor	K_R	lb-mole/ftyr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period		-		Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	v	mph	Equal 0 for IFR Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	I	Btu/ft^2-d		1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	T_{AX}	°F		79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	T_{AN}	°F		57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	DT_A	°R	$T_{AX} - T_{AN}$	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	T_{AA}	°F	((T +459.67)+(T +459.67))/2	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	T_b	°F	$T_{AA} + 6\alpha - 1$	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	T_{LA}	°F	$0.44T_{AA}+0.56T_b+0.0079(\alpha*I)$	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	°F	$T_{LA}+0.25*DT_V$	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	$T_{LA}-0.25*DT_V$	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	DT_V	°R	$0.72*DT_A+0.028*\alpha*I$	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	-	Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Liquid Molecular Wt.	M_L	lb/lb-mole		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vapor Molecular Wt.	M_V	lb/lb-mole		50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Liquid Density	W_l	lb/gal		7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Vapor Pressure Method		-		RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	RVP	psi		8	8	8	8	8	8	8	8	8	8	8
Slope	SI	°F/vol %		0	0	0	0	0	0	0	0	0	0	0
Vapor Pressure Constant A	A	dimensionless		10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809
Vapor Pressure Constant B	B	°C		4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732
Vapor Pressure Constant C	C	°C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	P_{VA}	psia @ T_{LA}		6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152
True Vapor Pressure @ T_{LN}	P_{VN}	psia @ T_{LN}		5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_A/(1+(1-(P_{VA}/P_A))$^0.5)^2	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557
Daily Vapor Pressure Range	DP_V	psia	$P_{VX} - P_{VN}$	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383
Rim Seal Loss	L_R	lbs/yr	$(K_R)(P*)(D)(M_V)(K_C)$	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4
Deck Fitting Loss	L_F	lbs/yr	$(F_F)(P*)(M_V)(K_C)$	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7
Deck Seam Loss	L_D	lbs/yr	$(K_D)(S_D)(D$^2)$(P*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lbs/yr	$[(0.943)(Q)(C)(W_l)/(D)](1+[(N_c)(F_C)]/D)$	1115.79	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95
Total VOC Loss	L_T	lbs/yr	$(L_R+L_F+L_D+L_{WD})$	1636.91	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07
Total VOC Loss	L_T	**ton/yr**	**$L_T/2000$**	**0.82**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	P*	dimensionless	$P_{VX}/P_A/(1+(1-(P_{VX}/P_A))$^0.5)^2	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	L_R	lb/yr	$(K_R)(P*)(D)(M_V)(K_C)$	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85
Deck Fitting Loss	L_F	lb/yr	$(F_F)(P*)(M_V)(K_C)$	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60
Deck Seam Loss	L_D	lb/yr	$(K_D)(S_D)(D$^2)$(P*)(M_V)(K_C)$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lb/yr	$[(0.943)(Qmax*8760)(C)(W_l)/(D)](1+[(N_c)(F_C)]/D)$	81,452.63	179,195.78	179,195.78	179,195.78	179,195.78	179,195.78	179,195.78	81,452.63	81,452.63	81,452.63	81,452.63
Total VOC Loss	L_T	**lb/hr**	**$(L_R+L_F+L_D+L_{WD})/8760$**	**9.43**	**20.59**	**20.59**	**20.59**	**20.59**	**20.59**	**20.59**	**9.43**	**9.43**	**9.43**	**9.43**

FIN	P120-015	P120-016	P120-017	P120-018	P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025
EPN	P120-015	P120-016	P120-017	P120-018	P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025
Project No.	3	3	3	3	3	3	3	3	3	3	3
Material	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**
Material Type	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL
Diameter	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
Tank Type	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Paint Color	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank	No	No	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Throughput	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000
Shell Clingage	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
No. of Columns	1	1	1	1	1	1	1	1	1	1	1
Column Diameter	1	1	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	0	0	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	0	0	0	0	0	0	0	0	0	0	0
Product Factor	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Tank Rim Seal Factor, Kra	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	1	1	1	1	1	1	1	1	1	1	1
Rim Seal Factor	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Liquid Molecular Wt.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vapor Molecular Wt.	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Liquid Density	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Vapor Pressure Method	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	8	8	8	8	8	8	8	8	8	8	8
Slope	0	0	0	0	0	0	0	0	0	0	0
Vapor Pressure Constant A	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809
Vapor Pressure Constant B	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732
Vapor Pressure Constant C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524
True Vapor Pressure @ T_{LX}	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152
True Vapor Pressure @ T_{LN}	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939
Vapor Pressure Function	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557
Daily Vapor Pressure Range	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383
Rim Seal Loss	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4	190.4
Deck Fitting Loss	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7
Deck Seam Loss	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95	1338.95
Total VOC Loss	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07	1860.07
Total VOC Loss	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**
True Vapor Pressure @ T_{LX}	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85	433.85
Deck Fitting Loss	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60
Deck Seam Loss	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	81,452.63	81,452.63	81,452.63	81,452.63	81,452.63	81,452.63	81,452.63	81,452.63	81,452.63	81,452.63	81,452.63
Total VOC Loss	**9.43**	**9.43**	**9.43**	**9.43**	**9.43**	**9.43**	**9.43**	**9.43**	**9.43**	**9.43**	**9.43**

Notes:
1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the produ
2. Actual tank deck fitting details may vary, however, maximum short-term and annual tank emissions will comply

Table A-1B
Floating Roof Tank Emissions - Short-Term Basis
Intercontinental Terminals Company LLC
December 2018

FIN				**P120-026**	**P120-027**	**P120-028**	**P120-029**	**P120-030**	**P165-007**	**P165-008**	**P165-009**	**P165-010**	**P165-011**	**P165-012**
EPN				**P120-026**	**P120-027**	**P120-028**	**P120-029**	**P120-030**	**P165-007**	**P165-008**	**P165-009**	**P165-010**	**P165-011**	**P165-012**
Project No.				**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Material				**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**	**Crude Oil**
Material Type				CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL	CRUDE OIL
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	140.00	140.00	140.00	140.00	140.00	140.00
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Tank Nominal Capacity		bbl		120,000	120,000	120,000	120,000	120,000	165,000	165,000	165,000	165,000	165,000	165,000
Paint Color	-	-		White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Continuous Level Tank		(Yes / No)		No	No	No	No	No	No	No	No	No	No	No
Maximum Withdrawal Rate	Q max	bbl/hr		25,000	25,000	25,000	25,000	25,000	55,000	55,000	55,000	55,000	55,000	55,000
Throughput	Q	bbls/yr		3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	4,950,000	4,950,000	4,950,000	4,950,000	4,950,000	4,950,000
Shell Clingage	C	bbl/ft^2		0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
No. of Columns	N_C	-		1	1	1	1	1	1	1	1	1	1	1
Column Diameter	F_C	ft		1	1	1	1	1	1	1	1	1	1	1
Deck Fitting Factor	F_F	lb-mole/yr		113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60
Deck Construction	-	-		Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded	Welded
Deck Seam Loss Factor	K_D	lb-mole/ft/yr		0	0	0	0	0	0	0	0	0	0	0
Deck Seam Length Factor	S_D	ft/ft^2		0	0	0	0	0	0	0	0	0	0	0
Product Factor	K_C	-		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Tank Rim Seal Factor, Kra	K_{ra}			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Tank Rim Seal Factor, Krb	K_{rb}			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Tank Rim Seal Factor, n	n			1	1	1	1	1	1	1	1	1	1	1
Rim Seal Factor	K_s	lb-mole/ft/yr		0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Period				Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Average Wind Speed	v	mph	Equal 0 for IFR Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily Total Solar Insolation Factor	I	Btu/ft^2-d		1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	T_{AX}	*F		79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	T_{AN}	*F		57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	DT_A	*R	T_{AX} - T_{AN}	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70	21.70
Daily Avg. Ambient Temperature	T_{AA}	*F	(T$_{AX}$+459.67)+(T$_{AN}$+459.67)/2	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25	68.25
Liquid Bulk Temperature	T_b	*F	T_{AA} + 6α-1	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27	68.27
Daily Avg. Liquid Surface Temp.	T_{LA}	*F	0.44T_{AA}+0.56t_b+0.0079(α*I)	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08	70.08
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	*F	T_{LA}+0.25*DT_v	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59	75.59
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	*F	T_{LA}-0.25*DT_v	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56	64.56
Daily Vapor Temperature Range	DT_v	*R	0.72*DT_A+0.028*α*I	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Crude Oil Service?	-	Y/N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Liquid Molecular Wt.	M_L	lb/lb-mole		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vapor Molecular Wt.	M_V	lb/lb-mole		50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Liquid Density	W_L	lb/gal		7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	RVP	psi		8	8	8	8	8	8	8	8	8	8	8
Slope	SI	*F/vol %		0	0	0	0	0	0	0	0	0	0	0
Vapor Pressure Constant A	A	dimensionless		10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809	10.809
Vapor Pressure Constant B	B	*C		4732	4732	4732	4732	4732	4732	4732	4732	4732	4732	4732
Vapor Pressure Constant C	C	*C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	P_{VA}	psia @ T_{LA}		6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524	6.524
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152	7.152
True Vapor Pressure @ T_{LN}	P_{VN}	psia @ T_{LN}		5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939	5.939
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_V/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557	0.14557
Daily Vapor Pressure Range	DP_V	psia	P_{VX} - P_{VN}	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383	1.21383
Rim Seal Loss	L_R	lbs/yr	(K_R)(P*)(D)(M_V)(K_C)	190.4	190.4	190.4	190.4	190.4	244.6	244.6	244.6	244.6	244.6	244.6
Deck Fitting Loss	L_F	lbs/yr	(F_F)(P*)(M_V)(K_C)	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7	330.7
Deck Seam Loss	L_D	lbs/yr	(K_D)(S_D)(D^2)(P*)(M_V)(K_C)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lbs/yr	[(0.943)(Q)(C)(W_L)/(D)][1+[(N_C)(F_C)]/D]	1338.95	1338.95	1338.95	1338.95	1338.95	1430.51	1430.51	1430.51	1430.51	1430.51	1430.51
Total VOC Loss	L_T	lbs/yr	(L_R+L_F+L_D+L_{WD})	1860.07	1860.07	1860.07	1860.07	1860.07	2005.78	2005.78	2005.78	2005.78	2005.78	2005.78
Total VOC Loss	**L_T**	**ton/yr**	**L_T/2000**	**0.93**	**0.93**	**0.93**	**0.93**	**0.93**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000	11.000
Vapor Pressure Function	P*	dimensionless	$P_{VA}/P_V/(1+(1-(P_{VA}/P_A))^{0.5})^2$	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169	0.33169
Rim Seal Loss	L_R	lb/yr	(K_R)(P*)(D)(M_V)(K_C)	433.85	433.85	433.85	433.85	433.85	557.24	557.24	557.24	557.24	557.24	557.24
Deck Fitting Loss	L_F	lb/yr	(F_F)(P*)(M_V)(K_C)	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60	753.60
Deck Seam Loss	L_D	lb/yr	(K_D)(S_D)(D^2)(P*)(M_V)(K_C)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Withdrawal Loss	L_{WD}	lb/yr	[(0.943)(Qmax*8760)(C)(W_L)/(D)][1+[(N_C)(F_C)]/D]	81,452.63	81,452.63	81,452.63	81,452.63	81,452.63	139,235.87	139,235.87	139,235.87	139,235.87	139,235.87	139,235.87
Total VOC Loss	**L_T**	**lb/hr**	**(L_R+L_F+L_D+L_{WD})/8760**	**9.43**	**9.43**	**9.43**	**9.43**	**9.43**	**16.04**	**16.04**	**16.04**	**16.04**	**16.04**	**16.04**

Notes:
1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the produ
2. Actual tank deck fitting details may vary; however, maximum short-term and annual tank emissions will comply

Table A-2

Tank Deck Fitting Factors

Intercontinental Terminals Company LLC

December 2018

Houston, Texas

Average Annual Wind Speed (ws): 7.87 mph

				FIN>>	P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010	P12-001	P12-002
				Roof Type>	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Fitting Type	Cover Type/Description	KFa	KFb	m	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	1.6	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed	36	5.9	1.2												
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed	31	5.2	1.3												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Ungask.	31	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Gask.	25	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Flex. Fabric Sleeve Seal	10	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Ungask.	51	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Gask.	33	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unslotted Guidepoles	Ungasketed Sliding Cover	31	150	1.4												
Unslotted Guidepoles	Ungasketed Sliding Cover, w. Sleeve	25	2.2	2.1												
Unslotted Guidepoles	Gasketed Sliding Cover	25	13	2.2												
Unslotted Guidepoles	Gasketed sliding Cover, w. Wiper	14	3.7	0.78	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Unslotted Guidepoles	Gasketed Sliding Cover, w. Sleeve	8.6	12	0.81												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Wiper	41	48	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve	11	46	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve,Wiper	8.3	4.4	1.6												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float, Wiper	21	7.9	1.8	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Slotted Guidepoles/Sample Well	Gask Sliding Covr, w. Float,Sleeve,Wiper	11	9.9	0.89												
Automatic Gauge Float Well	Unbolted Cover, Ungasketed	14	5.4	1.1												
Automatic Gauge Float Well	Unbolted Cover, Gasketed	4.3	17	0.38												
Automatic Gauge Float Well	Bolted Cover, Gasketed	2.8	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Gask.	0.47	0.02	0.97												
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Ungask.	2.3	0	0												
Gauge-Hatch/Sample Well	Slit Fabric Seal 10% Open	12	0	0												
Vacuum Breaker	Weighted Mech. Actuation, Ungask.	7.8	0.01	4												
Vacuum Breaker	Weighted Mech. Actuation, Gask.	6.2	1.2	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Roof Drain	Open	1.5	0.21	1.7												
Roof Drain	90% Closed	1.8	0.14	1.1												
Roof Drain	Stub	1.2	0	0												
Roof Leg - IFR	Adjustable	7.9	0	0												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Ungasketed	2	0.37	0.91												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Gasketed	1.3	0.08	0.65												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Sock	1.2	0.14	0.65												
Roof Leg - Center Area	Adjustable, Center Area, Ungasketed	0.82	0.53	0.14												
Roof Leg - Center Area	Adjustable, Center Area, Gasketed	0.53	0.11	0.13												
Roof Leg - Center Area	Adjustable, Center Area, Sock	0.49	0.16	0.14												
Roof Leg - Double-Deck	Adjustable, Double-Deck Roofs	0.82	0.53	0.14												
Roof Leg - IFR	Fixed	0	0	0	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00
Rim Vent	Weighted Mech. Actuation, Ungask.	0.68	1.8	1												
Rim Vent	Weighted Mech. Actuation, Gask.	0.71	0.1	1												
Ladder Well	Sliding Cover, Ungasketed	98	0	0												
Ladder Well	Sliding Cover, Gasketed	56	0	0												
				Deck Fitting Factor:	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60

Table A-2

Tank Deck Fitting Factors

Intercontinental Terminals Company LLC

December 2018

Houston, Texas

Average Annual Wind Speed (ws): 7.87 mph

				FIN>>	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005	P165-006	P110-001	P110-002	P110-003	P110-004
				Roof Type>	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Fitting Type	Cover Type/Description	KFa	KFb	m	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	1.6	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed	36	5.9	1.2												
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed	31	5.2	1.3												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Ungask.	31	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Gask.	25	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Flex. Fabric Sleeve Seal	10	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Ungask.	51	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Gask.	33	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unslotted Guidepoles	Ungasketed Sliding Cover	31	150	1.4												
Unslotted Guidepoles	Ungasketed Sliding Cover, w. Sleeve	25	2.2	2.1												
Unslotted Guidepoles	Gasketed Sliding Cover	25	13	2.2												
Unslotted Guidepoles	Gasketed sliding Cover, w. Wiper	14	3.7	0.78	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Unslotted Guidepoles	Gasketed Sliding Cover, w. Sleeve	8.6	12	0.81												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Wiper	41	48	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve	11	46	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve,Wiper	8.3	4.4	1.6												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float, Wiper	21	7.9	1.8	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Slotted Guidepoles/Sample Well	Gask Sliding Covr, w. Float,Sleeve,Wiper	11	9.9	0.89												
Automatic Gauge Float Well	Unbolted Cover, Ungasketed	14	5.4	1.1												
Automatic Gauge Float Well	Unbolted Cover, Gasketed	4.3	17	0.38												
Automatic Gauge Float Well	Bolted Cover, Gasketed	2.8	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Gask.	0.47	0.02	0.97												
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Ungask.	2.3	0	0												
Gauge-Hatch/Sample Well	Slit Fabric Seal 10% Open	12	0	0												
Vacuum Breaker	Weighted Mech. Actuation, Ungask.	7.8	0.01	4												
Vacuum Breaker	Weighted Mech. Actuation, Gask.	6.2	1.2	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Roof Drain	Open	1.5	0.21	1.7												
Roof Drain	90% Closed	1.8	0.14	1.1												
Roof Drain	Stub	1.2	0	0												
Roof Leg - IFR	Adjustable	7.9	0	0												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Ungasketed	2	0.37	0.91												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Gasketed	1.3	0.08	0.65												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Sock	1.2	0.14	0.65												
Roof Leg - Center Area	Adjustable, Center Area, Ungasketed	0.82	0.53	0.14												
Roof Leg - Center Area	Adjustable, Center Area, Gasketed	0.53	0.11	0.13												
Roof Leg - Center Area	Adjustable, Center Area, Sock	0.49	0.16	0.14												
Roof Leg - Double-Deck	Adjustable, Double-Deck Roofs	0.82	0.53	0.14												
Roof Leg - IFR	Fixed	0	0	0	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00
Rim Vent	Weighted Mech. Actuation, Ungask.	0.68	1.8	1												
Rim Vent	Weighted Mech. Actuation, Gask.	0.71	0.1	1												
Ladder Well	Sliding Cover, Ungasketed	98	0	0												
Ladder Well	Sliding Cover, Gasketed	56	0	0												
				Deck Fitting Factor:	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60

Table A-2

Tank Deck Fitting Factors

Intercontinental Terminals Company LLC

December 2018

Houston, Texas

Average Annual Wind Speed (ws): 7.87 mph

				FIN>>	P120-001	P120-002	P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	P100-014	P100-015	P100-016	P100-017
				Roof Type>	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Fitting Type	Cover Type/Description	KFa	KFb	m	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	1.6	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed	36	5.9	1.2												
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed	31	5.2	1.3												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Ungask.	31	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Gask.	25	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Flex. Fabric Sleeve Seal	10	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Ungask.	51	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Gask.	33	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unslotted Guidepoles	Ungasketed Sliding Cover	31	150	1.4												
Unslotted Guidepoles	Ungasketed Sliding Cover, w. Sleeve	25	2.2	2.1												
Unslotted Guidepoles	Gasketed Sliding Cover	25	13	2.2												
Unslotted Guidepoles	Gasketed sliding Cover, w. Wiper	14	3.7	0.78	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Unslotted Guidepoles	Gasketed Sliding Cover, w. Sleeve	8.6	12	0.81												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Wiper	41	48	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve	11	46	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve,Wiper	8.3	4.4	1.6												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float, Wiper	21	7.9	1.8	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Slotted Guidepoles/Sample Well	Gask Sliding Covr, w. Float,Sleeve,Wiper	11	9.9	0.89												
Automatic Gauge Float Well	Unbolted Cover, Ungasketed	14	5.4	1.1												
Automatic Gauge Float Well	Unbolted Cover, Gasketed	4.3	17	0.38												
Automatic Gauge Float Well	Bolted Cover, Gasketed	2.8	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Gask.	0.47	0.02	0.97												
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Ungask.	2.3	0	0												
Gauge-Hatch/Sample Well	Slit Fabric Seal 10% Open	12	0	0												
Vacuum Breaker	Weighted Mech. Actuation, Ungask.	7.8	0.01	4												
Vacuum Breaker	Weighted Mech. Actuation, Gask.	6.2	1.2	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Roof Drain	Open	1.5	0.21	1.7												
Roof Drain	90% Closed	1.8	0.14	1.1												
Roof Drain	Stub	1.2	0	0												
Roof Leg - IFR	Adjustable	7.9	0	0												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Ungasketed	2	0.37	0.91												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Gasketed	1.3	0.08	0.65												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Sock	1.2	0.14	0.65												
Roof Leg - Center Area	Adjustable, Center Area, Ungasketed	0.82	0.53	0.14												
Roof Leg - Center Area	Adjustable, Center Area, Gasketed	0.53	0.11	0.13												
Roof Leg - Center Area	Adjustable, Center Area, Sock	0.49	0.16	0.14												
Roof Leg - Double-Deck	Adjustable, Double-Deck Roofs	0.82	0.53	0.14												
Roof Leg - IFR	Fixed	0	0	0	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00
Rim Vent	Weighted Mech. Actuation, Ungask.	0.68	1.8	1												
Rim Vent	Weighted Mech. Actuation, Gask.	0.71	0.1	1												
Ladder Well	Sliding Cover, Ungasketed	98	0	0												
Ladder Well	Sliding Cover, Gasketed	56	0	0												
				Deck Fitting Factor:	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60

Table A-2

Tank Deck Fitting Factors

Intercontinental Terminals Company LLC

December 2018

Houston, Texas

Average Annual Wind Speed (ws): 7.87 mph

				FIN>>	P100-018	P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014
				Roof Type>	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Fitting Type	Cover Type/Description	KFa	KFb	m	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	1.6	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed	36	5.9	1.2												
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed	31	5.2	1.3												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Ungask.	31	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Gask.	25	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Flex. Fabric Sleeve Seal	10	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Ungask.	51	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Gask.	33	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unslotted Guidepoles	Ungasketed Sliding Cover	31	150	1.4												
Unslotted Guidepoles	Ungasketed Sliding Cover, w. Sleeve	25	2.2	2.1												
Unslotted Guidepoles	Gasketed Sliding Cover	25	13	2.2												
Unslotted Guidepoles	Gasketed sliding Cover, w. Wiper	14	3.7	0.78	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Unslotted Guidepoles	Gasketed Sliding Cover, w. Sleeve	8.6	12	0.81												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Wiper	41	48	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve	11	46	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve,Wiper	8.3	4.4	1.6												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float, Wiper	21	7.9	1.8	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Slotted Guidepoles/Sample Well	Gask Sliding Covr, w. Float,Sleeve,Wiper	11	9.9	0.89												
Automatic Gauge Float Well	Unbolted Cover, Ungasketed	14	5.4	1.1												
Automatic Gauge Float Well	Unbolted Cover, Gasketed	4.3	17	0.38												
Automatic Gauge Float Well	Bolted Cover, Gasketed	2.8	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Gask.	0.47	0.02	0.97												
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Ungask.	2.3	0	0												
Gauge-Hatch/Sample Well	Slit Fabric Seal 10% Open	12	0	0												
Vacuum Breaker	Weighted Mech. Actuation, Ungask.	7.8	0.01	4												
Vacuum Breaker	Weighted Mech. Actuation, Gask.	6.2	1.2	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Roof Drain	Open	1.5	0.21	1.7												
Roof Drain	90% Closed	1.8	0.14	1.1												
Roof Drain	Stub	1.2	0	0												
Roof Leg - IFR	Adjustable	7.9	0	0												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Ungasketed	2	0.37	0.91												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Gasketed	1.3	0.08	0.65												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Sock	1.2	0.14	0.65												
Roof Leg - Center Area	Adjustable, Center Area, Ungasketed	0.82	0.53	0.14												
Roof Leg - Center Area	Adjustable, Center Area, Gasketed	0.53	0.11	0.13												
Roof Leg - Center Area	Adjustable, Center Area, Sock	0.49	0.16	0.14												
Roof Leg - Double-Deck	Adjustable, Double-Deck Roofs	0.82	0.53	0.14												
Roof Leg - IFR	Fixed	0	0	0	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00
Rim Vent	Weighted Mech. Actuation, Ungask.	0.68	1.8	1												
Rim Vent	Weighted Mech. Actuation, Gask.	0.71	0.1	1												
Ladder Well	Sliding Cover, Ungasketed	98	0	0												
Ladder Well	Sliding Cover, Gasketed	56	0	0												
				Deck Fitting Factor:	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60

Table A-2

Tank Deck Fitting Factors

Intercontinental Terminals Company LLC

December 2018

Houston, Texas

Average Annual Wind Speed (ws): 7.87 mph

				FIN>>	P120-015	P120-016	P120-017	P120-018	P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025	P120-026
				Roof Type>	IFR	IFR	IFR	IFR	IFR	!FR	IFR	IFR	IFR	IFR	IFR	IFR
Fitting Type	Cover Type/Description	KFa	KFb	m	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	1.6	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed	36	5.9	1.2												
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed	31	5.2	1.3												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Ungask.	31	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Gask.	25	0	0												
Column Well (24-in. Diam.)	Pipe Col.-Flex. Fabric Sleeve Seal	10	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Ungask.	51	0	0												
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Gask.	33	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unslotted Guidepoles	Ungasketed Sliding Cover	31	150	1.4												
Unslotted Guidepoles	Ungasketed Sliding Cover, w. Sleeve	25	2.2	2.1												
Unslotted Guidepoles	Gasketed Sliding Cover	25	13	2.2												
Unslotted Guidepoles	Gasketed sliding Cover, w. Wiper	14	3.7	0.78	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Unslotted Guidepoles	Gasketed Sliding Cover, w. Sleeve	8.6	12	0.81												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w/o Float	43	270	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float	31	36	2												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Wiper	41	48	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve	11	46	1.4												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve,Wiper	8.3	4.4	1.6												
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float, Wiper	21	7.9	1.8	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Slotted Guidepoles/Sample Well	Gask Sliding Covr, w. Float,Sleeve,Wiper	11	9.9	0.89												
Automatic Gauge Float Well	Unbolted Cover, Ungasketed	14	5.4	1.1												
Automatic Gauge Float Well	Unbolted Cover, Gasketed	4.3	17	0.38												
Automatic Gauge Float Well	Bolted Cover, Gasketed	2.8	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Gask.	0.47	0.02	0.97												
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Ungask.	2.3	0	0												
Gauge-Hatch/Sample Well	Slit Fabric Seal 10% Open	12	0	0												
Vacuum Breaker	Weighted Mech. Actuation, Ungask.	7.8	0.01	4												
Vacuum Breaker	Weighted Mech. Actuation, Gask.	6.2	1.2	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Roof Drain	Open	1.5	0.21	1.7												
Roof Drain	90% Closed	1.8	0.14	1.1												
Roof Drain	Stub	1.2	0	0												
Roof Leg - IFR	Adjustable	7.9	0	0												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Ungasketed	2	0.37	0.91												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Gasketed	1.3	0.08	0.65												
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Sock	1.2	0.14	0.65												
Roof Leg - Center Area	Adjustable, Center Area, Ungasketed	0.82	0.53	0.14												
Roof Leg - Center Area	Adjustable, Center Area, Gasketed	0.53	0.11	0.13												
Roof Leg - Center Area	Adjustable, Center Area, Sock	0.49	0.16	0.14												
Roof Leg - Double-Deck	Adjustable, Double-Deck Roofs	0.82	0.53	0.14												
Roof Leg - IFR	Fixed	0	0	0	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00
Rim Vent	Weighted Mech. Actuation, Ungask.	0.68	1.8	1												
Rim Vent	Weighted Mech. Actuation, Gask.	0.71	0.1	1												
Ladder Well	Sliding Cover, Ungasketed	98	0	0												
Ladder Well	Sliding Cover, Gasketed	56	0	0												
				Deck Fitting Factor:	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60

Table A-2

Tank Deck Fitting Factors

Intercontinental Terminals Company LLC

December 2018

Houston, Texas

Average Annual Wind Speed (ws): 7.87 mph

				FIN>>	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009	P165-010	P165-011	P165-012
				Roof Type>	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Fitting Type	Cover Type/Description	KFa	KFb	m	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	1.6	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed	36	5.9	1.2										
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed	31	5.2	1.3										
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Ungask.	31	0	0										
Column Well (24-in. Diam.)	Pipe Col.-Sliding Cover, Gask.	25	0	0										
Column Well (24-in. Diam.)	Pipe Col.-Flex. Fabric Sleeve Seal	10	0	0										
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Ungask.	51	0	0										
Column Well (24-in. Diam.)	Built-Up Col.-Sliding Cover, Gask.	33	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unslotted Guidepoles	Ungasketed Sliding Cover	31	150	1.4										
Unslotted Guidepoles	Ungasketed Sliding Cover, w. Sleeve	25	2.2	2.1										
Unslotted Guidepoles	Gasketed Sliding Cover	25	13	2.2										
Unslotted Guidepoles	Gasketed sliding Cover, w. Wiper	14	3.7	0.78	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Unslotted Guidepoles	Gasketed Sliding Cover, w. Sleeve	8.6	12	0.81										
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w/o Float	43	270	1.4										
Slotted Guidepoles/Sample Well	Ungask. Sliding Cover, w. Float	31	36	2										
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w/o Float	43	270	1.4										
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float	31	36	2										
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Wiper	41	48	1.4										
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve	11	46	1.4										
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Pole Sleeve,Wiper	8.3	4.4	1.6										
Slotted Guidepoles/Sample Well	Gask. Sliding Cover, w. Float, Wiper	21	7.9	1.8	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Slotted Guidepoles/Sample Well	Gask Sliding Covr, w. Float,Sleeve,Wiper	11	9.9	0.89										
Automatic Gauge Float Well	Unbolted Cover, Ungasketed	14	5.4	1.1										
Automatic Gauge Float Well	Unbolted Cover, Gasketed	4.3	17	0.38										
Automatic Gauge Float Well	Bolted Cover, Gasketed	2.8	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Gask.	0.47	0.02	0.97										
Gauge-Hatch/Sample Well	Weighted Mech. Actuation, Ungask.	2.3	0	0										
Gauge-Hatch/Sample Well	Slit Fabric Seal 10% Open	12	0	0										
Vacuum Breaker	Weighted Mech. Actuation, Ungask.	7.8	0.01	4										
Vacuum Breaker	Weighted Mech. Actuation, Gask.	6.2	1.2	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Roof Drain	Open	1.5	0.21	1.7										
Roof Drain	90% Closed	1.8	0.14	1.1										
Roof Drain	Stub	1.2	0	0										
Roof Leg - IFR	Adjustable	7.9	0	0										
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Ungasketed	2	0.37	0.91										
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Gasketed	1.3	0.08	0.65										
Roof Leg - Pontoon Area	Adjustable, Pontoon Area, Sock	1.2	0.14	0.65										
Roof Leg - Center Area	Adjustable, Center Area, Ungasketed	0.82	0.53	0.14										
Roof Leg - Center Area	Adjustable, Center Area, Gasketed	0.53	0.11	0.13										
Roof Leg - Center Area	Adjustable, Center Area, Sock	0.49	0.16	0.14										
Roof Leg - Double-Deck	Adjustable, Double-Deck Roofs	0.82	0.53	0.14										
Roof Leg - IFR	Fixed	0	0	0	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00
Rim Vent	Weighted Mech. Actuation, Ungask.	0.68	1.8	1										
Rim Vent	Weighted Mech. Actuation, Gask.	0.71	0.1	1										
Ladder Well	Sliding Cover, Ungasketed	98	0	0										
Ladder Well	Sliding Cover, Gasketed	56	0	0										
				Deck Fitting Factor:	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60	113.60

Table A-3
Storage Tank Routine Landings (EPN: TKLAND)
Intercontinental Terminals Company LLC
December 2018

Refilling Losses																														
Saturation Correction Factor	C_{sf}			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Csf * S ≥ 0.15				---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Filling Losses	L_{FL}	lb		68.66	68.66	68.66	68.66	68.66	68.66	68.66	68.66	68.66	68.66	7.91	11.70	11.70	51.07	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78
Time to Refloat Roof		hr		1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	0.16	0.24	0.24	1.06	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heat Input From Vapor		MMBtu/event		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Refilling Volume		ft^3/event		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Refilling Emission Rate		lb/hr		48.23	48.23	48.24	48.24	48.25	48.26	48.26	48.27	48.28	48.28	7.91	11.70	11.70	48.31	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78
Refilling Emission Rate		tpy		0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.02	0.02	0.02	0.10	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Total Routine Landing Emissions by Tank																														
Tank FIN				**P100-001**	**P100-002**	**P100-003**	**P100-004**	**P100-005**	**P100-006**	**P100-007**	**P100-008**	**P100-009**	**P100-010**	**P12-001**	**P12-002**	**P12-003**	**P80-001**	**P100-12**	**P100-13**	**P165-003**	**P165-004**	**P165-005**	**P165-006**	**P110-001**	**P110-002**	**P110-003**	**P110-004**	**P120-001**	**P120-002**	**P120-003**
VOC Emission Rate		lb/hr		48.23	48.23	48.24	48.24	48.25	48.26	48.26	48.27	48.28	48.28	7.91	11.70	11.70	48.31	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78	40.78
		tpy		0.153	0.153	0.153	0.153	0.153	0.153	0.153	0.153	0.153	0.153	0.018	0.026	0.026	0.114	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091

Notes:

1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the products listed in the comprehensive product list included this permit application and the proposed emission caps rather than throughput limits.
2. Actual tank roof landing event details may vary; however, maximum short-term and annual tank emissions will comply with the proposed emission limits.

10(.153) + .018 +
.052
.114
.184
1.53
1.714

Table A-3
Storage Tank Routine Landings (EPN: TKLAND)
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.08
Daily Average Ambient Temperature	T_{AA}	deg R	527.89
Routine Landings per Tank		events/yr	4.00

Routine Landings																														
Tank FIN			P120-004	P165-001	P165-002	P060-001	P060-002	P100-014	P100-015	P100-016	P100-017	P100-018	P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018	P120-019	P120-020
Project ID			2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Material			LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL
Tank Type			IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft	84.00	84.00	84.00	84.00	84.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
High Roof Leg Height		ft	6.50	6.50	6.50	6.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_G	days	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling			Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Height of Liquid Heel	H_{le}	ft	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Filling Pump-in Rate		bbl/hr	7,497	7,498	7,499	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Vapor Pressure Method			RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Vapor Molecular Wt.	M_v	lb/lbmole	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Stock Liquid Density	W_l	lb/gal	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Heat Value		Btu/lb	19,997	19,998	19,999	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Saturation Factor	S		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Height of Vapor Space		ft	6.40	6.40	6.40	6.40	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
Volume of Vapor Space	V_v	ft^3	35,467	35,467	35,467	35,467	27,155	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723
Paint Color			White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Antoine's Equation Constant	A		13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96
Antoine's Equation Constant	B		9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61
Antoine's Equation Constant	C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Standing Idle Losses																													
Tank FIN			**P120-004**	**P165-001**	**P165-002**	**P060-001**	**P060-002**	**P100-014**	**P100-015**	**P100-016**	**P100-017**	**P100-018**	**P100-019**	**P120-005**	**P120-006**	**P120-007**	**P120-008**	**P120-009**	**P120-010**	**P120-011**	**P120-012**	**P120-013**	**P120-014**	**P120-015**	**P120-016**	**P120-017**	**P120-018**	**P120-019**	**P120-020**
Vapor Space Expansion Factor (eqn 1-5)	IFR		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19	Drain Dry		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor	K_E		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_S		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Vapor Pressure Function	P*		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Not to Exceed Standing Idle Losses		lb	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51
Calculated Standing Idle Losses		lb	4.76	4.76	4.76	4.76	3.65	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14
Standing Idle Losses	L_{SL}	lb	4.76	4.76	4.76	4.76	3.65	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14
Total Standing Idle Losses		lb	4.76	4.76	4.76	4.76	3.65	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14
Heat Input From Vapor		MMBtu/event	0.10	0.10	0.10	0.10	0.07	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Standing Idle Emission Rate		lb/hr	0.13	0.13	0.13	0.13	0.10	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Standing Idle Emission Rate		tpy	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

[uncontrolled]

Table A-3
Storage Tank Routine Landings (EPN: TKLAND)
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.08
Daily Average Ambient Temperature	T_{AA}	deg R	527.89
Routine Landings per Tank		events/yr	4.00

Routine Landing Emissions					
		Project No. 1	Project No. 2	Project No. 3	Totals
VOC	lb/hr	48.31	40.78	48.42	137.51
	tpy	1.72	1.46	5.08	8.26

Σ tpy (A) = 1.72
max lb/hr (A) = 48.31

Routine Landings

Tank FIN			P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005	P165-006	P110-001	P110-002	P110-003	P110-004	P120-001	P120-002	P120-003
Project ID			1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
Material			LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL
Tank Type			IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	37.00	45.00	45.00	94.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
High Roof Leg Height		ft	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
Number of Days Roof Off-Float	n_d	days	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling			Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Height of Liquid Heel	H_{le}	ft	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Filling Pump-in Rate		bbl/hr	7,470	7,471	7,472	7,473	7,474	7,475	7,476	7,477	7,478	7,479	7,480	7,481	7,482	7,483	7,484	7,485	7,486	7,487	7,488	7,489	7,490	7,491	7,492	7,493	7,494	7,495	7,496
Vapor Pressure Method			RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Vapor Molecular Wt.	M_v	lb/lbmole	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Stock Liquid Density	W_l	lb/gal	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Heat Value		Btu/lb	19,970	19,971	19,972	19,973	19,974	19,975	19,976	19,977	19,978	19,979	19,980	19,981	19,982	19,983	19,984	19,985	19,986	19,987	19,988	19,989	19,990	19,991	19,992	19,993	19,994	19,995	19,996
Saturation Factor	S		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Height of Vapor Space		ft	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40
Volume of Vapor Space	V_v	ft^3	59,720	59,720	59,720	59,720	59,720	59,720	59,720	59,720	59,720	59,720	6,881	10,179	10,179	44,415	35,467	35,467	35,467	35,467	35,467	35,467	35,467	35,467	35,467	35,467	35,467	35,467	35,467
Paint Color			White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Antoine's Equation Constant	A		13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96
Antoine's Equation Constant	B		9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61
Antoine's Equation Constant	C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09

Standing Idle Losses

Tank FIN			P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005	P165-006	P110-001	P110-002	P110-003	P110-004	P120-001	P120-002	P120-003
Vapor Space Expansion Factor (eqn 1-5)	IFR		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor	K_E		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_S		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Vapor Pressure Function	P*		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Not to Exceed Standing Idle Losses		lb	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	5,734.74	8,482.73	8,482.73	37,014.00	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58	29,557.58
Calculated Standing Idle Losses		lb	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	0.92	1.37	1.37	5.96	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
Standing Idle Losses	L_{SL}	lb	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	0.92	1.37	1.37	5.96	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
Total Standing Idle Losses		lb	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	0.92	1.37	1.37	5.96	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
Heat Input From Vapor		MMBtu/event	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.02	0.03	0.03	0.12	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Standing Idle Emission Rate		lb/hr	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.03	0.04	0.04	0.17	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Standing Idle Emission Rate		tpy	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Table A-3
Storage Tank Routine Landings (EPN: TKLAND)
Intercontinental Terminals Company LLC
December 2018

Refilling Losses																															
Saturation Correction Factor	C_{sf}			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Csf * S ≥ 0.15				---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Filling Losses	L_{FL}	lb		40.78	40.78	40.78	40.78	31.22	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57
Time to Refloat Roof		hr		0.84	0.84	0.84	0.84	0.64	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Heat Input From Vapor		MMBtu/event		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Refilling Volume		ft^3/event		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Refilling Emission Rate		lb/hr		40.78	40.78	40.78	40.78	31.22	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42
Refilling Emission Rate		tpy		0.08	0.08	0.08	0.08	0.06	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Total Routine Landing Emissions by Tank																															
Tank FIN				**P120-004**	**P165-001**	**P165-002**	**P060-001**	**P060-002**	**P100-014**	**P100-015**	**P100-016**	**P100-017**	**P100-018**	**P100-019**	**P120-005**	**P120-006**	**P120-007**	**P120-008**	**P120-009**	**P120-010**	**P120-011**	**P120-012**	**P120-013**	**P120-014**	**P120-015**	**P120-016**	**P120-017**	**P120-018**	**P120-019**	**P120-020**
VOC Emission Rate		lb/hr		40.78	40.78	40.78	40.78	31.22	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42
		tpy		0.091	0.091	0.091	0.091	0.070	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117

Notes:

1. A worst case product scenario used to establish the emission limits. Actual operations are lin
2. Actual tank roof landing event details may vary; however, maximum short-term and annual ta

Table A-3
Storage Tank Routine Landings (EPN: TKLAND)
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.08
Daily Average Ambient Temperature	T_{AA}	deg R	527.89
Routine Landings per Tank		events/yr	4.00

Routine Landings																		
Tank FIN				P120-021	P120-022	P120-023	P120-024	P120-025	P120-026	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009	P165-010	P165-011	P165-012
Project ID				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Material				LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	140.00	140.00	140.00	140.00	140.00	140.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Height of Liquid Heel	H_{le}	ft		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Filling Pump-in Rate		bbl/hr		7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Vapor Molecular Wt.	M_v	lb/lbmole		130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Stock Liquid Density	W_l	lb/gal		7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Heat Value		Btu/lb		20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Saturation Factor	S			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Height of Vapor Space		ft		4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
Volume of Vapor Space	V_v	ft^3		45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	75,430	75,430	75,430	75,430	75,430	75,430
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Antoine's Equation Constant	A			13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96
Antoine's Equation Constant	B			9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Standing Idle Losses																			
Tank FIN				P120-021	P120-022	P120-023	P120-024	P120-025	P120-026	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009	P165-010	P165-011	P165-012
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19	Drain Dry			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_S			0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Vapor Pressure Function	P*			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Not to Exceed Standing Idle Losses		lb		49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	49,769.51	82,104.40	82,104.40	82,104.40	82,104.40	82,104.40	82,104.40
Calculated Standing Idle Losses		lb		6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	10.13	10.13	10.13	10.13	10.13	10.13
Standing Idle Losses	L_{SL}	lb		6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	10.13	10.13	10.13	10.13	10.13	10.13
Total Standing Idle Losses		lb		6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	10.13	10.13	10.13	10.13	10.13	10.13
Heat Input From Vapor		MMBtu/event		0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.20	0.20	0.20	0.20	0.20	0.20
Standing Idle Emission Rate		lb/hr		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.28	0.28	0.28	0.28	0.28	0.28
Standing Idle Emission Rate		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02

Table A-3
Storage Tank Routine Landings (EPN: TKLAND)
Intercontinental Terminals Company LLC
December 2018

Refilling Losses																			
Saturation Correction Factor	C_{sf}			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Csf * S ≥ 0.15				---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Filling Losses	L_{FL}	lb		52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	52.57	86.73	86.73	86.73	86.73	86.73	86.73
Time to Refloat Roof		hr		1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.79	1.79	1.79	1.79	1.79	1.79
Heat Input From Vapor		MMBtu/event		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Refilling Volume		ft^3/event		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Refilling Emission Rate		lb/hr		48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42
Refilling Emission Rate		tpy		0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.17	0.17	0.17	0.17	0.17	0.17
Total Routine Landing Emissions by Tank																			
Tank FIN				**P120-021**	**P120-022**	**P120-023**	**P120-024**	**P120-025**	**P120-026**	**P120-027**	**P120-028**	**P120-029**	**P120-030**	**P165-007**	**P165-008**	**P165-009**	**P165-010**	**P165-011**	**P165-012**
VOC Emission Rate		lb/hr		48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42	48.42
		tpy		0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.194	0.194	0.194	0.194	0.194	0.194

Notes:

1. A worst case product scenario used to establish the emission limits. Actual operations are lin
2. Actual tank roof landing event details may vary; however, maximum short-term and annual ta

Table A-4
Storage Tank Routine Landings
Intercontinental Terminals Company LLC
December 2018

Controlled

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- NOx and CO emissions factor is from vendor.
- H2S emissions from product combustion assume 98% destruction per TCEQ guidance for flares.
- Assumed all products have a maximum heat content equivalent to 20,000 Btu/lb.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.
- Control device will be a vapor combustor and will achieve a minimum 99.8% DRE for VOCs with a vapor pressure > 0.02 psia.
- CO2e calculated based on 40 CFR 98 Table C-1 and C-2 emission factors and Table A-1 Global Warming Potentials.

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.08
Daily Average Ambient Temperature	T_{AA}	deg R	527.89
VCU Control Device Efficiency	CE		99.9%
VCU NOX Emission Factor		lb/MMBtu	0.0600
VCU CO Emission Factor		lb/MMBtu	0.2000
H2S Emission Factor for Waste Gase		lb-H_2S/lb-VOC	0.0054
VCU SO2 Emission Factor for Natural Gas		lb/MMBtu	0.0006
VCU SO2 Emission Factor for Waste Gas		lb/MMBtu	0.3825
VCU PM Emission Factor		lb/MMBtu	0.0075
VCU VOC Emission Factor for Natural Gas		lb/MMBtu	0.0054
CO_2 Emission Factor for Waste Gas		lb/MMBtu	154.81
CH_4 Emission Factor for Waste Gas		lb/MMBtu	0.003
N_2O Emission Factor for Waste Gas		lb/MMBtu	0.0006
CO_2 Emission Factor for Natural Gas		lb/MMBtu	116.889
CH_4 Emission Factor for Natural Gas		lb/MMBtu	0.001
N_2O Emission Factor for NaturalGas		lb/MMBtu	0.0001
Routine Landings per Tank		events/yr	12.00
Max Hourly Assist Gas Flow		scf/hr	24,000
Annual Average Assist Gas Flow		scf/yr	60,000,000

Assist Gas Emissions		
VOC	lb/hr	0.13
	tpy	0.17
NOX	lb/hr	1.47
	tpy	1.84
CO	lb/hr	4.90
	tpy	6.12
SO2	lb/hr	0.01
	tpy	0.02
PM	lb/hr	0.18
	tpy	0.23
CO_2e	tpy	3,578.48

Routine Landing Emissions Project 1-3			Project No. 1	Project No. 2	Project No. 3
VOC	lb/hr	3.08	3.07	1.99	3.08
	tpy	1.34	0.24	0.20	0.91
NOX	lb/hr	3.70	3.68	2.38	3.70
	tpy	1.61	0.28	0.24	1.09
CO	lb/hr	12.32	12.27	7.94	12.32
	tpy	5.38	0.94	0.80	3.63
H2S	lb/hr	0.33	0.33	0.22	0.33
	tpy	0.15	0.03	0.05	0.10
SO2	lb/hr	23.56	23.47	15.19	23.56
	tpy	10.282	1.804	1.531	6.947
PM	lb/hr	0.46	0.46	0.30	0.46
	tpy	0.20	0.04	0.03	0.14
CO_2e	tpy	4,168.52	731.21	620.88	2,816.44

1.34
.24
.20
.91
2.69

= 2.69

Routine Landings																												
Tank FIN				P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005	P165-006	P110-001	P110-002	P110-003	P110-004	P120-001	P120-002
Project ID				1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2
Material				GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	37.00	45.00	45.00	94.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Height of Liquid Heel	H_w	ft		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Filling Pump-in Rate		bbl/hr		7,470	7,471	7,472	7,473	7,474	7,475	7,476	7,477	7,478	7,479	7,480	7,481	7,482	7,483	7,484	7,485	7,486	7,487	7,488	7,489	7,490	7,491	7,492	7,493	7,494	7,495
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Vapor Molecular Wt.	M_V	lb/lbmole		66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Stock Liquid Density	W_l	lb/gal		5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
Heat Value		Btu/lb		19,970	19,971	19,972	19,973	19,974	19,975	19,976	19,977	19,978	19,979	19,980	19,981	19,982	19,983	19,984	19,985	19,986	19,987	19,988	19,989	19,990	19,991	19,992	19,993	19,994	19,995
Saturation Factor	S			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Height of Vapor Space		ft		4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
Volume of Vapor Space	V_V	ft^3		45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	5,269	7,793	7,793	34,005	27,155	27,155	27,155	27,155	27,155	27,155	27,155	27,155	27,155	27,155	27,155	27,155
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Antoine's Equation Constant	A			11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69
Antoine's Equation Constant	B			5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00

Table A-4
Storage Tank Routine Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses																												
Tank FIN				**P100-001**	**P100-002**	**P100-003**	**P100-004**	**P100-005**	**P100-006**	**P100-007**	**P100-008**	**P100-009**	**P100-010**	**P12-001**	**P12-002**	**P12-003**	**P80-001**	**P100-12**	**P100-13**	**P165-003**	**P165-004**	**P165-005**	**P165-006**	**P110-001**	**P110-002**	**P110-003**	**P110-004**	**P120-001**	**P120-002**
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_S			0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Vapor Pressure Function	P*			0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Not to Exceed Standing Idle Losses		lb		39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	4,523.18	6,690.60	6,690.60	29,194.14	23,313.02	23,313.02	23,313.02	23,313.02	23,313.02	23,313.02	23,313.02	23,313.02	23,313.02	23,313.02	23,313.02
Calculated Standing Idle Losses		lb		168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	19.44	28.76	28.76	125.50	100.22	100.22	100.22	100.22	100.22	100.22	100.22	100.22	100.22	100.22	100.22
Standing Idle Losses	L_{SL}	lb		168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	19.44	28.76	28.76	125.50	100.22	100.22	100.22	100.22	100.22	100.22	100.22	100.22	100.22	100.22	100.22
Total Standing Idle Losses		lb		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.02	0.03	0.03	0.13	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Heat Input From Vapor		MMBtu/event		3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	0.39	0.57	0.57	2.51	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Heat Input From Vapor		MMBtu/hr		0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.03	0.05	0.05	0.21	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Standing Idle Emission Rate		lb/hr		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standing Idle Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Refilling Losses																												
Saturation Correction Factor	C_{sf}			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Csf * S ≥ 0.15				--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Filling Losses	L_{FL}	lb		3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	385.34	569.99	569.99	2,487.12	1,986.09	1,986.09	1,986.09	1,986.09	1,986.09	1,986.09	1,986.09	1,986.09	1,986.09	1,986.09	1,986.09
Time to Refloat Roof		hr		1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	0.13	0.19	0.19	0.81	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Heat Input From Vapor		MMBtu/event		66.78	66.79	66.79	66.79	66.80	66.80	66.80	66.81	66.81	66.81	7.70	11.39	11.39	49.70	39.69	39.69	39.69	39.70	39.70	39.70	39.70	39.70	39.71	39.71	39.71
Heat Input From Vapor		MMBtu/hr		61.26	61.27	61.29	61.30	61.31	61.32	61.33	61.34	61.35	61.36	7.70	11.39	11.39	49.70	39.69	39.69	39.69	39.70	39.70	39.70	39.70	39.70	39.71	39.71	39.71
Total Refilling Volume		ft^3/event		45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	5,269	7,793	7,793	34,005	27,155	27,155	27,155	27,155	27,155	27,155	27,155	27,155	27,155	27,155	27,155
Refilling Emission Rate		lb/hr		3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	0.39	0.57	0.57	2.49	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Refilling Emission Rate		tpy		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total Routine Landing Emissions by Tank																												
Tank FIN				**P100-001**	**P100-002**	**P100-003**	**P100-004**	**P100-005**	**P100-006**	**P100-007**	**P100-008**	**P100-009**	**P100-010**	**P12-001**	**P12-002**	**P12-003**	**P80-001**	**P100-12**	**P100-13**	**P165-003**	**P165-004**	**P165-005**	**P165-006**	**P110-001**	**P110-002**	**P110-003**	**P110-004**	**P120-001**	**P120-002**
VOC Emission Rate		lb/hr		3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07	0.39	0.57	0.57	2.49	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
		tpy		0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.002	0.004	0.004	0.016	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
NOx Emission Rate		lb/hr		3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68	0.46	0.68	0.68	2.98	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
		tpy		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
CO Emission Rate		lb/hr		12.25	12.25	12.26	12.26	12.26	12.26	12.27	12.27	12.27	12.27	1.54	2.28	2.28	9.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94
		tpy		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.01	0.01	0.01	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
H2S Emission Rate		lb/hr		0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.04	0.06	0.06	0.27	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
		tpy		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
SO2 Emission Rate		lb/hr		23.43	23.44	23.44	23.44	23.45	23.45	23.46	23.46	23.47	23.47	2.94	4.36	4.36	19.01	15.18	15.18	15.18	15.18	15.18	15.18	15.19	15.19	15.19	15.19	15.19
		tpy		0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.02	0.03	0.03	0.12	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
PM Emission Rate		lb/hr		0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.06	0.08	0.08	0.37	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 Emissoin Rate		tpy		65.16	65.17	65.17	65.17	65.18	65.18	65.18	65.19	65.19	65.19	7.51	11.11	11.11	48.49	38.73	38.73	38.73	38.73	38.73	38.74	38.74	38.74	38.74	38.75	38.75
CH_4 Emissoin Rate		tpy		0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0001	0.0002	0.0002	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
N_2O Emission Rate		tpy		0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0000	0.0000	0.0000	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
CO_2e Emission Rate		tpy		65.27	65.27	65.28	65.28	65.28	65.29	65.29	65.29	65.30	65.30	7.52	11.13	11.13	48.57	38.79	38.79	38.79	38.80	38.80	38.80	38.80	38.80	38.81	38.81	38.81

Notes:

1. A worst case product scenario used to establish the emission limits. Actual operations are limited to the products listed in the comprehensive product list included this permit application and the proposed emission caps rather than throughput limits.
2. Actual tank roof landing event details may vary; however, maximum short-term and annual tank emissions will comply with the proposed emission limits.

Table A-4
Storage Tank Routine Landings
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- NOx and CO emissions factor is from vendor.
- H2S emissions from product combustion assume 98% destruction per TCEQ guidance for flares.
- Assumed all products have a maximum heat content equivalent to 20,000 Btu/lb.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.
- Control device will be a vapor combustor and will achieve a minimum 99.8% DRE for VOCs with a v
- CO2e calculated based on 40 CFR 98 Table C-1 and C-2 emission factors and Table A-1 Global Wa

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.08
Daily Average Ambient Temperature	T_{AA}	deg R	527.89
VCU Control Device Efficiency	CE		99.9%
VCU NOX Emission Factor		lb/MMBtu	0.0600
VCU CO Emission Factor		lb/MMBtu	0.2000
H2S Emission Factor for Waste Gase		lb-H_2S/lb-VOC	0.0054
VCU SO2 Emission Factor for Natural Gas		lb/MMBtu	0.0006
VCU SO2 Emission Factor for Waste Gas		lb/MMBtu	0.3825
VCU PM Emission Factor		lb/MMBtu	0.0075
VCU VOC Emission Factor for Natural Gas		lb/MMBtu	0.0054
CO_2 Emission Factor for Waste Gas		lb/MMBtu	154.81
CH_4 Emission Factor for Waste Gas		lb/MMBtu	0.003
N_2O Emission Factor for Waste Gas		lb/MMBtu	0.0006
CO_2 Emission Factor for Natural Gas		lb/MMBtu	116.889
CH_4 Emission Factor for Natural Gas		lb/MMBtu	0.001
N_2O Emission Factor for NaturalGas		lb/MMBtu	0.0001
Routine Landings per Tank		events/yr	12.00
Max Hourly Assist Gas Flow		scf/hr	24,000
Annual Average Assist Gas Flow		scf/yr	60,000,000

Routine Landings																													
Tank FIN				P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	P100-014	P100-015	P100-016	P100-017	P100-018	P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018
Project ID				2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Material				GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVI-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		84.00	84.00	84.00	84.00	84.00	84.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Height of Liquid Heel	H_R	ft		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Filling Pump-in Rate		bbl/hr		7,496	7,497	7,498	7,499	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Vapor Molecular Wt.	M_V	lb/lbmole		66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Stock Liquid Density	W_l	lb/gal		5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
Heat Value		Btu/lb		19,996	19,997	19,998	19,999	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Saturation Factor	S			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Height of Vapor Space		ft		4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
Volume of Vapor Space	V_V	ft^3		27,155	27,155	27,155	27,155	27,155	27,155	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Antoine's Equation Constant	A			11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69
Antoine's Equation Constant	B			5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00

Table A-4
Storage Tank Routine Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses																												
Tank FIN				**P120-003**	**P120-004**	**P165-001**	**P165-002**	**P060-001**	**P060-002**	**P100-014**	**P100-015**	**P100-016**	**P100-017**	**P100-018**	**P100-019**	**P120-005**	**P120-006**	**P120-007**	**P120-008**	**P120-009**	**P120-010**	**P120-011**	**P120-012**	**P120-013**	**P120-014**	**P120-015**	**P120-016**	**P120-017**	**P120-018**
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_S			0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Vapor Pressure Function	P^*			0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Not to Exceed Standing Idle Losses		lb		23,313.02	23,313.02	23,313.02	23,313.02	23,313.02	23,313.02	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82
Calculated Standing Idle Losses		lb		100.22	100.22	100.22	100.22	100.22	100.22	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75
Standing Idle Losses	L_{SL}	lb		100.22	100.22	100.22	100.22	100.22	100.22	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75
Total Standing Idle Losses		lb		0.10	0.10	0.10	0.10	0.10	0.10	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Heat Input From Vapor		MMBtu/event		2.00	2.00	2.00	2.00	2.00	2.00	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37
Heat Input From Vapor		MMBtu/hr		0.17	0.17	0.17	0.17	0.17	0.17	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Standing Idle Emission Rate		lb/hr		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standing Idle Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Refilling Losses																													
Saturation Correction Factor	C_{sf}			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Csf * S ≥ 0.15				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Filling Losses	L_{FL}	lb		1,986.09	1,986.09	1,986.09	1,986.09	1,986.09	1,986.09	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21
Time to Refloat Roof		hr		0.65	0.65	0.64	0.64	0.64	0.64	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Heat Input From Vapor		MMBtu/event		39.71	39.72	39.72	39.72	39.72	39.72	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88
Heat Input From Vapor		MMBtu/hr		39.71	39.72	39.72	39.72	39.72	39.72	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60
Total Refilling Volume		ft^3/event		27,155	27,155	27,155	27,155	27,155	27,155	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723
Refilling Emission Rate		lb/hr		1.99	1.99	1.99	1.99	1.99	1.99	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08
Refilling Emission Rate		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Total Routine Landing Emissions by Tank																													
Tank FIN				**P120-003**	**P120-004**	**P165-001**	**P165-002**	**P060-001**	**P060-002**	**P100-014**	**P100-015**	**P100-016**	**P100-017**	**P100-018**	**P100-019**	**P120-005**	**P120-006**	**P120-007**	**P120-008**	**P120-009**	**P120-010**	**P120-011**	**P120-012**	**P120-013**	**P120-014**	**P120-015**	**P120-016**	**P120-017**	**P120-018**
VOC Emission Rate		lb/hr		1.99	1.99	1.99	1.99	1.99	1.99	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08
		tpy		0.013	0.013	0.013	0.013	0.013	0.013	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
NOx Emission Rate		lb/hr		2.38	2.38	2.38	2.38	2.38	2.38	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
		tpy		0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
CO Emission Rate		lb/hr		7.94	7.94	7.94	7.94	7.94	7.94	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32
		tpy		0.05	0.05	0.05	0.05	0.05	0.05	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
H2S Emission Rate		lb/hr		0.22	0.22	0.22	0.22	0.22	0.22	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
		tpy		0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
SO2 Emission Rate		lb/hr		15.19	15.19	15.19	15.19	15.19	15.19	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56
		tpy		0.10	0.10	0.10	0.10	0.10	0.10	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
PM Emission Rate		lb/hr		0.30	0.30	0.30	0.30	0.30	0.30	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 Emissoin Rate		tpy		38.75	38.75	38.75	38.76	38.76	38.76	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26
CH_4 Emissoin Rate		tpy		0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
N_2O Emission Rate		tpy		0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
CO_2e Emission Rate		tpy		38.81	38.82	38.82	38.82	38.82	38.82	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37

Notes:

1. A worst case product scenario used to establish the emission limits. Actual operations are limite
2. Actual tank roof landing event details may vary; however, maximum short-term and annual tank

Table A-4
Storage Tank Routine Landings
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- NOx and CO emissions factor is from vendor.
- H2S emissions from product combustion assume 98% destruction per TCEQ guidance for flares.
- Assumed all products have a maximum heat content equivalent to 20,000 Btu/lb.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.
- Control device will be a vapor combustor and will achieve a minimum 99.8% DRE for VOCs with a v
- CO2e calculated based on 40 CFR 98 Table C-1 and C-2 emission factors and Table A-1 Global Wa

Conatants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.08
Daily Average Ambient Temperature	T_{AA}	deg R	527.89
VCU Control Device Efficiency	CE		99.9%
VCU NOX Emission Factor		lb/MMBtu	0.0600
VCU CO Emission Factor		lb/MMBtu	0.2000
H2S Emission Factor for Waste Gase		lb-H_2S/lb-VOC	0.0054
VCU SO2 Emission Factor for Natural Gas		lb/MMBtu	0.0006
VCU SO2 Emission Factor for Waste Gas		lb/MMBtu	0.3825
VCU PM Emission Factor		lb/MMBtu	0.0075
VCU VOC Emission Factor for Natural Gas		lb/MMBtu	0.0054
CO_2 Emission Factor for Waste Gas		lb/MMBtu	154.81
CH_4 Emission Factor for Waste Gas		lb/MMBtu	0.003
N_2O Emission Factor for Waste Gas		lb/MMBtu	0.0006
CO_2 Emission Factor for Natural Gas		lb/MMBtu	116.889
CH_4 Emission Factor for Natural Gas		lb/MMBtu	0.001
N_2O Emission Factor for NaturalGas		lb/MMBtu	0.0001
Routine Landings per Tank		events/yr	12.00
Max Hourly Assist Gas Flow		scf/hr	24,000
Annual Average Assist Gas Flow		scf/yr	60,000,000

Routine Landings																					
Tank FIN				P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025	P120-026	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009	P165-010	P165-011	P165-012
Project ID				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Material				GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	140.00	140.00	140.00	140.00	140.00	140.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Height of Liquid Heel	H_{lb}	ft		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Filling Pump-in Rate		bbl/hr		7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Vapor Molecular Wt.	M_V	lb/lbmole		66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Stock Liquid Density	W_l	lb/gal		5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
Heat Value		Btu/lb		20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Saturation Factor	S			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Height of Vapor Space		ft		4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
Volume of Vapor Space	V_v	ft^3		45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	75,430	75,430	75,430	75,430	75,430	75,430
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Antoine's Equation Constant	A			11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69
Antoine's Equation Constant	B			5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00

Table A-4
Storage Tank Routine Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses																					
Tank FIN				P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025	P120-026	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009	P165-010	P165-011	P165-012
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_S			0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Vapor Pressure Function	P*			0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Not to Exceed Standing Idle Losses		lb		39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	39,254.82	64,758.40	64,758.40	64,758.40	64,758.40	64,758.40	64,758.40
Calculated Standing Idle Losses		lb		168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	278.38	278.38	278.38	278.38	278.38	278.38
Standing Idle Losses	L_{SL}	lb		168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	168.75	278.38	278.38	278.38	278.38	278.38	278.38
Total Standing Idle Losses		lb		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.28	0.28	0.28	0.28	0.28	0.28
Heat Input From Vapor		MMBtu/event		3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	5.57	5.57	5.57	5.57	5.57	5.57
Heat Input From Vapor		MMBtu/hr		0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.46	0.46	0.46	0.46	0.46	0.46
Standing Idle Emission Rate		lb/hr		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Standing Idle Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Refilling Losses																					
Saturation Correction Factor	C_{sf}			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Csf * S ≥ 0.15				--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Filling Losses	L_{FL}	lb		3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	3,344.21	5,516.92	5,516.92	5,516.92	5,516.92	5,516.92	5,516.92
Time to Refloat Roof		hr		1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.79	1.79	1.79	1.79	1.79	1.79
Heat Input From Vapor		MMBtu/event		66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	66.88	110.34	110.34	110.34	110.34	110.34	110.34
Heat Input From Vapor		MMBtu/hr		61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60
Total Refilling Volume		ft^3/event		45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	45,723	75,430	75,430	75,430	75,430	75,430	75,430
Refilling Emission Rate		lb/hr		3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08
Refilling Emission Rate		tpy		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
Total Routine Landing Emissions by Tank																					
Tank FIN				P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025	P120-026	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009	P165-010	P165-011	P165-012
VOC Emission Rate		lb/hr		3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08
		tpy		0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.035	0.035	0.035	0.035	0.035	0.035
NOx Emission Rate		lb/hr		3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
		tpy		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04
CO Emission Rate		lb/hr		12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32	12.32
		tpy		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.14	0.14	0.14	0.14	0.14	0.14
H2S Emission Rate		lb/hr		0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
		tpy		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.004	0.004	0.004	0.004	0.004
SO2 Emission Rate		lb/hr		23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56	23.56
		tpy		0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.27	0.27	0.27	0.27	0.27	0.27
PM Emission Rate		lb/hr		0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
CO_2 Emissoin Rate		tpy		65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	65.26	107.66	107.66	107.66	107.66	107.66	107.66
CH_4 Emissoin Rate		tpy		0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021
N_2O Emission Rate		tpy		0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
CO_2e Emission Rate		tpy		65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	65.37	107.84	107.84	107.84	107.84	107.84	107.84

Notes:

1. A worst case product scenario used to establish the emission limits. Actual operations are limite
2. Actual tank roof landing event details may vary; however, maximum short-term and annual tank

Table A-5
Short-Term Marine Loading Emissions
Intercontinental Terminals Company LLC
December 2018

Dock Scenario		Units and/or Constants	1	2	3	4	5	6	7	8	Proposed Permit Limits									
Uncollected Loading EPN			DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	RACK-1, RACK-3, & RACK-5	RACK-1, RACK-3, & RACK-5	RACK-1, RACK-3, & RACK-5	DOCK-1	DOCK-2	DOCK-3	DOCK-4	RACK-1	RACK-3	RACK-5	VC-1	VC-2	VC-3
Controlled Loading EPN			VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3	VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3	VC-1, VC-2, & VC-3	-										
Dock Data	Vessel Type	Ship/Barge/Truck/Rail	Ship	Ship	Barge	Barge	Barge	Railcar	Tank Truck	Tank Truck/Rail										
	Vapor Collection Efficiency	%	99.865%	0.00%	100.00%	95.00%	0.00%	100.000%	99.200%	0.00%										
	Vapor Destruction Efficiency	%	99.90%	0.00%	99.90%	99.90%	0.00%	99.90%	99.90%	0.00%										
	Saturation Factor	S	0.20	0.20	0.50	0.50	0.50	0.60	0.60	0.60										
Constants, Conversions, and Combustion Device Emission Factors	Loading Loss Equation Constant	-	12.46	12.46	12.46	12.46	12.46	12.46	12.46	12.46										
	gals/bbl	B_c	42	42	42	42	42	42	42	42										
	lbs/ton	-	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000										
	NO_x Emission factor	lbs/MMBtu	0.06	N/A	0.06	0.06	N/A	0.06	0.06	N/A										
	CO Emission Factor	lbs/MMBtu	0.20	N/A	0.20	0.08	N/A	0.20	0.20	N/A										
	H_2S Emissions Factor	lbs/lb-VOC	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018										
	SO_2 Natural Gas Emission Factor	lbs/MMBtu	0.0006	N/A	0.0006	0.0006	N/A	0.0006	0.0006	N/A										
	$PM/PM_{10}/PM_{2.5}$ Emission Factor	lbs/MMBtu	0.0075	N/A	0.0075	0.0075	N/A	0.0075	0.0075	N/A										
Product Physical Property Data	Product Name	-	Product Group No. 1	Product Group No. 2	Product Group No. 1	Product Group No. 1	Product Group No. 2	Product Group No. 1	Product Group No. 1	Product Group No. 2										
	Vapor Molecular Weight	M (lbs/lb-mole)	66	130	66	66	130	66	66	130										
	Vapor Heat Content	Btu/lb	20,000	-	20,000	20,000	-	20,000	20,000	-										
	Maximum True Vapor Pressure	P (psia)	11.00	0.09	11.00	11.00	0.09	11.00	11.00	0.09										
	Maximum Product Loading Temp.	T (^{0}R)	549	549	549	549	549	549	549	549										
VOC Loading Loss Factor	Short-Term Loading Loss (LL)	lbs/1,000 bbl.	138.41	2.23	346.02	346.02	5.58	415.22	415.22	6.69										
	Uncollected Short-Term[1]	lbs/1,000 bbl.	0.19	2.231	-	17.301	5.58	-	3.32	6.69										
	Collected and Controlled Short-Term	lbs/1,000 bbl.	138.22	-	346.02	328.72	-	415.22	411.90	-										
Product Throughput	Short-Term Pump Rate Per Dock/Rack	bbls/hr	20,000	20,000	20,000	5,000	10,000	10,000	10,000	10,000	*20,000*	*20,000*	*20,000*	*20,000*	*10,000*	*10,000*	*10,000*			
Uncollected Loading Loss Emissions	**Uncollected VOC Short-Term**	**lbs/hr**	***3.74***	***44.61***	-	***86.51***	***55.76***	-	***33.22***	***66.92***	***86.51***	***86.51***	***86.51***	***86.51***	***66.92***	***66.92***	***66.92***			
	Uncollected H_2S Short-Term	**lbs/hr**	***0.01***	***0.08***	-	***0.15***	***0.10***	-		***0.12***	***0.15***	***0.15***	***0.15***	***0.15***	***0.12***	***0.12***	***0.12***			
	Collected and Controlled VOC Short-Term	**lbs/hr**	***2.76***	-	***6.92***	***1.64***	-	***4.15***	***4.12***	-								***6.92***	***6.92***	***6.92***
Controlled Loading Loss Emissions and Vapor Control Combustion Emissions	Total Heat Input (VCU Physical Capacity)	MMBtu/hr	99.00	N/A	99.00	99.00	N/A	99.00	99.00	N/A								***99.00***	***99.00***	***99.00***
	NO_x Short-Term	***lbs/hr***	***5.94***	***N/A***	***5.94***	***5.94***	***N/A***	***5.94***	***5.94***	***N/A***								***5.94***	***5.94***	***5.94***
	CO Short Term	***lbs/hr***	***19.80***	***N/A***	***19.80***	***7.92***	***N/A***	***19.80***	***19.80***	***N/A***								***19.80***	***19.80***	***19.80***
	H_2S Short-Term	***lbs/hr***	***0.10***	***N/A***	***0.25***	***0.06***	***N/A***	***0.15***	***0.15***	***N/A***								***0.25***	***0.25***	***0.25***
	SO_2 Short-Term	***lbs/hr***	***9.23***	***N/A***	***23.11***	***0.06***	***N/A***	***13.87***	***0.06***	***N/A***								***23.11***	***23.11***	***23.11***
	$PM/PM_{10}/PM_{2.5}$ Short-Term	***lbs/hr***	***0.74***	***N/A***	***0.74***	***0.74***	***N/A***	***0.74***	***0.74***	***N/A***								***0.74***	***0.74***	***0.74***

Example Emission Calcs:
$LL = 12.46 * SPM/T*B_c$
LL = loading loss, lbs/1,000 gals of liquid loaded
S = saturation factor
P = true vapor pressure of liquid loaded (psia)
M = molecular weight of vapors (lb/lb-mole)
T = temperature of bulk liquid loaded (^{0}R)
B_c = gals/bbl conversion

Sample Calculations, SO_2 Short-Term Emissions:
SO_2 Short-Term Emissions, lb/hr = Throughput * Collected and Controlled Short-Term VOC Loading Loss Factor *H_2S Emission Factor * Molecular Weight of SO_2 / Molecular Weight of H_2S
SO_2 Short-Term Emissions, lb/hr = (20,000 bbl/hr) * (138.27 lb-VOC/1,000 bbl) * (0.0018 lbs/lb-VOC) * (64 lb/lb-mole) / (34 lb/lb-mole)
SO_2 Short-Term Emissions, lb/hr = 9.23 lb/hr

VC 1:

loading:
hose venting:
WW:
R+RL:

Table A-6
Annual Marine Loading Emissions
Intercontinental Terminals Company LLC
December 2018

(A)

non-isolated inlet

isolated inlet - please

Dock Scenario		Units and/or Constants	1	2	3	4	5	6	7	8	VCU Assist & Pilot Gas	Proposed Permit Limits	
Uncollected Loading EPN			DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	RACK-1, RACK-3, & RACK-5	RACK-1, RACK-3, & RACK-6	RACK-1, RACK-3, & RACK-5	-	LOADFUG	VC-1, VC-2, & VC-3
Controlled Loading EPN			VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3	VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3	VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3		
Dock Data	Vessel Type	Ship/Barge/Truck/Rail	(inerted) OGB/ Ship	Ship	Barge	Barge	Barge	Railcar	Tank Truck	Truck/Rail			
	Vapor Collection Efficiency	%	99.865%	0.00%	✓ 100.00%	95.00%	0.00%	✓ 100.000%	99.200%	0.00%			
	Vapor Destruction Efficiency	%	99.90%	0.00%	99.90%	99.90%	0.00%	99.90%	99.90%	0.00%			
	Saturation Factor	S	0.20	0.20	0.50	0.50	0.50	0.60	0.60	0.60			
Constants, Conversions, and Combustion Device Emission Factors	Loading Loss Equation Constant	-	12.46	12.46	12.46	12.46	12.46	12.46	12.46	12.46			
	gals/bbl	B_c	42	42	42	42	42	42	42	42			
	lbs/ton	-	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000		
	VOC Emission Factor	lbs/MMBtu									0.0054		
	NO_x Emission factor	lbs/MMBtu	0.06	N/A	0.06	0.06	N/A	0.06	0.06	N/A	0.06		
	CO Emission Factor	lbs/MMBtu	0.20	N/A	0.20	0.20	N/A	0.20	0.20	N/A	0.20		
	H_2S Emissions Factor	lbs/lb-VOC	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	N/A		
	SO_2 Natural Gas Emission Factor	lbs/MMBtu	0.0006	N/A	0.0006	0.0006	N/A	0.0006	0.0006	N/A	0.0006		
	$PM/PM_{10}/PM_{2.5}$ Emission Factor	lbs/MMBtu	0.0075	N/A	0.0075	0.0075	N/A	0.0075	0.0075	N/A	0.0075		
	CO_2 Emission Factor	lbs/MMBtu	154.81	N/A	154.81	154.81	N/A	154.81	154.81	N/A	116.889		
	CH_4 Emission Factor	lbs/MMBtu	0.003	N/A	0.003	0.003	N/A	0.003	0.003	N/A	0.001		
	N_2O Emission Factor	lbs/MMBtu	0.0006	N/A	0.0006	0.0006	N/A	0.0006	0.0006	N/A	0.0001		
Product Physical Property Data	Product Name	-	Product Group No. 1	Product Group No. 2	Product Group No. 1	Product Group No. 1	Product Group No. 2	Product Group No. 1	Product Group No. 1	Product Group No. 2			
	Vapor Molecular Weight	M (lbs/lb-mole)	66	130	66	66	130	66	66	130			
	Vapor Heat Content	Btu/lb	20,000	-	20,000	20,000	-	20,000	20,000	-			
	Annual Average Vapor Pressure	P (psia)	4.90	0.01	4.90	4.90	0.01	4.90	4.90	0.01			
	Annual Average Product Loading Temp.	T (°R)	530	530	530	530	530	530	530	530			
VOC Loading Loss Factor	Annual Loading Loss (LL)	lbs/1,000 bbl.	63.86	0.26	159.66	159.66	0.64	191.59	191.59	0.77			
	Uncollected Annual[1]	lbs/1,000 bbl.	0.09	0.26	-	-	0.64	-	1.53	0.77			
	Collected and Controlled Annual	lbs/1,000 bbl.	63.78	-	159.66	159.66	-	191.59	190.06	-			
Product Throughput	Annual Ship/Barge/Truck/Rail Total	bbls/yr	15,000,000	5,000,000	5,000,000	200,000	4,500,000	1,500,000	1,500,000	1,500,000			
Uncollected Loading Loss Emissions	Uncollected VOC Annual	tpy	0.65	0.64	-	-	1.44	-	1.15	0.58		4.46	
	Uncollected H_2S Annual	tpy	0.001	0.001	-	-	0.003	-	0.002	0.001		0.01	
	Collected and Controlled VOC Annual	tpy	0.48	-	0.40	0.02	-	0.14	0.14	-			1.18
Controlled Loading Loss Emissions and Vapor Control Combustion Emissions	Total Heat Input	MMBtu/yr	19,133.57	N/A	15,966.20	638.65	N/A	5,747.83	5,701.85	N/A	187,639		234,827.30
	VOC Annual (Natural Gas)	tpy									0.51		0.51
	NO_X Annual	tpy	0.57	N/A	0.48	0.02	N/A	0.17	0.17	N/A	5.63		7.04
	CO Annual	tpy	1.91	N/A	1.60	0.06	N/A	0.57	0.57	N/A	18.76		23.48
	H_2S Annual	tpy	0.02	N/A	0.01	0.00	N/A	0.01	0.01	N/A	N/A		0.04
	SO_2 Annual	tpy	1.60	N/A	1.33	0.05	N/A	0.48	0.48	N/A	0.06		4.00
	$PM/PM_{10}/PM_{2.5}$ Annual	tpy	0.07	N/A	0.06	0.00	N/A	0.02	0.02	N/A	0.70		0.87
	CO_2 Annual	tpy	1,481.03	N/A	1,235.86	49.43	N/A	444.91	441.35	N/A	10,966.48		14,619.07
	CH_4 Annual	tpy	0.03	N/A	0.02	0.00	N/A	0.01	0.01	N/A	0.09		0.16
	N_2O Annual	tpy	0.01	N/A	0.00	0.00	N/A	0.00	0.00	N/A	0.01		0.02
	CO_2e Annual	tpy	1,483.46	N/A	1,237.89	49.52	N/A	445.64	442.08	N/A	10,971.62		14,630.20

Example Emission Calcs:

$LL = 12.46 * SPM/T*B_c$

- flow rate = scf/hr

LL = loading loss, lbs/1,000 gals of liquid loaded
S = saturation factor
P = true vapor pressure of liquid loaded (psia)
M = molecular weight of vapors (lb/lb-mole)
T = temperature of bulk liquid loaded (°R)
B_c = gals/bbl conversion

	LOADFUG	LOAD UNC
A:	5.68 →	4.46
B:	6.51 →	2.97
C:	14.78 →	16.38
	26.97 →	23.81 (cap)

Sample Calculations, SO_2 Annual Emissions:

SO_2 Short-Term Emissions, tpy = Throughput * Collected and Controlled Annual VOC Loading Loss Factor *H_2S Emission Factor * Molecular Weight of SO_2 / Molecular Weight of H_2S / 2,000 lbs/ton

SO_2 Short-Term Emissions, tpy = (75,000,000 bbl/yr) * (63.72 lb-VOC/1,000 bbl) * (0.0018 lbs/lb-VOC) * (64 lb/lb-mole) / (34 lb/lb-mole) / 2,000 lbs/ton

SO_2 Short-Term Emissions, tpy = 7.99 lb/hr

Table A-6
Annual Marine Loading Emissions
Intercontinental Terminals Company LLC
December 2018

(B)

Dock Scenario		Units and/or Constants	1	2	3	4	5	6	7	8	VCU Assist & Pilot Gas	Proposed Permit Limits	
Uncollected Loading EPN			DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	RACK-1, RACK-3, & RACK-5	RACK-1, RACK-3, & RACK-6	RACK-1, RACK-3, & RACK-5	-	LOADFUG	VC-1, VC-2, & VC-3
Controlled Loading EPN			VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3	VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3	VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3		
Dock Data	Vessel Type	Ship/Barge/Truck/Rail	Ship	Ship	Barge	Barge	Barge	Railcar	Tank Truck	Tank Truck/Rail			
	Vapor Collection Efficiency	%	99.865%	0.00%	100.00%	95.00%	0.00%	100.000%	99.200%	0.00%			
	Vapor Destruction Efficiency	%	99.90%	0.00%	99.90%	99.90%	0.00%	99.90%	99.90%	0.00%			
	Saturation Factor	S	0.20	0.20	0.50	0.50	0.50	0.60	0.60	0.60			
Constants, Conversions, and Combustion Device Emission Factors	Loading Loss Equation Constant	-	12.46	12.46	12.46	12.46	12.46	12.46	12.46	12.46			
	gals/bbl	B_c	42	42	42	42	42	42	42	42			
	lbs/ton	-	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000		
	VOC Emission Factor	lbs/MMBtu									0.0054		
	NO_x Emission factor	lbs/MMBtu	0.06	N/A	0.06	0.06	N/A	0.06	0.06	N/A	0.06		
	CO Emission Factor	lbs/MMBtu	0.20	N/A	0.20	0.20	N/A	0.20	0.20	N/A	0.20		
	H_2S Emissions Factor	lbs/lb-VOC	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	N/A		
	SO_2 Natural Gas Emission Factor	lbs/MMBtu	0.0006	N/A	0.0006	0.0006	N/A	0.0006	0.0006	N/A	0.0006		
	$PM/PM_{10}/PM_{2.5}$ Emission Factor	lbs/MMBtu	0.0075	N/A	0.0075	0.0075	N/A	0.0075	0.0075	N/A	0.0075		
	CO_2 Emission Factor	lbs/MMBtu	154.81	N/A	154.81	154.81	N/A	154.81	154.81	N/A	116.889		
	CH_4 Emission Factor	lbs/MMBtu	0.003	N/A	0.003	0.003	N/A	0.003	0.003	N/A	0.001		
	N_2O Emission Factor	lbs/MMBtu	0.0006	N/A	0.0006	0.0006	N/A	0.0006	0.0006	N/A	0.0001		
Product Physical Property Data	Product Name	-	Product Group No. 1	Product Group No. 2	Product Group No. 1	Product Group No. 1	Product Group No. 2	Product Group No. 1	Product Group No. 1	Product Group No. 2			
	Vapor Molecular Weight	M (lbs/lb-mole)	66	130	66	66	130	66	66	130			
	Vapor Heat Content	Btu/lb	20,000	-	20,000	20,000	-	20,000	20,000	-			
	Annual Average Vapor Pressure	P (psia)	4.90	0.01	4.90	4.90	0.01	4.90	4.90	0.01			
	Annual Average Product Loading Temp.	T (°R)	530	530	530	530	530	530	530	530			
VOC Loading Loss Factor	Annual Loading Loss (LL)	lbs/1,000 bbl.	63.86	0.26	159.66	159.66	0.64	191.59	191.59	0.77			
	Uncollected Annual[1]	lbs/1,000 bbl.	0.09	0.26	-	-	0.64	-	1.53	0.77			
	Collected and Controlled Annual	lbs/1,000 bbl.	63.78	-	159.66	159.66	-	191.59	190.06	-			
Product Throughput	Annual Ship/Barge/Truck/Rail Total	bbls/yr	12,300,000	5,000,000	9,799,200	200,000	2,000,000	1,000,000	1,000,000	1,000,000			
Uncollected Loading Loss Emissions	Uncollected VOC Annual	tpy	0.53	0.64	-	-	0.64	-	0.77	0.39		2.97	
	Uncollected H_2S Annual	tpy	0.001	0.001	-	-	0.001	-	0.001	0.001		0.01	
	Collected and Controlled VOC Annual	tpy	0.39	-	0.78	0.02	-	0.10	0.10	-			1.38
Controlled Loading Loss Emissions and Vapor Control Combustion Emissions	Total Heat Input	MMBtu/yr	15,689.53	N/A	31,291.19	638.65	N/A	3,831.89	3,801.23	N/A	187,639		242,891.69
	VOC Annual (Natural Gas)	tpy									0.51		0.51
	NO_x Annual	tpy	0.47	N/A	0.94	0.02	N/A	0.11	0.11	N/A	5.63		7.29
	CO Annual	tpy	1.57	N/A	3.13	0.06	N/A	0.38	0.38	N/A	18.76		24.29
	H_2S Annual	tpy	0.01	N/A	0.03	0.00	N/A	0.00	0.00	N/A	N/A		0.05
	SO_2 Annual	tpy	1.31	N/A	2.61	0.05	N/A	0.32	0.32	N/A	0.06		4.67
	$PM/PM_{10}/PM_{2.5}$ Annual	tpy	0.06	N/A	0.12	0.00	N/A	0.01	0.01	N/A	0.70		0.90
	CO_2 Annual	tpy	1,214.45	N/A	2,422.09	49.43	N/A	296.61	294.23	N/A	10,966.48		15,243.30
	CH_4 Annual	tpy	0.02	N/A	0.05	0.00	N/A	0.01	0.01	N/A	0.09		0.18
	N_2O Annual	tpy	0.00	N/A	0.01	0.00	N/A	0.00	0.00	N/A	0.01		0.03
	CO_2e Annual	tpy	1,216.44	N/A	2,426.07	49.52	N/A	297.09	294.72	N/A	10,971.62		15,255.45

Example Emission Calcs:

$LL = 12.46 * SPM/T*B_c$

LL = loading loss, lbs/1,000 gals of liquid loaded

S = saturation factor

P = true vapor pressure of liquid loaded (psia)

M = molecular weight of vapors (lb/lb-mole)

T = temperature of bulk liquid loaded (°R)

B_c = gals/bbl conversion

Sample Calculations, SO_2 Annual Emissions:

SO_2 Short-Term Emissions, tpy = Throughput * Collected and Controlled Annual VOC Loading Loss Factor *H_2S Emission Factor * Molecular Weight of SO_2 / Molecular Weight of H_2S / 2,000 lbs/ton

SO_2 Short-Term Emissions, tpy = (75,000,000 bbl/yr) * (63.72 lb-VOC/1,000 bbl) * (0.0018 lbs/lb-VOC) * (64 lb/lb-mole) / (34 lb/lb-mole) / 2,000 lbs/ton

SO_2 Short-Term Emissions, tpy = 7.99 lb/hr

Table A-6
Annual Marine Loading Emissions
Intercontinental Terminals Company LLC
December 2018

Dock Scenario		Units and/or Constants	1	2	3	4	5	6	7	8	VCU Assist & Pilot Gas	Proposed Permit Limits	
Uncollected Loading EPN			DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	DOCK-1, DOCK-2, DOCK-3, & DOCK-4	RACK-1, RACK-3, & RACK-5	RACK-1, RACK-3, & RACK-6	RACK-1, RACK-3, & RACK-5	-	LOADFUG	VC-1, VC-2, & VC-3
Controlled Loading EPN			VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3	VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3	VC-1, VC-2, & VC-3	-	VC-1, VC-2, & VC-3		
Dock Data	Vessel Type	Ship/Barge/Truck/Rail	Ship	Ship	Barge	Barge	Barge	Railcar	Tank Truck	Tank Truck/Rail			
	Vapor Collection Efficiency	%	99.865%	0.00%	100.00%	95.00%	0.00%	100.000%	99.200%	0.00%			
	Vapor Destruction Efficiency	%	99.90%	0.00%	99.90%	99.90%	0.00%	99.90%	99.90%	0.00%			
	Saturation Factor	S	0.20	0.20	0.50	0.50	0.50	0.60	0.60	0.60			
Constants, Conversions, and Combustion Device Emission Factors	Loading Loss Equation Constant	-	12.46	12.46	12.46	12.46	12.46	12.46	12.46	12.46			
	gals/bbl	B_c	42	42	42	42	42	42	42	42			
	lbs/ton	-	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000		
	VOC Emission Factor	lbs/MMBtu									0.0054		
	NO_X Emission factor	lbs/MMBtu	0.06	N/A	0.06	0.06	N/A	0.06	0.06	N/A	0.06		
	CO Emission Factor	lbs/MMBtu	0.20	N/A	0.20	0.20	N/A	0.20	1.20	N/A	0.20		
	H_2S Emissions Factor	lbs/lb-VOC	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	N/A		
	SO_2 Natural Gas Emission Factor	lbs/MMBtu	0.0006	N/A	0.0006	0.0006	N/A	0.0006	0.0006	N/A	0.0006		
	$PM/PM_{10}/PM_{2.5}$ Emission Factor	lbs/MMBtu	0.0075	N/A	0.0075	0.0075	N/A	0.0075	0.0075	N/A	0.0075		
	CO_2 Emission Factor	lbs/MMBtu	154.81	N/A	154.81	154.81	N/A	154.81	154.81	N/A	116.889		
	CH_4 Emission Factor	lbs/MMBtu	0.003	N/A	0.003	0.003	N/A	0.003	0.003	N/A	0.001		
	N_2O Emission Factor	lbs/MMBtu	0.0006	N/A	0.0006	0.0006	N/A	0.0006	0.0006	N/A	0.0001		
Product Physical Property Data	Product Name	-	Product Group No. 1	Product Group No. 2	Product Group No. 1	Product Group No. 1	Product Group No. 2	Product Group No. 1	Product Group No. 1	Product Group No. 2			
	Vapor Molecular Weight	M (lbs/lb-mole)	66	130	66	66	130	66	66	130			
	Vapor Heat Content	Btu/lb	20,000	-	20,000	20,000	-	20,000	20,000	-			
	Annual Average Vapor Pressure	P (psia)	4.90	0.01	4.90	4.90	0.01	4.90	4.90	0.01			
	Annual Average Product Loading Temp.	T (°R)	530	530	530	530	530	530	530	530			
VOC Loading Loss Factor	Annual Loading Loss (LL)	lbs/1,000 bbl.	63.86	0.26	159.66	159.66	0.64	191.59	191.59	0.77			
	Uncollected Annual[1]	lbs/1,000 bbl.	0.09	0.26	-	-	0.64	-	1.53	0.77			
	Collected and Controlled Annual	lbs/1,000 bbl.	63.78	-	159.66	159.66	-	191.59	190.06	-			
Product Throughput	Annual Ship/Barge/Truck/Rail Total	bbls/yr	75,000,000	30,000,000	20,000,000	200,000	20,000,000	2,500,000	2,500,001	2,500,000			
Uncollected Loading Loss Emissions	Uncollected VOC Annual	tpy	3.23	3.85	-	-	6.42	-	1.92	0.96		16.38	
	Uncollected H_2S Annual	tpy	0.006	0.007	-	-	0.011	-	0.003	0.002		0.03	
	Collected and Controlled VOC Annual	tpy	2.39	-	1.60	0.02	-	0.24	0.24	-			4.48
Controlled Loading Loss Emissions and Vapor Control Combustion Emissions	Total Heat Input	MMBtu/yr	95,667.86	N/A	63,864.79	638.65	N/A	9,579.72	9,503.08	N/A	107,222		286,476.49
	VOC Annual (Natural Gas)	tpy									0.29		0.29
	NO_X Annual	tpy	2.87	N/A	1.92	0.02	N/A	0.29	0.29	N/A	3.22		8.59
	CO Annual	tpy	9.57	N/A	6.39	0.06	N/A	0.96	5.70	N/A	10.72		33.40
	H_2S Annual	tpy	0.08	N/A	0.06	0.00	N/A	0.01	0.01	N/A	N/A		0.16
	SO_2 Annual	tpy	7.99	N/A	5.33	0.05	N/A	0.80	0.79	N/A	0.03		15.00
	$PM/PM_{10}/PM_{2.5}$ Annual	tpy	0.36	N/A	0.24	0.00	N/A	0.04	0.04	N/A	0.40		1.07
	CO_2 Annual	tpy	7,405.17	N/A	4,943.45	49.43	N/A	741.52	735.59	N/A	6,266.56		20,141.72
	CH_4 Annual	tpy	0.14	N/A	0.10	0.00	N/A	0.01	0.01	N/A	0.05		0.32
	N_2O Annual	tpy	0.03	N/A	0.02	0.00	N/A	0.00	0.00	N/A	0.01		0.06
	CO_2e Annual	tpy	7,417.31	N/A	4,951.56	49.52	N/A	742.73	736.79	N/A	6,269.50		20,167.41

Example Emission Calcs:

LL = 12.46 * SPM/T*B_c

LL = loading loss, lbs/1,000 gals of liquid loaded

S = saturation factor

P = true vapor pressure of liquid loaded (psia)

M = molecular weight of vapors (lb/lb-mole)

T = temperature of bulk liquid loaded (°R)

B_c = gals/bbl conversion

Sample Calculations, SO_2 Annual Emissions:

SO_2 Short-Term Emissions, tpy = Throughput * Collected and Controlled Annual VOC Loading Loss Factor *H_2S Emission Factor * Molecular Weight of SO_2 / Molecular Weight of H_2S / 2,000 lbs/ton

SO_2 Short-Term Emissions, tpy = (75,000,000 bbl/yr) * (63.72 lb-VOC/1,000 bbl) * (0.0018 lbs/lb-VOC) * (64 lb/lb-mole) / (34 lb/lb-mole) / 2,000 lbs/ton

SO_2 Short-Term Emissions, tpy = 7.99 lb/hr

Table A-7
Flare Emissions (EPN: FL-001)
Intercontinental Terminals Company LLC
December 2018

Event: Pilot/Assit Gas
Maximum Gas Flow: 50,280 scfh

Component	Waste Stream							VOC EMISSIONS		LHV	Net Heat Release		Emission Factors		Combustion Emissions	
	Flow							Efficiency	Emissions				lb/MMBTU		NOX	CO
	MW	Wt %	Mol%	Vol%	lb/hr	scf/hr	mol/hr	%	lb/hr	BTU/scf	BTU/scf	BTU/hr	NOX	CO	lb/hr	lb/hr
Nitrogen	28.00	0.60%	0.38%	0.38%	14.21	192.32	0.51	0%	14.2084	-	-	-	0.138	0.0000	0.00	0.00
Hydrogen	2.02	0.00%	0.00%	0.00%	0.01	1.21	0.00	99%	0.0001	269	0	325	0.138	0.0000	0.00	0.00
Methane	16.00	82.18%	91.98%	91.98%	1,952.32	46245.63	122.02	99%	19.5232	892	821	41,266,455	0.138	0.2755	5.69	11.37
Ethane	30.07	3.43%	2.04%	2.04%	81.37	1025.61	2.71	99%	0.8137	1,588	32	1,628,694	0.138	0.2755	0.22	0.45
Propane	44.09	1.03%	0.42%	0.42%	24.50	210.62	0.56	99%	0.2450	2,273	10	478,791	0.138	0.2755	0.07	0.13
n-Butane	58.12	0.45%	0.14%	0.14%	10.64	69.39	0.18	98%	0.2128	2,957	4	205,176	0.138	0.2755	0.03	0.06
Butenes	56.10	0.42%	0.13%	0.13%	9.91	66.97	0.18	98%	0.1983	2,828	4	189,400	0.138	0.2755	0.03	0.05
n-Pentane	72.14	0.19%	0.05%	0.05%	4.61	24.23	0.06	98%	0.0923	3,609	2	87,464	0.138	0.2755	0.01	0.02
Isopentane	72.15	0.34%	0.09%	0.09%	8.19	43.04	0.11	98%	0.1639	3,602	3	155,029	0.138	0.2755	0.02	0.04
Hexane (C6+)	86.17	0.25%	0.05%	0.05%	5.98	26.30	0.07	98%	0.1196	4,287	2	112,733	0.138	0.2755	0.02	0.03
Carbon Dioxide	44.01	11.11%	4.52%	4.52%	263.97	2273.21	6.00	0%	263.9682	-	-	-	0.138	0.2755	0.00	0.00
TOTAL		100.00%	99.80%	99.80%	2,375.72	50,178.53	132.40		1.0318		878	44,124,065			6.09	12.16

107.11

Event: VCU Backup
Maximum Gas Flow: 30,000 scfh
Average Gas Flow: - scfh

Component	Waste Stream							VOC EMISSIONS		LHV	Net Heat Release		Emission Factors		Combustion Emissions	
	Flow							Efficiency	Emissions				lb/MMBTU		NOX	CO
	MW	Wt %	Mol%	Vol%	lb/hr	scf/hr	mol/hr	%	lb/hr	BTU/scf	BTU/scf	BTU/hr	NOX	CO	lb/hr	lb/hr
Gasoline	68.00	99.75%	99.50%	99.50%	5,355.67	29850.00	78.76	98%	107.11	3,588	3,570	107,101,800	0.138	0.2755	14.78	29.51
H_2S	34.08	0.25%	0.50%	0.50%	13.49	150.00	0.40	98%	0.27	546	3	81,900	0.138	0.2755	0.01	0.02
SO_2	64.00	0.00%	0.00%	0.00%	-	0.00	0.00	0%	25.33	-	-	-	0.138	0.2755	0.00	0.00
TOTAL		100.00%	100.00%	100.00%	5,369.16	30,000.00	79.16		107.11		3,573	107,183,700			14.79	29.53

Notes:

1. The VOC speciation and flow rates utlized in the emission calculations are based on typical compositions and flows that may vary based on process conditions.

Updated 12/21/2018

+ hosedrain

Table A-8
Loading Hose Disconnect Emissions (EPN: HOSEVENT, VC-001, VC-002, & VC-003)
Intercontinental Terminals Company LLC
December 2018

Emissions Summary	Uncontrolled Emission Totals		Annual Project Emissions Contribution		
	lb/hr	tpy	Project No. 1	Project No. 2	Project No. 3
details)	52.55	11.18	2.96	2.08	6.13
Hose Disconnet Liquid Draining	3.00	5.45	1.75	1.68	2.02

Equipment ID		Project No. 1			Project No. 2			Project No. 3			Uncontrolled Emission Totals
		HV(UC) Uncontrolled Hose Vent/D	HD(C) Hose Vent to Controlled Vessel	Vapor Collection Header Vent to Control	HV Uncontrolled Hose Vent	HD Hose Vent to Controlled Vessel	Vapor Collection Header Vent to Control	HV Uncontrolled Hose Vent	HD Hose Vent to Controlled Vessel	Vapor Collection Header Vent to Control	
Annual Events	events/yr	338	1000	1000	238	1000	1000	700	1000	1000	
Short-Term Simultaneous Events	events/hr	1	1	1	1	1	1	1	1	1	
Maximum Product Vapor Pressure	psia	11	11	11	11	11	11	11	11	11	
Molecular Weight of Vapor	lb/lb-mole	66	66	66	66	66	66	66	66	66	
Daily Avg. Liquid Surface Temp.	°R	544.77	544.77	544.77	544.77	544.77	544.77	544.77	544.77	544.77	
Intial Hose Pressure	psig	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	
Volume Per Cycle	ft^3/cycle	33.53	33.53	33.53	33.53	33.53	33.53	33.53	33.53	33.53	
Cycles Per Event	-	3	3	5	3	3	5	3	3	5	
Hose Disconnect Vapors Vented (See Table A-9 for controlled emission details)											
Vented to Control	Yes/No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	
Moles Per Cycle	M_v/cycle	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	
Vented VOC Emissions	lbs/hr	17.52	0.04	0.06	17.52	0.04	0.06	17.52	0.04	0.06	**52.55**
Total Venting VOC Emissions	tpy	2.96	0.02	0.03	2.08	0.02	0.03	6.13	0.02	0.03	**11.18**
Hose Disconnect Liquid Draining	***Project Totals (tpy)***		**3.01**			**2.13**			**6.18**		
Equipment Draining VOC Loading Loss	lbs/1,000 gals loaded	9.96	9.96	9.96	9.96	9.96	9.96	9.96	9.96	9.96	
Equipment Draining VOC Loading Loss (20% of hose volume vented to vessel and tank and 0% of vapor header volume vented to control)	lbs/event	1.50	1.50	0.00	1.50	1.50	0.00	1.50	1.50	0.00	
Equipment Draining VOC Loading Loss	lbs/hr	1.50	1.50	0.00	1.50	1.50	0.00	1.50	1.50	0.00	**9.00**
Equipment Draining VOC Loading Loss	tpy	0.25	1.50	0.00	0.18	1.50	0.00	0.52	1.50	0.00	**5.45**
	Project Totals (tpy)		**1.75**			**1.68**			**2.02**		

hosevent

hosedrain

CV CV CV

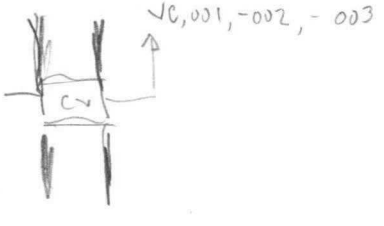
Sample Calculations, Equipment Draining VOC Loading Loss (Uncontrolled Hose Vent):

Equipment Draining VOC Loading Loss, (lbs/1,000 gals loaded) = 12.46 (SPM/T)
Equipment Draining VOC Loading Loss, (lbs/1,000 gals loaded) = (12.46 lb-mole°R/psia-1,000 gal) * (0.6) * (11 psia) * (66 lbs/lb-mole) / (544.77°R)
Equipment Draining VOC Loading Loss, (lbs/1,000 gals loaded) = **9.96 lbs/1,000 gals loaded**
Equipment Draining VOC Loading Loss, (lbs/event) = (Volume per cycle) * (Cycles per Event) * (Equipment Draining VOC Loading Loss lbs/1,000 gals loaded) * (20%)
Equipment Draining VOC Loading Loss, (lbs/event) = (33.53 ft^3/cycle) * (7.48 gals/ft^3) * (3 cycle/event) * (9.96 lbs/1,000 gals loaded) * (0.20)
Equipment Draining VOC Loading Loss, (lbs/event) = **1.50 lbs/event**
Equipment Draining VOC Loading Loss, (lbs/hr) = (Equipment Draining VOC Loading Loss, lbs/event) * (Short-Term Simultaneous Events)
Equipment Draining VOC Loading Loss, (lbs/hr) = (1.50 lbs/event) * (1 event/hr)
Equipment Draining VOC Loading Loss, (lbs/hr) = **1.50 lbs/hr**
Equipment Draining VOC Loading Loss, (tpy) = (Equipment Draining VOC Loading Loss, lbs/event) * (Annual Events) * (Equipment Count) / 2,000 lbs/ton
Equipment Draining VOC Loading Loss, (tpy) = (1.50 lbs/event) * (700 event/yr) * (1) / 2,000 lbs/ton
Equipment Draining VOC Loading Loss, (tpy) = **0.52 tpy**

.52
.18
.25
.95
4.5 → controlled to sump
5.45

hosevent: de-pressurization, vent to ATM
hosedrain: drain to sump, controlled

Vent to control: 0
Vent to controlled vessel



UC:

lb/hr	tpy
1.5	.25
1.5	.18
1.5	.52
4.5	.95

C:

lb/hr	tpy
1.5	1.5
1.5	1.5
1.5	1.5
4.5	4.5

Updated 12/21/2018

Table A-9
Controlled Loading Hose Disconnet Emissions (EPN: VCU-001, VCU-002, & VCU-003)
Intercontinental Terminals Company LLC
December 2018

Controlled @

Basis
Used NO_x and CO emissions factors prvided by vendor.
Used PM factors from AP-42, Section 3.2-7.
Used H_2S emissions factor calculated in Table A-14 and a DRE of 98%.
SO_2 emissoins based on 100% conversion of H_2S.

Operation Type	Source	Hourly		Annual - Project No. 1		Annual - Project No. 2		Annual - Project No. 3	
		Vapors lb/hr	Heat Release MMBtu/hr	Vapors lb/yr	Heat Release MMBtu/yr	Vapors lb/yr	Heat Release MMBtu/yr	Vapors lb/yr	Heat Release MMBtu/yr
Loading/Unloading Hose Disconnect	Loading/Unloading Hoses	140.13	2.80	46,711.52	934.23	46,711.52	934.23	46,711.52	934.23

Operation Type	Pollutant	Emissions Factor		Project No. 1-3	Project No. 1	Project No. 2	Project No. 3
		(Value)	(Units)	(lb/hr)	(ton/yr)	(ton/yr)	(ton/yr)
Loading/Unloading Hose Disconnect	VOC	99.8%	DRE	0.28	0.05	0.05	0.05
	NO_x	0.0600	lb/MMBtu	0.17	0.03	0.03	0.03
	CO	0.2000	lb/MMBtu	0.56	0.09	0.09	0.09
	H_2S	0.0018	lb/lb-VOC	0.00	8.29E-04	8.29E-04	8.29E-04
	SO_2	100%	H_2S Conversion	0.50	0.08	0.08	0.08
	$PM/PM_{10}/PM_{2.5}$	0.0075	lb/MMBtu	0.02	0.004	0.004	0.004
	CO_2	154.81	lb/MMBtu	433.88	72.31	72.31	72.31
	CH_4	0.003	lb/MMBtu	0.01	1.40E-03	1.40E-03	1.40E-03
	N_2O	0.0006	lb/MMBtu	0.002	2.80E-04	2.80E-04	2.80E-04

Table A-10
Fugitive Piping Component Emissions Summary
Intercontinental Terminals Company LLC
December 2018

Project ID	Fugitive Emissions	
	lbs/hr	tpy
Project No. 1	0.41	1.81
Project No. 2	0.83	3.63
Project No. 3	4.25	18.60
Totals	***5.49***	***24.04***

Table A-11
Project No. 1 Fugitive Emissions
Intercontinental Terminals Company LLC
December 2018

Component Type	Stream Type	Emission Factor SOCMI w/o C2=	Number of Components	Control Efficiency 28VHP	Hours 8,760	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Valves	Gas/Vapor	0.0089	0	97%	8,760	0.000	0.000
	Light Liquid	0.0035	1,658	97%	8,760	0.174	0.763
	Heavy Liquid	0.0007	0	30%	8,760	0.000	0.000
Pumps	Light Liquid	0.0386	65	93%	8,760	0.176	0.769
	Heavy Liquid	0.0161	0	30%	8,760	0.000	0.000
Flanges	Gas/Vapor	0.0029	0	30%	8,760	0.000	0.000
	Light Liquid	0.0005	4,290	97%	8,760	0.064	0.282
	Heavy Liquid	0.00007	0	30%	8,760	0.000	0.000
Compressors	Gas/Vapor	0.5027	0	95%	8,760	0.000	0.000
Relief Valves	Gas/Vapor	0.2293	0	97%	8,760	0.000	0.000
Open Ends		0.004	0	97%	8,760	0.000	0.000
Sample Con.	Light Liquid	0.033	0	97%	8,760	0.000	0.000
					Total	*0.41*	*1.81*

Notes:
1. Emission Factors based on TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Equipment Leak Fugitives, Uncontrolled SOCMI Fugitive Emission Factors, dated October 2000.
2. Percent reduction based on TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Equipment Leak Fugitives, Control Efficiencies for TNRCC Leak Detection and Repair Programs, dated October 2000.

3. Actual component counts may vary; however, maximum short-term and annual emissions will comply with the proposed emission limits.

Table A-12
Project No. 2 Fugitive Emissions
Intercontinental Terminals Company LLC
December 2018

Component Type	Stream Type	Emission Factor SOCMI w/o C2=	Number of Components	Control Efficiency 28VHP	Hours 8,760	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Valves	Gas/Vapor	0.0089	0	97%	8,760	0.000	0.000
	Light Liquid	0.0035	3,316	97%	8,760	0.348	1.525
	Heavy Liquid	0.0007	0	30%	8,760	0.000	0.000
Pumps	Light Liquid	0.0386	130	93%	8,760	0.351	1.539
	Heavy Liquid	0.0161	0	30%	8,760	0.000	0.000
Flanges	Gas/Vapor	0.0029	0	30%	8,760	0.000	0.000
	Light Liquid	0.0005	8,580	97%	8,760	0.129	0.564
	Heavy Liquid	0.00007	0	30%	8,760	0.000	0.000
Compressors	Gas/Vapor	0.5027	0	95%	8,760	0.000	0.000
Relief Valves	Gas/Vapor	0.2293	0	97%	8,760	0.000	0.000
Open Ends		0.004	0	97%	8,760	0.000	0.000
Sample Con.	Light Liquid	0.033	0	97%	8,760	0.000	0.000
					Total	*0.83*	*3.63*

Notes:

1. Emission Factors based on TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Equipment Leak Fugitives, Uncontrolled SOCMI Fugitive Emission Factors, dated October 2000.
2. Percent reduction based on TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Equipment Leak Fugitives, Control Efficiencies for TNRCC Leak Detection and Repair Programs, dated October 2000.

3. Actual component counts may vary; however, maximum short-term and annual emissions will comply with the proposed emission limits.

Table A-13
Project No. 3 Fugitive Emissions
Intercontinental Terminals Company LLC
December 2018

Component Type	Stream Type	Emission Factor SOCMI w/o C2=	Number of Components	Control Efficiency 28VHP	Hours 8,760	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Valves	Gas/Vapor	0.0089	155	97%	8,760	0.041	0.181
	Light Liquid	0.0035	3,316	97%	8,760	0.348	1.525
	Heavy Liquid	0.0007	0	30%	8,760	0.000	0.000
Pumps	Light Liquid	0.0386	28	93%	8,760	0.076	0.331
	Heavy Liquid	0.0161	0	30%	8,760	0.000	0.000
Flanges	Gas/Vapor	0.0029	307	30%	8,760	0.623	2.730
	Light Liquid	0.0005	8,580	30%	8,760	3.003	13.153
	Heavy Liquid	0.00007	0	30%	8,760	0.000	0.000
Compressors	Gas/Vapor	0.5027	5	95%	8,760	0.126	0.550
Relief Valves	Gas/Vapor	0.2293	0	97%	8,760	0.000	0.000
Open Ends		0.004	0	97%	8,760	0.000	0.000
Sample Con.	Light Liquid	0.033	30	97%	8,760	0.030	0.130
					Total	*4.25*	*18.60*

Notes:

1. Emission Factors based on TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Equipment Leak Fugitives, Uncontrolled SOCMI Fugitive Emission Factors, dated October 2000.
2. Percent reduction based on TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Equipment Leak Fugitives, Control Efficiencies for TNRCC Leak Detection and Repair Programs, dated October 2000.

3. Actual component counts may vary; however, maximum short-term and annual emissions will comply with the proposed emission limits.

Table A-14
Emergency Firewater and Generator Emissions Summary (EPN: EGEN-1 through EGEN-9)
Intercontinental Terminals Company LLC
December 2018

Basis		
Annual Operation:	52	hr/yr

Emergency Firewater and Generator Emission Rates

EPN	Engine Horsepower (hp)	Pollutant	Emission Factor		Emission Rates	
					lb/hr	tpy
EFWP-1	460	NO_X	5.73E-03	lb/hp-hr	2.64	6.86E-02
		CO	1.10E-03	lb/hp-hr	0.51	0.01
		$PM/PM_{10}/PM_{2.5}$	1.98E-04	lb/hp-hr	0.09	2.37E-03
		VOC	2.20E-04	lb/hp-hr	0.10	2.64E-03
		SO_2	2.30E-05	lb/hp-hr	0.01	2.75E-04
EFWP-2	460	NO_X	5.73E-03	lb/hp-hr	2.64	6.86E-02
		CO	1.10E-03	lb/hp-hr	0.51	0.01
		$PM/PM_{10}/PM_{2.5}$	1.98E-04	lb/hp-hr	0.09	2.37E-03
		VOC	2.20E-04	lb/hp-hr	0.10	2.64E-03
		SO_2	2.30E-05	lb/hp-hr	0.01	2.75E-04
EFWP-3	525	NO_X	5.73E-03	lb/hp-hr	3.01	7.82E-02
		CO	1.10E-03	lb/hp-hr	0.58	0.02
		$PM/PM_{10}/PM_{2.5}$	1.98E-04	lb/hp-hr	0.10	2.71E-03
		VOC	2.20E-04	lb/hp-hr	0.12	3.01E-03
		SO_2	2.30E-05	lb/hp-hr	0.01	3.14E-04
EGEN-1	267	NO_X	2.87E-04	lb/hp-hr	0.08	1.99E-03
		CO	1.17E-03	lb/hp-hr	0.31	0.01
		$PM/PM_{10}/PM_{2.5}$	5.97E-07	lb/hp-hr	1.59E-04	4.14E-06
		VOC	1.17E-03	lb/hp-hr	3.12E-01	8.11E-03
		SO_2	4.56E-06	lb/hp-hr	1.22E-03	3.17E-05
EGEN-2	40	NO_X	3.51E-03	lb/hp-hr	0.14	3.65E-03
		CO	2.90E-01	lb/hp-hr	11.61	0.30
		$PM/PM_{10}/PM_{2.5}$	6.36E-07	lb/hp-hr	2.54E-05	6.61E-07
		VOC	2.20E-04	lb/hp-hr	8.82E-03	2.29E-04
		SO_2	4.85E-06	lb/hp-hr	1.94E-04	5.04E-06
EGEN-3	40	NO_X	3.51E-03	lb/hp-hr	0.14	3.65E-03
		CO	2.90E-01	lb/hp-hr	11.61	0.30
		$PM/PM_{10}/PM_{2.5}$	6.36E-07	lb/hp-hr	2.54E-05	6.61E-07
		VOC	2.20E-04	lb/hp-hr	8.82E-03	2.29E-04
		SO_2	4.85E-06	lb/hp-hr	1.94E-04	5.04E-06
EGEN-4	71	NO_X	3.51E-03	lb/hp-hr	0.25	6.47E-03
		CO	2.90E-01	lb/hp-hr	20.60	0.54
		$PM/PM_{10}/PM_{2.5}$	7.47E-07	lb/hp-hr	5.30E-05	1.38E-06
		VOC	2.20E-04	lb/hp-hr	1.57E-02	4.07E-04
		SO_2	5.70E-06	lb/hp-hr	4.05E-04	1.05E-05
EGEN-5	460	NO_X	3.51E-03	lb/hp-hr	1.61	4.19E-02
		CO	2.90E-01	lb/hp-hr	133.46	3.47
		$PM/PM_{10}/PM_{2.5}$	7.47E-07	lb/hp-hr	0.00	8.93E-06
		VOC	2.20E-04	lb/hp-hr	0.10	2.64E-03
		SO_2	5.70E-06	lb/hp-hr	0.00	6.82E-05
EGEN-6	279	NO_X	5.73E-03	lb/hp-hr	1.60	4.16E-02
		CO	1.10E-03	lb/hp-hr	0.31	0.01
		$PM/PM_{10}/PM_{2.5}$	1.98E-04	lb/hp-hr	0.06	1.44E-03
		VOC	2.20E-04	lb/hp-hr	0.06	1.60E-03
		SO_2	2.30E-05	lb/hp-hr	0.01	1.67E-04
EGEN-7	71	NO_X	3.51E-03	lb/hp-hr	0.25	6.47E-03
		CO	2.90E-01	lb/hp-hr	20.60	0.54
		$PM/PM_{10}/PM_{2.5}$	7.47E-07	lb/hp-hr	0.00	1.38E-06
		VOC	2.20E-04	lb/hp-hr	0.02	4.07E-04
		SO_2	5.70E-06	lb/hp-hr	0.00	1.05E-05
EGEN-8	71	NO_X	3.51E-03	lb/hp-hr	0.25	6.47E-03
		CO	2.90E-01	lb/hp-hr	20.60	0.54
		$PM/PM_{10}/PM_{2.5}$	7.47E-07	lb/hp-hr	0.00	1.38E-06
		VOC	2.20E-04	lb/hp-hr	0.02	4.07E-04
		SO_2	5.70E-06	lb/hp-hr	0.00	1.05E-05
EGEN-9	40	NO_X	3.51E-03	lb/hp-hr	0.14	3.65E-03
		CO	2.90E-01	lb/hp-hr	11.61	0.30
		$PM/PM_{10}/PM_{2.5}$	7.47E-07	lb/hp-hr	2.99E-05	7.77E-07
		VOC	2.20E-04	lb/hp-hr	8.82E-03	2.29E-04
		SO_2	5.70E-06	lb/hp-hr	2.28E-04	5.93E-06
EGEN-10	49	NO_X	5.73E-03	lb/hp-hr	0.23	5.96E-03
		CO	1.10E-03	lb/hp-hr	0.04	1.15E-03
		$PM/PM_{10}/PM_{2.5}$	1.98E-04	lb/hp-hr	7.94E-03	2.06E-04
		VOC	2.20E-04	lb/hp-hr	8.82E-03	2.29E-04
		SO_2	2.30E-05	lb/hp-hr	9.20E-04	2.39E-05

Notes:

(1) Emission Factors for NOx, CO, and THC from manufacturer data. PM and SO2 factor from AP-42 Table 3.2-2.

Table A-15
Wastewater Vessel Emissions
Intercontinental Terminals Company LLC
December 2018

Parameter Name & Variable		Units	Notes											
FIN				**EFWPTK-1**	**EFWPTK-2**	**EFWPTK-3**	**T-101**	**T-201**	**T-301**	**T-401**	**PW-S20-01**	**PW-H20-01**	**OWS-01A**	**OWS-01B**
EPN				**EFWPTK-1**	**EFWPTK-2**	**EFWPTK-3**	**T-101**	**T-201**	**T-301**	**T-401**	**VCU-(001-003)**	**VCU-(001-003)**	**VCU-(001-003)**	**VCU-(001-003)**
Material				Diesel	Diesel	Diesel	Wastewater	Wastewater	Wastewater	Wastewater	Wastewater	Wastewater	Wastewater	Wastewater
Material Type				Petroluem	Petroluem	Petroluem	Petroluem	Petroluem	Petroluem	Petroluem	Petroluem	Petroluem	Petroluem	Petroluem
Tank Type				HFR	HFR	HFR	HFR	HFR	HFR	HFR	VFR	VFR	HFR	HFR
Continuous Level Tank		(Yes / No)		No	No	No	No	No	No	No	No	No	No	No
Throughput	Q	bbl/yr		157	157	157	182	150	150	150	5,714	5,714	3,078	3,078
Height	H_S	ft		16.00	16.00	16.00	17.00	14.00	14.00	14.00	25.00	25.00	22.64	22.64
Average Liquid Height	H_L	ft	H_S / 2	8.00	8.00	8.00	8.50	7.00	7.00	7.00	12.50	12.50	11.32	11.32
Diameter	D	ft		7	7	7	12	12	12	12	12	12	9.0	9.0
Effective Diameter (for horizontal tanks	De	ft		11.94	11.94	11.94	16.12	14.63	14.63	14.63	NA	NA	16.11	16.11
Tank Liquid Volume	V_{LX}	ft3	(D/2)^2 * pi * H_S	616	616	616	1,923	1,583	1,583	1,583	2,827	2,827	1,440	1,440
Tank Liquid Volume	T_{CG}	gal	VLX * 7.481	4,606	4,606	4,606	14,382	11,844	11,844	11,844	21,151	21,151	10,772	10,772
Turnovers	N		5.614*Q / V_{LX}	1.43	1.43	1.43	0.53	0.53	0.53	0.53	11.35	11.35	12.00	12.00
Maximum Filling Rate	FRm	bbl/hr		13	13	15	1	1	1	1	504	429	256	256
Roof Slope	S_R	ft/ft		0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Paint Color				White	White	White	White	White	White	White	White	White	White	White
Heated/Hot Product				No	No	No	No	No	No	No	No	No	No	No
Paint Solar Absorptance	α	-		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Roof Outage	H_{RO}	ft	1/3*SR*De/2 for cone, or 0.137*De/2 for dome	-	-	-	-	-	-	-	0.13	0.13	-	-
Vapor Space Outage	H_{VO}	ft	H_C-H_L+H_{RO} or D/2	3.5	3.5	3.5	6.0	6.0	6.0	6.0	12.6	12.6	4.5	4.5
Breather Vent Pressure				0.3	0.3	0.3	0	0	0	0	0	0	0	0
Breather Vent Vacuum				-0.3	-0.3	-0.3	0	0	0	0	0	0	0	0
Month		-		Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Daily Total Solar Insolation Factor	I	Btu/ft^{2}d		1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00	1351.00
Daily Maximum Ambient Temperature	T_{AX}	°F		79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10	79.10
Daily Minimum Ambient Temperature	T_{AN}	°F		57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40	57.40
Daily Ambient Temp. Change	DT_A	°F	T_{AX} - T_{AN}	21.700	21.700	21.700	21.700	21.700	21.700	21.700	21.700	21.700	21.700	21.700
Daily Avg. Ambient Temperature	T_{AA}	°F	((T_{AX}+459.67)+(T_{AN}+459.67))/2	68.3	68.3	68.3	68.3	68.3	68.3	68.3	68.3	68.3	68.3	68.3
Bulk Temperature Source				Ambient	Ambient	Ambient	Ambient	Ambient	Ambient	Ambient	Ambient	Ambient	Ambient	Ambient
Liquid Bulk Temperature	T_b	°F	T_{AA} + 6α -1 or Input	68.3	68.3	68.3	68.3	68.3	68.3	68.3	68.3	68.3	68.3	68.3
Insulated?			0.44T_{AA}+0.56$_{Tb}$+0.0079(α*I) if not insulated; otherwise	No	No	No	No	No	No	No	No	No	No	No
Daily Avg. Liquid Surface Temp.	T_{LA}	°F	T_{LA} based on measurements from tank	70.1	70.1	70.1	70.1	70.1	70.1	70.1	70.1	70.1	70.1	70.1
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	°F	T_{LA}+0.25*DT_V	70.1	70.1	70.1	70.1	70.1	70.1	70.1	75.6	75.6	75.6	75.6
Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	T_{LA}-0.25*DT_V	70.1	70.1	70.1	70.1	70.1	70.1	70.1	64.6	64.6	64.6	64.6
Daily Vapor Temperature Range	DT_V	°R	0.72*DT_A+0.028*α*I (zero for underground tanks)	0	0	0	0	0	0	0	22.05	22.05	22.05	22.05
Liquid Molecular Wt.	M_L	lb/lb-mole		188.00	188.00	188.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vapor Molecular Wt.	M_V	lb/lb-mole		130.00	130.00	130.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00	66.00
Vapor Pressure Method		-		RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure	RVP	psi		0.02	0.02	0.02	10.72	10.72	10.72	10.72	10.72	10.72	10.72	10.72
Slope	SI	°F/vol %		2	2.00	2.00	3	3	3	3	3	3	3	3
VP Constant A	A	dimensionless		14.62	14.62	14.62	11.70	11.70	11.70	11.70	11.70	11.70	11.70	11.70
VP Constant B	B	°C		10379.58	10379.58	10379.58	5185.84	5185.84	5185.84	5185.84	5185.84	5185.84	5185.84	5185.84
VP Constant C	C	°C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vapor Pressure @ 40°F		psia		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vapor Pressure @ 50°F		psia		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vapor Pressure @ 60°F		psia		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vapor Pressure @ 70°F		psia		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vapor Pressure @ 80°F		psia		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vapor Pressure @ 90°F		psia		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vapor Pressure @ 100°F		psia		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure @ T_{LA}	P_{VA}	psia @ T_{LA}		0.01	0.01	0.01	6.76	6.76	6.76	6.76	6.76	6.76	6.76	6.76
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		0.01	0.01	0.01	6.76	6.76	6.76	6.76	7.47	7.47	7.47	7.47
True Vapor Pressure @ T_{LN}	P_{VN}	psia @ T_{LN}		0.01	0.01	0.01	6.76	6.76	6.76	6.76	6.10	6.10	6.10	6.10
Daily Vapor Pressure Range	dPv	psia	P_{VX} - P_{VX}	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.378	1.378	1.378	1.378
Vapor Pressure Function	P*	dimensionless	P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^0.5)^2	0.00024	0.00024	0.00024	0.29067	0.29067	0.29067	0.29067	0.29067	0.29067	0.29067	0.29067
Vapor Space Expansion Factor	K_E		0.0018DT_V or (DT_V/T_{LA}) + (DP_V - DP_B)/(P_A-P_{VA}))	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.215	0.215	0.215	0.215
Vented Vapor Saturation Factor	K_S		1/(1 + 0.053 * P_{VA} * H_{VO})	1.00	1.00	1.00	0.32	0.32	0.32	0.32	0.18	0.18	0.38	0.38
Turnover Factor	K_N		turnovers < 36 = 1, turnovers > 36 = (180 + N)/6N	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Working Loss Product Factor	K_P		0.75 for crude oils, 1.0 all other organic liquids	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Vapor Space Volume	V_V	ft3	pi * (D/2)^2 * H_{VO}	392.20	392.20	392.20	1,224.62	1,008.51	1,008.51	1,008.51	1,427.85	1,427.85	917.20	917.20
Vapor Density	Wv	lb/ft3	(M_V * P_{VA}) / (10.731*T_{LA})	0.00016	0.00016	0.00016	0.07846	0.07846	0.07846	0.07846	0.07846	0.07846	0.07846	0.07846
Standing Losses	L_S	lb/yr	Number of Days * V_V * W_V * K_E * K_S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,592.8	1,592.8	2,163.2	2,163.2
Working Losses	L_W	lb/yr	0.0010 * M_V * P_{VA} * Q * K_N * K_P	0.1	0.1	0.1	81.2	66.7	66.7	66.7	2,548.7	2,548.7	1,372.7	1,372.7
Total Losses	L_T	lb/yr	L_S + L_W	0.1	0.1	0.1	81.2	66.7	66.7	66.7	4,141.4	4,141.4	3,535.9	3,535.9
Annual Emission Rate		ton/yr	L_T / 2000	0.0001	0.0001	0.0001	0.0406	0.0334	0.0334	0.0334	2.0707	2.0707	1.7679	1.7679
Control Eff.	CE	%		0	0	0	0	0	0	0	99.9%	99.9%	99.9%	99.9%
Annual Emission Rate		**ton/yr**		**7.08E-05**	**7.08E-05**	**7.08E-05**	**0.04**	**0.03**	**0.03**	**0.03**	**0.00002**	**0.00002**	**0.00002**	**0.00002**
Month		-		July	July	July	July	July	July	July	July	July	July	July
Daily Total Solar Insolation Factor	I	Btu/ft^{2}d		1828.00	1828.00	1828.00	1828.00	1828.00	1828.00	1828.00	1828.00	1828.00	1828.00	1828.00
Daily Maximum Ambient Temperature	T_{AX}	°F		93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60
Daily Minimum Ambient Temperature	T_{AN}	°F		72.50	72.50	72.50	72.50	72.50	72.50	72.50	72.50	72.50	72.50	72.50
Daily Ambient Temp. Change	DT_A	°F	T_{AX} - T_{AN}	21.10	21.10	21.10	21.10	21.10	21.10	21.10	21.10	21.10	21.10	21.10
Daily Avg. Ambient Temperature	T_{AA}	°F	((T_{AX}+459.67)+(T_{AN}+459.67))/2	83.05	83.05	83.05	83.05	83.05	83.05	83.05	83.05	83.05	83.05	83.05
Max Liquid Bulk Temperature	T_b	°F	T_{AA} + 6α -1 or Input	83.1	83.1	83.1	83.1	83.1	83.1	83.1	83.1	83.1	83.1	83.1
Insulated?			0.44T_{AA}+0.56$_{Tb}$+0.0079(α*I) if not insulated; otherwise	No	No	No	No	No	No	No	No	No	No	No
Daily Avg. Liquid Surface Temp.	T_{LA}	°F	T_{LA} based on measurements from tank	85.52	85.52	85.52	85.52	85.52	85.52	85.52	85.52	85.52	85.52	85.52
Daily Max. Avg. Liq. Surf. Temp.	T_{LX}	°F	T_{LA}+0.25*DT_V	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Daily Vapor Temperature Range	DT_V	°R	0.72*DT_A+0.028*α*I	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89	23.89
True Vapor Pressure @ T_{LX}	P_{VX}	psia @ T_{LX}		0.02	0.02	0.02	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Max. Emission Rate	L_{MAX}	lb/hr	(M_V* P_{VA}) / (R * T) * FR_M	0.03	0.03	0.04	0.97	0.97	0.97	0.97	341.59	290.70	173.97	173.97
Control Eff.	CE	%		0	0	0	0	0	0	0	99.9%	99.9%	99.9%	99.9%
Maximum Emission Rate		**lb/hr**		**0.03**	**0.03**	**0.04**	**0.97**	**0.97**	**0.97**	**0.97**	**0.0034**	**0.0029**	**0.0017**	**0.0017**

Notes:

1. Annual emission rate calculations taken from AP-42 5th Ed., Section 7.
2. Calculated using TCEQ equation from Storage Tank Guidance Document.

Table A-16
Controlled Wastewater Treatment System Emissions (EPN: VCU-001, VCU-002, VCU-003)
Intercontinental Terminals Company LLC
December 2018

Basis

VOC flow rates based on WATER9 modeling.
Used NO_x and CO emissions factors prvided by vendor.
Used PM factors from AP-42, Section 3.2-7.
Used H_2S emissions factor calculated in Table A-14 and a DRE of 98%.
SO_2 emissoins based on 100% conversion of H_2S.

Operation Type	Source	Hourly		Annual	
		Vapors lb/hr	Heat Release MMBtu/hr	Vapors lb/yr	Heat Release MMBtu/yr
Wastewater Treatment System	OWS-01A, OWS-01B, PW-S20-01, & PS-H20-01	9.80	0.20	153.55	3.07

Operation Type	Pollutant	Emissions Factor		Emissions	
		(Value)	(Units)	(lb/hr)	(ton/yr)
Wastewater Treatment System	VOC	99.9%	DRE	0.01	7.68E-05
	NO_x	0.0600	lb/MMBtu	0.01	0.0001
	CO	0.2000	lb/MMBtu	0.04	0.0003
	H_2S	0.0018	lb/lb-VOC	0.0003	2.72E-06
	SO_2	100%	H_2S Conversion	0.03	0.0003
	$PM/PM_{10}/PM_{2.5}$	0.0075	lb/MMBtu	0.001	1.15E-05

Table A-17
H_2S Emission Speciation
Intercontinental Terminals Company LLC
December 2018

Crude/Crude Condensate Characteristics	
VOC K Value (1)	0.748
VOC max. vapor pressure, psia	11
Liquid max. temperature, deg F	100
VOC vapor molecular weight	50
VOC Liquid molecular weight	207

	K value	MW	ppmw	$X_{COMPONENT}$	Emission Factor
Hydrogen Sulfide (H2S)	19.63	34.08	50	3.04E-04	5.43E-03

Calculated emission factor is used below to calculate H2S emission rates from VOC emission rate from tanks and other sources.

(1) Total VOC K value = (VPliquid/14.7psia)/(1) = 0.748

(2) K value obtained from fash emission data using EPCON Internation's THERMA ™ Flash/Mixture Calculations software, which is based on API's TECHNICAL DATA BOOK (8th Edition).

Calculated H2S Emissions at 50 ppmw in Crude/Crude Condensate

X_{H2S} in liquid = ppmw H2S in liquid / 1,000,000 *Avg. MW liquid / H2S molecular weight (lbs.-lb.-mol)

$$= \frac{50 \text{ ppmw in liquid}}{1{,}000{,}000} \cdot \frac{1 \text{ lb.-mol}}{34.08 \text{ lb}} \cdot \frac{207.00 \text{ lb liquid}}{1 \text{ lb-mol liquid}}$$

= 3.04E-04

Y_{H2S} in vapor space = X_{H2S} in liquid *K_{H2S} = 3.037E-04 * 19.628 = 0.0060

Y_{VOC} in vapor space = X_{VOC} in liquid *K_{VOC} = (1.0) * 0.748 = 0.748

Emission Factor $_{H2S}$ = Y_{H2S} / Y_{VOC} / MW_{VOC} (lbs/lb-mol) * MW_{H2S} (lbs/lb-mol)

$$= \frac{0.0060 \text{ lb-mol}}{0.748 \text{ lb-mol VOC}} \cdot \frac{1 \text{ lb-mol VOC}}{50 \text{ lb voc}} \cdot \frac{34.08 \text{ lb}}{1 \text{ lb-mol}}$$

= 0.0054 lbs_{H2S}/lbs_{VOC}

Emissions $_{H2S}$ = Emission Factor $_{H2S}$ * $Emissions_{VOC}$ (lbs/hr)

Appendix B

MSS Emission Calculation Details

Table B-1
Maintenance, Startup and Shutdown Emissions Summary
Intercontinental Terminals Company LLC
December 2018

Equipment Type	Activity Description	EPN	Emission Rate												
			VOC		NO_x		CO		SO_2		$PM/PM_{10}/PM_{2.5}$		H_2S		CO2e
			lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	tpy
IFR Storage Tanks	Uncontrolled roof landings	MSS-ATM	86.27	3.53	-	-	-	-	-	-	-	-	0.47	3.36E-03	-
IFR Storage Tanks	Controlled roof landings	VCU-001-VCU-003	22.05	1.26E-01	6.81	0.18	22.69	0.60	35.89	0.94	0.85	0.02	2.38	1.34E-02	249.61
IFR Storage Tanks	Venting to atosphere post control	MSS-ATM	36.67	1.30	-	-	-	-	-	-	-	-	0.20	1.23E-03	-
Misc. Piping Components	Equipment venting/degassing and refilling emissions	MSS-CONT	4.35	1.09	6.75	1.75	9.00	2.33	7.71	1.93	0.34	0.09	0.08	1.93E-02	1,776.21
Misc. Piping Components	Equipment liquid draining emissions	MSS-ATM	20.80	0.39	-	-	-	-	-	-	-	-	0.11	7.09E-04	-
Misc. Piping Components	Venting to atmosphere post control	MSS-ATM	4.54	0.13	-	-	-	-	-	-	-	-	0.02	2.40E-04	-
Air Mover & Vacuum Mover	Air Mover & Vacuum Mover	MSS-CONT	0.90	0.16	0.60	0.26	0.80	0.34	0.44	0.17	0.03	0.01	0.00	1.69E-03	237.53
Air Mover & Vacuum Mover	Air Mover & Vacuum Mover	MSS-ATM	61.21	4.98	-	-	-	-	-	-	-	-	0.33	6.28E-03	-
Totals		*MSS-ATM*	***209.48***	***10.33***	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***1.14***	***0.01***	**-**
		MSS-CONT	***5.25***	***1.25***	***7.34***	***2.00***	***9.79***	***2.67***	***8.15***	***2.10***	***0.37***	***0.10***	***0.08***	***0.02***	***2,013.74***

Notes:
1. The MSS emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

lb/hr .90 = Σ AM/VT CONT - B6
tpy .16 = " " " "

4.49 from hi
.22 AM/VT Lo
.28 from low
4.99

B-6

Table B-2
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.00
Daily Average Ambient Temperature	T_{AA}	deg R	527.92
MSS Events per Tank			1.00

MSS Landing Emissions		
VOC	lb/hr	86.27
	lb/day	157.64
	Project 1 (tpy)	0.62
	Project 2 (tpy)	0.53
	Project 3 (tpy)	2.38

MSS Landings																										
Tank FIN				P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005	P165-006	P110-001	P110-002	P110-003
Project No.				1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
Material				LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	37.00	45.00	45.00	94.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean
Height of Liquid Heel	H_{le}	ft		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Filling Pump-in Rate		bbl/hr		7,470	7,471	7,472	7,473	7,474	7,475	7,476	7,477	7,478	7,479	7,480	7,481	7,482	7,483	7,484	7,485	7,486	7,487	7,488	7,489	7,490	7,491	7,492
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Vapor Molecular Wt.	M_v	lb/lbmole		130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Stock Liquid Density	W_l	lb/gal		7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Heat Value		Btu/lb		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saturation Factor	S			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Height of Vapor Space		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Volume of Vapor Space	V_v	ft^3		46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	5,375	7,951	7,951	34,692	27,703	27,703	27,703	27,703	27,703	27,703	27,703	27,703	27,703
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Antoine's Equation Constant	A			13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96
Antoine's Equation Constant	B			9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09

Table B-2
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses																										
Tank FIN				P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005	P165-006	P110-001	P110-002	P110-003
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_s			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Vapor Pressure Function	P*			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Not to Exceed Standing Idle Losses		lb		497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	57.35	84.83	84.83	370.14	295.58	295.58	295.58	295.58	295.58	295.58	295.58	295.58	295.58
Calculated Standing Idle Losses		lb		1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	0.18	0.27	0.27	1.16	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Standing Idle Losses	L_{SL}	lb		1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	0.18	0.27	0.27	1.16	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Total Standing Idle Losses		lb		1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	0.18	0.27	0.27	1.16	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Standing Idle Emission Rate		lb/hr		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.02	0.02	0.02	0.10	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Standing Idle Emission Rate		lb/day		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standing Idle Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Losses																										
Tank Degassed?				No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Moles		lbmole		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VOC Mass Vapor	Q	lb/event		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degas VOC Emissions	E_P	lb/event		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tank Degassing Duration		hr		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Heat Input From Vapor		MMBtu/event		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Degassing Volume		ft^3/event		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Degassing Emission Rate		lb/hr		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Emission Rate		lb/day		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venting Emissions																										
Vented VOC after Control	E_C	lb/event		95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	11.01	16.29	16.29	71.07	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75
Tank Venting Duration		hr		1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	0.13	0.19	0.19	0.83	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Vented VOC Emissions		lb/hr		85.92	85.93	85.94	85.96	85.97	85.98	85.99	86.00	86.01	86.02	11.01	16.29	16.29	71.07	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75
Vented VOC Emissions		lb/day		95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	11.01	16.29	16.29	71.07	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75
Vented VOC Emissions		tpy		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Refilling Losses																										
Saturation Correction Factor	C_{sf}			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Csf * S ≥ 0.15				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Filling Losses	L_{FL}	lb		13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	1.54	2.29	2.29	9.97	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96
Time to Refloat Roof		hr		1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	0.13	0.19	0.19	0.83	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Heat Input From Vapor		MMBtu/event		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total Refilling Volume		ft^3/event		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Refilling Emission Rate		lb/hr		12.06	12.06	12.06	12.06	12.06	12.06	12.07	12.07	12.07	12.07	1.54	2.29	2.29	9.97	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96
Refilling Emission Rate		lb/day		13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	1.54	2.29	2.29	9.97	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96
Refilling Emission Rate		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total MSS Emissions by Tank																										
Tank FIN				P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005	P165-006	P110-001	P110-002	P110-003
VOC Emission Rate		lb/hr		85.92	85.93	85.94	85.96	85.97	85.98	85.99	86.00	86.01	86.02	11.01	16.29	16.29	71.07	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75
		lb/day		95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	11.01	16.29	16.29	71.07	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75
		tpy		0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.006	0.009	0.009	0.041	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033

Notes:

1. The MSS emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Table B-2
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.00
Daily Average Ambient Temperature	T_{AA}	deg R	527.92
MSS Events per Tank			1.00

MSS Landings																									
Tank FIN				P110-004	P120-001	P120-002	P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	P100-014	P100-015	P100-016	P100-017	P100-018	P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011
Project No.				2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Material				LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean
Height of Liquid Heel	H_{le}	ft		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Filling Pump-in Rate		bbl/hr		7,493	7,494	7,495	7,496	7,497	7,498	7,499	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Vapor Molecular Wt.	M_v	lb/lbmole		130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Stock Liquid Density	W_l	lb/gal		7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Heat Value		Btu/lb		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saturation Factor	S			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Height of Vapor Space		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Volume of Vapor Space	V_V	ft^3		27,703	27,703	27,703	27,703	27,703	27,703	27,703	27,703	27,703	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Antoine's Equation Constant	A			13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96
Antoine's Equation Constant	B			9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09

Table B-2
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses																									
Tank FIN				P110-004	P120-001	P120-002	P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	TK-314	P100-015	P100-016	P100-017	P100-018	P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_s			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Vapor Pressure Function	P*			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Not to Exceed Standing Idle Losses		lb		295.58	295.58	295.58	295.58	295.58	295.58	295.58	295.58	295.58	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70
Calculated Standing Idle Losses		lb		0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
Standing Idle Losses	L_{SL}	lb		0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
Total Standing Idle Losses		lb		0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
Standing Idle Emission Rate		lb/hr		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Standing Idle Emission Rate		lb/day		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standing Idle Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Losses																									
Tank Degassed?				No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Moles		lbmole		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VOC Mass Vapor	Q	lb/event		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degas VOC Emissions	E_P	lb/event		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tank Degassing Duration		hr		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Heat Input From Vapor		MMBtu/event		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Degassing Volume		ft^3/event		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Degassing Emission Rate		lb/hr		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Emission Rate		lb/day		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venting Emissions																									
Vented VOC after Control	E_C	lb/event		56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56
Tank Venting Duration		hr		0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Vented VOC Emissions		lb/hr		56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27
Vented VOC Emissions		lb/day		56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56
Vented VOC Emissions		tpy		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Refilling Losses																									
Saturation Correction Factor	C_{sf}			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Csf * S ≥ 0.15				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Filling Losses	L_{FL}	lb		7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41
Time to Refloat Roof		hr		0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Heat Input From Vapor		MMBtu/event		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total Refilling Volume		ft^3/event		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Refilling Emission Rate		lb/hr		7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10
Refilling Emission Rate		lb/day		7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41
Refilling Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total MSS Emissions by Tank																									
Tank FIN				P110-004	P120-001	P120-002	P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	P100-014	P100-015	P100-016	P100-017	P100-018	P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011
VOC Emission Rate		lb/hr		56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27
		lb/day		56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	56.75	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56
		tpy		0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055

Notes:

1. The MSS emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Table B-2
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Basis

- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.00
Daily Average Ambient Temperature	T_{AA}	deg R	527.92
MSS Events per Tank			1.00

MSS Landings																									
Tank FIN				P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018	P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025	P120-026	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009
Project No.				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Material				LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	140.00	140.00	140.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean
Height of Liquid Heel	H_{le}	ft		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Filling Pump-in Rate		bbl/hr		7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Vapor Molecular Wt.	M_v	lb/lbmole		130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Stock Liquid Density	W_l	lb/gal		7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
Heat Value		Btu/lb		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saturation Factor	S			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Height of Vapor Space		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Volume of Vapor Space	V_v	ft^3		46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	76,954	76,954	76,954
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Antoine's Equation Constant	A			13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96	13.96
Antoine's Equation Constant	B			9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61	9099.61
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09

Table B-2
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses																								
Tank FIN				P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018	P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025	P120-026	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_s			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Vapor Pressure Function	P*			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Not to Exceed Standing Idle Losses		lb		497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	497.70	821.04	821.04	821.04
Calculated Standing Idle Losses		lb		1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	2.58	2.58	2.58
Standing Idle Losses	L_{SL}	lb		1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	2.58	2.58	2.58
Total Standing Idle Losses		lb		1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	2.58	2.58	2.58
Standing Idle Emission Rate		lb/hr		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.22	0.22	0.22
Standing Idle Emission Rate		lb/day		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standing Idle Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Losses																									
Tank Degassed?				No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Moles		lbmole		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VOC Mass Vapor	Q	lb/event		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degas VOC Emissions	E_P	lb/event		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tank Degassing Duration		hr		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Heat Input From Vapor		MMBtu/event		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Degassing Volume		ft^3/event		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Degassing Emission Rate		lb/hr		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Emission Rate		lb/day		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Venting Emissions																									
Vented VOC after Control	E_C	lb/event		95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	157.64	157.64	157.64
Tank Venting Duration		hr		1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.83	1.83	1.83
Vented VOC Emissions		lb/hr		86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27
Vented VOC Emissions		lb/day		95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	157.64	157.64	157.64
Vented VOC Emissions		tpy		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.08	0.08	0.08
Refilling Losses																									
Saturation Correction Factor	C_{sf}			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Csf * S ≥ 0.15				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Filling Losses	L_{FL}	lb		13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	22.12	22.12	22.12
Time to Refloat Roof		hr		1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.83	1.83	1.83
Heat Input From Vapor		MMBtu/event		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total Refilling Volume		ft^3/event		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Refilling Emission Rate		lb/hr		12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10
Refilling Emission Rate		lb/day		13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	13.41	22.12	22.12	22.12
Refilling Emission Rate		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total MSS Emissions by Tank																									
Tank FIN				P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018	P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025	P120-026	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009
VOC Emission Rate		lb/hr		86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27	86.27
		lb/day		95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	95.56	157.64	157.64	157.64
		tpy		0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.091	0.091	0.091

Notes:

1. The MSS emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Table B-2
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Basis

- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.00
Daily Average Ambient Temperature	T_{AA}	deg R	527.92
MSS Events per Tank			1.00

MSS Landings						
Tank FIN				P165-010	P165-011	P165-012
Project No.				3	3	3
Material				LIGHT FUEL OIL	LIGHT FUEL OIL	LIGHT FUEL OIL
Tank Type				IFR	IFR	IFR
Diameter	D	ft		140.00	140.00	140.00
High Roof Leg Height		ft		5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3
Status Prior to Re-Filling				Clean	Clean	Clean
Height of Liquid Heel	H_{le}	ft		0.001	0.001	0.001
Filling Pump-in Rate		bbl/hr		7,500	7,500	7,500
Vapor Pressure Method				RVP	RVP	RVP
Reid Vapor Pressure		psia		0.1	0.1	0.1
Vapor Molecular Wt.	M_v	lb/lbmole		130	130	130
Stock Liquid Density	W_l	lb/gal		7.10	7.10	7.10
Heat Value		Btu/lb		-	-	-
Saturation Factor	S			0.15	0.15	0.15
Height of Vapor Space		ft		5.00	5.00	5.00
Volume of Vapor Space	V_v	ft^3		76,954	76,954	76,954
Paint Color				White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00
Slope of ASTM Distillation Curve				2	2	2
Antoine's Equation Constant	A			13.96	13.96	13.96
Antoine's Equation Constant	B			9099.61	9099.61	9099.61
Antoine's Equation Constant	C			NA	NA	NA
True Vapor Pressure of Liquid	P	psia		0.09	0.09	0.09

Table B-2
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses						
Tank FIN				P165-010	P165-011	P165-012
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.04	0.04	0.04
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04
Standing Idle Saturation Factor	K_s			0.15	0.15	0.15
Vapor Pressure Function	P*			0.00	0.00	0.00
Not to Exceed Standing Idle Losses		lb		821.04	821.04	821.04
Calculated Standing Idle Losses		lb		2.58	2.58	2.58
Standing Idle Losses	L_{SL}	lb		2.58	2.58	2.58
Total Standing Idle Losses		lb		2.58	2.58	2.58
Standing Idle Emission Rate		lb/hr		0.22	0.22	0.22
Standing Idle Emission Rate		lb/day		0.00	0.00	0.00
Standing Idle Emission Rate		tpy		0.00	0.00	0.00
Degassing Losses						
Tank Degassed?				No	No	No
Moles		lbmole		—	—	—
VOC Mass Vapor	Q	lb/event		0.00	0.00	0.00
Degas VOC Emissions	E_P	lb/event		0.00	0.00	0.00
Tank Degassing Duration		hr		—	—	—
Heat Input From Vapor		MMBtu/event		0.00	0.00	0.00
Total Degassing Volume		ft^3/event		—	—	—
Degassing Emission Rate		lb/hr		0.00	0.00	0.00
Degassing Emission Rate		lb/day		0.00	0.00	0.00
Degassing Emission Rate		tpy		0.00	0.00	0.00
Venting Emissions						
Vented VOC after Control	E_C	lb/event		157.64	157.64	157.64
Tank Venting Duration		hr		1.83	1.83	1.83
Vented VOC Emissions		lb/hr		86.27	86.27	86.27
Vented VOC Emissions		lb/day		157.64	157.64	157.64
Vented VOC Emissions		tpy		0.08	0.08	0.08
Refilling Losses						
Saturation Correction Factor	C_{sf}			—	—	—
Csf * S ≥ 0.15				—	—	—
Filling Losses	L_{FL}	lb		22.12	22.12	22.12
Time to Refloat Roof		hr		1.83	1.83	1.83
Heat Input From Vapor		MMBtu/event		—	—	—
Total Refilling Volume		ft^3/event		—	—	—
Refilling Emission Rate		lb/hr		12.10	12.10	12.10
Refilling Emission Rate		lb/day		22.12	22.12	22.12
Refilling Emission Rate		tpy		0.01	0.01	0.01
Total MSS Emissions by Tank						
Tank FIN				P165-010	P165-011	P165-012
VOC Emission Rate		lb/hr		86.27	86.27	86.27
		lb/day		157.64	157.64	157.64
		tpy		0.091	0.091	0.091

Notes:
1. The MSS emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Table B-3
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance. Equations summarized at end.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.
- Control device will be a vapor combustor and will achieve a minimum 99.9% DRE for VOCs with a vapor pressure > 0.02 psia.
- CO2e calculated based on 40 CFR 98 Table C-1 and C-2 emission factors and Table A-1 Global Warming Potentials.

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.00
Daily Average Ambient Temperature	T_{AA}	deg R	527.89
VCU Control Device Efficiency	CE		99.9%
VCU NOX Emission Factor		lb/MMBtu	0.0600
VCU CO Emission Factor		lb/MMBtu	0.2000
H2S Emission Factor for Waste Gas		lb-H_2S/lb-VOC	0.0054
VCU SO2 Emission Factor for Natural Gas		lb/MMBtu	0.0006
VCU SO2 Emission Factor for Waste Gas		lb/MMBtu	0.3825
VCU PM Emission Factor		lb/MMBtu	0.0075
VCU VOC Natural Gas Emission Factor		lb/MMBtu	0.0054
CO_2 Emission Factor for Waste Gas		lb/MMBtu	154.81
CH_4 Emission Factor for Waste Gas		lb/MMBtu	0.003
N_2O Emission Factor for Waste Gas		lb/MMBtu	0.0006
CO_2 Emission Factor for Natural Gas		lb/MMBtu	116.889
CH_4 Emission Factor for Natural Gas		lb/MMBtu	0.001
N_2O Emission Factor for NaturalGas		lb/MMBtu	0.0001
MSS Events per Tank			1.00
Max Hourly Assist Gas Flow		scf/hr	19,251
Max Daily Assist Gas Flow		scf/day	231,017
Annual Average Assist Gas Flow		scf/yr	1,000,000
Degassing Turnovers			2.00
Degassing Air Flow Rate		cfm	12,000
Degassing Saturation Factor			0.5

Assist Gas Emissions - Per Project		
VOC	lb/hr	0.11
	lb/day	1.27
	tpy	2.75E-03
NO_X	lb/hr	1.18
	lb/day	14.14
	tpy	0.03
CO	lb/hr	3.93
	lb/day	47.13
	tpy	0.10
SO_2	lb/hr	0.01
	lb/day	0.14
	tpy	0.00
PM	lb/hr	0.15
	lb/day	1.76
	tpy	0.00
CO_2e	tpy	59.64

MSS Landing Emissions		Project No. 1	Project No. 2	Project No. 3
VOC (uncontrolled)	lb/hr	36.57	24.12	36.67
	lb/day	40.62	24.12	67.00
	tpy	0.23	0.19	0.87
VOC (controlled)	lb/hr	21.94	21.94	21.94
	lb/day	2.84	4.69	4.69
	tpy	0.02	0.02	0.08
NO_X	lb/hr	3.41	2.03	5.63
	lb/day	3.41	2.03	5.63
	tpy	0.03	0.02	0.10
CO	lb/hr	11.36	6.75	18.76
	lb/day	11.36	6.75	18.76
	tpy	0.09	0.07	0.33
H_2S	lb/hr	2.38	2.38	2.38
	lb/day	0.31	0.18	0.51
	tpy	0.00	0.00	0.01
SO_2	lb/hr	21.73	12.92	35.88
	lb/day	21.73	12.92	35.88
	tpy	0.17	0.14	0.64
PM	lb/hr	0.42	0.42	0.70
	lb/day	0.42	0.25	0.70
	tpy	0.00	0.00	0.01
CO_2e	tpy	49.32	41.88	189.97

MSS Landings																													
Tank FIN				P100-001	P100-002	P100-003	P100-004	P100-005	P100-006	P100-007	P100-008	P100-009	P100-010	P12-001	P12-002	P12-003	P80-001	P100-12	P100-13	P165-003	P165-004	P165-005	P165-006	P110-001	P110-002	P110-003	P110-004	P120-001	P120-002
Project No.				1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2
Material				GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	37.00	45.00	45.00	94.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean
Height of Liquid Heel	H_{le}	ft		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Filling Pump-in Rate		bbl/hr		7.470	7.471	7.472	7.473	7.474	7.475	7.476	7.477	7.478	7.479	7.480	7.481	7.482	7.483	7.484	7.485	7.486	7.487	7.488	7.489	7.490	7.491	7.492	7.493	7.494	7.495
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Vapor Molecular Wt.	M_V	lb/lbmole		66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Stock Liquid Density	W_L	lb/gal		5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
Heat Value		Btu/lb		19.970	19.971	19.972	19.973	19.974	19.975	19.976	19.977	19.978	19.979	19.980	19.981	19.982	19.983	19.984	19.985	19.986	19.987	19.988	19.989	19.990	19.991	19.992	19.993	19.994	19.995
Saturation Factor	S			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Height of Vapor Space		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Volume of Vapor Space	V_V	ft^3		46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	5,375	7,951	7,951	34,692	27,703	27,703	27,703	27,703	27,703	27,703	27,703	27,703	27,703	27,703	27,703	27,703
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Antoine's Equation Constant	A			11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69
Antoine's Equation Constant	B			5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00

Table B-3
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses																													
Tank FIN				**P100-001**	**P100-002**	**P100-003**	**P100-004**	**P100-005**	**P100-006**	**P100-007**	**P100-008**	**P100-009**	**P100-010**	**P12-001**	**P12-002**	**P12-003**	**P80-001**	**P100-12**	**P100-13**	**P165-003**	**P165-004**	**P165-005**	**P165-006**	**P110-001**	**P110-002**	**P110-003**	**P110-004**	**P120-001**	**P120-002**
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_S			0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Vapor Pressure Function	P*			0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Not to Exceed Standing Idle Losses		lb		392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	45.23	66.91	66.91	291.94	233.13	233.13	233.13	233.13	233.13	233.13	233.13	233.13	233.13	233.13	233.13	233.13
Calculated Standing Idle Losses		lb		169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	19.54	28.91	28.91	126.14	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73
Standing Idle Losses	L_{SL}	lb		169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	19.54	28.91	28.91	126.14	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73	100.73
Total Standing Idle Losses		lb		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.02	0.03	0.03	0.13	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Heat Input From Vapor		MMBtu/event		3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	0.39	0.58	0.58	2.52	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
Heat Input From Vapor		MMBtu/hr		0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.03	0.05	0.05	0.21	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Standing Idle Emission Rate		lb/hr		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Standing Idle Emission Rate		lb/day		1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	0.12	0.17	0.17	0.76	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Standing Idle Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Losses																													
Tank Degassed?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Moles		lbmole		43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	4.96	7.34	7.34	32.04	25.59	25.59	25.59	25.59	25.59	25.59	25.59	25.59	25.59	25.59	25.59	25.59
VOC Mass Vapor	Q	lb/event		2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	327.64	484.63	484.63	2114.67	1688.67	1688.67	1688.67	1688.67	1688.67	1688.67	1688.67	1688.67	1688.67	1688.67	1688.67	1688.67
Degas VOC Emissions	E_F	lb/event		2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	0.33	0.48	0.48	2.11	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
Tank Degassing Duration		hr		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.01	0.02	0.02	0.10	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Heat Input From Vapor		MMBtu/event		56.78	56.79	56.79	56.79	56.79	56.80	56.80	56.80	56.81	56.81	6.55	9.68	9.68	42.26	33.75	33.75	33.75	33.75	33.75	33.75	33.76	33.76	33.76	33.76	33.76	33.77
Heat Input From Vapor		MMBtu/hr		56.78	56.79	56.79	56.79	56.79	56.80	56.80	56.80	56.81	56.81	6.55	9.68	9.68	42.26	33.75	33.75	33.75	33.75	33.75	33.75	33.76	33.76	33.76	33.76	33.76	33.77
Total Degassing Volume		ft^3/event		93.294	93.294	93.294	93.294	93.294	93.294	93.294	93.294	93.294	93.294	10.750	15.901	15.901	69.384	55.407	55.407	55.407	55.407	55.407	55.407	55.407	55.407	55.407	55.407	55.407	55.407
Degassing Emission Rate		lb/hr		21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94
Degassing Emission Rate		lb/day		2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	0.33	0.48	0.48	2.11	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
Degassing Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post-Control Degassing/Venting Emissions																													
Vented VOC after Control (5,000 ppm)	E_C	lb/event		40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	4.68	6.92	6.92	30.21	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12
Tank Venting Duration		hr		1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	0.13	0.19	0.19	0.83	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Vented VOC Emissions		lb/hr		36.52	36.53	36.53	36.54	36.54	36.55	36.55	36.56	36.56	36.57	4.68	6.92	6.92	30.21	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12
Vented VOC Emissions		lb/day		40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	4.68	6.92	6.92	30.21	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12
Vented VOC Emissions		tpy		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Refilling Losses																													
Saturation Correction Factor	C_{sf}			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Csf * S ≥ 0.15				---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Filling Losses	L_{FL}	lb		852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	98.28	145.38	145.38	634.34	506.55	506.55	506.55	506.55	506.55	506.55	506.55	506.55	506.55	506.55	506.55	506.55
Time to Refloat Roof		hr		1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	0.13	0.19	0.19	0.83	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Heat Input From Vapor		MMBtu/event		17.03	17.03	17.04	17.04	17.04	17.04	17.04	17.04	17.04	17.04	1.96	2.90	2.90	12.68	10.12	10.12	10.12	10.12	10.13	10.13	10.13	10.13	10.13	10.13	10.13	10.13
Heat Input From Vapor		MMBtu/hr		15.32	15.32	15.32	15.32	15.33	15.33	15.33	15.34	15.34	15.34	1.96	2.90	2.90	12.68	10.12	10.12	10.12	10.12	10.13	10.13	10.13	10.13	10.13	10.13	10.13	10.13
Total Refilling Volume		ft^3/event		46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	5.375	7.951	7.951	34.692	27.703	27.703	27.703	27.703	27.703	27.703	27.703	27.703	27.703	27.703	27.703	27.703
Refilling Emission Rate		lb/hr		0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.10	0.15	0.15	0.63	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
Refilling Emission Rate		lb/day		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.10	0.15	0.15	0.63	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
Refilling Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total MSS Emissions by Tank																													
Tank FIN				**P100-001**	**P100-002**	**P100-003**	**P100-004**	**P100-005**	**P100-006**	**P100-007**	**P100-008**	**P100-009**	**P100-010**	**P12-001**	**P12-002**	**P12-003**	**P80-001**	**P100-12**	**P100-13**	**P165-003**	**P165-004**	**P165-005**	**P165-006**	**P110-001**	**P110-002**	**P110-003**	**P110-004**	**P120-001**	**P120-002**
VOC Emission Rate (Uncontrolled)		lb/hr		36.52	36.53	36.53	36.54	36.54	36.55	36.55	36.56	36.56	36.57	4.68	6.92	6.92	30.21	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12
		lb/day		40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	4.68	6.92	6.92	30.21	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12	24.12
		tpy		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
VOC Emission Rate (Controlled)		lb/hr		21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94
		lb/day		2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	0.33	0.48	0.48	2.11	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
		tpy		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
NOx Emission Rate		lb/hr		3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	0.39	0.58	0.58	2.54	2.02	2.02	2.02	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03
		lb/day		3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	0.39	0.58	0.58	2.54	2.02	2.02	2.02	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO Emission Rate		lb/hr		11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	1.31	1.94	1.94	8.45	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
		lb/day		11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	1.31	1.94	1.94	8.45	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H2S Emission Rate		lb/hr		2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
		lb/day		0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.04	0.05	0.05	0.23	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
		tpy		2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.42E-05	3.58E-05	3.58E-05	1.56E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04
SO2 Emission Rate		lb/hr		21.72	21.72	21.72	21.72	21.72	21.72	21.72	21.72	21.73	21.73	2.50	3.70	3.70	16.16	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91
		lb/day		21.72	21.72	21.72	21.72	21.72	21.72	21.72	21.72	21.73	21.73	2.50	3.70	3.70	16.16	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91	12.91
		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PM Emission Rate		lb/hr		0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.05	0.07	0.07	0.31	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
		lb/day		0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.05	0.07	0.07	0.31	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 Emissoin Rate		tpy		4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	0.51	0.75	0.75	3.27	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.61
CH_4 Emissoin Rate		tpy		8.52E-05	8.52E-05	8.52E-05	8.52E-05	8.52E-05	8.52E-05	8.52E-05	8.52E-05	8.52E-05	8.52E-05	9.82E-06	1.45E-05	1.45E-05	6.34E-05	5.06E-05	5.06E-05	5.06E-05	5.06E-05	5.06E-05	5.06E-05	5.06E-05	5.06E-05	5.06E-05	5.06E-05	5.06E-05	5.06E-05
N_2O Emission Rate		tpy		1.70E-05	1.70E-05	1.70E-05	1.70E-05	1.70E-05	1.70E-05	1.70E-05	1.70E-05	1.70E-05	1.70E-05	1.96E-06	2.91E-06	2.91E-06	1.27E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05
CO_2e Emission Rate		tpy		4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	0.51	0.75	0.75	3.28	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62

Notes:
1. The MSS emission calculations included in this permit application are for cap calculation purposes only.
These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Table B-3
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance. Equations summarized at end.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database
- Control device will be a vapor combustor and will achieve a minimum 99.9% DRE for VOCs with a vapor pressure > 0.02 psia
- CO2e calculated based on 40 CFR 98 Table C-1 and C-2 emission factors and Table A-1 Global Warming Potenti

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.00
Daily Average Ambient Temperature	T_{AA}	deg R	527.89
VCU Control Device Efficiency	CE		99.9%
VCU NOX Emission Factor		lb/MMBtu	0.0600
VCU CO Emission Factor		lb/MMBtu	0.2000
H2S Emission Factor for Waste Gas		lb-H_2S/lb-VOC	0.0054
VCU SO2 Emission Factor for Natural Gas		lb/MMBtu	0.0006
VCU SO2 Emission Factor for Waste Gas		lb/MMBtu	0.3825
VCU PM Emission Factor		lb/MMBtu	0.0075
VCU VOC Natural Gas Emission Factor		lb/MMBtu	0.0054
CO_2 Emission Factor for Waste Gas		lb/MMBtu	154.81
CH_4 Emission Factor for Waste Gas		lb/MMBtu	0.003
N_2O Emission Factor for Waste Gas		lb/MMBtu	0.0006
CO_2 Emission Factor for Natural Gas		lb/MMBtu	116.889
CH_4 Emission Factor for Natural Gas		lb/MMBtu	0.001
N_2O Emission Factor for NaturalGas		lb/MMBtu	0.0001
MSS Events per Tank			1.00
Max Hourly Assist Gas Flow		scf/hr	19.251
Max Daily Assist Gas Flow		scf/day	231.017
Annual Average Assist Gas Flow		scf/yr	1,000.000
Degassing Turnovers			2.00
Degassing Air Flow Rate		cfm	12.000
Degassing Saturation Factor			0.5

MSS Landings																														
Tank FIN				P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	P100-014	P100-015	P100-016	P100-017	P100-018	P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018
Project No.				2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Material				GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		84.00	84.00	84.00	84.00	84.00	84.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean
Height of Liquid Heel	H_{le}	ft		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Filling Pump-in Rate		bbl/hr		7.496	7.497	7.498	7.499	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Vapor Molecular Wt.	M_v	lb/lbmole		66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Stock Liquid Density	W_l	lb/gal		5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
Heat Value		Btu/lb		19.996	19.997	19.998	19.999	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000
Saturation Factor	S			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Height of Vapor Space		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Volume of Vapor Space	V_v	ft^3		27.703	27.703	27.703	27.703	27.703	27.703	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Antoine's Equation Constant	A			11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69
Antoine's Equation Constant	B			5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00

Table B-3
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses																													
Tank FIN				P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	TK-314	P100-015	P100-016	P100-017	P100-018	P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_S			0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Vapor Pressure Function	P^*			0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Not to Exceed Standing Idle Losses		lb		233.13	233.13	233.13	233.13	233.13	233.13	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55
Calculated Standing Idle Losses		lb		100.73	100.73	100.73	100.73	100.73	100.73	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62
Standing Idle Losses	L_{SL}	lb		100.73	100.73	100.73	100.73	100.73	100.73	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62
Total Standing Idle Losses		lb		0.10	0.10	0.10	0.10	0.10	0.10	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Heat Input From Vapor		MMBtu/event		2.01	2.01	2.01	2.01	2.01	2.01	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39
Heat Input From Vapor		MMBtu/hr		0.17	0.17	0.17	0.17	0.17	0.17	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Standing Idle Emission Rate		lb/hr		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Standing Idle Emission Rate		lb/day		0.60	0.60	0.60	0.60	0.60	0.60	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Standing Idle Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Losses																													
Tank Degassed?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Moles		lbmole		25.59	25.59	25.59	25.59	25.59	25.59	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08
VOC Mass Vapor	Q	lb/event		1688.67	1688.67	1688.67	1688.67	1688.67	1688.67	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41
Degas VOC Emissions	E_F	lb/event		1.69	1.69	1.69	1.69	1.69	1.69	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84
Tank Degassing Duration		hr		0.08	0.08	0.08	0.08	0.08	0.08	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Heat Input From Vapor		MMBtu/event		33.77	33.77	33.77	33.77	33.77	33.77	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87
Heat Input From Vapor		MMBtu/hr		33.77	33.77	33.77	33.77	33.77	33.77	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87
Total Degassing Volume		ft^3/event		55,407	55,407	55,407	55,407	55,407	55,407	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294
Degassing Emission Rate		lb/hr		21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94
Degassing Emission Rate		lb/day		1.69	1.69	1.69	1.69	1.69	1.69	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84
Degassing Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post-Control Degassing/Venting Emissions																													
Vented VOC after Control (5,000 ppm)	E_C	lb/event		24.12	24.12	24.12	24.12	24.12	24.12	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62
Tank Venting Duration		hr		0.66	0.66	0.66	0.66	0.66	0.66	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Vented VOC Emissions		lb/hr		24.12	24.12	24.12	24.12	24.12	24.12	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67
Vented VOC Emissions		lb/day		24.12	24.12	24.12	24.12	24.12	24.12	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62
Vented VOC Emissions		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Refilling Losses																													
Saturation Correction Factor	C_{sf}			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Csf * S ≥ 0.15				---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Filling Losses	L_{FL}	lb		506.55	506.55	506.55	506.55	506.55	506.55	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94
Time to Refloat Roof		hr		0.66	0.66	0.66	0.66	0.66	0.66	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Heat Input From Vapor		MMBtu/event		10.13	10.13	10.13	10.13	10.13	10.13	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06
Heat Input From Vapor		MMBtu/hr		10.13	10.13	10.13	10.13	10.13	10.13	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40
Total Refilling Volume		ft^3/event		27,703	27,703	27,703	27,703	27,703	27,703	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647
Refilling Emission Rate		lb/hr		0.51	0.51	0.51	0.51	0.51	0.51	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Refilling Emission Rate		lb/day		0.51	0.51	0.51	0.51	0.51	0.51	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Refilling Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total MSS Emissions by Tank																													
Tank FIN				P120-003	P120-004	P165-001	P165-002	P060-001	P060-002	TK-314	P100-015	P100-016	P100-017	P100-018	P100-019	P120-005	P120-006	P120-007	P120-008	P120-009	P120-010	P120-011	P120-012	P120-013	P120-014	P120-015	P120-016	P120-017	P120-018
VOC Emission Rate (Uncontrolled)		lb/hr		24.12	24.12	24.12	24.12	24.12	24.12	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67
		lb/day		24.12	24.12	24.12	24.12	24.12	24.12	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62
		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
VOC Emission Rate (Controlled)		lb/hr		21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94
		lb/day		1.69	1.69	1.69	1.69	1.69	1.69	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84
		tpy		0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
NOx Emission Rate		lb/hr		2.03	2.03	2.03	2.03	2.03	2.03	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41
		lb/day		2.03	2.03	2.03	2.03	2.03	2.03	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO Emission Rate		lb/hr		6.75	6.75	6.75	6.75	6.75	6.75	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37
		lb/day		6.75	6.75	6.75	6.75	6.75	6.75	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
H2S Emission Rate		lb/hr		2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
		lb/day		0.18	0.18	0.18	0.18	0.18	0.18	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
		tpy		1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04
SO2 Emission Rate		lb/hr		12.91	12.92	12.92	12.92	12.92	12.92	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75
		lb/day		12.91	12.92	12.92	12.92	12.92	12.92	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75
		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PM Emission Rate		lb/hr		0.25	0.25	0.25	0.25	0.25	0.25	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
		lb/day		0.25	0.25	0.25	0.25	0.25	0.25	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 Emissoin Rate		tpy		2.61	2.61	2.61	2.61	2.61	2.61	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
CH_4 Emissoin Rate		tpy		5.07E-05	5.07E-05	5.07E-05	5.07E-05	5.07E-05	5.07E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05
N_2O Emission Rate		tpy		1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05
CO_2e Emission Rate		tpy		2.62	2.62	2.62	2.62	2.62	2.62	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41

Notes:
1. The MSS emission calculations included in this permit application are for cap calculation purposes only.
These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Table B-3
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Basis
- Calculation methods taken from Chapter 7 of AP-42 and TCEQ guidance. Equations summarized at end.
- Temperature and windspeed data taken from the TANKS 4.0.9d meterological database.
- Control device will be a vapor combustor and will achieve a minimum 99.9% DRE for VOCs with a vapor pressure > 0.02 psia.
- CO2e calculated based on 40 CFR 98 Table C-1 and C-2 emission factors and Table A-1 Global Warming Potenti

Constants			
Atmospheric Pressure	Pa	psia	14.70
Month			July
Max Daily Ambient Temperature	T_{MAX}	deg F	93.60
Min Daily Ambient Temperature	T_{MIN}	deg F	72.50
Daily Total Solar Insulation Factor	I	Btu/(ft2*day)	1351.00
Daily Average Ambient Temperature	T_{AA}	deg R	527.89
VCU Control Device Efficiency	CE		99.9%
VCU NOX Emission Factor		lb/MMBtu	0.0600
VCU CO Emission Factor		lb/MMBtu	0.2000
H2S Emission Factor for Waste Gas		lb-H_2S/lb-VOC	0.0054
VCU SO2 Emission Factor for Natural Gas		lb/MMBtu	0.0006
VCU SO2 Emission Factor for Waste Gas		lb/MMBtu	0.3825
VCU PM Emission Factor		lb/MMBtu	0.0075
VCU VOC Natural Gas Emission Factor		lb/MMBtu	0.0054
CO_2 Emission Factor for Waste Gas		lb/MMBtu	154.81
CH_4 Emission Factor for Waste Gas		lb/MMBtu	0.003
N_2O Emission Factor for Waste Gas		lb/MMBtu	0.0006
CO_2 Emission Factor for Natural Gas		lb/MMBtu	116.889
CH_4 Emission Factor for Natural Gas		lb/MMBtu	0.001
N_2O Emission Factor for NaturalGas		lb/MMBtu	0.0001
MSS Events per Tank			1.00
Max Hourly Assist Gas Flow		scf/hr	19.251
Max Daily Assist Gas Flow		scf/day	231.017
Annual Average Assist Gas Flow		scf/yr	1,000.000
Degassing Turnovers			2.00
Degassing Air Flow Rate		cfm	12.000
Degassing Saturation Factor			0.5

MSS Landings																					
Tank FIN				P120-019	P120-020	P120-021	P120-022	P120-023	P120-024	P120-025	P120-026	P120-027	P120-028	P120-029	P120-030	P165-007	P165-008	P165-009	P165-010	P165-011	P165-012
Project No.				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Material				GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)	GASOLINE (RVP-11)
Tank Type				IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR	IFR
Diameter	D	ft		109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	109.00	140.00	140.00	140.00	140.00	140.00	140.00
High Roof Leg Height		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Days Roof Off-Float	n_d	days		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Status Prior to Re-Filling				Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean	Clean
Height of Liquid Heel	H_{le}	ft		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Filling Pump-in Rate		bbl/hr		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500
Vapor Pressure Method				RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP	RVP
Reid Vapor Pressure		psia		11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Vapor Molecular Wt.	M_v	lb/lbmole		66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Stock Liquid Density	W_l	lb/gal		5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
Heat Value		Btu/lb		20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000
Saturation Factor	S			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Height of Vapor Space		ft		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Volume of Vapor Space	V_V	ft^3		46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	46.647	76.954	76.954	76.954	76.954	76.954	76.954
Paint Color				White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
Paint Solar Absorptance	α			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Daily Vapor Temp. Range	ΔT	deg R		21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62	21.62
Liquid Bulk Temp.	T_B	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Daily Average Liquid Surface Temp.	T_{LA}	deg R		555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00	555.00
Slope of ASTM Distillation Curve				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Antoine's Equation Constant	A			11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69	11.69
Antoine's Equation Constant	B			5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91	5166.91
Antoine's Equation Constant	C			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
True Vapor Pressure of Liquid	P	psia		11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00

Table B-3
MSS Activities: Storage Tank Landings
Intercontinental Terminals Company LLC
December 2018

Standing Idle Losses																					
Tank FIN				**P120-019**	**P120-020**	**P120-021**	**P120-022**	**P120-023**	**P120-024**	**P120-025**	**P120-026**	**P120-027**	**P120-028**	**P120-029**	**P120-030**	**P165-007**	**P165-008**	**P165-009**	**P165-010**	**P165-011**	**P165-012**
Vapor Space Expansion Factor (eqn 1-5)	IFR			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Vapor Space Expansion Factor (tbl 7.1-19)	Drain Dry			0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Vapor Space Expansion Factor	K_E			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Idle Saturation Factor	K_S			0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Vapor Pressure Function	P*			0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Not to Exceed Standing Idle Losses		lb		392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	392.55	647.58	647.58	647.58	647.58	647.58	647.58
Calculated Standing Idle Losses		lb		169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	279.81	279.81	279.81	279.81	279.81	279.81
Standing Idle Losses	L_{SL}	lb		169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	169.62	279.81	279.81	279.81	279.81	279.81	279.81
Total Standing Idle Losses		lb		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.28	0.28	0.28	0.28	0.28	0.28
Heat Input From Vapor		MMBtu/event		3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39	5.60	5.60	5.60	5.60	5.60	5.60
Heat Input From Vapor		MMBtu/hr		0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.47	0.47	0.47	0.47	0.47	0.47
Standing Idle Emission Rate		lb/hr		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Standing Idle Emission Rate		lb/day		1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.68	1.68	1.68	1.68	1.68	1.68
Standing Idle Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing Losses																					
Tank Degassed?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Moles		lbmole		43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	43.08	71.07	71.07	71.07	71.07	71.07	71.07
VOC Mass Vapor	Q	lb/event		2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	2843.41	4690.76	4690.76	4690.76	4690.76	4690.76	4690.76
Degas VOC Emissions	E_P	lb/event		2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	4.69	4.69	4.69	4.69	4.69	4.69
Tank Degassing Duration		hr		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.21	0.21	0.21	0.21	0.21	0.21
Heat Input From Vapor		MMBtu/event		56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	93.82	93.82	93.82	93.82	93.82	93.82
Heat Input From Vapor		MMBtu/hr		56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	93.82	93.82	93.82	93.82	93.82	93.82
Total Degassing Volume		ft^3/event		93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	93,294	153,907	153,907	153,907	153,907	153,907	153,907
Degassing Emission Rate		lb/hr		21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94
Degassing Emission Rate		lb/day		2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	4.69	4.69	4.69	4.69	4.69	4.69
Degassing Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post-Control Degassing/Venting Emissions																					
Vented VOC after Control (5,000 ppm)	E_C	lb/event		40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	67.00	67.00	67.00	67.00	67.00	67.00
Tank Venting Duration		hr		1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.83	1.83	1.83	1.83	1.83	1.83
Vented VOC Emissions		lb/hr		36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67
Vented VOC Emissions		lb/day		40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	67.00	67.00	67.00	67.00	67.00	67.00
Vented VOC Emissions		tpy		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
Refilling Losses																					
Saturation Correction Factor	C_W			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Caf * S ≥ 0.15				---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Filling Losses	L_{FL}	lb		852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	852.94	1,407.10	1,407.10	1,407.10	1,407.10	1,407.10	1,407.10
Time to Refloat Roof		hr		1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.83	1.83	1.83	1.83	1.83	1.83
Heat Input From Vapor		MMBtu/event		17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	28.14	28.14	28.14	28.14	28.14	28.14
Heat Input From Vapor		MMBtu/hr		15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40	15.40
Total Refilling Volume		ft^3/event		46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	46,647	76,954	76,954	76,954	76,954	76,954	76,954
Refilling Emission Rate		lb/hr		0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Refilling Emission Rate		lb/day		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	1.41	1.41	1.41	1.41	1.41	1.41
Refilling Emission Rate		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total MSS Emissions by Tank																					
Tank FIN				**P120-019**	**P120-020**	**P120-021**	**P120-022**	**P120-023**	**P120-024**	**P120-025**	**P120-026**	**P120-027**	**P120-028**	**P120-029**	**P120-030**	**P165-007**	**P165-008**	**P165-009**	**P165-010**	**P165-011**	**P165-012**
VOC Emission Rate (Uncontrolled)		lb/hr		36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67	36.67
		lb/day		40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	40.62	67.00	67.00	67.00	67.00	67.00	67.00
		tpy		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
VOC Emission Rate (Controlled)		lb/hr		21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94	21.94
		lb/day		2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	4.69	4.69	4.69	4.69	4.69	4.69
		tpy		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003
NOx Emission Rate		lb/hr		3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	5.63	5.63	5.63	5.63	5.63	5.63
		lb/day		3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	5.63	5.63	5.63	5.63	5.63	5.63
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO Emission Rate		lb/hr		11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	18.76	18.76	18.76	18.76	18.76	18.76
		lb/day		11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	11.37	18.76	18.76	18.76	18.76	18.76	18.76
		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
H2S Emission Rate		lb/hr		2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
		lb/day		0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.51	0.51	0.51	0.51	0.51	0.51
		tpy		2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	3.46E-04	3.46E-04	3.46E-04	3.46E-04	3.46E-04	3.46E-04
SO2 Emission Rate		lb/hr		21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	35.88	35.88	35.88	35.88	35.88	35.88
		lb/day		21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	35.88	35.88	35.88	35.88	35.88	35.88
		tpy		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
PM Emission Rate		lb/hr		0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.70	0.70	0.70	0.70	0.70	0.70
		lb/day		0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.70	0.70	0.70	0.70	0.70	0.70
		tpy		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 Emissoin Rate		tpy		4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	7.26	7.26	7.26	7.26	7.26	7.26
CH_4 Emissoin Rate		tpy		8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	8.53E-05	1.41E-04	1.41E-04	1.41E-04	1.41E-04	1.41E-04	1.41E-04
N_2O Emission Rate		tpy		1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	2.81E-05	2.81E-05	2.81E-05	2.81E-05	2.81E-05	2.81E-05
CO_2e Emission Rate		tpy		4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	7.27	7.27	7.27	7.27	7.27	7.27

Notes:
1. The MSS emission calculations included in this permit application are for cap calculation purposes only.
These emission calculations are not to be considered enforceable representations as to the magnitude, duration,
and/or frequency of individual activities.

Table B-4
Equipment Venting MSS Emissions (EPN: MSS-CONT & MSS-ATM)
Intercontinental Terminals Company LLC
December 2018

Emissions Summary	Short-Term (lb/hr)	Project ID No. 1 (tpy)	Project ID No. 2 (tpy)	Project ID No. 3 (tpy)
Equipment MSS Vapors Vented to Control (See Table B-5 for controlled emissions details)	3.57	0.36	0.36	0.36
Equipment MSS Liquid Draining	20.80	0.13	0.13	0.13
Equipment MSS Venting to Atmosphere Post Control	4.54	0.04	0.04	0.04
Equipment Refilling (See Table B-5 for controlled emissions details)	0.78	0.01	0.01	0.01

		Project ID No. 1			Project ID No. 2			Project ID No. 3			
Equipment ID		**Pump**	**Filter/Meter/ Valve**	**Vesseel, Sump, & Piping**	**Pump**	**Filter/Meter/ Valve**	**Vesseel, Sump, & Piping**	**Pump**	**Filter/Meter/ Valve**	**Vesseel, Sump, & Piping**	**Emission Totals**
Annual Venting/Draining/Refilling Events	events/yr	30	35	22	30	35	22	30	35	22	
Short-Term Venting/Draining/Refilling Events	simultaneous events	5	5	1	5	5	1	5	5	1	
Molecular Weight of Vapor	lb/lb-mole	66	66	66	66	66	66	66	66	66	
Daily Avg. Liquid Surface Temp.	°R	544.77	544.77	544.77	544.77	544.77	544.77	544.77	544.77	544.77	
Vapor Pressure at Max. Storage Temp.	psia	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	
Volume	ft^3/event	85.00	85.00	4,363	85.00	85.00	4,363	85.00	85.00	4,363	
Equipment MSS Vapors Vented (See Table B-5 for controlled emission details)											
Vented to Control	Yes/No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Moles	M_v/event	0.160	0.160	8.211	0.160	0.160	8.211	0.160	0.160	8.211	
Vented VOC Emissions	lbs/hr	0.11	0.00	1.08	0.11	0.00	1.08	0.11	0.00	1.08	***3.57***
Total Venting VOC Emissions	tpy	0.16	0.18	0.01	0.16	0.18	0.01	0.16	0.18	0.01	***1.07***
Equipment MSS Liquid Draining											
Equipment Draining VOC Loading Loss	lbs/1,000 gals loaded	9.96	9.96	9.96	9.96	9.96	9.96	9.96	9.96	9.96	
Equipment Draining VOC Loading Loss (20% of pump, filter, meter, and valve volume and 2.5% of piping volume)	lbs/event	1.27	1.27	8.13	1.27	1.27	8.13	1.27	1.27	8.13	
Equipment Draining VOC Loading Loss	lbs/hr	6.33	6.33	8.13	6.33	6.33	8.13	6.33	6.33	8.13	***62.40***
Equipment Draining VOC Loading Loss	tpy	0.02	0.02	0.09	0.02	0.02	0.09	0.02	0.02	0.09	***0.39***
Equipment MSS Venting (Volume > 85 ft3) to Atmosphere Post Control											
Vented VOC Emissions after Control (5,000 ppm)	lbs/event	0.07	0.07	3.80	0.07	0.07	3.80	0.07	0.07	3.80	
Venting Duration	hrs	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Vented VOC Emissions after Control (5,000 ppm)	lb/hr	0.37	0.37	3.80	0.37	0.37	3.80	0.37	0.37	3.80	***13.62***
Total Venting VOC Emissions	tpy	0.001	0.001	0.042	0.001	0.001	0.042	0.001	0.001	0.042	***0.133***
Equipment MSS Refilling (See Table B-5 for controlled emission details)											
Vented to Control	Yes/No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Equipment VOC Loading Loss	lbs/1,000 gals loaded	9.96	9.96	9.96	9.96	9.96	9.96	9.96	9.96	9.96	
Recovery VOC Loading Loss	lbs/event	0.01	0.01	0.65	0.01	0.01	0.65	0.01	0.01	0.65	
Recovery VOC Loading Loss	lbs/hr	0.06	0.06	0.65	0.06	0.06	0.65	0.06	0.06	0.65	***2.33***
Recovery VOC Loading Loss	tpy	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	***0.02***

Venting Emissions after Control

$Ec = 0.005 * V_L/379\ M_{wm}$

Where:

Ec = Emissions vented to atmosphere after controlled degassing (lb)

V_L = Equipment volume (ft^3)

M_{wm} = Molecular weight (lbs/mole)

Notes:

1. The MSS emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Table B-5
Controlled LDAR Equipment MSS Emissions (EPN: MSS-CONT)
Intercontinental Terminals Company LLC
December 2018

Basis
Used NO_x and CO emissions factors prvided by vendor.
Used PM factors from AP-42, Section 3.2-7.
Used H_2S emissions factor calculated in Table A-14 and a DRE of 98%.
SO_2 emissoins based on 100% conversion of H_2S.

Operation Type	Source	Hourly		Annual - Project No. 1		Annual - Project No. 2		Annual - Project No. 3	
		Vapors lb/hr	Heat Release MMBtu/hr	Vapors lb/yr	Heat Release MMBtu/yr	Vapors lb/yr	Heat Release MMBtu/yr	Vapors lb/yr	Heat Release MMBtu/yr
MSS	Equipment Venting/Refilling	2,172.67	43.45	362,595.01	7,251.90	362,595.01	7,251.90	362,595.01	7,251.90
Totals		*2,172.67*	*43.45*	*362,595.01*	*7,251.90*	*362,595.01*	*7,251.90*	*362,595.01*	*7,251.90*

Operation Type	Pollutant	Emissions Factor		Project No. 1-3	Project No. 1	Project No. 2	Project No. 3
		(Value)	(Units)	(lb/hr)	(ton/yr)	(ton/yr)	(ton/yr)
MSS	VOC	99.8%	DRE	4.35	0.36	0.36	0.36
	NO_x	0.1500	lb/MMBtu	6.52	0.54	0.54	0.54
	CO	0.2000	lb/MMBtu	8.69	0.73	0.73	0.73
	H_2S	0.0018	lb/lb-VOC	0.08	6.43E-03	6.43E-03	6.43E-03
	SO_2	100%	H_2S Conversion	7.71	0.64	0.64	0.64
	$PM/PM_{10}/PM_{2.5}$	0.0075	lb/MMBtu	0.33	0.027	0.027	0.027
	CO_2	154.81	lb/MMBtu	6,726.96	561.33	561.33	561.33
	CH_4	0.003	lb/MMBtu	0.13	1.09E-02	1.09E-02	1.09E-02
	N_2O	0.0006	lb/MMBtu	0.03	2.18E-03	2.18E-03	2.18E-03

Pilot/Assist Gas Emissions - Each Project

Total natural gas combusted (Annual Emissions)= 25.0 scfm = 26.5 cfm
Total natural gas combusted (Short-Term Emissions)= 25.0 scfm = 26.5 cfm
based on 68 F & 100 F standard and actual temperature, respectively.
Natural gas heating value = 1020 btu/scf, based on LHV

Pollutant	Emission factor		Total Gas Flow		Operating Hours	Emissions	
	(Value)	(Units)	scfh (maximum)	scfh (average)	(hrs/yr)	(lb/hr)	(tons/yr)
VOC	0.0054	lb/MMBtu	1,500	1,500	1,000	0.01	0.004
NO_X	0.1500	lb/MMBtu	1,500	1,500	1,000	0.23	0.11
CO	0.2000	lb/MMBtu	1,500	1,500	1,000	0.31	0.15
SO_2	0.0006	lb/MMBtu	1,500	1,500	1,000	0.00	0.00
$PM/PM_{10}/PM_{2.5}$	0.0075	lb/MMBtu	1,500	1,500	1,000	0.01	0.01
CO_2	116.8890	lb/MMBtu	1,500	1,500	1,000	178.84	89.42
CH_4	0.001	lb/MMBtu	1,500	1,500	1,000	0.002	7.65E-04
N_2O	0.0001	lb/MMBtu	1,500	1,500	1,000	0.0002	7.65E-05

Notes:
1. The MSS emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Updated 12/21/2018

Table B-6
Air Mover and VacuumTruck MSS Emissions (EPN: MSS-CONT & MSS-ATM)
Intercontinental Terminals Company LLC
December 2018

Basis - Air Mover, Vacuum Mover, & Frac Tank (Control & No Control)

Emissions calculated based on loading loss equation (Equation 1, AP-42, Section 5.2)
Saturation factor assumed to be 1.45, splash loading.
Volume of vapor displaced is two times the volume of liquid transferred. This is to account for the vacuum hose sucking air during part of the transfer.
Includes vacuum trucks that utilize a "vacuum pump" to collect material. Controls (i.e., carbon, thermal, scrubber, or etc.) will be utilized for materials with a vp > 0.5

Basis - Vacuum Mover (Empty Vacuum)

The vacuum truck volume is 3,486 gals (466 ft^3).
Saturation factor assumed to be 0.6, submerged loading.

						Throughtput								VACUUM TRUCK EMISSIONS (EPN: MSS-CONT & MSS-ATM)							
Load Type and Control Method	Product	Vapor MW	Vapor Pressure		Loadign Loss		Project No. 1-3		Project No. 1		Project No. 2		Project No. 3		Control (%)	Project No. 1-3 (lbs/hr)		Project No. 1 (tpy)		Project No. 2 (tpy)		Project No. 3 (tpy)	
Air Mover& Vacuum Mover - Thermal Control	High Vapor Pressure Products	66	11	psia	1020.18	lb/1000bbl	60	bbl/hr	3,400	bbl/yr	3,400	bbl/yr	40,000	bbl/yr	99.8%	0.24	lb/hr	0.01	tpy	0.01	tpy	0.08	tpy
Air Mover& Vacuum Mover - Carbon Control	High Vapor Pressure Products	66	11	psia	NA	lb/1000bbl	60	bbl/hr	3,400	bbl/yr	3,400	bbl/yr	2,400	bbl/yr	100 ppm	0.66	lb/hr	0.02	tpy	0.02	tpy	0.01	tpy
Frac Tank	High Vapor Pressure Products	66	11	psia	1020.18	lb/1000bbl	60	bbl/hr	2,000	bbl/yr	2,000	bbl/yr	4,800	bbl/yr	0%	61.21	lb/hr	1.02	tpy	1.02	tpy	2.45	tpy
Air Mover & Vacuum Mover	Low Vapor Pressure Products	130	0.5	psia	91.34	lb/1000bbl	60	bbl/hr	1,500	bbl/yr	1,500	bbl/yr	2,400	bbl/yr	0%	5.48	lb/hr	0.07	tpy	0.07	tpy	0.11	tpy
Frac Tank	Low Vapor Pressure Products	130	0.5	psia	91.34	lb/1000bbl	60	bbl/hr	1,500	bbl/yr	1,500	bbl/yr	2,400	bbl/yr	0%	5.48	lb/hr	0.07	tpy	0.07	tpy	0.11	tpy
															Totals	***61.21***	*lb/hr*	***1.18***	*tpy*	***1.18***	*tpy*	***2.76***	*tpy*

Notes:

1. The MSS emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual

Table B-7
Controlled Vacuum Truck and Air Mover MSS Emissions (EPN: MSS-CONT)
Intercontinental Terminals Company LLC
December 2018

Basis
Used NO_x and CO emissions factors prvided by vendor.
Used PM factors from AP-42, Section 3.2-7.
Used H_2S emissions factor calculated in Table A-14 and a DRE of 98%.
SO_2 emissoins based on 100% conversion of H_2S.
Vapors generated from products with a vapor pressure < 0.5 psia are not controlled by a thermal control device.

Operation Type	Source	Hourly		Annual - Project No. 1		Annual - Project No. 2	
		Vapors lb/hr	Heat Release MMBtu/hr	Vapors lb/yr	Heat Release MMBtu/yr	Vapors lb/yr	Heat Release MMBtu/yr
MSS	Vacuum Truck & Air Mover	122.42	2.45	6,937.25	138.74	6,937.25	138.74
Max/Totals		*122.42*	*2.45*	*6,937.25*	*138.74*	*6,937.25*	*138.74*

Operation Type	Pollutant	Emissions Factor		Project No. 1-3	Project No. 1	Project No. 2	Project No. 3
		(Value)	(Units)	(lb/hr)	(ton/yr)	(ton/yr)	(ton/yr)
MSS	VOC	99.8%	DRE	0.24	0.01	0.01	0.08
	NO_x	0.1500	lb/MMBtu	0.37	0.01	0.01	0.12
	CO	0.2000	lb/MMBtu	0.49	0.01	0.01	0.16
	H_2S	0.0018	lb/lb-VOC	0.00	1.23E-04	1.23E-04	1.45E-03
	SO_2	100%	H_2S Conversion	0.43	0.01	0.01	0.14
	$PM/PM_{10}/PM_{2.5}$	0.0075	lb/MMBtu	0.02	0.001	0.001	0.006
	CO_2	154.81	lb/MMBtu	379.04	10.74	10.74	126.35
	CH_4	0.003	lb/MMBtu	0.01	2.08E-04	2.08E-04	2.45E-03
	N_2O	0.0006	lb/MMBtu	0.00	4.16E-05	4.16E-05	4.90E-04

Pilot/Assist Gas Emissions - Each Project

.	25.0 scfm =	26.5 cfm
Total natural gas combusted (Short-Term Emissions)=	25.0 scfm =	26.5 cfm
based on 68 F & 100 F standard and actual temperature, respectively.		
Natural gas heating value =	1020 btu/scf, based on LHV	

Pollutant	Emission factor		Total Gas Flow		Operating Hours	Emissions	
	(Value)	(Units)	scfh (maximum)	scfh (average)	(hrs/yr)	(lb/hr)	(tons/yr)
VOC	0.0054	lb/MMBtu	1,500	1,500	1,000	0.01	0.004
NO_x	0.1500	lb/MMBtu	1,500	1,500	1,000	0.23	0.11
CO	0.2000	lb/MMBtu	1,500	1,500	1,000	0.31	0.15
SO_2	0.0006	lb/MMBtu	1,500	1,500	1,000	0.00	0.00
$PM/PM_{10}/PM_{2.5}$	0.0075	lb/MMbtu	1,500	1,500	1,000	0.01	0.01
CO_2	116.8890	lb/MMBtu	1,500	1,500	1,000	178.84	89.42
CH_4	0.001	lb/MMBtu	1,500	1,500	1,000	0.002	7.65E-04
N_2O	0.0001	lb/MMBtu	1,500	1,500	1,000	0.0002	7.65E-05

Notes:
1. The MSS emission calculations included in this permit application are for cap calculation purposes only. These emission calculations are not to be considered enforceable representations as to the magnitude, duration, and/or frequency of individual activities.

Appendix C

Proposed Revisions to Permit No. 95754