TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	**BEFORE THE** **TEXAS COMMISSION ON** **ENVIRONMENTAL QUALITY**

FLINT HILLS RESOURCES INGLESIDE LLC RESPONSE TO MOTION TO OVERTURN

TO THE HONORABLE COMMISSIONERS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY:

Applicant Flint Hills Resources Ingleside LLC ("FHR") files this response to Bay Coastal Watch Association's and Coastal Alliance to Protect Our Environment's (collectively, "Movants") Motion to Overturn ("Motion").

I. INTRODUCTION

Despite Movants' statements otherwise, this is a dispute about what is known as project aggregation. The basis of the Motion is that the emission increases due to two separate projects pursued by FHR and its predecessor should have been aggregated for federal new source review ("NSR") purposes. But that is not the case. FHR and its predecessor followed all applicable laws and rules in conducting the required federal NSR applicability analyses included in their applications to amend Air Quality Permit No. 6606 for its Ingleside, Texas marine terminal. FHR concluded, based on a case-by-case assessment of the required factors, that the set of changes authorized by the TCEQ on October 11, 2022, for the 2021 SuezMax Project, were not "substantially related" to the set of changes for the 2018 Permian to Ingleside ("P2I") Project authorized by the TCEQ on January 25, 2019, because of the lack of a substantial technical or economic relationship between them. Because these two projects reflect two separate and independent sets of physical or operational changes that capitalize on different market opportunities arising over three years apart, the emission increases in sulfur dioxide ("SO_2") need not be aggregated for federal NSR applicability purposes, neither project triggered federal NSR review, and the Motion should be denied.

II. BACKGROUND

FHR owns and operates a marine terminal in Ingleside, Texas for the storage and handling of crude oil and condensate. FHR's predecessor Flint Hills Resources Corpus Christi, LLC ("FHRCC") historically used the terminal primarily to support its nearby petroleum refineries complex in Corpus Christi, Texas known as the West Refinery and East Refinery, including for receipt of inbound crude oil deliveries. Beginning around 2018, FHRCC began looking for opportunities to diversify the operations at the terminal.

One such opportunity at the terminal was the 2018 Permian to Ingleside ("2018 P2I Project"). As its name implies, the project was intended to capitalize on increased crude oil production in the Permian Basin in 2018, and the planned construction of third-party pipelines to transport crude oil from the Permian Basin to the Corpus Christi region. As reflected in the confidential internal funding package supporting final internal funding and approval of the 2018 P2I Project on August 20, 2018, FHRCC determined that new takeaway capacity would be required to provide a waterborne outlet for the crude oil arriving in the Corpus Christi region. For that reason and to seize on that discrete economic opportunity, FHRCC submitted an application to amend Air Quality Permit No. 6606 in April 2019,[1] to authorize a suite of physical and

[1] The application for the P2I Amendment was later updated by FHRCC in supplements submitted to TCEQ in July, September, and November 2018. The Updated November 2018 version of the P2I Application is attached hereto as FHR's Exhibit A. NSR Air Quality Permit No. 6606, as amended, is attached hereto as FHR's Exhibit B.

operational changes to expand the terminal, such that the total combined amount of crude oil and stabilized condensate that could be loaded into barges and ships would increase from 73,700,000 barrels per rolling twelve-month period to 138,700,000 barrels per rolling twelve-month period ("P2I Amendment"). TCEQ approved the P2I Amendment on January 25, 2019, and shortly thereafter FHRCC began implementing the changes authorized by the P2I Amendment.

The federal NSR applicability analysis included in the P2I Amendment fully evaluated the potential for the 2018 P2I Project to result in additional emissions, including additional maintenance, start up, and shut down ("MSS") emissions. In fact, MSS emissions associated with the new tanks that were part of the P2I Project scope were estimated and included as part of the "project emissions increase" included in the P2I Project federal NSR applicability analysis, even though these increases were authorized not by Permit No. 6606, but by a separate permit-by-rule[2] ("PBR") that TCEQ has established for the precise purpose of authorizing planned MSS emissions. Specifically, the 2018 P2I Project MSS emissions reflected in the revision to PBR Registration No. 107625 were included in the P2I Project federal NSR applicability analysis.[3]

In November 2019, Flint Hills Resources Ingleside, LLC ("FHR") became the legal owner and operator of the Ingleside marine terminal. Around that same time, and following the 2018 P2I Project, a different opportunity for the terminal presented itself. In early 2019 the Port of Corpus Christi began significant work to deepen its ship channel to a depth of 54 feet, which importantly is the depth needed to allow fully loaded SuezMax crude oil vessels to pass. FHRCC was right in its assessment of this new opportunity, and on November 1, 2019, executed a commercial contract requiring it to have the capability to fully load SuezMax vessels at Ingleside once necessary

[2] 30 TEX. ADMIN. CODE § 106.263.
[3] The 2019 PBR Registration No. 107625 is attached hereto as FHR's Exhibit C. The TCEQ's approval of PBR No. 107625 (January 15, 2019) is attached hereto as FHR's Exhibit D. The Movants attached the corresponding Technical Review as Attachment B to the Motion.

permitting is completed. That capability in turn required a vessel loading throughput condition in the Air Quality Permit No. 6606 to be increased from 138,700,000 barrels per rolling twelve-month period to 187,200,000 barrels per rolling twelve-month period.

To that end, FHR submitted a second application to amend Air Quality Permit No. 6606, on April 7, 2021 ("SuezMax Amendment")[4], to authorize the vessel loading throughput increase to capitalize on a new opportunity for the terminal, namely to fully load domestic crude oil and condensate into SuezMax vessels ("2021 SuezMax Project"). The 2021 SuezMax Project would allow the terminal to fully optimize operation by accommodating a full load schedule of SuezMax vessels. Until the permit was obtained, FHR was at a local competitive disadvantage compared to its neighboring facilities. No new tanks were required for the project and therefore no new tank maintenance emissions were required to be authorized. The application was fully reviewed by TCEQ staff, and the SuezMax Amendment was issued on October 11, 2022.

Given the time of the filing of the application for the 2021 SuezMax Project, following completion of construction of the 2018 P2I Project, FHR had also identified several minor "as-built" corrections to the changes associated with the P2I Project. "As-built" amendments are routinely required following the construction of new or modified facilities to true up the permit representations with the as-built configuration of the equipment installed following construction. Rather than seek TCEQ approval of these clean up items in a separate, "as-built" amendment application, FHR described them in the April 2021 application for administrative convenience of both FHR and the TCEQ. The impacts of these discrete "as-built" changes on the P2I federal NSR applicability analysis were fully evaluated by FHR and TCEQ staff and both confirmed that they did not cause the 2018 P2I Project to become subject to federal NSR.

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[4] The SuezMax Amendment application is attached hereto as FHR's Exhibit E.

TCEQ and FHR fully complied with all public notice requirements applicable to minor NSR permit amendment applications with the 2021 SuezMax Project.[5] Movants participated fully in the SuezMax Amendment permitting process by filing comments and attending the TCEQ public meeting on the amendment application on July 14, 2022. FHR also held a separate meeting with counsel for Movants in a good faith attempt to explain the projects and why its concerns were unfounded. The Executive Director considered these concerns as well and explained why they were not supported in his Response to Public Comments. In relevant part, the Executive Director stated that the following with respect to the 2021 SuezMax Project:

> Flint Hills did not aggregate emissions from PBR Registration No. 107625, which authorized tank MSS emissions with [the 2021 SuezMax Project], or emissions from the [2018 P2I Project], and these emissions were not affected sources that should be included in the [2021 SuezMax Project] emission increases. EPA's final action of project aggregation for the NSR Program states that projects should be technically and economically related to be aggregated. Projects that are more than three years apart should not be aggregated unless there is a compelling reason. Therefore, [2021 SuezMax Project] increases are still below the significant emissions rates and are not subject to [federal NSR] permitting."[6]

FHR's analyses are proper, staff's conclusion is proper, and the Motion should therefore be denied.

III. PROCEDURAL REQUIREMENTS

With their Motion, the Movants seek to overturn the Executive Director's issuance of the amendment to Air Quality Permit No. 6606 dated October 11, 2022. As the movant, the Movants bear the burden of proof to show that the issuance of the SuezMax Amendment is unlawful.

IV. SUBSTANTIVE REQUIREMENTS

The federal Clean Air Act, the Texas Clean Air Act and the TCEQ's SIP-approved new source review ("NSR") regulations apply separately to each modification, which is defined both

[5] Executive Director's Response to Public Comment, Flint Hills Resources Ingleside, LLC, Permit No. 6606 (October 11, 2022), at 3, attached hereto as FHR's Exhibit F.
[6] *Id.* at 27.

in the law and the rules as a singular physical change or change in the method of operation of a stationary source. 42 U.S.C. § 111(a)(4); 30 TAC § 116.12(20). A plain reading of these requirements creates the presumption that nominally separate changes at a plant are separate modifications. Only in narrow circumstances are nominally separate changes aggregated or combined for purposes of determining federal NSR applicability. Under applicable federal and TCEQ guidance, two nominally separate changes must be aggregated only if they would not be technically and economically viable without each other or if they are "substantially related" in such a way that their objectives would be substantially impaired without each other. *Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Aggregation; Reconsideration*, 83 Fed. Reg. 57324, 57326 (November 15, 2018).

The "substantially related" test has been developed in EPA policy statements over the years and is the test used by TCEQ in rendering federal NSR applicability determinations.[7] EPA first addressed this issue in an uncodified final rule issued in 1989 and signed by the EPA Administrator. 54 Fed. Reg. 27274 at 27280 (June 28, 1989). In this rule, EPA clarified that, because the NSR program is a preconstruction review program, it is impermissible for a source owner deliberately to evade preconstruction review by misrepresenting the capacity or potential emissions from a project at the time of the initial construction permitting with the intent to undergo subsequent permitting for an increase in capacity or potential emissions. EPA recognized in this rule that there are circumstances in which a source owner legitimately constructs a source or project and subsequently realizes that the source or project will emit above NSR applicability thresholds. EPA distinguished those circumstances and established its anti-circumvention

[7] *See* Major New Source Review – Applicability Determination guidance document (APDG-5881, Jan. 2022), attached hereto as FHR's Exhibit G; FHR's Ex. F at 27.

guidance for cases where the "economic realities" are such that it is obvious that the source or project as initially proposed would not be economically viable.

In 2006, recognizing that the anti-circumvention guidance had caused confusion among EPA regional office staff, permitting authorities, and the regulated community, EPA issued a *Federal Register* notice, again signed by the Administrator. 71 Fed. Reg. 54235 at 54244 (Sept. 14, 2006). In this notice, EPA described its long-standing project aggregation policy as having "evolved in large part from specific, case-by-case after-the-fact inquiries related to the possible circumvention of NSR in existing permits" and summarized the policy as requiring aggregation of one project with another if the first would not be funded or it would not be economically viable if operated on an extended basis without the second project in place.

The 2006 *Federal Register* notice also included proposed changes to the codified federal NSR regulations, but those changes were never finalized. EPA took final action with respect to the 2006 proposal in a *Federal Register* notice published in 2009. 74 Fed. Reg. 2376 (Jan. 15, 2009). This final action was administratively stayed during the Obama administration but took effect in 2018. 83 Fed. Reg. 57324 (Nov. 15, 2018). The 2009 and 2018 actions did not involve any changes to the codified federal NSR regulations but rather described a change in EPA's policy going forward: Two projects should be aggregated only where they are substantially related in such a way that their objectives would be substantially impaired without each other.

As articulated in the 2018 action, "[t]he test of a substantial relationship centers around the interrelationship and interdependence of the activities, such that substantially related activities are likely to be jointly planned (i.e., part of the same capital improvement project or engineering study), and occur close in time and at components that are functionally interconnected.'' 83 Fed. Reg. 57324, 57327 (Nov. 15, 2018). Furthermore, where two projects are approved more than three years apart, there is a presumption that the two projects should not be aggregated for federal applicability determinations. 83 Fed. Reg. 57324, 57324 (November 15, 2018); FHR's Ex. F at 26-27.

V. ARGUMENTS

Movants allege that the TCEQ's approval of the SuezMax Amendment is in error because the changes approved as part of that amendment should have triggered federal NSR, specifically prevention of significant deterioration ("PSD") review, for sulfur dioxide ("SO_2"). While the Motion lacks the requisite level of clarity to be granted, the primary arguments presented by Movants appear to be as follows: 1) the increased throughput that was required to support the 2021 SuezMax Project should not be viewed as a project separate and distinct from the 2018 P2I Project, but should instead be viewed as an "impermissible" relaxation of conditions in Air Permit No. 6606; and 2) the federal NSR applicability analysis for the SuezMax Project is flawed because it did not re-authorize planned MSS emissions that had been included in the federal NSR applicability analysis for the 2018 P2I Project and authorized in PBR Registration No. 107625. Inexplicably, Movants seek SO_2 emissions increases from separate sets of changes at the terminal to be aggregated, while arguing that the basis of its Motion is not in fact "aggregation."

The Executive Director succinctly responded to both arguments in his Response to Public Comments, correctly noting that the issue presented is one of aggregation, and FHR and TCEQ acted properly in not aggregating SO_2 emissions increases from the separate sets of changes implemented by FHR:

> Flint Hills did not aggregate emissions from PBR Registration No. 107625, which authorized tank MSS emissions with [the 2021 SuezMax Project], or emission from the [2018 P2I Project], and these emissions were not affected sources that should be included in the [2021 SuezMax Project] emission increases. EPA's final action on project aggregation for the NSR Program states that projects should be technically and economically related to be aggregated. Projects that are more than

> three years apart are presumed to not be technically and economically related and should not be aggregated unless there is a compelling reason. Therefore, the [2021 SuezMax Project] increases are still below the significant emission rates and are not subject to PSD permitting.

FHR's Ex. F, at 27.

A. FHRCC CONDUCTED A PROPER FEDERAL NSR APPLICABILITY ANALYSIS FOR THE CHANGES ASSOCIATED WITH THE 2018 P2I PROJECT DOCUMENTING THAT SO2 EMISSIONS INCREASES WERE BELOW THE PSD SIGNIFICANCE LEVEL.

While Movants do not and cannot now challenge the approval of the P2I Amendment, or the revision to FHRCC's PBR registration, it is important to understand that permitting action to evaluate Movants' challenge to the SuezMax Amendment.

On April 18, 2018, FHRCC filed a minor NSR application for the 2018 P2I Project. FHRCC sought the expansion to enable it to handle additional crude oil and condensates that would be available in the region due to the construction of new third-party pipelines from the Permian Basin to Corpus Christi area. FHRCC referred to this project as the 2018 P2I Project or the Expansion Project in the application. The 2018 P2I Project sought NSR permit authorization for the construction of six new storage tanks, three new vapor combustion units ("VCUs") to replace an existing VCU, and new piping components.

As required by TCEQ's PSD rules, the application included a full evaluation of whether the changes required as part of the 2018 P2I Project would constitute a major modification as defined in 30 TAC § 116.12(20). This evaluation entailed a determination of whether "any physical change, or change in the method of operation" of the terminal would cause a "significant project emissions increase" and a "significant net emissions increase" for any federally regulated new source review pollutant. The evaluation was reflected in an accounting of the "project emissions increase," as defined in 30 TAC § 116.12(32), for each regulated pollutant, including emissions increases from new, modified and affected downstream sources. Since the terminal is located in an attainment area for all criteria pollutants, the accounting was performed to evaluate whether the "project emissions increase" of any federally regulated NSR pollutant was greater than the PSD significance level applicable to major modifications and therefore trigger PSD review.

As documented in the application, and the TCEQ staff's Permit Amendment Source Analysis & Technical Review ("Technical Review"), dated January 25, 2019, PSD was not triggered for the P2I Amendment. FHR's Ex. A at 113; P21 Amendment Technical Review at 1, attached hereto as FHR's Exhibit H. With respect to SO_2, which is the federally regulated NSR pollutant of concern to the Movants, the application projected and the TCEQ staff documented project increases of 37.71 tons per year (tpy) of SO_2, which is less than the PSD significance level for modifications of 40 tpy. A copy of the Table 2F documenting the P2I Amendment Project Emissions Increase for SO_2 from page 113 of FHRCC's November 2018 submittal is reproduced below.

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [1]:	SO2				Permit:	6606				
Baseline Period:			2014	to	2015					
					B	A				
	Affected or Modified Facilities [2] FIN	EPN	Permit NO.	Actual Emissions [3] (tons/yr)	Baseline Emissions [4] (tons/yr)	Proposed Emissions [5] (tons/yr)	Projected Actual Emissions (tons/yr)	Difference (A-B) [6] (ton/yr)	Correction [7] (ton/yr)	Project Increase [8] (ton/yr)
1	MVCU	MVCU	6606	0.02	0.02	0.00		-0.02		0.00
2	DOCK	MVCU1/ MVCU2/ MVCU3	6606	0.00	0.00	35.40		35.40		35.40
3	COMBMSS (1 Tank)	COMBMSS (1 Tank)	PBR Registration No. 107625	0.00	0.00	2.31		2.31		2.31
4										
5										
6										
7										
8										
9										
10										
11										
						PAGE SUBTOTAL: [9]				37.71
								Total		37.71

As noted in Table 2F, FHR represented an increase of 35.40 tpy SO_2 from the new VCUs that were proposed to control vapors from marine loading operations and 2.31 tpy SO_2 from planned MSS activities for the new storage tanks, for a total of 37.71 tpy. The TCEQ staff's Technical Review confirmed the project emissions increase due to the 2018 P2I Project was below 40 tpy SO_2. FHR's Ex. H at 1.

With respect to planned MSS emissions for the new tanks, the P2I Amendment and the Technical Review both noted that MSS emissions for the Ingleside terminal are authorized under the TCEQ's PBR for planned MSS, 30 TAC § 106.263. Applicant's Ex. A at 108; Technical Summary (October 10, 2022), attached hereto as Applicant's Exhibit H at 1. Rather than authorize the planned MSS emissions for the new tanks as part of Air Permit No. 6606, FHRCC projected that the installation of all of the new tanks would result in a new maintenance event on one tank per year, quantified the emissions for this new maintenance event as part of the project emissions increase, and subsequently authorized those emissions through an update to its PBR registration.[8] The intent to do so was clearly stated in Table 2F under the Permit column, which states "PBR Registration No. 107625" and in the Technical Summary, which states "MSS is authorized separately under PBR 30 TAC 106.263 (PBR Registration No. 107625). FHR will revise PBR 107625 to include MSS emissions from the six new tanks to be constructed." Technical Summary (January 25, 2019), at 1.

FHRCC calculated this SO_2 increase at 2.31 tpy in the P2I Amendment, and the PBR Registration revision for COMBMSS reflects an emission increase due to an additional tank

[8] FHRCC represented in the P2I Amendment that the project will result in maintenance emissions associated with the new tanks, as follows: "These maintenance emissions occur from tank landings and tank cleaning activities associated with tank component repairs and other operating needs as well as tanks cleanings for required inspections and other maintenance purposes (EPN TANKSMSS). An internal combustion engine or thermal oxidizer will be used to control some maintenance activities associated with the storage tanks, such as tank landings and tank cleaning (EPNTANKCOMBMSS). These maintenance emissions will be authorized under PBR Registration No. 107625. *Only one of the six new tanks will undergo maintenance in one year."* Applicant's Ex. A at 109.

maintenance event on one tank for the six new tanks each year.[9] that amount was then included in the emissions increase authorized as part of a revision to PBR Registration No. 107625 submitted by FHRCC to TCEQ on November 8, 2018.

TCEQ approved that update to PBR Registration No. 107625 on January 25, 2019. Following TCEQ's approval of the amendment to Air Quality Permit No. 6606 and the PBR Registration, four of the six new tanks, the three new VCUs and piping were promptly constructed and put into service.

B. FHR CONDUCTED A CONSERVATIVE FEDERAL NSR APPLICABILITY ANALYSIS FOR THE CHANGES ASSOCIATED WITH THE 2021 SUEZMAX PROJECT DOCUMENTING THAT SO2 EMISSIONS INCREASES ARE BELOW THE PSD SIGNIFICANCE LEVEL.

On April 7, 2021, FHR filed a second minor NSR application to amend Air Quality Permit No. 6606, to authorize additional changes to the Ingleside marine terminal. As described above, the application sought to capitalize on an entirely different opportunity for the terminal following the 2018 P2I Project, namely changes that would allow FHR to fully load third-party SuezMax crude oil vessels following additional deepening of the ship channel by the Port of Corus Christi. To accommodate the 2021 SuezMax Project, FHR filed an application to change a special condition in Air Quality Permit No. 6606 to increase the allowed terminal loading capacity from 138,700,000 barrels per rolling twelve-month period to 187,200,000 barrels per rolling twelve-month period.

Like with the 2018 P2I Amendment, the SuezMax Amendment included a federal applicability analysis to determine whether that project was subject to PSD review for any

[9] The PBR Registration also authorized other emissions changes not attributable to the 2018 P2I Project such as updates to assumptions and factors used to estimate emissions from MSS activities at the existing terminal. When those updates are considered, the SO_2 emissions increase due to an additional tank maintenance event on one of the six new tanks each year as represented in the P2I Amendment was 1.73 tpy, which is less than the 2.31 tpy that had been conservatively estimated.

federally regulated NSR pollutant. As documented in the application, and the TCEQ staff's Permit Amendment Source Analysis & Technical Review ("Technical Review"), dated October 10, 2022, PSD was not triggered for this application. With respect to SO_2, the application projected and the TCEQ staff documented a project emissions increase of 38.10 tons per year (tpy) of SO_2, which is less than the PSD significance level for modifications of 40 tpy. A copy of the Table 2F from page 98 of the SuezMax Amendment documenting the project emissions increase for SO_2 is reproduced below:

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [1]:	SO2			**Permit:**	6606
Baseline Period:	2018	to	2019		

	Affected or Modified Facilities [2]		Permit	Actual	Baseline	Proposed	Projected	Difference	Correction [7]	Project
					B	A				
	FIN	EPN	NO.	Emissions [3] (tons/yr)	Emissions [4] (tons/yr)	Emissions [5] (tons/yr)	Actual Emissions (tons/yr)	(A-B) [6] (ton/yr)	(ton/yr)	Increase [8] (ton/yr)
1	DOCK/ MVCU1/ MVCU2/ MVCU3	MVCU1/ MVCU2/ MVCU3	6606	0.01	0.01	38.10		38.10		38.10
2										
3										
4										
5										
6										
7										
8										
9										
PAGE SUBTOTAL: [9]										38.10
								Total		38.10

As noted in Table 2F, FHR represented an increase of 38.10 tpy SO_2 from the VCUs that control vapors from marine loading operations. This level of increase was remarkably conservative in fact. FHR did not refine its determination of baseline actual emissions for these new facilities as allowed by TCEQ rules.[10]

[10] See Section V.C, supra.

Movants argue that the federal NSR applicability analysis for the 2021 SuezMax Project was deficient because it did not reflect MSS emissions for the then existing terminal storage tanks that were constructed as part of the 2018 P2I Project. There is no deficiency. Additional maintenance emissions would only be required to be authorized as part of the 2021 SuezMax Project emissions increase if there were in fact additional maintenance emissions attributable to that project. Because no new tanks were authorized as part of the 2021 SuezMax Project, it did not result in the need to conduct any additional maintenance activities on the tanks at the terminal. There was no oversight in excluding COMBMSS from the Table 2F in 2021. It was not included because there were no new maintenance emissions to be conducted.[11]

Although the Movants insist that the increased throughput would necessarily result in increased MSS emissions of SO_2, that is simply not true. COMBMSS emissions of SO_2 are the result of the combustion of vapors from MSS activities on the tanks. Crude oil storage tanks are taken out of service for a variety of reasons, and taking a tank out of service requires landing the tank's floating roof (external floating roof ("EFR") or internal floating roof ("IFR")). At the Ingleside terminal, when a tank EFR or IFR is landed, FHR is required to control emissions using a combustion device, typically an internal combustion engine or a thermal oxidizer. When these control devices are used, SO_2 emissions are generated as a result of the combustion of tank vapors containing sulfur. The increase in annual marine vessel loading rate does not change the need to take tanks out of service or the frequency of landing IFRs or EFRs. In other words, the actions that would result in MSS emissions of SO_2 from the tanks are not a function of increased throughput but rather the frequency of when planned tank maintenance is performed. Whether the

[11] In stark contrast, MSS emissions were included in the PSD analysis for the 2018 P2I Project because new tanks were being constructed as part of that project and one of those new tanks could potentially undergo maintenance in any given year.

throughput remained at 380,000 bbl/day or increased to 513,000 bbl/day, FHR would complete the same number of tank service events.

The MSS emissions need not be included in the PSD analysis for the 2021 SuezMax Project because no new MSS emissions will result from that project. The increased loading will not result in any new MSS emissions nor affect the existing MSS performed at the site. FHR will execute the activities authorized by the SuezMax Amendment without increasing MSS SO_2 emissions. Conversely, if the 2021 SuezMax Project were not implemented, there would be no decrease in MSS emissions of SO_2 from COMBMSS. This is because the number and frequency of the maintenance events on the tanks is not dependent on the throughput of crude oil through the tanks.

The TCEQ staff's Technical Review confirmed the project emissions increase due to the SuezMax Project as 38.1 tpy SO_2. SuezMax Amendment Technical Review (October 10, 2022), attached hereto as FHR's Ex. I at 1.

C. A MORE REFINED AND LESS CONSERVATIVE FEDERAL NSR APPLICABILITY ANALYSIS FOR THE CHANGES ASSOCIATED WITH THE 2021 SUEZMAX PROJECT LIKEWISE DOCUMENTS THAT SO2 EMISSIONS INCREASES ARE BELOW THE PSD SIGNIFICANCE LEVEL.

The project emissions increase for SO_2 represented as part of the 2021 SuezMax Project was extremely conservative. Since the project emission increase was below the significance level, FHI's approach conservatively accounted for the full potential of the three new VCUs to emit SO_2. There was simply no need to refine the project emission increase calculation further as allowed by the TCEQ's rules.

Movants' suggestion that the SO_2 emissions from the 2021 SuezMax Project exceeded the significance level, though untrue for the reasons stated above, provide FHR with a reason to further refine the project emissions increase. The definitions of project emissions increase and baseline actual emissions do not require the conservative approach taken in the SuezMax Amendment.

Those definitions allow FHR to determine the baseline actual emissions of SO_2 from the VCUs in a more refined manner, that reflects the level of SO_2 emissions authorized in the P2I Amendment.

The VCUs were constructed following the issuance of the P2I Amendment and commenced operation on November 5, 2019. As a result, the VCUs were considered "new facilities" since they did not have 24 months of operation that is necessary to classify them as "existing facilities." The definition of baseline actual emissions, at 30 TAC § 116.12(3), states that baseline actual emissions for an existing facility is "the average rate, in tons per year, at which the unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the five-year period immediately preceding when the owner or operator begins actual construction of the project." If a facility has not been operated for 24 months, it is considered a "new facility" under this definition. The definition provides that "[f]or a new facility, the baseline actual emissions for purposes of determining the emissions increase that will result from the initial construction and operation of such unit shall equal zero; and for all other purposes during the first two years following initial operation, shall equal the unit's potential to emit." In other words, as explained by TCEQ in its Major NSR Review guidance: "[f]or a new facility: The baseline actual emission rate, for purposes of determining the emissions increase that will result from the initial construction and operation of the facility, shall equal zero. If an existing facility has less than two years of operating history (from the date of initial operation of the facility), the baseline actual emission rate may be taken as the allowable emission rate, or the PTE, of the facility."[12]

This means that the baseline for the VCUs was properly set to zero for the initial permitting of them as part of the 2018 P2I Project, but could have properly been set at the level permitted in

[12] TCEQ guidance also supports this concept. *See* FHRt's Ex. G at 8-10.

the initial permitting action, for any subsequent projects to the VCUs that are planned within 24 months of start up of the VCUs, like the 2021 SuezMax Project. Since the "project emissions increase," as defined at 30 TAC § 116.12(32), for the SO_2 increase from the VCUs as part of the 2021 SuezMax Project is determined by the "sum of the differences between the potential to emit from the facility following completion of the project and the baseline actual emissions," the less conservative increase that could have been determined by FHR for the SuezMax Amendment is 2.7 tpy, determined as follows:

Baseline actual emissions (potential to emit in 2018 P2I Project) equals 35.4 tpy
Potential to emit in 2021 SuezMax Project equals 38.10 tpy
Sum of the difference equals 2.7 tpy

This more refined determination of the project emissions increase for SO_2 from the 2021 SuezMax Project provides additional confirmation that the significance threshold of 40 tpy was not exceeded and the project was not subject to PSD review. A revised Table 2F that shows this refinement is provided below:

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [(1)]:	SO2						Permit:	6606		
Baseline Period:			2018	to	2019					
					B	A				
	Affected or Modified Facilities [(2)] FIN	EPN	Permit NO.	Actual Emissions [(3)] (tons/yr)	Baseline Emissions [(4)] (tons/yr)	Proposed Emissions [(5)] (tons/yr)	Projected Actual Emissions (tons/yr)	Difference (A-B) [(6)] (ton/yr)	Correction [(7)] (ton/yr)	Project Increase [(8)] (ton/yr)
1	DOCK/ MVCU1/ MVCU2/ MVCU3 *	MVCU1/ MVCU2/ MVCU3	6606	35.40	35.40	38.10		2.70		2.70
2										
3										
4										
5										
6										
7										
8										
9										
							PAGE SUBTOTAL: [(9)]			2.70
								Total		2.70

* MVCU1, MVCU2, and MVCU3 began operation in December 2019. Because they have not been in operation for at least 24 months, the existing potential to emit is used for actual/baseline emissions.

D. FHR PROPERLY UPDATED ITS FEDERAL NSR APPLICABILITY ANALYSIS FOR THE "AS BUILT" CHANGES ASSOCIATED WITH THE 2018 P2I PROJECT IN DOCUMENTING THAT SO2 EMISSIONS INCREASES WERE BELOW THE PSD SIGNIFICANCE LEVEL.

Given the time of the filing of the application for the 2021 SuezMax Project, following completion of construction of the 2018 P2I Project, FHR had also identified several minor "as-built" corrections to the activities associated with the 2018 P2I Project. These "as-built" changes, which were included in the application for the 2021 SuezMax Project, consisted of corrections to representations in the application for the 2018 P2I Project and other changes determined to be required during final design and construction of the 2018 P2I Project. Where the as-built changes resulted in changes to the project emissions increases for the 2018 P2I Project, updated Table 2Fs were provided at pages 92-94 under the heading "Revised PSD Applicability Analysis for Past Expansion Project." This was the case for VOC, where the project emissions increase was reduced from 39.14 tpy to 38.96 tpy and for H_2S, where the project emissions increase was reduced from

0.29 to 0.27 tpy. The evaluation resulted in Table 2Fs in the federal NSR applicability analysis for the P2I Amendment, which did not trigger federal NSR review.

Movants complain that no updated Table 2F was provided for SO_2. This is true as none was needed. No updated table for SO_2 was provided because there was no change in the SO_2 project emissions increase for the 2018 P2I Project. An updated Table 2F was only provided where the "as-built changes" resulted in a change in the project emissions increase for a federally regulated NSR pollutant for the 2018 P2I Project. Since the as-built change resulted in no greater or lesser emissions of SO_2, there was no need to provide an updated Table 2F for that pollutant. As the Executive Director found with respect to the updated analysis, "Flint Hills only updated project emission increases for H_2S and VOC. The project emission increases for the other pollutants did not change." FHR's Ex. I at 1. Therefore, the federal NSR applicability analysis for the SO_2 project emissions increase for the 2018 P2I Project was confirmed at 37.71 tpy, again below the 40 tpy significance level.

E. THE 2018 P2I PROJECT AND THE 2021 SUEZMAX PROJECT ARE SEPARATED BY THREE YEARS, PRESUMED NOT TO BE "SUBSTANTIALLY RELATED," AND IN FACT ARE NOT "SUBSTANTIALLY RELATED."

There is no merit to Movants' argument that the 2021 SuezMax Project amendment was an impermissible relaxation of the permit amendment approved for the 2018 P2I Project. *See* 40 C.F.R. § 52.21(r)(4); 30 T.A.C. § 116.160(c)(2)(C). The impermissible relaxation regulation was intended to:

> discourage sources that would manipulate the NSR system by improperly obtaining minor status for a new source or modification. This could occur, for example, where the owner or operator's purpose is, from the start, to construct a new source or modification that would not be economically viable for any appreciable period of time if it were restricted to emitting at minor levels.

Approval and Promulgation of Implementation Plans, 54 Fed. Reg. at 27,280, 27,281. EPA has identified several "objective indicia" that suggest that a source intended to evade preconstruction review by obtaining a sham permit. *Id*. These indicia include seeking a minor and major source permit simultaneously, constructing a new source that would not be economically viable under operation restrictions, and portraying its operations to lenders as though it were or would soon be a major source. *Id.*[13]

In fact, the EPA specifically leaves open the possibility of a minor source seeking relaxation of operating restrictions, noting that it "in no way seeks to discourage or intends to penalize [sources that] accept emissions limitations in pursuit of legitimate business purposes, and who in good faith later seek a relaxation of those limitations." *Id.* Impermissible relaxation can only be claimed where these objective indicia of intent to circumvent PSD are met. Here there was no such intent, as two independent and separate projects were being sought. This is evidenced both by the considerable time between the two projects and the facts showing that they are not "substantially related." The evidence overwhelmingly demonstrates that FHR has never sought a "sham permit."

With respect to timing, where two projects are approved more than three years apart, there is a presumption that the two projects should not be aggregated for federal NSR applicability determinations. 83 Fed. Reg. 57324, 57324 (November 15, 2018); FHR's Ex. F at 26-27. EPA's 2009 Aggregation Action explained that "the farther apart projects are timed, the less likely they are to be substantially related, since the activities would likely be part of distinct planning and capital-funding cycles." 74 Fed. Reg. 2376, 2380 (Jan. 15, 2009). It stated "the passage of time provides a fairly objective indicator of nonrelatedness between physical or operational changes. Specifically, the greater the time period between activities, the less likely that a deliberate decision

[13] Even if these objective indicia exist, at no point do the relevant regulations suggest that they would necessarily disqualify a source from obtaining a minor source permit in the first instance—the regulation is retrospective. *See* 54 Fed. Reg. at 27,280, 27,281.

was made by the source to split an otherwise ‘significant’ activity into two or more smaller, nonmajor activities.” *Id.* Accordingly, EPA affirmed that timing could be a basis to not aggregate separate projects, and it established a policy of applying a rebuttable presumption against aggregating projects that occur three or more years apart. EPA affirmed the validity of this presumption in the 2018 Aggregation Action. 83 Fed. Reg. 57324, 57237-8 (November 15, 2018).

EPA justified its selection of three years as the presumptive timeframe in part by reasoning that it “is long enough to ensure a reasonable likelihood that the presumption of independence will be valid, but is short enough to maintain a useful separation between relevant construction cycles, consistent with industry practice.” *Id.* On the other hand, where there is ‘‘evidence that a company intends to undertake a phased capital improvement project’’ where the activities ‘‘have a substantial economic relationship,’’ this would likely overcome the presumption that those activities should not be aggregated. *Id.*

The 2018 P2I Project was approved by TCEQ in January 2019 and the 2021 SuezMax Project was approved in October 2022, meaning the two projects are three years and eight months apart, thereby creating the presumption that the two projects should not be aggregated. Movants have provided no basis for rebutting this presumption.

With respect to the application of the “substantially related” test, the facts set forth in the Introduction and Background demonstrate that clear independence of the two projects. They were conceived at different times to capitalize on two entirely different business opportunities: the 2018 P2I Project to capitalize on the increased availability of crude oil from the Permian Basin in the Corpus Christi region in 2018, and the 2021 SuezMax Project to capitalize on the opportunity to fully load SuezMax vessels based on channel deepening work proposed by the Port in 2019, after the previous project had been designed. In fact, the confidential internal funding packages received final approval on August 20, 2018, before the Port of Corpus Christi announced its plans in 2019 to deepen the channel to allow for the SuezMax Project, confirming that they were the subject of different planning and capital funding cycles. The P2I Project was in no way reliant on the SuezMax Project for economic or technical viability.

The federal Clean Air Act and TCEQ's air permitting rules allow FHR to take advantage of these discrete opportunities, without the need to re-permit the terminal as a green-field site each time a new opportunity presents itself.

VI. CONCLUSION

The Executive Director correctly determined that the permit amendment complies with all applicable statutory and regulatory requirements. The Movants have not presented a sufficient factual or legal basis for its request to overturn the Executive Director's issuance. FHR respectfully requests the Commissioners (1) deny the Motion to Overturn; and (2) order any other relief the Commissioners determine is reasonable and necessary.

Respectfully submitted,

Derek R. McDonald
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Shannon Glen
Texas Bar No. 24109927
Baker Botts L.L.P.
401 S. First St., Suite 1300
Austin, Texas 78704
(512) 322-2500
(512) 322-2501 (Fax)

ATTORNEYS FOR APPLICANT FLINT HILLS RESOUCES INGLESIDE, LLC

STATE OF TEXAS §

~~TRAVIS~~ COUNTY §

JT Tarrant BDP

VERIFICATION

My name is Brent D. Peterson. I am sound of mind and capable of making this declaration. I have read Flint Hills Resources Ingleside, LLC'S Response to the Motion to Overturn. The facts stated therein are true and correct based upon my personal knowledge and information obtained by individuals who are known to me and have responsibility for obtaining the facts covered by this verification.

Brent D. Peterson

Brent D. Peterson

Sworn to and subscribed before me by Brent Peterson on November 21, 2022.

Notary Public in and for
the State of Texas

JAMES GREGORY THROWER
NOTARY PUBLIC - STATE OF TEXAS
ID # 13238714-8
COMM. EXP. 02-25-2024

CERTIFICATE OF SERVICE

I hereby certify that I have e-filed and served a true and correct copy of the foregoing Flint Hills Resources Ingleside LLC Response to the Motion to Overturn by e-mail and regular U.S. Mail on this 21st day of November 2022.

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FOR INGLESIDE ON THE BAY COASTAL WATCH ASSOCIATION:
via electronic mail:
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____
Derek R. McDonald

TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	**BEFORE THE** **TEXAS COMMISSION ON** **ENVIRONMENTAL QUALITY**

FLINT HILLS RESOURCES INGLESIDE LLC RESPONSE TO MOTION TO OVERTURN

Exhibit A

FHR's Exhibt A

Texas Commission on Environmental Quality
Permit No. 6606 Amendment Application

Flint Hills Resources Corpus Christi, LLC
Ingleside Terminal

Ingleside, San Patricio County
Air Quality Account ID No. SD-0047-K
Regulated Entity No. RN100222744
Customer No. CN603741463

April 2018
Revised November 2018

Prepared and Approved by:

STATE OF TEXAS
KRIS L. KIRCHNER
89354
REGISTERED
PROFESSIONAL ENGINEER

11/7/18

Kris L. Kirchner, P.E.
Principal Engineer

Waid Corporation dba Waid Environmental
Certificate of Registration No. F-58

Document based on information provided by FHR
Waid Project No. FHI12750

www.waid.com

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512.255.9999 • 512.255.8780 FAX

Houston Office
1325 Space Park Dr., Suite D, Houston, Texas 77058
281.333.9990 • 512.255.8780 FAX

FHR's Exhibt A

Form APD-EXP Expedited Permitting Request

I. Contact Information

Company or Other Legal Customer Name: Flint Hills Resources Corpus Christi, LLC

Customer Reference Number (CN): CN603741463

Regulated Entity Number (RN): RN100222744

Company Official or Technical Contact Name: Mita Upadhyay

Phone Number: 361-242-7276

Email: mita.upadhyay@fhr.com

II. Project Information

Facility Type: Terminal

Permit Number: 6606

Project Number: to be determined

III. Economic Justification

The purpose of the application associated with this request to expedite will benefit the economy of this state or an area of this state.	☒ YES ☐ NO

IV. Delinquent Fees and Penalties

Applications will not be expedited if any delinquent fees and/or penalties are owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ. For more information regarding Delinquent Fees and Penalties, go to the TCEQ Web site at: www.tceq.texas.gov/agency/delin/index.html.

V. 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. As the applicant, I commit to fulfilling all expectations of the expedited permitting program and application requirements promptly. Failure to meet any expectation or requirement may cause my application to be removed from the expedited permitting program and possibly voided at the discretion of the TCEQ Executive Director. 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: Mr. Brook A. Vickery, P.E.

Signature: Brook A. Vickery

Date: 4/19/18

Reset Form

FHR's Exhibt A

Texas Commission on Environmental Quality
Form APD-APS Air Permitting Surcharge Payment

I. Contact Information	
Company or Other Legal Customer Name: Flint Hills Resources Corpus Christi, LLC	
Customer Reference Number (CN): CN603741463	
Regulated Entity Number (RN): RN100222744	
Company Official or Technical Contact Information: (☐ Mr. ☐ Mrs. ☒ Ms. ☐ Other:____________________)	
Name: Mita Upadhyay	
Title: Senior Environmental Engineer	
Mailing Address: P.O. Box 2608	
City: Corpus Christi	
State: Texas	
ZIP Code: 78403	
Telephone Number: 361-242-7276	
E-mail Address: mita.upadhyay@fhr.com	
II. Project Information	
Facility Name: Ingleside Terminal	
Permit Number: 6606	
Project Number: to be determined	
III. Surcharge Payment	
Project Type: NSR Case-by-Case Permit	
Fee Amount: $10,000	
Check, Money Order, Transaction Number, and/or ePay Voucher Number: *(below)*	
Paid Online:	☐ YES ☒ NO
Company Name on Check: Flint Hills Resources Corpus Christi, LLC	

FHR's Exhibt A

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

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

I. Applicant Information		
A. Company or Other Legal Name: Flint Hills Resources Corpus Christi, LLC		
Texas Secretary of State Charter/Registration Number (if applicable):		
B. Company Official Contact Information: (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:) ______		
Name: Mr. Brook A. Vickery, P.E.		
Title: Vice President and Manufacturing Manager		
Mailing Address: P.O. Box 2608		
City: Corpus Christi	State: TX	ZIP Code: 78403
Telephone No.: 361-241-4811	Fax No.: 361-2424840	
E-mail Address: sharon.walker@fhr.com		
All permit correspondence will be sent via regular mail unless electronic copies are specifically requested. The company official must initial here if electronic correspondence is requested. ______		
C. Technical Contact Name Information: (☐ Mr. ☐ Mrs. ☒ Ms. ☐ Other:) ______		
Name: Mita Upadhyay		
Title: Senior Environmental Engineer		
Company Name: Flint Hills Resources Corpus Christi, LLC		
Mailing Address: P.O. Box 2608		
City: Corpus Christi	State: TX	ZIP Code: 78403
Telephone No.: 361-242-7276	Fax No.: 361-242-8743	
E-mail Address: mita.upadhyay@fhr.com		
D. Site Name: Ingleside Terminal		
E. Area Name/Type of Facility: Ingleside 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 Petroleum Storage and Handling		
Principal Standard Industrial Classification Code (SIC): 4226		
Principal North American Industry Classification System (NAICS): 493190		
G. Projected Start of Construction Date: March 1, 2019		
Projected Start of Operation Date: September 1, 2019		

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: 103 FM 1069		
City/Town: Ingleside	County: San Patricio/Nueces	ZIP Code: 78362
Latitude (nearest second): 27°49'29"	Longitude (nearest second): -97°11'44"	
I. Account Identification Number (leave blank if new site or facility): SD-0047-K		
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): CN603741463		
L. Regulated Entity Number (RN): RN100222744		
II. General Information		
A. Is confidential information submitted with this application? If Yes, mark each confidential page confidential in large red letters at the bottom of each page.	☒ YES ☐ NO	
B. Is this application in response to an investigation, notice of violation, or enforcement action? If Yes, attach a copy of any correspondence from the agency and provide the RN in section I.L. above.	☐ YES ☒ NO	
C. Number of New Jobs: 0		
D. Provide the name of the State Senator and State Representative and district numbers for this facility site:		
State Senator: Judith Zaffirini	District No.: 21	
State Representative: J.M. Lozano	District No.: 43	
III. Type of Permit Action Requested		
A. Mark the appropriate box indicating what type of action is requested. ☐ Initial ☒ Amendment ☐ Revision (30 TAC § 116.116(e) ☐ Change of Location ☐ Relocation		
B. Permit Number (if existing):		
C. Permit Type: Mark the appropriate box indicating what type of permit is requested. *(check all that apply, skip for change of location)* ☒ Construction ☐ Flexible ☐ Multiple Plant ☐ Nonattainment ☐ Plant-Wide Applicability Limit ☐ Prevention of Significant Deterioration (PSD) ☐ Hazardous Air Pollutant Major Source ☐ PSD for greenhouse gases (GHGs) ☐ Other:________		

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendment
Page 3

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. Consolidation into this Permit: List any standard permits, exemptions or permits by rule to be consolidated into this permit including those for planned maintenance, startup, and shutdown.	
List: 147189, 124323, 151016	
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.	
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).	
Associated Permit No (s.): O3454	
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	

FHR's Exhibt A

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendment
Page 4

III. Type of Permit Action Requested *(continued)*	
H. Federal Operating Permit Requirements (30 TAC Chapter 122 Applicability) *(continued)*	
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).	
List:	
F. Is this a state permit amendment application? If Yes, complete all parts of IV.F.	
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): -7.42	
Sulfur Dioxide (SO_2): 23.70	
Carbon Monoxide (CO): -25.39	
Nitrogen Oxides (NO_x): -31.27	
Particulate Matter (PM): 5.62	
PM 10 microns or less (PM_{10}): 5.62	
PM 2.5 microns or less ($PM_{2.5}$): 5.62	
Lead (Pb):	
Hazardous Air Pollutants (HAPs):	
Other speciated air contaminants not listed above: H2S: 0.18	

Texas Commission on Environmental Quality
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Air Preconstruction Permit and Amendment
Page 5

V. Public Notice Information *(complete if applicable)*			
A. Responsible Person: (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:)			
Name: Andy Saenz			
Title: Regional Manager, Public Affairs			
Company Name: Flint Hills Resources Corpus Christi, LLC			
Mailing Address: P.O. Box 2608			
City: Corpus Christi	State: Texas		ZIP Code: 78403
Telephone No.: 361-242-8772		Fax No.: 404-749-9273	
E-mail Address: andy.saenz@kochps.com			
B. Technical Contact: (☐ Mr. ☐ Mrs. ☒ Ms. ☐ Other:) ___			
Name: Mita Upadhyay			
Title: Senior Environmental Engineer			
Mailing Address: P.O. Box 2608			
City: Corpus Christi	State: Texas		ZIP Code: 78403
Telephone No.: 361-242-7276		Fax No.: 361-242-8743	
E-mail Address: mita.upadhyay@fhr.com			
C. Name of the Public Place: Ingleside Public Library			
Physical Address *(No P.O. Boxes)*: 2775 Waco Street			
City: Ingleside	County: San Patricio		ZIP Code: 78362
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:			
Mailing Address:			
City:	State:		ZIP Code:

Texas Commission on Environmental Quality
Form PI-1 General Application for
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Page 6

V. Public Notice Information *(complete if applicable)*		
D. Concrete Batch Plants, PSD, and Nonattainment Permits *(continued)*		
Is the facility located in a municipality or an extraterritorial jurisdiction of a municipality? ***(For Concrete Batch Plants)***		☐ YES ☐ NO
Presiding Officers Name(s):		
Title:		
Mailing Address:		
City:	State:	ZIP Code:
Provide the name, mailing address of the chief executive for the location where the facility is or will be located.		
Chief Executive:		
Mailing Address:		
City:	State:	ZIP Code:
Provide the name, mailing address of the Indian Governing Body for the location where the facility is or will be located.		
Indian Governing Body:		
Mailing Address:		
City:	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

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendment
Page 7

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)**	
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.		

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendment
Page 8

VII.	**Technical Information *(continued)***	
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:		
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
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. Kris L. Kirchner, 89354		

Texas Commission on Environmental Quality
Form PI-1 General Application for
Air Preconstruction Permit and Amendment
Page 9

XI. ✓ Permit Fee Information	
Check, Money Order, Transaction Number, ePay Voucher Number: Check # 101465	
Fee Amount: $ 75,000	
Paid online?	☐ YES ☒ NO
Company name on check: Flint Hills Resources Corpus Christi, LLC	
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/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: Mr. Brook A. Vickery, P.E.	
Signature: [signature] *Original Signature Required*	
Date: 4/19/18	

Save Form **Reset Form**

FLINT HILLS resources

Flint Hills Resources Corpus Christi, LLC
PO Box 2938
Wichita, KS 67201-2938

NO. 101465 FHR's Exhibit A

DATE 18-Apr-18 CUST.ACCT.NO VENDOR NAME STATE OF TEXAS VENDOR NO. 42599

INVOICE NO	INVOICE DATE	DESCRIPTION	DISCOUNT AMOUNT	NET AMOUNT
17APR18A	04/17/18	CV1560728	$0.00	$75,000.00

CN 603141463
RN 100222744

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT Thank You $0.00 $75,000.00

THIS IS WATERMARKED PAPER - DO NOT ACCEPT WITHOUT NOTING WATERMARK - HOLD TO LIGHT TO VERIFY WATERMARK.

FLINT HILLS resources

Flint Hills Resources Corpus Christi, LLC
PO Box 2938
Wichita, KS 67201-2938

JPMorgan Chase Bank, N.A. 50-937/213
Syracuse, NY

NO. 101465

VOID 120 DAYS AFTER DATE OF CHECK

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
04/18/2018	101465	$ **75,000.00 **

Seventy Five Thousand Dollars and Zero Cents*****

PAY TO THE ORDER OF
STATE OF TEXAS
COMMISSION ON ENVIRONMENTAL QU
PO BOX 13089
AUSTIN TX 78711-3089

AUTHORIZED SIGNATURE

⑈101465⑈ ⑆021309379⑆ 709374524⑈

Flint Hills Resources Corpus Christi, LLC
PO Box 2938
Wichita, KS 67201-2938

FHR's Exhibit A

NO. 101466

DATE **18-Apr-18** CUST.ACCT NO VENDOR NAME **STATE OF TEXAS** VENDOR NO. **42599**

INVOICE NO	INVOICE DATE	DESCRIPTION	DISCOUNT AMOUNT	NET AMOUNT
17APR18	04/17/18	CV1560727	$0.00	$10,000.00

Expediting Fee
CN603741463
RN 100222744

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT **Thank You** **$0.00** **$10,000.00**

THIS IS WATERMARKED PAPER - DO NOT ACCEPT WITHOUT NOTING WATERMARK - HOLD TO LIGHT TO VERIFY WATERMARK.

Flint Hills Resources Corpus Christi, LLC
PO Box 2938
Wichita, KS 67201-2938

JPMorgan Chase Bank, N.A. 50-937/213
Syracuse, NY

NO. 101466

VOID 120 DAYS AFTER DATE OF CHECK

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
04/18/2018	101466	$ **10,000.00 **

Ten Thousand Dollars and Zero Cents*****

PAY TO THE ORDER OF
STATE OF TEXAS
COMMISSION ON ENVIRONMENTAL QU
PO BOX 13089
AUSTIN TX 78711-3089

AUTHORIZED SIGNATURE

⑈101466⑈ ⑆021309379⑆ 709374524⑈

TABLE OF CONTENTS

STANDARD PERMITS, EXEMPTIONS OR PERMITS BY RULE

As part of this amendment application, FHR is incorporating PBR Registration No. 147189 issued July 6, 2017, into Permit No. 6606. This PBR authorized an increase in VOC and H_2S emissions resulting from the addition of fittings on Tank 28075 (EPN TK-28075). The TCEQ issuance letter for PBR Registration No. 147189 is provided in this section.

FHR is also incorporating PBR Registration Nos. 124323 (issued September 1, 2015) and 151016 (issued April 10, 2018) into the permit. Both of these PBRs authorized an increase in VOC emissions resulting from the installation of additional fugitive piping components. In the PBR registrations, the emission rate calculations used refinery average emission factors rather than petroleum marketing terminal emission factors. Rather than add the emission rates authorized by the PBR registrations to the total VOC emission rate for EPN FUG-1, FHR is adding the fugitive component counts authorized in each of the PBR registrations to the total fugitive component counts for the terminal and calculating a total emission rate based on the petroleum marketing terminal emission factors. As a result, the speciation for these new fugitive components will be changing to the general speciation used for the terminal fugitive piping components. FHR is not including the issuance letters of these PBR registrations since the emission rates authorized by the registrations are being corrected.

PBR Registration No. 136465 was incorporated into Permit No. 6606 with the amendment to Permit No. 6606 issued on May 31, 2017 (TCEQ Project No. 232031). However, the PBR was not voided. FHR is requesting to void PBR Registration No. 136465 since it has already been incorporated into Permit No. 6606.

FHR's Exhibt A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 6, 2017

MR BROOK VICKERY PE
VICE PRESIDENT AND MANUFACTURING MANAGER
FLINT HILLS RESOURCES CORPUS CHRISTI LLC
PO BOX 2608
CORPUS CHRISTI TX 78403-2608

Permit by Rule Registration Number:	147189
Install New Drains on Tank 41TK28075	
Ingleside Terminal	
Ingleside, San Patricio County	
Regulated Entity Number:	RN100222744
Customer Reference Number:	CN603741463
Affected Permit:	6606

This is in response to your certification, Form PI-7 CERT, regarding the installation of new drains on Tank 28075 at the Ingleside Terminal located a 103 Fm Rd 1069, Ingleside, San Patricio County.

Flint Hills Resources Corpus Christi, LLC has certified the emissions under Title 30 Texas Administrative Code (TAC) §§ 106.261 and 106.262. For rule information see: www.tceq.texas.gov/permitting/air/nav/numerical_index.html

As referenced in 30 TAC § 116.116(d)(2), all changes authorized under Chapter 106 to this permitted facility shall be incorporated into Permit No. 6606 when it is amended or renewed. The company is also reminded that these facilities may be subject to and must comply with other state and federal air quality requirements.

If you need further information or have questions, please contact Mr. Monico Banda at (512) 239-1544 or write to the Texas Commission on Environmental Quality (TCEQ), Office of Air, Air Permits Division, MC-163, P.O. Box 13087, Austin, Texas 78711-3087.

This action is taken under the authority delegated by the Executive Director of the TCEQ.

Sincerely,

Samuel Short, Manager
Rule Registrations Section
Air Permits Division

cc: Air Section Manager, Region 14 - Corpus Christi

Project Number: 270357

P.O. Box 13087 · Austin, Texas 78711-3087 · 512-239-1000 · tceq.texas.gov

FHR's Exhibt A

Emission Sources - Certified Emission Rates

Registration Number 147189

This table lists the certified emission rates and all sources of air contaminants on the applicant’s property covered by this registration. The emission rates shown are those derived from information submitted as part of the registration for PBR.

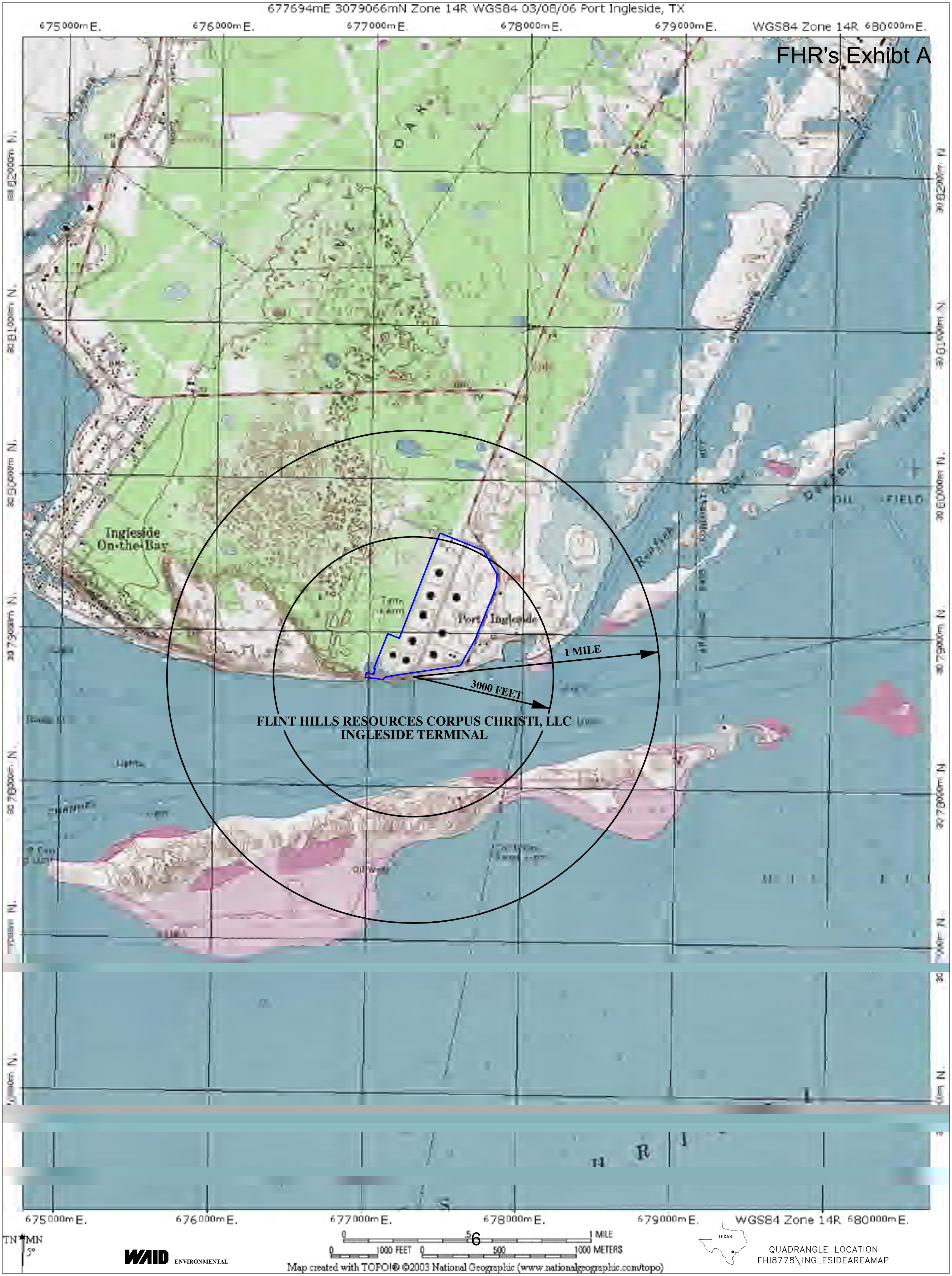
ESTIMATED EMISSIONS														
EPN / Emission Source	**VOC**		**NOx**		**CO**		**PM_{10}**		**$PM_{2.5}$**		**SO_2**		**H_2S**	
	lbs/hr	**tpy**	**lbs/hr**	**tpy**	**lbs/hr**	**tpy**	**lbs/hr**	**tpy**	**lbs/hr**	**tpy**	**lbs/hr**	**tpy**	**lbs/hr**	**tpy**
TK-28075/ Tank No. 28075	0.03	0.12											<0.01	<0.01
TOTAL EMISSIONS (TPY):		0.12												

MAXIMUM OPERATING SCHEDULE:	**Hours/Day**	24	**Days/Week**	7	**Weeks/Year**	52	**Hours/Year**	8,760

PLANNED MAINTENANCE, STARTUP, AND SHUTDOWN EMISSIONS

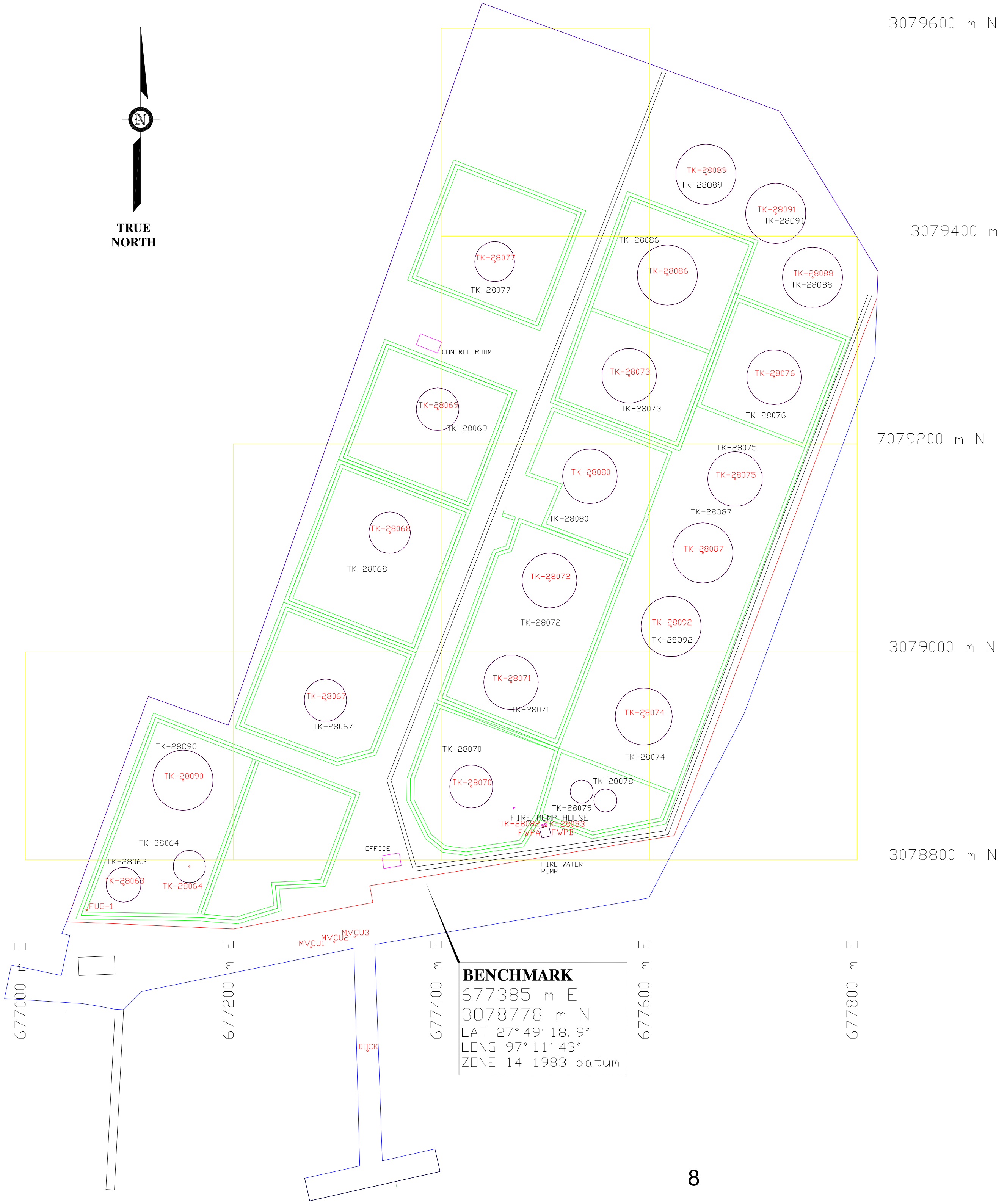
FHR is not seeking to include planned maintenance, startup or shutdown emissions associated with the operation of the Ingleside Terminal in Permit No. 6606 at this time. MSS activities at the Ingleside Terminal are authorized under PBR 30 TAC §106.263 (PBR Registration No. 107625). FHR will be revising PBR Registration No. 107625 to include MSS emissions from Tanks 28087, 28088, 28089, 28090, 28091, and 28092 which will be authorized through this amendment application. FHR has included MSS emissions from these new tanks in the PSD applicability section.

AREA MAP


677694mE 3079066mN Zone 14R WGS84 03/08/06 Port Ingleside, TX
FHR's Exhibt A
675000mE.
676000mE.
677000mE.
678000mE.
679000mE.
WGS84 Zone 14R 680000mE.
Ingleside On-the-Bay
Port Ingleside
1 MILE
3000 FEET
FLINT HILLS RESOURCES CORPUS CHRISTI, LLC
INGLESIDE TERMINAL
TN MN
5°
0 .5 1 MILE
0 1000 FEET 0 500 1000 METERS
WAID ENVIRONMENTAL
Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)
TEXAS
QUADRANGLE LOCATION
FHI8778\INGLESIDEAREAMAP

PLOT PLAN

FHR's Exhibt A



Downwash Structure Name	Height (feet)	Height (meters)	Dimensions (meters)	
FIRE PUMP HOUSE	16.0	4.88	9.10 x	9.80
TK-28063	48.0	14.63	Diameter	33.37
TK-28064	48.0	14.63	Diameter	31.00
TK-28067	48.0	14.63	Diameter	40.69
TK-28068	48.0	14.63	Diameter	39.83
TK-28069	48.0	14.63	Diameter	40.92
TK-28070	48.0	14.63	Diameter	41.46
TK-28071	56.0	17.07	Diameter	52.59
TK-28072	56.0	17.07	Diameter	52.59
TK-28073	56.0	17.07	Diameter	52.59
TK-28074	56.0	17.07	Diameter	54.74
TK-28075	55.0	16.76	Diameter	52.59
TK-28076	55.0	16.76	Diameter	52.59
TK-28077	48.0	14.63	Diameter	38.42
TK-28078	40.0	12.19	Diameter	22.19
TK-28079	40.0	12.19	Diameter	22.19
TK-28080	56.0	17.07	Diameter	52.59
TK-28086	48.0	14.63	Diameter	57.90
TK-28087	56.0	17.07	Diameter	57.91
TK-28088	56.0	17.07	Diameter	57.91
TK-28089	56.0	17.07	Diameter	57.91
TK-28090	56.0	17.07	Diameter	57.91
TK-28091	56.0	17.07	Diameter	57.91
TK-28092	56.0	17.07	Diameter	57.91

Emission Point Number	Name	Location Easting, Northing (meters)
DOCK	SHIP AND BARGE LOADING DOCK	677329, 3078616
FUG-1	TERMINAL FUGITIVES	677059, 3078752
FWPA	FIREWATER PUMP A	677498, 3078832
FWPB	FIREWATER PUMP B	677501, 3078832
MVCU1	MARINE VAPOR COMBUSTION UNIT 1	677275, 3078716
MVCU2	MARINE VAPOR COMBUSTION UNIT 2	677297, 3078721
MVCU3	MARINE VAPOR COMBUSTION UNIT 3	677317, 3078726
TK-28063	TANK 28063	677095, 3078776
TK-28064	TANK 28064	677158, 3078793
TK-28067	TANK 28067	677289, 3078953
TK-28068	TANK 28068	677350, 3079115
TK-28069	TANK 28069	677397, 3079233
TK-28070	TANK 28070	677429, 3078870
TK-28071	TANK 28071	677467, 3078971
TK-28072	TANK 28072	677504, 3079069
TK-28073	TANK 28073	677581, 3079266
TK-28074	TANK 28074	677595, 3078938
TK-28075	TANK 28075	677683, 3079166
TK-28076	TANK 28076	677720, 3079264
TK-28077	TANK 28077	677451, 3079375
TK-28080	TANK 28080	677543, 3079169
TK-28082	FIREWATER PUMP TANK	677497, 3078833
TK-28083	FIREWATER PUMP TANK	677500, 3078834
TK-28086	TANK 28086	677618, 3079362
TK-28087	TANK 28087	677652, 3079095
TK-28088	TANK 28088	677757, 3079360
TK-28089	TANK 28089	677655, 3079459
TK-28090	TANK 28090	677152, 3078876
TK-28091	TANK 28091	677722, 3079422
TK-28092	TANK 28092	677621, 3079024

0 100 200 400

SCALE IN METERS

WAID ENVIRONMENTAL

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

INGLESIDE PLOT PLAN

Drawn By	Start Date	Rev. Date	DWG Name	Rev. No.
DWW	7/15/98	6/27/18	INGLSIDE	24

H:\CLIENTS\FLINT HILL INGLESIDE\FHI4817\ACAD

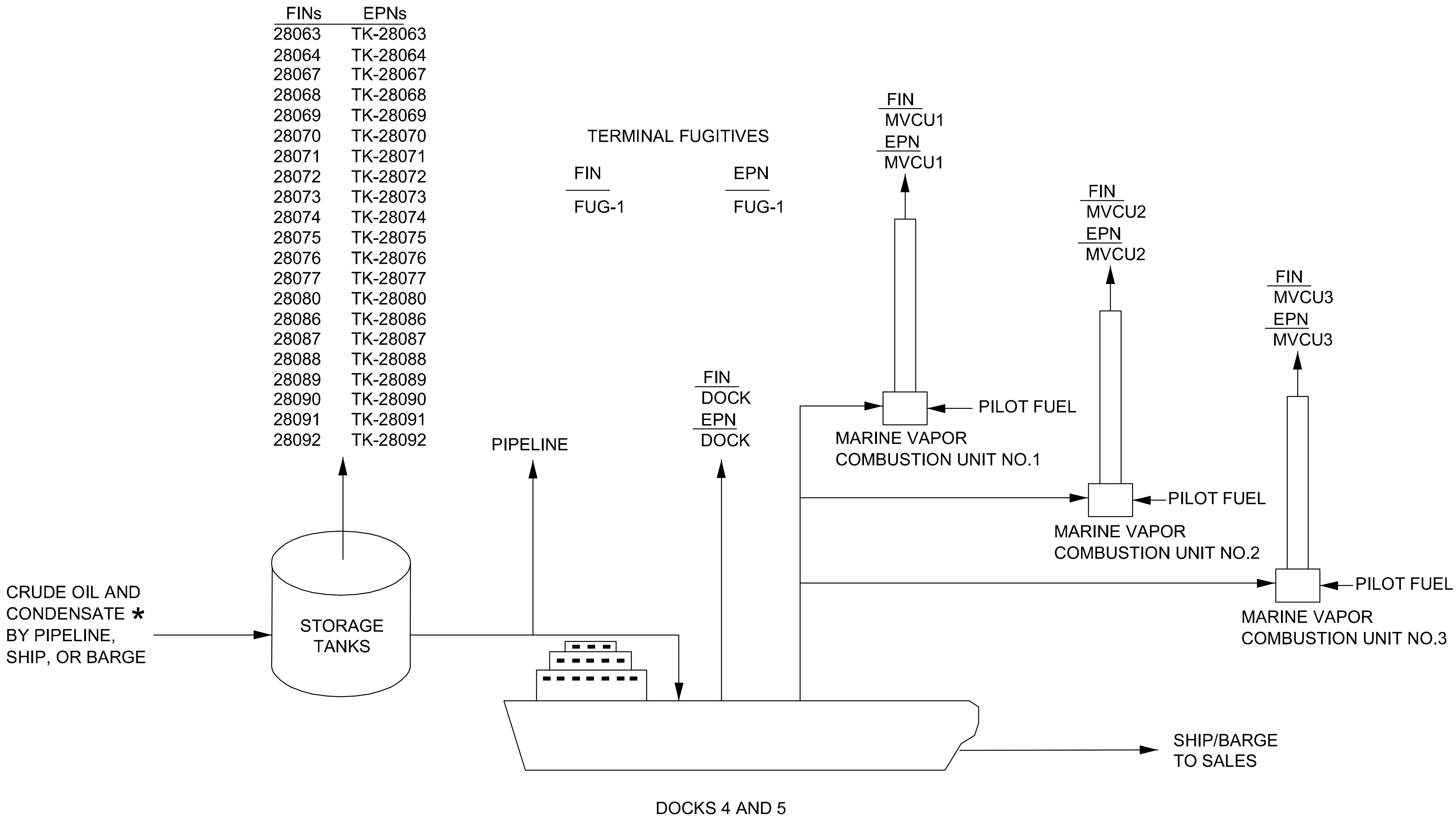
EXISTING AUTHORIZATIONS

The Ingleside Terminal operates under NSR Permit No. 6606. Additionally, MSS activities at the Ingleside Terminal are authorized under PBR 30 TAC §106.263 (Registration No. 107625). Fugitive emissions associated with a temporary scavenger injection system (that may be used again in the future) were authorized under PBR 30 TAC §106.262 (Registration No. 124323), which is being incorporated into the Permit No. 6606 with this amendment application. Fugitive emissions associated with the replacement of a densitometer at Dock 5 of the terminal were authorized under PBR 30 TAC §106.261 (Registration No. 151016), which is being incorporated into the Permit No. 6606 with this amendment application. Emission rate increases from Tank 28075 as a result of fitting additions were authorized under PBR Registration No. 147189, which is being incorporated into Permit No. 6606 with this amendment application.

PBR Registration No. 136465 was incorporated into Permit No. 6606 with the amendment to Permit No. 6606 issued on May 31, 2017 (TCEQ Project No. 232031). However, the PBR was not voided. FHR is requesting to void PBR Registration No. 136465 since it has already been incorporated into Permit No. 6606.

PROCESS FLOW DIAGRAM

FHR's Exhibt A



* TERMINAL MAY ALSO HANDLE REFINED PRODUCTS WITH VAPOR PRESSURE LESS THAN CRUDE OIL.

WAID ENVIRONMENTAL				
FLINT HILLS RESOURCES CORPUS CHRISTI, LLC				
INGLESIDE TERMINAL PROCESS FLOW DIAGRAM				
Drawn By: DWW	Start Date: 2/14/11	Rev. Date: 6/28/18	DWG Name: FLOW	Rev. No.: 8
H:\CLIENTS\FLINT HILL INGLESIDE\FHI4817\ACAD				

PROCESS DESCRIPTION

Flint Hills Resources Corpus Christi, LLC (FHR) owns and operates a marine terminal handling crude oil and condensate in Ingleside, Texas. Existing equipment at the terminal includes ship and barge docks for loading and unloading crude oil and condensate, storage tanks, a marine vapor combustion unit, and ancillary equipment. Crude oil and condensate are received at the terminal via marine dock or via pipeline and exit the terminal via marine dock or pipeline. Additionally, refined fuel products with vapor pressure less than crude oil, such as naphtha, diesel, No. 6 oil, and coker gas oil may be stored in existing tanks at the terminal. These refined fuel products are received at the terminal via marine dock or via pipeline and exit the terminal via pipeline. There is no tank truck loading and no tank truck unloading at the terminal.

With this amendment, FHR is proposing to increase the total combined throughput of the barge and ship loading of crude oil and stabilized condensate from 73,000,000 barrels to 138,700,000 barrels per rolling twelve months. In addition, FHR is increasing the hourly barge and ship loading rate from 20,000 bbl/hr to 60,000 bbl/hr. As part of the project, six new storage tanks and two new marine vapor combustion units (MVCUs) are being constructed. In addition, the existing MVCU is being replaced by a new MVCU. New fugitive piping components (EPN FUG-1) will be installed as part of the construction of the new storage tanks and the new MVCUs and the connection to the new crude oil pipeline coming into the terminal. FHR is also incorporating PBR Registration Nos. 124323 and 151016 into Permit No. 6606, which authorized new fugitive piping components. A table is provided at the end of the section summarizing the new, modified and affected facilities.

Six new domed floating-roof storage tanks (EPNs TK-28087, TK-28088, TK-28089, TK-28090, TK-28091, and TK-28092) will be constructed to accommodate the additional throughput of crude oil and stabilized condensate. As currently authorized for the existing storage tanks, the annual average hydrogen sulfide (H_2S) concentration of the crude oil and condensate stored in the new tanks will be 100 ppmw or less, and the maximum hourly H_2S concentration of the crude oil and condensate stored in the new tanks will be 500 ppmw or less. FHR is proposing a combined annual VOC emission limit for the six new storage tanks.

FHR is not proposing any physical changes or changes in method of operation to the existing storage tanks in Permit No. 6606. However, the existing storage tanks could realize an increase in actual emissions as a result of the increased crude oil and stabilized condensate throughput (within the currently permitted throughput). Therefore, the existing storage tanks are considered downstream affected facilities (see PSD Review section for additional discussion). FHR is incorporating PBR Registration No. 147189 issued July 6, 2017, into Permit No. 6606 as part of this amendment application. That PBR authorized an increase in VOC and H_2S emissions from Tank 28075 (EPN TK-28075) resulting from the addition of fittings on the tank. FHR is revising the individual (i.e., tank specific) emission limits for Tank 28075 as a result of incorporating the PBR. The tank is part of the existing annual VOC emission rate cap for the existing storage tanks, but FHR is not proposing any changes to the annual VOC emission rate cap as a result of incorporating the PBR registration.

Two new marine vapor combustion units (EPNs MVCU2 and MVCU3) will be constructed to provide additional control of the marine loading emissions. The new MVCUs will utilize John Zink Hamworthy Combustion's NOxSTAR Vapor Combustion System technology, which minimizes NO_X, CO, and VOC emissions. The existing MVCU (EPN MVCU) will be replaced by a new MVCU (EPN MVCU1) with the same NOxStAR Vapor Combustion System technology to minimize NO_X, CO, and VOC emissions. The NOxStAR Vapor Combustion System technology is guaranteed to meet a VOC destruction efficiency of 99.99%, but FHR is conservatively basing the new and replacement MVCUs' emission rate calculations on a VOC destruction efficiency of 99.9%. Each new MVCU has a maximum firing capacity of 180 MMBtu/hr. FHR is proposing combined annual emission limits from the three MVCUs based on the new total throughput of 138,700,000 bbl/yr and a combined total firing capacity of 1,680,000 MMBtu/yr. The VOC collection efficiency for the marine loading operation is increasing from 99.86% to 99.9% based on capture efficiency testing performed by FHR at the Ingleside Terminal while loading inerted vessels pursuant to Special Condition No. 10 of Permit No. 6606. FHR is proposing to increase the hourly H_2S concentration for the marine loading operation from 18 ppmw to 19 ppmw and increase the annual H_2S concentration from 14 ppmw to 19 ppmw. FHR will utilize an H_2S scavenger system as necessary to decrease the H_2S concentration of the crude oil/condensate in the event the H_2S concentration of the crude oil/condensate in the storage tanks is higher than these proposed H_2S concentrations for marine loading. FHR will also sample the H_2S concentration of the crude oil/condensate in the storage tanks twice per month to verify compliance with the H_2S concentrations for marine loading.

Last, FHR is proposing to correct the H_2S emissions for Tank 28071. In the amendment application for Permit No. 6606 issued on May 31, 2017 (TCEQ Project No. 232031), FHR inadvertently included the wrong H_2S emission rates on the Table 1(a) compared to the H_2S emission rates represented in the permit application calculations. The H_2S emission rates included on the Table 1(a) and that are currently in Permit No. 6606 are 0.13 lb/hr and 0.08 tons/yr. The H_2S emission rates represented in the calculations of the amendment application were 0.08853 lb/hr and 0.05398 tons/yr. Therefore, FHR is proposing to correct the H_2S emission rates for Tank 28071 in Permit No. 6606 to 0.09 lb/hr and 0.05 tpy. See Appendix A for the Table 1(a) and emission rate calculations submitted in November 2015 as part of the amendment to Permit No. 6606 issued on May 31, 2017.

SUMMARY OF PROPOSED CHANGES

FIN	EPN	Description	Proposed Changes	Is there a Physical Change or Change in Method of Operation Causing an Emission Increase?	Minor NSR Source Type	PSD Source Type
28087	TK-28087	Tank 28087	- Construction of new domed internal floating roof storage tank. FHR is proposing a grouped annual emission limit for Tanks 28087, 28088, 28089 28090, 28091, and 28092.	Yes	New	New
28088	TK-28088	Tank 28088	- Construction of new domed internal floating roof storage tank. FHR is proposing a grouped annual emission limit for Tanks 28087, 28088, 28089 28090, 28091, and 28092.	Yes	New	New
28089	TK-28089	Tank 28089	- Construction of new domed internal floating roof storage tank. FHR is proposing a grouped annual emission limit for Tanks 28087, 28088, 28089 28090, 28091, and 28092.	Yes	New	New
28090	TK-28090	Tank 28090	- Construction of new domed internal floating roof storage tank. FHR is proposing a grouped annual emission limit for Tanks 28087, 28088, 28089 28090, 28091, and 28092.	Yes	New	New

SUMMARY OF PROPOSED CHANGES

FIN	EPN	Description	Proposed Changes	Is there a Physical Change or Change in Method of Operation Causing an Emission Increase?	Minor NSR Source Type	PSD Source Type
28091	TK-28091	Tank 28091	- Construction of new domed internal floating roof storage tank. FHR is proposing a grouped annual emission limit for Tanks 28087, 28088, 28089 28090, 28091, and 28092.	Yes	New	New
28092	TK-28092	Tank 28092	- Construction of new domed internal floating roof storage tank. FHR is proposing a grouped annual emission limit for Tanks 28087, 28088, 28089 28090, 28091, and 28092.	Yes	New	New
28075	TK-28075	Tank 28075	- Incorporating PBR Registration No. 147189 issued July 6, 2017, into Permit No. 6606. This PBR authorized an increase in VOC and H_2S emissions resulting from the addition of fittings on Tank 28075.	Yes (PBR Incorporation)	N/A (Although BACT review required for PBR incorporation)	Affected Downstream
MVCU	MVCU	Existing Marine Vapor Combustion Unit	- The existing marine vapor combustion unit (MVCU) will be replaced by three new MVCUs in a different location.	No	N/A	N/A (Although decrease from shutdown accounted for in PSD applicability review)

SUMMARY OF PROPOSED CHANGES

FIN	EPN	Description	Proposed Changes	Is there a Physical Change or Change in Method of Operation Causing an Emission Increase?	Minor NSR Source Type	PSD Source Type
MVCU1	MVCU1	Marine Vapor Combustion Unit No. 1	- New marine vapor combustion unit to control marine loading emissions. FHR is proposing grouped annual emission limits for the three new MVCUs.	Yes	New	New
MVCU2	MVCU2	Marine Vapor Combustion Unit No. 2	- New marine vapor combustion unit to control marine loading emissions. FHR is proposing grouped annual emission limits for the three new MVCUs.	Yes	New	New
MVCU3	MVCU3	Marine Vapor Combustion Unit No. 3	- New marine vapor combustion unit to control marine loading emissions. FHR is proposing grouped annual emission limits for the three new MVCUs.	Yes	New	New
DOCK	DOCK, MVCU1, MVCU2, MVCU3	Marine Loading Operation	- Increasing the hourly loading rate from 20,000 bbl/hr to 60,000 bbl/hr. - Increasing the annual loading rate from 73,000,000 bbl/yr to 138,700,000 bbl/yr. - Increasing the capture efficiency from 99.86% to 99.9%. - Increasing the maximum hourly H_2S concentration from 18 ppmw to 19 ppmw and increasing the annual average H_2S concentration from 14 ppmw to 19 ppmw.	Yes	Modified	Modified

SUMMARY OF PROPOSED CHANGES

FIN	**EPN**	**Description**	**Proposed Changes**	**Is there a Physical Change or Change in Method of Operation Causing an Emission Increase?**	**Minor NSR Source Type**	**PSD Source Type**
FUG-1	FUG-1	Terminal Fugitives	- Addition of new fugitive piping components (i.e. valves, flanges, etc.) as part of constructing new storage tanks and new MVCUs and for connecting to a new crude oil pipeline coming into the terminal. - Incorporation of PBR Registration Nos. 124323 and 151016, which authorized increases in VOC emissions from the installation of additional fugitive piping components.	Yes	New (not including fugitives authorized by PBRs being incorporated into the permit)	New (not including fugitives authorized by PBRs being incorporated into the permit)
Existing Crude Oil/ Condensate Storage Tanks	Existing Crude Oil/ Condensate Storage Tanks	Existing Crude Oil/ Condensate Storage Tanks in Permit No. 6606	- Increase in actual annual emissions above past actual emissions as a result of an increase in the actual annual throughput within currently authorized rates.	No	N/A	Affected Downstream

EMISSIONS DATA

An emissions summary table is provided in this section showing the proposed emission rates for new facilities and existing facilities affected by this amendment application as well as changes to allowable emission rates for existing facilities. FHR is proposing a combined annual VOC emission limit for storage Tanks 28087, 28088, 28089, 28090, 28091, and 28092 and combined annual emission limits for the MVCUs.

Storage Tanks (EPNs TK-28075, TK-28087, TK-28088, TK-28089, TK-28090, TK-28091, TK-28092)

VOC emission rates from Tanks 28087, 28088, 28089, 28090, 28091, and 28092 are estimated using the AP-42 Section 7 emission estimation methodology. Short-term VOC emission rates are calculated based on the TCEQ's Guidance Document for Floating Roof Storage Tanks dated February 2018. The maximum hourly and annual VOC emissions from the storage tanks are based on a crude oil/condensate true vapor pressure (TVP) of 10.9 psia and 9.05 psia, respectively.

FHR is proposing an annual grouped VOC emission limit for the six new tanks and an individual hourly VOC emission limit for each of the six new tanks. The grouped annual VOC emission limit is based on a maximum combined/total throughput of 66,000,000 bbl/yr for all six tanks going through any one of the six tanks. Emission rates are calculated for each tank at this maximum total throughput. The grouped annual VOC emission limit is calculated by adding the rim seal losses, deck fitting losses, and deck seam losses from each tank to the maximum withdrawal loss from any one tank at the maximum combined/total throughput.

VOC emissions Tank 28075 are based on AP-42 Section 7 emission estimation methodology and TCEQ's guidance document for floating-roof storage tanks in effect when PBR Registration No. 147189 was issued in July 2017.

Maximum hourly and annual H_2S emissions from the six new storage tanks are estimated based on a maximum H_2S short-term concentration of 500 ppmw in the crude oil and condensate, and an annual average H_2S concentration of 100 ppmw. The K factor method from "Using K Factors to Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids" by Jeffrey Meling, Karen Horne, and Jay Hoover is used for the calculations. The standing loss calculation assumes H_2S emissions occur due to evaporation so a vapor phase concentration is calculated based on the liquid H_2S concentration and the partition coefficient (K-factor). Therefore, K factors are used to estimate the H_2S emissions from the rim seal, deck seam and deck fitting losses. A K factor of 24, which is based on a temperature of 85ºF, is used for the annual emission rate calculations. A K factor of 27, which is based on a temperature of 95ºF, is used for the hourly emission rate calculations. Withdrawal losses are calculated based on the H_2S weight fraction in the liquid. The withdrawal loss calculation assumes that all of H_2S contained in the crude oil clinging to the wall of the tank as the roof goes down flashes off. FHR is proposing an annual grouped H_2S emission limit for the six new tanks based on the annual grouped VOC emissions from the six new tanks.

Marine Loading (EPNs DOCK, MVCU1, MVCU2, MVCU3)

VOC emissions from the marine loading operation are estimated using equation (1) from AP-42, Fifth Edition, Section 5.2, with the saturation factor of 0.2 for submerged loading of ships. The maximum hourly and annual VOC emissions from the marine loading operation are based on a crude oil/condensate TVP of 10.9 psia and 9.28 psia, respectively. Because the temperature in equation (1) of AP-42, Fifth Edition, Section 5.2 is in the denominator, a worst case emission rate is calculated at lower temperatures. Therefore, FHR is estimating hourly and annual emission rates from the loading operation at temperatures of 80ºF and 73.5ºF, respectively, although temperatures during loading could be higher. FHR is proposing an annual grouped VOC emission limit for the three MVCUs and an individual hourly VOC emission limit for each of the three MVCUs. The hourly VOC emissions for each MVCU is based on a marine loading rate of 20,000 bbl/hr. The grouped annual VOC emission limit for the MVCUs is based on the total loading rate of 138,700,000 bbl/yr. Uncaptured dock fugitive VOC emissions (EPN DOCK) are based on a collection efficiency of 99.9% based on recent testing. Because the collection efficiency has been demonstrated to be between 99.9% and 100%, and to conservatively estimate emissions, FHR is calculating controlled VOC emissions from the MVCUs based on a collection efficiency of 100% and a control efficiency of 99.9%. Hourly NO_X and CO emissions from the MVCUs are estimated based on vendor emission factors and the maximum firing capacities of the MVCUs during any one hour of the loading period. The annual NO_X and CO grouped emission limits for the MVCUs are estimated based on vendor emission factors and the total firing capacity of the MVCUs over the entire year. Hourly particulate matter and VOC emissions from combustion are estimated based on the maximum firing capacities of the MVCUs during any one hour of the loading period and emission factors from AP-42 (5th Ed.), Section 1.4 dated March 1998. The annual particulate and VOC emissions from combustion are estimated based on the total firing capacity of the MVCUs over the entire year and emission factors from AP-42 (5th Ed.), Section 1.4 dated March 1998.

Maximum hourly and annual H_2S emissions from the marine loading operation are estimated based on a maximum H_2S short-term concentration of 19 ppmw in the crude oil and condensate, and an annual average H_2S concentration of 19 ppmw. The K factor method from "Using K Factors to Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids" by Jeffrey Meling, Karen Horne, and Jay Hoover is used for the calculations. A K factor of 24, which is based on a temperature of 85ºF, is used for the annual emission rate calculations. A K factor of 27, which is based on a temperature of 95ºF, is used for the hourly emission rate calculations. Uncaptured dock fugitive H_2S emissions are based on the collection efficiency of 99.9%. H_2S and SO_2 emissions from the MVCUs are conservatively based on a collection efficiency of 100% and 99% of the H_2S being converted to SO_2 during combustion of the marine loading vapors.

Equipment Fugitives (EPN FUG-1)

VOC emissions from fugitive piping components are estimated using Petroleum Marketing Terminal fugitive emission factors from the TCEQ Draft Guidance Document "Equipment Leak Fugitives," dated December 2017. The facility uses an audio, visual, and olfactory leak detection and repair (LDAR) program. The total fugitive count includes all components currently in the permit plus the new components being authorized with this amendment application. FHR is incorporating PBR Registration Nos. 124323 and 151016 into Permit No. 6606, which authorized new fugitive piping components. In the PBR registrations, the emission rate calculations used refinery average emission factors rather than petroleum marketing terminal emission factors. Rather than add the emission rates authorized by the PBR registrations to the total VOC emission rate for EPN FUG-1, FHR is adding the fugitive component counts authorized in each of the PBR registrations to the total fugitive component counts for the terminal and calculating a total emission rate based on the petroleum marketing terminal emission factors. As a result, the speciation for these new fugitive components will be changing to the general speciation used for the terminal fugitive piping components. H_2S emissions are based on the same concentrations as storage tanks: 500 ppmw (hourly) and 100 ppmw (annual).

FHR's Exhibt A

			NO_X						CO					
			Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates		Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates	
FIN	EPN	Description	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
DOCK, MVCU	MVCU	Existing Marine Vapor Combustion Unit	27.72	50.59	0	0	-27.72	-50.59	27.72	50.59	0	0	-27.72	-50.59
DOCK, MVCU1	MVCU1	Marine Vapor Combustion Unit No. 1	0.00	0.00	4.14		4.14		0.00	0.00	5.40		5.40	
DOCK, MVCU2	MVCU2	Marine Vapor Combustion Unit No. 2	0.00	0.00	4.14	19.32	4.14	19.32	0.00	0.00	5.40	25.20	5.40	25.20
DOCK, MVCU3	MVCU3	Marine Vapor Combustion Unit No. 3	0.00	0.00	4.14		4.14		0.00	0.00	5.40		5.40	
DOCK	DOCK	Ship and Barge Loading Dock												
28075 *	TK-28075 *	Tank No. 28075 *												
28087	TK-28087	Tank No. 28087												
28088	TK-28088	Tank No. 28088												
28089	TK-28089	Tank No. 28089												
28090	TK-28090	Tank No. 28090												
28091	TK-28091	Tank No. 28091												
28092	TK-28092	Tank No. 28092												
28071	TK-28071	Tank No. 28071												
FUG-1 **	FUG-1 **	Terminal Fugitives **												
Total Project Emissions for Public Notice							**-15.30**	**-31.27**					**-11.52**	**-25.39**
Public Notice Thresholds (tons/yr)								**5.00**						**50.00**
Does the Project Increase Result in Public Notice?								**NO**						**NO**

* Proposed emission rates reflect the incorporation of PBR Registration No. 147189 which authorized an increase in VOC emissions of 0.03 lb/hr and 0.12 tpy and an increase in H2S emissions of 0.002 lb/hr and 0.002 tpy. These emission rate increases are not included in total project emissions for public notice since they were authorized by PBR.

** Proposed emission rates reflect the incorporation of PBR Registration Nos. 124323 and 151016, which authorized an increase in VOC emissions of 0.0022 lb/hr and 0.01 tpy (based on corrected calculations) as a result of installing new fugitive piping components. These emission rate increases are not included in total project emissions for public notice since they were authorized by PBR.

FHR's Exhibt A

			SO_2						$PM/PM_{10}/PM_{2.5}$					
			Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates		Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates	
FIN	EPN	Description	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
DOCK, MVCU	MVCU	Existing Marine Vapor Combustion Unit	8.80	13.70	0	0	-8.80	-13.70	0.38	0.68	0	0	-0.38	-0.68
DOCK, MVCU1	MVCU1	Marine Vapor Combustion Unit No. 1	0.00	0.00	11.40		11.40		0.00	0.00	1.35		1.35	
DOCK, MVCU2	MVCU2	Marine Vapor Combustion Unit No. 2	0.00	0.00	11.40	35.40	11.40	35.40	0.00	0.00	1.35	6.30	1.35	6.30
DOCK, MVCU3	MVCU3	Marine Vapor Combustion Unit No. 3	0.00	0.00	11.40		11.40		0.00	0.00	1.35		1.35	
DOCK	DOCK	Ship and Barge Loading Dock												
28075 *	TK-28075 *	Tank No. 28075 *												
28087	TK-28087	Tank No. 28087												
28088	TK-28088	Tank No. 28088												
28089	TK-28089	Tank No. 28089												
28090	TK-28090	Tank No. 28090												
28091	TK-28091	Tank No. 28091												
28092	TK-28092	Tank No. 28092												
28071	TK-28071	Tank No. 28071												
FUG-1 **	FUG-1 **	Terminal Fugitives **												
Total Project Emissions for Public Notice							**25.40**	**21.70**					**3.67**	**5.62**
Public Notice Thresholds (tons/yr)								**10.00**						**5.00**
Does the Project Increase Result in Public Notice?								**YES**						**YES**

* Proposed emission rates reflect the incorporation of PBR Registration No. 147189 which authorized an increase in VOC emissions of 0.03 lb/hr and 0.12 tpy and an increase in H_2S emissions of 0.002 lb/hr and 0.002 tpy. These emission rate increases are not included in total project emissions for public notice since they were authorized by PBR.

** Proposed emission rates reflect the incorporation of PBR Registration Nos. 124323 and 151016, which authorized an increase in VOC emissions of 0.0022 lb/hr and 0.01 tpy (based on corrected calculations) as a result of installing new fugitive piping components. These emission rate increases are not included in total project emissions for public notice since they were authorized by PBR.

FHR's Exhibt A

			VOC						H_2S					
			Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates		Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates	
FIN	EPN	Description	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
DOCK, MVCU	MVCU	Existing Marine Vapor Combustion Unit	19.41	30.60	0	0	-19.41	-30.60	0.05	0.07	0	0	-0.05	-0.07
DOCK, MVCU1	MVCU1	Marine Vapor Combustion Unit No. 1	0.00	0.00	3.10		3.10		0.00	0.00	0.06		0.06	
DOCK, MVCU2	MVCU2	Marine Vapor Combustion Unit No. 2	0.00	0.00	3.10	10.89	3.10	10.89	0.00	0.00	0.06	0.19	0.06	0.19
DOCK, MVCU3	MVCU3	Marine Vapor Combustion Unit No. 3	0.00	0.00	3.10		3.10		0.00	0.00	0.06		0.06	
DOCK	DOCK	Ship and Barge Loading Dock	2.98	4.68	6.38	6.36	3.40	1.68	0.008	0.01	0.018	0.019	0.010	0.009
28075 *	TK-28075 *	Tank No. 28075 *	8.32	7.71	8.35	7.83	0.03	0.12	0.13	0.08	0.132	0.081	0.002	0.002
28087	TK-28087	Tank No. 28087	0.00		8.66		8.66		0.00		0.02		0.02	
28088	TK-28088	Tank No. 28088	0.00		8.66		8.66		0.00		0.02		0.02	
28089	TK-28089	Tank No. 28089	0.00	0.00	8.66	10.24	8.66	10.24	0.00	0.00	0.02	0.05	0.02	0.05
28090	TK-28090	Tank No. 28090	0.00		8.66		8.66		0.00		0.02		0.02	
28091	TK-28091	Tank No. 28091	0.00		8.66		8.66		0.00		0.02		0.02	
28092	TK-28092	Tank No. 28092	0.00		8.66		8.66		0.00		0.02		0.02	
28071	TK-28071	Tank No. 28071							0.13	0.08	0.09	0.05	-0.04	-0.03
FUG-1 **	FUG-1 **	Terminal Fugitives **	0.21	0.92	0.30	1.30	0.09	0.39	0.01	0.01	0.02	0.02	0.01	0.01
Total Project Emissions for Public Notice							**45.37**	**-7.42**					**0.26**	**0.16**
Public Notice Thresholds (tons/yr)								**5.00**						**5.00**
Does the Project Increase Result in Public Notice?								**NO**						**NO**

* Proposed emission rates reflect the incorporation of PBR Registration No. 147189 which authorized an increase in VOC emissions of 0.03 lb/hr and 0.12 tpy and an increase in H2S emissions of 0.002 lb/hr and 0.002 tpy. These emission rate increases are not included in total project emissions for public notice since they were authorized by PBR.

** Proposed emission rates reflect the incorporation of PBR Registration Nos. 124323 and 151016, which authorized an increase in VOC emissions of 0.0022 lb/hr and 0.01 tpy (based on corrected calculations) as a result of installing new fugitive piping components. These emission rate increases are not included in total project emissions for public notice since they were authorized by PBR.

FHR's Exhibit A

VOC CAP FOR EXISTING STORAGE TANKS

Source	EPN	VOC lbs/hr	VOC tons/yr
Tank 28063	TK-28063	4.82	5.02
Tank 28064	TK-28064	5.04	5.71
Tank 28067	TK-28067	9.83	9.20
Tank 28068	TK-28068	8.56	7.66
Tank 28069	TK-28069	7.98	5.84
Tank 28070	TK-28070	5.50	10.67
Tank 28071	TK-28071	7.78	6.00
Tank 28072	TK-28072	8.32	7.71
Tank 28073	TK-28073	8.26	7.53
Tank 28074	TK-28074	8.37	7.89
Tank 28075	TK-28075	8.35	7.83
Tank 28076	TK-28076	8.35	7.82
Tank 28077	TK-28077	9.06	6.76
Tank 28080	TK-28080	8.32	7.72
Tank 28086	TK-28086	7.96	7.56
Tank 28082	TK-28082	0.03	0.0003
Tank 28083	TK-28083	0.03	0.0003
Tank Cap*			**83.59**

***No change in these emission rates is proposed for this amendment.**

HOURLY CONTROLLED AND UNCONTROLLED VOC LOADING EMISSIONS[1]
(FIN DOCK, EPN MVCU1); (FIN DOCK, EPN MVCU2); (FIN DOCK, EPN MVCU3); (FIN DOCK, EPN DOCK)

EPN	Product	Marine Loading Throughput M gal/hr	S	P (psia)	M (lb/lb-mol)	T (F)	T (R)	Uncontrolled Loading Loss (lbs/hr)	VOC Collection Efficiency (%)	VOC Destruction Efficiency (%)	Controlled Loading Loss [4] (lbs/hr)	EPN DOCK Uncollected Loading Loss [5] (lbs/hr)
MVCU1	Crude Oil [3]	840	0.2	10.90	50.3	80.0	539.6	2,127	99.9	99.9	2.13	2.13
MVCU2	Crude Oil [3]	840	0.2	10.90	50.3	80.0	539.6	2,127	99.9	99.9	2.13	2.13
MVCU3	Crude Oil [3]	840	0.2	10.90	50.3	80.0	539.6	2,127	99.9	99.9	2.13	2.13
											Total	6.38

Sample Calculation

Crude Oil:

Uncontrolled = 12.46(S)(P)(M)/T*throughput (M gal/hr)'
= 2,127 lb/hr

NOTES:

1. Calculations based on equation (1) from AP-42, Fifth Edition, Section 5.2, with the saturation factor for submerged loading of ships.
2. Vapor pressure is based on crude oil with an RVP of 10 at an annual average temperature.
3. Vapor pressure is based on crude oil with an RVP of 10 at a temperature that will produce the highest emissions.
4. Controlled emissions are based on 100% collection efficiency to estimate worst-case emissions from the marine vapor combustors.
5. Uncollected emissions are represented at 0.1% of the loading loss equation, based on on-site testing.
6. The maximum temperature could be higher, but a lower temperature is used to estimate the highest emission rates since the temperature is in the denominator of the AP-42 loading loss equation.
6. Variables represented in the calculations are used to estimate maximum hourly and annual emission rates and are not intended to be binding. Although actual values may vary or may be higher than those represented, actual emission rates will be below the proposed emission rates.

HOURLY COMBUSTION EMISSIONS FROM MVCUs
(FIN MVCU1, EPN MVCU1); (FIN MVCU2, EPN MVCU2), (FIN MVCU3, EPN MVCU3)

MVCU1 Maximum Firing Capacity:	180 MMBtu/hr
MVCU2 Maximum Firing Capacity:	180 MMBtu/hr
MVCU3 Maximum Firing Capacity:	180 MMBtu/hr

Pollutant	Emission Factor (lb/MMBtu)	Hourly Emission Rates (lb/hr) FIN MVCU1 EPN MVCU1	FIN MVCU2 EPN MVCU2	FIN MVCU3 EPN MVCU3
NOx	0.023	4.14	4.14	4.14
CO	0.03	5.40	5.40	5.40
PM\PM$_{10}$\PM$_{2.5}$	0.0075	1.35	1.35	1.35
VOC	0.0054	0.97	0.97	0.97

* The PM and VOC emission factor is from AP-42 (5th Ed.), Section 1.4 dated March 1998.

GROUPED ANNUAL VOC LOADING EMISSIONS[1]
(FIN DOCK, EPN MVCU1/MVCU2/MVCU3), (FIN DOCK, EPN DOCK)

EPN	Product	Marine Loading Throughput M gal/yr	S	P (psia)	M (lb/lb-mol)	T (F)	T (R)	Uncontrolled Loading Loss (lbs/yr)	Uncontrolled Loading Loss (tons/yr)	VOC Capture Efficiency (%)	VOC Destruction Efficiency (%)	Controlled Loading Loss [4] (tons/yr)	EPN DOCK Uncollected Loading Loss [5] (tons/yr)
MVCU1/ MVCU2/ MVCU3	Crude Oil [2]	5,825,400	0.2	9.28	50.3	73.50	533.1	12,711,039	6355.52	99.9	99.9	6.356	6.36

Sample Calculation

Crude Oil:

Uncontrolled = 12.46*(0.2)*(9.28 psia)*(50.3 lb/lb-mol)/(533.1 R) *(3,066,000 M gal/yr)
= (12,711,039 lb/yr) (1 ton/2000 lb)
= 6,355.52 tons/yr

NOTES:
1. Calculations based on equation (1) from AP-42, Fifth Edition, Section 5.2, with the saturation factor for submerged loading of ships.
2. Vapor pressure is based on crude oil with an RVP of 10 at an annual average temperature.
3. Vapor pressure is based on crude oil with an RVP of 10 at a temperature that will produce the highest emissions.
4. Controlled emissions are based on 100% collection efficiency to estimate worst-case emissions from the marine vapor combustors.
5. Uncollected emissions are represented at 0.1% of the loading loss equation, based on on-site testing.
6. The annual temperature could be higher, but a lower temperature is used to estimate the highest emission rates since the temperature is in the denominator of the AP-42 loading loss equation.
7. Variables represented in the calculations are used to estimate maximum hourly and annual emission rates and are not intended to be binding. Although actual values may vary or may be higher than those represented, actual emission rates will be below the proposed emission rates.

GROUPED ANNUAL COMBUSTION EMISSIONS
(FIN MVCU1/MVCU2/MVCU3, EPN MVCU1/MVCU2/MVCU3)

Annual Firing Capacity: 1,680,000 MMBtu/yr

Pollutant	Emission Factor (lb/MMBtu)	Grouped Annual Emission Rates (tons/yr)
NOx	0.023	19.32
CO	0.03	25.20
$PM\backslash PM_{10}\backslash PM_{2.5}$	0.0075	6.30
VOC	0.0054	4.54

* The PM and VOC emission factor is from AP-42 (5th Ed.), Section 1.4 dated March 1998.

Hourly Uncollected H_2S Loading Emissions from Barge and Ship Loading (FIN DOCK, EPN DOCK)

						Hourly Emissions			
	H_2S Content (ppmw)	Liquid Mole Fraction, x	K Value *	Vapor Mole Fraction, y	VOC Partial Pressure, P	Mass Emission Ratio (MR) (lb H_2S/lb VOC)	Amount of H_2S Generated (lb/hr)	Collection Efficiency (%)	H_2S Emissions (lbs/hr)
Crude Oil	19	0.000116	27	0.00313	0.741	0.00287	18.31	99.9	0.0183
						Total			**0.0183**

*K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972. The K value is based on a temperature of 95 F.

Sample Calculations:

Basis:

207 lb/lb-mole molecular weight (MW) of crude oil
34 lb/lb-mole MW of H_2S
64 lb/lb-mole MW of SO_2
50 lb/lb-mole MW of crude oil vapor
x = mole fraction of a component in the liquid phase
K = equilibrium factor, specifically for H_2S
y = mole fraction of a component in the vapor phase, where y = (x) (K)
P = VOC partial pressure (with respect to crude)
MR = mass rate (lb H_2S/lb VOC) to determine H_2S emission estimates
where: MR = (y)(MW H_2S)/(P)(MW crude vapor)

$$x = \frac{(19 \text{ lb H2S})\ (207 \text{ lb/lb-mol MW of crude})}{(10^6 \text{ lb crude})\ (34 \text{ lb/lb-mol MW of H2S})}$$
= 0.000116

y = (x) (k) = (0.000116) (27)
= 0.00313

$$P = \frac{(10.9 \text{ psia crude vapor pressure})}{(14.7 \text{ psia total pressure})}$$
= 0.741

$$MR = \frac{(0.00313)\ (34 \text{ lb/lb-mole H2S})}{(0.741)\ (50 \text{ lb/lb-mol oil})}$$
= 0.00287 lb H2S/lb VOC

Amount of H_2S Generated = (2126.9 lb VOC/yr) (0.00287 lb H2S/lb VOC)
= 18.3 lb H2S/hr

Uncollected H_2S Emissions = (18.31 lb H2S/yr) (1-99.9/100)
= 0.0183 lb/hr

Note: Variables represented in the calculations are used to estimate maximum hourly and annual emission rates and are not intended to be binding. Although actual values may vary or may be higher than those represented, actual emission rates will be below the proposed emission rates.

Annual Uncollected H_2S Loading Emissions from Barge and Ship Loading (FIN DOCK, EPN DOCK)

						Annual Emissions			
	H_2S Content (ppmw)	Liquid Mole Fraction, x	K Value *	Vapor Mole Fraction, y	VOC Partial Pressure, P	Mass Emission Ratio (MR) (lb H_2S/lb VOC)	Amount of H_2S Generated (lb/yr)	Collection Efficiency (%)	H_2S Emissions (tons/yr)
Crude Oil	19	0.000116	24	0.00278	0.63	0.00299	38006	99.9	0.019
						Total			**0.019**

*K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972. The K value is based on a temperature of 85 F.

Sample Calculations:

Basis:

207 lb/lb-mole molecular weight (MW) of crude oil
34 lb/lb-mole MW of H_2S
64 lb/lb-mole MW of SO_2
50 lb/lb-mole MW of crude oil vapor
x = mole fraction of a component in the liquid phase
K = equilibrium factor, specifically for H_2S
y = mole fraction of a component in the vapor phase, where y = (x) (K)
P = VOC partial pressure (with respect to crude)
MR = mass rate (lb H_2S/lb VOC) to determine H_2S emission estimates
where: MR = (y)(MW H_2S)/(P)(MW crude vapor)

x = (19 lb H2S) (207 lb/lb-mol MW of crude) / (10^6 lb crude) (34 lb/lb-mol MW of H2S)
= 0.000116

y = (x) (k) = (0.000116) (24)
= 0.00278

P = (9.28 psia crude vapor pressure) / (14.7 psia total pressure)
= 0.631

MR = (0.00278) (34 lb/lb-mole H2S) / (0.631) (50 lb/lb-mol oil)
= 0.00299 lb H2S/lb VOC

Amount of H_2S to Generated = (12711040 lb VOC/yr) (0.00299 lb H2S/lb VOC)
= 38006 lb H2S/yr

Uncollected H_2S Emissions = (38006 lb H2S/yr) (1-99.9/100) (ton/2000 lbs)
= 0.019 tons/yr

Note: Variables represented in the calculations are used to estimate maximum hourly and annual emission rates and are not intended to be binding. Although actual values may vary or may be higher than those represented, actual emission rates will be below the proposed emission rates.

Hourly SO_2 and H_2S Emissions from MVCUs (FIN DOCK, EPN MVCU1, MVCU2, MVCU3)

EPN	Crude Oil H_2S Content (ppmw)	Liquid Mole Fraction, x	K Value *	Vapor Mole Fraction, y	VOC Partial Pressure, P	Mass Emission Ratio (MR) (lb H_2S/lb VOC)	Amount of H_2S to Control Device (lb/hr)	% H_2S Converted to SO_2 (%)	H_2S Emissions (lbs/hr)	SO_2 Emissions (lb/hr)
MVCU1	19	0.000116	27	0.00313	0.7415	0.00287	6.10	99	0.06	11.4
MVCU2	19	0.000116	27	0.00313	0.7415	0.00287	6.10	99	0.06	11.4
MVCU3	19	0.000116	27	0.00313	0.7415	0.00287	6.10	99	0.06	11.4

*K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972. The K value is based on a temperature of 95 F.

Sample Calculations:

Basis:

207 lb/lb-mole molecular weight (MW) of crude oil
34 lb/lb-mole MW of H_2S
64 lb/lb-mole MW of SO_2
50 lb/lb-mole MW of crude oil vapor
x = mole fraction of a component in the liquid phase
K = equilibrium factor, specifically for H_2S
y = mole fraction of a component in the vapor phase, where y = (x) (K)
P = VOC partial pressure (with respect to crude)
MR = mass rate (lb H_2S/lb VOC) to determine H_2S emission estimates
where: MR = (y)(MW H_2S)/(P)(MW crude vapor)

$$x = \frac{(19 \text{ lb H2S})\ (207 \text{ lb/lb-mol MW of crude})}{(10\text{\^{}}6 \text{ lb crude})\ (34 \text{ lb/lb-mol MW of H2S})} = 0.000116$$

$$y = (x)\ (k) = (0.000116)\ (27) = 0.00313$$

$$P = \frac{(10.9 \text{ psia crude vapor pressure})}{(14.7 \text{ psia total pressure})} = 0.741$$

$$MR = \frac{(0.00313)\ (34 \text{ lb/lb-mole H2S})}{(0.7415)\ (50 \text{ lb/lb-mol oil})} = 0.00287 \text{ lb H2S/lb VOC}$$

Amount of H_2S to Control Device = (2126.9 lb VOC/yr) (0.00287 lb H2S/lb VOC)
= 6.1 lb H2S/hr

SO_2 Emissions = (6.1 lb H2S/yr) (lb-mol/34 lb H2S) (lb-mol SO2/lb-mol H2S) (64 lb SO2/lb-mol SO2) (99/100)
= 11.4 lb/hr

Note: Variables represented in the calculations are used to estimate maximum hourly and annual emission rates and are not intended to be binding. Although actual values may vary or may be higher than those represented, actual emission rates will be below the proposed emission rates.

Annual SO_2 and H_2S Emissions from MVCUs (FIN DOCK, EPN MVCU1/MVCU2/MVCU3)

						Annual Emissions				
EPN	H_2S Content (ppmw)	Liquid Mole Fraction, x	K Value *	Vapor Mole Fraction, y	VOC Partial Pressure, P	Mass Emission Ratio (MR) (lb H_2S/lb VOC)	Amount of H_2S to Control Device (lb/yr)	% H_2S Converted to SO_2 (%)	H_2S Emissions (tons/yr)	SO_2 Emissions (tons/yr)
MVCU1/MVCU2/MVCU3	19	0.000116	24	0.00278	0.63	0.00299	38006	99	0.19	35.4
						Total			**0.19**	**35.4**

*K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972. The K value is based on a temperature of 95 F.

Sample Calculations:

Basis:

207 lb/lb-mole molecular weight (MW) of crude oil
34 lb/lb-mole MW of H_2S
64 lb/lb-mole MW of SO_2
50 lb/lb-mole MW of crude oil vapor
x = mole fraction of a component in the liquid phase
K = equilibrium factor, specifically for H_2S
y = mole fraction of a component in the vapor phase, where y = (x) (K)
P = VOC partial pressure (with respect to crude)
MR = mass rate (lb H_2S/lb VOC) to determine H_2S emission estimates
where: MR = (y)(MW H_2S)/(P)(MW crude vapor)

$$x = \frac{\text{(19 lb H2S) (207 lb/lb-mol MW of crude)}}{\text{(10^6 lb crude) (34 lb/lb-mol MW of H2S)}} = 0.000116$$

y = (x) (k) = (0.000116) (24)
= 0.00278

$$P = \frac{\text{(9.28 psia crude vapor pressure)}}{\text{(14.7 psia total pressure)}} = 0.631$$

$$MR = \frac{\text{(0.00278) (34 lb/lb-mole H2S)}}{\text{(0.631) (50 lb/lb-mol oil)}} = 0.00299 \text{ lb H2S/lb VOC}$$

Amount of H_2S to Control Device = (12711040 lb VOC/yr) (0.00299 lb H2S/lb VOC)
= 38006 lb H2S/yr

SO_2 Emissions = (38006 lb H2S/yr) (lb-mol H2S/34 lb H2S) (lb-mol SO2/lb mol H2S) (64 lb SO2/lb-mol SO2) (1 ton/2000 lb) (99/100)
= 35.4 tons/yr

Note: Variables represented in the calculations are used to estimate maximum hourly and annual emission rates and are not intended to be binding. Although actual values may vary or may be higher than those represented, actual emission rates will be below the proposed emission rates.

H_2S Emission Estimates
Tanks and Fugitives

Background:

H_2S emissions are calculated by applying the K factor method of Meling, Horne, and Hoover[1] to tank losses. The H_2S mole fraction in the vapor phase of the crude oil is used to calculate H_2S emissions from the working and breathing losses from the fixed-roof tanks. The withdrawal loss (or working loss) from floating-roof tanks, however, assumes 100% volatilization. Therefore, for floating-roof tanks the weight fraction in the liquid phase of the crude oil is used to calculate the H_2S emissions from the working loss (withdrawal loss) contribution. The breathing loss contribution is the same for any type of tank.
K factors are used to calculate H_2S emissions from loading losses.

K = y/x, where

y = mole fraction of a component in the vapor phase
x = mole fraction of a component in the liquid phase

If x is known, y = Kx

Liquid	Time Period	H_2S, liquid WF	x	K[2]	y	Vapor Pressure, psia	P*	MR lbs H_2S/ lb VOC
Crude Oil	Annual	1.00E-04	0.000609	24	0.014612	9.05	0.6155	0.0161
(RVP 10)	Hourly	5.00E-04	0.003044	27	0.082191	10.9	0.7415	0.0754

a = annual emisions
h = hourly emissions
x = (WF H_2S)(MW oil)/MW H_2S
WF = Weight Fraction
MW oil = 207

P* = VOC partial pressure = vapor pressure/14.7 psia
MR = mass ratio = (y)(MW H_2S)/(P)(MW oil vapor)
MW = molecular weight
MW H_2S = 34
MW crude oil vapor = 50

		VOC Emissions (withdrawal)		VOC Emissions (rim seal and deck fitting)		H_2S Emissions	
EPN	Liquid	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
TK-28087	Crude Oil	8.398	N/A	0.263	N/A	0.0240	N/A
TK-28088	Crude Oil	8.398	N/A	0.263	N/A	0.0240	N/A
TK-28089	Crude Oil	8.398	N/A	0.263	N/A	0.0240	N/A
TK-28090	Crude Oil	8.398	N/A	0.263	N/A	0.0240	N/A
TK-28091	Crude Oil	8.398	N/A	0.263	N/A	0.0240	N/A
TK-28092	Crude Oil	8.398	N/A	0.263	N/A	0.0240	N/A
TK-28087, TK-28088, TK-28089 TK-28090, TK-28091, TK-28092	Crude Oil	N/A	6.928	N/A	3.310	N/A	0.0541

		VOC Emissions		H_2S Emissions	
FUG-1	Crude Oil	0.297	1.302	0.0224	0.0210

Sample Calculations:

Tank (28087)
H_2S Emissions = (WF)(withdrawal loss) + (MR)(rim seal loss + deck fitting loss)
H2S Emissions, lbs/hr = (0.0005)(8.398) + (0.075)(0.2625) = 0.0240

Grouped H_2S Limit
H_2S Emissions = (WF)(max withdrawal loss) + (MR)(rim seal loss from all 6 tanks + deck fitting loss from all 6 tanks)
H2S Emissions, tons/yr = (0.0001)(6.9281) + (0.0161)(3.310) = 0.0541

FUG-1
H_2S Emissions = (WF)(VOC emissions)
H2S Emissions, lbs/hr = (0.0754)(0.297) = 0.0224
H2S Emissions, tons/yr = (0.0161)(1.302) = 0.0210

Footnotes:

1 "Using K Factors To Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids," by Jeffrey Meling, Karen Horne, and Jay Hoover

2 K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972. The K value for hourly emissions is based on a temperature of 95 F. The K value for annual emissions is based on a temperature of 85 F.

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 (2006) and short-term emission equations from the TCEQ's 2018 Guidance Document for Storage Tanks.

TK-28087

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	554.01
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	40,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131
Deck Fitting Loss (lb/hr)	L_F =	0.132
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	8.398
Total Short-Term Loss	L_T =	8.660 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{549.24\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.087 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{554.01\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.088 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\ \text{lb}}{\text{yr}} \cdot \frac{40000\ \text{bbl}}{\text{hr}} \cdot \frac{\text{yr}}{66000000\ \text{bbl}}$$

= 8.398 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 (2006) and short-term emission equations from the TCEQ's 2018 Guidance Document for Storage Tanks.

TK-28088

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	554.01
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	40,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131
Deck Fitting Loss (lb/hr)	L_F =	0.132
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	8.398
Total Short-Term Loss	L_T =	8.660 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{549.24\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.087 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{554.01\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.088 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\ \text{lb}}{\text{yr}} \left| \frac{40000\ \text{bbl}}{\text{hr}} \right| \frac{\text{yr}}{66000000\ \text{bbl}}$$

= 8.398 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 (2006) and short-term emission equations from the TCEQ's 2018 Guidance Document for Storage Tanks.

TK-28089

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	554.01
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	40,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131
Deck Fitting Loss (lb/hr)	L_F =	0.132
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	8.398
Total Short-Term Loss	L_T =	8.660 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{549.24\text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.087 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{554.01\text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.088 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\text{ lb}}{\text{yr}} \cdot \frac{40000\text{ bbl}}{\text{hr}} \cdot \frac{\text{yr}}{66000000\text{ bbl}}$$

= 8.398 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 (2006) and short-term emission equations from the TCEQ's 2018 Guidance Document for Storage Tanks.

TK-28090

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P^* =	0.235
Maximum Vapor Pressure Function	P^* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	554.01
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	40,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131
Deck Fitting Loss (lb/hr)	L_F =	0.132
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	8.398
Total Short-Term Loss	L_T =	8.660 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{549.24\ \text{lb}}{\text{yr}} \Big| \frac{\text{yr}}{8760\ \text{hr}} \Big| \frac{0.326}{0.235}$$

= 0.087 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{554.01\ \text{lb}}{\text{yr}} \Big| \frac{\text{yr}}{8760\ \text{hr}} \Big| \frac{0.326}{0.235}$$

= 0.088 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\ \text{lb}}{\text{yr}} \Big| \frac{\text{yr}}{8760\ \text{hr}} \Big| \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\ \text{lb}}{\text{yr}} \Big| \frac{40000\ \text{bbl}}{\text{hr}} \Big| \frac{\text{yr}}{66000000\ \text{bbl}}$$

= 8.398 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 (2006) and short-term emission equations from the TCEQ's 2018 Guidance Document for Storage Tanks.

TK-28091

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	554.01
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	40,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131
Deck Fitting Loss (lb/hr)	L_F =	0.132
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	8.398
Total Short-Term Loss	L_T =	8.660 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{549.24\text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.087 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{554.01\text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.088 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\text{ lb}}{\text{yr}} \cdot \frac{40000\text{ bbl}}{\text{hr}} \cdot \frac{\text{yr}}{66000000\text{ bbl}}$$

= 8.398 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 (2006) and short-term emission equations from the TCEQ's 2018 Guidance Document for Storage Tanks.

TK-28092

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	554.01
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	40,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131
Deck Fitting Loss (lb/hr)	L_F =	0.132
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	8.398
Total Short-Term Loss	L_T =	8.660 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * (P*$_{Maximum}$) / (P*$_{Annual}$)

$$= \frac{549.24\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.087 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * (P*$_{Maximum}$) / (P*$_{Annual}$)

$$= \frac{554.01\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.088 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * (P*$_{Maximum}$) / (P*$_{Annual}$)

$$= \frac{0.00\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\ \text{lb}}{\text{yr}} \left| \frac{40000\ \text{bbl}}{\text{hr}} \right| \frac{\text{yr}}{66000000\ \text{bbl}}$$

= 8.398 lb/hr

FHR's Exhibt A

Grouped Annual VOC Emission Limit for Tanks 28087, 28088, 28089, 28090, 28091, and 28092

A grouped annual VOC emission limit is proposed for Tanks 28087, 28088, 28089, 28090, 28091, and 28092. The grouped annual VOC emission li limit is based on a maximum total throughput of 66,000,000 bbl/yr going through any of the three tanks. Emission rates are calculated for each tank at this maximum total throughput. The Grouped Annual VOC emission limit is calculated by adding the rim seal losses, deck fitting losses, and deck seam losses from each tank plus the maximum withdrawal loss from any one tank at the maximum total throughput. Values used to determine the grouped emission limit are in bold font.

Grouped Annual VOC Emission Limit for Tanks 28087, 28088, 28089, 28090, 28091, 28092

Tank	Proposed Throughput (bbl/yr)	Rim Seal Loss at Proposed Total Throughput (tons/yr)	Deck Fitting Loss at Proposed Total Throughput (tons/yr)	Deck Seam Loss at Proposed Total Throughput (tons/yr)	Withdrawal Loss at Proposed Total Throughput (tons/yr)	Contribution of Emission Rates to Proposed Grouped Limit (tons/yr)
28087	66,000,000	**0.27**	**0.28**	N/A	**6.93**	**7.48**
28088		**0.27**	**0.28**	N/A	**6.93**	**0.55**
28089		**0.27**	**0.28**	N/A	**6.93**	**0.55**
28090		**0.27**	**0.28**	N/A	**6.93**	**0.55**
28091		**0.27**	**0.28**	N/A	**6.93**	**0.55**
28092		**0.27**	**0.28**	N/A	**6.93**	**0.55**
Proposed Totals	**66,000,000**					**10.24**

IFR Tanks

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Maximum Tank Throughput (bbl/hr)	Tank Construction (Welded/ Riveted)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Deck Seam Construction (Welded/ Bolted)	Primary Seal (MS/LM/ VM)	Secondary Seal (None/SM/ RM/WS)	Vapor Molecular Weight MWv (lb/lbmol)	Average Liquid Density W_L (lb/gal)	Monthly Average Temperature T (^oF)	RVP	Monthly Average True Vapor Pressure P (psia)
TK-28087		Crude Oil	190	56	10,500,000	66,000,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.048
TK-28088		Crude Oil	190	56	10,500,000	66,000,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.05

FHR's Exhibit A

IFR Tanks

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Maximum Tank Throughput (bbl/hr)	Tank Construction (Welded/ Riveted)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Deck Seam Construction (Welded/ Bolted)	Primary Seal (MS/LM/ VM)	Secondary Seal (None/SM/ RM/WS)	Vapor Molecular Weight MWv (lb/lbmol)	Average Liquid Density W_L (lb/gal)	Monthly Average Temperature T (^oF)	RVP	Monthly Average True Vapor Pressure P (psia)
TK-28089		Crude Oil	190	56	10,500,000	66,000,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.05
TK-28090		Crude Oil	190	56	10,500,000	66,000,000	0	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.048

FHR's Exhibit A

IFR Tanks

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Maximum Tank Throughput (bbl/hr)	Tank Construction (Welded/ Riveted)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Deck Seam Construction (Welded/ Bolted)	Primary Seal (MS/LM/ VM)	Secondary Seal (None/SM/ RM/WS)	Vapor Molecular Weight MWv (lb/lbmol)	Average Liquid Density W_L (lb/gal)	Monthly Average Temperature T (^oF)	RVP	Monthly Average True Vapor Pressure P (psia)
TK-28091		Crude Oil	190	56	10,500,000	66,000,000	0	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.05
TK-28092		Crude Oil	190	56	10,500,000	66,000,000	0	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	40,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.05

Notes:

1. Variables represented in the VOC emission basis calculations are used to estimate maximum hourly and annual VOC emission rates. Only the throughput and true vapor pressure are intended to be binding. Although actual values of the other variables may vary or may be higher than those represented, the actual emission rates will be below the proposed emission rates. Additionally, the throughputs represented in the calculations only include the throughput that leads to change in the floating roof level (i.e. cause working losses); those occasional instances, where the tank loading and unloading rates match and the floating roof level does not change, are excluded.

2. Crude oil includes crude oil and crude oil condensate.

IFR Tanks

								Rim Seal Losses		Withdrawal Losses				Deck Fitting Losses		Deck Seam Losses			
EPN	Month	Average Pressure at Tank Location Pa (psia)	Vapor Pressure Function at average Temperature P*	Wind Speed V (mi/hr)	Zero Wind Speed Rim Seal Loss Factor [Kra] Kra lbmole/ft*yr	Wind Speed Dependant Rim Seal Loss Factor [Krb] Krb lbmole/(mph)^n ft*yr	Seal Related Wind Speed Exponent [n] n Dimensionless	Product Factor Kc	Internal Floating Roof Rim Seal Losses Lr (ton/month)	Shell Clingage Factor C (bbl/1000 ft^2)	Number of Columns Nc	Effective Column Diameter Fc	Internal Floating Roof Withdrawal Losses Lw (ton/month)	Deck Fitting Loss Factor Ff (lb-mol/month)	Internal Floating Deck Fitting Losses Lf (ton/month)	Deck Seam Loss Factor Kd (lb-mol/ft-month)	Deck Seam Length Factor Sd (ft/ft^2)	Internal Floating Deck Seam Losses Ld (ton/month)	MONTHLY TOTAL INTERNAL FLOATING ROOF LOSSES Lr+Lw+Lf+Ld (ton/month)
TK-28087		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		114.99		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	114.99	0.0149	0	0.2	0.0000	0.6069
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	114.99	0.0163	0	0.2	0.0000	0.6098
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	114.99	0.0223	0	0.2	0.0000	0.6218
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	114.99	0.0261	0	0.2	0.0000	0.6294
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	114.99	0.0292	0	0.2	0.0000	0.6355
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	114.99	0.0284	0	0.2	0.0000	0.6339
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	114.99	0.0235	0	0.2	0.0000	0.6242
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	114.99	0.0159	0	0.2	0.0000	0.6090
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	114.99	0.2770	0	0.2	0.0000	7.4797
TK-28088		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		114.99		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	114.99	0.0149	0	0.2	0.0000	0.6069
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	114.99	0.0163	0	0.2	0.0000	0.6098
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	114.99	0.0223	0	0.2	0.0000	0.6218
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	114.99	0.0261	0	0.2	0.0000	0.6294
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	114.99	0.0292	0	0.2	0.0000	0.6355
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	114.99	0.0284	0	0.2	0.0000	0.6339
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	114.99	0.0235	0	0.2	0.0000	0.6242
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	114.99	0.0159	0	0.2	0.0000	0.6090
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	114.99	0.2770	0	0.2	0.0000	7.4797

IFR Tanks

EPN	Month	Average Pressure at Tank Location Pa (psia)	Vapor Pressure Function at average Temperature P*	Wind Speed V (mi/hr)	Zero Wind Speed Rim Seal Loss Factor [Kra] Kra lbmole/ft*yr	Wind Speed Dependant Rim Seal Loss Factor [Krb] Krb lbmole/(mph)^n ft*yr	Seal Related Wind Speed Exponent [n] n Dimensionless	Rim Seal Losses: Product Factor Kc	Rim Seal Losses: Internal Floating Roof Rim Seal Losses Lr (ton/month)	Withdrawal Losses: Shell Clingage Factor C (bbl/1000 ft^2)	Withdrawal Losses: Number of Columns Nc	Withdrawal Losses: Effective Column Diameter Fc	Withdrawal Losses: Internal Floating Roof Withdrawal Losses Lw (ton/month)	Deck Fitting Losses: Deck Fitting Loss Factor Ff (lb-mol/month)	Deck Fitting Losses: Internal Floating Deck Fitting Losses Lf (ton/month)	Deck Seam Losses: Deck Seam Loss Factor Kd (lb-mol/ft-month)	Deck Seam Losses: Deck Seam Length Factor Sd (ft/ft^2)	Deck Seam Losses: Internal Floating Deck Seam Losses Ld (ton/month)	MONTHLY TOTAL INTERNAL FLOATING ROOF LOSSES Lr+Lw+Lf+Ld (ton/month)
TK-28089		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		114.99		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	114.99	0.0149	0	0.2	0.0000	0.6069
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	114.99	0.0163	0	0.2	0.0000	0.6098
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	114.99	0.0223	0	0.2	0.0000	0.6218
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	114.99	0.0261	0	0.2	0.0000	0.6294
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	114.99	0.0292	0	0.2	0.0000	0.6355
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	114.99	0.0284	0	0.2	0.0000	0.6339
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	114.99	0.0235	0	0.2	0.0000	0.6242
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	114.99	0.0159	0	0.2	0.0000	0.6090
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	114.99	0.2770	0	0.2	0.0000	7.4797
TK-28090		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		114.99		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	114.99	0.0149	0	0.2	0.0000	0.6069
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	114.99	0.0163	0	0.2	0.0000	0.6098
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	114.99	0.0223	0	0.2	0.0000	0.6218
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	114.99	0.0261	0	0.2	0.0000	0.6294
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	114.99	0.0292	0	0.2	0.0000	0.6355
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	114.99	0.0284	0	0.2	0.0000	0.6339
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	114.99	0.0235	0	0.2	0.0000	0.6242
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	114.99	0.0159	0	0.2	0.0000	0.6090
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	114.99	0.2770	0	0.2	0.0000	7.4797

IFR Tanks

								Rim Seal Losses		Withdrawal Losses				Deck Fitting Losses		Deck Seam Losses			
EPN	Month	Average Pressure at Tank Location Pa (psia)	Vapor Pressure Function at average Temperature P*	Wind Speed V (mi/hr)	Zero Wind Speed Rim Seal Loss Factor [Kra] Kra lbmole/ft*yr	Wind Speed Dependant Rim Seal Loss Factor [Krb] Krb lbmole/(mph)^n ft*yr	Seal Related Wind Speed Exponent [n] n Dimensionless	Product Factor Kc	Internal Floating Roof Rim Seal Losses Lr (ton/month)	Shell Clingage Factor C (bbl/1000 ft^2)	Number of Columns Nc	Effective Column Diameter Fc	Internal Floating Roof Withdrawal Losses Lw (ton/month)	Deck Fitting Loss Factor Ff (lb-mol/month)	Internal Floating Deck Fitting Losses Lf (ton/month)	Deck Seam Loss Factor Kd (lb-mol/ft-month)	Deck Seam Length Factor Sd (ft/ft^2)	Internal Floating Deck Seam Losses Ld (ton/month)	MONTHLY TOTAL INTERNAL FLOATING ROOF LOSSES Lr+Lw+Lf+Ld (ton/month)
TK-28091		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		114.99		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	114.99	0.0149	0	0.2	0.0000	0.6069
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	114.99	0.0163	0	0.2	0.0000	0.6098
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	114.99	0.0223	0	0.2	0.0000	0.6218
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	114.99	0.0261	0	0.2	0.0000	0.6294
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	114.99	0.0292	0	0.2	0.0000	0.6355
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	114.99	0.0284	0	0.2	0.0000	0.6339
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	114.99	0.0235	0	0.2	0.0000	0.6242
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	114.99	0.0159	0	0.2	0.0000	0.6090
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	114.99	0.2770	0	0.2	0.0000	7.4797
TK-28092		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		114.99		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	114.99	0.0149	0	0.2	0.0000	0.6069
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	114.99	0.0163	0	0.2	0.0000	0.6098
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	114.99	0.0223	0	0.2	0.0000	0.6218
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	114.99	0.0261	0	0.2	0.0000	0.6294
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	114.99	0.0292	0	0.2	0.0000	0.6355
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	114.99	0.0309	0	0.2	0.0000	0.6390
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	114.99	0.0284	0	0.2	0.0000	0.6339
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	114.99	0.0235	0	0.2	0.0000	0.6242
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	114.99	0.0192	0	0.2	0.0000	0.6157
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	114.99	0.0159	0	0.2	0.0000	0.6090
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	114.99	0.2770	0	0.2	0.0000	7.4797

FHR's Exhibt A

		IFR	IFR	IFR	IFR	IFR	IFR
		TK-28087	TK-28088	TK-28089	TK-28090	TK-28091	TK-28092
	Diameter (ft)	190	190	190	190	190	190
Access hatch	Bolted cover, gasketed	3.2	3.2	3.2	3.2	3.2	3.2
	Unbolted cover, gasketed	0	0	0	0	0	0
	Unbolted cover, ungasketed	0	0	0	0	0	0
Fixed roof support column well	Round pipe, ungasketed sliding cover	0	0	0	0	0	0
	Round pipe, gasketed sliding cover	0	0	0	0	0	0
	Round pipe, flexible fabric sleeve seal	0	0	0	0	0	0
	Built-up column, ungasketed sliding cover	0	0	0	0	0	0
	Built-up column, gasketed sliding cover	0	0	0	0	0	0
Unslotted guide-pole and well	Ungasketed sliding cover	0	0	0	0	0	0
	Ungasketed sliding cover w/pole sleeve	0	0	0	0	0	0
	Gasketed sliding cover	0	0	0	0	0	0
	Gasketed sliding cover w/pole wiper	0	0	0	0	0	0
	Gasketed sliding cover w/pole sleeve	0	0	0	0	0	0
Slotted guide-pole/sample well	Ungasketed or gasketed sliding cover	0	0	0	0	0	0
	Ungasketed or gasketed sliding cover, w/float	0	0	0	0	0	0
	Gasketed sliding cover, w/pole wiper	0	0	0	0	0	0
	Gasketed sliding cover, w/pole sleeve	11	11	11	11	11	11
	Gasketed sliding cover, w/pole sleeve, pole wiper	0	0	0	0	0	0
	Gasketed sliding cover, w/float, pole wiper	0	0	0	0	0	0
	Gasketed sliding cover, w/float, pole sleeve, pole wiper	11	11	11	11	11	11
Gauge-float well (auto. gauge)	Unbolted cover, ungasketed	0	0	0	0	0	0
	Unbolted cover, gasketed	0	0	0	0	0	0
	Bolted cover, gasketed	0	0	0	0	0	0
Gauge-hatch/sample port	Weighted mechanical action, gasketed	0	0	0	0	0	0
	Weighted mechanical actuation, ungasketed	2.3	2.3	2.3	2.3	2.3	2.3
	Slit fabric seal, 10% open area	0	0	0	0	0	0
Vacuum breaker	Weighted mechanical actuation, ungasketed	0	0	0	0	0	0
	Weighted mechanical actuation, gasketed	12.4	12.4	12.4	12.4	12.4	12.4
Deck drain	Open	0	0	0	0	0	0
	90% closed	0	0	0	0	0	0
Stub drain		0	0	0	0	0	0
Deck leg	Adjustable, internal floating deck	0	0	0	0	0	0
	Adjustable, pontoon area -ungasketed	0	0	0	0	0	0
	Adjustable, pontoon area -gasketed	36.4	36.4	36.4	36.4	36.4	36.4
	Adjustable, pontoon area -sock	0	0	0	0	0	0
	Adjustable, center area -ungasketed	0	0	0	0	0	0
	Adjustable, center area -gasketed	38.69	38.69	38.69	38.69	38.69	38.69
	Adjustable, center area -sock	0	0	0	0	0	0
	Adjustable, double-deck roofs	0	0	0	0	0	0
	Fixed	0	0	0	0	0	0
Rim Vent	Weighted mechanical actuation, ungasketed	0	0	0	0	0	0
	Weighted mechanical actuation, gasketed	0	0	0	0	0	0
Ladder well	Sliding cover, ungasketed	0	0	0	0	0	0
	Sliding cover, gasketed	0	0	0	0	0	0
TOTAL DECK LOSS FITTING FACTOR, Ff (lb-mol/yr)		**114.99**	**114.99**	**114.99**	**114.99**	**114.99**	**114.99**

FHR's Exhibt A

		IFR	IFR	IFR	IFR	IFR	IFR
		TK-28087	TK-28088	TK-28089	TK-28090	TK-28091	TK-28092
	Diameter (ft)	190	190	190	190	190	190
Access hatch	Bolted cover, gasketed	2	2	2	2	2	2
	Unbolted cover, gasketed						
	Unbolted cover, ungasketed						
Fixed roof support column well	Round pipe, ungasketed sliding cover						
	Round pipe, gasketed sliding cover						
	Round pipe, flexible fabric sleeve seal						
	Built-up column, ungasketed sliding cover						
	Built-up column, gasketed sliding cover						
Unslotted guide-pole and well	Ungasketed sliding cover						
	Ungasketed sliding cover w/pole sleeve						
	Gasketed sliding cover						
	Gasketed sliding cover w/pole wiper						
	Gasketed sliding cover w/pole sleeve						
Slotted guide-pole/sample well	Ungasketed or gasketed sliding cover						
	Ungasketed or gasketed sliding cover, w/float						
	Gasketed sliding cover, w/pole wiper						
	Gasketed sliding cover, w/pole sleeve	1	1	1	1	1	1
	Gasketed sliding cover, w/pole sleeve, pole wiper						
	Gasketed sliding cover, w/float, pole wiper						
	Gasketed sliding cover, w/float, pole sleeve, pole wiper	1	1	1	1	1	1
Gauge-float well (auto. gauge)	Unbolted cover, ungasketed						
	Unbolted cover, gasketed						
	Bolted cover, gasketed						
Gauge-hatch/sample port	Weighted mechanical action, gasketed						
	Weighted mechanical actuation, ungasketed	1	1	1	1	1	1
	Slit fabric seal, 10% open area						
Vacuum breaker	Weighted mechanical actuation, ungasketed						
	Weighted mechanical actuation, gasketed	2	2	2	2	2	2
Deck drain	Open						
	90% closed						
Stub drain							
Deck leg	Adjustable, internal floating deck						
	Adjustable, pontoon area -ungasketed						
	Adjustable, pontoon area -gasketed	28	28	28	28	28	28
	Adjustable, pontoon area -sock						
	Adjustable, center area -ungasketed						
	Adjustable, center area -gasketed	73	73	73	73	73	73
	Adjustable, center area -sock						
	Adjustable, double-deck roofs						
	Fixed						
Rim Vent	Weighted mechanical actuation, ungasketed						
	Weighted mechanical actuation, gasketed						
Ladder well	Sliding cover, ungasketed						
	Sliding cover, gasketed						

FHR's Exhibt A

		Loss Factors				
		KFa	KFb	m	EFR KF	IFR KF
Fitting Type and Construction Details		(lb-mol/yr)	(lb-mol/(mph)^m-yr)	(dimensionless)	(lb-mol/yr)	(lb-mol/yr)
Access hatch	Bolted cover, gasketed	1.6	0	0	1.6	1.6
	Unbolted cover, gasketed	31	5.2	1.2	97.86	31.
	Unbolted cover, ungasketed	36	5.9	1.3	129.85	36.
Fixed roof support column well	Round pipe, ungasketed sliding cover	31			31.	31.
	Round pipe, gasketed sliding cover	25			25.	25.
	Round pipe, flexible fabric sleeve seal	10			10.	10.
	Built-up column, ungasketed sliding cover	51			51.	51.
	Built-up column, gasketed sliding cover	33			33.	33.
Unslotted guide-pole and well	Ungasketed sliding cover	31	150	1.4	2982.77	31.
	Ungasketed sliding cover w/pole sleeve	25	2.2	2.1	217.05	25.
	Gasketed sliding cover	25	13	2.2	1428.97	25.
	Gasketed sliding cover w/pole wiper	14	3.7	0.78	33.46	14.
	Gasketed sliding cover w/pole sleeve	8.6	12	0.81	75.87	8.6
Slotted guide-pole/sample well	Ungasketed or gasketed sliding cover	43	270	1.4	5356.18	43.
	Ungasketed or gasketed sliding cover, w/float	31	36	2	2571.16	31.
	Gasketed sliding cover, w/pole wiper	41	48	1.4	985.57	41.
	Gasketed sliding cover, w/pole sleeve	11	46	1.4	916.21	11.
	Gasketed sliding cover, w/pole sleeve, pole wiper	8.3	4.4	1.6	140.83	8.3
	Gasketed sliding cover, w/float, pole wiper	21	7.9	1.8	385.19	21.
	Gasketed sliding cover, w/float, pole sleeve, pole wiper	11	9.9	0.89	76.8	11.
Gauge-float well (auto. gauge)	Unbolted cover, ungasketed	14	5.4	1.1	70.12	14.
	Unbolted cover, gasketed	4.3	17	0.38	42.47	4.3
	Bolted cover, gasketed	2.8	0	0	2.8	2.8
Gauge-hatch/sample port	Weighted mechanical action, gasketed	0.47	0.02	0.97	0.63	0.47
	Weighted mechanical actuation, ungasketed	2.3	0	0	2.3	2.3
	Slit fabric seal, 10% open area	12			12.	12.
Vacuum breaker	Weighted mechanical actuation, ungasketed	7.8	0.01	4	57.59	7.8
	Weighted mechanical actuation, gasketed	6.2	1.2	0.94	15.07	6.2
Deck drain	Open	1.5	0.21	1.7	9.33	1.5
	90% closed	1.8	0.14	1.1	3.25	1.8
Stub drain		1.2			1.2	1.2
Deck leg	Adjustable, internal floating deck	7.9			7.9	7.9
	Adjustable, pontoon area -ungasketed	2	0.37	0.91	4.57	2.
	Adjustable, pontoon area -gasketed	1.3	0.08	0.65	1.62	1.3
	Adjustable, pontoon area -sock	1.2	0.14	0.65	1.76	1.2
	Adjustable, center area -ungasketed	0.82	0.53	0.14	1.53	0.82
	Adjustable, center area -gasketed	0.53	0.11	0.13	0.68	0.53
	Adjustable, center area -sock	0.49	0.16	0.14	0.71	0.49
	Adjustable, double-deck roofs	0.82	0.53	0.14	1.53	0.82
	Fixed	0	0	0	0.	0.
Rim Vent	Weighted mechanical actuation, ungasketed	0.68	1.8	1	15.8	0.68
	Weighted mechanical actuation, gasketed	0.71	0.1	1	1.55	0.71
Ladder well	Sliding cover, ungasketed	98			98.	98.
	Sliding cover, gasketed	56			56.	56.
	For EFR tanks, Kv=	0.7				
	For IFR tanks, Kv=	0				
	Average ambient wind speed =	12				
Deck -Fitting Loss Factors from AP-42, Table 7.1-12 (Nov. 2006)						
Average wind speed from AP-42, Table 7.1-9 (Nov. 2006)						

FHR's Exhibt A

Fugitive Emission Rate Estimates
Ingleside Terminal
New Components

FIN:	FUG-1
EPN:	FUG-1
Operating schedule (hr/yr):	8760

Flint Hills Resources Corpus Christi, LLC has implemented an audio, visual, olfactory Inspection and Maintenance (I&M) program as specified on the March 21, 1996 TNRCC memo for Petroleum Marketing Terminal Fugitive Emission Factors. Because this facility is a marketing terminal, these factors are the most appropriate for use in estimating fugitive emissions from this site.

Emission Source	Source Count	Emission Factors (lb/hr-source)	Control Factor	Controlled Emissions (lb/hr)	Controlled Emissions (ton/yr)
Valves - gas	75	0.0000287	0.00	0.0022	0.0094
Valves - light liquid	489	0.0000948	0.00	0.0464	0.2030
Pump seals	0	0.001190	0.00	0.0000	0.0000
Flanges - gas	150	0.00009260	0.00	0.0139	0.0608
Flanges - light liquid	279	0.00001760	0.00	0.0049	0.0215
Relief valve-gas	0	0.000265	0.00	0.0000	0.0000
Sampling Connection - light liquid	60	0.000287	0.00	0.0172	0.0754
TOTAL EMISSIONS:				0.0845	0.3702

SAMPLE CALCULATION:

Valves (light liquid) = (489 sources)(0.0000948 lb/hr-source)(1 - 0.00)
= 0.0464 lb/hr

Pollutant	Weight Fraction	Emission Rate (lb/hr)	Emission Rate (ton/yr)
Benzene	0.0060	0.0005	0.0022
Cumene	0.0010	0.0001	0.0004
Cyclohexane	0.0070	0.0006	0.0026
Ethylbenzene	0.0040	0.0003	0.0015
Hexane	0.0040	0.0003	0.0015
Toluene	0.0100	0.0008	0.0037
Trimethylbenzene	0.0033	0.0003	0.0012
Trimethylpentane	0.0010	0.0001	0.0004
Xylene	0.0140	0.0012	0.0052
Crude Oil - misc.	0.9497	0.0803	0.3516
Total	1.000	0.0845	0.3702

Fugitive Emission Rate Estimates
Ingleside Terminal
Total Components
(including PBR Registration Nos. 124323 and 151016)

FIN:	FUG-1
EPN:	FUG-1
Operating schedule (hr/yr):	8760

Flint Hills Resources Corpus Christi, LLC has implemented an audio, visual, olfactory Inspection and Maintenance (I&M) program as specified on the March 21, 1996 TNRCC memo for Petroleum Marketing Terminal Fugitive Emission Factors. Because this facility is a marketing terminal, these factors are the most appropriate for use in estimating fugitive emissions from this site.

Emission Source	Source Count	Emission Factors (lb/hr-source)	Control Factor	Controlled Emissions (lb/hr)	Controlled Emissions (ton/yr)
Valves - gas	188	0.0000287	0.00	0.0054	0.0236
Valves - light liquid	1677	0.0000948	0.00	0.1590	0.6963
Pump seals	31	0.001190	0.00	0.0369	0.1616
Flanges - gas	289	0.00009260	0.00	0.0268	0.1172
Flanges - light liquid	2923	0.00001760	0.00	0.0514	0.2253
Relief valve	2	0.000265	0.00	0.0005	0.0023
Sampling Connection - light liquid	60	0.000287	0.00	0.0172	0.0754
TOTAL EMISSIONS:				0.2972	1.3018

SAMPLE CALCULATION:

Valves (light liquid) = (1,677 sources)(0.0000948 lb/hr-source)(1 - 0.00)
= 0.1590 lb/hr

Pollutant	Weight Fraction	Emission Rate (lb/hr)	Emission Rate (ton/yr)
Benzene	0.0060	0.0018	0.0078
Cumene	0.0010	0.0003	0.0013
Cyclohexane	0.0070	0.0021	0.0091
Ethylbenzene	0.0040	0.0012	0.0052
Hexane	0.0040	0.0012	0.0052
Toluene	0.0100	0.0030	0.0130
Trimethylbenzene	0.0033	0.0010	0.0043
Trimethylpentane	0.0010	0.0003	0.0013
Xylene	0.0140	0.0042	0.0182
Crude Oil - misc.	0.9497	0.2823	1.2363
Total	1.000	0.2972	1.3018

AIR PERMIT APPLICATION TABLES

A Table 1(a) is provided in this section showing the proposed emission limits for each of the facilities affected by this amendment application. A Table 3 is provided for the new MVCUs (EPNs MVCU1, MVCU2, and MVCU3). A Table 7(d) is provided for the new storage Tanks 28087, 28088, 28089, 28090, 28091, and 28092.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	**April 2018; Revised September 2018**	**Permit No.: 6606**	**Regulated Entity No.: RN100222744**
Area Name:	**Ingleside Terminal**		**Customer Reference No.: CN603741463**

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

AIR CONTAMINANT DATA					
1. Emission Point			**2. Component or Air Contaminant Name**	**3. Air Contaminant Emission Rate**	
(A) EPN	**(B) FIN**	**(C) NAME**		**(A) POUND**	**(B) TPY**
MVCU1	DOCK	Marine Vapor Combustion Unit No. 1	VOC	3.10	N/A
			NOx	4.14	N/A
			CO	5.40	N/A
			SO_2	11.40	N/A
			$PM/PM_{10}/PM_{2.5}$	1.35	N/A
			H_2S	0.06	N/A
MVCU2	DOCK	Marine Vapor Combustion Unit No. 2	VOC	3.10	N/A
			NOx	4.14	N/A
			CO	5.40	N/A
			SO_2	11.40	N/A
			$PM/PM_{10}/PM_{2.5}$	1.35	N/A
			H_2S	0.06	N/A

EPN = Emission Point Number
FIN = Facility Identification Number

TCEQ - 10153 (Revised 04/08) Table 1(a)
This form is for use by sources subject to air quality permit requirements and may be revised periodically. (APDG 5178 v5)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date: April 2018; Revised September 2018	Permit No.: 6606	Regulated Entity No.:	RN100222744
Area Name: Ingleside Terminal		Customer Reference No.:	CN603741463

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

AIR CONTAMINANT DATA					
1. Emission Point			2. Component or Air Contaminant Name	3. Air Contaminant Emission Rate	
(A) EPN	(B) FIN	(C) NAME		(A) POUND	(B) TPY
MVCU3	DOCK	Marine Vapor Combustion Unit No. 3	VOC	3.10	N/A
			NOx	4.14	N/A
			CO	5.40	N/A
			SO_2	11.40	N/A
			$PM/PM_{10}/PM_{2.5}$	1.35	N/A
			H_2S	0.06	N/A
MVCU1 / MVCU2/MVCU3	DOCK	Combined Annual Emission Limit for MVCUs	VOC	N/A	10.89
			NOx	N/A	19.32
			CO	N/A	25.20
			SO_2	N/A	35.40
			$PM/PM_{10}/PM_{2.5}$	N/A	6.30
			H_2S	N/A	0.19
DOCK	DOCK	Ship and Barge Loading Dock	VOC	6.38	6.36
			H_2S	0.02	0.02

EPN = Emission Point Number
FIN = Facility Identification Number

TCEQ - 10153 (Revised 04/08) Table 1(a)
This form is for use by sources subject to air quality permit requirements and may be revised periodically. (APDG 5178 v5)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	**April 2018; Revised September 2018**	**Permit No.: 6606**		**Regulated Entity No.:**	**RN100222744**
Area Name:	**Ingleside Terminal**			**Customer Reference No.:**	**CN603741463**

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

AIR CONTAMINANT DATA					
1. Emission Point			**2. Component or Air Contaminant Name**	**3. Air Contaminant Emission Rate**	
(A) EPN	**(B) FIN**	**(C) NAME**		**(A) POUND**	**(B) TPY**
TK-28075	28075	Tank 28075	VOC	8.35	7.83
			H_2S	0.13	0.08
TK-28087	28087	Tank 28087	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28088	28088	Tank 28088	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28089	28089	Tank 28089	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28090	28090	Tank 28090	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28091	28091	Tank 28091	VOC	8.66	N/A
			H_2S	0.02	N/A

EPN = Emission Point Number
FIN = Facility Identification Number

TCEQ - 10153 (Revised 04/08) Table 1(a)
This form is for use by sources subject to air quality permit requirements and may be revised periodically. (APDG 5178 v5)

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	**April 2018; Revised September 2018**	**Permit No.: 6606**	**Regulated Entity No.: RN100222744**
Area Name:	**Ingleside Terminal**		**Customer Reference No.: CN603741463**

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

AIR CONTAMINANT DATA					
1. Emission Point			**2. Component or Air Contaminant Name**	**3. Air Contaminant Emission Rate**	
(A) EPN	**(B) FIN**	**(C) NAME**		**(A) POUND**	**(B) TPY**
TK-28092	28092	Tank 28092	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28087, TK-28088, TK-28089, TK-28090, TK-28091, TK-28092	28087, 28088, 28089, 28090, 28091, 28092	Annual Caps for Tanks 28087, 28088, 28089, 28090, 28091, 28092	VOC	N/A	10.24
			H_2S	N/A	0.05
TK-28071	28071	Tank 28071	H_2S	0.09	0.05
FUG-1	FUG-1	Terminal Fugitives	VOC	0.30	1.30
			H_2S	0.02	0.02

EPN = Emission Point Number
FIN = Facility Identification Number

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date: April 2018; Revised September 2018	Permit No.: 6606	Regulated Entity No.:	RN100222744
Area Name: Ingleside Terminal		Customer Reference No.:	CN603741463

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			4. UTM Coordinates of Emission Point			Source							
						5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives		
EPN (A)	FIN (B)	Name (C)	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees (C)
MVCU1	DOCK, MVCU1	Marine Vapor Combustion Unit No. 1	14	677275	3078716		70	13	47.0	1600			
MVCU2	DOCK, MVCU2	Marine Vapor Combustion Unit No. 2	14	677297	3078721		70	13	47.0	1600			
MVCU3	DOCK, MVCU3	Marine Vapor Combustion Unit No. 3	14	677317	3078726		70	13	47.0	1600			
DOCK	DOCK	Ship and Barge Loading Dock	14	677244	3078607		16	0.0033	0.0033	ambient			
TK-28075	28075	Tank 28075	14	677683	3079166		55	0.0033	0.0033	ambient			
TK-28087	28087	Tank 28087	14	677652	3079095		56	0.0033	0.0033	ambient			
TK-28088	28088	Tank 28088	14	677757	3079360		56	0.0033	0.0033	ambient			
TK-28089	28089	Tank 28089	14	677655	3079459		56	0.0033	0.0033	ambient			
TK-28090	28090	Tank 28090	14	677152	3078876		56	0.0033	0.0033	ambient			
TK-28091	28091	Tank 28091	14	677722	3079422		56	0.0033	0.0033	ambient			
TK-28092	28092	Tank 28092	14	677621	3079024		56	0.0033	0.0033	ambient			
TK-28071	28071	Tank 28071	14	677467	3078971		56	0.0033	0.0033	ambient			
FUG-1	FUG-1	Terminal Fugitives	14	677089	3078548		5				600	600	
FWP-A	FWP-A	Fire Water Pump Engine A	14	677498	3078832		26	0.67	120	701			
FWP-B	FWP-B	Fire Water Pump Engine B	14	677501	3078832		26	0.67	120	701			

EPN = Emission Point Number
FIN = Facility Identification Number

TCEQ - 10153 (Revised 04/08) Table 1(a)
This form is for use by sources subject to air quality permit requirements and may be revised periodically. (APDG 5178 v5)

Texas Commission on Environmental Quality
Table 3
Simplified Data Sheet for Gaseous Abatement Devices

Equipment Information		
Complete one table for each abatement device.		
Emission Point No. (EPN) *(from flow diagram)*: MVCU1		
Type of Device: ☐ Vapor Condenser ☐ Absorber ☐ Adsorber ☒ Other: Vapor Combustor		
Manufacturer: John Zink	Model or Type:	
Design Removal Efficiency of Affected Pollutants		
Gaseous Pollutant	**Removal Efficiency**	
VOC	99.9%	
H2S	99%	

Gas Stream Characteristics			
Temperature °F		**Static Pressure (PSIG)**	**Composition Mole Percentage**
Inlet			
Outlet:			

Abatement Device Data Instructions	
☐	Attach separate sheets as necessary providing a description of the air pollution abatement device(s) or treatment including details regarding principles of operation, size, type, capacity, and the basis for calculating its efficiency.

FHR's Exhibt A

Texas Commission on Environmental Quality
Table 3
Simplified Data Sheet for Gaseous Abatement Devices

Equipment Information		
Complete one table for each abatement device.		
Emission Point No. (EPN) *(from flow diagram)*: MVCU2		
Type of Device: ☐ Vapor Condenser ☐ Absorber ☐ Adsorber ☒ Other: Vapor Combustor		
Manufacturer: John Zink	Model or Type:	
Design Removal Efficiency of Affected Pollutants		
Gaseous Pollutant	**Removal Efficiency**	
VOC	99.9%	
H2S	99%	

Gas Stream Characteristics			
Temperature °F		**Static Pressure (PSIG)**	**Composition Mole Percentage**
Inlet			
Outlet:			

Abatement Device Data Instructions	
☐	Attach separate sheets as necessary providing a description of the air pollution abatement device(s) or treatment including details regarding principles of operation, size, type, capacity, and the basis for calculating its efficiency.

FHR's Exhibt A

Texas Commission on Environmental Quality
Table 3
Simplified Data Sheet for Gaseous Abatement Devices

Equipment Information			
Complete one table for each abatement device.			
Emission Point No. (EPN) *(from flow diagram)*: MVCU3			
Type of Device: ☐ Vapor Condenser ☐ Absorber ☐ Adsorber ☒ Other: Vapor Combustor			
Manufacturer: John Zink		Model or Type:	
Design Removal Efficiency of Affected Pollutants			
Gaseous Pollutant		**Removal Efficiency**	
VOC		99.9%	
H2S		99%	
Gas Stream Characteristics			
Temperature °F		**Static Pressure (PSIG)**	**Composition Mole Percentage**
Inlet			
Outlet:			
Abatement Device Data Instructions			
☐	Attach separate sheets as necessary providing a description of the air pollution abatement device(s) or treatment including details regarding principles of operation, size, type, capacity, and the basis for calculating its efficiency.		

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

I. Tank Identification ***(Use a separate form for each tank).***			
Applicant's Name: Flint Hills Resources Corpus Christi, LLC			
Location (*indicate on plot plan and provide coordinates*)			
Tank No.: 28087	Emission Point No. (EPN) *(from flow diagram)*: TK-28087		
FIN: 28087	CIN:		
Status: ☒ New Tank	☐ Altered Tank	☐ Relocation	☐ Change of Service
Previous Permit No., Permit by Rule No., or exemption number(s):			
II. Tank Physical Characteristics			
Dimensions			
Shell Height (*ft.*): 56	Diameter (*ft.*): 190		
Normal Capacity of Tank Volume (*gallons*): 10,500,000			
Turnovers per year:	Net Throughput (*gallons/year*): 924,000,000		
Maximum Pumping Rate (*gallons/year*[1]): 42,000 gallons/hour			
Self-Supporting Roof:			☐ YES ☐ NO
Number of Columns: 0-Domed Roof	Column Diameter: ft.		
Shell/Roof and Paint Characteristics			
Shell Condition:	☒ Light Rust	☐ Dense Rust	☐ Gunite Lining
Shell Color/Shade:	☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Shell Condition: ☒ Good	☐ Poor		
Roof Color/Shade:	☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Roof Condition: ☒ Good	☐ Poor		
Rim-Seal System			
Primary Seal:	☐ Vapor-mounted	☐ Liquid-mounted	☒ Mechanical Shoe
Secondary Seal:			☒ YES ☐ NO
Deck Characteristic			
Deck Type: ☐ Bolted	☒ Welded		

[1] *Use the higher of the maximum fill rate or maximum withdrawal rate.*

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

II. Tank Physical Characteristics			
Deck Characteristic *(continued)*			
Deck Construction (*Bolted Tanks Only):*			
☐ Continuous Sheet Construction 5 ft. wide			
☐ Continuous Sheet Construction 6 ft. wide			
☐ Continuous Sheet Construction 7 ft. wide			
☐ Rectangular Panel Construction 5 X 7.5 ft. wide			
☐ Rectangular Panel Construction 5 X 12 ft. wide			
Deck Seam Length (*Bolted Tanks Only*) (*ft.*):			
Roof Fitting Loss Factor (*lb-mole/year*): 114.99 - see tank calculations for fitting factor information			
Based upon:	☐ Typical	☐ Controlled	◉ Actual Fittings
Complete Section IV. "Fittings Information" to recorded fittings count used to calculate the roof fitting loss factor.			
III. Liquid Properties of Stored Material			
Chemical Category:	☐ Organic Liquids	☐ Petroleum Distillates	☒ Crude Oils
Single or Multi-Category:		☐ Single *(Complete Section III. 1)*	☐ Multiple *(Complete Section III. 2)*
1. Single Component Information			
Chemical Name:			
CAS No.:			
Average Liquid Surface Temperature (°F):			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*):			
Liquid Molecular Weight: 207			
2. Multiple Component Information			
Mixture Name: Crude Oil			
Average Liquid Surface Temperature (°F): 71.6			
Minimum Liquid Surface Temperature (°F): N/A			
Maximum Liquid Surface Temperature (°F): 100			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*): 9.05			
True Vapor Pressure at Minimum Liquid Surface Temperature (*psia*): N/A			
True Vapor Pressure at Maximum Liquid Surface Temperature (*psia*): 10.9			
Liquid Molecular Weight: 207		Vapor Molecular Weight: 50	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

III. Liquid Properties of Stored Material				
Chemical Components Information *(Below)*				
Chemical Name	**CAS No.**	**Percent of Total Liquid Weight *(typical)***	**Percent of Total Vapor Weight *(typical)***	**Molecular Weight**
Benzene	71432	0.6	3.70	78.1
Cumene	98828	0.1	.02	120.2
Cyclohexane	110827	0.7	4.55	84.2
Ethylbenzene	100414	0.4	0.25	106.2
Hexane	110543	0.4	3.94	86.2
Toluene	108883	1	1.83	92.1
1,2,4- Trimethylbenzene	95636	0.33	0.04	120.2
2,2,4-Trimethylpentane	540841	0.1	0.32	114.2
Xylene	95476	1.4	0.78	106.2
Other VOC			84.57	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

IV. Fitting Information				
Fitting Type	**Fitting Status**	**Quantity**	**Deck Fitting Loss Factor K_F**	**Quality x K_F**
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	*	1.6	*
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed		11	
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed		25	
Automatic Gauge Float Well	Bolted Cover, Gasketed		5.1	
Automatic Gauge Float Well	Unbolted Cover, Gasketed		15	
Automatic Gauge Float Well	Unbolted Cover, Ungasketed		28	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Gask		33	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Ungask		47	
Column Well (24-in.Diam.)	Pipe Col. - Flex. Fabric Sleeve Seal		10	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Gask		19	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Ungask		32	
Ladder Well (36-in. Diam.)	Sliding Cover, Ungasketed		76	
Ladder Well (36-in. Diam.)	Sliding Cover, Gasketed		56	
Roof Leg or Hanger Well	Adjustable		7.9	
Roof Leg or Hanger Well	Fixed		0	
Sample Pipe or Well (24-in. Diam.)	Slit Fabric Seal 10% Open		12	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Gask		44	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Ungask		57	
Stub Drain (1-in. Diam.)			1.2	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Gask		07	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Ungask		0.9	
Total deck fitting loss factor, lb-mole/year				

* See tank calculations for quantity of fittings and calculation of fitting factor.

Save Form | Reset Form

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

I. Tank Identification *(Use a separate form for each tank).*			
Applicant's Name: Flint Hills Resources Corpus Christi, LLC			
Location (*indicate on plot plan and provide coordinates*)			
Tank No.: 28088	Emission Point No. (EPN) *(from flow diagram)*: TK-28088		
FIN: 28088	CIN:		
Status: ☒ New Tank	☐ Altered Tank	☐ Relocation	☐ Change of Service
Previous Permit No., Permit by Rule No., or exemption number(s):			
II. Tank Physical Characteristics			
Dimensions			
Shell Height (*ft.*): 56	Diameter (*ft.*): 190		
Normal Capacity of Tank Volume (*gallons*): 10,500,000			
Turnovers per year:	Net Throughput (*gallons/year*): 924,000,000		
Maximum Pumping Rate (*gallons/year*[1]): 42,000 gallons/hour			
Self-Supporting Roof:	☐ YES ☐ NO		
Number of Columns: 0-Domed Roof	Column Diameter: ft.		
Shell/Roof and Paint Characteristics			
Shell Condition:	☒ Light Rust	☐ Dense Rust	☐ Gunite Lining
Shell Color/Shade:	☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Shell Condition: ☒ Good ☐ Poor			
Roof Color/Shade:	☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Roof Condition: ☒ Good ☐ Poor			
Rim-Seal System			
Primary Seal:	☐ Vapor-mounted	☐ Liquid-mounted	☒ Mechanical Shoe
Secondary Seal:	☒ YES ☐ NO		
Deck Characteristic			
Deck Type: ☐ Bolted ☒ Welded			

[1] *Use the higher of the maximum fill rate or maximum withdrawal rate.*

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

II. Tank Physical Characteristics			
Deck Characteristic *(continued)*			
Deck Construction (*Bolted Tanks Only):*			
☐ Continuous Sheet Construction 5 ft. wide			
☐ Continuous Sheet Construction 6 ft. wide			
☐ Continuous Sheet Construction 7 ft. wide			
☐ Rectangular Panel Construction 5 X 7.5 ft. wide			
☐ Rectangular Panel Construction 5 X 12 ft. wide			
Deck Seam Length (*Bolted Tanks Only*) (*ft.*):			
Roof Fitting Loss Factor (*lb-mole/year*): 114.99 - see tank calculations for fitting factor information			
Based upon:	☐ Typical	☐ Controlled	☒ Actual Fittings
Complete Section IV. "Fittings Information" to recorded fittings count used to calculate the roof fitting loss factor.			
III. Liquid Properties of Stored Material			
Chemical Category:	☐ Organic Liquids	☐ Petroleum Distillates	☒ Crude Oils
Single or Multi-Category:		☐ Single *(Complete Section III. 1)*	☐ Multiple *(Complete Section III. 2)*
1. Single Component Information			
Chemical Name:			
CAS No.:			
Average Liquid Surface Temperature (*°F*):			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*):			
Liquid Molecular Weight: 207			
2. Multiple Component Information			
Mixture Name: Crude Oil			
Average Liquid Surface Temperature (*°F*): 71.6			
Minimum Liquid Surface Temperature (*°F*): N/A			
Maximum Liquid Surface Temperature (*°F*): 100			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*): 9.05			
True Vapor Pressure at Minimum Liquid Surface Temperature (*psia*): N/A			
True Vapor Pressure at Maximum Liquid Surface Temperature (*psia*): 10.9			
Liquid Molecular Weight: 207		Vapor Molecular Weight: 50	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

III. Liquid Properties of Stored Material				
Chemical Components Information *(Below)*				
Chemical Name	**CAS No.**	**Percent of Total Liquid Weight *(typical)***	**Percent of Total Vapor Weight *(typical)***	**Molecular Weight**
Benzene	71432	0.6	3.70	78.1
Cumene	98828	0.1	.02	120.2
Cyclohexane	110827	0.7	4.55	84.2
Ethylbenzene	100414	0.4	0.25	106.2
Hexane	110543	0.4	3.94	86.2
Toluene	108883	1	1.83	92.1
1,2,4- Trimethylbenzene	95636	0.33	0.04	120.2
2,2,4-Trimethylpentane	540841	0.1	0.32	114.2
Xylene	95476	1.4	0.78	106.2
Other VOC			84.57	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

IV. Fitting Information

Fitting Type	Fitting Status	Quantity	Deck Fitting Loss Factor K_F	Quality x K_F
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	*	1.6	*
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed		11	
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed		25	
Automatic Gauge Float Well	Bolted Cover, Gasketed		5.1	
Automatic Gauge Float Well	Unbolted Cover, Gasketed		15	
Automatic Gauge Float Well	Unbolted Cover, Ungasketed		28	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Gask		33	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Ungask		47	
Column Well (24-in.Diam.)	Pipe Col. - Flex. Fabric Sleeve Seal		10	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Gask		19	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Ungask		32	
Ladder Well (36-in. Diam.)	Sliding Cover, Ungasketed		76	
Ladder Well (36-in. Diam.)	Sliding Cover, Gasketed		56	
Roof Leg or Hanger Well	Adjustable		7.9	
Roof Leg or Hanger Well	Fixed		0	
Sample Pipe or Well (24-in. Diam.)	Slit Fabric Seal 10% Open		12	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Gask		44	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Ungask		57	
Stub Drain (1-in. Diam.)			1.2	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Gask		07	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Ungask		0.9	
Total deck fitting loss factor, lb-mole/year				

* See tank calculations for quantity of fittings and calculation of fitting factor.

Save Form   Reset Form

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

I. Tank Identification ***(Use a separate form for each tank).***			
Applicant's Name: Flint Hills Resources Corpus Christi, LLC			
Location (*indicate on plot plan and provide coordinates*)			
Tank No.: 28089	Emission Point No. (EPN) *(from flow diagram)*: TK-28089		
FIN: 28089	CIN:		
Status: ☒ New Tank	☐ Altered Tank	☐ Relocation	☐ Change of Service
Previous Permit No., Permit by Rule No., or exemption number(s):			
II. Tank Physical Characteristics			
Dimensions			
Shell Height (*ft.*): 56	Diameter (*ft.*): 190		
Normal Capacity of Tank Volume (*gallons*): 10,500,000			
Turnovers per year:	Net Throughput (*gallons/year*): 924,000,000		
Maximum Pumping Rate (*gallons/year*[1]): 42,000 gallons/hour			
Self-Supporting Roof:			☐ YES ☐ NO
Number of Columns: 0-Domed Roof	Column Diameter: ft.		
Shell/Roof and Paint Characteristics			
Shell Condition: ☒ Light Rust	☐ Dense Rust	☐ Gunite Lining	
Shell Color/Shade: ☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse	
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Shell Condition: ☒ Good	☐ Poor		
Roof Color/Shade: ☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse	
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Roof Condition: ☒ Good	☐ Poor		
Rim-Seal System			
Primary Seal: ☐ Vapor-mounted	☐ Liquid-mounted	☒ Mechanical Shoe	
Secondary Seal:			☒ YES ☐ NO
Deck Characteristic			
Deck Type: ☐ Bolted	☒ Welded		

[1] *Use the higher of the maximum fill rate or maximum withdrawal rate.*

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

II. Tank Physical Characteristics			
Deck Characteristic *(continued)*			
Deck Construction (*Bolted Tanks Only):*			
☐ Continuous Sheet Construction 5 ft. wide			
☐ Continuous Sheet Construction 6 ft. wide			
☐ Continuous Sheet Construction 7 ft. wide			
☐ Rectangular Panel Construction 5 X 7.5 ft. wide			
☐ Rectangular Panel Construction 5 X 12 ft. wide			
Deck Seam Length (*Bolted Tanks Only*) (*ft.*):			
Roof Fitting Loss Factor (*lb-mole/year*): 114.99 - see tank calculations for fitting factor information			
Based upon:	☐ Typical	☐ Controlled	◉ Actual Fittings
Complete Section IV. "Fittings Information" to recorded fittings count used to calculate the roof fitting loss factor.			
III. Liquid Properties of Stored Material			
Chemical Category:	☐ Organic Liquids	☐ Petroleum Distillates	☒ Crude Oils
Single or Multi-Category:	☐ Single *(Complete Section III. 1)*	☐ Multiple *(Complete Section III. 2)*	
1. Single Component Information			
Chemical Name:			
CAS No.:			
Average Liquid Surface Temperature (*°F*):			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*):			
Liquid Molecular Weight: 207			
2. Multiple Component Information			
Mixture Name: Crude Oil			
Average Liquid Surface Temperature (*°F*): 71.6			
Minimum Liquid Surface Temperature (*°F*): N/A			
Maximum Liquid Surface Temperature (*°F*): 100			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*): 9.05			
True Vapor Pressure at Minimum Liquid Surface Temperature (*psia*): N/A			
True Vapor Pressure at Maximum Liquid Surface Temperature (*psia*): 10.9			
Liquid Molecular Weight: 207	Vapor Molecular Weight: 50		

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

III. Liquid Properties of Stored Material				
Chemical Components Information *(Below)*				
Chemical Name	**CAS No.**	**Percent of Total Liquid Weight *(typical)***	**Percent of Total Vapor Weight *(typical)***	**Molecular Weight**
Benzene	71432	0.6	3.70	78.1
Cumene	98828	0.1	.02	120.2
Cyclohexane	110827	0.7	4.55	84.2
Ethylbenzene	100414	0.4	0.25	106.2
Hexane	110543	0.4	3.94	86.2
Toluene	108883	1	1.83	92.1
1,2,4- Trimethylbenzene	95636	0.33	0.04	120.2
2,2,4-Trimethylpentane	540841	0.1	0.32	114.2
Xylene	95476	1.4	0.78	106.2
Other VOC			84.57	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

IV. Fitting Information				
Fitting Type	**Fitting Status**	**Quantity**	**Deck Fitting Loss Factor K_F**	**Quality x K_F**
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	*	1.6	*
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed		11	
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed		25	
Automatic Gauge Float Well	Bolted Cover, Gasketed		5.1	
Automatic Gauge Float Well	Unbolted Cover, Gasketed		15	
Automatic Gauge Float Well	Unbolted Cover, Ungasketed		28	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Gask		33	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Ungask		47	
Column Well (24-in.Diam.)	Pipe Col. - Flex. Fabric Sleeve Seal		10	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Gask		19	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Ungask		32	
Ladder Well (36-in. Diam.)	Sliding Cover, Ungasketed		76	
Ladder Well (36-in. Diam.)	Sliding Cover, Gasketed		56	
Roof Leg or Hanger Well	Adjustable		7.9	
Roof Leg or Hanger Well	Fixed		0	
Sample Pipe or Well (24-in. Diam.)	Slit Fabric Seal 10% Open		12	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Gask		44	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Ungask		57	
Stub Drain (1-in. Diam.)			1.2	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Gask		07	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Ungask		0.9	
Total deck fitting loss factor, lb-mole/year				

* See tank calculations for quantity of fittings and calculation of fitting factor.

Save Form   Reset Form

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

I. Tank Identification ***(Use a separate form for each tank).***			
Applicant's Name: Flint Hills Resources Corpus Christi, LLC			
Location (*indicate on plot plan and provide coordinates*)			
Tank No.: 28090	Emission Point No. (EPN) *(from flow diagram)*: TK-28090		
FIN: 28090	CIN:		
Status: ☒ New Tank	☐ Altered Tank	☐ Relocation	☐ Change of Service
Previous Permit No., Permit by Rule No., or exemption number(s):			
II. Tank Physical Characteristics			
Dimensions			
Shell Height (*ft.*): 56	Diameter (*ft.*): 190		
Normal Capacity of Tank Volume (*gallons*): 10,500,000			
Turnovers per year:	Net Throughput (*gallons/year*): 924,000,000		
Maximum Pumping Rate (*gallons/year*[1]): 42,000 gallons/hour			
Self-Supporting Roof:	☐ YES ☐ NO		
Number of Columns: 0-Domed Roof	Column Diameter: ft.		
Shell/Roof and Paint Characteristics			
Shell Condition: ☒ Light Rust	☐ Dense Rust	☐ Gunite Lining	
Shell Color/Shade: ☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse	
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Shell Condition: ☒ Good	☐ Poor		
Roof Color/Shade: ☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse	
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Roof Condition: ☒ Good	☐ Poor		
Rim-Seal System			
Primary Seal:	☐ Vapor-mounted	☐ Liquid-mounted	☒ Mechanical Shoe
Secondary Seal:	☒ YES ☐ NO		
Deck Characteristic			
Deck Type: ☐ Bolted	☒ Welded		

[1] *Use the higher of the maximum fill rate or maximum withdrawal rate.*

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

II. Tank Physical Characteristics			
Deck Characteristic *(continued)*			
Deck Construction (*Bolted Tanks Only):*			
☐ Continuous Sheet Construction 5 ft. wide			
☐ Continuous Sheet Construction 6 ft. wide			
☐ Continuous Sheet Construction 7 ft. wide			
☐ Rectangular Panel Construction 5 X 7.5 ft. wide			
☐ Rectangular Panel Construction 5 X 12 ft. wide			
Deck Seam Length (*Bolted Tanks Only*) (*ft.*):			
Roof Fitting Loss Factor (*lb-mole/year*): 114.99 - see tank calculations for fitting factor information			
Based upon:	☐ Typical	☐ Controlled	◉ Actual Fittings
Complete Section IV. "Fittings Information" to recorded fittings count used to calculate the roof fitting loss factor.			
III. Liquid Properties of Stored Material			
Chemical Category:	☐ Organic Liquids	☐ Petroleum Distillates	☒ Crude Oils
Single or Multi-Category:		☐ Single *(Complete Section III. 1)*	☐ Multiple *(Complete Section III. 2)*
1. Single Component Information			
Chemical Name:			
CAS No.:			
Average Liquid Surface Temperature (°F):			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*):			
Liquid Molecular Weight: 207			
2. Multiple Component Information			
Mixture Name: Crude Oil			
Average Liquid Surface Temperature (°F): 71.6			
Minimum Liquid Surface Temperature (°F): N/A			
Maximum Liquid Surface Temperature (°F): 100			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*): 9.05			
True Vapor Pressure at Minimum Liquid Surface Temperature (*psia*): N/A			
True Vapor Pressure at Maximum Liquid Surface Temperature (*psia*): 10.9			
Liquid Molecular Weight: 207		Vapor Molecular Weight: 50	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

III. Liquid Properties of Stored Material				
Chemical Components Information *(Below)*				
Chemical Name	**CAS No.**	**Percent of Total Liquid Weight *(typical)***	**Percent of Total Vapor Weight *(typical)***	**Molecular Weight**
Benzene	71432	0.6	3.70	78.1
Cumene	98828	0.1	.02	120.2
Cyclohexane	110827	0.7	4.55	84.2
Ethylbenzene	100414	0.4	0.25	106.2
Hexane	110543	0.4	3.94	86.2
Toluene	108883	1	1.83	92.1
1,2,4- Trimethylbenzene	95636	0.33	0.04	120.2
2,2,4-Trimethylpentane	540841	0.1	0.32	114.2
Xylene	95476	1.4	0.78	106.2
Other VOC			84.57	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

IV. Fitting Information				
Fitting Type	**Fitting Status**	**Quantity**	**Deck Fitting Loss Factor K_F**	**Quality x K_F**
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	*	1.6	*
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed		11	
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed		25	
Automatic Gauge Float Well	Bolted Cover, Gasketed		5.1	
Automatic Gauge Float Well	Unbolted Cover, Gasketed		15	
Automatic Gauge Float Well	Unbolted Cover, Ungasketed		28	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Gask		33	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Ungask		47	
Column Well (24-in.Diam.)	Pipe Col. - Flex. Fabric Sleeve Seal		10	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Gask		19	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Ungask		32	
Ladder Well (36-in. Diam.)	Sliding Cover, Ungasketed		76	
Ladder Well (36-in. Diam.)	Sliding Cover, Gasketed		56	
Roof Leg or Hanger Well	Adjustable		7.9	
Roof Leg or Hanger Well	Fixed		0	
Sample Pipe or Well (24-in. Diam.)	Slit Fabric Seal 10% Open		12	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Gask		44	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Ungask		57	
Stub Drain (1-in. Diam.)			1.2	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Gask		07	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Ungask		0.9	
Total deck fitting loss factor, lb-mole/year				

* See tank calculations for quantity of fittings and calculation of fitting factor.

Save Form   Reset Form

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

I. Tank Identification ***(Use a separate form for each tank).***	
Applicant's Name: Flint Hills Resources Corpus Christi, LLC	
Location (*indicate on plot plan and provide coordinates*)	
Tank No.: 28091	Emission Point No. (EPN) *(from flow diagram)*: TK-28091
FIN: 28091	CIN:
Status: ☒ New Tank ☐ Altered Tank ☐ Relocation ☐ Change of Service	
Previous Permit No., Permit by Rule No., or exemption number(s):	
II. Tank Physical Characteristics	
Dimensions	
Shell Height (*ft.*): 56	Diameter (*ft.*): 190
Normal Capacity of Tank Volume (*gallons*): 10,500,000	
Turnovers per year:	Net Throughput (*gallons/year*): 924,000,000
Maximum Pumping Rate (*gallons/year*[1]): 42,000 gallons/hour	
Self-Supporting Roof: ☐ YES ☐ NO	
Number of Columns: 0-Domed Roof	Column Diameter: ft.
Shell/Roof and Paint Characteristics	
Shell Condition: ☒ Light Rust ☐ Dense Rust ☐ Gunite Lining	
Shell Color/Shade: ☒ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer ☐ Other Describe:	
Shell Condition: ☒ Good ☐ Poor	
Roof Color/Shade: ☒ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer ☐ Other Describe:	
Roof Condition: ☒ Good ☐ Poor	
Rim-Seal System	
Primary Seal: ☐ Vapor-mounted ☐ Liquid-mounted ☒ Mechanical Shoe	
Secondary Seal: ☒ YES ☐ NO	
Deck Characteristic	
Deck Type: ☐ Bolted ☒ Welded	

[1] *Use the higher of the maximum fill rate or maximum withdrawal rate.*

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

II. Tank Physical Characteristics			
Deck Characteristic *(continued)*			
Deck Construction (*Bolted Tanks Only):*			
☐ Continuous Sheet Construction 5 ft. wide			
☐ Continuous Sheet Construction 6 ft. wide			
☐ Continuous Sheet Construction 7 ft. wide			
☐ Rectangular Panel Construction 5 X 7.5 ft. wide			
☐ Rectangular Panel Construction 5 X 12 ft. wide			
Deck Seam Length (*Bolted Tanks Only*) (*ft.*):			
Roof Fitting Loss Factor (*lb-mole/year*): 114.99 - see tank calculations for fitting factor information			
Based upon:	☐ Typical	☐ Controlled	◉ Actual Fittings
Complete Section IV. "Fittings Information" to recorded fittings count used to calculate the roof fitting loss factor.			
III. Liquid Properties of Stored Material			
Chemical Category:	☐ Organic Liquids	☐ Petroleum Distillates	☒ Crude Oils
Single or Multi-Category:		☐ Single *(Complete Section III. 1)*	☐ Multiple *(Complete Section III. 2)*
1. Single Component Information			
Chemical Name:			
CAS No.:			
Average Liquid Surface Temperature (*°F*):			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*):			
Liquid Molecular Weight: 207			
2. Multiple Component Information			
Mixture Name: Crude Oil			
Average Liquid Surface Temperature (*°F*): 71.6			
Minimum Liquid Surface Temperature (*°F*): N/A			
Maximum Liquid Surface Temperature (*°F*): 100			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*): 9.05			
True Vapor Pressure at Minimum Liquid Surface Temperature (*psia*): N/A			
True Vapor Pressure at Maximum Liquid Surface Temperature (*psia*): 10.9			
Liquid Molecular Weight: 207		Vapor Molecular Weight: 50	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

III. Liquid Properties of Stored Material				
Chemical Components Information *(Below)*				
Chemical Name	**CAS No.**	**Percent of Total Liquid Weight *(typical)***	**Percent of Total Vapor Weight *(typical)***	**Molecular Weight**
Benzene	71432	0.6	3.70	78.1
Cumene	98828	0.1	.02	120.2
Cyclohexane	110827	0.7	4.55	84.2
Ethylbenzene	100414	0.4	0.25	106.2
Hexane	110543	0.4	3.94	86.2
Toluene	108883	1	1.83	92.1
1,2,4- Trimethylbenzene	95636	0.33	0.04	120.2
2,2,4-Trimethylpentane	540841	0.1	0.32	114.2
Xylene	95476	1.4	0.78	106.2
Other VOC			84.57	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

IV. Fitting Information				
Fitting Type	**Fitting Status**	**Quantity**	**Deck Fitting Loss Factor K_F**	**Quality x K_F**
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	*	1.6	*
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed		11	
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed		25	
Automatic Gauge Float Well	Bolted Cover, Gasketed		5.1	
Automatic Gauge Float Well	Unbolted Cover, Gasketed		15	
Automatic Gauge Float Well	Unbolted Cover, Ungasketed		28	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Gask		33	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Ungask		47	
Column Well (24-in.Diam.)	Pipe Col. - Flex. Fabric Sleeve Seal		10	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Gask		19	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Ungask		32	
Ladder Well (36-in. Diam.)	Sliding Cover, Ungasketed		76	
Ladder Well (36-in. Diam.)	Sliding Cover, Gasketed		56	
Roof Leg or Hanger Well	Adjustable		7.9	
Roof Leg or Hanger Well	Fixed		0	
Sample Pipe or Well (24-in. Diam.)	Slit Fabric Seal 10% Open		12	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Gask		44	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Ungask		57	
Stub Drain (1-in. Diam.)			1.2	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Gask		07	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Ungask		0.9	
Total deck fitting loss factor, lb-mole/year				

* See tank calculations for quantity of fittings and calculation of fitting factor.

Save Form Reset Form

FHR's Exhibt A

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

I. Tank Identification ***(Use a separate form for each tank).***			
Applicant's Name: Flint Hills Resources Corpus Christi, LLC			
Location (*indicate on plot plan and provide coordinates*)			
Tank No.: 28092	Emission Point No. (EPN) *(from flow diagram)*: TK-28092		
FIN: 28092	CIN:		
Status: ☒ New Tank	☐ Altered Tank	☐ Relocation	☐ Change of Service
Previous Permit No., Permit by Rule No., or exemption number(s):			
II. Tank Physical Characteristics			
Dimensions			
Shell Height (*ft.*): 56	Diameter (*ft.*): 190		
Normal Capacity of Tank Volume (*gallons*): 10,500,000			
Turnovers per year:	Net Throughput (*gallons/year*): 924,000,000		
Maximum Pumping Rate (*gallons/year*[1]): 42,000 gallons/hour			
Self-Supporting Roof:	☐ YES ☐ NO		
Number of Columns: 0-Domed Roof	Column Diameter: ft.		
Shell/Roof and Paint Characteristics			
Shell Condition:	☒ Light Rust	☐ Dense Rust	☐ Gunite Lining
Shell Color/Shade:	☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Shell Condition: ☒ Good ☐ Poor			
Roof Color/Shade:	☒ White/White	☐ Aluminum/Specular	☐ Aluminum/Diffuse
☐ Gray/Light	☐ Gray/Medium	☐ Red/Primer	☐ Other
Describe:			
Roof Condition: ☒ Good ☐ Poor			
Rim-Seal System			
Primary Seal:	☐ Vapor-mounted	☐ Liquid-mounted	☒ Mechanical Shoe
Secondary Seal:	☒ YES ☐ NO		
Deck Characteristic			
Deck Type: ☐ Bolted ☒ Welded			

[1] *Use the higher of the maximum fill rate or maximum withdrawal rate.*

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

II. Tank Physical Characteristics			
Deck Characteristic *(continued)*			
Deck Construction (*Bolted Tanks Only):*			
☐ Continuous Sheet Construction 5 ft. wide			
☐ Continuous Sheet Construction 6 ft. wide			
☐ Continuous Sheet Construction 7 ft. wide			
☐ Rectangular Panel Construction 5 X 7.5 ft. wide			
☐ Rectangular Panel Construction 5 X 12 ft. wide			
Deck Seam Length (*Bolted Tanks Only*) (*ft.*):			
Roof Fitting Loss Factor (*lb-mole/year*): 114.99 - see tank calculations for fitting factor information			
Based upon:	☐ Typical	☐ Controlled	◉ Actual Fittings
Complete Section IV. "Fittings Information" to recorded fittings count used to calculate the roof fitting loss factor.			
III. Liquid Properties of Stored Material			
Chemical Category:	☐ Organic Liquids	☐ Petroleum Distillates	☒ Crude Oils
Single or Multi-Category:		☐ Single *(Complete Section III. 1)*	☐ Multiple *(Complete Section III. 2)*
1. Single Component Information			
Chemical Name:			
CAS No.:			
Average Liquid Surface Temperature (*°F*):			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*):			
Liquid Molecular Weight: 207			
2. Multiple Component Information			
Mixture Name: Crude Oil			
Average Liquid Surface Temperature (*°F*): 71.6			
Minimum Liquid Surface Temperature (*°F*): N/A			
Maximum Liquid Surface Temperature (*°F*): 100			
True Vapor Pressure at Average Liquid Surface Temperature (*psia*): 9.05			
True Vapor Pressure at Minimum Liquid Surface Temperature (*psia*): N/A			
True Vapor Pressure at Maximum Liquid Surface Temperature (*psia*): 10.9			
Liquid Molecular Weight: 207		Vapor Molecular Weight: 50	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

III. Liquid Properties of Stored Material				
Chemical Components Information *(Below)*				
Chemical Name	**CAS No.**	**Percent of Total Liquid Weight *(typical)***	**Percent of Total Vapor Weight *(typical)***	**Molecular Weight**
Benzene	71432	0.6	3.70	78.1
Cumene	98828	0.1	.02	120.2
Cyclohexane	110827	0.7	4.55	84.2
Ethylbenzene	100414	0.4	0.25	106.2
Hexane	110543	0.4	3.94	86.2
Toluene	108883	1	1.83	92.1
1,2,4- Trimethylbenzene	95636	0.33	0.04	120.2
2,2,4-Trimethylpentane	540841	0.1	0.32	114.2
Xylene	95476	1.4	0.78	106.2
Other VOC			84.57	

Texas Commission on Environmental Quality
Table 7(d)
Internal Floating Roof Storage Tank Summary

IV. Fitting Information				
Fitting Type	**Fitting Status**	**Quantity**	**Deck Fitting Loss Factor K_F**	**Quality x K_F**
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	*	1.6	*
Access Hatch (24-in. Diam.)	Unbolted Cover, Gasketed		11	
Access Hatch (24-in. Diam.)	Unbolted Cover, Ungasketed		25	
Automatic Gauge Float Well	Bolted Cover, Gasketed		5.1	
Automatic Gauge Float Well	Unbolted Cover, Gasketed		15	
Automatic Gauge Float Well	Unbolted Cover, Ungasketed		28	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Gask		33	
Column Well (24-in.Diam.)	Built-Up Col. - Sliding Cover, Ungask		47	
Column Well (24-in.Diam.)	Pipe Col. - Flex. Fabric Sleeve Seal		10	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Gask		19	
Column Well (24-in.Diam.)	Pipe Col. - Sliding Cover, Ungask		32	
Ladder Well (36-in. Diam.)	Sliding Cover, Ungasketed		76	
Ladder Well (36-in. Diam.)	Sliding Cover, Gasketed		56	
Roof Leg or Hanger Well	Adjustable		7.9	
Roof Leg or Hanger Well	Fixed		0	
Sample Pipe or Well (24-in. Diam.)	Slit Fabric Seal 10% Open		12	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Gask		44	
Sample Pipe or Well (24-in. Diam.)	Slotted Pipe-Sliding Cover, Ungask		57	
Stub Drain (1-in. Diam.)			1.2	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Gask		07	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Ungask		0.9	
Total deck fitting loss factor, lb-mole/year				

* See tank calculations for quantity of fittings and calculation of fitting factor.

Save Form   Reset Form

DISASTER REVIEW

This application amends Permit No. 6606 to allow for more storage and loading of crude oil and condensate. Neither crude oil nor condensate is an explicitly listed chemical within the TCEQ Disaster Review guidance as obtained from the TCEQ website. The crude oil and condensate will contain low concentrations of H_2S, which is a listed chemical within the TCEQ Disaster Review guidance. Because the project does not involve storing or handling of concentrated H_2S, this application is not proposing changes that warrant a disaster review. In addition, FHR understands that the general industry practice is not to include a Disaster Review for crude oil or condensate.

STATE REGULATORY REQUIREMENTS

As demonstrated in this permit application, emissions from the storage tanks, marine loading, and fugitive piping components will comply with all rules and regulations of the TCEQ and with the intent of the Texas Clean Air Act (TCAA). A NAAQS analysis and modeling and effects review will be submitted upon TCEQ's request to demonstrate that emissions from the project will be protective of public health and property. There are no schools located within 3,000 feet of the Ingleside Terminal.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
Chapter 101	**General Rules**		
§101.2	Multiple Air Contaminant Sources or Properties	☐ Yes ☒ No	FHR is not petitioning the commission to designate two or more properties as a single property.
§101.3.	Circumvention	☒ Yes ☐ No	FHR will not use a plan, activity, device or contrivance to conceal or appear to minimize an emission violation of the Act or a regulation.
§101.4	Nuisance	☒ Yes ☐ No	The facility will not discharge air contaminants in such concentration/ duration to be injurious or adversely affect human health or welfare, or interfere with the normal use/enjoyment of animal life, vegetation, or property.
§101.5	Traffic Hazard	☒ Yes ☐ No	The facility will not discharge air contaminants, uncombined water, or other materials from any source that causes or has a tendency to cause a traffic hazard or interfere with normal road use.
§101.8 and §101.9	Sampling and Sampling Ports	☒ Yes ☐ No	FHR will comply with the applicable requirements if requested by the board or Executive Director to conduct sampling.
§101.10.	Emissions Inventory Requirements	☒ Yes ☐ No	FHR annually submits an emission inventory by the required due date.
§101.14.	Sampling Procedures and Terminology	☒ Yes ☐ No	FHR will employ commonly accepted methods and procedures for sampling/measuring air contaminants when otherwise not specified in rules, regulations, determinations and/or orders by the commission.
§101.20.	Compliance with Environmental Protection Agency Standards	☒ Yes ☐ No	The sources in this application will be operated to comply with the applicable Environmental Protection Agency Standards as detailed in this application.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§101.23.	Alternate Emission Reduction ("Bubble") Policy	☐ Yes ☒ No	FHR does not seek approval of emission controls from another facility at this site in lieu of controlling the sources as explained in this application.
§101.24.	Inspection Fees	☒ Yes ☐ No	FHR submits the relevant inspection or emissions fees annually to the commission by the specified due date.
§101.26.	Surcharge on Fuel Oil in Specified Boilers	☐ Yes ☒ No	There is not an industrial boiler or utility boiler as defined in §101.1 associated with this application.
§101.27.	Emissions Fees	☒ Yes ☐ No	FHR submits the relevant inspection or emissions fees annually to the commission by the specified due date.
§101.28.	Stringency Determination for Federal Operating Permits	☐ Yes ☒ No	FHR will comply with the relevant regulatory requirements as defined by §122.10 rather than equivalent or more stringent requirements.
§101.201.	Emissions Event Reporting and Recordkeeping Requirements	☒ Yes ☐ No	FHR will comply with the emissions events reporting and recordkeeping requirements.
§101.211.	Scheduled Maintenance, Startup, and Shutdown Reporting and Recordkeeping Requirements	☒ Yes ☐ No	FHR will comply with the reporting and recordkeeping requirements for scheduled maintenance, startup, and shutdown activities. FHR submitted a PBR for MSS activities on January 3, 2013.
§101.221 through §101.224.	Operational Requirements, Demonstrations, and Actions to Reduce Excessive Emissions	☒ Yes ☐ No	FHR will comply with the applicable requirements of §101.221 through §101.224.
§101.231 through §101.233.	Variances	☐ Yes ☒ No	FHR is not seeking a variance.
§101.300 through §101.311.	Emission Credit Banking and Trading	☐ Yes ☒ No	FHR does not participate in the emissions credit banking and trading system for this site.
§101.330 through §101.339.	Emission Banking and Trading of Allowances	☐ Yes ☒ No	The facility does not participate in the emission banking and trading of allowances.
§101.350 through §101.363.	Mass Emissions Cap and Trade Program	☐ Yes ☒ No	The site is not located in the Houston/Galveston nonattainment area.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§101.370 through §101.379.	Discrete Emission Credit Banking and Trading	☐ Yes ☒ No	FHR does not participate in this voluntary reduction program.
§101.390 through §101.403.	Highly Reactive Volatile Organic Compound Emission Cap and Trade Program	☐ Yes ☒ No	The Ingleside Terminal is not located in the Houston/Galveston nonattainment area.
§101.501 through §101.508.	Clean Air Interstate Rule	☐ Yes ☒ No	There is not a fossil fuel-fired boiler or stationary, fossil fuel-fired combustion turbine associated with this application that meets the applicability requirements under 40 Code of Federal Regulations Part 96, Subpart AA or Subpart AAA.
Chapter 111.	**Visible Emissions**		
§111.111 through §111.113.	Visible Emissions	☒ Yes ☐ No	The operation of the marine vapor combustion units may result in occasional visible emissions, but not in excess of the 20% opacity limit specified in 30 TAC 111.111(a)(1)(B).
§111.121 through §111.129.	Incineration	☐ Yes ☒ No	There is not an incinerator associated with this application that burns domestic, commercial, or industrial solid waste as defined in §101.1, medical waste, or hazardous waste as fuel for energy recovery.
§111.131 through §111.139.	Abrasive Blasting of Water Storage Tanks Performed by Portable Operations	☐ Yes ☒ No	Abrasive blasting of water storage tanks performed by portable operations will not be performed at the facility as part of this application.
§111.141 through §111.149.	Materials Handling, Construction, Roads, Streets, Alleys, and Parking Lots	☐ Yes ☒ No	The site is located in San Patricio County which is not listed as an affected area.
§111.151.	Allowable Emissions Limits	☒ Yes ☐ No	The PM emission rates from the marine vapor combustors will not exceed the allowable emission rates presented in Table 1 in §111.151 as demonstrated at the end of this section.
§111.153.	Emissions Limits on Steam Generators	☐ Yes ☒ No	There are no steam generators with heat input greater than 2500 MM Btu/hr or any solid fossil fuel-fired steam generators associated with this application.
§111.171 through §111.175.	Emissions Limits on Agricultural Processes	☐ Yes ☒ No	There are no agricultural processes associated with this application.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§111.181 through §111.183.	Exemptions for Portable or Transient Operations	☐ Yes ☒ No	There are no portable or transient operations such as rock crushers, hot mix asphaltic concrete facilities, etc., associated with this application.
§111.201 through §111.221.	Outdoor Burning	☐ Yes ☒ No	Outdoor burning will not be conducted at the facility as part of this application.
Chapter 112.	**Sulfur Compounds**		
§112.3 through §112.4.	Net Ground Level Concentrations	☒ Yes ☐ No	FHR will comply with the applicable requirements and will provide modeling at the request of the TCEQ to demonstrate compliance with the applicable net ground level concentration.
§112.5 and §112.6.	Allowable Emission Rates - Sulfuric Acid Plants	☐ Yes ☒ No	There is not an affected sulfuric acid plant associated with this application.
§112.7.	Allowable Emission Rates - Sulfur Recovery Plant	☐ Yes ☒ No	There is not an affected sulfur recovery plant associated with this application.
§112.8.	Allowable Emission Rates from Solid Fossil Fuel-Fired Steam Generators	☐ Yes ☒ No	There is not a solid fossil fuel-fired steam generator associated with this application.
§112.9.	Allowable Emission Rates - Combustion of Liquid Fuel	☐ Yes ☒ No	There is not a liquid fuel-fired steam generator, furnace, or heater associated with this application.
§112.14.	Allowable Emission Rates from Nonferrous Smelter Processes	☐ Yes ☒ No	There is not an affected nonferrous smelter process associated with this application.
§112.15 through §112.18.	Temporary Fuel Shortage Plan	☒ Yes ☐ No	FHR will comply with all applicable filing, operating, notification, and reporting requirements in case of a temporary fuel shortage.
§112.19 through §112.21.	Area Control Plan	☐ Yes ☒ No	FHR does not intend to apply for an Area Control Plan at this time.
§112.31 through §112.34.	Control of Hydrogen Sulfide	☒ Yes ☐ No	FHR will comply with the applicable requirements and will provide modeling at the request of the TCEQ to demonstrate compliance with the applicable net ground level concentration.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§112.41 through §112.47.	Control of Sulfuric Acid	☐ Yes ☒ No	The sources associated with this application are not expected to emit sulfuric acid.
§112.51 through §112.59.	Control of Total Reduced Sulfur	☐ Yes ☒ No	The Ingleside Terminal is not a kraft pulp mill.
Chapter 113.	**Toxic Materials**	☒ Yes ☐ No	The facility is potentially subject to MACT Y and MACT EEEE, which are addressed below, but is not subject to any other standard in this chapter since the terminal is not a major source of HAP and does not qualify as any other type of listed source category.
§113.300.	Marine Vessel Loading (40 CFR 63, Subpart Y)	☒ Yes ☐ No	FHR will comply with the applicable requirements for recordkeeping, emission estimation, and submerged fill.
§113.880.	Organic Liquids Distribution (Non-Gasoline) (40 CFR 63, Subpart EEEE)	☐ Yes ☒ No	Not applicable. The Ingleside Terminal is not a major source of HAP emissions.
Chapter 115.	**Volatile Organic Compounds**		
§115.112 through §115.119.	Storage of Volatile Organic Compounds	☒ Yes ☐ No	Tanks 28075, 28087, 28088, 28089, 28090, 28091, and 28092 will comply with the applicable requirements. The storage tanks will store material with a maximum true vapor pressure greater than 1.5 psia and will be controlled with floating roofs.
§115.120 through §115.129.	Vent Gas Control	☐ Yes ☒ No	There is not an affected vent gas stream associated with this application.
§115.131 through §115.139.	Water Separation	☐ Yes ☒ No	There are no oily water separators associated with this application.
§115.140 through §115.149.	Industrial Wastewater	☐ Yes ☒ No	Do not apply. The Ingleside Terminal is not located in the Beaumont/Port Arthur, Dallas/Fort Worth, El Paso, or Houston/Galveston areas.
§115.152 through §115.159.	Municipal Solid Waste Landfills	☐ Yes ☒ No	There is not an affected municipal solid waste landfill source associated with this application.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§115.160 through §115.169.	Batch Processes	☐ Yes ☒ No	There is not an affected batch process associated with this application.
§115.211 through §115.219.	Loading and Unloading of Volatile Organic Compounds	☐ Yes ☒ No	There is not an affected loading or unloading facility associated with this application. Marine loading is only subject to this section if located in the Houston/Galveston area.
§115.221 through §115.229.	Filling of Gasoline Storage Vessels (Stage I) for Motor Vehicle Fuel Dispensing Facilities	☐ Yes ☒ No	There is not an affected vehicle fuel dispensing facility associated with this application.
§115.234 through §115.239.	Control of Volatile Organic Compound Leaks from Transport Vessels	☐ Yes ☒ No	The facilities in this application are not associated with filling or emptying gasoline tank trucks.
§115.240 through §115.248.	Control of Vehicle Refueling Emissions (Stage II) at Motor Vehicle Fuel Dispensing Facilities	☐ Yes ☒ No	There is not an affected motor fuel dispensing facility associated with this application.
§115.252 through §115.259.	Control of Reid Vapor Pressure of Gasoline	☐ Yes ☒ No	Do not apply. The Ingleside Terminal is not located in El Paso County.
§115.311 through §115.319.	Petroleum Refining, Natural Gas/Gasoline Processing, and Petrochemical Processes	☐ Yes ☒ No	There are no affected facilities associated with this application.
§115.322 through §115.329.	Fugitive Emission Control in Petroleum Refineries in Gregg, Nueces, and Victoria Counties	☐ Yes ☒ No	The Ingleside Terminal is not a petroleum refinery.
§115.352 through §115.359.	Fugitive Emission Control in Petroleum Refining, Natural Gas/Gasoline Processing, and Petrochemical Processes in Ozone Nonattainment Areas	☐ Yes ☒ No	The Ingleside Terminal is not located in a designated ozone nonattainment area.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§115.410 through §115.419.	Degreasing Processes	☐ Yes ☒ No	There is not an affected degreasing process associated with this application.
§115.420 through §115.429.	Surface Coating Processes	☐ Yes ☒ No	There is not an affected surface coating process associated with this application.
§115.430 through §115.439.	Flexographic and Rotogravure Printing	☐ Yes ☒ No	There is not an affected rotogravure or flexographic process associated with this application.
§115.440 through §115.449.	Offset Lithographic Printing	☐ Yes ☒ No	There is not an affected offset lithographic printing facility associated with this application.
§115.450 through §115.459.	Control Requirements for Surface Coating Processes	☐ Yes ☒ No	The Ingleside Terminal is not located in Dallas-Fort Worth and Houston-Galveston-Brazoria areas.
§115.460 through §115.469.	Industrial Cleaning Solvents	☐ Yes ☒ No	The Ingleside Terminal is not located in Dallas-Fort Worth and Houston-Galveston-Brazoria areas.
§115.470 through §115.479.	Miscellaneous Industrial Adhesives	☐ Yes ☒ No	The Ingleside Terminal is not located in Dallas-Fort Worth and Houston-Galveston-Brazoria areas.
§115.510 through §115.519.	Cutback Asphalt	☐ Yes ☒ No	There is not a source of cutback asphalt associated with this application.
§115.531 through §115.539.	Pharmaceutical Manufacturing Facilities	☐ Yes ☒ No	There is not an affected pharmaceutical manufacturing facility associated with this application.
§115.540 through §115.549.	Degassing of Storage Tanks, Transport Vessels, and Marine Vessels	☐ Yes ☒ No	The Ingleside Terminal is not located in an affected county.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§115.552 through §115.559.	Petroleum Dry Cleaning Systems	☐ Yes ☒ No	There is not an affected petroleum dry cleaning system associated with this application.
§115.600 through §115.619.	Automotive Windshield Washer Fluid	☐ Yes ☒ No	FHR's Ingleside Terminal does not sell, supply, offer for sale, distribute, or manufacture automotive windshield washer fluid as defined in §115.600.
§115.720 through §115.729.	Highly-Reactive VOC: Vent Gas Control	☐ Yes ☒ No	The Ingleside Terminal is not located in the Houston/Galveston/Brazoria area.
§115.760 through §115.769.	Highly-Reactive VOC: Cooling Tower Heat Exchange Systems	☐ Yes ☒ No	The Ingleside Terminal is not located in the Houston/Galveston/Brazoria area.
§115.780 through §115.789.	Highly-Reactive VOC: Fugitive Emissions	☐ Yes ☒ No	The Ingleside Terminal is not located in the Houston/Galveston/Brazoria area.
§115.901 and §115.910 through §115.916.	Alternate Means of Control	☐ Yes ☒ No	FHR is not applying for an alternate means of control as part of this permit application.
§115.920 and §115.923.	Early Reductions	☐ Yes ☒ No	An extension of the compliance date is not being requested as part of this permit application.
§115.930 through §115.940.	Compliance and Control Plan Requirements	☐ Yes ☒ No	There are no relevant compliance dates or control plan requirements.
§115.950. Emissions Trading	Emissions Trading	☐ Yes ☒ No	FHR is not participating in the emissions trading system to meet the emission control requirements.
Chapter 117.	**Nitrogen Oxides**	☐ Yes ☒ No	Chapter 117 is not applicable because the site is located in San Patricio County which is not an affected county, and the facility is not a nitric acid production unit.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
Chapter 122.	**Federal Operating Permits**	☒ Yes ☐ No	FHR's Ingleside Terminal operates under Title V Operating Permit No. O3454 issued on January 11, 2018. FHR will submit the required minor revision to the Title V operating permit as a result of this application.

COMPLIANCE DEMONSTRATION FOR 30 TAC 111.151

DATA **SUMMARY**

Emission Point Number (EPN)	Emission Point Name	PM Emission Rate as per Table 1(a) (lb/hr)	Physical Stack Height (ft)	Stack Diameter (ft)	Stack Exit Velocity (ft/sec)	Stack Exit Temp (°F)	Stack Exit Temp (°R)	Effective Stack Height as per 111.151(c) (ft)	Estimated Volumetric Stack Flow Rate (acfm)	Standard Effective Stack Height as per 111.151(b) Table 2 Equation (ft)	Effective Stack Height less than Standard Effective Stack Height?	PM Allowable Emission Rate as per 111.151(a) Table 1 Equation (lb/hr)	Table 1(a) Emission Rate complies with Allowable Emission Rate as per 111.151(a)?
MVCU1	Marine Vapor Combustion Unit No. 1	1.35	70.0	13.0	47.0	1600	2060	542.33	374,305	93.7	NO	136.97	YES
MVCU2	Marine Vapor Combustion Unit No. 2	1.35	70.0	13.0	47.0	1600	2060	542.33	374,305	93.7	NO	136.97	YES
MVCU3	Marine Vapor Combustion Unit No. 3	1.35	70.0	13.0	47.0	1600	2060	542.33	374,305	93.7	NO	136.97	YES

SAMPLE CALCULATIONS (based on EPN MVCU1):

Effective Stack Height (h_e) = h + 0.083vD [1.5+ 0.82 D(T-550)/T)]

where: h_e = effective stack height in feet
h = physical stack height above ground level in feet
v = stack exit velocity in feet/sec
D = stack exit inside diameter in feet
T = stack exit temperature in °R

Effective Stack Height (h_e) = (70 ft stack height) + 0.083(47 ft/sec stack velocity)(13 ft stack diameter)
· [1.5 + 0.82(13 ft stack diameter)(2060°R - 550°R)/(2,060°R)]
= 542.33 ft

Estimated Stack Volumetric Flow Rate (q) = (π D²/4) · v · 60

where: q = volumetric flowrate in acfm
D = stack exit inside diameter in feet
v = stack exit velocity in feet/sec

Effective Stack Volumetric Rate (q) = (π) (13 ft stack diameter)² (47 ft/sec stack velocity) (60 min/sec)/4 = 374,301 acfm

Standard Effective Stack Height (H_e)= 1.05 $q^{0.35}$

Standard Effective Stack Height (H_e) = (1.05) (374305 acfm)^0.35 = 93.7 ft

PM Allowable Emission Rate (E)
If effective stack height (h_e) < standard effective stack height (H_e),
then $E = 0.048q^{0.62}(h_e/H_e)^2$
otherwise $E = 0.048q^{0.62}$

PM Allowable Emission Rate (E) = (0.048) (374305 scfm)^0.62 = 136.97 lb/hr

MEASUREMENT OF EMISSIONS [§116.111(a)(2)(B)]

Measuring the emissions of significant air contaminants will be conducted as required by the Executive Director. FHR has performed capture efficiency testing at the Ingleside Terminal while loading inerted vessels pursuant to Special Condition No. 10 of Permit No. 6606, and results show a vapor collection efficiency of greater than 99.9%. Per the TCEQ's Air Permits Division Marine Loading Collection Efficiency Guidance dated September 21, 2016, FHR will perform testing while loading inerted vessels to verify the collection efficiency of the modified marine loading operation is at least 99.9%. FHR will monitor and record the pressure at the vapor collection connection of inerted marine vessels to ensure proper capture. FHR will perform testing of the new MVCUs to verify the VOC destruction efficiency is at least 99.9%. The firebox temperature of all three MVCUs will be monitored continuously and recorded when waste generated from the loading of crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia is directed to the MVCUs. As currently performed for existing storage tanks, FHR will sample the material in Tanks 28087, 28088, 28089, 28090, 28091, and 28092 twice monthly to demonstrate compliance with the H_2S concentration limits. FHR will also measure and record the volume of each material stored and loaded at the terminal and use this information to estimate emissions for compliance demonstration purposes.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT) [§116.111(a)(2)(C)]

As required by §116.111(a)(2)(C), best available control technology (BACT) must be evaluated and applied to all new and modified facilities. A facility is considered modified when there is a physical change or change in the method of operation which results in an increase in the amount of any air contaminant emitted by the facility or results in the emission of any air contaminant not previously emitted.

As part of the project, the new storage tanks, the new MVCUs, and the new fugitive piping components are subject to a BACT evaluation. The marine loading operation is a modified facility and also subject to a BACT evaluation. The existing storage tanks will not be modified facilities (*i.e.* they will not undergo a physical change or change in the method of operation) but will be affected facilities upstream of the project because they will see an increase in their actual emissions as a result of the increased throughput at the marine loading terminal. Increased emissions from the existing storage tanks will be below the existing allowable emission rate limits. The existing storage tanks are not modified sources and are not subject to a TCEQ BACT evaluation, with the exception of Tank 28075. The VOC and H_2S emission rate increases from Tank 28075 authorized by PBR Registration No. 147189 are being incorporated into Permit No. 6606 with this amendment application. Therefore, Tank 28075 is subject to a TCEQ BACT evaluation.

The TCEQ BACT analysis consists of three tiers, and in each tier BACT is evaluated on a case-by-case basis for technical practicability and economic reasonableness. Each tier of the three tier analysis is described below.

<u>Tier I</u>

In the Tier 1 analysis, a comparison is made between the proposed emission reduction performance levels and the emission reduction performance levels accepted as BACT in recent NSR permit reviews for the same process and/or industry. Because the emission reduction option has been previously accepted, the technical practicability and economic reasonableness has been demonstrated. This step should also consider any new technical developments, which may indicate that additional emission reductions are technically practical and economically reasonable.

<u>Tier II</u>

A Tier II analysis occurs when BACT requirements have not been established for a particular process/industry or if there are technical differences between the proposed process and others in the same industry. In the Tier II analysis, a comparison is made between the proposed emission reduction level to the emission reduction levels that have been accepted in recent TCEQ reviews for similar air emissions in a different process or industry type. Because the emission reduction option has been accepted for a similar process/industry, economic reasonableness has already been demonstrated, but a demonstration must be made that the emission reduction level for a similar process/industry is technically practical for the proposed process/industry.

Tier III

A Tier III analysis is performed only if the first two tiers have failed to identify an emission reduction level that is both technically practical and economically reasonable. In the Tier III analysis, a detailed technical and quantitative economic analysis is performed for all possible emission reduction options. The technical practicability of each emission reduction option is demonstrated by the success of that option based on past use in industry and/or the engineering evaluation of a new technology. The economic reasonableness is demonstrated by determining the cost effectiveness of controlling the emissions (expressed as dollars per ton of pollutant reduced).

FHR's BACT Review

The TCEQ has established Tier I BACT requirements for a number of industry types and processes, including the types of facilities that will be newly constructed or modified as part of this project, based on the review of emission reduction performance levels accepted as BACT in recent permitting actions. Therefore, FHR is basing its BACT review on a Tier I analysis. Copies of the BACT requirements for storage tanks, marine loading operations, vapor combustors, and equipment leak fugitives from TCEQ's website are provided at the end of this section. For each of the relevant Tier 1 BACT requirements previously established by the TCEQ, FHR has undertaken an analysis to determine whether any new technical developments have occurred that would warrant additional emissions reductions. A description of the proposed control technologies is provided below.

Storage Tanks

New Tanks 28087, 28088, 28089, 28090, 28091, and 28092 will have a capacity greater than 25,000 gallons and will store material with a maximum true vapor pressure greater than 0.5 psia. Existing Tank 28075 has a capacity greater than 25,000 gallons and stores material with a maximum true vapor pressure greater than 0.5 psia. TCEQ's current BACT for these tanks is either an internal/external floating roof or a vent to a control device (see TCEQ's BACT Guidance for Storage Tanks dated June 2015).

New Tanks 28087, 28088, 28089, 28090, 28091, and 28092 will be domed (internal) floating-roof tanks with mechanical-shoe primary seals and rim-mounted secondary seals. Exterior surfaces exposed to the sun will be un-insulated and painted white or aluminum. The new tanks will also be designed to be drained dry. Accordingly, proposed new Tanks 28087, 28088, 28089, 28090, 28091, and 28092 will meet the current BACT requirements for new tanks. The TCEQ does not currently specify BACT for H_2S emissions from storage tanks. Because H_2S emissions are determined based on VOC emissions and the new tanks will meet BACT for VOC emissions, the tanks will also meet BACT for H_2S emissions.

Tank 28075 is an external floating-roof tank with a mechanical-shoe primary seal and rim-mounted secondary seal. The tank's exterior surfaces exposed to the sun are un-insulated and painted white. One slotted guide pole has a pole sleeve and the other slotted guide pole has a pole sleeve and pole wiper. Both slotted guides poles are equipped with a flexible enclosure, which is equivalent to a float. Accordingly, Tank 28075 meets the current BACT requirements for existing tanks. The TCEQ does not currently specify BACT for H_2S emissions from storage tanks. Because H_2S emissions are determined based on VOC emissions and existing Tank 28075 will meet BACT for VOC emissions, the tank will also meet BACT for H_2S emissions.

Marine Loading

The marine loading operation will load materials with a maximum true vapor pressure (TVP) greater than 0.5 psia. TCEQ's current BACT for the marine loading of these materials is routing the emissions to a control device (see TCEQ's BACT Guidance for Loading Operations dated November 2017). The TCEQ also requires the following for marine loading operations:

- Annual vapor tightness testing of marine vessels as specified in 40 CFR §63.565(c) or 40 CFR §61.304(f).
- Audio, olfactory, and visual (AVO) checks for leaks shall be conducted once every 8 hours for on-shore equipment and on board the vessel during the loading of inerted vessels.
- The pressure at the vapor collection connection and the loading rate must be monitored and recorded.

FHR will route emissions generated during the marine loading of materials with a TVP greater than 0.5 psia to a vapor combustor. All marine vessels are required to provide FHR with proof that they have passed an annual vapor tightness test as specified in 40 CFR §63.565(c) or 40 CFR §61.304(f) prior to loading. FHR or the owner/operator of the marine vessel will conduct AVO checks for leaks once every 8 hours for on-shore equipment and on board the vessel during the loading of inerted vessels. FHR will monitor and record the pressure at the vapor collection connection of an inerted marine vessel and the loading rate. Accordingly, the modified marine loading operations will meet the current BACT requirements for marine loading operations.

Marine Vapor Combustors

TCEQ's current BACT for vapor combustors is 99% destruction efficiency and the initial testing and monitoring of the firebox temperature (see TCEQ's BACT Guidance for Flares and Vapor Combustors dated August 2011).

The NOxStAR Vapor Combustion System technology is guaranteed to meet a VOC destruction efficiency of 99.99%, but FHR is conservatively basing the new/replacement MVCU emission rate calculations on a VOC destruction efficiency of 99.9%. The MVCUs will be initially tested to determine the minimum firebox temperature, and the firebox temperature of all three MVCUs will be monitored continuously and recorded when waste generated from the loading of crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia is directed to the MVCUs. Accordingly, the new MVCUs will meet the current BACT requirements for vapor combustors.

Equipment Fugitives

TCEQ does not specify any control for equipment leak fugitives with uncontrolled VOC emissions less than 10 tons/yr (see TCEQ's BACT Guidance for Equipment Leak Fugitives dated August 2011). Fugitive emissions from equipment at the terminal are estimated to be less than 10 tpy using the Petroleum Marketing Terminal emission factors. Therefore, there are no control requirements specified by the TCEQ. Nonetheless, the terminal has an audio/visual/olfactory (AVO) inspection and maintenance program in place and will apply that program to the new fugitive components.

Current Best Available Control Technology (BACT) Loading Operations

Year	Source Type	Pollutant	Minimum Acceptable Control	Control Efficiency or Details
2017	Truck	VOC vp < 0.5 psia	Submerged or bottom loading	No splash loading
		VOC vp ≥ 0.5 psia	Route to VOC control device	See specific control device requirements
			Annual truck leak checking per NSPS XX	98.7% collection efficiency for annual NSPS XX leak check
	Marine Vessels*	VOC vp ≥ 0.5 psia	Route to VOC control device Vessel leak testing: the marine vessel must pass an annual vapor tightness test as specified in 40 CFR §63.565(c) or 40 CFR §61.304(f). During loading of inerted marine vessels, the owner or operator of the marine terminal or of the marine vessel shall conduct audio, olfactory, and visual checks for leaks once every 8 hours for on-shore equipment and on board the vessel. The pressure at the vapor collection connection and the loading rate must be monitored and recorded.	See specific control device requirements See Marine Terminal Guidance dated September 21, 2016 for emission factors for ship-side emissions.
	Railcar	VOC VP < 0.5 psia	Submerged or bottom loading	No splash loading
		VOC VP ≥ 0.5 psia	Route to VOC control device Hard-piped or bolted connections, dry lock design Hard-piped loading arms, and/or pressure-rated chemical transfer hoses Pressure-rated railcars and Department of Transportation (DOT) Testing	See specific control device requirements 100% collection efficiency.

***Federal Coast Guard Regulations require ocean-going vessels to be inerted. Therefore, ocean-going vessels cannot use vacuum loading.**

FHR's Exhibt A

Current Best Available Control Technology (BACT) Guidelines

Storage Tanks

This information is maintained by the Chemical NSR Section and is subject to change. Last update 06/2015.

Year	Source Type	Pollutant	Minimum Acceptable Control	Control Efficiency or Details
2015	Atmospheric Storage Tanks	Tank capacity < 25 Mgal or TVP < 0.50 psia	Fixed roof with submerged fill. White or aluminum uninsulated exterior surfaces exposed to the sun.	
		Tank Capacity ≥ 25 Mgal and 0.50 psia < TVP < 11.0 psia	Internal floating roof (IFR). White or aluminum uninsulated exterior surfaces exposed to the sun.	Alternative 1: Primary seal: mechanical or liquid mounted Alternative 2: Primary seal: vapor mounted and Secondary seal: rim mounted Drain dry design (new tanks only)
			External floating roof (EFR). White or aluminum uninsulated exterior surfaces exposed to the sun. Slotted guide pole fittings must have gasketed cover, and at least 2 of the following – wiper, float, or sleeve.	Primary seal: mechanical or liquid mounted, and Secondary seal: rim mounted Drain dry design (new tanks only)
			Vent to control	Appropriate control device efficiency
		Tank Capacity ≥ 25 Mgal and TVP ≥ 11.0 psia	Vent to control	Appropriate control device efficiency

TCEQ Chemical Sources
Current Best Available Control Technology (BACT) Requirements

Flares and Vapor Combustors

Year	Source Type	Pollutant	Minimum Acceptable Control	Control Efficiency or Details
2011	Flares	VOC	Flare required to meet 40 CFR 60.18	Destruction Efficiency: 99% for certain compounds up to three carbons, 98% otherwise No flaring of halogenated compounds allowed Flow monitor will be required. Composition or BTU analyzer may be required.
		Non-VOC	Case-by-case	Case-by-case Flow monitor will be required. Composition or BTU analyzer may be required.
	Vapor Combustors	VOC	Monitor temperature, perform initial test	99% destruction efficiency

TCEQ Chemical Sources
Current Best Available Control Technology (BACT) Requirements

Equipment Leak Fugitives

Year	Source Type	Pollutant	Minimum Acceptable Control	Control Efficiency or Details
2011	Equipment Leak Fugitives	Uncontrolled VOC emissions < 10 tpy	None	
		10 tpy < uncontrolled VOC emissions < 25 tpy	28M leak detection and repair program	75% credit for 28M
		Uncontrolled VOC emissions > 25 tpy	28VHP leak detection and repair program	97% credit for valves, 85% for pumps and compressors
		VOC vp < 0.002 psia	No inspection required	No fugitive emissions expected
		Approved odorous compounds: NH3, C12, H2S, etc.	Audio/Visual/Olfactory (AVO) inspection twice per shift	Appropriate credit for AVO program

PERFORMANCE DEMONSTRATION [§116.111(a)(2)(G)]

FHR's Ingleside Terminal will achieve the performance specified in this application and will submit additional performance data as may be required by the Executive Director.

The emission calculation bases (including performance of control devices) are provided in the Emissions Data section. The monitoring and testing to be performed are summarized in Measurement of Emissions section. FHR maintains operating and maintenance procedures and training to ensure the equipment is maintained in good operating condition.

NEW SOURCE PERFORMANCE STANDARDS (NSPS) [§116.111(a)(2)(D)]

Tanks 28087, 28088, 28089, 28090, 28091, and 28092 will be subject to 40 CFR Part 60, Subparts A and Kb. FHR will comply with the applicable monitoring, recordkeeping, and reporting requirements of these NSPS subparts. Tank 28075 is subject to 40 CFR Part 60, Subparts A and Ka and will continue to comply with the applicable monitoring, recordkeeping, and reporting requirements of these NSPS subparts.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP) [§116.111(a)(2)(E)]

The storage tanks, marine loading operation, and equipment fugitives are not subject to any NESHAP requirements.

MAXIMUM ACHIEVABLE CONTROL TECHNOLOGIES (MACT) [§116.111(a)(2)(F)]

The MACT rules in 40 CFR 63, Subparts A (General), Y (Marine Tank Vessel Loading Operations) and EEEE (Organic Liquids Distribution) are potentially applicable to the Ingleside Terminal. However, because the terminal is an existing source with potential HAP emissions below the 10/25 ton/yr thresholds, gasoline is not handled at the facility and throughput of crude oil is below the 200 million barrels/yr threshold, the terminal is not an affected source as defined in §63.561 and, therefore, is not subject to the General Provisions of Subpart A (per 40 CFR 63.560(c)). FHR will comply with the recordkeeping requirements of §63.567(j)(4) and the emission estimation requirements of §63.565(l) as required by §63.560(a)(3), and the submerged fill requirements of 46 CFR 153.282 as required by §63.560(a)(4). Because the terminal is not a major source of HAP it is not subject to OLD MACT (per 40 CFR 63.2334).

NONATTAINMENT REVIEW [§116.111(a)(2)(H)]

The Ingleside Terminal is not located in a nonattainment county. Therefore, the requirement to conduct a nonattainment review is not applicable.

PREVENTION OF SIGNIFICANT DETERIORATION (PSD) REVIEW [§116.111(a)(2)(I)]

FHR's Ingleside Terminal is considered a major source for purpose of PSD review because it emits more than 100 tons/yr of VOC. Accordingly, FHR analyzed whether the proposed project will result in a significant project emissions increase and a significant net emissions increase. The levels at which an emissions increase is considered significant are shown in the table below.

Pollutant	PSD Significance Level (tons/yr)
Nitrogen oxides (NO_x)	40
Carbon monoxide (CO)	100
Sulfur dioxide (SO_2)	40
Particulate matter (PM)	25
Particulate matter (PM_{10})	15
Particulate matter ($PM_{2.5}$)	10
Ozone	40
Lead	0.6
Fluorides	3
Sulfuric acid mist	7
Total reduced sulfur (including H_2S)	10
Hydrogen sulfide (H_2S)	10
Reduced sulfur compounds (including H_2S)	10

The PSD applicability analysis for the proposed project includes emissions increases from the new facilities, modified facilities as well as upstream and downstream affected facilities (*i.e.*, facilities that are not being modified, but will experience an actual emission increase as a result of the project).[1] The analysis also includes emissions decreases resulting from facilities that will be shutdown/replaced as part of the project.[2] As demonstrated in the attached Table 2-Fs, for all PSD pollutants, the sum of project emission increases and decreases are below the applicable significant emission rates. Therefore, determining the net emissions increase is not necessary because the proposed project is not subject to PSD review.

New Facilities

<u>Marine Vapor Combustors (EPNs MVCU1, MVCU2, MVCU3)</u>

FHR will be constructing three new MVCUs. For these new MVCUs, the project NO_X, CO, SO_2, and $PM/PM_{10}/PM_{2.5}$ emissions increases are equal to their potential to emit. The proposed combined annual emission limits are used as the potentials to emit.

[1] *See* TCEQ Air Permits Division, Air Permit Reviewer Reference Guide, APDG-5881, Major New Source Review – Applicability Determination (June 2017) at 6-7 ("The total increase in emissions that are included in a Major NSR determination includes: Increases in emissions occurring at all new or modified facilities, and any other increase at existing facilities that are not being modified, but are experiencing an emissions increase as a result of the change.").

[2] See EPA Memorandum "Project Emissions Accounting Under the New Source Review Preconstruction Permitting Program" dated March 13, 2018, which allows emission decreases from a proposed project to be taken into account during the Step 1 process.

Storage Tanks (EPNs TK-28087, TK-28088, TK-28089, TK-28090, TK-28091, and TK-28092)

FHR will be constructing six new storage Tanks 28087, 28088, 28089, 28090, 28091, and 28092. For these new tanks, the project emissions increase is equal to their potential to emit. The proposed combined annual VOC limit is used as the potential to emit.

MSS Emissions from Storage Tanks (EPNs TANKMSS, COMBMSS)

The project will result in maintenance emissions associated with the six new storage tanks. These maintenance emissions occur from tank landings and tank cleaning activities associated with tank component repairs and other operating needs as well as tank cleanings for required inspections and other maintenance purposes (EPN TANKMSS). An internal combustion engine or thermal oxidizer will be used to control some maintenance activities associated with the storage tanks, such as tank landings and tank cleaning (EPN COMBMSS). These maintenance emissions will be authorized under PBR Registration No. 107625. Only one of the six new tanks will undergo maintenance in one year. MSS emission rates from the new tanks were estimated using the same calculation methods used to estimate MSS emissions from the existing storage tanks in PBR Registration No. 107625.

Equipment Fugitives (EPN FUG-1)

New fugitive piping components will be installed as part of constructing the new storage tanks and MVCUs. The project emissions increase for the new fugitive piping components is equal to their potential to emit.

Modified Facilities

Marine Loading Emissions (EPNs MVCU1, MVCU2, MVCU3, and DOCK)

The marine loading operation is modified due to an increase in the annual loading rate above the currently permitted loading rate. The project VOC and H_2S emissions increases for the marine loading operation is calculated as the difference between baseline VOC and H_2S emissions and future potential VOC and H_2S emissions. Specifically, the project emissions increase for the modified marine loading operation is calculated as the difference between the combined baseline actual VOC and H_2S emissions (calendar years 2014 and 2015) for the existing MVCU and the associated uncaptured dock emissions and the future VOC and H_2S potentials to emit of the new MVCUs and the associated uncaptured dock emissions. The combined VOC and H_2S annual emission limits for the MVCUs is used as the VOC and H_2S potentials to emit for the MVCUs.

Upstream/Downstream Affected Facilities

The existing crude oil storage tanks are not new or modified but are upstream facilities that will experience an increase in actual emissions solely as a result of increased throughput (within the currently permitted throughput) following the proposed project. As mentioned in the process description, FHR is proposing to increase the total combined throughput of crude oil and stabilized condensate loaded into barges and ships to 138,700,000 bbl/yr. Six new tanks with a grouped permitted throughput of 66,000,000 bbl/yr will accommodate the majority of the increase in throughput. Based on baseline throughputs of the existing tanks and accounting for the grouped throughput of the six new storage tanks, it is expected that the existing storage tanks will experience an overall potential crude oil/condensate throughput increase of 51,500,000 bbl/yr. Therefore, the existing storage tanks were evaluated assuming they each experience the full 51,500,000 bbl/yr increase in crude oil/condensate throughput, and the maximum individual tank withdrawal loss emissions was used as the total project emissions increase for the upstream affected existing storage tanks. Each of the existing affected tanks will continue to operate consistent with past permit application representations and within their currently authorized allowable emission rates.

The combined annual pre-project effective throughput for existing tanks at the Ingleside Terminal is approximately 72,700,000 bbl/yr. FHR will track combined annual post-project effective throughput through the existing Ingleside Terminal tanks to demonstrate that the increase in combined effective throughput above the pre-project level resulting from the project is not greater than 51,500,000 bbl/yr.

Shutdown/Replaced Facilities

The existing MVCU (EPN MVCU) will be shut down and replaced by three new MVCUs. The project NO_X, CO, SO_2, and $PM/PM_{10}/PM_{2.5}$ emissions decreases for the existing MVCU are equal to the baseline actual NO_X, CO, SO_2, and $PM/PM_{10}/PM_{2.5}$ emissions for calendar years 2014 and 2015.

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [1]:	NOx	**Permit:**	6606
Baseline Period:	2014 **to** 2015		

	Affected or Modified Facilities [2] FIN	EPN	Permit NO.	Actual Emissions [3] (tons/yr)	B Baseline Emissions [4] (tons/yr)	A Proposed Emissions [5] (tons/yr)	Projected Actual Emissions (tons/yr)	Difference (A-B) [6] (ton/yr)	Correction [7] (ton/yr)	Project Increase [8] (ton/yr)
1	MVCU	MVCU	6606	15.85	15.85	0.00		-15.85		0.00
2	MVCU1/ MVCU2/ MVCU3	MVCU1/ MVCU2/ MVCU3	6606	0.00	0.00	19.32		19.32		19.32
3	COMBMSS (1 Tank)	COMBMSS (1 Tank)	PBR Registration No. 107625	0.00	0.00	0.09		0.09		0.09
4										
5										
6										
7										
8										
9										
10										
11										
PAGE SUBTOTAL: [9]										19.41
								Total		19.41

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [1]:	CO	**Permit:**	6606
Baseline Period:	2014 **to** 2015		

	Affected or Modified Facilities [2] FIN	EPN	Permit NO.	Actual Emissions [3] (tons/yr)	B Baseline Emissions [4] (tons/yr)	A Proposed Emissions [5] (tons/yr)	Projected Actual Emissions (tons/yr)	Difference (A-B) [6] (ton/yr)	Correction [7] (ton/yr)	Project Increase [8] (ton/yr)
1	MVCU	MVCU	6606	15.85	15.85	0.00		-15.85		0.00
2	MVCU1/ MVCU2/ MVCU3	MVCU1/ MVCU2/ MVCU3	6606	0.00	0.00	25.20		25.20		25.20
3	COMBMSS (1 Tank)	COMBMSS (1 Tank)	PBR Registration No. 107625	0.00	0.00	0.15		0.15		0.15
4										
5										
6										
7										
8										
9										
10										
11										
								PAGE SUBTOTAL: [9]		25.35
								Total		25.35

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant (1):	SO2	**Permit:**	6606
Baseline Period:	2014 **to** 2015		

	Affected or Modified Facilities (2) FIN	EPN	Permit NO.	B Actual Emissions (3) (tons/yr)	A Baseline Emissions (4) (tons/yr)	Proposed Emissions (5) (tons/yr)	Projected Actual Emissions (tons/yr)	Difference (A-B) (6) (ton/yr)	Correction (7) (ton/yr)	Project Increase (8) (ton/yr)
1	MVCU	MVCU	6606	0.02	0.02	0.00		-0.02		0.00
2	DOCK	MVCU1/ MVCU2/ MVCU3	6606	0.00	0.00	35.40		35.40		35.40
3	COMBMSS (1 Tank)	COMBMSS (1 Tank)	PBR Registration No. 107625	0.00	0.00	2.31		2.31		2.31
4										
5										
6										
7										
8										
9										
10										
11										
							PAGE SUBTOTAL: (9)			37.71
								Total		37.71

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant (1): PM/PM10/PM2.5		**Permit:**	6606
Baseline Period:	2014 **to** 2015		

	Affected or Modified Facilities (2) FIN	EPN	Permit NO.	Actual Emissions (3) (tons/yr)	Baseline Emissions (4) (tons/yr) B	Proposed Emissions (5) (tons/yr) A	Projected Actual Emissions (tons/yr)	Difference (A-B) (6) (ton/yr)	Correction (7) (ton/yr)	Project Increase (8) (ton/yr)
1	MVCU	MVCU	6606	0.00	0.00	0.00		0.00		0.00
2	MVCU1/ MVCU2/ MVCU3	MVCU1/ MVCU2/ MVCU3	6606	0.00	0.00	6.30		6.30		6.30
3	COMBMSS (1 Tank)	COMBMSS (1 Tank)	PBR Registration No. 107625	0.00	0.00	0.00040		0.0004		0.0004
4										
5										
6										
7										
8										
9										
10										
11										
PAGE SUBTOTAL: (9)										6.30
								Total		6.30

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [1]**:**	VOC	**Permit:**	6606
Baseline Period:	2014 **to** 2015		

	Affected or Modified Facilities [2] FIN	EPN	Permit NO.	Actual Emissions [3] (tons/yr)	Baseline Emissions [4] (tons/yr) B	Proposed Emissions [5] (tons/yr) A	Projected Actual Emissions (tons/yr)	Difference (A-B) [6] (ton/yr)	Correction [7] (ton/yr)	Project Increase [8] (ton/yr)
1	DOCK	MVCU/ MVCU1/ MVCU2/ MVCU3	6606	0.004	0.004	10.89		10.89		10.89
2	DOCK	DOCK	6606	1.05	1.05	6.36		5.31		5.31
3	28087, 28088, 28089, 28090, 28091, 28092	TK-28087, TK-28088, TK-28089, TK-28090, TK-28091, TK-28092	6606	0.00	0.00	10.24		10.24		10.24
4	TANKMSS (1 Tank)	TANKMSS (1 Tank)	PBR Registration No. 107625	0.00	0.00	2.06		2.06		2.06
5	COMBMSS (1 Tank)	COMBMSS (1 Tank)	PBR Registration No. 107625	0.00	0.00	0.004		0.004		0.004
6	FUG-1	FUG-1	6606	0.00	0.00	0.37		0.37		0.37
7	Existing Tanks	Existing Tanks	6606	N/A	N/A	N/A	N/A	N/A		10.27
8										
9										
10										
								PAGE SUBTOTAL: [9]		39.14
								Total		39.14

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [1]:	H2S	**Permit:**	6606
Baseline Period:	2014 **to** 2015		

	Affected or Modified Facilities [2]		Permit	Actual Emissions [3]	Baseline Emissions [4] B	Proposed Emissions [5] A	Projected Actual Emissions	Difference (A-B) [6]	Correction [7]	Project Increase [8]
	FIN	EPN	NO.	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(ton/yr)	(ton/yr)	(ton/yr)
1	DOCK	MVCU/ MVCU1/ MVCU2/ MVCU3	6606	0.000	0.000	0.19		0.19		0.19
2	DOCK	DOCK	6606	0.00	0.00	0.02		0.02		0.02
3	28087, 28088, 28089, 28090, 28091, 28092	TK-28087, TK-28088, TK-28089, TK-28090, TK-28091, TK-28092	6606	0.00	0.00	0.05		0.05		0.05
4	FUG-1	FUG-1	6606	0.00	0.00	0.02		0.02		0.02
5	Existing Tanks	Existing Tanks	6606	N/A	N/A	N/A	N/A	N/A		0.001
6										
7										
8										
								PAGE SUBTOTAL: [9]		0.29
								Total		0.29

TABLE 2F
PROJECT EMISSIONS INCREASE

1. Individual Table 2F's should be used to summarize the project emission increase for each criteria pollutant
2. Emission Point Number as designated in NSR Permit or Emissions Inventory
3. All records and calculations for these values must be available upon request
4. Correct actual emissions for currently applicable rule or permit requirements, and periods of non-compliance.
   These corrections, as well as any MSS previously demonstrated under 30 TAC 101, should be explained in the Table 2F supplement.
5. If projected actual emission is used it must be noted in the next column and the basis for the projection identified in the Table 2F supplement
6. Proposed Emissions or Projected Actual Emissions (column B) minus Baseline Emissions (column A)
7. Correction made to emission increase for what portion could have been accommodated during the baseline period. The justification and basis for this estimate must be provided in the Table 2F supplement
8. Obtained by subtracting the correction from the difference. Must be a positive number.
9. Sum all values for this page.

FHR's Exhibit A

H_2S Emission Estimates
Incremental Increase in Tank Emissions

Background:

H_2S emissions are calculated by applying the K factor method of Meling, Horne, and Hoover[1] to tank losses. The H_2S mole fraction in the vapor phase of the crude oil is used to calculate H_2S emissions from the working and breathing losses from the fixed-roof tanks. The withdrawal loss (or working loss) from floating-roof tanks, however, assumes 100% volatilization. Therefore, for floating-roof tanks the weight fraction in the liquid phase of the crude oil is used to calculate the H_2S emissions from the working loss (withdrawal loss) contribution. The breathing loss contribution is the same for any type of tank.
K factors are used to calculate H_2S emissions from loading losses.

K = y/x, where

y = mole fraction of a component in the vapor phase
x = mole fraction of a component in the liquid phase

If x is known, y = Kx

Liquid	H_2S, liquid WF	x	K[2]	y	Vapor Pressure, psia	P*	MR lbs H_2S/ lb VOC
Crude Oil	1.00E-04	0.000609	24	0.014612	9.05	0.6155	0.0161
(RVP 10)	5.00E-04	0.003044	27	0.082191	10.9	0.7415	0.0754

a = annual emisions
h = hourly emissions
x = (WF H_2S)(MW oil)/MW H_2S
WF = Weight Fraction
MW oil = 207

P* = VOC partial pressure = vapor pressure/14.7 psia
MR = mass ratio = (y)(MW H_2S)/(P)(MW oil vapor)
MW = molecular weight
MW H_2S = 34
MW crude oil vapor = 50

EPN	Liquid	VOC Withdrawal Emissions lbs/hr	VOC Withdrawal Emissions tons/yr	H_2S Emissions lbs/hr	H_2S Emissions tons/yr
Existing Tanks	Crude Oil	N/A	10.271	N/A	0.00103

Sample Calculations:

Existing Tanks

Incremental H_2S Emissions = (WF)(withdrawal loss)
Incremental H2S Emissions, tons/yr = (0.0001)(10.271) = 0.00103

Footnotes:

1 "Using K Factors To Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids," by Jeffrey Meling, Karen Horne, and Jay Hoover

2 K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972

IFR Tanks

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Maximum Tank Throughput (bbl/hr)	Tank Construction (Welded/ Riveted)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Deck Seam Construction (Welded/ Bolted)	Primary Seal (MS/LM/ VM)	Secondary Seal (None/SM/ RM/WS)	Vapor Molecular Weight MWv (lb/lbmol)
TK-28063	Tank 28063	Crude Oil	110	48	3,360,000	51,500,000	10,000	Welded	Light Rust	Bolted	MS	RM	50
	January	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	February	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	March	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	April	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	May	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	June	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	July	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	August	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	September	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	October	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	November	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	December	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	Annual	Crude Oil	110	48	3,360,000	51,500,000	10,000	Welded	Light Rust	Bolted	MS	RM	50
TK-28064	Tank 28064	Crude Oil	110	48	3,360,000	51,500,000	10,000	Welded	Light Rust	Bolted	MS	RM	50
	January	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	February	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	March	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	April	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	May	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	June	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	July	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	August	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	September	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	October	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	November	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	December	Crude Oil	110	48	3,360,000	4,291,667	10,000	Welded	Light Rust	Bolted	MS	RM	50
	Annual	Crude Oil	110	48	3,360,000	51,500,000	10,000	Welded	Light Rust	Bolted	MS	RM	50
TK-28067	Tank 28067	Crude Oil	140	48	5,040,000	51,500,000	25,000	Welded	Light Rust	Bolted	MS	RM	50
	January	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	February	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	March	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	April	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	May	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	June	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	July	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	August	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	September	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	October	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	November	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	December	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	Annual	Crude Oil	140	48	5,040,000	51,500,000	25,000	Welded	Light Rust	Bolted	MS	RM	50
TK-28070	Tank 28070	Crude Oil	140	48	5,040,000	51,500,000	10,000	Welded	Light Rust	Bolted	MS	None	50
	January	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	February	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	March	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	April	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	May	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	June	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	July	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	August	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	September	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	October	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	November	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	December	Crude Oil	140	48	5,040,000	4,291,666.7	10,000	Welded	Light Rust	Bolted	MS	None	50
	Annual	Crude Oil	140	48	5,040,000	51,500,000	10,000	Welded	Light Rust	Bolted	MS	None	50
TK-28077	Tank 28077	Crude Oil	140	48	5,040,000	51,500,000	25,000	Welded	Light Rust	Bolted	MS	RM	50
	January	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	February	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	March	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	April	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	May	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	June	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	July	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	August	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	September	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	October	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	November	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	December	Crude Oil	140	48	5,040,000	4,291,666.7	25,000	Welded	Light Rust	Bolted	MS	RM	50
	Annual	Crude Oil	140	48	5,040,000	51,500,000	25,000	Welded	Light Rust	Bolted	MS	RM	50

IFR Tanks

EPN	Month	Representative Material	Average Liquid Density W_L (lb/gal)	Monthly Average Temperature T (^oF)	RVP	Monthly Average True Vapor Pressure P (psia)	Average Pressure at Tank Location Pa (psia)	Vapor Pressure Function at average Temperature P*	Wind Speed V (mi/hr)	Zero Wind Speed Rim Seal Loss Factor [Kra] Kra lbmole/ft*yr	Wind Speed Dependant Rim Seal Loss Factor [Krb] Krb lbmole/(mph)^{n}ft*yr	Seal Related Wind Speed Exponent [n] n Dimensionless
TK-28063	Tank 28063	Crude Oil	7.05				14.71	0.0000	0	0.6	0.4	1
	January	Crude Oil	7.05	55	10	6.84	14.71	0.1550		0.6	0.4	1
	February	Crude Oil	7.05	59	10	7.31	14.71	0.1701		0.6	0.4	1
	March	Crude Oil	7.05	66	10	8.20	14.71	0.2009		0.6	0.4	1
	April	Crude Oil	7.05	72	10	9.02	14.71	0.2331		0.6	0.4	1
	May	Crude Oil	7.05	78	10	9.91	14.71	0.2727		0.6	0.4	1
	June	Crude Oil	7.05	82	10	10.53	14.71	0.3047		0.6	0.4	1
	July	Crude Oil	7.05	84	10	10.86	14.71	0.3229		0.6	0.4	1
	August	Crude Oil	7.05	84	10	10.86	14.71	0.3229		0.6	0.4	1
	September	Crude Oil	7.05	81	10	10.37	14.71	0.2962		0.6	0.4	1
	October	Crude Oil	7.05	74	10	9.31	14.71	0.2454		0.6	0.4	1
	November	Crude Oil	7.05	66	10	8.20	14.71	0.2009		0.6	0.4	1
	December	Crude Oil	7.05	58	10	7.19	14.71	0.1661		0.6	0.4	1
	Annual	Crude Oil	7.05	71.58	10	9.05	14.71	0.2343		0.6	0.4	1
TK-28064	Tank 28064	Crude Oil	7.05				14.71	0.0000	0	0.6	0.4	1
	January	Crude Oil	7.05	55	10	6.84	14.71	0.1550		0.6	0.4	1
	February	Crude Oil	7.05	59	10	7.31	14.71	0.1701		0.6	0.4	1
	March	Crude Oil	7.05	66	10	8.20	14.71	0.2009		0.6	0.4	1
	April	Crude Oil	7.05	72	10	9.02	14.71	0.2331		0.6	0.4	1
	May	Crude Oil	7.05	78	10	9.91	14.71	0.2727		0.6	0.4	1
	June	Crude Oil	7.05	82	10	10.53	14.71	0.3047		0.6	0.4	1
	July	Crude Oil	7.05	84	10	10.86	14.71	0.3229		0.6	0.4	1
	August	Crude Oil	7.05	84	10	10.86	14.71	0.3229		0.6	0.4	1
	September	Crude Oil	7.05	81	10	10.37	14.71	0.2962		0.6	0.4	1
	October	Crude Oil	7.05	74	10	9.31	14.71	0.2454		0.6	0.4	1
	November	Crude Oil	7.05	66	10	8.20	14.71	0.2009		0.6	0.4	1
	December	Crude Oil	7.05	58	10	7.19	14.71	0.1661		0.6	0.4	1
	Annual	Crude Oil	7.05	71.58	10	9.05	14.71	0.2343		0.6	0.4	1
TK-28067	Tank 28067	Crude Oil	7.05				14.71	0.0000	0	0.6	0.4	1
	January	Crude Oil	7.05	55	10	6.84	14.71	0.1550		0.6	0.4	1
	February	Crude Oil	7.05	59	10	7.31	14.71	0.1701		0.6	0.4	1
	March	Crude Oil	7.05	66	10	8.20	14.71	0.2009		0.6	0.4	1
	April	Crude Oil	7.05	72	10	9.02	14.71	0.2331		0.6	0.4	1
	May	Crude Oil	7.05	78	10	9.91	14.71	0.2727		0.6	0.4	1
	June	Crude Oil	7.05	82	10	10.53	14.71	0.3047		0.6	0.4	1
	July	Crude Oil	7.05	84	10	10.86	14.71	0.3229		0.6	0.4	1
	August	Crude Oil	7.05	84	10	10.86	14.71	0.3229		0.6	0.4	1
	September	Crude Oil	7.05	81	10	10.37	14.71	0.2962		0.6	0.4	1
	October	Crude Oil	7.05	74	10	9.31	14.71	0.2454		0.6	0.4	1
	November	Crude Oil	7.05	66	10	8.20	14.71	0.2009		0.6	0.4	1
	December	Crude Oil	7.05	58	10	7.19	14.71	0.1661		0.6	0.4	1
	Annual	Crude Oil	7.05	71.58	10	9.05	14.71	0.2343		0.6	0.4	1
TK-28070	Tank 28070	Crude Oil	7.05				14.71	0.0000	0	5.8	0.3	2.1
	January	Crude Oil	7.05	55	10	6.84	14.71	0.1550		5.8	0.3	2.1
	February	Crude Oil	7.05	59	10	7.31	14.71	0.1701		5.8	0.3	2.1
	March	Crude Oil	7.05	66	10	8.20	14.71	0.2009		5.8	0.3	2.1
	April	Crude Oil	7.05	72	10	9.02	14.71	0.2331		5.8	0.3	2.1
	May	Crude Oil	7.05	78	10	9.91	14.71	0.2727		5.8	0.3	2.1
	June	Crude Oil	7.05	82	10	10.53	14.71	0.3047		5.8	0.3	2.1
	July	Crude Oil	7.05	84	10	10.86	14.71	0.3229		5.8	0.3	2.1
	August	Crude Oil	7.05	84	10	10.86	14.71	0.3229		5.8	0.3	2.1
	September	Crude Oil	7.05	81	10	10.37	14.71	0.2962		5.8	0.3	2.1
	October	Crude Oil	7.05	74	10	9.31	14.71	0.2454		5.8	0.3	2.1
	November	Crude Oil	7.05	66	10	8.20	14.71	0.2009		5.8	0.3	2.1
	December	Crude Oil	7.05	58	10	7.19	14.71	0.1661		5.8	0.3	2.1
	Annual	Crude Oil	7.05	71.58	10	9.05	14.71	0.2343		5.8	0.3	2.1
TK-28077	Tank 28077	Crude Oil	7.05				14.71	0.0000	0	0.6	0.4	1
	January	Crude Oil	7.05	55	10	6.84	14.71	0.1550		0.6	0.4	1
	February	Crude Oil	7.05	59	10	7.31	14.71	0.1701		0.6	0.4	1
	March	Crude Oil	7.05	66	10	8.20	14.71	0.2009		0.6	0.4	1
	April	Crude Oil	7.05	72	10	9.02	14.71	0.2331		0.6	0.4	1
	May	Crude Oil	7.05	78	10	9.91	14.71	0.2727		0.6	0.4	1
	June	Crude Oil	7.05	82	10	10.53	14.71	0.3047		0.6	0.4	1
	July	Crude Oil	7.05	84	10	10.86	14.71	0.3229		0.6	0.4	1
	August	Crude Oil	7.05	84	10	10.86	14.71	0.3229		0.6	0.4	1
	September	Crude Oil	7.05	81	10	10.37	14.71	0.2962		0.6	0.4	1
	October	Crude Oil	7.05	74	10	9.31	14.71	0.2454		0.6	0.4	1
	November	Crude Oil	7.05	66	10	8.20	14.71	0.2009		0.6	0.4	1
	December	Crude Oil	7.05	58	10	7.19	14.71	0.1661		0.6	0.4	1
	Annual	Crude Oil	7.05	71.58	10	9.05	14.71	0.2343		0.6	0.4	1

FHR's Exhibit A

IFR Tanks

			Rim Seal Losses		Withdrawal Losses				Deck Fitting Losses		Deck Seam Losses		
EPN	Month	Representative Material	Product Factor Kc	Internal Floating Roof Rim Seal Losses Lr (ton/month)	Shell Clingage Factor C (bbl/1000 ft^2)	Number of Columns Nc	Effective Column Diameter Fc	Internal Floating Roof Withdrawal Losses Lw (ton/month)	Deck Fitting Loss Factor Ff (lb-mol/month)	Internal Floating Deck Fitting Losses Lf (ton/month)	Deck Seam Loss Factor Kd (lb-mol/ft-month)	Deck Seam Length Factor Sd (ft/ft^2)	Internal Floating Deck Seam Losses Ld (ton/month)
TK-28063	Tank 28063	Crude Oil	0.4	N/A	0.006	11	1.0		685.30	N/A	0.14	0.2	N/A
	January	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	February	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	March	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	April	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	May	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	June	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	July	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	August	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	September	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	October	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	November	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	December	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	685.30	N/A	0.14	0.2	N/A
	Annual	Crude Oil	0.4	N/A	0.006	11	1.0	10.2714	685.30	N/A	0.14	0.2	N/A
TK-28064	Tank 28064	Crude Oil	0.4	N/A	0.006	11	1.0		973.30	N/A	0.14	0.2	N/A
	January	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	February	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	March	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	April	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	May	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	June	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	July	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	August	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	September	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	October	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	November	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	December	Crude Oil	0.4	N/A	0.006	11	1.0	0.8559	973.30	N/A	0.14	0.2	N/A
	Annual	Crude Oil	0.4	N/A	0.006	11	1.0	10.2714	973.30	N/A	0.14	0.2	N/A
TK-28067	Tank 28067	Crude Oil	0.4	N/A	0.006	18	1.0		1,715.50	N/A	0.14	0.2	N/A
	January	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	February	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	March	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	April	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	May	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	June	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	July	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	August	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	September	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	October	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	November	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	December	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	1,715.50	N/A	0.14	0.2	N/A
	Annual	Crude Oil	0.4	N/A	0.006	18	1.0	8.2800	1,715.50	N/A	0.14	0.2	N/A
TK-28070	Tank 28070	Crude Oil	0.4	N/A	0.006	20	1.0		1,602.80	N/A	0.14	0.2	N/A
	January	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	February	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	March	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	April	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	May	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	June	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	July	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	August	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	September	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	October	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	November	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	December	Crude Oil	0.4	N/A	0.006	20	1.0	0.6987	1,602.80	N/A	0.14	0.2	N/A
	Annual	Crude Oil	0.4	N/A	0.006	20	1.0	8.3848	1,602.80	N/A	0.14	0.2	N/A
TK-28077	Tank 28077	Crude Oil	0.4	N/A	0.006	18	1.0		704.90	N/A	0.14	0.2	N/A
	January	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	February	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	March	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	April	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	May	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	June	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	July	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	August	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	September	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	October	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	November	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	December	Crude Oil	0.4	N/A	0.006	18	1.0	0.6900	704.90	N/A	0.14	0.2	N/A
	Annual	Crude Oil	0.4	N/A	0.006	18	1.0	8.2800	704.90	N/A	0.14	0.2	N/A

EFR Tanks

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Maximum Tank Throughput (bbl/hr)	Tank Construction (Welded/ Bolted)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Primary Seal (MS/LM/ VM)	Secondary Seal (None/SM/ RM/WS)
TK-28068	Tank 28068	Crude Oil	140	48	5,040,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	140	48	5,040,000	51,500,000	N/A	welded	Light Rust	MS	RM
TK-28069	Tank 28069	Crude Oil	140	48	5,040,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	140	48	5,040,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	140	48	5,040,000	51,500,000	N/A	welded	Light Rust	MS	RM
TK-28071	Tank 28071	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
TK-28072	Tank 28072	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM

FHR's Exhibit A

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Maximum Tank Throughput (bbl/hr)	Tank Construction (Welded/ Bolted)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Primary Seal (MS/LM/ VM)	Secondary Seal (None/SM/ RM/WS)
TK-28073	Tank 28073	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
TK-28074	Tank 28074	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
TK-28075	Tank 28075	Crude Oil	180	55	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	180	55	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
TK-28076	Tank 28076	Crude Oil	180	55	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	180	55	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	180	55	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM

FHR's Exhibit A

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Maximum Tank Throughput (bbl/hr)	Tank Construction (Welded/ Bolted)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Primary Seal (MS/LM/ VM)	Secondary Seal (None/SM/ RM/WS)
TK-28080	Tank 28080	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	180	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	180	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
TK-28086	Tank 28086	Crude Oil	190	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM
	January	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	February	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	March	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	April	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	May	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	June	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	July	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	August	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	September	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	October	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	November	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	December	Crude Oil	190	56	10,500,000	4,291,666.7	N/A	welded	Light Rust	MS	RM
	Annual	Crude Oil	190	56	10,500,000	51,500,000	N/A	welded	Light Rust	MS	RM

EFR Tanks

EPN	Month	Vapor Molecular Weight MWv (lb/lbmol)	Average Liquid Density W_L (lb/gal)	Monthly Average Temperature T (^{o}F)	RVP	Monthly Average True Vapor Pressure P (psia)	Average Pressure at Tank Location Pa (psia)	Vapor Pressure Function P*	Wind Speed V (mi/hr)	Zero Wind Speed Rim Seal Loss Factor [Kra] Kra lbmole/ft*yr	Wind Speed Dependant Rim Seal Loss Factor [Krb] Krb mole/(mph)^{n}ft*	Seal Related Wind Speed Exponent [n] n Dimensionles
TK-28068	Tank 28068	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1
TK-28069	Tank 28069	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1
TK-28071	Tank 28071	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1
TK-28072	Tank 28072	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1

EPN	Month	Vapor Molecular Weight MWv (lb/lbmol)	Average Liquid Density W_L (lb/gal)	Monthly Average Temperature T (^oF)	RVP	Monthly Average True Vapor Pressure P (psia)	Average Pressure at Tank Location Pa (psia)	Vapor Pressure Function P*	Wind Speed V (mi/hr)	Zero Wind Speed Rim Seal Loss Factor [Kra] Kra lbmole/ft*yr	Wind Speed Dependant Rim Seal Loss Factor [Krb] Krb mole/(mph)^{n}ft*	Seal Related Wind Speed Exponent [n] n Dimensionless
TK-28073	Tank 28073	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1
TK-28074	Tank 28074	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1
TK-28075	Tank 28075	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1
TK-28076	Tank 28076	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1

EPN	Month	Vapor Molecular Weight MWv (lb/lbmol)	Average Liquid Density W_L (lb/gal)	Monthly Average Temperature T (^oF)	RVP	Monthly Average True Vapor Pressure P (psia)	Average Pressure at Tank Location Pa (psia)	Vapor Pressure Function P*	Wind Speed V (mi/hr)	Zero Wind Speed Rim Seal Loss Factor [Kra] Kra lbmole/ft*yr	Wind Speed Dependant Rim Seal Loss Factor [Krb] Krb mole/(mph)^{n}ft*	Seal Related Wind Speed Exponent [n] n Dimensionless
TK-28080	Tank 28080	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1
TK-28086	Tank 28086	50	7.05				14.71	0.0000	12	0.6	0.4	1
	January	50	7.05	55	10	6.84	14.71	0.1550	12	0.6	0.4	1
	February	50	7.05	59	10	7.31	14.71	0.1701	12	0.6	0.4	1
	March	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	April	50	7.05	72	10	9.02	14.71	0.2331	12	0.6	0.4	1
	May	50	7.05	78	10	9.91	14.71	0.2727	12	0.6	0.4	1
	June	50	7.05	82	10	10.53	14.71	0.3047	12	0.6	0.4	1
	July	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	August	50	7.05	84	10	10.86	14.71	0.3229	12	0.6	0.4	1
	September	50	7.05	81	10	10.37	14.71	0.2962	12	0.6	0.4	1
	October	50	7.05	74	10	9.31	14.71	0.2454	12	0.6	0.4	1
	November	50	7.05	66	10	8.20	14.71	0.2009	12	0.6	0.4	1
	December	50	7.05	58	10	7.19	14.71	0.1661	12	0.6	0.4	1
	Annual	50	7.05	71.58	10	9.05	14.71	0.2343	12	0.6	0.4	1

FHR's Exhibt A

EFR Tanks

EPN	Month	Rim Seal Losses: Product Factor Kc	Rim Seal Losses: External Floating Roof Rim Seal Losses Lr (ton/month)	Withdrawal Losses: Shell Clingage Factor C (bbl/1000 ft^2)	Withdrawal Losses: External Floating Roof Withdrawal Losses Lw (ton/month)	Deck Fitting Losses: Deck Fitting Loss Factor Ff (lb-mol/yr)	Deck Fitting Losses: External Floating Deck Fitting Losses Lf (ton/month)	Deck Seam Loss: External Floating Deck Seam Losses Ld (ton/month)
TK-28068	Tank 28068	0.4		0.006		1,092.48		
	January	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	February	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	March	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	April	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	May	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	June	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	July	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	August	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	September	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	October	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	November	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	December	0.4	N/A	0.006	0.6114	1,092.48	N/A	N/A
	Annual	0.4	N/A	0.006	7.3367	1,092.48	N/A	N/A
TK-28069	Tank 28069	0.4		0.006		335.19		
	January	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	February	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	March	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	April	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	May	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	June	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	July	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	August	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	September	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	October	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	November	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	December	0.4	N/A	0.006	0.6114	335.19	N/A	N/A
	Annual	0.4	N/A	0.006	7.3367	335.19	N/A	N/A
TK-28071	Tank 28071	0.4		0.006		477.40		
	January	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	February	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	March	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	April	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	May	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	June	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	July	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	August	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	September	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	October	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	November	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	December	0.4	N/A	0.006	0.4755	477.40	N/A	N/A
	Annual	0.4	N/A	0.006	5.7063	477.40	N/A	N/A
TK-28072	Tank 28072	0.4		0.006		1,187.23		
	January	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	February	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	March	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	April	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	May	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	June	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	July	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	August	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	September	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	October	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	November	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	December	0.4	N/A	0.006	0.4755	1,187.23	N/A	N/A
	Annual	0.4	N/A	0.006	5.7063	1,187.23	N/A	N/A

		Rim Seal Losses		Withdrawal Losses		Deck Fitting Losses		Deck Seam Loss
EPN	Month	Product Factor Kc	External Floating Roof Rim Seal Losses Lr (ton/month)	Shell Clingage Factor C (bbl/1000 ft^2)	External Floating Roof Withdrawal Losses Lw (ton/month)	Deck Fitting Loss Factor Ff (lb-mol/yr)	External Floating Deck Fitting Losses Lf (ton/month)	External Floating Deck Seam Losses Ld (ton/month)
TK-28073	Tank 28073	0.4		0.006		1,112.51		
	January	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	February	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	March	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	April	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	May	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	June	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	July	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	August	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	September	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	October	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	November	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	December	0.4	N/A	0.006	0.4755	1,112.51	N/A	N/A
	Annual	0.4	N/A	0.006	5.7063	1,112.51	N/A	N/A
TK-28074	Tank 28074	0.4		0.006		1,259.16		
	January	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	February	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	March	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	April	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	May	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	June	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	July	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	August	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	September	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	October	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	November	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	December	0.4	N/A	0.006	0.4755	1,259.16	N/A	N/A
	Annual	0.4	N/A	0.006	5.7063	1,259.16	N/A	N/A
TK-28075	Tank 28075	0.4		0.006		1,233.86		
	January	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	February	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	March	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	April	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	May	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	June	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	July	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	August	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	September	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	October	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	November	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	December	0.4	N/A	0.006	0.4755	1,233.86	N/A	N/A
	Annual	0.4	N/A	0.006	5.7063	1,233.86	N/A	N/A
TK-28076	Tank 28076	0.4		0.006		1,232.11		
	January	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	February	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	March	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	April	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	May	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	June	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	July	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	August	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	September	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	October	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	November	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	December	0.4	N/A	0.006	0.4755	1,232.11	N/A	N/A
	Annual	0.4	N/A	0.006	5.7063	1,232.11	N/A	N/A

EPN	Month	Product Factor Kc	Rim Seal Losses: External Floating Roof Rim Seal Losses Lr (ton/month)	Withdrawal Losses: Shell Clingage Factor C (bbl/1000 ft^2)	Withdrawal Losses: External Floating Roof Withdrawal Losses Lw (ton/month)	Deck Fitting Losses: Deck Fitting Loss Factor Ff (lb-mol/yr)	Deck Fitting Losses: External Floating Deck Fitting Losses Lf (ton/month)	Deck Seam Loss: External Floating Deck Seam Losses Ld (ton/month)
TK-28080	Tank 28080	0.4		0.006		1,188.83		
	January	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	February	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	March	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	April	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	May	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	June	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	July	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	August	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	September	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	October	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	November	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	December	0.4	N/A	0.006	0.4755	1,188.83	N/A	N/A
	Annual	0.4	N/A	0.006	5.7063	1,188.83	N/A	N/A

EPN	Month	Product Factor Kc	Lr (ton/month)	C (bbl/1000 ft^2)	Lw (ton/month)	Ff (lb-mol/yr)	Lf (ton/month)	Ld (ton/month)
TK-28086	Tank 28086	0.4		0.006		1,123.27		
	January	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	February	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	March	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	April	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	May	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	June	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	July	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	August	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	September	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	October	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	November	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	December	0.4	N/A	0.006	0.4505	1,123.27	N/A	N/A
	Annual	0.4	N/A	0.006	5.4060	1,123.27	N/A	N/A

HAZARDOUS AIR POLLUTANTS [§116.111(a)(2)(K)]

EPA has promulgated MACTs Y and EEEE which cover marine loading facilities and crude oil handling. Therefore, the requirements of Chapter 116, Subchapter E do not apply to the Ingleside Terminal.

PERMIT FEE

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.	$ 12,000,000.00
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.	$ 3,000,000.00
C.	Freight charges	$ 100,000.00
D.	Site preparation, including demolition, construction of fences, outdoor lighting, road, and parking areas.	$ 150,000.00
E.	Installation, including foundations, erection of supporting structures, enclosures or weather protection, insulation and painting, utilities and connections, process integration, and process control equipment.	$ 500,000.00
F.	Auxiliary buildings, including materials storage, employee facilities, and changes to existing structures.	$ 30,000,000.00
G.	Ambient air monitoring network.	$ 0.00
II.	**Indirect Costs [30 TAC § 116.141(c)(2)]**	**Estimated Capital Cost**
A.	Final engineering design and supervision, and administrative overhead.	$ 2,500,000.00
B.	Construction expense, including construction liaison, securing local building permits, insurance, temporary construction facilities, and construction clean-up.	$ 7,050,000.00
C.	Contractor's fee and overhead.	$ 1,000,000.00
	Total Estimated Capital Cost	$ 56,300,000.00

FHR's Exhibt A

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: Flint Hills Resources Corpus Christi, LLC

Company Representative Name *(please print)*: Mr. Brook A. Vickery, P.E.

Title: Vice President and Manufacturing Manager

Company Representative Signature: Brook A. Vickery

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) = $ 75,000 | Date: 4/19/18

OTHER CHAPTER 116 REQUIREMENTS

Other requirements under §116.111(a)(2) not addressed on the Form PI-1 are addressed in this section.

Air Dispersion Modeling [§116.111(a)(2)(J)]

FHR will submit air dispersion modeling upon request of the TCEQ.

Mass Cap and Trade Allowances [§116.111(a)(2)(L)]

The Ingleside Terminal is not located in an ozone non-attainment area. Therefore, the mass cap and trade requirements do not apply.

APPENDIX

PAGES FROM PERMIT NO. 6606 AMENDMENT ISSUED MAY 31, 2017

VIA EMAIL

FHR's Exhibt A

FLINT HILLS
resources®

Corpus Christi Refineries

P.O. Box 2608
Corpus Christi, Texas 78403-2608

November 18, 2015

Mr. Tom Lawshae
Texas Commission on Environmental Quality
Air Permits Division, MC 163
P.O. Box 13087
Austin, Texas 78711-3087

Re: Flint Hills Resources Corpus Christi, LLC – Ingleside Terminal
Response to Additional Information Request
TCEQ Project No. 232031
Permit No. 6606 Amendment Application
Ingleside, San Patricio County
Regulated Entity Number RN100222744
Customer Number CN603741463
Account No. SD-0047-K

Dear Mr. Lawshae:

On behalf of Flint Hills Resources Corpus Christi, LLC ("FHR"), I am submitting responses to your October 19, 2015 information request regarding the application for amendment of Permit No. 6606 to increase the allowable H_2S concentration of crude oil and condensate handled in the storage tanks at our Ingleside Terminal. Responses are provided on the following pages.

Please contact Ms. Barbara Angstadt at (361) 242-7473 if you have any questions or need additional information.

Sincerely,

Curtis Taylor

Curtis Taylor
Environmental Manager

CT/BA/kjf
Air 15-446; I 3 N 1

Enclosures

cc: Mr. Kelly Ruble, Air Section Manager, TCEQ, Region 14, Corpus Christi, w/enclosure
Ms. Sara A. Hutson, P.E., Waid Environmental, Austin, w/enclosure

FHR's Exhibt A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	**November 2015**	**Permit No.:**	**6606**	**Regulated Entity No.:**	**RN100222744**
Area Name:	**Ingleside Terminal**			**Customer Reference No.:**	**CN603741463**

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

AIR CONTAMINANT DATA					
1. Emission Point			**2. Component or Air Contaminant Name**	**3. Air Contaminant Emission Rate**	
(A) EPN	**(B) FIN**	**(C) NAME**		**(A) POUND**	**(B) TPY**
TK-28063	TK-28063	Tank 28063	VOC	4.82	5.02
			H_2S	0.06	0.04
TK-28064	TK-28064	Tank 28064	VOC	5.04	5.71
			H_2S	0.08	0.05
TK-28067	TK-28067	Tank 28067	VOC	9.83	9.20
			H_2S	0.14	0.06
TK-28068	TK-28068	Tank 28068	VOC	8.56	7.66
			H_2S	0.11	0.07
TK-28069	TK-28069	Tank 28069	VOC	7.98	5.84
			H_2S	0.07	0.04
TK-28070	TK-28070	Tank 28070	VOC	5.50	10.67
			H_2S	0.17	0.11
TK-28071	TK-28071	Tank 28071	VOC	7.78	6.00
			H2S	0.13	0.08

EPN = Emission Point Number
FIN = Facility Identification Number

FHR's Exhibit A

H_2S Emission Estimates

Background:

H_2S emissions are calculated by applying the K factor method of Meling, Horne, and Hoover [1] to tank losses. The H_2S mole fraction in the vapor phase of the crude oil is used to calculate H_2S emissions from the working and breathing losses from the fixed-roof tanks. The withdrawal loss (or working loss) from floating-roof tanks, however, assumes 100% volatilization. Therefore, for floating-roof tanks the weight fraction in the liquid phase of the crude oil is used to calculate the H_2S emissions from the working loss (withdrawal loss) contribution. The breathing loss contribution is the same for any type of tank.
K factors are used to calculate H_2S emissions from loading losses.

K = y/x, where

y = mole fraction of a component in the vapor phase
x = mole fraction of a component in the liquid phase

If x is known, y = Kx

Liquid	H_2S, liquid WF	x	K [2]	y	Vapor Pressure, psia	P*	MR lbs H_2S/ lb VOC
Crude Oil	1.00E-04	0.000609	22	0.013398	9.05	0.6156	0.0148
(RVP 10)	5.00E-04	0.003044	27	0.082188	10.9	0.7415	0.0754

a = annual emisions
h = hourly emissions
x = (WF H_2S)(MW oil)/MW H_2S
WF = Weight Fraction
MW oil = 207

P* = VOC partial pressure = vapor pressure/14.7 psia
MR = mass ratio = (y)(MW H_2S)/(P)(MW oil vapor)
MW = molecular weight
MW H_2S = 34
MW crude oil vapor = 50

EPN	Liquid	VOC Emissions lbs/hr	VOC Emissions tons/yr	H_2S Emissions lbs/hr	H_2S Emissions tons/yr
TK-28063	Crude Oil	4.820	5.019	0.06473	0.03911
TK-28064	Crude Oil	5.040	5.714	0.08131	0.04939
TK-28067	Crude Oil	9.832	9.196	0.13914	0.06453
TK-28068	Crude Oil	8.558	7.660	0.11169	0.06730
TK-28069	Crude Oil	7.980	5.836	0.06810	0.04030
TK-28070	Crude Oil	5.501	10.670	0.17090	0.10670
TK-28071	Crude Oil	7.777	6.002	0.08853	0.05398
TK-28072	Crude Oil	8.318	7.713	0.12932	0.07930
TK-28073	Crude Oil	8.261	7.533	0.12502	0.07663
TK-28074	Crude Oil	8.373	7.885	0.13346	0.08185
TK-28075	Crude Oil	8.318	7.713	0.12932	0.07930
TK-28076	Crude Oil	8.352	7.820	0.13188	0.08088
TK-28077	Crude Oil	9.061	6.761	0.08100	0.04948
TK-28080	Crude Oil	8.320	7.717	0.12947	0.07936
TK-28086	Crude Oil	7.961	7.561	0.12861	0.07888
FUG-1	Crude Oil	0.210	0.920	0.01583	0.01362
Total					1.0406

Sample Calculations:

Tank (28072)

H_2S Emissions = (WF)(withdrawal loss) + (MR)(rim seal loss + deck fitting loss)
H2S Emissions, lbs/hr = (0.0005)(6.647) + (0.0754)(1.671) = 0.12932
H2S Emissions, tons/yr = (0.0001)(2.4372) + (0.0148)(5.2755) = 0.0793

Footnotes:

1 "Using K Factors To Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids," by Jeffrey Meling, Karen Horne, and Jay Hoover

2 K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972

TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	**BEFORE THE** **TEXAS COMMISSION ON** **ENVIRONMENTAL QUALITY**

FLINT HILLS RESOURCES INGLESIDE LLC RESPONSE TO MOTION TO OVERTURN

Exhibit B

FHR's Exhibit B

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 6, 2018

MR BROOK VICKERY
VICE PRESIDENT & MANUFACTURING MANAGER
FLINT HILLS RESOURCES CORPUS CHRISTI, LLC
PO BOX 2608
CORPUS CHRISTI TX 78403-2608

Note: This searchable PDF was created using optical character recognition software. It is a useful tool, but should not be relied upon since OCR is not 100% reliable. Find what you are looking for then look at original document or PDF from original document.

Re: Permit Alteration
Permit Number: 6606
Expiration Date: August 18, 2027
Flint Hills Resources Corpus Christi, LLC
FHR Ingleside Marine Terminal Facility
Ingleside, San Patricio County
Regulated Entity Number: RN100222744
Customer Reference Number: CN603741463

Dear Mr. Vickery:

This is in response to your letter received September 12, 2017, requesting alteration of the conditions and Maximum Allowable Emission Rates Table (MAERT) of the above-referenced permit. We understand that you are proposing to clarify monitoring and compliance requirements associated with marine loading and the sampling and analysis of hydrogen sulfide. We also understand that you wish to correct various emission limits that were authorized for increase in a May 31, 2017 permit amendment, but were inadvertently changed to previous values in an August 18, 2017 renewal/amendment.

In accordance with Title 30 Texas Administrative Code §116.116(c) and based on our review, Permit Number 6606 is altered. Enclosed are the new general conditions (permit face), altered special conditions, and altered MAERT. Please attach these to your permit.

You are reminded that these facilities must be in compliance with all rules and regulations of the Texas Commission on Environmental Quality (TCEQ) and of the U.S. Environmental Protection Agency at all times.

If you need further information or have any questions, please contact Mr. Lyndon Poole, P.E. at (512) 239-6971 or write to the Texas Commission on Environmental Quality, Office of Air, Air Permits Division, MC-163, P.O. Box 13087, Austin, Texas 78711-3087.

FHR's Exhibit B

Re: Permit Number: 6606

This action is taken under authority delegated by the Executive Director of TCEQ.

Sincerely,

Michael Wilson, P.E., Director
Air Permits Division
Office of Air
Texas Commission on Environmental Quality

Enclosure

cc: Air Section Manager, Region 14 - Corpus Christi

Project Number: 275147

FHR's Exhibit B

Texas Commission on Environmental Quality
Air Quality Permit

A Permit Is Hereby Issued To
Flint Hills Resources Corpus Christi, LLC
Authorizing the Construction and Operation of
FHR Ingleside Marine Terminal Facility
Located at **Ingleside, San Patricio County, Texas**
Latitude 27° 49′ 29″ Longitude −97° 11′ 44″

Permit: 6606

Revision Date: June 6, 2018

Expiration Date: August 18, 2027

Stephanie Bergeron Perdue
For the Commission

1. **Facilities** covered by this permit shall be constructed and operated as specified in the application for the permit. All representations regarding construction plans and operation procedures contained in the permit application shall be conditions upon which the permit is issued. Variations from these representations shall be unlawful unless the permit holder first makes application to the Texas Commission on Environmental Quality (commission) Executive Director to amend this permit in that regard and such amendment is approved. [Title 30 Texas Administrative Code (TAC) Section 116.116 (30 TAC § 116.116)] [1]
2. **Voiding of Permit**. A permit or permit amendment is automatically void if the holder fails to begin construction within 18 months of the date of issuance, discontinues construction for more than 18 months prior to completion, or fails to complete construction within a reasonable time. Upon request, the executive director may grant an 18-month extension. Before the extension is granted the permit may be subject to revision based on best available control technology, lowest achievable emission rate, and netting or offsets as applicable. One additional extension of up to 18 months may be granted if the permit holder demonstrates that emissions from the facility will comply with all rules and regulations of the commission, the intent of the Texas Clean Air Act (TCAA), including protection of the public's health and physical property; and (b)(1)the permit holder is a party to litigation not of the permit holder's initiation regarding the issuance of the permit; or (b)(2) the permit holder has spent, or committed to spend, at least 10 percent of the estimated total cost of the project up to a maximum of $5 million. A permit holder granted an extension under subsection (b)(1) of this section may receive one subsequent extension if the permit holder meets the conditions of subsection (b)(2) of this section. [30 TAC § 116.120]
3. **Construction Progress**. Start of construction, construction interruptions exceeding 45 days, and completion of construction shall be reported to the appropriate regional office of the commission not later than 15 working days after occurrence of the event. [30 TAC § 116.115(b)(2)(A)]
4. **Start-up Notification**. The appropriate air program regional office shall be notified prior to the commencement of operations of the facilities authorized by the permit in such a manner that a representative of the commission may be present. The permit holder shall provide a separate notification for the commencement of operations for each unit of phased construction, which may involve a series of units commencing operations at different times. Prior to operation of the facilities authorized by the permit, the permit holder shall identify the source or sources of allowances to be utilized for compliance with Chapter 101, Subchapter H, Division 3 of this title (relating to Mass Emissions Cap and Trade Program). [30 TAC § 116.115(b)(2)(B)]
5. **Sampling Requirements**. If sampling is required, the permit holder shall contact the commission's Office of Compliance and Enforcement prior to sampling to obtain the proper data forms and procedures. All sampling and testing procedures must be approved by the executive director and coordinated with the regional representatives of the commission. The permit holder is also responsible for providing sampling facilities and conducting the sampling operations or contracting with an independent sampling consultant. [30 TAC § 116.115(b)(2)(C)]
6. **Equivalency of Methods.** The permit holder must demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the conditions of the permit. Alternative methods shall be applied for in writing and must be reviewed and approved by the executive director prior to their use in fulfilling any requirements of the permit. [30 TAC § 116.115(b)(2)(D)]
7. **Recordkeeping.** The permit holder shall maintain a copy of the permit along with records containing the information and data sufficient to demonstrate compliance with the permit, including production records and

operating hours; keep all required records in a file at the plant site. If, however, the facility normally operates unattended, records shall be maintained at the nearest staffed location within Texas specified in the application; make the records available at the request of personnel from the commission or any air pollution control program having jurisdiction in a timely manner; comply with any additional recordkeeping requirements specified in special conditions in the permit; and retain information in the file for at least two years following the date that the information or data is obtained. [30 TAC § 116.115(b)(2)(E)]

8. **Maximum Allowable Emission Rates**. The total emissions of air contaminants from any of the sources of emissions must not exceed the values stated on the table attached to the permit entitled "Emission Sources--Maximum Allowable Emission Rates." [30 TAC § 116.115(b)(2)(F)] [1]
9. **Maintenance of Emission Control**. The permitted facilities shall not be operated unless all air pollution emission capture and abatement equipment is maintained in good working order and operating properly during normal facility operations. The permit holder shall provide notification in accordance with 30 TAC §101.201, 101.211, and 101.221 of this title (relating to Emissions Event Reporting and Recordkeeping Requirements; Scheduled Maintenance, Startup, and Shutdown Reporting and Recordkeeping Requirements; and Operational Requirements). [30 TAC§ 116.115(b)(2)(G)]
10. **Compliance with Rules**. Acceptance of a permit by an applicant constitutes an acknowledgment and agreement that the permit holder will comply with all rules and orders of the commission issued in conformity with the TCAA and the conditions precedent to the granting of the permit. If more than one state or federal rule or regulation or permit condition is applicable, the most stringent limit or condition shall govern and be the standard by which compliance shall be demonstrated. Acceptance includes consent to the entrance of commission employees and agents into the permitted premises at reasonable times to investigate conditions relating to the emission or concentration of air contaminants, including compliance with the permit. [30 TAC § 116.115(b)(2)(H)]
11. **This** permit may not be transferred, assigned, or conveyed by the holder except as provided by rule. [30 TAC § 116.110(e)]
12. **There** may be additional special conditions attached to a permit upon issuance or modification of the permit. Such conditions in a permit may be more restrictive than the requirements of Title 30 of the Texas Administrative Code. [30 TAC § 116.115(c)]
13. **Emissions** from this facility must not cause or contribute to "air pollution" as defined in Texas Health and Safety Code (THSC) §382.003(3) or violate THSC § 382.085. If the executive director determines that such a condition or violation occurs, the holder shall implement additional abatement measures as necessary to control or prevent the condition or violation.
14. **The** permit holder shall comply with all the requirements of this permit. Emissions that exceed the limits of this permit are not authorized and are violations of this permit. [1]

[1] Please be advised that the requirements of this provision of the general conditions may not be applicable to greenhouse gas emissions.

Special Conditions

Permit Number 6606

Emission Standards

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

Federal Applicability

2. Storage tank numbers 28063, 28064, 28071, 28072, 28073, 28074, 28075, 28076 and 28080 shall comply with all applicable requirements of the U.S. Environmental Protection Agency (EPA) regulations on Standards of Performance for New Stationary Sources promulgated in Title 40 Code of Federal Regulations Part 60 (40 CFR Part 60):

   A. Subpart A, General Provisions.

   B. Subpart Ka, Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984.

3. Storage tank number 28086 shall comply with all applicable requirements of the U.S. Environmental Protection Agency (EPA) regulations on Standards of Performance for New Stationary Sources promulgated in Title 40 Code of Federal Regulations Part 60 (40 CFR Part 60):

   A. Subpart A, General Provisions.

   B. Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984.

4. These facilities shall comply with all applicable requirements of the U.S. Environmental Protection Agency (EPA) regulations on National Emission Standards for Hazardous Air Pollutants in 40 CFR Part 61:

   A. Subpart A, General Provisions.

   B. Subpart M, National Emissions Standard for Asbestos.

5. The barge and ship dock shall comply with all applicable requirements of the U.S. Environmental Protection Agency (EPA) regulations on National Emission Standards for Hazardous Air Pollutants in 40 CFR Part 63:

   A. Subpart A, General Provisions.

   B. Subpart Y, National Emission Standards for Marine Tank Vessel Loading Operations.

Operational Practices

6. This permit authorizes the storage of crude oil and stabilized condensate in all floating roof storage tanks and refined fuel products with a vapor pressure less than crude oil, such as naphtha, diesel, No. 6 oil and coker gas oil. Storage of other chemicals is prohibited unless prior authorization for such storage is obtained. Only four floating roof storage tanks may be filled at the represented maximum fill rate at any given time.

   Crude oil and stabilized condensate stored in tanks at the Ingleside Terminal shall be limited to hydrogen sulfide (H_2S) concentrations of 100 ppmw on an annual average basis and 500 ppmw on an hourly basis. Compliance with the H_2S concentration limits shall be demonstrated by sampling the material in each tank twice monthly, using a Lead Acetate Paper (LAP) Test (ASTM D5705 – Standard Test Method for Measurement of Hydrogen Sulfide in the Vapor Phase Above Residual Fuel Oils with the following modifications: 1) lead acetate paper shall be used rather than stain detector tubes; 2) crude oil sample collection shall be in accordance with ASTM D4057; 3) the crude oil shall not be heated; 4) the vapor space shall not be purged with nitrogen; and 5) the headspace of the sample shall be tested as received.) A negative LAP test result shall indicate that the H_2S concentration of the material is below the limits and shall be recorded as a concentration of 0.0297 ppmw. Should an LAP test indicate a positive result, further analysis shall be completed via Lead Acetate Reaction Rate testing for H_2S in crude oil (ASTM D4084-82 – Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels; ASTM D4468-85, Standard Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry; and ASTM D4045-81, Standard Test Method for Sulfur in Petroleum Products by Hydrogenolysis and Rateometric Colorimetry; or subsequently approved ASTM methods) utilizing an Analytical Systems International Keco 205L H_2S in Liquids Analyzer or subsequent generation equivalent analyzer to demonstrate compliance with the H_2S limits. The H_2S analyzer shall be calibrated according to manufacturer recommendations. The permit holder shall calculate and record a rolling 12-month average H_2S concentration. Records of the H_2S sampling, test method(s) used, and H_2S concentrations shall be maintained on site for a period of five years and shall be made readily available to representatives of the TCEQ upon request. **(6/18)**

7. This permit authorizes ship or barge loading of crude oil and stabilized condensate only. Loading of other chemicals into barges or ships is prohibited unless prior authorization for such storage is obtained.

   Total combined throughput of the barge and ship loading of crude oil and stabilized condensate is limited to 73,000,000 barrels per rolling twelve months. Records of crude oil and stabilized condensate barge and ship loading product throughput shall be maintained for a period of five years and made readily available to representatives of the Texas Commission on Environmental Quality (TCEQ) upon request.

   Crude oil and stabilized condensate loaded into barges or ships at the Ingleside Terminal shall be limited to maximum hydrogen sulfide (H_2S) concentrations of 14 ppmw on an annual average basis and 18 ppmw on an hourly basis. Compliance with the H_2S concentration limits shall be demonstrated by sampling the material loaded into each barge or ship, using a Lead Acetate Paper (LAP) Test (ASTM D5705 – Standard Test Method for Measurement of Hydrogen Sulfide in the Vapor Phase Above Residual Fuel Oils with the following modifications:
   1) lead acetate paper shall be used rather than stain detector tubes; 2) crude oil sample collection shall be in accordance with ASTM D4057; 3) the crude oil shall not be heated; 4) the vapor space shall not be purged with nitrogen; and 5) the headspace of the sample shall be tested as received.)

A negative LAP test result shall indicate that the H_2S concentration of the material is below the limits and shall be recorded as a concentration of 0.0297 ppmw. Should an LAP test indicate a positive result, further analysis shall be completed via Lead Acetate Reaction Rate testing for H_2S in crude oil (ASTM D4084-82 – Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels; ASTM D4468-85, Standard Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry; and ASTM D4045-81, Standard Test Method for Sulfur in Petroleum Products by Hydrogenolysis and Rateometric Colorimetry; or subsequently approved ASTM methods) utilizing an Analytical Systems International Keco 205L H_2S in Liquids Analyzer or subsequent generation equivalent analyzer to demonstrate compliance with the H_2S limits. The H_2S analyzer shall be calibrated according to manufacturer recommendations. The permit holder shall calculate and record a rolling 12-month average H_2S concentration. Records of the H_2S sampling, test method(s) used, and H_2S concentrations shall be maintained on site for a period of five years and made readily available to representatives of the TCEQ upon request. **(6/18)**

8. Collected VOC emissions from loading into inerted marine vessels crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 pounds per square inch, absolute (psia) at maximum loading temperature shall be routed to the Marine Vapor Combustion Unit designated as EPN MVCU. The inerted vessel loading dock shall utilize submerged fill, and is not required to use vacuum-assisted vapor collection.

   Collected VOC emissions from loading into non-inerted marine vessels crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 pounds per square inch, absolute (psia) at maximum loading temperature shall be routed to the Marine Vapor Combustion Unit designated as EPN MVCU using a vacuum-assisted vapor collection system. Loading of crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia at maximum loading temperature shall be immediately stopped if the vacuum-assisted vapor collection system is inoperative. Loading of crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.5 psia at maximum loading temperature shall not start or re-start until the vacuum-assisted vapor collection system is operational. The non-inerted loading dock shall utilize submerged fill. **(6/18)**

9. The following additional requirements apply to loading of a VOC which has a vapor pressure equal to or greater than 0.5 pounds per square inch absolute (psia) under actual storage conditions onto inerted marine vessels.

   A. Before loading, the owner or operator of the marine terminal shall verify that the marine vessel has passed an annual vapor tightness test as specified in 40 CFR §63.565(c) (September 19, 1995) or 40 CFR §61.304(f) (October 17, 2000) within the previous twelve months.

   B. The pressure at the vapor collection connection of an inerted marine vessel must be maintained such that the pressure in a vessels' cargo tanks do not go below 0.2 pounds per square inch gauge (psig) or exceed 80% of the lowest setting of any of the vessel's pressure relief valves. The lowest vessel cargo tank or vent header pressure relief valve setting for the vessel being loaded shall be recorded. Pressure shall be continuously monitored while the vessel is being loaded. Pressure shall be recorded at fifteen minute intervals.

   C. Crude and/or stabilized condensate loading rates shall be recorded during loading. The loading rate must not exceed the maximum permitted loading rate.

D. During loading, the owner or operator of the marine terminal or of the marine vessel shall conduct audio, olfactory, and visual checks for leaks once every 8 hours for on-shore equipment and on board the ship.

(1) If a liquid leak is detected during loading and cannot be repaired immediately (for example, by tightening a bolt or packing gland), then the loading operation shall cease until the leak is repaired.

(2) If a vapor leak is detected by sight, sound, smell, or hydrocarbon gas analyzer during the loading operation, then a "first attempt" shall be made to repair the leak. Loading operations need not be ceased if the first attempt to repair the leak is not successful provided that the first attempt effort is documented by the owner or operator of the marine vessel and a copy of the repair log is made available to a representative of the marine terminal.

(3) If the attempt to repair the leak is not successful and loading continues, emissions from the loading operation for that inerted vessel shall be calculated assuming a collection efficiency of 95%.

(4) Date and time of each inspection shall be noted in the operator's log or equivalent. Records shall be maintained at the plant site of all repairs and replacements made due to leaks. These records shall be made available to representatives of the Texas Commission on Environmental Quality (TCEQ) upon request.

E. Compliance with Special Condition 9 shall be required upon issuance of the permit revision dated June 6, 2018. **(6/18)**

10. VOC collection efficiency tests of inerted ocean-going marine vessels shall be conducted as follows to demonstrate a collection efficiency of 99.86% as represented in the permit application.

A. Testing shall be conducted using the protocol agreed to by the Executive Director in October 2016. Any revision to the approved testing protocol shall require approval from the Executive Director prior to implementation. The permittee shall maintain a copy of the approved protocol on site.

B. Complying test results shall be obtained in accordance with the protocol for a minimum of one vessel per year for 3 years. The first test shall be conducted within twelve months of the first loading of an inerted ocean-going marine vessel. Tests conducted on January 29, 2015 and December 19, 2015 shall satisfy the requirements of the first two tests.

C. The results of the test shall be submitted to the TCEQ Regional Office with a copy to the TCEQ Air Permits Division within 60 days after completion of the test.

D. The TCEQ Regional Office must be notified at least 48 hours prior to testing. The facility owner or operator may request a waiver from the 48 hour advance notification requirement from the TCEQ Regional Office.

E. The permit holder shall maintain the following records for each ship tested for a period of 5 years from the date of testing:

(1) The most recent vapor tightness certificate;

(2) A recent, completed Standard Tanker Chartering Questionnaire form (Q88); and

(3) Records of each incidence of testing conducted in accordance with this condition.

11. The following requirements apply if a test conducted per Condition 10 shows collection efficiency lower than assumed in permit emission calculations.

    A. Emissions from the tested ship shall be calculated at the measured collection efficiency instead of the efficiency assumed for permit calculations.

    B. Emissions from future instances of ship loading shall continue to be calculated at the lower measured collection efficiency until a test result confirming the permitted collection efficiency is obtained.

    C. As an alternative to assuming the lower measured collection efficiency for subsequent loading as specified in paragraph B, the regulated entity can assume the permitted collection efficiency in subsequent loading operations provided that the loading activity is monitored with an optical gas imaging instrument as defined in 30 TAC 115.358 and no leaks are observed. If a leak is observed, the lower measured collection efficiency must be used. The observations must occur during a minimum 6 hour period as close to the end of loading as possible.

12. Barges and ships loaded with crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia at the barge and ship terminal spots authorized in this permit shall be leak-tested once in a 12-month period using the leak testing methods of NESHAP, Subpart BB. A set of records shall be accessible at the terminal site pursuant to each requirement listed in 40 CFR § 61.305(h) to certify the leak testing has been completed to allow loading of VOC liquids with a true vapor pressure equal to or greater than 0.50 psia. A barge and ship shall not be loaded with any VOC liquids with a true vapor pressure equal to or greater than 0.50 psia at this barge and ship terminal loading station if no valid proof of the leak testing is shown.

13. The holder of this permit shall maintain the connections within the non-inerted vessel vapor collection system in a vapor tight manner when loading crude oil and stabilized condensate that has a maximum true vapor pressure equal to and greater than 0.50 psia at maximum loading temperature.

    If connections within the non-inerted vapor collection system are not maintained and operating vapor tight while loading liquid VOC with a true vapor pressure equal to and greater than 0.50 psia, the loading process shall cease within two hours of discovery of the malfunction. Additional loading requiring vapor tight non-inerted vessel vapor collection system connections should not begin until the problem(s) with the vapor tight connections are corrected. Records shall be kept accessible at the plant site on a rolling five-year basis when vapor tight connections are not maintained and operating and what repairs were done to correct the problem(s).

14. A pressure monitoring device shall be installed at the common point of the vapor collection system between the liquid knockout pot and the vacuum blowers to continuously measure pressure in the non-inerted vessel loading vapor collection system during loading of crude oil and stabilized condensate with a maximum true vapor pressure equal to and greater than 0.50 psia. The vapor collection piping will be all welded between the Dock Safety Unit discharge flange and the vacuum blower liquid knockout pot inlet flange. A blower system shall be installed which will produce a vacuum in the loading system. The average pressure at the liquid knockout pot discharge shall be maintained at a negative pressure of at least 1.5 inches water column during a loading period of crude oil and stabilized condensate with a maximum true vapor pressure equal to and greater than 0.50 psia. The vacuum shall be recorded every fifteen minutes during crude oil and stabilized condensate loading. In the event the pressure monitoring device is not functioning properly, non-

inerted vessel loading operations for crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia requiring use of the Marine Vapor Combustion Unit as an emission control device shall cease within two hours of malfunction. Additional loading requiring use of the Marine Vapor Combustion Unit should not begin until the problems with pressure monitoring device(s) are repaired.

Quality assured (or valid) data must be generated when non-inerted vessels are loaded with crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia at this dock. Loss of valid data due to periods of monitor break down, out-of-control operation (producing inaccurate data), repair, maintenance or calibration may be exempted provided it does not exceed 5 percent of the time (in minutes) that the non-inerted vessel loading dock operated over the previous rolling 12-month period. The measurements missed shall be estimated using engineering judgment and the methods used recorded.

Storage and Loading of Volatile Organic Compounds (VOC)

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

    A. An internal floating deck or “roof” or equivalent control shall be installed in all tanks. The floating roof shall be equipped with one of the following closure devices between the wall of the storage vessel and the edge of the internal floating roof: (1) a liquid-mounted seal, (2) two continuous seals mounted one above the other, or (3) a mechanical shoe seal.

    B. An open-top tank containing a floating roof (external floating roof tank) which uses double seal or secondary seal technology shall be an approved control alternative to an internal floating roof tank provided the primary seal consists of either a mechanical shoe seal or a liquid-mounted seal and the secondary seal is rim-mounted. A weather shield is not approvable as a secondary seal unless specifically reviewed and determined to be vapor-tight.

    C. For any tank equipped with a floating roof, the permit holder shall perform the visual inspections and seal gap measurements as specified in Title 40 Code of Federal Regulations § 60.113b (40 CFR § 60.113b) Testing and Procedures (as amended at 54 FR 32973, Aug. 11, 1989) to verify fitting and seal integrity. Records shall be maintained of the dates seals were inspected and seal gap measurements made, results of inspections and measurements made (including raw data), and actions taken to correct any deficiencies noted.

    D. The floating roof design shall incorporate sufficient flotation to conform to the requirements of the version of API Code 650 in effect at time of construction except that an internal floating cover need not be designed to meet rainfall support requirements and the materials of construction may be steel or other materials.

    E. Except for logos, slogans, identification numbers and similar displays (not to exceed 15 percent of the vertical tank shell area), uninsulated tank exterior surfaces exposed to the sun shall be white or aluminum.

    F. Emissions for tanks shall be calculated using: (a) AP-42 “Compilation of Air Pollution Emission Factors, Chapter 7 - Storage of Organic Liquids” and (b) the TCEQ publication, titled “Technical Guidance Package for Chemical Sources-Storage Tanks.”

Recordkeeping

16. Records shall be kept of all fire water pump engine testing and operations and each engine is limited to 876 hours per rolling twelve months of operation. Only one fire water pump engine may operate at any one time and for no more than 30 minutes in any one-hour period on a rolling basis. When planned operation of a diesel fueled engine occurs, no other planned diesel fueled engine operation can have occurred one hour prior or one hour after the 30 minutes of operation. The records shall include the time and duration that each fire water pump engine is in use and shall be used to calculate annual and hourly emissions to show compliance with the maximum allowable emission rates table and the simultaneous use restriction. All records shall be maintained for a five-year rolling period. Records shall be made readily available upon request of TCEQ personnel.

17. For purposes of assuring compliance with the annual VOC emission value shown on the MAERT for each EPN, the holder of this permit shall maintain a monthly emissions record which describes calculated emissions of VOC from all storage tanks and loading operations. The record shall include tank or loading point identification number, control method used, tank or vessel capacity, name of the material stored or loaded, VOC molecular weight, VOC monthly average temperature in degrees Fahrenheit, VOC vapor pressure at the monthly average material temperature in psia and VOC throughput for the previous month and year-to-date. Records of VOC monthly average temperature are not required to be kept for unheated tanks which receive liquids that are at or below ambient temperatures. Compliance with the annual emissions MAERT value for each EPN shall be based on a 12-month rolling average. Compliance with this condition includes and meets the requirements of Special Condition No. 15.F.

Initial Demonstration of Compliance

18. Sampling ports and platform(s) shall be incorporated into the design of the Marine Vapor Combustion Unit designated as EPN MVCU according to the specifications set forth in the attachment entitled “Chapter 2, Stack Sampling Facilities” of the TCEQ Sampling Procedures Manual. Alternate sampling facility designs must be submitted for approval to the TCEQ Regional Director.

19. The permit holder shall perform stack sampling and other testing as required to establish the actual pattern and quantities of air contaminants being emitted into the atmosphere from the Marine Vapor Combustion Unit designated as EPN MVCU to demonstrate compliance with the MAERT and percent VOC abatement shown in Special Condition No. 23. The permit holder is responsible for providing sampling and testing facilities and conducting the sampling and testing operations at his expense. Sampling shall be conducted in accordance with the appropriate procedures of the TCEQ Sampling Procedures Manual and the U.S. EPA Reference Methods.

    Requests to waive testing for any pollutant specified in this condition shall be submitted to the TCEQ Office of Air, Air Permits Division. Test waivers and alternate/equivalent procedure proposals for Title 40 Code of Federal Regulation Part 60 (40 CFR Part 60) testing which must have EPA approval shall be submitted to the TCEQ Regional Director.

    A. The appropriate TCEQ Regional Office shall be notified not less than 30 days prior to sampling. The notice shall include:

        (1) Proposed date for pretest meeting.

        (2) Date sampling will occur.

(3) Name of firm conducting sampling.

(4) Type of sampling equipment to be used.

(5) Method or procedure to be used in sampling.

(6) Description of any proposed deviation from the sampling procedures specified in this permit or TCEQ/EPA sampling procedures.

(7) Procedure/parameters to be used to determine worst case emissions like the maximum inerted or non-inerted vessel crude oil and stabilized condensate loading value recorded in gallons or barrels per hour during the sampling period.

The purpose of the pretest meeting is to review the necessary sampling and testing procedures, to provide the proper data forms for recording pertinent data, and to review the format procedures for the test reports. The TCEQ Regional Director must approve any deviation from specified sampling procedures.

B. Air contaminants emitted from the Marine Vapor Combustion Unit designated as EPN MVCU to be tested for include (but are not limited to) CO, NO_x, SO_2 and VOC.

C. Sampling shall occur within 60 days after achieving the maximum operating rate, but no later than 180 days after initial start-up of the facilities tied to the Marine Vapor Combustion Unit designated as EPN MVCU and at such other times as may be required by the TCEQ Executive Director. Requests for additional time to perform sampling shall be submitted to the appropriate regional office.

D. The facility being sampled shall operate under maximum inerted or non-inerted vessel crude oil and stabilized condensate loading operations during Marine Vapor Combustion Unit stack emission testing. Maximum inerted or non-inerted vessel crude oil and stabilized condensate loading operations shall be recorded in gallons or barrels loading in sampling time. These conditions/parameters and any other primary operating parameters that affect the emission rate shall be monitored and recorded during the stack test. Any additional parameters shall be determined at the pretest meeting and shall be stated in the sampling report. Permit conditions and parameter limits may be waived during stack testing performed under this condition if the proposed condition/parameter range is identified in the test notice specified in paragraph A and accepted by the TCEQ Regional Office. Permit allowable emissions and emission control requirements are not waived and still apply during stack testing periods.

During subsequent operations, if the maximum inerted or non-inerted vessel crude oil and stabilized condensate loading operations recorded in gallons or barrels per hour is greater than that recorded during the test period, stack sampling shall be performed at the new operating conditions within 120 days. This sampling may be waived by the TCEQ Air Section Manager for the region. **(6/18)**

E. One copy of the final sampling report shall be forwarded to the appropriate TCEQ Regional Office within 60 days after sampling is completed. Sampling reports shall comply with the attached provisions entitled “Chapter 14, Contents of Sampling Reports” of the TCEQ Sampling Procedures Manual.

Process Fugitive Monitoring

20. Piping, Valves, Pumps, and Compressors in Petroleum Service

A. Audio, olfactory and visual checks for petroleum product leaks and crude oil and stabilized condensate leaks within the operating area shall be made monthly.

B. A leaking component shall be repaired as soon as practicable, but no later than 15 days after a leak is found. If the repair or replacement of a leaking component would require a unit shutdown, the repair may be delayed until the next scheduled shutdown. All leaking components which cannot be repaired or replaced until a scheduled shutdown shall be identified in a list to be made available to representatives of the TCEQ upon request.

Records shall be accessible at the plant site of all repairs and replacements made due to leaks. These accessible records shall be made available to representatives of the TCEQ upon request.

21. Piping, Valves, Pumps, Flanges, Connectors and Compressors in Hydrogen Sulfide (H_2S) Service

A. Visual, audio and olfactory checks for H_2S leaks within the operating area shall be made at least once per day.

B. Immediately, but no later than one hour upon detection of a leak, plant personnel shall isolate the leak and

(1) Commence repair or replacement of the leaking component, or

(2) Use a leak collection/containment system to prevent the leak until repair or replacement can be made if immediate repair is not possible.

Date and time of each inspection shall be noted in the operator's log or equivalent. Records of all repairs and replacements resulting from leaks shall be maintained at this site. These records shall be maintained for a period of five years and shall be made readily available to TCEQ representatives upon request.

22. The Marine Vapor Combustion Unit firebox temperature shall be monitored continuously and recorded when waste generated from the loading of crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia is directed to the Marine Vapor Combustion Unit designated as EPN MVCU. The temperature measurement device shall reduce the temperature readings to an averaging period of 6 minutes or less and record it at that frequency. The Marine Vapor Combustion Unit firebox temperature monitor shall be installed, calibrated at least annually and maintained according to the manufacturer's specifications. The device shall have an accuracy of the greater of ±2 percent of the temperature being measured expressed in degrees Celsius or ±2.5ºC. During inerted or non-inerted vessel loading activities of chemicals that require VOC abatement, the average Marine Vapor Combustion Unit firebox temperature shall not fall below 1600^0F over the entire loading period. Upon completion of the stack test required under Special Condition No. 18, an alternate Marine Vapor Combustion Unit firebox temperature limit may be requested from the Air Permits Division.

Quality assured (or valid) data must be generated when inerted or non-inerted vessels are being loaded with crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia at this barge and ship dock except during the performance of a daily zero and span check. Loss of valid data due to periods of monitor break down, out-of-control operation (producing inaccurate data), repair, maintenance, or calibration may be exempted provided it does not exceed 5 percent of the time (in minutes) that the barge and ship loading dock operated over the previous rolling 12 month period. The measurements missed shall be estimated using engineering judgment and the methods used recorded.

The presence of a pilot flame shall be confirmed by a pilot ultra violet scanner, a thermocouple, a temperature element or an agency approved equivalent measurement device before crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia is initiated for loading onto an inerted or non-inerted vessel. If the pilot flame is lost during inerted or non-inerted vessel loading operation then an orderly system shutdown shall occur.

23. The Marine Vapor Combustion Unit designated as EPN MVCU shall maintain a waste gas destruction efficiency at a minimum of 99.1 percent in the Marine Vapor Combustion Unit firebox while crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia is loaded into inerted or non-inerted vessels.

24. The following requirements apply to capture systems for EPN MVCU.

A. If used to control pollutants designated as VOC, either:

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

or

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

B. The control device shall not have a bypass.

or

If there is a bypass for the control device, comply with either of the following requirements:

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

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

A deviation shall be reported if the monitoring or inspections indicate bypass of the control device.

C. Records of the inspections required shall be maintained and if the results of any of the above inspections are not satisfactory, the permit holder shall promptly take necessary corrective action.

Date: June 6, 2018

ATTACHMENT A

Permit Number 6606

Authorized Products, Filling/Loading Rates, and Throughputs

Emission Point Number	Name	Crude oil and stabilized condensate		Diesel	
		bbl/hr	Mbbl/yr	gal/hr	bbl/yr
28063	Tank 28063	10,000	12,000		
28064	Tank 28064	10,000	12,000		
28067	Tank 28067	25,000	22,000		
28068	Tank 28068	25,000	22,000		
28069	Tank 28069	25,000	22,000		
28070	Tank 28070	10,000	22,000		
28071	Tank 28071	30,000	22,000		
28072	Tank 28072	30,000	22,000		
28073	Tank 28073	30,000	22,000		
28074	Tank 28074	30,000	22,000		
28075	Tank 28075	30,000	22,000		
28076	Tank 28076	30,000	22,000		
28077	Tank 28077	25,000	22,000		
28080	Tank 28080	30,000	22,000		
28086	Tank 28086	30,000	22,000		
28082	Tank 28082			460	460
28083	Tank 28083			460	460
MVCU	Marine Vapor Combustion Unit	20,000	73,000		

Hourly rates reflect maximum tank fill rates. In addition to crude oil and stabilized condensate, all tanks authorized for crude oil and stabilized condensate may also store refined fuel products with a vapor pressure less than crude oil and stabilized condensate, such as naphtha, diesel, No. 6 oil, and coker gas oil.

NOTE: Mbbl/yr = thousand barrels per year

Date: August 18, 2017

Permit Number 6606

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

Air Contaminants Data

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	TPY (4)
FWP-A	Fire Water Pump Engine (6)	CO	0.54	0.47
		NO_x	3.11	2.73
		PM	0.22	0.19
		PM_{10}	0.22	0.19
		$PM_{2.5}$	0.22	0.19
		SO_2	0.48	0.42
		VOC	0.06	0.05
FWP-B	Fire Water Pump Engine (6)	CO	0.54	0.47
		NO_x	3.11	2.73
		PM	0.22	0.19
		PM_{10}	0.22	0.19
		$PM_{2.5}$	0.22	0.19
		SO_2	0.48	0.42
		VOC	0.06	0.05
TK-28082	Fire Water Pump Fuel Tank	VOC	0.03	0.01
TK-28083	Fire Water Pump Fuel Tank	VOC	0.03	0.01
MVCU	Marine Vapor Combustion Unit	CO	27.72	50.59
		H_2S	0.05	0.07
		NO_x	27.72	50.59
		SO_2	8.80	13.70
		PM	0.38	0.68
		PM_{10}	0.38	0.68
		$PM_{2.5}$	0.38	0.68
		VOC	19.41	30.60

FHR's Exhibit B

EMISSION SOURCES – MAXIMUM ALLOWABLE EMISSION RATES

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	TPY (4)
TK-28063	Tank No. 28063	H_2S	0.06	0.04
		VOC	4.82	5.02
TK-28064	Tank No. 28064	H_2S	0.08	0.05
		VOC	5.04	5.71
TK-28067	Tank No. 28067	H_2S	0.14	0.06
		VOC	9.83	9.20
TK-28068	Tank No. 28068	H_2S	0.11	0.07
		VOC	8.56	7.66
TK-28069	Tank No. 28069	H_2S	0.07	0.04
		VOC	7.98	5.84
TK-28070	Tank No. 28070	H_2S	0.17	0.11
		VOC	5.50	10.67
TK-28071	Tank No. 28071	H_2S	0.13	0.08
		VOC	7.78	6.00
TK-28072	Tank No. 28072	H_2S	0.13	0.08
		VOC	8.32	7.71
TK-28073	Tank No. 28073	H_2S	0.13	0.08
		VOC	8.26	7.53
TK-28074	Tank No. 28074	H_2S	0.13	0.08
		VOC	8.37	7.89
TK-28075	Tank No. 28075	H_2S	0.13	0.08
		VOC	8.32	7.71
TK-28076	Tank No. 28076	H_2S	0.13	0.08
		VOC	8.35	7.82
TK-28077	Tank No. 28077	H_2S	0.08	0.05
		VOC	9.06	6.76
TK-28080	Tank No. 28080	H_2S	0.13	0.08
		VOC	8.32	7.72

EMISSION SOURCES – MAXIMUM ALLOWABLE EMISSION RATES

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour	**TPY (4)**
TK-28086	Tank No. 28086	H_2S	0.13	0.08
		VOC	7.96	7.56
ALLTANKS	Annual Tank Emission Cap	VOC (7)	--	83.59
FUG-1	Process Fugitives (5)	H_2S	0.0158	0.0136
		VOC	0.21	0.92
DOCK	Ship and Barge Loading Dock	VOC	2.98	4.68
		H_2S	0.008	0.010

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name. For fugitive sources, use area name or fugitive source name.
(3) CO - carbon monoxide
H_2S - hydrogen sulfide
NO_x - total oxides of nitrogen
PM - total particulate matter, suspended in the atmosphere, including PM_{10} and $PM_{2.5}$, as represented
PM_{10} - total particulate matter equal to or less than 10 microns in diameter, including $PM_{2.5}$, as represented
$PM_{2.5}$ - particulate matter equal to or less than 2.5 microns in diameter
SO_2 - sulfur dioxide
VOC - volatile organic compounds as defined in Title 30 Texas Administrative Code § 101.1
(4) Compliance with annual emission limits (tons per year) is based on a 12 month rolling period.
(5) Emission rate is an estimate and is enforceable through compliance with the applicable special condition(s) and permit application representations.
(6) These emissions are for only for 876 hours per engine per rolling twelve months of operation. EPN FWP-A and EPN FWP-B shall not operate simultaneously. Only one fire water pump engine may operate at any one time and for no more than 30 minutes in any one-hour period on a rolling basis.
(7) Tank numbers TK-280 (63, 64, 67 through 77, 80 and 86) are subject to its individually listed hourly and annual VOC emission rate. In addition, the total annual VOC emission rate from all of the floating roof storage tanks shall not exceed the listed EPN ALLTANKS emission limit.

Date: June 6, 2018

TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	**BEFORE THE** **TEXAS COMMISSION ON** **ENVIRONMENTAL QUALITY**

FLINT HILLS RESOURCES INGLESIDE LLC RESPONSE TO MOTION TO OVERTURN

Exhibit C

FHR's Exhibit C

FLINT HILLS resources®

Corpus Christi Refineries

P.O. Box 2608
Corpus Christi, Texas 78403-2608

November 8, 2018 VIA STEERS

Air Permit Initial Review Team ("APIRT")
Texas Commission on Environmental Quality ("TCEQ")
Air Permits Division
Via ePermits at: https://www3.tceq.texas.gov/steers/

Re: Flint Hills Resources Corpus Christi, LLC – Ingleside Terminal
Permit by Rule Registration No. 107625 Revision
Ingleside Terminal
Ingleside, San Patricio County Regulated Entity
No. RN100222744 Customer Reference No.
CN603741463 Account No. SD-0047-K

Attn: APIRT

On behalf of Flint Hills Resources Corpus Christi, LLC (FHR), I am submitting the enclosed revision to Permit by Rule (PBR) Registration No. 107625. This PBR registration documents the emissions from routine maintenance, startup, and shutdown (MSS) activities and temporary maintenance facilities at the Ingleside Terminal that are authorized under PBR §106.263.

The enclosed PBR registration revision is submitted to update the emissions from the MSS activities and temporary maintenance facilities to reflect more accurately the actual number of MSS activity occurrences the duration of MSS activities, and the types of temporary MSS facilities. Updates throughout the application are in red text. This revised application also reflects the revisions that were made in October 2013, but those updates are no longer in red text. In detail, the following changes are proposed in the enclosed PBR registration:

- Changes to true vapor pressures, temperatures, and H_2S concentration to align with representations in Permit No. 6606 for normal operation.
- Changes to equipment opening calculations to reflect more accurately the activities that occur and the actual number of occurrences and duration.
- Revising vacuum truck emissions to be based on outlet concentration of air contaminants from the control device.
- Adding the use of thermal oxidizers to control emissions from tank landing/degassing activities.
- Increasing the number of tank landing/degassing occurrences for maintenance or material change purposes from 3 to 10 per year. This revision includes authorizing one tank landing/degassing activity for maintenance or material change purposes for the six new internal floating roof (IFR) storage tanks being authorized as part of Permit No. 6606 amendment, which is currently under TCEQ's review.
- Increasing the number of tank cleaning activities, including the associated tank landing/degassing occurrences associated with the tank cleaning activities from 3 to 4 per year. This revision includes authorizing one tank cleaning activity, including the associated tank landing/degassing for the six new IFR storage tanks being authorized as part of Permit No. 6606 amendment, which is currently under TCEQ's review.

FHR's Exhibit C

Included in this submittal are the Form PI-7-CERT and other supporting information. The $450 PBR registration fee for this revision was submitted to the TCEQ Revenue Section via ePay.

If you have any questions regarding this submittal or require additional information, please contact Ms. Margaret Ndetti at (361) 242-4972 or via email at margaret.ndetti@fhr.com.

Sincerely,

Mita Upadhyay
Lead Environmental Engineer

MU/MN/rj
Air 18-349; 1 3 O 2

Enclosures

FHR's Exhibit C

Texas Commission on Environmental Quality
Certification and Registration for Permits by Rule
Form PI-7-CERT
(Page 1)

I. Registrant Information		
Company or Other Legal Customer Name: Flint Hills Resources Corpus Christi, LLC		
Company Official Contact Information (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other ____)		
Name: Mr. Brock A. Vickary, P.E.		
Title: Vice President and Manufacturing Manager		
Mailing Address: P.O. Box 2608		
City: Corpus Christi	State: Texas	ZIP Code: 78403
Phone: (361) 241-4811	Fax: (361) 242-4840	
E-mail Address: rebecca.jimenez@fhr.com		
All PBR registration responses will be sent via e-mail		
Technical Contact Information (☐ Mr. ☐ Mrs. ☒ Ms. ☐ Other ____)		
Name: Margaret Ndetti		
Title: Environmental Engineer		
Company Name: Flint Hills Resources Corpus Christi, LLC		
Mailing Address: P.O. Box 2608		
City: Corpus Christi	State: Texas	ZIP Code: 78403
Phone: (361) 242-4972	Fax: (361) 242-8743	
E-mail: margaret.ndetti@fhr.com		
II. Facility and Site Information		
A. Name and Type of Facility		
Facility Name: Ingleside Terminal MSS		
Type of Facility:	☒ Permanent	☐ Temporary
For portable units, please provide the serial number of the equipment being authorized below.		
Serial No:	Serial No:	
B. Facility Location Information		
Street Address: 105 FM 1069		
If there is no street address, provide written driving directions to the site and provide the closest city or town, county, and ZIP code for the site (attach description if additional space is needed).		
City: Ingleside	County: San Patricio	ZIP Code: 78362

FHR's Exhibit C

Texas Commission on Environmental Quality
Certification and Registration for Permits by Rule
Form PI-7-CERT
Page 2

II. Facility and Site Information *(continued)*	
C. TCEQ Core Data Form	
Is the Core Data Form (TCEQ Form Number 10400) attached?	☐ YES ☒ NO
If "NO," provide customer reference number (CN) and regulated entity number (RN) below.	
Customer Reference Number (CN): CN603741485	
Regulated Entity Number (RN): RN100222744	
D. TCEQ Account Identification Number (if known): SD-0047-K	
E. Type of Action	
☐ Initial Application ☒ Change to Registration	
For Change to Registration provide the Registration Number: 107825	
F. PBR number(s) claimed under 30 TAC Chapter 106	
(List all the individual rule number(s) that are being claimed.)	
106. 263	106.
106.	106.
106.	106.
G. Historical Standard Exemption or PBR	
Are you claiming a historical standard exemption or PBR?	☐ YES ☒ NO
If "YES," enter rule number(s) and associated effective date in the spaces provided below.	
Rule Number(s)	Effective Date
H. Previous Standard Exemption or PBR Registration Number	
Is this authorization for a change to an existing facility previously authorized under a standard exemption or PBR?	☒ YES ☐ NO
If "YES," enter previous standard exemption number(s) and PBR registration number(s), and associated effective dates in the spaces provided below.	
Standard Exemption and PBR Registration Number(s)	Effective Date
107825	11/19/2013

FHR's Exhibit C

Texas Commission on Environmental Quality
Certification and Registration for Permits by Rule
Form PI-7-CERT
Page 3

II. Facility and Site Information *(continued)*	
I. Other Facilities at this Site Authorized by Standard Exemption, PBR, or Standard Permit	
Are there any other facilities at this site that are authorized by an Air Standard Exemption, PBR, or Standard Permit?	☒ YES ☐ NO
If "YES," enter standard exemption number(s), PBR registration number(s), and Standard Permit registration number(s), and associated effective date in the spaces provided below.	
Standard Exemption, PBR Registration, and Standard Permit Registration Number(s)	Effective Date
Various	
J. Other Air Preconstruction Permits	
Are there any other air preconstruction permits at this site?	☒ YES ☐ NO
If "YES," enter permit number(s) in the spaces provided below.	
6606	
K. Affected Air Preconstruction Permits	
Does the PBR being claimed directly affect any permitted facility?	☐ YES ☒ NO
If "YES," enter the permit number(s) in the spaces provided below.	
L. Federal Operating Permit (FOP) Requirements (30 TAC Chapter 122 Applicability)	
1. Is this facility located at a site that is required to obtain an FOP pursuant to 30 TAC Chapter 122?	☒ YES ☐ NO ☐ To Be Determined
If the site currently has an existing FOP, enter the permit number: O3454	
Check the requirements of 30 TAC Chapter 122 that will be triggered if this certification is accepted. *(check all that apply)* ☐ Initial Application for an FOP ☐ Significant Revision for an SOP ☐ Minor Revision for an SOP ☐ Operational Flexibility/Off Permit Notification for an SOP ☐ Revision for a GOP ☐ To be Determined ☒ None	
2. Identify the type(s) of FOP issued and/or FOP application(s) submitted/pending for the site. *(check all that apply)* ☒ SOP ☐ GOP ☐ GOP application/revision (submitted or under APD review) ☐ N/A ☐ SOP application/revision (submitted or under APD review)	

FHR's Exhibit C

Texas Commission on Environmental Quality
Certification and Registration for Permits by Rule
Form PI-7-CERT
Page 4

III. Fee Information (See Section VII. for address to send fee or go to [illegible] to pay online.)	
A. Fee Requirements	
Is a fee required per Title 30 TAC § 106.50?	☒ YES ☐ NO
If "NO," specify the exception. There are three exceptions to paying a PBR fee.	(check all that apply)
1. Registration is solely to establish a federally enforceable emission limit.	☐
2. Registration is within six months of an initial PBR review, and it is addressing deficiencies, administrative changes, or other allowed changes.	☐
3. Registration is for a remediation project (30 TAC § 106.533).	☐
B. Fee Amount	
1. A $100 fee is required if any of the answers in III.B.1 are "YES."	
This business has less than 100 employees.	☐ YES ☒ NO
This business has less than 6 million dollars in annual gross receipts.	☐ YES ☒ NO
This registration is submitted by a governmental entity with a population of less than 10,000.	☐ YES ☒ NO
This registration is submitted by a non-profit organization.	☐ YES ☒ NO
2. A $450 fee is required for all other registrations.	
C. Payment Information	
Check/money order/transaction or voucher number:	
Individual or company name on check:	
Fee Amount: $ 450	
Was fee paid online?	☒ YES ☐ NO
IV. Technical Information Including State And Federal Regulatory Requirements. Check the appropriate box to indicate what is included in your submittal. *NOTE: Any technical or essential information needed to confirm that facilities are meeting the requirements of the PBR must be provided. Not providing key information could result in an automatic deficiency and voiding of the project.*	
A. PBR requirements (Checklists are optional; however, your review will go faster if you provide applicable checklists.)	
Did you demonstrate that the general requirements in 30 TAC § 106.4 are met?	☒ YES ☐ NO
Did you demonstrate that the individual requirements of the specific PBR are met?	☒ YES ☐ NO
B. Confidential Information Included (If confidential information is submitted with this registration, all confidential pages must be properly marked "CONFIDENTIAL.")	☐ YES ☒ NO

FHR's Exhibit C

IV. Technical Information Including State And Federal Regulatory Requirements *(continued)*	
Check the appropriate box to indicate what is included in your submittal.	
Note: Any technical or essential information needed to confirm that facilities are meeting the requirements of the PBR must be provided. Not providing key information could result in an automatic deficiency and voiding of the project.	
C. Process Flow Diagram A PFD can be provided upon request.	☐ YES ☒ NO
D. Process Description	☒ YES ☐ NO
E. Maximum Emissions Data and Calculations	☒ YES ☐ NO
***Note:** If the facilities listed in this registration are subject to the Mass Emissions Cap & Trade program under **30 TAC Chapter 101, Subchapter H, Division 3**, the owner/operator of these facilities must possess NO_x allowances equivalent to the actual NO_x emissions from these facilities.*	
F. Is this certification being submitted to certify the emissions for the entire site?	☐ YES ☒ NO
If "NO," include a summary of the specific facilities and emissions being certified.	
G. Table 1(a) (Form 10153) Emission Point Summary	☐ YES ☒ NO
H. Distances from Property Line and Nearest Off-Property Structure	
Distance from this facility's emission release point to the nearest property line [illegible] feet	
Distance from this facility's emission release point to the nearest off-property structure [illegible] feet	
I. Project Status	
Has the company implemented the project or waiting on a response from TCEQ?	☒ Implemented ☐ Waiting
J. Projected Start of Construction and Projected Start of Operation Dates	
Projected Start of Construction (provide date): N/A	
Projected Start of Operation (provide date): N/A	
V. Delinquent Fees	
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 website at: [illegible]	

FHR's Exhibit C

VI. Signature For Registration And Certification
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 this 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 (printed): Mr. Brook A. Vickery, P. E.
Signature (original signature required):
Date: 11/8/18

VII. Submitting Copies of the Certification and Registration
Copies must be sent as listed below: **Processing delays may occur if copies are not sent as noted.**

Who	Where	What
Air Permits Initial Review Team (APIRT)	Regular, Certified, Priority Mail MC 161, P.O. Box 13087 Austin, Texas 78711-3087 Hand Delivery, Overnight Mail MC 161, 12100 Park 35 Circle, Building C, Third Floor Austin, Texas 78753	Originals Form PI-7-CERT, Core Data Form, and all attachments. Not required if using ePermits[1].
Revenue Section, TCEQ	Regular, Certified, Priority Mail MC 214, P.O. Box 13088 Austin, Texas 78711-3088 Hand Delivery, Overnight Mail MC 214, 12100 Park 35 Circle, Building A, Third Floor Austin, Texas 78753	Original Money Order or Check, Copy of Form PI-7-CERT, and Core Data Form. Not required if fee was paid using ePay[2].
Appropriate TCEQ Regional Office	To find your Regional Office address, go to the TCEQ website at www.tceq.texas.gov/publications/gi/gi-002.html, or call (512) 239-1250.	Copy of Form PI-7-CERT, Core Data Form, and all attachments. Not required if using ePermits
Appropriate Local Air Pollution Control Program(s)	To Find your local or Regional Air Pollution Control Programs go to the TCEQ, APD website at www.tceq.texas.gov/permitting/air/local_programs.html, or call (512) 239-1250	Copy of Form PI-7-CERT, Core Data Form, and all attachments.

Save Form **Reset Form**

[1] ePermits located at www3.tceq.texas.gov/steers
[2] ePay located at www.tceq.texas.gov/epay

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ATTACHMENT V.A

PROCESS/PROJECT DESCRIPTION

FHR's Ingleside Terminal is a marine terminal handling crude oil and condensate. Existing equipment at the facility includes ship and barge docks for loading and unloading crude oil and condensate and crude oil and condensate storage tanks along with ancillary equipment. Crude oil and condensate is received at the terminal via marine dock or via pipeline. Crude oil and condensate exit the terminal via loading dock or pipeline. There is no tank truck loading and no longer any tank truck unloading at this terminal.

The terminal currently has fifteen crude oil and condensate storage tanks with capacities ranging from 80,000 bbls to 302,000 bbls. Five tanks are internal floating roof tanks and ten tanks are external floating roof tanks. FHR is planning to construct six new IFR tanks, which are being authorized by a pending amendment to Permit No. 6606 (TCEQ Project No. 284633).

This Permit by Rule registration documents the authorization of emissions from routine maintenance, startup, and shutdown (MSS) of terminal facilities as well as from temporary maintenance facilities which are operated on site in conjunction with maintenance activities at the Ingleside Terminal.

The MSS emissions from the Ingleside Terminal are currently authorized under PBR Registration No. 107625. FHR is proposing to revise PBR Registration No. 107625 and replace any prior representations with the representations in this PBR registration.

FHR is making the following updates to PBR Registration No. 107625:

- Changes to true vapor pressures, temperatures, and H_2S concentration to align with representations in Permit No. 6606 for normal operation.
- Changes to equipment opening calculations to reflect more accurately the activities that occur and the actual number of occurrences and duration.
- Revising vacuum truck emissions to be based on outlet concentration of the control device.
- Adding the use of thermal oxidizers to control emissions from tank landing/degassing activities.
- Increasing the number of tank landing/degassing occurrences for maintenance or material change purposes from 3 to 10 per year. This revision includes authorizing one tank landing/degassing activity for maintenance or material change purposes for the six new IFR storage tanks being authorized as part of Permit No. 6606 amendment, which is currently under TCEQ's review.
- Increasing the number of tank cleaning activities, including the associated tank landing/degassing occurrences associated with the tank cleaning activities from 3 to 4 per year. This revision includes authorizing one tank cleaning activity, including the associated tank landing/degassing for the six new IFR storage tanks being authorized as part of Permit No. 6606 amendment, which is currently under TCEQ's review.

The MSS activities and temporary facilities included in this registration fall into several categories, as described below:

Tank MSS (EPN TANKMSS): Activities in this category include tank landings and tank cleaning activities associated with tank component repairs and other operating needs as well as tank cleanings for required inspections and other maintenance purposes. The tanks which will experience landings and/or cleaning activities will vary from year to year, but all resulting emissions will be reported under this EPN and the combined actual emissions from all authorized MSS activities will not exceed the total annual emission rates shown in the Summary Table.

General Terminal MSS (EPN TERMMSS): Emissions are included in this category from activities including the use of vacuum truck at the terminal, temporary storage of material in frac tanks during maintenance activities, and the opening of piping and vessels for inspection and maintenance purposes. Vacuum trucks are controlled using carbon canisters when loading material greater than 0.5 psia. Other controls, such as VOC/H_2S scrubbers, may also be used to control of vacuum truck emissions. Vacuum trucks may be loaded uncontrolled if loading material less than 0.5 psia. The need for these activities varies from year to year, but the resulting emissions from these activities will be reported under this EPN and the combined actual emissions from all authorized MSS activities will not exceed the total annual emission rates shown in the Summary Table.

Inherently Low Emitting Activities (EPN LOWMSS): Activities in this category generate emissions at a very low level per occurrence and are conducted on a relatively predictable schedule. Emissions have been calculated for purposes of this registration and will be assumed to occur at this level on an annual basis. Activities in this category include such events as product sampling from tanks and pipelines, removal of tank guide-pole floats for sampling and gauging and draining of residual product from equipment and piping for maintenance purposes.

Combustion Emissions from Temporary Control Devices and Equipment (EPN COMBMSS): An internal combustion engine or thermal oxidizer will be used to control emissions from maintenance activities, such as tank landings and tank cleaning. When an engine or thermal oxidizer is used, emissions of VOC, NOx, CO, SO_2, and PM may be generated. Emissions resulting from use of this equipment is calculated and reported under this EPN and the combined actual emissions from all authorized MSS activities will not exceed the total annual emission rates shown in the Summary Table.

Painting (EPN PAINT): Storage tanks, piping and other terminal equipment is routinely painted to protect from rust and damage. The tanks and equipment painted vary from year to year.
Emissions from all painting activities at the site will be calculated and reported under this EPN and the combined actual emissions from all authorized MSS activities will not exceed the total annual emission rates shown in the Summary Table.

Abrasive Blasting (EPN BLAST): Abrasive blasting is sometimes conducted at the terminal to prepare surfaces for painting. Emissions from all blasting conducted at the terminal will be calculated and reported under this EPN and the combined actual emissions from all authorized MSS activities will not exceed the total annual emission rates shown in the Summary Table.

The terminal may also conduct additional maintenance activities which TCEQ has classified as de minimis. No emission estimate has been prepared for these activities and no recordkeeping or reporting is required. Emissions from these activities are authorized under §116.119 and are not authorized under §106.263. De minimis activities at the terminal may include the following:

- Landscaping.
- Fumigation facility complying with all U.S. Environmental Protection Agency (EPA) Federal Insecticide, Fungicide, and Rodenticide Act requirements including but not limited to the labeling requirements for each specific fumigant used at the site. Any fumigant used at the facility must be registered by the EPA and the Texas Department of Agriculture, Texas Structural Pest Control Board, or Texas Department of State Health Services, as appropriate, prior to use.
- Application of lubricants (including greases and oils) without aerosol propellants other than air and/or nitrogen, for maintaining equipment and other facilities.

- Manual application of cleaning or stripping solutions or coatings. Manual application includes application using brushes, cloth, pads, sponges, droppers, tube dispensing equipment, or spray bottles and pump-up sprayers without aerosol propellants.

- Application of aqueous detergents, surfactants, and other cleaning solutions containing not more than one percent of any organic compound by weight or containing not more than five percent of any organic compound with a vapor pressure less than 0.002 pounds per square inch absolute.
- Application of aerosol-propelled organic liquids using hand-held devices for maintaining equipment and other facilities where usage is no more than four aerosol cans or 64 ounces per day on a 12-month rolling average basis.
- Bench scale laboratory equipment and laboratory equipment used exclusively for chemical and physical analyses (excluding pilot plants).
- Blast cleaning equipment using only water as the cleaning media.
- Application of argon, ethane, helium, hydrogen, methane, neon, nitrogen, and propane for testing, purging, and leak checking of equipment.

ATTACHMENT V.B
EMISSIONS DATA AND CALCULATIONS

This registration documents maximum potential emissions associated with the maintenance, startup, and shutdown of facilities at the Ingleside Terminal as well as emissions from temporary maintenance facilities which are operated in conjunction with maintenance activities at the terminal.

Emissions from MSS activities and temporary maintenance facilities in each category are calculated as described below:

Tank Landings and Cleanings
Emissions associated with tank landings are calculated using procedures in Section 7.1.3.2.2 Roof Landings from EPA's AP-42 Chapter 7.1, Organic Liquid Storage Tanks. Emissions calculations assume landing of the 10 largest tanks in any given year for maintenance or material change. Emissions from tank cleaning were estimated using guidance from the API Technical Report 2568, "Evaporative Loss from Cleaning of Storage Tanks" from November 2007. Tank cleaning emissions calculations assume landing and cleaning the 4 largest tanks in any given year. The controlled tank emissions are controlled by engines or thermal oxidizers with 99% control efficiency.

Vacuum Trucks
Emissions associated with vacuum trucks are calculated based on a carbon cannister outlet VOC concentration of 100 ppmv and the vent gas stream flow rate.

Frac Tanks
Emissions associated with temporary diesel storage in frac tanks are calculated using the loading loss equation from AP-42, Section 5.2 for the filling losses and the standing storage loss equation from AP-42, Chapter 7.1 for the standing losses. The total emissions from each frac tank are the sum of these two losses.

Equipment Openings
Emissions associated with equipment openings are calculated assuming that one volume of vapors is released to the atmosphere when the equipment or line is opened and drained. Once drained, a volume of vapor equal to the liquid clingage is released, and a second volume of vapor is vented to the atmosphere when the equipment/line is refilled and returned to service.

Inherently Low Emitting Activities
Emissions for activities in this category are calculated based on the loading loss equation for sample collection and draining of materials into a pan or bucket, the difference in tank emissions for fittings with control versus without control when fittings are opened or removed for sampling or inspection, and clingage evaporation for immersed sample bottles and guide pole floats that are removed for sampling and inspection purposes.

Abrasive Blasting

The plant conducts abrasive blasting on in-place equipment (EPN BLAST). Abrasive blasting emissions are calculated using the blast material usage rate and blast material emission factors from the TCEQ's "Abrasive Blast Cleaning" guidance document (March 2001).

Painting

Painting is conducted on in-place or movable equipment (EPN PAINT). Coatings are brushed, rolled, or sprayed on. The facility employs HVLP spray guns and airless guns.

Surface coating VOC emissions are calculated by assuming that all of the VOC in the paint evaporates. Brushing or rolling coatings generates no particulate matter emissions, since there is no overspray. Particulate matter emissions from spraying are calculated using 50% overspray, the solids content of the paint, and an overspray solids fall out factor.

Combustion Control Device

The NO_X, CO, VOC and PM combustion emission rates from the engines are for natural gas- fired, 4-stroke rich-burn engines based on AP-42, Table 3.2-3. SO_2 emissions are based on the sulfur content in the fuel. The NO_x and CO combustion emission rates from the thermal oxidizers are based on stack testing information. The SO_2, VOC, and PM combustion emissions from the thermal oxidizers are based on emission factors for natural gas combustion from AP-42, Section 1.4.

ATTACHMENT V.C
GENERAL REQUIREMENTS

Texas Commission on Environmental Quality Permit by Rule Considerations
Chapter 106
Subchapter A: General Requirements

§106.1 – Purpose (Effective September 4, 2000)

This chapter identifies certain types of facilities or changes within facilities which the commission has determined will not make a significant contribution of air contaminants to the atmosphere pursuant to the Texas Health and Safety Code, the Texas Clean Air Act (TCAA), §382.057 and §382.05196.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

The purpose of this PBR registration is to authorize the maximum potential emissions associated with the maintenance, startup, and shutdown (MSS) of facilities at the Flint Hills Resources Corpus Christi, LLC ("FHR") Ingleside Terminal as well as emissions from temporary maintenance facilities which are operated in conjunction with maintenance activities at the terminal. Emissions meet the requirements of §106.263. Therefore, they do not make a significant contribution of air contaminants to the atmosphere.

§106.2 – Applicability (Effective April 17, 2014)

This chapter applies to certain types of facilities or changes within facilities listed in this chapter where construction is commenced on or after the effective date of the relevant permit by rule. This chapter does not apply to emissions of greenhouse gases (as defined in §101.1 of this title (relating to Definitions)).

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

The MSS emissions qualify for PBR under the version of §106.263 currently in effect.

§106.4 – Requirements for Permitting by Rule (Effective April 17, 2014)

(a) To qualify for a permit by rule, the following general requirements must be met.

- **(1) Total actual emissions authorized under permit by rule from the facility shall not exceed the following limits, as applicable:**
  - **(A) 250 tons per year (tpy) of carbon monoxide (CO) or nitrogen oxides (NOX);**
  - **(B) 25 tpy of volatile organic compounds (VOC), sulfur dioxide (SO2), or inhalable particulate matter (PM);**
  - **(C) 15 tpy of particulate matter with diameters of 10 microns or less (PM10);**
  - **(D) 10 tpy of particulate matter with diameters of 2.5 microns or less (PM2.5); or**
  - **(E) 25 tpy of any other air contaminant except:**
    - **(i) water, nitrogen, ethane, hydrogen, and oxygen; and**

FHR's Exhibit C

(ii) notwithstanding any provision in any specific permit by rule to the contrary, greenhouse gases as defined in §101.1 of this title (relating to Definitions).

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Total MSS emissions are less than the limits described in paragraph (a)(1). Emissions calculations are provided in the Appendix of this document.

(2) Any facility or group of facilities, which constitutes a new major stationary source, as defined in §116.12 of this title (relating to Nonattainment and Prevention of Significant Deterioration Review Definitions), or any modification which constitutes a major modification, as defined in §116.12 of this title, under the new source review requirements of the Federal Clean Air Act (FCAA), Part D (Nonattainment) as amended by the FCAA Amendments of 1990, and regulations promulgated thereunder, must meet the permitting requirements of Chapter 116, Subchapter B of this title (relating to New Source Review Permits) and cannot qualify for a permit by rule under this chapter. Persons claiming a permit by rule under this chapter should see the requirements of §116.150 of this title (relating to New Major Source or Major Modification in Ozone Nonattainment Areas) to ensure that any applicable netting requirements have been satisfied.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Not applicable. The FHR Ingleside Terminal is not located in a nonattainment area.

(3) Any facility or group of facilities, which constitutes a new major stationary source, as defined in 40 Code of Federal Regulations (CFR) §52.21, or any change which constitutes a major modification, as defined in 40 CFR §52.21, under the new source review requirements of the FCAA, Part C (Prevention of Significant Deterioration) as amended by the FCAA Amendments of 1990, and regulations promulgated thereunder because of emissions of air contaminants other than greenhouse gases, must meet the permitting requirements of Chapter 116, Subchapter B of this title and cannot qualify for a permit by rule under this chapter. Notwithstanding any provision in any specific permit by rule to the contrary, a new major stationary source or major modification which is subject to Chapter 116, Subchapter B, Division 6 of this title due solely to emissions of greenhouse gases may use a permit by rule under this chapter for air contaminants that are not greenhouse gases. However, facilities or projects which require a prevention of significant deterioration permit due to emissions of greenhouse gases may not commence construction or operation until the prevention of significant deterioration permit is issued.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Not applicable. The proposed MSS emissions are less than the applicable significant emission rates. Therefore, this update to the emissions from MSS activities and temporary MSS facilities does not constitute a major stationary source or a major modification.

(4) Unless at least one facility at an account has been subject to public notification and comment as required in Chapter 116, Subchapter B or Subchapter D of this title (relating to New Source Review Permits or Permit Renewals), total actual emissions from all facilities permitted by rule at an account shall not exceed 250 tpy of CO or NOX ; or 25 tpy of VOC or SO2 or PM; or 15 tpy of PM10 ; or 10 tpy of PM2.5 ; or 25 tpy of any other air contaminant except water, nitrogen, ethane, hydrogen, oxygen, and GHGs (as specified in §106.2 of this title (relating to Applicability)).

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Not applicable. The FHR Ingleside Terminal has been through a public notice and comment period for Permit No. 6606.

(5) Construction or modification of a facility commenced on or after the effective date of a revision of this section or the effective date of a revision to a specific permit by rule in this chapter must meet the revised requirements to qualify for a permit by rule.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

The MSS emissions are being claimed under the version of §106.263 currently in effect.

(6) A facility shall comply with all applicable provisions of the FCAA, §111 (Federal New Source Performance Standards) and §112 (Hazardous Air Pollutants), and the new source review requirements of the FCAA, Part C and Part D and regulations promulgated thereunder.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR will comply with all applicable provisions of the FCAA, §111 (NSPS) and §112 (HAPs), and the new source review requirements of the FCAA, Part C and Part D and regulations promulgated thereunder.

The NSPS in 40 CFR 60 Subparts A, Ka (Tanks Constructed/Modified after May 18, 1978 and prior to July 23, 1984) and Kb (Volatile Organic Liquid Storage Vessels Constructed After July 23, 1984) are applicable to some of the storage tanks at this facility. Tanks 28063, 28064, 28071, 28072, 28073, 28074, 28075, 28076, and 28080 were built between 1987 and 1982 and thus are subject to Subparts A and Ka. Tank 28086 was built in 2008 and is therefore subject to Subparts A and Kb. Tanks 28087, 28088, 28089, 28090, 28091, and 28092 will be subject to NSPS Kb after they are constructed. FHR will comply with the control, monitoring, reporting, and recordkeeping requirements of the applicable subparts of NSPS.

The MACT rules in 40 CFR 63, Subparts A (General), Y (Marine Tank Vessel Loading Operations) and EEEE (Organic Liquids Distribution or OLD) are potentially applicable to the terminal. However, because the terminal is an existing facility with HAP emissions below the 10/25 ton/yr threshold, gasoline is not handled at the facility and throughput of crude oil and condensate is below the 200 million barrels/yr threshold, the terminal is not subject to the General Provisions of Subpart A (per 40 CFR 63.560(c)). FHR will comply with the recordkeeping requirements of 63.567(j)(4) and the emission estimation requirements of 63.565(l) as required by 63.560(a)(3). Because the terminal is not a major source of HAP it is not subject to OLD MACT (per 40 CFR 63.2334).

(7) There are no permits under the same commission account number that contain a condition or conditions precluding the use of a permit by rule under this chapter.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Not applicable. There are no permit conditions for the FHR Ingleside Terminal that preclude the use of PBRs.

(8) The proposed facility or group of facilities shall obtain allowances for NOx if they are subject to Chapter 101, Subchapter H, Division 3 of this title (relating to Mass Emissions Cap and Trade Program).

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Not applicable. The FHR Ingleside Terminal is not located in the affected area and is not subject to Chapter 101, Subchapter H, Division 3.

(b) No person shall circumvent by artificial limitations the requirements of §116.110 of this title (relating to Applicability).

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

No artificial limitations are being employed to circumvent permit requirements.

(c) The emissions from the facility shall comply with all rules and regulations of the commission and with the intent of the Texas Clean Air Act (TCAA), including protection of health and property of the public, and all emissions control equipment shall be maintained in good condition and operated properly during operation of the facility.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

The MSS emissions will comply with all rules and regulations of the TCEQ and with the intent of the TCAA. Any deviations will be noted in periodic reports and/or the Title V deviation reports, as applicable.

(d) Facilities permitted by rule under this chapter are not exempted from any permits or registrations required by local air pollution control agencies. Any such requirements must be in accordance with Texas Health and Safety Code, §382.113 and any other applicable law.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Not applicable. There are no permits or registrations required by local air pollution control agencies.

§106.6 – Registration of Emissions (Effective December 11, 2002)

EHR's Exhibit C

(a) An owner or operator may certify and register the maximum emission rates from facilities permitted by rule under this chapter in order to establish federally- enforceable allowable emission rates which are below the emission limitations in §106.4 of this title (relating to Requirements for Permitting by Rule).

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR is submitting this registration to certify and register the maximum emission rates from MSS activities using the attached Form PI-7-CERT.

(b) All representations with regard to construction plans, operating procedures, and maximum emission rates in any certified registration under this section become conditions upon which the facility permitted by rule shall be constructed and operated.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR understands that all actual representations with regard to construction plans, operating procedures, and maximum emission rates are conditions upon which the facility permitted by rule will be constructed and operated. However, as may be noted in this registration, certain statements and/or values are included for informational, example, or calculation purposes only and should not be considered to be representations that are conditions upon which the facilities will be constructed and operated.

(c) It shall be unlawful for any person to vary from such representation if the change will cause a change in the method of control of emissions, the character of the emissions, or will result in an increase in the discharge of the various emissions, unless the certified registration is first revised.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR will not vary from such actual representations if the change will cause a change in the method of control of emissions, the character of the emissions, or will result in an increase in the discharge of the various emissions unless a revision to the originally submitted registration is first submitted to the TCEQ. FHR often performs an in-field verification of installed and modified facilities after a project has been constructed. If the in-field verification process identifies changes in the representations contained in this registration, FHR will submit an as-built revision to this registration. As long as the verification is completed, and the revised registration is submitted in a reasonable amount of time and the revised project still meets the requirements of applicable PBRs, FHR will consider the requirements of this citation satisfied.

(d) The certified registration must include documentation of the basis of emission estimates and a written statement by the registrant certifying that the maximum emission rates listed on the registration reflect the reasonably anticipated maximums for operation of the facility.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR's Exhibit C

This PBR registration and certification package includes the basis of the emission estimates. FHR certifies that the maximum emission rates listed in the registration package reflect the reasonably anticipated maximums for the MSS activities.

(e) Certified registrations used to demonstrate that Chapter 122 of this title (relating to Federal Operating Permits) does not apply to a source shall be submitted on the required form to the executive director; to the appropriate commission regional office; and to all local air pollution control agencies having jurisdiction over the site.

(1) Certified registrations established prior to the effective date of this rule shall be submitted on or before February 3, 2003.

(2) Certified registrations established on or after the effective date of this rule shall be submitted no later than the date of operation.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Not applicable. This certified registration is not being used to demonstrate that Chapter 122 of this title does not apply.

(f) All certified registrations shall be maintained on-site and be provided immediately upon request by representatives of the commission or any local air pollution control agency having jurisdiction over the site. If however, the site normally operates unattended, certified registrations and records demonstrating compliance with the certified registration must be maintained at an office within Texas having day-to-day operational control of the site. Upon request, the commission shall make any such records of compliance available to the public in a timelymanner.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

A copy of this registration will be kept at the Ingleside Terminal and will be provided immediately upon request by a representative of the TCEQ or any local air pollution control agency having jurisdiction.

(g) Copies of certified registrations shall be included in permit applications subject to review under Chapter 116, Subchapter B of this title (relating to New Source Review Permits).

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

If required by TCEQ, FHR will include a copy of this certified registration in the next permit application for the Ingleside Terminal subject to review under Chapter 116, Subchapter B of this title.

§106.8 – Recordkeeping (Effective November 1, 2001)

(a) Owners or operators of facilities and sources that are de minimis as designated in §116.119 of this title (relating to De Minimis Facilities or Sources) are not subject to this section.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Some MSS activities, as listed in Attachment V.A, are de minimis. Records are not required to be kept for these activities. For all other MSS activities, FHR is subject to the recordkeeping requirements in §106.8.

(b) Owners or operators of facilities operating under a permit by rule (PBR) in Subchapter C of this chapter (relating to Domestic and Comfort Heating and Cooling) or under those PBRs that only name the type of facility and impose no other conditions in the PBR itself do not need to comply with specific recordkeeping requirements of subsection (c) of this section. A list of these PBRs will be available through the commission's Austin central office, regional offices, and the commission's website. Upon request from the commission or any air pollution control program having jurisdiction, claimants must provide information that would demonstrate compliance with §106.4 of this title (relating to Requirements for Permitting by Rule), or the general requirements, if any, in effect at the time of the claim, and the PBR under which the facility is authorized.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

Not applicable. FHR is not proposing to use a PBR that only names the type of facility and imposes no other conditions in the PBR. FHR will comply with the recordkeeping requirements in §106.8(c).

(c) Owners or operators of all other facilities authorized to be constructed and operate under a PBR must retain records as follows:

(1) maintain a copy of each PBR and the applicable general conditions of §106.4 of this title or the general requirements, if any, in effect at the time of the claim under which the facility is operating. The PBR and general requirements claimed should be the version in effect at the time of construction or installation or changes to an existing facility, whichever is most recent. The PBR holder may elect to comply with a more recent version of the applicable PBR and general requirements;

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR will maintain a copy of the PBR and the applicable general conditions of §106.4 *that are currently in effect*

(2) maintain records containing sufficient information to demonstrate compliance with the following:

(A) all applicable general requirements of §106.4 of this title or the general requirements, if any, in effect at the time of the claim; and

(B) all applicable PBR conditions;

FHR's Exhibit C

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR will maintain records to demonstrate compliance with all applicable general requirements of §106.4 and all applicable PBR conditions.

(3) keep all required records at the facility site. If however, the facility normally operates unattended, records must be maintained at an office within Texas having day-to-day operational control of the plant site;

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR will maintain all required records at the FHR Ingleside Terminal.

(4) make the records available in a reviewable format at the request of personnel from the commission or any air pollution control program having jurisdiction;

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR will make the records available in a reviewable format at the request of personnel from the TCEQ or any air pollution control program having jurisdiction.

(5) Beginning April 1, 2002, keep records to support a compliance demonstration for any consecutive 12-month period. Unless specifically required by a PBR, records regarding the quantity of air contaminants emitted by a facility to demonstrate compliance with §106.4 of this title prior to April 1, 2002 are not required under this section; and

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR will keep the records required to demonstrate compliance for any consecutive 12-month period within the applicable record retention time period (five years).

(6) for facilities located at sites designated as major in accordance with §122.10(13) of this title (relating to General Definitions) or subject to or potentially subject to any applicable federal requirement, retain all records demonstrating compliance for at least five years. For facilities located at all other sites, all records demonstrating compliance must be retained for at least two years. These record retention requirements supercede any retention conditions of an individual PBR.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

The FHR Ingleside Terminal is a major source. Therefore, FHR will keep all records demonstrating compliance for at least five years.

Texas Commission on Environmental Quality Permit by Rule Considerations
Chapter 106
Subchapter B: Registration Fees for New Permits by Rule

§106.50 – Registration Fees for Permit by Rule (Effective June 30, 2004)

(a) A registrant who submits a permit by rule (PBR) registration for review by the commission shall remit one of the following fees with the PI-7 registration form:

(1) $100 for:

(A) small businesses, as defined in Texas Government Code, §2006.001;

(B) non-profit organizations; and

(C) municipalities, counties, and independent school districts with populations or districts of 10,000 or fewer residents, according to the most recently published census; or

(2) $450 for all other entities.

(b) This fee does not apply to:

(1) a certification submitted solely for the purpose of establishing a federally enforceable emissions limit under §106.6 of this title (relating to Registration of Emissions);

(2) a remediation project conducted under §106.533 of this title (relating to Remediation); or

(3) resubmittal of previously reviewed registrations, if received within six months of a written response on the original action.

(c) This fee is for PBR registrations that are received on or after November 1, 2002.

(d) All PBR fees will be remitted in the form of a check, certified check, electronic funds transfer, or money order made payable to the Texas Commission on Environmental Quality (TCEQ) and submitted concurrently with the registration to the TCEQ, P.O. Box 13088, MC 214, Austin, Texas 78711-3087. No fees will be refunded.

<u>FLINT HILLS RESOURCES CORPUS CHRISTI, LLC</u>

The PBR registration fee of $450.00 associated with this PBR registration revision was submitted to the TCEQ Revenue Section via STEERS.

FHR's Exhibit C

ATTACHMENT V.C
SPECIFIC REQUIREMENTS

Texas Commission on Environmental Quality Permit by Rule Considerations
Chapter 106
Subchapter U: Tanks, Storage, and Loading

§106.263 – Routine Maintenance, Start-up and Shutdown of Facilities, and Temporary Maintenance Facilities (Effective November 1, 2001)

(a) This section authorizes routine maintenance, start-up and shutdown of facilities, and specific temporary maintenance facilities except as specified in subsection (b) of this section.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

The purpose of this PBR registration is to authorize the maximum potential emissions associated with the maintenance, startup, and shutdown (MSS) of facilities at the Flint Hills Resources Corpus Christi, LLC ("FHR") Ingleside Terminal as well as emissions from temporary maintenance facilities which are operated in conjunction with maintenance activities at the terminal.

(b) The following are not authorized under this section:

(1) construction of any new or modified permanent facility;

(2) reconstruction under 40 Code of Federal Regulations, Part 60, New Source Performance Standards, Subpart A, §60.15 (relating to Reconstruction);

(3) physical or operational changes to a facility which increase capacity or production beyond previously existing performance levels or results in the emission of a new air contaminant;

(4) facilities and sources that are de minimis as allowed in §116.119 of this title (relating to De Minimis Facilities or Sources);

(5) piping fugitive emissions authorized under a permit or another permit by rule; and

(6) any emissions associated with operations claimed under the following sections of this chapter:

i. §106.231 of this title (relating to Manufacturing, Refinishing, and Restoring Wood Products);

ii. §106.351 of this title (relating to Salt Water Disposal (Petroleum));

iii. §106.352 of this title (relating to Oil and Gas Production Facilities);

iv. §106.353 of this title (relating to Temporary Oil and Gas Facilities);

v. §106.355 of this title (relating to Pipeline Metering, Purging, and Maintenance);

vi. §106.392 of this title (relating to Thermoset Resin Facilities);

vii. §106.418 of this title (relating to Printing Presses);

viii. §106.433 of this title (relating to Surface Coat Facility);

ix. §106.435 of this title (relating to Classic or Antique Automobile Restoration Facility);

x. §106.436 of this title (relating to Auto Body Refinishing Facility); and

xi. §106.512 of this title (relating to Stationary Engines and Turbines).

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

None of the activities listed in subsection (b) above apply to this registration. Therefore, Permit by Rule 106.263 can be used to authorize the MSS activities at the Ingleside Terminal.

(c) The following activities and facilities are authorized under this section:

(1) routine maintenance activities which are those that are planned and predictable and ensure the continuous normal operation of a facility or control device or return a facility or control device to normal operating conditions;

(2) routine start-ups and shutdowns which are those that are planned and predictable; and

(3) temporary maintenance facilities which are constructed in conjunction with maintenance activities. Temporary maintenance facilities include only the following:

(A) facilities used for abrasive blasting, surface preparation, and surface coating on immovable fixed structures;

(B) facilities used for testing and repair of engines and turbines;

(C) compressors, pumps, or engines and associated pipes, valves, flanges, and connections, not operating as a replacement for an existing authorized unit;

(D) flares, vapor combustors, catalytic oxidizers, thermal oxidizers, carbon adsorption units, and other control devices used to control vent gases released during the degassing of immovable, fixed process vessels, storage vessels, and associated piping to atmospheric pressure, plus cleaning apparatus that will have or cause emissions;

(E) temporary piping required to bypass a unit or pipeline section undergoing maintenance; and

(F) liquid or gas-fired vaporizers used for the purpose of vaporizing inert gas.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR is submitting this registration to document authorization of routine MSS activities and temporary maintenance facilities at the Ingleside Terminal. The routine MSS activities are planned and predictable and ensure the continuous normal operation of a facility or control device or return a facility or control device to normal operating conditions. The temporary maintenance facilities will only include those facilities listed in paragraphs (c)(3)(A) through (F).

(d) Emissions from routine maintenance (excluding temporary maintenance facilities), start-up, and shutdown are:

(1) limited to 24-hour emission totals which are less than the reportable quantities defined in §101.1(89) of this title (relating to Definitions) for individual occurrences;

(2) required to be authorized under Chapter 116 of this title (relating to Control of Air Pollution by Permits for New Construction or Modification) or comply with §101.7 and §101.11 of this title (relating to Maintenance, Start-up and Shutdown Reporting, Recordkeeping, and Operational Requirements, and Demonstrations) if unable to comply with paragraph (1) of this subsection or subsection (f) of this section; and

(3) required to comply with subsection (f) of this section.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR will adhere to the above listed restrictions for the MSS activities that are included in this registration. Emission totals for individual occurrences of MSS activities will remain below the reportable quantities as defined in §101.1(89). Compliance with §106.263(f) is addressed below.

(e) In addition to the emission limits in subsection (f) of this section, specific temporary maintenance facilities as listed in subsection (c)(3) of this section must meet the following additional requirements:

(1) flares or vapor combustors must meet the requirements of §106.492(1) and (2)(C) of this title (relating to Flares);

(2) catalytic oxidizers must meet the requirements of §106.533(5)(C) of this title (relating to Water and Soil Remediation);

(3) thermal oxidizers must meet the requirements of §106.493(2) and (3) of this title (relating to Direct Flame Incinerators);

(4) carbon adsorption systems must meet the requirements of §106.533(5)(D) of this title;

(5) other control devices used to control vents caused by the degassing of process vessels, storage vessels, and associated piping must have an overall vapor collection and destruction or removal efficiency of at least 90%;

(6) any temporary maintenance facility that cannot meet all applicable limitations of this section must obtain authorization under Chapter 116 of this title; and

(7) temporary maintenance facilities may not operate at a given location for longer than 180 consecutive days or the completion of a single project unless the facility is

registered. If a single project requires more than 180 consecutive days to complete, the facilities must be registered using a PI-7 Form, along with documentation on the project. Registration and supporting documentation shall be submitted upon determining the length of the project will exceed 180 days, but no later than 180 days after the project begins.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

The Ingleside Terminal will comply with any applicable additional requirements as specified in 106.263(e) including paragraph (e)(5) requiring an overall vapor collection and destruction efficiency of greater than 90% for control devices. Paragraph (e)(3) above references §106.493(2) and (3) as the requirements for the temporary thermal oxidizer however these requirements no longer exist. Paragraph (e)(4) above references §106.533(5)(D) as the requirements for the carbon adsorption systems however this requirement no longer exists. Paragraph (e)(7) above requires the registration of the temporary maintenance facility if it will operate greater than 180 consecutive days. This PBR registration satisfies this requirement.

(f) All emissions covered by this section are limited to, collectively and cumulatively, less than any applicable emission limit under §106.4(a)(1) - (3) of this title (relating to Requirements for Permitting by Rule) in any rolling 12-month period.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

The total emissions covered by this section will not exceed any applicable emission limit under §106.4(a)(1)-(3) of this title in any rolling 12-month period. The maximum emission rates of each pollutant for this PBR registration are provided in Attachment V-A of this document.

(g) Facility owners or operators must retain records containing sufficient information to demonstrate compliance with this section and must include information listed in paragraphs (1) - (4) of this subsection. Documentation must be separate and distinct from records maintained for any other air authorization. Records must identify the following for all maintenance, start- up, or shutdown activities and temporary maintenance facilities:

(1) the type and reason for the activity or facility construction;

(2) the processes and equipment involved;

(3) the date, time, and duration of the activity or facility operation; and

(4) the air contaminants and amounts which are emitted as a result of the activity or facility operation.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC

FHR will maintain records to demonstrate compliance with the requirements of §106.263(g) as specified.

APPENDIX
MSS CALCULATIONS

Routine Start-up/Shutdown/Maintenance Fugitive Emissions
Emissions Summary

EPN	MSS Activity	NOx (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM (ton/yr)	PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)	VOC (ton/yr)
TERMMSS	Equipment Openings							0.26
LOWMSS	Drain Emissions							0.14
TERMMSS	Vacuum Truck Loading							0.03
TERMMSS	Frac Tanks							0.07
COMBMSS	Tank Landings (Maintenance/Repair)	0.54	0.89	4.62	0.068	0.068	0.068	0.375
COMBMSS	Tank Refilling (Maintenance/Repair)	0.14	0.22	6.27	0.017	0.017	0.017	0.456
COMBMSS	Tank Degassing to Control (Cleaning)	0.22	0.36	1.92	0.027	0.027	0.027	0.155
TANKMSS	Tank Cleaning							13.60
COMBMSS	Tank Refilling After Cleaning	0.05	0.09	0.64	0.007	0.007	0.007	0.050
LOWMSS	Float Removal							0.001
LOWMSS	Tank Sampling							0.001
LOWMSS	Uncontrolled Slotted Guidepoles							0.001
BLAST	Abrasive Blasting				8.85	2.10	2.10	
PAINT	Painting				1.67	1.67	1.67	7.49
Total		0.95	1.56	13.45	10.84	3.89	3.89	22.63

Routine Maintenance/Start-up/Shutdown Emissions
Emissions from Product Drained to Pan/Bucket and Sampling
EPN LOWMSS

Emissions are generated when product is drained out of lines and equipment for maintenance purposes and when samples are collected. Emissions are calculated using the loading loss equation from AP-42, Section 5.2 with a saturation factor of 1.45 for splash loading. All calculations are done assuming crude oil service as a worst-case, although product drained could also be diesel.

$$L_L = \frac{12.46 \times S \times M \times P \times Q}{T} \qquad \text{(AP-42, Section 5.2)}$$

L_L = Loading Losses
S = Saturation factor from Table 5.2-1
M = Vapor molecular weight of liquid loaded, lb/lb-mol
P = True vapor pressure of liquid loaded, psia
T = Temperature of bulk liquid loaded, °R
Q = Filling rate, gal/yr

Hourly Emissions

Material	Multiplier	Saturation Factor	Vapor MW (lb/lb-mol)	TVP (psia)	Temperature (R)	Filling Rate (gal/hr)	Control Efficiency	VOC in Vapor (wt%)	VOC Emissions (lb/hr)
Crude Oil	1	1.45	50	10.9	543.8	210	0%	100%	[illegible]

Annual Emissions

Material	Multiplier	Saturation Factor	Vapor MW (lb/lb-mol)	TVP (psia)	Temperature (R)	Volume Drained (gal/yr)	Control Efficiency	VOC in Vapor (wt%)	VOC Emissions (tons/yr)
Crude Oil	1	1.45	50	10.9	543.8	15,000	0%	100%	0.14
								Total	0.14

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, [illegible]

Annual VOC Emissions = 12.46 x 1.45 x 50 lb/lb-mol x 10.90 psia / 543.8 R / 1000 gal x 15000 gal/yr x ton/2000 lb
= 0.14 ton/yr

Routine Maintenance/Start-up/Shutdown Emissions
Vacuum Trucks
EPN TERMMSS

Emissions Basis

Flowrate Through System:	500 scfm
Max VOC Concentration exiting Carbon Canister System:	100 ppmv
Average VOC Concentration exiting Carbon Canister System:	100 ppmv
VOC Molecular Weight:	86.18 lb/lb-mole (as hexane)
Operating Hours Per Event:	1 hours
Number of Events per Year:	100 events/yr

Hourly VOC Emission Rate

=	500 scf vent gas	lb-mole vent gas	100 lbmole VOC	86.18 lb VOC	60 min
	min	379 scf	10^6 lb-mole vent gas	lb-mole VOC	1 hr

= 0.68 lb/hr

Annual VOC Emission Rate

=	500 scf vent gas	lb-mole vent gas	100 lbmole VOC	86.18 lb VOC	60 min	1 hours	100 events	ton
	min	379 scf	10^6 lb-mole vent gas	lb-mole VOC	1 hr	event	yr	2000 lbs

= 0.03 tons/yr

Note: When vacuum trucks are loaded uncontrolled, emissions will not exceed the emissions estimated for controlled loading.

The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

FHR's Exhibit C

Routine Maintenance/Start-up/Shutdown Emissions
Frac Tanks
EPN TERMMSS

Short-term emission occur during filling of the frac tanks.
Annual emission are the total from filling the tanks and standing losses.

Filling the Tanks

$$L_L = \frac{12.46 \times S \times M \times P \times Q}{T} \qquad \text{(AP-42, Section 5.2)}$$

L_L = Loading Losses
S = Saturation factor from Table 5.2-1
M = Vapor molecular weight of liquid loaded, lb/lb-mol
P = True vapor pressure of liquid loaded, psia
T = Temperature of bulk liquid loaded, °R
Q = Filling rate, gal/yr

Hourly Filling Emissions

Material	Saturation Factor	Vapor MW (lb/lb-mol)	TVP (psia)	Temperature (R)	Filling Rate (gal/hr)	Number of Events per Hour	Control Efficiency	VOC in Vapor (wt%)	VOC Emissions (lb/hr)
Distillates	0.6	130	0.02	555	21,000	4	0%	100%	2.94

Annual Filling Emissions

Material	Saturation Factor	Vapor MW (lb/lb-mol)	TVP (psia)	Temperature (R)	Filling Rate (gal/event)	Number of Events per Year	Control Efficiency	VOC in Vapor (wt%)	VOC Emissions (tons/yr)
Distillates	0.6	130	0.012	540	21,000	15	0%	100%	0.003
								Total	0.003

Annual VOC Emissions = 12.46 x 0.6 x 130 lb/lb-mol x 0.012 psia / 540 R / 1000 gal x 315000 gal/yr x ton/2000 lb
= 0.003 ton/yr

Standing Storage Losses

$$L_s = N \times (Vv) \times (Wv) \times (Ke) \times (Ks)$$

L_s = Standing Storage Losses, lb/event
N = Number of days product is stored in tank
V_v = Vapor space volume, ft^3
W_v = Vapor density, lb/ft^3
Ke = Vapor expansion factor
Ks = Vapor saturation factor

Annual Standing Emissions

Material	Days Stored per Event	Vapor Space Volume	Vapor Density	Vapor Expansion Factor	Vapor Saturation Factor	Number of Events per Year	Control Efficiency	VOC in Vapor (wt%)	Standing Storage Losses (tons/yr)
Distillates	60	2800	0.0003	0.1702	0.997	15	0%	100%	0.064
								Total	0.064

Annual VOC Emissions = 60 days/event x 2,800 ft^3 x 0.0003 lb/ft^3 x 0.1702 x 0.997 x 15 events/yr x ton/2000 lb
= 0.064 ton/yr

Total Emissions

Material	Hourly Emissions (lb/hr)	Annual Emissions (tons/yr)
Distillates	2.94	0.07
Total	2.94	0.07

[illegible]

FHR's Exhibit C

Routine Maintenance/Start-up/Shutdown Emissions
Equipment Openings
EPN TERMMSS

		Input Fields						Constants		Calculations								
		D	H	P_v	MW_v	T	ρ	R	l	V	A_w	A_b	A_T					
Vessel/Piping Description	Activity	Diameter, in	Height/ Length, in	TVP, psia	Vapor Molecular Weight, lb/lb-mol	Temp, °F	Product Density, lb/gal	Gas Constant, psia ft³/ lb-mol °R	Clingage Layer, in	Volume, ft³	Surface Area - walls, ft²	Surface Area - top/bottom, ft²	Surface Area - total, ft²	Emissions, lb/event	Event Duration Hours	Emissions/ hour, lbs	Events per year	Emissions / year, lbs
Pump Filter	clean/change filter	24	50	10.9	50	84.2	7.1	10.731	0.0004	13.09	26.18	6.28	32.46	2.50	[illegible]	2.50	[illegible]	[illegible]
Pump Filter (2)	clean/change filter	24	24	10.9	50	84.2	7.1	10.731	0.0004	6.28	12.57	6.28	18.85	[illegible]	[illegible]	[illegible]	6	[illegible]
Pig Trap A	receive/launch pig	10	364	[illegible]	50	[illegible]	7.1	10.731	0.0004	16.54	79.41	1.09	80.50	[illegible]	1	[illegible]	24	[illegible]
Pig Trap B	receive/launch pig	12	420	[illegible]	50	[illegible]	7.1	10.731	0.0004	27.49	109.96	1.57	111.53	[illegible]	[illegible]	[illegible]	24	[illegible]
Pig Trap C	receive/launch pig	16	276	[illegible]	50	[illegible]	7.1	10.731	0.0004	32.11	96.34	2.79	99.13	[illegible]	1	[illegible]	24	[illegible]
Piping	tank out of service	30	72	[illegible]	50	[illegible]	7.1	10.731	0.0004	29.45	47.12	9.82	56.94	[illegible]	[illegible]	[illegible]	4	[illegible]
Piping	gauge replacement	1	1	[illegible]	50	[illegible]	7.1	10.731	0.0004	0.0005	0.02	0.01	0.03	[illegible]	1	[illegible]	30	[illegible]
Piping	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10.731	0.0004	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Piping	[illegible]	[illegible]	[illegible]	[illegible]	50	[illegible]	[illegible]	10.731	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Meter	drain out	10	46	[illegible]	50	[illegible]	7.1	10.731	0.0004	2.18	10.47	1.09	11.56	[illegible]	1	[illegible]	10	[illegible]
Total																		[illegible]

Sample Calculation (Pump Filter):

Total Emissions = 2 x V x Pv x MWv / (R x T) + A_T x l x 7.48 x ρ

= 2 x 13.09 ft^3 x 10.90 psia x 50 lb/lbmol / (10.731 x 544.2 F) + 32.46 ft^2 x 0.000033 ft x 7.48 gal/ft^3 x 7.1 lb/gal
= 2.50 lb/event

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

FHR's Exhibit C

Routine Maintenance/Start-up/Shutdown Emissions
Float Removal/Sample Jars
EPN LOWMSS

		Input Fields						Constants		Calculations						
		D	H	P_v	MW_v	T	ρ	R	l	V	A_w	A_b	A_T			
Vessel/Piping Description	Activity	Diameter, in	Height/ Length, in	TVP, psia	Vapor Molecular Weight, lb/lb-mole	Temp, °F	Product Density, lb/gal	Gas Constant, psia ft³/ lb-mol °R	Clingage Layer, in	Volume, ft³	Surface Area - walls, ft2	Surface Area - top/bottom, ft2	Surface Area - total, ft2	Emissions, lb/event	Events/year	Emissions/ year, lbs
Float Removal	Removal of floats for sampling and gauging	8	15	10.9	50	84.2	7.1		0.0004		2.62	0.35	2.97	0.0053	260	1.378
Sample Jar	Sample collection by immersion	8	6	10.9	50	84.2	7.1		0.0004		1.05	0.35	1.40	0.0025	780	1.95

Sample Calculation (Float Removal):

Total Emissions = A_T x l x 7.48 x ρ

= 2.97 ft^2 x 0.000033 ft x 7.48 gal/ft^3 x 7.1 lb/gal
= 0.0053 lb/event

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

FHR's Exhibit C

Routine Maintenance/Start-up/Shutdown Emissions
Uncontrolled Slotted Guidepoles
EPN LOWMSS

	Input Fields						Constants	Calculations				
	K_{Fa}	K_{Fa}	P_v	P_A	MW_v	t	K_c	P*				
Activity Description	with Float	without Float	Product TVP, psia	Atmospheric Pressure, psia	Vapor Molecular Weight, lb/lb-mole	Duration of Opening, hrs	Product Factor	Vapor Pressure Function	Emissions, lb/event	Events/Tank/ year	Tanks	Emissions/ year, lbs
Guidepole float removed to allow sampling and gauging	43	31	10.9	14.7	50	0.5	0.4	0.3259	0.0045	52	5	1.17

Sample Calculation:

Total Emissions = ΔK_{FA} x P* MW_V x K_C / 8760 x t

= 12 lbmol/yr x 0.3259 psia x 50 lb/lbmol x 0.4 / 8760 x 0.5 hrs
= 0.0045 lb/event

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

FHR's Exhibit C

Routine Maintenance/Start-up/Shutdown Emissions Surface Coating
EPN PAINT

Basis:
Maximum paint density (lb/gal) = 10.16
Estimated overspray = 50% from air atomization, flat surfaces in Table 1 of TCEQ's April 2001 "Surface Coating Operations" guidance
Aerosol can size = 12 oz. (by weight)
PM/PM10/PM2.5 Fall Out Factor = 61% (estimated - based on TCEQ guidance)

Hourly Painting Emissions

Plant Area	FIN	EPN	Type of Application	Coatings Usage Rate (gal/hr)	Coatings Usage Rate (cans/hr)	Maximum VOC Content (lb VOC/gal)	Maximum VOC Content (lb VOC/lb coatings)	Maximum Coating Density (lb/gal)	Solids Content (lb solids/gal)	Overspray (%)	PM/PM10/PM2.5 Control Efficiency (%)	PM/PM10/PM2.5 Fall Out Factor	VOC Emissions (lb/hr)	$PM/PM_{10}/PM_{2.5}$ Emissions (lb/hr)
Site-wide	PAINT	PAINT	Roller/brush	80		3.997		16.16	14.761	0%	0%	0.00	319.76	0.00
Site-wide	PAINT	PAINT	Sprayer	80		3.997		16.16	14.761	50%	0%	0.61	319.76	112.18
Site-wide	PAINT	PAINT	Thinner	3		7.510		7.51	0.0	0%	0%	0.00	22.53	0.00
Site-wide	PAINT	PAINT	Aerosol Can		4		0.6		0.4	50%	0%	0.61	1.80	0.11
													344.09	112.29

Annual Painting Emissions

Plant Area	FIN	EPN	Type of Application	Coatings Usage Rate (gal/yr)	Coatings Usage Rate (cans/yr)	Average VOC Content (lb VOC/gal)	Average VOC Content (lb VOC/lb coatings)	Coating Density (lb/gal)	Solids Content (lb solids/lb coating)	Overspray (%)	PM/PM10/PM2.5 Control Efficiency (%)	PM/PM10/PM2.5 Fall Out Factor (%)	VOC Emissions (tons/yr)	$PM/PM_{10}/PM_{2.5}$ Emissions (tons/yr)
Site-wide	PAINT	PAINT	Roller/brush	5,000		1.665		10.60	9.137	0%	0%	0.00	4.16	0.00
Site-wide	PAINT	PAINT	Sprayer	3,800		1.665		10.60	9.137	50%	0%	0.61	3.16	1.65
Site-wide	PAINT	PAINT	Thinner	800		7.510		7.51	0.0	0%	0%	0.00	3.00	0.00
Site-wide	PAINT	PAINT	Aerosol Can		1,460		0.6		0.4	50%	0%	0.61	0.33	0.02
													7.49	1.67

Sample Calculation for Site-wide Roller/Brush Emissions:

Hourly VOC Emissions = Coatings Usage Rate (lb/hr) x (Maximum VOC Content (lb VOC/gal))
= (80 gal/hr) x (3.997 lb VOC/gal)
= 319.76 lb/hr

Sample Calculation for Site-wide Sprayer PM/PM_{10} Emissions:

Hourly PM/PM_{10} Emissions = Coating Usage Rate (gal/hr) x (Solids Content (lb solids/gal coating) x (% Overspray) x (100% - Control Efficiency) x (1 - Fall Out Factor)
= (80 gal/hr) x (14.761 lb solids/gal coating) x (0.5) x (100% - 0%) x (1 - 0.61)
= 112.18 lb/hr

Sample Calculation for Site-wide Aerosol Can

Emissions:

Hourly PM/PM_{10} Emissions = Aerosol Can Usage Rate (cans/hr) x (Aerosol Can Size (lb/can)) x (Solids Content (lb solids/lb coating) x (% Overspray) x (100% - Control Efficiency)
= (4 can/hr) x (0.75 lb/can) x (0.4 lb solids/lb coating) x (0.5) x (100% - 0%)
= 0.11 lb/hr

Note: [illegible]

Routine Maintenance/Start-up/Shutdown Emissions
Abrasive Blasting
EPN BLAST

Maximum hourly usage rate (lb/hr) =	2,000
Total annual usage rate (lb/yr) =	750,000

Hourly Abrasive Blasting Emissions

Plant Area	FIN	EPN	Blast Material Usage Rate (lb/hr)	Control Efficiency (%)	PM Emission Factor (lb PM/lb material)	PM_{10} Emission Factor (lb PM_{10}/lb material)	$PM_{2.5}$ Emission Factor (lb $PM_{2.5}$/lb material)	PM Emissions (lb/hr)	PM_{10} Emissions (lb/hr)	$PM_{2.5}$ Emissions (lb/hr)
Site-wide	BLAST	BLAST	10,000	0%	0.0059	0.0014	0.00013	59.00	14.00	1.300
							TOTALS	**59.00**	**14.00**	**1.300**

Annual Abrasive Blasting Emissions

Plant Area	FIN	EPN	Blast Material Usage Rate (lb/yr)	Control Efficiency (%)	PM Emission Factor (lb PM/lb material)	PM_{10} Emission Factor (lb PM_{10}/lb material)	$PM_{2.5}$ Emission Factor (lb $PM_{2.5}$/lb material)	PM Emissions (ton/yr)	PM_{10} Emissions (ton/yr)	$PM_{2.5}$ Emissions (ton/yr)
Site-wide	BLAST	BLAST	3,000,000	0%	0.0059	0.0014	0.00013	8.850	2.100	0.1950
							TOTALS	**8.850**	**2.100**	**0.1950**

Sample Calculation for Blasting:

Hourly PM Emissions = Blast Material Usage Rate (lb/hr) x PM Emission Factor (lb PM/lb material) x (100% - control efficiency)
Hourly PM Emissions = (10,000 lb/hr) x (0.0059 lb PM/lb material) x (100% - 0%)
Hourly PM Emissions = 59 lb/hr

[illegible]

FHR's Exhibit C

IFR with Full Heel Standing Idle Calculations - Tank Maintenance/Repair (EPN COMBMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007

Ambient Pressure, P_a = 14.7 psia
Ambient Temp. = 71.55 °F and 531.22 °R
Maximum Temp. = [illegible] °F and [illegible] °R
Minimum Temp. = 62.06 °F and 521.73 °R
Average Temp. = [illegible] °F and [illegible]
°R Ideal Gas Law Constant, R = 10.731 psia-ft³/lb-mol-°R

Tank and Chemical Details:

Tank No.	Stored Material	Time Period Idle (days/yr)	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	Liquid Density, Wl (lb/gal)	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Antoine's Equation Constant, B (°R)	Solar Absorptance, α	Solar Insolation, I (Btu/ft²-day)	Diameter, D (ft)	Leg Height, h_{ld} (ft)	Liquid Height, h_l (ft)	Tank Bottom Slope, s (in/ft)	Vapor Control Efficiency (%) [1]
28063	Crude Oil	5	10	50	7.1	10.9	7.696	9.06	5303.9	0.17	1447.94	109	6.5	0.167	0	99
28064	Crude Oil	5	10	50	7.1	10.9	7.696	9.06	5303.9	0.17	1447.94	109	6.67	0.167	0	99
28067	Crude Oil	5	10	50	7.1	10.9	7.696	9.06	5303.9	0.17	1447.94	140	6.33	0.167	0	99
28070	Crude Oil	5	10	50	7.1	10.9	7.696	9.06	5303.9	0.17	1447.94	140	7.42	0.167	0	99
28077	Crude Oil	5	10	50	7.1	10.9	7.696	9.06	5303.9	0.17	1447.94	140	6.83	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	[illegible]	10.9	7.696	9.06	[illegible]	[illegible]	1447.94	180	[illegible]	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	[illegible]	10.9	7.696	[illegible]	[illegible]	[illegible]	1447.94	180	6.5	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	[illegible]	[illegible]	7.696	[illegible]	[illegible]	[illegible]	1447.94	180	6.5	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	[illegible]	[illegible]	7.696	[illegible]	[illegible]	[illegible]	1447.94	180	6.5	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	[illegible]	[illegible]	7.696	[illegible]	[illegible]	[illegible]	1447.94	180	6.5	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	[illegible]	[illegible]	7.696	[illegible]	[illegible]	[illegible]	1447.94	180	6.5	0.167	[illegible]	99

Notes: 1) Use NA if vapor control is not used.

Emission Calculations and Summary:

Tank No.	Vapor Space Expansion, K_E	Vapor Volume, V_V (ft³)	Vapor Height, h_v (ft)	Standing Idle Saturation, K_S	Daily Temperature Range ΔT_V (°R)	Effective Liquid/ Sludge Height, h_{le} (ft)	Calculated Standing Loss, L_S (lb/yr)	Maximum Standing Loss, L_{Smax} (lb/yr)	Uncontrolled Standing Loss, L_S (lb/yr)	Controlled Standing Loss, L_S (lb/yr)
28063	0.386	59100	6.33	0.246	32.8	0.167	2250	82800	2750	22.5
28064	0.386	60700	6.5	0.243	32.8	0.167	2260	82800	2260	22.6
28067	0.386	94800	6.16	0.253	32.8	0.167	3670	137000	3670	36.7
28070	0.386	112000	7.25	0.225	32.8	0.167	3830	137000	3830	38.3
28077	0.386	103000	6.66	0.238	32.8	0.167	3750	137000	3750	37.6
[illegible]	0.386	179000	[illegible]	[illegible]	32.8	0.167	[illegible]	[illegible]	6800	68
[illegible]	0.386	179000	[illegible]	[illegible]	32.8	0.167	[illegible]	[illegible]	6800	68
[illegible]	0.386	[illegible]	[illegible]	0.246	32.8	0.167	[illegible]	[illegible]	6800	68
[illegible]	0.386	[illegible]	[illegible]	0.246	32.8	[illegible]	[illegible]	[illegible]	6800	68
[illegible]	0.386	[illegible]	[illegible]	0.246	32.8	[illegible]	[illegible]	[illegible]	6800	68
[illegible]	0.386	[illegible]	[illegible]	0.246	32.8	[illegible]	[illegible]	[illegible]	6800	68

IFR with Full Heel Standing Idle Calculations (cont'd)
Sample Calculations (Tank No. 28063):

$\Delta T_V = 0.72(T_{AMX} - T_{AMN}) + 0.028\alpha I$
$= (0.72)\ (543.87 - 521.73)°R + (0.028)\ (0.17)\ (1447.94\ Btu/ft^2\text{-}day) \qquad = 22.8°R$

$K_E = \frac{\Delta T_V}{T}\left(1 + \frac{0.50\,B\,P}{T(P_a - P)}\right)$
$= \frac{(22.8°R)}{(531.22°R)}\left(1 + \frac{(0.50)\ (5303.9°R)\ (9.05\ psia)}{(531.22°R)\ (14.7 - 9.05)\ psia}\right) \qquad = 0.386$

$h_v = h_d - h_l$
$= (6.5\ ft - 0.167\ ft) \qquad = 6.33\ ft$

$V_V = (h_v)(\pi D^2/4)$
$= \frac{(6.33\ ft)\ (3.14)\ (109\ ft)^2}{4} \qquad = 59100\ ft^3$

$K_S = \frac{1}{1 + 0.053\,P\,(h_v)} \qquad \leq \qquad 0.8$

$\frac{1}{[\ (1) + (0.053)\ (9.05\ psia)\ (6.33\ ft)\ ]} \qquad = \qquad 0.248$

Since Ks ≤ 0.8, then
= 0.248

$h_{le} = \left(h_l + \frac{sD}{72}\right)$
$= (0.167\ ft) + \left(\frac{(0\ in./ft)(109\ ft)}{(72)}\right) \qquad = 0.167\ ft$

$L_S = n_d K_E \left(\frac{P V_V}{R T}\right) M_V K_S$
$= \frac{(5\ days\ idle/yr)\ (0.386)\ (9.05\ psia)\ (59100\ ft^3)\ (50\ lb/lb\text{-}mol)\ (0.248)}{(10.731\ psia\text{-}ft^3/lb\text{-}mol\text{-}°R)\ (531.22°R)} \qquad = 2250\ lb/yr$

$L_{S(max)} = (\pi/4)(D\ ft)^2\ (h_{le}\ ft.)(W_l\ lb/gal)(7.48\ gal/ft^3)$
$= \frac{(3.14)\ (109\ ft)^2\ (0.167\ ft)\ (7.1\ lb/gal)\ (7.48\ gal/ft^3)}{(4)} \qquad = 82800\ lb/yr$

L_S cannot exceed $L_{S(max)}$, *therefore:*
L_S = 2250 lb/yr uncontrolled
= (2250 lb/yr)(100-99)%/100% ***= 22.5 lb/yr controlled***

*Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

IFR Floating Roof Tank Filling Calculations - Tank Maintenance/Repair (EPN COMBMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007
Ambient Temp., T = 71.55 °F and 531.22 °R
Ambient Maximum Temp. = [illegible] °F and [illegible] °R
Ambient Minimum Temp. = 62.06 °F and 521.73 °R
Ambient Average Temp. = [illegible] °F and [illegible] °R
Ideal Gas Law Constant, R = 10.731 psia-ft³/lb-mol-°R
Tank and Chemical Details:

Tank No.	Stored Material	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	Diameter, D (ft)	Tank Bottom Slope, s (in/ft)	Leg Height, h_l (ft)	Saturation Factor, S	Number of Events Per Year (no./yr)	Vapor Control Efficiency (%)[1]
28063	Crude Oil	10	50	109	0	6.5	0.6	1	99
28064	Crude Oil	10	50	109	0	6.67	0.6	1	99
28067	Crude Oil	10	50	140	0	6.33	0.6	1	99
28070	Crude Oil	10	50	140	0	7.42	0.6	1	99
28077	Crude Oil	10	50	140	0	6.83	0.6	1	99
28087	Crude Oil	10	50	190	0	6.5	0.6	1	99
28088	Crude Oil	10	50	190	0	6.5	0.6	1	99
28089	Crude Oil	10	50	190	0	6.5	0.6	1	99
28090	Crude Oil	10	50	190	0	6.5	0.6	1	99
28091	Crude Oil	10	50	190	0	6.5	0.6	1	99
28092	Crude Oil	10	50	190	0	6.5	0.6	1	99

Notes: 1) Use NA if vapor control is not used.

Emission Calculations and Summary:

Tank No.	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Vapor Volume, V_V (ft³)	Vapor Height, h_v (ft)	Uncontrolled Refilling Emissions L_F (lb/yr)	Controlled Refilling Emissions L_F (lb/yr)
28063	10.9	7.696	9.05	60700	6.5	2890	28.9
28064	10.9	7.696	9.05	62200	6.67	2960	29.6
28067	10.9	7.696	9.05	97400	6.33	4640	46.4
28070	10.9	7.696	9.05	114000	7.42	5430	54.3
28077	10.9	7.696	9.05	105000	6.83	5000	50
28087	10.9	7.696	9.05	184000	6.5	8760	87.6
28088	10.9	7.696	9.05	184000	6.5	8760	87.6
28089	10.9	7.696	9.05	184000	6.5	8760	87.6
28090	10.9	7.696	9.05	184000	6.5	8760	87.6
28091	10.9	7.696	9.05	184000	6.5	8760	87.6
28092	10.9	7.696	9.05	184000	6.5	8760	87.6

IFR Floating Roof Tank Filling Calculations - Tank Maintenance/Repair (EPN COMBMSS) (cont'd)

Sample Calculations (Tank No. 28063):

$h_v = h_d$
$= 6.5$ ft

$V_V = (h_v)(\pi D^2/4)$
$= \dfrac{(6.5\text{ ft})(3.14)(109\text{ ft})^2}{(4)} = 60700\text{ ft}^3$

$L_F = \left(\dfrac{PV_V}{RT}\right) M_V S$

$= \dfrac{(9.05\text{ psia})(60700\text{ ft}^3)(50\text{ lb-lb-mol})(0.6)(1\text{ number of events/yr})}{(10.731\text{ psia-ft}^3\text{/lb-mol-°R})(531.22\text{°R})}$ = ***2890 lb/yr uncontrolled***

$= (2890\text{ lb/yr})(100-99)\%/100\%$ = ***28.9 lb/yr controlled***

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

EFR with Heel Standing Idle Calculations - Tank Maintenance/Repair (EPN COMBMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3.
November 2007 Ambient Pressure: P_{atm} = 14.7 psia
Ambient Temp. = 71.55 °F and 531.22 °R
Maximum Temp. = [illegible] °F and [illegible] °R
Minimum Temp. = 62.06 °F and 521.73 °R
Average Temp. = [illegible] °F and [illegible] °R Ideal Gas Law Constant, R 10.731 psia-ft³/lb-mol-°R
Tank and Chemical Details:

Tank No.	Stored Material	Time Period Idle (days/yr)	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	Liquid Density, Wl (lb/gal)	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Diameter, D (ft)	Tank Bottom Slope, s (in/ft)	Liquid Height, hl (ft)	Vapor Control Efficiency (%) [1]
28066	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	140	0	0.167	99
28069	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	140	0	0.167	99
28071	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28072	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28073	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28074	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28075	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28076	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28080	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28086	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	190	0	0.167	99

Notes: 1) Use NA if vapor control is not used.

Emission Calculations and Summary:

Tank No.	Vapor Pressure Function P*	Effective Liquid/ Sludge Height, h_e (ft)	Calculated Standing Loss, L_S (lb/yr)	Maximum Standing Loss $L_{S,max}$ (lb/yr)	Uncontrolled Standing Loss, L_S (lb/yr)	Controlled Standing Loss, L_S (lb/yr)
28066	0.235	0.167	4630	137100	4630	46.3
28069	0.235	0.167	4630	137100	4630	46.3
28071	0.235	0.167	6030	226700	6030	60.3
28072	0.235	0.167	6030	226700	6030	60.3
28073	0.235	0.167	6030	226700	6030	60.3
28074	0.235	0.167	6030	226700	6030	60.3
28075	0.235	0.167	6030	226700	6030	60.3
28076	0.235	0.167	6030	226700	6030	60.3
28080	0.235	0.167	6030	226700	6030	60.3
28086	0.235	0.167	6360	252500	6360	63.6

FHR's Exhibit C

EFR with Heel Standing Idle Calculations - Tank Maintenance/Repair (EPN COMBMSS) (cont'd)

Sample Calculations (Tank No. 28068):

$$P^* = \frac{P/P_a}{\left(1+\left[1-(P/P_a)\right]^{0.5}\right)^2}$$

$$= \frac{(9.05 \text{ psia}) / (14.7 \text{ psia})}{\text{psia } ((1) + [(1) - (9.05 \text{ psia})/(14.7 \text{ psia})]\text{\^{}}0.5)^2} \qquad = 0.235$$

$$L_S = 0.57\, n_d\, D\, P^*\, M_V$$

$$= (0.57)\ (5 \text{ days/yr})\ (140 \text{ ft})\ (0.235)\ (50 \text{ lb-lb-mol}) \qquad = 4690 \text{ lb/yr}$$

$$h_{le} = \left[h_l + \frac{sD}{72}\right]$$

$$= (0.167 \text{ ft}) + \frac{(0 \text{ in./ft})(140 \text{ ft})}{(72)} \qquad = 0.167 \text{ ft}$$

$$L_{S(max)} = (5.9)\ (D)^2\ (h_{le})\ (W_l)$$

$$= (5.9)\ (140)^2\ (0.167 \text{ ft})\ (7.1 \text{ lb/gal}) \qquad = 137100 \text{ lb/yr}$$

L_S cannot exceed $L_{S(max)}$, *therefore:*

L_S = ***4690 lb/yr uncontrolled***

= (4690 lb/yr)(100-99)%/100% ***= 46.9 lb/yr controlled***

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

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EFR Floating Roof Tank Filling Calculations - Tank Maintenance/Repair (EPN COMBMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007

Ambient Temp., T =	71.55 °F and	531.22 °R
Ambient Maximum Temp. =	[illegible] °F and	542.67 °R
Ambient Minimum Temp. =	62.06 °F and	521.73 °R
Ambient Average Temp. =	72.14 °F and	531.81 °R
Ideal Gas Law Constant, R =	10.731 psia-ft³/lb-mol-°R	

Tank and Chemical Details:

Tank No.	Stored Material	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	Diameter, D (ft)	Tank Bottom Slope, s (in/ft)	Leg Height, h_d (ft)	Saturation Factor, S	Number of Events Per Year (no./yr)	Vapor Control Efficiency (%) [1]
28068	Crude Oil	10	50	140	0	6.83	0.6	1	99
28069	Crude Oil	10	50	140	0	6.58	0.6	1	99
28071	Crude Oil	10	50	180	0	6.83	0.6	1	99
28072	Crude Oil	10	50	180	0	7.08	0.6	1	99
28073	Crude Oil	10	50	180	0	6.83	0.6	1	99
28074	Crude Oil	10	50	180	0	7.83	0.6	1	99
28075	Crude Oil	10	50	180	0	6.83	0.6	1	99
28076	Crude Oil	10	50	180	0	6.83	0.6	1	99
28080	Crude Oil	10	50	180	0	7.83	0.6	1	99
28086	Crude Oil	10	50	190	0	6.5	0.6	1	99

Notes: 1) Use NA if vapor control is not used.

Emission Calculations and Summary:

Tank No.	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Vapor Volume, V_V (ft³)	Vapor Height, h_v (ft)	Uncontrolled Refilling Emissions L_F (lb/yr)	Controlled Refilling Emissions L_F (lb/yr)
28068	10.9	7.696	9.05	105000	6.83	5000	50
28069	10.9	7.696	9.05	101000	6.58	4810	48.1
28071	10.9	7.696	9.05	174000	6.85	8290	82.9
28072	10.9	7.696	9.05	180000	7.08	8570	85.7
28073	10.9	7.696	9.05	174000	6.83	8290	82.9
28074	10.9	7.696	9.05	199000	7.83	9480	94.8
28075	10.9	7.696	9.05	174000	6.83	8290	82.9
28076	10.9	7.696	9.05	174000	6.83	8290	82.9
28080	10.9	7.696	9.05	199000	7.83	9480	94.8
28086	10.9	7.596	9.05	184000	6.5	8760	87.6

EFR Floating Roof Tank Filling Calculations - Tank Maintenance/Repair (EPN COMBMSS) (cont'd)

Sample Calculations (Tank No. 28068):

$h_V = h_d$
$= 6.83 \text{ ft}$

$V_V = (h_v)(\pi D^2/4)$
$= \dfrac{(6.83\text{ ft})\ (3.14)\ (140\text{ ft})^2}{(4)} \qquad = 105000 \text{ ft}^3$

$L_F = \left(\dfrac{PV_V}{RT}\right) M_V S$
$= \dfrac{(9.05\text{ psia})\ (105000\text{ ft}^3)\ (50\text{ lb-lb-mol})\ (0.6)\ (1\text{ number of events/yr})}{(10.731\text{ psia-ft}^3/\text{lb-mol-°R})\ (531.22\text{°R})} \qquad$ ***= 5000 lb/yr uncontrolled***
$= (5000\text{ lb/yr})(100\text{-}99)\%/100\% \qquad$ ***= 50 lb/yr controlled***

*Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

Routine Start-up/Shutdown/Maintenance Fugitive Emissions
Combustion Emissions from Controlling Tank during Tank Maintenance/Repair
EPN COMBMSS

Sulfur Dioxide Emissions from Crude Oil

H_2S Concentration = 500 ppmv (annual average permit 8608 allowable)
Mass Emission Ratio = 0.075 lb H_2S/lb VOC (from permit amendment)
Hourly VOC Emissions to Control = 57 lb/hr
Annual VOC Emissions to Control = [illegible] lb/yr

VOC Control Efficiency = 99 %

MW of H_2S (lb/lb-mol) = 34
MW of SO_2 (lb/lb-mol) = 64
It is assumed that all of the H_2S sent to the engine is converted to SO_2 and emitted

VOC Vented to Control	VOC Vented to Control	H_2S Vented to Control	H_2S Vented to Control	SO_2 Emissions	SO_2 Emissions
(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(tons/yr)
57	[illegible]	4.29	[illegible]	8.06	[illegible]

Sample Calculations

SO_2 Emissions (lb/hr) = VOC Vented to Control x Mass Emission Ratio x MW_{SO2} / MW_{H2S}
SO_2 Emissions (lb/hr) = (57 lb/hr) x (0.075 lb H2S/lb VOC) x (64 lb/lb-mol SO2) x (34 lb/lb-mol H2S)
SO_2 Emissions (lb/hr) = 8.06

H_2S to Control (lb/hr) = VOC Vented to Control x Mass Emission Ratio
H_2S to Control (lb/hr) = (57 lb/hr) x (0.075 lb H2S/lb VOC))
H_2S to Control (lb/hr) = 4.29

Engine Combustion Emissions

Individual engine horsepower (hp) = 52
Number of engines required = 3
Cumulative engine horsepower (hp) = 156

Emission factors are for natural-gas fired, 4-stroke rich burn engines from AP-42 Table 3.2-3
NO_x (lb/MMBtu) = 2.27E+00
CO (lb/MMBtu) = 3.72E+00
SO_2 (lb/MMBtu) = 0.0147 based on 5 gr/100 dscf instead of 0.2 gr/100 dscf
VOC (lb/MMBtu) = 2.96E-02
PM (lb/MMBtu) = 9.91E-03
PM_{10} (lb/MMBtu) = 9.50E-03

Engine Horsepower	Fuel Usage	Emissions (lb/hr)					
(hp)	(MMBtu/hr)	NO_x	CO	SO_2	VOC	PM	PM_{10}
156	0.397	0.90	1.48	0.0058	0.0118	0.0039	0.0038

Sample Calculations

NO_x Emissions (lb/hr) = Engine Horsepower x 2544 Btu/hp-hr x Emission Factor
NO_x Emissions (lb/hr) = (156 hp) x (2544 Btu/hp-hr) / (1,000,000 Btu/MMBtu) * (2.27 lb/MMBtu)
NO_x Emissions (lb/hr) = 0.90

Note: [illegible]

Routine Start-up/Shutdown/Maintenance Fugitive Emissions
Combustion Emissions from Controlling Tank during Tank Maintenance/Repair
EPN COMBMSS

Thermal Oxidizer (TO) Combustion Emissions

TO Firing Rate (MMBtu/hr) 15

Emissions factors for NOx and CO are found in the stack test for TO 1289
SO2, PM, PM10, PM2.5, and VOC emission factors are based on AP-42, Section 1.4

NO_x (lb/MMBtu) =	0.0004
CO (lb/MMBtu) =	0.05
SO_2 (lb/MMBtu) =	0.00059
VOC (lb/MMBtu) =	0.0054
PM (lb/MMBtu) =	0.0075
PM_{10} (lb/MMBtu) =	0.0075

Emissions (lb/hr)					
NOx	CO	SO2	VOC	PM	PM10
0.006	0.75	0.0089	0.081	0.11	0.11

Sample Calculations

NO_x Emissions (lb/hr) = TO Firing Duty x Emission Factor
NO_x Emissions (lb/hr) = (15 MMBtu/hr) x (0.0004
lb/MMBtu) NO_x Emissions (lb/hr) = 0.006

Total Combustion Emissions

Number of Events	Hourly Emissions (lb/hr)					
(Events/hr)	NO_x	CO	SO_2	VOC	PM	PM_{10}
1	0.90	1.48	[illegible]	0.63	0.11	0.11

Duration of Control (Standing)	Number of Events (Standings)	Annual Emissions (tons/yr)					
(hr/event)	(events/yr)	NO_x	CO	SO_2	VOC	PM	PM_{10}
120	[illegible]	0.54	0.80	[illegible]	0.37	0.07	0.07

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, the actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined annual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

FHR's Exhibit C

Routine Start-up/Shutdown/Maintenance Fugitive Emissions
Combustion Emissions from Controlling Tank Refills during Tank Maintenance/Repair
EPN COMBMSS

Sulfur Dioxide Emissions from Crude Oil

H_2S Concentration = [illegible] ppmw (annual average permit 6606 allowable)
Mass Emission Ratio = 0.075 lb H_2S/lb VOC (from permit Amendment)
Hourly VOC Emissions to Control = 527 lb/hr
Annual VOC Emissions to Control = [illegible] lb/yr

Shortest time to refill Tank = 18 hrs (used to calculate hourly H_2S and VOC emissions)
Maximum time to refill Tank = 30 hrs (used for annual combustion emissions calculations)

VOC Control Efficiency = 99 %

MW of H_2S (lb/lb-mol) = 34
MW of SO_2 (lb/lb-mol) = 64
It is assumed that all of the H_2S sent to the engine is converted to SO_2 and emitted.

VOC Vented to Control (lb/hr)	VOC Vented to Control (ton/yr)	H_2S Vented to Control (lb/hr)	H_2S Vented to Control (ton/yr)	SO_2 Emissions (lb/hr)	SO_2 Emissions (tons/yr)
527	44.41	39.53	[illegible]	74.41	[illegible]

Sample Calculations:

SO_2 Emissions (lb/hr) = VOC Vented to Control x Mass Emission Ratio x MW_{SO2} / MW_{H2S}
SO_2 Emissions (lb/hr) = (527 lb/hr) x (0.075 lb H2S/lb VOC) X (64 lb/lb-mol SO2) x (34 lb/lb-mol H2S)
SO_2 Emissions (lb/hr) = 74.41

H_2S to Control (lb/hr) = VOC Vented to Control x Mass Emission Ratio
H_2S to Control (lb/hr) = (527 lb/hr) x (0.075 lb H2S/lb VOC))
H_2S to Control (lb/hr) = 39.53

Engine Combustion Emissions

Individual engine horsepower (hp) = 52
Number of engines required = 3
Cumulative engine horsepower (hp) = 156

Emission factors are for natural-gas fired, 4-stroke rich-burn engines, from AP-42 Table 3.2-3
NO_x (lb/MMBtu) = 2.27E+00
CO (lb/MMBtu) = 3.72E+00
SO_2 (lb/MMBtu) = 0.0147 based on 5 gr/100 dscf instead of 0.2 gr/100 dscf
VOC (lb/MMBtu) = 2.96E-02
PM (lb/MMBtu) = 9.91E-03
PM_{10} (lb/MMBtu) = 9.50E-03

Engine Horsepower (hp)	Fuel Usage (MMBtu/hr)	Emissions (lb/hr)					
		NO_x	CO	SO_2	VOC	PM	PM_{10}
156	0.397	0.90	1.48	0.0058	0.0118	0.0039	0.0038

Sample Calculations:

NO_x Emissions (lb/hr) = Engine Horsepower x 2544 Btu/hp-hr x Emission Factor
NO_x Emissions (lb/hr) = (156 hp) x (2544 Btu/hp-hr) / (1,000,000 Btu/MMBtu) * (2.27 lb/MMBtu)
NO_x Emissions (lb/hr) = 0.90

Note: [illegible]

FHR's Exhibit C

Routine Start-up/Shutdown/Maintenance Fugitive Emissions Combustion Emissions from Controlling Tank Refills during Tank Maintenance/Repair EPN COMBMSS

Thermal Oxidizer (TO) Combustion Emissions

TO Firing Rate (MMBtu/hr) 15

Emissions factors for NOx and CO are found in the stack test for TO 1399.
SO_2, PM, PM_{10}, $PM_{2.5}$ and VOC emission factors are based on AP-42, Section 1.4

NO_x (lb/MMBtu) =	0.0004
CO (lb/MMBtu) =	0.05
SO_2 (lb/MMBtu) =	0.00059
VOC (lb/MMBtu) =	0.0054
PM (lb/MMBtu) =	0.0075
PM_{10} (lb/MMBtu) =	0.0075

Emissions (lb/hr)					
NO_x	CO	SO_2	VOC	PM	PM_{10}
0.006	0.75	0.0089	0.081	0.11	0.11

Sample Calculations

NO_x Emissions (lb/hr) = TO Fired Duty x Emission Factor
NO_x Emissions (lb/hr) = (15 MMBtu/hr) x (0.0004 lb/MMBtu)
NO_x Emissions (lb/hr) = 0.006

Total Combustion Emissions

Number of Events (Events/hr)	Hourly Emissions (lb/hr)					
	NO_x	CO	SO_2	VOC	PM	PM_{10}
1	0.90	1.48	71.42	5.35	0.11	0.11

Duration of Control (Refilling) (hr/event)	Number of Events (Refillings) (events/yr)	Annual Emissions (tons/yr)					
		NO_x	CO	SO_2	VOC	PM	PM_{10}
30	16	0.14	0.22	8.27	0.46	0.02	0.02

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant [illegible] parameters and cumulative actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

FHR's Exhibit C

Summary of Uncontrolled Emissions from Tank Cleaning
EPN TANKMSS

Tank Number	Tank Type IFR, EFR, DD	Vapor Space Purge Emissions ** (lb/yr)	Sludge Removal Emissions ** (lb/yr)	**Total Emissions (lb/yr)**	**Total Emissions (tons/yr)**
28063	IFR	9.7	2130	2139.7	1.070
28064	IFR	9.97	2220	2229.97	1.115
28067	IFR	15.6	3430	3445.6	1.723
28070	IFR	18.4	4040	4058.4	2.029
28077	IFR	16.9	3740	3756.9	1.878
28087	IFR	29.4	6470	6499.4	3.250
28088	IFR	29.4	6470	6499.4	3.250
28089	IFR	29.4	6470	6499.4	3.250
28090	IFR	29.4	6470	6499.4	3.250
28091	IFR	29.4	6470	6499.4	3.250
28092	IFR	29.4	6470	6499.4	3.250
28068	EFR	16.1	3730	3746.1	1.873
28069	EFR	15.3	3580	3595.3	1.798
28071	EFR	27.1	6120	6147.1	3.074
28072	EFR	28.3	6370	6398.3	3.199
28073	EFR	27.1	6120	6147.1	3.074
28074	EFR	31.6	7060	7091.6	3.546
28075	EFR	27.1	6120	6147.1	3.074
28076	EFR	27.1	6120	6147.1	3.074
28080	EFR	31.6	7060	7091.6	3.546
28086	EFR	28.7	6480	6508.7	3.254
Total:		**121.3 ***	**27070.0 ***	**27191.3 ***	**13.596 ***

* Total of four tanks with highest emissions

** The standing idle and refilling emissions are based on the API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007.

FHR's Exhibit C

IFR with Full Heel Initial Vapor Space Purge Calculations - Tank Cleaning (EPN TANKMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 5,

November 2007 Ambient Maximum Temp. = 84.2 °F and [illegible] °R
Ambient Minimum Temp. = 62.05 °F and 521.73 °R Ambient
Average Temp. = 72.14 °F and [illegible] °R Ideal Gas Law
Constant, R = 10.731 psia-ft³/lb-mol-°R
Tank and Chemical Details:

Tank No.	Stored Material	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Diameter, D (ft)	Leg Height, h_l (ft)	Liquid Height, h_l (ft)	Number of Events Per Year (no./yr)	Vapor Control Efficiency (%) [1]
28063	Diesel	-	130	0.016	0.0065	0.012	109	6.5	0.167	1	NA
28064	Diesel	-	130	0.016	0.0065	0.012	109	6.67	0.167	1	NA
28067	Diesel	-	130	0.016	0.0065	0.012	140	6.33	0.167	1	NA
28070	Diesel	-	130	0.016	0.0065	0.012	140	7.42	0.167	1	NA
28077	Diesel	-	130	0.016	0.0065	0.012	140	6.83	0.167	1	NA
28087	Diesel		130	0.016	0.0065	0.012	190	6.5	0.167	1	NA
28088	Diesel		130	0.016	0.0065	0.012	190	6.5	0.167	1	NA
28089	Diesel		130	0.016	0.0065	0.012	190	6.5	0.167	1	NA
28090	Diesel	-	130	0.016	0.0065	0.012	190	6.5	0.167	1	NA
28091	Diesel	-	130	0.016	0.0065	0.012	190	6.5	0.167	1	NA
28092	Diesel	-	130	0.016	0.0065	0.012	190	6.5	0.167	1	NA

Notes: 1) Use NA if vapor control is not used.

Emission Calculations and Summary:

Tank No.	Saturation Factor, S	Vapor Volume, V_v (ft³)	Vapor Height, h_v (ft)	Uncontrolled Vapor Space Purge Loss, L_P (lb/yr)	Controlled Vapor Space Purge Loss, L_P (lb/yr)
28063	0.6	59100	6.33	9.7	NA
28064	0.6	60700	6.5	9.97	NA
28067	0.6	94800	6.16	15.6	NA
28070	0.6	112000	7.25	18.4	NA
28077	0.6	103000	6.66	16.9	NA
28087	0.6	179000	6.33	29.4	NA
28088	0.6	179000	6.33	29.4	NA
28089	0.6	179000	6.33	29.4	NA
28090	0.6	179000	6.33	29.4	NA
28091	0.6	179000	6.33	29.4	NA
28092	0.6	179000	6.33	29.4	NA

IFR with Full Heel Initial Vapor Space Purge Calculations - Tank Cleaning (EPN TANKMSS) (cont'd)
Sample Calculations (Tank No. 28063):

$h_V = h_d - h_l$
$= (6.5 \text{ ft} - 0.167 \text{ ft}) \quad = 6.33 \text{ ft}$

$V_V = (h_v)(\pi D^2/4))$
$= \dfrac{(6.33 \text{ ft})\ (3.14)\ (109 \text{ ft})^2}{(4)} \quad = 59100 \text{ ft}^3$

$$L_P = \left(\frac{PV_V}{RT}\right) M_V S$$

$$= \frac{(0.012 \text{ psia})\ (59100 \text{ ft}^3)\ (130 \text{ lb/lb-mol})\ (0.6)\ (1 \text{ number of events/yr})}{(10.731 \text{ psia-ft}^3\text{/lb-mol-°R})\ (531.22\text{°R})} \quad = \textit{9.7 lb/yr uncontrolled}$$

Drain Dry Initial Vapor Space Purge Calculations

$L_P =$ 0 lb

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

Full Heel Forced Ventilation Calculations - IFR Tanks - Sludge Removal - Tank Cleaning (EPN TANKMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007

Ambient Pressure, P_a =	14.7 psia	
Ambient Temp., T =	71.55 °F and	531.22 °R
Maximum Temp. =	[illegible] °F and	[illegible] °R
Minimum Temp. =	62.06 °F and	521.73 °R
Average Temp. =	[illegible] °F and	[illegible] °R
Ideal Gas Law Constant, R =	10.731 psia-ft³/lb-mol-°R	

Tank and Chemical Details:

Tank No.	Stored Material	Time Period for Sludge Removal, n_d (days/yr)	Time Period for Forced Removal, t. (days/hr)	Average Vapor Pressure (psia)	Mol. Wt., Mv (lb/lb-mol)	Diameter, D (ft)	Liquid Density, Wl (lb/gal)	Liquid Height, h_l (ft)	Tank Bottom Slope, s (ft/ft)	Ventilation Rate, Q_v (ft³/min)	Average Vapor LEL[2] (%)	Calibration Vapor LEL[2] (%)	Response Factor, RF	Fraction of Sludge Evaporated, F_e	Depth of Sludge, d_s (in.)	Vapor Control Efficiency (%)[1]
28063	Diesel	5	12	0.012	130	109	7.1	0.167	0	[illegible]	2	1.8	1	0.2	1	NA
28064	Diesel	5	12	0.012	130	109	7.1	0.167	0	5100	2	1.8	1	0.2	1	NA
28067	Diesel	5	12	0.012	130	140	7.1	0.167	0	7900	2	1.8	1	0.2	1	NA
28070	Diesel	5	12	0.012	130	140	7.1	0.167	0	9300	2	1.8	1	0.2	1	NA
28077	Diesel	5	12	0.012	130	140	7.1	0.167	0	8600	2	1.8	1	0.2	1	NA
28087	Diesel	5	12	0.012	130	150	7.1	0.167	0	14800	2	1.8	1	0.2	1	NA
28088	Diesel	5	12	0.012	130	150	7.1	0.167	0	14900	2	1.8	1	0.2	1	NA
28089	Diesel	5	12	0.012	130	150	7.1	0.167	0	14900	2	1.8	1	0.2	1	NA
28090	Diesel	5	12	0.012	130	150	7.1	0.167	0	14900	2	1.8	1	0.2	1	NA
28091	Diesel	5	12	0.012	130	150	7.1	0.167	0	14800	2	1.8	1	0.2	1	NA
28092	Diesel	5	12	0.012	130	150	7.1	0.167	0	14900	2	1.8	1	0.2	1	NA

Notes: 1) Use NA if vapor control is not used.
2) LEL - Lower Explosive Limit

Emission Calculations and Summary:

Tank No.	Calculated Vapor Concentration by Vol., C_c	Maximum Vapor Concentration by Vol., C_{max}	Vapor Concentration by Vol., C_v	Effective Liquid Height, h_e (ft)	Calculated Vapor Conc. Method, Vapor Loss, L_F (lb/yr)	Maximum Vapor Loss, L_F (lb/yr)	Uncontrolled Vapor Loss, L_F (lb/yr)	Controlled Vapor Loss, L_F (lb/yr)
28063	0.00036	0.000816	0.00036	0.167	2130	83120	2130	NA
28064	0.00036	0.000816	0.00036	0.167	2220	83120	2220	NA
28067	0.00036	0.000816	0.00036	0.167	3430	137100	3430	NA
28070	0.00036	0.000816	0.00036	0.167	4040	137100	4040	NA
28077	0.00036	0.000816	0.00036	0.167	3740	137100	3740	NA
28087	0.00036	0.000816	0.00036	0.167	6470	352500	6470	NA
28088	0.00036	0.000816	0.00036	0.167	6470	352500	6470	NA
28089	0.00036	0.000816	0.00036	0.167	6470	352500	6470	NA
28090	0.00036	0.000816	0.00036	0.167	6470	352500	6470	NA
28091	0.00036	0.000816	0.00036	0.167	6470	352500	6470	NA
28092	0.00036	0.000816	0.00036	0.167	6470	352500	6470	NA

Full Heel Forced Ventilation Calculations - IFR Tanks - Sludge Removal - Tank Cleaning (EPN TANKMSS) (cont'd)
Sample Calculations (Tank No. 28063):

$C_V = \dfrac{\text{(average\% LEL as displayed)}}{100} \dfrac{\text{(LEL of the calibration gas, volume\% in air)}}{100} RF$

$= \dfrac{(2\%)\ (1.8\%)\ (1)}{(100\%)\ (100\%)} = 0.00036$

$C_{V(max)} = P/P_a$

$= \dfrac{(0.012\ \text{psia})}{(14.7\ \text{psia})} = 0.000816$

C_V cannot exceed $C_{V(max)}$, therefore:

$C_V = 0.00036$

$L_{SR} = 60\, Q_s\, n_{SR}\, t_s\, C_V \dfrac{P_a M_V}{RT}$

$= \dfrac{(60)\ (4900\ \text{ft}^3/\text{min})\ (5\ \text{days/yr})\ (12\ \text{hr/day})\ (0.00036)\ (14.7\ \text{psia})\ (130\ \text{lb/lb-mol})}{(10.731\ \text{psia-ft}^3/\text{lb-mol-°R})\ (531.22\text{°R})} = 2130\ \text{lb/yr}$

$h_{le} = \left(h_s + \dfrac{sD}{72}\right)$

$= (0.167\ \text{ft}) + \left(\dfrac{(0\ \text{in./ft})(109\ \text{ft})}{(72)}\right) = 0.167\ \text{ft}$

$L_{SR(max)} = 5.9 D^2\, h_{le}\, W_l$

$= (5.9)\ (109\ \text{ft})^2\ (0.167\ \text{ft})\ (7.1\ \text{lb/gal}) = 83120$

lb/yr L_{SR} cannot exceed $L_{SR(max)}$, therefore:

L_{SR} = 2130 lb uncontrolled

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

EFR with Full Heel Initial Vapor Space Purge Calculations - Tank Cleaning (EPN TANKMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007

Ambient Pressure =	14.7 psia		
Ambient Temp., T =	71.55 °F and	531.22 °R	
Ambient Maximum Temp. =	[illegible] °F and	[illegible] °R	
Ambient Minimum Temp. =	62.06 °F and	521.73 °R	
Ambient Average Temp. =	[illegible] °F and	[illegible] °R	
Ideal Gas Law Constant, R =	10.731 psia-ft³/lbmol-°R		

Tank and Chemical Details:

Tank No.	Stored Material	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Diameter, D (ft)	Leg Height, h_{le} (ft)	Liquid Height, h_l (ft)	Antoine's Equation Constant, B (°R)	Solar Absorptance, α	Solar Insolation, I (Btu/ft²-day)	Number of Events Per Year (no./yr)[1]	Vapor Control Efficiency (%)[1]
28068	Diesel	-	130	0.016	0.0065	0.012	140	6.83	0.167	5303.9	0.17	1447.94	1	NA
28069	Diesel	-	130	0.016	0.0065	0.012	140	6.58	0.167	5303.9	0.17	1447.94	1	NA
28071	Diesel	-	130	0.016	0.0065	0.012	180	6.83	0.167	5303.9	0.17	1447.94	1	NA
28072	Diesel	-	130	0.016	0.0065	0.012	180	7.08	0.167	5303.9	0.17	1447.94	1	NA
28073	Diesel	-	130	0.016	0.0065	0.012	180	6.83	0.167	5303.9	0.17	1447.94	1	NA
28074	Diesel	-	130	0.016	0.0065	0.012	180	7.83	0.167	5303.9	0.17	1447.94	1	NA
28075	Diesel	-	130	0.016	0.0065	0.012	180	6.83	0.167	5303.9	0.17	1447.94	1	NA
28076	Diesel	-	130	0.016	0.0065	0.012	180	6.83	0.167	5303.9	0.17	1447.94	1	NA
28080	Diesel	-	130	0.016	0.0065	0.012	180	7.83	0.167	5303.9	0.17	1447.94	1	NA
28086	Diesel	-	130	0.016	0.0065	0.012	190	6.5	0.167	5303.9	0.17	1447.94	1	NA

Notes: 1) Use NA if vapor control is not used.

Emission Calculations and Summary:

Tank No.	Vapor Height, h_v (ft)	Vapor Volume, V_V (ft³)	Vapor Pressure Function P*	Daily Temperature Range ΔT_V (°R)	Vapor Space Expansion, K_E	Standing Idle Saturation, K_S	Saturation Factor, S	Uncontrolled Vapor Space Purge Loss, L_P (lb/yr)	Controlled Vapor Space Purge Loss, L_P (lb/yr)
28068	6.66	103000	0.000204	[illegible]	0.0421	0.996	0.57	16.1	NA
28069	6.41	98700	0.000204	[illegible]	0.0421	0.996	0.567	15.3	NA
28071	6.66	169000	0.000204	[illegible]	0.0421	0.996	0.585	27.1	NA
28072	6.91	176000	0.000204	[illegible]	[illegible]	0.996	0.587	28.3	NA
28073	6.66	169000	0.000204	[illegible]	[illegible]	0.996	0.585	27.1	NA
28074	7.66	195000	0.000204	[illegible]	[illegible]	0.995	0.592	31.6	NA
28075	6.66	169000	0.000204	[illegible]	[illegible]	0.996	0.585	27.1	NA
28076	6.66	169000	0.000204	[illegible]	[illegible]	0.996	0.585	27.1	NA
28080	7.66	195000	0.000204	[illegible]	[illegible]	0.995	0.592	31.6	NA
28086	6.33	179000	0.000204	[illegible]	[illegible]	0.996	0.585	28.7	NA

EFR with Full Heel Initial Vapor Space Purge Calculations - Tank Cleaning (EPN TANKMSS) (cont'd)
Sample Calculations (Tank No. 28068):

$$h_v = h_d - h_l$$
$$= (6.83 \text{ ft} - 0.167 \text{ ft}) \qquad = 6.66 \text{ ft}$$

$$V_V = (h_v)(\pi D^2/4))$$
$$= \frac{(6.66 \text{ ft})\ (3.14)\ (140 \text{ ft})^2}{(4)} \qquad = 103000 \text{ ft}^3$$

$$P^* = \frac{P / P_a}{\left[1 + \left[1 - (P / P_a)\right]^{0.5}\right]^2}$$
$$= \frac{(0.012 \text{ psia}) / (14.7 \text{ psia})}{(\ (1) + [\ (1) - (0.012 \text{ psia})/(14.7 \text{ psia})\ ]^{0.5})^2} \qquad = 0.000204 \text{ psia}$$

$$\Delta T_V = 0.72(T_{MAX} - T_{MIN}) + 0.028\alpha I$$
$$= (0.72)\ (543.87 - 521.73)°R + (0.028)\ (0.17)\ (1447.94 \text{ Btu/ft}^2\text{-day}) \qquad = 22.8°R$$

$$K_E = \frac{\Delta T_V}{T}\left(1 + \frac{0.50\, B\, P}{T\,(P_a - P)}\right)$$
$$= \frac{(22.8°R)}{(531.22°R)}\left(1 + \frac{(0.50)\ (5303.9°R)\ (0.012 \text{ psia})}{(531.22°R)\ (14.7 - 0.012) \text{ psia}}\right) \qquad = 0.0431$$

$$K_S = \frac{1}{1 + 0.053\, P\, (h_v)} \qquad \leq \quad 0.6$$

$$= \frac{1}{(1) + (0.053)\ (0.012 \text{ psia})\ (6.66 \text{ ft})} \qquad = \quad 0.996$$

Since Ks > 0.6, then
= 0.6

$$S = 0.6\left(1 - \frac{\dfrac{0.57 D P^* R T}{P V_V} - K_E K_S}{K_E K_S + 0.6}\right)$$

$$= (0.6)\left((1) - \frac{\dfrac{(0.57)\ (140 \text{ ft})\ (0.000204)\ (10.731 \text{ psia-ft}^3/\text{lb-lbmol-}°R)\ (531.22°R)}{(0.012 \text{ psia})\ (103000 \text{ ft}^3)} - (0.0431)\ (0.996)}{(0.0431)\ (0.996) + (0.6)}\right) \qquad = 0.57$$

$$L_P = \left(\frac{P V_V}{R T}\right) M_V S$$
$$= \frac{(0.012 \text{ psia})\ (103000 \text{ ft}^3)\ (130 \text{ lb/lb-mol})\ (0.57)\ (1 \text{ number of events/yr})}{(10.731 \text{ psia-ft}^3/\text{lb-mol-}°R)\ (531.22°R)}$$ ***= 16.1 lb/yr uncontrolled***

Note: The variables represented in these calculations are used for [illegible] emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions [illegible] from each MSS activity occurrence will [illegible] and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

Full Heel Forced Ventilation Calculations - EFR Tanks - Sludge Removal - Tank Cleaning (EPN TANKMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007

Ambient Pressure, P_a =	14.7 psia	
Ambient Temp., T =	71.55 °F and	531.22 °R
Maximum Temp. =	[illegible] °F and	[illegible] °R
Minimum Temp. =	62.06 °F and	521.73 °R
Average Temp. =	[illegible] °F and	[illegible] °R
Ideal Gas Law Constant, R =	10.731 psia-ft³/lb-mol °R	

Tank and Chemical Details:

Tank No.	Stored Material	Time Period for Sludge Removal, n_d (days/yr)	Time Period for Forced Removal, t_v (hr/day)	Average Vapor Pressure (psia)	Mol. Wt., M_V (lb/lb-mol)	Diameter, D (ft)	Liquid Density, W_l (lb/gal)	Liquid Height, h_l (ft)	Tank Bottom Slope, s (in/ft)	Ventilation Rate, Q_v (ft³/min)	Average Vapor LEL[2] (%)	Calibration Vapor LEL[2] (%)	Response Factor, RF	Fraction of Sludge Evaporated, F_e	Depth of Sludge, d_s (in.)	Vapor Control Efficiency (%)[1]
28068	Diesel	5	12	0.012	130	140	7.1	0.167	0	8590	2	1.8	1	0.2	1	NA
28069	Diesel	5	12	0.012	130	140	7.1	0.167	0	8230	2	1.8	1	0.2	1	NA
28071	Diesel	5	12	0.012	130	180	7.1	0.167	0	14060	2	1.8	1	0.2	1	NA
28072	Diesel	5	12	0.012	130	180	7.1	0.167	0	14070	2	1.8	1	0.2	1	NA
28073	Diesel	5	12	0.012	130	180	7.1	0.167	0	14080	2	1.8	1	0.2	1	NA
28074	Diesel	5	12	0.012	130	180	7.1	0.167	0	16250	2	1.8	1	0.2	1	NA
28075	Diesel	5	12	0.012	130	180	7.1	0.167	0	14060	2	1.8	1	0.2	1	NA
28076	Diesel	5	12	0.012	130	180	7.1	0.167	0	14080	2	1.8	1	0.2	1	NA
28080	Diesel	5	12	0.012	130	180	7.1	0.167	0	16250	2	1.8	1	0.2	1	NA
28086	Diesel	5	12	0.012	130	190	7.1	0.167	0	14920	2	1.8	1	0.2	1	NA

Notes: 1) Use NA if vapor control is not used.
2) LEL = Lower Explosive Limit

Emission Calculations and Summary:

Tank No.	Calculated Vapor Concentration by Vol., C_T	Maximum Vapor Concentration by Vol., C_{max}	Vapor Concentration by Vol., C_V	Effective Liquid Height, h_e (ft)	Calculated Vapor Conc. Method, Vapor Loss, L_F (lb/yr)	Maximum Vapor Loss, L_F (lb/yr)	Uncontrolled Vapor Loss, L_F (lb/yr)	Controlled Vapor Loss, L_F (lb/yr)
28068	0.00036	0.000816	0.00036	0.167	3730	137100	3730	NA
28069	0.00036	0.000816	0.00036	0.167	3560	137100	3560	NA
28071	0.00036	0.000816	0.00036	0.167	6120	226700	6120	NA
28072	0.00036	0.000816	0.00036	0.167	6570	226700	6570	NA
28073	0.00036	0.000816	0.00036	0.167	6120	226700	6120	NA
28074	0.00036	0.000816	0.00036	0.167	7050	226700	7060	NA
28075	0.00036	0.000816	0.00036	0.167	6120	226700	6120	NA
28076	0.00036	0.000816	0.00036	0.167	6450	226700	6120	NA
28080	0.00036	0.000816	0.00036	0.167	7060	226700	7060	NA
28086	0.00036	0.000816	0.00036	0.167	6480	252500	6480	NA

Full Heel Forced Ventilation Calculations - EFR Tanks - Sludge Removal - Tank Cleaning (EPN TANKMSS) (cont'd)
Sample Calculations (Tank No. 28066):

$$C_V = \frac{(\text{average\% LEL as displayed})}{100}\,\frac{(\text{LEL of the calibration gas, volume\% in air})}{100}\,RF$$

$$= \frac{(2\%)\ (1.8\%)\ (1)}{(100\%)\ (100\%)} = 0.00036$$

$$C_{V(max)} = P/P_a$$

$$= \frac{(0.012\ \text{psia})}{(14.7\ \text{psia})} = 0.000816$$

C_V cannot exceed $C_{V(max)}$, therefore:

$$C_V = 0.00036$$

$$L_{SR} = 60\,Q_v\,n_{SR}\,t_v\,C_V\,\frac{P_a M_V}{RT}$$

$$= \frac{(60)\ (8580\ \text{ft}^3/\text{min})\ (5\ \text{days/yr})\ (12\ \text{hr/day})\ (0.00036)\ (14.7\ \text{psia})\ (130\ \text{lb/lb-mol})}{(10.731\ \text{psia-ft}^3/\text{lb-mol-°R})\ (531.22\text{°R})} = 3730\ \text{lb/yr}$$

$$h_{le} = \left(h_l + \frac{sD}{72}\right)$$

$$= (0.167\ \text{ft}) + \left(\frac{(0\ \text{in./ft})(140\ \text{ft})}{(72)}\right) = 0.167\ \text{ft}$$

$$L_{SR(max)} = 5.9\,D^2\,h_{le}\,W_l$$

$$= (5.9)\ (140\ \text{ft})^2\ (0.167\ \text{ft})\ (7.1\ \text{lb/ft}^3/\text{gal}) = 137100$$

lb/yr L_{SR} cannot exceed $L_{SR(max)}$, therefore:

L_{SR} = 3730 lb uncontrolled

Note. The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

IFR with Full Heel Standing Idle Calculations - Tank Cleaning (EPN COMBMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007

Ambient Pressure, P_a =	14.7 psia	
Ambient Temp. =	71.55 °F and	531.22 °R
Maximum Temp. =	84.2 °F and	543.87 °R
Minimum Temp. =	62.06 °F and	521.73 °R
Average Temp. =	72.14 °F and	531.81 °R
Ideal Gas Law Constant, R =	10.731 psia-ft³/lb-mol-°R	

Tank and Chemical Details:

Tank No.	Stored Material	Time Period Idle (days/yr)	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	Liquid Density, Wl (lb/gal)	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Antoine's Equation Constant, B (°R)	Solar Absorptance, α	Solar Insolation, I (Btu/ft²-day)	Diameter, D (ft)	Leg Height, h_d (ft)	Liquid Height, h_l (ft)	Tank Bottom Slope, s (in/ft)	Vapor Control Efficiency (%) [1]
28063	Crude Oil	5	10	50	7.1	[illegible]	7.696	[illegible]	5303.9	0.17	1447.94	109	6.5	0.167	0	99
28064	Crude Oil	5	10	50	7.1	[illegible]	7.696	[illegible]	5303.9	0.17	1447.94	109	6.67	0.167	0	99
28067	Crude Oil	5	10	50	7.1	[illegible]	7.696	[illegible]	5303.9	0.17	1447.94	140	6.33	0.167	0	99
28070	Crude Oil	5	10	50	7.1	10.9	7.696	[illegible]	5303.9	0.17	1447.94	140	7.42	0.167	0	99
28077	Crude Oil	5	10	50	7.1	10.9	7.696	[illegible]	5303.9	0.17	1447.94	140	6.83	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	7.1	10.9	7.696	[illegible]	5303.9	0.17	1447.94	180	6.5	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	7.1	10.9	7.696	[illegible]	5303.9	0.17	1447.94	180	6.5	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	7.1	10.9	7.696	[illegible]	5303.9	0.17	1447.94	180	6.5	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	7.1	10.9	7.696	[illegible]	5303.9	0.17	1447.94	180	6.5	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	7.1	10.9	7.696	[illegible]	5303.9	0.17	1447.94	180	6.5	0.167	0	99
[illegible]	Crude Oil	[illegible]	10	50	7.1	10.9	7.696	[illegible]	5303.9	0.17	1447.94	180	6.5	0.167	0	99

Notes: 1) Use NA if vapor control is not used.

Emission Calculations and Summary:

Tank No.	Vapor Space Expansion, K_E	Vapor Volume, V_V (ft³)	Vapor Height, h_v (ft)	Standing Idle Saturation, K_S	Daily Temperature Range ΔT_V (°R)	Effective Liquid/ Sludge Height, h_{le} (ft)	Calculated Standing Loss, L_S (lb/yr)	Maximum Standing Loss, $L_{S_{max}}$ (lb/yr)	Uncontrolled Standing Loss, L_S (lb/yr)	Controlled Standing Loss, L_S (lb/yr)
28063	0.386	59100	6.33	0.248	22.8	0.167	2250	82800	2250	22.5
28064	0.386	60700	6.5	0.243	22.8	0.167	2260	82800	2260	22.6
28067	0.386	94800	6.16	0.253	22.8	0.167	3670	137000	3670	36.7
28070	0.386	112000	7.25	0.223	22.8	0.167	3830	137000	3830	38.3
28077	0.386	103000	6.66	0.238	22.8	0.167	3760	137000	3760	37.6
[illegible]	0.386	179000	6.33	0.248	22.8	0.167	6800	251000	6800	68
[illegible]	0.386	179000	6.33	0.248	22.8	0.167	6800	251000	6800	68
[illegible]	0.386	179000	6.33	0.248	22.8	0.167	6800	251000	6800	68
[illegible]	0.386	179000	6.33	0.248	22.8	0.167	6800	251000	6800	68
[illegible]	0.386	179000	6.33	0.248	22.8	0.167	6800	251000	6800	68
[illegible]	0.386	179000	6.33	0.248	22.8	0.167	6800	251000	6800	68

IFR with Full Heel Standing Idle Calculations (cont'd)
Sample Calculations (Tank No. 28063):

$\Delta T_V = 0.72(T_{MAX} - T_{MIN}) + 0.028\alpha I$
$= (0.72)(543.87 - 521.73)°R + (0.028)(0.17)(1447.94 \text{ Btu/ft}^2\text{-day})$ $= 22.8°R$

$K_E = \frac{\Delta T_V}{T}\left(1 + \frac{0.50\,B\,P}{T(P_a - P)}\right)$
$= \frac{(22.8°R)}{(531.22°R)}\left(1 + \frac{(0.50)(5303.9°R)(9.05 \text{ psia})}{(531.22°R)(14.7 - 9.05) \text{ psia}}\right)$ $= 0.386$

$h_v = h_d - h_l$
$= (6.5 \text{ ft} - 0.167 \text{ ft})$ $= 6.33 \text{ ft}$

$V_V = (h_v)(\pi D^2/4)$
$= \frac{(6.33 \text{ ft})(3.14)(109 \text{ ft})^2}{4}$ $= 59100 \text{ ft}^3$

$K_S = \frac{1}{1 + 0.053\,P\,(h_v)}$ ≤ 0.6

$= \frac{1}{[(1) + (0.053)(9.05 \text{ psia})(6.33 \text{ ft})]}$ $= 0.248$

Since Ks ≤ 0.6, then
= 0.248

$h_{le} = \left(h_l + \frac{sD}{72}\right)$
$= (0.167 \text{ ft}) + \left(\frac{(0 \text{ in./ft})(109 \text{ ft})}{(72)}\right)$ $= 0.167 \text{ ft}$

$L_S = n_d K_E \left(\frac{P V_V}{RT}\right) M_V K_S$
$= \frac{(5 \text{ days idle/yr})(0.386)(9.05 \text{ psia})(59100 \text{ ft}^3)(60 \text{ lb/lb-mol})(0.248)}{(10.731 \text{ psia-ft}^3\text{/lb-mol-}°R)(531.22°R)}$ $= 2250 \text{ lb/yr}$

$L_{S(max)} = (\pi/4)(D \text{ ft})^2 (h_{le} \text{ ft.})(W_l \text{ lb/gal})(7.48 \text{ gal/ft}^3)$
$= \frac{(3.14)(109 \text{ ft})^2 (0.167 \text{ ft})(7.1 \text{ lb/gal})(7.48 \text{ gal/ft}^3)}{(4)}$ $= 82800 \text{ lb/yr}$

L_S cannot exceed $L_{S(max)}$, therefore:
L_S = 2250 lb/yr uncontrolled
= (2250 lb/yr)(100-99)%/100% ***= 22.5 lb/yr controlled***

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

IFR Floating Roof Tank Filling Calculations - Tank Cleaning (EPN COMBMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007

Ambient Temp., T =	71.55	°F and	531.22	°R
Ambient Maximum Temp. =	[illegible]	°F and	[illegible]	°R
Ambient Minimum Temp. =	62.06	°F and	521.73	°R
Ambient Average Temp. =	[illegible]	°F and	[illegible]	°R
Ideal Gas Law Constant, R =	10.731	psia·ft³/lb-mol·°R		

Tank and Chemical Details:

Tank No.	Stored Material	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	Diameter, D (ft)	Tank Bottom Slope, s (in/ft)	Leg Height, h_{le} (ft)	Saturation Factor, S	Number of Events Per Year (no./yr)	Vapor Control Efficiency (%) [1]
28063	Crude Oil	10	50	109	0	6.5	0.15	1	99
28064	Crude Oil	10	50	109	0	6.67	0.15	1	99
28067	Crude Oil	10	50	140	0	6.33	0.15	1	99
28070	Crude Oil	10	50	140	0	7.42	0.15	1	99
28077	Crude Oil	10	50	140	0	6.83	0.15	1	99
28087	Crude Oil	10	50	190	0	6.5	0.15	1	99
28088	Crude Oil	10	50	190	0	6.5	0.15	1	99
28089	Crude Oil	10	50	190	0	6.5	0.15	1	99
28090	Crude Oil	10	50	190	0	6.5	0.15	1	99
28091	Crude Oil	10	50	190	0	6.5	0.15	1	99
28092	Crude Oil	10	50	190	0	6.5	0.15	1	99

Notes: 1) Use NA if vapor control is not used.

Emission Calculations and Summary:

Tank No.	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Vapor Volume, V_v (ft³)	Vapor Height, h_v (ft)	Uncontrolled Vapor Space Purge Loss, L_F (lb/yr)	Controlled Vapor Space Purge Loss, L_F (lb/yr)
28063	10.9	7.696	9.05	60700	6.5	723	7.23
28064	10.9	7.696	9.05	62200	6.67	741	7.41
28067	10.9	7.696	9.05	97400	6.33	1160	11.6
28070	10.9	7.696	9.05	114000	7.42	1360	13.6
28077	10.9	7.696	9.05	105000	6.83	1250	12.5
28087	10.9	7.696	9.05	184000	6.5	2190	21.9
28088	10.9	7.696	9.05	184000	6.5	2190	21.9
28089	10.9	7.696	9.05	184000	6.5	2190	21.9
28090	10.9	7.696	9.05	184000	6.5	2190	21.9
28091	10.9	7.696	9.05	184000	6.5	2190	21.9
28092	10.9	7.696	9.05	184000	6.5	2190	21.9

IFR Floating Roof Tank Filling Calculations - Tank Cleaning (EPN COMBMSS) (cont'd)
Sample Calculations (Tank No. 28063):

$h_V = h_d$
$= 6.5 \text{ ft}$

$V_V = (h_v)(\pi D^2/4)$
$= \dfrac{(6.5 \text{ ft})\ (3.14)\ (109 \text{ ft})^2}{(4)} \quad = 60700 \text{ ft}^3$

$L_F = \left(\dfrac{PV_V}{RT}\right) M_V S$
$= \dfrac{(9.05 \text{ psia})\ (60700 \text{ ft}^3)\ (50 \text{ lb-lb-mol})\ (0.15)\ (1 \text{ number of events/yr})}{(10.731 \text{ psia-ft}^3\text{/lb-mol-°R})\ (531.22\text{°R})}$ ***= 723 lb/yr uncontrolled***

$= (723 \text{ lb/yr})(100\text{-}99)\%/100\%$ ***= 7.23 lb/yr controlled***

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

FLINT HILLS RESOURCES CORPUS CHRISTI, LLC INGLESIDE TERMINAL
REVISION TO PBR REGISTRATION
NO. 107625 MSS ACTIVITIES

FHR's Exhibit C

EFR with Heel Standing Idle Calculations - Tank Cleaning (EPN COMBMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3.
November 2007 Ambient Pressure, P_A = 14.7 psia
Ambient Temp. = 71.55 °F and 531.22 °R
Maximum Temp. = [illegible] °F and [illegible] °R
Minimum Temp. = 62.06 °F and 521.73 °R
Average Temp. = [illegible] °F and [illegible] °R Ideal Gas Law Constant, R 10.731 psia-ft/lb-mol-°R
Tank and Chemical Details:

Tank No.	Stored Material	Time Period Idle (days/yr)	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	Liquid Density, Wl (lb/gal)	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Diameter, D (ft)	Tank Bottom Slope, s (in/ft)	Liquid Height, hl (ft)	Vapor Control Efficiency (%) [1]
28068	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	140	0	0.167	99
28069	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	140	0	0.167	99
28071	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28072	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28073	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28074	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28075	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28076	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28080	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	180	0	0.167	99
28088	Crude Oil	5	10	50	7.1	10.9	7.696	9.05	190	0	0.167	99

Notes: 1) Use 0% if vapor control is not used.

Emission Calculations and Summary:

Tank No.	Vapor Pressure Function P*	Effective Liquid/ Sludge Height, h_{le} (ft)	Calculated Standing Loss, L_S (lb/yr)	Maximum Standing Loss $L_{S(max)}$ (lb/yr)	Uncontrolled Standing Loss, L_S (lb/yr)	Controlled Standing Loss, L_S (lb/yr)
28068	0.235	0.167	4690	137100	4690	46.9
28069	0.235	0.167	4690	137100	4690	46.9
28071	0.235	0.167	6030	226700	6030	60.3
28072	0.235	0.167	6030	226700	6030	60.3
28073	0.235	0.167	6030	226700	6030	60.3
28074	0.235	0.167	6030	226700	6030	60.3
28075	0.235	0.167	6030	226700	6030	60.3
28076	0.235	0.167	6030	226700	6030	60.3
28080	0.235	0.167	6030	226700	6030	60.3
28088	0.235	0.167	5350	252500	5350	53.5

EFR with Heel Standing Idle Calculations - Tank Cleaning (EPN COMBMSS) (cont'd)
Sample Calculations (Tank No. 28068):

$$P^* = \frac{P/P_a}{\left[1+\left[1-(P/P_a)\right]^{0.5}\right]^2}$$

$$= \frac{(9.05\text{ psia}) / (14.7\text{ psia})}{\text{psia}\ \left((1) + [\ (1) - (9.05\text{ psia})/(14.7\text{ psia})\ ]\text{^}0.5\right)^2} = 0.235$$

$$L_S = 0.57\, n_d\, D\, P^*\, M_V$$

$$= (0.57)\ (5\text{ days/yr})\ (140\text{ ft})\ (0.235)\ (50\text{ lb-lb-mol}) = 4690\text{ lb/yr}$$

$$h_{le} = \left(h + \frac{sD}{72}\right)$$

$$= (0.167\text{ ft}) + \frac{(0\text{ in./ft})(140\text{ ft})}{(72)} = 0.167\text{ ft}$$

$$L_{S(max)} = (5.9)\ (D)^2\ (h_{le})\ (W_l)$$

$$= (5.9)\ (140)^2\ (0.167\text{ ft})\ (7.1\text{ lb/gal}) = 137100\text{ lb/yr}$$

L_S cannot exceed $L_{S(max)}$, *therefore:*

L_S = 4690 lb/yr uncontrolled

= (4690 lb/yr)(100-99)%/100% ***= 46.9 lb/yr controlled***

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

EFR Floating Roof Tank Filling Calculations - Tank Cleaning (EPN COMBMSS)

Basis: API Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks," p. 3, November 2007

Ambient Temp., T =	71.55 °F and	531.22 °R
Ambient Maximum Temp. =	84.2 °F and	543.87 °R
Ambient Minimum Temp. =	62.00 °F and	521.73 °R
Ambient Average Temp. =	72.14 °F and	531.81 °R
Ideal Gas Law Constant, R =	10.731 psia-ft³/lb-mol-°R	

Tank and Chemical Details:

Tank No.	Stored Material	Reid Vapor Pressure, RVP (psia)	Mol. Wt., Mv (lb/lb-mol)	Diameter, D (ft)	Tank Bottom Slope, s (in/ft)	Leg Height, h_{le} (ft)	Saturation Factor, S	Number of Events Per Year (no./yr)	Vapor Control Efficiency (%) [1]
28068	Crude Oil	10	50	140	0	6.83	0.15	1	99
28069	Crude Oil	10	50	140	0	6.58	0.15	1	99
28071	Crude Oil	10	50	180	0	6.83	0.15	1	99
28072	Crude Oil	10	50	180	0	7.08	0.15	1	99
28073	Crude Oil	10	50	180	0	6.83	0.15	1	99
28074	Crude Oil	10	50	180	0	7.83	0.15	1	99
28075	Crude Oil	10	50	180	0	6.83	0.15	1	99
28076	Crude Oil	10	50	180	0	6.83	0.15	1	99
28080	Crude Oil	10	50	180	0	7.83	0.15	1	99
28086	Crude Oil	10	50	190	0	6.5	0.15	1	99

Notes: 1) Use NA if there vapor control is not used.

Emission Calculations and Summary:

Tank No.	True Vapor Pressure, TVP, @ Maximum Temperature (psia)	TVP @ Minimum Temperature (psia)	TVP @ Average Temperature, P (psia)	Vapor Volume, V_v (ft³)	Vapor Height, h_v (ft)	Uncontrolled Vapor Space Purge Loss, L_F (lb/yr)	Controlled Vapor Space Purge Loss, L_F (lb/yr)
28068	10.9	7.696	9.05	105000	6.83	1250	12.5
28069	10.9	7.696	9.05	101000	6.58	1200	12
28071	10.9	7.696	9.05	174000	6.83	2070	20.7
28072	10.9	7.696	9.05	180000	7.08	2140	21.4
28073	10.9	7.696	9.05	174000	6.83	2070	20.7
28074	10.9	7.696	9.05	199000	7.83	2370	23.7
28075	10.9	7.696	9.05	174000	6.83	2070	20.7
28076	10.9	7.696	9.05	174000	6.83	2070	20.7
28080	10.9	7.696	9.05	199000	7.83	2370	23.7
28086	10.9	7.696	9.05	184000	6.5	2190	21.9

EFR Floating Roof Tank Filling Calculations - Tank Cleaning (EPN COMBMSS) (cont'd)

Sample Calculations (Tank No. 28068):

$h_V = h_d$
$= 6.83$ ft

$V_V = (h_v)(\pi D^2/4)$

$= \dfrac{(6.83 \text{ ft})\ (3.14)\ (140 \text{ ft})^2}{(4)} = 105000 \text{ ft}^3$

$L_F = \left(\dfrac{PV_V}{RT}\right) M_V S$

$= \dfrac{(9.05 \text{ psia})\ (105000 \text{ ft}^3)\ (50 \text{ lb-lb-mol})\ (0.15)\ (1 \text{ number of events/yr})}{(10.731 \text{ psia-ft}^3\text{/lb-mol-°R})\ (531.22\text{°R})}$ ***= 1250 lb/yr uncontrolled***

$= (1250 \text{ lb/yr})(100\text{-}99)\%/100\%$ ***= 12.5 lb/yr controlled***

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

 FHR's Exhibit C

Routine Start-up/Shutdown/Maintenance Fugitive Emissions
Combustion Emissions from Controlling Standing Idle Emissions during Tank Cleaning
EPN COMBMSS

Sulfur Dioxide Emissions from Crude Oil

H_2S Concentration = [illegible] ppmv (annual average permit 6505 allowable)
Mass Emission Ratio = 0.075 lb H_2S/lb VOC (from permit amendment)
Hourly VOC Emissions to Control = 57 lb/hr
Annual VOC Emissions to Control = 27200 lb/yr (based on highest

VOC Control Efficiency = 99 %

MW of H_2S (lb/lb-mol) = 34
MW of SO_2 (lb/lb-mol) = 64
It is assumed that all of the H_2S sent to the engine is converted to SO_2 and emitted.

VOC Vented to Control	VOC Vented to Control	H_2S Vented to Control	H_2S Vented to Control	SO_2 Emissions	SO_2 Emissions
(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(tons/yr)
57	13.6[illegible]	4.28	[illegible]	6.06	[illegible]

Sample Calculations:

SO_2 Emissions (lb/hr) = VOC Vented to Control x Mass Emission Ratio x MW_{SO2} / MW_{H2S}
SO_2 Emissions (lb/hr) = (57 lb/hr) x (0.075 lb H2S/lb VOC) X (64 lb/lb-mol SO2) / (34 lb/lb-mol H2S)
SO_2 Emissions (lb/hr) = 6.06

H_2S to Control (lb/hr) = VOC Vented to Control x Mass Emission Ratio
H_2S to Control (lb/hr) = (57 lb/hr) x (0.075 lb H2S/lb VOC))
H_2S to Control (lb/hr) = 4.28

Engine Combustion Emissions

Individual engine horsepower (hp) = 52
Number of engines required = 3
Cumulative engine horsepower (hp) = 156

Emission factors are for natural-gas fired, 4-stroke rich-burn engines, from AP-42 Table 3.2-3:
NO_x (lb/MMBtu) = 2.27E+00
CO (lb/MMBtu) = 3.72E+00
SO_2 (lb/MMBtu) = 0.0147 based on 5 gr/100 dscf instead of 0.2 gr/100 dscf
VOC (lb/MMBtu) = 2.96E-02
PM (lb/MMBtu) = 9.91E-03
PM_{10} (lb/MMBtu) = 9.50E-03

Engine Horsepower	Fuel Usage	Emissions (lb/hr)					
(hp)	(MMBtu/hr)	NO_x	CO	SO_2	VOC	PM	PM_{10}
156	0.397	0.90	1.48	0.0058	0.0118	0.0039	0.0038

Sample Calculations:

NO_x Emissions (lb/hr) = Engine Horsepower x 2544 Btu/hp-hr x Emission Factor
NO_x Emissions (lb/hr) = (156 hp) x (2544 Btu/hp-hr) / (1,000,0000 Btu/MMBtu) * (2.27 lb/MMBtu)
NO_x Emissions (lb/hr) = 0.90

Note: The [illegible] MSS [illegible] Summary Table.

Thermal Oxidizer (TO) Combustion Emissions

TO Firing Rate (MMBtu/hr) 15

Emissions factors for NOx and CO are found in the stack test for TO 1299
SO_2, PM, PM_{10}, $PM_{2.5}$ and VOC emission factors are based on AP-42 Section 1.4

NO_x (lb/MMBtu) =	0.0004
CO (lb/MMBtu) =	0.05
SO_2 (lb/MMBtu) =	0.00059
VOC (lb/MMBtu) =	0.0054
PM (lb/MMBtu) =	0.0075
PM_{10} (lb/MMBtu) =	0.0075

Emissions (lb/hr)					
NO_x	CO	SO_2	VOC	PM	PM_{10}
0.006	0.75	0.0089	0.081	0.11	0.11

Sample Calculations

NO_x Emissions (lb/hr) = TO Fired Duty x Emission Factor
NO_x Emissions (lb/hr) = (15 MMBtu/hr) x (0.0004 lb/MMBtu)
NO_x Emissions (lb/hr) = 0.006

Total Combustion Emissions

Number of Events (Events/hr)	Hourly Emissions (lb/hr)					
	NO_x	CO	SO_2	VOC	PM	PM_{10}
1	0.90	1.48	8.07	0.65	0.11	0.11

Duration of Control (Standing) (hr/event)	Number of Events (Standings) (events/yr)	Annual Emissions (tons/yr)					
		NO_x	CO	SO_2	VOC	PM	PM_{10}
120	4	0.22	0.36	1.02	0.16	0.03	0.030

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

Routine Start-up/Shutdown/Maintenance Fugitive Emissions
Combustion Emissions from Controlling Tank Refill Emissions after Tank Cleaning
EPN COMBMSS

Sulfur Dioxide Emissions from Crude Oil

H_2S Concentration =	[illegible]	ppmv (annual average permit 6606 allowable)
Mass Emission Ratio =	0.075	lb H_2S/lb VOC (from permit amendment)
Hourly VOC Emissions to Control =	132	lb/hr
Annual VOC Emissions to Control =	[illegible]	lb/yr
Time to refill Tank =	18	hrs (used to calculate hourly H_2S and VOC emissions)
Time to refill Tank =	30	hrs (used for annual combustion emissions calculations)
VOC Control Efficiency =	99	%
MW of H_2S (lb/lb-mol) =	34	
MW of SO_2 (lb/lb-mol) =	64	

It is assumed that all of the H_2S sent to the engine is converted to SO_2 and emitted.

VOC Vented to Control (lb/hr)	VOC Vented to Control (ton/yr)	H_2S Vented to Control (lb/hr)	H_2S Vented to Control (ton/yr)	SO_2 Emissions (lb/hr)	SO_2 Emissions (tons/yr)
132	[illegible]	9.90	[illegible]	18.64	[illegible]

Sample Calculations:

SO_2 Emissions (lb/hr) = VOC Vented to Control x Mass Emission Ratio x MW_{SO2} / MW_{H2S}
SO_2 Emissions (lb/hr) = (132 lb/hr) x (0.075 lb H2S/lb VOC) X (64 lb/lb-mol SO2) / (34 lb/lb-mol H2S)
SO_2 Emissions (lb/hr) = 18.64

H_2S to Control (lb/hr) = VOC Vented to Control x Mass Emission Ratio
H_2S to Control (lb/hr) = (132 lb/hr) x (0.075 lb H2S/lb VOC))
H_2S to Control (lb/hr) = 9.90

Engine Combustion Emissions

Individual engine horsepower (hp) =	52
Number of engines required =	3
Cumulative engine horsepower (hp) =	156

Emission factors are for natural-gas fired, 4-stroke rich-burn engines, from AP-42 Table 3.2-3:

NO_x (lb/MMBtu) =	2.27E+00	
CO (lb/MMBtu) =	3.72E+00	
SO_2 (lb/MMBtu) =	0.0147	based on 5 gr/100 dscf instead of 0.2 gr/100 dscf
VOC (lb/MMBtu) =	2.96E-02	
PM (lb/MMBtu) =	9.91E-03	
PM_{10} (lb/MMBtu) =	9.50E-03	

Engine Horsepower (hp)	Fuel Usage (MMBtu/hr)	Emissions (lb/hr)					
		NO_x	CO	SO_2	VOC	PM	PM_{10}
156	0.397	0.90	1.48	0.0058	0.0118	0.0039	0.0038

Sample Calculations:

NO_x Emissions (lb/hr) = Engine Horsepower x 2544 Btu/hp-hr x Emission Factor
NO_x Emissions (lb/hr) = (156 hp) x (2544 Btu/hp-hr) / (1,000,0000 Btu/MMBtu) * (2.27 lb/MMBtu)
NO_x Emissions (lb/hr) = 0.90

[illegible]

Thermal Oxidizer (TO) Combustion Emissions

TO Firing Rate (MMBtu/hr) 15

Emissions factors for NOx and CO are found in the stack test for TO 1299.
SO_2, PM, PM_{10}, $PM_{2.5}$, and VOC emission factors are based on AP-42, Section 1.4.

NO_x (lb/MMBtu) = 0.0004
CO (lb/MMBtu) = 0.05
SO_2 (lb/MMBtu) = 0.00059
VOC (lb/MMBtu) = 0.0054
PM (lb/MMBtu) = 0.0075
PM_{10} (lb/MMBtu) = 0.0075

Emissions (lb/hr)					
NO_x	CO	SO_2	VOC	PM	PM_{10}
0.006	0.75	0.0089	0.081	0.11	0.11

Sample Calculations:

NO_x Emissions (lb/hr) = TO Fired Duty x Emission Factor
NO_x Emissions (lb/hr) = (15 MMBtu/hr) x (0.0004 lb/MMBtu)
NO_x Emissions (lb/hr) = 0.006

Total Combustion Emissions

Number of Events (Events/hr)	Hourly Emissions (lb/hr)					
	NO_x	CO	SO_2	VOC	PM	PM_{10}
1	0.90	1.48	18.65	1.40	0.11	0.11

Duration of Control (Refilling) (hr/event)	Number of Events (Refillings) (events/yr)	Annual Emissions (tons/yr)					
		NO_x	CO	SO_2	VOC	PM	PM_{10}
30	4	0.05	0.09	0.64	0.05	0.01	0.01

Note: The variables represented in these calculations are used only to estimate emissions. Although actual values of the variables may vary and may be higher than represented, 24-hour actual emissions totals from each MSS activity occurrence will not exceed the relevant reportable quantities and combined actual emissions from all authorized MSS activities will not exceed the annual (tons/year) emission rates shown in the Summary Table.

TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	BEFORE THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

**FLINT HILLS RESOURCES INGLESIDE LLC
RESPONSE TO MOTION TO OVERTURN**

Exhibit D

Jon Niermann, *Chairman*
Emily Lindley, *Commissioner*
Toby Baker, *Executive Director*

FHR's Exhibit D

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

January 15, 2019

Mr. Brook Vickery
Vice President And Manufacturing Manager
Flint Hills Resources Corpus Christi, LLC
PO BOX 2608
Corpus Christi, TX 78403

Permit by Rule Registration Number: 107625
Flint Hills Resources Corpus Christi, LLC
Project Description/Unit: Fhr Ingleside Marine Terminal Facility
City: Ingleside, San Patricio County
Regulated Entity Number: RN100222744
Customer Reference Number: CN603741463
30 TAC § 106.263
Affected Permit(s): 6606

This is in response to your Permit by Rule (PBR) registration submitted through the online ePermits process for your facility located near Ingleside, San Patricio County. Based on the information submitted and review completed by the Rule Registration Section, this is an acknowledgement that Flint Hills Resources Corpus Christi, LLC has certified emissions associated with Fhr Ingleside Marine Terminal Facility under the Permit By Rule(s) listed above. For rule information see: www.tceq.texas.gov/permitting/air/nav/numerical_index.html. Records must be maintained in accordance with Title 30 Texas Administrative Code § 106.8 to demonstrate compliance with the claimed PBRs.

As referenced in 30 TAC § 116.116(d)(2), all changes authorized under Chapter 106 to a permitted facility shall be incorporated into the NSR Permit No. 6606 when it is amended or renewed.

As a reminder, regardless of the authorization mechanism, all facilities must be in compliance and operate in accordance with all rules and regulations of the TCEQ and the U.S. Environmental Protection Agency. Facilities not operating in accordance with these rules and regulations, or that misrepresented or failed to fully disclose all relevant facts in obtaining this authorization may be subject to formal enforcement action.

This action is taken under authority delegated by the Executive Director of the TCEQ. If you need further information or have questions, please contact the Rule Registrations Section at (512) 239-1250 or write to the Texas Commission on Environmental Quality, Office of Air, Air Permits Division, MC-163, P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

Mark T. Meyer

Mark Meyer, Manager

Rule Registrations Section
Air Permits Division
Texas Commission on Environmental Quality

FHR's Exhibit D

[Project Number: 292889]

TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	BEFORE THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

FLINT HILLS RESOURCES INGLESIDE LLC
RESPONSE TO MOTION TO OVERTURN

Exhibit E

Texas Commission on Environmental Quality
Amendment Application

Flint Hills Resources Ingleside, LLC
Ingleside Terminal

Ingleside, San Patricio County
Air Quality Account ID No. SD-0047-K
Regulated Entity No. 100222744
Customer No. 605721935

March 2021

Prepared by:

Marshall Vandermeer

Marshall B. Vandermeer, E.I.T
Graduate Staff Engineer

Approved by:

This document is being released for the purpose of draft review under the authority of Kris L. Kirchner, P.E. No. 89354 on March 29, 2021 firm registration for Waid Corporation dba Waid Environmental Certificate of Registration No. F-58.
It is not to be used for final submittal.

Kris L. Kirchner, P.E.
Principal Engineer

Waid Corporation dba Waid Environmental
Certificate of Registration No. F-58

Document based on information provided by FHR
Waid Project No. FHI14340

WAID ENVIRONMENTAL
www.waid.com

Austin Office
13785 Research Blvd., Suite 100, Austin, Texas 78750
512.255.9999 • 512.255.8780 FAX

Houston Office
1325 Space Park Dr., Suite D, Houston, Texas 77058
281.333.9990 • 512.255.8780 FAX

FHR's Exhibit E

I. Applicant Information		
I acknowledge that I am submitting an authorized TCEQ application workbook and any necessary attachments. Except for inputting the requested data and adjusting row height and column width, I have not changed the TCEQ application workbook in any way, including but not limited to changing formulas, formatting, content, or protections.		I agree
A. Company Information		
Company or Legal Name:	Flint Hills Resources Ingleside, LLC	
Permits are issued to either the facility owner or operator, commonly referred to as the applicant or permit holder. List the legal name of the company, corporation, partnership, or person who is applying for the permit. We will verify the legal name with the Texas Secretary of State at (512) 463-5555 or at the link below:		
https://www.sos.state.tx.us		
Texas Secretary of State Charter/Registration Number (if given):		

B. Company Official Contact Information: must not be a consultant	
Prefix (Mr., Ms., Dr., etc.):	Mr.
First Name:	Bryan
Last Name:	Ray
Title:	Terminal Manager
Mailing Address:	103 FM 1069
Address Line 2:	
City:	Ingleside
State:	Texas
ZIP Code:	79362
Telephone Number:	361-242-5476
Fax Number:	N/A
Email Address:	bryan.ray@fhr.com
C. Technical Contact Information: This person must have the authority to make binding agreements and representations on behalf of the applicant and may be a consultant. **Additional technical contact(s) can be provided in a cover letter.**	
Prefix (Mr., Ms., Dr., etc.):	Ms.
First Name:	Kristin
Last Name:	Mahesaniya
Title:	Evironmental Engineer
Company or Legal Name:	Flint Hills Resources, LC
Mailing Address:	11055A Eastex Freeway
Address Line 2:	
City:	Beaumont
State:	Texas
ZIP Code:	78403
Telephone Number:	512-230-5006
Fax Number:	N/A
Email Address:	kristin.mahesaniya@FHR.com

D. Assigned Numbers

The CN and RN below are assigned when a Core Data Form is initially submitted to the Central Registry. The RN is also assigned if the agency has conducted an investigation or if the agency has issued an enforcement action. If these numbers have not yet been assigned, leave these questions blank and include a Core Data Form with your application submittal. See Section VI.B. below for additional information.

FHR's Exhibit E

Enter the CN. The CN is a unique number given to each business, governmental body, association, individual, or other entity that owns, operates, is responsible for, or is affiliated with a regulated entity.	605721935
Enter the RN. The RN is a unique agency assigned number given to each person, organization, place, or thing that is of environmental interest to us and where regulated activities will occur. The RN replaces existing air account numbers. The RN for portable units is assigned to the unit itself, and that same RN should be used when applying for authorization at a different location.	100222744

II. Delinquent Fees and Penalties

Does the applicant have unpaid delinquent fees and/or penalties owed to the TCEQ? 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 are 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 the link below:	No

https://www.tceq.texas.gov/agency/financial/fees/delin

III. Permit Information

A. Permit and Action Type (multiple may be selected, leave no blanks)

Additional information regarding the different NSR authorizations can be found at the link below:
https://www.tceq.texas.gov/permitting/air/guidance/authorize.html

Select from the drop-down the type of action being requested for each permit type. **If that permit type does not apply, you MUST select "Not applicable".**

Provide all assigned permit numbers relevant for the project. Leave blank if the permit number has not yet been assigned.

Permit Type	Action Type Requested (do not leave blank)	Permit Number (if assigned)
Minor NSR (can be a Title V major source): *Not applicable, Initial, Amendment, Renewal, Renewal Certification, Renewal/Amendment, Relocation/Alteration, Change of Location, Alteration, Extension to Start of Construction*	Amendment	6606
Special Permit: *Not applicable, Amendment, Renewal, Renewal Certification, Renewal/Amendment, Alteration, Extension to Start of Construction*	Not applicable	
De Minimis: *Not applicable, Initial*	Not applicable	
Flexible: *Not applicable, Initial, Amendment, Renewal, Renewal Certification, Renewal/Amendment, Alteration, Extension to Start of Construction*	Not applicable	
PSD: *Not applicable, Initial, Major Modification*	Not applicable	
Nonattainment: *Not applicable, Initial, Major Modification*	Not applicable	
HAP Major Source [FCAA § 112(g)]: *Not applicable, Initial, Major Modification*	Not applicable	
PAL: *Not applicable, Initial, Amendment, Renewal, Renewal/Amendment, Alteration*	Not applicable	
GHG PSD: *Not applicable, Initial, Major Modification, Voluntary Update*	Not applicable	

B. MSS Activities	
How are/will MSS activities for sources associated with this project be authorized?	Permit by Rule
List the permit number, registration number, and/or PBR number.	107625
C. Consolidating NSR Permits	
Will this permit be consolidated into another NSR permit with this action?	No
Will NSR permits be consolidated into this permit with this action?	No

D. Incorporation of Standard Permits, Standard Exemptions, and/or Permits By Rule (PBR)

To ensure protectiveness, previously issued authorizations (standard permits, standard exemptions, or PBRs) including those for MSS, are incorporated into a permit either by consolidation or by reference.

- Authorizations entirely incorporated by consolidation will be voided when the project is complete, and the sources and allowable emissions will be added to the NSR permit's MAERT.
- Authorizations incorporated by reference will be referenced with the final action for this project but will not be voided. Sources will continue to be authorized in the current manner.

At the time of renewal and/or amendment, consolidation (in some cases) may be voluntary and referencing is mandatory. More guidance regarding incorporation can be found in 30 TAC § 116.116(d)(2), 30 TAC § 116.615(3) and in this memo (link below):
https://www.tceq.texas.gov/assets/public/permitting/air/memos/pbr_spc06.pdf

Are there any standard permits, standard exemptions, or PBRs to be incorporated by reference?	No
Are there any PBR, standard exemptions, or standard permits associated to be incorporated by consolidation? **Note:** Emission calculations, a BACT analysis, and an impacts analysis must be attached to this application at the time of submittal for any authorization to be incorporated by consolidation.	
If yes, list any PBR, standard exemptions, or standard permits that need to be consolidated:	161793, 160536
If yes, are emission calculations, BACT analysis, an impacts analysis, and a table of FINs and EPNs with authorization identifiers (registration number or rule citation) included for each authorization to be consolidated? **If any required information is not provided, the authorization will be incorporated by reference.**	Yes
E. Associated Federal Operating Permits	
Is this facility located at a site required to obtain a **site operating permit (SOP)** or **general operating permit (GOP)?**	Yes
Is a **SOP** or **GOP** review pending for this source, area, or site?	No
If required to obtain a **SOP** or **GOP**, list all associated permit number(s). If no associated permit number has been assigned yet, enter "TBD":	3454

FHR's Exhibit E

IV. Facility Location and General Information	
A. Location	
County: Enter the county where the facility is physically located.	San Patricio
TCEQ Region	Region 14
County attainment status as of Sept. 23, 2019	attainment or unclassified for all pollutants
Street Address:	103 FM1069
City: If the address is not located in a city, then enter the city or town closest to the facility, even if it is not in the same county as the facility.	Ingleside
ZIP Code: Include the ZIP Code of the physical facility site, not the ZIP Code of the applicant's mailing address.	78362
Site Location Description: If there is no street address, provide written driving directions to the site. Identify the location by distance and direction from well-known landmarks such as major highway intersections.	
Use USGS maps, county maps prepared by the Texas Department of Transportation, or an online software application such as Google Earth to find the latitude and longitude.	
Latitude (in degrees, minutes, and nearest second (DDD:MM:SS)) for the street address or the destination point of the driving directions. Latitude is the angular distance of a location north of the equator and will always be between 25 and 37 degrees north (N) in Texas.	27°49'29"
Longitude (in degrees, minutes, and nearest second (DDD:MM:SS)) for the street address or the destination point of the driving directions. Longitude is the angular distance of a location west of the prime meridian and will always be between 93 and 107 degrees west (W) in Texas.	-97°11'44"
Is this a project for a lead smelter, concrete crushing facility, and/or a hazardous waste management facility?	No
B. General Information	
Site Name:	Ingleside Marine Terminal
Area Name: Must indicate the general type of operation, process, equipment or facility. Include numerical designations, if appropriate. Examples are Sulfuric Acid Plant and No. 5 Steam Boiler. Vague names such as Chemical Plant are not acceptable.	Ingleside Terminal
Are there any schools located within 3,000 feet of the site boundary?	No
C. Portable Facility	
Permanent or portable facility?	Permanent

D. Industry Type	
Principal Company Product/Business:	Petroleum Bulk Stations and Terminals
A list of SIC codes can be found at the link below: https://www.naics.com/sic-codes-industry-drilldown/	
Principal SIC code:	5171
NAICS codes and conversions between NAICS and SIC Codes are available at the link below: https://www.census.gov/eos/www/naics/	
Principal NAICS code:	
E. State Senator and Representative for this site	
This information can be found at the link below (note, the website is not compatible to Internet Explorer): https://wrm.capitol.texas.gov/	
State Senator:	Judith Zaffirini
District:	21
State Representative:	J. M. Lozano
District:	43

V. Project Information	
A. Description	
Provide a **brief** description of the project that is requested (describe the what, not the how and why). Limited to 500 characters.	Amendment to correct representations made in the original permit amendment application for the Expansion Project (TCEQ Project No. 284633), increase the total combined annual throughput of the barge and ship loading of crude oil and stabilized condensate, make other permit corrections, revise wording in special conditions, and incorporate permits by rule.
B. Project Timing	
Authorization must be obtained for many projects before beginning construction. Construction is broadly interpreted as anything other than site clearance or site preparation. Enter the date as "Month Date, Year" (e.g. July 4, 1776).	
Projected Start of Construction:	April 1, 2022
Projected Start of Operation:	April 1, 2022
C. Enforcement Projects	
Is this application in response to, or related to, an agency investigation, notice of violation, or enforcement action?	No
D. Operating Schedule	
Will sources in this project be authorized to operate 8760 hours per year?	Yes

VI. Application Materials	
All representations regarding construction plans and operation procedures contained in the permit application shall be conditions upon which the permit is issued. (30 TAC § 116.116)	
A. Confidential Application Materials	
Is confidential information submitted with this application?	No
B. Is the Core Data Form (Form 10400) attached (link to the form below)?	N/A

FHR's Exhibit E

C. Is a current area map attached?	Yes
Is the area map a current map with a true north arrow, an accurate graduated scale, the entire plant property, the location of the property relative to prominent geographical features including, but not limited to, highways, roads, streams, and significant landmarks such as buildings, residences, schools, parks, hospitals, day care centers, and churches?	Yes
Does the map show a 3,000-foot radius from the property boundary?	Yes
D. Is a plot plan attached?	Yes
Does your plot plan clearly show a north arrow, an accurate scale, all property lines, all emission points, buildings, tanks, process vessels, other process equipment, and two bench mark locations?	Yes
Does your plot plan identify all emission points on the affected property, including all emission points authorized by other air authorizations, construction permits, PBRs, special permits, and standard permits?	Yes
Did you include a table of emission points indicating the authorization type and authorization identifier, such as a permit number, registration number, or rule citation under which each emission point is currently authorized?	Yes
E. Is a process flow diagram attached?	Yes
Is the process flow diagram sufficiently descriptive so the permit reviewer can determine the raw materials to be used in the process; all major processing steps and major equipment items; individual emission points associated with each process step; the location and identification of all emission abatement devices; and the location and identification of all waste streams (including wastewater streams that may have associated air emissions)?	Yes
F. Is a process description attached?	Yes
Does the process description emphasize where the emissions are generated, why the emissions must be generated, what air pollution controls are used (including process design features that minimize emissions), and where the emissions enter the atmosphere?	Yes
Does the process description also explain how the facility or facilities will be operating when the maximum possible emissions are produced?	Yes
G. Is a detailed list of requested actions included in the application? This list can be included in the project description.	Yes
H. Are detailed calculations attached? Calculations must be provided for each source with new or changing emission rates. For example, a new source, changing emission factors, decreasing emissions, consolidated sources, etc. Calculations do not need to be submitted for sources without any proposed emission rate changes. Note: the preferred format is an electronic workbook (such as Excel) with all formulas viewable for review.	Yes
Are emission rates and associated calculations for planned MSS facilities and related activities attached?	Yes
I. Is a material balance (Table 2, Form 10155) attached?	Yes
Table 2 (Form 10155), entitled Material Balance: A material balance representation may be required for all applications to confirm technical emissions information. Typically this is required for refining and chemical manufacturing processes involving reactions, separations, and blending. It may also be requested by the permit reviewer for other applications. Table 2 should represent the total material balance; that is, all streams into the system and all streams out. Additional sheets may be attached if necessary. Complex material balances may be presented on spreadsheets or indicated using process flow diagrams. All materials in the process should be addressed whether or not they directly result in the emission of an air contaminant. All production rates must be based on maximum operating conditions.	
J. Is a list of MSS activities attached?	N/A
K. Is a discussion of state regulatory requirements attached, addressing 30 TAC Chapters 101, 111, 112, 113, 115, and 117?	Yes
For all applicable chapters, does the discussion include how the facility will comply with the requirements of the chapter?	Yes
For all not applicable chapters, does the discussion include why the chapter is not applicable?	Yes
L. Are all other required tables, calculations, and descriptions attached?	Yes

VII. Signature

The owner or operator of the facility must apply for authority to construct. The appropriate company official (owner, plant manager, president, vice president, or environmental director) must sign all copies of the application. The applicant's consultant cannot sign the application. **Important Note: Unless submitting through STEERS, signatures must be original in ink, not reproduced by photocopy, fax, or other means, and must be received before any permit is issued.**

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:	Bryan Ray
Signature:	
Original signature is required unless submitted through STEERS.	
Date:	

I. Additional Questions for Specific NSR Minor Permit Actions	
E. Concrete Batch Plants	
Is this a project for a concrete batch plant?	No

VIII. Federal Regulatory Questions	
Indicate if any of the following requirements apply to the proposed facility. Note that some federal regulations apply to minor sources. Enter all applicable Subparts.	
A. Title 40 CFR Part 60	
Do NSPS subpart(s) apply to a facility in this application?	Yes
List applicable subparts you will demonstrate compliance with (e.g. Subpart M)	Ka, Kb
B. Title 40 CFR Part 61	
Do NESHAP subpart(s) apply to a facility in this application?	No
C. Title 40 CFR Part 63	
Do MACT subpart(s) apply to a facility in this application?	No

IX. Emissions Review	
A. Impacts Analysis	
Any change that may result in an increase in off-property concentrations of air contaminants requires an air quality impacts demonstration, which may include a qualitative analysis, the MERA, and/or modeling. Information regarding the air quality impacts demonstration must be provided with the application and show compliance with all state and federal requirements. Detailed requirements for the information necessary to make the demonstration are listed on the Impacts sheet.	
Are there any increases in short-term and/or long-term allowable emission rates?	Yes
Can all the emission rate increases be attributed to speciation of currently authorized PM emissions and/or revisions of AP-42 or TCEQ guidance?	No
Are there any new or modified control devices or emission sources?	No
Are there any changes to emission point discharge parameters? Consider all parameters on the Stack Parameters sheet, including location.	No
Will any PBR registrations, standard permit, or standard exemptions be incorporated by consolidation?	Yes
Does this project require an impacts analysis?	Yes
Will off property impacts for any of the pollutants require Tier III Toxicology Effects Evaluation as defined in Appendix D of MERA?	No
B. Disaster Review	
If the proposed facility will handle sufficient quantities of certain chemicals which, if released accidentally, would cause off-property impacts that could be immediately dangerous to life and health, a disaster review analysis may be required as part of the application. Contact the appropriate NSR permitting section for assistance at (512) 239-1250. Additional Guidance can be found at the link below:	
https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/disrev-factsheet.pdf	
Does this application involve any air contaminants for which a disaster review is required?	No

FHR's Exhibit E

C. Air Pollutant Watch List	
Certain areas of the state have concentrations of specific pollutants that are of concern. The TCEQ has designated these portions of the state as watch list areas. Location of a facility in a watch list area could result in additional restrictions on emissions of the affected air pollutant(s) or additional permit requirements. The location of the areas and pollutants of interest can be found at the link below: https://www.tceq.texas.gov/toxicology/apwl/apwl.html	
Is the proposed facility located in a watch list area?	No

D. Mass Emissions Cap and Trade	
Is this facility located at a site within the Houston/Galveston nonattainment area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties)?	No

X. Additional Requirements	
A. Bulk Fuel Terminals	
Is this project for a bulk fuel terminal?	No
B. Plant Fuel Gas Facilities	
Does this site utilize plant fuel gas?	No

Texas Commission on Environmental Quality
Form PI-1 General Application
Unit Types - Emission Rates

Permit primary industry (must be selected for workbook to function)	Chemical / Energy

Action Requested (only 1 action per FIN)	Include these emissions in annual (tpy) summary?	Facility ID Number (FIN)	Emission Point Number (EPN)	Source Name	Pollutant	Current Short-Term (lb/hr)	Current Long-Term (tpy)	Consolidated Current Short-Term (lb/hr)	Consolidated Current Long-Term (tpy)	Proposed Short-Term (lb/hr)	Proposed Long-Term (tpy)	Short-Term Difference (lb/hr)	Long-Term Difference (tpy)	Unit Type (Used for reviewing BACT and Monitoring Requirements)
Not New/Modified	Yes	FWP	FWP-A	Fire Water Pump Engine	CO	0.85	0.04			0.85	0.04	0	0	Engine: Emergency, Diesel
					NOx	4.88	0.24			4.88	0.24	0	0	
					PM	0.34	0.02			0.34	0.02	0	0	
					PM10	0.34	0.02			0.34	0.02	0	0	
					PM2.5	0.34	0.02			0.34	0.02	0	0	
					SO2	0.01	<0.01			0.01	<0.01	0	0	
					VOC	0.1	0.01			0.1	0.01	0	0	
Not New/Modified	Yes	FWP	FWP-B	Fire Water Pump Engine	CO	0.85	0.04			0.85	0.04	0	0	Engine: Emergency, Diesel
					NOx	4.88	0.24			4.88	0.24	0	0	
					PM	0.34	0.02			0.34	0.02	0	0	
					PM10	0.34	0.02			0.34	0.02	0	0	
					PM2.5	0.34	0.02			0.34	0.02	0	0	
					SO2	0.01	<0.01			0.01	<0.01	0	0	
					VOC	0.1	0.01			0.1	0.01	0	0	
Not New/Modified	Yes	28082	TK-28082	Fire Water Pump Fuel Tank	VOC	0.03	0.01			0.03	0.01	0	0	Storage Tank (1): Fixed roof with capacity < 25,000 gal or TVP < 0.50 psia
Not New/Modified	Yes	28083	TK-28083	Fire Water Pump Fuel Tank	VOC	0.03	0.01			0.03	0.01	0	0	Storage Tank (1): Fixed roof with capacity < 25,000 gal or TVP < 0.50 psia
New/Modified	Yes	MVCU1	MVCU1	Marine Vapor Combustion Unit No. 1	CO	5.4	-			5.4	-	0	0	Control: Vapor Combustor
					H2S	0.06	-			0.06	-	0	0	
					NOx	4.14	-			4.14	-	0	0	
					SO2	11.4	-			11.78	-	0.38	0	
					PM	1.35	-			1.35	-	0	0	
					PM10	1.35	-			1.35	-	0	0	
					PM2.5	1.35	-			1.35	-	0	0	
					VOC	3.1	-			3.1	-	0	0	
New/Modified	Yes	MVCU2	MVCU2	Marine Vapor Combustion Unit No. 2	CO	5.4	-			5.4	-	0	0	Control: Vapor Combustor
					H2S	0.06	-			0.06	-	0	0	
					NOx	4.14	-			4.14	-	0	0	
					SO2	11.4	-			11.78	-	0.38	0	
					PM	1.35	-			1.35	-	0	0	
					PM10	1.35	-			1.35	-	0	0	
					PM2.5	1.35	-			1.35	-	0	0	
					VOC	3.1	-			3.1	-	0	0	
New/Modified	Yes	MVCU3	MVCU3	Marine Vapor Combustion Unit No. 3	CO	5.4	-			5.4	-	0	0	Control: Vapor Combustor
					H2S	0.06	-			0.06	-	0	0	
					NOx	4.14	-			4.14	-	0	0	
					SO2	11.4	-			11.78	-	0.38	0	
					PM	1.35	-			1.35	-	0	0	
					PM10	1.35	-			1.35	-	0	0	
					PM2.5	1.35	-			1.35	-	0	0	
					VOC	3.1	-			3.1	-	0	0	
New/Modified	Yes	MVCU1 / MVCU2 / MVCU3	MVCU1 / MVCU2 / MVCU3	Combined Annual Emission Limit for MVCUs	CO	-	25.2			-	34.01	0	8.81	Control: Vapor Combustor
					H2S	-	0.19			-	0.2	0	0.01	
					NOx	-	19.32			-	26.08	0	6.76	
					SO2	-	35.4			-	38.1	0	2.7	
					PM	-	6.3			-	8.5	0	2.2	
					PM10	-	6.3			-	8.5	0	2.2	
					PM2.5	-	6.3			-	8.5	0	2.2	
					VOC	-	10.89			-	14.7	0	3.81	
Remove	Yes	28063	TK-28063	Tank No. 28063	H2S	0.06	0.04			0	0	-0.06	-0.04	
					VOC	4.82	5.02			0	0	-4.82	-5.02	
Remove	Yes	28064	TK-28064	Tank No. 28064	H2S	0.08	0.05			0	0	-0.08	-0.05	
					VOC	5.04	5.71			0	0	-5.04	-5.71	
New/Modified	Yes	28067	TK-28067	Tank No. 28067	H2S	0.14	0.06			0.14	0.09	0	0.03	Storage Tank (4): Floating roof with TVP <11.0 psia
					VOC	9.83	9.2			21.09	9.2	11.26	0	
New/Modified	Yes	28068	TK-28068	Tank No. 28068	H2S	0.11	0.07			0.12	0.07	0.01	0	Storage Tank (4): Floating roof with TVP <11.0 psia
					VOC	8.56	7.66			18.53	7.66	9.97	0	
New/Modified	Yes	28069	TK-28069	Tank No. 28069	H2S	0.07	0.04			0.07	0.04	0	0	Storage Tank (4): Floating roof with TVP <11.0 psia
					VOC	7.98	5.84			17.95	5.84	9.97	0	
Remove	Yes	28070	TK-28070	Tank No. 28070	H2S	0.17	0.11			0	0	-0.17	-0.11	
					VOC	5.5	10.67			0	0	-5.5	-10.67	
New/Modified	Yes	28070R	TK-28070R	Tank No. 28070R	H2S	0	0	0.03	0.011	0.02	0.01	-0.01	-0.0009	Storage Tank (4): Floating roof with TVP <11.0 psia
					VOC	0	0	8.77	5.55	12.9	5.55	4.13	0	
New/Modified	Yes	28071	TK-28071	Tank No. 28071	H2S	0.09	0.05			0.09	0.06	0	0.01	Storage Tank (4): Floating roof with TVP <11.0 psia
					VOC	7.78	6			14.42	6	6.64	0	
New/Modified	Yes	28072	TK-28072	Tank No. 28072	H2S	0.13	0.08			0.13	0.09	0	0.01	Storage Tank (4): Floating roof with TVP <11.0
					VOC	8.32	7.71			14.97	7.71	6.65	0	
New/Modified	Yes	28073	TK-28073	Tank No. 28073	H2S	0.13	0.08			0.13	0.08	0	0	Storage Tank (4): Floating roof with TVP <11.0

Action Requested (only 1 action per FIN)	Include these emissions in annual (tpy) summary?	Facility ID Number (FIN)	Emission Point Number (EPN)	Source Name	Pollutant	Current Short-Term (lb/hr)	Current Long-Term (tpy)	Consolidated Current Short-Term (lb/hr)	Consolidated Current Long-Term (tpy)	Proposed Short-Term (lb/hr)	Proposed Long-Term (tpy)	Short-Term Difference (lb/hr)	Long-Term Difference (tpy)	Unit Type (Used for reviewing BACT and Monitoring Requirements)
					VOC	8.26	7.53			14.91	7.53	*6.65*	0	
New/Modified	Yes	28074	TK-28074	Tank No. 28074	H2S	0.13	0.08			0.14	0.09	*0.01*	*0.01*	Storage Tank (4): Floating roof with TVP <11.0
					VOC	8.37	7.89			15.02	7.89	*6.65*	0	
New/Modified	Yes	28075	TK-28075	Tank No. 28075	H2S	0.13	0.08			0.13	0.09	0	*0.01*	Storage Tank (4): Floating roof with TVP <11.0
					VOC	8.35	7.83			14.97	7.83	*6.62*	0	
New/Modified	Yes	28076	TK-28076	Tank No. 28076	H2S	0.13	0.08			0.14	0.09	*0.01*	*0.01*	Storage Tank (4): Floating roof with TVP <11.0
					VOC	8.35	7.82			15	7.82	*6.65*	0	
New/Modified	Yes	28077	TK-28077	Tank No. 28077	H2S	0.08	0.05			0.09	0.05	*0.01*	0	Storage Tank (4): Floating roof with TVP <11.0
					VOC	9.06	6.76			20.32	6.76	*11.26*	0	
New/Modified	Yes	28080	TK-28080	Tank No. 28080	H2S	0.13	0.08			0.13	0.09	0	*0.01*	Storage Tank (4): Floating roof with TVP <11.0
					VOC	8.32	7.72			14.97	7.72	*6.65*	0	
New/Modified	Yes	28086	TK-28086	Tank No. 28086	H2S	0.13	0.08			0.13	0.09	0	*0.01*	Storage Tank (4): Floating roof with TVP <11.0 psia
					VOC	7.96	7.56			14.26	7.56	*6.3*	0	
Not New/Modified	No	28063, 28064, 28067-28077, 28080, 28082, 28083, 28086	TANKGRP1	Annual Tank Emissions Cap for Tanks 28063, 28064, 28067-28077, 28080, 28082, 28083, 28086	VOC	-	83.59			-	67.74	0	**-15.85**	Storage Tank (4): Floating roof with TVP <11.0 psia
Not New/Modified	No	28087	TK-28087	Tank 28087	H2S	0.02	-			0.03	-	*0.01*	0	Storage Tank (4): Floating roof with TVP <11.0
					VOC	8.66	-			12.84	-	*4.18*	0	
Not New/Modified	No	28088	TK-28088	Tank 28088	H2S	0.02	-			0.03	-	*0.01*	0	Storage Tank (4): Floating roof with TVP <11.0
					VOC	8.66	-			12.84	-	*4.18*	0	
Not New/Modified	No	28089	TK-28089	Tank 28089	H2S	0.02	-			0.03	-	*0.01*	0	Storage Tank (4): Floating roof with TVP <11.0
					VOC	8.66	-			12.84	-	*4.18*	0	
Not New/Modified	No	28090	TK-28090	Tank 28090	H2S	0.02	-			0.03	-	*0.01*	0	Storage Tank (4): Floating roof with TVP <11.0
					VOC	8.66	-			12.84	-	*4.18*	0	
Remove	No	28091	TK-28091	Tank 28091	H2S	0.02	-			0	-	**-0.02**	0	
					VOC	8.66	-			0	-	**-8.66**	0	
Remove	No	28092	TK-28092	Tank 28092	H2S	0.02	-			0	-	**-0.02**	0	
					VOC	8.66	-			0	-	**-8.66**	0	
Not New/Modified	No	28087, 28088, 28089, 28090, 28091, 28092	TANKGRP2	Annual Tank Emission Cap for Tanks 28087, 28088, 28089, 28090, 28091, 28092	H2S	-	0.05			-	0.03	0	**-0.02**	Storage Tank (4): Floating roof with TVP <11.0 psia
					VOC	-	10.24			-	9.02	0	**-1.22**	
New/Modified	No	FUG-1	FUG-1	Terminal Fugitives	H2S	0.02	0.02			0.1	0.09	*0.08*	*0.07*	Fugitives: Piping and Equipment Leak
					VOC	0.3	1.3	0.012	0.047	1.27	5.56	*0.958*	*4.213*	
New/Modified	Yes	DOCK	DOCK	Ship and Barge Loading Dock	VOC	6.38	6.36			6.38	8.58	0	*2.22*	Loading: Marine Vessel
					H2S	0.02	0.02			0.02	0.02	0	0	
												0	0	
												0	0	

Emission Point Discharge Parameters													
EPN	**Included in EMEW?**	**UTM Coordinates Zone**	**East (Meters)**	**North (Meters)**	**Building Height (ft)**	**Height Above Ground (ft)**	**Stack Exit Diameter (ft)**	**Velocity (FPS)**	**Temperature (°F)**	**Fugitives - Length (ft)**	**Fugitives - Width (ft)**	**Fugitives - Axis Degrees**
FWP-A		14	677498	3078832		26	0.67	120	701			
FWP-B		14	677501	3078832		26	0.67	120	701			
TK-28082	No	14	677497	3078833			0.0033	0.0033	ambient			
TK-28083	No	14	677500	3078834			0.0033	0.0033	ambient			
MVCU1	Yes											
MVCU2	Yes											
MVCU3	Yes											
MVCU1 / MVCU2 / MVCU3	Yes											
TK-28063	No											
TK-28064	No											
TK-28067	No	14	677282	3078947		48	0.0033	0.0033	ambient			
TK-28068	No	14	677350	3079115		48	0.0033	0.0033	ambient			
TK-28069	No	14	677397	3079233		48	0.0033	0.0033	ambient			
TK-28070	No											
TK-28070R	No	14	677423	3078862		62.7	0.0033	0.0033	ambient			
TK-28071	No	14	677467	3078971		56	0.0033	0.0033	ambient			
TK-28072	No	14	677504	3079069		56	0.0033	0.0033	ambient			
TK-28073	No	14	677580	3079278		56	0.0033	0.0033	ambient			
TK-28074	No	14	677595	3078939		56	0.0033	0.0033	ambient			
TK-28075	No	14	677681	3079167		55	0.0033	0.0033	ambient			
TK-28076	No	14	677723	3079280		55	0.0033	0.0033	ambient			
TK-28077	No	14	677450	3079389		48	0.0033	0.0033	ambient			
TK-28080	No	14	677542	3079168		56	0.0033	0.0033	ambient			
TK-28086	No	14	677624	3079380		48	0.0033	0.0033	ambient			
TANKGRP1	No											
TK-28087	No	14	677645	3079076		56	0.0033	0.0033	ambient			
TK-28088	No	14	677757	3079360		56	0.0033	0.0033	ambient			
TK-28089	No	14	677690	3079465		56	0.0033	0.0033	ambient			
TK-28090	No	14	677145	3078858		56	0.0033	0.0033	ambient			
TK-28091	No											
TK-28092	No											
TANKGRP2	No											
FUG-1	No	14	677059	3078752		5				600	600	
DOCK	No	14	677329	3078616		16	0.0033	0.0033	ambient			

I. Public Notice Applicability	
A. Application Type	
Is this an application for a minor permit amendment?	Yes
Is there any change in character of emissions in this application (such as a new VOC or PM species)?	No
Is there a new air contaminant in this application (such as a newly emitted or newly quantified criteria pollutant)?	No

B. Project Increases and Public Notice Thresholds (for Initial and Amendment Projects)

For public notice applicability, the agency does not include consolidation or incorporation of any previously authorized facility or activity (PBR, standard permits, etc.), changes to permitted allowable emission rates when exclusively due to changes to standardized emission factors, or reductions in emissions which are not enforceable through the amended permit. Thus, the total emissions increase would be the sum of emissions increases under the amended permit and the emissions decreases under the amended permit for each air contaminant.

The table below will generate emission increases based on the values represented on the "Unit Types - Emission Rates" sheet. Use the "yes" and "no" options in column B of the "Unit Types - Emission Rates" worksheet to indicate if a unit's proposed change of emissions should be included in these totals.

Notes:

1. Emissions of PM, PM10, and/or PM2.5 may have been previously quantified and authorized as PM, PM10,and/or PM2.5. These emissions will be speciated based on current guidance and policy to demonstrate compliance with current standards and public notice requirements may change during the permit review.

This row is optional. If you do not think the table below accurately represents public notice applicability increases for your project, provide discussion here (1000 characters).	
Do the facilities handle, load, unload, dry, manufacture, or process grain, seed, legumes, or vegetable fibers (agricultural facilities)?	No

Pollutant	**Current Long-Term (tpy)**	**Consolidated Emissions (tpy)**	**Proposed Long-Term (tpy)**	**Project Change in Allowable (tpy)**	**PN Threshold**	**Notice required?**
VOC	128.21	5.55	118.39	-15.37	5	No
PM	6.34	0.00	8.54	2.20	5	No
PM_{10}	6.34	0.00	8.54	2.20	5	No
$PM_{2.5}$	6.34	0.00	8.54	2.20	5	No
NO_x	19.80	0.00	26.56	6.76	5	Yes
CO	25.28	0.00	34.09	8.81	50	No
SO_2	35.42	0.00	38.12	2.70	10	No
Pb	0.00	0.00	0.00	0.00	0.6	No
H2S	1.24	0.011	1.16	-0.091	5	No

FHR's Exhibit E

* Notice is required for PM, PM10, and PM2.5 if one of these pollutants is above the threshold.

** Notice of a GHG action is determined by action type. Initial and major modification always require notice. Voluntary updates require a consolidated notice if there is a change to BACT. Project emission increases of CO2e (CO2 equivalent) are not relevant for determining public notice of GHG permit actions.

D. Is public notice required for this project as represented in this PI-1? If no, proceed to Section III Small Business Classification. Note: public notice applicability for this project may change throughout the technical review.	Yes
E. Are any HAPs to be authorized/re-authorized with this project? The category "HAPs" must be specifically listed in the public notice if the project authorizes (reauthorizes for renewals) any HAP pollutants.	No

II. Public Notice Information

Complete this section if public notice is required (determined in the above section) or if you are not sure if public notice is required.

A. Contact Information

Enter the contact information for the **person responsible for publishing.** This is a designated representative who is responsible for ensuring public notice is properly published in the appropriate newspaper and signs are posted at the facility site. This person will be contacted directly when the TCEQ is ready to authorize public notice for the application.

Prefix (Mr., Ms., Dr., etc.):	Mr.
First Name:	Andy
Last Name:	Saenz
Title:	Regional Manager, Public Affairs
Company Name:	Koch Companies Public Sector, LLC
Mailing Address:	P.O. Box 2608
Address Line 2:	
City:	Corpus Christi
State:	TX
ZIP Code:	78403
Telephone Number:	(361) 242-8772
Fax Number:	(404) 749-9273
Email Address:	andy.saenz@kochps.com

Enter the contact information for the **Technical Contact.** This is the designated representative who will be listed in the public notice as a contact for additional information.

Prefix (Mr., Ms., Dr., etc.):	Mr.
First Name:	Andy
Last Name:	Saenz
Title:	Regional Manager, Public Affairs
Company Name:	Koch Companies Public Sector, LLC
Mailing Address:	P.O. Box 2608
Address Line 2:	
City:	Corpus Christi
State:	TX
ZIP Code:	78403
Telephone Number:	(361) 242-8772
Fax Number:	(404) 749-9273
Email Address:	andy.saenz@kochps.com

FHR's Exhibit E

B. Public place

Place a copy of the full application (including the entire completed PI-1 and all attachments) at a public place in the county where the facilities are or will be located. You must state where in the county the application will be available for public review and comment. The location must be a public place and described in the notice. A public place is a location which is owned and operated by public funds (such as libraries, county courthouses, city halls) and cannot be a commercial enterprise. You are required to pre-arrange this availability with the public place indicated below. The application must remain available from the first day of publication through the designated comment period.

If this is an application for a PSD, nonattainment, or FCAA §112(g) permit, the public place must have internet access available for the public as required in 30 TAC § 39.411(f)(3).

If the application is submitted to the agency with information marked as Confidential, you are required to indicate which specific portions of the application are not being made available to the public. These portions of the application must be accompanied with the following statement: ***Any request for portions of this application that are marked as confidential must be submitted in writing, pursuant to the Public Information Act, to the TCEQ Public Information Coordinator, MC 197, P.O. Box 13087, Austin, Texas 78711-3087.***

Name of Public Place:	Ingleside Public Library
Physical Address:	2775 Waco St.
Address Line 2:	
City:	Ingleside
ZIP Code:	78362
County:	San Patricio
Has the public place granted authorization to place the application for public viewing and copying?	Yes

C. Alternate Language Publication

In some cases, public notice in an alternate language is required. If an elementary or middle school nearest to the facility is in a school district required by the Texas Education Code to have a bilingual program, a bilingual notice will be required. If there is no bilingual program required in the school nearest the facility, but children who would normally attend those schools are eligible to attend bilingual programs elsewhere in the school district, the bilingual notice will also be required. If it is determined that alternate language notice is required, you are responsible for ensuring that the publication in the alternate language is complete and accurate in that language.

Is a bilingual program required by the Texas Education Code in the School District?	Yes
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
If yes to either question above, list which language(s) are required by the bilingual program.	Spanish
Enter the second required language, if applicable.	
Enter the third required language, if applicable.	
Enter the fourth required language, if applicable.	

III. Small Business Classification

Complete this section to determine small business classification. If a small business requests a permit, agency rules (30 TAC § 39.603(f)(1)(A)) allow for alternative public notification requirements if all of the following criteria are met. If these requirements are met, public notice does not have to include publication of the prominent (12 square inch) newspaper notice.

Does the company (including parent companies and subsidiary companies) have fewer than 100 employees or less than $6 million in annual gross receipts?	No
Small business classification:	**No**

FHR's Exhibit E

I. County Classification	
Does the project require retrospective review?	No
County (completed for you from your response on the General sheet)	San Patricio
This project will be located in an area that is in attainment for ozone as of Sept. 23, 2019. Select from the drop-down list to the right if you would like the project to be reviewed under a different classification.	
Determination:	**This project will be located in an area that is in attainment or unclassified for all pollutants. Nonattainment review is not required.**

II. PSD and GHG PSD Applicability Summary	
Is netting required for the PSD analysis for this project?	**No**

Pollutant	**Project Increase**	**Threshold**	**PSD Review Required?**
CO	8.81	100	No
NO_x	6.76	40	No
PM	2.2	25	No
PM_{10}	2.2	15	No
$PM_{2.5}$	2.2	10	No
SO_2	38.1	40	No
Ozone (as VOC)	34.54	40	No
Ozone (as NOx)	6.76	40	No
H_2S	0.22	10	No

FHR's Exhibit E

I. Expedited Permitting Request	
Are you requesting to expedite this project?	No

II. General Information - Non-Renewal	
Is this project for new facilities controlled and operated directly by the federal government? (30 TAC § 116.141(b)(1) and 30 TAC § 116.163(a))	No
A fee of $75,000 shall be required if no estimate of capital project cost is included with the permit application. (30 TAC § 116.141(d)) Select "yes" here to use this option.	No
Select Application Type	Minor Application

III. Direct Costs - Non-Renewal	
Type of Cost	**Amount**
Process and control equipment not previously owned by the applicant and not currently authorized under this chapter.	$0.00
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.	$0.00
Freight charges.	$0.00
Site preparation, including demolition, construction of fences, outdoor lighting, road, and parking areas.	$0.00
Installation, including foundations, erection of supporting structures, enclosures or weather protection, insulation and painting, utilities and connections, process integration, and process control equipment.	$0.00
Auxiliary buildings, including materials storage, employee facilities, and changes to existing structures.	$0.00
Ambient air monitoring network.	$0.00
Sub-Total:	$0.00

IV. Indirect Costs - Non-Renewal	
Type of Cost	**Amount**
Final engineering design and supervision, and administrative overhead.	$0.00
Construction expense, including construction liaison, securing local building permits, insurance, temporary construction facilities, and construction clean-up.	$0.00
Contractor's fee and overhead.	$0.00
Sub-Total:	$0.00

FHR's Exhibit E

V. Calculations - Non-Renewal		
For GHG permits: 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. Identify these other fees in the GHG PSD permit application.		
In signing the "General" sheet with this fee worksheet attached, 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.		
Estimated Capital Cost	**Minor Application Fee**	
Less than $300,000	$900 (minimum fee)	
$300,000 - $7,500,000	N/A	
$300,000 - $25,000,000	0.30% of capital cost	
Greater than $7,500,000	N/A	
Greater than $25,000,000	$75,000 (maximum fee)	

Your estimated capital cost:	**$0.00**	Minimum fee applies.
Permit Application Fee:	**$900.00**	

VII. Total Permit Fees	
Note: fees can be paid together with one payment or as two separate payments.	
Non-Renewal Fee	$900.00
Total	$900.00

VIII. Payment Information	
A. Payment One (required)	
Was the fee paid online?	Yes
Enter the fee amount:	$ 900.00
Enter the check, money order, ePay Voucher, or other transaction number (enter "STEERS" if submitting and paying through STEERS):	STEERS
Enter the Company name as it appears on the check:	
C. Total Paid	**$900.00**

IX. Professional Engineer Seal Requirement	
Is the estimated capital cost of the project above $2 million?	No
Is the application required to be submitted under the seal of a Texas licensed P.E.? Note: an electronic PE seal is acceptable.	No

FHR's Exhibit E

Pollutant	Does this pollutant require PSD review?	How will you demonstrate that this project meets all applicable requirements?	Notes	Additional Notes (optional)
VOC	No	MERA analysis, steps 0-2 only or using screening tables	Attach a detailed description of which MERA step was met for each species in the project. Include speciated emission rates with the total VOC and/or PM species corresponding to the short-term and long-term differences represented on the Unit Types-Emission Rates sheet.	
CO	No	Not applicable	This pollutant is not a part of this project or does not require an impacts analysis.	
NOx	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
PM	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
PM10	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
PM2.5	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
SO2	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	

Pollutant	**Does this pollutant require PSD review?**	**How will you demonstrate that this project meets all applicable requirements?**	**Notes**	**Additional Notes (optional)**
H2S	No	Not applicable	This pollutant is not a part of this project or does not require an impacts analysis.	

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
New/Modified	MVCU1	Control: Vapor Combustor	CO	See Additional Notes:	Yes	Maintaining good combustion practices.
			H_2S	See Additional Notes:	Yes	Minimizing the amount of H_2S in the crude oil being loaded. At least 98% of the H_2S is converted to SO_2 through combustion.
			NO_x	See Additional Notes:	Yes	NOxSTAR vapor combustion system with emissions less than 0.023 lb/MMBtu.
			SO_2	See Additional Notes:	Yes	SO_2 emissions from the Charge Gas Heater are minimized by combusting sweet natural gas or plant fuel gas with a maximum concentration of 5 grains of sulfur/100 dscf.
			PM	The emission reduction techniques for PM_{10} and $PM_{2.5}$ will follow the technique for PM. See Additional Notes:	Yes	Maintaining good combustion practices.
			VOC	99% destruction efficiency. Monitor temperature. Perform initial test.	Yes	
			MSS	Same as normal operation BACT requirements.	Yes	
New/Modified	MVCU2	Control: Vapor Combustor	CO	See Additional Notes:	Yes	Maintaining good combustion practices.
			H_2S	See Additional Notes:	Yes	Minimizing the amount of H_2S in the crude oil being loaded. At least 98% of the H_2S is converted to SO_2 through combustion.
			NO_x	See Additional Notes:	Yes	NOxSTAR vapor combustion system with emissions less than 0.023 lb/MMBtu.
			SO_2	See Additional Notes:	Yes	SO_2 emissions from the Charge Gas Heater are minimized by combusting sweet natural gas or plant fuel gas with a maximum concentration of 5 grains of sulfur/100 dscf.
			PM	The emission reduction techniques for PM_{10} and $PM_{2.5}$ will follow the technique for PM. See Additional Notes:	Yes	Maintaining good combustion practices.
			VOC	99% destruction efficiency. Monitor temperature. Perform initial test.	Yes	
			MSS	Same as normal operation BACT requirements.	Yes	
New/Modified	MVCU3	Control: Vapor Combustor	CO	See Additional Notes:	Yes	Maintaining good combustion practices.
			H_2S	See Additional Notes:	Yes	Minimizing the amount of H_2S in the crude oil being loaded. At least 98% of the H_2S is converted to SO_2 through combustion.
			NO_x	See Additional Notes:	Yes	NOxSTAR vapor combustion system with emissions less than 0.023 lb/MMBtu.
			SO_2	See Additional Notes:	Yes	SO_2 emissions from the Charge Gas Heater are minimized by combusting sweet natural gas or plant fuel gas with a maximum concentration of 5 grains of sulfur/100 dscf.
			PM	The emission reduction techniques for PM_{10} and $PM_{2.5}$ will follow the technique for PM. See Additional Notes:	Yes	Maintaining good combustion practices.
			VOC	99% destruction efficiency. Monitor temperature. Perform initial test.	Yes	
			MSS	Same as normal operation BACT requirements.	Yes	
New/Modified	MVCU1 / MVCU2 / MVCU3	Control: Vapor Combustor	CO	See Additional Notes:	Yes	Maintaining good combustion practices.
			H_2S	See Additional Notes:	Yes	Minimizing the amount of H_2S in the crude oil being loaded. At least 98% of the H_2S is converted to SO_2 through combustion.
			NO_x	See Additional Notes:	Yes	NOxSTAR vapor combustion system with emissions less than 0.023 lb/MMBtu.
			SO_2	See Additional Notes:	Yes	SO_2 emissions from the Charge Gas Heater are minimized by combusting sweet natural gas or plant fuel gas with a maximum concentration of 5 grains of sulfur/100 dscf.

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
			PM	The emission reduction techniques for PM10 and PM2.5 will follow the technique for PM. See Additional Notes:	Yes	Maintaining good combustion practices.
			VOC	99% destruction efficiency. Monitor temperature. Perform initial test.	Yes	
			MSS	Same as normal operation BACT requirements.	Yes	
New/Modified	28067	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28067 is an internal floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white.
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.	Yes	
New/Modified	28068	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28068 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28068 has gasketted slotted guide poles with floats, pole wipers and pole sleeves.
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.	Yes	
New/Modified	28069	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28069 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28069 has gasketted slotted guide poles with pole wipers and pole sleeves.

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.	Yes	
New/Modified	28070R	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28070R is an internal floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white.
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
New/Modified	28071	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28071 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28071 has gasketted slotted guide poles with pole wipers and pole sleeves.
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		
New/Modified	28072	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28072 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28072 has gasketted slotted guide poles with floats, pole wipers and pole sleeves.

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		
New/Modified	28073	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28073 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28073 has gasketted slotted guide poles with floats, pole wipers and pole sleeves.

FHR's Exhibit E

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		
New/Modified	28074	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28074 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28074 has gasketted slotted guide poles with floats, pole wipers and pole sleeves.
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
New/Modified	28075	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28075 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28075 has gasketted slotted guide poles with floats, pole wipers and pole sleeves.
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		
New/Modified	28076	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28076 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28076 has gasketted slotted guide poles with floats, pole wipers and pole sleeves.

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		
New/Modified	28077	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28077 is an internal floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white.

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		
New/Modified	28080	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28080 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28080 has gasketted slotted guide poles with floats, pole wipers and pole sleeves.
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		

FHR's Exhibit E

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
New/Modified	28086	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	See Additional Notes:	Yes	There is no BACT specified for H2S in storage tanks. H2S emissions are determined based on VOC emissions and the tank meets BACT for VOC emissions. Therefore, BACT is also satisfied for H2S emissions.
			VOC	Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).	Yes	Tank 28086 is an external floating-roof tank with a mechanical-shoe primary seal and a rim mounted secondary seal. Exterior surfaces exposed to the sun are uninsulated and painted white. Tank 28086 has gasketted slotted guide poles with floats, pole wipers and pole sleeves.
			MSS	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		
New/Modified	FUG-1	Fugitives: Piping and Equipment Leak	H2S	AVO inspection twice per shift. Appropriate credit for AVO program.	Yes	
			VOC	Specify which is applicable: 1. Uncontrolled VOC emissions < 10 tpy: none 2. 10 tpy < uncontrolled VOC emissions < 25 tpy: 28M leak detection and repair program. 75% credit for 28M. 3. Uncontrolled VOC emissions > 25 tpy: 28VHP leak detection and repair program. 97% credit for valves, 85% for pumps and compressors. 4. VOC vp < 0.002 psia: no inspection required, no fugitive emissions expected. For emissions of approved odorous compounds (chlorine, ammonia, hydrogen sulfide, hydrogen cyanide and mercaptans only): AVO inspection twice per shift. Appropriate credit for AVO program.	Yes	Because uncontrolled VOC emissions are greater than 25 tpy after changing emission factors, FHR will implement the 28VHP LDAR monitoring program.

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
			MSS	Same as normal operation BACT requirements.		
New/Modified	DOCK	Loading: Marine Vessel	VOC	VOC >= 0.5 psia: Route to VOC control device and meet the specific control device requirements. Vessel leak testing: the marine vessel must pass an annual vapor tightness test as specified in 40 CFR §63.565(c) or 40 CFR §61.304(f). During loading of inerted marine vessels, the owner or operator of the marine terminal or of the marine vessel shall conduct AVO checks for leaks once every 8 hours for on-shore equipment and on board the vessel. The pressure at the vapor collection connection and the loading rate must be monitored and recorded. See Marine Terminal Guidance dated September 21, 2016 for emission factors for ship-side emissions. Federal Coast Guard Regulation require ocean-going vessels to be inerted. Therefore, ocean-going vessels cannot use vacuum loading.	Yes	
			H2S	See Additional Notes:	Yes	Minimizing the amount of H2S in the crude oil being loaded. H2S emissions are collected at an efficiency of 99.9% and routed to a vapor combustor where 98% is converted to SO2.
			MSS	Same as normal operation BACT requirements.	Yes	

FIN	Unit Type	Pollutant	Minimum Monitoring Requirements	Confirm	Additional Notes for Monitoring
MVCU1	Control: Vapor Combustor	CO	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		H2S	Continuous Exhaust Temperature Monitoring recorded in six minute averages.	Yes	FHR monitors the concentration of H2S in the crude oil loaded.
		NOx	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		SO2	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel and the amount of sulfur in the natural gas.
		PM	The emission monitoring techniques for PM10 and PM2.5 will follow the technique for PM. Continuous Exhaust Temperature Monitoring recorded in six minute averages. Visible emissions monitoring quarterly	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel and the amount of sulfur in the natural gas.
		VOC	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
MVCU2	Control: Vapor Combustor	CO	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		H2S	Continuous Exhaust Temperature Monitoring recorded in six minute averages.	Yes	FHR monitors the concentration of H2S in the crude oil loaded.
		NOx	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		SO2	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel and the amount of sulfur in the natural gas.
		PM	The emission monitoring techniques for PM10 and PM2.5 will follow the technique for PM. Continuous Exhaust Temperature Monitoring recorded in six minute averages. Visible emissions monitoring quarterly	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		VOC	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.

MVCU3	Control: Vapor Combustor	CO	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		H2S	Continuous Exhaust Temperature Monitoring recorded in six minute averages.	Yes	FHR monitors the concentration of H2S in the crude oil loaded.
		NOx	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		SO2	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel and the amount of sulfur in the natural gas.
		PM	The emission monitoring techniques for PM10 and PM2.5 will follow the technique for PM. Continuous Exhaust Temperature Monitoring recorded in six minute averages. Visible emissions monitoring quarterly.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		VOC	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
MVCU1 / MVCU2 /	Control: Vapor Combustor	CO	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		H2S	Continuous Exhaust Temperature Monitoring recorded in six minute averages.	Yes	FHR monitors the concentration of H2S in the crude oil loaded.
		NOx	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		SO2	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel and the amount of sulfur in the natural gas.
		PM	The emission monitoring techniques for PM10 and PM2.5 will follow the technique for PM. Continuous Exhaust Temperature Monitoring recorded in six minute averages. Visible emissions monitoring quarterly.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.
		VOC	Continuous Exhaust Temperature Monitoring recorded in six minute averages. Waste gas flow monitor or operation record that provides flow by design.	Yes	FHR also monitors the amount of natural gas used for supplemental/pilot fuel.

28067	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	
28068	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	
28069	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	

28070R	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	
28071	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	
28072	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	

28073	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	
28074	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	
28075	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	

28076	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	
28077	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	
28080	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	

28086	Storage Tank (4): Floating roof with TVP <11.0 psia	H2S	Monitor H2S concentration in crude oil and oil vapor annually or within 60 days of changing the oil, whichever is more frequent.	Yes	
		VOC	Monitor and record throughput by material stored to record a monthly average. Monitor and record the monthly average temperature for each material stored if material or tank is heated.	Yes	
FUG-1	Fugitives: Piping and Equipment Leak	H2S	Look for leaks twice per shift using audio, visual or olfactory (AVO) senses to observe leaks. Record results and corrective action taken.	Yes	
		VOC	Use EPA Method 21 to monitor for leaks from seals on pumps, compressors, agitator and valve seals on piping components in light liquid and gas VOC service quarterly. Gas or hydraulic check new and a replaced connectors prior to returning to service, or monitor with Method 21 within 15 days of returning to service. Leak detection and repair (LDAR) Program 28M has a leak definition where repair action is required at 10,000 ppmv. LDAR Program 28 VHP has a leak definition where repair action is required at 500 ppmv for valves and connectors and 2000 ppmv for pumps, compressors and agitators. Check connectors weekly using audio, visual or olfactory (AVO) senses to observe leaks. Record results and corrective action taken.	Yes	
DOCK	Loading: Marine Vessel	VOC	Temperature and Hourly volume loaded for each product. Observation for connection leaks. . Where vapor routed to control, copy of annual vessel vapor tightness certification. Where 99% or greater capture claimed AVO check of vessel tanks for leaks and pressure monitoring of cargo tank. Vacuum monitoring for 100% capture, not required for pressure vessel loading. Ship loading testing required for non vacuum >99% capture claims.	Yes	

		H2S	Volume of each product loaded each hour with knowledge of H2S content.	Yes	

Item	How submitted	Date submitted
A. Administrative Information		
Form PI-1 General Application	STEERS	
Hard copy of the General sheet with original (ink) signature	Not applicable	
Professional Engineer Seal	Not applicable	
B. General Information		
Copy of current permit (both Special Conditions and MAERT)		
Core Data Form	Not applicable	
Area map	STEERS	
Plot plan	STEERS	
Process description	STEERS	
Process flow diagram	STEERS	
List of MSS activities		
State regulatory requirements discussion	STEERS	
C. Federal Applicability		
Summary and project emission increase determination - Tables 1F and 2F	STEERS	
Netting analysis (if required) - Tables 3F and 4F as needed	Not applicable	
D. Technical Information		
BACT discussion, if additional details are attached	STEERS	
Monitoring information, if additional details are attached	Not applicable	
Material Balance (if applicable)	Not applicable	
Calculations	STEERS	
E. Impacts Analysis		
Qualitative impacts analysis	Not applicable	
MERA analysis	STEERS	
EMEW: SCREEN3	Not applicable	
EMEW: NonSCREEN3	STEERS	
PSD modeling protocol	Not applicable	
F. Additional Attachments		

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EXECUTIVE SUMMARY

Flint Hills Resources Ingleside, LLC (FHR) owns and operates a marine terminal handling crude oil and condensate in Ingleside, Texas. The marine loading terminal is operated under NSR Permit No. 6606. With this amendment application, FHR is proposing to make as-built changes to the original permit amendment application for the Expansion Project, increase the total combined annual throughput of the barge and ship loading of crude oil and stabilized condensate as part of a new separate project, make other permit corrections, revise wording in special conditions, and incorporate permits by rule. The previous amendment of Permit No. 6606 authorizing the Expansion Project was issued by TCEQ in October 2020 (TCEQ Project No. 314930). The as-built changes for the past Expansion Project include correcting representations made in that application and adding changes that should have been included in that application.

Representation Corrections for the Past Expansion Project

Tanks 28087, 28088, 28089, 28090, 28091, and 28092 (EPNs TK-28087, TK-28088, TK 28089, TK-28090, TK-28091, TK-28092) were new tanks authorized as part of the Expansion Project. FHR is correcting the tank deck fittings for Tanks 28087, 28088, 28089, and 28090 (EPNs TK-28087, TK-28088, TK 28089, TK-28090) based on as-built configurations. The correction to the tank deck fittings results in a decrease in emissions. Tanks 28091 and 28092 (EPNs TK-28091 and TK-28092) are being removed from Permit No. 6606 since they were never constructed.

As part of the Expansion Project, the maximum hourly loading throughput at the marine loading terminal was increased to 60,000 bbl/hr. With the maximum hourly loading throughput at 60,000 bbl/hr for the marine loading operation, the maximum throughput for new Tanks 28087, 28088, 28089, and 28090 should have been based on the maximum withdrawal rate of 60,000 bbl/hr rather than 40,000 bbl/hr. Therefore, with this application, FHR is revising the hourly emissions rate calculations for Tanks 28087, 28088, 28089, and 28090 to be based on the maximum withdrawal rate of 60,000 bbl/hr.

FHR is correcting the number of new fugitive piping components (EPN FUG-1) installed as part of the Expansion Project, which results in a correction to the total number of fugitive components at the site. The correction to the number of new fugitive piping components results in a decrease in emissions. However, FHR is also correcting the emission factors for the fugitive piping component emissions calculations, which were previously calculated using petroleum marketing terminal emission factors. Per TCEQ's request and TCEQ's fugitive guidance document (APDG 6422, June 2018), FHR is correcting the emission factors to the oil and gas productions operations factors. In addition, FHR will be implementing the 28VHP LDAR monitoring program at the Ingleside Terminal, so the emission calculations are being corrected to reflect the 28VHP control efficiencies.

FHR is revising the PSD applicability analysis for the Expansion Project to reflect these corrections. See the PSD section in this application for additional details and the revised analysis.

Revised application pages from the original amendment application with updated representations are provided in the Emissions Calculations section and any corrections to representations are highlighted in yellow.

Additional Changes for the Past Expansion Project

As mentioned above, the maximum hourly loading throughput at the marine loading terminal was increased to 60,000 bbl/hr as part of the Expansion Project. The hourly emission rates in Permit No. 6606 for existing Tanks 28067, 28068, 28069, 28071, 28072, 28073, 28074, 28075, 28076, 28077, 28080, and 28086 are currently based on the maximum fill rate for each tank. TCEQ's guidance document for estimating short-term emission rates from floating roof tanks dated February 2020 states that the greater of the maximum fill rate or maximum withdrawal rate should be used as the maximum throughput for internal floating roof tanks, and the maximum withdrawal rate should be used as the maximum throughput for external floating roof tanks. With the maximum hourly loading throughput at 60,000 bbl/hr for the marine loading operation, the maximum throughput for all of the existing tanks should have been revised to be based on the maximum withdrawal rate of 60,000 bbl/hr. Therefore, with this application, FHR is revising the hourly emission rate calculations for existing Tanks 28067, 28068, 28069, 28070R, 28071, 28072, 28073, 28074, 28075, 28076, 28077, 28080, and 28086 to be based on the maximum withdrawal rate of 60,000 bbl/hr.

The annual H_2S emission rates for these same existing tanks are being revised to be based on a K factor of 24 rather than a K factor of 22 in order to be consistent with the H_2S calculations for Tanks 28087, 28088, 28089, and 28090 from the Expansion Project.

New Proposed Project: Increase in Total Combined Annual Throughput

In 2019, The Port of Corpus Christi announced plans to deepen the Corpus Christi Channel to a depth capable of accommodating the transit of fully laden Very Large Crude Carrier Vessels by end of year 2022. This deepening dredge project will allow larger vessels to be loaded at the Ingleside Terminal. Therefore, FHR is proposing to increase the total combined throughput of the barge and ship loading of crude oil and stabilized condensate from 138,700,000 barrels to 187,200,000 barrels per rolling twelve months. FHR is not proposing to increase the hourly loading throughputs nor proposing any new construction as part of this project. The annual loading emissions calculations will be based on the increased annual loading rate which will increase the annual uncollected emissions from the ship and barge loading dock (EPN DOCK) as well as the annual controlled emissions from the three marine vapor combustion units (EPNs MVCU1, MVCU2, and MVCU3).

Other Permit Corrections

Tanks 28063, 28064, 28070 (EPNs TK-28063, TK-28064, TK-28070) are being removed from Permit No. 6606 since they are permanently out of service and will be demolished.

The emission rates on the Maximum Allowable Emission Rate Table (MAERT) for Tanks 28071 and 28075 (EPNs TK-28071 and TK-28075) do not reflect the emission rates authorized in the Expansion Project. The H_2S emission rates for Tank 28071 and the VOC emission rates for

Tank 28075 proposed on the Table 1(a) submitted as part of the Expansion Project were not reflected on the MAERT that was issued by TCEQ in October 2020 for the Expansion Project (TCEQ Project No. 314930). A copy of the Table 1(a) submitted with the Expansion Project is included in Appendix A. Note: the emission rates were corrected on the draft MAERT reviewed by FHR and submitted to TCEQ on November 30, 2019. In this amendment application, FHR is using the emission rates from the Table 1(a) as the currently authorized emission rates in TCEQ's PI-1 workbook and the tables in the Emissions Calculations section.

FHR is quantifying existing SO_2 emissions from the sulfur in the natural gas used as supplemental and pilot fuel at the MVCUs, and adding these emission rates to the currently authorized SO_2 emissions from crude oil vapors generated from the loading operation.

FHR is decreasing the annual averaging H_2S concentration in the crude oil and condensate loaded at the dock from 19 to 15 ppmw based on sampling of the H_2S in the crude oil. The maximum hourly H_2S concentration of 19 ppmw will remain unchanged.

Revisions to Special Conditions

Per AP-42, Chapter 7 methodology, emissions from floating roof tanks are based on withdrawal rate. From TCEQ guidance, emissions from internal floating roof tanks are based on the higher of the maximum fill rate or maximum withdrawal rate, and emissions from external floating roof tanks are based on the maximum withdrawal rate. Because FHR is revising the maximum hourly throughput for all tanks to a withdrawal rate of 60,000 bbl/hr with this amendment application, FHR is proposing to revise Special Condition No. 6 to specify a withdrawal rate versus a maximum fill rate.

FHR is also proposing to change the H_2S sampling frequency from twice monthly to annually based on sampling frequencies in NSR permits of other facilities that store crude oil. FHR proposes the following changes in red:

6. This permit authorizes the storage of crude oil and stabilized condensate in all floating roof storage tanks and refined fuel products with a vapor pressure less than crude oil, such as naphtha, diesel, No. 6 oil and coker gas oil. Storage of other chemicals is prohibited unless prior authorization for such storage is obtained. Only four floating roof storage tanks may be ~~filled~~ **emptied** at the represented maximum ~~fill~~ **withdrawal** rate at any given time.

   Crude oil and stabilized condensate stored in tanks at the Ingleside Terminal shall be limited to hydrogen sulfide (H_2S) concentrations of 100 ppmw on an annual average basis and 500 ppmw on an hourly basis. Compliance with the H_2S concentration limits shall be demonstrated by sampling the material in each tank ~~twice monthly~~ **annually**, using Lead Acetate Paper (LAP) Test.

In Special Condition No. 8, FHR is requesting to replace EPN MVCU with EPNs MVCU1, MVCU2, and MVCU3 as a result of the amendment of Permit No. 6606 for the Expansion Project issued by TCEQ in January 2019 (TCEQ Project No. 284633). As part of that project, the original marine vapor combustion unit at the site was replaced by three new marine vapor combustion units.

FHR's Exhibit E

FHR is proposing to revise Special Condition No. 14 to allow for connections between the Dock Safety Unit discharge flange and the vacuum blower liquid knockout pot inlet flange that are needed to perform MSS activities. FHR proposes the following changes in red:

> 14. A pressure monitoring device shall be installed at the common point of the vapor collection system between the liquid knockout pot and the vacuum blowers to continuously measure pressure in the non-inerted vessel loading vapor collection system during loading of crude oil and stabilized condensate with a maximum true vapor pressure equal to and greater than 0.50 psia. The vapor collection piping will be all welded between the Dock Safety Unit discharge flange and the vacuum blower liquid knockout pot inlet flange **with the exception of flanged connections necessary to perform periodic MSS activities**. A blower system shall be installed which will produce a vacuum in the loading system...

Similar to the revision to Special Condition No. 6, FHR is requesting to revise Attachment A to specify a withdrawal rate of 66,000 bbl/hr versus the maximum fill rates in the table for crude oil and stabilized condensate since the maximum withdrawal rate of 66,000 bbl/hr is higher than the maximum fill rates for the tanks listed in Attachment A.

Permit by Rule Incorporation

With this amendment application, FHR is incorporating PBR Registrations No. 160536 and 161793 in Permit No. 6606. PBR Registration No. 160536 was issued on April 8, 2020 and authorized new fugitive piping components that were associated with the projects undertaken during the 2019 calendar year. PBR Registration No. 161793 was issued on July 13, 2020 and authorized a new domed floating roof storage tank (EPN TK-28070R) to replace Tank 28070 and the associated fugitive piping components (EPN FUG-1). With this amendment application, FHR is revising the maximum hourly emission rates to be based on a maximum withdrawal rate of 60,000 bbl/hr to be consistent with the changes to maximum throughput being made in this application for the other tanks at the site.

SUMMARY OF PROPOSED CHANGES

FIN	EPN	Description	Proposed Changes	Is there a Physical Change or Change in Method of Operation Causing an Emission Increase?	Minor NSR Source Type	PSD Source Type
28063	TK-28063	Tank 28063	- Tank is being removed from the permit since it is permanently out of service and will be demolished.	No	N/A	N/A
28064	TK-28064	Tank 28064	- Tank is being removed from the permit since it is permanently out of service and will be demolished.	No	N/A	N/A
28070	TK-28070	Tank 28070	- Tank has been replaced by Tank 28070R and is being removed from the permit.	No	N/A	N/A
28070R	TK-28070R	Tank 28070R	- New tank as a result of incorporating PBR Registration No. 161793. The tank replaced Tank 28070. - Revising the maximum hourly throughput to be based on a maximum withdrawal rate of 60,000 bbl/hr to be consistent with changes being made to other tanks in this application.	Yes	Modified for state purposes only as a result of increased hourly throughput	N/A

SUMMARY OF PROPOSED CHANGES

FIN	EPN	Description	Proposed Changes	Is there a Physical Change or Change in Method of Operation Causing an Emission Increase?	Minor NSR Source Type	PSD Source Type
28067, 28068, 28069, 28071, 28072, 28073, 28074, 28075, 28076, 28077, 28080, 28086	TK-28067, TK-28068, TK-28069, TK-28071, TK-28072, TK-28073, TK-28074, TK-28075, TK-28076, TK-28077, TK-28080, TK-28086	Tank 28067, Tank 28068, Tank 28069, Tank 28071, Tank 28072, Tank 28073, Tank 28074, Tank 28075, Tank 28076, Tank 28077, Tank 28080, Tank 28086	- As-built change associated with the Expansion Project. Revising the maximum hourly throughput of the existing tanks to be based on a maximum withdrawal rate of 60,000 bbl/hr based on the maximum loading throughput of 60,000 bbl/hr at the marine terminal authorized in the Exapnsion Project. - Revising H_2S annual emissions to be based on a K factor of 24 instead of a K factor of 22.	Yes	Modified in the Expansion Project for state purposes only as a result of increasing the hourly throughput	Affected Upstream in the Expansion Project as a result of an increase in the actual annual throughput within currently authorized rates
TANKGRP1	TANKGRP1	Annual Tank Emission Cap for Tanks 28067-28077, 28080, 28082, 28083, 28086	- Revising the annual VOC emission cap to reflect the removal of Tanks 28063 and 28064 and the replacement of Tank 28070 with Tank 28070R.	No	N/A	N/A

SUMMARY OF PROPOSED CHANGES

FIN	EPN	Description	Proposed Changes	Is there a Physical Change or Change in Method of Operation Causing an Emission Increase?	Minor NSR Source Type	PSD Source Type
28087, 28088, 28089, 28090	TK-28087, TK-28088, TK-28089, TK-28090	Tank 28087, Tank 28088, Tank 28089, Tank 28090	- As-built correction associated with the Expansion Project. Correcting tank deck fittings based on as-built configurations for the new tanks constructed as part of the Expansion Project. - As-built correction associated with the Expansion Project. Revising the maximum hourly throughput of the tanks to be based on a maximum withdrawal rate of 60,000 bbl/hr based on the maximum loading throughput of 60,000 bbl/hr at the marine terminal authorized in the Expansion Project.	Yes	New as part of past Expansion Project. No change in BACT from that project.	New as part of Expansion Project. Revising PSD analysis for that project.
28091	TK-28091	Tank 28091	- As-built correction associated with the Expansion Project. Tank was never constructed and is being removed from the permit.	No	N/A	New as part of past Expansion Project. Revising PSD analysis for that project.

SUMMARY OF PROPOSED CHANGES

FIN	EPN	Description	Proposed Changes	Is there a Physical Change or Change in Method of Operation Causing an Emission Increase?	Minor NSR Source Type	PSD Source Type
28092	TK-28092	Tank 28092	- As-built correction associated with the Expansion Project. Tank was never constructed and is being removed from the permit.	No	N/A	New as part of past Expansion Project. Revising PSD analysis for that project.
DOCK	DOCK, MVCU1, MVCU2, MVCU3	Marine Loading Operation	- Change associated with new proposed project. Increasing the annual loading rate from 138,700,000 bbl/yr to 187,200,000 bbl/yr. - Quantifying existing SO_2 emissions from sulfur contained in the natural gas used for supplemental fuel and pilot gas at the MVCUs. - Decreasing the annual average H_2S concentration in the crude oil and condensate from 19 to 15 ppmw.	Yes	Modified	Modified

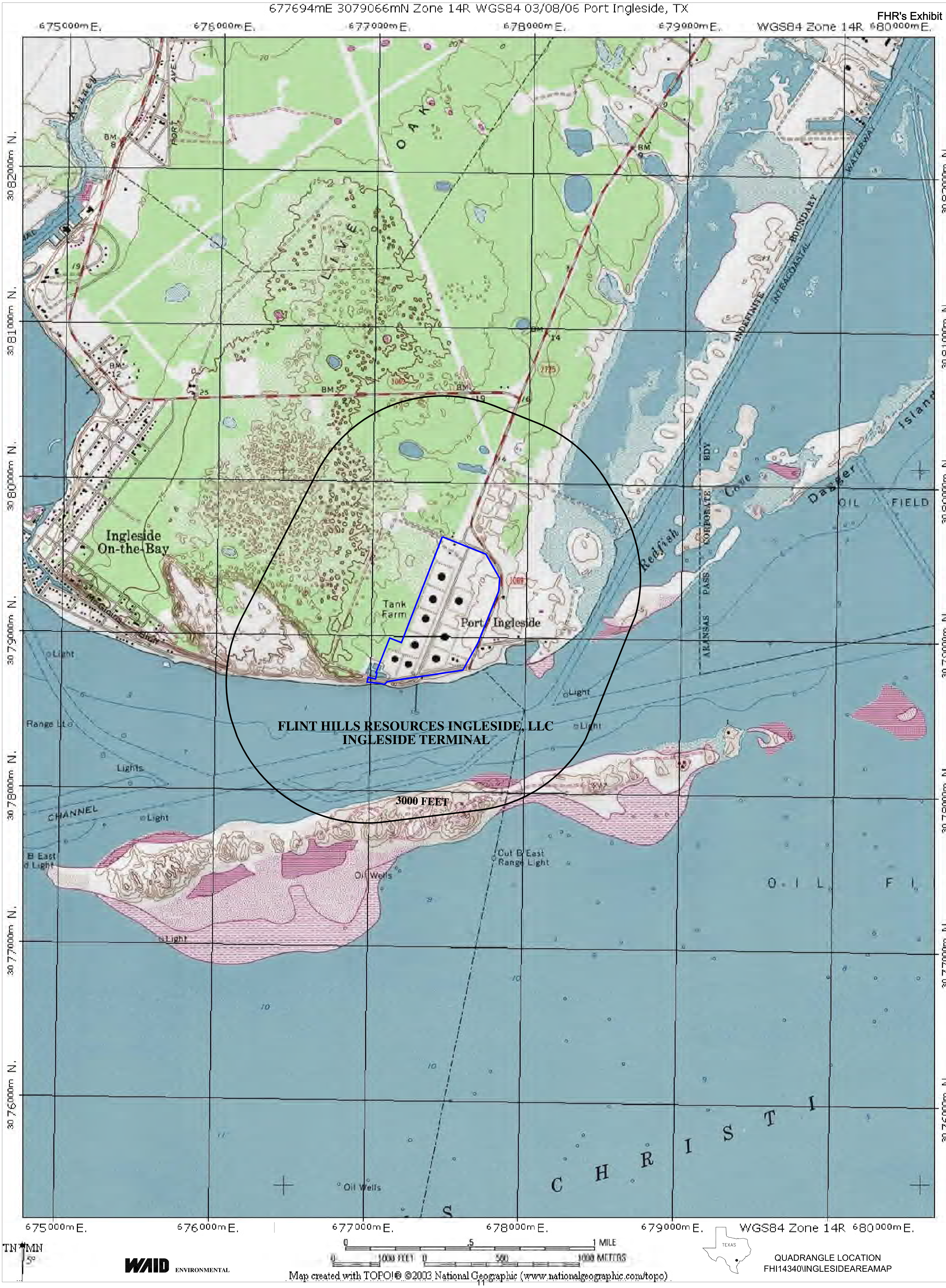
FHR's Exhibit E

SUMMARY OF PROPOSED CHANGES

FIN	EPN	Description	Proposed Changes	Is there a Physical Change or Change in Method of Operation Causing an Emission Increase?	Minor NSR Source Type	PSD Source Type
FUG-1	FUG-1	Terminal Fugitives	- As-built correction associated with the Expansion Project. Correcting the number of new fugitive piping components installed as part of the Expansion Project. - Correcting emission calculations to reflect Oil and Gas Production fugitive emission factors rather than Petroleum Marketing Terminal emission factors. - Correcting emission calculations to reflect 28VHP LDAR monitoring program that the site will be implementing. - Incorporation of PBR Registrations No. 160536 and 161793, which authorized increases in VOC emissions from the installation of additional fugitive piping components.	Yes	New as part of past Expansion Project. Revising BACT analysis for that project. BACT provided for new fugitive components authorized by PBR.	New as part of past Expansion Project. Revising PSD analysis for that project.
Existing Crude Oil/ Condensate Storage Tanks	Existing Crude Oil/ Condensate Storage Tanks	Existing Crude Oil/ Condensate Storage Tanks in Permit No. 6606	- Change associated with new proposed project. Increase in actual annual emissions above past actual emissions as a result of an increase in the actual annual throughput within currently authorized rates as a result of increasing the annual loading rate of the marine loading operation with this amendment application.	No	N/A	Affected Upstream

AREA MAP

FHR's Exhibit E



WAID ENVIRONMENTAL

Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)

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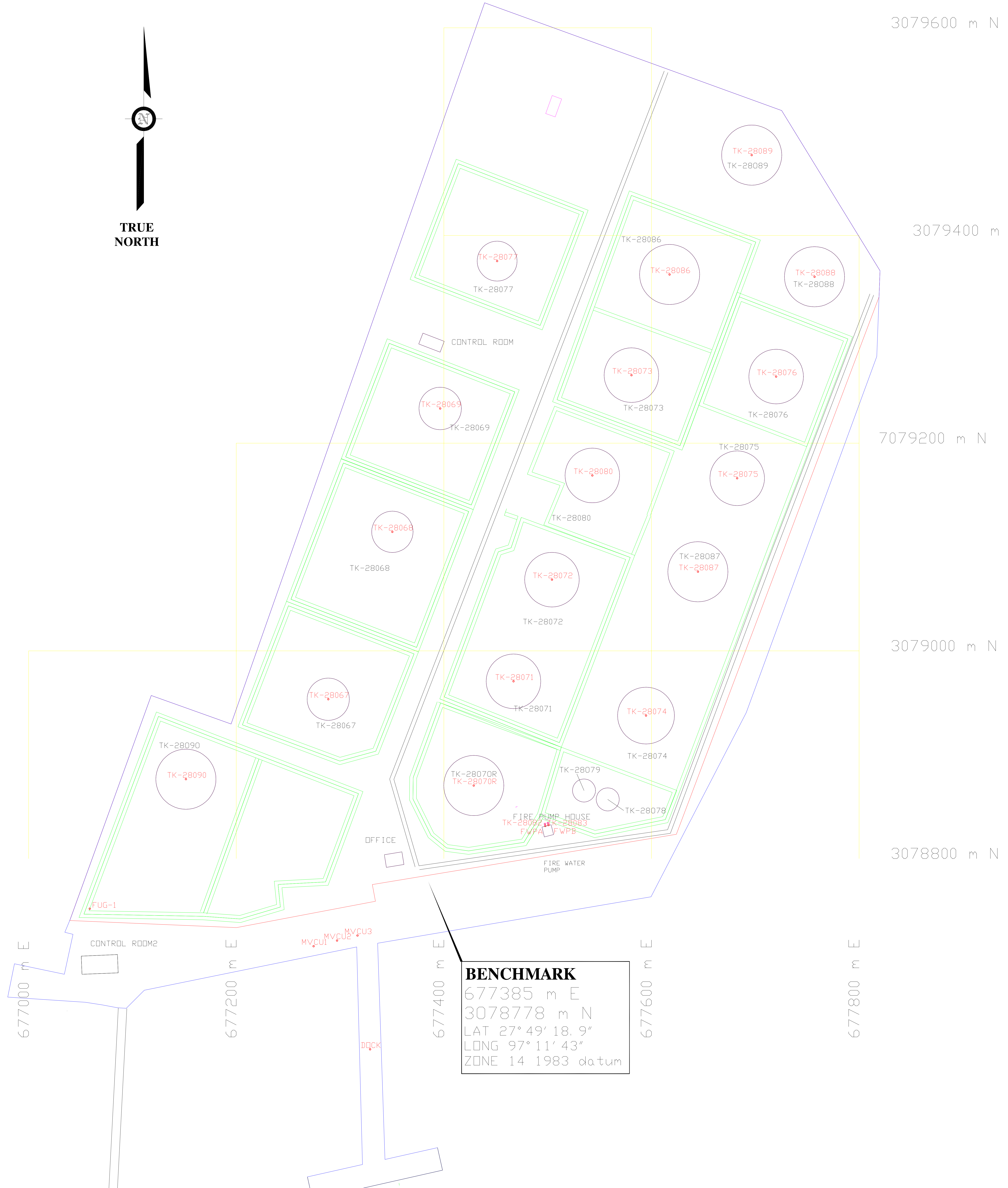
PLOT PLAN



Downwash Structure Name	Height (feet)	Height (meters)	Dimensions (meters)	
CONTROL ROOM	16.0	4.88	21.97 ×	11.24
CONTROL ROOM2	16.0	4.88	34.83 ×	17.61
FIRE PUMP HOUSE	16.0	4.88	9.10 ×	9.80
OFFICE	16.0	4.88	17.13 ×	12.36
TK-28067	48.0	14.63	Diameter	40.69
TK-28068	48.0	14.63	Diameter	39.83
TK-28069	48.0	14.63	Diameter	40.92
TK-28070R	62.7	19.11	Diameter	57.91
TK-28071	56.0	17.07	Diameter	52.59
TK-28072	56.0	17.07	Diameter	52.59
TK-28073	56.0	17.07	Diameter	52.59
TK-28074	56.0	17.07	Diameter	54.74
TK-28075	55.0	16.76	Diameter	52.59
TK-28076	55.0	16.76	Diameter	52.59
TK-28077	48.0	14.63	Diameter	38.42
TK-28078	40.0	12.19	Diameter	22.19
TK-28079	40.0	12.19	Diameter	22.19
TK-28080	56.0	17.07	Diameter	52.59
TK-28086	48.0	14.63	Diameter	57.90
TK-28087	56.0	17.07	Diameter	57.91
TK-28088	56.0	17.07	Diameter	57.91
TK-28089	56.0	17.07	Diameter	57.91
TK-28090	56.0	17.07	Diameter	57.91

Emission Point Number	Emission Point Name	Location Easting, Northing (meters)
DOCK	SHIP AND BARGE LOADING DOCK	677329, 3078616
FUG-1	TERMINAL FUGITIVES	677059, 3078752
FWPA	FIREWATER PUMP A	677498, 3078832
FWPB	FIREWATER PUMP B	677501, 3078832
MVCU1	MARINE VAPOR COMBUSTION UNIT 1	677275, 3078716
MVCU2	MARINE VAPOR COMBUSTION UNIT 2	677297, 3078721
MVCU3	MARINE VAPOR COMBUSTION UNIT 3	677317, 3078726
TK-28067	TANK 28067	677289, 3078953
TK-28068	TANK 28068	677350, 3079115
TK-28069	TANK 28069	677397, 3079233
TK-28070R	TANK 28070R	677429, 3078870
TK-28071	TANK 28071	677467, 3078971
TK-28072	TANK 28072	677504, 3079069
TK-28073	TANK 28073	677581, 3079266
TK-28074	TANK 28074	677595, 3078938
TK-28075	TANK 28075	677683, 3079166
TK-28076	TANK 28076	677720, 3079264
TK-28077	TANK 28077	677451, 3079375
TK-28080	TANK 28080	677543, 3079169
TK-28082	FIREWATER PUMP TANK	677497, 3078833
TK-28083	FIREWATER PUMP TANK	677500, 3078834
TK-28086	TANK 28086	677618, 3079362
TK-28087	TANK 28087	677645, 3079076
TK-28088	TANK 28088	677757, 3079360
TK-28089	TANK 28089	677697, 3079477
TK-28090	TANK 28090	677152, 3078876

0 100 200 400

SCALE IN METERS

WAID ENVIRONMENTAL

FLINT HILLS RESOURCES INGLESIDE, LLC

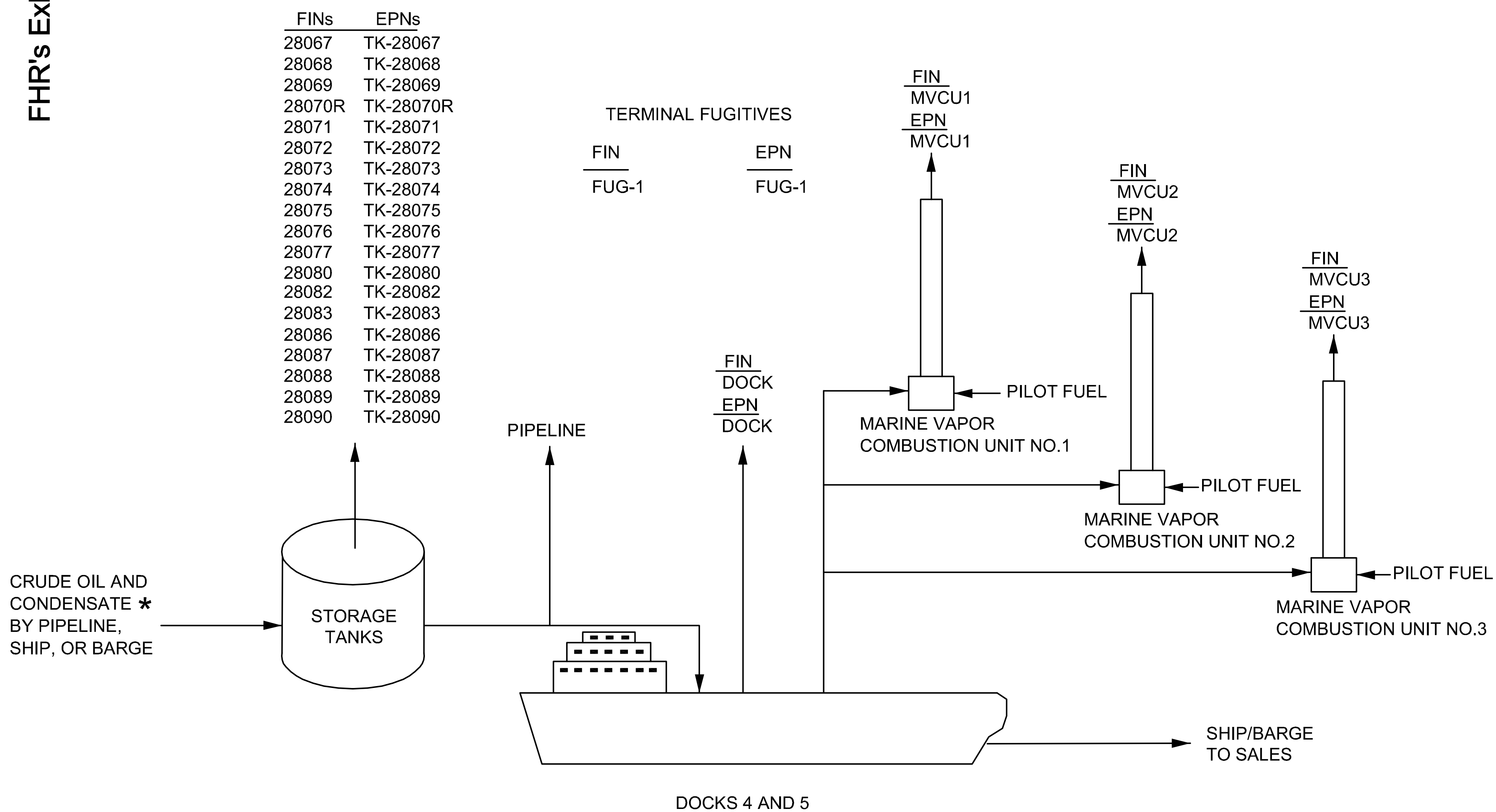
INGLESIDE PLOT PLAN

Drawn By	Start Date	Rev. Date	DWG Name	Rev. No.
DWW	7/15/98	2/25/21	INGLSIDE	28

H:\CLIENTS\FLINT HILL INGLESIDE\FHI4817\ACAD

PROCESS FLOW DIAGRAM

FHR's Exhibit E



* TERMINAL MAY ALSO HANDLE REFINED PRODUCTS WITH VAPOR PRESSURE LESS THAN CRUDE OIL.

WAID ENVIRONMENTAL

FLINT HILLS RESOURCES INGLESIDE, LLC

INGLESIDE TERMINAL PROCESS FLOW DIAGRAM

Drawn By	Start Date	Rev. Date	DWG Name	Rev. No.
DWW	2/11/21	3/9/21	FLOW	3

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PROCESS DESCRIPTION

Flint Hills Resources Ingleside, LLC (FHR) owns and operates a marine terminal handling crude oil and condensate in Ingleside, Texas. Existing equipment at the terminal includes ship and barge docks for loading and unloading crude oil and condensate, storage tanks, three marine vapor combustion units, and ancillary equipment. Crude oil and condensate are received at the terminal via marine dock or via pipeline and exit the terminal via marine dock or pipeline. Additionally, refined fuel products with vapor pressure less than crude oil, such as naphtha, diesel, No. 6 oil, and coker gas oil may be stored in existing tanks at the terminal. These refined fuel products are received at the terminal via marine dock or via pipeline and exit the terminal via pipeline. There is no tank truck loading and no tank truck unloading at the terminal.

EMISSIONS CALCULATIONS

Storage Tanks (EPNs TK-28067, TK-28068, TK-28069, TK-28070R, TK-28071, TK-28072, TK-28073, TK-28074, TK-28075, TK-28076, TK-28077, TK-28080, TK-28086, TK-28087, TK-28088, TK-28089, 28090, TK-28091, TK-28092)

Tanks 28087, 28088, 28089, 28090, 28091, and 28092 were new tanks proposed as part of the past Expansion Project. Tanks 28091 and 28092 were never constructed and are being removed from the permit with this amendment application. FHR is correcting the tank deck fittings for Tanks 28087, 28088, 28089, and 28090 (EPNs TK-28087, TK-28088, TK 28089, TK-28090) based on as-built configurations. FHR is also revising the maximum hourly throughput to be based on a withdrawal rate of 60,000 bbl/hr to be consistent with the maximum hourly throughput authorized for the marine loading operation as part of the past Expansion Project.

FHR is revising the maximum hourly throughput Tanks 28067, 28068, 28069, 28071, 28072, 28073, 28074, 28075, 28076, 28077, 28080, and 28086 to be based on a withdrawal rate of 60,000 bbl/hr to be consistent with the maximum hourly throughput authorized for the marine loading operation as part of the past Expansion Project. The maximum hourly throughputs currently authorized for each tank are based on the maximum fill rates which are less than 60,000 bbl/hr.

VOC annual emission rates from Tanks 28087, 28088, 28089, and 28090 are estimated using the AP-42 Section 7 emission estimation methodology. Short-term VOC emission rates for all tanks are calculated based on the TCEQ's Guidance Document for Floating Roof Storage Tanks dated February 2020.

Maximum hourly and annual H_2S emissions from the tanks are estimated based on a maximum H_2S short-term concentration of 500 ppmw in the crude oil and condensate, and an annual average H_2S concentration of 100 ppmw. The K factor method from "Using K Factors to Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids" by Jeffrey Meling, Karen Horne, and Jay Hoover is used for the calculations. The standing loss calculation assumes H_2S emissions occur due to evaporation so a vapor phase concentration is calculated based on the liquid H_2S concentration and the partition coefficient (K-factor). Therefore, K factors are used to estimate the H_2S emissions from the rim seal, deck seam and deck fitting losses. A K factor of 24, which is based on a temperature of 85ºF, is used for the annual emission rate calculations. A K factor of 27, which is based on a temperature of 95ºF, is used for the hourly emission rate calculations. Withdrawal losses are calculated based on the H_2S weight fraction in the liquid. The withdrawal loss calculation assumes that all of H_2S contained in the crude oil clinging to the wall of the tank as the roof goes down flashes off. FHR is revising the annual grouped H_2S emission limit for the four tanks based on the revised annual grouped VOC emissions from the four tanks. Note: Annual H_2S emissions for Tanks 28067, 28068, 28069, 28071, 28072, 28073, 28074, 28075, 28076, 28077, 28080, and 28086 were previously based on a K factor of 22 and are being revised with this amendment to be based on the K factor of 24.

Annual Tank Cap for Tanks 28087, 28088, 28089, and 28090 (EPN TANKGRP2)

As part of the past Expansion Project, an annual grouped VOC emission limit was established for the new proposed Tanks 28087, 28088, 28089, 28090, 28091, and 28092. FHR is revising this annual grouped VOC emission limit to reflect the removal of Tanks 28091 and 28092 and the corrections to deck fittings for Tanks 28087, 28088, 28089, and 28090. The grouped annual VOC emission limit is based on a maximum combined/total throughput of 66,000,000 bbl/yr for all four tanks going through any one of the four tanks. Emission rates are calculated for each tank at this maximum total throughput. The grouped annual VOC emission limit is calculated by adding the rim seal losses, deck fitting losses, and deck seam losses from each tank to the maximum withdrawal loss from any one tank at the maximum combined/total throughput.

Annual Tank Cap for Tanks 28067-28077, 28080, 28082, 28083, 28086 (EPN TANKGRP1)

Permit No. 6606 includes an annual tank emission cap for Tanks 28063, 28064, 28067-28077, 28080, 28082, 28083, and 28086 (EPN TANKGRP1). FHR is revising this annual VOC emission cap to reflect multiple changes included in this application. FHR is removing Tanks 28063 and 28064 from the emission cap since they have been permanently shut down and are being removed from the permit. FHR is removing Tank 28070 from the emission cap and replacing it with Tank 28070R, which was authorized by PBR Registration No. 161793. FHR is requesting to change the name of EPN TANKGRP1 to include Tanks 28082 and 28083, which have been represented in the emission cap in past applications.

Marine Loading (EPNs DOCK, MVCU1, MVCU2, MVCU3)

VOC emissions from the marine loading operation are estimated using equation (1) from AP-42, Fifth Edition, Section 5.2, with the saturation factor of 0.2 for submerged loading of ships. The maximum hourly and annual VOC emissions from the marine loading operation are based on a crude oil/condensate TVP of 10.9 psia and 9.28 psia, respectively. Because the temperature in equation (1) of AP-42, Fifth Edition, Section 5.2 is in the denominator, a worst case emission rate is calculated at lower temperatures. Therefore, FHR is estimating hourly and annual emission rates from the loading operation at temperatures of 80ºF and 73.5ºF, respectively, although temperatures during loading could be higher. The three MVCUs have an annual grouped VOC emission limit and an individual hourly VOC emission limit for each of the three MVCUs. The hourly VOC emissions for each MVCU is based on a marine loading rate of 20,000 bbl/hr. FHR is not proposing any changes to the these hourly loading rates. The grouped annual VOC emission limit for the MVCUs is based on the proposed total loading rate of 187,200,000 bbl/yr. Uncaptured dock fugitive VOC emissions (EPN DOCK) are based on a collection efficiency of 99.9% based on recent testing. Because the collection efficiency has been demonstrated to be between 99.9% and 100%, and to conservatively estimate emissions, FHR is calculating controlled VOC emissions from the MVCUs based on a collection efficiency of 100% and a control efficiency of 99.9%. Hourly NO_X and CO emissions from the MVCUs are estimated based on vendor emission factors and the maximum firing capacities of the MVCUs during any one hour of the loading period. The annual NO_X and CO grouped emission limits for the MVCUs are estimated based on vendor emission factors and the total firing capacity of the MVCUs over the entire year. Hourly particulate matter and VOC emissions from combustion are estimated based on the maximum firing capacities of the MVCUs during any one hour of the loading period and emission factors from AP-42 (5th Ed.), Section 1.4 dated March 1998. The annual particulate and VOC emissions from combustion are estimated based on the total firing capacity of the MVCUs over the entire year and emission factors from AP-42 (5th Ed.), Section 1.4 dated March 1998.

Maximum hourly and annual H_2S emissions from the marine loading operation are estimated based on the concentration in the crude oil and condensate. The emissions are currently based on a maximum H_2S short-term concentration of 19 ppmw, and an annual average H_2S concentration of 19 ppmw. With this application, FHR is proposing to revise the annual average H_2S concentration to 15 ppmw. The K factor method from “Using K Factors to Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids” by Jeffrey Meling, Karen Horne, and Jay Hoover is used for the calculations. A K factor of 24, which is based on a temperature of 85ºF, is used for the annual emission rate calculations. A K factor of 27, which is based on a temperature of 95ºF, is used for the hourly emission rate calculations. Uncaptured dock fugitive H_2S emissions are based on the collection efficiency of 99.9%. H_2S emissions from the MVCUs are conservatively based on a collection efficiency of 100% and 99% conversion of H_2S to SO_2 during combustion of the marine loading vapors. The SO_2 emissions from the MVCUs are conservatively based on a collection efficiency of 100% and 100% conversion from H_2S to SO_2 during combustion of the marine loading vapors. With the application, FHR is quantifying existing SO_2 emissions from the sulfur in the natural gas used for supplemental and pilot fuel. Hourly SO_2 emission rate estimates from the combustion of natural gas are based on a sulfur content of 5 gr S/100 scf from fuel specifications. Annual SO_2 emission rate estimates from the combustion of natural gas are based on a sulfur content of 0.5 gr S/100 scf from fuel sampling.

Equipment Fugitives (EPN FUG-1)

FHR is correcting the number of new fugitive piping components (EPN FUG-1) installed as part of the Expansion Project, which also results in a correction to the total number of fugitive components at the site. FHR is also correcting the VOC fugitive emissions calculations to reflect oil and gas production emissions factors rather than the petroleum marketing terminal emissions factors and the control efficiencies for a 28VHP LDAR monitoring program that the site will be implementing. H_2S emissions are based on the same K factor method as storage tanks (concentrations of 500 ppmw on an hourly basis and 100 ppmw on an annual basis).

PBR Registrations Being Incorporated into the Permit (EPNs TK-28070R, FUG-1)

FHR is incorporating PBR Registrations No. 160536 and 161793 into Permit No. 6606. PBR Registration No. 161793 authorized Tank 28070R as a replacement tank for Tank 28070, which has been demolished and is being removed from the permit. Calculations for Tank 28070R from the PBR registration are provided at the end of this section, and the annual emission rates authorized in that PBR registration are being proposed as the maximum allowable emission rates in the permit. FHR is revising the maximum hourly emission rates for Tank 28070R to be based on a maximum throughput of 60,000 bbl/hr rather than 40,000 bbl/hr in the PBR registration to be consistent with the changes being made to other tanks in this application. PBR Registrations No. 160536 and 161793 authorized new fugitive piping components. In the PBR registrations, the emission rate calculations used petroleum marketing emission factors rather than oil and gas production emission factors. Rather than add the emission rates authorized by the PBR registrations to the total VOC emission rate for EPN FUG-1, FHR is adding the fugitive component counts authorized in each of the PBR registrations to the total fugitive component counts for the terminal and calculating a total emission rate based on the oil and gas production emission factors and the control efficiencies for the 28VHP LDAR monitoring program the site will be implementing. In addition, the speciation for these new fugitive components will be changing to the general speciation used for the terminal fugitive piping components. The VOC emission rate calculations are based on emission factors and control efficiencies from TCEQ's fugitive guidance document dated June 2018. H_2S emissions were not estimated in either PBR registrations but are being estimated in this application based on the same concentrations as storage tanks: 500 ppmw (hourly) and 100 ppmw (annual). Calculations for the fugitive piping components authorized in the two PBR registrations are provided at the end of this section.

FHR's Exhibit E

			NO_X						CO					
			Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates		Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates	
FIN	EPN	Description	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
DOCK, MVCU1	MVCU1	Marine Vapor Combustion Unit No. 1	4.14		4.14		0.00		5.40		5.40		0.00	
DOCK, MVCU2	MVCU2	Marine Vapor Combustion Unit No. 2	4.14	19.32	4.14	26.08	0.00	6.76	5.40	25.20	5.40	34.01	0.00	8.81
DOCK, MVCU3	MVCU3	Marine Vapor Combustion Unit No. 3	4.14		4.14		0.00		5.40		5.40		0.00	
DOCK	DOCK	Ship and Barge Loading Dock												
28063	TK-28063	Tank No. 28063												
28064	TK-28064	Tank No. 28064												
26067	TK-28067	Tank No. 28067												
26068	TK-28068	Tank No. 28068												
26069	TK-28069	Tank No. 28069												
28070	TK-28070	Tank No. 28070												
28070R[2]	TK-28070R[2]	Tank No. 28070R[2]												
28071[1]	TK-28071[1]	Tank No. 28071[1]												
28072	TK-28072	Tank No. 28072												
28073	TK-28073	Tank No. 28073												
28074	TK-28074	Tank No. 28074												
28075[1]	TK-28075[1]	Tank No. 28075[1]												
28076	TK-28076	Tank No. 28076												
28077	TK-28077	Tank No. 28077												
28080	TK-28080	Tank No. 28080												
28086	TK-28086	Tank No. 28086												
28087	TK-28087	Tank No. 28087												
28088	TK-28088	Tank No. 28088												
28089	TK-28089	Tank No. 28089												
28090	TK-28090	Tank No. 28090												

FHR's Exhibit E

FIN	EPN	Description	NO_X Currently Permitted Emission Rates lb/hr	NO_X Currently Permitted Emission Rates tons/yr	NO_X Proposed Permit Emission Rates lb/hr	NO_X Proposed Permit Emission Rates tons/yr	NO_X Change in Permitted Emission Rates lb/hr	NO_X Change in Permitted Emission Rates tons/yr	CO Currently Permitted Emission Rates lb/hr	CO Currently Permitted Emission Rates tons/yr	CO Proposed Permit Emission Rates lb/hr	CO Proposed Permit Emission Rates tons/yr	CO Change in Permitted Emission Rates lb/hr	CO Change in Permitted Emission Rates tons/yr
28091	TK-28091	Tank No. 28091												
28092	TK-28092	Tank No. 28092												
28067-28077, 28080, 28082, 28083 28086	TANKGRP1	Annual Tank Emission Cap for Tanks 28067-28077, 28080, 28082, 28083, 28086												
FUG-1[3]	FUG-1[3]	Terminal Fugitives[3]												
Total Change in Permitted Emission Rates							**0.00**	**6.76**					**0.00**	**8.81**
Total Project Emissions for Public Notice[4]							**0.00**	**6.76**					**0.00**	**8.81**
Public Notice Thresholds (tons/yr)								**5.00**						**50.00**
Does the Project Increase Result in Public Notice?								**YES**						**NO**

1. The currently permitted H2S emission rates for Tank 28071 and currently permitted VOC emission rates for Tank 28075 reflect the proposed emission rates on the Table 1(a) submitted as part of the Expansion Project. The emission rates on the Table 1(a) were not reflected on the MAERT that was issued by TCEQ in October 2020 for the Expansion Project (TCEQ Project No. 314930). See Appendix A for the Table 1(a) from the Expansion Project showing the H2S emission rates for Tank 28071 and VOC emission rates for Tank 28075.
2. Proposed emission rates reflect the incorporation of PBR Registration No. 161793. These emission rate increases are not included in the total project emissions for public notice since they were authorized by PBR.
3. Proposed emission rates reflect the corrected fugitive component counts from the Expansion Project, the change to oil and gas production emission factors, the implementation of a 28VHP LDAR monitoring program, and incorporation of PBR Registration Nos. 160536 and 161793. These emission rate increases are not included in total project emissions for public notice since they include corrections to emission factors and PBR authorizations.
4. The total project emissions for public notice excludes emissions increases from incorporated PBRs for Tank 28070R and fugitives, corrections to emission factors for fugitive calculations, corrections to MAERT limits for Tanks 28071 and 28075, the decrease in emissions for TANKGRP1 since the changes to emission rates for the individual tanks are already being accounted for in the total, corrections for Tanks 28071 and 28075, corrections for Tanks 28087, 28088, 28089, 28090 associated with the Expansion Project, and removal of Tanks 28091 and 28092 that were never built.

FHR's Exhibit E

			SO_2						$PM/PM_{10}/PM_{2.5}$					
			Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates		Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates	
FIN	EPN	Description	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
DOCK, MVCU1	MVCU1	Marine Vapor Combustion Unit No. 1	11.40		11.78		0.38		1.35		1.35		0.00	
DOCK, MVCU2	MVCU2	Marine Vapor Combustion Unit No. 2	11.40	35.40	11.78	38.10	0.38	2.70	1.35	6.30	1.35	8.50	0.00	2.20
DOCK, MVCU3	MVCU3	Marine Vapor Combustion Unit No. 3	11.40		11.78		0.38		1.35		1.35		0.00	
DOCK	DOCK	Ship and Barge Loading Dock												
28063	TK-28063	Tank No. 28063												
28064	TK-28064	Tank No. 28064												
26067	TK-28067	Tank No. 28067												
26068	TK-28068	Tank No. 28068												
26069	TK-28069	Tank No. 28069												
28070	TK-28070	Tank No. 28070												
28070R[2]	TK-28070R[2]	Tank No. 28070R[2]												
28071[1]	TK-28071[1]	Tank No. 28071[1]												
28072	TK-28072	Tank No. 28072												
28073	TK-28073	Tank No. 28073												
28074	TK-28074	Tank No. 28074												
28075[1]	TK-28075[1]	Tank No. 28075[1]												
28076	TK-28076	Tank No. 28076												
28077	TK-28077	Tank No. 28077												
28080	TK-28080	Tank No. 28080												
28086	TK-28086	Tank No. 28086												
28087	TK-28087	Tank No. 28087												
28088	TK-28088	Tank No. 28088												
28089	TK-28089	Tank No. 28089												
28090	TK-28090	Tank No. 28090												

FHR's Exhibit E

			SO_2						$PM/PM_{10}/PM_{2.5}$					
			Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates		Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates	
FIN	EPN	Description	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
28091	TK-28091	Tank No. 28091												
28092	TK-28092	Tank No. 28092												
28067-28077, 28080, 28082, 28083 28086	TANKGRP1	Annual Tank Emission Cap for Tanks 28067-28077, 28080, 28082, 28083, 28086												
FUG-1[3]	FUG-1[3]	Terminal Fugitives[3]												
Total Change in Permitted Emission Rates							**1.14**	**2.70**					**0.00**	**2.20**
Total Project Emissions for Public Notice[4]							**1.14**	**2.70**					**0.00**	**2.20**
Public Notice Thresholds (tons/yr)								**10.00**						**5.00**
Does the Project Increase Result in Public Notice?								**NO**						**NO**

1. The currently permitted H2S emission rates for Tank 28071 and currently permitted VOC emission rates for Tank 28075 reflect the proposed emission rates on the Table 1(a) submitted as part of the Expansion Project. The emission rates on the Table 1(a) were not reflected on the MAERT that was issued by TCEQ in October 2020 for the Expansion Project (TCEQ Project No. 314930). See Appendix A for the Table 1(a) from the Expansion Project showing the H2S emission rates for Tank 28071 and VOC emission rates for Tank 28075.
2. Proposed emission rates reflect the incorporation of PBR Registration No. 161793. These emission rate increases are not included in the total project emissions for public notice since they were authorized by PBR.
3. Proposed emission rates reflect the corrected fugitive component counts from the Expansion Project, the change to oil and gas production emission factors, the implementation of a 28VHP LDAR monitoring program, and incorporation of PBR Registration Nos. 160536 and 161793. These emission rate increases are not included in total project emissions for public notice since they include corrections to emission factors and PBR authorizations.
4. The total project emissions for public notice excludes emissions increases from incorporated PBRs for Tank 28070R and fugitives, corrections to emission factors for fugitive calculations, corrections to MAERT limits for Tanks 28071 and 28075, the decrease in emissions for TANKGRP1 since the changes to emission rates for the individual tanks are already being accounted for in the total, corrections for Tanks 28071 and 28075, corrections for Tanks 28087, 28088, 28089, 28090 associated with the Expansion Project, and removal of Tanks 28091 and 28092 that were never built.

FHR's Exhibit E

			VOC						H_2S					
			Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates		Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates	
FIN	EPN	Description	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
DOCK, MVCU1	MVCU1	Marine Vapor Combustion Unit No. 1	3.10		3.10		0.00		0.06		0.06		0.00	
DOCK, MVCU2	MVCU2	Marine Vapor Combustion Unit No. 2	3.10	10.89	3.10	14.70	0.00	3.81	0.06	0.19	0.06	0.20	0.00	0.01
DOCK, MVCU3	MVCU3	Marine Vapor Combustion Unit No. 3	3.10		3.10		0.00		0.06		0.06		0.00	
DOCK	DOCK	Ship and Barge Loading Dock	6.38	6.36	6.38	8.58	0.00	2.22	0.02	0.02	0.02	0.02	0.00	0.00
28063	TK-28063	Tank No. 28063	4.82	5.02	0.00	0.00	-4.82	-5.02	0.06	0.04	0.00	0.00	-0.06	-0.04
28064	TK-28064	Tank No. 28064	5.04	5.71	0.00	0.00	-5.04	-5.71	0.08	0.05	0.00	0.00	-0.08	-0.05
26067	TK-28067	Tank No. 28067	9.83	9.20	21.09	9.20	11.26	0.00	0.14	0.06	0.14	0.09	0.00	0.03
26068	TK-28068	Tank No. 28068	8.56	7.66	18.53	7.66	9.97	0.00	0.11	0.07	0.12	0.07	0.01	0.00
26069	TK-28069	Tank No. 28069	7.98	5.84	17.95	5.84	9.97	0.00	0.07	0.04	0.07	0.04	0.00	0.00
28070	TK-28070	Tank No. 28070	5.50	10.67	0.00	0.00	-5.50	-10.67	0.17	0.11	0.00	0.00	-0.17	-0.11
28070R[2]	TK-28070R[2]	Tank No. 28070R[2]	0.00	0.00	12.90	5.55	12.90	5.55	0.00	0.00	0.02	0.01	0.02	0.01
28071[1]	TK-28071[1]	Tank No. 28071[1]	7.78	6.00	14.42	6.00	6.64	0.00	0.09	0.05	0.09	0.06	0.00	0.01
28072	TK-28072	Tank No. 28072	8.32	7.71	14.97	7.71	6.65	0.00	0.13	0.08	0.13	0.09	0.00	0.01
28073	TK-28073	Tank No. 28073	8.26	7.53	14.91	7.53	6.65	0.00	0.13	0.08	0.13	0.08	0.00	0.00
28074	TK-28074	Tank No. 28074	8.37	7.89	15.02	7.89	6.65	0.00	0.13	0.08	0.14	0.09	0.01	0.01
28075[1]	TK-28075[1]	Tank No. 28075[1]	8.35	7.83	14.97	7.83	6.62	0.00	0.13	0.08	0.13	0.09	0.00	0.01
28076	TK-28076	Tank No. 28076	8.35	7.82	15.00	7.82	6.65	0.00	0.13	0.08	0.14	0.09	0.01	0.01
28077	TK-28077	Tank No. 28077	9.06	6.76	20.32	6.76	11.26	0.00	0.08	0.05	0.09	0.05	0.01	0.00
28080	TK-28080	Tank No. 28080	8.32	7.72	14.97	7.72	6.65	0.00	0.13	0.08	0.13	0.09	0.00	0.01
28086	TK-28086	Tank No. 28086	7.96	7.56	14.26	7.56	6.30	0.00	0.13	0.08	0.13	0.09	0.00	0.01
28087	TK-28087	Tank No. 28087	8.66		12.84		4.18		0.02		0.03		0.01	
28088	TK-28088	Tank No. 28088	8.66		12.84		4.18		0.02		0.03		0.01	
28089	TK-28089	Tank No. 28089	8.66	10.24	12.84	9.02	4.18	-1.22	0.02	0.05	0.03	0.03	0.01	-0.02
28090	TK-28090	Tank No. 28090	8.66		12.84		4.18		0.02		0.03		0.01	

FHR's Exhibit E

			VOC						H_2S					
			Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates		Currently Permitted Emission Rates		Proposed Permit Emission Rates		Change in Permitted Emission Rates	
FIN	EPN	Description	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
28091	TK-28091	Tank No. 28091	8.66		0.00		-8.66		0.02		0.00		-0.02	
28092	TK-28092	Tank No. 28092	8.66		0.00		-8.66		0.02		0.00		-0.02	
28067-28077, 28080, 28082, 28083 28086	TANKGRP1	Annual Tank Emission Cap for Tanks 28067-28077, 28080, 28082, 28083, 28086		83.59		67.74		-15.85						
FUG-1[3]	FUG-1[3]	Terminal Fugitives[3]	0.30	1.30	1.27	5.56	0.97	4.26	0.02	0.02	0.10	0.09	0.08	0.07
Total Change in Permitted Emission Rates							**93.20**	**-22.64**					**-0.19**	**-0.03**
Total Project Emissions for Public Notice[4]							**73.30**	**-15.37**					**-0.27**	**-0.11**
Public Notice Thresholds (tons/yr)								**5.00**						**5.00**
Does the Project Increase Result in Public Notice?								**NO**						**NO**

-15.37

1. The currently permitted H2S emission rates for Tank 28071 and currently permitted VOC emission rates for Tank 28075 reflect the proposed emission rates on the Table 1(a) submitted as part of the Expansion Project. The emission rates on the Table 1(a) were not reflected on the MAERT that was issued by TCEQ in October 2020 for the Expansion Project (TCEQ Project No. 314930). See Appendix A for the Table 1(a) from the Expansion Project showing the H2S emission rates for Tank 28071 and VOC emission rates for Tank 28075.
2. Proposed emission rates reflect the incorporation of PBR Registration No. 161793. These emission rate increases are not included in the total project emissions for public notice since they were authorized by PBR.
3. Proposed emission rates reflect the corrected fugitive component counts from the Expansion Project, the change to oil and gas production emission factors, the implementation of a 28VHP LDAR monitoring program, and incorporation of PBR Registration Nos. 160536 and 161793. These emission rate increases are not included in total project emissions for public notice since they include corrections to emission factors and PBR authorizations.
4. The total project emissions for public notice excludes emissions increases from incorporated PBRs for Tank 28070R and fugitives, corrections to emission factors for fugitive calculations, corrections to MAERT limits for Tanks 28071 and 28075, the decrease in emissions for TANKGRP1 since the changes to emission rates for the individual tanks are already being accounted for in the total, corrections for Tanks 28071 and 28075, corrections for Tanks 28087, 28088, 28089, 28090 associated with the Expansion Project, and removal of Tanks 28091 and 28092 that were never built.

Emissions Calculations from Past Expansion Project
that are Being Corrected

H_2S Emission Estimates
Tanks and Fugitives

Background:
H_2S emissions are calculated by applying the K factor method of Meling, Horne, and Hoover[1] to tank losses. The H_2S mole fraction in the vapor phase of the crude oil is used to calculate H_2S emissions from the working and breathing losses from the fixed-roof tanks. The withdrawal loss (or working loss) from floating-roof tanks, however, assumes 100% volatilization. Therefore, for floating-roof tanks the weight fraction in the liquid phase of the crude oil is used to calculate the H_2S emissions from the working loss (withdrawal loss) contribution. The breathing loss contribution is the same for any type of tank. K factors are used to calculate H_2S emissions from loading losses.

K = y/x, where

y = mole fraction of a component in the vapor phase
x = mole fraction of a component in the liquid phase

If x is known, y = Kx

Liquid	Time Period	H_2S, liquid WF	x	K[2]	y	Vapor Pressure, psia	P*	MR lbs H_2S/ lb VOC
Crude Oil	Annual	1.00E-04	0.000609	24	0.014612	9.05	0.6155	0.0161
(RVP 10)	Hourly	5.00E-04	0.003044	27	0.082191	10.9	0.7415	0.0754

a = annual emisions
h = hourly emissions
x = (WF H_2S)(MW oil)/MW H_2S
WF = Weight Fraction
MW oil = 207

P* = VOC partial pressure = vapor pressure/14.7 psia
MR = mass ratio = (y)(MW H_2S)/(P)(MW oil vapor)
MW = molecular weight
MW H_2S = 34
MW crude oil vapor = 50

EPN	Liquid	VOC Emissions (withdrawal) lbs/hr	VOC Emissions (withdrawal) tons/yr	VOC Emissions (rim seal, deck fitting, and deck seam) lbs/hr	VOC Emissions (rim seal, deck fitting, and deck seam) tons/yr	H_2S Emissions lbs/hr	H_2S Emissions tons/yr
TK-28067	Crude Oil	19.296	3.54	1.795	5.66	0.1449	0.0917
TK-28068	Crude Oil	17.097	3.13	1.435	4.53	0.1167	0.0734
TK-28069	Crude Oil	17.097	3.13	0.857	2.70	0.0731	0.0439
TK-28070R	Crude Oil	12.686	4.86	0.217	0.68	0.0227	0.0115
TK-28071	Crude Oil	13.294	2.44	1.131	3.57	0.0919	0.0578
TK-28072	Crude Oil	13.294	2.44	1.673	5.28	0.1328	0.0854
TK-28073	Crude Oil	13.294	2.44	1.616	5.10	0.1285	0.0825
TK-28074	Crude Oil	13.294	2.44	1.728	5.45	0.1369	0.0882
TK-28075	Crude Oil	13.294	2.44	1.673	5.28	0.1328	0.0854
TK-28076	Crude Oil	13.294	2.44	1.707	5.38	0.1353	0.0871
TK-28077	Crude Oil	19.296	3.54	1.022	3.22	0.0867	0.0524
TK-28080	Crude Oil	13.294	2.44	1.674	5.28	0.1329	0.0855
TK-28086	Crude Oil	12.593	2.31	1.666	5.25	0.1318	0.0850
TK-28087	Crude Oil	12.596	N/A	0.248	N/A	0.0250	N/A
TK-28088	Crude Oil	12.596	N/A	0.248	N/A	0.0250	N/A
TK-28089	Crude Oil	12.596	N/A	0.248	N/A	0.0250	N/A
TK-28090	Crude Oil	12.596	N/A	0.248	N/A	0.0250	N/A
TK-28087, TK-28088, TK-28089 TK-28090	Crude Oil	N/A	6.928	N/A	2.087	N/A	0.0344

Sample Calculations:

Tank (28087)
H_2S Emissions = (WF)(withdrawal loss) + (MR)(rim seal loss + deck fitting loss)
H2S Emissions, lbs/hr = (0.0005)(12.596) + (0.075)(0.2483) = 0.0250

Grouped H_2S Limit
H_2S Emissions = (WF)(max withdrawal loss) + (MR)(rim seal loss from all 6 tanks + deck fitting loss from all 6 tanks)
H2S Emissions, tons/yr = (0.0001)(6.9281) + (0.0161)(2.087) = 0.0344

Footnotes:
1 "Using K Factors To Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids," by Jeffrey Meling, Karen Horne, and Jay Hoover

2 K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972. The K value for hourly emissions is based on a temperature of 95 F. The K value for annual emissions is based on a temperature of 85 F.

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28087

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	494.22
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131	
Deck Fitting Loss (lb/hr)	L_F =	0.118	
Deck Seam Loss (lb/hr)	L_D =	0.000	
Withdrawal Loss (lb/hr)	L_{WD} =	12.596	
Total Short-Term Loss	L_T =	12.845	lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{549.24\text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.087 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{494.22\text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.078 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\text{ lb}}{\text{yr}} \left| \frac{60000\text{ bbl}}{\text{hr}} \right| \frac{\text{yr}}{66000000\text{ bbl}}$$

= 12.596 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28088

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	494.22
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131
Deck Fitting Loss (lb/hr)	L_F =	0.118
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	12.596
Total Short-Term Loss	L_T =	12.845 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{549.24\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.087 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{494.22\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.078 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\ \text{lb}}{\text{yr}} \cdot \frac{60000\ \text{bbl}}{\text{hr}} \cdot \frac{\text{yr}}{66000000\ \text{bbl}}$$

= 12.596 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28089

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	494.22
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131
Deck Fitting Loss (lb/hr)	L_F =	0.118
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	12.596
Total Short-Term Loss	L_T =	12.845 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{549.24\text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.087 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{494.22\text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.078 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\text{ lb}}{\text{yr}} \left| \frac{60000\text{ bbl}}{\text{hr}} \right| \frac{\text{yr}}{66000000\text{ bbl}}$$

= 12.596 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28090

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Product Factor for Crude Oil	Kc =	0.4
Maximum Product Factor for Crude Oil	Kc =	0.6
Annual Rim Seal Losses (lb/yr)	L_R =	549.24
Annual Deck Fitting Loss (lb/yr)	L_F =	494.22
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	13856.14
Annual Throughput (bbl/yr)	Q =	66,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.131
Deck Fitting Loss (lb/hr)	L_F =	0.118
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	12.596
Total Short-Term Loss	L_T =	12.845 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{549.24\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

$$= 0.087\ \text{lb/hr}$$

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{494.22\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

$$= 0.078\ \text{lb/hr}$$

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

$$= 0.000\ \text{lb/hr}$$

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{13856.14\ \text{lb}}{\text{yr}} \left| \frac{60000\ \text{bbl}}{\text{hr}} \right| \frac{\text{yr}}{66000000\ \text{bbl}}$$

$$= 12.596\ \text{lb/hr}$$

Grouped Annual VOC Emission Limit for Tanks 28087, 28088, 28089, and 28090

A grouped annual VOC emission limit is proposed for Tanks 28087, 28088, 28089, and 28090. The grouped annual VOC emission limit is based on a maximum total throughput of 66,000,000 bbl/yr going through any of the four tanks. Emission rates are calculated for each tank at this maximum total throughput. The Grouped Annual VOC emission limit is calculated by adding the rim seal losses, deck fitting losses, and deck seam losses from each tank plus the maximum withdrawal loss from any one tank at the maximum total throughput. Values used to determine the grouped emission limit are in bold font.

Grouped Annual VOC Emission Limit for Tanks 28087, 28088, 28089, 28090, 28091, 28092

Tank	Proposed Throughput (bbl/yr)	Rim Seal Loss at Proposed Total Throughput (tons/yr)	Deck Fitting Loss at Proposed Total Throughput (tons/yr)	Deck Seam Loss at Proposed Total Throughput (tons/yr)	Withdrawal Loss at Proposed Total Throughput (tons/yr)	Contribution of Emission Rates to Proposed Grouped Limit (tons/yr)
28087	66,000,000	**0.27**	**0.25**	N/A	**6.93**	**7.45**
28088		**0.27**	**0.25**	N/A	**6.93**	**0.52**
28089		**0.27**	**0.25**	N/A	**6.93**	**0.52**
28090		**0.27**	**0.25**	N/A	**6.93**	**0.52**
Proposed Totals	**66,000,000**					**9.02**

FLINT HILLS RESOURCES INGLESIDE, LLC
INGLESIDE TERMINAL
PERMIT NO. 6606 AMENDMENT APPLICATION

DOMED (INTERNAL) FLOATING ROOF TANKS

MARCH 2021

FHR's Exhibit E

IFR Tanks

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Maximum Tank Throughput (bbl/hr)	Tank Construction (Welded/ Riveted)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Deck Seam Construction (Welded/ Bolted)	Primary Seal (MS/LM/ VM)	Secondary Seal (None/SM/ RM/WS)	Vapor Molecular Weight MWv (lb/lbmol)	Average Liquid Density W_L (lb/gal)	Monthly Average Temperature T (^oF)	RVP	Monthly Average True Vapor Pressure P (psia)
TK-28087		Crude Oil	190	56	10,500,000	66,000,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.048
TK-28088		Crude Oil	190	56	10,500,000	66,000,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.05

IFR Tanks

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Maximum Tank Throughput (bbl/hr)	Tank Construction (Welded/ Riveted)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Deck Seam Construction (Welded/ Bolted)	Primary Seal (MS/LM/ VM)	Secondary Seal (None/SM/ RM/WS)	Vapor Molecular Weight MWv (lb/lbmol)	Average Liquid Density W_L (lb/gal)	Monthly Average Temperature T (°F)	RVP	Monthly Average True Vapor Pressure P (psia)
TK-28089		Crude Oil	190	56	10,500,000	66,000,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.05
TK-28090		Crude Oil	190	56	10,500,000	66,000,000	0	Welded	Light Rust	Welded	MS	RM	50	7.05			
	January	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	55	10	6.84
	February	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	59	10	7.31
	March	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	April	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	72	10	9.02
	May	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	78	10	9.91
	June	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	82	10	10.53
	July	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	August	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	84	10	10.86
	September	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	81	10	10.37
	October	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	74	10	9.31
	November	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	66	10	8.20
	December	Crude Oil	190	56	10,500,000	5,500,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	58	10	7.19
	Annual	Crude Oil	190	56	10,500,000	66,000,000	60,000	Welded	Light Rust	Welded	MS	RM	50	7.05	71.58	10	9.048

Notes:

1. Variables represented in the VOC emission basis calculations are used to estimate maximum hourly and annual VOC emission rates. Only the throughput and true vapor pressure are intended to be binding. Although actual values of the other variables may vary or may be higher than those represented, the actual emission rates will be below the proposed emission rates.
Additionally, the throughputs represented in the calculations only include the throughput that leads to change in the floating roof level (i.e. cause working losses); those occasional instances, where the tank loading and unloading rates match and the floating roof level does not change, are excluded.

2. Crude oil includes crude oil and crude oil condensate.

IFR Tanks

EPN	Month	Average Pressure at Tank Location Pa (psia)	Vapor Pressure Function at average Temperature P*	Wind Speed V (mi/hr)	Zero Wind Speed Rim Seal Loss Factor [Kra] Kra lbmole/ft*yr	Wind Speed Dependant Rim Seal Loss Factor [Krb] Krb lbmole/(mph)^n ft*yr	Seal Related Wind Speed Exponent [n] n Dimensionless	Rim Seal Losses: Product Factor Kc	Rim Seal Losses: Internal Floating Roof Rim Seal Losses Lr (ton/month)	Withdrawal Losses: Shell Clingage Factor C (bbl/1000 ft^2)	Withdrawal Losses: Number of Columns Nc	Withdrawal Losses: Effective Column Diameter Fc	Withdrawal Losses: Internal Floating Roof Withdrawal Losses Lw (ton/month)	Deck Fitting Losses: Deck Fitting Loss Factor Ff (lb-mol/month)	Deck Fitting Losses: Internal Floating Deck Fitting Losses Lf (ton/month)	Deck Seam Losses: Deck Seam Loss Factor Kd (lb-mol/ft-month)	Deck Seam Losses: Deck Seam Length Factor Sd (ft/ft^2)	Deck Seam Losses: Internal Floating Deck Seam Losses Ld (ton/month)	MONTHLY TOTAL INTERNAL FLOATING ROOF LOSSES Lr+Lw+Lf+Ld (ton/month)
TK-28087		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		102.58		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	102.58	0.0132	0	0.2	0.0000	0.6053
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	102.58	0.0145	0	0.2	0.0000	0.6080
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	102.58	0.0172	0	0.2	0.0000	0.6136
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	102.58	0.0199	0	0.2	0.0000	0.6194
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	102.58	0.0233	0	0.2	0.0000	0.6266
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	102.58	0.0260	0	0.2	0.0000	0.6323
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	102.58	0.0276	0	0.2	0.0000	0.6356
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	102.58	0.0276	0	0.2	0.0000	0.6356
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	102.58	0.0253	0	0.2	0.0000	0.6308
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	102.58	0.0210	0	0.2	0.0000	0.6216
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	102.58	0.0172	0	0.2	0.0000	0.6136
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	102.58	0.0142	0	0.2	0.0000	0.6073
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	102.58	0.2471	0	0.2	0.0000	7.4498
TK-28088		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		102.58		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	102.58	0.0132	0	0.2	0.0000	0.6053
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	102.58	0.0145	0	0.2	0.0000	0.6080
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	102.58	0.0172	0	0.2	0.0000	0.6136
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	102.58	0.0199	0	0.2	0.0000	0.6194
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	102.58	0.0233	0	0.2	0.0000	0.6266
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	102.58	0.0260	0	0.2	0.0000	0.6323
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	102.58	0.0276	0	0.2	0.0000	0.6356
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	102.58	0.0276	0	0.2	0.0000	0.6356
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	102.58	0.0253	0	0.2	0.0000	0.6308
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	102.58	0.0210	0	0.2	0.0000	0.6216
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	102.58	0.0172	0	0.2	0.0000	0.6136
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	102.58	0.0142	0	0.2	0.0000	0.6073
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	102.58	0.2471	0	0.2	0.0000	7.4498

IFR Tanks

EPN	Month	Average Pressure at Tank Location Pa (psia)	Vapor Pressure Function at average Temperature P*	Wind Speed V (mi/hr)	Zero Wind Speed Rim Seal Loss Factor [Kra] Kra lbmole/ft*yr	Wind Speed Dependant Rim Seal Loss Factor [Krb] Krb lbmole/(mph)^{n}ft*yr	Seal Related Wind Speed Exponent [n] n Dimensionless	Rim Seal Losses: Product Factor Kc	Rim Seal Losses: Internal Floating Roof Rim Seal Losses Lr (ton/month)	Withdrawal Losses: Shell Clingage Factor C (bbl/1000 ft^2)	Withdrawal Losses: Number of Columns Nc	Withdrawal Losses: Effective Column Diameter Fc	Withdrawal Losses: Internal Floating Roof Withdrawal Losses Lw (ton/month)	Deck Fitting Losses: Deck Fitting Loss Factor Ff (lb-mol/month)	Deck Fitting Losses: Internal Floating Deck Fitting Losses Lf (ton/month)	Deck Seam Losses: Deck Seam Loss Factor Kd (lb-mol/ft-month)	Deck Seam Losses: Deck Seam Length Factor Sd (ft/ft^2)	Deck Seam Losses: Internal Floating Deck Seam Losses Ld (ton/month)	MONTHLY TOTAL INTERNAL FLOATING ROOF LOSSES Lr+Lw+Lf+Ld (ton/month)
TK-28089		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		102.58		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	102.58	0.0132	0	0.2	0.0000	0.6053
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	102.58	0.0145	0	0.2	0.0000	0.6080
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	102.58	0.0172	0	0.2	0.0000	0.6136
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	102.58	0.0199	0	0.2	0.0000	0.6194
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	102.58	0.0233	0	0.2	0.0000	0.6266
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	102.58	0.0260	0	0.2	0.0000	0.6323
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	102.58	0.0276	0	0.2	0.0000	0.6356
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	102.58	0.0276	0	0.2	0.0000	0.6356
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	102.58	0.0253	0	0.2	0.0000	0.6308
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	102.58	0.0210	0	0.2	0.0000	0.6216
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	102.58	0.0172	0	0.2	0.0000	0.6136
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	102.58	0.0142	0	0.2	0.0000	0.6073
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	102.58	0.2471	0	0.2	0.0000	7.4498
TK-28090		14.71	0.0000	0	0.6	0.4	1	0.4		0.006	0	1.0		102.58		0	0.2		0.0000
	January	14.71	0.1550		0.6	0.4	1	0.4	0.0147	0.006	0	1.0	0.5773	102.58	0.0132	0	0.2	0.0000	0.6053
	February	14.71	0.1701		0.6	0.4	1	0.4	0.0162	0.006	0	1.0	0.5773	102.58	0.0145	0	0.2	0.0000	0.6080
	March	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	102.58	0.0172	0	0.2	0.0000	0.6136
	April	14.71	0.2331		0.6	0.4	1	0.4	0.0221	0.006	0	1.0	0.5773	102.58	0.0199	0	0.2	0.0000	0.6194
	May	14.71	0.2727		0.6	0.4	1	0.4	0.0259	0.006	0	1.0	0.5773	102.58	0.0233	0	0.2	0.0000	0.6266
	June	14.71	0.3047		0.6	0.4	1	0.4	0.0289	0.006	0	1.0	0.5773	102.58	0.0260	0	0.2	0.0000	0.6323
	July	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	102.58	0.0276	0	0.2	0.0000	0.6356
	August	14.71	0.3229		0.6	0.4	1	0.4	0.0307	0.006	0	1.0	0.5773	102.58	0.0276	0	0.2	0.0000	0.6356
	September	14.71	0.2962		0.6	0.4	1	0.4	0.0281	0.006	0	1.0	0.5773	102.58	0.0253	0	0.2	0.0000	0.6308
	October	14.71	0.2454		0.6	0.4	1	0.4	0.0233	0.006	0	1.0	0.5773	102.58	0.0210	0	0.2	0.0000	0.6216
	November	14.71	0.2009		0.6	0.4	1	0.4	0.0191	0.006	0	1.0	0.5773	102.58	0.0172	0	0.2	0.0000	0.6136
	December	14.71	0.1661		0.6	0.4	1	0.4	0.0158	0.006	0	1.0	0.5773	102.58	0.0142	0	0.2	0.0000	0.6073
	Annual	14.71	0.2343		0.6	0.4	1	0.4	0.2746	0.006	0	1.0	6.9281	102.58	0.2471	0	0.2	0.0000	7.4498

CALCULATED FITTING FACTORS

		IFR	IFR	IFR	IFR
		TK-28087	TK-28088	TK-28089	TK-28090
	Diameter (ft)	190	190	190	190
Access hatch	Bolted cover, gasketed	4.8	4.8	4.8	4.8
	Unbolted cover, gasketed	0	0	0	0
	Unbolted cover, ungasketed	0	0	0	0
Fixed roof support column well	Round pipe, ungasketed sliding cover	0	0	0	0
	Round pipe, gasketed sliding cover	0	0	0	0
	Round pipe, flexible fabric sleeve seal	0	0	0	0
	Built-up column, ungasketed sliding cover	0	0	0	0
	Built-up column, gasketed sliding cover	0	0	0	0
Unslotted guide-pole and well	Ungasketed sliding cover	0	0	0	0
	Ungasketed sliding cover w/pole sleeve	0	0	0	0
	Gasketed sliding cover	0	0	0	0
	Gasketed sliding cover w/pole wiper	0	0	0	0
	Gasketed sliding cover w/pole sleeve	0	0	0	0
Slotted guide-pole/sample well	Ungasketed or gasketed sliding cover	0	0	0	0
	Ungasketed or gasketed sliding cover, w/float	0	0	0	0
	Gasketed sliding cover, w/pole wiper	0	0	0	0
	Gasketed sliding cover, w/pole sleeve	0	0	0	0
	Gasketed sliding cover, w/pole sleeve, pole wiper	16.6	16.6	16.6	16.6
	Gasketed sliding cover, w/float, pole wiper	0	0	0	0
	Gasketed sliding cover, w/float, pole sleeve, pole wiper	0	0	0	0
Gauge-float well (auto. gauge)	Unbolted cover, ungasketed	0	0	0	0
	Unbolted cover, gasketed	0	0	0	0
	Bolted cover, gasketed	0	0	0	0
Gauge-hatch/sample port	Weighted mechanical action, gasketed	0	0	0	0
	Weighted mechanical actuation, ungasketed	2.3	2.3	2.3	2.3
	Slit fabric seal, 10% open area	0	0	0	0
Vacuum breaker	Weighted mechanical actuation, ungasketed	0	0	0	0
	Weighted mechanical actuation, gasketed	12.4	12.4	12.4	12.4
Deck drain	Open	0	0	0	0
	90% closed	0	0	0	0
Stub drain		0	0	0	0
Deck leg	Adjustable, internal floating deck	0	0	0	0
	Adjustable, pontoon area -ungasketed	0	0	0	0
	Adjustable, pontoon area -gasketed	0	0	0	0
	Adjustable, pontoon area -sock	31.2	31.2	31.2	31.2
	Adjustable, center area -ungasketed	0	0	0	0
	Adjustable, center area -gasketed	0	0	0	0
	Adjustable, center area -sock	35.28	35.28	35.28	35.28
	Adjustable, double-deck roofs	0	0	0	0
	Fixed	0	0	0	0
Rim Vent	Weighted mechanical actuation, ungasketed	0	0	0	0
	Weighted mechanical actuation, gasketed	0	0	0	0
Ladder well	Sliding cover, ungasketed	0	0	0	0
	Sliding cover, gasketed	0	0	0	0
TOTAL DECK LOSS FITTING FACTOR, Ff (lb-mol/yr)		**102.58**	**102.58**	**102.58**	**102.58**

Fitting Factor Counts

		IFR	IFR	IFR	IFR
		TK-28087	TK-28088	TK-28089	TK-28090
	Diameter (ft)	190	190	190	190
Access hatch	Bolted cover, gasketed	3	3	3	3
	Unbolted cover, gasketed				
	Unbolted cover, ungasketed				
Fixed roof support column well	Round pipe, ungasketed sliding cover				
	Round pipe, gasketed sliding cover				
	Round pipe, flexible fabric sleeve seal				
	Built-up column, ungasketed sliding cover				
	Built-up column, gasketed sliding cover				
Unslotted guide-pole and well	Ungasketed sliding cover				
	Ungasketed sliding cover w/pole sleeve				
	Gasketed sliding cover				
	Gasketed sliding cover w/pole wiper				
	Gasketed sliding cover w/pole sleeve				
Slotted guide-pole/sample well	Ungasketed or gasketed sliding cover				
	Ungasketed or gasketed sliding cover, w/float				
	Gasketed sliding cover, w/pole wiper				
	Gasketed sliding cover, w/pole sleeve				
	Gasketed sliding cover, w/pole sleeve, pole wiper	2	2	2	2
	Gasketed sliding cover, w/float, pole wiper				
	Gasketed sliding cover, w/float, pole sleeve, pole wiper				
Gauge-float well (auto. gauge)	Unbolted cover, ungasketed				
	Unbolted cover, gasketed				
	Bolted cover, gasketed				
Gauge-hatch/sample port	Weighted mechanical action, gasketed				
	Weighted mechanical actuation, ungasketed	1	1	1	1
	Slit fabric seal, 10% open area				
Vacuum breaker	Weighted mechanical actuation, ungasketed				
	Weighted mechanical actuation, gasketed	2	2	2	2
Deck drain	Open				
	90% closed				
Stub drain					
Deck leg	Adjustable, internal floating deck				
	Adjustable, pontoon area -ungasketed				
	Adjustable, pontoon area -gasketed				
	Adjustable, pontoon area -sock	26	26	26	26
	Adjustable, center area -ungasketed				
	Adjustable, center area -gasketed				
	Adjustable, center area -sock	72	72	72	72
	Adjustable, double-deck roofs				
	Fixed				
Rim Vent	Weighted mechanical actuation, ungasketed				
	Weighted mechanical actuation, gasketed				
Ladder well	Sliding cover, ungasketed				
	Sliding cover, gasketed				

FHR's Exhibit E

		Loss Factors				
		KFa	KFb	m	EFR KF	IFR KF
Fitting Type and Construction Details		(lb-mol/yr)	(lb-mol/(mph)^m-yr)	(dimensionless)	(lb-mol/yr)	(lb-mol/yr)
Access hatch	Bolted cover, gasketed	1.6	0	0	1.6	1.6
	Unbolted cover, gasketed	31	5.2	1.2	97.86	31.
	Unbolted cover, ungasketed	36	5.9	1.3	129.85	36.
Fixed roof support column well	Round pipe, ungasketed sliding cover	31			31.	31.
	Round pipe, gasketed sliding cover	25			25.	25.
	Round pipe, flexible fabric sleeve seal	10			10.	10.
	Built-up column, ungasketed sliding cover	51			51.	51.
	Built-up column, gasketed sliding cover	33			33.	33.
Unslotted guide-pole and well	Ungasketed sliding cover	31	150	1.4	2982.77	31.
	Ungasketed sliding cover w/pole sleeve	25	2.2	2.1	217.05	25.
	Gasketed sliding cover	25	13	2.2	1428.97	25.
	Gasketed sliding cover w/pole wiper	14	3.7	0.78	33.46	14.
	Gasketed sliding cover w/pole sleeve	8.6	12	0.81	75.87	8.6
Slotted guide-pole/sample well	Ungasketed or gasketed sliding cover	43	270	1.4	5356.18	43.
	Ungasketed or gasketed sliding cover, w/float	31	36	2	2571.16	31.
	Gasketed sliding cover, w/pole wiper	41	48	1.4	985.57	41.
	Gasketed sliding cover, w/pole sleeve	11	46	1.4	916.21	11.
	Gasketed sliding cover, w/pole sleeve, pole wiper	8.3	4.4	1.6	140.83	8.3
	Gasketed sliding cover, w/float, pole wiper	21	7.9	1.8	385.19	21.
	Gasketed sliding cover, w/float, pole sleeve, pole wiper	11	9.9	0.89	76.8	11.
Gauge-float well (auto. gauge)	Unbolted cover, ungasketed	14	5.4	1.1	70.12	14.
	Unbolted cover, gasketed	4.3	17	0.38	42.47	4.3
	Bolted cover, gasketed	2.8	0	0	2.8	2.8
Gauge-hatch/sample port	Weighted mechanical action, gasketed	0.47	0.02	0.97	0.63	0.47
	Weighted mechanical actuation, ungasketed	2.3	0	0	2.3	2.3
	Slit fabric seal, 10% open area	12			12.	12.
Vacuum breaker	Weighted mechanical actuation, ungasketed	7.8	0.01	4	57.59	7.8
	Weighted mechanical actuation, gasketed	6.2	1.2	0.94	15.07	6.2
Deck drain	Open	1.5	0.21	1.7	9.33	1.5
	90% closed	1.8	0.14	1.1	3.25	1.8
Stub drain		1.2			1.2	1.2
Deck leg	Adjustable, internal floating deck	7.9			7.9	7.9
	Adjustable, pontoon area -ungasketed	2	0.37	0.91	4.57	2.
	Adjustable, pontoon area -gasketed	1.3	0.08	0.65	1.62	1.3
	Adjustable, pontoon area -sock	1.2	0.14	0.65	1.76	1.2
	Adjustable, center area -ungasketed	0.82	0.53	0.14	1.53	0.82
	Adjustable, center area -gasketed	0.53	0.11	0.13	0.68	0.53
	Adjustable, center area -sock	0.49	0.16	0.14	0.71	0.49
	Adjustable, double-deck roofs	0.82	0.53	0.14	1.53	0.82
	Fixed	0	0	0	0.	0.
Rim Vent	Weighted mechanical actuation, ungasketed	0.68	1.8	1	15.8	0.68
	Weighted mechanical actuation, gasketed	0.71	0.1	1	1.55	0.71
Ladder well	Sliding cover, ungasketed	98			98.	98.
	Sliding cover, gasketed	56			56.	56.
	For EFR tanks, Kv=	0.7				
	For IFR tanks, Kv=	0				
	Average ambient wind speed =	12				
Deck -Fitting Loss Factors from AP-42, Table 7.1-12 (Nov. 2006)						
Average wind speed from AP-42, Table 7.1-9 (Nov. 2006)						

Fugitive Emission Rate Estimates
Ingleside Terminal
Revised New Components for Expansion Project

FIN:	FUG-1
EPN:	FUG-1
Operating schedule (hr/yr):	8760

Flint Hills Resources Corpus Christi, LLC will be implementing a 28VHP Leak Dection and Repair program as directed by the TCEQ's Current Tier I BACT Requirements for fugitive emissions. This program has 97% credit for valves and 85% credit for pumps and compressors. The TCEQ reccomends the Oil and Gas Production Operations factors as most appropriate for use in estimating fugitive emissions from this site.

Emission Source	Source Count	Emission Factors (lb/hr-source)	Control Factor	Controlled Emissions (lb/hr)	Controlled Emissions (ton/yr)
Valves - gas	39	0.00992	0.97	0.0116	0.0508
Valves - light liquid	460	0.0055	0.97	0.0759	0.3324
Pump seals	2	0.02866	0.85	0.0086	0.0377
Flanges - gas	75	0.00086	0.30	0.0452	0.1978
Flanges - light liquid	996	0.000243	0.30	0.1694	0.7421
Relief valve-gas	21	0.0194	0.97	0.0122	0.0535
Sampling Connection - light liquid	0	0.0165	0.00	0.0000	0.0000
TOTAL VOC EMISSIONS:				0.3229	1.4143

SAMPLE CALCULATION:

Valves (light liquid) = (460 sources)(0.0055000 lb/hr-source)(1 - 0.97)
= 0.0759 lb/hr

Pollutant	**Weight Fraction**	**Emission Rate (lb/hr)**	**Emission Rate (ton/yr)**
Benzene	0.0060	0.0019	0.0085
Cumene	0.0010	0.0003	0.0014
Cyclohexane	0.0070	0.0023	0.0099
Ethylbenzene	0.0040	0.0013	0.0057
Hexane	0.0040	0.0013	0.0057
Toluene	0.0100	0.0032	0.0141
Trimethylbenzene	0.0033	0.0011	0.0047
Trimethylpentane	0.0010	0.0003	0.0014
Xylene	0.0140	0.0045	0.0198
Crude Oil - misc.	0.9497	0.3067	1.3432
Total	1.000	0.3229	1.4143

H2S Emissions

Hourly Mass Ratio* lb H2S/lb VOC	Annual Mass Ratio* lb H2S/lb VOC	H2S Emissions (lb/hr)	H2S Emissions (tpy)
0.0754	0.0161	0.0243	0.0228

SAMPLE CALCULATION:

H2S Emissions (tpy) = (1.4143 tons VOC per year)(0.0161 lb H2S per lb VOC)
=0.0228 tpy

* Mass Ratio value is taken from the Tank H2S calculations.

New Emissions Calculations as Part of Past Expansion Project

FHR's Exhibit E

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK28077

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	404.80
Annual Deck Fitting Loss (lb/yr)	L_F =	3397.20
Annual Deck Seam Loss (lb/yr)	L_D =	2644.80
Annual Withdrawal Loss (lb/yr)	L_{WD} =	7075.20
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.064
Deck Fitting Loss (lb/hr)	L_F =	0.539
Deck Seam Loss (lb/hr)	L_D =	0.419
Withdrawal Loss (lb/hr)	L_{WD} =	19.296
Total Short-Term Loss	L_T =	20.318 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{404.80\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.064 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{3397.20\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.539 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{2644.80\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.419 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{7075.20\ \text{lb}}{\text{yr}} \left| \frac{60000\ \text{bbl}}{\text{hr}} \right| \frac{\text{yr}}{22000000\ \text{bbl}}$$

= 19.296 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28086

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P^* =	0.235
Maximum Vapor Pressure Function	P^* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	5088.80
Annual Deck Fitting Loss (lb/yr)	L_F =	5415.00
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	4617.60
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.807
Deck Fitting Loss (lb/hr)	L_F =	0.859
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	12.593
Total Short-Term Loss	L_T =	14.259 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{5088.80\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.807 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{5415.00\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.859 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{4617.60\ \text{lb}}{\text{yr}} \cdot \frac{60000\ \text{bbl}}{\text{hr}} \cdot \frac{\text{yr}}{22000000\ \text{bbl}}$$

= 12.593 lb/hr

FHR's Exhibit E

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28067

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	404.80
Annual Deck Fitting Loss (lb/yr)	L_F =	8267.40
Annual Deck Seam Loss (lb/yr)	L_D =	2644.80
Annual Withdrawal Loss (lb/yr)	L_{WD} =	7075.20
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.064
Deck Fitting Loss (lb/hr)	L_F =	1.311
Deck Seam Loss (lb/hr)	L_D =	0.419
Withdrawal Loss (lb/hr)	L_{WD} =	19.296
Total Short-Term Loss	L_T =	21.091 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{404.80\text{ lb}}{\text{yr}} \times \frac{\text{yr}}{8760\text{ hr}} \times \frac{0.326}{0.235}$$

= 0.064 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{8267.40\text{ lb}}{\text{yr}} \times \frac{\text{yr}}{8760\text{ hr}} \times \frac{0.326}{0.235}$$

= 1.311 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{2644.80\text{ lb}}{\text{yr}} \times \frac{\text{yr}}{8760\text{ hr}} \times \frac{0.326}{0.235}$$

= 0.419 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{7075.20\text{ lb}}{\text{yr}} \times \frac{60000\text{ bbl}}{\text{hr}} \times \frac{\text{yr}}{22000000\text{ bbl}}$$

= 19.296 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28068

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	3787.60
Annual Deck Fitting Loss (lb/yr)	L_F =	5264.40
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	6268.80
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.601
Deck Fitting Loss (lb/hr)	L_F =	0.835
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	17.097
Total Short-Term Loss	L_T =	18.532 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{3787.60\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.601 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{5264.40\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.835 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\ \text{lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\ \text{hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{6268.80\ \text{lb}}{\text{yr}} \cdot \frac{60000\ \text{bbl}}{\text{hr}} \cdot \frac{\text{yr}}{22000000\ \text{bbl}}$$

= 17.097 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28069

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P^* =	0.235
Maximum Vapor Pressure Function	P^* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	3787.60
Annual Deck Fitting Loss (lb/yr)	L_F =	1616.00
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	6268.80
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.601
Deck Fitting Loss (lb/hr)	L_F =	0.256
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	17.097
Total Short-Term Loss	L_T =	17.954 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{3787.60 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.601 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{1616.00 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.256 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{6268.80 \text{ lb}}{\text{yr}} \cdot \frac{60000 \text{ bbl}}{\text{hr}} \cdot \frac{\text{yr}}{22000000 \text{ bbl}}$$

= 17.097 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 (2006) and short-term emission equations from the TCEQ's 2001 Guidance Document for Storage Tanks.

TK-28070R

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P^* =	0.235
Maximum Vapor Pressure Function	P^* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	561.03
Annual Deck Fitting Loss (lb/yr)	L_F =	804.93
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	9725.80
Annual Throughput (bbl/yr)	Q =	46,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.089
Deck Fitting Loss (lb/hr)	L_F =	0.128
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	12.686
Total Short-Term Loss	L_T =	12.902 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{561.03 \text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760 \text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.089 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{804.93 \text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760 \text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.128 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00 \text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760 \text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{9725.80 \text{ lb}}{\text{yr}} \left| \frac{60000 \text{ bbl}}{\text{hr}} \right| \frac{\text{yr}}{46000000 \text{ bbl}}$$

= 12.686 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28071

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	4828.20
Annual Deck Fitting Loss (lb/yr)	L_F =	2301.80
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	4874.40
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.766
Deck Fitting Loss (lb/hr)	L_F =	0.365
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	13.294
Total Short-Term Loss	L_T =	14.424 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{4828.20\text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.766 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{2301.80\text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.365 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760\text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{4874.40\text{ lb}}{\text{yr}} \cdot \frac{60000\text{ bbl}}{\text{hr}} \cdot \frac{\text{yr}}{22000000\text{ bbl}}$$

= 13.294 lb/hr

FHR's Exhibit E

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28072

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	4828.20
Annual Deck Fitting Loss (lb/yr)	L_F =	5722.80
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	4874.40
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.766
Deck Fitting Loss (lb/hr)	L_F =	0.907
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	13.294
Total Short-Term Loss	L_T =	14.967 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{4828.20 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.766 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{5722.80 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.907 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{4874.40 \text{ lb}}{\text{yr}} \cdot \frac{60000 \text{ bbl}}{\text{hr}} \cdot \frac{\text{yr}}{22000000 \text{ bbl}}$$

= 13.294 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28073

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P^* =	0.235
Maximum Vapor Pressure Function	P^* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	4828.20
Annual Deck Fitting Loss (lb/yr)	L_F =	5363.00
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	4874.40
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.766
Deck Fitting Loss (lb/hr)	L_F =	0.850
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	13.294
Total Short-Term Loss	L_T =	14.910 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{4828.20 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.766 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{5363.00 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.850 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{4874.40 \text{ lb}}{\text{yr}} \cdot \frac{60000 \text{ bbl}}{\text{hr}} \cdot \frac{\text{yr}}{22000000 \text{ bbl}}$$

= 13.294 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28074

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P^* =	0.235
Maximum Vapor Pressure Function	P^* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	4828.20
Annual Deck Fitting Loss (lb/yr)	L_F =	6067.60
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	4874.40
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.766
Deck Fitting Loss (lb/hr)	L_F =	0.962
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	13.294
Total Short-Term Loss	L_T =	15.022 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{4828.20\text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.766 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{6067.60\text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.962 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00\text{ lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\text{ hr}} \right| \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{4874.40\text{ lb}}{\text{yr}} \left| \frac{60000\text{ bbl}}{\text{hr}} \right| \frac{\text{yr}}{22000000\text{ bbl}}$$

= 13.294 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28075

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	4828.20
Annual Deck Fitting Loss (lb/yr)	L_F =	5722.80
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	4874.40
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.766
Deck Fitting Loss (lb/hr)	L_F =	0.907
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	13.294
Total Short-Term Loss	L_T =	14.967 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * (P*$_{Maximum}$) / (P*$_{Annual}$)

$$= \frac{4828.20\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.766 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * (P*$_{Maximum}$) / (P*$_{Annual}$)

$$= \frac{5722.80\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.907 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * (P*$_{Maximum}$) / (P*$_{Annual}$)

$$= \frac{0.00\ \text{lb}}{\text{yr}} \left| \frac{\text{yr}}{8760\ \text{hr}} \right| \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{4874.40\ \text{lb}}{\text{yr}} \left| \frac{60000\ \text{bbl}}{\text{hr}} \right| \frac{\text{yr}}{22000000\ \text{bbl}}$$

= 13.294 lb/hr

Short-Term Emission Rates for Floating-Roof Tanks

The emission estimates provided below are based on AP-42 Emission Factors from Chapter 7.1 and short-term emission equations from the TCEQ's 2020 Guidance Document for Storage Tanks.

TK-28076

INPUT DATA FROM TANKS

Atmospheric Pressure (psia)	P_A =	14.700
Average Vapor Pressure Function	P* =	0.235
Maximum Vapor Pressure Function	P* =	0.326
Maximum Vapor Pressure (psia)	P_{max} =	10.9
Annual Rim Seal Losses (lb/yr)	L_R =	4828.20
Annual Deck Fitting Loss (lb/yr)	L_F =	5936.80
Annual Deck Seam Loss (lb/yr)	L_D =	0.00
Annual Withdrawal Loss (lb/yr)	L_{WD} =	4874.40
Annual Throughput (bbl/yr)	Q =	22,000,000
Maximum Pumping Rate (bbl/hr)	PR_M =	60,000

MAXIMUM SHORT-TERM EMISSION RATE

Rim Seal Losses (lb/hr)	L_R =	0.766
Deck Fitting Loss (lb/hr)	L_F =	0.941
Deck Seam Loss (lb/hr)	L_D =	0.000
Withdrawal Loss (lb/hr)	L_{WD} =	13.294
Total Short-Term Loss	L_T =	15.001 lb/hr

Sample Calculations:

Rim Seal Losses (lb/hr) = (Annual Rim Seal Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{4828.20 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.766 lb/hr

Deck Fitting Loss (lb/hr) = (Annual Deck Fitting Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{5936.80 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.941 lb/hr

Deck Seam Losses = (Annual Deck Seam Losses) / (Total Hours / Year) * ($P^*_{Maximum}$) / (P^*_{Annual})

$$= \frac{0.00 \text{ lb}}{\text{yr}} \cdot \frac{\text{yr}}{8760 \text{ hr}} \cdot \frac{0.326}{0.235}$$

= 0.000 lb/hr

Withdrawal Losses = (Annual Withdrawal Losses) * (Maximum Filling Rate) / (Annual Throughput)

$$= \frac{4874.40 \text{ lb}}{\text{yr}} \cdot \frac{60000 \text{ bbl}}{\text{hr}} \cdot \frac{\text{yr}}{22000000 \text{ bbl}}$$

= 13.294 lb/hr

Emissions Calculations for Loading Increase and Fugitive Piping Corrections

EMISSION ESTIMATES FOR MARINE LOADING

EMISSION FACTOR EQUATION[1]

$$L = \frac{12.46\ S\ P\ M}{T}$$ (AP-42, Fifth Edition, Equation 5.2-1)

where: L = Loading loss (lb/1000 gal liquid loaded)
M = Vapor molecular weight of liquid loaded (lb/lb-mol)
P = True vapor pressure of liquid loaded (psia)
T = Temperature of bulk liquid loaded (°R)
S = Saturation factor (from AP-42 Table 5.2-1)

HOURLY VOC EMISSIONS

FIN	Loading Vessel	Liquid Loaded[3]	Saturation Factor (S)	Maximum Temp. (°F)	Maximum Temp. (°R)	Vapor Mol. Wt. (lb/lb-mol)	Vapor Pressure (psia)	Loading Loss (lb/1000 gal)	Hourly Loading Rate (gal/hr)	Uncontrolled Loading Losses (lb/hr)	Collection Efficiency (%)	EPN: DOCK Uncollected Loading Fugitive Emissions (lb/hr)[5]	Control Efficiency (%)	EPNs: MVCU1, MVCU2, MVCU3 [8] Controlled Loading Emissions (lb/hr)[4]
DOCK	Marine Vessel	Crude Oil	0.2	80	539.6	50.30	10.90	2.532	2,520,000	N/A	99.9	6.38	99.9	6.38
									Total:	**N/A**	**Total:**	**6.38**	**Total:**	**6.38**

ANNUAL VOC EMISSIONS

FIN	Loading Vessel	Liquid Loaded[2]	Saturation Factor (S)	Average Temp. (°F)	Average Temp. (°R)	Vapor Mol. Wt. (lb/lb-mol)	Vapor Pressure (psia)	Loading Loss (lb/1000 gal)	Annual Loading Rate (gal/yr)	Uncontrolled Loading Losses (tons/yr)	Collection Efficiency (%)	EPN: DOCK Uncollected Loading Fugitive Emissions (tons/yr)[5]	Control Efficiency (%)	EPNs: MVCU1, MVCU2, MVCU3 Controlled Loading Emissions (tons/yr)[4]
DOCK	Marine Vessel	Crude Oil	0.2	73.5	533.1	50.30	9.28	2.18	7,862,400,000	N/A	99.9	8.58	99.9	8.58
									Total:	**N/A**	**Total:**	**8.58**	**Total:**	**8.58**

Sample calculations:

Annual Loading loss for Crude Oil = $\frac{12.46\ S\ P\ M}{T}$
= $\frac{(12.46)\ (0.20)\ (9.280\text{ psia})\ (50.300\text{ lb/lb-mol})}{(533.1\ °R)}$
= 2.182 lb/1000 gal

Annual Loading losses for Crude Oil = (Loading loss emission factor) (Annual loading rate)
= (2.182 lb/1000 gal) (ton/ 2000 lb) (7,862,400,000 gal/yr)
= 8,577.890 tons/yr

Annual Uncollected Loading Fugitive Emissions for Crude Oil = (Annual loading losses) (100% - Collection efficiency)
= (8,577.89 tons/yr) (100% - 99.9%)
= 8.5779 tons/yr

Annual Controlled Loading Emissions for Crude Oil = (Annual Loading Losses) (Collection efficiency Assumed to be 100%) (100% - Control efficiency)
= (8,577.89 tons/yr) (100.00%) (100% - 99.9%)
= 8.5779 tons/yr

NOTES:
1. Calculations based on equation (1) from AP-42, Fifth Edition, Section 5.2, with the saturation factor for submerged loading of ships.
2. Vapor pressure is based on crude oil with an RVP of 10 at an annual average temperature.
3. Vapor pressure is based on crude oil with an RVP of 10 at a temperature that will produce the highest emissions.
4. Controlled emissions are based on 100% collection efficiency to estimate worst-case emissions from the marine vapor combustors.
5. Uncollected emissions are represented at 0.1% of the loading loss equation, based on on-site testing.
6. The annual temperature could be higher, but a lower temperature is used to estimate the highest emission rates since the temperature is in the denominator of the AP-42 loading loss equation.
7. Variables represented in the calculations are used to estimate maximum hourly and annual emission rates and are not
8. The hourly controlled loading emissions are evenly distributed amongst the three EPNs: MVCU1, MVCU2 and MVCU3.

EMISSION ESTIMATES FOR MARINE LOADING

UNCOLLECTED H_2S EMISSIONS

FIN: DOCK, EPN: DOCK

Compound	Liquid Mol. Wt. (lb/lb-mol)	Hourly							Annual						
		Maximum Hourly H2S Concentration (ppmw)	H2S Liquid mol Fraction (x)	K Factor*	H2S Vapor mol Fraction (y)	Mass Ratio (lb H2S/lb VOC)	Uncollected / Uncontrolled VOC Emissions (lb/hr)	H2S Emissions (lb/hr)	Annual Average H2S Concentration (ppmw)	H2S Liquid mol% (x)	K Factor	H2S Vapor Fraction (y)	Mass Ratio (lb H2S/lb VOC)	Uncollected / Uncontrolled VOC Emissions (tpy)	H2S Emissions (tpy)
Crude Oil	207	19	0.00012	27	0.0031	0.0028	6.38	0.018	15	0.00009	24	0.0022	0.0023	8.58	0.020
							Total:	**0.018**						**Total:**	**0.020**

Sample calculation:

Crude Oil H2S Liquid mol Fraction (x) = (H2S liquid wt% / H2S liquid MW) / ((H2S liquid wt% / H2S liquid MW) + (Crude Oil liquid wt%) / (Crude Oil liquid MW))
= (19 ppmw / 1000000 / 34.1 lb/lb-mol) / ((19 ppmw / 1000000 / 34.1 lb/lb-mol) + (1 - 19 ppmw /1000000) / 207 lb/lb-mol)
= 0.00012

H2S Vapor mol Fraction (y) = (H2S Liquid mol Fraction (x)) (K Factor)
= (0.00012) (27.000)
= 0.0031

Mass Ratio (lb H2S/lb VOC) = (H2S Vapor mol Fraction (y)) (34 lb/lb-mol H2S) / ((vapor pressure) (Vapor Mol. Wt.(lb/lb-mol)))
= (0.0031) (34 lb/lb-mol H2S) / ((0.7415 atm) (50.3 lb/lb-mol))
= 0.0028 lb H2S/lb VOC

H2S Emissions (lb/hr) = (Mass Ratio) (Uncollected / Uncontrolled VOC Emissions (lb/hr))
= (0.0028 lb H2S/lb VOC) (6.3807 (lb VOC/hr))
= 0.018 lb/hr

*K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972. The K value is based on a temperature of 95 F.

Note: Variables represented in the calculations are used to estimate maximum hourly and annual emission rates and are not intended to be binding. Although actual values may vary or may be higher than those represented, actual emission rates represented, actual emission rates will be below the proposed emission rates.

FHR's Exhibit E

EMISSION ESTIMATES FOR MARINE LOADING

EMISSIONS GENERATED AT CONTROL DEVICE

FIN: MVCU1/MVCU2/MVCU3, EPN: MVCU1/MVCU2/MVCU3

Max Hourly Firing Capacity: 540 MM Btu/hr
Annual Firing Capacity: 2,267,455 MM Btu/yr

Pollutant	Hourly			Annual		
	Emission Factor (lb/MM Btu)	Emisson Factor Basis	Emission Rate (lb/hr)	Emission Factor (lb/MM Btu)	Emisson Factor Basis	Emission Rate (tons/yr)
NOx	0.023	Vendor	12.42	0.023	Vendor	26.08
CO	0.03	Vendor	16.20	0.03	Vendor	34.01
PM	0.0075	AP-42 (5th Ed.), Section 1.4	4.05	0.0075	AP-42 (5th Ed.), Section 1.4	8.50
VOC	0.0054	AP-42 (5th Ed.), Section 1.4	2.92	0.0054	AP-42 (5th Ed.), Section 1.4	6.12

Sample calculation:

Annual NOx Emissions = (Total annual heat release) (NOx emission factor) (1 ton/2000 lbs)
= (2,267,454.94 MM Btu/yr) (0.02 lb/MM Btu) (1 ton/2000 lbs)
= 26.08 tons/yr

SO_2 Emissions from Supplemental/Pilot Fuel

Compound	Hourly			Annual		
	SO_2 Emission Factor (gr S/100 scf)	Usage Rate (scf/hr)	SO_2 Emissions (lb/hr)	SO_2 Emission Factor (gr S/100 scf)	Usage Rate (MM scf/yr)	SO_2 Emissions (tons/yr)
Supplemental and Pilot Fuel	5	80000.00	1.14	0.5	300.00	0.21
		Total	**1.14**		**Total**	**0.21**

Sample calculation:

ınual SO2 Emissions from Supplemental and Pilot Fuel = (Usage rate) (SO2 Emission Factor) (1 lb/7000 gr) (1 lbmol S/32.1 lb S) (lbmol SO2/lbmol S) (64.1 lb SO2/1 lbmol SO2) (1 ton/2000 lbs)
= (300 MM scf/yr)(1,000,000 scf/MM scf) (5 gr S/100 scf) (1 lb/7000 gr) (1lbmol S/32.1lb S) (lbmol SO2/lbmol S) (64.1lb SO2/1lbmol SO2) (ton/2000 lb)
= 2.1395 tons/yr

FHR's Exhibit E

EMISSION ESTIMATES FOR MARINE LOADING

H2S and SO2 Emissions from Material Loaded

FIN: DOCK, EPN: MVCU1/MVCU2/MVCU3

Compound	Liquid Mol. Wt. (lb/lb-mol)	Conversion % to SO2	Hourly								Annual							
			Maximum Hourly H2S Concentration (ppmw)	H2S Liquid mol Fraction (x)	K Factor*	H2S Vapor mol Fraction (y)	Mass Ratio (lb H2S/lb VOC)	Controlled VOC Emissions (lb/hr)	H2S Emissions (lb/hr)	SO2 Emissions (lb/hr)	Annual Average H2S Concentration (ppmw)	H2S Liquid mol% (x)	K Factor	H2S Vapor Fraction (y)	Mass Ratio (lb H2S/lb VOC)	Controlled VOC Emissions (tpy)	H2S Emissions (tpy)	SO2 Emissions (tpy)
Crude Oil	207	99%	19	0.00012	27	0.0031	0.0028	6380.74	0.18	34.19	15	0.00009	24	0.0022	0.002	8577.89	0.20	37.89
								Total:	**0.18**	**34.19**						**Total:**	**0.20**	**37.89**

Note: SO2 emissions are based on 100% conversion of H_2S to SO_2 to be conservative.

Sample calculation:

Crude Oil H2S Liquid mol Fraction (x) = (H2S liquid wt% / H2S liquid MW) / ((H2S liquid wt% / H2S liquid MW) + (Crude Oil liquid wt%) / (Crude Oil liquid MW))
= (19 ppmw / 1000000 / 34 lb/lb-mol) / ((19 ppmw / 1000000 / 34 lb/lb-mol) + (1 - 19 ppmw /1000000) / 207 lb/lb-mol)
= 0.00012

H2S Vapor mol Fraction (y) = (H2S Liquid mol Fraction (x)) (K Factor)
= (0.00012) (27.000)
= 0.0031

Mass Ratio (lb H2S/lb VOC) = (H2S Vapor mol Fraction (y)) (34 lb/lb-mol H2S) / ((vapor pressure) (Vapor Mol. Wt.(lb/lb-mol)))
= (0.0031) (34 lb/lb-mol H2S) / ((0.7415 atm) (50.3 lb/lb-mol))
= 0.0028 lb H2S/lb VOC

H2S Emissions (lb/hr) = (Mass Ratio) (Controlled VOC Emissions (lb/hr)) (1-Conversion)
= (0.0028 lb H2S/lb VOC) (6380.7411 (lb VOC/hr)) (1-0.99)
= 0.18 lb/hr

SO2 Emissions from Crude Oil (lb/hr) = (Controlled VOC Emissions (lb/hr)) (Mass Ratio (lb H2S/lb VOC)) (molar weight SO2/ molar weight H2S)
= (0.003 lb H2S/lb VOC) (6,380.7411 lb/hr) (64 lb/lbmol/34 lb/lbmol)
= 34.19 lb/hr

*K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972. The K value is based on a temperature of 85 F.

Note: Variables represented in the calculations are used to estimate maximum hourly and annual emission rates and are not intended to be binding. Although actual values may vary or may be higher than those represented, actual emission rates represented, actual emission rates will be below the proposed emission rates.

FHR's Exhibit E

EMISSION ESTIMATES FOR MARINE LOADING

UNCOLLECTED / UNCONTROLLED LOADING FUGITIVE EMISSIONS SUMMARY

FIN: DOCK, EPN: DOCK

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tons/yr)
VOC	6.38	8.58
H2S	0.02	0.02

CONTROL EMISSIONS SUMMARY

FIN: DOCK/MVCU1/MVCU2/MVCU3, EPN: MVCU1/MVCU2/MVCU3

Pollutant	MVCU1	MVCU2	MVCU3	MVCU1/MVCU 2/ MVCU3 Annual Group Limit
	(lb/hr)	(lb/hr)	(lb/hr)	(tons/yr)
NOx	4.14	4.14	4.14	26.08
CO	5.40	5.40	5.40	34.01
PM	1.35	1.35	1.35	8.50
SO_2	11.78	11.78	11.78	38.10
H_2S	0.06	0.06	0.06	0.20
VOC	3.10	3.10	3.10	14.70

FHR's Exhibit E

VOC CAP FOR EXISTING STORAGE TANKS

Source	EPN	VOC lbs/hr	VOC tons/yr
Tank 28067	TK-28067	9.83	9.20
Tank 28068	TK-28068	8.56	7.66
Tank 28069	TK-28069	7.98	5.84
Tank 28070R	TK-28070R	12.90	5.55
Tank 28071	TK-28071	7.78	6.00
Tank 28072	TK-28072	8.32	7.71
Tank 28073	TK-28073	8.26	7.53
Tank 28074	TK-28074	8.37	7.89
Tank 28075	TK-28075	14.97	7.83
Tank 28076	TK-28076	8.35	7.82
Tank 28077	TK-28077	9.06	6.76
Tank 28080	TK-28080	8.32	7.72
Tank 28086	TK-28086	7.96	7.56
Tank 28082	TK-28082	0.03	0.0003
Tank 28083	TK-28083	0.03	0.0003
Tank Cap *			**67.74**

* The cap is being revised to reflect the removal of Tanks 28063, 28064, and 28070 and the addition of Tank 28070R, which replaced Tank 28070.

Fugitive Emission Rate Estimates
Ingleside Terminal
Total Components

FIN:	FUG-1
EPN:	FUG-1
Operating schedule (hr/yr):	8760

Flint Hills Resources Corpus Christi, LLC will be implementing a 28VHP Leak Dection and Repair program as directed by the TCEQ's Current Tier I BACT Requirements for fugitive emissions. This program has 97% credit for valves and 85% credit for pumps and compressors. The TCEQ reccomends the Oil and Gas Production Operations factors as most appropriate for use in estimating fugitive emissions from this site.

Emission Source	Source Count	Emission Factors (lb/hr-source)	Control Factor	Controlled Emissions (lb/hr)	Controlled Emissions (ton/yr)
Valves - gas	176	0.00992	0.97	0.0524	0.2294
Valves - light liquid	1670	0.0055	0.97	0.2756	1.2069
Pump seals	33	0.02866	0.85	0.1419	0.6214
Flanges - gas	254	0.00086	0.30	0.1529	0.6697
Flanges - light liquid	3720	0.000243	0.30	0.6328	2.7715
Relief valve	23	0.0194	0.97	0.0134	0.0586
Sampling Connection - light liquid	0	0.0165	0.00	0.0000	0.0000
TOTAL VOC EMISSIONS:				1.2689	5.5576

SAMPLE CALCULATION:

Valves (light liquid) = (1,670 sources)(0.0055000 lb/hr-source)(1 - 0.97)
= 0.2756 lb/hr

Pollutant	Weight Fraction	Emission Rate (lb/hr)	Emission Rate (ton/yr)
Benzene	0.0060	0.0076	0.0333
Cumene	0.0010	0.0013	0.0056
Cyclohexane	0.0070	0.0089	0.0389
Ethylbenzene	0.0040	0.0051	0.0222
Hexane	0.0040	0.0051	0.0222
Toluene	0.0100	0.0127	0.0556
Trimethylbenzene	0.0033	0.0042	0.0183
Trimethylpentane	0.0010	0.0013	0.0056
Xylene	0.0140	0.0178	0.0778
Crude Oil - misc.	0.9497	1.2050	5.2781
Total	1.000	1.2689	5.5576

H_2S Emissions

Hourly Mass Ratio* lb H_2S/lb VOC	Annual Mass Ratio* lb H_2S/lb VOC	H_2S Emissions (lb/hr)	H_2S Emissions (tpy)
0.0754	0.0161	0.0956	0.0897

SAMPLE CALCULATION:

H_2S Emissions (tpy) = (5.5576 tons VOC per year)(0.0161 lb H_2S per lb VOC)
=0.0897 tpy

* Mass Ratio value is taken from the Tank H_2S calculations.

Emission Calculations for PBR Registration No. 160536

Table 2.1
MOC 1812-044 Potential Emissions (EPN: FUG-1)
Ingleside Terminal Annual CY 2019 under PBR 106.261
Flint Hills Resources Ingleside, LLC

MOC Description:
This MOC involved the installation of a knockout pot on the tubing upstream of the oxygen analyzers with isolation valves upstream and downstream of the knockout pot, and the installation of a drain valve on the bottom of the knockout pot at the Ingleside Terminal Dock 4. The oxygen analyzers are located on the crude oil loading line and the project eliminated the potential for liquid build-up in the oxygen analyzers. There was no increase to capacity, production rate, or throughput beyond existing levels as a result of this project because liquid build-up in the oxygen analyzers has not resulted in loading downtime.

Process Description:
The Ingleside Terminal is a storage tank facility that stores both crude oil and condensate. The Terminal's primary function is collecting, storing, blending, and transferring various crude oils and condensate offsite.

Stream Type: Crude Oil

Component Type	Service	No. of Components	USEPA Petroleum Marketing Terminal with 28PET Emission Factor (1)	Control Efficiency (2)	Calculated Emission Rates (3)	
			lb/hr-component	%	lb/hr	tpy
Valves	Gas/Vapor	12	0.0000287	0	<0.001	0.002
Flanges/Connectors	Gas/Vapor	24	0.000092604	0	0.002	0.010
Total Unspeciated Emissions					**0.003**	**0.012**

Chemical	VOC?	Stream Composition	Speciated Emission Rates (4, 5)	
		Wt %	lb/hr	tpy
Crude Oil	Yes	100.0	0.003	0.012
VOC Total	-	**100.0**	**0.003**	**0.012**

Notes:

1) TCEQ Air Permit Technical Guidance Package for Chemical Sources - Fugitive Guidance (APDG 6422, June 2018). FHR has implemented an audio, visual, and olfactory Inspection and Maintenance (I&M) program as specified in the March 21, 1996 TNRCC memo for Petroleum Marketing Terminal Fugitive Emission Factors. The facility is a marketing terminal; therefore, these factors are the most appropriate for use in estimating fugitive emissions from this site.

2) Control credit is included in the emission factor.

3) Sample Calculations - Fugitive Emissions (Valves)

12 components * 0.0000287 lb/hr-component * (1 - 0/100) = <0.001 lb/hr

<0.001 lb/hr * 8,760 hr/yr / 2,000 lb/ton = 0.002 tpy

4) Sample Speciated Calculations - Crude Oil

0.003 lb/hr * 100.0 Wt % Crude Oil = 0.003 lb/hr

0.012 tpy * 100.0 Wt % Crude Oil = 0.012 tpy

5) The speciated emission rates are compared to the applicable individual chemical emission limits of 106.261 in Table 1.0.

Table 2.2
MOC 1904-072 Potential Emissions (EPN: FUG-1)
Ingleside Terminal Annual CY 2019 under PBR 106.261
Flint Hills Resources Ingleside, LLC

MOC Description:
This MOC involved the installation of pressure transmitters on pumps and crude tanks throughout the Ingleside Terminal. There was no increase to capacity, production rate, or throughput beyond existing levels as a result of this project because the pressure transmitters are only being installed to provide visibility to the board operators.

Process Description:
The Ingleside Terminal is a storage tank facility that stores both crude oil and condensate. The Terminal's primary function is collecting, storing, blending, and transferring various crude oils and condensate offsite.

Stream Type: Crude Oil

Component Type	Service	No. of Components	USEPA Petroleum Marketing Terminal with 28PET Emission Factor (1)	Control Efficiency (2)	Calculated Emission Rates (3)	
			lb/hr-component	%	lb/hr	tpy
Valves	Light Liquid	10	0.0000948	0	0.001	0.004
Flanges/Connectors	Light Liquid	32	0.00001762	0	0.001	0.003
				Total Unspeciated Emissions	**0.002**	**0.007**

Chemical	VOC?	Stream Composition	Speciated Emission Rates (4, 5)	
		Wt %	lb/hr	tpy
Crude Oil	Yes	100.0	0.002	0.007
VOC Total	-	**100.0**	**0.002**	**0.007**

Notes:
1) TCEQ Air Permit Technical Guidance Package for Chemical Sources - Fugitive Guidance (APDG 6422, June 2018). FHR has implemented an audio, visual, and olfactory Inspection and Maintenance (I&M) program as specified in the March 21, 1996 TNRCC memo for Petroleum Marketing Terminal Fugitive Emission Factors. The facility is a marketing terminal; therefore, these factors are the most appropriate for use in estimating fugitive emissions from this site.
2) Control credit is included in the emission factor.
3) Sample Calculations - Fugitive Emissions (Valves)
10 components * 0.0000948 lb/hr-component * (1 - 0/100) = 0.001 lb/hr
0.001 lb/hr * 8,760 hr/yr / 2,000 lb/ton = 0.004 tpy
4) Sample Speciated Calculations - Crude Oil
0.002 lb/hr * 100.0 Wt % Crude Oil = 0.002 lb/hr
0.007 tpy * 100.0 Wt % Crude Oil = 0.007 tpy
5) The speciated emission rates are compared to the applicable individual chemical emission limits of 106.261 in Table 1.0.

Emission Calculations for PBR Registration No. 161793

Table 1.1
MOC 1907-436 Potential Emissions (EPN: FUG-1)
New Fugitive Components
Flint Hills Resources Ingleside, LLC

Stream Type: Crude Oil and Stabilized Condensate, and Refinery Petroleum Fractions[6]

Component Type	Service	No. of Components	USEPA Petroleum Marketing Terminal with 28PET Emission Factor (1)	Control Efficiency (2)	Calculated Emission Rates (3)	
			lb/hr-component	%	lb/hr	tpy
Valves	Gas/Vapor	24	0.0000287	0	0.001	0.003
Valves	Light Liquid	12	0.0000948	0	0.001	0.005
Flanges/Connectors	Gas/Vapor	40	0.000092604	0	0.004	0.016
Flanges/Connectors	Light Liquid	48	0.00001762	0	0.001	0.004
				Total Unspeciated Emissions	**0.007**	**0.028**

Chemical	VOC?	Stream Composition	Speciated Emission Rates[5]	
		Wt %	lb/hr	tpy
Crude Oil and Stabilized Condensate, and Refinery Petroleum Fractions	Yes	100.0	0.007	0.028
VOC Total (6)	-	**100.0**	**0.007**	**0.028**

Notes:

1) TCEQ Air Permit Technical Guidance Package for Chemical Sources - Fugitive Guidance (APDG 6422, June 2018). FHR has implemented an audio, visual, olfactory Inspection and Maintenance (I&M) program as specified in the March 21, 1996 TNRCC memo for Petroleum Marketing Terminal Fugitive Emission Factors. Because this facility is a petroleum marketing terminal, these factors are the most appropriate for use in estimating fugitive emissions from this site.
2) Control credit is included in the emission factor.
3) Sample Calculations - Fugitive Emissions (Valves)
   24 components * 0.0000287 lb/hr-component * (1 - 0/100) = 0.001 lb/hr
   0.001 lb/hr * 8,760 hr/yr / 2,000 lb/ton = 0.003 tpy
4) Sample Speciated Calculations – Crude Oil
   0.007 lb/hr * 100.0 Wt % Crude Oil = 0.007 lb/hr
   0.028 tpy * 100.0 Wt % Crude Oil = 0.028 tpy
5) The speciated emission rates are compared to the applicable individual chemical emission limits of 106.261 in Table 1.0.
6) The refinery petroleum fractions include refined fuel products with a vapor pressure less than crude oil and stabilized condensate, such as naphtha, diesel, No. 6 oil, and coker gas oil.

Table 1.2
MOC 1907-436 Potential Annual Tank Emissions (EPN: TK-28070R)
New Crude Oil Tank
Flint Hills Resources Ingleside, LLC

Data Input			**Value**	**Basis and Notes**	
EPN			TK-28070R		
EPN Name			Crude Oil Tank		
Material Stored Data	**Variable**	**Units**	**Value**	**Basis and Notes**	
Tank Contents/Service			Crude Oil, Stabilized Condensate, and Refinery Petroleum Fractions		
Tank Content Category			Crude Oil		
Speciation Type			Full Speciation		
Product Stored			Crude Oil		
Stock Reid Vapor Pressure	RVP	psia	10		
Annual Throughput	Q_{ANN}	bbl/yr	46,000,000		Tank Capacity * Turnovers * Conversion Factor
Maximum Pumping Rate	PR_M	bbl/hr	40,000		
Hourly Throughput	Q_{HR}	bbl/yr	350,400,000		Maximum Pumping Rate * 8,760 hr/yr
Tank Parameters	**Variable**	**Units**	**Value**	**Basis and Notes**	
Tank Type			Internal		
Tank Construction			Welded		
Tank Deck Construction			Welded		
Deck Seam Length Type	S_D	NA	Welded Deck		
Welded Rim-Seal System			Mechanical Shoe		
Mechanical Shoe Type			Rim Mounted		
Tank Capacity	C	gal	12,089,868		
Diameter	D	ft	190		
Tank Roof Paint Color			White		
Tank Roof Paint Condition			New		
Tank Shell Paint Color			White		
Tank Shell Paint Condition			New		
Tank Shell Paint Solar Absorptance	α_S	-	0.17	Table 7.1-6	
Tank Roof Paint Solar Absorptance	α_R	-	0.17	Table 7.1-6	
Number of Fixed Roof Support Columns	N_C		0	Table 7.1-11	For a self-supporting fixed roof or an external floating roof tank $N_C = 0$
Effective Column Diameter	F_C	ft	1.0		
Tank Operation	**Variable**	**Units**	**Value**	**Basis and Notes**	
Avg. Daily Liq. Surface Temp.	T_{LA}	°F	73.80	Eq. 2-5	$T_{LA} = [(2.86\ (H_S/D)+1.43)\ T_{AA} + (3.52\ (H_S/D)+3.79)\ T_B + (0.027*\alpha_R * I) + (0.017\ (H_S/D)\alpha_S * I)] / [6.38\ (H_S/D)+5.22]$
Avg. Daily Max. Liq. Surface Temp.	T_{LX}	°F	78.17	Figure 7.1-17 Section 7.1.3.8.4	$T_{LX} = T_{LA} + 0.25 * \Delta T_V$ $T_{LX} = T_{BX}$
Avg. Daily Min. Liq. Surface Temp.	T_{LN}	°F	69.43	Figure 7.1-17 Section 7.1.3.8.4	$T_{LN} = T_{LA} - 0.25 * \Delta T_V$ $T_{LN} = T_{BN}$
Avg. Daily Vapor Temp. Range	ΔT_V	°R	17.48	Eq. 1-6	$\Delta T_V = (1 - (0.8 / 2.2 * (H_S/D)+1.9))\ \Delta T_A + (0.042 * \alpha_R * I + 0.026 *(H_S/D)\ \alpha_S * I)/(2.2 * (H_S/D)+1.9)$ (Uninsulated tank)
Bulk Liquid Temperature	T_B	°R	532.68	Eq. 1-31	$T_B = T_{AA} + 0.003 * \alpha_S * I$
Meteorological Data	**Variable**	**Units**	**Value**	**Basis and Notes**	
Meteorological Period Basis			**Annual**		
Number of Days Tank is in Service	N_D	days/yr	365		
Tank Location			Corpus Christi, Texas		
Daily Total Solar Insolation	I	Btu/ft²day	1,497.0	AP-42, Chapter 7, Section 7.1, Table 7.1-7 (11/19)	
Daily Max. Ambient Temp.	T_{AX}	°F	81.10	AP-42, Chapter 7, Section 7.1, Table 7.1-7 (11/19)	

Table 1.2
MOC 1907-436 Potential Annual Tank Emissions (EPN: TK-28070R)
New Crude Oil Tank
Flint Hills Resources Ingleside, LLC

Data Input			**Value**	**Basis and Notes**	
Daily Min. Ambient Temp.	T_{AN}	°F	63.40	AP-42, Chapter 7, Section 7.1, Table 7.1-7 (11/19)	
Atmospheric Pressure	P_A	psia	14.68	AP-42, Chapter 7, Section 7.1, Table 7.1-7 (11/19)	
Avg. Daily Ambient Temp.	T_{AA}	°F	72.25	Eq. 1-30	$T_{AA} = (T_{AX} + T_{AN}) / 2$
Avg. Daily Ambient Temp. Range	ΔT_A	°R	17.70	Eq. 1-11	$T_{AX} - T_{AN}$
Emission Calculations	**Variable**	**Units**	**Value**	**Basis and Notes**	
Standing Loss Emissions	$\mathbf{L_S}$	**lb/yr**	**1,365.95**	**Eq. (2-2)**	$\mathbf{L_S = L_R + L_F + L_D}$
Rim Seal Loss	L_R	lb/yr	561.028	Eq. 2-3	$L_R = (K_{Ra} + K_{Rb}\, v^n)\, D P^* M_V K_C$
Zero Wind Speed Rim Seal Loss Factor	K_{Ra}	lbmole/ft-yr	0.6	Table 7.1-8	
Wind Speed Dep. Rim Seal Loss Factor	K_{Rb}	lbmole/(mph)^n ft-yr	0.4	Table 7.1-8	
Avg. Ambient Wind Speed	v	mph	0.0	Eq. 2-3 Note 1	v = 0 for internal or domed external floating roof tank
Seal-Related Wind Speed Exponent	n	-	1.0	Table 7.1-8	
Vapor Pressure Function	P^*	-	0.25	Eq. 2-4	$P^* = (P_{VA} / P_A) / (1 + [1 - (P_{VA}/P_A)]^{0.5})^2$
Vapor Pressure @ T_{LA}	P_{VA}	psia	9.31	Eq. 1-24	$P_{VA} = \Sigma P_i = \Sigma (P * x_i)$
Vapor Molecular Weight	M_V	lb/lbmole	50.00		
Product Factor	K_C		0.4		0.4 for crude oils and 1 for all other organic liquids
Deck Fitting Loss	L_F	lb/yr	804.927	Eq. 2-13	$L_F = F_F P^* M_V K_C$
Total Deck Fitting Loss Factor	F_F	lbmole/yr	163.56	Eq. 2-14	$F_F = [(N_{F1} K_{F1}) + (N_{F2} K_{F2}) + ... + (N_{Fnf} K_{Fnf})]$
Deck Seam Loss	L_D	lb/yr	0.000	Eq. 2-18	$L_D = K_D S_D D^2 P^* M_V K_C$
Working (Withdrawal) Loss	$\mathbf{L_W}$	**lb/yr**	**9,725.804**	**Eq. 2-19**	$\mathbf{L_W = [(0.943\ Q\ C_S\ W_L) / D] * [1 + (N_C F_C / D)]}$
Shell Clingage Factor	C_S	bbl/1,000 ft^2	0.006	Table 7.1-10	
Average Organic Liquid Density	W_L	lb/gal	7.10		
Annual Total Routine Losses[3]	$\mathbf{L_T}$	lb/yr	**11,091.76**	**Eq. (2-1)**	$\mathbf{L_T = L_S + L_W}$
		tons/yr	**5.546**		
Withdrawal Loss	$\mathbf{L_W}$	lb/hr	**8.457**	Eq. 3	$L_W = [0.943\ Q_{MAX}\ C_S\ W_L / D][1 + N_C F_C / D]$
Max. Throughput	Q_{MAX}	bbl/yr	350,400,000	Eq. 2	$Q_{MAX} = PR_M$ * hr/yr
Rim Seal Loss	$\mathbf{L_R}$	lb/hr	**0.128**	Eq. 4	$L_R = (K_{Ra} + K_{Rb}\, v^n)\, D P^* M_V K_C$
Worst Month Wind Speed	v_{MAX}	mph	0.00	AP-42, Chapter 7, Section 7.1, Table 7.1-7 (11/19)	
Vapor Pressure Function	P^*_{MAX}		0.33	Eq. 5	$P^* = (P_{VHR} / P_A) / (1 + [1 - (P_{VHR}/P_A)]^{0.5})^2$
Vapor Pressure at Max. Liq. Surface Temp.	P_{VHR}	psia	10.90		
Worst-case Liquid Surface Temperature	T_{HR} =	°R	554.67		TCEQ practice is to use either 95°F (554.67°R) or the actual temperature if greater than 95°F
Product Factor	K_C		0.6		0.6 for crude oils and 1 for all other organic liquids
Deck Fitting Loss	$\mathbf{L_F}$ =	lb/hr	**0.183**	Eq. 6	$L_F = F_F P^* M_V K_C$
Deck Seam Loss	$\mathbf{L_D}$ =	lb/hr	**0.000**	Eq. 7	$L_D = K_D S_D D^2 P^* M_V K_C$ (Internal Floating Roof Tanks with Bolted Decks only)
Maximum Short-term Emission Rate[4]	$\mathbf{L_{MAX}}$	**lb/hr**	**8.768**	Eq. 1	$L_{Max} = L_W + L_R + L_F + L_D$

Notes:

1. Variables represented in the VOC emission basis calculations are used to estimate maximum hourly and annual VOC emission rates. Only the throughput and true vapor pressure are intended to be binding. Although actual values of the other variables may vary or may be higher than those represented, the actual emission rates will be below the proposed emission rates. Additionally, the throughputs represented in the calculations only include the throughput that leads to change in the floating roof level (i.e. cause working losses); those occasional instances, where the tank loading and unloading rates match and the floating roof level does not change, are excluded.

2. Crude oil includes crude oil and stabilized condensate, and refinery petroleum fractions. The refinery petroleum fractions include refined fuel products with a vapor pressure less than crude oil and stabilized condensate, such as naphtha, diesel, No. 6 oil, and coker gas oil.

3. AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I, Chapter 7 Liquid Storage Tanks, Section 7.1 Organic Liquid Storage Tanks, dated November 2019.

4. APDG 6419v1, Released 02/18, Short-term Emissions from Floating Roof Tanks.

FHR's Exhibit E

Table 1.3
MOC 1907-436 Potential H2S Emissions Summary (EPN: TK-28070R)
New Crude Oil Tank and Associated Fugitive Components
Flint Hills Resources Ingleside, LLC

Background:

H_2S emissions are calculated by applying the K factor method of Meling, Horne, and Hoover[1] to tank losses. The H_2S mole fraction in the vapor phase of the crude oil is used to calculate H_2S emissions from the working and breathing losses from the fixed-roof tank. The withdrawal loss (or working loss) from floating-roof tanks, however, assumes 100% volatilization. Therefore, for floating-roof tanks the weight fraction in the liquid phase of the crude oil is used to calculate the H_2S emissions from the working loss (withdrawal loss) contribution. The breathing loss contribution is the same for any type of tank. K factors are used to calculate H_2S emissions from loading losses.

K = y/x, where

y = mole fraction of a component in the vapor phase
x = mole fraction of a component in the liquid phase

If x is known, y = Kx

Liquid	Time Period	H_2S, liquid WF	x	K[2]	y	Vapor Pressure, psia	P*	MR lbs H_2S/lb VOC
Crude Oil (RVP 10)	Annual	1.00E-04	0.000609	24	0.014612	9.31	0.633	0.016
	Hourly	5.00E-04	0.003044	27	0.082191	10.90	0.741	0.075

a = annual emisions
h = hourly emissions
x = (WF H_2S)(MW oil)/MW H_2S
WF = Weight Fraction
MW oil = 207

P* = VOC partial pressure = vapor pressure/14.7 psia
MR = mass ratio = (y)(MW H_2S)/(P)(MW oil vapor)
MW = molecular weight
MW H_2S = 34
MW crude oil vapor = 50

EPN	Liquid		VOC Emissions (withdrawal)		(rim seal and deck fitting)		H_2S Emissions	
			lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
TK-28070R	Crude Oil		8.457	4.863	0.311	0.683	0.028	0.011

EPN	Liquid		VOC Emissions	
			lbs/hr	tons/yr
FUG-1	Crude Oil		0.007	0.028

Sample Calculations:

Tank 28070R
H_2S Emissions = (WF) x (withdrawal loss) + (MR) x (rim seal loss + deck fitting loss)
Hourly Emissions = (0.0005) x (8.457) + (0.075) x (0.311) = 0.028 lbs/hr

Notes:
1) "Using K Factors To Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids," by Jeffrey Meling, Karen Horne, and Jay Hoover.

2) K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972. The K value for hourly emissions is based on a temperature of 95 F. The K value for annual emissions is based on a temperature of 85 F.

Table 1.4
MOC 1907-436 Deck Fitting Count (EPN: TK-28070R)
Deck Fitting Counts
Flint Hills Resources Ingleside, LLC

Fitting Type	Fitting Status	Quantity
Access hatch	Bolted cover, gasketed	3
	Unbolted cover, gasketed	
	Unbolted cover, ungasketed	
Fixed roof support column well	Round pipe, ungasketed sliding cover	
	Round pipe, gasketed sliding cover	
	Round pipe, flexible fabric sleeve seal	
	Built-up column, ungasketed sliding cover	
	Built-up column, gasketed sliding cover	
Unslotted guide-pole and well	Ungasketed sliding cover	
	Ungasketed sliding cover w/pole sleeve	
	Gasketed sliding cover	
	Gasketed sliding cover w/pole wiper	
	Gasketed sliding cover w/pole sleeve	
Slotted guide-pole/sample well	Ungasketed or gasketed sliding cover	
	Ungasketed or gasketed sliding cover, w/float	
	Gasketed sliding cover, w/pole wiper	
	Gasketed sliding cover, w/pole sleeve	1
	Gasketed sliding cover, w/pole sleeve, pole wiper	
	Gasketed sliding cover, w/float, pole wiper	
	Gasketed sliding cover, w/float, pole sleeve, pole wiper	1
Gauge-float well (auto. gauge)	Unbolted cover, ungasketed	
	Unbolted cover, gasketed	
	Bolted cover, gasketed	
Gauge-hatch/sample port	Weighted mechanical action, gasketed	
	Weighted mechanical actuation, ungasketed	1
	Slit fabric seal, 10% open area	
Vacuum breaker	Weighted mechanical actuation, ungasketed	
	Weighted mechanical actuation, gasketed	3
Deck drain	Open	
	90% closed	
Stub drain		
Deck leg	Adjustable, internal floating deck	
	Adjustable, pontoon area, ungasketed	28
	Adjustable, pontoon area, gasketed	
	Adjustable, pontoon area, sock	
	Adjustable, center area, ungasketed	73
	Adjustable, center area, gasketed	
	Adjustable, center area, sock	
	Adjustable, double-deck roofs	
	Fixed	
Rim vent	Weighted mechanical actuation, ungasketed	
	Weighted mechanical actuation, gasketed	
Ladder well	Sliding cover, ungasketed	
	Sliding cover, gasketed	

Table 1.5
MOC 1907-436 Deck Fitting Loss Factors Calculations (EPN: TK-28070R)
Deck Fitting Loss Factors
Flint Hills Resources Ingleside, LLC

Fitting Type	Fitting Status	Loss Factor
Access hatch	Bolted cover, gasketed	4.8
	Unbolted cover, gasketed	
	Unbolted cover, ungasketed	
Fixed roof support column well	Round pipe, ungasketed sliding cover	
	Round pipe, gasketed sliding cover	
	Round pipe, flexible fabric sleeve seal	
	Built-up column, ungasketed sliding cover	
	Built-up column, gasketed sliding cover	
Unslotted guide-pole and well	Ungasketed sliding cover	
	Ungasketed sliding cover w/pole sleeve	
	Gasketed sliding cover	
	Gasketed sliding cover w/pole wiper	
	Gasketed sliding cover w/pole sleeve	
Slotted guide-pole/sample well	Ungasketed or gasketed sliding cover	
	Ungasketed or gasketed sliding cover, w/float	
	Gasketed sliding cover, w/pole wiper	
	Gasketed sliding cover, w/pole sleeve	11.0
	Gasketed sliding cover, w/pole sleeve, pole wiper	
	Gasketed sliding cover, w/float, pole wiper	
	Gasketed sliding cover, w/float, pole sleeve, pole wiper	11.0
Gauge-float well (auto. gauge)	Unbolted cover, ungasketed	
	Unbolted cover, gasketed	
	Bolted cover, gasketed	
Gauge-hatch/sample port	Weighted mechanical action, gasketed	
	Weighted mechanical actuation, ungasketed	2.3
	Slit fabric seal, 10% open area	
Vacuum breaker	Weighted mechanical actuation, ungasketed	
	Weighted mechanical actuation, gasketed	18.6
Deck drain	Open	
	90% closed	
Stub drain		
Deck leg	Adjustable, internal floating deck	
	Adjustable, pontoon area, ungasketed	56.0
	Adjustable, pontoon area, gasketed	
	Adjustable, pontoon area, sock	
	Adjustable, center area, ungasketed	59.9
	Adjustable, center area, gasketed	
	Adjustable, center area, sock	
	Adjustable, double-deck roofs	
	Fixed	
Rim vent	Weighted mechanical actuation, ungasketed	
	Weighted mechanical actuation, gasketed	
Ladder well	Sliding cover, ungasketed	
	Sliding cover, gasketed	
TOTAL DECK FITTING LOSS FACTOR, F_F (lb-mol/yr)		**163.56**

PLANNED MAINTENANCE, STARTUP, AND SHUTDOWN EMISSIONS

FHR is not seeking to include planned maintenance, startup or shutdown emissions associated with the operation of the Ingleside Terminal in Permit No. 6606 at this time. MSS activities at the Ingleside Terminal are authorized under PBR 30 TAC §106.263 (PBR Registration No. 107625).

STATE REGULATORY REQUIREMENTS

As demonstrated in this permit application, emissions from the storage tanks, marine loading and fugitive piping components will comply with all rules and regulations of the TCEQ and with the intent of the Texas Clean Air Act (TCAA). A NAAQS analysis and modeling and effects review is provided in Appendix B to demonstrate that emissions changes associated with this application from the project will be protective of public health and property. There are no schools located within 3,000 feet of the Ingleside Terminal.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
Chapter 101	**General Rules**		
§101.2	Multiple Air Contaminant Sources or Properties	☐ Yes ☒ No	FHR is not petitioning the commission to designate two or more properties as a single property
§101.3.	Circumvention	☒ Yes ☐ No	FHR will not use a plan, activity, device or contrivance to conceal or appear to minimize an emission violation of the Act or a regulation.
§101.4	Nuisance	☒ Yes ☐ No	The facility will not discharge air contaminants in such concentration/duration to be injurious or adversely affect human health or welfare, or interfere with the normal use/enjoyment of animal life, vegetation, or property.
§101.5	Traffic Hazard	☒ Yes ☐ No	The facility will not discharge air contaminants, uncombined water, or other materials from any source that causes or has a tendency to cause a traffic hazard or interfere with normal road use.
§101.8 and §101.9	Sampling and Sampling Ports	☒ Yes ☐ No	FHR will comply with the applicable requirements if requested by the board or Executive Director to conduct sampling.
§101.10.	Emissions Inventory Requirements	☒ Yes ☐ No	FHR annually submits an emission inventory by the required due date.
§101.14.	Sampling Procedures and Terminology	☒ Yes ☐ No	FHR will employ commonly accepted methods and procedures for sampling/measuring air contaminants when otherwise not specified in rules, regulations, determinations and/or orders by the commission.
§101.20.	Compliance with Environmental Protection Agency Standards	☒ Yes ☐ No	The sources in this application will be operated to comply with the applicable Environmental Protection Agency Standards as detailed in this supporting documentation.
§101.21.	The National Primary and Secondary Ambient Air Quality Standards	☒ Yes ☐ No	The sources in this application will be operated in accordance with the National Primary and Secondary Air Quality Standards as demonstrated in the air dispersion modeling provided in Appendix B.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§101.23.	Alternate Emission Reduction ("Bubble") Policy	☐ Yes ☒ No	FHR does not seek approval of emission controls from another facility at this site in lieu of controlling the sources as explained in this application.
§101.24.	Inspection Fees	☒ Yes ☐ No	FHR submits the relevant inspection or emissions fees annually to the commission by the specified due date.
§101.26.	Surcharge on Fuel Oil in Specified Boilers	☐ Yes ☒ No	There is not an industrial boiler or utility boiler as defined in §101.1 associated with this application.
§101.27.	Emissions Fees	☒ Yes ☐ No	FHR submits the relevant inspection or emissions fees annually to the commission by the specified due date.
§101.28.	Stringency Determination for Federal Operating Permits	☐ Yes ☒ No	FHR will comply with the relevant state regulatory requirements as defined by §122.10 rather than equivalent or more stringent requirements.
§101.100 through §101.122.	Failure to Attain Fee	☒ Yes ☐ No	FHR will comply with any §185 fee obligation assessed by the Executive Director.
§101.150 through §101.155.	Voluntary Supplemental Leak Detection Program	☐ Yes ☒ No	Does not apply. FHR does not participate in the voluntary supplemental leak detection program.
§101.201.	Emissions Event Reporting and Recordkeeping Requirements	☒ Yes ☐ No	FHR will comply with the emissions events reporting and recordkeeping requirements.
§101.211.	Scheduled Maintenance, Startup, and Shutdown Reporting and Recordkeeping Requirements	☒ Yes ☐ No	FHR will comply with the reporting and recordkeeping requirements for scheduled maintenance, startup, and shutdown activities. FHR submitted a PBR for MSS activities on January 3, 2013.
§101.221 through §101.224.	Operational Requirements, Demonstrations, and Actions to Reduce Excessive Emissions	☒ Yes ☐ No	FHR will comply with the applicable requirements of §101.221 through §101.224.
§101.231 through §101.233.	Variances	☐ Yes ☒ No	FHR is not seeking a variance.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§101.300 through §101.311.	Emission Credit Banking and Trading	☐ Yes ☒ No	This facility does not participate in the emissions credit banking and trading system for this site.
§101.330 through §101.339.	Emission Banking and Trading of Allowances	☐ Yes ☒ No	The site does not include an electric generating unit permitted under Chapter 116, Subchapter I.
§101.350 through §101.363.	Mass Emissions Cap and Trade Program	☐ Yes ☒ No	The site is not located in the Houston/Galveston nonattainment area subject to §117.106, §117.206, or §117.475.
§101.370 through §101.379.	Discrete Emission Credit Banking and Trading	☐ Yes ☒ No	FHR does not participate in this voluntary reduction program.
§101.390 through §101.403.	Highly Reactive Volatile Organic Compound Emission Cap and Trade Program	☐ Yes ☒ No	This Ingleside Terminal is not located in the Houston/Galveston nonattainment area.
§101.501 through §101.508.	Clean Air Interstate Rule	☐ Yes ☒ No	There is no affected combustion device associated with this project that burns fossil fuel which is subject to the requirements in 40 CFR 96 Subparts AA or AAA.
Chapter 111.	**Visible Emissions**		
§111.111 through §111.113.	Visible Emissions	☒ Yes ☐ No	The operation of the marine vapor combustion units may result in occasional visible emissions, but not in excess of the 20% opacity limits specified in 30 TAC 111.111(a)(1)(B).
§111.121 through §111.129.	Incineration	☐ Yes ☒ No	There is not an incinerator associated with this application that burns domestic, commercial, or industrial solid waste as defined in §101.1, medical waste, or hazardous waste as fuel for energy recovery.
§111.131 through §111.139.	Abrasive Blasting of Water Storage Tanks Performed by Portable Operations	☐ Yes ☒ No	Abrasive blasting of water storage tanks performed by portable operations will not be performed at the facility as part of this application.
§111.141 through §111.149.	Materials Handling, Construction, Roads, Streets, Alleys, and Parking Lots	☐ Yes ☒ No	The site is located in San Patricio County which is not listed as an affected area.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§111.151.	Allowable Emissions Limits	☐ Yes ☒ No	There is no change to the hourly PM emission rate for the marine vapor combustion units. Therefore, they will continue to meet the allowable emission rates.
§111.153.	Emissions Limits on Steam Generators	☐ Yes ☒ No	There are no steam generators with heat input greater than 2500 MM Btu/hr or any solid fossil fuel-fired steam generators associated with this application.
§111.171 through §111.175.	Emissions Limits on Agricultural Processes	☐ Yes ☒ No	There are no agricultural processes associated with this application.
§111.181 through §111.183.	Exemptions for Portable or Transient Operations	☐ Yes ☒ No	There are no portable or transient operations such as rock crushers, hot mix asphaltic concrete facilities, etc., associated with this application.
§111.201 through §111.221.	Outdoor Burning	☐ Yes ☒ No	Outdoor burning will not be conducted at the facility as part of this application.
Chapter 112.	**Sulfur Compounds**		
§112.3 through §112.4.	Net Ground Level Concentrations	☒ Yes ☐ No	An air dispersion modeling analysis is provided in Appendix B to demonstrate compliance with the applicable net ground level concentration.
§112.5 and §112.6.	Allowable Emission Rates - Sulfuric Acid Plants	☐ Yes ☒ No	There is not an affected sulfuric acid plant associated with this application.
§112.7.	Allowable Emission Rates - Sulfur Recovery Plant	☐ Yes ☒ No	There is not an affected sulfur recovery plant associated with this application.
§112.8.	Allowable Emission Rates from Solid Fossil Fuel-Fired Steam Generators	☐ Yes ☒ No	There is not a solid fossil fuel-fired steam generator associated with this application.
§112.9.	Allowable Emission Rates - Combustion of Liquid Fuel	☐ Yes ☒ No	There is not a combustion unit associated with this application.
§112.14.	Allowable Emission Rates from Nonferrous Smelter Processes	☐ Yes ☒ No	There is not an affected nonferrous smelter process associated with this application.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§112.15 through §112.18.	Temporary Fuel Shortage Plan	☒ Yes ☐ No	FHR will comply with all applicable filing, operating, notification, and reporting requirements in case of a temporary fuel shortage.
§112.19 through §112.21.	Area Control Plan	☐ Yes ☒ No	FHR does not intend to apply for an Area Control Plan at this time.
§112.31 through §112.34.	Control of Hydrogen Sulfide	☒ Yes ☐ No	An air dispersion modeling analysis is provided in Appendix B to demonstrate compliance with the applicable net ground level concentration.
§112.41 through §112.47.	Control of Sulfuric Acid	☐ Yes ☒ No	The sources associated with this application are not expected to emit sulfuric acid.
§112.51 through §112.59.	Control of Total Reduced Sulfur	☐ Yes ☒ No	The Ingleside Terminal is not a kraft pulp mill.
Chapter 113.	**Toxic Materials**	☒ Yes ☐ No	The facility is potentially subject to MACT Y and MACT EEEE, which are addressed below, but is not subject to any other standard in this chapter since the terminal is not a major source of HAP and does not qualify as any other type of listed source category.
§113.300.	Marine Vessel Loading (40 CFR 63, Subpart Y)	☒ Yes ☐ No	FHR will comply with the applicable requirements for recordkeeping, emission estimation, and submerged fill.
§113.880.	Organic Liquids Distribution (Non-Gasoline) (40 CFR 63, Subpart EEEE)	☐ Yes ☒ No	Not applicable. The Ingleside Terminal is not a major source of HAP emissions.
Chapter 115.	**Volatile Organic Compounds**		
§115.110 through §115.119.	Storage of Volatile Organic Compounds	☒ Yes ☐ No	The tanks associated with this application will comply with the applicable requirements. The storage tanks will store material with a maximum true vapor pressure greater than 1.5 psia and will be controlled with floating roofs.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§115.120 through §115.129.	Vent Gas Control	☐ Yes ☒ No	There is not an affected vent gas stream associated with this application.
§115.131 through §115.139.	Water Separation	☐ Yes ☒ No	There are no oily water separators associated with this application.
§115.140 through §115.149.	Industrial Wastewater	☐ Yes ☒ No	Does not apply. The Ingleside Terminal is not located in the Beaumont/Port Arthur, Dallas/Fort Worth, El Paso, or Houston/Galveston areas.
§115.152 through §115.159.	Municipal Solid Waste Landfills	☐ Yes ☒ No	There is not an affected municipal solid waste landfill sources associated with this application.
§115.160 through §115.169.	Batch Processes	☐ Yes ☒ No	There is not an affected batch process associated with this application.
§115.211 through §115.219.	Loading and Unloading of Volatile Organic Compounds	☐ Yes ☒ No	There is not an affected loading or unloading facility associated with this application. Marine loading is only subject to this section if located in the Houston/Galveston area.
§115.221 through §115.229.	Filling of Gasoline Storage Vessels (Stage I) for Motor Vehicle Fuel Dispensing Facilities	☐ Yes ☒ No	There is not an affected vehicle fuel dispensing facility associated with this application.
§115.234 through §115.239.	Control of Volatile Organic Compound Leaks from Transport Vessels	☐ Yes ☒ No	The sources in this application are not associated with filling or emptying gasoline tank trucks.
§115.240 through §115.248.	Control of Vehicle Refueling Emissions (Stage II) at Motor Vehicle Fuel Dispensing Facilities	☐ Yes ☒ No	There is not an affected motor fuel dispensing facility associated with this application.
§115.252 through §115.259.	Control of Reid Vapor Pressure of Gasoline	☐ Yes ☒ No	Does not apply. The Ingleside Terminal is not located in El Paso County.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§115.311 through §115.319.	Process Unit Turnaround and Vacuum-Producing Systems	☐ Yes ☒ No	There is no affected source associated with this application.
§115.322 through §115.329.	Fugitive Emission Control in Petroleum Refineries in Gregg, Nueces, and Victoria Counties	☐ Yes ☒ No	The Ingleside Terminal is not a petroleum refinery.
§115.352 through §115.359.	Fugitive Emission Control in Petroleum Refining, Natural Gas/Gasoline Processing, and Petrochemical Processes in Ozone Nonattainment Areas	☐ Yes ☒ No	The Ingleside Terminal is not located in a designated ozone nonattainment area.
§115.410 through §115.419.	Degreasing Processes	☐ Yes ☒ No	There is not an affected degreasing facility associated with this application.
§115.420 through §115.429.	Surface Coating Processes	☐ Yes ☒ No	There is not an affected surface coating facility associated with this application.
§115.430 through §115.439.	Flexographic and Rotogravure Printing	☐ Yes ☒ No	There is not an affected rotogravure or flexographic process associated with this application.
§115.440 through §115.449.	Offset Lithographic Printing	☐ Yes ☒ No	There is not an affected offset lithographic printing facility associated with this application.
§115.450 through §115.459.	Control Requirements for Surface Coating Processes	☐ Yes ☒ No	The Ingleside Terminal is not located in the Dallas-Fort Worth or Houston-Galveston-Brazoria areas.
§115.460 through §115.469.	Industrial Cleaning Solvents	☐ Yes ☒ No	The site is not located in the Dallas-Fort Worth or Houston-Galveston-Brazoria areas.
§115.470 through §115.479.	Miscellaneous Industrial Adhesives	☐ Yes ☒ No	The site is not located in the Dallas-Fort Worth or Houston-Galveston-Brazoria areas.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§115.510 through §115.519.	Cutback Asphalt	☐ Yes ☒ No	There is not a source of cutback asphalt associated with this application.
§115.531 through §115.539.	Pharmaceutical Manufacturing Facilities	☐ Yes ☒ No	There is not an affected pharmaceutical manufacturing facility associated with this application.
§115.540 through §115.549.	Degassing or Cleaning of Stationary, Marine, and Transport Vessels	☐ Yes ☒ No	The Ingleside Terminal is not located in an affected county.
§115.552 through §115.559.	Petroleum Dry Cleaning Systems	☐ Yes ☒ No	There is not an affected petroleum dry cleaning system associated with this application.
§115.600 through §115.619.	Automotive Windshield Washer Fluid	☐ Yes ☒ No	FHR's Ingleside Terminal does not sell, supply, offer for sale, distribute, or manufacture automotive windshield washer fluid as defined in §115.600.
§115.720 through §115.729.	Vent Gas Control	☐ Yes ☒ No	The Ingleside Terminal is not located in the Houston/Galveston/Brazoria area.
§115.760 through §115.769.	Cooling Tower Heat Exchange Systems	☐ Yes ☒ No	The Ingleside Terminal is not located in the Houston/Galveston/Brazoria area.
§115.780 through §115.789.	Fugitive Emissions	☐ Yes ☒ No	The Ingleside Terminal is not located in the Houston/Galveston/Brazoria area.
§115.901 through §115.916.	Alternate Means of Control	☐ Yes ☒ No	FHR is not applying for an alternate means of control as part of this permit application.
§115.920 and §115.923.	Early Reductions	☐ Yes ☒ No	An extension of the compliance date is not requested as part of the permit application.
§115.930 through §115.940.	Compliance and Control Plan Requirements	☐ Yes ☒ No	There are no relevant compliance dates or control plan requirements.

CITATION	CITATION DESCRIPTION	APPLICABLE?	COMMENT
§115.950.	Emissions Trading	☐ Yes ☒ No	FHR is not participating in the emissions trading system to meet the emission control requirements.
Chapter 117.	**Nitrogen Oxides**	☐ Yes ☒ No	Chapter 117 is not applicable because the site is located in San Patricio County which is not an affected county and the facility is not a nitric acid production unit.
Chapter 122.	**Federal Operating Permits**	☒ Yes ☐ No	FHR’s Ingleside Terminal operates under Title V Operating Permit No. O3454. FHR will submit the required minor revision to the Title V operating permit as a result of this application.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

As required by §116.111(a)(2)(C), best available control technology (BACT) must be evaluated and applied to all new and modified facilities. A facility is considered modified when there is a physical change or change in the method of operation which results in an increase in the amount of any air contaminant emitted by the facility or results in the emission of any air contaminant not previously emitted.

As part of this amendment application, FHR is revising the BACT evaluation for the new fugitive piping components that were installed as part of the past Expansion Project. Because this application is proposing an increase in the total combined annual throughput of the barge and ship loading of crude oil and stabilized condensate, the marine loading operation is a modified facility and is subject to BACT evaluation. A BACT evaluation is required for the fugitive piping components that are being incorporated into the permit from PBR Registrations No. 160536 and 161793, and the new Tank 28070R being incorporated into the permit from PBR Registration No. 161793. The storage tanks are considered modified facilities for state purposes only since the maximum hourly throughput for each of the tanks is increasing.

The TCEQ BACT analysis consists of three tiers, and in each tier BACT is evaluated on a case-by-case basis for technical practicability and economic reasonableness. Each tier of the three tier analysis is described below.

<u>Tier I</u>

In the Tier 1 analysis, a comparison is made between the proposed emission reduction performance levels and the emission reduction performance levels accepted as BACT in recent NSR permit reviews for the same process and/or industry. Because the emission reduction option has been previously accepted, the technical practicability and economic reasonableness has been demonstrated. This step should also consider any new technical developments, which may indicate that additional emission reductions are technically practical and economically reasonable.

<u>Tier II</u>

A Tier II analysis occurs when BACT requirements have not been established for a particular process/industry or if there are technical differences between the proposed process and others in the same industry. In the Tier II analysis, a comparison is made between the proposed emission reduction level to the emission reduction levels that have been accepted in recent TCEQ reviews for similar air emissions in a different process or industry type. Because the emission reduction option has been accepted for a similar process/industry, economic reasonableness has already been demonstrated, but a demonstration must be made that the emission reduction level for a similar process/industry is technically practical for the proposed process/industry.

<u>Tier III</u>

A Tier III analysis is performed only if the first two tiers have failed to identify an emission reduction level that is both technically practical and economically reasonable. In the Tier III analysis, a detailed technical and quantitative economic analysis is performed for all possible emission reduction options. The technical practicability of each emission reduction option is demonstrated by the success of that option based on past use in industry and/or the engineering evaluation of a new technology. The economic reasonableness is demonstrated by determining the cost effectiveness of controlling the emissions (expressed as dollars per ton of pollutant reduced).

FHR's BACT Review

The TCEQ has established Tier I BACT requirements for a number of industry types and processes, including the types of facilities that will be newly constructed or modified as part of this project, based on the review of emission reduction performance levels accepted as BACT in recent permitting actions. Therefore, FHR is basing its BACT review on a Tier I analysis. Copies of the BACT requirements for marine loading operations, vapor combustors, storage tanks, and equipment leak fugitives from the TCEQ's website are provided at the end of this section. For each of the relevant Tier 1 BACT requirements previously established by the TCEQ, FHR has undertaken an analysis to determine whether any new technical developments have occurred that would warrant additional emissions reductions. A description of the proposed control technologies is provided below.

Marine Loading

The marine loading operation will load materials with a maximum true vapor pressure (TVP) greater than 0.5 psia. TCEQ's current BACT for the marine loading of these materials is routing the emissions to a control device (see TCEQ's BACT Guidance for Marine Vessel Loading). The TCEQ also requires the following for marine loading operations:

- Annual vapor tightness testing of marine vessels as specified in 40 CFR §63.565(c) or 40 CFR §61.304(f).
- Audio, olfactory, and visual (AVO) checks for leaks shall be conducted once every 8 hours for on-shore equipment and on board the vessel during the loading of inerted vessels.
- The pressure at the vapor collection connection and the loading rate must be monitored and recorded.

FHR will route emissions generated during the marine loading of materials with a TVP greater than 0.5 psia to a vapor combustor. All marine vessels are required to provide FHR with proof that they have passed an annual vapor tightness test as specified in 40 CFR §63.565(c) or 40 CFR §61.304(f) prior to loading. FHR or the owner/operator of the marine vessel will conduct AVO checks for leaks once every 8 hours for on-shore equipment and on board the vessel during the loading of inerted vessels. FHR will monitor and record the pressure at the vapor collection connection of an inerted marine vessel and the loading rate. Accordingly, the modified marine loading operations will meet the current BACT requirements for marine loading operations.

Marine Vapor Combustors

TCEQ's current BACT for vapor combustors is 99% destruction efficiency and the initial testing and monitoring of the firebox temperature (see TCEQ's BACT Guidance for Vapor Combustor

Control). The NOxStAR Vapor Combustion System technology is guaranteed to meet a VOC destruction efficiency of 99.99%, but FHR is conservatively basing the MVCUs' emission rate calculations on a VOC destruction efficiency of 99.9%. The MVCUs have been initially tested. The firebox temperature of all three MVCUs is monitored continuously and recorded when waste generated from the loading of crude oil and stabilized condensate with a maximum true vapor pressure equal to or greater than 0.50 psia is directed to the MVCUs. Accordingly, the MVCUs will continue to meet the current BACT requirements for vapor combustors.

Equipment Fugitives

TCEQ's current BACT specifies the 28VHP LDAR program when uncontrolled VOC emissions are greater than 25 tpy (see TCEQ's BACT Guidance for Equipment Leak Fugitives). After correcting the emission rate calculations for the fugitive piping components to be based on oil and gas production emission factors, uncontrolled fugitive emissions from equipment at the terminal are estimated to be greater than 25 tpy. FHR will be implementing a 28VHP LDAR monitoring program to control VOC emissions from fugitive piping components at the terminal. Accordingly, the new fugitive piping components installed as part of the Expansion Project and the new fugitive piping components being incorporated into the permit from PBR Registrations No. 160536 and 161793 will meet the current BACT requirements for equipment leaks.

Storage Tanks 28067, 28070R, 28077, 28087, 28088, 28089, 28090

Tank 28070R is authorized under PBR Registration No. 161793, which is being incorporated into the permit with this application. Tanks 28067, 28070R, 28077, 28087, 28088, 28089, 28090 are internal floating roof tanks that store material with a true vapor pressure less than 11 psia and have a capacity greater than 25,000 gallons. TCEQ's current BACT specify that an internal floating roof tank storing material with a true vapor pressure less than 11 psia must have uninsulated exterior surfaces that are white or aluminum. It also requires either a mechanical or liquid mounted primary seal or the combination of a vapor mounted primary seal and rim mounted secondary seal. Tanks 28067, 28070R, 28077, 28087, 28088, 28089, 28090 are internal floating-roof tanks with mechanical-shoe primary seals and rim-mounted secondary seals. Exterior surfaces exposed to the sun are uninsulated and painted white. Accordingly, Tanks 28067, 28070R, 28077, 28087, 28088, 28089, 28090 meet the current BACT requirements for floating roof storage tanks storing material with a true vapor pressure less than 11 psia. The TCEQ does not currently specify BACT for H_2S emissions in storage tanks. Because H_2S emissions are determined based on VOC emissions and Tanks 28067, 28070R, 28077, 28087, 28088, 28089, 28090 meet BACT for VOC emissions, the tanks also meet BACT for H_2S emissions.

Storage Tanks 28068, 28069, 28071, 28072, 28073, 28074, 28075, 28076, 28080, and 28086

Tanks 28068, 28069, 28071, 28072, 28073, 28074, 28075, 28076, 28080, and 28086 are external floating roof tanks that store material with a true vapor pressure less than 11 psia and have a capacity greater than 25,000 gallons. TCEQ's current BACT specify that an external floating roof tank storing material with a true vapor pressure less than 11 psia must have uninsulated exterior surfaces that are white or aluminum. It also requires either a mechanical or liquid mounted primary seal and a rim mounted secondary seal. Slotted guide pole fittings must have a gasketed cover and at least two of the following: wiper, float, or sleeve. Tanks 28068, 28069, 28071, 28072, 28073, 28074, 28075, 28076, 28080, and 28086 are external floating roof tanks with mechanical-shoe primary seal and rim-mounted secondary seals. Exterior surfaces exposed to the sun are uninsulated and painted white. Tanks 28069 and 28071 have gasketed slotted guide-poles and are equipped with pole sleeves and wipers while tanks 28068, 28072, 28073, 28074, 28075, 28076, 28080, and 28086 have gasketed slotted guide-poles with floats, pole wipers and pole sleeves. Accordingly, Tanks 28068, 28069, 28071, 28072, 28073, 28074, 28075, 28076, 28080, and 28086 meet the current BACT requirements for floating roof storage tanks storing material with a true vapor pressure less than 11 psia. The TCEQ does not currently specify BACT for H_2S emissions in storage tanks. Because H_2S emissions are determined based on VOC emissions and Tanks 28068, 28069, 28071, 28072, 28073, 28074, 28075, 28076, 28080, and 28086 meet BACT for VOC emissions, the tanks also meet BACT for H_2S emissions.

FHR's Exhibit E

Unit Type	Date of Last Update	MSS	PM	VOC	NOx	SO2	CO	Other
Control: vapor combustor	2011	Same as normal operation BACT requirements.		99% destruction efficiency. Monitor temperature. Perform initial test.				
Fugitives: piping and equipment leak	2011	Same as normal operation BACT requirements.		Specify which is applicable: 1. Uncontrolled VOC emissions < 10 tpy: none 2. 10 tpy < uncontrolled VOC emissions < 25 tpy: 28M leak detection and repair program. 75% credit for 28M. 3. Uncontrolled VOC emissions > 25 tpy: 28VHP leak detection and repair program. 97% credit for valves, 85% for pumps and compressors. 4. VOC vp < 0.002 psia: no inspection required, no fugitive emissions expected. 5. For emissions of approved odorous compounds (chlorine, ammonia, hydrogen sulfide, hydrogen cyanide and mercaptans only): AVO inspection twice per shift. Appropriate credit for AVO program.				NH3: AVO inspection twice per shift. Appropriate credit for AVO program. H2S: AVO inspection twice per shift. Appropriate credit for AVO program. HCl: AVO inspection twice per shift. Appropriate credit for AVO program.
Loading: marine vessel	2017	Same as normal operation BACT requirements.		VOC >= 0.5 psia: Route to VOC control device and meet the specific control device requirements. Vessel leak testing: the marine vessel must pass an annual vapor tightness test as specified in 40 CFR §63.565(c) or 40 CFR §61.304(f). During loading of inerted marine vessels, the owner or operator of the marine terminal or of the marine vessel shall conduct AVO checks for leaks once every 8 hours for on-shore equipment and on board the vessel. The pressure at the vapor collection connection and the loading rate must be monitored and recorded. See Marine Terminal Guidance dated September 21, 2016 for emission factors for ship-side emissions. Federal Coast Guard Regulation require ocean-going vessels to be inerted. Therefore, ocean-going vessels cannot use vacuum loading.				
Storage Tank (4): Floating roof with TVP <11.0 psia	2015	Unless specified below, route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi. Floating roof tank landings at bulk gasoline terminals: May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes. Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy.		Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).				Exempt solvent: Specify tank type. 1. Internal floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Drain dry design (new tanks only). Specify seals: Alternative 1: Primary seal mechanical or liquid mounted. Alternative 2: Primary seal vapor mounted and secondary seal rim mounted. 2. External floating roof: Uninsulated exterior surfaces exposed to the sun shall be white or aluminum. Slotted guide pole fittings must have gasketed cover and at least two of the following (specify selection): wiper, float, or sleeve. Specify seals: Primary seal mechanical or liquid mounted, secondary seal rim mounted. Drain dry design (new tanks only).

NONATTAINMENT REVIEW

The Ingleside Terminal is not located in a nonattainment county. Therefore, the requirement to conduct a nonattainment review is not applicable.

PREVENTION OF SIGNIFICANT DETERIORATION REVIEW

FHR's Ingleside Terminal is considered a major source for purpose of PSD review because it emits more than 100 tons/yr of VOC. As part of this application, FHR is providing two separate PSD analyses. The first is a revised PSD analysis from the previous amendment of Permit No. 6606 authorizing the Expansion Project which was issued by TCEQ in October 2020 (TCEQ Project No. 314930). The revised PSD analysis reflects the as-built corrections being made in this application for the storage tanks and new fugitive piping components authorized as part of that project. The second PSD analysis is for the increase in the total combined annual throughput of barge and ship loading proposed in this application. FHR analyzed whether the project emissions increase from each of these two separate projects result in a significant project emissions increase. The levels at which an emissions increase is considered significant are shown in the table below.

Pollutant	PSD Significance Level (tons/yr)
Nitrogen oxides (NO_x)	40
Carbon monoxide (CO)	100
Sulfur dioxide (SO_2)	40
Particulate matter (PM)	25
Particulate matter (PM_{10})	15
Particulate matter ($PM_{2.5}$)	10
Ozone	40
Lead	0.6
Fluorides	3
Sulfuric acid mist	7
Total reduced sulfur (including H_2S)	10
Hydrogen sulfide (H_2S)	10
Reduced sulfur compounds (including H_2S)	10

Revised PSD Analysis for Past Expansion Project

The only revision to the PSD analysis for the past Expansion Project is for VOC. The original Table 2F for VOC from the Expansion Project reflected a total project increase of 39.14 tpy, which was below the PSD significance level of 40 tpy. The Table 2F for VOC from the past Expansion Project has been revised to reflect the following:

- Corrections to the tank deck fittings for the new Tanks 28087, 28088, 28089, and 28090 (EPNs TK-28087, TK-28088, TK 28089, TK-28090) based on as-built configurations,
- Removal of Tanks 28091 and 28092, and
- Corrections to the emission rate calculations for the new fugitive piping components installed as part of the project which include the number of counts, the change to oil and gas production emission factors, and the implementation of a 28VHP LDAR monitoring program.

The revised Table 2F for VOC provided in this section shows a total project increase of 38.96, which is still below the PSD significance level of 40 tpy. Therefore, no further action is required.

PSD Analysis for New Proposed Project: Increase in the Total Combined Annual Loading Throughput

The PSD applicability analysis for the proposed project includes emissions increases from modified facilities as well as existing upstream affected facilities (*I.e.,* facilities that are not being modified, but will experience an actual emission increase as a result of the project).[1] There are no emissions increases from new facilities since FHR will not construct any new facilities associated with the annual loading throughput increase. As demonstrated in the attached Table 2-Fs, for all PSD pollutants, the sum of project emission increases and decreases are below the applicable significant emission rates. Therefore, determining the net emissions increase is not necessary because the proposed project is not subject to PSD review.

<u>Modified Facilities</u>

The marine loading operation is modified due to an increase in the annual loading rate above the currently permitted loading rate. The project SO_2, VOC, and H_2S emissions increases for the marine loading operation is calculated as the difference between baseline SO_2, VOC, and H_2S emissions from 2018 and 2019 and future potential SO_2, VOC and H_2S emissions. The combined SO_2, VOC, and H_2S annual emission limits for the three MVCUs is used as the SO_2, VOC, and H_2S potentials to emit for the three MVCUs. Emissions from the marine loading operation were controlled by previous EPN MVCU from January 2018 to November 2019. In December 2019, EPNs MVCU1, MVCU2, and MVCU3 began operation and replaced EPN MVCU as the control device for loading emissions. Therefore, baseline emissions for the controlled loading emissions are based on the actual emissions from all of these EPNs from 2018 and 2019. Because actual controlled loading emissions from 2018 and 2019 were higher than the existing VOC potential to emit for MVCU1/MVCU2/MVCU3, the baseline emissions have been adjusted down to the existing potential to emit.

The project NO_X, CO, and particulate matter emissions increases for the marine loading operation is calculated as the difference between baseline NO_X, CO, and particulate matter emissions and future potential NO_X, CO, and particulate matter emissions. Because the three MVCUs did not begin operation until December 2019 and have not been operation for at least 24 months, the existing NO_X, CO, and particulate matter potentials to emit is used for actual/baseline emissions. The combined NO_X, CO, and particulate matter annual emission limits for the three MVCUs is used as the NO_X, CO, and particulate matter potentials to emit for the three MVCUs.

1 *See* TCEQ Air Permits Division, Air Permit Reviewer Reference Guide, APDG-5881, Major New Source Review – Applicability Determination (September 2019) at 7 ("The total increase in emissions that are included in a Major NSR determination includes: Increases in emissions occurring at all new or modified facilities, and any other increase at existing facilities that are not being modified, but are experiencing an emissions increase as a result of the change.")

Upstream Affected Facilities

The existing crude oil storage tanks are not new or modified but are upstream facilities that will experience an increase in actual emissions solely as a result of increased annual throughput (within the currently permitted throughput) following the proposed project. For the existing crude oil storage tanks, the increase in emissions is calculated based on the estimated maximum incremental increase in utilization of the tanks that could occur as a result of the increase in the total combined annual throughput of barge and ship loading.[2] As mentioned in the executive summary, FHR is proposing to increase the total combined throughput of crude oil and stabilized condensate loaded into barges and ships to 187,200,000 bbl/yr. Based on baseline throughputs of the existing tanks, it is expected that the existing storage tanks will experience an overall potential crude oil/condensate throughput increase of 147,000,000 bbl/yr. Therefore, the existing storage tanks were evaluated assuming they each experience the full 147,000,000 bbl/yr increase in crude oil/condensate throughput, and the maximum individual tank withdrawal loss emissions was used as the total project emissions increase for the upstream affected existing storage tanks. Each of the existing affected tanks will continue to operate consistent with past permit application representations and within their currently authorized allowable emission rates.

2 See Letter from Sam Portanova, EPA to Steve Dunn, Wisconsin Department of Natural Resources (Feb. 24, 2005) at 4-5 (“For a situation where the existing boilers are not being modified, the emissions increase from the existing boilers that occurs as a direct result of the proposed project should be based on the maximum utilization for which the new unit will be permitted. The emissions increases should be calculated as the worst case increases that could occur at those existing units if the new units were to operate at maximum capacity.”); Letter from Rebecca Weber, EPA to Bliss Higgins, Louisiana Department of Environmental Quality (July 25, 2001) at 2 (“In the case of the existing equipment not undergoing a change, but whose emission levels could be affected by the change at the facility (e.g., because of increased demand for steam and other products), emissions increases should be calculated as the worst case increases that could occur at those existing units if the new or modified units were to operate at their maximum permitted capacity.”).

REVISED PSD APPLICABILITY ANALYSIS FOR PAST EXPANSION PROJECT

FHR's Exhibit E

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [(1)]**:**	VOC		**Permit:**	6606
Baseline Period:	2014	**to**	2015	

	Affected or Modified Facilities [(2)] FIN	EPN	Permit NO.	Actual Emissions [(3)] (tons/yr)	Baseline Emissions [(4)] (tons/yr) B	Proposed Emissions [(5)] (tons/yr) A	Projected Actual Emissions (tons/yr)	Difference (A-B) [(6)] (tons/yr)	Correction [(7)] (tons/yr)	Project Increase [(8)] (tons/yr)
1	DOCK	MVCU1/ MVCU2/ MVCU3	6606	0.004	0.004	10.89		10.89		10.89
2	DOCK	DOCK	6606	1.05	1.05	6.36		5.31		5.31
3	28087, 28088, 28089, 28090, ~~28091, 28092~~	TK-28087, TK-28088, TK-28089, TK-28090, ~~TK-28091, TK-28092~~	6606	0.00	0.00	~~10.24~~ 9.02		~~10.24~~ 9.02		~~10.24~~ 9.02
4	TANKMSS (1 Tank)	TANKMSS (1 Tank)	PBR Registration No. 107625	0.00	0.00	2.06		2.06		2.06
5	COMBMSS (1 Tank)	COMBMSS (1 Tank)	PBR Registration No. 107625	0.00	0.00	0.004		0.004		0.004
6	FUG-1	FUG-1	6606	0.00	0.00	~~0.37~~ 1.41		~~0.37~~ 1.41		~~0.37~~ 1.41
7	Existing Tanks	Existing Tanks	6606	N/A	N/A	N/A	N/A	N/A		10.27
								PAGE SUBTOTAL: [(9)]		~~39.14~~ 38.96
								Total		~~39.14~~ 38.96

TCEQ - 20470(Revised 04/12) Table 2F
These forms are for use by facilities subject to air quality permit requirements and may be revised periodically. (APDG 5915v2)

FHR's Exhibit E

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant (1):	H2S	**Permit:**	6606
Baseline Period:	2014	**to**	2015

	Affected or Modified Facilities (2) FIN	EPN	Permit NO.	Actual Emissions (3) (tons/yr)	Baseline Emissions (4) (tons/yr) B	Proposed Emissions (5) (tons/yr) A	Projected Actual Emissions (tons/yr)	Difference (A-B) (6) (tons/yr)	Correction (7) (tons/yr)	Project Increase (8) (tons/yr)
1	DOCK	MVCU/ MVCU1/ MVCU2/ MVCU3	6606	0.00	0.00	0.19		0.19		0.190
2	DOCK	DOCK	6606	0.00	0.00	0.02		0.02		0.019
3	28087, 28088, 28089, 28090, ~~28091, 28092~~	TK-28087, TK-28088, TK-28089, TK-28090, ~~TK-28091, TK-28092~~	6606	0.00	0.00	~~0.05~~ 0.034		~~0.05~~ 0.034		~~0.05~~ 0.034
4	FUG-1	FUG-1	6606	0.00	0.00	~~0.02~~ 0.023		~~0.02~~ 0.023		~~0.02~~ 0.023
5	Existing Tanks	Existing Tanks	6066	N/A	N/A	N/A	N/A	N/A		0.001
6										
7										
								PAGE SUBTOTAL: (9)		~~0.29~~ 0.27
								Total		~~0.29~~ 0.27

TCEQ - 20470(Revised 04/12) Table 2F
These forms are for use by facilities subject to air quality permit requirements and may be revised periodically. (APDG 5915v2)

PSD APPLICABILITY ANALYSIS FOR PROPOSED PROJECT

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant (1):	NOx	**Permit:**	6606
Baseline Period:	N/A **to** N/A		

	Affected or Modified Facilities (2) FIN	EPN	Permit NO.	Actual Emissions (3) (tons/yr)	Baseline Emissions (4) (tons/yr) B	Proposed Emissions (5) (tons/yr) A	Projected Actual Emissions (tons/yr)	Difference (A-B) (6) (ton/yr)	Correction (7) (ton/yr)	Project Increase (8) (ton/yr)
1	MVCU1/ MVCU2/ MVCU3 *	MVCU1/ MVCU2/ MVCU3	6606	19.32	19.32	26.08		6.76		6.76
2										
3										
4										
5										
6										
7										
8										
9										
PAGE SUBTOTAL: (9)										6.76
								Total		6.76

* MVCU1, MVCU2, and MVCU3 began operation in December 2019. Because they have not been in operation for at least 24 months, the existing potential to emit is used for actual/baseline emissions.

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant (1):	CO	**Permit:**	6606
Baseline Period:	N/A **to** N/A		

	Affected or Modified Facilities (2) FIN	EPN	Permit NO.	Actual Emissions (3) (tons/yr)	Baseline Emissions (4) (tons/yr) B	Proposed Emissions (5) (tons/yr) A	Projected Actual Emissions (tons/yr)	Difference (A-B) (6) (ton/yr)	Correction (7) (ton/yr)	Project Increase (8) (ton/yr)
1	MVCU1/ MVCU2/ MVCU3 *	MVCU1/ MVCU2/ MVCU3	6606	25.20	25.20	34.01		8.81		8.81
2										
3										
4										
5										
6										
7										
8										
9										
						PAGE SUBTOTAL: (9)				8.81
								Total		8.81

* MVCU1, MVCU2, and MVCU3 began operation in December 2019. Because they have not been in operation for at least 24 months, the existing potential to emit is used for actual/baseline emissions.

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [1]:	SO2	**Permit:**	6606
Baseline Period:	2018 **to** 2019		

	Affected or Modified Facilities [2] FIN	EPN	Permit NO.	Actual Emissions [3] (tons/yr)	Baseline Emissions [4] (tons/yr) B	Proposed Emissions [5] (tons/yr) A	Projected Actual Emissions (tons/yr)	Difference (A-B) [6] (ton/yr)	Correction [7] (ton/yr)	Project Increase [8] (ton/yr)
1	DOCK/ MVCU1/ MVCU2/ MVCU3	MVCU1/ MVCU2/ MVCU3	6606	0.01	0.01	38.10		38.10		38.10
2										
3										
4										
5										
6										
7										
8										
9										
PAGE SUBTOTAL: [9]										38.10
								Total		38.10

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [(1)]**:**	PM/PM10/PM2.5	**Permit:**	6606
Baseline Period:	N/A **to** N/A		

	Affected or Modified Facilities [(2)] FIN	EPN	Permit NO.	Actual Emissions [(3)] (tons/yr)	Baseline Emissions [(4)] (tons/yr) B	Proposed Emissions [(5)] (tons/yr) A	Projected Actual Emissions (tons/yr)	Difference (A-B) [(6)] (ton/yr)	Correction [(7)] (ton/yr)	Project Increase [(8)] (ton/yr)
1	MVCU1/ MVCU2/ MVCU3 *	MVCU1/ MVCU2/ MVCU3	6606	6.30	6.30	8.50		2.20		2.20
2										
3										
4										
5										
6										
7										
8										
9										
PAGE SUBTOTAL: [(9)]										2.20
								Total		2.20

* MVCU1, MVCU2, and MVCU3 began operation in December 2019. Because they have not been in operation for at least 24 months, the existing potential to emit is used for actual/baseline emissions.

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant (1):	VOC	**Permit:**	6606
Baseline Period:	2018 **to** 2019		

	Affected or Modified Facilities (2) FIN	EPN	Permit NO.	Actual Emissions (3) (tons/yr)	B Baseline Emissions (4) (tons/yr)	A Proposed Emissions (5) (tons/yr)	Projected Actual Emissions (tons/yr)	Difference (A-B) (6) (tons/yr)	Correction (7) (tons/yr)	Project Increase (8) (tons/yr)
1	DOCK/ MVCU1/ MVCU2/ MVCU3 *	MVCU1/ MVCU2/ MVCU3	6606	11.08	10.89	14.70		3.81		3.81
2	DOCK	DOCK	6606	1.49	1.49	8.58		7.09		7.09
3	Existing Tanks	Existing Tanks	6606	N/A	N/A	N/A	N/A	N/A		23.63
4										
5										
PAGE SUBTOTAL: (9)										34.54
								Total		34.54

* Loading emissions were controlled by previous EPN MVCU from January 2018 to November 2019. In December 2019, MVCU1, MVCU2, and MVCU3 began operation and replaced MVCU as the control device for loading emissions. Because actual emissions from 2018 and 2019 were higher than the existing VOC potential to emit for MVCU1/MVCU2/MVCU3, the baseline emissions have been adjusted down to the existing potential to emit.

TABLE 2F
PROJECT EMISSIONS INCREASE

Pollutant [(1)]**:**	H2S	**Permit:**	6606
Baseline Period:	2014 **to** 2015		

				B	A					
	Affected or Modified Facilities [(2)] FIN	EPN	Permit NO.	Actual Emissions [(3)] (tons/yr)	Baseline Emissions [(4)] (tons/yr)	Proposed Emissions [(5)] (tons/yr)	Projected Actual Emissions (tons/yr)	Difference (A-B) [(6)] (tons/yr)	Correction [(7)] (tons/yr)	Project Increase [(8)] (tons/yr)
1	DOCK	MVCU1/ MVCU2/ MVCU3	6606	0.00	0.00	0.201		0.201		0.201
2	DOCK	DOCK	6606	0.00	0.00	0.020		0.020		0.020
3	Existing Tanks	Existing Tanks	6606	N/A	N/A	N/A	N/A	N/A		0.002
4										
5										
							PAGE SUBTOTAL: [(9)]			0.22
								Total		0.22

TABLE 2F
PROJECT EMISSIONS INCREASE

1. Individual Table 2F's should be used to summarize the project emission increase for each criteria pollutant
2. Emission Point Number as designated in NSR Permit or Emissions Inventory
3. All records and calculations for these values must be available upon request
4. Correct actual emissions for currently applicable rule or permit requirements, and periods of non-compliance.
   These corrections, as well as any MSS previously demonstrated under 30 TAC 101, should be explained in the Table 2F supplement.
5. If projected actual emission is used it must be noted in the next column and the basis for the projection identified in the Table 2F supplement
6. Proposed Emissions or Projected Actual Emissions (column B) minus Baseline Emissions (column A)
7. Correction made to emission increase for what portion could have been accommodated during the baseline period. The justification and basis for this estimate must be provided in the Table 2F supplement
8. Obtained by subtracting the correction from the difference. Must be a positive number.
9. Sum all values for this page.

FHR's Exhibit E

H_2S Emission Estimates
Incremental Increase in Tank Emissions

Background:
H_2S emissions are calculated by applying the K factor method of Meling, Horne, and Hoover[1] to tank losses. The H_2S mole fraction in the vapor phase of the crude oil is used to calculate H_2S emissions from the working and breathing losses from the fixed-roof tanks. The withdrawal loss (or working loss) from floating-roof tanks, however, assumes 100% volatilization. Therefore, for floating-roof tanks the weight fraction in the liquid phase of the crude oil is used to calculate the H_2S emissions from the working loss (withdrawal loss) contribution. The breathing loss contribution is the same for any type of tank.
K factors are used to calculate H_2S emissions from loading losses.

K = y/x, where

y = mole fraction of a component in the vapor phase
x = mole fraction of a component in the liquid phase

If x is known, y = Kx

Liquid	H_2S, liquid WF	x	K[2]	y	Vapor Pressure, psia	P*	MR lbs H_2S/ lb VOC
Crude Oil	1.00E-04	0.000609	24	0.014612	9.05	0.6155	0.0161
(RVP 10)	5.00E-04	0.003044	27	0.082191	10.9	0.7415	0.0754

a = annual emisions
h = hourly emissions
x = (WF H_2S)(MW oil)/MW H_2S
WF = Weight Fraction
MW oil = 207

P* = VOC partial pressure = vapor pressure/14.7 psia
MR = mass ratio = (y)(MW H_2S)/(P)(MW oil vapor)
MW = molecular weight
MW H_2S = 34
MW crude oil vapor = 50

EPN	Liquid	VOC Withdrawal Emissions lbs/hr	VOC Withdrawal Emissions tons/yr	H_2S Emissions lbs/hr	H_2S Emissions tons/yr
Existing Tanks	Crude Oil	N/A	23.634	N/A	0.00236

Sample Calculations:

Existing Tanks
Incremental H_2S Emissions = (WF)(withdrawal loss)
Incremental H2S Emissions, tons/yr = (0.0001)(23.634) = 0.00236

Footnotes:
1 "Using K Factors To Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids," by Jeffrey Meling, Karen Horne, and Jay Hoover

2 K values are taken from H_2S K equilibrium factor graph published in Natural Gas Processors Suppliers Association, Engineering Data Book, Ninth Edition, 1972

IFR Tanks

									Withdrawal Losses			
EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Average Liquid Density W_L (lb/gal)	Shell Clingage Factor C (bbl/1000 ft^2)	Number of Columns Nc	Effective Column Diameter Fc	Internal Floating Roof Withdrawal Losses Lw (ton/month)
TK-28067	Tank 28067	Crude Oil	140	48	5,040,000	147,000,000	Light Rust	7.05	0.006	18	1.0	
	January	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	February	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	March	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	April	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	May	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	June	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	July	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	August	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	September	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	October	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	November	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	December	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	Annual	Crude Oil	140	48	5,040,000	147,000,000	Light Rust	7.05	0.006	18	1.0	23.6342
TK-28070R	Tank 28070R	Crude Oil	190	63	12,089,868	147,000,000	Light Rust	7.05	0.006	20	1.0	
	January	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	February	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	March	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	April	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	May	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	June	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	July	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	August	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	September	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	October	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	November	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	December	Crude Oil	190	63	12,089,868	12,250,000.0	Light Rust	7.05	0.006	20	1.0	1.4212
	Annual	Crude Oil	190	63	12,089,868	147,000,000	Light Rust	7.05	0.006	20	1.0	17.0550
TK-28077	Tank 28077	Crude Oil	140	48	5,040,000	147,000,000	Light Rust	7.05	0.006	18	1.0	
	January	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	February	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	March	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	April	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	May	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	June	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	July	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	August	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	September	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	October	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	November	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	December	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	18	1.0	1.9695
	Annual	Crude Oil	140	48	5,040,000	147,000,000	Light Rust	7.05	0.006	18	1.0	23.6342

FHR's Exhibit E

EFR Tanks

									Withdrawal Losses	
EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Average Liquid Density W_L (lb/gal)	Shell Clingage Factor C (bbl/1000 ft^2)	External Floating Roof Withdrawal Losses Lw (ton/month)
TK-28068	Tank 28068	Crude Oil	140	48	5,040,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	February	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	March	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	April	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	May	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	June	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	July	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	August	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	September	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	October	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	November	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	December	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	Annual	Crude Oil	140	48	5,040,000	147,000,000	Light Rust	7.05	0.006	20.9417
TK-28069	Tank 28069	Crude Oil	140	48	5,040,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	February	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	March	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	April	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	May	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	June	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	July	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	August	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	September	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	October	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	November	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	December	Crude Oil	140	48	5,040,000	12,250,000.0	Light Rust	7.05	0.006	1.7451
	Annual	Crude Oil	140	48	5,040,000	147,000,000	Light Rust	7.05	0.006	20.9417
TK-28071	Tank 28071	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	February	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	March	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	April	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	May	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	June	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	July	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	August	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	September	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	October	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	November	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	December	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	Annual	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	16.2880
TK-28072	Tank 28072	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	February	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	March	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	April	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	May	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	June	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	July	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	August	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	September	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	October	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	November	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	December	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	Annual	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	16.2880

									Withdrawal Losses	
EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Average Liquid Density W_L (lb/gal)	Shell Clingage Factor C (bbl/1000 ft^2)	External Floating Roof Withdrawal Losses Lw (ton/month)
TK-28073	Tank 28073	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	February	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	March	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	April	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	May	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	June	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	July	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	August	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	September	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	October	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	November	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	December	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	Annual	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	16.2880
TK-28074	Tank 28074	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	February	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	March	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	April	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	May	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	June	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	July	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	August	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	September	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	October	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	November	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	December	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	Annual	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	16.2880
TK-28075	Tank 28075	Crude Oil	180	55	10,500,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	February	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	March	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	April	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	May	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	June	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	July	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	August	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	September	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	October	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	November	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	December	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	Annual	Crude Oil	180	55	10,500,000	147,000,000	Light Rust	7.05	0.006	16.2880
TK-28076	Tank 28076	Crude Oil	180	55	10,500,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	February	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	March	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	April	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	May	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	June	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	July	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	August	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	September	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	October	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	November	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	December	Crude Oil	180	55	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	Annual	Crude Oil	180	55	10,500,000	147,000,000	Light Rust	7.05	0.006	16.2880

FHR's Exhibit E

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Average Liquid Density W_L (lb/gal)	Withdrawal Losses: Shell Clingage Factor C (bbl/1000 ft^2)	Withdrawal Losses: External Floating Roof Withdrawal Losses Lw (ton/month)
TK-28080	Tank 28080	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	February	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	March	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	April	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	May	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	June	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	July	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	August	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	September	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	October	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	November	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	December	Crude Oil	180	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.3573
	Annual	Crude Oil	180	56	10,500,000	147,000,000	Light Rust	7.05	0.006	16.2880
TK-28086	Tank 28086	Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	
	January	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	February	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	March	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	April	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	May	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	June	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	July	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	August	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	September	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	October	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	November	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	December	Crude Oil	190	56	10,500,000	12,250,000.0	Light Rust	7.05	0.006	1.2859
	Annual	Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	15.4307

IFR Tanks

EPN	Month	Representative Material	Tank Diameter (ft)	Tank Height (ft)	Tank Capacity (gal)	Monthly Tank Throughput (bbl/month)	Shell Condition (Light Rust/ Dense Rust/ Gunite Lining)	Average Liquid Density W_L (lb/gal)	Withdrawal Losses			
									Shell Clingage Factor C (bbl/1000 ft^2)	Number of Columns Nc	Effective Column Diameter Fc	Internal Floating Roof Withdrawal Losses Lw (ton/month)
TK-28087		Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	0	1.0	
	January	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	February	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	March	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	April	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	May	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	June	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	July	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	August	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	September	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	October	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	November	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	December	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	Annual	Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	0	1.0	15.4307
TK-28088		Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	0	1.0	
	January	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	February	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	March	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	April	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	May	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	June	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	July	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	August	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	September	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	October	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	November	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	December	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	Annual	Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	0	1.0	15.4307
TK-28089		Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	0	1.0	
	January	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	February	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	March	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	April	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	May	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	June	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	July	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	August	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	September	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	October	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	November	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	December	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	Annual	Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	0	1.0	15.4307
TK-28090		Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	0	1.0	
	January	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	February	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	March	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	April	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	May	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	June	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	July	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	August	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	September	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	October	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	November	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	December	Crude Oil	190	56	10,500,000	12,250,000	Light Rust	7.05	0.006	0	1.0	1.2859
	Annual	Crude Oil	190	56	10,500,000	147,000,000	Light Rust	7.05	0.006	0	1.0	15.4307

APPENDIX A

TABLE 1(A) FROM PAST EXPANSION PROJECT

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	**April 2018; Revised September 2018**	**Permit No.: 6606**	**Regulated Entity No.:** **RN100222744**
Area Name:	**Ingleside Terminal**		**Customer Reference No.:** **CN603741463**

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

AIR CONTAMINANT DATA					
1. Emission Point			**2. Component or Air Contaminant Name**	**3. Air Contaminant Emission Rate**	
(A) EPN	**(B) FIN**	**(C) NAME**		**(A) POUND**	**(B) TPY**
MVCU1	DOCK	Marine Vapor Combustion Unit No. 1	VOC	3.10	N/A
			NOx	4.14	N/A
			CO	5.40	N/A
			SO_2	11.40	N/A
			$PM/PM_{10}/PM_{2.5}$	1.35	N/A
			H_2S	0.06	N/A
MVCU2	DOCK	Marine Vapor Combustion Unit No. 2	VOC	3.10	N/A
			NOx	4.14	N/A
			CO	5.40	N/A
			SO_2	11.40	N/A
			$PM/PM_{10}/PM_{2.5}$	1.35	N/A
			H_2S	0.06	N/A

EPN = Emission Point Number
FIN = Facility Identification Number

FHR's Exhibit E

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	**April 2018; Revised September 2018**	**Permit No.: 6606**		**Regulated Entity No.:**	**RN100222744**
Area Name:	**Ingleside Terminal**			**Customer Reference No.:**	**CN603741463**

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

AIR CONTAMINANT DATA					
1. Emission Point			**2. Component or Air Contaminant Name**	**3. Air Contaminant Emission Rate**	
(A) EPN	**(B) FIN**	**(C) NAME**		**(A) POUND**	**(B) TPY**
MVCU3	DOCK	Marine Vapor Combustion Unit No. 3	VOC	3.10	N/A
			NOx	4.14	N/A
			CO	5.40	N/A
			SO_2	11.40	N/A
			$PM/PM_{10}/PM_{2.5}$	1.35	N/A
			H_2S	0.06	N/A
MVCU1 / MVCU2/MVCU3	DOCK	Combined Annual Emission Limit for MVCUs	VOC	N/A	10.89
			NOx	N/A	19.32
			CO	N/A	25.20
			SO_2	N/A	35.40
			$PM/PM_{10}/PM_{2.5}$	N/A	6.30
			H_2S	N/A	0.19
DOCK	DOCK	Ship and Barge Loading Dock	VOC	6.38	6.36
			H_2S	0.02	0.02

EPN = Emission Point Number
FIN = Facility Identification Number

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date: April 2018; Revised September 2018	**Permit No.: 6606**	**Regulated Entity No.:**	**RN100222744**
Area Name: Ingleside Terminal		**Customer Reference No.:**	**CN603741463**

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

AIR CONTAMINANT DATA					
1. Emission Point			**2. Component or Air Contaminant Name**	**3. Air Contaminant Emission Rate**	
(A) EPN	**(B) FIN**	**(C) NAME**		**(A) POUND**	**(B) TPY**
TK-28075	28075	Tank 28075	VOC	8.35	7.83
			H_2S	0.13	0.08
TK-28087	28087	Tank 28087	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28088	28088	Tank 28088	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28089	28089	Tank 28089	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28090	28090	Tank 28090	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28091	28091	Tank 28091	VOC	8.66	N/A
			H_2S	0.02	N/A

EPN = Emission Point Number
FIN = Facility Identification Number

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date: April 2018; Revised September 2018	**Permit No.:** 6606	**Regulated Entity No.:**	**RN100222744**
Area Name: Ingleside Terminal		**Customer Reference No.:**	**CN603741463**

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

AIR CONTAMINANT DATA					
1. Emission Point			**2. Component or Air Contaminant Name**	**3. Air Contaminant Emission Rate**	
(A) EPN	**(B) FIN**	**(C) NAME**		**(A) POUND**	**(B) TPY**
TK-28092	28092	Tank 28092	VOC	8.66	N/A
			H_2S	0.02	N/A
TK-28087, TK-28088, TK-28089, TK-28090, TK-28091, TK-28092	28087, 28088, 28089, 28090, 28091, 28092	Annual Caps for Tanks 28087, 28088, 28089, 28090, 28091, 28092	VOC	N/A	10.24
			H_2S	N/A	0.05
TK-28071	28071	Tank 28071	H_2S	0.09	0.05
FUG-1	FUG-1	Terminal Fugitives	VOC	0.30	1.30
			H_2S	0.02	0.02

EPN = Emission Point Number
FIN = Facility Identification Number

FHR's Exhibit E

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	April 2018; Revised September 2018	Permit No.: 6606	Regulated Entity No.:	RN100222744
Area Name:	Ingleside Terminal		Customer Reference No.:	CN603741463

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			4. UTM Coordinates of Emission Point			Source							
						5. Building	6. Height Above	7. Stack Exit Data			8. Fugitives		
EPN (A)	FIN (B)	Name (C)	Zone	East (Meters)	North (Meters)	Height (Ft.)	Ground (Ft.)	Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees (C)
MVCU1	DOCK, MVCU1	Marine Vapor Combustion Unit No. 1	14	677275	3078716		70	13	47.0	1600			
MVCU2	DOCK, MVCU2	Marine Vapor Combustion Unit No. 2	14	677297	3078721		70	13	47.0	1600			
MVCU3	DOCK, MVCU3	Marine Vapor Combustion Unit No. 3	14	677317	3078726		70	13	47.0	1600			
DOCK	DOCK	Ship and Barge Loading Dock	14	677244	3078607		16	0.0033	0.0033	ambient			
TK-28075	28075	Tank 28075	14	677683	3079166		55	0.0033	0.0033	ambient			
TK-28087	28087	Tank 28087	14	677652	3079095		56	0.0033	0.0033	ambient			
TK-28088	28088	Tank 28088	14	677757	3079360		56	0.0033	0.0033	ambient			
TK-28089	28089	Tank 28089	14	677655	3079459		56	0.0033	0.0033	ambient			
TK-28090	28090	Tank 28090	14	677152	3078876		56	0.0033	0.0033	ambient			
TK-28091	28091	Tank 28091	14	677722	3079422		56	0.0033	0.0033	ambient			
TK-28092	28092	Tank 28092	14	677621	3079024		56	0.0033	0.0033	ambient			
TK-28071	28071	Tank 28071	14	677467	3078971		56	0.0033	0.0033	ambient			
FUG-1	FUG-1	Terminal Fugitives	14	677089	3078548		5				600	600	
FWP-A	FWP-A	Fire Water Pump Engine A	14	677498	3078832		26	0.67	120	701			
FWP-B	FWP-B	Fire Water Pump Engine B	14	677501	3078832		26	0.67	120	701			

EPN = Emission Point Number
FIN = Facility Identification Number

APPENDIX B

AIR QUALITY ANALYSIS

APPENDIX C

ELECTRONIC MODELING EVALUATION WORKBOOK (EMEW)

TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	**BEFORE THE** **TEXAS COMMISSION ON** **ENVIRONMENTAL QUALITY**

FLINT HILLS RESOURCES INGLESIDE LLC
RESPONSE TO MOTION TO OVERTURN

Exhibit F

TCEQ AIR QUALITY PERMIT NUMBER 6606

APPLICATION BY FLINT HILLS RESOURCES INGLESIDE, LLC INGLESIDE MARINE TERMINAL INGLESIDE, SAN PATRICIO COUNTY	§ § § §	**BEFORE THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

EXECUTIVE DIRECTOR'S RESPONSE TO PUBLIC COMMENT

The Executive Director of the Texas Commission on Environmental Quality (the commission or TCEQ) files this Response to Public Comment (Response) on the New Source Review Authorization application and Executive Director's preliminary decision.

As required by Title 30 Texas Administrative Code (TAC) § 55.156, before an application is approved, the Executive Director prepares a response to all timely, relevant and material, or significant comments. The Office of Chief Clerk received timely comments from the following persons: State Senator Judith Zaffirini, State Representative J. M. Lozano, Aimee Wilson (on behalf of the United States Environmental Protection Agency), Colin Cox (on behalf of the Environmental Integrity Project), Patrick Arnold Nye (on behalf of the Ingleside on the Bay Coastal Watch Association), Carl Daniel Amsden, Tara Anders, Chrystal Beasley, Mariah Ann Boone, Lara Breeding, Lara Ann Breeding, Payton Gray Campbell, Elida Castillo, Trisha Christian, Robyn Cobb, Andi Cornett, Tom Daley, Margaret A Duran, Sally Clark Farris, Deborah A Ferrell, Larry R Ferrell, Cathy Fulton, Guillermo Gallegos, Patricia C Gardiner, Jose Gonzales, Bob Gonzalez, Robert Graham, Bruce Harry Henkhaus, Jennifer R Hilliard, Donna L Hoffman, Lynn Hughes, Wendy Hughes, Jeffrey Jacoby, James E Klein, Uneeda E Laitinen, Yvonne Landin, Charlotte Lawrence, Naomi Linzer, Nancy Lubbock, Michelle Mack, Thomas Mack, Brandt Mannchen, Kathryn A Masten, Eli Mckay, Stacey Meany, Carrie Robertson Meyer, Molly Morabito, Ann R Nyberg, Julie Ann Nye, Jasmin O'Neil, Jessica Palitza, Blanca Parkinson, Dorothy Pena, Christopher L Phelan, Lynne Goeglein Porter, William Porter, Beth Priday, Elizabeth Riebschlaeger, Lisa T Riley, Richard Alan Roark, Julie Travis Rogers, A Leslie Rozzell, Andrea Rozzell, Deandra M Sanchez, Jonah Sandoval, Encarnacion Serna, Joellen Flores Simmons, Lori Simmons, Errol Alvie Summerlin, John Tester, Chloe Torres, Ana Trevino, Lisa Moncrief Turcotte, Cynthia Valdes, Veronica Vela, Thomas Craig Wadham, James Walton, Sheila Walton, John Stephen Weber, Steven Wilder, Susan Wilder, Ken Willis, and Melissa Zamora. This Response addresses all timely public comments received, whether or not withdrawn. If you need more information about this permit application or the permitting process, please call the TCEQ Public Education Program at 1-800-687-4040. General information about TCEQ can be found at our website at www.tceq.texas.gov.

BACKGROUND

Description of Terminal

Flint Hills Resources Ingleside, LLC (Applicant) has applied to TCEQ for a New Source Review Authorization under Texas Clean Air Act (TCAA) § 382.0518. This will authorize the modification of an existing terminal that may emit air contaminants.

This permit will authorize the Applicant to modify the Ingleside Marine Terminal. The Terminal is located at 103 Farm-to-Market Road 1069, Ingleside, San Patricio County, Texas 78362. Contaminants authorized under this permit include carbon monoxide (CO), hazardous air pollutants (HAPs), hydrogen sulfide (H_2S), nitrogen oxides (NO_X), organic compounds, particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less (PM_{10} and $PM_{2.5}$, respectively), and sulfur dioxide (SO_2).

Procedural Background

Before work is begun on the modification of an existing facility that may emit air contaminants, the person planning the modification must obtain a permit amendment from the commission. This permit application is for a permit amendment of Air Quality Permit Number 6606.

The permit application was received on April 7, 2021 and declared administratively complete on April 9, 2021. The Notice of Receipt and Intent to Obtain an Air Quality Permit (first public notice) for this permit application was published in English on April 29, 2021, in the *Corpus Christi Caller Times* and in Spanish on May 4, 2021, in *La Prensa Comunidad*. The Notice of Application and Preliminary Decision for an Air Quality Permit (second public notice) was published on March 31, 2022, in English in the *Corpus Christi Caller Times* and in Spanish on March 29, 2022, in *La Prensa Comunidad*. A public meeting was held on July 14, 2022 at the Portland Community Center, Ballroom B, 2000 Billy G. Webb, Portland, Texas 78374. The notice of public meeting was mailed on June 14, 2022. The public comment period was extended to end on July 14, 2022, the day of the public meeting. Because this application was received after September 1, 2015, it is subject to the procedural requirements of and rules implementing Senate Bill 709 (84th Legislature, 2015).

COMMENTS AND RESPONSES

COMMENT 1: Public Meeting and Contested Case Hearing

Commenters requested that TCEQ hold either a public meeting or a contested case hearing regarding the proposed amendment for Flint Hills Resources' Permit 6606. Kathryn Masten also requested an extension of the public comment period.

(State Senator Judith Zaffirini, State Representative J. M. Lozano, Trisha Christian, Colin Cox, Sally Clark Farris, Guillermo Gallegos, Patricia C Gardiner, Bruce Harry Henkhaus, Jennifer R Hilliard, Nancy Lubbock, Brandt Mannchen, Kathryn Masten, Stacey Meany, Molly Morabito, Patrick Arnold Nye, Dorothy Pena, Christopher L Phelan, Richard Alan Roark, Julie Travis Rogers, Jonah Sandoval, Encarnacion Serna, Lori Simmons, Chloe Torres, Veronica Vela, and Susan Wilder)

RESPONSE 1: A public meeting was held on July 14, 2022 at 7:00 PM in Portland, Texas and the comment period was automatically extended to the close of the public meeting. The opportunity to request a Contested Case Hearing was during the Notice of Receipt of Application and Intent to Obtain Permit (NORI), otherwise known as the project's first public notice comment period. The NORI comment period started on October 19, 2021 and ended on November 18, 2021 and no hearing requests were received, therefore, there is no further opportunity to request a hearing.

COMMENT 2: Health Effects / Air Quality / Cumulative Effects

Commenters expressed concern about the effect of the emissions from the proposed project on the air quality and health of people, particularly sensitive populations such as the elderly, children, and people with existing medical conditions. Many commenters specifically questioned if TCEQ accounted for the cumulative effects of emissions of multiple properties in the surrounding area or were concerned with odors noticed in the city of Ingleside on the Bay. Encarnacion Serna expressed concern that the public would be inhaling Hazardous Air Pollutants (HAPs) from the site. Patrick Arnold Nye asked about $PM_{2.5}$ monitoring and health screening levels for $PM_{2.5}$.

(Tara Anders, Chrystal Beasley, Mariah Ann Boone, Lara Ann Breeding, Lara Breeding, Payton Gray Campbell, Elida Castillo, Trisha Christian, Robyn Cobb, Andi Cornett, Colin Cox, Tom Daley, Margaret A Duran, Sally Clark Farris, Deborah A Ferrell, Larry R Ferrell, Cathy Fulton, Guillermo Gallegos, Patricia C Gardiner, Jose Gonzales, Robert Graham, Bruce Harry Henkhaus, Jennifer R Hilliard, Donna L Hoffman, Lynn Hughes, Wendy Hughes, Jeffrey Jacoby, James E Klein, Uneeda E Laitinen, Yvonne Landin, Charlotte Lawrence, Naomi Linzer, Nancy Lubbock, Michelle Mack, Brandt Mannchen, Kathryn A Masten, Eli Mckay, Stacey Meany, Carrie Robertson Meyer, Molly Morabito, Ann R Nyberg, Patrick Arnold Nye, Julie Ann Nye, Jasmin O'Neil, Jessica Palitza, Blanca Parkinson, Dorothy Pena, Christopher L Phelan, Lynne Goeglein Porter, William Porter, Beth Priday, Elizabeth Riebschlaeger, Lisa T Riley, Richard Alan Roark, Julie Travis Rogers, Andrea Rozzell, A Leslie Rozzell, Deandra M Sanchez, Jonah Sandoval, Encarnacion Serna, Joellen Flores Simmons, Lori Simmons, Errol Alvie Summerlin, Chloe Torres, Ana Trevino, Lisa Moncrief Turcotte, Cynthia Valdes, Veronica Vela, Thomas Craig Wadham, Sheila Walton, James Walton, John Stephen Weber, Susan Wilder, Steven Wilder, Susan Wilder, Ken Willis, and Melissa Zamora)

RESPONSE 2: The Executive Director is required to review permit applications to ensure they will be protective of human health and the environment. For this type of air permit application, potential impacts to human health and welfare or the environment are determined by comparing the Applicant's proposed air emissions to appropriate state and federal standards and guidelines. These standards and guidelines include the National Ambient Air Quality Standards (NAAQS), TCEQ Effects Screening Levels (ESLs), and TCEQ rules. As described in detail below, the Executive Director determined that the emissions authorized by this permit are protective of both human health and welfare and the environment.

The United States (U.S.) Environmental Protection Agency (EPA) created and continues to evaluate the NAAQS, which include both primary and secondary standards, for pollutants considered harmful to public health and the environment.[1] Primary standards protect public health, including sensitive members of the population such as children, the elderly, and those individuals with preexisting health conditions. Secondary NAAQS protect public welfare and the environment, including animals, crops, vegetation, visibility, and buildings, from any known or anticipated adverse effects from air contaminants. EPA has set NAAQS for criteria pollutants, which include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), particulate matter less than or equal to 10 microns in aerodynamic diameter (PM_{10}), and PM less than or equal to 2.5 microns in aerodynamic diameter ($PM_{2.5}$).

The Applicant conducted a NAAQS analysis for SO_2, $PM_{2.5}$, and NO_2. The first step of the NAAQS analysis is to compare the proposed modeled emissions against the established de minimis level. Predicted concentrations (GLC_{max}[2]) below the de minimis level are considered to be so low that they do not require further NAAQS analysis. Table 1, shown below, contains the results of the de minimis analysis.

Table 1. Modeling Results for De Minimis Review

Pollutant	Averaging Time	GLC_{max} (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	0.5	7.8
SO_2	3-hr	0.3	25
$PM_{2.5}$	Annual	0.006	0.2
NO_2	Annual	0.02	1

[1] 40 CFR 50.2.
[2] The GLC_{max} is the maximum ground level concentration predicted by the modeling.

All the pollutants evaluated are below the de minimis standard, should not cause or contribute to an exceedance of the NAAQS, and are protective of human health and the environment.

ESLs are specific guideline concentrations used in TCEQ's evaluation of certain pollutants. These guidelines are derived by the TCEQ's Toxicology Division and are based on a pollutant's potential to cause adverse health effects, odor nuisances, and effects on vegetation. Health-based ESLs are set below levels reported to produce adverse health effects, and are set to protect the general public, including sensitive subgroups such as children, the elderly, or people with existing respiratory conditions. The TCEQ's Toxicology Division specifically considers the possibility of cumulative and aggregate exposure when developing the ESL values that are used in air permitting, creating an additional margin of safety that accounts for potential cumulative and aggregate impacts. Adverse health or welfare effects are not expected to occur if the air concentration of a pollutant is below its respective ESL. If an air concentration of a pollutant is above the screening level, it is not necessarily indicative that an adverse effect will occur, but rather that further evaluation is warranted.

The Applicant conducted a health effects analysis using the Modeling and Effects Review Applicability (MERA) guidance.[3] The MERA is a tool to evaluate impacts of non-criteria pollutants. It is a step-by-step process, evaluated on a chemical species by chemical species basis, in which the potential health effects are evaluated against the ESL for the chemical species. The initial steps are simple and conservative, and as the review progresses through the process, the steps require more detail and result in a more refined (less conservative) analysis. If the contaminant meets the criteria of a step, the review of human health and welfare effects for that chemical species is complete and is said to "fall out" of the MERA process at that step because it is protective of human health and welfare. All pollutants satisfy the MERA criteria and therefore are not expected to cause adverse health effects, except for distillates (petroleum), crude oil pollutants.

The following pollutants did not meet the criteria of the MERA guidance document and required further analysis. Site-wide modeling was performed and demonstrated that the predicted concentrations will not exceed the ESL for the Distillates Annual Averaging time but will exceed for the Distillates 1-hour Averaging Time, as shown below in Table 2.

[3] *See* Air Permit Reviewer Reference Guide - APDG 5874 guidance document.

Table 2. Minor NSR Site-wide Modeling Results for Health Effects

Pollutant	CAS#	Averaging Time	GLC_{max} (µg/m³)	GLC_{max} Location	GLC_{ni}[4] (µg/m³)	GLC_{ni} Location	ESL (µg/m³)
Distillates (petroleum), crude oil	68410-00-4	1-hr	7108	West Property Line	5583	East Property Line	3500
Distillates (petroleum), crude oil	68410-00-4	Annual	30	173m South	30	173m South	350

Table 3. Minor NSR Hours of Exceedance for Health Effects

Pollutant	Averaging Time	1 X ESL GLC_{ni}	2 X ESL GLC_{max}
Distillates (petroleum), crude oil	1-hr	15	1

The TCEQ Toxicology Division conducted an analysis for each pollutant with a predicted concentration above its ESL identified in Table 3, evaluated potential exposures, and assessed human health risks to the public. The Toxicology Division determined that the described impacts are acceptable given the conservative nature of both the ESLs and the emissions estimates.

Because this application has sulfur emissions, the Applicant conducted a state property line analysis to demonstrate compliance with TCEQ rules for net ground-level concentrations for sulfur dioxide (SO_2), hydrogen sulfide (H_2S), and sulfuric acid (H_2SO_4), as applicable. This analysis demonstrated that resulting air concentrations will not exceed the applicable state standard.

[4] The GLC_{ni} is the maximum non-industrial ground level concentration predicted by the modeling.

Table 4. Project-Related Modeling Results for State Property Line

Pollutant	Averaging Time	GLC_{max} (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	0.5	20.42

Table 5. Site-Wide Modeling Results for State Property Line

Pollutant	Averaging Time	Project GLC_{max} (µg/m^3)	Previous GLC_{max} (µg/m^3)	Total GLC_{max} (µg/m^3)	Standard (µg/m^3)
H_2S	1-hr	5	24	29	108

The 1-hr H_2S GLC_{max} is the summation of the previous 2015 site-wide GLCmax (NSR project # 232031) and the current project GLC_{max}.

In summary, based on the Executive Director's staff review, it is not expected that existing health conditions will worsen, or that there will be adverse health effects on the general public, sensitive subgroups, or the public welfare and the environment as a result of proposed emission rates associated with this project.

COMMENT 3: Federal Applicability and HAP Emission Increases

EPA requested TCEQ provide clarification on why the PI-1 form did not include confirmation that the Ingleside Marine Terminal is subject to 40 Code of Federal Regulations (CFR) 63 Subpart A General Provisions and Subpart Y National Emission Standard for Marine Tank Vessel Loading Operations.

(Aimee Wilson)

RESPONSE 3: Flint Hills did not include MACT Y in the PI-1 because the dockside emissions were not affected by this amendment. Not including MACT Y in the PI-1 does not change whether the site is subject to NESHAP MACT Y. Special Condition 5 of the NSR Permit 6606 and the Unit Summary of Title V Permit 3454 both indicate that they are subject to MACT Y.

TCEQ requires all emissions increases to be evaluated for impacts regardless of whether they are a HAP or not. All HAP emissions were evaluated according to the Modeling Effects Review Applicability Guidance.[5] All emission increases were determined to meet the applicable requirements and are protective of the public.

TCEQ does not require the individual species or HAPS be listed on the Maximum Allowable Emissions Rate Table (MAERT) if they are a subspecies of a criteria pollutant, so no updates to the MAERT are necessary. All speciated emission calculations are located in the permit application.

COMMENT 4: Storage Tanks' Withdraw Rate

EPA recommended adding the withdraw rate to Special Condition 6. EPA and Blanca Parkinson also inquired about the source of the 60,000 barrels per hour (bbl/hr) representation.

(Blanca Parkinson and Aimee Wilson)

RESPONSE 4: Storage tanks 28087, 28088, 28089, and 28090 hourly withdraw rate is 60,000 bbl/hr. The applicant is limited to a maximum withdraw rate based on their permit application representations on page 1 of the permit application. Per the Expansion Project's original request, the marine loading maximum hourly throughput is 60,000 bbl/hr; however, the storage tanks were represented at 40,000 bbls/hr initially. The storage tanks calculations were revised to include the updated withdraw rate and reflect the maximum operations. The withdraw rate for each storage tank may be found in the draft Special Conditions Attachment A for Permit 6606.

COMMENT 5: Merit of the Lead Acid Paper (LAP) and HAPs Sampling

EPA and another commenter expressed concern about the storage tanks' H_2S sampling and averaging time, and the merit of the LAP test. EPA questioned why TCEQ did not require Keco 205L analyzer testing for all H_2S sampling.

(Encarnacion Serna and Aimee Wilson)

RESPONSE 5: Flint Hills Resources is required to perform a LAP test protocol twice monthly, per Special Condition 6, if the American Petroleum Institute (API) gravity is less than 25, and annually if the API gravity is greater than 25. The LAP test follows protocols verified by the American Society for Testing and Materials (ASTM) which includes ASTM D5705, ASTM D4057, ASTM D4084-82, and ASTM D4468-85/D4045-81.

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[5] https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/mera.pdf

- ASTM D5705 – Standard Test Method for Measurement of Hydrogen Sulfide in Vapor Phase Above Residual Fuels Oils

- ASTM D4057 – Standard Practice for Manual Sampling of Petroleum and Petroleum Products

- ASTM D4084-82 – Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method)

- ASTM D4468-85/D4045-81 – Standard Test Method for Total Sulfur in Gaseous Fuels by hydrogenolysis and Rateometic Colorimetry

Crude oil naturally contains H_2S and the percentage of concentration depends on the source of the crude oil. Ingleside Marine Terminal supports the Flint Hills' Corpus Christi refinery where the terminal is expected to receive crude oil with varying crude oil densities. Per the United States' Energy Information Administration (EIA), API gravity is defined as "density of liquid petroleum products". API gravity is measured in degrees and the lower the API gravity, the higher the density and lower possibility of material-to-air contact evaporation.

API gravity indicates how quickly H_2S will evaporate into the headspace of the storage tanks when in contact with air. The lower the API gravity, the denser the material, and the higher the concentration of H_2S. Predictably, crude oil with a lower API gravity will contain more H_2S compounds; therefore, the contact between the air in the headspace of the storage tanks and the liquid surface can result in a higher gaseous H_2S in the headspace than higher API gravity crude oils.

Since several academic articles and other sites have verified that API gravity and the H_2S concentration of crude oil are correlated, the agency has accepted monitoring frequency based on the API gravity. Flint Hills Resources calculated the maximum crude oil throughput and performed a site-wide modeling for health impacts. The preliminary model indicated that crude oil impacts exceeded the ESLs. Flint Hills Resources limited the potential impacts of crude oil by artificially restricting how many storage tanks may be loaded at a given time and by implementing total hourly control device limitations. Ingleside Marine Terminal is authorized to store and load crude oil within the framework of their modeling and toxicology limitations so it is unlikely that the concentration of the crude oil will be frequently changed. Thus, the two monthly samplings for higher H_2S crude oil and annual sampling for lower H_2S concentration is acceptable.

The Keco 205L analyzer is required for higher H_2S concentration in the crude oil or crude oil with an API gravity lower than 25. The agency is aware that the Keco 205L analyzer is able to quantify H_2S concentrations more accurately. However, the LAP test is used to determine which crude oil batch needs to be sampled. The LAP test has been verified by the ASTM to be sensitive enough to detect H_2S at 0.0297 part per million by weight (ppmw) so if a negative result is indicated, Special Condition 7 requires that the crude oil is tested with a Keco 205L analyzer.

COMMENT 6: Crude Oil Special Conditions

EPA requested an explanation of the crude oil properties and potential conflicting conditions. Specifically, EPA asked if the barges and ships at the terminal are loaded with the same crude and stabilized condensate that is stored within the tanks listed in Special Condition 6. They also asked why the H_2S concentration limit is different for the barge and ship loading compared to the storage tank H_2S concentration limit.

(Aimee Wilson)

RESPONSE 6: Special Condition 6 puts a limit on the material stored in the storage tanks at the site and Special Condition 7 puts a limit on the material that is loaded into barges from the storage tanks. It is a common practice to segregate stored materials based upon their specifications to different storage tanks to allow for transfer or sale of different specification materials. As the flow of material goes from storage tanks to barges, barge loading is naturally going to have more emissions per hour. As the emission rates will be higher, a lower H_2S concentration is required to compensate for the higher rate in order to meet emission limits. The material transferred to barges is also tested before it is loaded. Thus, a lower H_2S limit on materials loaded onto barges limits the H_2S emissions from barge loading.

TCEQ does not establish a best available control technology (BACT) H_2S limit on crude oil since it is inherent to crude oil and gets processed out in downstream processes (e.g., sulfur recovery units). Refineries are designed based upon the expected sulfur content of the crude oil and need sulfur for proper plant operations. H_2S limits are required to ensure that the site is not exceeding permitted limits and did not trigger prevention of significant deterioration (PSD) modifications or have impacts issues.

COMMENT 7: Collection Efficiency

EPA asked if the third collection efficiency test had been conducted for inerted vessel loading, if performing three tests in 2015 would ensure compliance after 7 years, and if TCEQ can be assured that there is no degradation to the collection equipment as it ages.

(Aimee Wilson)

RESPONSE 7: The applicant conducted the third collection efficiency test on August 23, 2015. This applicant was part of the group of facilities that conducted testing that TCEQ used to develop the updated marine loading collection efficiency guidance. After review of the data submitted, TCEQ has concluded that higher collection efficiencies are achieved with the identification and repair of leaks at the beginning of the loading cycle. Special Condition 9 requires audio, visual, and olfactory (AVO) leak checks during the loading process once every eight hours during the loading operation for onshore equipment and on board the ship. Any liquid leaks that are detected require that the site stop loading until it is fixed. If a vapor leak is detected a first attempt at repair must be made but loading does not need to stop. However, if loading continues then the site is only allowed to claim 95 percent capture credit.

COMMENT 8: Vacuum Assisted Loading

Encarnacion Serna asked why vacuum-assisted loading is not used on an inerted marine vessel, as stated in Special Condition 8.

(Encarnacion Serna)

RESPONSE 8: Coast Guard regulations do not allow vacuums to be applied to inerted vessels for safety reasons. Vacuum-assisted loading cannot be used on an inerted vessel because it will remove the nitrogen blanket and render it no longer inerted. In accordance with these regulations, Special Condition 8 establishes requirements for collected VOC emissions from loading into inerted and non-inerted marine vessels, including routing to the Marine Vapor Combustor Unit (MVCU).

COMMENT 9: Product Temperature

EPA requested a clarification of Special Condition 13 asking if the referenced temperature is the product temperature, if there is a maximum loading temperature, and if there is monitoring.

(Aimee Wilson)

RESPONSE 9: The referenced temperature in Special Condition 13 is the temperature of the product being loaded into marine vessels. TCEQ policy is to require 95° Fahrenheit or maximum expected worst-case temperature whichever is higher be used to calculate the true vapor pressure. Special Condition 17 requires that a monthly average temperature be recorded, but it does not specify the frequency of monitoring.

COMMENT 10: Liquid Knockout Pot Discharge Pressure

EPA requested clarification on the averaging time of the pressure monitoring for non-inerted barge loading and that Special Condition 14 be updated to add averaging time.

(Aimee Wilson)

RESPONSE 10: The applicant is required to monitor the liquid knockout pot pressure every 15-minutes which is consistent with EPA's definition of continuous monitoring. Any pressure reading under 1.5 inches water column is considered non-compliant. Since any pressure reading would be a deviation there is no need to add an averaging time and, therefore, it is not necessary to update Special Condition 14.

COMMENT 11: Visual Inspections and Seal Gap Federal Requirement References

EPA states that Special Condition 15 does not include enough information to indicate if the tanks are internal or external floating tanks and what monitoring is required.

(Aimee Wilson)

RESPONSE 11: TCEQ typically references the general monitoring section of NSPS Kb and does not require that the NSR permit specify which specific monitoring requirements each tank must follow. Each tank must follow the appropriate monitoring based on whether it is an internal or external floating roof tank. Internal floating roof tanks are required to be monitored according to 40 CFR § 60.113b(a), and external floating roof tanks are required to be monitored according to 40 CFR § 60.113b(b). 40 CFR § 63.1063(d) can be used for both internal and external floating roof tanks.

TK-28067, TK-28070R and TK-28077 are internal floating roof tanks. TK-28068, TK-28069, TK-28071, TK-28072, TK-28073, TK-28074, TK-28075, TK-28076, TK-28080 and TK-28066 are external floating roofs.

COMMENT 12: Incremental Emissions Increases

EPA expressed concern that Special Condition 18 allows for the permit limits to be exceeded. EPA also requested that TCEQ explain the condition and make publicly available any emissions that were reported that exceeded the baseline actual emissions.

(Aimee Wilson)

RESPONSE 12: All non-confidential records submitted to TCEQ are available for the public viewing upon request.

Special Condition 18 does not provide an exemption for the site to exceed its permitted emission limits. The permit holder must comply with the limits on the maximum allowable emission rate table for all operations that are authorized by the permit. Special Condition 18 ensures compliance with the incremental emission analysis used in TCEQ Project 284633, which authorized an increase in the permitted throughput for the site. Based on an EPA PSD Applicability Determination letter for Murphy Oil[6], Flint Hills used an incremental analysis to calculate the emission increases from the existing facilities that were part of that project. Incremental emissions may be used to calculate emission increases for "existing facilities that are being modified but are experiencing an emission increase as a result of a change."[7]

Special Condition 18 requires the permit holder to maintain records to determine whether the actual emissions exceed the baseline emissions by more than the incremental emissions thus triggering an updated federal applicability analysis. Per the condition, if the updated federal applicability results in a project increase that exceeds the major source thresholds, a report would be submitted by the permit holder. TCEQ has not received a report that these emission thresholds have been exceeded. The company confirmed that the incremental increases were accurate during the application for this current project.

COMMENT 13: Marine Vapor Combustor Unit (MVCU) Control Efficiency

EPA stated that it is unclear from the NSR permit whether the MVCUs are subject to NESHAP MACT Y. EPA also asked if the DRE applied to both HAPs and VOC, and what monitoring is done to ensure compliance.

(Aimee Wilson)

RESPONSE 13: The vapor combustion units (VCUs) are required to achieve 99.9-percent control of the waste gas. The VCU has a combustion chamber firebox temperature monitor. The pilot flame is also required to be monitored. The applicant is required to perform sampling after achieving the maximum operation rate to establish the minimum temperature at which the VCUs must operate to achieve the required minimum control efficiency. After sampling is conducted, the minimum actual temperature must be maintained above the minimum temperature established during the stack test during loading operations. Additionally, per Special Condition 20(D), if the "maximum…crude oil and stabilized condensate loading operations recorded…is greater than that recorded during the test periods, stack sampling shall be performed at the new operating conditions…" The applicant is restricted from installing (and operating) an atmospheric bypass without a flow monitor or installing car-seals, a

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[6] https://www.epa.gov/sites/default/files/2015-07/documents/murphy.pdf
[7] *See* Air Permit Reviewer Reference Guide - APDG 5881v8 (Revised 01/22) guidance document.

physical restriction to operating the bypass, on the bypass. Car-seals must be inspected monthly to verify the position of the values and that flow out of the bypass is prevented.

Special Condition 20(D) does not permit the exceedance of any other established permit condition. The purpose of Special Condition 20(D) is to account for situations where the plant owner/operator is not able to test at the maximum authorized rate during the initial 180-day period after the permit is issued, when testing must be conducted. Special Condition 20(D) allows for subsequent testing to occur if the loading rate exceeds the rate that was previously tested but does not allow any permit limit to be exceeded.

Texas has a split permitting program and Title V permits are issued separately from the NSR permits. The Title V permit will have the documentation for which specific sources are subject to which regulation. The NSR permit will generally state which regulation applies to the facilities authorized by the NSR Permit. Title V Permit O3454 indicates that the previous MVCU was subject to MACT Y and since these are replacement units then they will be subject to MACT Y.

COMMENT 14: Marine Vessel Stack Testing

EPA asked if the initial stack testing has taken place and if Special Condition 15 allows the site to stack test outside permitted scenarios. EPA also asked if the site could be exempt from stack testing in the future.

(Aimee Wilson)

RESPONSE 14: The site commenced operation of the MVCUs in December 2019 and has completed the required stack testing.

As stated in Response 13 (Marine Vapor Combustor Unit (MVCU) Control Efficiency), if actual production rates exceed the rate that the control devices were previously tested, then the permit holder must test at the higher rate within 120 days. This does not allow an exceedance of a permit limit but does allow for testing to be conducted in the event that future operations exceed the rate at which the equipment was originally tested.

COMMENT 15: Audio, Visual and Olfactory (AVO) Checks Frequency

EPA asked why a monthly AVO is adequate for these units in petroleum service and if a more frequent AVO could be performed.

(Aimee Wilson)

RESPONSE 15: The site is currently subject to the 28PET fugitive monitoring program and is currently only required to do monthly inspections for VOC emissions. Ninety days after issuance of this permit, the site will be required to implement the 28VHP fugitive monitoring program which requires weekly AVO inspections. Additionally, the site does daily AVO inspections for H_2S leaks for components in H_2S service.

COMMENT 16: Continuous Monitoring of Control Devices

EPA asked TCEQ to ensure the special conditions are enforceable so that the equipment operates as represented, and that representations for modeling be made enforceable.

(Aimee Wilson)

RESPONSE 16: The external floating roof and internal floating roof storage tanks are required to meet the inspection requirements and frequency in NSPS Kb.

The MVCUs are required to perform temperature monitoring on a 6-minute averaging period. The temperature instrumentation is required to maintain the equipment according to the manufacturer's instructions and the applicant is required to calibrate it at least annually. The pilot flame is required to be detected by ultraviolet scanner, a thermocouple, a temperature element, or an agency approved equivalent measurement device.

The H_2S concentration change for marine loading was updated in the permit and must be tested before each loading operation. Only four tanks were represented to have working losses at any given time in the modeling. There was nothing written into the special conditions that require this, but representations in a permit application are enforceable pursuant to 30 TAC 116.116(a) and Condition 10 "Compliance with Rules" of the General Conditions. The modeling had restrictions on Maintenance, Startup, and Shutdown (MSS) emissions authorized by Permit by Rule Registration No. 107625. These restrictions are not written into permit 6606 since they are not authorized by the NSR permit.

COMMENT 17: Loading Operations of Marine Vessel

Encarnacion Serna claimed that text in Special Condition 9D (1) and (2) are contradicted and nullified by 9D (3).

(Encarnacion Serna)

RESPONSE 17: Special Condition 9D (1) describes actions taken upon a liquid leak, whereas Special Condition 9D (2) describes actions taken upon a vapor leak. Special Condition 9D (1) states that if a liquid leak is detected and "cannot be repaired immediately", then the "loading operation shall cease until the leak is repaired." Special Condition 9D (2) states that if a vapor leak is detected, that a "first attempt" “shall be made to repair the leak” and “loading operations need not be ceased” if the first attempt is unsuccessful. Special Condition 9D (3) states that if the “attempt to repair the leak is not successful and loading continues” then a collection efficiency of 95 percent shall be used to calculate the emissions from the loading operation.

Special Condition 9D (3) is only intended to be applied to (2), as (2) states that loading can continue if a vapor leak is detected but the repair attempt should be documented.

COMMENT 18: Access to Rule Citations

Encarnacion Serna requested easier access to rule citations relevant to the permit.

(Encarnacion Serna)

RESPONSE 18: Flint Hills Ingleside is a major source and has a Title V permit, O3454. The Title V permit contains all the relevant rule citations for the plant.

COMMENT 19: Quarterly Deviation Reporting

Commenters stated that the applicant should perform quarterly deviation reporting and include additional information in the deviation report.

(Blanca Parkinson and Encarnacion Serna)

RESPONSE 19: State and federal rules require that the sites that have a Title V permit submit semi-annual reporting of deviations. Flint Hills Ingleside is a major source and has a Title V permit and is subject to semi-annual deviation reporting in addition to any other reports required by the state and federal rules. The regional office and EPA have the authority to request any information they deem necessary, but it is not necessary to include additional information with deviation reporting.

COMMENT 20: Diesel Fuel Monitoring and Recordkeeping

Encarnacion Serna stated calibration and accuracy requirements of monitors and recordkeeping of diesel fuel is insufficient.

(Encarnacion Serna)

RESPONSE 20: The calibration and accuracy requirements for the instrumentation and recordkeeping of diesel fuel is consistent with recently issued permits and TCEQ guidance on monitoring requirements. These requirements are appropriate given the type of sources and the amount of emissions at the site.

COMMENT 21: Sulfur Dioxide and Hydrogen Sulfide Net Concentration Requirements

Patrick Arnold Nye questioned if the sulfur dioxide (SO_2) and hydrogen sulfide (H_2S) net concentration requirements of 30 TAC Chapter 112 will be complied with.

(Patrick Arnold Nye)

RESPONSE 21: Flint Hills Resources conducted a Texas State Property Line Analysis de minimis evaluation on the project's proposed increases in hourly SO_2 and H_2S emissions, per 30 TAC 112.3, 30 TAC 112.31, 30 TAC 112.32 and TCEQ Modeling Guidelines. TCEQ reviewed this analysis and found the air quality analysis to be acceptable for SO_2 and H_2S. *See* Response 2 (Health Effects / Air Quality/ Cumulative Effects) for more information on the health effects review.

COMMENT 22: Vapor Combustor Monitoring and Maintenance

Patrick Arnold Nye asked how the MVCUs will be maintained to meet manufacturer specifications and/or operated in a manner that is consistent with minimizing emissions, including how 98 percent of the H_2S in crude oil will be converted to SO_2 through combustion. Mr. Nye also asked about the cleaning and routine inspections of the site, specifically of the vapor combustors.

(Patrick Arnold Nye)

RESPONSE 22: The MVCUs are control devices that are subject to Title V Compliance Assurance Monitoring (CAM) requirements. CAM is a federal monitoring program established under 40 CFR Part 64 that ensures control devices have sufficient monitoring, testing, and recordkeeping requirements to show compliance with an emission limitation or standard. The MVCUs meet CAM requirements by continuously monitoring the firebox temperatures at an averaging period of 6 minutes or less with an accuracy of the greater of the plus or minus 2 percent of the temperature being measured expressed in degrees Celsius or plus or minus 2.5 ºC. This ensures that the average firebox temperature is kept at a minimum of 1600 ˚F, which translates into a minimum of 99.9 percent waste gas destruction efficiency and the minimum conversion of 98 percent H_2S into SO_2 in crude oil through combustion. The monitoring, testing, and recordkeeping requirements for MVCUs can be found in Special Conditions 24, 25, and 26 of the permit.

MVCU maintenance includes operational checks prior to any barge loading and site-wide quarterly routine maintenance performed by a third-party company, John Zink. Site employees also perform hourly inspection rounds whenever the MVCUs are operational.

COMMENT 23: Actual Emissions

Patrick Arnold Nye asked how the phrase "significant amount" of "actual emissions" in Special Condition 18 is defined in the context of "actual emissions" exceeding "baseline actual emissions."

(Patrick Arnold Nye)

RESPONSE 23: The significant amount of actual emissions exceedance is defined in 30 TAC § 116.12(13) - Nonattainment and Prevention of Significant Deterioration Review Definitions. This is a method of determining if a proposed emission increase will trigger nonattainment or prevention of significant deterioration review. The summation of the proposed project emission increases in tons per year with all other creditable source emission increases and decreases during the contemporaneous period is compared to the significant level for that pollutant. If the significant level is exceeded, then prevention of significant deterioration and/or nonattainment review is required.

COMMENT 24: Stack Sampling

Patrick Arnold Nye questioned if stack sampling is the best available method to determine levels of air contaminant considering the requirement to perform stack testing 60 days after the maximum operating rate. Mr. Nye also questioned the frequency that stack tests are done and if they are reported.

(Patrick Arnold Nye)

RESPONSE 24: Special Condition 20 for stack sampling, establishes the actual pattern and quantities of air contaminants being emitted into the atmosphere. The stack sampling is conducted in accordance with the appropriate procedures of the TCEQ Sampling Procedures Manual and the U.S. EPA Reference Methods. Emissions from this facility were determined by actual stack testing data. The Applicant represented the appropriate methodologies to control and minimize emissions and utilized corresponding control efficiencies when calculating the emission rates. As provided in 30 TAC § 116.116(a), the Applicant is bound by these representations, including the represented performance characteristics of the control equipment. In addition, the permit holder must operate within the limits of the permit, including the emission limits as listed in the MAERT.

Special Condition 20 (D) allows for subsequent testing to occur if the loading rate exceeds the rate that was previously tested but does not allow any permit limit to be exceeded.

Special Condition 20 (E) requires one copy of the final sampling report be forwarded to the appropriate TCEQ Regional Office and the sampling reports shall comply with Chapter 14, Contents of Sampling Reports of the TCEQ Sampling Procedures Manual. This chapter provides guidance for submitting air emission test reports.

COMMENT 25: Heated Storage Tanks

Patrick Arnold Nye asked how many heated storage tanks Flint Hills Ingleside will have, and if they will have vapor recovery systems or if they are routed to vapor combustors. Additionally, Mr. Nye asked how naptha, diesel, coker gas oil, and #6 fuel oil, which are stated to be stored at increased temperatures and stirred to maintain viscosity, will be kept at such states, and if cutter stock/hazardous waste will be added to the thick fuel oil, and how these emissions would be controlled.

(Patrick Arnold Nye)

RESPONSE 25: Flint Hills Resources Ingleside's marine terminal is not currently authorized to have any heated storage tanks on site. Naptha, diesel, coker gas oil, and #6 fuel oil are not authorized to be stored at increased temperatures.

MSS operations are authorized under Permit by Rule (PBR) Registration No. 107625. Maintenance activities, such as tank landings and tank cleaning, is controlled by an internal combustion engine or thermal oxidizer authorized by PBR Registration No. 107625.

COMMENT 26: Temperatures of Loading Operations

Patrick Arnold Nye asked where the temperatures of 80 ˚F and 73.5 ˚F for the hourly and annual emission rates of loading operations, respectively, originated from. Mr. Nye also asked, as it is stated that the temperatures could be higher, what happens when the temperatures are higher, and if there are records kept of loading temperatures.

(Patrick Arnold Nye)

RESPONSE 26: The temperatures for hourly and annual loading operations found in the permit application are temperatures derived from national weather sources. As stated in the application, loading emissions are estimated through Equation 1 of the AP-42, Fifth Edition, Section 5.2, where lower temperatures used in the calculation would result in a more conservative emission rate. Actual temperatures during loading may be higher but would represent a less conservative emission rate estimate. Additionally, the true vapor pressure used in the calculation is based on crude oil with a Reid Vapor Pressure (RVP) of 10 pounds per square inch, absolute (psia), that represents a worst-case vapor pressure, consistent with TCEQ guidance on loading calculations.

Flint Hills Ingleside is required to keep records describing calculated emissions of VOC from all storage tanks and loading operations, described in Special Condition 17 of the permit; this includes the VOC monthly average temperature in degrees Fahrenheit.

COMMENT 27: Shore Power for Marine Loading

Kathryn Masten asked why shore power is not used by docking ships during marine loading processes, as opposed to ships idling during loading.

(Kathryn Masten)

RESPONSE 27: TCEQ does not have jurisdiction to require marine vessels to be fully powered by shore or stop the marine vessel from idling during loading operations.

COMMENT 28: Accuracy of MVCU Firebox Temperature

Encarnacion Serna asked why the accuracy of the firebox temperature monitor in Special Condition 24 is limited by the greater of plus or minus 2 percent of the temperature being measured expressed in ºC or plus or minus 2.5 ºC, and states that the required accuracy should be the smaller of the criteria.

(Encarnacion Serna)

RESPONSE 28: TCEQ is only allowing the greater of plus or minus 2 percent of the temperature being measured expressed in ºC or plus or minus 2.5 ºC for any instrument errors or temperature variance that may occur during operations.

COMMENT 29: Good Practices

Patrick Arnold Nye asked how "good air pollution control practices and "good combustion practices" are defined by TCEQ.

(Patrick Arnold Nye)

RESPONSE 29: Regarding "good air pollution control practices," control devices shall follow manufacture operational procedures to meet vendor guaranteed requirements.

Regarding "good combustion practices," combustion occurs when fossil fuels such as natural gas react with oxygen in the air to produce heat. Natural gas is mostly methane (CH_4), which when combined with air, produces carbon dioxide and water along with heat. Unless combustion is properly controlled, incomplete combustion results in high concentrations of undesirable products such as soot, carbon monoxide (CO), sulfur dioxide (SO_2), and nitrogen oxides (NO_X). Good combustion practices are the optimization of air and fuel flow to minimize incomplete combustion. It is very common for BACT for certain pollutants from combustion sources to be controlled and reduced through good combustion practices.

COMMENT 30: Operator Training Procedures

Patrick Arnold Nye requested a description of Flint Hills Ingleside's current operator training procedures to ensure proper operation and combustion efficiency of the VCUs.

(Patrick Arnold Nye)

RESPONSE 30: Flint Hills Ingleside's operator training procedure includes direction from the site's operator training manual to comply with coast guard requirements, training with third-party company John Zink, training to ensure operations occur with no visible opacity, and reporting any opacity events to TCEQ.

COMMENT 31: Method 21 Gas Analyzers

Patrick Arnold Nye asked if Toxic Vapor Analyzers (TVAs) are used for Method 21 leak detection for measuring hydrocarbon concentrations. Mr. Nye also asked what gases are used to calibrate Method 21 instruments.

(Patrick Arnold Nye)

RESPONSE 31: TCEQ does not specify the type of gas analyzers a site must use. Special Condition 21 only requires the gas analyzer to conform to requirements listed in Method 21 of 40 CFR Part 60, Appendix A. The gas analyzer shall be calibrated with methane. In addition, the response factor of the instrument for a specific VOC of interest shall be determined and meet the requirements of Section 8 of Method 21. If a mixture of VOCs is being monitored, the response factor shall be calculated for the average composition of the process fluid.

COMMENT 32: Opacity Reports by the Public

Patrick Arnold Nye asked if TCEQ accepts citizen-collected evidence for opacity measurements using Method 9, Method 22, and/or EPA Method 82/ASTM D7520-16. Mr. Nye also asked what the specific requirements are to meet TCEQ standards.

(Patrick Arnold Nye)

RESPONSE 32: Individuals are encouraged to report any concerns about nuisance issues or suspected non-compliance with the terms of any permit or other environmental regulation by contacting the TCEQ Corpus Christi Regional Office at 361-881-6900 or by calling the 24-hour toll-free Environmental Complaints Hotline at 1-888-777-3186. TCEQ reviews all complaints received. If the terminal is found to be out of compliance with the terms and conditions of the permit, it may be subject to possible enforcement action. Additionally, the general public can view the emissions event database on the TCEQ website at www.tceq.texas.gov/nav/cec/.

Citizen-collected evidence may be used in enforcement actions. *See* 30 TAC § 70.4, Enforcement Action Using Information Provided by Private Individual, for details on gathering and reporting such evidence. Under the citizen-collected evidence program, individuals are providing information on possible violations of environmental law and the information can be used by TCEQ to pursue enforcement. In this program, citizens can become involved and may eventually testify at a hearing or trial concerning the violation. For additional information, see the TCEQ publication, "Do You Want to Make an Environmental Complaint? Do You Have Information or Evidence?" This booklet is available in English and Spanish from the TCEQ Publications office at 512-239-0028 and may be downloaded from the agency website at www.tceq.texas.gov (under Publications, search for Publication Number 278).

COMMENT 33: Monitors

Commenters stated that there are no TCEQ air monitoring stations in San Patricio County and requested that an air monitor be located in their area. Commenters also questioned if fenceline monitoring was being implemented at the Flint Hills Ingleside site.

(Mariah Ann Boone, Elida Castillo, Tom Daley, Larry R Ferrell, Jose Gonzales, Jennifer R Hilliard, James E Klein, Uneeda E Laitinen, Yvonne Landin, Charlotte Lawrence, Nancy Lubbock, Thomas Mack, Kathryn A Masten, Carrie Robertson Meyer, Ann R Nyberg, Patrick Arnold Nye, Jasmin O'Neil, Blanca Parkinson, Lynne Goeglein Porter, Julie Travis Rogers, Andrea Rozzell, A Leslie Rozzell, Encarnacion Serna, Errol Alvie Summerlin, Thomas Craig Wadham, Sheila Walton, John Stephen Weber, and Steven Wilder)

RESPONSE 33: Due to cost and logistical constraints, the placement of air monitors is prioritized to provide data on regional air quality in areas frequented by the public. The existing air monitoring network is the result of a strategic balance of matching federal monitoring requirements with state and local needs. Consistent with federal air monitoring requirements, TCEQ evaluates the placement of air quality monitors within the air monitoring network using trends in population, reported emissions inventory data, and existing air monitoring data for a given area. In addition, TCEQ may prioritize monitor placement in areas with potential regional air quality issues, such as those related to increased oil and gas activity in the Barnett Shale and Eagle Ford Shale areas.

TCEQ annually evaluates the number and location of air monitors within its network to assess compliance with federal monitoring requirements and the adequacy of monitoring coverage for identified monitoring objectives as a part of the Annual Monitoring Network Plan provided to EPA on July 1 of each year. This plan is made available on the TCEQ's website for public review and comment for 30 days beginning in mid-May. Requests for additional monitoring or the identification of additional monitoring needs may be made during this public comment period and will be considered along with other monitoring priorities across the state. To receive email announcements related to the ambient air monitoring network, including the availability of the Annual Monitoring Network Plan for public review and comment, please visit the following link https://service.govdelivery.com/accounts/TXTCEQ/subscriber/new and select "Air Monitoring Network Announcements."

Stationary air monitors are sited to measure air quality that is representative of a broader area or region. Therefore, monitors are not typically placed to measure the impacts from specific industrial facilities.

The Flint Hills Resources Ingleside Terminal does not currently have fenceline monitoring capabilities at the site. There is no federal or state requirement for marine terminals to install and maintain fenceline monitoring at the facilities. Flint Hills Resources is required to perform monitoring to demonstrate compliance with the permitted limits to ensure protectiveness of their site. *See* Response 43 (Demonstrate Compliance with the Permit) for more details of monitoring.

COMMENT 34: Climate Change

Commenters expressed concern about the effects of this project in relation to climate change. Patrick Arnold Nye asked about the permit's Greenhouse Gases (GHG) reporting requirements.

(Tara Anders, Chrystal Beasley, Elida Castillo, Robyn Cobb, Sally Clark Farris, Patricia C Gardiner, Donna L Hoffman, Uneeda E Laitinen, Nancy Lubbock, Kathryn A Masten, Ann R Nyberg, Patrick Arnold Nye, Jessica Palitza, Dorothy Pena, Christopher L Phelan, Lynne Goeglein Porter, Encarnacion Serna, Chloe Torres, Ana Trevino, James Walton, and Melissa Zamora)

RESPONSE 34: EPA has stated that unlike the criteria pollutants for which EPA has historically issued PSD permits, there is no NAAQS for GHGs, including no PSD increment. Climate change modeling and evaluations of risks and impacts are typically conducted for changes in emissions that are orders of magnitude larger than the emissions from individual projects that might be analyzed in permit reviews. Thus, EPA has concluded it would not be meaningful to evaluate impacts of GHG emissions on a local community in the context of a single permit. For these reasons, TCEQ has determined that an air quality analysis for GHG emissions would provide no meaningful data and has not required the Applicant to perform one.

COMMENT 35: Access to Permit Documents

Commenters stated that they did not have access to the permit documents.

(Richard Alan Roark and Encarnacion Serna)

RESPONSE 35: 30 TAC § 39.405 requires the Applicant to provide copies of the application and the Executive Director's preliminary decision at a public place in the county in which the facility is located or proposed to be located. The rules also require the public have an opportunity to review and copy these materials. In addition, the application, including any subsequent revisions to the application, must be available for review for the duration of the comment period. The Applicant represented that the application was made available at the Ingleside Public Library. In addition, a copy of the application was also available at the TCEQ Corpus Christi Regional Office and the TCEQ Central Office.

COMMENT 36: Jurisdictional Issues

Location / Zoning: Commenters expressed concern regarding the location of the facility as it relates to current zoning ordinances and the proximity to residential and public areas, including schools.

(Margaret A Duran and Sally Clark Faris)

Quality of Life / Aesthetics / Property Value: Commenters expressed concern about the effect of the proposed project on their quality of life, on the aesthetics of the area, and on their property value.

(Tara Anders, Mariah Ann Boone, Lara Ann Breeding, Elida Castillo, Colin Cox, Sally Clark Farris, Larry R Ferrell, Jose Gonzales, Jennifer R Hilliard, Lynn Hughes, Wendy Hughes, James E Klein, Uneeda E Laitinen, Yvonne Landin, Charlotte Lawrence, Nancy Lubbock, Michelle Mack, Kathryn A Masten, Carrie Robertson Meyer, Ann R Nyberg, Jasmin O'Neil, Jessica Palitza, Lynne Goeglein Porter, Elizabeth Riebschlaeger, Lisa T Riley, Richard Alan Roark, Julie Travis Rogers, A Leslie Rozzell, Andrea Rozzell, Deandra M Sanchez, Joellen Flores Simmons, Errol Alvie Summerlin, Chloe Torres, Ana Trevino, Lisa Moncrief Turcotte, Sheila Walton, John Stephen Weber, Steven Wilder, Susan Wilder, Ken Willis, and Melissa Zamora)

RESPONSE 36:

Location / Zoning: TCEQ does not have jurisdiction to consider plant location choices made by an applicant when determining whether to approve or deny a permit application, unless a statute or rule imposes specific distance limitations that are enforceable by TCEQ. Zoning and land use are beyond the authority of TCEQ for consideration when reviewing air quality permit applications and such issues should be directed to local officials. The issuance of an air quality authorization does not override any local zoning requirements that may be in effect and does not authorize an applicant to operate outside of local zoning requirements.

TCEQ Region 14 (Corpus Christi) Office conducted a site review of the area on April 29, 2021. According to that site review, nuisance, odor, and hazard potentials were low. The review also described the surrounding land use as industrial, and the nearest off-property receptor is a building at an adjacent facility approximately 350 feet away. The distance from the facility to the nearest property line, according to the site review, is approximately 200 feet. The recommendation of the Regional Office was to proceed with the permit review and the site review indicated no reasons to deny the permit application.

Although TCEQ cannot consider zoning or land use, TCEQ does conduct a health effects review to ensure that there will be no adverse impacts to human health and welfare. As described in Response 2 (Health Effects / Air Quality / Cumulative Effects), a protectiveness review was conducted for all contaminants emitted. The maximum concentrations were evaluated at the property line, at the nearest off-property receptor, and at any schools located within 3,000 feet of the facilities and were found to be protective of human health and the environment.

Quality of Life / Aesthetics / Property Value: TCEQ does not have the authority to consider potential effects from plant location, aesthetics, zoning and land use issues, or effects on property values when determining whether to approve or deny an air quality permit.

COMMENT 37: Best Available Control Technology (BACT)

Commenters questioned the control technology proposed in the application.

(Colin Cox, Jennifer R Hilliard, James E Klein, Kathryn A Masten, Patrick Arnold Nye, Richard Alan Roark, Encarnacion Serna, Ken Willis, and Aimee Wilson)

RESPONSE 37: BACT is an air pollution control method for a new or modified facility that through experience and research, has proven to be operational, obtainable, and capable of reducing or eliminating emissions from the facility, and is considered technically practical and economically reasonable for the facility. BACT may be numerical limitations, the use of an add-on control technology, design considerations, the implementation of work practices, or operational limitations. The Applicant has represented in the permit application that BACT will be used for the proposed new and modified sources.

The contaminants authorized by this permitting action are carbon monoxide (CO), hazardous air pollutants (HAPs), hydrogen sulfide (H_2S), nitrogen oxides (NO_X), organic compounds, particulate matter including particulate matter with diameters of 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$) and sulfur dioxide (SO_2). The primary control measures applied to this facility are an internal floating deck or "roof" or equivalent control on storage tanks, an external floating roof tank with double seal or secondary seal technology on storage tanks provided the primary seal consists of either a mechanical shoe seal or a liquid-mounted seal and the secondary seal is rim-mounted, and MVCUs for marine loading activities. The permit reviewer evaluated the proposed BACT and confirmed it to be acceptable.

COMMENT 38: Emission Rates and Calculations

Commenters questioned the accuracy and methodology for determining the emission rates for the proposed project.

(Carl Daniel Amsden, Colin Cox, Lynn Hughes, Wendy Hughes, Kathryn A Masten, Patrick Arnold Nye, Blanca Parkinson, Encarnacion Serna, and Aimee Wilson)

RESPONSE 38: Emissions from this facility were determined by using AP-42 Section 7.1 calculation guidance for storage tanks, AP-42 following TCEQ guidance for marine loading and VCU control emissions, stack testing data, and TCEQ's fugitive guidance document APDG 6422. The Applicant represented the appropriate methodologies to control and minimize emissions and utilized corresponding control efficiencies when calculating the emission rates. As provided in 30 TAC § 116.116(a), the Applicant is bound by these representations, including the represented performance characteristics of the control equipment. In addition, the permit holder must operate within the limits of the permit, including the emission limits as listed in the MAERT.

COMMENT 39: Federal Applicability

Commenters expressed concern about the quantity of emissions that will result from the project and if the project requires federal review, specifically if the emissions from MSS from PBR Registration No. 107625 should have been included in the federal review calculation, or if the site's recent 2019 expansion project should affect this project's federal applicability analysis. Commenters also stated that the project should calculate project emission increases based upon baseline actual emissions.

(Colin Cox, Kathryn A Masten, Patrick Arnold Nye, and Richard Alan Roark)

RESPONSE 39: A PSD major site is defined as a site emitting over 250 tons per year (tpy) of any one pollutant if it is an unnamed source or 100 tpy of any one pollutant if it is one of 28 sources named in 40 CFR § 52.21(b)(1)(a). Once it is determined a site is major, the project emission increases for each pollutant are compared to the applicable significant emission rate to determine if that pollutant requires PSD review. This site is a named source and has proposed emission rates greater than 100 tpy of at least one pollutant, making it a major source. In addition, the proposed increases of the VOC pollutants are above the defined significant emission rates and are subject to PSD permitting. The proposed increases of all other pollutants with this project are below the significant emission rates and are not subject to PSD permitting.

Flint Hills did not aggregate emissions from PBR Registration No. 107625, which authorized tank MSS emissions with Project No. 292889, or emission from the 2019 expansion project, and these emissions were not affected sources that should be included in the project emission increases. EPA's final action on project aggregation for the NSR Program[8] states that projects should be technically and economically related to be aggregated. Projects that are more than three years apart are presumed to not be technically and economically related and should not be aggregated unless there is a compelling reason. Therefore, the project increases are still below the significant emission rates and are not subject to PSD permitting.

This project calculated project emission increases based on Potential to Emit (PTE) minus baseline actual emissions. It was not calculated based upon PTE to PTE.

Nonattainment New Source Review (NNSR) permitting is applicable for major sites, defined as a site emitting over the threshold for the nonattainment pollutant in that county. Texas nonattainment area designations are specified in 40 CFR § 81.344. Once it is determined a site is major, the project emission increases for each pollutant are compared to the applicable significant emission rate to determine if that pollutant requires netting. If the project's net emissions are greater than the netting threshold, the project is subject to NNSR permitting. Because the site is not located in a nonattainment county, the project is not subject to NNSR permitting.

COMMENT 40: Environmental Impact Study

Commenters requested that an additional environmental impact study be conducted prior to authorization of this project, including a regional airshed study.

(Jennifer R Hilliard, Kathryn A Masten, Richard Alan Roark, Encarnacion Serna, and John Stephen Weber)

RESPONSE 40: Environmental Assessments and Environmental Impact Statements (EIS) are a specific requirement for federal agencies under the National Environmental Policy Act (NEPA). An EIS is not required for state actions such as this permit. However, both the TCAA and TCEQ rules provide for an extensive review of the application to ensure that emissions from the proposed facility will not violate the NAAQS and will not be expected to adversely affect human health or the environment. A health effects review was conducted for the proposed facilities during the permit review and the permit was found to be protective of human health and the environment.

Furthermore, regional airshed studies are also not required for state actions such as this permit. This type of analysis may be conducted for counties or areas that are not in attainment for the NAAQS. For example, TCEQ addresses regional ozone formation through the SIP development process rather than through individual permitting actions to determine what must be done to bring the area county back into compliance with the NAAQS since ozone is a regional issue.

[8] Federal Register Vol. 74, No. 10, pg. 2376 dated January 15, 2009

COMMENT 41: Environmental Justice

Commenters raised concerns regarding the environmental justice implications of this project.

(Deborah A Ferrell, Jose Gonzales, Blanca Parkinson, Ana Trevino, and Lisa Moncrief Turcotte)

RESPONSE 41: Air permits evaluated by TCEQ are reviewed without reference to the socioeconomic or racial status of the surrounding community. TCEQ is committed to protecting the health of the people of Texas and the environment regardless of location. A health effects review was conducted for the proposed facilities during the permit review and the permit was found to be protective of human health and the environment.

TCEQ encourages participation in the permitting process. The Office of the Chief Clerk works to help the public and neighborhood groups participate in the regulatory process to ensure that agency programs that may affect human health or the environment operate without discrimination and to make sure that concerns are considered thoroughly and are handled in a way that is fair to all. For further information, contact the Office of the Chief Clerk at 512-239-3300. More information may also be found on the TCEQ website: https://www.tceq.texas.gov/agency/decisions/participation/title-vi-compliance.

COMMENT 42: Corporate Profits

Commenters questioned the corporate profits made by this project at a cost to the surrounding community.

(Colin Cox, Deborah Ferrell, Patrick Arnold Nye, and Jessica Palitza)

RESPONSE 42: TCEQ is not authorized to consider a company's financial status nor its profits in determining whether a permit should be issued. TCEQ's review of this company's application included analysis of health impacts and application of BACT, and based on this review, the facility should comply with all applicable health effects guidelines and emission control requirements. Continued compliance with health effects guidelines and BACT requirements is expected if the company operates in compliance with the permit terms and conditions.

Individuals are encouraged to report any environmental concerns at the facility by contacting the Corpus Christi Regional Office at 361-881-6900 or by calling the 24-hour toll-free Environmental Complaints Hotline at 1-888-777-3186. TCEQ evaluates all complaints received. If the facility is found to be out of compliance with the terms and conditions of the permit, it may be subject to possible enforcement action.

COMMENT 43: Demonstrate Compliance with Permit

Commenters asked how the Applicant will demonstrate compliance with the terms of their permit on a continuous basis.

(Payton Gray Campbell, Colin Cox, Deborah A Ferrell, Lynn Hughes, Wendy Hughes, James E Klein, Uneeda E Laitinen, Kathryn A Masten, Patrick Arnold Nye, Encarnacion Serna, and Sheila Walton)

RESPONSE 43: Special conditions have been included as part of the proposed permit to ensure the Applicant can demonstrate compliance with the emission limitations set forth in the permit. Emissions will be monitored by the MVCU firebox temperature monitoring, the 28 VHP LDAR program for fugitive monitoring, storage tank visual inspections and seal gap measurements in accordance with NSPS Kb to verify fitting and seal integrity, storage tank hydrogen sulfide (H_2S) sampling twice monthly if the American Petroleum Institute (API) gravity is less than or equal to 25 and once annually if the API gravity is greater than 25, monthly marine loading and storage tanks throughput recordkeeping, a marine vessel leak check once every 12-month period, pressure monitoring of the vacuum-assisted vapor collection system, an AVO for H_2S leaks at least once per day, and an AVO check for marine vessel and MVCU leaks once every 8 hours. The permit holder is also required to maintain records to demonstrate compliance, including the monitoring listed above. Records must be made available upon request to representatives of the TCEQ, EPA, or any local air pollution control program having jurisdiction. The Regional Office may perform investigations of the plant as required. The investigation may include an inspection of the site including all equipment, control devices, monitors, and a review of all calculations and required recordkeeping.

TCEQ evaluates all complaints received. If a facility is found to be out of compliance with the terms and conditions of its permit, it may be subject to investigation and possible enforcement action. Individuals are encouraged to report any concerns about nuisance issues or suspected noncompliance with terms of any permit or other environmental regulation by contacting TCEQ Corpus Christi Regional Office at 361-881-6900 or by calling the 24-hour toll-free Environmental Complaints Hotline at 1-888-777-3186.

Citizen-collected evidence may be used in such an action. *See* 30 TAC § 70.4, Enforcement Action Using Information Provided by Private Individual, for details on gathering and reporting such evidence. Under the citizen-collected evidence program, individuals can provide information on possible violations of environmental law. The information, if gathered according to agency procedures and guidelines, can be used by TCEQ to pursue enforcement. In this program, citizens can become involved and may eventually testify at a hearing or trial concerning the violation. For additional information, see the TCEQ publication, "Do You Want to Report an Environmental Problem? Do You Have Information or Evidence?" This booklet is available in English and Spanish from the TCEQ Publications office at 512-239-0028 and may be downloaded from the agency website at http://www.tceq.texas.gov (under Publications, search for document number 278).

COMMENT 44: Compliance History

Commenters asked about the compliance history of the Applicant and the site.

(Carl Daniel Amsden, Tara Anders, Lara Ann Breeding, Payton Gray Campbell, Colin Cox, Margaret A Duran, Sally Clark Farris, Cathy Fulton, Bob Gonzalez, Jennifer R Hilliard, James E Klein, Kathryn A Masten, Patrick Arnold Nye, Jessica Palitza, Blanca Parkinson, Dorothy Pena, Christopher L Phelan, Lynne Goeglein Porter, Richard Alan Roark, A Leslie Rozzell, Encarnacion Serna, Joellen Flores Simmons, Sheila Walton, John Stephen Weber, Susan Wilder, Steven Wilder, and Melissa Zamora)

RESPONSE 44: During the technical review of the permit application, a compliance history review of both the company and the site is conducted based on the criteria in 30 TAC Chapter 60. These rules may be found at the following website: https://www.tceq.texas.gov/rules/index.html.

The compliance history is reviewed for the five-year period prior to the date the permit application was received and includes multimedia compliance-related components about the site under review. These components include enforcement orders, consent decrees, court judgments, criminal convictions, chronic excessive emissions events, investigations, notices of violations, audits and violations disclosed under the Audit Act, environmental management systems, voluntary on-site compliance assessments, voluntary pollution reduction programs, and early compliance. However, TCEQ does not have jurisdiction to consider violations outside of the State of Texas.

A company and site may have one of the following classifications and ratings:

- High: rating below 0.10 – complies with environmental regulations extremely well;
- Satisfactory: rating 0.10 – 55.00 – generally complies with environmental regulations;
- Unsatisfactory: rating greater than 55.00 – fails to comply with a significant portion of the relevant environmental regulations.

This site has a rating of 0.18 and a classification of Satisfactory. The company rating has a rating of 0.18, and a classification of Satisfactory. The company rating reflects the average of the ratings for all sites the company owns in Texas.

COMMENT 45: Inspections

Commenters asked how often the facility will be inspected and expressed concern that TCEQ has not performed inspections adequately.

(Colin Cox, Jennifer R Hilliard, James E Klein, Patrick Arnold Nye, and Encarnacion Serna)

RESPONSE 45: The Regional Office performs investigations of the plant on a regular schedule as required. The investigation may include an announced or unannounced inspection of the site including all equipment, control devices, monitors, and a review of all calculations and required recordkeeping.

Additional investigations will occur in response to complaints reported by contacting the TCEQ Corpus Christi Regional Office at 361-881-6900 or by calling the 24-hour toll-free Environmental Complaints Hotline at 1-888-777-3186. The regional offices prioritize their responses to complaints based on the potential for adverse health effects associated with the alleged violation. For example, a "priority one" case means serious health concerns exist, and that case will be investigated immediately. A "priority four" case, on the other hand, means no immediate health concerns exist; therefore, it will be investigated within 30 days. In addition, the investigation schedule may be increased if violations are found, violations are repeated, or if a regulated entity is classified as an unsatisfactory performer.

COMMENT 46: Violations / Enforcement

Commenters questioned the consequences of violating the terms of the permit and expressed concern about the violation history of Flint Hills Resources, particularly as it pertains to their "high priority violator" status in the EPA ECHO database.

(Carl Daniel Amsden, Chrystal Beasley, Lara Breeding, Lara Ann Breeding, Payton Gray Campbell, Trisha Christian, Robyn Cobb, Andi Cornett, Colin Cox, Margaret A Duran, Sally Clark Farris, Guillermo Gallegos, Patricia C Gardiner, Bob Gonzalez, Robert Graham, Jennifer R Hilliard, Donna L Hoffman, Lynn Hughes, Wendy Hughes, Jeffrey Jacoby, James E Klein, Uneeda E Laitinen, Naomi Linzer, Nancy Lubbock, Brandt Mannchen, Kathryn A Masten, Eli Mckay, Stacey Meany, Molly Morabito, Ann R Nyberg, Julie Ann Nye, Patrick Arnold Nye, Jessica Palitza, Blanca Parkinson, Dorothy Pena, Christopher L Phelan, Lynne Goeglein Porter, William Porter, Beth Priday, Richard Alan Roark, Julie Travis Rogers, A Leslie Rozzell, Jonah Sandoval, Encarnacion Serna, Joellen Flores Simmons, Lori Simmons, Chloe Torres, Ana Trevino, Cynthia Valdes, Veronica Vela, Sheila Walton, James Walton, John Stephen Weber, Susan Wilder, and Melissa Zamora)

RESPONSE 46: Violations are usually addressed through a notice of violation letter that allows the operator a specified period of time within which to correct the problem. The violation is considered resolved upon timely corrective action. A formal enforcement referral will be made if the cited problem is not timely corrected, if the violation is repeated, or if a violation is causing substantial impact to the environment or neighbors. In most cases, formal enforcement results in an agreed enforcement order including penalties and technical requirements for corrective action. Penalties are based upon the severity and duration of the violation(s). Violations are maintained on file and are included in the calculation of a facility and a person's compliance history. Compliance history ratings are considered during permit application reviews.

Flint Hills has two high priority violations listed through the EPA "Enforcement and Compliance History Online" database, one for late reporting and one for a failed stack test (the company has since retested and passed), that are currently being resolved by the TCEQ's Office of Compliance and Enforcement. These violations are considered when evaluating the site's compliance history.

COMMENT 47: Other Required Authorizations

Commenters asked if other authorizations are required for this project.

(Colin Cox, Ann R Nyberg, Patrick Arnold Nye, and Encarnacion Serna)

RESPONSE 47: Although TCEQ is responsible for the environmental protection of air and water as well as the safe management of waste, this proposed permit will regulate the control and abatement of air emissions only. Therefore, issues regarding water quality or discharge and the handling of waste are not within the scope of this review. However, the Applicant may be required to apply for separate authorizations for water quality, water usage, or the handling of waste.

COMMENT 48: Optical Gas Imaging (OGI)

Commenters expressed concern with the videos of the Optical Gas Imagery (OGI) footage taken by Tim Doty of EarthWorks, a non-profit organization. Commenters suggested that the videos showed that Flint Hills Resources was improperly maintaining their storage tanks.

(Chrystal Beasley, Mariah Ann Boone, Lara Ann Breeding, Lara Breeding, Payton Gray Campbell, Andi Cornett, Larry R Ferrell, Robert Graham, Jennifer R Hilliard, Yvonne Landin, Charlotte Lawrence, Naomi Linzer, Nancy Lubbock, Kathryn A Masten, Eli Mckay, Carrie Robertson Meyer, Ann R Nyberg, Patrick Arnold Nye, Jasmin O'Neil, Lynne Goeglein Porter, Julie Travis Rogers, Andrea Rozzell, Errol Alvie Summerlin, Cynthia Valdes, Sheila Walton, Steven Wilder, and Melissa Zamora)

RESPONSE 48: OGI is not used to determine compliance with the permitted emission limits of tanks. Tanks are permitted sources of emissions and detection of emissions is not an indication of being out of compliance. Compliance is determined by performing the proper inspections of the floating roof required by the permit and federal rules and limiting withdrawal rates to the maximum permitted rates.

TCEQ does take reports of emissions detected by OGI seriously and may send out investigators to look into these reports. Response 44 (Compliance History) states how to contact TCEQ with concerns and further information.

CHANGES MADE IN RESPONSE TO COMMENT

No changes to the draft permit have been made in response to public comment.

Respectfully submitted,

Texas Commission on Environmental Quality

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REPRESENTING THE
EXECUTIVE DIRECTOR OF THE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	**BEFORE THE** **TEXAS COMMISSION ON** **ENVIRONMENTAL QUALITY**

FLINT HILLS RESOURCES INGLESIDE LLC
RESPONSE TO MOTION TO OVERTURN

Exhibit G

Air Permit Reviewer Reference Guide

APDG 5881

Major New Source Review - Applicability Determination

Air Permits Division
Texas Commission on Environmental Quality

January 2022

***The purpose of this document is to provide assistance to the regulated community and TCEQ staff. The contents of this document is for informational purposes only and does not supersede or replace applicable federal rules, statutes, or court rulings. This document is not an original legal source and should not be cited in regulatory actions.**

Table of Contents

Major New Source Review - Applicability Determination

I. Introduction

What Gives Texas Its Authority?

The Texas Commission on Environmental Quality (TCEQ) regulates air quality in the state of Texas through the Texas Clean Air Act (TCAA), located in Chapter 382 of the Texas Health and Safety Code; develops rules, including those in Title 30 Texas Administrative Code (TAC) Chapter 116; and implements provisions of the Federal Clean Air Act (FCAA).

Title I of the FCAA requires states to develop State Implementation Plans (SIPs) to address the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). Title I also requires a preconstruction permitting program for both major and minor sources (New Source Review or NSR).

The NAAQS were designed by the Environmental Protection Agency (EPA) to protect public health (Primary NAAQS) and welfare (Secondary NAAQS) from the effects of criteria pollutants. Criteria pollutants include carbon monoxide, lead, nitrogen dioxide, particulate matter equal to or less than ten micrometers in diameter (PM_{10}), particulate matter equal to or less than 2.5 micrometers in diameter ($PM_{2.5}$), ozone, and sulfur dioxide. The FCAA requires states to determine which areas are in compliance with the NAAQS (attainment areas), and which areas are out of compliance with the NAAQS (nonattainment areas).

In an effort to help protect public health and welfare, the EPA initiated two Major New Source Review (Major NSR, or MNSR) permitting programs. The Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) permitting programs to apply to new major sources, and major modifications of existing major sources.

The PSD permitting program is applicable for criteria pollutants, in areas that are in compliance with the NAAQS for that pollutant. The PSD permitting program is also applicable to certain non-criteria pollutants. Non-criteria pollutants are pollutants that are regulated by the EPA; however, they do not have a NAAQS.

The NNSR permitting program is applicable for criteria pollutants in areas, which are out of compliance with the NAAQS for that pollutant. If an area is out of compliance, or not in attainment with the NAAQS, it is generally referred to as a “nonattainment” area.

The applicability steps for each of these Major NSR programs will be discussed in detail later in this document.

This document provides permit reviewers with a process to evaluate Major NSR applicability. The applicant must fully document and explain why Major NSR is, or is not, applicable to the project under review. The document also contains links to the necessary Major NSR forms, and to additional information specific to the PSD and nonattainment permitting programs.

This document covers definitions, concepts, approaches, and examples, which can be used in determining whether Major NSR is required. While this document provides general guidance for the determination of Major NSR applicability, it is not regulatory and does not limit the permit reviewer's ability to require that the applicant provide additional information. Due to the complexity of Major NSR applicability determinations, there may be instances where the permit reviewers may deviate from this guidance on a case-by-case basis. Deviation from this guidance may only occur with the approval of the permit reviewer's supervisor or the Air Permits Division (APD) director.

Finally, this guidance document is a training tool that supersedes and is intended to replace previous documents related to Major NSR applicability, including previous versions of the "Federal New Source Review Permits (FNSR Permits) Applicability Determination" document.

Background

The TCEQ staff conducts a preconstruction technical review during the air permitting process. This review ensures that the operation of a proposed facility will comply with all applicable rules and regulations (federal and state) and intent of the TCAA, and not cause or contribute to air pollution.

One of the first actions in any technical review is the check for Major NSR applicability. Each project with a proposed new facility, or a modification of an existing facility, must be evaluated to determine whether it is subject to either the PSD permitting program or the NNSR permitting program. For NO_x emissions, it is possible that both PSD and NNSR may apply. That determination is made on a pollutant by pollutant basis using the steps provided in this document. Although the PSD and NNSR permit reviews are quite different, the steps to determine whether they apply to a project are very similar.

Major source or major modification permitting is similar to minor source or minor modification permitting; however, the differences are significant enough so that every project must be evaluated to determine if it is subject to MNSR permitting requirements. Projects subject to MNSR cannot be authorized through permit by rule (PBR) or standard permit. Note the following explanations of major NSR:

- Major NSR permitting is only done for regulated NSR pollutants (commonly called federally regulated pollutants, or regulated pollutants) that meet or exceed specific significant emission rates. This includes both criteria pollutants (regulated pollutants which have a NAAQS), and non-criteria pollutants (regulated pollutants which do not have a NAAQS). If a pollutant will be emitted at rates below the significant emission rates, they are not subject to review under EPA's Major NSR permitting programs; however, the state's "minor NSR" permitting program still applies. The TCAA requires that all air contaminants emitted from a facility be authorized, so a technical review for a single project could require multiple evaluations: PSD, NNSR, and/or minor NSR.

- Major NSR permitting is done on a pollutant-by-pollutant basis. A project may be considered a major modification for one pollutant and Best Available Control Technology (BACT) or Lowest Achievable Emission Rate (LAER) would only be evaluated for that pollutant. All physical and/or operational changes must be authorized by the state's minor NSR program. Even if a project is not major, a BACT Review (along with all other requirements of the state's Minor NSR program) must be conducted.
- If a project is subject to Major NSR, the minor NSR authorization cannot be obtained through 30 TAC § 116.116(e) or 30 TAC § 116.617. If Major NSR applies to equipment authorized by a flexible permit, a Major NSR application will be required and the flexible permit must be amended. In addition, if a project is subject to Major NSR, authorization cannot be obtained through 30 TAC Chapter 106 (Permit by Rule, or PBR). The only exemptions to major NSR are identified in the definition of major modification in 30 TAC § 116.12.

Additional Notes

There have been court decisions and EPA initiatives that have created new NAAQS requirements. Some of the changes are either not reflected in TCEQ rules or not fully implemented by EPA rules or policy. Permit reviewers must be aware of any existing, updated, or new NAAQS and conduct their reviews appropriately. Below are recent NAAQS changes as of the latest revision of this guidance.

- **2008 Ozone NAAQS Reclassification**

  Effective September 23, 2019, the Dallas-Fort Worth nonattainment area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties) and the Houston-Galveston-Brazoria nonattainment area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties) have been reclassified to Serious nonattainment areas. The EPA determined that these areas failed to attain the standards set by the attainment date.

- **2015 Ozone NAAQS Implementation**

  Effective August 3, 2018, the EPA finalized designations for the Dallas-Fort Worth nonattainment area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Tarrant, and Wise Counties) and the Houston-Galveston-Brazoria nonattainment area (Brazoria, Chambers, Fort Bend, Galveston, Harris, and Montgomery Counties). Effective September 24, 2018, the EPA finalized designation for the San Antonio nonattainment area (Bexar County). The EPA classified these three nonattainment areas as Marginal nonattainment for the 2015 ozone NAAQS.

- **$PM_{2.5}$ NAAQS Implementation**

  $PM_{2.5}$ emissions must be addressed during permit technical reviews. This means that BACT needs to be evaluated, and $PM_{2.5}$ emissions need to be included in the Maximum Allowable Emission Rates Table, or MAERT (if $PM_{2.5}$ is present). The review of $PM_{2.5}$ includes "direct" emissions, which contain the "condensable" portions of the emissions as well. Pending further guidance from the EPA, precursors to $PM_{2.5}$ (NO_x and SO_2) will be evaluated under their own federal requirements (as they currently exist). Calculations and BACT specific to PM_{10} and $PM_{2.5}$ should be submitted with an authorization request; however, there may be situations where the BACT and calculation methodology for PM_{10} and $PM_{2.5}$ are equivalent. There are currently no $PM_{2.5}$ nonattainment areas in Texas.

- **1-Hour NO_2 NAAQS Implementation**

  In 2010, the EPA finalized 1-hour NO_2 NAAQS. There are no NO_2 nonattainment areas in Texas. Permit technical reviews include consideration of 1-hour NO_x NAAQS.

- **1-Hour SO_2 NAAQS Implementation**

In 2010, the EPA finalized 1-hour SO_2 NAAQS. In 2016, portions of Freestone, Anderson, Rusk, Panola, and Titus counties were designated as nonattainment for SO_2. In 2021, portions of Hutchinson, Navarro, and Howard counties were designated as nonattainment for SO_2. Permit technical reviews include consideration of 1-hour SO_2 as part of state property line standards and NAAQS.

II. Common Terms and Concepts

Major NSR is applicable for new major sources and major modifications of existing major sources. If an owner or operator is constructing a new facility or modifying an existing facility, they must determine if the new or modified facility is either a "new major source" or a "major modification of an existing major source." To make these types of determinations, the reviewer will need to be familiar with some of the common terms and concepts associated with the MNSR program.

Source

When reviewing the TCEQ's minor NSR rules, the term "source" is commonly used. A source is defined in 30 TAC § 116.10 as "A point of origin of air contaminants, whether privately or publicly owned or operated." A stationary source is defined in 30 TAC § 116.12 as: "any building, structure, facility, or installation that emits or may emit any air pollutant subject to regulation under 42 United States Code, §§ 7401 et seq."

It is important to note that the definition of “source,” as used in Major NSR applicability, does not have the same meaning as the “source” as defined for use in Texas’s minor NSR program. This difference, in the use of the word “source,” can lead to confusion.

In Major NSR applicability, a “source” is, in most cases, the entire plant site. In 40 Code of Federal Regulations (CFR) § 51.166 and 40 CFR § 52.21, the EPA defines “source” as “any building, structure, facility, or installation which emits or may emit a regulated NSR pollutant.” The EPA rule continues with an explanation of what is meant by “building, structure, facility or installation,” stating that: “*Building, structure, facility, or installation* means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties and are under the control of the same person (or persons under common control) except the activities of any vessel. Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same “Major Group” (i.e., which have the same first two-digit code) as described in the *Standard Industrial Classification Manual*, 1972, as amended by the 1977 Supplement (U. S. Government Printing Office stock numbers 4101-006 and 003-005-00176-0, respectively).”

Modification

A modification is any physical change in, or change in the method of operation of, a facility that causes an emissions increase for any federally regulated NSR pollutant with the following exceptions:

- routine maintenance, repair, and replacement (RMRR);
- use of alternative fuel or raw material by reason of an order under the Energy Supply and Environmental Coordination Act of 1974, § 2(a) and (b) (or any superseding legislation) or by reason of a natural gas curtailment plan under the Federal Power Act;
- use of alternative fuel by reason of an order or rule of 42 United States Code § 7425;
- use of an alternative fuel at a steam generating unit to the extent that the fuel is generated from municipal solid waste;
- use of alternative fuel or raw material by a stationary source that the source was capable of accommodating before December 21, 1976 (unless such change would be prohibited under any federally enforceable permit condition established after December 21, 1976) that the source is approved to use under any permit issued under regulations approved under 40 CFR 51 or 52;
- an increase in the hours of operation or in the production rate (unless the change is prohibited under any federally enforceable permit condition that was established after December 21, 1976);
- any change in ownership at a stationary source;

- any change in emissions of a pollutant at a site that occurs under an existing plant-wide applicability limit (PAL);
- the installation, operation, cessation, or removal of a temporary clean coal technology demonstration project, provided that the project complies with the SIP and other requirements necessary to attain and maintain the national ambient air quality standard during the project and after it is terminated;
- for PSD review only, the installation or operation of a permanent clean coal technology demonstration project that constitutes repowering, provided that the project does not result in an increase in the potential to emit (PTE) of any regulated pollutant emitted by the unit. This exemption shall apply on a pollutant-by-pollutant basis; or
- for PSD review only, the reactivation of a clean coal-fired electric utility steam-generating unit.

A facility does not need to be physically "touched" for a modification to occur. The relaxation of a federally enforceable emission rate or restriction is considered to be a modification. If a PTE is increased, or if another restriction is relaxed (such as a throughput limit, charge rate, firing rate, restrictions on the types or amount of material processed, handled, etc.), the facility is considered to be modified.

In most cases, if it is necessary to change an NSR permit condition to allow an operation, the change should be considered a change in method of operation and therefore a potential modification. This is also generally true of changes proposed under 30 TAC § 116.116(e) Changes to Qualified Facilities (SB 1126). Also, there is no pollution control project (PCP) exclusion, and EPA's Equipment Replacement Provision option for RMRR was vacated by the federal district court and is not available for use.

See the following examples for the practical application of the information presented in this section.

Example 1

Example 2

Example 3

Example 4

Example 5

Affected Facility

Although "affected facility" is not an official term used in the Major NSR rules, it is terminology that is commonly used to describe facilities that have been "debottlenecked" by a modification of a source.

Major sources often consist of multiple pieces of equipment, both emitting (facilities) and non-emitting, that comprise integrated processes. As part of the operations of a source, various pieces of equipment at a source (both emitting and non-emitting) may provide input to or accept output from other pieces of equipment. It is possible that some pieces of equipment may constrain other pieces of equipment from operating at their full design or authorized capacity. Such constraining pieces of equipment are typically called "bottlenecks."

When a constraining piece of equipment is changed to increase its capacity, another piece of equipment may increase its operations to provide input to the formerly constrained equipment, or to accept output from it. This is typically described as an upstream and/or downstream effect, and the EPA has historically referred to this scenario as "debottlenecking."

The EPA defines a major modification as a modification in which a physical change or a change in the method of operation of a source results in a significant project emissions increase of a regulated NSR pollutant and a significant net emissions increase of that pollutant. The total increase in emissions that are included in a Major NSR determination includes:

- Increases in emissions occurring at all new or modified facilities, and
- Any other increases at existing facilities that are not being modified but are experiencing an emissions increase as a result of a change.

The EPA has presumed that increases in emissions at debottlenecked units are caused by the project, or modification, and are therefore required to be included in determining Major NSR applicability for the project.

Potential to Emit (PTE)

PTE means the maximum capacity of a source to emit a pollutant under its physical and operational design. This takes into account air pollution control equipment, restrictions on the hours of operation or on the type or amount of material being combusted, stored or processed. PTE also refers to the maximum allowable emission rate contained within an air authorization. These rates can generally be found on the MAERT.

When evaluating the emission from a "source," or plant site for Major NSR applicability, the source PTE must include all of the pollutant-emitting activities, which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Secondary emissions do not need to be included in this determination. Certain emissions from ships and barges located at berth are considered to be primary emissions and must be included in the PTE determination. These emissions include loading emissions, any vessel equipment meant to support the transfer of materials between the vessel and shore, and the emissions from the ship's boilers used to support the transfer of materials between the vessel and shore facilities while the ship is docked.

Secondary emissions are emissions that would occur as a result of the construction or operation of a major source, or from the major modification of an existing major source, but they do not come from the major source or major modification itself. Secondary emissions include emissions from any offsite support facility which would not be constructed or increase its emissions except as a result of the construction or operation of the major source or major modification. These emissions should be considered in the air dispersion modeling analysis required for the project.

All allowable emissions (or PTE) for the pollutant from each facility at the source, including wastewater, cooling tower emissions, and compliant planned startup, shutdown (MSS), and maintenance emissions should be summed. The physical PTE, or enforceable emission rate, that should be used in this calculation for each facility is based on its authorization.

- For construction permits or flexible permits – use the maximum allowable emission rate for the facility.
- For PBRs or standard permits – the lowest of the maximum emissions that may be authorized under the specific rule or permit (including the requirements in 30 TAC §§ 106.4 and 116.610). The source may establish a lower enforceable emission rate limit as specified in Form PI-7 CERT or Form APD-CERT for the facility.

Baseline Actual Emission Rates

Baseline actual emission rates are used specifically for Major NSR applicability determinations. The definition of baseline actual emission rate is specific to the type of facility being evaluated. A baseline actual emission rate is:

- **For an existing facility (other than an electric utility steam generating unit):** The actual emission rate, in tons per year, at which the facility actually emitted the pollutant during any consecutive 24-month period (selected by the owner or operator) within the **ten year period** immediately preceding either the date the owner or operator begins actual construction of the project, or the date of a complete permit application submitted to the TCEQ.
- **For an existing electric utility steam generating unit:** The actual emission rate, in tons per year, at which the facility actually emitted the pollutant during any consecutive 24-month period (selected by the owner or operator) within the **five-year period** immediately preceding when the

owner or operator begins actual construction of the project. For electric utilities, the Executive Director shall allow the use of a different time period upon a determination that it is more representative of normal source operation. Unlike the requirement for other stationary sources described above, a different 24-month period may be used if justified.

- **For a new facility:** The baseline actual emission rate, for purposes of determining the emissions increase that will result from the initial construction and operation of the facility, shall equal zero. If an existing facility has less than two years of operating history (from the date of initial operation of the facility), the baseline actual emission rate may be taken as the allowable emission rate, or the PTE, of the facility.

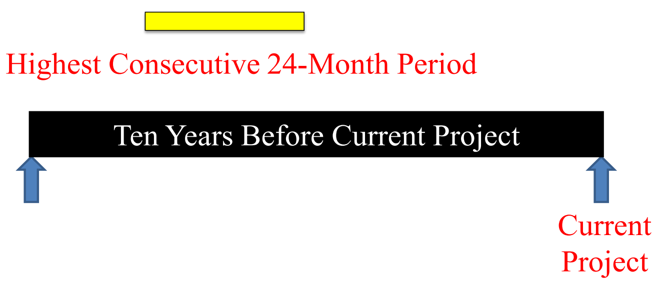
The following items apply to baseline actual emission rates in all cases:

- The baseline actual emission rate shall be adjusted downward to exclude any noncompliant emissions that occurred during the consecutive 24-month period. The applicant must determine whether any legally enforceable limitations currently exist, that would prevent the affected unit from emitting a pollutant at the levels calculated from the 24-month baseline period. The baseline actual emission rate cannot exceed a permitted maximum allowable emission rate or authorized rate.

- The baseline actual emission rate shall be adjusted downward to reflect any rule and/or SIP requirements.
- For each regulated NSR pollutant, when a project involves multiple facilities, only one consecutive 24-month period must be used to determine the baseline actual emissions for the facilities being changed. However, a different consecutive 24-month period can be used for each regulated pollutant.
- The baseline actual emission rate shall not be based on any consecutive 24-month period for which there is inadequate information for determining annual emissions, in tons per year, and for adjusting this amount.
- Baseline emissions cannot occur prior to November 15, 1990.
- Existing planned MSS emissions, meeting the criteria to be added to a permit, may be considered part of the baseline emissions if they were reported in the emissions inventory (EI) in a timely manner. In other words, they need to be reported in the emissions inventory during their EI questionnaire response, and not “backfilled” information, by providing emissions data to the EI’s going back in time a number of years. MSS emissions reported to the EI will be reviewed and corrected, if necessary, for any controls determined to be necessary to satisfy BACT and impacts in the permit review.
- Baseline actual emissions should not be used when determining a facility’s actual emissions for other Major NSR related requirements, such as an air

quality impacts analyses (for example, compliance with NAAQS and PSD increments). For modeling requirements, the pre-New Source Review Reform definition of ''actual emissions'' continues to apply to the facility (the two highest consecutive years of annual average actual operation immediately before the change).

Graphically, the contemporaneous period looks like this:



See the following examples for the practical application of the information presented in this section.

Example 6

Example 7

Example 8

Projected Actual Emission Rates

Projected actual emission rates are used specifically for Major NSR applicability determinations and can be used in lieu of PTE emissions. Projected actual emission rates can only be used for existing facilities associated with the proposed project undergoing review.

A projected actual emission rate is the maximum annual rate, in tons per year, at which an existing facility is projected to emit a federally regulated new source review pollutant in any rolling 12-month period during:

- the five years following the date the facility resumes regular operation after the project, or
- in any one of the ten years following the date that the facility resumes regular operation after the project if the project involves increasing the

facility’s design capacity or its PTE for that federally regulated new source review pollutant.

When determining the projected actual emission rate:

- If the owner or operator of the major stationary source is required to include fugitive emissions in their Major NSR applicability evaluation, they shall include fugitive emissions to the extent quantifiable. Consider all relevant information, including, but not limited to, historical operational data, the company’s own representations, the company’s expected business activity and the company's highest projections of business activity, the company's filings with the state or federal regulatory authorities, and compliance plans under the approved SIP.

If the owner or operator chooses to use projected actual emission rates in their Major NSR applicability determination, the owner or operator must provide documentation for the projected actual emission rates that will be used. The documentation required is identified in 30 TAC § 116.127, and this documentation must be provided as a part of any notification, certification, registration, or application submitted to the Executive Director. This documentation must include:

- A description of the project;
- Identification of the facilities for which emissions of a federally regulated NSR pollutant could be affected by the project; and
- A description of the applicability test used to determine that the project is not a major modification for any pollutant, including the baseline actual emissions, the projected actual emissions, and any netting calculations, if applicable.

The owner or operator shall monitor the emissions of any regulated NSR pollutant that could increase as a result of the project at that facility and calculate and maintain a record of the annual emissions from that facility on a calendar year basis for the following time periods:

- five years following the date the facility resumes regular operation after the project, or
- ten years following that date the facility resumes regular operation after the project if the project involves increasing the facility’s design capacity or its potential to emit for that federally regulated new source review pollutant.

Projected actual emissions are most likely to be used with PBR and standard permit registrations where there is not an explicit allowable emission rate for a facility in the rule. It is unlikely that allowable emission rates for modified facilities that are subject to a minor NSR permit review would be set at a level that the owner or operator has indicated that it did not plan to operate at for at least the next ten years.

If the owner or operator uses projected actual emissions in their permit application, the use of projected actual emissions will be identified in a permit condition. There will be a permit requirement that the projected actual emissions be tracked. An example of such a condition is provided below.

"The amendment application, PI-1 dated July 10, 2006, was determined not to be subject to major new source review by identifying projected actual emission rates for one or more facilities potentially affected by the project. Actual emissions from these facilities shall be monitored, recorded and reports made in accordance with 30 TAC § 116.127."

If the facility is an electric utility steam-generating unit (EGU), the owner or operator must submit a report to the Executive Director within 60 days after the end of each calendar year. Records must be maintained to document the unit's annual emissions during the calendar year that preceded submission of the report.

Other facilities (non-EGUs) must report to the Executive Director if the annual emissions from the project exceed the baseline actual emissions by a significant amount for that pollutant, and the emissions exceed the preconstruction projection for any facility. If the annual emissions exceed the baseline actual emissions by a significant amount for that pollutant, and the emissions exceed the preconstruction projection for any facility, the project should have either undergone Major NSR review or completed a netting exercise to determine the net emission increase. A demonstration will need to be made that the project would still not be a major modification, or an application for a PSD and/or nonattainment permit will need to be submitted concurrent with, or shortly after, the report. In the preamble to their final rule, EPA did not believe it was "necessary to make your future projections enforceable in order to adequately enforce the major NSR requirements. The FCAA provides ample authority to enforce the Major NSR requirements if a physical or operational change results in significant net emissions increase at your major stationary source."

See the following examples for the practical application of the information presented in this section.

Example 9

Major Source Definition for PSD

There are two different definitions of "major source" in the PSD program. The following significant emission rates define a major source for PSD:

- Named Major Source – greater than or equal to 100 tons/year (tpy).
- Un-named Major Source – greater than or equal to 250 tpy.
- A source that is a major source for volatile organic compounds (VOC) or NO_x shall be considered to be a major source for ozone.

Named Sources are described in both 40 CFR § 51.166 and 40 CFR § 52.21. The "Named" Sources are:

1. Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input
2. Coal Cleaning Plants (with thermal dryers)
3. Kraft pulp mills
4. Portland cement plants
5. Primary zinc smelters
6. Iron and steel mills
7. Primary aluminum ore reduction plants (with thermal dryers)
8. Primary copper smelters
9. Municipal incinerators capable of charging more than 250 tons of refuse per day
10. Hydrofluoric, sulfuric, and nitric acid plants
11. Petroleum refineries
12. Lime plants
13. Phosphate rock processing plants
14. Coke oven batteries
15. Sulfur recovery plants
16. Carbon black plants (furnace process)
17. Primary lead smelters
18. Fuel conversion plants
19. Sintering plants
20. Secondary metal production plants
21. Chemical process plants (which does not include ethanol production facilities that produce ethanol by natural fermentation included in NAICS codes 325193 or 312140)
22. Fossil-fuel boilers (or a combination thereof) totaling more than 250 million British thermal units per hour heat input
23. Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
24. Taconite ore processing plants
25. Glass fiber processing plants
26. Charcoal production plants

Source types which do not appear on the “Named” major source list are considered to be unnamed sources.

For PSD applicability determinations, if the source is a named source, or is in a source category which, as of August 7, 1980, is being regulated under Federal Clean Air Act (FCAA) §§ 111 (New Source Performance Standards) or 112 (National Emission Standards for Hazardous Air Pollutants), fugitive emissions must be included in the major source determination, the determination of project emission increases, and the determination of net emission increases (net emission increases will be discussed later in this document).

For PSD applicability determinations, if the source is an unnamed source, fugitive emissions are not included in the determination of whether or not a source is a major source, the determination of project emission increases, and the determination of net emission increases (net emissions will be discussed later in this document).

For the PSD permitting program, if a source is a major source for anyone regulated pollutant, it is considered to be a major source for all regulated pollutants.

See the following examples for the practical application of the information presented in this section.

Example 10

Example 11

Major Source Definition for NNSR

The definition of a “major source facilities” in the NNSR program, depends on the classification of the area in which the source is located. The EPA currently uses the following classifications for ozone nonattainment areas: Marginal, Moderate, Serious, Severe, and Extreme. The further out of compliance that a particular area is with the NAAQS, the lower the ton/year definition of a major source becomes.

For ozone nonattainment areas (regulated through Ozone precursors, VOC and NO_x), the definition of a major source, for each of the classifications listed above, is as follows:

Marginal	100 tpy
Moderate	100 tpy
Serious	50 tpy
Severe	25 tpy
Extreme	10 tpy

For particulate matter (PM_{10} or $PM_{2.5}$) nonattainment areas, the definition of a major source, based on classification, is as follows:

Moderate	100 tpy
Serious	70 tpy

For lead, the definition of a major source is 100 tpy.

For SO_2, the definition of a major source is 100 tpy.

For nonattainment applicability determinations, if the source is a named source, or is in a source category which, as of August 7, 1980, is being regulated under Federal Clean Air Act (FCAA) §§ 111 (New Source Performance Standards) or 112 (National Emission Standards for Hazardous Air Pollutants), fugitive emissions must be included in determining whether or not a source is a major source, in the determination of project emission increases, and in the determination of net emission increases (net emission increases will be discussed later in this document).

For nonattainment applicability determinations, if the source is an unnamed source, fugitive emissions are only excluded when determining whether or not a source is a major source. Fugitive emissions **must** be considered in the determination of project emission increases and net emission increases (net emissions will be discussed later in this document).

For the NNSR permitting program, a source must be major for the specific ozone precursor. VOC and NO_x are evaluated individually (as VOC and NO_x). It is possible to be a major source for one, and not for the other. In addition, VOC and NO_x are evaluated separately. An owner or operator would not add VOC and NO_x emission rates together and evaluate an NNSR using a combined emission rate.

See the following examples for the practical application of the information presented in this section.

Example 12

Example 13

Significant Emission Rates for PSD

Significant emission rates have two purposes within the PSD Major NSR program.

- If the emissions from the new or modified facility equal or exceeds the PSD significant emission rate for the pollutant being evaluated, then an applicability threshold test (netting) is required.
- If the result of the netting analysis equals or exceeds the PSD significant emission rate for the pollutant being evaluated, then the modification is considered to be a major modification, and PSD review is required.

  Likewise:

- If the emissions from new or modified facilities are less than the PSD significant emission rate for the pollutant being evaluated, PSD is not required.

- If the result of the netting analysis is less than the PSD significant emission rate for the pollutant being evaluated, Major NSR is not required. Another way of describing this step is to say that the project has “netted out” of PSD review.

The significant emission rates for the PSD permitting program can be found at the following location:
www.tceq.texas.gov/assets/public/permitting/air/factsheets/factsheets-psd-na-sigemiss-6240.pdf

See the following examples for the practical application of the information presented in this section.

Example 14

Significant Emission Rates for NNSR

Similar to PSD, significant emission rates have two purposes within the Major NNSR program; however, there are some important differences.

- If the emissions from the new or modified facility equal or exceeds the NNSR significant emission rate, for the pollutant being evaluated, then an applicability threshold test (netting) is required. For serious and severe nonattainment classifications, the significant emission rate is five tons/year. For marginal or moderate, the significant emission rate is 40 tons/year.
- If the result of the netting analysis equals or exceeds the NNSR significant emission rate for the pollutant being evaluated, then the modification is considered to be a major modification, and NNSR review is required.

Likewise:

- If the emissions from new or modified facilities are less than the NNSR significant emission rate for the pollutant being evaluated, NNSR is not required.
- If the result of the netting analysis is less than the NNSR significant emission rate for the pollutant being evaluated, NNSR is not required. Another way of describing this step is to say that the project has “netted out” of nonattainment review.

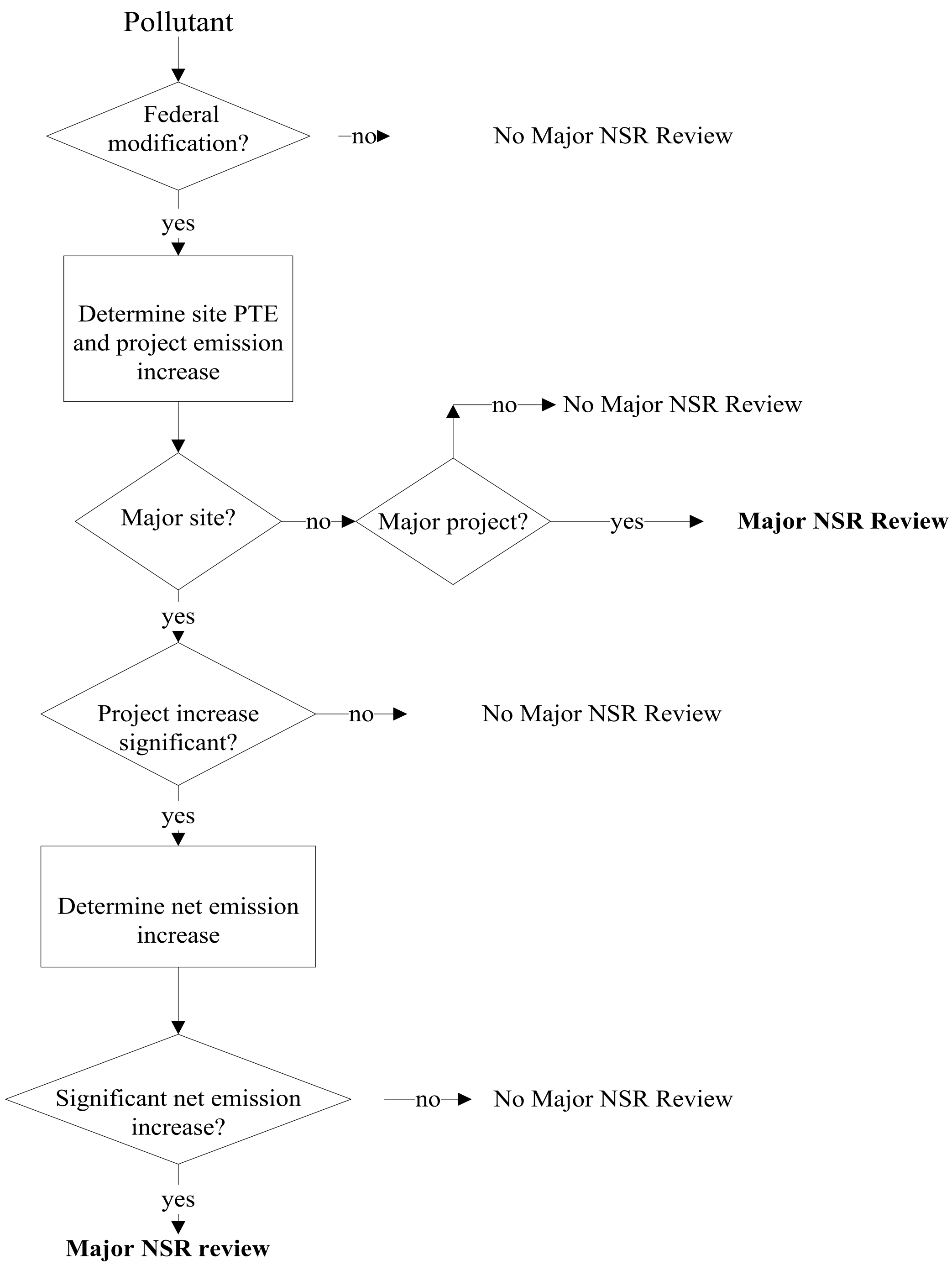
Another difference between the significant emission rates for PSD program as compared to the NNSR program is that for NNSR, as the severity of the nonattainment classification increases (becomes more severe or is further out of compliance with the NAAQS), the more stringent (i.e. lower) the significant emission rate becomes.

Also, there is a difference between the netting significant emission rate, and the major modification significant emission rate, when it comes to NNSR review. The significant emission rates for the NNSR permitting program can be found at the following location:
www.tceq.texas.gov/assets/public/permitting/air/factsheets/factsheets-psd-na-sigemiss-6240.pdf

III. Major NSR Applicability Determination

Major NSR is only applicable for new major sources and major modifications of existing major sources. If a company is constructing a new facility or modifying an existing facility, they must determine if the new or modified facility is either a “new major source” or a “major modification of an existing major source.” **Planned MSS emissions, which have passed their 30 TAC 101 (Chapter 101) authorization schedule, must be included in Major NSR applicability determinations.**

In a “flowchart” type format, the Major NSR Applicability analysis looks like this:



Is a New, Modified, or Affected Facility located at a “grass roots” site, or a minor source? Is the project a major source in and of itself?

It is important to understand the size of a source (minor source or major source), and the location of a source, when evaluating Major NSR applicability.

- Is the new, modified, or affected facility located at a “grass roots” site, an existing minor source, or an existing major source?
- Is the new, modified, or affected facility located in an attainment area, or nonattainment area, for the pollutant being evaluated?

Remember that Major NSR is applicable only for new major sources, and major modifications of existing major sources. If the location is currently a greenfield site, or an existing minor source, then the project under review must be a major source in and of itself to trigger Major NSR.

Are the emissions from the new, modified, or affected facilities equal to or greater than a major source significant emission rate?

- If the new, modified, or affected facility is not a major source in and of itself, Major NSR does not apply. However, the project will have to meet all of the state’s minor NSR permitting requirements.
- If the new, modified, or affected facility is a major source in and of itself, then the appropriate Major NSR program (either PSD and/or nonattainment) is triggered for the pollutant equaling or exceeding its respective major source significant emission rate.

Does a modification at an existing major source equal or exceed the significant emission rate? Is netting triggered?

A modification of an existing major source means that there are either new facilities being constructed, existing facilities are somehow being modified or affected (possibly resulting in upstream and/or downstream affects), or both. As defined using EPA’s “substantially related” test, new, modified, or affected facilities involved in a permitting action are generally referred to as a “project”. If the project emissions increase (sum of the differences between the planned emission rate and the baseline actual emission rate for each new, modified, and affected facility for the project) equals or exceeds the significant emission rate for the pollutant being evaluated, the project and increase is referred to as significant.

Project emission increases, at existing major sources, are determined by the following:

- If the facility is a new facility being constructed, the project emission increase corresponds to the facility’s potential to emit (baseline actual emission rate is equal to zero). For facilities that have started operation but have been in operation for less than two years, the project emission increase corresponds to the difference between the current PTE for the pollutant and the post change pollutant PTE for the facility (baseline actual emission rate is equal to the current PTE). Note: A decrease may also be utilized for a unit in operation less than two years.

- For existing modified facilities or affected facilities, the project emission increase is determined by comparing the difference between the modified or affected facilities planned emission rates to the baseline actual emission rate for each facility associated with the project. Note: A facility associated with the project may have a decrease.

The planned emission rate of a modified or affected facility is either the:

- PTE, or
- A projected actual emission rate.

Only the project emission increases from new, modified, or affected facilities are considered in this step. **Emission decreases are allowed in this step provided the units associated with the decreases are existing and substantially related to the project.** Substantially related generally means that the units have a substantial economic or functional relationship (Federal Register November 15, 2018 Volume 83, page 57324).If there are other facilities at the source, and they are not affected by the project undergoing review, they are not included in determining if a project is a major project.

If the sum of the differences between the planned emission rate and the baseline actual emission rate of any modified or affected facilities, plus the PTE contribution of any new facilities, equals or exceeds the significant emission rate for the pollutant and Major NSR permitting program being evaluated, the project is considered to be a significant project. If the project is a significant project, the net emission increase at the source must be determined. This step is referred to as the applicability threshold test, contemporaneous netting, or just “netting” for short.

It is worth restating that “netting” is only conducted at existing major sources. There is no netting for minor sources.

Example 15

Netting

Netting is a Major NSR applicability step that is used to determine if a project is a major modification of an existing major source. If a project is a major modification of an existing major source, then Major NSR (either PSD and/or nonattainment) is applicable to the pollutant(s) under evaluation.

Does the result of the applicability threshold test (netting) indicate that the modification of an existing major source is a major modification of an existing major source?

Details on making this determination, and which Major NSR program may apply (possibly both), follows in the discussion below.

Netting is a summation of the project emission increases from the current project plus all creditable emission changes (both increases and decreases) within the contemporaneous period (also called the contemporaneous window or netting window).

The project emissions increase of the current project results from a comparison of the baseline actual emission rate to either the projected actual emission rate or the PTE for modified or affected facilities, plus the PTE of any new facilities.

Creditable emission changes (both increases and decreases), within the contemporaneous period (also called the contemporaneous window or netting window), is a summation of all projects which occur within the period.

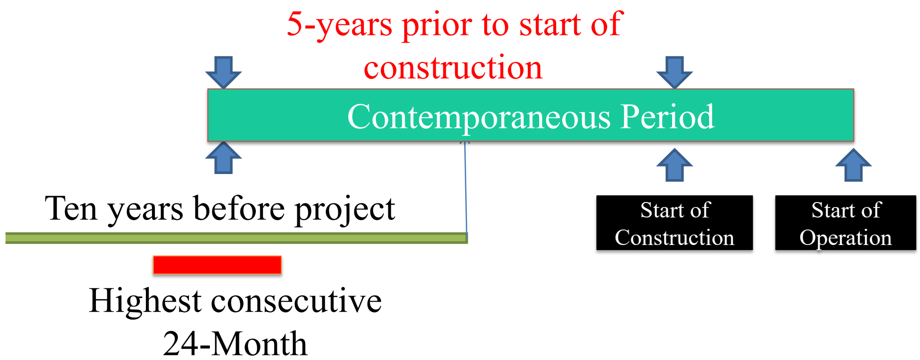
Changes within the contemporaneous period (outside of the project undergoing review) are determined on a project by project basis and are determined through a comparison of the baseline actual emission rate prior to the project and the PTE after the project. Although this approach treats a project differently when it appears in a subsequent netting exercise, the approach is required by the EPA's rule.

The owner or operator must examine the history of all modifications at the source, over a defined period of time (contemporaneous period). If the sum of the emission changes (netting) for these historical modifications, and the current project under review, equals or exceeds the significant emission rate for the pollutant undergoing evaluation, a major source permit (PSD and/or Nonattainment Permit) is required.

As a reminder, keep in mind that fugitive emission must be included in any Major NSR applicability determination, as discussed under the Major Source Definitions for PSD and NNSR.

Also, as a reminder, the significant emission rates for the PSD permitting program can be found at the following location: www.tceq.texas.gov/assets/public/permitting/air/factsheets/factsheets-psd-na-sigemiss-6240.pdf

All modifications during the contemporaneous period must be considered. The contemporaneous period extends back in time, from 60 months (five years) prior to start of construction for the proposed project through the start of operation of the new, modified, or affected facilities. Graphically, the contemporaneous period looks like this:



Increases and decreases appearing in the contemporaneous window must be creditable, and the owner or operator must include any of the source's anticipated projects that may be planned and completed between the date that the permit application is submitted and the projected start of operations.

An increase in emissions is creditable if the emissions increase:

- occurs during the contemporaneous period;
- is the result of a physical change in, or change in the method of operation of, a stationary source only to the extent that the new level of emissions exceeds the baseline actual emission rate; and
- has not relied on it in issuing a Major NSR permit for the source, and that permit is in effect when the increase in emissions from the particular change occurs. For PSD, this effectively limits the contemporaneous period to the start of operation of the last major modification for the pollutant at the site.

Note: Emission increases at facilities under a PAL are not creditable.

A decrease in emissions is creditable only if:

- the new level of emissions are less than the baseline actual emission rate;
- the emissions decrease has not relied on it in issuing a Major NSR permit (either a PSD Permit and/or a Nonattainment Permit), the emission reduction has not been used as an offset, and the emission reduction is

federally enforceable at and after the time that actual construction on a particular change begins (for PSD, this effectively limits the contemporaneous period to the start of operation of the last major modification for the pollutant at the site);

- the emissions decrease has not been required by a State Implementation Plan (SIP – including 30 TAC Chapters 115 and 117) or has not been relied upon to demonstrate attainment or rate of further progress in a nonattainment area. Cap and trade programs put into place as part of the SIP (such as those for NO_x and Highly Reactive Volatile Organic Compounds in the Houston-Galveston-Brazoria (HGB) nonattainment area) do not themselves affect the creditability of emission reductions made at any specific facility; however, other facility-specific control requirements in 30 TAC Chapters 115 or 117 for those pollutants must be considered in assessing the creditability of these reductions;
- if the facility is authorized by permit, the allowable emission rate would be reduced. An APD-CERT or PI-7 CERT form must be completed for the facility if it is authorized under standard permit or permit by rule;
- the decrease has approximately the same qualitative significance for public health and welfare as that attributed to the increase from the particular change; and
- decreases in emissions from MSS operations must be from emissions that have been reported in the Emissions Inventory (in a timely fashion), and discounted for BACT.

Note: Decreases in emissions are not creditable if the baseline actual emission rate exceeded an enforceable emission limit in existence before the project. Noncompliant emissions cannot be used as a creditable emission reduction.

In the case of PSD review only, an increase or decrease in emissions of SO_2, PM, or NO_x that occurs before the applicable minor source baseline date is creditable only if it is required to be considered in calculating the amount of maximum allowable increases remaining available.

The SIP nonattainment areas may include agreed orders, or Commission Orders. Emission reductions resulting from Commission orders, which are utilized by the SIP, are not creditable emission reductions for Major NSR applicability determinations.

See the following examples for the practical application of the information presented in this section.

Example 16

Example 17

Example 18

Example 19

Major Modification

If the result of the netting exercise is equal to, or greater than, the significant emission rate for the pollutant under evaluation, Major NSR is required. More details, regarding the PSD and NNSR permitting programs can be found in the Appendices of this document.

Once a Major NSR permit is issued or approved, this action will have an effect on future Major NSR applicability reviews.

- After a PSD permit is issued for a specific pollutant, or a major modification of a PSD permit is approved for a specific pollutant, the contemporaneous period for future applicability reviews for that pollutant starts from zero. All projects, for that pollutant, were considered to be “relied upon” for the issuance or approval of that PSD action and will not appear in future contemporaneous periods. Projects affecting that pollutant, which occur after the PSD permit is issued or approved, will be included in future applicability reviews (as long as they are contemporaneous of a future project). This is known as “wiping the slate clean.”
- After a NNSR permit is issued for a specific pollutant, or a major modification of a NNSR permit is approved for a specific pollutant, only the particular project that was offset is considered to be relied upon. All other contemporaneous increases and decreases remain “active” for future NNSR applicability reviews, as long as they remain within the contemporaneous period of a future project.

IV. Other Major NSR Applicability Concepts and Options

Netting within a project, or “Net to Zero”

An additional Major NSR applicability approach is typically called netting within a project, or net to zero. The approach applies to Nonattainment applicability determinations only and **does not** apply to PSD applicability. “Netting within a project” can only be used in serious and severe nonattainment areas for projects with an emissions increase (without considering decreases) up to 25 tons/year. Netting to zero means that if the project’s emission increases, coupled with the project’s actual emission decreases, result in a value of zero or less, the project emission increase would not be significant and the applicability threshold test (netting) would not be required. If the project emission increases (without considering decreases) were greater than or equal to 25 tons/year, or if the “netting within a project” results in an emission increase that is greater than zero, the project emission increase would be significant, and the applicability threshold test (netting) would be required.

“End Points” Netting

“End Points” Netting is an alternative netting approach for facilities, which undergo multiple modifications within the contemporaneous period. This approach is used on a facility-by-facility basis, and the emission change is shown in a netting calculation as follows:

Creditable Increase or Decrease = [final allowable emission rate (typically the PTE)] – [baseline actual emission rate prior to the first change in the contemporaneous period].

The end points netting approach was developed to help address the potential of “double counting” emissions that can be encountered when a specific facility undergoes a number of physical/operational changes within the contemporaneous period.

See the following examples for the practical application of the information presented in this section.

Example 20

Additional approaches for NNSR

The FCAA allows additional approaches that can be utilized when it comes to Major NSR applicability related to NNSR. These approaches are limited to nonattainment areas that are classified as either Serious or Severe nonattainment. **These approaches do not apply for PSD Reviews**, and are summarized below:

- Major sources, with a PTE of less than 100 tpy of an applicable nonattainment pollutant, are not required to undergo nonattainment review if the project increase is offset with internal offsets at a ratio of at least 1.3 to 1. If the owner or operator chooses to utilize the internal offset approach, BACT can be substituted for LAER.
- Major stationary sources with a PTE of greater than or equal to 100 tpy of an applicable nonattainment pollutant can substitute BACT for LAER if the project increases are offset with internal offsets at a ratio of at least 1.3 to 1.

Outside of the control technology approaches listed above, LAER shall otherwise be applied to each new facility, and to each existing modified facility, at which the net missions increase will occur as a result of a physical change or change in the method of operation.

Synthetic Minor

A synthetic minor source is a source that would normally be a major source, with the exception that the source is held to emission rates that are less than major source significant emission rate through either a permit condition and/or MAERT allowable. The equipment is physically capable of producing emission rates that would make the source a major source. In such cases, if a source becomes a major source because of a relaxation of a permit condition and/or MAERT allowable, the source will be treated as a new major source. The source will be subject to Major NSR, and the source will be reviewed as if it was never constructed, even though the increase over the sources previous allowable emission rates is less than significant.

Replacement Facilities

In certain cases, replacement facilities may be considered existing facilities for the purpose of determining the project emission increase. These facilities must satisfy the following:

- The facility is a reconstructed unit within the meaning of 40 CFR § 60.15(b)(1), or the facility replaces an existing facility.
- The facility is identical to or functionally equivalent to the replaced facility.
- The replacement does not alter the basic design parameters of the process unit.

- The replaced facility is permanently removed from the major source, otherwise permanently disabled, or permanently barred from operation by a permit that is enforceable. If the replaced facility is brought back into operation, the facility will be considered to be a new facility. No creditable emission reductions shall be generated from shutting down the existing facility that is replaced. A replacement facility is considered an existing facility for the purpose of determining Major NSR applicability. If the proposed project includes a replacement facility, the baseline emissions of the facility being replaced must be determined.

Note: Replacement facilities are typically viewed by the EPA to be an **exact** replacement of the equipment, which currently exists on the site. However, keep in mind that even if a replacement facility meets the requirements of the federal rule, it is still subject to the State of Texas's Minor NSR Program and the facility still must satisfy BACT and be protective of Off Property Impacts.

What could have been accommodated

In the estimation of a project's emission increase, the source owner can exclude emissions that could have been accommodated during the selected baseline period, and that are also unrelated to the particular project. This provision allows source owners to consider only emissions increases that are caused by a particular project (rather than all future emissions increases), resulting in fewer projects triggering major NSR. EPA has referred to this provision as the "causation element" or the "demand growth exclusion."

If any portion of the facility's post-project emissions is excluded from the project emissions increases, the amount of emissions excluded must be identified, and an explanation (including any relevant supporting information) must be provided for the exclusion.

The concept of "could have accommodated" is both legal and physical. In other words, an emission rate could have been accommodated at a facility must satisfy both of the following conditions: (1) the emission rate and associated operating conditions would have been allowed under the facility's operating permit or any applicable regulation during the baseline period (legal accommodation); and (2) the facility was capable of sustaining the operating conditions associated with the accommodated emission rate during the baseline period (physical accommodation).

Emissions must also be unrelated to the proposed project if they are to be excluded. Permit applicants excluding emissions from the project emissions increase should include in the permit application sufficient details about the proposed project so that project-related emissions increases can be estimated and distinguished from unrelated emissions.

Regulatory guidance on the demand growth exclusion is currently limited. If you receive an application that is proposing to use the demand growth exclusion, please bring it to the attention of your management (team leader and/or section manager) for further guidance.

See the following examples for the practical application of the information presented in this section.

Example 21

Plant-wide Applicability Limit (PAL)

The PAL is an alternative and voluntary permit limit that an owner or operator can choose to implement and use to assess FNSR applicability. If the emission rates of a future project, for a pollutant, which received a PAL, stay below the PAL emission rate, Major NSR is not applicable.

Any increases in a PAL must be made through the PAL permit amendment process. As a part of a PAL permit amendment, the applicant must demonstrate the following:

- The sum of the baseline actual emission from minor facilities, plus the sum of the baseline actual emissions of the significant and major facilities assuming the application of BACT equivalent controls, plus the sum of the allowable emissions of the new facilities exceeds the PAL.
- The owner or operator shall obtain a Major NSR permit for all facilities contributing to the increase in emissions that cause the major stationary sources emissions to exceed the PAL, regardless of the magnitude of the emissions increase. These facilities must demonstrate compliance with any emission requirements resulting from the major new source review process.

PAL permits must contain recordkeeping and recording requirements to ensure that the PAL is being complied with. The PAL permit must include the following requirements:

- Require that the increased PAL level be effective on the day any emission unit that is a part of the PAL major modification becomes operational or begins to emit the PAL pollutant.
- The new PAL shall be the sum of the allowable emissions for each modified or new facility, plus the sum of the baseline actual emissions for each significant and major emission unit after application of BACT equivalent controls, plus the sum of the baseline actual emissions of the minor units.

Applications for the establishment of a PAL, the renewal of a PAL, or for an increase of a PAL limit, are required to publish public notice and are subject to the notice and comment requirements of Chapter 39, except that PAL permits are not subject to the contested case hearings (Response To Comments (RTCs) only).

There is nothing in the PAL rules which exempts an applicant from meeting the requirements of the state's minor new source review permitting requirements. In fact, the PAL rule relies on the minor NSR program to ensure that any modifications completed do not violate the NAAQS.

It is important to remember that a PAL does not authorize the construction or modification of any facility to emit air pollutants. A PAL establishes an annual emission rate below which new and modified facilities will not be subject to Major NSR for that pollutant.

Finally, details relating to the PAL, including (but not limited to) amending a PAL, determining compliance with the PAL, semiannual PAL reports, and renewing a PAL can be found in 30 TAC Chapter 116, Subchapter C: Plant-Wide Applicability Limits.

V. PSD and Nonattainment Forms

PSD and Nonattainment applicability determinations are made, and represented, through the use of Tables 1F through 4F.

For Nonattainment review, there are additional information tables (in addition to Tables 1F through 4F) that are unique to the nonattainment-permitting program. These additional tables include the following:

Table 4N – Initial LAER Determination

Table 6N – Alternate Site Analysis for Texas Nonattainment New Source Review, and

Table 9N – Signature Verification.

Major NSR Applicability Examples

Concepts and Calculations

Example 1:

Question: An existing source is located in a severe nonattainment area. The owner or operator proposes to re-tray an existing distillation tower. The new “internals” will allow for a 10% increase in throughput capability, but the storage tanks downstream of the distillation tower can handle the additional throughput and still meet the maximum allowable emission rates contained in their permit. Is the project a modification?

Answer: Yes, the project is a modification. A physical change was conducted to the distillation tower, resulting in an increase in throughput. The increased throughput will carry over into downstream units (the tanks), which will result in an actual increase in emissions from those tanks, and that throughput increase could not have been achieved if it was not for the re-tray project.

Example 2:

Question: A refinery in Corpus Christi (an attainment area) currently has an uncontrolled vent stream that is routed directly to the atmosphere. The owner or operator is proposing to route the vent stream to a flare so that they can control VOC emissions. Is this a modification?

Answer: Yes, the project is a modification. A flare would be expected to reduce the amount of VOC emitted to the atmosphere; however, routing this stream to a flare will also emit products of combustion, such as CO and NO_x. In addition, any hydrogen sulfide in the vent stream would be oxidized to SO_2. Each of these pollutants must be evaluated separately to determine if there is a major modification for that pollutant.

In this example, there is no potential for an increase in emissions of VOC or hydrogen sulfide as a result of routing the vent stream to a flare. However; the project would be a modification for CO, NO_X and possibly SO_2 (if hydrogen sulfide were present). PM is not considered because it is assumed that no particulates are emitted from a properly operated flare.

Example 3:

Question: A routine burner inspection identified that five burners in an existing heater require replacement. Will the replacement of these five burners be considered a modification?

Answer: The burner replacement may be considered a modification, depending on the circumstances of the project. If the burners are replaced with the same type of burner and the replacement burners represent a fraction of the total installed burners, then the replacement would likely not be considered a modification. EPA has traditionally relied upon a four factor test (nature and extent, purpose, frequency, and cost) to determine whether a project falls into the routine maintenance repair and replacement exclusion to modification. There is a fair amount of

EPA guidance in this area. In simple terms, the more routine, more limited the improvement in operation, more frequent, and less costly, the more likely that the activity could be claimed under this exclusion.

Example 4:

Question: A source is authorized to react raw materials A and B to make product C as represented in the simplified process flow diagram below. The improved process was placed online in 2009 but has never reached the design capacity because the reaction step of the process was limited by problems with the catalyst. A new structured catalyst has become available and the source proposes to use it in the reactor to reach the design production rate. No other physical changes are proposed. Is the source modified?

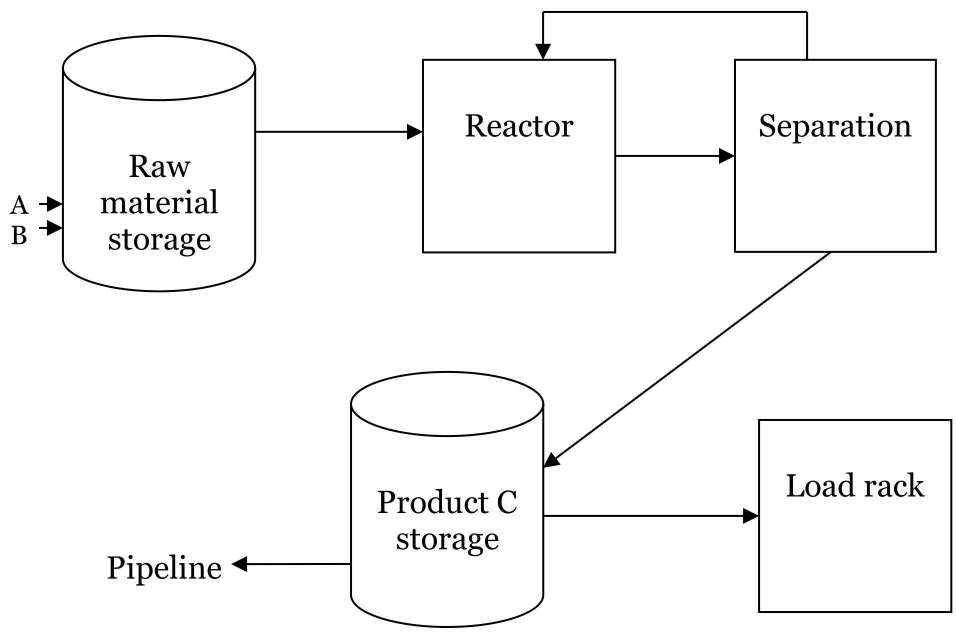


Figure 1: Diagram of a simplified process flow

Answer: Yes, the source is modified, because there is a physical change proposed for the reactor, which is expected to increase production, and therefore its emissions. The proposed change will also impact facilities upstream (raw material storage) and downstream (separation, product storage, and load rack) of the reactor. These facilities will be considered affected by the project, and they will have to be considered when determining the project emission increase.

Example 5:

Question: An owner or operator holds a Chapter 116, Subchapter B permit authorizing ten tanks. The permit MAERT contains an emission cap which limits all tank emissions to a total of 51 tpy. The owner or operator proposes to construct an additional tank, and the proposed tank will be added to the tanks covered by the emission cap. The new tank has the capability of emitting (contributing) 6 tpy. Is there a modification if there is no change to the emission cap? What facilities are modified if the cap is increased to 57 tpy?

Answer: Yes, there is a modification since the newly constructed tank is a new facility regardless of whether the emission cap increases. The source is modified for the inclusion of a new facility. If the emission cap is increased, all the tanks under the cap are modified because they can all now emit up to 57 tpy, unless there are other operational limits in the permit conditions that would prevent them from emitting at that rate.

Example 6:

Question: A permit application, for the modification of a reactor and its associated downstream storage tank, was submitted to the TCEQ. The application was determined to be administratively complete on January baseline actual emission rate vs. the planned emission rate, the PTE in this case), the source must determine the baseline actual emission rate for each of the facilities affected by the project. What is the baseline actual emission rate for the reactor and storage tank?

Answer: A review of their past records, for VOC, showed the following actual VOC emission rates for the reactor and associated storage tank:

In tpy	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Reactor	?	?	121	132	85	107	11	14	15	?
Storage	80	12	14	12	10	11	10	11	13	?

There was insufficient documentation available to determine actual emissions from the reactor in 2002 and 2003, while the EI has yet to be completed for 2011. The owner or operator verified that the calculations used to determine actual emissions for the inventory were consistent with current calculation methods. If this were not the case, the actual emissions from the inventory would need to be corrected.

A review of the rules and permit requirements for these facilities over the last ten years revealed the following:

- The reactor was affected by a permit amendment in 2008 with an allowable emission rate of 30 tpy. A Maximum Achievable Control Technology (MACT) standard also became effective in 2008 requiring emissions be controlled by 90 percent.
- Storage was also affected by a permit amendment in 2008 with an allowable of 30 tpy. A SIP (30 TAC Chapter 115) requirement became effective in 2002, requiring additional tank seals providing for a 90 percent control level.

The baseline actual emissions for each facility cannot exceed the current allowable emissions (30 tpy). Storage emissions from 2002 must be corrected for the SIP requirement that now applies. The actual emissions prior to 2008 must also be adjusted for any new emission controls required for BACT in that permit action.

The 2008 permit did not add any new controls for storage but did require 90 percent control on the reactor vent. The inventory emissions have been corrected for these requirements in the table below:

In tpy	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Reactor	?	?	12	13	9	11	11	14	15	?
Storage	8	12	14	12	10	11	10	11	13	?

The baseline actual emission rate is the highest consecutive 24 month timeframe (two years) out of the past ten years (for non-EGUs). When calculating the baseline actual emission rate, remember that you can use any consecutive 24 months with the last ten years for any one pollutant; however, you must use the same consecutive 24 month timeframe for any one given pollutant.

For the reactor the highest consecutive 24 month timeframe is 2009 and 2010. This yields a value of (14+15)/2, which equals a baseline actual emission rate of 14.5 tpy.

Note that even though the storage tank emits more actual emissions in 2004 and 2005 ((14+12)/2, which equals 13.0 tpy), the owner or operator must use the same timeframe that was used for the reactor (2009 and 2010). This results in a baseline actual emission rate for the storage tanks of (11+13)/2, which equals a baseline actual emission rate of 12.0 tpy.

The baseline actual emission rate for the reactor and storage, using the 2008 to 2009 timeframe, is 26.5 tpy.

As a sidebar discussion, when calculating the baseline actual emissions for multiple facilities affected by a project, it is to the owner or operators advantage to evaluate each consecutive 24 month timeframe within the last ten years, for the sum of each individual facilities emissions. It may not always be obvious as to which consecutive 24 month timeframe yields the highest baseline actual emission rate. This is especially true for projects affecting multiple facilities. This approach is acceptable as long as the same consecutive 24-month timeframe is used to establish the baseline actual emission rates for all facilities emitting the pollutant undergoing evaluation.

Example 7:

Question: A permit application for an electric generating unit (EGU) was submitted to the TCEQ. What is the baseline actual emission rate for the boiler?

Answer: The baseline actual emission rate for EGU's is based on the highest consecutive 24 month timeframe (2-years) out of the last five years.

A review of owner or operators past records, for NO_x, showed the following actual NO_x emission rates for the boiler:

In tpy	2007	2008	2009	2010	2011
Boiler	151	116	140	151	?

In this example, the actual emission rates are all within the boiler PTE, and the actual emission rate has not been affected by a change in rule requirements. In this case, it is not necessary to go through the actual emissions and adjust them for current requirements. The baseline actual emission rates for the boiler, which provide the greatest advantage to the applicant, are 2009 and 2010. The calculated baseline actual emission rates from the boiler would be (140+151)/2. This results in a baseline actual emission rate value of 145.5 tpy.

Note: For EGU's, the TCEQ may allow for the use of a different timeframe, if it can be demonstrated that another year is more representative of normal operation. For example, the owner or operator may wish to look at 2006 actual emissions to determine if the 2006 and 2007 are most representative of normal source operation. If the owner or operator believes that to be the case, they will need to provide the rationale for that determination in the projects permit application, so that it can be evaluated during the permit review. This capability (of using a different timeframe, if it can be demonstrated that another year is more representative of normal operation) cannot be used for non-EGU source types. They must use the highest consecutive 24-month timeframe (two years) out of the past ten years.

Example 8:

Question: The owner or operator of a surface coating operation, with five facilities (Units A through E), is considering making modifications to their production lines. These modifications will allow for a substantial increase in throughput. What is the baseline actual emission rate, given the information in the following discussion? The pollutant being evaluated is VOC.

Answer: The owner or operator has provided their actual emissions (in tpy) from each of their facilities, looking back over the last ten years. Their actual emissions are shown below.

Year	Unit A (tpy)	Unit B (tpy)	Unit C (tpy)	Unit D (tpy)	Unit E (tpy)
2002	50	199	19	54	0
2003	52	200	23	51	0
2004	68	205	22	54	0
2005	65	201	23	50	0
2006	60	210	23	30	0
2007	59	21	20	30	0
2008	59	19	22	0	0
2009	67	18	22	0	0
2010	65	16	23	0	0
2011	62	17	20	0	40

The owner or operator has maintained sufficient records to document the actual emissions for each of the facilities. In reviewing the requirements for baseline emissions, the applicant notes the following:

- There was a new rule requiring 90 percent control in 2006 that affected Unit B.
- Unit D was shut down at the end of 2007.
- Unit E was added in 2011 and has an allowable emission rate of 50 tpy.
- The Unit A allowable was 60 tpy so there have been some non-compliant emissions.
- All actual emissions were determined using the most current emission factors.

Considering the above information, the actual emissions will need to be adjusted to take into account 1) compliance issues with the current allowable emission rate for Unit A, and 2) the rule requirement for a 90 percent control efficiency required for Unit B. As a result, baseline emissions were adjusted as required and are shown in the following table.

Year	Unit A (tpy)	Unit B (tpy)	Unit C (tpy)	Unit D (tpy)	Unit E (tpy)
2002	50	20	19	54	0
2003	52	20	23	51	0
2004	60	21	22	54	0
2005	60	20	23	50	0
2006	60	21	23	30	0
2007	59	21	20	30	0
2008	59	19	22	0	0
2009	60	18	22	0	0
2010	60	16	23	0	0
2011	60	17	20	0	0
Max BL	60	21	23	52.5	50
Total BL	60	20.5	22.5	52	50

Here is a good place to point out a difference. If you look at the highest consecutive 24 month (two year) average, for each facility independently (in other words, picking the high two years in the last ten for that particular facility), you will obtain the baseline actual emission rates identified in the "Max BL" Row. However, remember that the owner or operator must use the same two year baseline period, for all facilities emitting the same pollutant. We point out this "difference" in calculating the "baseline actual emission rate," because we have found owners or operators which have tried this approach in the past. This is not the proper way to estimate a baseline actual emission rate for the project.

What the owner or operator should do is use the highest consecutive 24 month (two year) average for all facilities as a group. In this example, the highest baseline, as a group, is achieved for the 2004 and 2005 timeframe.

The baseline actual emission rates, for each facility involved in this particular project, are identified in the "Total BL" Row. If the facilities are to be upgraded as a group, their baseline actual emissions must be from the same 24 month period. The shaded areas, in the table above, show the corrected emissions rates, as identified below.

Unit A – The noncompliant emissions have been removed

Unit B – 90 percent control has been applied to all emissions prior to, and including, 2006.

Unit E – Since the unit has been in operation for less than two years, the PTE may be used for the baseline emission rate.

Example 9:

A gasoline terminal at a refinery is proposing to change the service of a tank, from some other material to gasoline, using a PBR (thus, modifying the storage tank). The change is necessary in order to provide for the flexibility necessary to meet projected demand in the area. The owner or operator has reviewed historical operational data, provided a forecast of expected business activity, and provided their highest projections of business activity. The company has estimated that the authorized tank emissions will be increasing from 6 tpy to 7 tpy.

The owner or operator also reviewed the other facilities that may be affected by the change of service of the storage tank. They determined that the addition of the new material to this tank would allow for a slightly reduced throughput at the other gasoline tanks at the source. It was also forecast that the throughput at the loading rack, and its associated emissions, will increase over time at the loading rack due to the modified tank as well as increased demand in the area. Even though actual emissions from the loading rack are predicted to increase to 44 tpy, the loading rack will still be able to operate within its currently authorized level of 50 tpy, and the authorized emission rate from the loading rack does not need to be increased.

Question: If the owner or operator avoids major NSR by comparing their baseline actual emission rate to a projected actual emission rate, how long will the company have to track their projected actual emission rate?

Answer: The projected actual emission rate for the tank must be tracked for ten years because the change in service resulted in increase in the tanks potential to emit. The company does not plan to increase the authorized emission rate (i.e., the allowable emissions rate) for the loading rack, so its projected actual emission rate (44 tpy) will need to be tracked for five years.

Example 10:

Question: An owner or operator wants to construct a new facility at an existing source. The source currently contains existing authorizations for several chemical processing units. The source currently has potential to emit (PTE) of 120 tons/year (tpy) of SO_2. Is the source a major source?

Answer: Yes, the source is a major source. Chemical Process Plants is one of the named source categories. The major source definition for a named source is 100 tpy. Since the source in this example has a pre-project PTE of 120 tpy SO_2, the source is a major source.

Example 11:

Question: An existing named source emits 400 tpy of CO. Is the source also a PSD major source for NO_x, PM_{10}, $PM_{2.5}$, and SO_2?

Answer: Yes, the named source is a PSD major source for NO_x, PM_{10}, $PM_{2.5}$, and SO_2. 400 tpy of CO at a named source exceeds the major source significant emission rate of 100 tpy. For PSD, if the source is a major source for any one criteria pollutant, the source is a major source for all criteria pollutants.

Example 12:

Question: An existing source is located in a serious nonattainment area. The source currently emits 30 tpy of VOC and 25 tpy of NO_x. Is the source a major source?

Answer: No, the source is not a major source. Even though the major source significant emission rate in a serious nonattainment area is 50 tpy, the source currently emits 30 tpy of VOC and 25 tpy of NO_x. Remember, for NNSR, each pollutant is evaluated individually (they are not additive). In this example, both VOC and NO_x are less than 50 tpy individually. The source is not a major source.

Example 13:

A project is being considered in a severe ozone nonattainment area. The project will affect the emissions of NO_x, CO, and PM_{10}. The PTE from all facilities at the source, for these pollutants, were determined and were summed to provide the values in the table below.

Pollutant	NO_X	CO	PM_{10}
Source PTE (tpy)	88	310	55

Question: Is the source a major source for purposes of nonattainment applicability?

Answer: Yes, the source is a major source for NO_x for the purposes of nonattainment applicability. When determining the source PTE for purposes of nonattainment review, remember that each pollutant is evaluated independently. Both NO_x and VOC are regulated as precursors to ozone. In this case, the source emits NO_x. The PTE for NO_x is 88 tpy and exceeds the major source significant emission rate of 25 tpy for severe nonattainment areas.

Question: Is the source a major source for the purposes of PSD applicability?

Answer: Yes, the source is a major source for the purposes of PSD applicability. When determining whether the source is a major source for PSD, consider the emissions of all federally regulated NSR pollutants at the source. A review of the emissions from the source in this example shows that the PTE for CO is 310 tpy. Since the current PTE for CO (310 tpy) exceeds the major source significant emission rate for criteria pollutants emitted in an attainment area (100 tpy for named sources, and 250 tpy for un-named sources), the source is a major source. Remember, that under PSD applicability requirements, if the source is a major source for one criteria pollutant, then the source is a major source for all criteria pollutants. This is different than nonattainment applicability, where the determination of a source being a major source is conducted on a pollutant by pollutant basis.

Example 14:

An owner or operator is located at an existing major named source, in an attainment area.

Current PTE = 200 tpy NO_x
Proposed PTE = 210 tpy NO_x
Baseline Actuals = 190 tpy NO_x

Question: Is the project a major project? 210 tpy - 190 tpy = 20 tpy NO_x increase.

The significant emission rate is 40 tpy NO_x.

Answer: No, the project is not a major project. The proposed increase of 20 tpy is less than the significant emission rate of 40 tpy. The project is not a major project, and Major NSR is not required (minor NSR review only).

Example 15

Question: A chemical plant in Beaumont (an attainment area) is proposing to modify a process to increase production. As part of the project, the owner or operator is proposing to vent a currently uncontrolled vent stream associated with the process to control. Can the reductions associated with the control of the vent stream be included in the determination of project emissions increases?

Answer: Yes, since there is a substantial relationship between the modified process and the previously uncontrolled vent stream, emission reductions associated with controlling the vent stream may be considered when determining project emissions increases.

Example 16:

In January 2011, an owner or operator submits an application for the modification of an existing major source in a nonattainment area. The permit reviewer determines that netting is required.

Upon review of projects within the contemporaneous window, a March 2007 permitting action for another facility at the source is identified. The facility was authorized to emit 300 tpy of VOC. A control device was voluntarily installed, and it was designed to obtain a 98% VOC control efficiency. The PTE after the installation of the control device was 6 tpy (300 tpy * 0.02). The baseline actual emission rate before the change was 110 tpy. In 2007, the creditable VOC emission reduction was 110 tpy – 6 tpy = 104 tpy.

In February 2008, a SIP related rule change required a 90% VOC reduction of emissions from the facility controlled in 2007.

Question: How would the new rule affect the magnitude of the creditable reduction that can be used in netting for the January 2011 project?

Answer: The March 2007 project resulted in an actual reduction of 104 tpy; however, the February 2008 SIP related rule change will affect the amount of the reduction that is creditable for use in netting. SIP rules are intended to bring an area into attainment, and as such, the emission reductions generated by SIP rules are considered to be “relied upon” in further attainment and/or demonstration of a standard. The SIP requirement of 90% control would need to be applied to the baseline emission rate, lowering the baseline emission rate by the appropriate control value (in this case, 90%). The effect on the baseline emission rate would be 110 tpy * 0.1 = 11 tpy. The creditable actual emission reduction from the March 2007 project that can be used in the netting calculation for the January 2011 project is 11 tpy – 6 tpy = 5 tpy.

In the netting calculation for the January 2011 project, the contemporaneous change for the March 2007 project would be a 5 tpy reduction.

Example 17:

An owner or operator is proposing a project at an existing major named source in an attainment area.

Current PTE = 200 tpy NO_x
Proposed PTE = 210 tpy NO_x
Baseline Actuals = 130 tpy NO_x

Question: Is the project a major project? 210 tpy - 130 tpy = 80 tpy NO_x increase.

The major modification significant emission rate increase for NO_x is 40 tpy.

Answer: Yes, the project is a major project. The proposed 80 tpy emission increase is greater than the major modification significant emission rate of 40 tpy. In this example, the project is considered to be a major project, and netting is required.

Netting:

Current Project is July 2011

Previous Projects	January 2011	20 tpy (increase)
	May 2009	80 tpy (increase)
	Dec 2008	30 tpy (decrease)
	Nov 2005	200 tpy (decrease)

The netting calculation includes the current project and all other projects within the contemporaneous period, looking back five years.
80 tpy + 20 tpy + 80 tpy - 30 tpy = 150 tpy increase.

The major modification significant emission rate for NO_x is 40 tpy.

The 150 tpy contemporaneous net increase exceeds the major modification significant emission rate of 40 tpy. The project is a major modification and PSD review for NO_x is required.

Second Question: Why was the 200 tpy emission reduction that resulted from the November 2005 project not included in the netting calculation?

Answer: The contemporaneous period goes back in time five years from the date of the current project. The 200 tpy emission reduction that resulted from the November 2005 project falls outside of the contemporaneous period for the July 2011 project, and is therefore ineligible for inclusion in the netting calculation.

Example 18:

An owner or operator is located at an existing major source in a serious nonattainment area.

Current PTE = 50 tpy NO_x
Proposed PTE = 70 tpy NO_x
Baseline Actuals = 40 tpy NO_x

Question: Is the project a major project? 70 tpy - 40 tpy = 30 tpy increase.

Answer: Yes, the project is a major project. The project increase is 30 tpy, which exceeds the five tpy netting significant emission rate for serious and severe nonattainment areas. The project is major project and netting is required.

Current Project is July 2011

Previous Projects	Nov 2010	10 tpy (increase)
	Oct 2007	20 tpy (increase)
	Dec 2006	5 tpy (increase)

The netting calculation includes the current project and all other projects within the contemporaneous period, looking back five years. 30tpy + 10 tpy + 20 tpy + 5 tpy = 65 tpy increase

The significant emission rate increase for NO_x is 25 tpy.

The contemporaneous net increase of 65 tpy is greater than the significant emission rate for a major modification, 25 tpy, for serious and severe nonattainment areas. The project is a major modification, and nonattainment review is required for NO_x.

The owner or operator must apply LAER and provide offsets at a ratio of 1.2:1.

Example 19:

An owner or operator submits a project for Facility A at an existing major source. The project is submitted in June 2010. The BACT review of Facility A indicates that a control device obtaining a 98% destruction efficiency would be required. The vent is currently uncontrolled, with a PTE of 300 tpy. The baseline actual emission rate (the highest actual average emissions achieved in a consecutive 24 month period out of the last ten years) before the project is 200 tpy. The owner or operator used a 2004 and 2005 timeframe to establish their baseline actual emission rate.

In February 2008, a SIP related rule change required a 90% reduction of emissions at Facility A.

Question: How will the 2008 SIP related rule change, and the BACT review for the June 2010 project, affect the baseline actual emission rate that can be used for Facility A in subsequent projects?

Answer: For the June 2010 project, the February 2008 SIP related rule (which required a 90% reduction) would reduce the baseline actual emissions. If the baseline actual emission rate was 200 tpy before the rule change, the corrected baseline actual emission rate (taking into account the SIP requirement) would be 200 TPY * 0.1 = 20 tpy.

The 20 tpy corrected baseline actual emission rate would be used for the June 2010 project at Facility A. However, if there is another modification of Facility A in the future, the baseline actual emission rate for that new project may need to be lowered because the June 2010 project contained a 98% destruction efficiency BACT requirement. If the same baseline period is used (2004 and 2005), this BACT requirement will also affect the baseline actual emission rate calculation. After the application of BACT, the corrected baseline actual emission rate will be 200 tpy * .02 = 4 tpy. In this example, the June 2010 permit action implemented a control requirement that is more stringent than the SIP requirement. The more stringent control requirement would lower the baseline actual emission rate to 4 tpy. Note that it is not necessary to further reduce the reduction by 90% for the SIP requirement. These requirements are not additive.

Example 20:

An owner or operator is located at an existing major source in a serious nonattainment area.

The current project is undergoing review in 2012.

Current PTE = 20 tpy VOC
Proposed PTE = 30 tpy VOC
Baseline Actuals = 15 tpy VOC

Question: Is the project a major project? 30 tpy - 15 tpy = 15 tpy increase

Answer: Yes, the project is a major project. The project increase is 15 tpy, which exceeds the five tpy netting significant emission rate for serious and severe nonattainment areas. The project is a major project and netting is required.

The particular facility being affected by this project has been affected by three other projects within the last five years (multiple changes at the same facility within the contemporaneous period).

The three other projects affecting this facility are:

2008:	PTE =	15 tpy	Project Change:
	Proposed PTE =	25 tpy	25 tpy - 15 tpy = 10 tpy
	Baseline Actuals =		15 tpy
2009:	PTE =	25 tpy	Project Change:
	Proposed PTE =	25 tpy	25 tpy - 15 tpy = 10 tpy
	Baseline Actuals =	15 tpy	
2010:	PTE =	25 tpy	Project Change:
	Proposed PTE =	25 tpy	25 tpy - 15 tpy = 10 tpy
	Baseline Actuals =	15 tpy	

The netting calculation includes the current project and all other projects within the contemporaneous period, looking back five-years. 15 tpy + 10 tpy + 10 tpy + 10 tpy = 45 tpy increase.

It should be noticed that the proposed PTE (i.e., the allowable) for this facility is only 30 tpy. The result of the netting calculation shows a net emissions increase that is greater than the allowable emission rate authorized for this facility. This netting result indicates that portions of the emission increases from this facility have been counted more than once in the traditional netting exercise.

Netting using Endpoints methodology:

2008 Project: 25 tpy - 15 tpy = 10 tpy
2009 Project: 25 tpy - 25 tpy = 0 tpy
2010 Project: 25 tpy - 25 tpy = 0 tpy
2012 Project: 30 tpy - 25 tpy = 5 tpy

The endpoints netting calculation includes the current project and all other projects within the contemporaneous period for this facility, looking back five-years.
10 tpy + 0 tpy + 0 tpy + 5 tpy = 15 tpy increase.

The netting calculation, utilizing the endpoints netting approach, results in a 15 tpy emission increase.

The contemporaneous net increase of 15 tpy is less than the major modification significant emission rate for a serious nonattainment area. The project “nets out” of nonattainment review; however, the project is still subject to the requirements of the minor NSR program.

Example 21:

A modification is proposed that would allow for increased production at a cement kiln. The owner or operator has demonstrated that demand for cement is, and will likely continue to be, higher than experienced during any sustained period over the last ten years. They have identified the baseline period as the years 2008 and 2009. The baseline actual emission rate during this period was 710 tpy. The owner or operator also indicates that the baseline actual emission rate does not include an adjustment for emissions that they were capable of accommodating during the baseline period.

Question: How can the owner or operator make an argument that they should be able to include the emissions that they were capable of accommodating into their major NSR applicability analysis?

Answer: The owner or operator proposes to determine what could have been accommodated by determining the highest production for a 30 day period (that's a 30 consecutive day time frame, not a few days here and a day or two there, added to obtain a 30 day value) during the baseline time frame, and verify that they have and will operate for 24 consecutive months without an extended shutdown. That annualized production rate represents what they could have produced during the baseline period.

The actual emissions that would be associated with this annualized production rate are estimated by multiplying the ratio of the rate at which they could have produced and the actual production rate during the baseline period by the baseline emission rate. In this example, the ratio of what they could have produced compared to what they did produce during that time frame is 1.2. Multiplying the ratio of what they could have produced compared to what they did produce (1.2) by the baseline actual emission rate (710 tpy) results in a value of 852 tpy. This method utilizes actual emission data and corrects it to an operating level actually achieved over a sustained period, which approximates the operating level that could have been accommodated during the baseline period. In this example, that emission rate (852 tpy) includes emissions that could have been accommodated (852 tpy – 710 tpy or 142 tpy) and can be used in a major NSR applicability evaluation. Remember, emissions that could have been accommodated can be excluded from the major NSR applicability analysis only if they are also unrelated to the proposed project. The owner or operator should include in the permit application sufficient details about the proposed project so that project-related emissions increases can be estimated and distinguished from unrelated emissions.

TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	**BEFORE THE** **TEXAS COMMISSION ON** **ENVIRONMENTAL QUALITY**

FLINT HILLS RESOURCES INGLESIDE LLC
RESPONSE TO MOTION TO OVERTURN

Exhibit H

FHR's Exhibit H

Permit Amendment
Source Analysis & Technical Review

Company	**Flint Hills Resources Corpus Christi LLC**	Permit Number	**6606**
City	**Ingleside**	Project Number	**284633**
County	**San Patricio**	Regulated Entity Number	**RN100222744**
Project Type	**Amend**	Customer Reference Number	**CN603741463**
Project Reviewer	**Michael Cheek, P.E.**		
Site Name	**FHR Ingleside Marine Terminal Facility**		

Project Overview

The Flint Hills Ingleside Terminal is a marine terminal handling crude oil and stabilized condensate. Crude oil and condensate enter and exit the terminal via marine dock or pipeline. Actions for this project include: authorizing an increased throughput from 73,000,000 barrels to 138,700,000 barrels per rolling twelve months; adding three new vapor combustors and removing an older combustor; and adding six new tanks. The new tanks will be designed to accommodate a throughput of 66,000,000 barrels per rolling twelve months. No modifications are proposed for the existing tanks. However, the existing tanks could realize an increase in actual emissions because of increased throughput of up to 51,500,000 barrels per rolling twelve months and therefore will be reviewed as affected downstream facilities.

MSS is authorized separately under PBR 30 TAC §106.263 (PBR Registration No. 107625). FHR will revise PBR 107625 to include MSS emissions from the six new tanks that will be constructed.

Emission Summary

Air Contaminant	Current Allowable Emission Rates (tpy)	Proposed Allowable Emission Rates (tpy)	Change in Allowable Emission Rates (tpy)
PM	1.06	6.68	5.62
PM_{10}	1.06	6.68	5.62
$PM_{2.5}$	1.06	6.68	5.62
VOC	119.91	123.03	5.28
NO_X	56.05	24.78	-31.27
CO	51.53	26.14	-25.39
SO_2	14.54	36.24	21.70
H_2S	1.15	1.31	0.16

PSD Review

Pollutant	Project Increases (tpy)	Major Mod Trigger (tpy)	PSD Triggered Y/N
PM	6.30	25	N
PM_{10}	6.30	15	N
$PM_{2.5}$	6.30	10	N
VOC	37.71	40	N
NO_X	19.41	40	N
CO	25.35	100	N
SO_2	39.71	40	N
H_2S	0.25	10	N

Compliance History Evaluation - 30 TAC Chapter 60 Rules

A compliance history report was reviewed on:	**May 11, 2018**
Site rating & classification:	**0.00 / High**
Company rating & classification:	**0.00 / High**
If the rating is 50<RATING<55, what was the outcome, if any, based on the findings in the formal report:	**N/A**
Has the permit changed on the basis of the compliance history or rating?	**No**

Public Notice Information - 30 TAC Chapter 39 Rules

Rule Citation	Requirement	
39.403	Is Public Notice Required?	**Yes**
	Date Application Received:	**April 20, 2018**
	Date Administratively Complete:	**April 27, 2018**
	Small Business Source?	**No**
	Date Leg Letters mailed:	**April 27, 2018**
39.603	Date Published:	**May 16, 2018**
	Publication Name:	***Ingleside Index***
	Pollutants:	**carbon monoxide, hydrogen sulfide, nitrogen oxides, organic compounds, particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less, and sulfur dioxide**
	Date Affidavits/Copies Received:	**May 24, 2018**
	Is bilingual notice required?	**Yes**
	Language:	**Spanish**
	Date Published:	**May 16, 2018**
	Publication Name:	***El Tejano Hispanic Community Magazine***
	Date Affidavits/Copies Received:	**May 24, 2018**
	Date Certification of Sign Posting / Application Availability Received:	**June 26, 2018**
39.604	Public Comments Received?	**No**
	Hearing Requested?	**No**
	Meeting Request?	**No**
	Date Response to Comments sent to OCC:	**NA**
	Consideration of Comments:	**NA**
	Is 2nd Public Notice required?	**Yes**
39.602(c)	Date SB 709 Legislative Notification Sent:	**October 4, 2018**
39.419	Date 2nd Public Notice/Preliminary Decision Letter Mailed:	**December 12, 2018**
39.413	Date Cnty Judge, Mayor, and COG letters mailed:	**Not required**
	Date Federal Land Manager letter mailed:	**Not required**
39.605	Date affected states letter mailed:	**Not required**
39.603	Date Published:	**December 19, 2018**
	Publication Name:	***Ingleside Index***

	Pollutants:	**carbon monoxide, hydrogen sulfide, nitrogen oxides, organic compounds, particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less, and sulfur dioxide**
	Date Affidavits/Copies Received:	**January 7, 2019**
	Is bilingual notice required?	**Yes**
	Language:	**Spanish**
	Date Published:	**December 21, 2018**
	Publication Name:	***El Tejano Hispanic Community Magazine***
	Date Affidavits/Copies Received:	**January 7, 2019**
	Date Certification of Sign Posting / Application Availability Received:	**June 26, 2018**
	Public Comments Received?	**No**
	Meeting Request?	**No**
	Date Meeting Held:	**N/A**
	Hearing Request?	**N/A**
	Date Hearing Held:	**N/A**
	Request(s) withdrawn?	**N/A**
	Date Withdrawn:	**N/A**
	Consideration of Comments:	**N/A**
39.421	Date RTC, Technical Review & Draft Permit Conditions sent to OCC:	**N/A**
	Request for Reconsideration Received?	**N/A**
	Final Action:	**N/A**
	Are letters Enclosed?	**N/A**

Construction Permit & Amendment Requirements - 30 TAC Chapter 116 Rules

Rule Citation	**Requirement**	
116.111(a)(2)(G)	Is the facility expected to perform as represented in the application?	**Yes**
116.111(a)(2)(A)(i)	Are emissions from this facility expected to comply with all TCEQ air quality Rules & Regulations, and the intent of the Texas Clean Air Act?	**Yes**
116.111(a)(2)(B)	Emissions will be measured using the following method:	**AVO fugitive monitoring; ship testing; stack sampling**
	Comments on emission verification:	
116.111(a)(2)(D)	Subject to NSPS?	**Yes**
	Subparts **A, Ka,** & **Kb**	
116.111(a)(2)(E)	Subject to NESHAP?	**Yes**
	Subparts **A** & **M**	
116.111(a)(2)(F)	Subject to NESHAP (MACT) for source categories?	**Yes**
	Subparts **A** & **Y**	
116.111(a)(2)(H)	**Nonattainment review applicability:**	
	San Patricio county is in unclassified/attainment status for all criteria pollutants per 40 CFR 81.344 (July 1, 2017 edition).	
116.111(a)(2)(I)	**PSD review applicability:**	
	Per the PSD Review Table above, project increases are less than the Significant Emission Rates for all pollutants. The project emissions increase was determined by calculating the incremental increase in emissions expected to occur from all modified and affected facilities.	

116.111(a)(2)(L)	Is Mass Emissions Cap and Trade applicable to the new or modified facilities?	**No**
	If yes, did the proposed facility, group of facilities, or account obtain allowances to operate:	**NA**
116.140 - 141	Permit Fee: **$75,000.00** Fee certification:	**M823066**
	Applicable Outstanding Fees:	**None**

Title V Applicability - 30 TAC Chapter 122 Rules

Rule Citation	Requirement
122.10(13)	**Title V applicability:**
	Title V is applicable. Federal Operating Permit O3454 is associated with this site.
122.602	**Periodic Monitoring (PM) applicability:** The site is subject to periodic monitoring. The permit conditions contain the following monitoring requirements: • Continuous pressure monitoring and AVO fugitive monitoring during ship loading. (9) • Periodic ship testing. (10) • Continuous pressure monitoring during vacuum loading. (14) • Monthly AVO monitoring of fugitive components in petroleum service. (20) • Daily AVO monitoring of fugitive components in H_2S service. (21)
122.604	**Compliance Assurance Monitoring (CAM) applicability:** The site is subject to CAM. The VOC emissions resulting from dock loading are controlled by the Marine Vapor Combustion Units (EPNs MVCU1, MVCU2, MVCU3). Without these controls each emission point would result in the release of 6,356 tpy of VOC. CAM is applicable to these control devices. The permit conditions contain the following monitoring requirements for these EPNs: • Continuous monitoring of the firebox temperature during operation. • Continuous confirmation of the presence of the pilot flame during operation. [22]

Request for Comments

Received From	Program/Area Name	Reviewed By/Date	Comments
Region:	**14**		**Sent to Region on 11/9/18, no comments received.**
City:	**Ingleside**		**No program**
County:	**San Patricio**		**No program**
ADMT:	**TCEQ**	**Philip Leung December 3, 2018**	**Air quality analysis is acceptable**
EB&T:			
Toxicology:			
Compliance:			
Legal:			
Comment resolution and/or unresolved issues:			

Process/Project Description

The Flint Hills Ingleside Terminal is a marine terminal handling crude oil and stabilized condensate. Equipment currently authorized for the facility includes two ship and barge docks that are controlled by a Marine Vapor Combustion Unit, two Fire Water Pump Engines, and 17 storage tanks. Crude oil and condensate is received at the terminal via marine dock or pipeline and exits the same way.

This facility is a named major source per 40 CFR § 51.166 and 40 CFR § 52.21 (Petroleum storage and transfer units with total storage capacity exceeding 300,000 barrels). The facility is in an attainment county.

The actions for this project include the following:

- An increase of the total combined throughput of the barge and ship loading of crude oil and stabilized condensate from 73,000,000 to 138,700,000 barrels per rolling twelve months.
- The increase in throughput shall primarily be accommodated by adding six new tanks (EPNs TK-28087, TK-28088, TK-28089, TK-28090, TK-28091, TK-28092). These six tanks, combined or individually, shall be rated to permit up to a total of 66,000,000 barrels per rolling twelve months. The hourly H_2S concentration of crude oil and condensate will be 500 ppmw or less, and the annual H_2S concentration will be 100 ppmw or less, the same as for the currently authorized tanks.
- No modifications are proposed for the existing tanks. However, the existing tanks could realize an increase in actual emissions because of a potential increase in throughput of up to 51,500,000 barrels per rolling twelve months and therefore will be reviewed as affected downstream facilities.
- An increase in hourly H_2S concentration of crude oil and condensate for marine loading operation from 18 ppmw to 19 ppmw, and an annual increase in H_2S concentration from 14 ppmw to 19 ppmw.
- An increase in the barge and ship loading rate from 20,000 to 60,000 barrels per hour.
- Remove Marine Vapor Combustion Unit (EPN MCVU)
- Add three new vapor combustors (EPNs MVCU1, MVCU2, and MVCU3)
- Consolidate PBR Registration No. 147189 into this permit. This will result in an increase in VOC and H_2S emissions for EPN TK-28075. This is due to the addition of fittings for this tank previously authorized by this PBR.
- Void PBR Registration No. 136465. This permit has already been previously consolidated, but the PBR has not yet been voided.
- Consolidate PBR Registration No. 124323 into this permit, which authorizes fugitive emissions associated with an H_2S scavenging system.
- Correct a typo for H_2S emissions for EPN TK-28071.

Pollution Prevention, Sources, Controls and BACT- [30 TAC 116.111(a)(2)(C)]

Marine Loading

VOC and H_2S

- Emissions generated during marine loading with a True Vapor Pressure (TVP) greater than 0.5 psia will be routed to one of three Marine Vapor Combustors (EPNs MCVU-1, MCVU-2 or MCVU-3) each with a VOC destruction efficiency of at least 99.9%. H_2S destruction will be at least 99%.
- All marine vessels are required to provide FHR with proof that they have passed an annual vapor tightness testing of marine vessels as specified in 40 CFR §63.565(c) or 40 CFR §61.304(f) prior to loading.
- FHR or the owner/operator will conduct AVO checks for leaks once every 8 hours for on-shore equipment and on board the vessel during the loading of inerted vessels.
- FHR will monitor and record the pressure at the vapor collection connection of an inerted marine vessel and the loading rate.

This is BACT for marine loading operations.

Marine Vapor Combustors EPNs MCVU-1, MCVU-2, MCVU-3

The represented performance of the proposed Marine Vapor Combustors are as follows:

NO_x
0.023 lb/MMBtu

CO
0.03 lb/MMBtu

VOC
99.9 % destruction of VOCs. BACT requires 99% destruction.

PM/PM$_{10}$/PM$_{2.5}$
0.0075 lb/MMBtu

H_2S and SO_2
99% destruction of H_2S. SO_2 emissions are controlled by limiting H_2S in crude oil and condensate to 100 ppmw on an annual basis and 500 ppmw on an hourly basis.

The MCVUs will be initially tested to determine the minimum firebox temperature. The firebox temperature will be continuously monitored and recorded when materials are loaded that have a maximum true vapor pressure greater than or equal to 0.5 psia.

The above is BACT for vapor combustors.

Tank EPN TK-28075

VOC

Tank is an external floating-roof with mechanical shoe primary seals and rim-mounted secondary seals. Exterior surfaces exposed to the sun will be painted white or aluminum. This is BACT.

H_2S

There is currently no BACT for H_2S emissions from storage tanks. However, H_2S emissions will be controlled via the tank VOC emission controls, which has been demonstrated to be BACT.

New Tanks EPNs TK-28087, TK-28088, TK-28089, TK-28090, TK-28091, TK-28092

VOC

Tanks will be domed internal floating roof tanks with mechanical shoe primary seals and rim-mounted secondary seals. Exterior surfaces exposed to the sun will be painted white or aluminum. This is BACT.

H_2S

There is currently no BACT for H_2S emissions from storage tanks. However, H_2S emissions will be controlled via the tank VOC emission controls, which has been demonstrated to be BACT.

Existing Tanks – Downstream Affected Facilities

Due to the project increase, the following existing tanks are not modified but may potentially experience an increase in throughput of up to 51,500,000 barrels per rolling twelve months: EPNs TK-28063, TK-28064, TK-28067, TK-28068, TK-28069, TK- 28070, TK-28071, TK-28072, TK-28073, TK-28074, TK-28075, TK-28076, TK-28077, TK-28080, TK-28082, TK-28083, and TK-28086. These are all considered downstream affected facilities. Special Condition No. 18 shall require the permit holder to calculate and maintain a record of the incremental annual emissions resulting from the Ingleside Terminal Expansion Project, in tons per year, on a calendar basis, for a period of five years following the implementation of this project.

Impacts Evaluation - 30 TAC 116.111(a)(2)(J)

Was modeling conducted?	**Yes**	Type of Modeling:	**AERMOD**
Will GLC of any air contaminant cause violation of NAAQS?			**No**
Is this a sensitive location with respect to nuisance?			**No**
[§116.111(a)(2)(A)(ii)] Is the site within 3000 feet of any school?			**No**
Additional site/land use information:			
Site is immediately adjacent to industrial or undeveloped areas on land. Site is also adjacent to Corpus Christi bay. Nearest private residences are approximately 4000 feet away.			

Summary of Modeling Results

The air quality analysis, as supplemented by the ADMT, is acceptable for all review types and pollutants. These impacts are not expected to cause any short- or long-term adverse health effects to occur among the general public as a result of exposure to the proposed emissions. More detailed information regarding the modeling analysis may be found in the TCEQ memorandum dated November 29, 2018. The results are summarized below.

Project-Related Modeling Results for State Property Line

Pollutant	Averaging Time	GLCmax (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	10	20.42
H_2S	1-hr	0.7	2.16
H_2S	1-hr	3.15	3.24

For above the applicant did not provide sufficient justification for the GLCmax for the non-industrial standard for H_2S. The ADMT reviewed all GLCmax in non-industrial areas and added previously modeled project-wide and site-wide H_2S impacts for this permit and determined that predicted concentrations are below the non-industrial State Property Line standard of 108 µg/m^3.

Modeling Results for Minor NSR De Minimis

Pollutant	Averaging Time	GLCmax (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	10	7.8
SO_2	3-hr	9	25
SO_2	24-hr	4.9	5
SO_2	Annual	0.1	1
PM_{10}	24-hr	1	5
$PM_{2.5}$	24-hr	0.6	1.2
$PM_{2.5}$	Annual	0.02	0.2
NO_2	1-hr	3	7.5

NO_2	Annual	0.1	1
CO	1-hr	5	2000
CO	8-hr	4	500

Additional review was required for 1-hr SO_2.

Total Concentrations for Minor NSR NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Conc. = [Background + GLCmax] ($\mu g/m^3$)	Standard ($\mu g/m^3$)
SO_2	1-hr	62	8	70	196

For above the GLCmax for 1-hr SO_2 is based on the highest five-year average of the maximum predicted concentrations determined for each receptor. The GLCmax for all other pollutants and averaging times are the maximum predicted concentrations associated with one year of meteorological data.

Emissions of Crude Oil/Crude Condensate were first subjected to MERA analysis. The applicant conducted modeling to generate unit impacts for each applicable source. The result of this review indicated that site wide modeling was required. The summary results from site wide modeling are presented below. For below, GLCni refers to Ground Level Concentration at non-industrial locations.

Minor NSR Site-wide Modeling Results for Health Effects for Crude Oil / Condensate

Pollutant & CAS#	Averaging Time	GLCmax ($\mu g/m^3$)	GLCmax Location	GLCni ($\mu g/m^3$)	GLCni Location	ESL ($\mu g/m^3$)
Crude Oil/Crude Condensate 64741-47-5	1-hr	7261	Property Line	968	1296m W	3500

Minor NSR Hours of Exceedance for Health Effects

Pollutant	Averaging Time	2 X ESL GLCmax
Crude Oil/Crude Condensate	1-hr	1

Per Appendix D of APDG 5874, revised 03/18, a Tier II analysis is required for the above results. Per Tier II since GLCmax <= 2 x ESL on industrial property and GLCni < ESL on nonindustrial property the impacts are acceptable.

Permit Concurrence and Related Authorization Actions

Is the applicant in agreement with special conditions?	**Yes**
Company representative(s):	**Mita Upadhyay**
Contacted Via:	**email**
Date of contact:	**December 4, 2018**
Other permit(s) or permits by rule affected by this action:	**Yes**

List permit and/or PBR number(s) and actions required or taken:	**Void PBR No. 136465. It has previously been consolidated with this permit.** **Void PBR Registration No. 124323. It is consolidated with issuance of this permit.** **Void PBR Registration No. 147189. It is consolidated with issuance of this permit.** **Amend PBR Registration No. 107625 to account for increased MSS emissions resulting from this project.**

Michael Cheek	1/25/2019		1/25/2019
Project Reviewer Michael Cheek, P.E.	Date	Section Manager Samuel Short	Date

TCEQ DOCKET NO. 2022-1541-AIR

APPLICATION OF FLINT HILLS RESOURCES INGLESIDE LLC, INGLESIDE MARINE TERMINAL TO AMEND AIR QUALITY PERMIT NO. 6606	§ § § § § §	**BEFORE THE** **TEXAS COMMISSION ON** **ENVIRONMENTAL QUALITY**

FLINT HILLS RESOURCES INGLESIDE LLC
RESPONSE TO MOTION TO OVERTURN

Exhibit I

Permit Amendment
Source Analysis & Technical Review

FHR's Exhibit I

Company	**Flint Hills Resources LLC**	Permit Number	**6606**
City	**Ingleside**	Project Number	**327436**
County	**San Patricio**	Regulated Entity Number	**RN100222744**
Project Type	**Amendment**	Customer Reference Number	**CN605721935**
Project Reviewer	**Miranda Duncan, Will Gao**	Received Date	**April 7, 2021**
Site Name	**Ingleside Marine Terminal**		

Project Overview

Flint Hills Resources Ingleside, LLC (FHR) owns and operates a marine terminal handling crude oil and condensate in Ingleside, Texas. Flint Hills proposed as-built changes to the original permit amendment application dated January 2019 (TCEQ Project Number No. 284633) for the Expansion Project to include: crude oil annual throughput increases, calculation and wording corrections, and the incorporation of Permit by Rule (PBR) Numbers (Nos) 160536 and 161793. In addition to as-built corrections to the Expansion Project, Flint Hills proposed to increase the total combined annual throughput of the barge and ship loading of crude oil and stabilized condensate.

Emission Summary

Air Contaminant	Current Allowable Emission Rates (tpy)	Proposed Allowable Emission Rates (tpy)	Change in Allowable Emission Rates (tpy)	Retrospective Project Changes at Major Sources (Baseline Actual to Allowable)[1]	Prospective Project Changes at Major Sources (Baseline Actual to Allowable)[2]
PM	6.34	8.54	2.20	*	2.20
PM_{10}	6.34	8.54	2.20	*	2.20
$PM_{2.5}$	6.34	8.54	2.20	*	2.20
VOC	133.78	105.60	-28.18	38.96	34.54
NO_X	19.80	26.56	6.76	*	6.76
CO	25.28	34.09	8.81	*	8.81
SO_2	35.42	38.12	2.70	*	38.10
H_2S	1.24	1.16	-0.08	0.27	0.22

[1] Retrospective changes were as-built changes to the January 2019 Expansion Project (TCEQ Project Number No. 284633).
[2] Prospective changes refer to new changes proposed by current project 327436.
*Flint Hills only updated project emission increases for H_2S and VOC. The project emission increases for the other pollutants did not change.

Compliance History Evaluation - 30 TAC Chapter 60 Rules

A compliance history report was reviewed on:	September 13, 2022
Site rating & classification:	0.18 / Satisfactory
Company rating & classification:	0.18 / Satisfactory
Has the permit changed on the basis of the compliance history or rating?	No
Did the Regional Office have any comments? If so, explain.	N/A

Public Notice Information

Requirement	Date
Legislator letters mailed	4/9/2021

Permit Amendment
Source Analysis & Technical Review

Date 1st notice published	4/29/2021
Publication Name: Corpus Christi Caller Times	
Pollutants: carbon monoxide, hydrogen sulfide, nitrogen oxides, organic compounds, particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less and sulfur dioxide.	
Date 1st notice Alternate Language published	5/4/2021
Publication Name (Alternate Language): La Prensa Comunidad	
1st public notice tearsheet(s) received	5/4/2021
1st public notice affidavit(s) received	5/4/2021
1st public notice certification of sign posting/application availability received	6/9/2021
SB709 Notification mailed	1/14/2022
Date 2nd notice published	3/31/2022
Publication Name: Corpus Christi Caller Times	
Pollutants: hazardous air pollutants, carbon monoxide, hydrogen sulfide, nitrogen oxides, organic compounds, particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less and sulfur dioxide.	
Date 2nd notice published (Alternate Language)	3/29/2022
Publication Name (Alternate Language): La Prensa Comunidad	
2nd public notice tearsheet(s) received	4/5/2022
2nd public notice affidavit(s) received	4/5/2022
2nd public notice certification of sign posting/application availability received	5/3/2022

Public Interest

Number of comments received	36
Number of meeting requests received	69
Number of hearing requests received	10
Date meeting held	7/14/2022
Date response to comments filed with OCC	10/10/2022
Date of SOAH hearing	N/A, none of the public hearing requests were submitted in a timely manner.

Federal Rules Applicability

Permit Amendment
Source Analysis & Technical Review

Requirement		
Subject to NSPS?		**Yes**
Subparts	A, Ka & Kb	
Subject to NESHAP?		**Yes**
Subparts	A & M	
Subject to NESHAP (MACT) for source categories?		**Yes**
Subparts	A & Y	

Nonattainment review applicability:
Ingleside Terminal is located in San Patricio, which is in attainment for all pollutants. A nonattainment review is not required.

PSD review applicability:
Ingleside Terminal is an existing PSD named major source. The site is anticipating emitting PM, PM_{10}, $PM_{2.5}$, NO_x, CO and SO_2 and performed a retrospective analysis for the 2019 project (284633) which increased crude oil annual throughput, added three new vapor combustors while removing an older combustor, and added six new tanks, and a prospective analysis of the current project that authorized the increased annual throughput of marine loading docks and increased hourly throughput to storage tanks and marine loading docks.

Retrospective updates for project 284633 account for increased fugitive emissions but a decrease in storage tank emissions due to permitted tanks not being constructed.

	VOC (tpy)	H2S
Project Increases	38.96	0.27
PSD Significant Threshold	40	10
Increases after Netting	N/A	N/A
PSD review Required	No	No

Below are the project emission increases for the current project. An incremental analysis was used to calculate the VOC emissions from affected storage tanks to account for the potential of increased emissions due to this project authorizing increased marine loading throughput.

	VOC (tpy)	NO_x (tpy)	CO (tpy)	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	H2S
Project Increases	34.54	6.76	8.81	2.20	2.20	2.20	38.10	0.22
PSD Significant Threshold	40	40	100	25	15	10	40	10
Increases after Netting	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PSD review Required	No	No	No	No	No	No	No	No

As indicated above, all criteria pollutants' emission increases are below the PSD significant thresholds. Therefore, netting is not triggered, and a PSD review is not required for either the retrospective or prospective project changes.

Title V Applicability - 30 TAC Chapter 122 Rules

Requirement

Title V applicability:
The site is subject to Title V 3454.

Periodic Monitoring (PM) applicability:
The site is subject to Title V; therefore, subjected to PM. The PM for the affected facilities is as follows:

- Monthly storage tank visual inspections,
- Storage tanks hydrogen sulfide (H_2S) sampling twice monthly and once annually,
- Monthly marine loading and storage tanks throughput recordkeeping,
- Rolling 12-month H_2S concentration average for marine vessel and storage tank loading,
- Marine vessel leak check once every 12-month period,
- Marine vessels and MVCUs audio, visual, and olfactory (AVO) checks for leaks once every 8-hours,
- 28VHP LDAR fugitive monitoring.

Compliance Assurance Monitoring (CAM) applicability:
The site is subject to Title V; therefore, CAM for affected marine loading vapor combustion units (MVCUs) includes firebox temperature monitoring to meet a minimum operating temperature and monitoring quality assurance requirements.

Process Description

The terminal receives and stores several products via pipeline and/or the marine loading docks (emission point number [EPN] DOCK). The material is store in the storage tanks until sent off to the customer. The product is sent off by pipeline or marine vessels. Marine loading is controlled by one of three MVCUs (EPNs MVCU1, MVCU2 and MVCU3).

Project Scope

The following changes are being made as part of this amendment:

- Correct tank calculations,
- Remove storage tanks 28063, 28064, 28070, 28091, 28092 (EPN TK-28063, TK-28064, TK-28070, TK-28091 and TK-28092),

- Increase hourly throughput to storage tanks and marine loading docks,
- Increase annual throughput to marine loading docks,
- Correct the number of new fugitive piping components,
- Implement 28VHP LDAR monitoring program,
- Add existing SO_2 emissions at the MVCUs, and
- Update annual averaging H_2S crude oil and condensate concentration authorizations.

Below are the changes to Permit 6606's Special Conditions associated with the project:

Item No.	Current CND	Draft CND	Draft Changes
1	2	2	Removed storage tanks numbers 28063 and 28064 federal applicability. The storage tanks are being taking out of service.
2	3	3	Removed storage tanks numbers 28091 and 28092 federal applicability. The storage tanks are being taking out of service.
3	6	6	Update rate verbiage and include storage tanks' H_2S American Petroleum Institute (API) gravity stipulation. API gravity is associated with vaporization rate of the crude oil (and condensate) so H_2S sampling is associated with API gravity. The site receives standardized crude oil with very little variation in H_2S concentration. Multiple tests for the same crude oil are unnecessary so the language was updated to define when testing is required. Authorized alternative compliance demonstration for tanks' change of service.
4	7	7	Updated marine loading throughput from 138 million to 187 million and reduce H_2S liquid concentration from 19 part per million by weight (ppmw) to 15 ppmw.
5	14	14	Stipulated flanged connection exception for flanges required for MSS activities.
6	18	18	Removed storage tanks 28063, 28064 and 28070 from projected actual emissions. The storage tanks are being taking out of service. Added storage tank 28070R to the list for the actual emissions.
7	--	21	Added 28 VHP fugitives LDAR program.
8	Att. A	Att. A	Updated storage tanks 28087-28090 maximum hourly fill/withdraw rate and removed storage tanks 28091 and 28092.

Best Available Control Technology

Source Name	**EPN**	**Best Available Control Technology Description**
IFR Storage Tanks	TK-28067, TK-28070R & TK-28077	Equipped with a mechanical seal primary seal and rime mounted secondary seal. The exterior surfaces are uninsulated and painted white. Material stored is less than 11.0 pound per square inch atmosphere (psia).
EFR Storage Tanks	TK-28068, TK-28069, TK-28071, TK-28072, TK-28073, TK-28074, TK-28075, TK-28076, TK-28080 & TK-28066	Equipped with a mechanical shoe primary seal and rim mounted secondary seal, and gasketed slotted guide poles with floats, pole wipers and pole sleeves. The exterior surfaces are uninsulated and painted white. Material stored is less than 11.0 psia.
Marine VCU	MVCU1-3	The VCUs meet a 99.9-percent VOC destruction efficiency control (DRE). The site maintains maintain good combustion practices including monitoring the combustion chamber

		temperature and perform an initial operation stack test. H_2S, SO_2 and particulate matter emissions are minimizing through limiting H_2S concentration of the crude oil feed upstream and using pipeline-quality natural gas fuel (5 grains of sulfur/100dscf).
Ships	DOCK	99-percent capture efficiency. Route to MVCUs when loading VOC with a true vapor pressure (TVP) of 0.5 psia. Vessels are required to pass annual vapor tightness test and adhere to AVO checks and monitoring requirements per *Marine Terminal Guidance* dated September 21, 2021.
Barges		100-percent capture efficiency with vacuum. Route to MVCUs when loading VOC with a true vapor pressure (TVP) of 0.5 psia. Vessels are required to pass annual vapor tightness test and adhere to AVO checks and monitoring requirements per *Marine Terminal Guidance* dated September 21, 2021.
Fugitives	FUG-1	Adhere 28VHP LDAR.

Permits Incorporation

Permit by Rule (PBR) / Standard Permit / Permit Nos.	Description (include affected EPNs)	Action (Reference / Consolidate / Void)
160536	**Fugitives increase**	**Consolidate and void**
161793	**Storage tank 28070R authorization**	**Consolidate and void**

Impacts Evaluation

Was modeling conducted? **Yes** Type of Modeling: **AERMOD**

Is the site within 3,000 feet of any school? **No**

Additional site/land use information: The local area near the site is a mixture of industrial and non-industrial land and waterways. The site is nestled between two other terminals site. However, adjacent Farm-to-Market (FM) road 1069 is considered a transient receptor. The nearest non-industrial receptor is a grass median near the east property line. Northwest of the Flint Hills' and the other two terminals' is undeveloped non-industrial land. Immediately south is an industrial waterway and not restricted to the public.

Flint Hills performed an impacts demonstration to determine if the National Ambient Air Quality Standards (NAAQS) would be exceeded from the emission increases, which was audited by the TCEQ ADMT. The air quality analysis is acceptable for all review types and pollutants. More detailed information regarding the air quality analysis may be found in the ADMT modelling memo, ADMT Project No. 7587, dated November 12, 2021. The applicant evaluated criteria pollutants CO, NO_x (modeled as NO_2), SO_2, H_2S, PM_{10}, and $PM_{2.5}$, and crude oil for the NAAQS and state health effect analysis. The NAAQS and Modeling Effects Review Applicability (MERA) evaluations as follows:

State Property Line and NAAQS Analysis

Flint Hills evaluated 1-hr state property line for SO_2 and H_2S listed in the table below:

Table 1. Project-related Modeling Results for State Property Line.

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$)	De Minimis ($\mu g/m^3$)

SO_2	1-hr	0.5	20.42

Table 2. Site-wide Modeling Results for State Property Line.

Pollutant	Averaging Time	Project GLCmax ($\mu g/m^3$)	Previous GLCmax ($\mu g/m^3$)	Total GLCmax ($\mu g/m^3$)	Standard ($\mu g/m^3$)
H_2S	1-hr	5	24	29	106

As demonstrated from the tables above, H_2S and SO_2 are below the de-minimis and property-line standard.

Flint Hills also performed an evaluation on 1-hr and 3-hr averaging time for SO_2, and annual averaging time for $PM_{2.5}$ and NO_x (modeled as NO_2). The results are in the table below:

Table 3. Modeling Results for Minor NSR De-minimis.

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$)	De Minimis ($\mu g/m^3$)
SO_2	1-hr	0.50	7.8
SO_2	3-hr	0.30	25
$PM_{2.5}$	Annual	0.006	0.2
NO_2	Annual	0.02	1

The table above shows that for all the pollutants concentration evaluated are below the de-minimis standard. The concentrations of all criteria pollutants evaluated are deemed acceptable.

MERA and Health Impacts
Distillates (petroleum) (as known as crude oil) was evaluated for health impacts. The results for distillates are below:

Table 4. Health Impacts Analysis - Site Wide Modeling Results.

Pollutant & CAS#	Averaging Time	ESL ($\mu g/m^3$)	GLCmax ($\mu g/m^3$)	GLCni ($\mu g/m^3$)	Modeling and Effects Review Applicability (MERA) Step in Which Pollutant Screened Out
Distillates (petroleum), crude oil	1-hr	3500	7108	5583	Step 7 – Site-wide modeling
	Annual	350	30	30	

FHR's Exhibit I

Permit Amendment
Source Analysis & Technical Review

The annual distillate predicted concentration was below the annual ESL but the 1-hr averaging time demonstrated that the industrial and non-industrial ground level concentration (GLC) exceed the short-term ESL. Air Division Modeling Team provided the exceedance for the health effects below:

The exceedances are over the Toxicology Tier II analysis and a toxicology review was requested for the 1-hr averaging period for distillates. The exceedances and operational limitations were evaluated by the Toxicology Division (TD) and found to have no anticipated short- or long-term adverse health effects in the memorandum dated February 3, 2022. The TCEQ does not anticipate any health impacts from this project.

	10/10/2022		10/10/2022
Project Reviewer Will Gao	Date	Team Leader Samuel Harris	Date