UTAH DEPARTMENT OF
ENVIRONMENTAL QUALITY

MAY - 3 2017

DIVISION OF AIR QUALITY

May 3, 2017

TESORO

Tesoro Refining & Marketing Company LLC
474 West 900 North
Salt Lake City, UT 84103

Marty Gray, Manager New Source Review Permits
Utah Division of Air Quality (UDAQ)
195 North 1950 West
P.O. Box 144820
Salt Lake City, Utah 84114-4820

JC
CK # 2016947 2300.00

Hand-Delivered

RE: Tesoro Salt Lake City Refinery Tier 3 Gasoline Compliance Project NOI Submittal

Dear Mr. Gray:

Enclosed please find a Notice of Intent (NOI) application for modifications to achieve compliance with the United States Environmental Protection Agency's (EPA's) Tier 3 gasoline sulfur regulations. This project will occur at the Tesoro Refining & Market Company LLC's (Tesoro's) Salt Lake City (SLC) Refinery which operates under Approval Order (AO) DAQE-AN103350071-16 and DAQE-AN0103350042-08.

Also included is a check for $2,300 which covers the filing fee and the base fee (Existing Major Source with Minor Modification) for the NOI application.

Tesoro requests that UDAQ prioritize this application over the pending NOI application for the refinery previously submitted to UDAQ.

If you have any questions in regards to this application, please do not hesitate to contact Michelle Bujdoso of my staff at 801-366-2036.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

Respectfully,

Karma M. Thomson

Karma M. Thomson
Vice President, Tesoro Salt Lake City Refinery

Document Date: 05/03/2017
DAQ-2017-006101

Enclosures

Tier 3 Gasoline Compliance Project

Notice of Intent for an Approval Order

Prepared for
Tesoro Refining & Marketing Company LLC
Salt Lake City Refinery

TESORO

May 2017

BARR

Tier 3 Gasoline Compliance Project

Notice of Intent for an Approval Order

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Tesoro Refining & Marketing Company LLC
Salt Lake City Refinery

TESORO

May 2017

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Tier 3 Gasoline Compliance Project

May 2017

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1.0 Introduction

This Notice of Intent (NOI) application is submitted for approval of investments at the Tesoro Refining & Marketing Company LLC (Tesoro) Salt Lake City (SLC) Refinery to achieve compliance with the United States Environmental Protection Agency's (EPA's) Tier 3 gasoline sulfur regulations. The EPA's Tier 3 gasoline sulfur regulations targets improvements in ambient air quality from vehicles using the gasoline. The Tier 3 program sets new vehicle emissions standards and lowers the sulfur content of gasoline, considering the vehicle and its fuel as an integrated system. The gasoline sulfur standard makes emission-control systems more effective for both existing and new vehicles, and enables more stringent vehicle-emissions standards. Removing sulfur in the gasoline allows a vehicle's catalyst to work more efficiently. Lower-sulfur gasoline also facilitates the development of some lower-cost technologies to improve fuel economy and cut GHG emissions. The vehicle-emission standards, combined with the proposed reduction of gasoline sulfur content, will reduce motor vehicle emissions, including oxides of nitrogen (NOx), volatile organic compounds (VOCs), particulate matter less than 2.5 microns ($PM_{2.5}$), carbon monoxide (CO), and air toxics. In the spring of 2014, Tesoro's SLC Refinery voluntarily committed to Utah Governor Gary Herbert to produce and sell Tier 3 gasoline in Utah by end of 2019 to help improve air quality in the region.

The SLC Refinery currently operates under multiple Approval Orders (AOs), of which DAQE-AN0103350071-16 and DAQE-AN0103350042-08 are affected by this application. The SLC Refinery is situated on 236 acres in Salt Lake County, approximately 1.5 miles north of Salt Lake City.

Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) regulatory applicability analyses have been conducted for the Tier 3 Gasoline Compliance Project (Project) pursuant to Rules R307-403 and R307-405 of the Utah Administrative Code. Tesoro has calculated the increase in emissions of each regulated New Source Review (NSR) pollutant emitted by sources impacted by this project. The resulting emissions increase is less than the significant emissions rate for all PSD pollutants; therefore, the Project is not subject to federal NSR requirements as provided in Utah's State Implementation Plan (SIP).

Rule R307-401-3(b) requires submittal of an NOI to "make modifications or relocate an existing installation which will or might reasonably expected to increase the amount or change the effect of, or the character of, air contaminants discharged, so that such installation may be expected to become a source or indirect source of air pollution." The project involves modifications at an existing installation that are expected to increase the amount of air contaminants discharged. Rule R307-401-5 requires that the NOI must contain specific information related to the process, nature of emissions, control device(s), and regulatory applicability and compliance. This NOI includes a project description, an emissions summary, and a description of regulatory applicability and demonstration of compliance to address these requirements.

This NOI is organized as follows:

- Section 2.0 contains a project description,
- Section 3.0 contains the emissions summary,
- Section 4.0 contains a description of regulatory applicability and compliance demonstration,
- Section 5.0 through 8.0 contains a best achievable control technology (BACT) analysis,
- Section 9.0 contains a summary of the NOI requirements,
- Attachment A contains a site diagram,
- Attachment B contains the project emission calculations,
- Attachment C contains applicable UDAQ NOI forms and the NOI checklist.

2.0 Project Scope

This section includes a general description of the facility and details of the proposed Project.

2.1 General Facility Information

The Tesoro Salt Lake City Refinery is located at 474 West 900 North, Salt Lake City, Utah. The refinery is located in a nonattainment area for $PM_{2.5}$ (including precursors SO_2, NO_x, and VOC)[1], PM_{10} (including precursors SO_2 and NO_x)[2], and SO_2. The area is also a designated maintenance area for ozone (VOC and NO_x) and CO. Attachment A includes a figure that shows the location of the refinery in Salt Lake City.

2.2 Project Overview

Tesoro proposes to reduce the net sulfur content of its gasoline products, of which the gasoline provided to Utah markets produced at the SLC Refinery will be less than 10 ppm sulfur. To achieve the sulfur reductions, Tesoro plans to complete the following:

- Modify the existing Gasoline Hydrotreater Unit (GHT) to lower the sulfur content in the GHT product.
- Add an additional larger pump within the existing Alkylation Unit to help maintain octane balance within the refinery.
- Add vapor recovery equipment at the blending component loading rack (BCLR).
- Modify piping and pumps associated with the BCLR and for gasoline blending to produce 10 ppm Utah gasoline and to support shipping up to 3 rail cars of Debutanized Atmospheric Naphtha (DAN) per day from the BCLR.
- Install two new storage tanks to contain heavy cat naphtha (HCN) and gasoline in the refinery's tank farm.
- Use sulfur removal additive in the Fluidized Catalytic Cracking Unit (FCCU) to lower FCC naphtha sulfur.

The proposed new equipment and physical modifications are described in Section 2.3. An analysis of non-modified emission units affected by the Project is described in Section 2.4, and emission units not affected by the Project are described in Section 2.5. The affected units in the emissions-increase analysis for PSD applicability are summarized in Section 2.6. Finally, the project schedule is described in Section 2.7.

2.3 Proposed New Equipment and Physical Modifications

The major elements of the Project are described in the sub-sections below.

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[1] Utah $PM_{2.5}$ Nonattainment Provisions for Salt Lake County, Section IX.A.21, December 3, 2014.

[2] Utah PM_{10} Maintenance Provisions for Salt Lake County, Section IX.A.10, July 6, 2005.

2.3.1 Gasoline Hydrotreater Unit (GHT) Modifications

Tesoro is currently capable of processing 10,600 BPD of HCN from the FCCU. The GHT utilizes catalytic reactions to reduce the sulfur content of the HCN currently from 500 ppmw to 40 ppmw. The proposed modifications at the GHT will increase the feed rate to a nominal capacity of 12,000 BPD and treat the feed to 15 ppmw sulfur. The nominal 12,000 BPD feed will be comprised of 8,000 BPD of HCN through the existing line from the FCCU and 4,000 BPD of light straight run naphtha (LSR) from a new feed line from the Ultraformer (UFU) Pre-Fractionator column overhead. There are no modifications to the existing HCN feed line from the FCCU as part of the Project.

The combined feed will be routed to the reactor charge heat train which will consist of new exchangers and the existing Charge Heater, F-701. The combined feed will be fed to a new GHT reactor vessel, which replaces the existing reactor vessel, and catalyzed to reduce the sulfur content of the effluent product. The effluent will be routed through new exchangers to be cooled before entering the existing separator, stabilizer, and heat exchangers.

New emissions sources associated with the Project include new component equipment in VOC/HAP service, and new emissions resulting from intermittent maintenance activities of the new equipment. Charge Heater F-701 will not be modified but will be affected by the Project. These emission units are described in Section 3.2.

2.3.2 Alkylation Unit Modifications

Tesoro expects with the GHT Unit modifications, octane destruction will occur at the refinery. Therefore, to maintain octane balance within the refinery, Tesoro can improve octane yields by increasing alkylate blended in the gasoline product. Tesoro proposes to install a larger spare isobutane recycle pump in the Alkylation (commonly referred to as Alky) Unit to produce the required alkylate for octane balance.

Tesoro currently produces excess olefins which are not consumed within the refinery and shipped outside of the refinery. Tesoro proposes to route the excess olefin stream to the Alky Unit for processing. The new spare pump could result in up to an additional 800 BPD of alkylate production, which will be stored in storage tank, T-331, and then blended in the gasoline product at the BCLR.

New emission sources associated with the Project include new component equipment in VOC/HAP service and increased throughput of products in T-331 and at the BCLR, which are discussed in more detail in Section 3.2.

2.3.3 Additional Equipment at the Vapor Recovery Unit (VRU) at the Blending Component Loading Rack (BCLR)

The existing BCLR allows for the refinery to load gasoline blending products into railcars for off-site distribution. Products currently capable of being loaded include a variety of gasoline blending components such as ultraformate, alkylate, and LSR.

Gasoline products and blending components are produced within the refinery, blended, and distributed to storage tanks prior to loading into railcars. Pumps transfer the material from the tanks into railcars through loading arms. The vapors displaced during loading are recovered using a vapor return hose connecting the railcar tank to the vapor collection system, where the collected vapors are directed to a VRU comprised of a pressure swing adsorption process with two activated carbon bed vessels used one at a time.

Tesoro is proposing to install emission control equipment at the VRU to provide improved reliability. The new equipment will function as a partial spare for the existing VRU, where the existing carbon beds, knockout pot, and continuous emissions monitoring system (CEMS) analyzer is common to the new and existing equipment. These changes will not result in an emissions increase.

2.3.4 New DAN Loadout and Gasoline Blending Equipment at Refinery Tank Farm and Blending Component Loading Rack

The BCLR is currently capable of loading 1,800 BPD of DAN, however, it is not capable of sustained operation at this capacity and simultaneously unloading toluene. Tesoro typically operates at 665 BPD of DAN three days a week. The additional equipment at the VRU will support sustained operation at this capacity. Currently the refinery ships out one rail car of DAN three times per week, and toluene is unloaded three times per week at a rate of 220 BPH.

Tesoro is proposing to ship up to 3 rail cars of DAN per day following completion of the Project. Shipment of DAN is necessary to achieve blending specifications for Tier 3 gasoline standards for Utah markets. DAN is currently stored in storage tank, T-328, and DAN can be transferred from T-328 to storage tanks, T-307 or T-308 or the gasoline blending header by the DAN blending pumps. Tesoro proposes to add two DAN rail loading pumps at the outlet of T-328 to pump DAN through a new dedicated header directly to the BCLR to fill two rail cars simultaneously. The new pumps on the outlet of the tank will not impact the actual or maximum throughput through the tank because no additional DAN will be produced and DAN from T-328 would have otherwise been directed to T-307 or T-308 or gasoline blending. However, there will be increased loading of DAN at the BCLR. The emissions resulting from the increase in DAN throughput at the BCLR is discussed in Section 3.2.3.

Alkylate, a low-sulfur, high-octane product is currently stored in storage tank, T-331. The increased alkylate production can allow Tesoro to manage the amount of DAN shipped from the refinery because the alkylate balance with sulfur and octane.

Tesoro is proposing replacement of blending pumps and piping in the refinery tank farm and at the BCLR to increase blending rates of LCN, HCN and alkylate. Increased blending rates are needed to produce 10 ppm Utah gasoline. No increase in annual production or shipping of these products is anticipated.

2.3.5 New Storage Tanks

Tesoro proposes to install a new 60,000 barrel HCN storage tank in the refinery's tank farm and blending pumps. The two new HCN blending pumps on the outlet of the tank will direct HCN to gasoline blending.

The new storage tank increases overall HCN storage capacity at the refinery, but will not result in an overall increase in HCN production.

Additionally, Tesoro proposes to install a new 80,000 barrel gasoline storage tank in the refinery's tank farm as part of the Project to help with the needed blending associated with the Project.

The new tanks' emissions are described in Section 3.2.7.

2.3.6 Fluidized Catalytic Cracking Unit

To achieve lower sulfur content in LCN routed to gasoline blending, Tesoro may use a sulfur removal additive to reduce FCC naphtha sulfur. Tesoro has completed a trial to determine the level of sulfur removal achieved by the additive. The sulfur will be diverted to the HCN and LSR streams for treatment in the GHT. This removal additive will not affect the production or emission rates of the FCCU. A hopper and metering equipment may be installed to support usage of the additive. Tesoro will continue to operate the FCCU in a manner consistent with historical operations. Therefore, the FCCU will not be considered an affected unit by this Project.

2.4 Review of Non-Modified Emission Units Affected by Project

Tesoro reviewed the changes described in Section 2.2 to assess their potential to cause an emissions increase at existing non-modified emission units, which would result in the existing equipment being considered "affected units." Tesoro predicted the impacts of these changes by using process modeling software, the refinery's linear programming (LP) model, and subsequent engineering analyses to determine whether the simulated impacts could actually occur.

To support this permit action, Tesoro employed a refinery process model that looks at a pre-project scenario and a future (post–project) scenario in which the Project has been completed. Tesoro determined whether or not non-modified emission units would be affected by this permit action by comparing the pre-project and future post-project scenarios. The only affected non-modified process units is the Sulfur Recovery Unit (SRU), described below. The unaffected units are described in Section 2.5.

2.4.1 Sulfur Recovery Unit

The SRU complex reduces sulfur emissions from refinery processes by removing hydrogen sulfide (H_2S) from the refinery sour water and sour fuel gas systems and converting it into elemental sulfur. Through desulfurizing and hydrotreating reactions in the refinery, sulfur compounds are separated from the product streams and converted to H_2S, which is absorbed from product streams by an aqueous amine solution using amine absorber columns. The rich amine, which is an amine solution that contains the chemically-bound H_2S, is circulated from multiple locations within the refinery to the Amine Unit as part of a closed-loop process.

The GHT modifications and corresponding increased throughput will result in an increase of H_2S routed to the SRU and resulting elemental sulfur production. No physical changes or changes in the method of operation at the SRU will occur. The Project will result in increased actual emissions from the SRU.

2.4.2 Cogeneration Unit Heat Recovery Steam Generator (HRSG) System

Tesoro operates parallel Cogeneration systems (B-930 East and B-940 West). Each consists of a turbine train that burns both natural gas and refinery fuel gas to generate electricity for the refinery and regional power grid; natural gas serves as the primary fuel for the combustion turbines, while supplemental refinery fuel gas (referred to as SRU Sweet Gas) consists of up to 30 percent of the mixture. The train is equipped with a fuel gas-fired Heat Recovery Steam Generator (HRSG). This system recovers usable heat from the turbine and fires additional refinery fuel gas to create high-pressure steam for the refinery.

The Project will result in additional steam to be produced by the Cogeneration HRSGs. No physical changes or changes in the method of operation at the Cogeneration units will occur. The Project will result in an increase of actual emissions.

2.5 Summary of Units Not Affected by Project

Tesoro determined that the process units not addressed in Section 2.4 and non-process infrastructure equipment will not be affected by the Project. A summary of this evaluation is as follows:

- The Project does not require any changes, nor does the Project result in feed rate increases or additional emissions at any process units in the refinery other than the GHT, Alky, BCLR, Cogeneration Unit HRSG, and SRU as described above. The increased feed at the GHT is supplied by rerouting of a UFU Pre-Fractionator overhead line to the GHT.
- Cooling Water Towers (CWTs): There is no expected increase in the recirculation rate of each CWT. Therefore, the CWTs are unaffected by the Project.
- Refinery Fuel Gas System: There is no expected increase in the production or consumption of refinery fuel gas (RFG). Therefore, the RFG system is unaffected by the Project.
- Flare System: The only direct venting is from blowing down the new GHT reactor vessel to the flare will be during planned maintenance events. Venting from the new equipment to the flare system will not occur during normal operations due to the use of a flare gas recovery system at the refinery.
- Wastewater Treatment Plant (WWTP): There is no expected increase in the wastewater directed to the treatment plant. Therefore, the WWTP is unaffected by the Project.
- Stationary Diesel Engines: The Project will not result in any increased use of the existing stationary diesel engines and no new diesel engines will be installed.
- Haul Road Truck Traffic: The Project will not result in any increases in truck traffic.

2.6 Summary of New and Affected Existing Emission Units

Table 2-1 summarizes the new units and affected non-modified units as a result of the proposed Project.

Table 2-1 Summary of New, Modified, and Non-Modified Affected Emission Units

	Emission Unit/Fugitive Source Description	EU ID
New/Modified Units	Intermittent GHT Maintenance Activities	N/A
	New Equipment in VOC Service at the Existing GHT	N/A
	New Equipment in VOC Service at the BCLR and Refinery Tank Farm	N/A
	New Equipment in VOC Service at the Existing Alkylation Unit	N/A
	New HCN Storage Tank	T-248
	New Gasoline Storage Tank	T-205
Non-Modified Project-Related Existing Units	GHT Charge Heater F-701	F-701
	DAN Loading	BCLR
	Alkylate Loading	BCLR
	Cogeneration Unit HRSG	B-930/B-940
	Sulfur Recovery Unit	SRU
	Alkylate Tank T-331	T-331

2.7 Project Schedule

It is estimated that construction of the Project will commence in 2018, contingent on air permit issuance. Construction is estimated to be completed by the end of 2019.

3.0 NSR Applicability Analysis

Utah rules implement the New Source Review (NSR) permitting program for major sources and major modifications. Rule R307-403 and R307-405 implement the federal Nonattainment New Source Review (NNSR) and Prevention of Significant Deterioration (PSD) preconstruction permitting programs, respectively. Tesoro is currently a major source as defined in Utah Rule R307-100 and in these federal permitting programs. Therefore, Tesoro has completed an applicability analysis to determine if this Project is a major modification as defined under Utah rules and the NSR permitting program.

The NSR pollutants are covered either by the PSD or NNSR permitting programs, but for purposes of determining applicability as a major modification, the significance thresholds are the same. For simplicity, Tesoro uses the PSD definitions to describe the applicability analysis. The PSD rules are incorporated by reference into the Utah rules. The applicability analysis therefore relies upon and references 40 CFR 52.21.

On June 23, 2014, the U.S. Supreme Court issued its decision in Utility Air Regulatory Group v. EPA. The Court held that EPA may not treat greenhouse gases (GHGs) as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The project does not trigger a PSD or NNSR permit as described below, therefore GHG is not a regulated pollutant and need not be further analyzed.

3.1 Emissions Increase Calculation Procedures

The first step in the major modification analysis is identification of physical changes or changes in the method of operation of the proposed projects. The next step is to determine the emissions increase from the modification (projects resulting in a physical change or change in method of operation). The total emissions increase is significant if it equals or exceeds the annual tons per year (tpy) thresholds known as the PSD significant emission rates, which are identified in §52.21(b)(23) and (b)(49)(iii), and summarized below in Table 3-1. The emission increase analysis is only required for those regulated NSR pollutants that are emitted in quantifiable amounts from emission units affected by the projects.

Table 3-1 NSR Significant Emission Rates

Pollutant[a]	Significant Emission Rate (tpy)
Particulate matter (PM)	25
Particulate matter less than 10 microns (PM_{10})	15
Particulate matter less than 2.5 microns ($PM_{2.5}$)[B]	10
Sulfur dioxide (SO_2)	40
Nitrogen oxides (NO_X)	40
Carbon monoxide (CO)	100
Ozone (O_3)	40 [C]
Sulfuric Acid Mist (H_2SO_4)	7
Greenhouse gases as carbon dioxide equivalents (CO_2e)	75,000 [D]

Note(s):

A Only those NSR pollutants that are emitted in quantifiable amounts from emission units affected by this project are shown in the table. Condensable particulate matter is included within the definition of PM, PM_{10}, and $PM_{2.5}$ as of January 1, 2011.

B The significant emission rate for direct $PM_{2.5}$ emissions is 10 tpy; additionally this includes 40 tpy of SO_2 emissions and/or 40 tpy of NO_X emissions unless they are demonstrated not to be a $PM_{2.5}$ precursor.

C The NSR significant emission rate is assessed based on emissions of volatile organic compounds (VOC).

D Greenhouse gases are defined as the aggregate group of six greenhouse gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. In accordance with 40 CFR 52.21(b)(49)(iv), greenhouse gases are subject to regulation for a project only if another regulated pollutant also triggers PSD. Because PSD is not being triggered with respect to this permit for other regulated pollutant(s), greenhouse gases are not subject to regulation with respect to the Project and are thus not considered further in this analysis.

Because the Project involves both new and existing emissions units, Tesoro used the "hybrid test" specified in §52.21(a)(2)(iv)(*f*):

> *"Hybrid test for projects that involve multiple types of emissions units. A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the emissions increases for each emissions unit, using the method specified in paragraphs (a)(2)(iv)(c) through (d) of this section as applicable with respect to each emissions unit, for each type of emissions unit equals or exceeds the significant amount for that pollutant (as defined in paragraph (b)(23) of this section)."*

The hybrid test refers to the use of two emissions increase calculation methods listed in paragraphs 40 CFR 52.21(a)(2)(iv)(c) and (d). These calculation methods are summarized as follows:

1. **Actual-to-Potential Test for New Emissions Units**: The emissions increase at a new emissions unit is equal to the difference between the potential to emit and baseline actual emissions, which prior to initial construction and operation are zero. See Section 3.1.1 for additional detail on this methodology.

2. **Actual-to-Projected-Actual Test for Existing Emissions Units**: The 2002 NSR Reform rules introduced a method of calculating the emissions increase at an existing emissions unit equal to the difference between baseline actual emissions and projected actual emissions. This test also

includes an option to use the potential-to-emit in lieu of projected actual emissions. See Section 3.1.1 for additional detail on this methodology.

3. **Project-related Potential Increase in Utilization at Non-modified Project-affected Units**: Non-modified project-affected units experiencing an emissions increase as a result of the Projects must be considered in the overall emissions increase calculation. These units are treated as existing emissions units, which allows for the calculation to be performed using the actual-to-projected-actual approach or an alternative method in which the source calculates the emissions increase as the product of the potential increase in throughput due to the Projects and an emissions factor representative of "worst-case" operations. See Section 3.1.2 for additional detail on this methodology.

The project emissions increase is calculated on a pollutant-by-pollutant basis as the sum of emissions increases from the new and existing emissions units that are affected by the proposed projects. If the projects' emissions increase for a regulated NSR pollutant is less than the significance threshold (as expressed on a tpy basis for a pollutant), PSD review is not required for that pollutant. If the emissions increase is more than the corresponding PSD significance threshold, a major source may proceed to evaluate contemporaneous emission increases and decreases for that pollutant (known as a "netting" analysis) or proceed directly to PSD review for that pollutant.

3.1.1 New and Existing Emissions Units: Actual-to-Potential Test

In §52.21(a)(2)(iv)(*d*), the actual-to-potential applicability test is described as the following:

> *"Actual-to-potential test for projects that only involve construction of a new emissions unit(s). A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the potential to emit (as defined in paragraph (b)(4) of this section) from each new emissions unit following completion of the project and the baseline actual emissions (as defined in paragraph (b)(48)(iii) of this section) of these units before the project equals or exceeds the significant amount for that pollutant (as defined in paragraph (b)(23) of this section)."*

The terms "new emissions unit," "baseline actual emissions" (BAE), and "potential to emit" as used in this paragraph have specific meanings ascribed by the applicable rules. A "new emissions unit" is any part of a stationary source that emits any regulated NSR pollutant and is or will be newly constructed and has existed for less than two years from the date the unit first began operating.[3] The BAE for a new emissions unit is zero prior to initial operation and is equal to the unit's potential to emit for the first two years of operation.[4] The BAE for existing units is described in Section 3.1.1.1. "Potential to emit" is defined as:[5]

> *"... [t]he maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including*

[3] 40 CFR §52.21(b)(7)(ii).

[4] 40 CFR §52.21(b)(48)(iii).

[5] 40 CFR §52.21(b)(4).

air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable..."

The potential to emit for an emissions unit yet to be constructed is generally calculated as the product of its hourly maximum throughput or heat-input capacity and a maximum-case emission factor, which may be found in EPA guidance (e.g., AP-42), a manufacturer performance guarantee, existing regulatory standards (e.g., NSPS), or other information sources. Enforceable emission limitations on the source's capacity to emit a pollutant (e.g., air-pollution-control equipment, restriction on hours of operation) may be taken to reduce the potential to emit.

3.1.1.1 Baseline Actual Emissions

"Baseline actual emissions" for an existing emissions unit are calculated as:[6]

"... [t]he average rate, in tons per year, at which the emissions unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 10-year period immediately preceding either the date the owner or operator begins actual construction of the project, or the date a complete permit application is received by the Administrator for a permit required under this section or by the reviewing authority for a permit required by a plan, whichever is earlier, except that the 10-year period shall not include any period earlier than November 15, 1990."

For baseline actual emissions, Tesoro has defined a 24-month baseline period specific to each NSR pollutant. Tesoro has considered emissions between January 1, 2015 and December 31, 2016, for all pollutants for its baseline emissions analysis. The 24-month baseline periods are chosen because they are considered the most representative of past and current capabilities of units being affected by this project for those pollutants (i.e., this time period is indicative of capabilities that exist today and could be utilized with variations in crude oil slate or intermediates). Refer to Attachment A for documentation of the baseline periods selected and the calculated baseline actual emissions.

As with projected actual emissions, baseline actual emissions shall include fugitive emissions and emissions associated with startups, shutdowns, and malfunctions.[7] The baseline emissions are adjusted downwards to remove non-compliant emissions that may have occurred during the 24-month baseline or emissions that would have exceeded a current emission limitation.[8]

3.1.2 Project-related Potential Increase in Utilization for Existing, Non-modified Units

EPA recognizes in its PSD rules that non-modified existing units experiencing an emissions increase as a result of the Projects (i.e., project-affected units) need to be considered in the overall emissions increase calculation.

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[6] 40 CFR §52.21(b)(48)(ii).

[7] 40 CFR 52.21(b)(48)(ii)(a).

[8] 40 CFR 52.21(b)(48)(ii)(b)-(c).

EPA Region 5 has described the approach to be taken in calculating emissions increases from non-modified project-affected units that will see increased utilization as a result of a new or modified unit. In a letter to the Wisconsin Department of Natural Resources regarding modifications at a refinery that would cause increased utilization of non-modified project-affected boilers, EPA stated:

> *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.*[9]

Conceptually, the potential increase in utilization calculation will yield an emissions increase that is equal to or greater than the increase calculated using the PAE approach given that the demand growth exclusion is applied to PAE and given that the potential increase in utilization methodology calculates the "worst case" increases rather than projecting actual emissions.

3.2 Project Emissions Calculations

Tesoro has identified in Table 2-1 the new and existing emissions units that are affected by the Project. Calculation of emissions from these emissions units are described in the subsections below. Tables detailing the emissions calculations for each of the project-affected units are contained in Attachment B.

Emissions of hazardous air pollutants (HAPs) are also described below for use in determining compliance with the Utah Administrative Code. Refer to Attachment B for detailed HAP emission calculations.

3.2.1 GHT Charge Heater F-701

The GHT Charge Heater F-701 is an existing emission unit that is not being modified, but is expected to experience an increase in utilization as the result of the Project. Tesoro has opted to use the actual-to-potential calculation methodology to determine the emissions increase for the heater.

The emissions resulting from fuel gas combustion in GHT Charge Heater F-701 are calculated as follows:

- NO_x emissions are based upon performance test results.
- SO_2 baseline actual emissions are calculated using measured fuel gas H_2S content. PTE is based on New Source Performance Standard (NSPS) Subpart Ja's H_2S fuel gas content limit of 60 ppm.
- CO, PM, PM_{10}, $PM_{2.5}$, VOC, and HAP emissions are calculated based on EPA's AP-42 emission factors for natural gas combustion for BAE and PTE.
- H_2SO_4 is calculated as 1.5% of SO_2 emissions consistent with the refinery Toxic Release Inventory (TRI) reporting.

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[9] February 24, 2005, Letter from Sam Portanova, EPA Region 5 to Steve Dunn of the Wisconsin Department of Natural Resources. *Accord* July 25, 2001, Letter from Rebecca Weber of EPA Region 6 to Bliss Higgins of the Louisiana Department of Environmental Quality.

3.2.2 Intermittent GHT Maintenance Activities

As part of the Refinery Sector Rule (RSR) finalized on December 1, 2015, a new type of regulated process vent referred to as "maintenance vent" was added within 40 CFR 63 Subpart CC (MACT CC) at 40 CFR 63.643(c). A maintenance vent is a process vent that is only used as a result of startup, shutdown, maintenance, or inspection of equipment where equipment is emptied, depressurized, degassed, or placed into service.

As with all refinery process units, intermittent activities associated with planned maintenance and shutdowns of the GHT equipment will occur in order to support the unit's normal operations. Emissions from maintenance activities are calculated both from depressurization of process gases to the flare gas recovery system and directly from the vessels at low pressure to atmosphere during maintenance activities.

When equipment is depressurized and purged, vapors from the vessels are sent to the flare system until it reaches the operating pressure of the flare system. The refinery operates a flare gas recovery system to compress and reintroduce flare gases to the refinery fuel gas system. These gases will displace natural gas that would otherwise be imported to the refinery fuel gas system.

When the GHT equipment needs to be opened for inspection and repair, the remaining vapors are released to atmosphere.[10] The GHT is designed for continuous operation with intermittent shutdowns for maintenance on an equipment level, partial unit, or full unit basis. For permitting purposes, Tesoro assumes that a full unit-wide shutdown occurs once every six years basis, which result in atmospheric emissions in order to safely enter the vessels. Tesoro includes the emissions estimate in the PSD applicability analysis to represent the expected worst-case emissions profile due to startup/shutdown/maintenance activities at the GHT. Atmospheric VOC emissions from vessel venting are estimated using Equation 11-1 from the EPA Protocol, excerpted below:

$$E_i = \left(\frac{(P_V + 14.7)}{14.7} \times \frac{528°\mathrm{R}}{T_V} \times \left[V_V \times f_{void} \right] \times \frac{MW_i}{MVC} \times MF_i \right) \qquad \text{(Eq. 11-1)}$$

where:

E_i = Emissions of pollutant "i" during depressurization event (lbs/event).
P_V = Gauge pressure of the vessel when depressurization gases are first routed to the atmosphere (pounds per square inch gauge, psig).
14.7 = Assumed atmospheric pressure (pounds per square inch, psi).
T_V = Absolute temperature of the vessel when depressurization gases are first routed to the atmosphere (degrees Rankine, °R).

[10] The new maintenance venting control requirements of 40 CFR 63 Subpart CC are currently scheduled to be effective on August 1, 2017. Due to a pending EPA rulemaking for technical corrections to Subpart CC, Tesoro submitted a request of extension of the effective compliance date by one year. Tesoro expects that the maintenance venting work practice standards will be applicable to the SLC Refinery process units, including the existing GHT. When instituted, the potential VOC emissions from depressurizing the GHT equipment will be less than that estimated in this application. Because these regulations are not currently applicable, they are not addressed in the notification of intent application.

See Table B-6 for the atmospheric depressurization emissions from the new equipment due to a shutdown. The potential VOC emissions assume 5 psig when atmospheric depressurization begins, which is conservatively high since the flare system operating pressure is normally less than 5 psig. Project engineering has provided current design information for vessel volumes and temperatures to inform this calculation. Emissions from these activities are insignificant.

3.2.3 Blending Component Loading Rack

The BCLR will experience an increase in utilization from increased throughput of DAN and alkylate. Tesoro conservatively assumed the future estimated throughput of DAN as the increase in loading rate (1800 BPD), and the estimated increase in alkylate production as the increase in loading rate (800 bpd). Emissions are calculated based on the emission limit of 10 mg/L from 40 CFR 63 Subpart CC. The modified VRU will operate similarly to the existing VRU (i.e., with the same control efficiency); therefore, no additional control for the VRU has been assumed.

3.2.4 Cogeneration Unit HRSG System

The Cogeneration Unit HRSG system are existing emission units that are not being modified, but are expected to experience an increase in utilization as the result of the Project.

The emissions resulting from combustion at the Cogeneration Unit HRSG system are calculated as follows:

- NO_x emissions are based upon vendor specification.
- SO_2 emissions are based on NSPS Subpart Ja's H_2S fuel gas content limit of 60 ppm.
- CO, PM, PM_{10}, $PM_{2.5}$, VOC, and HAP emissions are calculated based on EPA's AP-42 emission factors for natural gas combustion.
- H_2SO_4 is calculated as 1.5% of SO_2 emissions consistent with the refinery TRI reporting.

3.2.5 Sulfur Recovery Unit

The SRU will experience an increase in utilization from increased throughput of sulfur due to increased removal at the GHT. Emissions are calculated based on additional sulfur in the SRU feed and 95% sulfur control efficiency of the SRU. H_2SO_4 is calculated as 0.001% of SO_2 emissions consistent with the refinery TRI reporting.

3.2.6 New Equipment in VOC Service

New fugitive components in VOC service will be installed as part of this Project. The emissions increase is calculated based on the counts of new components to be added to the existing refinery process units. These new fugitive components will be incorporated into the emissions units associated with those existing refinery process units.

Emissions from new valves, flanges and pumps are estimated using a conservatively high estimate of new component counts, and emission factors from Table 2-2 and control efficiencies from Table 5-3 of the USEPA Protocol for Equipment Leak Emission Estimates. The final number of installed components will likely change from this estimate after additional detailed design/engineering is performed; however, the

change in VOC emissions from this activity is not appreciable and will not change the PSD applicability determination.

3.2.7 Storage Tanks

The VOC emissions from the two new storage tanks during normal operations are calculated by using the TankESP software. This software utilizes equations from EPA's AP-42 Section 7.1 to calculate VOC and HAP emissions from storage tanks. Tesoro considered emissions from storage of HCN and gasoline in the new tanks to determine the maximum-case emissions in order to define PTE and to secure future flexibility for storing various materials.

In addition to normal operations, once during every 10-year period, the tanks and floating roofs are required to undergo inspection. Emissions during the tank inspections are estimated as follows:

1. Standing idle losses following landing of the floating roof, based upon Equation 2-19 of AP-42 Chapter 7.1.
2. Tank degassing losses, calculated based upon the methodology described in American Petroleum Institute (API) Technical Report 2568, Evaporative Loss from the Cleaning of Storage Tanks, November 2007 for the forced ventilation process. Tesoro has conservatively estimated 2 days of forced ventilation after the initial vapor space purge event per tank for degassing based upon vendor estimates of typical degassing times for comparable tanks. Tesoro has assumed use of a portable thermal oxidizer with 95% control efficiency.
3. Refill losses based upon Equation 2-26 of AP-42 Chapter 7-1.

Tesoro included emissions which would occur during a calendar year with an inspection event as part of the PTE.

There will be minor increases in tank emissions associated with the increased throughput of alkylate at T-331. The emissions are calculated based upon Equation 2-19 of AP-42 Chapter 7.1 to account for additional withdrawal losses.

Additional details of these emissions calculations are included in Attachment B.

3.3 Project Emissions Increase Summary

Table 3-2 presents a summary of the total emissions increase associated with the proposed Project.

The Project emissions increase are less than the respective NSR SERs and does not trigger NSR pre-construction requirements for these pollutants.

Table 3-2 Project Emission Increase Summary (tpy)

Emission Unit	EU ID	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	H_2SO_4
Potential Project Impact at GHT Charge Heater F-701	F-701	0.09	0.09	0.09	0.30	1.51	1.00	0.05	4.5E-03
Intermittent GHT Maintenance Activities	N/A	---	---	---	---	---	---	0.06	---
Potential Project Impact at DAN Loading	BCLR	---	---	---	---	---	---	1.15	---
Potential Project Impact at Alkylate Loading	BCLR	---	---	---	---	---	---	0.51	---
Potential Project Impact at Cogeneration Unit HRSG	B-930/ B-940	0.60	0.60	0.60	0.78	9.44	6.59	0.40	1.2E-02
Potential Project Impact at Sulfur Recovery Unit	SRU	---	---	---	0.82	---	---	---	1.1E-05
New Equipment in VOC Service at the Existing GHT	N/A	---	---	---	---	---	---	0.73	---
New Equipment in VOC Service at the Existing BCLR and Refinery Tank Farm	N/A	---	---	---	---	---	---	2.58	---
New Equipment in VOC Service at the Existing Alkylation Unit	N/A	---	---	---	---	---	---	0.26	---
New HCN Storage Tank	T-248	---	---	---	---	---	---	3.66	---
New Gasoline Storage Tank	T-205	---	---	---	---	---	---	8.41	---
Potential Project Impact at Existing Tank T-331	T-331	---	---	---	---	---	---	0.02	---
Project Emissions Increase (tpy)		**0.69**	**0.69**	**0.69**	**1.91**	**10.95**	**7.59**	**17.83**	**1.6E-02**
PSD significant emission rate (tpy)		25	15	10	40	40	100	40	7
Is Project Emissions Increase Greater than PSD Significant Emissions Rate?		No	No	No	No	No	No	No	No

3.4 PSD "Reasonable Possibility" Recordkeeping Requirements

On December 21, 2007, the EPA promulgated updates to the federal PSD rules at 40 CFR §52.21(r)(6)(vi) that defines when an owner or operator of a major source is required to conduct recordkeeping and reporting when using the actual-to-projected-actual emissions-increase calculation methodology. Tesoro did not utilize the actual-to-projected-actual emissions-increase calculation methodology for the Project or exceed half of the PSD SER, therefore the reasonable possibility requirements are not applicable.

4.0 Regulatory Applicability and Compliance Demonstration

Tesoro has completed an applicability review of all Federal and State air quality regulations as part of the air permit application process. Table 4-1 provides a summary of the major air quality programs that were reviewed for the Project. Each regulation which requires explanation is described in the following sections. Certain aspects of the Project result in the triggering of new applicable requirements.

Table 4-1 Summary of Air Quality Regulatory Applicability for the Project

Report Section	Program Description	Regulatory Citation	Does This Project Trigger New Applicable Requirements?
---	**Federal Rules**	**40 CFR**	---
---	National Ambient Air Quality Standards (NAAQS)	40 CFR 50	No
3.0	New Source Review (NSR)	40 CFR 52	No
4.1	New Source Performance Standards (NSPS)	40 CFR 60	Yes
4.2	National Emission Standards for Hazardous Air Pollutants (NESHAPs)	40 CFR 61	No
4.2	NESHAPs for Source Categories	40 CFR 63	Yes
---	Risk Management Programs for Chemical Accidental Release Prevention	40 CFR 68	No
---	Title V Operating Permit	40 CFR 70	No
---	Acid Rain Requirements	40 CFR 72	No
---	Stratospheric Ozone Protection Requirements	40 CFR 82	No
---	**Utah State Rules**	**UAC R307**	---
---	General Requirements: State Implementation Plan	R307-110	No
4.1	Stationary Sources	R307-210	No
4.2	National Emission Standards for Hazardous Air Pollutants	R307-214	No
4.3	Ozone Nonattainment and Maintenance Areas: Control of Hydrocarbon Emissions in Petroleum Refineries	R307-326	No

Report Section	Program Description	Regulatory Citation	Does This Project Trigger New Applicable Requirements?
4.4	Ozone Nonattainment and Maintenance Areas: Petroleum Liquid Storage	R307-327	Yes
4.5	Permit: New and Modified Sources	R307-401	Yes
4.6	Nonattainment and Maintenance Areas	R307-403	No
4.7	Permits: Major Sources in Attainment or Unclassified Areas (PSD)	R307-405	No
4.8	Visibility	R307-406	No
4.9	Permits: Emissions Impact Analysis	R307-410	No
---	Permits: Fees for Approval Orders	R307-414	No
4.10	Permits: Ozone Offset Requirements in Davis and Salt Lake Counties	R307-420	No
4.11	Permits: PM_{10} Offset Requirements in Salt Lake County and Utah County	R307-421	No

4.1 R307-210: Stationary Sources

New Source Performance Standards (NSPS) are incorporated by reference into the UDAQ rules. New Source Performance Standards (NSPS) are incorporated by reference into the UDAQ rules. Applicability and compliance with Subparts J/Ja, Kb, GGGa, and QQQ are discussed below in additional detail. Regulatory coverage for other NSPS subparts currently applicable to the facility are as follows: 40 CFR 60 Subparts A, Db, J, Ja, GG, NNN, RRR, and IIII. These are listed in Section III of the AO and will not change as a result of this Project.

Regulatory coverage for other NSPS subparts currently applicable to the facility are as follows: 40 CFR 60 Subparts A, Db, J, Ja, GG, NNN, RRR, and IIII. These are listed in Section III of the AO and will not change as a result of this Project.

The NSPS regulation, at 40 CFR §60.14(a), defines a modification as a physical or operational change to the affected facility that is not specifically exempted and that results in an increase in the emissions rate to the atmosphere of any pollutant to which a standard applies (i.e., for NSPS Subpart Ja, SO_2, CO, PM, and NO_x for an FCCU). The physical or operational changes that are specifically exempted from being considered a modification are listed at 40 CFR §60.14(e). "Increase in emissions rate" in turn is defined pursuant to 40 CFR §60.14(b) as an increase in the maximum hourly emission rate of an applicable pollutant ("the NSPS Causality Test") from the affected facility.

4.1.1 Subpart Ja: Standards of Performance for Petroleum Refineries

The FCCU is currently subject to NSPS Ja for PM and CO and required to be in compliance with NSPS Ja for NOx and SO_2 by January 1, 2018. The Project is not expected to be completed by January 1, 2018, so the FCCU will be subject to NSPS Ja for all pollutants by the time any physical or operational changes will occur. Regardless, the catalyst replacement in the FCCU proposed in the Project will not result in an increase in the maximum emission rate of NOx or SO_2 because neither feed rate nor the emissions profile is expected to change as a result of the catalyst change. Additionally, there are no physical changes to the FCCU which could result in a reconstruction. Therefore, the Project does not trigger new NSPS Ja requirements at the FCCU.

There are no changes to the GHT Charge Heater F-701, Cogeneration Unit, or SRU, therefore, there is no change in compliance method or applicability for those units.

4.1.2 Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

The new HCN and gasoline storage tanks will be subject to NSPS Kb since its volume will be greater than 151 m^3 and the maximum true vapor pressure is greater than 3.5 kilopascals (0.5 psia). The new HCN and gasoline storage tanks will be subject to 40 CFR 63 Subpart CC. Tanks which are subject to NSPS Subpart Kb and Subpart CC are allowed to comply only with the requirements of NSPS Kb or Subpart CC under the overlap provisions in §63.640(n)(2). Tesoro elects to comply with NSPS Kb for the new HCN and gasoline storage tanks.

T-331 is currently subject to NSPS Kb. Tesoro will continue to comply with the rule.

4.1.3 Subpart GGGa: Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006

Tesoro is already subject to NSPS GGGa for equipment leaks throughout the refinery, therefore, Tesoro will continue to comply with the rule for the new equipment installed as part of the Project.

4.1.4 Subpart QQQ: Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems

Tesoro is not planning to install any new drains or junction boxes as part of the Project. Therefore, Subpart QQQ applicability and compliance will not change as part of the Project.

4.2 R307-214: National Emission Standards for Hazardous Air Pollutants

MACT and NESHAP standards are incorporated by reference into the UDAQ rules. Each currently applicable standard relevant to the Project is discussed below.

4.2.1 40 CFR 61 Subpart FF: National Emission Standard for Benzene Waste Operations

The Project will not increase the total annual benzene (TAB) quantity to greater than 10 megagrams per year. Therefore, Tesoro will continue to comply with the 10 MG/year work practice standards.

4.2.2 40 CFR 63 Subpart CC: National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries

Tesoro will continue to comply with Subpart CC at its existing emission units. The BCLR is subject to §63.650 as a gasoline loading rack, which requires compliance with 40 CFR 63 Subpart R. With the installation of the spare VRU at the BCLR, Tesoro will still be required to meet the emissions limit of 10 mg total organic compound (TOC) per liter of product loaded.

The new HCN and gasoline storage tanks will be subject to Subpart CC. Overlap provisions for tanks subject to NSPS Kb and 40 CFR 63 Subpart CC is described in Section 4.1.2.

The new and replaced equipment in VOC service will also be subject to requirements under Subpart CC.

4.2.3 40 CFR 63 Subpart UUU: National Emission Standard for Hazardous Air Pollutants for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units

The FCCU and SRU are currently subject to 40 CFR 63 Subpart UUU. Tesoro will continue to comply with the emission standards and other requirements of this rule. The FCCU and SRU will not be reconstructed as part of this project.

4.3 R307-326: Ozone Nonattainment and Maintenance Areas: Control of Hydrocarbon Emissions in Petroleum Refineries

Rule R307-326 requires control of various VOC sources at petroleum refineries. Tesoro will comply with the provisions of this rule by:

- Venting the GHT reactor to the flare gas recovery system during process unit turnarounds, and
- Monitoring leaks from existing, new, and replacement fugitive components.

4.4 R307-327: Ozone Nonattainment and Maintenance Areas: Petroleum Liquid Storage

Rule R307-207 requires tanks with a capacity greater than 40,000 gallons that are used to store volatile petroleum liquids with a true vapor pressure greater than 1.52 psia to be fitted with control equipment.

Tesoro will comply with the control requirements of the rule for the new HCN and gasoline storage tanks by installing internal floating roofs. T-331 is currently subject to Rule R307-327 and will continue to comply with the rule.

4.5 R307-401: Permit: New and Modified Sources

Rule R307-401-3(b) requires submittal of an NOI to "make modifications or relocate an existing installation which will or might reasonably expected to increase the amount or change the effect of, or the character of, air contaminants discharged, so that such installation may be expected to become a source or indirect source of air pollution." The Project may increase the amount of air contaminants discharge from multiple emission units. Rule R307-401-5 requires submittal of an NOI, which must contain specific information related to the process, nature of emissions, control device(s), and regulatory applicability and compliance. Refer to Section 5.0 for a summary of compliance with the NOI requirements.

4.5.1 BACT

Rule 307-401-5(d) permits the issuance of an approval order if it is determined that the pollution control for emissions is at least best available control technology (BACT). A BACT review is required for new emission units and existing emission units where there is a physical modification and an increase in emissions.

A BACT analysis for the BCLR, new storage tanks, and new and replaced equipment in VOC service is located in Sections 5.0 through 8.0 respectively.

4.6 R307-403: Nonattainment and Maintenance Areas

R307-403 applies to new major sources or major modifications to be located in a nonattainment area. The proposed project is neither a new major source nor a major modification as defined in R307-101-2 since the actual emissions increase is less than the significant emission rate (SER) thresholds. Refer to Section 3.3 for a summary of this determination.

4.6.1 R307-403-5: Offsets: PM_{10} Nonattainment Area

Emission offsets are required if the combined allowable emission increase of PM_{10}, SO_2, and NO_x exceeds 25 tons per year. The combined allowable emission increase from the project is zero (0) tons per year since the SIP caps will not increase. Therefore, no emission offsets are required.

4.7 R307-405: Permits: Major Sources in Attainment or Unclassified Areas (PSD)

This project is not a major modification and is not subject to the PSD program as described in Section 3.3. Tesoro has demonstrated compliance with all applicable requirements with the submission of this NOI. Therefore the requirements of R307-405 are not applicable to this proposed project.

4.8 R307-406: Visibility

This project is not a new major source or a major modification; therefore the provisions of this rule are not applicable.

4.9 R307-410: Permits: Emissions Impact Analysis

Pursuant to R307-410-4, dispersion modeling is required for increases in the total controlled emission rate of attainment pollutants (NO_x and CO for the SLC refinery) in an amount greater or equal to values given in Table 1 of the rule. For these pollutants, the thresholds given in Table 1 are equal to the SERs. Dispersion modeling is not required since the increases in emissions of NO_x and CO are less than the SERs.

4.9.1 R307-410-5: Ambient Air Impacts for Hazardous Air Pollutants

The requirements of R307-410-5 do not apply to installations which are subject to or are scheduled to be subject to an emission standard promulgated under 42 USC 7412 at the time the NOI is submitted. As described in Section 4.2, the BCLR, new tanks, and new components are all subject to standards under 40 CFR 63 Subparts CC or UUU. The requirements of R307-410-5 do not apply to the project.

Actual HAP emission increases associated with the project include fuel gas combustion emissions, storage tank emissions, and DAN loadout emissions. There are no increases in potential emissions of HAPs as a result of the project. Refer to Attachment B for detailed HAP emission calculations.

4.10 R307-420: Permits: Ozone Offset Requirements in Davis and Salt Lake Counties

The SLC Refinery is located in a maintenance area for ozone. Emission offsets are required for any new major source or major modification of VOC or NO_x. A "significant" increase used to determine whether a "major modification" of VOC would occur under this rule is defined as 25 tpy. The project is neither a new major source nor a major modification for VOC or NO_x, therefore offsets are not required.

4.11 R307-421: Permits: PM_{10} Offset Requirements in Salt Lake County and Utah County

Emission offsets are required if the combined allowable emission increase of SO_2 and NO_x exceeds 25 tons per year. The combined allowable emission increase from the project is zero (0) tons per year as described in Section 4.6.1. Therefore, no emission offsets are required.

5.0 BACT Methodology

BACT is defined as an emission limitation based on the maximum emission reduction achievable after a case-by-case review of potential emission controls which takes into account energy, environmental and economic impacts. This emissions limit may be achieved by a variety of means, such as control technologies, clean fuels, inherently lower polluting processes, or alternative operating practices.[11]

5.1 Top-Down BACT Approach

This BACT analysis has been conducted in accordance with Section 165(a) (4) of the Clean Air Act (at 40 CFR Part 52.21(j)), and R307-401-5. Proposed BACT technologies have been selected using the "top-down" approach specified in U.S. EPA's draft New Source Review Workshop Manual, (October 1990),[12] using the five-step process.

Step 1 - Identify all Available Control Technologies

All available control technologies are identified for each emission unit. A control technology is considered available for a specific pollutant if it could practically be applied to the specific emission unit. To identify all available control technologies, Tesoro reviewed the U.S. EPA's RACT/BACT/LAER Clearinghouse (RBLC).

Step 2 - Eliminate Technically Infeasible Control Technologies

Each control technology identified in Step 1 is evaluated, using source-specific factors, to determine if it is technically feasible. If physical, chemical, and engineering principles demonstrate that a technology could not be successfully used on the emission unit, then that technology is determined to be technically infeasible. Economics are not considered in the determination of technical feasibility. Technologies which are determined to be infeasible are eliminated from further consideration.

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

[12] The workshop manual can be found at U.S. EPA's website http://www.epa.gov/NSR/ttnnsr01/gen/wkshpman.pdf.

Step 3 - Rank Technically Feasible Technologies by Control Effectiveness

All technically feasible technologies are ranked in order of overall control effectiveness. Rankings are based on the level of emission control expressed as emissions per unit of production, emissions per unit of energy used, the concentration of a pollutant emitted from the source, control efficiency, or a similar measure. The control effectiveness listed will be representative of the level of emission control which can be achieved by the control technology at the operating conditions of the emission unit being reviewed. If the most effective control technology is selected as BACT, then Step 4 need not be completed.

Step 4 - Evaluate Technically Feasible Control Technologies

The economic, environmental, and energy impacts of each technically feasible control technology are evaluated. Step 4 is only required if the most effective control technology is not proposed as BACT. As the top control technology was chosen in all cases, the economic and energy impact analyses were not required for this evaluation.

The environmental impact analysis assesses collateral environmental impacts associated with control of the regulated pollutant in question. Impacts considered may include solid or hazardous waste generation, wastewater discharges from a control device, visibility impacts, collateral increases in emissions of other criteria or non-criteria pollutants, increased water consumption, and land use. The environmental impact analysis is conducted based on consideration of site-specific circumstances.

Step 5 - Select BACT

Based on technical considerations and economic, environmental and energy impacts the proposed BACT for each emissions unit will include:

- A pollutant-specific emission control technology as BACT, or a combination of controls when appropriate
- Document approach is consistent with NSPS requirements (BACT floor) i.e. equal to, or more stringent that the applicable NSPS.

6.0 BACT for Blending Components Loading Rack

The refinery operates the BCLR to load and unload refinery products into and out of railcars. The BCLR operates with an existing VRU utilizing carbon adsorption as the control device. As part of the Project, Tesoro will be modifying the VRU and the BCLR will experience an increase of DAN throughput.

6.1 Step 1 – Identify All Available Control Technologies

Potential control technologies for VOC emissions from a review of available information listed in U.S. EPA's RACT/BACT/LAER Clearinghouse (RBLC). In addition to the existing VRU utilizing carbon adsorption, a flare or thermal oxidizer is also an available control technology for the BCLR.

Table 6-1 Available Emission Control Technologies

Pollutant	Control Technology
VOC	Carbon Adsorption
	Flare/Thermal Oxidation

6.2 Step 2 – Technical Feasibility of Control Technologies

The technical feasibility of potential control options for VOC emissions are summarized in Table 6-2. All control options are technically feasible.

Table 6-2 Technical Feasibility of VOC Control Technologies for Loading Racks

Technology	Technically Feasible?
Carbon adsorption	Yes
Flare/Thermal Oxidizer	Yes

6.3 Step 3 –Effectiveness of Feasible Control Technologies

The technically feasible control options are ranked in Table 6-3, according to their control effectiveness.

Table 6-3 Control Effectiveness Ranking of VOC Control Technologies for Loading Racks

Rank	Technology	Emission Control Effectiveness	Basis for Listed Performance
1	Carbon Adsorption	10 mg/L product loaded	MACT CC
1	Flare/Thermal Oxidizer	10 mg/L product loaded	MACT CC

6.4 Step 4 - Evaluation of Feasible Control Technologies

The use of a flare/thermal oxidizer results in additional combustion related emissions from the controlled VOC. In comparison, a carbon adsorption unit recovers product which would otherwise be emitted and results in no collateral emissions. Therefore, a carbon adsorption unit is considered the top feasible control option in this case. The economic and energy impacts of technically feasible control options are not required, as the top feasible control option is selected.

6.5 Step 5 – BACT Selection

Tesoro proposes that BACT for VOC from the transport loading racks is a vapor recovery unit with carbon adsorption with an emissions limit of 10 mg/L product loaded. This proposal is consistent with recent RBLC determinations.

7.0 BACT for Storage Tanks

An internal floating roof (IFR) tank has a permanent roof with a floating roof on the inside floating on the surface of the liquid. Emissions from a floating roof tank come from both withdrawal losses and standing losses. Withdrawal losses are generally due to liquid level fluctuations, and standing storage losses originate from the rim seal, deck fittings, and the deck seam. As part of the Project, new HCN and gasoline storage tanks will be constructed with dual-seal, internal floating roofs to minimize VOC emissions.

7.1 Storage Tank VOC Emissions (Normal Operations)

7.1.1 Step 1 – Identify All Available Control Technologies

Potential control technologies for VOC emissions from a review of available information are listed in Table 7-1.

Table 7-1 Available Emission Control Technologies

Pollutant	Control Technology
Storage Tank VOC	Internal Floating Roof
	External Floating Roof
	Fixed Roof with Vapor Collection and Control System
	Fixed Roof

Installation of a fixed roof tank would not be compliant with NSPS Subpart Kb or MACT Subpart CC and is therefore not considered further in the analysis.

R307-327-4 requires that any storage tank erected after January 1, 1979 are equipped with internal floating roof that rest on the surface of the liquid contents and shall be equipped with a closure seal or seals to close the space between the roof edge and the tank wall. Therefore, the only remaining available control technology is an Internal Floating Roof.

7.1.2 Step 2 – Technical Feasibility of Control Technologies

The Internal Floating Roof is technically feasible.

7.1.3 Step 3 –Effectiveness of Feasible Control Technologies

The effectiveness of technically feasible control options are not required because the top feasible control option is selected.

7.1.4 Step 4 - Evaluation of Feasible Control Technologies

The economic, environmental, and energy impacts of technically feasible control options are not required, as the top feasible control option is selected.

7.1.5 Step 5 – BACT Selection

Tesoro proposes that BACT for VOC emissions from the new HCN and gasoline storage tanks is to use a dual-seal internal floating roof tank. This control requirement is consistent with applicable requirements under NSPS Subpart Kb, MACT Subpart CC, and Utah Rule R307-327. Emission limits are not practical since emissions cannot reasonably be measured from storage tanks; therefore, operation of internal floating roofs serves as the work practice standard under BACT.

7.2 Storage Tank VOC Emissions (Tank Degassing)

Storage tanks are emptied and degassed as part of maintenance, changes in service, and/or inspections. Tesoro has conservatively estimated 2 days of forced ventilation after the initial vapor space purge event per tank for degassing based upon vendor estimates of typical degassing times for comparable tanks. Control of other emissions during the remainder of the tank inspection process (while the tank is standing idle or being refilled) is not common practice due to negative pressures during tank drawdown and due to the length of time following degassing prior to refilling to complete the inspections.

Utah State Implementation Plan (SIP) Section IX.H PM_{10} Emissions Limits and Operating Practices and $PM_{2.5}$ Emissions Limits and Operating Practices requires control of tank degassing emissions for organic liquid storage tanks that exceed a volume and true vapor pressure.

8.0 BACT for Fugitive Equipment

Control strategies for volatile organic compound emissions from fugitive components are based on LDAR program work practice requirements, which identify and then reduce emissions from process equipment components.

8.1.1 Step 1 – Identify All Available Control Technologies

Potential control technologies for VOC emissions from a review of available information listed in Table 8-1.

Table 8-1 Available Emission Control Technologies

Pollutant	Control Technology
VOC	LDAR Program

8.1.2 Step 2 – Technical Feasibility of Control Technologies

An LDAR Program is technically feasible.

8.1.3 Step 3 – Effectiveness of Feasible Control Technologies

The effectiveness of technically feasible control options are not required because the top feasible control option is selected.

8.1.4 Step 4 – Evaluation of Feasible Control Technologies

The economic, environmental, and energy impacts of technically feasible control options are not required, as the top feasible control option is selected.

8.1.5 Step 5 – BACT Selection

Tesoro proposes that BACT for VOC emissions from fugitive equipment is an LDAR program, as required by 40 CFR Part 60 Subpart GGGa and Tesoro's Consent Decree. This proposal is consistent with recent RBLC determinations for fugitive emissions.

9.0 Summary of NOI Requirements for Project

Table 9-1 provides a summary of how this NOI complies with the specific requirements of Rule R307-401-5(2). Refer to Attachment C for a copy of Form 1 and an NOI Checklist including references to required information.

Table 9-1 Summary of NOI Requirements

Requirement	Section Reference for Information Provided Table Heading
(a) A description of the nature of the processes involved; the nature, procedures for handling and quantities of raw materials; the type and quantity of fuels employed; and the nature and quantity of finished product.	Section 2.0
(b) Expected composition and physical characteristics of effluent stream both before and after treatment by any control apparatus, including emission rates, volume, temperature, air contaminant types, and concentration of air contaminants.	Attachment B for emission rates.
(c) Size, type and performance characteristics of any control apparatus.	Section 2.0
(d) An analysis of best available control technology for the proposed source or modification. When determining best available control technology for a new or modified source in an ozone nonattainment or maintenance area that will emit volatile organic compounds or nitrogen oxides, the owner or operator of the source shall consider EPA Control Technique Guidance (CTG) documents and Alternative Control Technique documents that are applicable to the source. Best available control technology shall be at least as stringent as any published CTG that is applicable to the source.	Section 4.5.1, Section 5.0 through Section 8.0
(e) Location and elevation of the emission point and other factors relating to dispersion and diffusion of the air contaminant in relation to nearby structures and window openings, and other information necessary to appraise the possible effects of the effluent.	Attachment A – location provided – other info not needed since modeling is not required.
(f) The location of planned sampling points and the tests of the completed installation to be made by the owner or operator when necessary to ascertain compliance.	Not applicable – no new testing is necessary to demonstrate compliance.
(g) The typical operating schedule.	Section 2.0
(h) A schedule for construction.	Section 2.7
(i) Any plans, specifications and related information that are in final form at the time of submission of notice of intent.	No plans or specifications are in final form at the time of this submission.

Requirement	Section Reference for Information Provided Table Heading
(j) Any additional information required by: (i) R307-403, Permits: New and Modified Sources in Nonattainment Areas and Maintenance Areas; (ii) R307-405, Permits: Major Sources in Attainment or Unclassified Areas (PSD); (iii) R307-406, Visibility; (iv) R307-410, Emissions Impact Analysis; (v) R307-420, Permits: Ozone Offset Requirements in Davis and Salt Lake Counties; (vi) R307-421, Permits: PM10 Offset Requirements in Salt Lake County and Utah County.	(i) Section 4.6 (ii) Section 4.7 (iii) Section 4.8 (iv) Section 4.9 (v) Section 4.10 (vi) Section 4.11
(k) Any other information necessary to determine if the proposed source or modification will be in compliance with Title R307.	Refer to Section 4.0 for a complete analysis.

Attachment A

Refinery Location Map and Site Diagram

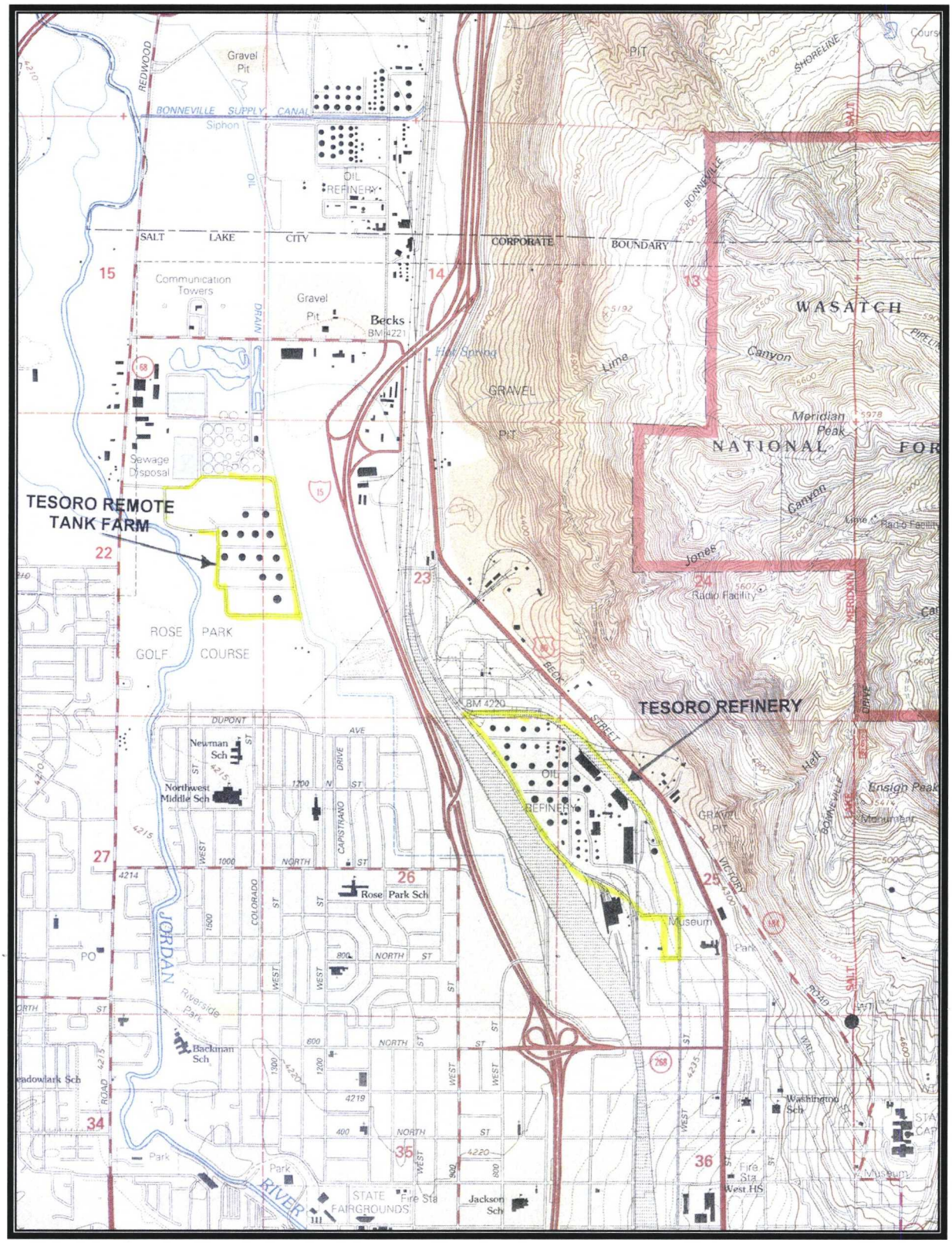
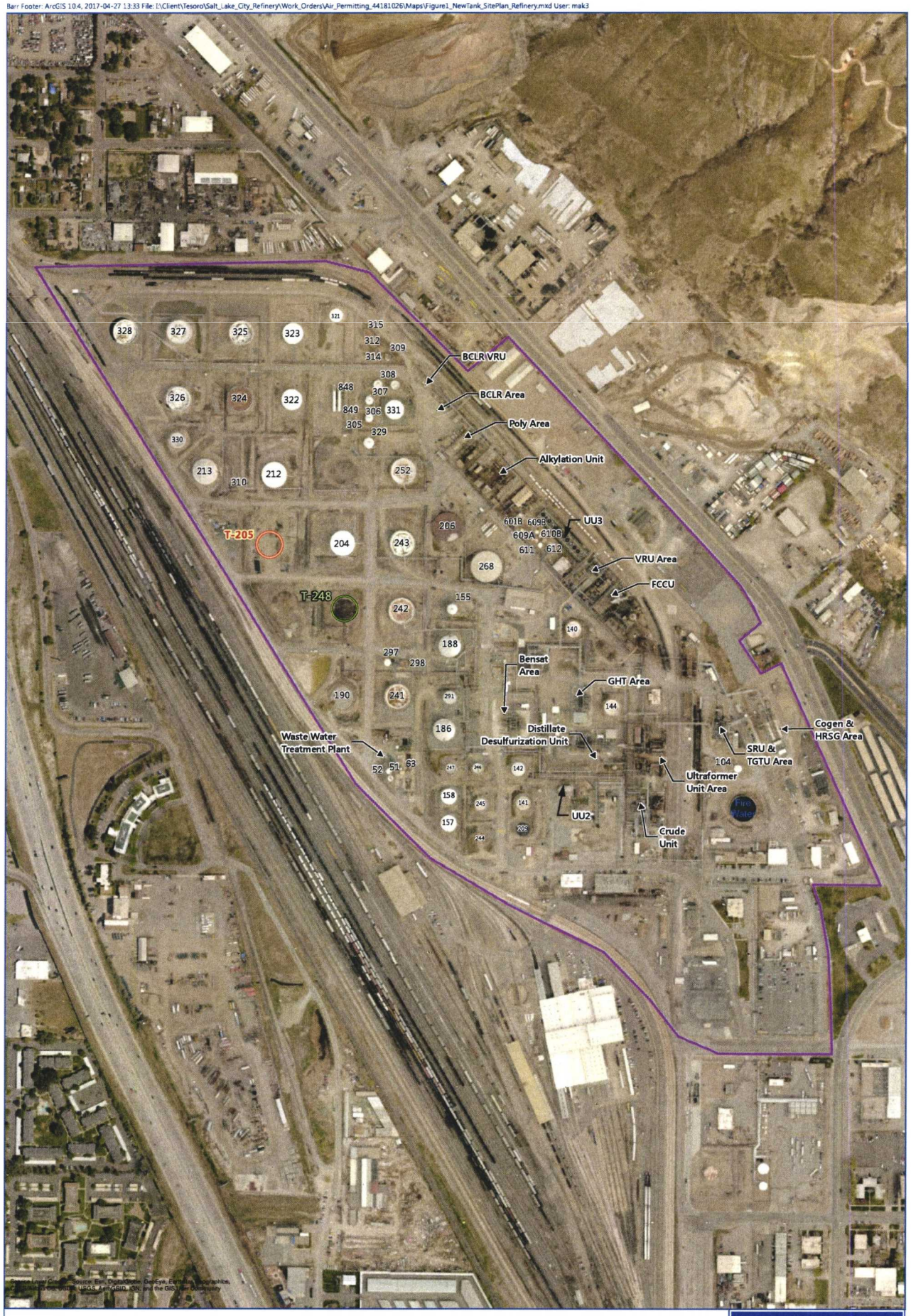


Figure A-1
Refinery Location Map

Barr Footer: ArcGIS 10.4, 2017-04-27 13:33 File: I:\Client\Tesoro\Salt_Lake_City_Refinery\Work_Orders\Air_Permitting_44181026\Maps\Figure1_NewTank_SitePlan_Refinery.mxd User: mak3



BARR

New Gasoline Storage Tank

New HCN Tank

SLC Refinery Boundary

0 400 800

Feet

SITE PLAN

Tesoro Refining and Marketing Company

Salt Lake City, UT

FIGURE 1

Attachment B

Emission Calculations for Project

Attachment B-1
Tier 3 Gasoline Compliance Project Emissions Summary
Tesoro Refining & Marketing Company LLC
Salt Lake City Refinery

Emission Unit[1]	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	H_2SO_4
Potential Project Impact at GHT Charge Heater F-701	0.09	0.09	0.09	0.30	1.51	1.00	0.05	4.5E-03
Intermittent GHT Maintenance Activities	---	---	---	---	---	---	0.06	---
Potential Project Impact at DAN Loading	---	---	---	---	---	---	1.15	---
Potential Project Impact at Alkylate Loading	---	---	---	---	---	---	0.51	---
Potential Project Impact at Cogeneration Unit HRSG	0.60	0.60	0.60	0.78	9.44	6.59	0.40	1.2E-02
Potential Project Impact at Sulfur Recovery Unit	---	---	---	0.82	---	---	---	1.1E-05
New Equipment in VOC Service at the Existing GHT	---	---	---	---	---	---	0.73	---
New Equipment in VOC Service at the Existing BCLR and Refinery Tank Farm	---	---	---	---	---	---	2.58	---
New Equipment in VOC Service at the Existing Alkylation Unit	---	---	---	---	---	---	0.26	---
New HCN Tank T-248	---	---	---	---	---	---	3.66	---
New Gasoline Tank T-205	---	---	---	---	---	---	8.41	---
Potential Project Impact at Existing Tank T-331	---	---	---	---	---	---	0.02	
Project Emission Increase (tpy)	**0.69**	**0.69**	**0.69**	**1.91**	**10.95**	**7.59**	**17.83**	**1.6E-02**

Notes:
(1) See Tables B-2 through B-18 for additional detail.

Attachment B-2

Tier 3 Gasoline Compliance Project HAP Emissions Summary

Tesoro Refining & Marketing Company LLC

Salt Lake City Refinery

Hazardous Air Pollutant	Potential Project Impact at GHT Charge Heater F-701	Potential Project Impact at DAN Loading	Potential Project Impact at Alkylate Loading	Potential Project Impact at Cogeneration Unit HRSG	Potential Project Impact at Sulfur Recovery Unit	New Storage Tanks	Potential Project Impact at Existing Tank T-331	Project Emissions Increase
	tpy	tpy	tpy		tpy	tpy	tpy	tpy
1,2,4- Trimethylbenzene	--	3.45E-02	5.74E-07	--	--	--	2.84E-11	3.45E-02
1,3-Butadiene	--	1.03E-05	2.53E-03	--	--	--	3.26E-05	2.57E-03
1,4-Dichlorobenzene(p)	1.66E-05	--	--	9.42E-05	--	--	--	1.11E-04
2,2,4-Trimethylpentane	--	3.38E-02	0.29	--	--	1.95E-02	3.52E-04	0.34
2-Methylnapthalene	3.31E-07	--	--	1.88E-06	--	--	--	2.21E-06
3-Methylchloranthrene	2.49E-08	--	--	1.41E-07	--	--	--	1.66E-07
7,12-Dimethylbenz(a)anthracene	2.21E-07	--	--	1.26E-06	--	--	--	1.48E-06
Acenaphthene	2.49E-08	--	--	1.41E-07	--	--	--	1.66E-07
Acenaphthylene	2.49E-08	--	--	1.41E-07	--	--	--	1.66E-07
Acetaldehyde	1.69E-04	--	--	9.60E-04	--	--	--	1.13E-03
Acrolein	2.39E-04	--	--	1.36E-03	--	--	--	1.60E-03
Anthracene	3.31E-08	--	--	1.88E-07	--	--	--	2.21E-07
Antimony	7.32E-06	--	--	4.16E-05	--	--	--	4.89E-05
Barium	5.94E-08	--	--	3.37E-07	--	--	--	3.97E-07
Benzene	2.90E-05	1.61E-02	3.44E-04	1.65E-04	--	5.96E-02	3.81E-07	7.62E-02
Benzo(a)anthracene	2.49E-08	--	--	1.41E-07	--	--	--	1.66E-07
Benzo(a)pyrene	1.66E-08	--	--	9.42E-08	--	--	--	1.11E-07
Benzo(b)fluoranthene	2.49E-08	--	--	1.41E-07	--	--	--	1.66E-07
Benzo(g,h,i)perylene	1.66E-08	--	--	9.42E-08	--	--	--	1.11E-07
Benzo(k)fluoroanthene	2.49E-08	--	--	1.41E-07	--	--	--	1 66E-07
Beryllium	1.66E-07	--	--	9.42E-07	--	--	--	1.11E-06
Biphenyl	--	--	--	--	--	--	--	0.00E+00
Cadmium	1.52E-05	--	--	8.63E-05	--	--	--	1.01E-04
Carbon Disulfide	--	--	--	--	1.47E-04	--	--	1.47E-04
Carbonyl Sulfide	--	--	--	--	4.42E-04	--	--	4.42E-04
Chromium (total)	1.93E-05	--	--	1.10E-04	--	--	--	1.29E-04
Chrysene	2.49E-08	--	--	1.41E-07	--	--	--	1.66E-07
Cobalt	1.16E-06	--	--	6.59E-06	--	--	--	7.75E-06

Attachment B-2
Tier 3 Gasoline Compliance Project HAP Emissions Summary
Tesoro Refining & Marketing Company LLC
Salt Lake City Refinery

Hazardous Air Pollutant	Potential Project Impact at GHT Charge Heater F-701	Potential Project Impact at DAN Loading	Potential Project Impact at Alkylate Loading	Potential Project Impact at Cogeneration Unit HRSG	Potential Project Impact at Sulfur Recovery Unit	New Storage Tanks	Potential Project Impact at Existing Tank T-331	Project Emissions Increase
	tpy	tpy	tpy		tpy	tpy	tpy	tpy
Copper	1.17E-05	--	--	6.67E-05	--	--	--	7.84E-05
Cumene	--	2.51E-03	5.74E-07	--	--	1.24E-02	7.00E-11	1.49E-02
Dibenz(a,h)anthracene	1.66E-08	--	--	9.42E-08	--	--	--	1.11E-07
Ethyl benzene	2.25E-04	1.71E-02	5.74E-07	1.28E-03	--	9.04E-03	1.14E-10	2.77E-02
Fluoranthene	4.14E-08	--	--	2.35E-07	--	--	--	2.77E-07
Fluorene	3.87E-08	--	--	2.20E-07	--	--	--	2.58E-07
Formaldehyde	1.04E-03	--	--	5.88E-03	--	--	--	6.92E-03
Hexane	--	2.64E-02	1.80E-02	--	--	0.17	3.93E-05	0.22
Hydrogen Sulfide	1.20E-03	--	--	6.80E-03	--	--	--	8.00E-03
Indeno(1,2,3-cd)pyrene	2.49E-08	--	--	1.41E-07	--	--	--	1.66E-07
Lead	6.90E-06	--	--	3.92E-05	--	--	--	4.61E-05
Manganese	5.25E-06	--	--	2.98E-05	--	--	--	3.51E-05
Mercury	3.59E-06	--	--	2.04E-05	--	--	--	2.40E-05
Methyl tertiary-butyl ether	--	--	--	--	--	--	--	0.00E+00
Molybdenum	1.52E-05	--	--	8.63E-05	--	--	--	1.01E-04
Naphthalene	8.42E-06	7.98E-03	5.74E-07	4.79E-05	--	1.18E-03	3.46E-12	9.21E-03
n-Butane	2.90E-02	--	--	0.16	--	--	--	0.19
Nickel	2.90E-05	--	--	1.65E-04	--	--	--	1.94E-04
Phenanthrene	2.35E-07	--	--	1.33E-06	--	--	--	1.57E-06
Phosphorus	9.01E-06	--	--	5.12E-05	--	--	--	6.02E-05
Propane	2.21E-02	--	--	0.13	--	--	--	0.15
Pyrene	6.90E-08	--	--	3.92E-07	--	--	--	4.61E-07
Selenium	3.31E-07	--	--	1.88E-06	--	--	--	2.21E-06
Styrene	--	8.81E-04	2.30E-04	--	--	--	2.91E-08	1.11E-03
Toluene	4.69E-05	8.90E-02	2.35E-02	2.67E-04	--	9.03E-02	1.05E-05	0.20
Vanadium	3.18E-05	--	--	1.80E-04	--	--	--	2.12E-04
Xylenes (isomers and mixture)	3.52E-04	7.53E-02	9.19E-04	2.00E-03	--	5.09E-02	1.52E-07	0.13
Zinc	4.00E-04	--	--	2.28E-03	--	--	--	2.68E-03
Total HAPs	0.05	0.30	0.34	0.31	0.00	0.41	4.35E-04	**1.42**

Attachment B-3
Baseline Actual Emission Calculations for Gasoline Hydrotreater (GHT) Unit F-701

Date	NO_X tons [1]	SO_2 tons [2]	CO tons [3]	PM tons [4]	PM_{10} tons [5]	$PM_{2.5}$ tons [6]	VOC tons [7]	H_2SO_4 tons [8]	Fuel Gas Firing MMBtu [9]	Fuel Gas Firing MMscf [9]
Jan-15	0.17	4.50E-03	0.19	1.75E-02	1.75E-02	1.75E-02	1.27E-02	6.75E-05	4,707	5.06
Feb-15	0.11	3.83E-03	0.12	1.10E-02	1.10E-02	1.10E-02	7.95E-03	5.75E-05	2,948	3.10
Mar-15	0.08	7.02E-04	0.09	8.53E-03	8.53E-03	8.53E-03	6.17E-03	1.05E-05	2,289	2.40
Apr-15	0.06	2.85E-03	0.07	6.19E-03	6.19E-03	6.19E-03	4.48E-03	4.28E-05	1,662	2.40
May-15	0.07	7.67E-03	0.08	7.53E-03	7.53E-03	7.53E-03	5.45E-03	1.15E-04	2,020	2.82
Jun-15	0.07	9.94E-03	0.08	7.47E-03	7.47E-03	7.47E-03	5.40E-03	1.49E-04	2,004	2.74
Jul-15	0.13	1.83E-02	0.15	1.31E-02	1.31E-02	1.31E-02	9.50E-03	2.74E-04	3,523	4.12
Aug-15	0.16	1.76E-02	0.18	1.62E-02	1.62E-02	1.62E-02	1.17E-02	2.65E-04	4,347	5.00
Sep-15	0.07	1.41E-02	0.15	1.37E-02	1.37E-02	1.37E-02	9.94E-03	2.11E-04	3,688	4.00
Oct-15	0.08	2.11E-02	0.18	1.64E-02	1.64E-02	1.64E-02	1.19E-02	3.16E-04	4,404	4.68
Nov-15	0.09	1.55E-02	0.19	1.69E-02	1.69E-02	1.69E-02	1.22E-02	2.32E-04	4,539	4.97
Dec-15	0.08	1.11E-02	0.17	1.57E-02	1.57E-02	1.57E-02	1.14E-02	1.66E-04	4,213	4.36
Jan-16	0.07	7.94E-03	0.16	1.42E-02	1.42E-02	1.42E-02	1.03E-02	1.19E-04	3,805	3.69
Feb-16	0.08	8.69E-03	0.18	1.59E-02	1.59E-02	1.59E-02	1.15E-02	1.30E-04	4,266	4.47
Mar-16	0.07	4.81E-03	0.15	1.32E-02	1.32E-02	1.32E-02	9.53E-03	7.21E-05	3,536	3.98
Apr-16	0.06	4.94E-03	0.14	1.23E-02	1.23E-02	1.23E-02	8.93E-03	7.40E-05	3,313	3.71
May-16	0.05	4.45E-03	0.10	8.88E-03	8.88E-03	8.88E-03	6.42E-03	6.68E-05	2,383	2.78
Jun-16	0.08	2.48E-03	0.16	1.49E-02	1.49E-02	1.49E-02	1.08E-02	3.72E-05	4,006	4.35
Jul-16	0.08	1.46E-03	0.17	1.57E-02	1.57E-02	1.57E-02	1.14E-02	2.19E-05	4,218	4.67
Aug-16	0.09	1.22E-03	0.20	1.84E-02	1.84E-02	1.84E-02	1.33E-02	1.83E-05	4,936	5.18
Sep-16	0.09	8.56E-04	0.20	1.79E-02	1.79E-02	1.79E-02	1.30E-02	1.28E-05	4,810	5.10
Oct-16	0.11	3.24E-03	0.25	2.22E-02	2.22E-02	2.22E-02	1.61E-02	4.85E-05	5,970	6.35
Nov-16	0.09	1.18E-03	0.19	1.75E-02	1.75E-02	1.75E-02	1.26E-02	1.78E-05	4,688	5.00
Dec-16	0.10	9.66E-04	0.22	2.01E-02	2.01E-02	2.01E-02	1.45E-02	1.45E-05	5,383	5.55
Baseline Period Ends:	**Dec-16**	**Dec-16**	**Dec-16**	**Dec-16**	**Dec-16**	**Dec-16**	**Dec-16**	**Dec-16**	--	--
Baseline Actual Emissions (tpy):	**1.08**	**0.08**	**1.89**	**0.17**	**0.17**	**0.17**	**0.12**	**1.27E-03**	--	--

Emission Factor References

[1] 4/1/09 stack test results (0.074 lb/MMBtu) for January 2015 through August 2015
8/26/15 stack test results (0.038 lb/MMBtu) for September 2015 through December 2016.

[2] Calculated as follows: SO_2 (tons) = Monthly average fuel gas H2S contents (ppmv) / 385.34 ft3/lb-mol * 64.01 lb/lb-mol * MMscf / 2000 lb/ton.

[3] Emission factor of 0.0824 lb/MMBtu per AP-42 Table 1.4-1.

[4] Emission factor of 7.45E-03 lb/MMBtu per AP-42 Table 1.4-2.

[5] Emission factor of 7.45E-03 lb/MMBtu per AP-42 Table 1 4-2.

[6] Emission factor of 7.45E-03 lb/MMBtu per AP-42 Table 1.4-2.

[7] Emission factor of 5.39E-03 lb/MMBtu per AP-42 Table 1.4-2.

[8] Assumed to be 1.5% of total SO2 emissions consistent with TRI reporting.

[9] Measured throughput rates.

Attachment B-4
Potential to Emit Calculations for Gasoline Hydrotreater (GHT) F-701

Constant	Value	Units	Reference
Firing Rate:	8.00	MMBtu/hr	Rated capacity
	8.88	Mscf/hr	Calculated
Fuel HHV:	901	Btu/scf	Engineering estimate (2015-16 average)
Fuel H_2S Content:	60	ppmvd	Permit Limit (NSPS Subpart Ja)
Hours of Operation:	8760	hr/yr	

Pollutant	Emission Factor	Units	Potential Emissions (lb/hr) [1]	Potential Emissions (tpy) [2]	Emission Factor Reference
NO_X	0.074	lb/MMBtu	0.59	2.59	Approval Order Emission Factor
SO_2	10.0	lb/MMscf	0.09	0.39	Permit Limit (NSPS Subpart Ja)
CO	0.082	lb/MMBtu	0.66	2.89	AP-42 Table 1.4-1
PM	0.0075	lb/MMBtu	5.96E-02	0.26	AP-42 Table 1.4-2
PM_{10}	0.0075	lb/MMBtu	5.96E-02	0.26	AP-42 Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	5.96E-02	0.26	AP-42 Table 1.4-2
VOC	0.0050	lb/MMBtu	4.00E-02	0.18	AP-42 Table 1.4-2
H_2SO_4	0.15	lb/MMscf	1.33E-03	5.81E-03	TRI calculation (1.5% of SO2 emissions)

[1] Potential Emissions (lb/hr) = Emission Factor (lb/MMBtu) x Firing Rate (MMBtu/hr) or
Potential Emissions (lb/hr) = Emission Factor (lb/MMscf) x Firing Rate (Mscf/hr) / 1000 Mscf/MMscf

[2] Emission Increase (tpy) = Potential Emissions (lb/hr) x Hours of Operation (hr/yr) / 2000 lb/ton

Attachment B-4
Potential to Emit Calculations for Gasoline Hydrotreater (GHT) F-701

	NOx	SO_2	CO	PM	PM_{10}	$PM_{2.5}$	VOC	H_2SO_4	
	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	Reference
A. Baseline Actual Emissions	1.08	0.08	1.89	0.17	0.17	0.17	0.12	0.00	Attachment B-3
B. Potential Emissions	2.59	0.39	2.89	0.26	0.26	0.26	0.18	0.01	
C. Emission Increase (C=B-A)	1.51	0.30	1.00	0.09	0.09	0.09	0.05	0.00	

Attachment B-5
HAP Emission Calculations for Gasoline Hydrotreater (GHT) Unit F-701 Combustion

Constant	Value	Units	Reference
Firing Rate:	8.00	MMBtu/hr	Rated capacity
	8.88	Mscf/hr	Calculated
Average Baseline Firing Rate	5.72	Mscf/hr	
Fuel HHV:	901	Btu/scf	Engineering estimate
Fuel H_2S Content:	60	ppmvd	Permit Limit (NSPS Ja)
Hours of Operation:	8760	hr/yr	

Hazardous Air Pollutant (HAP)	Emission Factor [1]	Units	Emissions Increase (lb/hr)	Emissions Increase (tpy)
Lead	5.00E-04	lb/MMscf	1.58E-06	6.90E-06
Acenaphthene	1.80E-06	lb/MMscf	5.67E-09	2.49E-08
Acenaphthylene	1.80E-06	lb/MMscf	5.67E-09	2.49E-08
Acetaldehyde	1.22E-02	lb/MMscf	3.86E-05	1.69E-04
Acrolein	1.73E-02	lb/MMscf	5.47E-05	2.39E-04
Antimony	5.30E-04	lb/MMscf	1.67E-06	7.32E-06
Anthracene	2.40E-06	lb/MMscf	7.56E-09	3.31E-08
Barium	4.30E-06	lb/MMscf	1.36E-08	5.94E-08
Benzene	2.10E-03	lb/MMscf	6.62E-06	2.90E-05
Benzo(a)anthracene	1.80E-06	lb/MMscf	5.67E-09	2.49E-08
Benzo(a)pyrene	1.20E-06	lb/MMscf	3.78E-09	1.66E-08
Benzo(b)fluoranthene	1.80E-06	lb/MMscf	5.67E-09	2.49E-08
Benzo(g,h,i)perylene	1.20E-06	lb/MMscf	3.78E-09	1.66E-08
Benzo(k)fluoroanthene	1.80E-06	lb/MMscf	5.67E-09	2.49E-08
Beryllium	1.20E-05	lb/MMscf	3.78E-08	1.66E-07
n-Butane	2.10E+00	lb/MMscf	6.62E-03	2.90E-02
Cadmium	1.10E-03	lb/MMscf	3.47E-06	1.52E-05

Attachment B-5

HAP Emission Calculations for Gasoline Hydrotreater (GHT) Unit F-701 Combustion

Constant	Value	Units	Reference
Firing Rate:	8.00	MMBtu/hr	Rated capacity
	8.88	Mscf/hr	Calculated
Average Baseline Firing Rate	5.72	Mscf/hr	
Fuel HHV:	901	Btu/scf	Engineering estimate
Fuel H_2S Content:	60	ppmvd	Permit Limit (NSPS Ja)
Hours of Operation:	8760	hr/yr	

Hazardous Air Pollutant (HAP)	Emission Factor [1]	Units	Emissions Increase (lb/hr)	Emissions Increase (tpy)
Chromium (total)	1.40E-03	lb/MMscf	4.41E-06	1.93E-05
Chrysene	1.80E-06	lb/MMscf	5.67E-09	2.49E-08
Cobalt	8.40E-05	lb/MMscf	2.65E-07	1.16E-06
Copper	8.50E-04	lb/MMscf	2.68E-06	1.17E-05
Dibenz(a,h)anthracene	1.20E-06	lb/MMscf	3.78E-09	1.66E-08
1,4-Dichlorobenzene(p)	1.20E-03	lb/MMscf	3.78E-06	1.66E-05
7,12-DImethylbenz(a)anthracene	1.60E-05	lb/MMscf	5.04E-08	2.21E-07
Ethyl benzene	1.63E-02	lb/MMscf	5.14E-05	2.25E-04
Fluoranthene	3.00E-06	lb/MMscf	9.46E-09	4.14E-08
Fluorene	2.80E-06	lb/MMscf	8.83E-09	3.87E-08
Formaldehyde	7.50E-02	lb/MMscf	2.36E-04	1.04E-03
Hydrogen Sulfide	8.67E-02	lb/MMscf	2.73E-04	1.20E-03
Indeno(1,2,3-cd)pyrene	1.80E-06	lb/MMscf	5.67E-09	2.49E-08
Manganese	3.80E-04	lb/MMscf	1.20E-06	5.25E-06
Mercury	2.60E-04	lb/MMscf	8.20E-07	3.59E-06
3-Methylchloranthrene	1.80E-06	lb/MMscf	5.67E-09	2.49E-08
2-Methylnapthalene	2.40E-05	lb/MMscf	7.56E-08	3.31E-07

Attachment B-5
HAP Emission Calculations for Gasoline Hydrotreater (GHT) Unit F-701 Combustion

Constant	Value	Units	Reference
Firing Rate:	8.00	MMBtu/hr	Rated capacity
	8.88	Mscf/hr	Calculated
Average Baseline Firing Rate	5.72	Mscf/hr	
Fuel HHV:	901	Btu/scf	Engineering estimate
Fuel H_2S Content:	60	ppmvd	Permit Limit (NSPS Ja)
Hours of Operation:	8760	hr/yr	

Hazardous Air Pollutant (HAP)	Emission Factor [1]	Units	Emissions Increase (lb/hr)	Emissions Increase (tpy)
Molybdenum	1.10E-03	lb/MMscf	3.47E-06	1.52E-05
Naphthalene	6.10E-04	lb/MMscf	1.92E-06	8.42E-06
Nickel	2.10E-03	lb/MMscf	6.62E-06	2.90E-05
Phenanthrene	1.70E-05	lb/MMscf	5.36E-08	2.35E-07
Phosphorus	6.53E-04	lb/MMscf	2.06E-06	9.01E-06
Propane	1.60E+00	lb/MMscf	5.04E-03	2.21E-02
Pyrene	5.00E-06	lb/MMscf	1.58E-08	6.90E-08
Selenium	2.40E-05	lb/MMscf	7.56E-08	3.31E-07
Toluene	0.003	lb/MMscf	1.07E-05	4.69E-05
Vanadium	0.002	lb/MMscf	7.25E-06	3.18E-05
Xylenes (isomers and mixture)	0.026	lb/MMscf	8.04E-05	3.52E-04
Zinc	0.029	lb/MMscf	9.14E-05	4.00E-04
Total Emissions (tpy)				**5.50E-02**

[1] HAPs from RTI International's Emission Estimation Protocol for Petroleum Refineries, version 2.1, April 2011 - Table 4-3.

Attachment B-6
Potential to Emit Calculations for Intermittent GHT Maintenance Activities: VOC Depressurization

Assumed atmospheric pressure: **12.6** psia

Process Equipment Vented to Atmosphere	System Pressure at Time of Opening for Stream (psig)	Total System Volume for Stream (gal)	Void Fraction	Gaseous Volume in System for Stream (gal)	System Temperature for Stream (F)	Vapor Molecular Weight for Stream (lb/lb-mol)	Vapor VOC Content (vol%)	Potential VOC Emissions[1,2,3] (lb)
GHT Unit	5.0	23,190	1.0	23,190	184	78	100%	718.0
							Total VOC, lbs	**718.0**
							Total VOC, tpy	**0.06**

Notes:

(1) Calculations based upon Emissions Estimation Protocol for Petroleum Refineries, Version 3, Equation 11-1, April 2015.

(2) Deinventory process includes multiple steam and nitrogen purges to the flare system. As such, at the time of atmospheric opening most light ends have been effectively removed.

Attachment B-7
Incremental Utilization Emission Calculations at Blending Component Loading Rack

Liquid Loaded	Loading Type	Throughput Increase [1] mgal/yr	Controlled Release Factor [2]				Total Emissions lb/year	ton/yr
DAN	Bottom Loading Balance Service	27,518.4	10	mg/L	0.083	lb/mgal	2,296.52	1.15
Alkylate	Bottom Loading Balance Service	12,230.4	10	mg/L	0.083	lb/mgal	1,020.68	0.51

[1] Increase of DAN loaded to rail (1800 BPD 7 days a week) via the Blending Component Loading Rack
Increase of Alkylate loaded to rail (800 BPD 7 days a week) via the Blending Component Loading Rack
[2] Controlled Release Factor based on 10 mg/L limit pursuant to 40 CFR 63 Subpart CC.

Attachment B-8

HAP Emission Calculations for Incremental Utilization at Blending Component Loading Rack

Product	Component	Liquid	Emissions[2]	Emissions
		Wt % [1]	lb/yr	tons/year (tpy)
DAN	Total VOC		2,297	
	Benzene	1.4%	3.22E+01	1.61E-02
	1,3-Butadiene	0.0009%	2.07E-02	1.03E-05
	Cumene	0.219%	5.03E+00	2.51E-03
	Ethyl benzene	1.49%	3.42E+01	1.71E-02
	Hexane	2.3%	5.28E+01	2.64E-02
	Naphthalene	0.695%	1.60E+01	7.98E-03
	Styrene	0.0767%	1.76E+00	8.81E-04
	Toluene	7.75%	1.78E+02	8.90E-02
	1,2,4- Trimethylbenzene	3.002%	6.89E+01	3.45E-02
	2,2,4-Trimethylpentane	2.94%	6.75E+01	3.38E-02
	Xylenes (isomers and mixture)	6.56%	1.51E+02	7.53E-02
Alkylate	Total VOC		1,021	
	Benzene	0.03%	6.89E-01	3.44E-04
	1,3-Butadiene	0.22%	5.05E+00	2.53E-03
	Cumene	0.00005%	1.15E-03	5.74E-07
	Ethyl benzene	0.00005%	1.15E-03	5.74E-07
	Hexane	1.57%	3.61E+01	1.80E-02
	Naphthalene	0.00005%	1.15E-03	5.74E-07
	Styrene	0.02%	4.59E-01	2.30E-04
	Toluene	2.05%	4.71E+01	2.35E-02
	1,2,4- Trimethylbenzene	0.00005%	1.15E-03	5.74E-07
	2,2,4-Trimethylpentane	25.24%	5.80E+02	2.90E-01
	Xylenes (isomers and mixture)	0.08%	1.84E+00	9.19E-04
Total Emissions (tpy)				**0.64**

[1] Weight percent based on Emission Estimation Protocol for Petroleum Refineries, Table A-1. Conservatively used for DAN the higher concentration of gasoline or reformulated gasoline.

[2] The liquid weight percent is applied to the VOC emissions from Attachment B-7

Attachment B-9
Incremental Utilization Emission Calculations for Cogeneration HRSG Steam Production

Physical Property Data	Temperature	Vapor Enthalpy (Btu/lb)	Liquid Enthalpy (Btu/lb)	Latent Heat (Btu/lb)	Delta H (Steam to BFW, btu/lb)
Boiler feedwater	227 F		195		
650# saturated steam	497 F	1204	483	721	1009

Activity	Steam Type	Increased load (Mlb/hr)	Total Additional Duty (MMBtu/hr HHV)[1]
Additional Steam Consumption	650#	14.0	18.3

[1] Calculated at 85% Efficiency on an LHV basis. Convert to HHV basis from LHV basis using a factor of 1.1.

https://www4.eere.energy.gov/manufacturing/tech_deployment/amo_steam_tool/equipBoiler?random=satSteam

Attachment B-9
Incremental Utilization Emission Calculations for Cogeneration HRSG Steam Production

Constant	Value	Units	Reference
Incremental Firing Rate:	18.27	MMBtu/hr	Calculated on Attachment B-9
	17.91	Mscf/hr	Calculated
Fuel HHV:	1020	Btu/scf	Engineering Estimate
Fuel H_2S Content:	60	ppmvd	Permit Limit (NSPS Subpart Ja)
Hours of Operation:	8760	hr/yr	

Pollutant	Emission Factor	Units	Potential Emissions (lb/hr) [1]	Potential Emissions (tpy) [2]	Emission Factor Reference
NO_X	0.118	lb/MMBtu	2.15	9.44	Vendor specification (32 ppm @ 15% O2)
SO_2	10.0	lb/MMscf	0.18	0.78	Permit Limit (NSPS Subpart Ja)
CO	0.082	lb/MMBtu	1.50	6.59	AP-42 Table 1.4-1
PM	0.0075	lb/MMBtu	0.14	0.60	AP-42 Table 1.4-2
PM_{10}	0.0075	lb/MMBtu	0.14	0.60	AP-42 Table 1.4-2
$PM_{2.5}$	0.0075	lb/MMBtu	0.14	0.60	AP-42 Table 1.4-2
VOC	0.0050	lb/MMBtu	9.14E-02	0.40	AP-42 Table 1.4-2
H_2SO_4	0.15	lb/MMscf	2.68E-03	1.17E-02	TRI calculation (1.5% of SO2 emissions)

[1] Potential Emissions (lb/hr) = Emission Factor (lb/MMBtu) x Firing Rate (MMBtu/hr) or
Potential Emissions (lb/hr) = Emission Factor (lb/MMscf) x Firing Rate (Mscf/hr) / 1000 Mscf/MMscf

[2] Emission Increase (tpy) = Potential Emissions (lb/hr) x Hours of Operation (hr/yr) / 2000 lb/ton

Attachment B-11
HAP Emission Calculations for Cogeneration HRSG

Constant	Value	Units	Reference
Incremental Firing Rate:	18.27	MMBtu/hr	Rated capacity
	17.91	Mscf/hr	Calculated
Fuel HHV:	1020	Btu/scf	Engineering estimate
Fuel H_2S Content:	60	ppmvd	Permit Limit (NSPS Ja)
Hours of Operation:	8760	hr/yr	

Hazardous Air Pollutant (HAP)	Emission Factor [1]	Units	Emissions Increase (lb/hr)	Emissions Increase (tpy)
Lead	5.00E-04	lb/MMscf	8.96E-06	3.92E-05
Acenaphthene	1.80E-06	lb/MMscf	3.22E-08	1.41E-07
Acenaphthylene	1.80E-06	lb/MMscf	3.22E-08	1.41E-07
Acetaldehyde	1.22E-02	lb/MMscf	2.19E-04	9.60E-04
Acrolein	1.73E-02	lb/MMscf	3.11E-04	1.36E-03
Antimony	5.30E-04	lb/MMscf	9.50E-06	4.16E-05
Anthracene	2.40E-06	lb/MMscf	4.30E-08	1.88E-07
Barium	4.30E-06	lb/MMscf	7.70E-08	3.37E-07
Benzene	2.10E-03	lb/MMscf	3.76E-05	1.65E-04
Benzo(a)anthracene	1.80E-06	lb/MMscf	3.22E-08	1.41E-07
Benzo(a)pyrene	1.20E-06	lb/MMscf	2.15E-08	9.42E-08
Benzo(b)fluoranthene	1.80E-06	lb/MMscf	3.22E-08	1.41E-07
Benzo(g,h,i)perylene	1.20E-06	lb/MMscf	2.15E-08	9.42E-08
Benzo(k)fluoroanthene	1.80E-06	lb/MMscf	3.22E-08	1.41E-07
Beryllium	1.20E-05	lb/MMscf	2.15E-07	9.42E-07
n-Butane	2.10E+00	lb/MMscf	3.76E-02	1.65E-01
Cadmium	1.10E-03	lb/MMscf	1.97E-05	8.63E-05
Chromium (total)	1.40E-03	lb/MMscf	2.51E-05	1.10E-04
Chrysene	1.80E-06	lb/MMscf	3.22E-08	1.41E-07
Cobalt	8.40E-05	lb/MMscf	1.50E-06	6.59E-06
Copper	8.50E-04	lb/MMscf	1.52E-05	6.67E-05

Attachment B-11
HAP Emission Calculations for Cogeneration HRSG

Constant	Value	Units	Reference
Incremental Firing Rate:	18.27	MMBtu/hr	Rated capacity
	17.91	Mscf/hr	Calculated
Fuel HHV:	1020	Btu/scf	Engineering estimate
Fuel H_2S Content:	60	ppmvd	Permit Limit (NSPS Ja)
Hours of Operation:	8760	hr/yr	

Hazardous Air Pollutant (HAP)	Emission Factor [1]	Units	Emissions Increase (lb/hr)	Emissions Increase (tpy)
Dibenz(a,h)anthracene	1.20E-06	lb/MMscf	2.15E-08	9.42E-08
1,4-Dichlorobenzene(p)	1.20E-03	lb/MMscf	2.15E-05	9.42E-05
7,12-DImethylbenz(a)anthracene	1.60E-05	lb/MMscf	2.87E-07	1.26E-06
Ethyl benzene	1.63E-02	lb/MMscf	2.92E-04	1.28E-03
Fluoranthene	3.00E-06	lb/MMscf	5.37E-08	2.35E-07
Fluorene	2.80E-06	lb/MMscf	5.02E-08	2.20E-07
Formaldehyde	7.50E-02	lb/MMscf	1.34E-03	5.88E-03
Hydrogen Sulfide	8.67E-02	lb/MMscf	1.55E-03	6.80E-03
Indeno(1,2,3-cd)pyrene	1.80E-06	lb/MMscf	3.22E-08	1.41E-07
Manganese	3.80E-04	lb/MMscf	6.81E-06	2.98E-05
Mercury	2.60E-04	lb/MMscf	4.66E-06	2.04E-05
3-Methylchloranthrene	1.80E-06	lb/MMscf	3.22E-08	1.41E-07
2-Methylnapthalene	2.40E-05	lb/MMscf	4.30E-07	1.88E-06
Molybdenum	1.10E-03	lb/MMscf	1.97E-05	8.63E-05
Naphthalene	6.10E-04	lb/MMscf	1.09E-05	4.79E-05
Nickel	2.10E-03	lb/MMscf	3.76E-05	1.65E-04
Phenanthrene	1.70E-05	lb/MMscf	3.05E-07	1.33E-06
Phosphorus	6.53E-04	lb/MMscf	1.17E-05	5.12E-05
Propane	1.60E+00	lb/MMscf	2.87E-02	1.26E-01
Pyrene	5.00E-06	lb/MMscf	8.96E-08	3.92E-07
Selenium	2.40E-05	lb/MMscf	4.30E-07	1.88E-06

Attachment B-11
HAP Emission Calculations for Cogeneration HRSG

Constant	Value	Units	Reference
Incremental Firing Rate:	18.27	MMBtu/hr	Rated capacity
	17.91	Mscf/hr	Calculated
Fuel HHV:	1020	Btu/scf	Engineering estimate
Fuel H_2S Content:	60	ppmvd	Permit Limit (NSPS Ja)
Hours of Operation:	8760	hr/yr	

Hazardous Air Pollutant (HAP)	Emission Factor [1]	Units	Emissions Increase (lb/hr)	Emissions Increase (tpy)
Toluene	0.003	lb/MMscf	6.09E-05	2.67E-04
Vanadium	0.002	lb/MMscf	4.12E-05	1.80E-04
Xylenes (isomers and mixture)	0.026	lb/MMscf	4.57E-04	2.00E-03
Zinc	0.029	lb/MMscf	5.19E-04	2.28E-03
Total Emissions (tpy)				**3.12E-01**

[1] HAPs from RTI International's Emission Estimation Protocol for Petroleum Refineries, version 2.1, April 2011 - Table 4-3.

Attachment B-12
Incremental Utilization Calculations for Sulfur Recovery Unit (SRU)

Quantity	Value	Units	Reference
Additional sulfur in feed:	45.2	lb/day	2 lb/hr H_2S increase; MW sulfur = 32.065, MW H_2S = 34.0809
	8.24	ton/yr	Calculated
Recovery:	95%		Permit condition II.B.2.b.1
Sulfur Emissions:	0.41	ton/yr	Calculated using recovery
SO_2 Emissions:	0.82	ton/yr	Calculated by stoichiometry (S to SO2)
Hours of Operation:	8760	hr/yr	

Pollutant	Emission Increase (lb/hr) (1)	Emission Increase (tpy)	Reference
SO_2	0.19	0.82	Calculated
H_2SO_4	2.52E-06	1.10E-05	TRI calculation (0.001% of SO_2 emissions)

(1) Emission Increase (lb/hr) = Emission Increase (tpy) / Hours of Operation (hr/yr) * 2000 lb/ton

Attachment B-13
HAP Emission Calculations for Incremental Utilization for Sulfur Recovery Unit (SRU)

Constant	Value	Units
Additional sulfur in feed:	8.24	ton/yr

Pollutant	Emission Factor	Units	Potential Emissions [1] (lb/hr)	Potential Emissions [2] (tpy)	Emission Factor Reference [3]
Carbon Disulfide	0.04	lb/LT	3.36E-05	1.47E-04	EEP, Section 5 - Sulfur Recovery Plants, Table 5-7
Carbonyl Sulfide	0.12	lb/LT	1.01E-04	4.42E-04	EEP, Section 5 - Sulfur Recovery Plants, Table 5-8

[1] Potential Emissions (lb/hr) = Potential Sulfur Increase (tons/yr) * Emission Factor (lb/LT) * 0.8928 LT/short ton * year/8,760 hours

[2] Potential Emissions (tpy) = Potential Emissions (lb/hr) * 8,760 hours/year * 1 ton/2000 lb

[3] EEP is the Emissions Estimation Protocol for Petroleum Refineries

Attachment B-14

Potential to Emit Calculations for New Equipment in VOC Service at the Existing GHT

Components (service)[1]	New Count	Emission Factor[2] (kg/hr/source)	Emission Factor[2] (lb/hr/source)	Control Effectiveness[3] (%)	VOC Emissions (lbs/yr)	VOC Emissions (Tons/yr)
Valves (gas)	36	0.0268	0.059	96	745	0.37
Valves (LL)	59	0.0109	0.024	95	621	0.31
Valves (HL)	0	0.00023	0.0005	0	-	-
Flanges (gas)	43	0.00025	0.0006	81	39	0.02
Flanges (LL)	65	0.00025	0.0006	81	60	0.03
Flanges (HL)	0	0.00025	0.0006	81	-	-
Pump Seals (LL)	0	0.114	0.25	88	-	-
Pump Seals LL (Tandem)	0	0.114	0.25	100	-	-
Pump Seal (HL)	0	0.021	0.046	0	-	-
Comp. Seals (gas)	0	0.636	1.4	100	-	-
Comp. Seals (H_2)	0	0.636	1.402	100	-	-
Process Drains (total)	0	0.073	0.161	100	-	-
Relief Valves (gas)	0	0.16	0.35	100	-	-
Total	203				1,465	0.73

(1) Gas = material in a gaseous state at operating conditions
LL = light liquid = material in a liquid state in which the sum of the concentration of individual constituents with a vapor pressure over 0.3 kilopascals (kPa) at 20 °C is greater than or equal to 20 weight percent.
HL = heavy liquid = not in gas/vapor service or light liquid service.

(2) Protocol for Equipment Leak Emission Estimates, November 1995,
Table 2-2. Refinery Average Emission Factors.

(3) Protocol for Equipment Leak Emission Estimates, November 1995,
Table 5-3. Control Effectiveness for an LDAR Program at a Refinery Process Unit.
Monitored under the Consent Decree leak definition of 500 pppm, quarterly with no chance for skip monitoring. Equivalent to HON regulation.

Attachment B-15

Potential to Emit Calculations for New Equipment in VOC Service at the Existing BCLR and Refinery Tank Farm

Components (service)[1]	New Count	Emission Factor[2] (kg/hr/source)	Emission Factor[2] (lb/hr/source)	Control Effectiveness[3] (%)	VOC Emissions (lbs/yr)	VOC Emissions (Tons/yr)
Valves (gas)	24	0.0268	0.059	96	497	0.25
Valves (LL)	215	0.0109	0.024	95	2,263	1.13
Valves (HL)	0	0.00023	0.0005	0	-	-
Flanges (gas)	34	0.00025	0.0006	81	31	0.02
Flanges (LL)	281	0.00025	0.0006	81	258	0.13
Flanges (HL)	0	0.00025	0.0006	81	-	-
Pump Seals (LL)	8	0.114	0.25	88	2,114	1.06
Pump Seals LL (Tandem)	0	0.114	0.25	100	-	-
Pump Seal (HL)	0	0.021	0.046	0	-	-
Comp. Seals (gas)	3	0.636	1.4	100	-	-
Comp. Seals (H_2)	0	0.636	1.402	100	-	-
Process Drains (total)	0	0.073	0.161	100	-	-
Relief Valves (gas)	0	0.16	0.35	100	-	-
Total	565				5,162	2.58

(1) Gas = material in a gaseous state at operating conditions
LL = light liquid = material in a liquid state in which the sum of the concentration of individual constituents with a vapor pressure over 0.3 kilopascals (kPa) at 20 °C is greater than or equal to 20 weight percent.
HL = heavy liquid = not in gas/vapor service or light liquid service.

(2) Protocol for Equipment Leak Emission Estimates, November 1995,
Table 2-2. Refinery Average Emission Factors.

(3) Protocol for Equipment Leak Emission Estimates, November 1995,
Table 5-3. Control Effectiveness for an LDAR Program at a Refinery Process Unit.
Monitored under the Consent Decree leak definition of 500 pppm, quarterly with no chance for skip monitoring. Equivalent to HON regulation.

Attachment B-16
Potential to Emit Calculations for New Equipment in VOC Service at the Existing Alkylation Unit

Components (service)[1]	New Count	Emission Factor[2] (kg/hr/source)	Emission Factor[2] (lb/hr/source)	Control Effectiveness[3] (%)	VOC Emissions (lbs/yr)	VOC Emissions (Tons/yr)
Valves (gas)	0	0.0268	0.059	96	-	-
Valves (LL)	20	0.0109	0.024	95	211	0.11
Valves (HL)	0	0.00023	0.0005	0	-	-
Flanges (gas)	0	0.00025	0.0006	81	-	-
Flanges (LL)	60	0.00025	0.0006	81	55	0.03
Flanges (HL)	0	0.00025	0.0006	81	-	-
Pump Seals (LL)	1	0.114	0.25	88	264	0.13
Pump Seals LL (Tandem)	0	0.114	0.25	100	-	-
Pump Seal (HL)	0	0.021	0.046	0	-	-
Comp. Seals (gas)	0	0.636	1.4	100	-	-
Comp. Seals (H_2)	0	0.636	1.402	100	-	-
Process Drains (total)	0	0.073	0.161	100	-	-
Relief Valves (gas)	0	0.16	0.35	100	-	-
Total	81				530	0.26

(1) Gas = material in a gaseous state at operating conditions
LL = light liquid = material in a liquid state in which the sum of the concentration of individual constituents with a vapor pressure over 0.3 kilopascals (kPa) at 20 °C is greater than or equal to 20 weight percent.
HL = heavy liquid = not in gas/vapor service or light liquid service.

(2) Protocol for Equipment Leak Emission Estimates, November 1995,
Table 2-2. Refinery Average Emission Factors.

(3) Protocol for Equipment Leak Emission Estimates, November 1995,
Table 5-3. Control Effectiveness for an LDAR Program at a Refinery Process Unit.
Monitored under the Consent Decree leak definition of 500 pppm, quarterly with no chance for skip monitoring. Equivalent to HON regulation.

Attachment B-17
Potential to Emit for New Storage Tanks

Product Stored	HCN	URL Gasoline
Tank ID	**T-248**	**T-205**
Roof Type	**IFRT**	**IFRT**
Throughput (bpd)	12,000	24,000
Annual Throughput (bpy)	4,380,000	8,760,000
Tank Volume (bbl)	60,000	80,000
Tank Volume (gal)	2,520,000	3,360,000
D (ft)	120	120
Height (ft)	36	48
RVP	7.0	13.5
ASTM Slope	2.5	3.0
Turnovers (#/yr)	73.00	109.50
Annual Emissions during Normal Operations (from TankESP) [1]		
Working Losses (lb VOC/yr)	351.63	615.35
Standing Losses (lb VOC/yr)	3,391.04	7,761.42
Emissions during Tank Inspection Event (see calculations below)		
Landing Losses (lb VOC/yr)	1,141.12	3,798.00
Refilling Losses (lb VOC/yr)	2,265.67	4,273.96
Cleaning/Degassing Emissions (lb VOC/yr)	163.69	369.53
Total Losses (lb VOC/yr)	7,313.13	16,818.26
Total Losses (tpy VOC)	3.66	8.41

[1] Storage tank emissions are calculated using TankESP, which is a software tool developed by the TGB Partnership as an alternative to the US EPA's TANKS 4.09d software. Both Tank ESP and US EPA's TANKS 4.09d are based on the methodology described in AP-42, Chapter 7.1, Organic Liquid Storage Tanks.

Attachment B-17
Potential to Emit for New Storage Tanks

Emissions during Tank Inspection Event

(1) Standing Idle Losses (Equation 2-16 of AP-42 Chapter 7.1)

$L_{SL} = n_D*K_E*(P*V_V/R*T)*M_V*K_S$

	T-248	T-205	
Warmest Month:	July	July	Based on Tank ESP Salt Lake City, UT data for July.
Temperature:	66.4	66.4	°F
n_D:	5	5	number of days standing idle
D:	120	120	tank Diameter, ft
P*:	0.148	0.454	vapor pressure function, eqn. (2-18), unitless
Pa:	12.6	12.6	Tank ESP atmospheric pressure, psia
P:	3.90	8.19	true vapor pressure of material, psia
M_V:	69.00	62.00	vapor molecular weight
R:	10.731	10.731	ideal gas constant
V_V:	76341	76341	vapor space volume under landed floating roof - assuming high leg setting of 7 feet and 3 inches of product remaining, ft3
K_S:	0.42	0.25	vented vapor saturation factor, eqn. (1-20), unitless
B:	5605.16	5015.72	vapor pressure constant, Figure 7.1-15, unitless
K_E:	0.15	0.43	vapor space expansion factor, eqn. (2-31), unitless
L_{SL}:	1141.12	3798.00	standing idle VOC emissions, eqn (2-16), lbs

Attachment B-17

Potential to Emit for New Storage Tanks

(2) Refill Losses (Equation 2-26 of AP-42 Chapter 7.1)

$L_{FL} = (P*V_V/R*T)*M_V*S$

	T-248	T-205	
P:	3.90	8.19	true vapor pressure material, psia
Vv:	79,168	79,168	vapor space volume under landed floating roof - assuming high leg setting of 7 feet, ft3
R	10.731	10.731	ideal gas constant
T	526	526	refill temp, R
MWv:	69.00	62.00	molecular weight of vapor
S:	0.60	0.60	saturation constant, eqn. (2-26)
Losses:	2265.67	4273.96	refilling VOC emissions, eqn. (lbs)

(3) Tank Degassing Losses: Initial Vapor Space Purge + Air Driven Losses (API 2568, Appendix A)

$L_P = (P*V_V/R*T)*M_V*S * (1 - \text{Control Efficiency})$

	T-248	T-205	
n:	1	1	days of forced ventilation (i.e. number of volume turnovers)
P:	3.90	8.19	true vapor pressure of stored material, psia
Vv:	78,697	78,697	volume of the vapor space, assuming 0.5 inches of product remaining, ft3
R:	10.731	10.731	ideal gas constant
T:	526	526	average temperature, R
Mv:	69.00	62.00	vapor molecular weight
S:	0.5	0.5	saturation factor, partial liquid heel
Control Efficiency:	95%	95%	VOC control efficiency [(A)]
Losses:	93.84	177.02	forced ventilation emissions (lbs)

Attachment B-17
Potential to Emit for New Storage Tanks

$L_{SR} = 0.57*(n_{SR})*(D)*(P^*)*(M_V)$

	T-248	T-205	
n_{SR}:	2	2	number of days, forced ventilation after initial vapor space purge[B]
D:	120	120	diameter of tank, ft
P*:	0.148	0.454	vapor pressure function
M_v:	69.00	62.00	vapor molecular weight
Control Efficiency:	95%	95%	VOC control efficiency[A]
L_{SR}:	69.84	192.50	air driven losses - sludge removal emissions, lbs

Note:

(A) Control efficiency applied for

(B) Number of days of cleaning activities based typical time frames provided in vendor quotes. This also assumes that once the forced ventilation of the tanks are complete, any remaining vapors result in negligible emissions.

Attachment B-17
Potential to Emit for New Storage Tanks

Hazardous Air Pollutant Emissions

Routine Operations Total VOC (lb/yr)	HCN T-248	URL Gasoline T-205
	3,742.66	**8,376.77**
n-Hexane	20.05	150.92
Benzene	11.90	47.75
Cyclohexane	2.65	34.17
Toluene	29.63	61.15
EthylBenzene	5.37	3.79
m-xylene	30.73	20.81
Cumene/Isopropyl benzene	10.00	2.58
Naphthalene	1.20	-
2,2,4-Trimethylpentane	1.37	18.07

Landing, Cleaning, Refilling Operations VOC (lb/yr)	HCN T-248	URL Gasoline T-205
	3,570.47	**8,441.50**
n-Hexane	19.12	152.08
Benzene	11.36	48.12
Cyclohexane	2.53	34.44
Toluene	28.27	61.62
EthylBenzene	5.12	3.81
m-xylene	29.32	20.97
Cumene/Isopropyl benzene	9.54	2.60
Naphthalene	1.15	-
2,2,4-Trimethylpentane	1.30	18.21

Attachment B-17
Potential to Emit for New Storage Tanks

Potential to Emit for Hazardous Air Pollutants (lb/yr)

Hazardous Air Pollutant	T-248	T-205	Total
n-Hexane	39.17	303.00	342.18
Benzene	23.26	95.87	119.13
Cyclohexane	5.18	68.61	73.79
Toluene	57.90	122.76	180.67
EthylBenzene	10.49	7.60	18.09
m-xylene	60.05	41.79	101.84
Cumene/Isopropyl benzene	19.54	5.17	24.71
Naphthalene	2.35	-	2.35
2,2,4-Trimethylpentane	2.67	36.28	38.95

Attachment B-18
Incremental Utilization Calculations for Storage Tank T-331

Calculation for VOC Withdrawl Losses from Floating Roof Storage Tanks [1]

$$L_{WD} = \frac{0.943 \times Q \times C \times W_L}{D \times \left(1 + \frac{N_C F_C}{D}\right)}$$

Where:

L_{WD} = withdrawal loss, lb/yr
Q = annual throughput, bbl/yr
C = clingage factor, bbl/1,000 ft^2 see table
W_L = average organic liquid density, lb/gal
D = tank diameter, ft
0.943 = constant, 1,000 ft^3*gal/bbl^2
N_C = number of fixed roof support columns, dimensionless
F_C = effective column diameter, ft (column perimeter [ft]/π)

Product Stored	Light Rust C (bbl/1,000 ft^2)
Single Component Stocks	0.0015

$$L_{WD} = 0.001 \times M_V \times P_{VA} \times Q \times K_N \times K_P$$

Product Stored	Alkylate	
Tank ID	TK 331	
Roof Type	IFRT	Information Source/Notes
Q (bbl)	292,000	800 bbl/d increase
C	0.0015	AP-42 Chapter 7, Table 7.1-10
W_L (lb/gal)	6.1	TankESP - Stock Composition
D (ft)	86	TankESP, listed diameter
N_C	6	AP-42 Chapter 7, IFRT
F_C (ft)	2	AP-42 Chapter 7, IFRT
L_{WD} (lb/yr) [2]	33.38	
Total VOC (lbs)	33.38	
Total VOC Increase (tpy)	**0.02**	

Notes:
[1] Equation per AP-42 Chapter 7, Equation 2-4 and Table 7.1-10
[2] Calculations represent the incremental increase in VOC emissions attributed to the withdrawal losses for the project.

Hazardous Air Pollutant Emissions

Withdrawal Loss Total VOC (lb/yr)	Alkylate TK 331 33.38
Benzene	7.62E-04
1,3-Butadiene	6.51E-02
Cumene	1.40E-07
Ethyl benzene	2.28E-07
Hexane	7.87E-02
Naphthalene	6.93E-09
Styrene	5.82E-05
Toluene	2.09E-02
1,2,4- Trimethylbenzene	5.69E-08
2,2,4-Trimethylpentane	7.04E-01
Xylenes (isomers and mixture)	3.04E-04

Attachment C

UDAQ NOI Forms and Checklist

Utah Division of Air Quality
New Source Review Section

Date April 2017

Form 1
Notice of Intent (NOI)

Application for: ☐Initial Approval Order ☒Approval Order Modification

APPROVAL ORDER MUST BE ISSUED BEFORE ANY CONSTRUCTION OR INSTALLATION CAN BEGIN. This is not a stand alone document; please refer to UAC R307-401and the published NOI guidebook for information on requirements of the specified information below. Please print or type all information requested. All outlined information requested must be accurate and completed before DAQ can determine that an NOI is complete and an engineering review can be initiated. If you have any questions, contact the Division of Air Quality at (801) 536-4000 and ask to speak with a New Source Review Engineer. Written inquiries may be addressed to: Division of Air Quality, New Source Review Section, P.O. Box 144820, Salt Lake City, Utah 84114-4820.

General Owner and Facility Information	R307-401-5(2)(k)
1. Filing Fee Paid*	2. Application Fee Paid*
3. Company name and address: Tesoro Refining & Marketing Company LLC 474 West 900 North Salt Lake City, UT 84103 Phone No.: (801)366-2036 Fax No.: (801)521-4965	4. Company** contact for environmental matters: Michelle Bujdoso Phone no.: (801)366-2036 Email: michelle.d.bujdoso@tsocorp.com *** Company contact only; consultant or independent contractor contact information can be provided in a cover letter*
5. Facility name and address (if different from above): Tesoro Refining & Marketing Company LLC 474 West 900 North Salt Lake City, UT 84103 Phone no.: (801)366-2036 Fax no.: (801)521-4965	6. Owners name and address: Tesoro Corporation 19100 Ridgewood Parkway San Antonio, TX 78259 Phone no.: Fax no.:
7. Property Universal Transverse Mercator coordinates (UTM), including System and Datum: Easting: 423,400 Northing: 4,515,950 System: UTM Zone 12 Datum:	8. County where the facility is located in: Salt Lake 9. Standard Industrial Classification Code: 29

10. Designation of facility in an attainment, maintenance, or nonattainment area(s):

SL City CO Maint Area
SL Co Ozone Maint Area
SL Co PM10 NAA
SL Co PM2.5 NAA
SL Co SO2 NAA

11. If request for modification, AO# to be modified: DAQE#DAQE-AN103350071-16 Date: 6/20/16
DAQE-AN0103350042-08 Date: 5/13/08

12. Identify any current Approval Order(s) for the facility **not** being modified with this request:

AO#DAQE-AN156590003-16 Date10/13/16
AO# Date
AO# Date
AO# Date

13. Application for:

- ☐ New construction
- ☐ Existing equipment operating without permit
- ☐ Change of permit condition
- ☒ Modification
- ☐ Permanent site for Portable Approval Order
- ☐ Change of location

14. Construction or modification estimated start date: 2018 Estimated completion date: 2019

R307-401-5(2)(h)

15. Does this application contain justifiable confidential data? ☐ Yes ☒ No

16. Current Title V (Operating Permit) Identification: N/A Date

☒ Requesting an enhanced Title V permit with this AO modification

17. Brief (50 words or less) description of project to post on DAQ web for public awareness

This Notice of Intent (NOI) package is submitted for approval of modifications to achieve compliance with the United States Environmental Protection Agency's (EPA) Tier 3 gasoline sulfur regulations at the Tesoro Refining & Marketing Company LLC (Tesoro) Salt Lake City (SLC) Refinery.

Process Information

18. Appendix A: Detailed description of project including process flow diagram (See Forms 2-23) **See Appendix C**

- ☐ Fuels and their use
- ☐ Equipment used in process
- ☐ Description of product(s)
- ☐ Raw materials used
- ☐ Description of changes to process (if applicable)
- ☐ Stack parameters
- ☐ Operation schedules
- ☐ Production rates (including daily/seasonal variances)

R307-401-5(2)(a)

19. Appendix B: Site plan of facility with all emission points and elevations, building dimensions, stack parameters included See Attachment A

R307-401-5(2)(e)

Emissions Information

20. Appendix C: Emission Calculations that must include: See Attachment B
    - [X] Emissions per new/modified unit for each of the following: PM_{10}, $PM_{2.5}$, NO_x, SO_x, CO, VOC, and HAPs
    - [X] Designation of fugitive and non fugitive emissions
    - [ ] Major GHG Sources: Emissions per new/modified unit for GHGs (in CO_2e short tons per year)
    - [X] References/assumptions for each Emission Factor used in calculating Criteria pollutant, HAP, and GHG emissions
    - [X] HAP emissions (in pounds per hour and tons per year) broken out by specific pollutant and summed as a total

    R307-401-5(2)(b)

21. Appendix D: DAQ Form 1a or equivalent (comparison of existing emissions to proposed emission and resulting new total emissions)

22. Appendix E: Source Size determination (Minor, Synthetic Minor, Major, or PSD)
    - [X] If an Existing Major Source: Determination of Minor, Major or PSD modification

23. Appendix F: Offset requirements (nonattainment/maintenance areas)
    - [ ] Acquired required offsets

    R307-401-420 & R307-401-421

Air Pollution Control Equipment Information

24. Appendix G: Best Available Control Technology (BACT) analysis for the proposed source or modification
    See Section 5.0-8.0 R307-401-5(2)(d)

25. Appendix H: Detailed information on all new/modified equipment controls. It is strongly recommended using DAQ forms as they outline required information, but something equivalent to the DAQ forms is acceptable.
    See Section 2.0 R307-401-5(2)(c)

26. Appendix I: Discussion of Federal/State requirement applicability (NAAQS, SIP, NSPS, NESHAP, etc)
    See Section 4.0

Modeling Information

27. Appendix J: Emissions Impact Analysis (if applicable) Not Applicable R307-410-4

Electronic NOI

28. A complete and accurate electronic NOI submitted To be provided

    R307-401-5(1)

I hereby certify that the information and data submitted in and with this application is completely true, accurate and complete, based on reasonable inquiry made by me and to the best of my knowledge and belief.

Signature: Karma M. Thomson Title: VP, SLC Refinery

Name (print) Karma M. Thomson	Telephone Number: 801.521.4813	Date: May 3, 2017

*with the exception of Federal Agencies who will be billed at completion of the project

Utah Division of Air Quality
New Source Review Section

Form 20
Organic Liquid Storage Tank

Company: _____
Site/Source: _____
Date: _____

Equipment

1. Tank manufacturer: TBD	2. Identification number: T-205
3. Installation date: 2018	4. Volume: 3,360,000 gallons
5. Inside tank diameter: 120 feet	6. Tank height: 48 feet
7. True vapor pressure of liquid: 8.19 psia	8. Reid vapor pressure of liquid: 13.5 psi
9. Outside color of tank: White	10. Maximum storage temperature: 66.4 °F
11. Average throughput: 367,920,000 gallons per year	12. Turnovers/yearly 109.5 Monthly ____ Weekly ____
13. Average liquid height (feet): _____	14. Access hatch: ☒ Yes ☐ No Number 1

15. Type of Seals:

a. Primary seals:
- ☒ Mechanical shoe
- ☐ Resilient filled
- ☐ Liquid filled
- ☐ Vapor mounted
- ☐ Liquid mounted
- ☐ Flexible wiper

b. Secondary seal:
Type: Rim-mounted

16. Deck Fittings:

Gauge float well	☒ Yes	☐ No	Number 1
Gauge hatch/ sample well	☐ Yes	☒ No	Number ____
Roof drains	☐ Yes	☒ No	Number ____
Rim vents	☐ Yes	☒ No	Number ____
Vacuum break	☒ Yes	☐ No	Number 1
Roof leg	☒ Yes	☐ No	Number 41
Ladder well	☒ Yes	☐ No	Number 1
Column well	☒ Yes	☐ No	Number 7

Other: _____

17. Shell Characteristics:

Condition: Good
Breather Vent Settings: -0.03/0.03
Tank Construction: Welded
Roof Type: Steel pan
Deck Construction: Welded
Deck Fitting Category: Typical

18. Type of Construction:

- ☐ Vertical Fixed Roof
- ☐ Horizontal Fixed Roof
- ☒ Internal Floating Roof
- ☐ External Floating Roof
- ☐ Other (please specify) _____

19. Additional Controls:

☐ Gas Blanket ☐ Venting ☐ Carbon Adsorption ☐ Thermal Oxidation ☐ Other: _____

20. Single Liquid Information

Liquid Name: Gasoline	Liquid Name: _____
CAS Number: Refer to Attachment B for	CAS Number: _____
Avg. Temperature: more information	Avg. Temperature: _____
Vapor Pressure: _____	Vapor Pressure: _____
Liquid Molecular Weight: _____	Liquid Molecular Weight: _____

Form 20 - Organic Liquid Storage Tank
(Continued)

21. **Chemical Components Information**	
Chemical Name: _____	Chemical Name: _____
Percent of Total Liquid Weight: _____	Percent of Total Liquid Weight: _____
Molecular Weight: Refer to Attachment B	Molecular Weight: _____
Avg. Liquid Temperature: for more information	Avg. Liquid Temperature: _____
Vapor Pressure: _____	Vapor Pressure: _____

Emissions Calculations (PTE)

22. Calculated emissions for this device: Refer to Attachment B for more information

VOC _____Lbs/hr_____ Tons/yr

HAPs_____Lbs/hr (speciate)_____Tons/yr (speciate)

Submit calculations as an appendix. Provide Material Safety Data Sheets for products being stored.

Instructions

Note: 1. **Submit this form in conjunction with Form 1 and Form 2.**
2. Call the Division of Air Quality (DAQ) at **(801) 536-4000** if you have problems or questions in filling out this form. Ask to speak with a New Source Review engineer. We will be glad to help!

1. Indicate the tank manufacturer's name.
2. Supply the equipment identification number that will appear on the tank.
3. Indicate the date of installation.
4. Indicate the capacity of the tank in gallons or barrels.
5. Specify the inside tank diameter in feet.
6. Specify the tank height in feet.
7. Indicate the true vapor pressure of the liquid (psia).
8. Indicate the Reid vapor pressure of the liquid (psi).
9. Indicate the outside color of the tank.
10. Supply the highest temperature the liquid will reach during storage (degrees Fahrenheit).
11. Indicate average annual throughput (gallons).
12. Specify how many times the tank will be emptied and refilled per year, month or week.
13. Specify the average liquid height (feet).
14. Indicate whether or not the tank has access hatches and the number.
15. Indicate what type of seals the tank has.
16. Indicate what types of deck fittings are installed.
17. Specify condition of the tank, also include the following:
    - Breather vent settings in (psig) for fixed roof tanks
    - Tank construction, welded or riveted
    - Roof type; pontoon, double deck, or self-supporting roof
    - Deck construction; bolted or welded, sheet or panel construction sizes and seam length
    - Deck fitting category; typical, controlled, or detail
18. Indicate the type of tank construction.
19. Indicate other types of additional controls which will be used.
20. Provide information on liquid being stored, add additional sheets as necessary.
21. Provide information on chemicals being stored, add additional sheets as necessary.
22. Supply calculations for all criteria pollutants and HAPs. Use AP-42 or manufacturers' data to complete your calculations.

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Revised 12/20/10

Utah Division of Air Quality
New Source Review Section

Form 20
Organic Liquid Storage Tank

Company: _____
Site/Source: _____
Date: _____

Equipment

1. Tank manufacturer: TBD	2. Identification number: T-248
3. Installation date: 2018	4. Volume: 2,520,000 gallons
5. Inside tank diameter: 120 feet	6. Tank height: 36 feet
7. True vapor pressure of liquid: 3.90 psia	8. Reid vapor pressure of liquid: 7 psi
9. Outside color of tank: White	10. Maximum storage temperature: 66.4 °F
11. Average throughput: 183,960,000 gallons per year	12. Turnovers/yearly 73.0 Monthly ____ Weekly ____
13. Average liquid height (feet): _____	14. Access hatch: ☒ Yes ☐ No Number 1

15. Type of Seals:
- a. Primary seals:
  - ☒ Mechanical shoe
  - ☐ Resilient filled
  - ☐ Liquid filled
  - ☐ Vapor mounted
  - ☐ Liquid mounted
  - ☐ Flexible wiper
- b. Secondary seal:
  - Type: Rim-mounted

16. Deck Fittings:

Gauge float well	☒ Yes	☐ No	Number 1
Gauge hatch/ sample well	☐ Yes	☒ No	Number ____
Roof drains	☐ Yes	☒ No	Number ____
Rim vents	☐ Yes	☒ No	Number ____
Vacuum break	☒ Yes	☐ No	Number 1
Roof leg	☒ Yes	☐ No	Number 41
Ladder well	☒ Yes	☐ No	Number 1
Column well	☒ Yes	☐ No	Number 7

Other: _____

17. Shell Characteristics:
- Condition: Good
- Breather Vent Settings: -0.03/0.03
- Tank Construction: Welded
- Roof Type: Steel pan
- Deck Construction: Welded
- Deck Fitting Category: Typical

18. Type of Construction:
- ☐ Vertical Fixed Roof
- ☐ Horizontal Fixed Roof
- ☒ Internal Floating Roof
- ☐ External Floating Roof
- ☐ Other (please specify) _____

19. Additional Controls:
☐ Gas Blanket ☐ Venting ☐ Carbon Adsorption ☐ Thermal Oxidation ☐ Other: _____

20. Single Liquid Information

Liquid Name: Heavy Cat Naphtha	Liquid Name: _____
CAS Number: Refer to Attachment B for	CAS Number: _____
Avg. Temperature: more information	Avg. Temperature: _____
Vapor Pressure: _____	Vapor Pressure: _____
Liquid Molecular Weight: _____	Liquid Molecular Weight: _____

Form 20 - Organic Liquid Storage Tank
(Continued)

21. **Chemical Components Information**	
Chemical Name: _____	Chemical Name: _____
Percent of Total Liquid Weight: _____	Percent of Total Liquid Weight: _____
Molecular Weight: Refer to Attachment B	Molecular Weight: _____
Avg. Liquid Temperature: for more information	Avg. Liquid Temperature: _____
Vapor Pressure: _____	Vapor Pressure: _____

Emissions Calculations (PTE)

22. Calculated emissions for this device: Refer to Attachment B for more information

VOC _____Lbs/hr_____ Tons/yr

HAPs_____Lbs/hr (speciate)_____Tons/yr (speciate)

Submit calculations as an appendix. Provide Material Safety Data Sheets for products being stored.

Instructions

Note: 1. **Submit this form in conjunction with Form 1 and Form 2.**
2. Call the Division of Air Quality (DAQ) at **(801) 536-4000** if you have problems or questions in filling out this form. Ask to speak with a New Source Review engineer. We will be glad to help!

1. Indicate the tank manufacturer's name.
2. Supply the equipment identification number that will appear on the tank.
3. Indicate the date of installation.
4. Indicate the capacity of the tank in gallons or barrels.
5. Specify the inside tank diameter in feet.
6. Specify the tank height in feet.
7. Indicate the true vapor pressure of the liquid (psia).
8. Indicate the Reid vapor pressure of the liquid (psi).
9. Indicate the outside color of the tank.
10. Supply the highest temperature the liquid will reach during storage (degrees Fahrenheit).
11. Indicate average annual throughput (gallons).
12. Specify how many times the tank will be emptied and refilled per year, month or week.
13. Specify the average liquid height (feet).
14. Indicate whether or not the tank has access hatches and the number.
15. Indicate what type of seals the tank has.
16. Indicate what types of deck fittings are installed.
17. Specify condition of the tank, also include the following:
    - Breather vent settings in (psig) for fixed roof tanks
    - Tank construction, welded or riveted
    - Roof type; pontoon, double deck, or self-supporting roof
    - Deck construction; bolted or welded, sheet or panel construction sizes and seam length
    - Deck fitting category; typical, controlled, or detail
18. Indicate the type of tank construction.
19. Indicate other types of additional controls which will be used.
20. Provide information on liquid being stored, add additional sheets as necessary.
21. Provide information on chemicals being stored, add additional sheets as necessary.
22. Supply calculations for all criteria pollutants and HAPs. Use AP-42 or manufacturers' data to complete your calculations.

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Revised 12/20/10

Utah Division of Air Quality

Boxes indicate where information can be found in the applicaiton.

NOTICE OF INTENT

COMPLETENESS CHECKLIST

TO BE COMPLETED BY PROJECT ENGINEER WITHIN 30 DAYS OF RECEIPT OF THE NOTICE OF INTENT (NOI). CRITERIA DERIVED FROM R307-401-5, UTAH ADMINISTRATIVE CODE (UAC). ANY NEGATIVE RESPONSE WILL CAUSE APPLICATION TO BE DELAYED. ALL REFERENCES ARE TO THE UAC EXCEPT AS NOTED.

Project Name: Tier 3 Gasoline Compliance Project Date:

1.	Fees Paid				
	A. Filing Fee	Cover letter	Y ☐	N ☐	
	B. Application Fee		Y ☐	N ☐	
2.	Source Identification Information: [R307-401-5(2)(k)]				
	A. Name, address, and telephone number (w/area code)		Y ☐	N ☐	
	B. Company submitting application		Y ☐	N ☐	
	C. Plant manager and/or Company contact		Y ☐	N ☐	
	D. Plant (if different from Company)		Y ☐	N ☐	N/A ☐
	E. Company owner and agent	Form 1	Y ☐	N ☐	
	F. Property UTM coordinates	General information in Sections 1.0 and 2.1	Y ☐	N ☐	
	G. County where facility is located		Y ☐	N ☐	
	H. SIC Code(s)		Y ☐	N ☐	
	I. Facility area designation (attainment, maintenance, or nonattaiment)		Y ☐	N ☐	
3.	If modification, AO# to be modified [R307-401-5(2)(k)]	Form 1 Section 1.0	Y ☐	N ☐	N/A ☐
	A. Other current Approval Order(s) for facility not being modified		Y ☐	N ☐	N/A ☐
	B. Current Title V (Operating Permit)		Y ☐	N ☐	N/A ☐
4.	Purpose of application [R307-401-5(2)(a)]	Form 1 Section 1.0	Y ☐	N☐	
5.	Construction schedule [R307-401-5(2)(h)]	Form 1 Section 2.7	Y ☐	N ☐	N/A ☐
6.	Justifiable confidential data	Form 1	Y ☐	N ☐	N/A ☐
7.	Description of Source Process. [R307-401-5(2)]				
	A. Detailed description of project: [(Appendix A) (Forms 2-23)]				
	1. Fuels and their use		Y ☐	N ☐	
	2. Raw materials used		Y ☐	N ☐	N/A ☐
	3. Description of product(s)	Section 2.0 and subsections	Y ☐	N ☐	
	4. Equipment used in process		Y ☐	N ☐	
	5. Operation schedules		Y ☐	N ☐	
	6. Description of changes to process		Y ☐	N ☐	N/A ☐
	7. Production rates		Y ☐	N ☐	N/A ☐

B. Site plan of facility with, building dimensions, stack parameters included: (Appendix B) Y ☐ N ☐

1. Emission points and elevations — Attachment A — Y ☐ N ☐
2. Building dimensions — No stack parameters included (no modeling analysis) — Y ☐ N ☐ N/A ☐
3. Stack parameters — Y ☐ N ☐ N/A ☐

8. Emissions Related Information. [R307-401-(2)(b)]

A. Emission Calculations: (Appendix C)

1. Emissions per new/modified unit for all pollutants: (PM_{10}, $PM_{2.5}$ NO_x, SO_x, CO, VOC, and HAPs) — Section 3.0 and subsections; Attachment B — Y ☐ N ☐
2. Designation of fugitive and non-fugitive emissions — Y ☐ N ☐
3. Major GHG Sources: (in CO2e short tons per year) — Y ☐ N ☐ N/A ☐
4. References/assumptions for each calculation and pollutant — Y ☐ N ☐
5. HAP emissions (broken out by specific pollutant in pounds per hr) — Y ☐ N ☐ N/A ☐
6. Applicable Material Safety Data Sheets — Y ☐ N ☐

B. DAQ Form 1a or equivalent (Appendix D) — Attachment C — Y ☐ N ☐

C. Source size determination (Appendix E) — Section 3.0 and subsections

1. If Existing Major Source: Determination of Minor, Major, or PSD Modification — Y ☐ N ☐ N/A ☐

D. Offset requirements (nonattainment/maintenance areas) [(R307-401-420)(R307-401-421)] (Appendix F) — Sections 4.10, 4.11 (not applicable) — Y ☐ N ☐ N/A ☐

1. Acquired required offsets — Y ☐ N ☐ N/A ☐

9. Air Pollution Control Equipment — Section 4.5

A. Best Available Control Technology (BACT) Analysis [R307-401-5(2)(d), (Appendix G)] — Y ☐ N ☐

B. Detailed information on new/modified equipment controls [R307-401-5(2)(c), (Appendix H)] — Y ☐ N ☐

10. Federal/State requirement applicability [(NAAQS, SIP, NSPS, etc), (Appendix I) — Section 4.0 and subsections — Y ☐ N ☐ N/A ☐

11. Modeling information

A. Emissions Impact Analysis [(R307-410-4), (Appendix J)] — Section 4.9 — Y ☐ N ☐ N/A ☐

12. Signature on application (Form 1 Notice of Intent) — Form 1 — Y ☐ N ☐