Naval Facilities Engineering Systems Command

Naval Facilities Engineering Systems Command Hawaii

Air Quality Monitoring Consolidated Plan

Red Hill Bulk Fuel Storage Facility

Joint Base Pearl Harbor-Hickam, Oahu, Hawai‘i

June 2024

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Acronyms and Abbreviations

AQM	Air Quality Monitoring
DOH	State of Hawaii Department of Health
EPA	U.S. Environmental Protection Agency
NAAQS	National Ambient Air Quality Standards
NIOSH	National Institute for Occupational Safety and Health
PID	Photoionization detector
PPM	Parts Per Million
PPMV	Parts Per Million By Volume
QAPP	Quality Assurance Protection Plan
REL	Recommended Exposure Limit
VOC	Volatile Organic Compound(s)

1.0 Introduction and Purpose

The following project is proposed to develop and implement an air quality monitoring (AQM) system at the Red Hill Bulk Fuel Storage Facility (Facility) for the purpose of monitoring during tank cleaning efforts. In response, the Navy agrees with the State of Hawaii Department of Health (DOH) request to implement this system for tank cleaning and site closure. The Navy will continue AQM focused directly at the Facility during an estimated three-year period. A total of eight (8) perimeter AQM stations systems have been installed around the perimeter of the Facility to monitor and evaluate air quality, with an additional AQM station on Halawa Correctional Facility property. These perimeter AQM stations also have meteorological stations to record weather data such as barometric pressure, wind speed, wind direction, temperature and humidity. Additionally, three photoionization detectors (PID) are located within the ventilation system: one at the bottom of the tank, one in the duct work inside the (b) (3) (A) [redacted] and a final PID placed at the exhaust/vent stack outside of (b) (3) (A) [redacted]

The perimeter AQM systems are housed in weatherproof enclosures on a stand or rack, and all stations run exclusively on solar and battery power. All systems are checked daily and tested along with manufacturer's recommended maintenance schedule.

The AQM systems are intended for monitoring, detection, and environmental surveillance of volatile organic compounds (VOCs) along with the potential for additional pollutants depending on the type of system chosen for this effort. This plan:

- Documents the logistics, operating procedures, and methodologies already in place and running to accomplish this task.
- Includes nine (9) enclosures used as guidance and reference by the Navy to demonstrate compliance with Hawaii Department of Health (DOH) requests for their approval to proceed with forced ventilation.

2.0 AQM Site Locations

Perimeter AQM locations were reviewed by DOH and the Navy, and represent the best monitoring grid based on the air model and exhaust rate at the stack. AQM placement is also based on current AQM weather data that has been collected since October 2023, including wind direction, which typically follows the ridge line, blowing northeast to southwest. Figure 1 is a map of the nine perimeter AQM locations with a baseline AQM (RH-AQM-9) at the top of the ridge (b) (3) (A) [redacted], and RH-AQM-4 located across from the exhaust/vent stack. RH-AQM 6 and 7 are situated as close to the gate/fence adjacent to the community as terrain allows. The remaining AQM locations are situated downwind, with some proximal to Adit entrances and adjacent communities to establish an effective monitoring zone.

Figure 1: Perimeter AQM Locations

[redacted]

3.0 Background and Overview

The original AQM program was part of the Navy's plan to establish a baseline of current air quality conditions at the Facility and the surrounding community to possibly identify potential future changes in air quality. While pursuing this baseline effort from October 2023 to March 2024, the Navy also realized an inherent capability to enhance response readiness with an AQM system.

It should be noted that there are no regulatory requirements for outdoor VOCs. Official correspondence from DOH to the Navy's contractor APTIM Federal Services [redacted] dated 04 October 2023 acknowledged receipt of the Navy's request on air permitting requirements, and determined that an air permit was not required for the forced ventilation project.

From October 2023 to present, there have been no reported VOC readings exceeding the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) of approximately 14.4 parts per million (ppm) based on a 10-hour time-weighted average.

However, in the absence of outdoor VOC regulatory requirements, the Navy, DOH and EPA collaborated to establish thresholds for the protection of human health and the environment, and help assuage public concerns of potential fumes/odors during the tank closure project. Using the EPA's Acute Exposure Guideline Levels (AEGLs) as a basis, along with an air model to demonstrate compliance, the Navy received DOH approval on May 29, 2024 to proceed with forced ventilation at Tank 8 (Enclosure 1). That correspondence establishes the framework and metrics the Navy is using to meet air quality requirements jointly accepted by EPA, DOH and the Navy.

The enclosures included with this AQM Consolidated Plan are critical documents used as references, guidance, and direction for this plan, and provide greater detail with respect to action levels, notification procedures, strategies, and compliance. The Navy will continue using requirements/guidance stated in the enclosures.

- **Enclosure 1:** DOH Conditional Approval – provides direction and requiements the Navy must meet in order to continue forced ventilation.
- **Enclosure 2:** AQM OPORD – provides a general synopsis of operations, trigger thresholds and corresponding actions.
- **Enclosre 4:** Notification Tree (Emergency)
- **Enclosure 5:** Notification Tree (Operational)
- **Enclosure 6:** Air Quality Modeling Report; 28 MAY 2024
- **Enclosure 7:** RH Tank Ventilation Modeling Results; 28 MAY 2024
- **Enclosure 8:** Aptim Transmittal letter; 10 MAR 2024
- **Enclosure 9:** Additives U.S. Navy COPC List

Additionally, NCTF provided an email response on 29 MAY 2024 to DOH regarding a query and request about potential fuel additives (fuel additives list is Enclosure 9) NCTF-RH previously identified eighteen potential additives for jet and diesel fuel and confirmed the additives were not included in APTIM's calculations. However the de minimis amounts added to each gallon of fuel do not have a measurable effect on the calculations provided nor the output of the model.

For example it is understood that benzene is a constituent of concern. In the list of potential additives, benzene is minor constitute in a corrosion inhibiter & lubricity improver additive for F-24 and JP-8 jet fuels. (b) (3) (A) [redacted]

[redacted]

[redacted]

[redacted]

(b) (3) (A) [redacted]

[redacted]

Review of all the VOC concentrations in the additives confirm VOCs are in the additives but de minimus amounts are in the remaining fuel. This small amount additives in the remaining fuel will have a negligible effect on the actual VOC lbs/hour generated.

4.0 AQM System Design Capabilities

The perimeter AQM consists of a weather station and a MiniRAE 3000+ PID equipped with a 10.6 eV lamp, capable of measuring approximately 200 VOCs. As previously stated, this project may incorporate additional pollutants, some of which may be a part of the National Ambient Air Quality Standards (NAAQS).

The AQM will also include an automatic summa canister air sample collection system at each station using. The summa canister will have the ability to collect an air sample when the AQM registers a VOC reading of 3.8 parts per million by volume (ppmv) for a 1-hour time weighted average (TWA). Those summa canister air samples will be sent to a Navy-approved laboratory for analysis. Currently, summa canister samples are manually taken until the automatic system is procured and in place.

As previously stated, each perimeter AQM includes a meteorological station that will collect, at a minimum:

- Temperature
- Barometric pressure
- Relative humidity
- Wind direction
- Wind speed

4.1 Perimeter AQM Work Requirements

Contractor will perform the following:

- Provide all equipment, materials, and labor necessary to complete the project.
- Collect air samples via summa canister at a set trigger threshold (TBD).
- AQM will continue with an onsite alarm and alert system in the event of a trigger, and will follow the established AQM notification chart.
- Monitor and continuously record data at each AQM location.
- Meet the reporting requirements that are specified in Section 5.
- Total monitoring duration will be dependent on NCTF work schedules for tank cleaning.

5.0 Data Evaluation, Validation and Reporting

Contractor will collect and evaluate air monitoring data for the duration defined in the contract which is expected to be approximately a three year period of performance. The equipment will be calibrated in accordance with manufacturer recommendations, and calibration will be performed at least monthly with the likelihood of daily bump testing. The accuracy of each AQM will be checked daily with a bump-test, and will be recalibrated when results are outside established limits.

Contractor will include a strategy to establish a baseline of air quality conditions based on equipment, as well as alert the Navy of any indications of potential exceedances/releases due to readings that are typically outside of established normal ranges. As stated previously, the Navy has identified VOCs and other potential air pollutants depending on equipment. This is subject to change and may include additional nuisance monitoring parameters as directed.

- Perimeter air monitoring equipment and/or database will provide a running 1-hour time-weighted average and 8-hour time-weighted average concentration.
- Contractor will utilize a networked system when practical, depending on the limitations of the location. Any direct reading instruments used shall have an audible alarm to indicate an immediate exceedance over a set trigger level (TBD).
- Fuel odor may be used to determine presence/release, but it will not be used exclusively to evaluate potential concentrations or issues.
- AQM system is expected to provide continuous monitoring during ventilation, which is expected to run during the tank cleaning effort.
- Per DOH's request in the March 08, 2024 official correspondence to the Navy; at a minimum, the following data is requested to be reported **<u>for each hour of degassing</u>**:
    - Total VOC concentrations in ppmv, averaged on an hourly basis.
        - That data shall be made available to the public by posting on Navy-hosted website (e.g., Safe Waters).
        - Hourly AQM data is currently being posted on the AQM tab of the NCTF-RH app. Data is also available on the Navy website: www.navyclosuretaskforce.navy.mil/tank-ventilation for daily updates.
- Data retrieval frequency at perimeter stations will be collected seven days a week and will be reviewed daily at external stations, which are capable of cellular uploads to a cloud-based data base, with password-keyed security, and user specified permissions for data use. Data from both in-tunnel stations and external broad area stations will be stored in a single cloud-based data system that will be customized for this project, based on project requirements.
- Data will be made available to NCTF-RH within 24 hours. In the event remote data transmission is unavailable, the data will be retrieved manually via direct instrument download and disseminated to NCTF-RH. In the event that a reading elicits concern, NCTF-RH will require immediate notification to enact proper response measures. At a

minimum, any detected exceedance that triggers a response/sampling action will need to address:

  - Notification of designated personnel/response contacts provided by the Navy, along with the Contractor Site-Specific Health and Safety Plan

- Upon completion of monitoring requirements, contractor will remove all equipment and return the site locations to their original condition.

Contractor shall include support to review data from each AQM system on a daily basis. Data will be validated according to procedures described in the project Quality Assurance Protection Plan (QAPP). Data that needs to be invalidated due to various reasons (such as bump test failure, weather issues/humidity, etc.) will be flagged by the data validator with input from the field operation team and oversite from a quality control manager. Data will be validated routinely.

Contractor shall include support to save all data from the project into a secure database. Activities in covered in this task include creating and maintaining the database. This should also cover daily or weekly maintenance (as needed) and uploading raw and validated data from the data validator. A secure, permanent copy of the data set may be used for current reporting and any future data needs. The contractor has also included support in this task to produce data sets of the time averaging intervals required for Navy reporting requirements.

For data collected outside the forced ventilation events, the contractor will prepare a baseline report presenting data collected during the first month, a completion report, summarizing all activities and results; weekly data reports; and exceedance reports as described below:

- Immediate reporting of any exceedances beyond an established Action Limit
- One baseline report after an agreed upon date.
  - Draft with Navy comment and contractor response to comments and final report submittal
- Monthly documentation reports including tables showing instrument results along with any relevant statistical analyses, including summaries of parameters and meteorological data.
  - Reports shall include a summary of 1-hour running average air monitoring results for each monitoring station and instrument, and the 1-hour block average meteorological data.
- One completion report summarizing activities and results.
  - Draft with Navy comment and contractor response to comments and final report submittal
- Raw electronic data files and reports will be uploaded to EDMS and/or Safe Waters per Navy direction and approval.

Due dates for these reports are not specified and assumes they will be determined in the project kick-off meeting.

6.0 Setup and Installation

Contractor shall procure all necessary equipment to satisfy requirements of this work plan. Upon contract issue, Navy assumes that installation should be relatively routine and fairly quick because of the simplicity of the set up. Figure 2 represents the current setup with the MiniRAE 3000+, stand, weather station, marine batteries, and solar panels.

The contractor shall ensure all AQM systems are in good working condition prior to use, and upon confirmation of working condition, installation for six locations should not exceed one week.

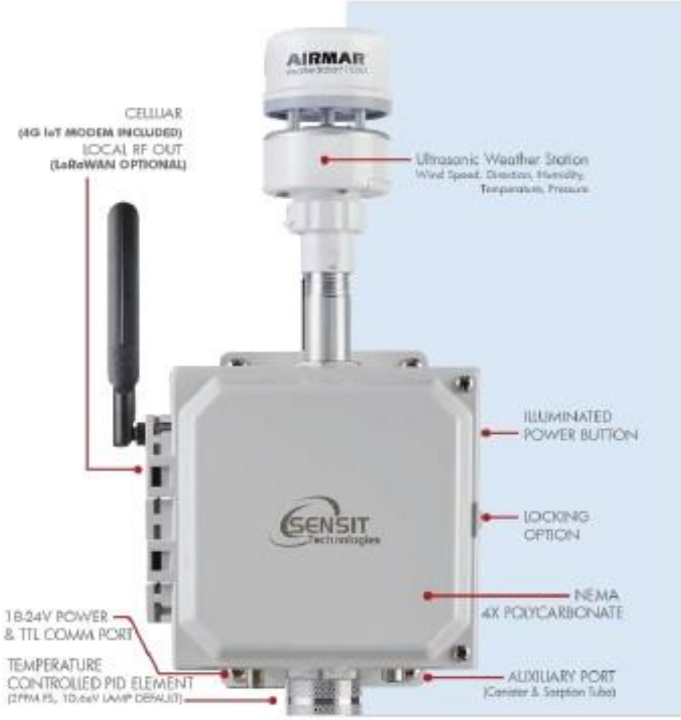
Using the existing AQM contract during defueling that ended on March 31, 2024, the Navy transitioned from that original effort to the current NCTF effort on April 01, 2024. The Navy is continuing AQM efforts with an extension of the current AQM contract using existing equipment at nine locations. Upon completion and acceptance of the new contract, the current systems may be replaced as needed with any new equipment identified in the new contract.

Figure 2: RH-AQM-4 station at Red Hill

[redacted] (b) (3) (A)

7.0 Potential Equipment Upgrades

There are other air monitoring systems that are better suited for outdoor use compared to the existing stations. The Navy has been researching several units including the Sentsit SPOD system shown on the following page. The SPOD, or similar equipment, can be used to achieve the monitoring goals previously stated in Section 4.0, and will be evaluated to potentially replace the current system.



STANDARD KIT
USB Adapter
Charging Cable

OPTIONAL HARDWARE:
Solar Panel
Tripod
Ultrasonic Anemometer
Outdoor Power Supply
Canister Valve Controller
Expansion Battery Pack
Particulate Matter

PRODUCT SPECIFICATIONS

Size: Fully assembled without anemometer or antenna D x W x H (6" x 8" x 16")
Weight: Base unit: 6.5 lbs
Operational Temp: -10°C to 50°C
Mounting: Attached Mounting Flanges
Voltage Requirements: 18V – 24V DC Charging (wired adapter or solar panel)
Current Requirements: 2A Max Current Draw when Charging
Operating Runtime: 2-5 Days Battery Backup
Operating Temp: -20°C to 50°C
Data Outputs: Digital Wired Output (3.3V TTL - USB) | Wireless (4G IoT Cellular Included) | Optional Analytics on Server | SD Card Data Backup

SENSOR SPECIFICATIONS

SENSORS	DETECTION METHOD	LAMP ENERGY (eV)	RANGE (STANDARD)	ACCURACY (STANDARD)	RESPONSE TIME (STANDARD)
ION - HS	PID	10.6	10 - 3000 ppb*	±20 ppb min or 20%	30-60 sec
ION - XF	PID	10.6	0.1 - 30 ppm*	±0.2 ppm min or 20%	30-60 sec
ION - 10.0	PID	10	0.5 - 100 ppm*	±1 ppm min or 20%	30-60 sec
ION - 11.7	PID	11.7**	1-1000 ppm*	±5 ppm min or 50%	30-60 sec
MOS	Metal Oxide	-	Variable	-	15-30 sec
CO	Electrochemical	-	100-2000 ppm	±5 ppm min or 50%	60-90 sec
PM2.5	Laser Scattering	-	1-1000 µg/m3	±10 µg min or 50%	15-30 sec

* Range defined as PPB Isobutylene | ** Reduced lifetime for high energy lamp (~3 month)

8.0 References

State of Hawaii Department of Health. 2024. *Official Correspondence to Department of the Navy; Rear Admiral Stephen Barnett.* SUBJECT: Red Hill Bulk Fuel Storage Facility Degassing Activity. March 08.

State of Hawaii Department of Health. 2023. *Official Correspondence to Department of the Navy contractor APTIM Federal Services, LLC;* [redacted] SUBJECT: Underground Storage Tanks Degassing Project, Seven (7) Jet Fuel (JP-5), Five (5) Jet Fuel (F-24), Two (2) Diesel Fuel (F-76) Storage Tanks, and Four (4) Diesel/Jet Fuel Surge Tanks Located at: Red Hill Bulk Fuel Storage Facility (RHBFSF) and Joint Base Pearl Harbor-Hickam (JBPHH), Aiea, Island of Oahu. DOH File 23-406E CAB. October 04.

JOSH GREEN, M.D.
GOVERNOR OF HAWAIʻI
KE KIAʻĀINA O KA MOKUʻĀINA ʻO HAWAIʻI

KENNETH S. FINK, MD, MGA, MPH
DIRECTOR OF HEALTH
KA LUNA HOʻOKELE

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DEPARTMENT OF HEALTH
KA ʻOIHANA OLAKINO
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

May 29, 2024

Rear Admiral Stephen Barnett
Commander, Navy Closure Task Force – Red Hill
850 Ticonderoga Street, Suite 110
Joint Base Pear Harbor Hickam, Hawaiʻi 96860
[via email only: stephen.d.barnett.mil@us.navy.mil]

Dear Rear Admiral Barnett:

SUBJECT: DOH Conditional Approval of NCTF–RH Tank Cleaning Ventilation Air Quality Monitoring Plan; and Tanks 7 & 8 Ventilation CONOP and OPORD

Under the Hawaiʻi Department of Health's (DOH's) May 6, 2022 Emergency Order (EO), the U.S. Department of the Navy is required to submit and receive the DOH's approval for an air quality monitoring plan prior to commencing tank cleaning ventilation activities at the Red Hill Facility. The DOH acknowledges receipt of the Navy Closure Task Force-Red Hill's (NCTF-RH's) *Air Modeling Demonstration*, dated May 13, 2024, submitted as part of the *Red Hill Tank Cleaning Ventilation Air Quality Monitoring Plan (AQM Plan)* and *Request for DOH Approval to Commence Tank Ventilation at Red HIll Bulk Fuel Storage Facility*, dated May 28, 2024.

<u>AQM Plan</u>

Based on the May 13 and May 28, 2024 submittals and previous information submitted, the DOH approves the AQM Plan on the conditions that:

1. NCTF-RH adheres to the supporting documents submitted with the May 28, 2024 request for DOH approval.

2. According to the *AQM Notification and Triggers Operation Order (OPORD)* included in NCTF-RH's May 28, 2024 submittal, NCTF-RH's internal standard for ceasing ventilation is when the 1-hour Time Weighted Average (TWA) of total volatile

organic compounds (VOCs) from the installed meter exceeds 20 parts per million by volume (ppmv) at the exhaust vent. NCTF-RH shall **immediately** notify the DOH of all occurrences when active ventilation is ceased and restarted as a result of exceeding 20 ppmv at the exhaust vent. Notification shall be provided by email to cab.general@doh.hawaii.gov.

3. As proposed by the NCTF-RH, no more than six (6) tanks shall be actively vented in any calendar year.

4. No more than two (2) tanks shall be actively vented at any time. The start of ventilation for each of the two (2) tanks shall be staggered and:
   a. Only one (1) tank shall be vented initially.
   b. Venting of the second tank shall begin only when total VOC emissions from the first tank are reduced to 4.82 pounds per hour (lbs/hr) or less.
   c. Written notification by email to cab.general@doh.hawaii.gov shall be provided to the DOH **prior to the start of venting** of each tank. Notification of the start of venting of the second tank shall include a statement that the VOC emissions from the first tank are at or below 4.82 lbs/hr.

      A second written notification by email shall be provided to the DOH **within 24 -hours** of the start of venting of the second tank and shall include the following information to demonstrate total VOC emissions from the first tank has reached 4.82 lbs/hr or less. The demonstration shall include:
      i. Total VOC concentration from the exhaust vent over a 1-hour averaging period, in ppmv, and the date and time the concentration was measured.
      ii. Total flow rate from the exhaust vent for this period, in cubic feet per hour (cubic feet/hr).
      iii. Total VOC emitted from the exhaust vent for this period, in lbs/hr. The molecular weight used in the calculation shall be provided.
   d. **Notification to the public shall be provided 12 hours prior to the start of venting of each tank.**

5. At all times during active tank ventilation, actual total VOC emissions from the exhaust vent shall not exceed 48.2 lbs/hr, the maximum potential emission rate used in the modeling assessment.

   If actual total VOC emissions from the exhaust vent exceed 48.2 lbs/hr:
   a. Active ventilation shall immediately stop.

b. Written notification by email to cab.general@doh.hawaii.gov shall **immediately** be provided to the DOH that includes:
   i. The date and time of the exceedance.
   ii. The date and time active ventilation was stopped.
   iii. Exceedance information, including the 1-hour average total VOC concentration at the exhaust vent (in ppmv), total flowrate from the exhaust vent during this period (in cubic feet/hr), and total VOC emissions from the exhaust (in lbs/hr) during this period.

c. The NCTF-RH must evaluate the cause of the exceedance.

d. DOH approval is required prior to restarting active venting. A written request to restart active ventilation shall be emailed to cab.general@doh.hawaii.gov. The request shall include the reason for the exceedance and corrective measures taken to ensure total VOC emissions will not exceed 48.2 lbs/hr.

6. NCTF-RH shall continuously monitor and record the exhaust vent exit for 1-hour average total VOC concentrations (in ppmv) and flowrate (in cubic feet per minute; cfm) and shall provide the DOH near real time data of the following information, for each hour:
   a. The date, time, and the 1-hour average total VOC concentration, in ppmv.
   b. The flowrate from the exhaust vent, in cubic feet/hr.
   c. Total VOC emissions, in lbs/hr. The molecular weight used in the calculation shall be provided.

7. A minimum of nine (9) air monitors shall be used to continuously measure and record total VOC concentrations, in ppmv, at locations approved by the DOH. A map showing the locations (including Universal Transverse Mercator (UTM) Coordinates in horizontal North American Datum-83), and identification numbers (e.g., RH-AMS-1) of the air monitors shall be shared with the public via the NCTF-RH app and NCTF-RH website.

8. Sampling by Summa cannister at a specific air monitor shall be triggered if total VOC concentrations at that monitor exceed 3.8 ppmv (10% of Acute Exposure Guideline Levels) on a 1-hour TWA as provided in the April 22, 2024 DOH letter.
   a. Written notification by email to cab.general@doh.hawaii.gov shall be provided to the DOH **within twenty-four (24) hours** of the start of sample collection that includes the location and identification number of the monitor, and date and time the Summa cannister began sample collection.

b. NCTF-RH shall submit the results of the Summa cannister analysis by email to the DOH at cab.general@doh.hawaii.gov **within twenty-four (24) hours** of the NCTF-RH receiving the results of the analysis.

9. At all times during active tank ventilation, total VOC concentrations measured at each of the air monitors shall not exceed 38 ppmv on a 1-hour TWA.

   If the total VOC concentration at any air monitor exceeds 38 ppmv on a 1-hour TWA:
   a. Active ventilation shall immediately stop.
   b. Written notification by email to cab.general@doh.hawaii.gov shall **immediately** be provided to the DOH that includes:
      i. The date and time of the exceedance(s), and total VOC concentration (in ppmv) on a 1-hour TWA.
      ii. The date and time active ventilation was stopped.
   c. NCTF-RH shall **immediately** provide notification of an exceedance to the public.
   d. The NCTF-RH must evaluate the cause of the exceedance.
   e. DOH approval is required prior to restarting active venting. A written request to restart active ventilation shall be emailed to cab.general@doh.hawaii.gov. The request shall include the reason for the exceedance and corrective measures taken to ensure total VOC concentrations will not exceed 38 ppmv on a 1-hour TWA.

10. The NCTF-RH shall make near real time air monitoring data available to the public by posting on a website hosted by the NCTF-RH. If this is not immediately feasible, the NCTF-RH shall initially make this data available to the public by posting the data on the NCTF-RH mobile app. Following website modifications, this data shall be available through both the NCTF-RH app and the NCTF-RH website. The information provided to the public shall include the date, time, and total VOC concentration, in ppmv, for each 1-hour averaging period.

11. This approval is contingent on NCTF-RH confirming that the VOC and hazardous air pollutant (HAP) emissions from the tanks takes into consideration impacts from any fuel additives that may have been added to the fuel stored in the tanks.

12. Using the maximum potential gram per second emission rate rather than the maximum potential lbs/hr emission rate, NCTF-RH shall revise Enclosures (1) and

(2) from the May 13, 2024 NCTF-RH submittal to correct the calculated maximum pollutant concentrations (in micrograms per cubic meter). NCTF-RH shall update all information in Enclosures (1) and (2) affected by the change and resubmit the Enclosures to the DOH prior to the start of venting to demonstrate ambient air concentrations will be at or below the threshold screening levels.

13. No later than seven (7) days after receipt of this letter, NCTF-RH is required to submit a complete and detailed AQM Plan that encompasses and combines all previous submittals, including but not limited to, details of the venting operations, air monitoring equipment and locations (UTM coordinates), a map/plot showing the location of the nine (9) monitoring stations overlaid on the modeled 1-hour VOC concentrations, Navy response actions and notifications, and all modeling, calculations, and assumptions. The AQM Plan shall identify all of the DOH requirements and how the NCTF-RH will comply with these requirements. In accordance with the EO, a redacted version of the AQM Plan must be submitted to the DOH no later than ten (10) business days after the unredacted version is submitted.

<u>Concept of Operations (CONOP) and OPORD</u>

Lastly, the DOH received the NCTF-RH's Tanks 7 and 8 CONOP and OPORD for active ventilation. We received the initial *Tank 7 & 8 Tank Forced Ventilation CONOP* on April 17, 2024; responses to regulator comments on May 2 and 17, 2024; and a revised CONOP on May 17, 2024. We received the *NCTF Tank Venting Operations Order* on May 21, 2024; responses to regulator comments on May 23, 2024; and a revised OPORD on May 28, 2024. Based on the information provided, the DOH approves the CONOP and OPORD on the conditions that:

14. The NCTF-RH hosts a walkthrough for the DOH to observe spill diversion and control measures before executing the OPORD Start (Day 2) 20-inch and 12-inch motor operated valves removal. Any comments from the DOH must be addressed before the valve removal operations.

15. Per the DOH's January 18, 2024 conditional approval of tank cleaning, the NCTF-RH shall provide weekly written updates, including a summary of completed work and any updates to the cleaning schedule.

Should you have any questions regarding this letter, please contact Ms. Kelly Ann Lee, Red Hill Project Coordinator, at (808) 586-4226 or kellyann.lee@doh.hawaii.gov.

Sincerely,

Kathleen Ho

KATHLEEN S. HO
Deputy Director for Environmental Health

cc via email only:
Amy Miller, U.S. Environmental Protection Agency
Roshni Brahmbhatt, U.S. Environmental Protection Agency
Claire Trombadore, U.S. Environmental Protection Agency
Andrew Suesse, U.S. Environmental Protection Agency
Matthew Cohen, U.S. Environmental Protection Agency
Ash Nieman, U.S. Environmental Protection Agency
Jamie Marincola, U.S. Environmental Protection Agency
RDML Marc Williams, NCTF-RH
CAPT James Sullivan, NCTF-RH
CAPT Milton Washington, NCTF-RH
CAPT Steven Stasick, NCTF-RH
Sherri Eng, NCTF-RH
Milton Johnston, NCTF-RH
Joshua Stout, NCTF-RH

AIR QUALITY MONITORING (AQM) NOTIFICATION AND TRIGGERS OPERATION ORDER (OPORD)

31 May 2024

Section 1 - Operational Overview

The Navy Closure Task Force – Red Hill (NCTF) is in the process of cleaning the fuel storage tanks in the Red Hill Bulk Fuel Storage Facility (RHBFSF). The closure process will involve 3 phases:

1) Floating the sludge. This process involves adding water to the sludge still contained in the bottom of the tanks. The water will help to lift the sludge for easier removal and to help float any residual fuel trapped within the sludge. The water will remain in the tank for approximately The water and fuel residue will be piped to a storage tank for sent for disposal at a permitted treatment facility. This process will be repeated a second time.
2) The second water fill will be maintained in the tank and the ventilation started to evacuate the VOCs from the tank until air quality levels are achieved to ensure human safety during the manual removal of the sludge. When air quality levels have been reached the water will be drained in preparation for the manual removal of the sludge.
3) The ventilation will cease once all the sludge has been removed and the tank washed.

Section 2 - Tank Ventilation and Air Quality Monitoring (AQM) Overview

1) **Tank Ventilation.** The tanks will be connected to a fan in the Lower Tunnel (LT) that will force air into the bottom of the tank, circulate the air inside the tank and force the air out of the tank through the attached air ducts in the Upper Tunnel (UT) out [redacted]

2) **Air Monitors.** Air monitoring is continuously occurring inside the Red Hill (RH) facility and around the perimeter of RH to ensure the VOC limits are within established limits.

    a. **Internal AQMs**. There will be 3 AQMs monitoring each tank throughout the tank cleaning. They are located inside the tank, along the vent line in the UT and outside on the stack. The monitors are set to alert if VOC concentrations exceed 30 parts per million by volume (ppmv).
    b. **External AQMS**. NCTF-RH will have a total of 9 operational air quality monitors prior to executing Tank Ventilation operations. Currently 6 AQM are installed and will complete installation of the additional 2 by COB 24 MAY 24. The final AQM will be installed in the vicinity of the Halawa Correctional Facility by COB 28 MAY 24. NCTF-RH is working closely with DOH to determine the exact locations for the 3 additional AQM. A graphical depiction of locations will be available after 28 MAY 2024.

Section 3 - Air Quality Monitoring (AQM) Operations

Hours of Operation: Ventilation system will be operational between the hours of 0600 and 2000 daily.

Monitoring:

Internal AQM – Normal Operations:

1) Active operations between the hours of 0600 and 2000.
2) Data is checked and verified continuously throughout the day.
3) After 2000, no personnel will be onsite. Data will be reviewed prior to operation start-up the next day.

Internal AQM – Troubleshooting and Notifications:

1) The DOH criteria to cease operation of the ventilation system is when VOC lbs/hr emitted exceeds the modeled VOC lbs/hr.
2) NCTF's internal standard for ceasing ventilation is when the 1-hour TWA of VOC's from the installed meter exceeds 30 ppmv at the stack.

Perimeter AQM Normal Operational Status:

1) AQMs are actively monitoring 24/7.
2) Data is checked and verified for discrepancies only when alarm sounds.

Perimeter AQM – Troubleshooting and Notification

1) **First trigger.** Perimeter AQM station exceeds 20 ppm VOC.
2) **First AQM System Notification Alert**. The AQM system will automatically notify NCTF EV staff when 20 ppmv is reached.
3) NCTF contractors will go to the monitors to check on the cause, make repairs if needed and communicate with the Ventilation System Operators to see if there is an issue.
4) Consider this the troubleshooting phase and it will require communication between the ventilation system operators and NCTF staff to evaluate the cause and potentially institute corrective actions.
5) **Second AQM system notification** to NCTF-RH staff will be made when an AQM station reaches 38 ppmv initially.
6) **Third system notification alert** will be made by the system when an AQM station reaches a 1 hour TWA of 38 ppmv VOCs.
7) An exceedance of a 1 hour TWA >38 ppm will require the cessation of ventilation activities, notification to DOH and public notification.
8) It is the responsibility of NCTF's Air Manager, Compliance Lead or as back up the EV Director to institute the call tree exercised yesterday.
9) The Commander or Deputy Commander are the second level Notifiers to Honolulu DEM and HI EMA to ask to use the established electronic public safety notification

system to transmit information quickly and efficiently to a geographically targeted audience.

10) Additionally public notification will be made through the NCTF website, app and press releases and by phone to DOH and DOC.

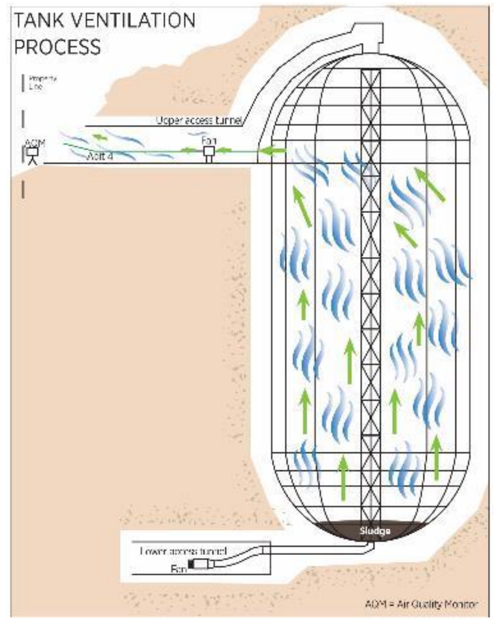
Tank Ventilation Operational Overview & Risk Management

APTIM Office - Adit 4

(b) (3) (A)
[redacted]

- Daily AQM Calibration at 0600
- N45 and Aptim will monitor VOC
- AECOM will provide hourly AQM readings to N6 for processing and PAO public release via App

(b) (3) (A)
[redacted]



- Sensors will be calibrated on 5/28
- Computer is hardwired
- N45, N4 Aptim Expert will monitor VOC and flow rate
- N4 email DOH hourly requirements from Stack

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Tank Ventilation Operational Overview & Risk Management

Public

Any health concerns will immediately be conveyed

Air Quality readings uploaded to the NCTF-RH App

External Leadership

Stakeholders

Internal Leadership

Navy Leadership

Notifications

Daily Calibration

(b) (3) (A)

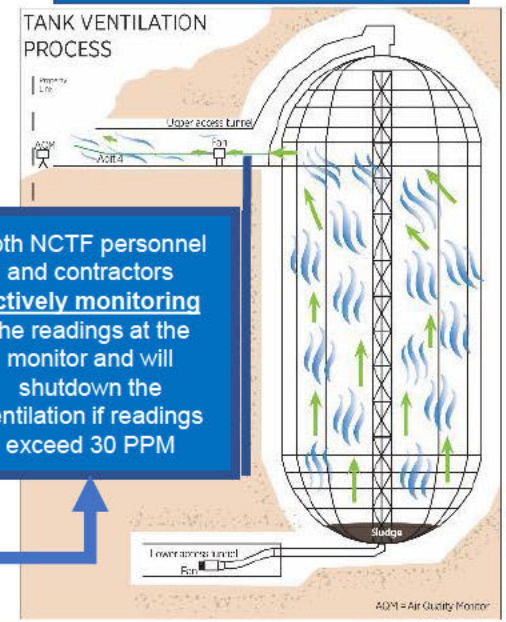
[redacted]

NCTF staff will be notified automatically if reading exceeds 30 ppm

Shutdown and Investigate

System Calibrated and Tested

Both NCTF personnel and contractors **actively monitoring** the readings at the monitor and will shutdown the ventilation if readings exceed 30 PPM



Built-In Safety Factors

NCTF-RH Safety Shutdown & Investigate Criteria: 30 PPM

NCTF Level-1 Safety Threshold: 38 PPM (Over 1 hour)

EPA AEGL Level-1 Threshold: 38 PPM (over 8 hrs)

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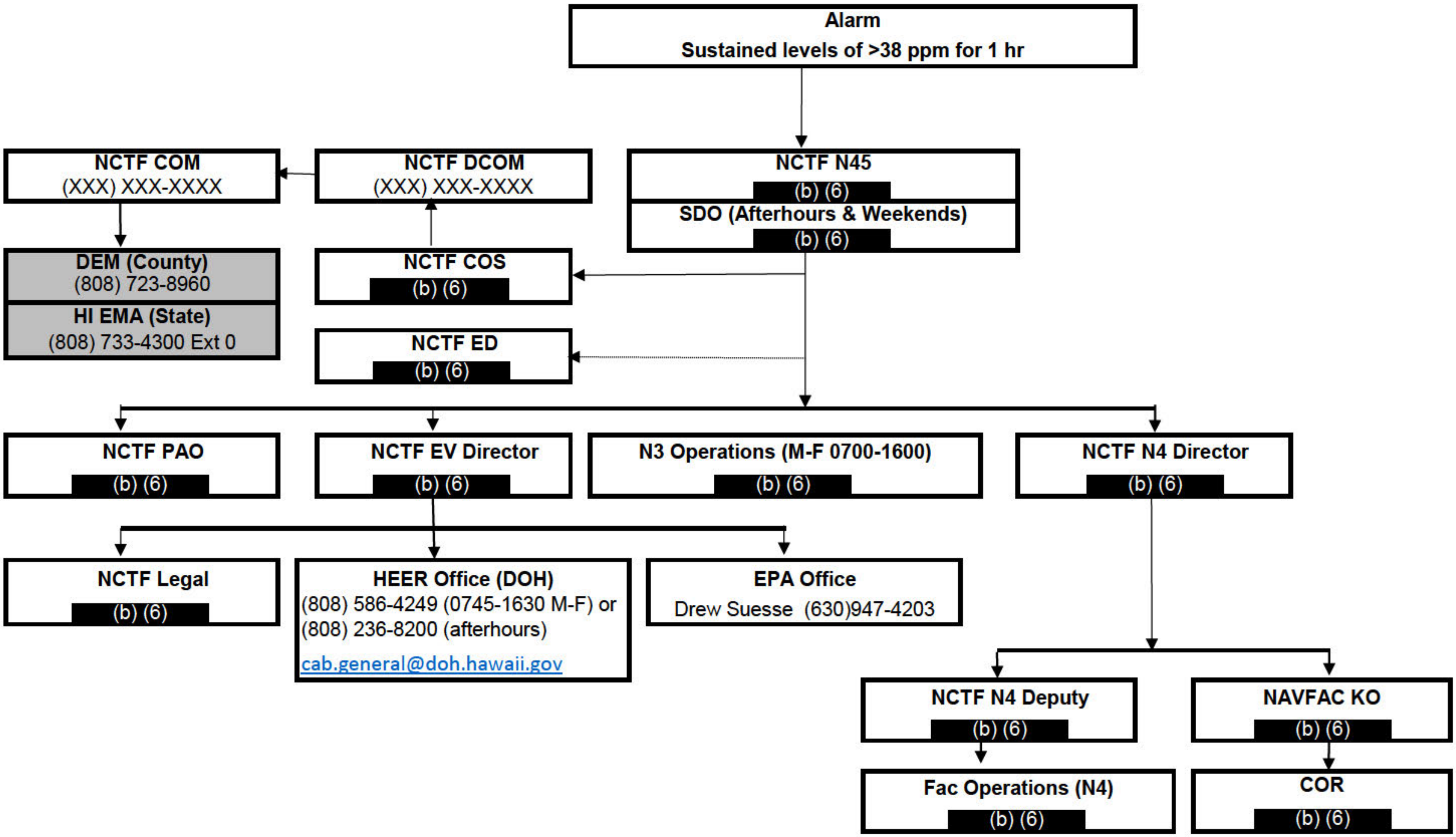
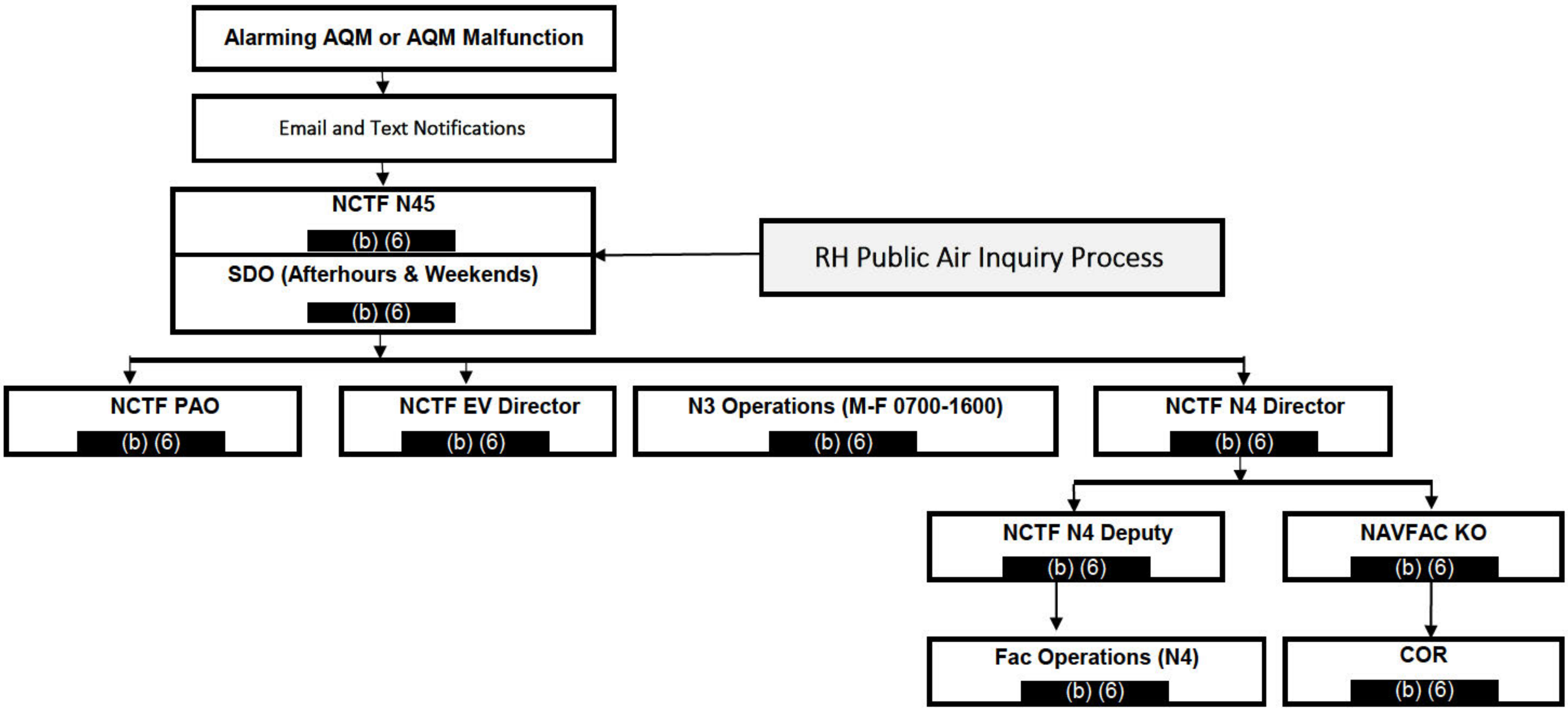
EMERGENCY AIR RELEASE NOTIFICATION TREE



OPERATIONAL AIR RELEASE NOTIFICATION TREE



AIR QUALITY MODELING

FOR

NAVY CLOSURE TASK FORCE - RED HILL TANK CLEANING VENTILATION AIR QUALITY MONITORING PLAN

Prepared by

NAVFAC PACIFIC
258 Makalapa Drive, JBPHH, HI 96860, USA

May 28, 2024 (update)

Enclosure (1)

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BACKGROUND

The Hawai'i Department of Health (DOH), citing authority under the May 6, 2022 Superseding Emergency Order (EO), asked the U.S. Department of the Navy (Navy) to submit and receive DOH's approval for an Air Quality Monitoring Plan prior to commencing forced air ventilation in preparation for the cleaning of the underground fuel storage tanks at the Red Hill Bulk Fuel Storage Facility (RHBFSF). The forced air ventilation and cleaning is required as part of the ultimate closure of the fuel tanks and decommissioning of RHBFSF.

Navy Closure Task Force - Red Hill (NCTF-RH) Tank Cleaning Ventilation Air Quality Monitoring Plan (the Plan), dated April 12, 2024, was submitted to DOH for approval prior to commencing forced ventilation activities at RHBFSF. Tank forced ventilation activities will exhaust air pollutants into the atmosphere through a single stack. Subsequently, on April 22, 2024 DOH, in consultation with EPA, directed NCTF-RH to demonstrate the forced air ventilation activities will not cause or contribute to the endangerment of human health through air quality modeling using maximum potential pound per hour emission rates. The air modeling results outlined in this report include the model input and output files along with a depiction of where the highest concentrations are projected to occur.

DOH's April 22, 2024 letter and May 2, 2024 clarifying email requires NCTF-RH to demonstrate ambient concentrations of volatile organic compounds (VOC), naphthalene, and benzene caused by forced ventilation activities are within specified thresholds using air quality modeling (see Table 1).

Table 1. Pollutant Thresholds

Pollutant	Averaging Period	Threshold (mg/m^3)	Basis (DOH)
VOC	15-day	2	Sub-chronic health risk from the Agency for Toxic Substances and Disease Registry
	Annual	0.13	April 2024 DOH Total Petroleum Hydrocarbon (TPH) Environmental Action Level (EAL) for vapors from middle distillate fuels
Naphthalene	8-hr	0.520	1/100th of the threshold limit value-time weighted average (TLV-TWA) (sub-chronic health risk) [52 mg/m^3]
	Annual	0.124	1/420th of the TLV-TWA (chronic health risk) [52 mg/m^3]
Benzene	24-hr	0.029	EPA Dose-Response Assessment Tables, Table 2. Acute Dose-Response Values for Screening Risk Assessments, ATSDR minimal risk levels for no adverse effects
	Annual	0.0063	April 2024 DOH EAL

DISPERSION MODEL

Air quality impacts were estimated with the AERMOD Modeling System: AERMOD (23132), AERMAP (18081), and BPIPPRM (04274). AERMET and AERSURFACE were not executed for this analysis because AERMOD-ready meteorological data was provided by DOH.

EMISSION SOURCE

Air pollutants will be exhausted from the tank at a maximum flow rate of 10,000 cubic feet per minute (CFM) and mixed with fresh air before exhausting into the atmosphere through a stack with flow rates ranging between 40,000 CFM and 80,000 CFM. The exhaust flow was modeled at ambient temperature due to the proportion of fresh air to tank air (3:1 to 7:1). The stack was modeled as a point source with diameter of (b) (3) (A) [redacted] for a range of flow rates, with horizontal or vertical orientations, and three (3) heights (see Table 2).

Table 2. Stack Data

Scenario ID	Flow Rate (CFM)	Orientation	Height
HRZ40	40,000	Horizontal	(b) (3) (A) [redacted]
HRZ50	50,000		
HRZ60	60,000		
HRZ70	70,000		
HRZ80	80,000		
VRT40	40,000	Vertical	
VRT50	50,000		
VRT60	60,000		
VRT70	70,000		
VRT80	80,000		
V5_40	40,000		
V10_40			

The stack coordinates and elevation are (b) (3) (A) [redacted], respectively. The elevation was determined using AERMAP and 3D Elevation Program (3DEP) 1 arc-second digital elevation model (DEM), downloaded from The National Map Viewer in compressed GeoTIFF and converted to uncompressed GeoTIFF using the Geospatial Data Abstraction Library. The stack location is shown in Figure 2 and Figure 3.

The modeled emission rates for ventilating jet fuel (JP-5 and F-24) tanks and diesel fuel (F-76) tanks are based on calculations by APTIM Federal Services (APTIM), which were previously submitted to DOH (see Attachment 1). NCTF-RH obtained clarification from APTIM that the maximum daily average emissions are equivalent to maximum potential 1-hr emission rates, i.e., maximum concentration at maximum flow rate for all hours of the day. Modeled maximum potential 1-hr emission rates vary by cleaning scenario: one tank at a time or 2 tanks concurrently (see Table 3).

Table 3. Maximum Potential 1-Hr Emission Rates

Scenario ID	# Tanks Cleaned Concurrently	Modeled Maximum Potential 1-Hr Emission Rate (lb/hr)					
		Diesel Fuel Tank			Jet Fuel Tank		
		VOC	Naphthalene	Benzene	VOC	Naphthalene	Benzene
HRZ40, HRZ50, HRZ60, HRZ70, HRZ80	1	24.1	0.051	0.132	15.0	0.011	0.19
VRT40, VRT50, VRT60, VRT70, VRT80, V5_40, V10_40	2	48.2	0.10	0.264	29.9	0.021	0.39

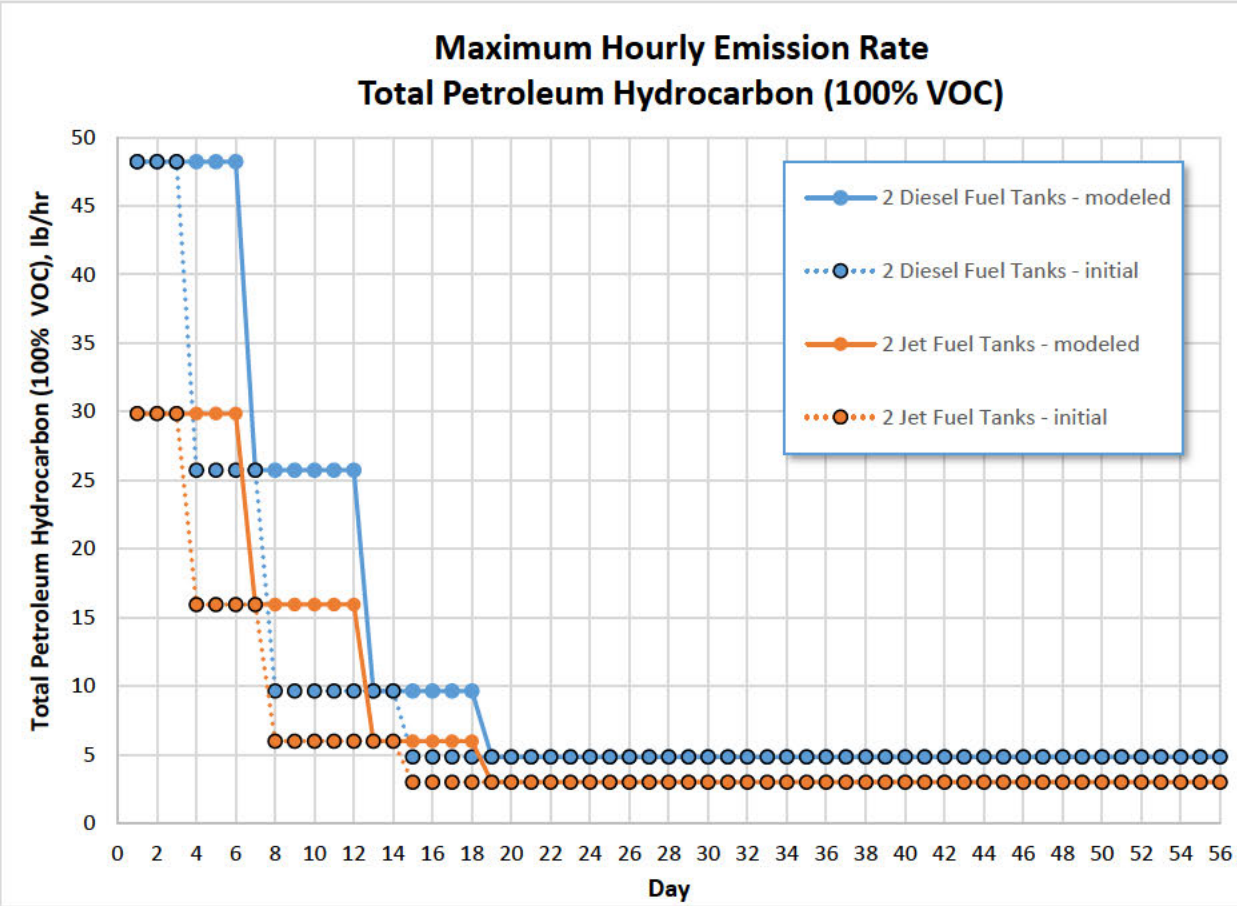
The proposed plan is to ventilate six (6) tanks per year. Modeled annual emissions for six tanks are based on maximum hourly emissions expected for completing cleaning in 56 days. For modeling, conservatism was added to APTIM's initial estimates by increasing the number of days at higher emission levels (parts per million by volume, ppmv) (see Table 4 and Figure 1), e.g., the number of days at 75 ppmv was doubled from three (3) days to six (6) days.

Table 4. Calculation of Annual Emission Rates

Day	Initial VOC (ppmv)	Modeled VOC (ppmv)	Modeled Maximum Potential 1-hr Emission Rate (lb/hr)					
			2 Diesel Fuel Tanks			2 Jet Fuel Tanks		
			VOC	Naphthalene	Benzene	VOC	Naphthalene	Benzene
1	75	75	48.2	0.10	0.26	29.9	0.021	0.39
2	75	75	48.2	0.10	0.26	29.9	0.021	0.39
3	75	75	48.2	0.10	0.26	29.9	0.021	0.39
4*	40	75	48.2	0.10	0.26	29.9	0.021	0.39
5*	40	75	48.2	0.10	0.26	29.9	0.021	0.39
6*	40	75	48.2	0.10	0.26	29.9	0.021	0.39
7	40	40	25.7	0.054	0.14	15.9	0.011	0.21
8*	15	40	25.7	0.054	0.14	15.9	0.011	0.21
9*	15	40	25.7	0.054	0.14	15.9	0.011	0.21
10*	15	40	25.7	0.054	0.14	15.9	0.011	0.21
11*	15	40	25.7	0.054	0.14	15.9	0.011	0.21
12*	15	40	25.7	0.054	0.14	15.9	0.011	0.21
13	15	15	9.7	0.020	0.053	6.0	0.0042	0.077
14	15	15	9.7	0.020	0.053	6.0	0.0042	0.077
15*	7.5	15	9.7	0.020	0.053	6.0	0.0042	0.077
16*	7.5	15	9.7	0.020	0.053	6.0	0.0042	0.077
17*	7.5	15	9.7	0.020	0.053	6.0	0.0042	0.077
18*	7.5	15	9.7	0.020	0.053	6.0	0.0042	0.077
19-56	7.5	7.5	4.8	0.010	0.026	3.0	0.0021	0.039
Annual ER – 2 tanks (lb/yr)			16436	34	90	10174	7	131
Annual ER - 6 tanks (lb/hr)			**5.6**	**0.012**	**0.031**	**3.5**	**0.0025**	**0.045**

Notes: *= day modeled with higher emission level [column 3] than APTIM's initial estimate [column 2]; ER = emission rate; Annual ER - 2 tanks (lb/yr) = Sum 56 days (Modeled Maximum Potential 1-hr Emission Rate (lb/hr) x 24 hr/day); Annual ER - 6 tanks (lb/hr) = Annual for 2 tanks (lb/yr) x 3 (for 6 tanks) ÷ 8760 hr/yr.

Figure 1. Maximum Hourly Emission Rates for Total Petroleum Hydrocarbon by Day



BUILDINGS/STRUCTURES

Buildings and structures that could cause downwash of the exhaust plume were identified. Heights and elevations of the buildings and structures are listed in Table 5. Elevations were determined with AERMAP and 1 arc-second 3DEP DEM. Downwash parameters for the stack were determined with BPIPPRM (04274).

Table 5. Building/Structure Heights and Elevations

[redacted] (b) (3) (A)

AMBIENT AIR RECEPTORS

Ambient air receptors (height = 0 m) were placed outside of the fenced property at the following spacing (see Figure 4). Receptors elevations were estimated with AERMAP and 1 arc-second 3DEP DEM.

- Along the fenceline – approximately and no greater than 25 m;
- ~ 500 m from the stack – 25 m;
- ~ 500 m to ~1 km from the stack – 50 m.

METEOROLOGICAL DATA

AERMOD-ready meteorological data for Daniel K. Inouye International Airport (HNL) was provided by DOH. This five (5) year dataset, 2019 – 2023, was processed with Lihue Airport upper air data using AERMET (23132) and the ADJ_U* option. The wind rose for this dataset is presented in Figure 5.

MODEL OPTIONS

AERMOD was executed with RURAL dispersion only.

SUMMARY AND CONCLUSIONS

A unit emission rate of 1 gram per second (g/s) was modeled to allow for development of operational scenarios by varying activity emission rates. Table 7 summarizes 8-hr, 24-hr, month, and annual concentrations per the unit emission rate. Concentrations for the unit emission rate are multiplied by the emission rate in Table 3 and Table 4 to obtain ambient air impacts for each scenario in Table 2, which are compared to the pollutant thresholds in Table 1.

The impact concentrations for each scenario are presented in Table 7. All scenarios have impacts below the pollutant thresholds in Table 1. The highest impacts occur along the fence, which can be seen in Figure 6 through Figure 9 for scenario HRZ40, a horizontal stack with a flow rate of 40,000 CFM.

The results presented in Table 7 demonstrate ambient concentrations of VOC, naphthalene, and benzene are within the specified thresholds in Table 1 for the tank cleaning and forced ventilation configurations summarized in Table 8.

Table 6. Modeled Concentrations for Emission Rate = 1 g/s

	Maximum Modeled Concentration (μg/m^3) per 1 g/s			
Scenario ID	8-hr	24-hr	Month	Annual
HRZ40	184.0277	117.64846	30.33921	22.92953
HRZ50	183.97384	117.37655	30.33332	22.92337
HRZ60	183.92529	117.13858	30.32815	22.91795
HRZ70	183.88072	116.9255	30.32349	22.91308
HRZ80	183.83928	116.73167	30.31924	22.90863
VRT40	181.75507	76.22718	27.82828	20.72115
VRT50	181.69737	74.58021	27.03157	20.11773
VRT60	181.65529	73.57739	26.40392	19.62445
VRT70	181.62104	72.94469	25.86912	19.20453
VRT80	181.59129	72.53071	25.37962	18.82936
V5_40	130.23315	63.09945	26.5445	19.67768
V10_40	118.49713	58.77909	25.02102	18.46582

Table 7. Ambient Air Pollutant Concentrations

Scenario ID	Ambient Air Concentration (μg/m³) for Diesel Tanks / Jet Fuel Tanks						All Pollutants ≤ Threshold?
	VOC		Naphthalene		Benzene		
	Month	Annual	8-hr	Annual	24-hr	Annual	
HRZ40	184.3 / 114.3	16.3 / 10.1	2.3 / 0.5	0.03 / 0.01	3.9 / 5.7	0.1 / 0.1	YES
HRZ50	184.2 / 114.3	16.3 / 10.1	2.3 / 0.5	0.03 / 0.01	3.9 / 5.7	0.1 / 0.1	YES
HRZ60	184.2 / 114.3	16.3 / 10.1	2.3 / 0.5	0.03 / 0.01	3.9 / 5.7	0.1 / 0.1	YES
HRZ70	184.2 / 114.2	16.2 / 10.1	2.3 / 0.5	0.03 / 0.01	3.9 / 5.7	0.1 / 0.1	YES
HRZ80	184.1 / 114.2	16.2 / 10.1	2.3 / 0.5	0.03 / 0.01	3.9 / 5.7	0.1 / 0.1	YES
VRT40	169 / 104.8	14.7 / 9.1	2.3 / 0.5	0.03 / 0.01	2.5 / 3.7	0.1 / 0.1	YES
VRT50	164.2 / 101.8	14.3 / 8.8	2.3 / 0.5	0.03 / 0.01	2.5 / 3.6	0.1 / 0.1	YES
VRT60	160.4 / 99.5	13.9 / 8.6	2.3 / 0.5	0.03 / 0.01	2.4 / 3.6	0.1 / 0.1	YES
VRT70	157.1 / 97.5	13.6 / 8.4	2.3 / 0.5	0.03 / 0.01	2.4 / 3.5	0.1 / 0.1	YES
VRT80	154.1 / 95.6	13.4 / 8.3	2.3 / 0.5	0.03 / 0.01	2.4 / 3.5	0.1 / 0.1	YES
V5_40	161.2 / 100	14 / 8.6	1.7 / 0.3	0.03 / 0.01	2.1 / 3.1	0.1 / 0.1	YES
V10_40	152 / 94.3	13.1 / 8.1	1.5 / 0.3	0.03 / 0.01	2 / 2.9	0.1 / 0.1	YES
Threshold	2000 (15-day)*	130	520	124	29	6.3	-

Note: *DOH confirmed use of a month average for comparison to the 15-day (sub-chronic) threshold.

Table 8. Tank Cleaning and Forced Ventilation Configurations

# Tanks Cleaned Concurrently	Stack		Exhaust Flow Rate (CFM)
	Orientation	Height	
2	Horizontal	(b) (3) (A) [redacted]	40,000 – 80,000
2	Vertical	[redacted]	40,000 – 80,000
2	Vertical	[redacted]	40,000 – 80,000
2	Vertical	[redacted]	40,000 – 80,000

Figure 2. Fenced Property (fence = purple, red = stack, blue = structure)

[redacted] (b) (3) (A)

Figure 3. Stack Location and Structure Footprints (red = stack; footprint = blue rectangle)

(b) (3) (A)

[redacted]

Figure 4. Ambient Air Receptors (yellow crosses)

(b) (3) (A)

[redacted]

Figure 5. PHNL 2019-2023 Wind Rose

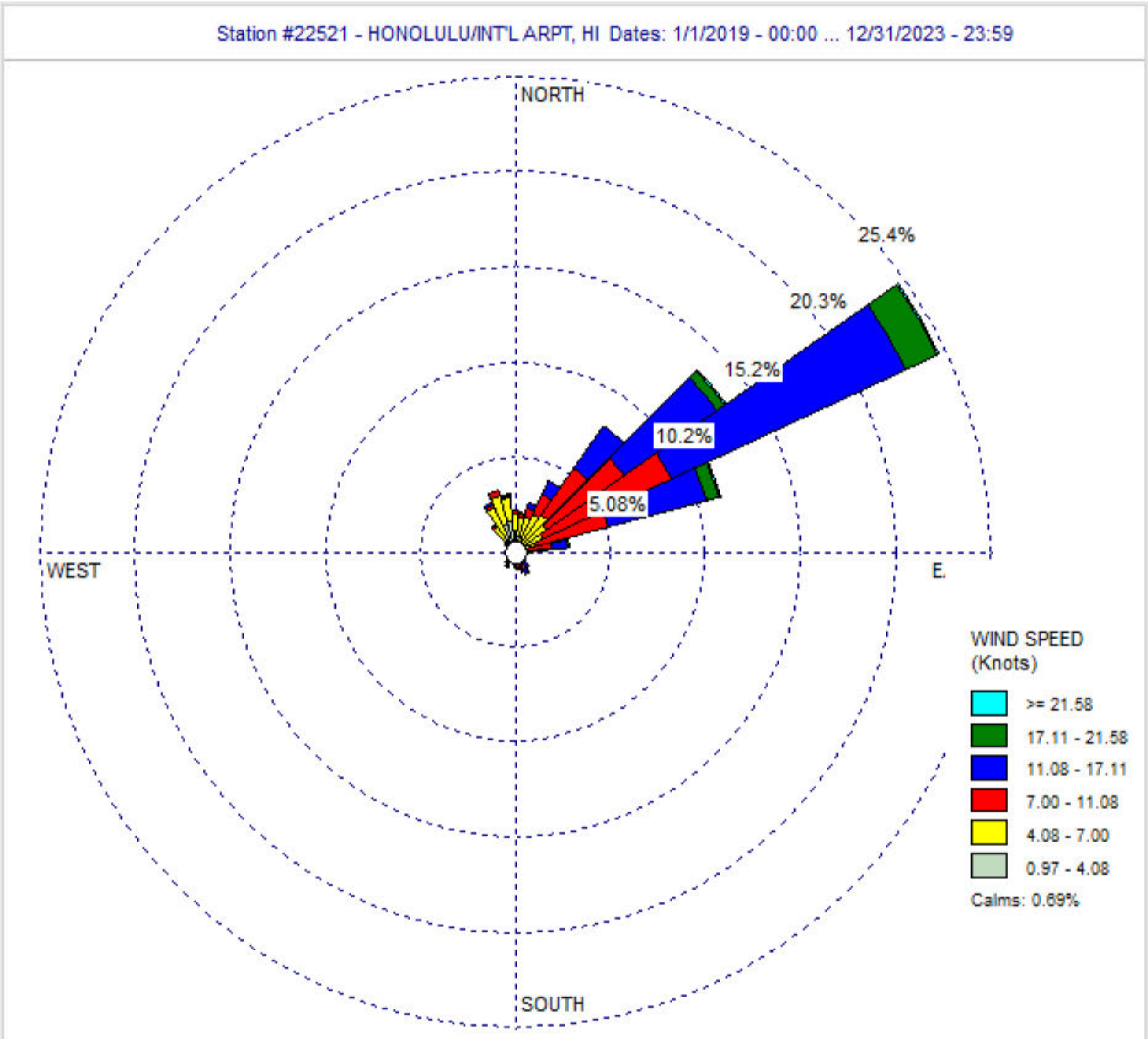


Figure 6. Location of Maximum 8-hr Impacts (μg/m³) for Scenario HRZ40 with Emission Rate = 1 g/s*

(b) (3) (A)

[redacted]

*Multiply concentrations by emission rates in Table 3 to determine pollutant impacts.

Figure 7. Location of Maximum 24-hr Impacts (μg/m³) for Scenario HRZ40 with Emission Rate = 1 g/s*

[redacted]

(b) (3) (A)

*Multiply concentrations by emission rates in Table 3 to determine pollutant impacts.

Figure 8. Location of Maximum Month Impacts (μg/m^3) for Scenario HRZ40 with Emission Rate = 1 g/s*

[redacted]

(b) (3) (A)

*Multiply concentrations by emission rates in Table 3 to determine pollutant impacts.

Figure 9. Location of Maximum Annual (2021) Impacts ($\mu g/m^3$) for Scenario HRZ40 with Emission Rate = 1 g/s*

(b) (3) (A)

[redacted]

*Multiply concentrations by emission rates in Table 4 to determine pollutant impacts.

ATTACHMENT 1

APTIM Federal Services, LLC letter dated March 19, 2024

RH Tank Ventilation Modeling - Jet Fuel

Enter data

> Threshold

	Exhaust Configuration			Maximum Potential Emission Rate (lb/hr)						Maximum Modeled Concentration (µg/m³) for 1 g/s emission rate				VOC Concentration (µg/m³)		Naphthalene Concentration (µg/m³)		Benzene Concentration (µg/m³)		All Pollutants
				VOC		Naphthalene		Benzene												
Scenario*	Flow Rate (CFM)	H [redacted] ft)	Direction	1-hr	Annual	1-hr	Annual	1-hr	Annual	8-hr	24-hr	month	Annual	month	Annual	8-hr	Annual	24-hr	Annual	≤ Threshold?
HRZ40	40,000	[redacted]	horizontal	29.9	3.48	0.0211	0.00247	0.385	0.0449	184.0277	117.64846	30.33921	22.92953	114.3	10.1	0.5	0.01	5.7	0.1	YES
HRZ50	50,000	[redacted]	horizontal	29.9	3.48	0.0211	0.00247	0.385	0.0449	183.97384	117.37655	30.33332	22.92337	114.3	10.1	0.5	0.01	5.7	0.1	YES
HRZ60	60,000	[redacted]	horizontal	29.9	3.48	0.0211	0.00247	0.385	0.0449	183.92529	117.13858	30.32815	22.91795	114.3	10.1	0.5	0.01	5.7	0.1	YES
HRZ70	70,000	[redacted]	horizontal	29.9	3.48	0.0211	0.00247	0.385	0.0449	183.88072	116.9255	30.32349	22.91308	114.2	10.1	0.5	0.01	5.7	0.1	YES
HRZ80	80,000	[redacted]	horizontal	29.9	3.48	0.0211	0.00247	0.385	0.0449	183.83928	116.73167	30.31924	22.90863	114.2	10.1	0.5	0.01	5.7	0.1	YES
VRT40	40,000	[redacted]	vertical	29.9	3.48	0.0211	0.00247	0.385	0.0449	181.75507	76.22718	27.82828	20.72115	104.8	9.1	0.5	0.01	3.7	0.1	YES
VRT50	50,000	[redacted]	vertical	29.9	3.48	0.0211	0.00247	0.385	0.0449	181.69737	74.58021	27.03157	20.11773	101.8	8.8	0.5	0.01	3.6	0.1	YES
VRT60	60,000	[redacted]	vertical	29.9	3.48	0.0211	0.00247	0.385	0.0449	181.65529	73.57739	26.40392	19.62445	99.5	8.6	0.5	0.01	3.6	0.1	YES
VRT70	70,000	[redacted]	vertical	29.9	3.48	0.0211	0.00247	0.385	0.0449	181.62104	72.94469	25.86912	19.20453	97.5	8.4	0.5	0.01	3.5	0.1	YES
VRT80	80,000	[redacted]	vertical	29.9	3.48	0.0211	0.00247	0.385	0.0449	181.59129	72.53071	25.37962	18.82936	95.6	8.3	0.5	0.01	3.5	0.1	YES
V5_40	40,000	[redacted]	vertical	29.9	3.48	0.0211	0.00247	0.385	0.0449	130.23315	63.09945	26.5445	19.67768	100.0	8.6	0.3	0.01	3.1	0.1	YES
V10_40	40,000	[redacted]	vertical	29.9	3.48	0.0211	0.00247	0.385	0.0449	118.49713	58.77909	25.02102	18.46582	94.3	8.1	0.3	0.01	2.9	0.1	YES
													Threshold (µg/m³)	2000	130	520	124	29	6.3	
														15-day						

* two tanks at a time, 6 tanks annually [redacted]

RH Tank Ventilation Modeling - Diesel

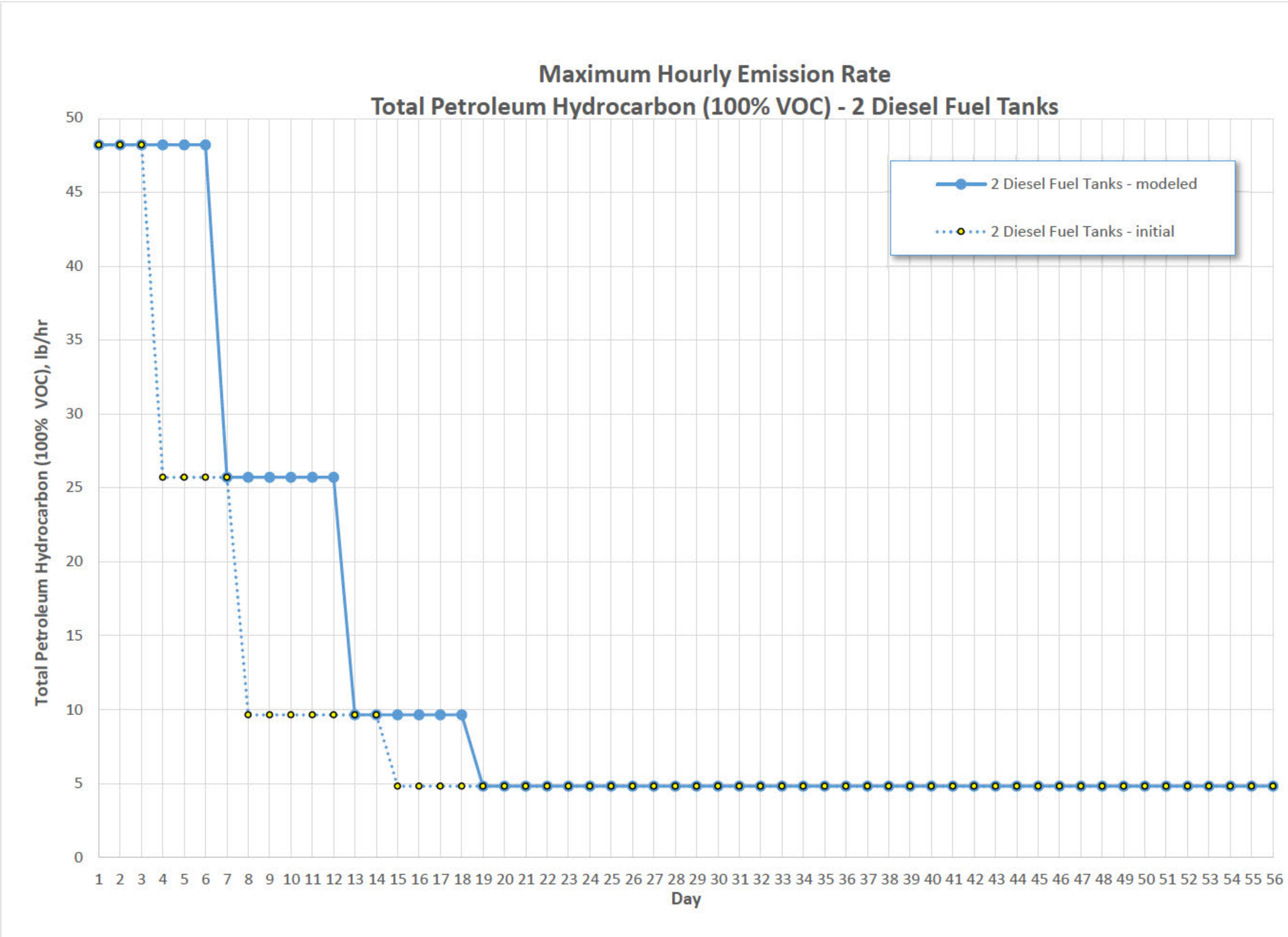
Enter data

> Threshold

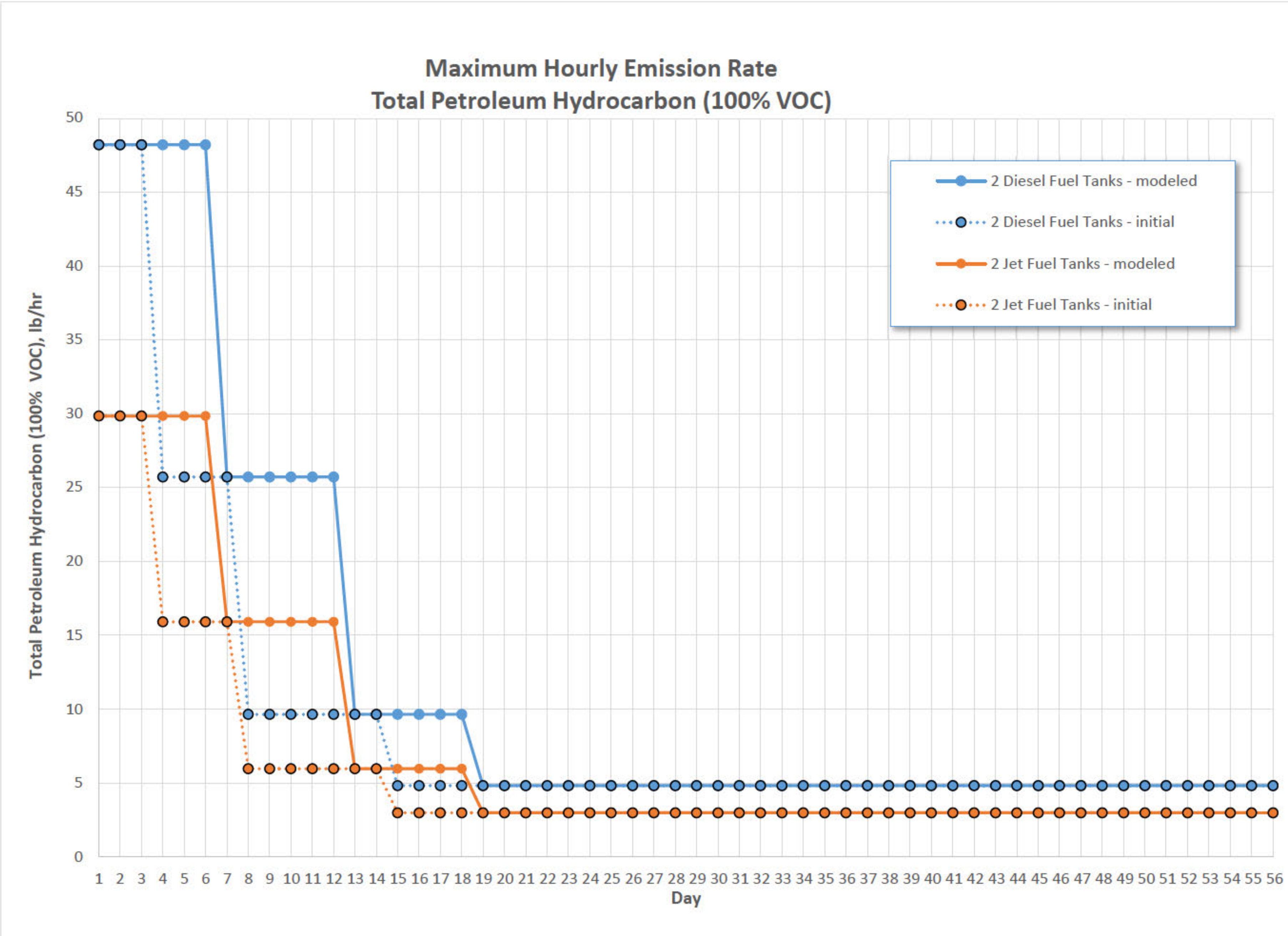
				Maximum Potential Emission Rate (lb/hr)						Maximum Modeled Concentration (µg/m³) for 1 g/s emission rate				VOC Concentration (µg/m³)		Naphthalene Concentration (µg/m³)		Benzene Concentration (µg/m³)		All Pollutants
	Exhaust Configuration			VOC		Naphthalene		Benzene												
Scenario*	Flow Rate (CFM)	Height (ft)	Direction	1-hr	Annual	1-hr	Annual	1-hr	Annual	8-hr	24-hr	month	Annual	month	Annual	8-hr	Annual	24-hr	Annual	≤ Threshold?
HRZ40	40,000	(b) (3) (A) [redacted]	horizontal	48.2	5.63	0.101	0.0118	0.264	0.0308	184.0277	117.64846	30.33921	22.92953	184.3	16.3	2.3	0.03	3.9	0.1	YES
HRZ50	50,000	[redacted]	horizontal	48.2	5.63	0.101	0.0118	0.264	0.0308	183.97384	117.37655	30.33332	22.92337	184.2	16.3	2.3	0.03	3.9	0.1	YES
HRZ60	60,000	[redacted]	horizontal	48.2	5.63	0.101	0.0118	0.264	0.0308	183.92529	117.13858	30.32815	22.91795	184.2	16.3	2.3	0.03	3.9	0.1	YES
HRZ70	70,000	[redacted]	horizontal	48.2	5.63	0.101	0.0118	0.264	0.0308	183.88072	116.9255	30.32349	22.91308	184.2	16.2	2.3	0.03	3.9	0.1	YES
HRZ80	80,000	[redacted]	horizontal	48.2	5.63	0.101	0.0118	0.264	0.0308	183.83928	116.73167	30.31924	22.90863	184.1	16.2	2.3	0.03	3.9	0.1	YES
VRT40	40,000	[redacted]	vertical	48.2	5.63	0.101	0.0118	0.264	0.0308	181.75507	76.22718	27.82828	20.72115	169.0	14.7	2.3	0.03	2.5	0.1	YES
VRT50	50,000	[redacted]	vertical	48.2	5.63	0.101	0.0118	0.264	0.0308	181.69737	74.58021	27.03157	20.11773	164.2	14.3	2.3	0.03	2.5	0.1	YES
VRT60	60,000	[redacted]	vertical	48.2	5.63	0.101	0.0118	0.264	0.0308	181.65529	73.57739	26.40392	19.62445	160.4	13.9	2.3	0.03	2.4	0.1	YES
VRT70	70,000	[redacted]	vertical	48.2	5.63	0.101	0.0118	0.264	0.0308	181.62104	72.94469	25.86912	19.20453	157.1	13.6	2.3	0.03	2.4	0.1	YES
VRT80	80,000	[redacted]	vertical	48.2	5.63	0.101	0.0118	0.264	0.0308	181.59129	72.53071	25.37962	18.82936	154.1	13.4	2.3	0.03	2.4	0.1	YES
V5_40	40,000	[redacted]	vertical	48.2	5.63	0.101	0.0118	0.264	0.0308	130.23315	63.09945	26.5445	19.67768	161.2	14.0	1.7	0.03	2.1	0.1	YES
V10_40	40,000	[redacted]	vertical	48.2	5.63	0.101	0.0118	0.264	0.0308	118.49713	58.77909	25.02102	18.46582	152.0	13.1	1.5	0.03	2.0	0.1	YES
													Threshold (µg/m³)	2000	130	520	124	29	6.3	
														15-day						

* two tanks at a time, 6 tanks annually [redacted]

(b) (3) (A)



Maximum Hourly Emission Rate
Total Petroleum Hydrocarbon (100% VOC) - 2 Diesel Fuel Tanks
2 Diesel Fuel Tanks - modeled
2 Diesel Fuel Tanks - initial
Total Petroleum Hydrocarbon (100% VOC), lb/hr
0
5
10
15
20
25
30
35
40
45
50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
Day



Maximum Hourly Emission Rate
Total Petroleum Hydrocarbon (100% VOC)
Total Petroleum Hydrocarbon (100% VOC), lb/hr
50
45
40
35
30
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
Day
2 Diesel Fuel Tanks - modeled
2 Diesel Fuel Tanks - initial
2 Jet Fuel Tanks - modeled
2 Jet Fuel Tanks - initial

DOH specified thresholds

						Need to verify	
Benzene	24-hr	0.029	mg/m3	29	μg/m3	Dose-Response Assessment for Assessing Health Risks Associated With Exposure to Hazardous Air Pollutants | US EPA.	
Benzene	Annual	6.3	μg/m3	6.3	μg/m3	updated April 2024 DOH EAL for benzene, Table C-3 in Appendix 1	
Naphthalene	8-hr	0.52	mg/m3	520	μg/m3	8-hr TLV-TWA = 52 mg/m3	1/100th TLV-TWA (sub-chronic health risk); American Conference of Governmental Industrial Hygienists; https://www.acgih.org/science/tlv-bei-guidelines/tlv-chemical-substances-introduction/
Naphthalene	Annual	0.12	mg/m3	124	μg/m3	8-hr TLV-TWA = 52 mg/m3	1/420th TLV-TWA (chronic health risk); American Conference of Governmental Industrial Hygienists; https://www.acgih.org/science/tlv-bei-guidelines/tlv-chemical-substances-introduction/
VOC	15 days	2	mg/m3	2000	μg/m3	ATSDR; https://www.atsdr.cdc.gov/toxprofiles/tp121.pdf	
VOC	Annual	0.13	mg/m3	130	μg/m3	updated April 2024 DOH Total Petroleum Hydrocarbon (TPH) Environmental Action Level (EAL) for vapors from middle distillate fuels, see summary Table C EAL Surfer 1 and Table C-3 in Appendix 1	

APTIM Federal Services, LLC
Contract No. N39430-20-D-2225
Task Order: N39430-23-F-4645

March 19, 2024

Prepared and delivered to NAVFAC Hawaii
via DOD SAFE to Contracting Officer, [redacted]

Response to Hawaii Department of Health letter dated March 8th, 2024
SUBJECT: Red Hill Fuel Storage Facility Degassing Activity

Dear [redacted]

Contained within this document is the information requested per Sections 1 and 2 of the referenced above Hawaii Department of Health (HDOH) letter.

In reference to section 1, the following information is being provided:

1. Exhaust information and on-site/operating conditions:
   b. For each exhaust vent, provide*:
      vii. Maximum potential pound per hour volatile organic compound (VOC) and hazardous air pollutant emissions and supporting calculations that show how pound per hour emissions were derived; and
         - **Provided as Attachment 1 of this document, calculations of the maximum estimated potential emissions requested by HDOH are provided.**

2. A letter from APTIM Federal Services, dated August 17, 2023, was submitted to the DOH's Clean Air Branch with attachments. Attachment 1 states "Full calculations can be found in the included Excel File." Provide a hard copy and electronic copy of the Excel file or files mentioned in the August 17, 2023, submittal.
   - **A hard copy in PDF format is being provided as Attachment 2 of this document. This document has been produced utilizing the Excel workbook used to calculate estimated emission levels for the tank de-gassing operations.**
   - **Provided separately to the project NAVFAC Contracting Officer via a DOD Safe document upload service, the Excel workbook file has been delivered for controlled dissemination to the requested party.**

ATTACHMENT 1

Estimated lbs/hr Emissions Addressing Hawaii Department of Health’s Concern Letter dated 3/8/2024

Attachment 1: Estimated lbs/hr Emissions

Addressing Hawaii Department of Health's Concern Letter dated 3/8/2024

The 8/16/2023 tank ventilation document provided the methodology and emission calculations described in chapter "Liquid Storage Tanks. (2020)," in AP-42: Compilation of Air Pollutant Emission Factors (5th ed., Vol.1, pp. 1–203) from the United States Environmental Protection Agency. The degassing rate was based on THC vapor concentrations measured while cleaning a previous Red Hill underground storage tank of identical size (Tank 18). A ventilation rate per tank of 10,000 CFM is assumed based on the calculations by (b) (6) [redacted] using the previous results. (See Table 1.)

The expected cleaning and degassing schedule (Table 1) for a single Red Hill Tank is 56 days. It is assumed that each tank will be continuously ventilated 24 hours a day.

There are 14 tanks to be cleaned consisting of 2 tanks containing Diesel (2 tanks of F-76) and 12 tanks containing Jet Fuel (7 tanks of JP-5 and 5 tanks of F-24).

Table 1. Assumed Degassing Schedule Per Tank for Tank Cleaning at the Red Hill Bulk Fuel Storage Facility (RHBFSF), Joint Base Pearl Harbor Hickam, Hawaii

Number of Days	Total Hydrocarbon (THC) Vapor Concentration
3	75 PPMV
4	40 PPMV
7	15 PPMV
42	7.5 PPMV

Under the current cleaning schedule, 2 tanks will be degassed at the same time. The emission calculations were repeated using the same August 16, 2023, Excel file for degassing two tanks diesel (F-76) or two tanks jet fuel (F-24). Using the degassing schedule in Table 1, the maximum values for the Total Petroleum Hydrocarbons and HAPS are shown in Table 2.

Table 2. Red Hill Tank Cleaning Maximum Daily Average Emissions (lbs/hr)

Pollutant	2 Diesel (F76) Tanks	2 Jet Fuel (F24) Tanks	HAP
Total Petroleum Hydrocarbons (VOCs) (lbs/hr)	4.82E+01	2.99E+01	No
Benzene (lbs/hr)	2.64E-01	3.85E-01	Yes
Toluene (lbs/hr)	7.66E-01	1.61E+00	Yes
Ethylbenzene (lbs/hr)	1.68E+00	5.82E-01	Yes
m,p-Xylene (lbs/hr)	6.53E+00	1.82E+00	Yes
o-Xylene (lbs/hr)	1.55E+00	2.08E-01	Yes
1,2-Dimethylbenzene (lbs/hr)	N/A	7.48E-01	Yes
Isopropylbenzene (lbs/hr)	1.20E-01	1.27E-01	Yes
Biphenyl (lbs/hr)	N/A	2.42E-03	Yes
Naphthalene (lbs/hr)	1.01E-01	2.11E-02	Yes
2-Methylnaphthalene (lbs/hr)	N/A	2.40E-02	Yes
1-Methylnaphthalene (lbs/hr)	N/A	3.15E-02	Yes
1-Ethylnaphthalene (lbs/hr)	N/A	3.30E-03	Yes
2,3-Dimethylnaphthalene (lbs/hr)	N/A	2.89E-04	Yes
2,6-Dimethylnaphthalene (lbs/hr)	N/A	2.13E-03	Yes
Styrene (lbs/hr)	N/A	N/A	Yes
n-Hexane (lbs/hr)	3.33E-01	N/A	Yes
2,2,4-Trimethylpentane (lbs/hr)	2.79E-01	N/A	Yes

Figure 1, below, depicts the daily average (lbs/hr) Total Petroleum Hydrocarbons (VOCs) emitted over the 56-day degassing schedule.

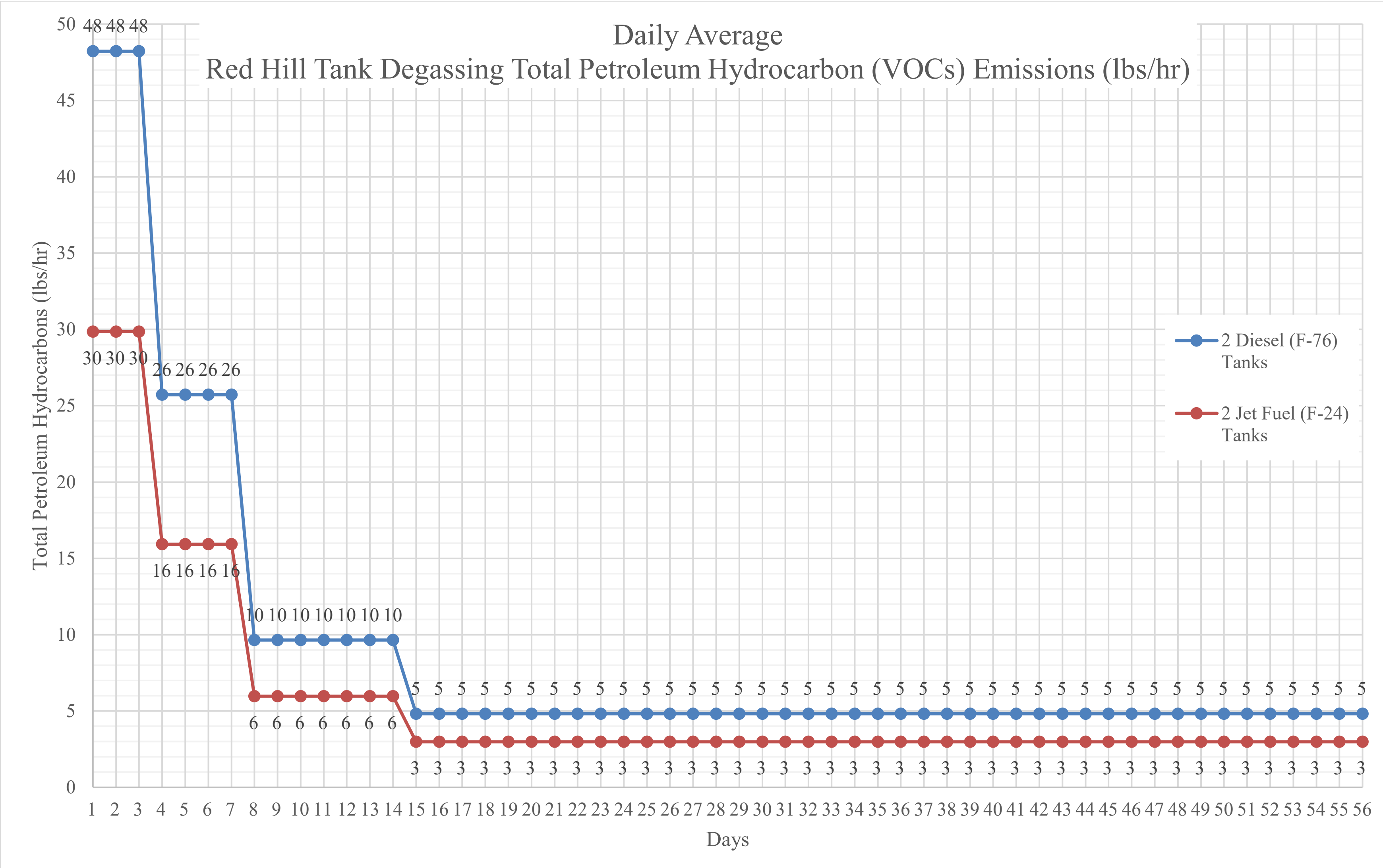
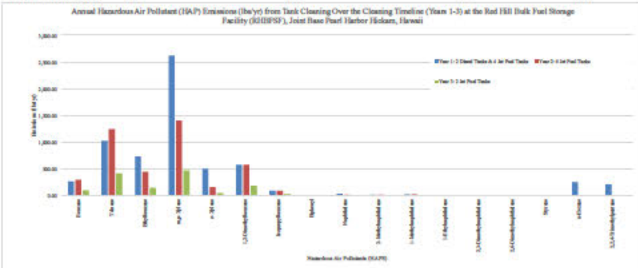


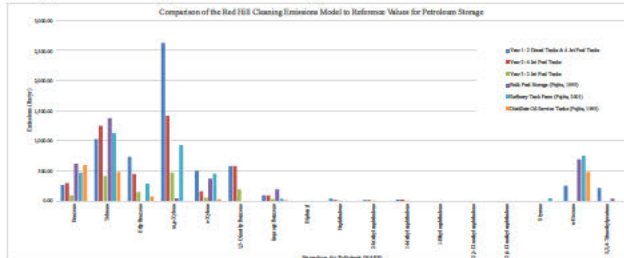
Figure 1. Daily Average Red Hill Degassing Total Hydrocarbon (VOCs) Emissions (lbs/hr).

ATTACHMENT 2

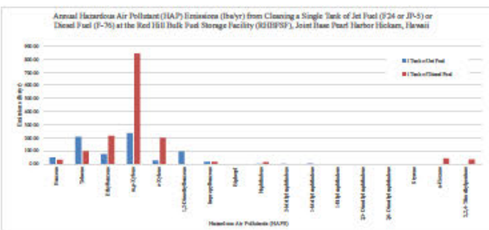
Red Hill Degas Emissions Excel File Product

	HAPS Overall Emissions (lbs/yr)						
	Year 1: 2 Diesel Tanks & 4 Jet Fuel Tanks	Year 2: 6 Jet Fuel Tanks	Year 3: 2 Jet Fuel Tanks	0.00	0.00	0.00	0.00
Year	1.00	2.00	3.00	Reference Value for Comparison	Reference Value for Comparison	Reference Value for Comparison	0.00
Tank Type	2 Diesel Tanks & 4 Jet Fuel Tanks	6 Jet Fuel Tanks	2 Jet Fuel Tanks	Bulk Fuel Storage (Fujita, 1995)	Refinery Tank Farm (Fujita, 2001)	Distillate Oil Service Tanks (Fujita, 1995)	Guideline
Benzene	266.43	297.43	99.21	418.32	466.03	392.84	300.00
Toluene	1,028.24	1,246.40	415.47	1,372.77	1,123.90	475.28	300.00
Ethylbenzene	732.83	449.50	149.85	N/A	266.09	73.83	300.00
m,p-Xylene	2,621.47	1,409.27	469.76	46.14	929.79	N/A	300.00
o-Xylene	506.58	160.38	53.55	371.43	449.00	29.99	300.00
1,2-Dimethylbenzene	578.10	578.10	192.70	N/A	N/A	N/A	300.00
Isopropylbenzene	96.38	98.31	32.77	191.50	39.22	11.34	300.00
Biphenyl	1.87	1.87	0.62	N/A	N/A	N/A	300.00
Naphthalene	36.96	16.33	5.44	N/A	N/A	N/A	300.00
2-Methylnaphthalene	18.55	18.55	6.18	N/A	N/A	N/A	300.00
1-Methylnaphthalene	24.35	24.35	8.12	N/A	N/A	N/A	300.00
1-Ethylnaphthalene	2.55	2.55	0.85	N/A	N/A	N/A	300.00
2,3-Dimethylnaphthalene	0.22	0.22	0.07	N/A	N/A	N/A	300.00
2,6-Dimethylnaphthalene	1.65	1.65	0.55	N/A	N/A	N/A	300.00
Styrene	N/A	N/A	N/A	N/A	66.14	N/A	300.00
n-Hexane	257.13	N/A	N/A	482.15	749.85	475.28	300.00
2,2,4-Trimethylpentane	213.70	N/A	N/A	36.91	N/A	N/A	300.00
Guideline	300.00	300.00	300.00	300.00	300.00	300.00	300.00
Total Hydrocarbons (THC) (lbs/yr)	27,804.37	23,071.71	7,690.37	N/A	N/A	N/A	N/A
Total Hydrocarbons (THC) (tons/yr)	13.90	11.54	3.85	N/A	N/A	N/A	N/A





	HAPS Overall Emissions (lbs/yr)		
Tank Type	1 Tank of Jet Fuel	1 Tank of Diesel Fuel	Guideline
Benzene	49.60	34.02	500.00
Toluene	207.73	98.47	500.00
Ethylbenzene	74.92	216.39	500.00
m,p-Xylene	234.88	840.08	500.00
o-Xylene	26.76	199.74	500.00
1,2-Dimethylbenzene	96.35	N/A	500.00
Isopropylbenzene	16.39	13.42	500.00
Biphenyl	0.31	N/A	500.00
Naphthalene	2.72	13.06	500.00
2-Methylnaphthalene	3.09	N/A	500.00
1-Methylnaphthalene	4.06	N/A	500.00
1-Ethylnaphthalene	0.43	N/A	500.00
2,3-Dimethylnaphthalene	0.04	N/A	500.00
2,6-Dimethylnaphthalene	0.27	N/A	500.00
Styrene	N/A	N/A	500.00
n-Hexane	N/A	42.85	500.00
2,2,4-Trimethylpentane	N/A	35.05	500.00
Total Hydrocarbons (THC) (lbs/yr)	3,845.28	6,211.61	N/A
Total Hydrocarbons (THC) (tons/yr)	1.92	3.11	N/A



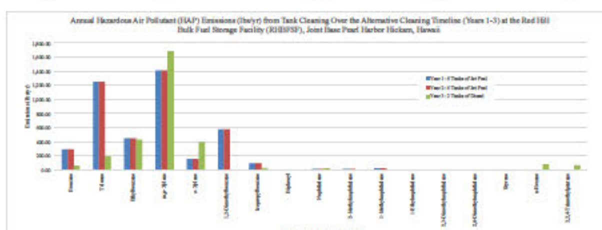
HAPS Overall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	Vapor Mass (lbs/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red Hill Fuel	F-24	F-24	JP-5	JP-5 or F-24	F-76	F-76 & JP-5 or F-24	F-76 & JP-5 or F-24	JP-5 or F-24	F-76	Reference Value from EPA SPECIATE for Validation	Reference Value from EPA SPECIATE for Validation	Reference Value from EPA SPECIATE for Validation	0.00
Tanks Cleaned per Year	6 Tanks of Jet A	6 Tanks of JP-8	6 Tanks of JP-5	6 Tanks of Average Jet Fuel	6 Tanks of Diesel	1 Diesel Tank & 3 Jet Fuel Tanks	2 Diesel Tanks & 4 Jet Fuel Tanks	2 Tanks of Jet Fuel	2 Tanks of Diesel	Bulk Fuel Storage	Refinery Tank Farm	Distillate Oil Service Tanks	Guideline
Benzene	297.43	N/A	N/A	297.43	204.10	282.04	266.43	99.21	68.03	418.32	466.03	392.84	300.00
Toluene	1,246.40	N/A	N/A	1,246.40	591.99	1,137.33	1,028.24	415.47	197.33	1,372.77	1,123.90	475.28	300.00
Ethylbenzene	449.50	N/A	N/A	449.50	1,299.56	591.18	732.83	149.85	433.19	N/A	266.09	73.83	300.00
m,p-Xylene	1,409.27	N/A	N/A	1,409.27	5,043.87	2,015.37	2,621.47	469.76	1,681.29	46.14	929.79	N/A	300.00
o-Xylene	N/A	128.47	192.70	160.38	1,198.77	355.38	506.58	53.55	399.52	371.43	449.00	29.99	300.00
1,2-Dimethylbenzene	578.10	N/A	N/A	578.10	N/A	578.10	578.10	192.70	#VALUE!	N/A	N/A	N/A	300.00
Isopropylbenzene	98.31	N/A	N/A	98.31	92.52	97.33	96.58	32.77	30.84	191.50	39.22	11.34	300.00
Biphenyl	N/A	1.77	1.97	1.87	N/A	1.87	1.87	0.62	#VALUE!	N/A	N/A	N/A	300.00
Naphthalene	4.77	20.15	13.00	16.33	78.22	26.64	36.96	5.44	26.07	N/A	N/A	N/A	300.00
2-Methylnaphthalene	6.44	23.42	23.72	18.55	N/A	18.55	18.55	6.18	#VALUE!	N/A	N/A	N/A	300.00
1-Methylnaphthalene	3.88	37.79	28.90	24.35	N/A	24.35	24.35	8.12	#VALUE!	N/A	N/A	N/A	300.00
1-Ethylnaphthalene	N/A	2.90	2.51	2.55	N/A	2.55	2.55	0.85	#VALUE!	N/A	N/A	N/A	300.00
2,3-Dimethylnaphthalene	N/A	0.30	0.25	0.22	N/A	0.22	0.22	0.07	#VALUE!	N/A	N/A	N/A	300.00
2,6-Dimethylnaphthalene	N/A	1.79	1.51	1.65	N/A	1.65	1.65	0.55	#VALUE!	N/A	N/A	N/A	300.00
Styrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	#VALUE!	#VALUE!	N/A	66.14	N/A	300.00
n-Hexane	N/A	N/A	N/A	N/A	257.13	257.13	257.13	#VALUE!	85.71	482.15	749.85	475.28	300.00
2,2,4-Trimethylpentane	N/A	N/A	N/A	N/A	213.70	213.70	213.70	#VALUE!	71.90	36.91	N/A	N/A	300.00
Guideline	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00

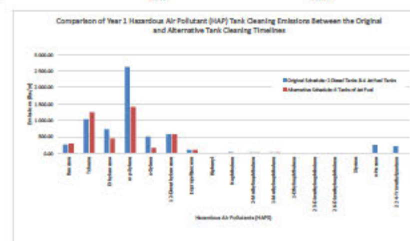
Original Schedule
Year 1: 2 Diesel 4 Jet
Year 2: 6 Jet
Year 3: 2 Jet

HAPS Overall	0.00	0.00	0.00	
Year	1.00	2.00	3.00	
Red Hill Fuel	F-76 & JP-5 or F-24	JP-5 or F-24	JP-5 or F-24	
Tanks Cleaned per Year	2 Diesel Tanks & 4 Jet Fuel Tanks	6 Tanks of Average Jet Fuel	2 Tanks of Jet Fuel	Total
Benzene	266.43	297.43	99.21	663.28
Toluene	1,028.24	1,246.40	415.47	2,690.11
Ethylbenzene	732.83	449.50	149.85	1,332.18
m,p-Xylene	2,621.47	1,409.27	469.76	4,500.49
o-Xylene	506.58	160.38	53.55	720.49
1,2-Dimethylbenzene	578.10	578.10	192.70	1,348.89
Isopropylbenzene	96.38	98.31	32.77	227.47
Biphenyl	1.87	1.87	0.62	4.37
Naphthalene	36.96	16.33	5.44	58.73
2-Methylnaphthalene	18.55	18.55	6.18	43.23
1-Methylnaphthalene	24.35	24.35	8.12	56.82
1-Ethylnaphthalene	2.55	2.55	0.85	5.95
2,3-Dimethylnaphthalene	0.22	0.22	0.07	0.52
2,6-Dimethylnaphthalene	1.65	1.65	0.55	3.85
Styrene	N/A	N/A	N/A	0.00
n-Hexane	257.13	N/A	N/A	257.13
2,2,4-Trimethylpentane	213.70	N/A	N/A	213.70
Total Hydrocarbons (THC) (lbs/yr)	27,804.37	23,071.71	7,690.37	58,566.46
Total Hydrocarbons (THC) (tons/yr)	13.90	11.54	3.85	29.28

Alternative Schedule 1
Year 1: 1 Diesel 3 Jet
Year 2: 1 Diesel 3 Jet
Year 3: 2 Jet

HAPS Overall	0.00	0.00	0.00

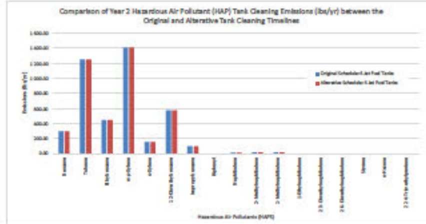


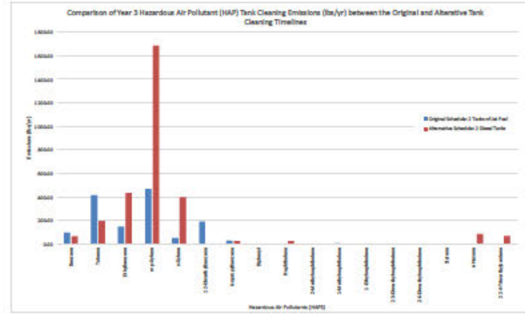


Year	1.00	2.00	3.00	
Red Hill Fuel	F-76 & JP-5 or F-24	F-76 & JP-5 or F-24	JP-5 or F-24	
Tanks Cleaned per Year	1 Diesel Tank & 3 Jet Fuel Tanks	1 Diesel Tank & 3 Jet Fuel Tanks	2 Tanks of Jet Fuel	Total
Benzene	282.04	282.04	99.21	663.29
Toluene	1,137.33	1,137.33	413.47	2,688.13
Ethylbenzene	591.18	591.18	149.83	1,332.18
m,p-Xylene	2,015.37	2,015.37	469.76	4,500.49
o-Xylene	555.58	555.58	33.33	724.49
1,2-Dimethylbenzene	378.10	378.10	192.70	1,148.90
Isopropylbenzene	97.33	97.33	32.77	227.47
Biphenyl	1.87	1.87	0.62	4.37
Naphthalene	26.66	26.66	5.44	58.75
2-Methylnaphthalene	18.33	18.33	6.18	43.23
1-Methylnaphthalene	24.33	24.33	8.12	56.82
1-Ethylnaphthalene	2.33	2.33	0.83	5.50
2,3-Dimethylnaphthalene	0.22	0.22	0.07	0.52
2,6-Dimethylnaphthalene	1.63	1.63	0.33	3.83
Styrene	N/A	N/A	N/A	0.00
n-Hexane	237.13	237.13	N/A	514.25
2,2,4-Trimethylpentane	213.70	213.70	N/A	451.40
Oxidation				0.00

Alternative Schedule 2
Year 1: 4 Jet
Year 2: 4 Jet
Year 3: 2 Diesel

HAPS Overall	0.00	0.00	0.00	
	Year 1: 4 Tanks of Jet Fuel	Year 2: 4 Tanks of Jet Fuel	Year 3: 2 Tanks of Diesel	
Year	1.00	2.00	3.00	
Red Hill Fuel	JP-5 or F-24	JP-5 or F-24	F-76	
Tanks Cleaned per Year	4 Tanks of Average Jet Fuel	4 Tanks of Average Jet Fuel	2 Tanks of Diesel	Total
Benzene	297.43	297.43	68.05	663.29
Toluene	1,246.40	1,246.40	197.33	2,690.13
Ethylbenzene	449.30	449.30	433.19	1,332.18
m,p-Xylene	1,409.27	1,409.27	1,481.96	4,300.49
o-Xylene	140.38	140.38	300.32	720.49
1,2-Dimethylbenzene	378.10	378.10	N/A	1,136.20
Isopropylbenzene	98.31	98.31	30.84	227.47
Biphenyl	1.87	1.87	N/A	3.74
Naphthalene	14.33	14.33	24.07	58.73
2-Methylnaphthalene	18.33	18.33	N/A	37.06
1-Methylnaphthalene	24.33	24.33	N/A	48.71
1-Ethylnaphthalene	2.33	2.33	N/A	5.10
2,3-Dimethylnaphthalene	0.22	0.22	N/A	0.43
2,6-Dimethylnaphthalene	1.63	1.63	N/A	3.50
Styrene	N/A	N/A	N/A	0.00
n-Hexane	N/A	N/A	83.71	83.71
2,2,4-Trimethylpentane	N/A	N/A	71.90	71.90
Total Hydrocarbons (THC) (lbs/yr)	23,071.71	23,071.71	12,423.23	58,566.66
Total Hydrocarbons (THC) (tons/yr)	11.54	11.54	6.21	29.28





Year 1	Original Schedule: 2 Diesel Tanks & 4 Jet Fuel Tanks	Alternative 1: 1 Diesel Tank & 3 Jet Fuel Tanks	Alternative 2: 4 Jet Fuel Tanks
Red Hill Fuel	F-76 & JP-5 or F-24	F-76 & JP-5 or F-24	JP-5 or F-24
Tanks Cleaned per Year	2 Diesel Tanks & 4 Jet Fuel Tanks	1 Diesel Tank & 3 Jet Fuel Tanks	4 Tanks of Average Jet Fuel
Benzene	266.43	282.04	297.43
Toluene	1,028.26	1,137.33	1,246.40
Ethylbenzene	732.83	591.18	449.30
m,p-Xylene	2,621.47	2,015.37	1,409.27
o-Xylene	506.58	555.58	140.38
1,2-Dimethylbenzene	378.10	378.10	378.10
Isopropylbenzene	96.36	97.33	98.31
Biphenyl	1.87	1.87	1.87
Naphthalene	36.96	26.66	14.33
2-Methylnaphthalene	18.33	18.33	18.33
1-Methylnaphthalene	24.33	24.33	24.33
1-Ethylnaphthalene	2.33	2.33	2.33
2,3-Dimethylnaphthalene	0.22	0.22	0.22
2,6-Dimethylnaphthalene	1.63	1.63	1.63
Styrene	N/A	N/A	N/A
n-Hexane	237.13	237.13	N/A
2,2,4-Trimethylpentane	213.70	213.70	N/A
Total Hydrocarbons (THC) (lbs/yr)	27,804.37	23,458.04	23,071.71
Total Hydrocarbons (THC) (tons/yr)	13.90	11.73	11.54

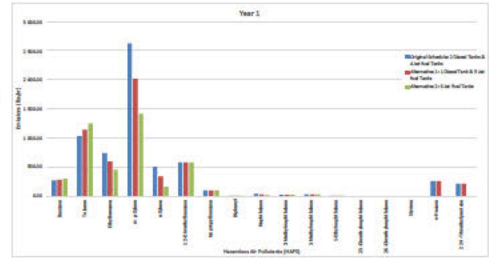
Year 2	Original Schedule: 4 Jet Fuel Tanks	Alternative Schedule 1: 1 Diesel Tank & 3 Jet Fuel Tanks	Alternative Schedule 2: 4 Jet Fuel Tanks
Red Hill Fuel	JP-5 or F-24	F-76 & JP-5 or F-24	JP-5 or F-24
Tanks Cleaned per Year	4 Tanks of Average Jet Fuel	1 Diesel Tank & 3 Jet Fuel Tanks	4 Tanks of Average Jet Fuel
Benzene	297.43	282.04	297.43
Toluene	1,246.40	1,137.33	1,246.40
Ethylbenzene	449.30	591.18	449.30
m,p-Xylene	1,409.27	2,015.37	1,409.27
o-Xylene	140.38	555.58	140.38
1,2-Dimethylbenzene	378.10	378.10	378.10
Isopropylbenzene	98.31	97.33	98.31
Biphenyl	1.87	1.87	1.87
Naphthalene	14.33	26.66	14.33
2-Methylnaphthalene	18.33	18.33	18.33
1-Methylnaphthalene	24.33	24.33	24.33
1-Ethylnaphthalene	2.33	2.33	2.33
2,3-Dimethylnaphthalene	0.22	0.22	0.22
2,6-Dimethylnaphthalene	1.63	1.63	1.63
Styrene	N/A	N/A	N/A
n-Hexane	N/A	237.13	N/A
2,2,4-Trimethylpentane	N/A	213.70	N/A
Total Hydrocarbons (THC) (lbs/yr)	23,071.71	23,458.04	23,071.71
Total Hydrocarbons (THC) (tons/yr)	11.54	11.73	11.54

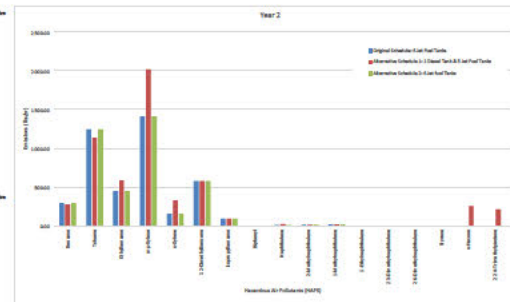
Year 3	Original Schedule: 2 Tanks of Jet Fuel	Alternative Schedule 1: 2 Tanks of Jet Fuel	Alternative Schedule 2: 2 Diesel Tanks
Red Hill Fuel	JP-5 or F-24	JP-5 or F-24	F-76
Tanks Cleaned per Year	2 Tanks of Jet Fuel	2 Tanks of Jet Fuel	2 Tanks of Diesel
Benzene	99.21	99.21	68.05
Toluene	413.47	413.47	197.33
Ethylbenzene	149.83	149.83	433.19
m,p-Xylene	469.76	469.76	1,481.96
o-Xylene	33.33	33.33	300.32
1,2-Dimethylbenzene	192.70	192.70	N/A
Isopropylbenzene	32.77	32.77	30.84
Biphenyl	0.62	0.62	N/A
Naphthalene	5.44	5.44	24.07
2-Methylnaphthalene	6.18	6.18	N/A
1-Methylnaphthalene	8.12	8.12	N/A
1-Ethylnaphthalene	0.83	0.83	N/A
2,3-Dimethylnaphthalene	0.07	0.07	N/A
2,6-Dimethylnaphthalene	0.33	0.33	N/A
Styrene	N/A	N/A	N/A
n-Hexane	N/A	N/A	83.71
2,2,4-Trimethylpentane	N/A	N/A	71.90
Total Hydrocarbons (THC) (lbs/yr)	7,690.37	7,690.37	12,423.23
Total Hydrocarbons (THC) (tons/yr)	3.85	3.85	6.21

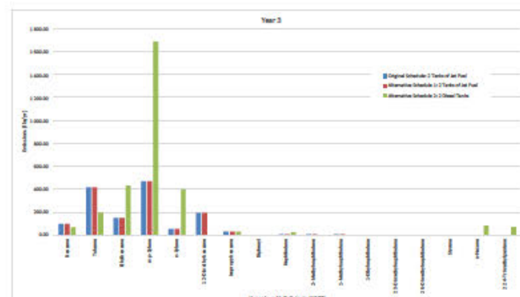
Year 1	Original Schedule: 2 Diesel Tanks & 4 Jet Fuel Tanks	Alternative Schedule: 4 Tanks of Jet Fuel	
Red Hill Fuel	F-76 & JP-5 or F-24	JP-5 or F-24	
Tanks Cleaned per Year	2 Diesel Tanks & 4 Jet Fuel Tanks	4 Tanks of Average Jet Fuel	Emissions Reduced (Original Timeline-Alternative Timeline)
Benzene	266.43	297.43	-31.17
Toluene	1,028.26	1,246.40	-218.14
Ethylbenzene	732.83	449.30	283.33
m,p-Xylene	2,621.47	1,409.27	1,212.20
o-Xylene	506.58	140.38	346.00
1,2-Dimethylbenzene	378.10	378.10	0.00
Isopropylbenzene	96.36	98.31	-1.95
Biphenyl	1.87	1.87	0.00
Naphthalene	36.96	16.33	20.63
2-Methylnaphthalene	18.33	18.33	0.00
1-Methylnaphthalene	24.33	24.33	0.00
1-Ethylnaphthalene	2.33	2.33	0.00
2,3-Dimethylnaphthalene	0.22	0.22	0.00
2,6-Dimethylnaphthalene	1.63	1.63	0.00
Styrene	N/A	N/A	N/A
n-Hexane	237.13	N/A	N/A
2,2,4-Trimethylpentane	213.70	N/A	N/A
Total Hydrocarbons (THC) (lbs/yr)	27,804.37	23,071.71	4,732.66
Total Hydrocarbons (THC) (tons/yr)	13.90	11.54	2.37

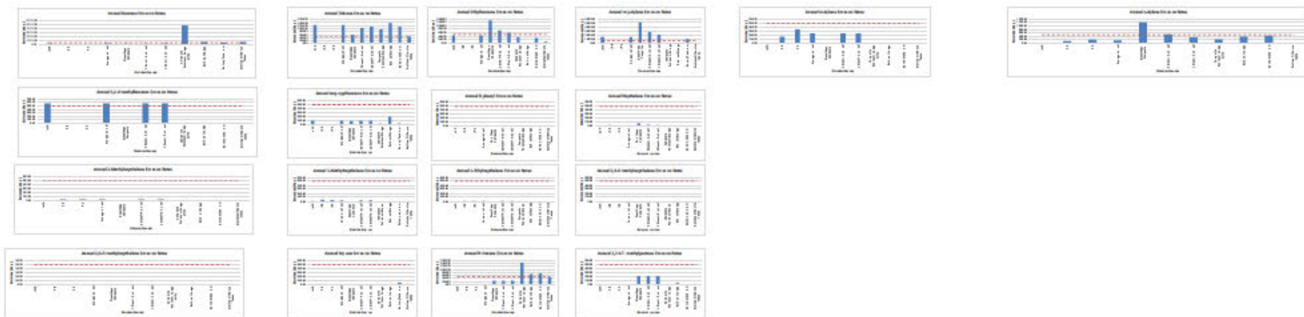
Year 2	Original Schedule: 4 Jet Fuel Tanks	Alternative Schedule: 4 Jet Fuel Tanks	
Red Hill Fuel	JP-5 or F-24	JP-5 or F-24	
Tanks Cleaned per Year	4 Tanks of Average Jet Fuel	4 Tanks of Average Jet Fuel	Emissions Reduction (Original Timeline-Alternative Timeline)
Benzene	297.43	297.43	0.00
Toluene	1,246.40	1,246.40	0.00
Ethylbenzene	449.30	449.30	0.00
m,p-Xylene	1,409.27	1,409.27	0.00
o-Xylene	140.38	140.38	0.00
1,2-Dimethylbenzene	378.10	378.10	0.00
Isopropylbenzene	98.31	98.31	0.00
Biphenyl	1.87	1.87	0.00
Naphthalene	14.33	16.33	0.00
2-Methylnaphthalene	18.33	18.33	0.00
1-Methylnaphthalene	24.33	24.33	0.00
1-Ethylnaphthalene	2.33	2.33	0.00
2,3-Dimethylnaphthalene	0.22	0.22	0.00
2,6-Dimethylnaphthalene	1.63	1.63	0.00
Styrene	N/A	N/A	N/A
n-Hexane	N/A	N/A	N/A
2,2,4-Trimethylpentane	N/A	N/A	N/A
Total Hydrocarbons (THC) (lbs/yr)	23,071.71	23,071.71	0.00
Total Hydrocarbons (THC) (tons/yr)	11.54	11.54	0.00

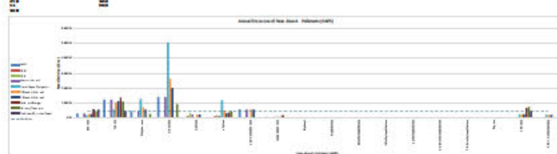
Year 3	Original Schedule: 2 Tanks of Jet Fuel	Alternative Schedule: 2 Diesel Tanks	
Red Hill Fuel	JP-5 or F-24	F-76	
Tanks Cleaned per Year	2 Tanks of Jet Fuel	2 Tanks of Diesel	Emissions Reduction (Original Timeline-Alternative Timeline)
Benzene	99.21	68.05	31.17
Toluene	413.47	197.33	218.14
Ethylbenzene	149.83	433.18	-283.35
m,p-Xylene	469.76	1,681.06	-1,212.30
o-Xylene	33.33	380.32	-346.00
1,2-Dimethylbenzene	192.70	N/A	#VALUE!
Isopropylbenzene	32.77	30.84	1.93
Biphenyl	0.62	N/A	#VALUE!
Naphthalene	5.44	26.07	-20.63
2-Methylnaphthalene	6.18	N/A	#VALUE!
1-Methylnaphthalene	8.12	N/A	#VALUE!
1-Ethylnaphthalene	0.83	N/A	#VALUE!
2,3-Dimethylnaphthalene	0.07	N/A	#VALUE!
2,6-Dimethylnaphthalene	0.33	N/A	#VALUE!
Styrene	N/A	N/A	#VALUE!
n-Hexane	N/A	83.71	#VALUE!
2,2,4-Trimethylpentane	N/A	71.90	#VALUE!
Total Hydrocarbons (THC) (lbs/yr)	7,690.37	12,423.23	-4,732.66
Total Hydrocarbons (THC) (tons/yr)	3.85	6.21	-2.37

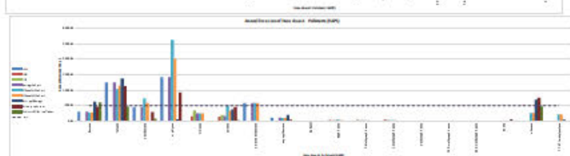


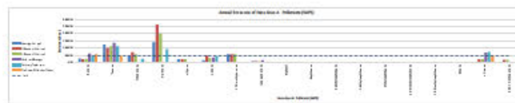


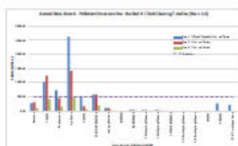


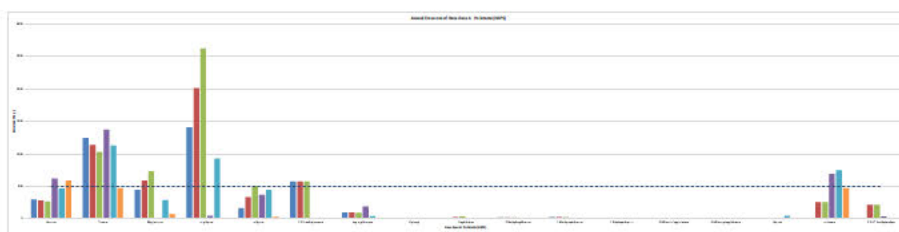


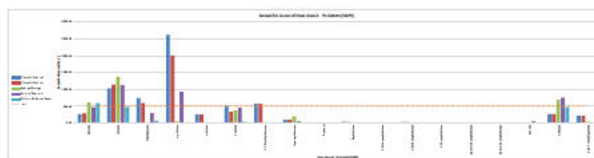


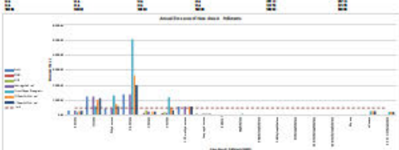


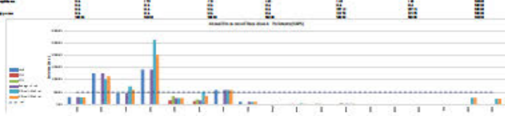


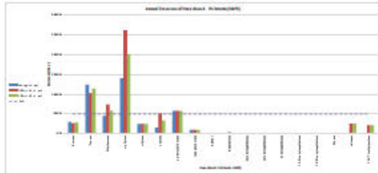


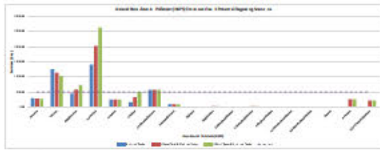


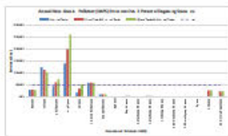


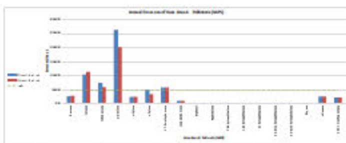


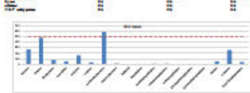


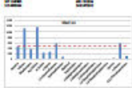


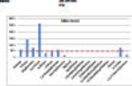


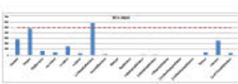


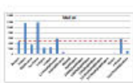


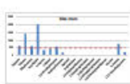












Reference: Risher, J., Faroon, O., Llados, F., & Citra, M. (2017). CHEMICAL AND PHYSICAL INFORMATION. In TOXICOLOGICAL PROFILE FOR JP-5, JP-8, AND JET A FUELS (pp. 145–155). United States Department of Health and Human Services. https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=773&tid=150
Document Link: https://www.atsdr.cdc.gov/ToxProfiles/tp121.pdf

4 CHEMICAL AND PHYSICAL INFORMATION

Table 4-1. Chemical Identity of JP-5, JP-8, and Jet A Fuels Information

Characteristic			
Chemical name	JP-5	JP-8	Jet A
Synonym(s)	NATO F-44; AVCAT; aviation kerosene; kerosene; fuel oil no. 1; jet kerosene; turbo fuel A; straight run kerosene; distillate fuel oils, light[a,b,c,d]	NATO F-34; AVTUR; MIL-DTL-83133H; aviation kerosene; kerosene; fuel oil no. 1; jet kerosene; turbo fuel A; straight run kerosene; distillate fuel oils, light[a,b,c,d,e]	No data
Registered tradename(s)	No data	No data	No data
Chemical formula[f]	No data	No data	No data
Chemical structure[f]	No data	No data	No data
Identificationnumbers:			
CAS registry	8008-20-6[g] /70892-10-3[h]	8008-20-6[g] /70892-10-3[h]	8008-20-6[g] /70892-10-3[h]
NIOSH RTECS	OA5500000[b] (kerosene)	OA5500000[b] (kerosene)	OA5500000[b] (kerosene)
EPA hazardouswaste	No data	No data	No data
OHM/TADS	7217063[g] (kerosene)	7217063[g] (kerosene)	7217063[g] (kerosene)
DOT/UN/NA/IMDG shipping	UN 1223; IMO 3.3[b] (kerosene)	UN 1223; IMO 3.3[b] (kerosene)	UN 1223; IMO 3.3[b] (kerosene)
HSDB	632[b] (kerosene)	632[b] (kerosene)	632[b] (kerosene)
NCI	No data	No data	No data

[a] RTECS 1998
[b] HSDB 2012
[c] IARC 1989
[d] Army 1988
[e] DOD 2013
[f] Fuel oils are mixtures of various hydrocarbons designed to meet specifications set forth by the American Society for Testing and Materials (DOD 1992); therefore, chemical structure and chemical formula cannot be determined.
[g] NTP/NIH 1986
[h] OHM/TADS 1985

CAS = Chemical Abstracts Service; DOT/UN/NA/IMDG = Department of Transportation/United Nations/North America/International Maritime Dangerous Goods Code; EPA = Environmental Protection Agency; HSDB = Hazardous Substances Data Bank; NCI = National Cancer Institute; NIOSH = National Institute for Occupational Safety and Health; OHM/TADS = Oil and Hazardous Materials/Technical Assistance Data System; RTECS = Registry of Toxic Effects of Chemical Substances

Degassing Schedule for 1 Tank

Degassing Schedule Constructed based on a degassing schedule provided by the Red Hill Client.

Reference for Jet Fuel Molecular Weight:	Liquid Storage Tanks. (2020). In AP-42: Compilation of Air Pollutant Emission Factors (5th ed., Vol. 1, pp. 1–203). United States Environmental Protection Agency. https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-7-liquid-storage-0
Document Link:	https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-7-liquid-storage-0

Pressure	1	atm
Pressure	14.70	PSI
Temperature	77	F
Temperature	536.67	R
R (Ideal Gas Constant)	10.73	PSI*ft^3/(Lbmol*R)
Molar Density of an Ideal Gas at 1 atm	2.55E-03	lbmols/ft^3
Jet Fuel Molar Mass	130.00	lbs/lbmol
Convert Minutes to Days	1440.00	mins/day

Days	PPMV Reading (Average)	Mole Fraction	Volumetric Flow Rate (ft^3/min)	Volumetric Flow Rate (ft^3/day)	Total Stream Molar Flow Rate (Jet Fuel + Air) (lbmols/day) (if 100% of organic vapors from Jet Fuel)	Jet Fuel Molar Flow Rate (lbmols/day) (if 100% of organic vapors from Jet fuel)	Jet Fuel Mass Flow Rate (lbs/day) (if 100% of Organic Vapors from Jet fuel)
1	75	7.50E-05	10,000	14400000	36744.23866	2.755817899	358.2563269
2	75	7.50E-05	10,000	14400000	36744.23866	2.755817899	358.2563269
3	75	7.50E-05	10,000	14400000	36744.23866	2.755817899	358.2563269
1	40	4.00E-05	10,000	14400000	36744.23866	1.469769546	191.070041
2	40	4.00E-05	10,000	14400000	36744.23866	1.469769546	191.070041
3	40	4.00E-05	10,000	14400000	36744.23866	1.469769546	191.070041
4	40	4.00E-05	10,000	14400000	36744.23866	1.469769546	191.070041
1	15	1.50E-05	10,000	14400000	36744.23866	0.55116358	71.65126538
2	15	1.50E-05	10,000	14400000	36744.23866	0.55116358	71.65126538
3	15	1.50E-05	10,000	14400000	36744.23866	0.55116358	71.65126538
4	15	1.50E-05	10,000	14400000	36744.23866	0.55116358	71.65126538
5	15	1.50E-05	10,000	14400000	36744.23866	0.55116358	71.65126538
6	15	1.50E-05	10,000	14400000	36744.23866	0.55116358	71.65126538
7	15	1.50E-05	10,000	14400000	36744.23866	0.55116358	71.65126538
1	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
2	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
3	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
4	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
5	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
6	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
7	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
8	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
9	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
10	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
11	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
12	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
13	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
14	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
15	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
16	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
17	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
18	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
19	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
20	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
21	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
22	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
23	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
24	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
25	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
26	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
27	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
28	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
29	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
30	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
31	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
32	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
33	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
34	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
35	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
36	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
37	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
38	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
39	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
40	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
41	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269
42	7.5	7.50E-06	10,000	14400000	36744.23866	0.27558179	35.82563269

Total Degassing Days/Tank	56	Days/Tank
Mass of Jet Fuel Vapor Per Tank	3,845.28	lbs Jet Fuel / Tank
Tanks/Year	6	Tanks/Year
Mass of Jet Fuel Vapor Per Year	23,071.71	lbs Jet Fuel / Year

(b) (3) (A) [redacted]

Reference:	Risher, J., Faroon, O., Llados, F., & Citra, M. (2017). CHEMICAL AND PHYSICAL INFORMATION. In TOXICOLOGICAL PROFILE FOR JP-5, JP-8, AND JET A FUELS (pp. 145–155). United States Department of Health and Human Services. https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=773&tid=150
Document Link:	https://www.atsdr.cdc.gov/ToxProfiles/tp121.pdf

Minimum Vapor Pressure	1.12	mm Hg
Maximum Vapor Pressure	26.50	mm Hg

JP-8 Safety Data Sheet (2022) https://www epc shell com/

Vapor Pressure (KPA)	Vapor Pressure (PSI)	Vapor Pressure (mm Hg)
1	0.15	7.50
3.7	0.54	27.75

Edwards, J. T. (2020). JET FUEL PROPERTIES: AFRL-RQ-WP-TR-2020-0017 Interim Report. https://apps.dtic.mil/sti/citations/AD1093317

Temperature (F)	Vapor Pressure (PSIA)	Vapor Pressure (mm Hg)
50	3.54E-03	0.18
100	2.32E-02	1.20
75	0.01	0.69

API, 2010 *KEROSENE/JET FUEL CATEGORY ASSESSMENT DOCUMENT* (2010) https://www petroleumhpv org/-/media/PetroleumHPV/Documents/2010 sept21 kerosene jet%20fuel%20CAD%20final pdf?la=en&hash=3E9768C078C9B7D5A95F8C589778100A07DA5786

Vapor Pressure hPA	Vapor Pressure (PSI)	mmHg
3.00	0.04	2.25
35.00	0.51	26.25

Jet A Aviation Fuel (2021) www CPChem com

Vapor Pressure (mm Hg)	Vapor pressure (PSIA)
0.4	0.01

Physical and Chemical Properties of Military Fuels (1996) In *National Research Council (US) Subcommittee on Permissible Exposure Levels for Military Fuels* National Academies Press (US) https://www ncbi nlm nih gov/books/NBK231234/

Vapor Pressure (mm HG)	Vapor Pressure (PSIA)
1.8	0.03

Liquid Storage Tanks (2020) In *AP-42: Compilation of Air Pollutant Emission Factors* (5th ed , Vol 1, pp 1–203) United States Environmental Protection Agency https://www epa gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-7-liquid-storage-0
https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-7-liquid-storage-0

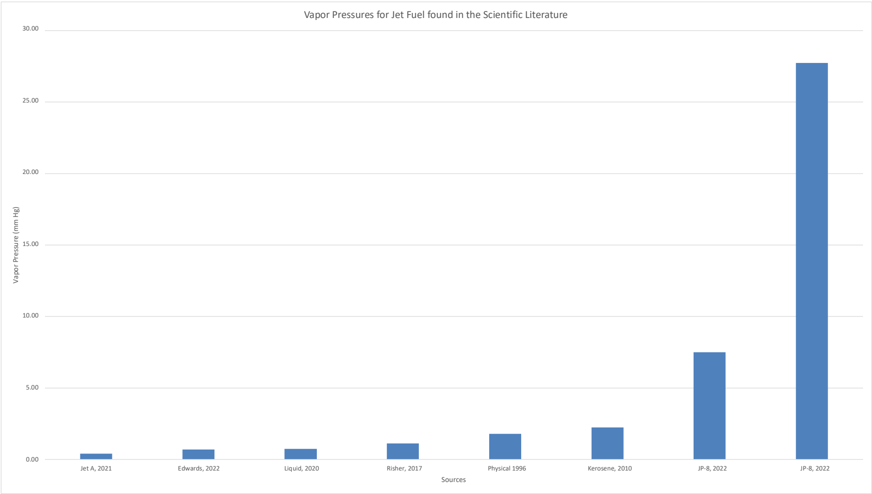
Assumed Temperature	77
Assumed Temperature	536.67

Vapor Pressure Equation Constant A	Vapor Pressure Equation Constant B
12.39	8933

Vapor Pressure (PSIA)	Vapor Pressure (mm Hg)
1.42E-02	0.73

Comparison Table

Vapor Pressure (mm Hg)	Vapor Pressure (PSI)	Citation	Reference
0.40	0.007734689	Jet A, 2021	*Jet A Aviation Fuel* (2021) www CPChem com
0.69	0.0133826	Edwards, 2022	Edwards, J. T. (2020). JET FUEL PROPERTIES: AFRL-RQ-WP-TR-2020-0017 Interim Report. https://apps.dtic.mil/sti/citations/AD1093317
0.73	0.01418971	Liquid, 2020	Liquid Storage Tanks (2020) In *AP-42: Compilation of Air Pollutant Emission Factors* (5th ed , Vol 1, pp 1–203) United States Environmental Protection Agency https://www epa gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-7-liquid-storage-0
1.12	0.021657128	Risher, 2017	Risher, J., Faroon, O., Llados, F., & Citra, M. (2017). CHEMICAL AND PHYSICAL INFORMATION. In TOXICOLOGICAL PROFILE FOR JP-5, JP-8, AND JET A FUELS (pp. 145–155). United States Department of Health and Human Services. https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=773&tid=150
1.80	0.034806098	Physical 1996	Physical and Chemical Properties of Military Fuels (1996) In National Research Council (US) Subcommittee on Permissible Exposure Levels for Military Fuels National Academies Press (US) https://www ncbi nlm nih gov/books/NBK231234/
2.25	0.043511321	Kerosene, 2010	*KEROSENE/JET FUEL CATEGORY ASSESSMENT DOCUMENT* (2010) https://www petroleumhpv org/-/media/PetroleumHPV/Documents/2010 sept21 kerosene jet%20fuel%20CAD%20final pdf?la=en&hash=3E9768C078C9B7D5A95F8C589778100A07DA5786
7.50	0.145037738	JP-8, 2022	*JP-8 Safety Data Sheet* (2022) https://www epc shell com/
27.75	0.53663963	JP-8, 2022	*JP-8 Safety Data Sheet* (2022) https://www epc shell com/



Reference	Liquid Storage Tanks. (2020). In AP-42: Compilation of Air Pollutant Emission Factors (5th ed., Vol. 1, pp. 1–203). United States Environmental Protection Agency. https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-7-liquid-storage-0	
Document Link	https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-7-liquid-storage-0	
Assumed Temperature	77	F
Assumed Temperature	536.67	R
Vapor Pressure Equation Constant A	Vapor Pressure Equation Constant B	
12.39	8933	
Input Jet Fuel Vapor Pressure for Excel Sheet:		
Jet Fuel Vapor Pressure	1.42E-02	PSIA
Conversions for Reference		
Jet Fuel Vapor Pressure	0.73	mmHg
Jet Fuel Vapor Pressure	97.83	Pascal
Jet Fuel Vapor Pressure	0.73	Torr
Jet Fuel Vapor Pressure	9.66E-04	atm

(b) (3) (A)

[redacted]

(b) (3) (A)

[redacted]

[redacted] (b) (3) (A)

Vapor Pressures Retrie ed from EPA SPECIATE 5.2	URL	https //www.epa.go /air-emissions- l g p
Con ert Pascal to PSI	0.0001 5038	PSI/Pas

Composi ional Data for Jet A	Added?
Benzene	Yes
Toluene	Yes
Ethylbenzene	Yes
m p-xylene	Yes
1 2-Dimethylbenzene (O-Xylene)	Yes
Isopropylbenzene	Yes
Propylbenzene	Yes
1-Methyl-3-ethylbenzne	Yes
1-Methyl- -ethylbenzne	Yes
1 3 5-Tr methylbenzene	Yes
1-Methyl-2-ethylbenzene	Yes
1 2 -Tr methylbenzene	Yes
1 2 3-Tr methylbenzene	Yes
Indane	Yes
Alkyl Indanes	No
1 -Diethyl-benzene	Yes
1 2-Diethylbenzene	Yes
1 2 5-Tetramethyl benzene	Yes
1 2 3 5-Tetramethylbenzene	Yes
Total C10 benzenes	No
Total C11 benzenes	No
Total C12 benzenes	No
Naphthalene	Yes
2-Methylnaphthalene	Yes
1-Methylnaphthalene	Yes

SPECIES_ID	CAS	CAS no hyphen	A ternat veCAS	SPECIES_NAMES	SPECIES_NAME	HAPS	SPECIES_SYMBOL	SPEC_MW	NonVOCTOG	SPECIES_PROP_NOTES	SRS ID	DSSTox_ID	Molecular Formula	Smiles Notation	VP_Pascal_EPI	VP_Pascal_UM	VP_Pascal_OPERA	VP_Median_Pascal	VP_Median_PSI	Duplicate_ID	ATMOSPHERIC_HYDROXYLATION_RATE_(AOH)_CM3/MOLECULE*SEC_OPERA	HENRYS_LAW_ATM-M3/MOLE_OPERA	OCTANOL_AIR_PARTITION_COEFF_LOGKOA_OPERA	OCTANOL_WATER_PARTITION_COEFF_LOGP_OPERA	RATIO	PAMS	REPCMPSCORE	REPRESENTATIVE_COMPOUND_DSSTox_ID	REPRESENTATIVE_COMPOUND_NAME	SAROAD	SPECIES ID COUNT
[illegible]																															

Composi ional Data for JP-8	Added?
Alkenes	N A
Tridecene	Yes
Alkyl aromatic	N A
m-Xylene	Yes
o-Xylene	Yes
1 2 3-Tr methylbenzene	Yes
1 2 3 -Tetramethylbenzene	Yes
1 3-Dimethyl-5-ethylbenzene	Yes
1-Methyl-2- sopropylbenzene	Yes
1 2 -Tr ethylbenzene	Yes
1 3 5-Tr ethylbenzene	Yes
n-Heptylbenzene	Yes
n-Oc ylbenzene	Yes
1-Ethylpropylbenzene	Yes
Branched paraffins	Yes
3-Methyloctane	Yes
2 6-Tr methylhep ane	Yes
2-Methyldecane	Yes
2 6-Dimethyldecane	Yes
2-Methylundecane	Yes
2 6-Dimethylundecane	Yes
Naphthenes	Yes
1 1 3-Tr methylcyclohexane	Yes
1 3 5-Tr methylcyclohexane	Yes
1-Methyl- -ethylcyclohexane	Yes
Propylcyclohexane	Yes
n-Bu ylcyclohexane	Yes
Hexylxyxlohexane	Yes
Phenylcyclohexane	Yes
Heptylcyclohexane	Yes
D aromatics exclud ng naphthalenes	Yes
Biphenyl	Yes
n-Paraffins	Yes
n-Heptane	Yes
n-Oc ane	Yes
n-Nonane	Yes
n-Decane	Yes
n-Undecane	Yes
n-Dodecane	Yes
n-Tridecane	Yes
n-Tetradecane	Yes
n-Pen adecane	Yes
n-Hexadecane	Yes
n-Heptadecane	Yes
n-Oc adecane	Yes
Napthalenes	Yes
Napthalene	Yes
1-Methylnapthalene	Yes
2-Methylnapthalene	Yes
1-Ethylnaphthalene	Yes
2 3-Dimethylnaphthalene	Yes
2 6-Dimethylnaphthalene	Yes

SPECIES_ID	CAS	CAS no hyphen	A ternat veCAS	SPECIES_NAMES	SPECIES_NAME	HAPS	SPECIES_SYMBOL	SPEC_MW	NonVOCTOG	SPECIES_PROP_NOTES	SRS ID	DSSTox_ID	Molecular Formula	Smiles Notation	VP_Pascal_EPI	VP_Pascal_UM	VP_Pascal_OPERA	VP_Median_Pascal	VP_Median_PSI	Duplicate_ID	ATMOSPHERIC_HYDROXYLATION_RATE_(AOH)_CM3/MOLECULE*SEC_OPERA	HENRYS_LAW_ATM-M3/MOLE_OPERA	OCTANOL_AIR_PARTITION_COEFF_LOGKOA_OPERA	OCTANOL_WATER_PARTITION_COEFF_LOGP_OPERA	RATIO	PAMS	REPCMPSCORE	REPRESENTATIVE_COMPOUND_DSSTox_ID	REPRESENTATIVE_COMPOUND_NAME	SAROAD	SPECIES ID COUNT
[illegible]																															

Table 4-3. Compos t onal Data for JP-5a

Components	Added?
Alkenes	YES
Tridecene	YES
Alkyl aromatic	YES
m- xylene	YES
o-xylene	YES
1 2 -Trimethylbenzene	YES
1 2 3 -Tetramethylbenzene	YES
1 3-Diethylbenzene	YES
1 -Diethylbenzene	YES
1 2 -Trie hylbenzene	YES
1- ert-Butyl-3 5-trime hylbenzene	YES
n- Heptylbenzene	YES
n- Octylbenzene	YES
1- E hylpropylbenzene	YES
Branched paraffins	YES
3- Methyloc ane	YES
2 6-Trimethylheptane	YES
2- Methyldecane	YES
- Methyldecane	YES
2 6-Dimethyldecane	YES
2- Methylundecane	YES
2 6-D methylundecane	YES
Naph henes	YES
1 1 3-Trimethylcyclohexane	YES
1 3 5-Trimethylcyclohexane	YES
n-Butylcyclohexane	YES
Phenylcyclohexane	YES
Heptylcyclohexane	YES
Diaroma ics excluding naphthalenes	YES
Biphenyl	YES
n-Paraffins	YES
n-Octane	YES
n-Nonane	YES
n-Decane	YES
n-Undecane	YES
n-Dodecane	YES
n-Tr decane	YES
n-Tetradecane	YES
n-Pentadecane	YES
n-Hexadecane	YES
n-Heptadecane	YES
Napthalenes	YES
Napthalene	YES
1-Me hylnapthalene	YES

2-Me hylnapthalene	YES
1-Ethylnaphthalene	YES
2 3-Dime hylnaphthalene	YES
2 6-Dime hylnaphthalene	

SPECIES_ID	CAS	CAS no hyphen	AlternativeCAS	SPECIES_NAMES	SPECIES_NAME	HAPS	SPECIES_SYMBOL	SPEC_MW	NonVOCTOG	SPECIES_PROP_NOTES	SRS ID	DSSTox_ID	Molecular Formula	Smiles Notat on	VP_Pascal_EPI	VP_Pascal_UM	VP_Pascal_OPERA
N/A	N/A	N/A	N/A	Alkenes	Alkenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N A	N A	N/A	N/A
2810	25377-82-6	25377826	25377826	Tridecene	Tridecene	NO	-	182.351	NO	-	17007592	DTXSID30893068	C13H26	CCCCCCCCCCCC=C	13.99885	8 6975 9	8. 8708 65
N/A	N/A	N/A	N/A	Alkyl aromat c	Alkyl aromatic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N A	N A	N/A	N/A
52	108-38-3	108383	108383	M-xylene ‖ Benzene 1 3-dimethyl- ‖ 3-Xylene | Benzene m-dimethyl- | 1 3-Dimethylbenzene ‖ 1 3-Xylene	M-xylene	YES	M_XYL	106.168	NO	-	25056	DTXSID6026298	C8H10	CC1=CC(C)=CC=C1	882.59 2	1 63.991	1106.65526
620	95- 7-6	95 76	95 76	O-xylene ‖ Benzene 1 2-dimethyl-	O-xylene	YES	O_XYL	106.168	NO	-	16139	DTXSID3021807	C8H10	CC1=C(C)C=CC=C1	907.9255	1 63.991	879 5 38991
30	95-63-6	95636	95636	1 2 -trimethylbenzene ‖ Benzene 1 2 - rimethyl-	1 2 -trimethylbenzene	NO	BZ12 M	120.195	NO	-	16261	DTXSID6021 02	C9H12	CC1=CC(C)=C(C)C=C1	215.9823	79 1 5	279. 122 79
22	88-23-3	88233	88233	1 2 3 -tetramethylbenzene | Benzene 1 2 3 - etramethyl- | Prehnitene | Prehnitol	1 2 3 - etramethylbenzene	NO	-	13 .222	NO	-	7365	DTXSID 060072	C10H1	CC1=CC=C(C)C(C)=C1C	37. 6359	156 8176	8.703 5985
51	1 1-93-5	1 1935	1 1935	1 3-diethylbenzene ‖ m-diethylbenzene ‖ Benzene 1 3-diethyl-	1 3-diethylbenzene (or m-diethylbenzene)	NO	DETBZ1	13 .222	NO	-	3855	DTXSID1022003	C10H1	CCC1=CC(CC)=CC=C1	121.99	156 8176	150 3765502
59	105-05-5	105055	105055	1 -diethylbenzene ‖ p-die hylbenzene ‖ Benzene 1 -die hyl-	1 -diethylbenzene (or p-d ethylbenzene)	NO	DETBZ2	13 .222	NO	-	22558	DTXSID 026711	C10H1	CCC1=CC=C(CC)C=C1	122.6566	156 8176	1 1 3653163
29	877- -1	877 1	877 1	1 2 -tr ethylbenzene | Benzene 1 2 -triethyl-	1 2 -triethylbenzene	NO	-	162.276	NO	-	17135302	DTXSID907503	C12H18	CCC1=CC(CC)=C(CC)C=C1	19.33175	16.7977	37.83158 0
N/A	98-23-7	98237	98237	1- tert-Butyl-3 5-tr methylbenzene	1- tert-Butyl-3 5-trimethylbenzene	N/A	N/A	176 3	N/A	N/A	N/A	N/A	C13H20	N A	N A	N/A	N/A
3213	N/A	N/A	N/A	C13 Monosubst tuted Benzenes	C13 Monosubstitu ed Benzenes	NO	-	176.303	NO	-	-	-	C13H20	CCCCCCCC1=CC=CC=C1	6.172827	-	.13787 917
2802	2189-60-8	2189608	2189608	Octylbenzene ‖ Phenyloc ane	Octylbenzene (or Phenyloctane)	NO	-	190.33	NO	-	98251	DTXSID20622 0	C1 H22	CCCCCCCCC1=CC=CC=C1	1.66653	1.799315	1.510898229
250	1196-58-3	1196583	1196583	3-phenylpentane ‖ Benzene (1-ethylpropyl)- (8CI)(9CI)	3-phenylpen ane (or Benzene (1-ethylpropyl)-)	NO	-	1 8.2 9	NO	-	-	DTXSID70152520	C11H16	CCC(CC)C1=CC=CC=C1	89.326	81.19712	120 3865663
N/A	N/A	N/A	N/A	Branched paraffins	Branched paraffins	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N A	N A	N/A	N/A
2 7	2216-33-3	2216333	2216333	3-methyloctane | Octane 3-methyl-	3-me hyloctane	NO	-	128.259	NO	-	687525	DTXSID30862875	C9H20	CCCCCC(C)CC	883.927	1199.229	837 271 925
2790	2613-61-8	2613618	2613618	2 6-Trimethylheptane	2 6-Tr methylhep ane	NO	-	1 2.286	NO	-	-	DTXSID30180763	C10H22	CC(C)CC(C)CC(C)C	761.2709	982 3 97	28 8.291208
192	6975-98-0	6975980	6975980	2-methyldecane | Decane 2-methyl-	2-methyldecane	NO	-	156.313	NO	-	1 6 98	DTXSID2058677	C11H2	CCCCCCCCC(C)C	11 .3906	128. 572	80.58 3 975
263	28 7-72-5	28 7725	28 7725	-methyldecane | Decane -methyl-	-methyldecane	NO	-	156.313	NO	-	107995	DTXSID 0863035	C11H2	CCCCCCC(C)CCC	127.3229	128. 572	192 5582978
159	13150-81-7	13150817	13150817	2 6-dimethyldecane ‖ Decane 2 6-dimethyl-	2 6-dimethyldecane	NO	-	170.3	NO	-	-	DTXSID6086 367	C12H26	CCCCC(C)CCCC(C)C	165.3198	66.51269	300 0 3827
200	70 5-71-8	70 5718	70 5718	2-methylundecane ‖ isododecane | Undecane 2-methyl-	2-methylundecane (or isododecane)	NO	-	170.3	NO	-	-	DTXSID508732 1	C12H26	CCCCCCCCCC(C)C	92 9257	2.0 231	58.6359 885
163	17301-23-	1730123	1730123	2 6-dime hylundecane | Undecane 2 6-d methyl-	2 6-dimethylundecane	NO	-	18 .367	NO	-	-	DTXSID2058623	C13H28	CCCCCC(C)CCCC(C)C	63.7281	21.76871	115 257 023
N/A	N/A	N/A	N/A	Naphthenes	Naphthenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N A	N A	N/A	N/A
12	3073-66-3	3073663	3073663	1 1 3-tr methylcyclohexane | Cyclohexane 1 1 3-tr methyl- ‖ Cyclogeraniolane	1 1 3-trimethylcyclohexane	NO	-	126.2 3	NO	-	-	DTXSID608587 6	C9H18	CC1CCCC(C)(C)C1	1230.566	1188 .79	1 8. 36872
5	1839-63-0	1839630	1839630	1 3 5-trimethylcyclohexane ‖ CYCLOHEXANE 1 3 5-TRIMETHYL-	1 3 5-trimethylcyclohexane	NO	-	126.2 3	NO	-	-	DTXSID20862763	C9H18	CC1CC(C)CC(C)C1	1015.917	1897.231	1889.59937
312	1678-93-9	1678939	1678939	Bu ylcyclohexane | Cyclohexane butyl-	Butylcyclohexane	NO	-	1 0.27	NO	-	906 7	DTXSID0061876	C10H20	CCCCC1CCCCC1	169.319	2 8 0919	176 0770322
N/A	827-52-1	827521	827521	Phenylcyclohexane	Phenylcyclohexane	N/A	N/A	160.26	N/A	N/A	N/A	N/A	C12H16	N A	5.306	0	7.693
18 0	5617- 1-	5617 1	5617 1	Heptylcyclohexane | 1-Cyclohexylheptane ‖ n-Heptylcyclohexane	Heptylcyclohexane	NO	-	182.351	NO	-	13 130	DTXSID1058636	C13H26	CCCCCCCC1CCCCC1	7.972679	8 6975 9	5.325360639
N/A	N/A	N/A	N/A	Diaromatics excluding naphthalenes	Diaromatics excluding naphthalenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N A	N A	N/A	N/A
860	92-52-	9252	9252	Biphenyl ‖ 1 1'-Biphenyl	Biphenyl	YES	BIPH	15 .212	NO	-	1 183	DTXSID 020161	C12H10	C1=CC=C(C=C1)C1=CC=CC=C1	0 99858 7	10.61776	1.192933259
N/A	N/A	N/A	N/A	n-Paraffins	n-Paraffins	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N A	N A	N/A	N/A
60	111-65-9	111659	111659	N-octane | Oc ane	N-octane	NO	N_OCT	11 .232	NO	-	277 8	DTXSID0026882	C8H18	CCCCCCCC	1973.171	2316.095	1867.1879 2
603	111-8 -2	1118 2	1118 2	N-nonane | Nonane	N-nonane	NO	N_NON	128.259	NO	-	27920	DTXSID9025796	C9H20	CCCCCCCCC	661.2791	758 0266	593 8575178
598	12 -18-5	12 185	12 185	N-decane ‖ Decane	N-decane	NO	N_DEC	1 2.286	NO	-	33 56	DTXSID602 913	C10H22	CCCCCCCCCC	230.6 77	2 8 0919	190 19 988
610	1120-21-	112021	112021	N-undecane | Undecane	N-undecane	NO	N_UNDE	156.313	NO	-	78907	DTXSID9021689	C11H2	CCCCCCCCCCC	83.85979	81.19712	5 .891 6716
599	112- 0-3	112 03	112 03	N-dodecane | Dodecane	N-dodecane	NO	N_DODE	170.3	NO	-	28 07	DTXSID0026913	C12H26	CCCCCCCCCCCC	31. 6 08	26.57 72	18.050 6558
609	629-50-5	629505	629505	N- ridecane | Tridecane	N-tridecane	NO	N_TRID	18 .367	NO	-	6 782	DTXSID6027266	C13H28	CCCCCCCCCCCCC	12.27899	8 6975 9	7. 56 06152
1051	629-59-	62959	62959	n-Tetradecane | Tetradecane	Tetradecane	NO	N_TETD	198.39	NO	-	6 808	DTXSID1027267	C1 H30	CCCCCCCCCCCCCC	.919596	2.8 659	1.5 6521868
10 9	629-62-9	629629	629629	Pentadecane | n-Pentadecane	Pen adecane	NO	N_PEND	212. 21	NO	-	6 82	DTXSID6027268	C15H32	CCCCCCCCCCCCCCC	2.039833	0.9316506	0. 5779975
10 5	5 -76-3	5 763	5 763	Hexadecane ‖ n-Hexadecane | Glyceryl oleate | Cetane	Hexadecane	NO	N_HEXD	226. 8	NO	-	52852	DTXSID0027195	C16H3	CCCCCCCCCCCCCCCC	0 9279239	0.30 9167	0.190165168
10 3	629-78-7	629787	629787	Heptadecane | n-Heptadecane	Heptadecane	NO	N_HEPD	2 0. 75	NO	-	6 915	DTXSID70 7061	C17H36	CCCCCCCCCCCCCCCCC	0. 3196 5	0.09979513	0.030533538
N/A	N/A	N/A	N/A	Napthalenes	Napthalenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N A	N A	N/A	N/A
611	91-20-3	91203	91203	Naphthalene	Naph halene	YES	NAPHTH	128.17	NO	-	1707 8 0	DTXSID8020913	C10H8	C1=CC2=CC=CC=C2C=C1	5.386225	115 5002	11.22861882
105	90-12-0	90120	90120	1-Methylnaphthalene ‖ Naphthalene 1-methyl- | alpha-Me hylnaphthalene	1-Methylnaphthalene	YES	NAP_1M	1 2.201	NO	-	1352	DTXSID9020877	C11H10	CC1=C2C=CC=CC2=CC=C1	.90626	37.80166	8.902563218
196	91-57-6	91576	91576	2-methylnaphthalene | Naph halene 2-me hyl-	2-methylnaphthalene	YES	NAP_2M	1 2.201	NO	-	1352	DTXSID 020878	C11H10	CC1=CC2=CC=CC=C2C=C1	.599622	37.80166	7.1859 91 2
2806	1127-76-0	1127760	1127760	alpha-Ethylnaphthalene	1-Ethylnaphthalene (or alpha-E hylnaph halene)	YES	-	156.228	NO	-	-	DTXSID10870852	C12H12	CCC1=CC=CC2=C1C=CC=C2	2.2931 5	12.37197	3.327357151
2805	581- 0-8	581 08	581 08	2 3-Dimethylnaphthalene	2 3-Dimethylnaphthalene	YES	-	156.228	NO	-	-	DTXSID2060383	C12H12	CC1=C(C)C=C2C=CC=CC2=C1	0 2306 77	12.37197	0.162603511
1881	581- 2-0	581 20	581 20	2 6-Dimethylnaphthalene	2 6-Dimethylnaphthalene	YES	-	156.228	NO	-	55525	DTXSID0029187	C12H12	CC1=CC2=C(C=C1)C=C(C)C=C2	0 3266399	12.37197	0.582826 56

SPECIES_ID	VP_Mod au_Pascal	VP_Mod au_PSI	Duplicate_ID	ATMOSPHERIC_HYDROXYLATION_RATE_(AOH)_CM3/MOLECULE-SEC_OPERA	HENRYS_LAW_ATM-M3/MOLE_OPERA	OCTANOL_AIR_PARTITION_COEFF_LOGKOA_OPERA	OCTANOL_WATER_PARTITION_COEFF_LOGP_OPERA	OXYGEN_TO_CARBON_RATIO	PAHS	REPCMPSCORE	REPRESENTATIVE_COMPOUND_DSSTox_ID	REPRESENTATIVE_COMPOUND_NAME	SAROAD	SPECIES ID COUNT
N/A	#NUM!	#NUM!	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2810	8.6975 9	0.001261 73	-	5.93965E-11	0.0129269	5.75932	6.83861	0	NO	2	DTXSID30893068	1-Tridecene	-	1
N/A	#NUM!	#NUM!	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
52	1106.65526	0.16050473	-	2.32759E-11	0.00713393	3.0 097	3.19055	0	NO		DTXSID6026298	m-Xylene	5209	1
620	907.9255	0.131683 26	-	1.37609E-11	0.005251 1	3.0 097	3.11985	0	NO		DTXSID3021807	o-Xylene	520	1
30	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID6021 02	1 2 -Tr methylbenzene	[illegible]	1
22	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	[illegible]	[illegible]	1
51	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID1022003	[illegible]	[illegible]	1
59	[illegible]	[illegible]	-	1.06E-11	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	[illegible]	[illegible]	1
29	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID907503	[illegible]	[illegible]	1
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	[illegible]	N/A	N/A
3213	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	2	[illegible]	[illegible]	[illegible]	1
2802	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	[illegible]	-	1
250	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID70152520	[illegible]	[illegible]	1
N/A	N/A	#NUM!	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2 7	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID30862875	3-Methyloc ane	[illegible]	1
2790	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID30180763	[illegible]	-	1
192	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID2058677	2-Methyldecane	[illegible]	1
263	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	[illegible]	[illegible]	1
159	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	2 6-Dimethyldecane	[illegible]	1
200	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	[illegible]	[illegible]	1
163	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID2058623	2 6-Dimethylundecane	[illegible]	1
N/A	N/A	#NUM!	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	1 1 3-Trimethylcyclohexane	[illegible]	1
5	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID20862763	1 3 5-Trimethylcyclohexane	[illegible]	1
312	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID0061876	Butylcyclohexane	[illegible]	1
N/A	[illegible]	[illegible]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18 0	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID1058636	Heptylcyclohexane	-	1
N/A	N/A	#NUM!	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
860	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	Biphenyl	[illegible]	1
N/A	N/A	#NUM!	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
60	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID0026882	N-oc ane	[illegible]	1
603	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID9025796	N-nonane	[illegible]	1
598	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	N-decane	[illegible]	1
610	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID9021689	N-undecane	[illegible]	1
599	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID0026913	N-dodecane	[illegible]	1
609	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID6027266	N-tridecane	[illegible]	1
1051	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID1027267	Tetradecane	-	1
10 9	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID6027268	Pen adecane	-	1
10 5	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		DTXSID0027195	Hexadecane	-	1
10 3	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	NO		[illegible]	Heptadecane	-	1
N/A	N/A	#NUM!	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
611	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	YES		DTXSID8020913	Naph halene	[illegible]	1
105	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	YES		DTXSID9020877	1-Methylnaphthalene	[illegible]	1
196	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	YES		[illegible]	2-Methylnaphthalene	[illegible]	1
2806	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	YES		DTXSID10870852	1-E hylnaphthalene (or alpha-Ethylnaphthalene)	-	1
2805	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	YES		DTXSID2060383	2 3-Dimethylnaphthalene	-	1
1881	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	0	YES		DTXSID0029187	2 6-Dimethylnaphthalene	-	1

Do ument L nk — ht ps www epa gov a -em ss ons fac o - and-qua t f c t on ap-42-f f h-ed t on-vo ume- -chap e 7- qu d sto age-0

Jet Fue Mo ecu a We ght — 130 00 — bs bmo

D ese Fue Mo e u a We ght — 210 00 — bs bmo

Tota Vapo F ow f 100% of O gan c Vapo s f om D ese Fue — 37 269 68 — bs y

PROFILE_NAME	PROFILE_CODE	PROFILE_TYPE	CATEGORY_LEVEL_1_G ne at on_Mechan sm	CATEGORY_LEVEL_2_Secto _Equ pment	CATEGORY_LEVEL_3_Fue _P odu t	MASTER_POLLUTANT	VERS ON	CONTROLS	REGION	SIZE_RANGE	SPEC ES_ID	CAS	CAS no hyphen	A e nat v CAS	WE GHT_PERCENT	We ght F act on	Vapo Ma s (bs y)	ANALYT CAL_METHOD	SPEC ES_NAMES
D ese Head pace Vapo Compos e	D ESEVP	GAS	Vo at z t on	Mob e On ad	D se	TOG		5 1 Uncont o ed	D st o t M h gan -		8	7094 26-0	7094260	7094260	0 088744 9	0 000887446	33 07482584	GC-F D	1 1 2-t me hy yc ohex ne | Cyc o exane 1 1 2 t m thy -
D ese Head pace Vapo Compos e	D ESEVP	GAS	Vo at z t on	Mob e On ad	D se	TOG		5 1 Uncont o ed	D st o t M h gan -		19	590- 6-9	590669	590669	0 035135 4	0 000351351	13 09475469	GC-F D	1 -d me hy cyc ohexane | Cyc ohex ne 1 1 d methy - | gem D me hy c c ohex [illegible]
D ese Head pace Vapo Compos e	D ESEVP	GAS	Vo at z t on	Mob e On ad	D se	TOG		5 1 Uncont o ed	D st o t M h gan -		20	1638 26-2	1638262	1638262	0 067099 7	0 000670996	25 00779587	GC-F D	1 -d me hy cyc open ane | Cyc opentane 1 1 d methy - (8CI (9CI) | gem D me [illegible]
D ese Head pace Vapo Compos e	D ESEVP	GAS	Vo at z t on	Mob e On ad	D se	TOG		5 1 Uncont o ed	D st o t M h gan -		25	526- 3-8	526738	526738	0 35084 4	0 003508424	130 7578442	GC-F D	1 2 3-t me hy b nzene | Benz ne 1 2 3-t me hy - | Hem me tene
D ese Head pace Vapo Compos e	D ESEVP	GAS	Vo at z t on	Mob e On ad	D se	TOG		5 1 Uncont o ed	D st o t M h gan -		27	2815 57-8	2815578	2815578	0 672779 2	0 006727799	250 7429518	GC-F D	1 2 3-t me hy yc open ane | Cyc open ane 1 2 3 t me hy -
D ese Head pace Vapo Compos e	D ESEVP	GAS	Vo at z t on	Mob e On ad	D se	TOG		5 1 Uncont o ed	D st o t M h gan -		28	95-9 -2	95932	95932	0 049783 5	0 000497836	18 55417041	GC-F D	1 2 4 5-t t me hy ben ene | Benzene 1 2 4 5 tet amethy - | Du ene | p Xy ene [illegible]
D ese Head pace Vapo Compos e	D ESEVP	GAS	Vo at z t on	Mob e On ad	D se	TOG		5 1 Uncont o ed	D st o t M h gan -		30	95-6 -6	95636	95636	1 064145 1	0 010641453	396 6035653	GC-F D	1 2 4-t me hy b nzene | Benz ne 1 2 4-t me hy -
D ese Head pace Vapo Compos e	D ESEVP	GAS	Vo at z t on	Mob e On ad	D se	TOG		5 1 Uncont o ed	D st o t M h gan -		31	2815 58-9	2815589	2815589	0 058441 6	0 000584416	21 78098314	GC-F D	1 2 4-t me hy yc open ane | Cyc open ane 1 2 4 t me hy -
[illegible]																			

[illegible]

Bulk Fuel Storage

Reference	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin TX by DRI, Reno NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	
Document Link	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	
Retrieved from EPA SPECIATE 5.2	URL	https://www.epa.gov/air-emissions-modeling/speciate
VOC Flow of 100% of Organic Vapors from Jet Fuel	23.072	lbs/yr

PROFILE_NAME	PROFILE_CODE	PROFILE_TYPE	CATEGORY_LEVEL_1_Generation_Mechanism	CATEGORY_LEVEL_2_Sector_Equipment	CATEGORY_LEVEL_3_Fuel_Product	MASTER_POLLUTANT	VERSION	CONTROLS	REGION	SIZE_RANGE	SPECIES_ID	CAS	CAS no hyphen	Alternate CAS	WEIGHT_PERCENT	WEIGHT_Fraction	Vapor Fraction (lbs/yr)	ANALYTICAL_METHOD	SPECIES_NAMES	SPECIES_NAME	UNCERTAINTY_PERCENT	UNCERTAINTY_METHOD	INCLUDE_IN_SUM	HAPS	SPECIES_SYMBOL	SPEC_MW	NonVOCTOG	SPECIES_PROP_NOTES	SRS ID	DSSTox_ID	Molecular Formula	Smiles Notation	VP_Pascal_EPI
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	30	95-63-6	95 36	95636	1.56	0.0156	3.59386363	Not Available	1,2,4-trimethylbenzene | Benzene, 1,2,4-trimethyl-	1,2,4-trimethylbenzene		-99 N/A	Yes	NO	BZ124M	120.195	NO	-	1 262	DTXSID6021402	C9H12	CC1=CC(C)=C(C)C=C1	215.9623
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	44	108-67-8	108 78	108678	0.02	0.0002	4.614361491	Not Available	1,3,5-trimethylbenzene | Benzene, 1,3,5-trimethyl-	1,3,5-trimethylbenzene		-99 N/A	Yes	NO	BZ135M	120.195	NO	-	2 262	DTXSID6026797	C9H12	CC1=CC(C)=CC(C)=C1	267.976
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	108	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	118	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	122	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	130	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	152	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	244	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	245	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	HEXA3M	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	248	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	PENA3M	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	302	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	367	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	371	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	385	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	390	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	438	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industrial Point Source Chevron Principle Business Bulk Fuel Storage - 1993	2473	GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	3.2	Not Available	-	0 to 0	449	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	ETBZ	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	491	75-2 -5		75 85	75285	11 75	0 1175	2 10 925626 Not Ava ab e	I obutane | 2 Me hy p opane | P opane 2-methy - | 1 1-D me hy e hane | T me hy me hane	Isobu ane (o 2-Methy p opan)
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	508	78-7 -4		78 84	78784	19 28	0 1928	4 48 225197 Not Ava ab e	I opent ne | 2-Me hy bu ane | Bu ane 2 me hy -	Isopen ane (o 2-Methy but ne)
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	514	98-8 -8		98 28	98828	0 83	0 0083	1 1 4951719 Not Ava ab e	I op opy benzene | cumene | 2-Pheny p opane | Benzene 1-methy ethy)-	Isop opy ben ene o cum ne | 2-Ph ny p opane)
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	522	108- 8-3 106-4 -3	1 8383 106423		179601231	0 2	0 002	46 14341491 Not Ava ab e	M & p-xy ene	M & p xy ene o m xy ne)
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	550	108- 7-2		108 72	108872	0 24	0 0024	55 37209789 Not Ava ab e	M thy cyc oh xane | Cyc ohexane methy -	Methy cyc ohexane
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	551	96-3 -7		96 77	96377	1 5	0 015	3 6 0756118 Not Ava ab e	M thy cyc op ntane | Cyc open ane methy -	Methy cyc opent ne
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	592	106- 7-8		106 78	106978	24 5	0 245	5 52 568326 Not Ava ab e	N-bu ane | But ne	N- utane
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	600	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-heptane	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	601	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-hexane	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	603	111-8 -2		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-nonane	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	604	111-6 -9		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-octane	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	605	109- 6-0		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-pentane	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	608	103- 5-1		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-propylbenzene	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	620	95-4 -6		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	O-xylene	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	671	74-9 -6		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Propane	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	717	108- 8-3		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Toluene	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	737	624- 4-6		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Trans-2-butene	[illegible]
Indust a Po nt Sou ce Chev on P nc p e Bus ne s Bu k Fue Sto age - 1993	2473 GAS	Vo at zat on	P t o heu ca Tank	Pet o e m P oduc s	-	3 2 Not A a abe	-	0 to 0	742	646-0 -8		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Trans-2-pentene	[illegible]

Industrial Point Source Chevron Principle

Business Bulk Fuel Storage - 1993	2473 GAS	Volatilization	Petrochemical Tank	Petroleum Products	-	32 Not Available	-	0 to 0	2284 N A	N A	N A	100	0.47	0.0047	08 437025 Not Available	Unidentified	Unidentified	-99 N A	Yes	NO	UNID	142.286 NO	-	-	-	C10H22	CCCCCCCCCC	-		

SPECIES_NAME	HAPS	WEIGHT_PERCENT	Vapor Flow (lbs/yr)
1,2,4-trimethylbenzene	NO	1.56%	359.92
1,3,5-trimethylbenzene	NO	0.02%	4.61
1-pentene	NO	0.61%	140.74
2,2,4-trimethylpentane	YES	0.16%	36.91
2,2-dimethylbutane	NO	0.78%	179.96
2,3,4-trimethylpentane	NO	0.08%	18.46
2,4-dimethylpentane	NO	0.43%	99.21
3-methylheptane	NO	0.16%	36.91
3-methylhexane	NO	0.56%	129.20
3-methylpentane	NO	1.64%	378.38
Benzene	YES	2.68%	618.32
Cis-2-butene (or 2-Butene, (2Z)-)	NO	0.65%	149.97
Cis-2-pentene (or (2Z)-2-Pentene)	NO	0.48%	110.74
Cyclohexane	NO	0.27%	62.29
Cyclopentane	NO	0.50%	115.36
Ethane	NO	1.00%	230.72
Ethylbenzene	YES	0.87%	200.72
Isobutane (or 2-Methylpropane)	NO	11.75%	2,710.93
Isopentane (or 2-Methylbutane)	NO	19.28%	4,448.23
Isopropylbenzene (or cumene | 2-Phenylpropane)	YES	0.83%	191.50
M & p-xylene (or m,p-xylene)	YES	0.20%	46.14
Methylcyclohexane	NO	0.24%	55.37
Methylcyclopentane	NO	1.50%	346.08
N-butane	NO	24.50%	5,652.57
N-heptane	NO	1.13%	260.71
N-hexane	YES	3.00%	692.15
N-nonane	NO	0.02%	4.61
N-octane	NO	0.09%	20.76
N-pentane	NO	8.59%	1,981.86
N-propylbenzene	NO	0.02%	4.61
O-xylene	YES	1.61%	371.45
Propane	NO	6.56%	1,513.50
Toluene	YES	5.95%	1,372.77
Trans-2-butene (or (2E)-2-Butene)	NO	0.83%	191.50
Trans-2-pentene (or (2E)-2-Pentene)	NO	0.98%	226.10
Unidentified	NO	0.47%	108.44

HAPS

SPECIES_NAME	HAPS	WEIGHT_PERCENT	Vapor Flow (lbs/yr)
2,2,4-trimethylpentane	YES	0.16%	36.91
Benzene	YES	2.68%	618.32
Isopropylbenzene (or cumene | 2-Phenylpropane)	YES	0.83%	191.50
M & p-xylene (or m,p-xylene)	YES	0.20%	46.14
N-hexane	YES	3.00%	692.15
O-xylene	YES	1.61%	371.45
Toluene	YES	5.95%	1,372.77
Total		**14.43%**	**3,329.25**

VP_Pa ca _UM	VP_Pasca_OPERA	Dep c te_D	PHASE	SPECIES_EM SS ON_RATE	SPEC ES_EMISSION_RATE_UNIT	QSCORE	QSCORE_DESC	QUALITY	JUDGEMENT_RAT NG	VINTAGE_RATING	DATA_QUANTITY_RATING	TEST_YEAR	PROFILE_DATE	PROFILE_NOTES	TOTAL	TEST_METHOD	NORMALIZATION_BAS S	ORIGINAL_COMPOSITE	INCLUDES_INORGANIC GAS	SAMPLES	SIBLING	TOG_ o_VOC RATIO	TEMP_SAMPLE_C	RH_SAMPLE	PARTICLE_LOAD NG_ug_pe _m3	ORGAN C_LOADING_ug_pe _m3	MASTER_POLLUTANT_EMISSION_RATE	MASTER_POLL EMISSION RATE UNIT	ORGANIC_MATTER_to_ORGANIC_CARBON_ RATIO	MASS_OVERAGE_PERCENT	Keywo ds	DOC_LINK	Q_LINK
479 1445	279 6122479	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
479 1445	3 3 614307	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
66065 08	84 60 58758	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
57448 85	64 8 975191	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
339005 9	41 31 23554	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
9170 856	36 5 106873	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
17711 85	10 97 20583	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
3664 158	26 3 670302	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
11195 57	81 6 451609	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
34207 23	25 90 80043	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
13667 28	12 20 68715	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
201857	26 928 0609	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
66065 08	46 52 95049	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
13667 28	12 91 53079	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
41759 38	42 62 28257	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
1884463	41 7621 606	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
1463 991	12 0 718646	-	GAS	-	-	-	-	N A	-	-	-	-	7 1 1999	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-

319346 2	34 121 2439	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
104517 7	91 04 62995	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
758 0266	5 5 561373	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
1463 991	1 06 65526	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
7076 658	60 3 801983	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
21622 21	18 23 52604	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
201857	24 292 8217	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
7076 658	61 7 146665	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
21622 21	20 93 09194	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
758 0266	593 8575178	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
2316 095	18 7 187942	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
66065 08	67 85 97954	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
479 1445	451 7176007	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
1463 991	879 5438991	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
616759 3	93 882 7698	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
4473 118	37 5 212413	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
201857	26 928 0609	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-
66065 08	46 52 95049	-	GAS	-	-	-	-	N A	-	-	-	-	P of e no ma zed o equa 1 0% o the sum of the 55 PAMS (Pho ochem ca As essment Mon to ng Stat ons) po u an s MTBE 7 1 1999 UNIDENT FIED and OTHER	100	-	-	-	NO	-	-	1 0101 1	-	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-	-

-	190 1944988 -	GAS	-	-	-	-	N A	-	-	-	-	[illegible] 1 0% o the sum of [illegible] As essment [illegible] MTBE OTHER	100 -	-	-	NO	-	-	1 0101 1 -	-	-	-	-	-	-	-	NDUSTRIAL PETROLEUM INDUSTRY	-

REF_Codes	REFERENCES	REF_DESCRIPTIONS	LINK2	LINK3	LINK1	ATMOSPHERIC_HYDROXYLATION_RATE_(AOH)_CM3/MOLECULE*SEC_OPERA	HENRYS_LAW_ATM-M3/MOLE_OPERA	OCTANOL_AIR_PARTITION_COEFF_LOGKOA_OPERA	OCTANOL_WATER_PARTITION_LOGP_OPERA	OXYGEN_to_CARBON_RATIO	PAMS	REPCMPSCORE	REPRESENTATIVE_COMPOUND_DSSTox_ID	REPRESENTATIVE_COMPOUND_NAME	SAROAD	PROFILE CODE COUNT
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	3.29E-11	0.00620397	4.53535	3.62962	0	NO	4	DTXS D60 1482	1,2,4-Trimethylbenzene	-	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	5.60E-11	0.00867811	4.53535	3.50232	0	NO	4	DTXS D60 6797	1,3,5-Trimethylbenzene	45207	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	3.19E-11	0.209606	1.98805	2.79988	0	NO	4	DTXS D70 5849	1-Pentene	43224	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	3.70E-12	0.380332	3.21652	3.84892	0	NO	4	DTXS D70 4370	2,2,4-Trimethylpentane	43276	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	2.34E-12	0.452463	2.69987	3.81743	0	NO	4	DTXS D40 5111	2,2-Dimethylbutane	43291	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	6.93E-12	0.378586	3.3531	4.0513	0	NO	4	DTXS D60 0343	2,3,4-Trimethylpentane	43279	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	5.16E-12	0.42549	3.06797	3.52221	0	NO	4	DTXS D20 9358	2,4-Dimethylpentane	43271	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	8.90E-12	0.371869	3.97625	4.84157	0	NO	4	DTXS D90 62250	3-methylheptane	-	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	6.45E-12	0.423537	3.32703	4.09658	0	NO	4	DTXS D30 4334	3-Methylhexane	43295	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	5.68E-12	0.467008	2.75793	3.60016	0	NO	4	DTXS D80 2647	3-Methylpentane	43230	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	1.23E-12	0.00552001	2.82554	2.13105	0	NO	4	DTXS D30 9242	Benzene	45201	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	6.02E-11	0.227274	2.28815	2.32639	0	NO	4	DTXS D00 7224	Cis-2-butene (or 2-Butene, (2Z)-)	43217	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	6.60E-11	0.196675	2.53883	2.73274	0	NO	4	DTXS D00 91269	Cis-2-pentene (or (2Z)-2-Pentene)	43227	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	7.48E-12	0.1506	2.94558	3.44061	0	NO	4	DTXS D40 1923	Cyclohexane	43248	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	5.17E-12	0.1524	2.78104	2.9988	0	NO	4	DTXS D60 4886	Cyclopentane	43242	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	2.69E-13	0.356667	0.436553	1.80691	0	NO	4	DTXS D60 6377	Ethane	43202	1
Fujita1995	Fujita EM, Z Lu, JC Sagebiel, NF Robinson and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin, TX by DRI, Reno, NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance, and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files, and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	7.16E-12	0.00784744	3.77119	3.1503	0	NO	4	DTXS D30 0596	Ethylbenzene	45203	1

Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	2 34E 12	0 452597	2 00019	2 75772	0 NO	4 DTXS D10 6401	Is butane (o 2 Me hy p pane)	43214	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	3 91E 12	0 60086	2 27857	3 00337	0 NO	4 DTXS D80 5468	Is pentane (o 2 Me hy bu ane)	98132	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	6 54E 12	0 0113666	3 99095	3 66274	0 NO	4 DTXS D10 1827	Is p opy benzene (o cumene || 2-Pheny p opane)	98063	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	2 33E 11	0 00713593	3 84097	3 19855	0 NO	4 DTXS D60 6298	m Xy ene	99024	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	1 03E 11	0 427594	3 2478	3 61124	0 NO	4 DTXS D00 7749	Me hy c c ohex ne	43261	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	8 06E 12	0 20356	3 10708	3 37025	0 NO	4 DTXS D30 5590	Me hy c c open ane	43262	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	2 54E 12	0 471425	1 61014	2 88914	0 NO	4 DTXS D70 4665	N but ne	43212	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	7 13E 12	0 395392	3 07219	4 65904	0 NO	4 DTXS D60 4127	N hep ane	43232	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	5 61E 12	0 492255	2 56013	3 90054	0 NO	4 DTXS D00 1917	n-Hexane	43231	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	1 02E 11	0 167561	4 15516	5 54877	0 NO	4 DTXS D90 5796	N nonane	43235	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	8 66E 12	0 365573	3 39317	5 17863	0 NO	4 DTXS D00 6882	N oc ane	43233	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	3 94E 12	1 24351	2 11356	3 38778	0 NO	4 DTXS D20 5846	N pen ane	43220	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	6 05E 12	0 0104595	4 27386	3 70432	0 NO	4 DTXS D30 2219	N p opy benzene	45209	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	1 38E 11	0 00525141	3 84097	3 11985	0 NO	4 DTXS D30 1807	o-Xy ne	45204	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	1 15E 12	0 392059	1 04169	2 36022	0 NO	4 DTXS D50 6386	P opane	43204	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	5 97E 12	0 00662645	3 49442	2 72879	0 NO	4 DTXS D70 1360	To uene	45202	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	6 02E 11	0 227274	2 28815	2 32639	0 NO	4 DTXS D70 7255	T an -2-bu ene (o (2E -2-Bu ene)	43216	1
Fuj ta1995	Fuj a EM Z Lu JC Sagebe NF Rob n on and JG Wat on 1995 VOC Sou e Appo tonment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An impo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on n e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	6 60E 11	0 196675	2 53883	2 73274	0 NO	4 DTXS D50 91268	T an -2-pe tene (o (E -2-P ntene)	43226	1

Fuj ta1995	Fuj a EM Z Lu JC Sageb e NF Rob n on and JG Wat on 1995 VOC Sou e Appo t onment o he Co sta Ox ant A sessment o Sou hea t Texas P epa ed fo Texas Na u a Con e vat on Comm s on Aust n TX by DRI Reno NV h tps www esea chgate net pub c t on 2353415 68_VOC_ ou ce_ap o t onm nt_fo _th _Co sta _Ox d nt_Asse sme t_fo _Southe st_Tex s	The 1993 Coasta Ox dant Asses ment o Southea t T xas (COAST) p oj ct was des gned to ga n a bet e unde tand ng of he e t o sh p between em ss ons and pat a and tempo a d st but ons of mb ent ozone concent at ons and ozone p ecu so s n he Hous on-Ga v ston and Be umon -Po t A hu a e s of Sou heast Tex s An mpo ant pa t of he COAST p o ect w s he acqu s t on of spec ated VOC oncent at ons that a e needed to eva uate em ss on a e e t ma es spec fy photoch m ca mode bounda y and n t a cond t ons eva ate a qua y mode pe o m nce and att bute sou ce c nt but ons th ugh ecepto mode ng Sou ce c mpos t on p of es we e comp ed f om p ev ous s ud s T xas Na u a Resou ce Con e vat on Comm ss on TNRCC) po nt sou ce em s on nven o y f es nd COAST ou ce cha a te zat on m asu emen s	undef ned	ndef ned	ht ps www e ea hgate net pub cat on 2353415 68_VOC_sou ce_appo t onmen _fo _the_Coa ta _Ox dan _A ses men _fo _Southea t_Texas	1 16E 11	0 153501	4 32698	5 01367	0 NO		1 DTXS D60 4913	D cane	99999	1

[illegible]

SPECIES_ID	CAS	CAS no hyphen	Alternative CAS	WEIGHT_PERCENT	WEIGHT_FRACTION	VAPOR FLOW RATE (LB/YR)	ANALYTICAL_METHOD	SPECIES_NAMES	SPECIES_NAME	UNCERTAINTY_PERCENT	UNCERTAINTY_METHOD
30	95 63-6	95636	95636	0 84	0 0084	193 8 23426	Not Ava b e	1 2 4-t me hy b nzene | Benz ne 1 2 4-t me hy -	1 2 4-t me hy b nzene	99	N A
44	108 67-8	108678	108678	0 34	0 0034	78 44 80534	Not Ava b e	1 3 5-t me hy b nzene | Benz ne 1 3 5-t me hy -	1 3 5-t me hy b nzene	99	N A
64	106 98-9	106989	106989	0 22	0 0022	50 7 77564	Not Ava b e	1-bu ene | 1-Buty ene | E hy e hy ene	1-bu ene	99	N A
80	611 14-3	611143	611143	0 23	0 0023	53 06 92714	Not Ava b e	1-Methy -2 ethy benzene | o ethy to uene | 1 Ethy -2-me hy benz ne | 2- thy to ene | 2 E hy met y benz ne | Benzene 1 et y -2-me hy - | To ue e o-e hy - | o-Methy ethy benzene | o-E hy me hy benzene | o-Ethy methy benz ne	1-Methy -2 ethy benzene (o o ethy to uene | 1 Ethy -2-me hy benz ne | 2-e hy o uene | 2-E hy methy benzene)	99	N A
89	620 14-4	620144	620144	0 6	0 006	138 4 02447	Not Ava b e	1-Methy -3 ethy benzene | 1 E hy 3-methy benzene | 3-E hy o uene | m E hy o u ne | Benzene -et y -3 me hy - | m-Ethy me hy enzene | m-Methy ethy benzene | To uene m ethy - (8CI) | Benzene -e hy -3 me hy - 9C)	1-Methy -3 ethy benzene (o 1 E hy 3-methy benzene | 3-Ethy to uene)	99	N A
108	109 67-1	109671	109671	0 5	0 005	115 3 85373	Not Ava b e	1-Pen ene | 1-Pen y ene | a pha Amy ne | a pha-n Amy e e | P opy ethy ene | Pent 1-ene	1-p ntene	99	N A
122	75 83-2	75832	75832	0 32	0 0032	73 82 46385	Not Ava b e	2 2-d me hy bu ane | But ne 2 2 d methy - | Neoh xane	2 -d met y bu ane	99	N A
130	565 75-3	565753	565753	0 61	0 0061	140 7 74155	Not Ava b e	2 3 4-t me hy p ntane | Penta e 2 3 4-t me hy -	2 3 4-t me hy p ntane	99	N A
136	79 29-8	79298	79298	1 21	0 0121	279 1 76682	Not Ava b e	2 3-D m thy butane | Butane 2 3-d m thy - | 1 1 2 2-Tet am thy ethane | B op opy | D sop opy	2 -d met y bu ane	99	N A
140	565 59-3	565593	565593	1 62	0 0162	373 7 16607	Not Ava b e	2 3-d me hy pen ane | Pe tane 2 3-d me hy -	2 -d met y pen ane	99	N A
152	108 08-7	108087	108087	1 1	0 011	253 88782	Not Ava b e	2 4-d me hy pen ane | Pe tane 2 4-d me hy -	2 -d met y pen ane	99	N A
193	592 27-8	592278	592278	0 31	0 0031	71 5 22931	Not Ava b e	2-met y hep ane | Hep ane 2-met y -	2-methy hep ane	99	N A
194	591 76-4	591764	591764	1 02	0 0102	235 31416	Not Ava b e	2-met y hexane | H xane 2-me hy -	2-methy hexane	99	N A
199	107 83-5	107835	107835	3 12	0 0312	719 8 72725	Not Ava b e	2-met y pen ane | sohexane | Pent ne 2-methy - | 1 1-D methy butane	2-methy pen ane (o ohexane)	99	N A
244	589 81-1	589811	589811	0 27	0 0027	62 29 61012	Not Ava b e	3-met y hep ane | Hep ane 3-met y -	3-methy hep ane	99	N A
245	589 34-4	589344	589344	1 09	0 0109	251 4 16112	Not Ava b e	3-met y hexane | H xane 3-me hy -	3-methy hexane	99	N A
248	96 14-0	96140	96140	2 03	0 0203	468 3 56613	Not Ava b e	3-met y pen ane | Pen ane 3 me hy -	3-methy pen ane	99	N A
282	74 86-2	74862	74862	0 39	0 0039	89 97 65907	Not Ava b e	Acety ene | e hyne	Acety ene (o e hyne)	99	N A
302	71 43-2	71432	71432	2 02	0 0202	466 0 84906	Not Ava b e	Benzene | Pheny hyd de	Benzene	99	N A
367	590 18-1	590181	590181	0 45	0 0045	103 8 26835	Not Ava b e	C s 2-bu ene | 2 Bu ene 2Z) | beta c -Buty ene | Z -But 2-ene | 2-Butene (Z) | c -Butene | c -1 2-D methy ethy ene	C s 2-bu ene (o 2-But ne (2Z))	99	N A
371	627 20-3	627203	627203	0 47	0 0047	108 37025	Not Ava b e	C s 2-pen ene | 2 Pent ne (2Z)	C s 2-pen ene (o (2Z -2-Pen ene)	99	N A
385	110 82-7	110827	110827	1 32	0 0132	304 5 65384	Not Ava b e	Cyc oh xane | Benzene hexahyd - | Benzen hexahyd de	Cyc oh xane	99	N A
390	287 92-3	287923	287923	0 65	0 0065	149 9 60984	Not Ava b e	Cyc op ntane | Pentame hy ene	Cyc op ntane	99	N A
438	74 84-0	74840	74840	1 32	0 0132	304 5 65384	Not Ava b e	Ethane | Ethy hyd de | B me hy | D m thy | Me hy meth ne	Ethane	99	N A
449	100 41-4	100414	100414	1 24	0 0124	286 0 91724	Not Ava b e	Ethy benzene | B nzene e hy -	Ethy benzene	99	N A
452	74 85-1	74851	74851	0 64	0 0064	147 6 89277	Not Ava b e	Ethy ene | e hene	Ethy ene (o e hene)	99	N A
491	75 28-5	75285	75285	3 22	0 0322	742 90898	Not Ava b e	I obutane | 2 Me hy p opane | P opane 2-met y - | 1 1-D methy eth ne | T me hy meth ne	I obutane (o 2 Me hy p pane)	99	N A
508	78 78-4	78784	78784	10 46	0 1046	2413 3086	Not Ava b e	I opentane | 2 Me hy bu ane | Bu ane 2-me hy -	I opentane (o 2 Me hy bu ane)	99	N A
511	78 79-5	78795	78795	0 06	0 0006	13 84 02447	Not Ava b e	I op ene | 2-methy -1 3-bu ad ene	I op ene	99	N A
514	98 82-8	98828	98828	0 17	0 0017	39 22 90267	Not Ava b e	I op opy benzene | cumene | 2 Pheny p opane | Ben ene (1-m thy ethy)-	I op opy benzene (o cumene | 2 Pheny p opane)	99	N A
522	108 38-3 106 42-3	108383 1 6423	79601231	4 03	0 0403	929 7 98104	Not Ava b e	M & p-xy ene	M & p-xy ene (o m p-xy ene)	99	N A
550	108 87-2	108872	108872	0 78	0 0078	179 9 93181	Not Ava b e	Me hy yc ohex ne | Cyc o exane methy -	Me hy yc ohex ne	99	N A
551	96 37-7	96377	96377	2 22	0 0222	512 1 19055	Not Ava b e	Me hy yc open ane | Cyc open ane methy -	Me hy yc open ane	99	N A
592	106 97-8	106978	106978	10 93	0 1093	2521 37625	Not Ava b e	N-but ne | Butane	N-but ne	99	N A
598	124 18-5	124185	124185	0 22	0 0022	50 7 77564	Not Ava b e	N-decane | D cane	N-decane	99	N A
600	142 82-5	142825	142825	1 05	0 0105	242 2 28263	Not Ava b e	N-hep ane | Hept ne	N-hep ane	99	N A
601	110 54-3	110543	110543	3 25	0 0325	749 8 04922	Not Ava b e	N-hexane | H xane	N-hexane	99	N A
603	111 84-2	111842	111842	0 28	0 0028	64 60 78087	Not Ava b e	N-nonane | None e	N-nonane	99	N A
604	111 65-9	111659	111659	0 49	0 0049	113 0 13665	Not Ava b e	N-oc ane | Oct ne	N-oc ane	99	N A
605	109 66-0	109660	109660	6 38	0 0638	1471 74936	Not Ava b e	N-pen ane | Pen ane	N-pen ane	99	N A
608	103 65-1	103651	103651	0 24	0 0024	55 37 09789	Not Ava b e	N-p opy benzene | Benzene p opy - | 1-P opy ben ene | 1-Pheny p opane	N-p opy benzene	99	N A
610	1120 21-4	1120214	1120214	0 17	0 0017	39 22 90267	Not Ava b e	N-undeca e | Undecane	N-undecane	99	N A
620	95 47-6	95476	95476	1 95	0 0195	449 8 82953	Not Ava b e	O-xy ne | Benzene 1 2-d m thy -	O-xy ne	99	N A
671	74 98-6	74986	74986	2 49	0 0249	574 4 55156	Not Ava b e	P opy hyd de | P opane | D me hy me hane	P opane	99	N A
678	115 07-1	115071	115071	0 21	0 0021	48 45 58565	Not Ava b e	P opy ene | P ope e | 1-P opene	P opy ene (o P opene | 1-P opene)	99	N A
698	100 42-5	100425	100425	0 2	0 002	46 14 41491	Not Ava b e	Sty ene | Benz ne eth ny - | Pheny thy ene | V ny b nzene	Sty ene	99	N A
717	108 88-3	108883	108883	4 88	0 0488	1125 99524	Not Ava b e	To ue e | Benzene met y - | Me hy benz ne	To uene	99	N A
737	624 64-6	624646	624646	0 33	0 0033	76 1 66346	Not Ava b e	T ans -2-bu ene | 2-Butene (2E)-	T an -2-bu ene (o (2E -2-Bu ene)	99	N A
742	646 04-8	646048	646048	0 85	0 0085	196 1 95134	Not Ava b e	T ans -2-p ntene | 2-Pen ene (2E -	T an -2-pe tene (o (E -2-P ntene)	99	N A
2213	N A	N A	N A	6 71	0 0671	1548 11157	Not Ava b e	Othe	Othe	99	N A
2284	N A	N A	N A	14 5	0 145	3345 97581	Not Ava b e	Un dent f ed	Un dent f ed	99	N A
			100								

[illegible]

[illegible]

INCLUDE_IN_SUM	HAPS	SPECIES_SYMBOL	SPEC_MW	NonVOCTOG	SPECIES_PROP_NOTES	SRS ID	DSSTox_ID	Molecular Formula	Smiles Notation	VP_Pascal_EPI	VP_Pascal_UM	VP_Pascal_OPERA	Duplicate_ID	PHASE	SPECIES_EMISSION_RATE	SPECIES_EMISSION_RATE_UNIT	QSCORE	QSCORE_DESC	QUALITY	JUDGEMENT_RATING	VINTAGE_RATING	DATA_QUANTITY_RATING
Yes	NO	BZ124M	120.195	NO	-	16261	DTXS D60 1402	C9H12	CC1=CC C =C C C=C1	215.9823	[illegible]	279.4122470	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	BZ135M	120.195	NO	-	25262	DTXS D60 6797	C9H12	CC1=CC C =CC(C)=C1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	I_BUTE	56.108	NO	-	777433	DTXS D10 6746	C4H8	CCC=C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	O_ETOL	120.195	NO	-	59857	DTXS D20 0403	C9H12	CCC1=CC=CC=C1C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	M_ETOL	120.195	NO	-	61887	DTXS D60 0386	C9H12	CCC1=CC(C)=CC=C1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	PENTE1	70.135	NO	-	26039	DTXS D70 5849	C5H10	CCCC=C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	BU22DM	86.178	NO	-	5918	DTXS D402 111	C6H14	CCC C)(C)C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	PA224M	114.232	NO	-	54858	DTXS D606 343	C8H18	CC(C)C(C)(C)C C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	BU23DM	86.178	NO	-	7732	DTXS D902 112	C6H14	CC(C)C(C)C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	PEN23M	100.205	NO	-	54817	DTXS D208 2203	C7H16	CCC C)C(C)C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	PEN24M	100.205	NO	-	24836	DTXS D205 358	C7H16	CC(C)CC(C)C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	HEP2ME	114.232	NO	-	57109	DTXS D206 460	C8H18	CCCCCC(C)C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	HEXA2M	100.205	NO	-	56994	DTXS D505 256	C7H16	CCCCC(C)C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	PENA2M	86.178	NO	-	24646	DTXS D402 143	C6H14	CCCC C C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	HEP3ME	114.232	NO	-	56481	DTXS D908 2250	C8H18	CCCCC(C)CC	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	HEXA3M	100.205	NO	-	56374	DTXS D304 334	C7H16	CCCC C CC	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	PENA3M	86.178	NO	-	16634	DTXS D8052 47	C6H14	CCC C)CC	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	ACETYL	26.038	NO	-	5108	DTXS D6026 79	C2H2	C#C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	YES	BENZE	78.114	NO	-	4754	DTXS D3039 42	C6H6	C1=CC=CC=C1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	C2BUTE	56.108	NO	-	777433	DTXS D0027 24	C4H8	C C=C C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	C2PENE	70.135	NO	-	64048	DTXS D1089 269	C5H10	CC C=C C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	CYHEXA	84.162	NO	-	777391	DTXS D4021 23	C6H12	C1CCCCC1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	CPENTA	70.135	NO	-	41020	DTXS D6024 86	C5H10	C1CCCC1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	ETHANE	30.07	YES	-	5082	DTXS D6026 77	C2H6	CC	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	YES	ETBZ	106.168	NO	-	19406	DTXS D3020 96	C8H10	CCC1=CC=CC=C1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	ETHENE	28.054	NO	-	5090	DTXS D10 6378	C2H4	C=C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	I_BUTA	58.124	NO	-	5470	DTXS D10 6401	C4H10	CC(C)C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	IPENTA	72.151	NO	-	7310	DTXS D80 5468	C5H12	CCC(C)C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	I_PREN	68.119	NO	-	7328	DTXS D20 0761	C5H8	CC(=C)C=C	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	YES	IPRBZ	120.195	NO	-	18309	DTXS D10 1927	C9H12	CC(C)C1=CC=CC=C1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	YES	MP_X	106.168	NO	-	-	-	C8H10	CC1=CC C =CC=C1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	MECYHX	98.189	NO	-	25445	DTXS D00 7749	C7H14	CC1CCCCC1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	MCYPNA	84.162	NO	-	16824	DTXS D302 590	C6H12	CC1CCCC1	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	N_BUTA	58.124	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	N_DEC	142.286	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	N_HEPT	100.205	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	YES	N_HEX	86.178	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	N_NON	128.259	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	N_OCT	114.232	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	N_PENT	72.151	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	N_PRBZ	120.195	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	N_UNDE	156.313	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	YES	O_XYL	106.168	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	N_PROP	44.097	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	PROPE	42.081	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	YES	STYR	104.152	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	YES	TOLUE	92.141	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	T2BUTE	56.108	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	T2PENE	70.135	NO	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	OTHE	142.286	NO	-	-	-	[illegible]	[illegible]	-	-	190.1944988	-	GAS	-	-	-	-	N.A.	-	-	-
Yes	NO	UNID	142.286	NO	-	-	-	[illegible]	[illegible]	-	-	190.1944988	-	GAS	-	-	-	-	N.A.	-	-	-

REFERENCES (all rows): Fujita EM. 2001. Hydrocarbon source apportionment for the 1996 Paso del Norte Ozone Study. Science of the Total Environment. 276 (1-3):171-184. http://doi.org/10.1016/S0048-9697(01)00778-1

REF_DESCRIPTIONS	LINK2	LINK3	LINK1	ATMOSPHERIC_HYDROXYLATION_RATE_(AOH)_CM3/MOLECULE*SEC_OPERA	HENRYS_LAW_ATM-M3/MOLE_OPERA	OCTANOL_AIR_PARTITION_COEFF_LOGKOA_OPERA	OCTANOL_WATER_PARTITION_LOGP_OPERA	OXYGEN_TO_CARBON_RATIO	PAMS	REPCMPSCORE	REPRESENTATIVE_COMPOUND_DSSTox_ID	REPRESENTATIVE_COMPOUND_NAME	SAROAD	PROFILE CODE COUNT
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	3.29E-11	0.00620397	4.53535	3.62962	0	NO	4	DTXSID6021402	1,2,4-Trimethylbenzene	-	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID6026797	1,3,5-Trimethylbenzene	45207	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID1026746	1-Butene	43213	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID2050403	1-Methyl-2-ethylbenzene (or o-ethyltoluene | 1-Ethyl-2-methylbenzene | 2-ethyltoluene | 2-Ethylmethylbenzene)	99915	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID6050386	1-Methyl-3-ethylbenzene (or 1-Ethyl-3-methylbenzene | 3-Ethyltoluene)	99912	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID7025849	1-Pentene	43224	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID4025111	2,2-Dimethylbutane	43291	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID6060343	2,3,4-Trimethylpentane	43279	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID9025112	2,3-Dimethylbutane	98001	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID208622 3	2,3-dimethylpentane	43274	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID2059358	2,4-Dimethylpentane	43271	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID2060460	2-Methylheptane	98140	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID5052256	2-Methylhexane	43275	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID4029143	2-methylpentane (or isohexane)	43229	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	8.90E-12	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID909622 0	3-methylheptane	-	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID3044334	3-Methylhexane	43295	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	[illegible]	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID8052647	3-Methylpentane	43230	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	8.16E-13	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID6026379	Acetylene (or ethyne)	43206	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.23E-12	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID3039242	Benzene	45201	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	6.02E-11	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID0027224	Cis-2-butene (or 2-Butene, (Z)-)	43217	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	6.60E-11	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID108912 9	Cis-2-pentene (or (2Z)-2-Pentene)	43227	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	7.48E-12	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID4021923	Cyclohexane	43248	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	5.17E-12	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID6024886	Cyclopentane	43242	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	2.69E-13	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID6026377	Ethane	43202	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	7.16E-12	[illegible]	[illegible]	[illegible]	0	NO	4	DTXSID3020596	Ethylbenzene	45203	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	8.53E-12	0.227707	0.280998	1.12995	0	NO	4	DTXSID1026378	Ethylene (or ethene)	43203	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	2.34E-12	0.452597	2.00819	2.75772	0	NO	4	DTXSID1026401	Isobutane (or 2-Methylpropane)	43214	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	3.91E-12	0.60086	2.27857	3.00337	0	NO	4	DTXSID8025468	Isopentane (or 2-Methylbutane)	98132	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.01E-10	0.0536737	2.17606	2.41803	0	NO	4	DTXSID2020761	Isoprene	43243	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	6.54E-12	0.0113666	3.99095	3.66274	0	NO	4	DTXSID1021827	Isopropylbenzene (or cumene | 2-Phenylpropane)	98063	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	2.33E-11	0.00713593	3.84097	3.19855	0	NO	4	DTXSID6026298	m-Xylene	99024	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.03E-11	0.427594	3.2478	3.61124	0	NO	4	DTXSID0047749	Methylcyclohexane	43261	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	8.06E-12	0.28356	3.10708	3.37025	0	NO	4	DTXSID3025590	Methylcyclopentane	43262	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	2.54E-12	0.471425	1.61014	2.88914	0	NO	4	DTXSID7024665	N-butane	43212	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.16E-11	0.153501	4.32698	5.01367	0	NO	4	DTXSID6024913	N-decane	43238	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	7.13E-12	0.395392	3.07219	4.65904	0	NO	4	DTXSID4024127	N-heptane	43232	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	5.61E-12	0.492255	2.56813	3.90054	0	NO	4	DTXSID0021917	n-Hexane	43231	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.02E-11	0.167561	4.15516	5.54877	0	NO	4	DTXSID9025796	N-nonane	43235	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	8.66E-12	0.365573	3.39317	5.17863	0	NO	4	DTXSID0026882	N-octane	43233	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	3.94E-12	1.24351	2.11356	3.38778	0	NO	4	DTXSID2025846	N-pentane	43220	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	6.05E-12	0.0104595	4.27386	3.70432	0	NO	4	DTXSID3042219	N-propylbenzene	45209	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.31E-11	0.147228	5.00581	6.53656	0	NO	4	DTXSID9021689	N-undecane	43241	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.38E-11	0.00525141	3.84097	3.11985	0	NO	4	DTXSID3021807	o-Xylene	45204	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.15E-12	0.392059	1.04169	2.36022	0	NO	4	DTXSID5026386	Propane	43204	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	2.63E-11	0.196349	1.60063	1.77007	0	NO	4	DTXSID5021205	Propylene (or Propene | 1-Propene)	43205	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	5.79E-11	0.00274507	3.78196	2.94967	0	NO	4	DTXSID2021284	Styrene	45220	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	5.97E-12	0.00662645	3.49442	2.72879	0	NO	4	DTXSID7021360	Toluene	45202	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	6.02E-11	0.227274	2.28815	2.32639	0	NO	4	DTXSID7027255	Trans-2-butene (or (2E)-2-Butene)	43216	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	6.60E-11	0.196675	2.53883	2.73274	0	NO	4	DTXSID50891268	Trans-2-pentene (or (2E)-2-Pentene)	43226	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.16E-11	0.153501	4.32698	5.01367	0	NO	0	DTXSID6024913	Decane	-	1
undefined	undefined	undefined	http://doi.org/10.1016/S0048-9697(01)00778-1	1.16E-11	0.153501	4.32698	5.01367	0	NO	1	DTXSID6024913	Decane	99999	1

[illegible]

PROFILE_NAME	PROFILE_CODE	PROFILE_TYPE	CATEGORY_LEVEL_1_Generation_Mechanism	CATEGORY_LEVEL_2_Sector_Equipment	CATEGORY_LEVEL_3_Fuel_Product	MASTER_POLLUTANT	VERSION	CONTROLS	REGION	SIZE_RANGE	SPECIES_ID	CAS	CAS no hyphen	Alternative CAS	WEIGHT_PERCENT	Weight Fraction	Mass Flow Rate (lbs/yr)	ANALYTICAL_METHOD	SPECIES_NAMES
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	30	95-63 6	95636	95636	0 37	0 0037	85 3653 758	Not Ava ab e	1 2 4-t me hy ben ene | Benzene 1 2 4-t me hy -
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	302	71-43 2	71432	71432	2 57	0 0257	592 942 815	Not Ava ab e	B nzene | Phe y hyd de
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	385	110-82 7	110827	110827	1 23	0 0123	283 782 017	Not Ava ab e	Cyc ohex ne | Benzene h xahyd o- | Hexamethy ene
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	438	74-84 0	74840	74840	2 13	0 0213	491 427 688	Not Ava ab e	Ethane | E hy hyd de | B me hy | D me hy | Met y methane
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	449	100-41 4	100414	100414	0 32	0 0032	73 8294 385	Not Ava ab e	Ethy benzene | Ben ene e hy -
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	491	75-28 5	75285	75285	7 34	0 0734	1693 46 327	Not Ava ab e	Isobu ane | 2-Methy p op ne | P op ne 2-methy - | 1 1-D me hy e hane | T met y methane
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	514	98-82 8	98828	98828	0 05	0 0005	11 5358 373	Not Ava ab e	Isop opy b nzene | cumene | 2-P eny p opane | Benz ne (1 me hy e hy -
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	592	106-97 8	106978	106978	28 08	0 2808	6478 53 653	Not Ava ab e	N butane | Butane
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	600	142-82 5	142825	142825	1 7	0 017	392 219 267	Not Ava ab e	N hept ne | Heptane
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	601	110-54 3	110543	110543	5 61	0 0561	1294 32 786	Not Ava ab e	N hexane | Hexa e
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	603	111-84 2	111842	111842	0 04	0 0004	9 22868 981	Not Ava ab e	N nonane | Nonane
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	604	111-65 9	111659	111659	0 01	0 0001	2 30717 745	Not Ava ab e	N octa e | Octane
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	605	109-66 0	109660	109660	7 97	0 0797	1838 81 084	Not Ava ab e	N pent ne | Pen ane
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	620	95-47 6	95476	95476	0 13	0 0013	29 9932 969	Not Ava ab e	O xy ene | Benzene 1 2-d me hy -
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	671	74-98 6	74986	74986	12 7	0 127	2930 10 847	Not Ava ab e	P opy hyd de | P opane | D me hy meth ne
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	717	108-88 3	108883	108883	2 06	0 0206	475 277 735	Not Ava ab e	To uene | B nzene methy - | Methy benzene
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	-	0 to 0	2264	N A	N A	N A	27 69	0 2769	6388 55 794	Not Ava ab e	Un dent f ed

SPECIES_NAME	[illegible]	Mass Flow Rate (lbs/yr)
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
SPECIES_NAME	[illegible]	Mass Flow Rate (lbs/yr)
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

SPECIES_NAME	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SPEC_MW	NonVOCTOG	SPEC ES_PROP NOTES	SRS ID	DSSTox_ D	Mo ecu a Fo mu a	Sm es Notat on	VP_Pa ca _EPI	VP_Pa ca _UM	VP_Pa ca _OPERA	Dup c te_ D	PHASE	SPECIES_EM SSION_RATE	SPECIES_EM SSION_RATE_UNIT
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	120 195	NO	-	16261	DTXSID6021402	C9H12	CC1=CC(C)=C(C)C=C1	215 9823	479 1445	279 412 479	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78 114	NO	-	4754	DTXSID3039242	C6H6	C1=CC=CC=C1	11625 71	13667 28	12620 6 715	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	84 162	NO	-	777391	DTXSID4021923	C6H12	C1CCCCC1	12518 97	13667 28	12891 5 079	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	30 07	YES	-	5082	DTXSID6026377	C2H6	CC	2693112	1884463	4137621 606	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	106 168	NO	-	19406	DTXSID3020596	C8H10	CCC1=CC=CC=C1	1011 917	1463 991	1270 71 646	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	58 124	NO	-	5470	DTXSID0026401	C4H10	CC C C	345305	319346 2	346121 439	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	120 195	NO	-	18309	DTXSID1021827	C9H12	CC C C1=CC=CC=C1	476 6274	758 0266	595 561 73	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	58 124	NO	-	24026	DTXSID7024665	C4H10	CCCC	241313 5	201857	241292 217	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100 205	NO	-	38984	DTXSID6024127	C7H16	CCCCCCC	6119 498	7076 658	6117 14 665	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	86 178	NO	-	26740	DTXSID0021917	C6H14	CCCCCC	19998 36	21622 21	20093 0 194	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	128 259	NO	-	27920	DTXSID9025796	C9H20	CCCCCCCCC	661 2791	758 0266	593 857 178	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	114 232	NO	-	27748	DTXSID0026882	C8H18	CCCCCCCC	1973 171	2316 095	1867 18 942	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72 151	NO	-	26021	DTXSID2025846	C5H12	CCCCC	68394 38	66065 08	67685 9 954	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	106 168	NO	-	16139	DTXSID0021807	C8H10	CC1=C(C)C=CC=C1	907 9255	1463 991	879 563 991	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	44 097	NO	-	5207	DTXSID5026386	C3H8	CCC	818599 5	616759 3	939882 698	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	92 141	NO	-	25452	DTXSID7021360	C7H8	CC1=CC=CC=C1	3159 741	4473 118	3775 21 413	-	GAS	-	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	142 286	NO	-	-	-	C1 H22	CCCCCCCCCC	-	-	190 194 988	-	GAS	-	-

QSCORE	QSCORE_DESC	QUAL TY	JUDGEMENT_RAT NG	V NTAGE_RAT NG	DATA_QUANTITY_RATING	TEST_YEAR	PROFILE_DATE	PROFILE_NOTES	TOTAL	TEST_METHOD	NORMAL ZATION_BASIS	ORIGINAL_COMPOSITE	INCLUDES_ NORGAN C GAS	SAMPLES	SIBLING	TOG_to_VOC RATIO	TEMP_SAMPLE_C	RH_SAMPLE	PARTICLE_LOAD NG_ug_pe _m3
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-
-	-	N A	-	-	-	-	36342	P of e no ma zed to equa 100% o the sum of t e 55 PAMS (Pho ochem ca A sessment M n to ng Stat o s) po utan s MTBE UNIDENT F ED and OTHER	100	-	-	-	NO	-	-	1.021764	-	-	-

ORGANIC_LOADING_ug_per_m3	MASTER_POLLUTANT_EMISSION_RATE	MASTER_POLL_EMISSION_RATE_UNIT	ORGANIC_MATTER_to_ORGANIC_CARBON_RATIO	MASS_OVERAGE_PERCENT	Keywords	DOC_LINK	[illegible]	[illegible]	REFERENCE	[illegible]	[illegible]	[illegible]	[illegible]	ATMOSPHERIC_HYDROXYLATION_RATE_(AOH)_CM3/MOLECULE-SEC_OPERA	HENRYS_LAW_ATM_M3/MOLE_OPERA	OCTANOL_AIR_PARTITION_COEFF_LOGKOA_OPERA	OCTANOL_WATER_PARTITION_LOGP_OPERA	OXYGEN_to_CARBON_RATIO	PAMS
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	3.29139E-11	0.0062097	4.53535	3.62962	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	1.23242E-12	0.0055201	2.82554	2.13105	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	7.48483E-12	0.1506	2.94558	3.44061	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	2.69225E-13	0.356667	0.436553	1.80691	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	7.15727E-12	0.0078444	3.77119	3.1503	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	2.33693E-12	0.452597	2.00019	2.75772	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	6.53573E-12	0.011366	3.99095	3.66274	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	2.53989E-12	0.471425	1.61014	2.88914	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	7.13392E-12	0.395392	3.07219	4.65904	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	5.60844E-12	0.492255	2.56013	3.90054	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	1.01701E-11	0.167561	4.15516	5.54877	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	8.66263E-12	0.365573	3.39317	5.17863	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	3.94227E-12	1.24351	2.11356	3.38778	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	1.37698E-11	0.0052541	3.84097	3.11985	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	1.15213E-12	0.392059	1.04169	2.36022	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	5.97336E-12	0.0066245	3.49442	2.72879	0	NO
-	-	-	-	-	DISTILLATE OIL, PETROLEUM INDUSTRY, INDUSTRIAL	-	-	[illegible]	Fujita EM, Z Lu, JC Sagebiel, NF Robinson, and JG Watson. 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. [illegible]	[illegible]	[illegible]	[illegible]	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	1.15884E-11	0.153501	4.32698	5.01367	0	NO

REPCMPSCORE	REPRESENTATIVE_COMPOUND_DSSTox_ID	REPRESENTATIVE_COMPOUND_NAME	SAROAD	PROFILE CODE COUNT
4	DTXSID6021402	1 2 4-Trimethylbenzene	-	1
4	DTXSID3039242	Benzene	45201	1
4	DTXSID4021923	Cyclohexane	43248	1
4	DTXSID6026377	Ethane	43202	1
4	DTXSID3020596	Ethylbenzene	45203	1
4	DTXSID0026401	Isobutane (or 2-Methylpropane)	43214	1
4	DTXSID1021827	Isopropylbenzene (or cumene | 2 Phenylpropane)	98043	1
4	DTXSID7024665	N butane	43212	1
4	DTXSID6024127	N heptane	43232	1
4	DTXSID0021917	n-Hexane	43231	1
4	DTXSID9025796	N nonane	43235	1
4	DTXSID0026882	N octane	43233	1
4	DTXSID2025846	N pentane	43220	1
4	DTXSID3021807	o-Xylene	45204	1
4	DTXSID5026386	Propane	43204	1
4	DTXSID7021360	Toluene	45202	1
1	DTXSID6024913	Decane	99999	1

[illegible]

PROFILE_NAME: Composite of 15 Fugitive Emission Profiles from Petroleum Storage Facilities - 1993 | PROFILE_TYPE: 24 9 GAS | CATEGORY_LEVEL_1: Volatilization | CATEGORY_LEVEL_2: Petrochemical Tank | CATEGORY_LEVEL_3: Miscellaneous | MASTER_POLLUTANT: - | VERSION: 3.2 | CONTROLS: Not Available | REGION: - | SIZE_RANGE: 0 to 0 | UNCERTAINTY_PERCENT: 99 | UNCERTAINTY_METHOD: N/A | INCLUDE_IN_SUM: Yes | PHASE: GAS | QUALITY: N/A | PROFILE_DATE: 7/1/1999 | PROFILE_NOTES: Profile normalized to equal 100% for the sum of the 55 PAMS (Photochemical Assessment Monitoring Stations) pollutants, MTBE, UNIDENTIFIED, and OTHER | TOTAL: 100

SPECIES_ID	CAS	CAS (no hyphen)	Alternative CAS	WEIGHT_PERCENT	Weight fraction	Vapor Flow	SPECIES_NAMES	SPECIES_NAME
[illegible]	95-63-6	95636	95636	1.1	0.011	253.788782	1,2,4-trimethylbenzene | Benzene, 1,2,4-trimethyl-	1,2,4-trimethylbenzene
302	71-43-2	71432	71432	20.65	0.2065	4764.307589	Benzene | Phenyl hydride	Benzene
385	110-82-7	110827	110827	0.46	0.0046	106.1298543	Cyclohexane | Benzene, hexahydro- | Hexahydrobenzene	Cyclohexane
390	287-92-3	287923	287923	0.15	0.0015	34.60756118	Cyclopentane | Pentamethylene	Cyclopentane
438	74-84-0	74840	74840	0.88	0.0088	203.0310256	Ethane | Ethyl hydride | Bimethyl | Dimethyl | Methylmethane	Ethane
449	100-41-4	100414	100414	1.41	0.0141	325.3110751	Ethylbenzene | Benzene, ethyl-	Ethylbenzene
491	75-28-5	75285	75285	1.54	0.0154	355.3042948	Isobutane | 2-Methylpropane | Propane, 2-methyl- | 1,1-Dimethylethane | Trimethylmethane	Isobutane (or 2-Methylpropane)
508	78-78-4	78784	78784	0.13	0.0013	29.99321969	Isopentane | 2-Methylbutane | Butane, 2-methyl-	Isopentane (or 2-Methylbutane)
514	98-82-8	98828	98828	0.09	0.0009	20.76453671	Isopropylbenzene | cumene | 2-Phenylpropane | Benzene, (1-methylethyl)-	Isopropylbenzene (or cumene | 2-Phenylpropane)
550	108-87-2	108872	108872	0.22	0.0022	50.7577564	Methylcyclohexane | Cyclohexane, methyl-	Methylcyclohexane
592	106-97-8	106978	106978	10.39	0.1039	2397.150404	N-butane | Butane	N-butane
6 0	142-82-5	142825	142825	4.87	0.0487	1123.592153	N-heptane | Heptane	N-heptane
6 1	110-54-3	110543	110543	6.21	0.0621	1432.753033	N-hexane | Hexane	n-Hexane
6 3	111-84-2	111842	111842	0.94	0.0094	216.8740501	N-nonane | Nonane	N-nonane
6 4	111-65-9	111659	111659	2.28	0.0228	526.0349299	N-octane | Octane	N-octane
605	109-66-0	109660	109660	2.54	0.0254	586.0213693	N-pentane | Pentane	N-pentane
620	95-47-6	95476	95476	0.95	0.0095	219.1812208	O-xylene | Benzene, 1,2-dimethyl-	O-xylene
671	74-98-6	74986	74986	7.15	0.0715	1649.627083	Propyl hydride | Propane | Dimethylmethane	Propane
678	115-07-1	115071	115071	9.34	0.0934	2154.997476	Propylene | Propene | 1-Propene	Propylene (or Propene | 1-Propene)
717	108-88-3	108883	108883	4.11	0.0411	948.2471763	Toluene | Benzene, methyl- | Methylbenzene	Toluene
2284	N/A	N/A	N/A	24.59	0.2459	5673.332863	Unidentified	Unidentified

SPECIES_NAME	HAPS	SPECIES_SYMBOL	SPEC_MW	Non VOCTOG	SRS ID	DSSTox_ID	Molecular Formula	Smiles Notation	VP_Pascal_EPI	VP_Pascal_UM	VP_Pascal_OPERA
1,2,4-trimethylbenzene	NO	BZ124M	120.1 5	NO	16261	DTXSID6021402	C9H12	CC1=CC(C)=C(C)C=C1	215.9823	479.1445	279.4122479
Benzene	YES	BENZE	78.1 4	NO	4754	DTXSID3039242	C6H6	C1=CC=CC=C1	11625.71	13667.28	12620.68715
Cyclohexane	NO	CYHEXA	84.1 2	NO	777391	DTXSID4021923	C6H12	C1CCCCC1	12518.97	13667.28	12891.53079

SPECIES_NAME	HAPS	WEIGHT_PERCENT	Vapor Flow (lbs/yr)
1,2,4-trimethylbenzene	NO	1%	253.788782
Benzene	YES	21%	4764.307589
Cyclohexane	NO	0%	106.1298543
Cyclopentane	NO	0%	34.60756118
Ethane	NO	1%	203.0310256
Ethylbenzene	YES	1%	325.3110751
Isobutane (or 2-Methylpropane)	NO	2%	355.3042948
Isopentane (or 2-Methylbutane)	NO	0%	29.99321969
Isopropylbenzene (or cumene | 2-Phenylpropane)	YES	0%	20.76453671
Methylcyclohexane	NO	0%	50.7577564
N-butane	NO	10%	2397.150404
N-heptane	NO	5%	1123.592153
n-Hexane	YES	6%	1432.753033
N-nonane	NO	1%	216.8740501
N-octane	NO	2%	526.0349299
N-pentane	NO	3%	586.0213693
O-xylene	YES	1%	219.1812208
Propane	NO	7%	1649.627083
Propylene (or Propene | 1-Propene)	NO	9%	2154.997476
Toluene	YES	4%	948.2471763
Unidentified	NO	25%	5673.332863

HAPS

SPECIES_NAME	HAPS	WEIGHT_PERCENT	Vapor Flow (lbs/yr)
Benzene	YES	21%	4764.307589
Ethylbenzene	YES	1%	325.3110751
Isopropylbenzene (or cumene | 2-Phenylpropane)	YES	0%	20.76453671
n-Hexane	YES	6%	1432.753033
O-xylene	YES	1%	219.1812208
Toluene	YES	4%	948.2471763
Total		**33%**	**7710.564631**

TEST_METHOD	NORMALIZATION_BASIS	ORIGINAL_COMPOSITE	INCLUDES_INORGANIC_GAS	SAMPLES	SIBLING	TOG_to_VOC_RATIO	TEMP_SAMPLE_C	RH_SAMPLE	PARTICLE_LOADING_ug_per_m3	ORGANIC_LOADING_ug_per_m3	MASTER_POLLUTANT_EMISSION_RATE	MASTER_POLL_EMISSION_RATE_UNIT	ORGANIC_MATTER_to_ORGANIC_CARBON_RATIO	MASS_OVERAGE_PERCENT	Keywords	DOC_LINK	Q_LINK	REF_Codes	REFERENCES	REF_DESCRIPTIONS	LINK2	LINK3	LINK1	ATMOSPHERIC_HYDROXYLATION_RATE_AOH_CM3 MOLECULE-SEC_OPERA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	REPRESENTATIVE_COMPOUND_NAME	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	Fujita EM, Lu Z, Sagebiel JC, Robinson NF and Watson JG, 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin TX, by DRI, Reno NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	3.29E-11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,2,4-Trimethylbenzene	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	Fujita EM, Lu Z, Sagebiel JC, Robinson NF and Watson JG, 1995. VOC Source Apportionment for the Coastal Oxidant Assessment for Southeast Texas. Prepared for Texas Natural Resource Conservation Commission, Austin TX, by DRI, Reno NV. https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	The 1993 Coastal Oxidant Assessment for Southeast Texas (COAST) project was designed to gain a better understanding of the relationship between emissions and spatial and temporal distributions of ambient ozone concentrations and ozone precursors in the Houston-Galveston and Beaumont-Port Arthur areas of Southeast Texas. An important part of the COAST project was the acquisition of speciated VOC concentrations that are needed to evaluate emission inventory estimates, specify photochemical model boundary and initial conditions, evaluate air quality model performance and attribute source contributions through receptor modeling. Source composition profiles were compiled from previous studies, Texas Natural Resource Conservation Commission (TNRCC) point source emission inventory files and COAST source characterization measurements.	undefined	undefined	https://www.researchgate.net/publication/235341568_VOC_source_apportionment_for_the_Coastal_Oxidant_Assessment_for_Southeast_Texas	1.23E-12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Benzene	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Cyclohexane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Cyclopentane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Ethane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Ethylbenzene	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Isobutane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Isopentane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Isopropylbenzene	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Methylcyclohexane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-butane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-heptane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	n-Hexane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-nonane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-octane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N-pentane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	o-Xylene	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Propane	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Propylene	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Toluene	[illegible]	[illegible]
-	-	-	NO	-	-	1.00878	-	-	-	-	-	-	-	-	PETROLEUM INDUSTRY INDUSTRIAL	-	-	Fujita1995	[illegible]	[illegible]	undefined	undefined	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Decane	[illegible]	[illegible]

(b) (3) (A)

[redacted]

Jet Fuel Hydrocarbons
Total Vapor Flow of Jet Fuel Vapor 23 072 lbs yr

PROFILE_NAME	PROFILE_CODE	PROFILE_TYPE	CATEGORY_LEVEL_1_Generation_Mechanism	CATEGORY_LEVEL_2_Sector_Equipment	CATEGORY_LEVEL_3_Fuel_Product	MASTER_POLLUTANT	VERSION	CONTROLS	REGION	SIZE_RANGE	SPECIES_ID	CAS	CAS no hyphen	AlternativeCAS	WEIGHT_PERCENT	Weight_Fraction	Vapor Flow (lbs/yr)	ANALYTICAL_METHOD	SPECIES_NAMES	SPECIES_NAME	UNCERTAINTY_PERCENT	UNCERTAINTY_METHOD	INCLUDE_IN_SUM	HAPS	SPECIES_SYMBOL	SPEC_MW	NonVOCTOG	SPECIES_PROP_NOTES	SRS ID	DSSTox_ID	Molecular Formula	Smiles Notation	VP_Pascal_EPI	VP_Pascal_UM	VP_Pascal_OPERA	Duplicate_ID	PHASE	SPECIES_EMISSION_RATE	SPECIES_EMISSION_RATE_UNIT	QSCORE	QSCORE_DESC	QUALITY	JUDGEMENT_RATING	VINTAGE_RATING	DATA_QUANTITY_RATING	TEST_YEAR	PROFILE_DATE	PROFILE_NOTES	TOTAL	TEST_METHOD	NORMALIZATION_BASIS	ORIGINAL_COMPOSITE	INCLUDES_INORGANIC GAS	SAMPLES	SIBLING	TOG_to_VOC RATIO	TEMP_SAMPLE_C	RH_SAMPLE	PARTICLE_LOADING_ug_per_m3	ORGANIC_LOADING_ug_per_m3	MASTER_POLLUTANT_EMISSION_RATE	MASTER_POLLUTANT_EMISSION_RATE_UNIT	ORGANIC_MATTER_to_ORGANIC_CARBON_RATIO	MASS_OVERAGE_PERCENT	Keywords	DOC_LINK	Q_LINK	REF_Codes	REFERENCES	REF_DESCRIPTIONS	LINK2	LINK3	LINK1	ATMOSPHERIC_HYDROXYLATION_RATE_(AOH)_CM3/MOLECULE-SEC_OPERA	HENRYS_LAW_ATM-M3/MOLE_OPERA	OCTANOL_AIR_PARTITION_COEFF_LOGKOA_OPERA	OCTANOL_WATER_PARTITION_LOGP_OPERA	OXYGEN_to_CARBON_RATIO	PAMS	REPCMPSCORE	REPRESENTATIVE_COMPOUND_DSSTox_ID	REPRESENTATIVE_COMPOUND_NAME	SAROAD	PROFILE CODE COUNT				
F xed Roof Tank - Commercial Jet Fuel (Jet A)	100	GAS	Volatiliza on	Tank	Jet Fuel	-	3.2	Uncon r olled	-	0 to 0	598	12 -18-5	12 185	12 185	19 6	0.196	522 05 66	Not A ailable	N-decane | Decane	N-decane	-99	N/A	Yes	NO	N_DEC	1 2 286	NO	-	33 56	DTXSID 602 913	C10H22	CCCCCC CCCC	230.6 77	2 8.0919	190.19 99	-	GAS	-	-	-	-	3	-	-	-	-	32513	Engineering e aluation of l terature da a.	100	-	-	-	NO	-	-	1	-	-	-	-	-	-	-	-	JET FUEL	-	-	Mayrsohn1967 Mayrsohn1976 Radian 1990	Mayrsohn H. & Crabtree JH. 1967. Source reconciliation of a mospheric hydrocarbons' Atmospheric En ironment 10(2) 137-1 3. http / doi.org/10.1016/000 -6981(76)90231-6 Mayrsohn H. and J. Crabtree. 1976. 'Source Reconciliation of Atmospheric Hydrocarbons in the Sou h Coast Air Bas n 1975' California Air Resources Board. 1990 â€ Air Emissions Species Manual: Volume I: Volatile Organic Compound Species Profiles 2nd Edition. Radian Corporation for US EPA. Research Triangle Park, NC. EPA-EPA- 50/2-90-001a. (NSCEP 50290001A). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	Fixed Roof Tank - Commercial Jet Fuel (Jet A) 3. F xed Roof Tank - Commercial Jet Fuel (Jet A) The U.S. EPA Office of A r Quality Planning and Standards (OAQPS) pro ides technical support to assist State and local a r pollut on con rol agencies in de eloping and implementing air toxics programs. This is done by compiling and publishing emission data for agencies and others who are in erested in locating potential emitters of toxic air compounds and in making preliminary estima es of air toxic emissions. This report is not intended to provide exact estimates of air toxics releases from specific facilities. The objective of the current study is to produce a second edition of the Air Emissions Species Manual (EPA- 50/2-88-003a	b)â€ document. The updated VOC species prof le data base is contained in Volume I of his second edition document. The VOC prof le data base includes VOC profiles from primarily three sources: (1) the 1988 VOC Data Manual	(2) new VOC prof les de elope d from readily a ailable existing data	and (3) new VOC profiles de elope d from original data as a result of the VOC specia io n field sampling program. In addition to the VOC profiles	Volume I contains profile assignme nts hat link a profile to a source category. For categorie s where profile data are not a a lable	the profile assignme nts are based on engineeri ng judgeme nt.	undefine d	https://nepis.epa.go /Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	http //doi.org/10 1016/000 -6981(76)90231-6	1.1588E-11	0.153501	32698	5 01367	0	NO	DTXSID 602 913	N-decane	3238	1
F xed Roof Tank - Commercial Jet Fuel (Jet A)	100	GAS	Volatiliza ion	Tank	Jet Fuel	-	3.2	Uncon r olled	-	0 to 0	599	112- 0-3	112 03	112 03	18 2	0.182	199 05076	Not A ailable	N-dodecane | Dodecane	N-dodecane	-99	N/A	Yes	NO	N_DODE	170 3	NO	-	28 07	DTXSID 0026913	C12H26	CCCCCC CCCCCC	31. 6	08 26.37	72 18.050	456 -	GAS	-	-	-	-	3	-	-	-	-	32513	Engineering e aluation of l terature da a.	100	-	-	-	NO	-	-	1	-	-	-	-	-	-	-	-	JET FUEL	-	-	Mayrsohn1967 Mayrsohn1976 Radian 1990	Mayrsohn H. & Crabtree JH. 1967. Source reconciliation of a mospheric hydrocarbons' Atmospheric En ironment 10(2) 137-1 3. http / doi.org/10.1016/000 -6981(76)90231-6 Mayrsohn H. and J. Crabtree. 1976. 'Source Reconciliation of Atmospheric Hydrocarbons in the Sou h Coast Air Bas n 1975' California Air Resources Board. 1990 â€ Air Emissions Species Manual: Volume I: Volatile Organic Compound Species Profiles 2nd Edition. Radian Corporation for US EPA. Research Triangle Park, NC. EPA-EPA- 50/2-90-001a. (NSCEP 50290001A). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	Fixed Roof Tank - Commercial Jet Fuel (Jet A) 3. F xed Roof Tank - Commercial Jet Fuel (Jet A) The U.S. EPA Office of A r Quality Planning and Standards (OAQPS) pro ides technical support to assist State and local a r pollut on con rol agencies in de eloping and implementing air toxics programs. This is done by compiling and publishing emission data for agencies and others who are in erested in locating potential emitters of toxic air compounds and in making preliminary estima es of air toxic emissions. This report is not intended to provide exact estimates of air toxics releases from specific facilities. The objective of the current study is to produce a second edition of the Air Emissions Species Manual (EPA- 50/2-88-003a	b)â€ document. The updated VOC species prof le data base is contained in Volume I of his second edition document. The VOC prof le data base includes VOC profiles from primarily three sources: (1) the 1988 VOC Data Manual	(2) new VOC prof les de elope d from readily a ailable existing data	and (3) new VOC profiles de elope d from original data as a result of the VOC specia io n field sampling program. In addition to the VOC profiles	Volume I contains profile assignme nts hat link a profile to a source category. For categorie s where profile data are not a a lable	the profile assignme nts are based on engineeri ng judgeme nt.	undefine d	https://nepis.epa.go /Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	http //doi.org/10 1016/000 -6981(76)90231-6	3.183E-11	0.1 56	5 8632	6.099 8	0	NO	DTXSID 0026913	N-dodecane	3235	1
F xed Roof Tank - Commercial Jet Fuel (Jet A)	100	GAS	Volatiliza ion	Tank	Jet Fuel	-	3.2	Uncon r olled	-	0 to 0	600	1 2-82-5	1 2825	1 2825	0.1	0.001	23 0717075	Not A ailable	N-heptane || Heptane	N-hep ane	-99	N/A	Yes	NO	N_HEPT	100 205	NO	-	3898	DTXSID 602 127	C7H16	CCCCCC C	6119. 99	7879.658	6117.1 667	-	GAS	-	-	-	-	3	-	-	-	-	32513	Engineering e aluation of l terature da a.	100	-	-	-	NO	-	-	1	-	-	-	-	-	-	-	-	JET FUEL	-	-	Mayrsohn1967 Mayrsohn1976 Radian 1990	Mayrsohn H. & Crabtree JH. 1967. Source reconciliation of a mospheric hydrocarbons' Atmospheric En ironment 10(2) 137-1 3. http / doi.org/10.1016/000 -6981(76)90231-6 Mayrsohn H. and J. Crabtree. 1976. 'Source Reconciliation of Atmospheric Hydrocarbons in the Sou h Coast Air Bas n 1975' California Air Resources Board. 1990 â€ Air Emissions Species Manual: Volume I: Volatile Organic Compound Species Profiles 2nd Edition. Radian Corporation for US EPA. Research Triangle Park, NC. EPA-EPA- 50/2-90-001a. (NSCEP 50290001A). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	Fixed Roof Tank - Commercial Jet Fuel (Jet A) 3. F xed Roof Tank - Commercial Jet Fuel (Jet A) The U.S. EPA Office of A r Quality Planning and Standards (OAQPS) pro ides technical support to assist State and local a r pollut on con rol agencies in de eloping and implementing air toxics programs. This is done by compiling and publishing emission data for agencies and others who are in erested in locating potential emitters of toxic air compounds and in making preliminary estima es of air toxic emissions. This report is not intended to provide exact estimates of air toxics releases from specific facilities. The objective of the current study is to produce a second edition of the Air Emissions Species Manual (EPA- 50/2-88-003a	b)â€ document. The updated VOC species prof le data base is contained in Volume I of his second edition document. The VOC prof le data base includes VOC profiles from primarily three sources: (1) the 1988 VOC Data Manual	(2) new VOC prof les de elope d from readily a ailable existing data	and (3) new VOC profiles de elope d from original data as a result of the VOC specia io n field sampling program. In addition to the VOC profiles	Volume I contains profile assignme nts hat link a profile to a source category. For categorie s where profile data are not a a lable	the profile assignme nts are based on engineeri ng judgeme nt.	undefine d	https://nepis.epa.go /Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	http //doi.org/10 1016/000 -6981(76)90231-6	7.1119E-12	0.395592	3.07219	4390	0	NO	DTXSID 602 127	N-heptane	3232	1
F xed Roof Tank - Commercial Jet Fuel (Jet A)	100	GAS	Volatiliza ion	Tank	Jet Fuel	-	3.2	Uncon r olled	-	0 to 0	603	111-8 -2	1118 2	1118 2	.7	0.0 7	108 37025	Not A ailable	N-nonane || Nonane	N-nonane	-99	N/A	Yes	NO	N_NON	128 259	NO	-	27920	DTXSID 9025796	C9H20	CCCCCC CCC	661.2791	758.8266	593.457518	-	GAS	-	-	-	-	3	-	-	-	-	32513	Engineering e aluation of l terature da a.	100	-	-	-	NO	-	-	1	-	-	-	-	-	-	-	-	JET FUEL	-	-	Mayrsohn1967 Mayrsohn1976 Radian 1990	Mayrsohn H. & Crabtree JH. 1967. Source reconciliation of a mospheric hydrocarbons' Atmospheric En ironment 10(2) 137-1 3. http / doi.org/10.1016/000 -6981(76)90231-6 Mayrsohn H. and J. Crabtree. 1976. 'Source Reconciliation of Atmospheric Hydrocarbons in the Sou h Coast Air Bas n 1975' California Air Resources Board. 1990 â€ Air Emissions Species Manual: Volume I: Volatile Organic Compound Species Profiles 2nd Edition. Radian Corporation for US EPA. Research Triangle Park, NC. EPA-EPA- 50/2-90-001a. (NSCEP 50290001A). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	Fixed Roof Tank - Commercial Jet Fuel (Jet A) 3. F xed Roof Tank - Commercial Jet Fuel (Jet A) The U.S. EPA Office of A r Quality Planning and Standards (OAQPS) pro ides technical support to assist State and local a r pollut on con rol agencies in de eloping and implementing air toxics programs. This is done by compiling and publishing emission data for agencies and others who are in erested in locating potential emitters of toxic air compounds and in making preliminary estima es of air toxic emissions. This report is not intended to provide exact estimates of air toxics releases from specific facilities. The objective of the current study is to produce a second edition of the Air Emissions Species Manual (EPA- 50/2-88-003a	b)â€ document. The updated VOC species prof le data base is contained in Volume I of his second edition document. The VOC prof le data base includes VOC profiles from primarily three sources: (1) the 1988 VOC Data Manual	(2) new VOC prof les de elope d from readily a ailable existing data	and (3) new VOC profiles de elope d from original data as a result of the VOC specia io n field sampling program. In addition to the VOC profiles	Volume I contains profile assignme nts hat link a profile to a source category. For categorie s where profile data are not a a lable	the profile assignme nts are based on engineeri ng judgeme nt.	undefine d	https://nepis.epa.go /Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	http //doi.org/10 1016/000 -6981(76)90231-6	1.0177E-11	0.167261	15516	3.5 877	0	NO	DTXSID 9025796	N-nonane	3235	1
F xed Roof Tank - Commercial Jet Fuel (Jet A)	100	GAS	Volatiliza ion	Tank	Jet Fuel	-	3.2	Uncon r olled	-	0 to 0	60	111-65-9	111659	111659	0.5	0.005	115.358537	Not A ailable	N-octane | Octane	N-octane	-99	N/A	Yes	NO	N_OCT	11 232	NO	-	277 8	DTXSID 0026882	C8H18	CCCCCC CC	1973.171	2216.095	1867.1879	-	GAS	-	-	-	-	3	-	-	-	-	32513	Engineering e aluation of l terature da a.	100	-	-	-	NO	-	-	1	-	-	-	-	-	-	-	-	JET FUEL	-	-	Mayrsohn1967 Mayrsohn1976 Radian 1990	Mayrsohn H. & Crabtree JH. 1967. Source reconciliation of a mospheric hydrocarbons' Atmospheric En ironment 10(2) 137-1 3. http / doi.org/10.1016/000 -6981(76)90231-6 Mayrsohn H. and J. Crabtree. 1976. 'Source Reconciliation of Atmospheric Hydrocarbons in the Sou h Coast Air Bas n 1975' California Air Resources Board. 1990 â€ Air Emissions Species Manual: Volume I: Volatile Organic Compound Species Profiles 2nd Edition. Radian Corporation for US EPA. Research Triangle Park, NC. EPA-EPA- 50/2-90-001a. (NSCEP 50290001A). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	Fixed Roof Tank - Commercial Jet Fuel (Jet A) 3. F xed Roof Tank - Commercial Jet Fuel (Jet A) The U.S. EPA Office of A r Quality Planning and Standards (OAQPS) pro ides technical support to assist State and local a r pollut on con rol agencies in de eloping and implementing air toxics programs. This is done by compiling and publishing emission data for agencies and others who are in erested in locating potential emitters of toxic air compounds and in making preliminary estima es of air toxic emissions. This report is not intended to provide exact estimates of air toxics releases from specific facilities. The objective of the current study is to produce a second edition of the Air Emissions Species Manual (EPA- 50/2-88-003a	b)â€ document. The updated VOC species prof le data base is contained in Volume I of his second edition document. The VOC prof le data base includes VOC profiles from primarily three sources: (1) the 1988 VOC Data Manual	(2) new VOC prof les de elope d from readily a ailable existing data	and (3) new VOC profiles de elope d from original data as a result of the VOC specia io n field sampling program. In addition to the VOC profiles	Volume I contains profile assignme nts hat link a profile to a source category. For categorie s where profile data are not a a lable	the profile assignme nts are based on engineeri ng judgeme nt.	undefine d	https://nepis.epa.go /Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	http //doi.org/10 1016/000 -6981(76)90231-6	8.4624E-12	0.365573	3.59317	5.17863	0	NO	DTXSID 0026882	N-octane	3233	1
F xed Roof Tank - Commercial Jet Fuel (Jet A)	100	GAS	Volatiliza ion	Tank	Jet Fuel	-	3.2	Uncon r olled	-	0 to 0	609	629-50-5	629505	629505	17.7	0.177	083 69222	Not A ailable	N-tridecane | Tr decane	N-tridecane	-99	N/A	Yes	NO	N_TRID	18 367	NO	-	6 782	DTXSID 6027266	C13H28	CCCCCC CCCCCC C	12.27899	8.6975 9	7 .56 8615	-	GAS	-	-	-	-	3	-	-	-	-	32513	Engineering e aluation of l terature da a.	100	-	-	-	NO	-	-	1	-	-	-	-	-	-	-	-	JET FUEL	-	-	Mayrsohn1967 Mayrsohn1976 Radian 1990	Mayrsohn H. & Crabtree JH. 1967. Source reconciliation of a mospheric hydrocarbons' Atmospheric En ironment 10(2) 137-1 3. http / doi.org/10.1016/000 -6981(76)90231-6 Mayrsohn H. and J. Crabtree. 1976. 'Source Reconciliation of Atmospheric Hydrocarbons in the Sou h Coast Air Bas n 1975' California Air Resources Board. 1990 â€ Air Emissions Species Manual: Volume I: Volatile Organic Compound Species Profiles 2nd Edition. Radian Corporation for US EPA. Research Triangle Park, NC. EPA-EPA- 50/2-90-001a. (NSCEP 50290001A). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	Fixed Roof Tank - Commercial Jet Fuel (Jet A) 3. F xed Roof Tank - Commercial Jet Fuel (Jet A) The U.S. EPA Office of A r Quality Planning and Standards (OAQPS) pro ides technical support to assist State and local a r pollut on con rol agencies in de eloping and implementing air toxics programs. This is done by compiling and publishing emission data for agencies and others who are in erested in locating potential emitters of toxic air compounds and in making preliminary estima es of air toxic emissions. This report is not intended to provide exact estimates of air toxics releases from specific facilities. The objective of the current study is to produce a second edition of the Air Emissions Species Manual (EPA- 50/2-88-003a	b)â€ document. The updated VOC species prof le data base is contained in Volume I of his second edition document. The VOC prof le data base includes VOC profiles from primarily three sources: (1) the 1988 VOC Data Manual	(2) new VOC prof les de elope d from readily a ailable existing data	and (3) new VOC profiles de elope d from original data as a result of the VOC specia io n field sampling program. In addition to the VOC profiles	Volume I contains profile assignme nts hat link a profile to a source category. For categorie s where profile data are not a a lable	the profile assignme nts are based on engineeri ng judgeme nt.	undefine d	https://nepis.epa.go /Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	http //doi.org/10 1016/000 -6981(76)90231-6	1.6866E-11	0.1 5 3	5.61752	6.20222	0	NO	DTXSID 6027266	N-tridecane	3236	1
F xed Roof Tank - Commercial Jet Fuel (Jet A)	100	GAS	Volatiliza ion	Tank	Jet Fuel	-	3.2	Uncon r olled	-	0 to 0	610	1120-21-	112021	112021	20 3	0.203	683 55661	Not A ailable	N-undecane | Undecane	N-undecane	-99	N/A	Yes	NO	N_UNDE	156 313	NO	-	78907	DTXSID 9021689	C11H2	CCCCCC CCCCC	65.45979	81.19712	5 891 672	-	GAS	-	-	-	-	3	-	-	-	-	32513	Engineering e aluation of l terature da a.	100	-	-	-	NO	-	-	1	-	-	-	-	-	-	-	-	JET FUEL	-	-	Mayrsohn1967 Mayrsohn1976 Radian 1990	Mayrsohn H. & Crabtree JH. 1967. Source reconciliation of a mospheric hydrocarbons' Atmospheric En ironment 10(2) 137-1 3. http / doi.org/10.1016/000 -6981(76)90231-6 Mayrsohn H. and J. Crabtree. 1976. 'Source Reconciliation of Atmospheric Hydrocarbons in the Sou h Coast Air Bas n 1975' California Air Resources Board. 1990 â€ Air Emissions Species Manual: Volume I: Volatile Organic Compound Species Profiles 2nd Edition. Radian Corporation for US EPA. Research Triangle Park, NC. EPA-EPA- 50/2-90-001a. (NSCEP 50290001A). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	Fixed Roof Tank - Commercial Jet Fuel (Jet A) 3. F xed Roof Tank - Commercial Jet Fuel (Jet A) The U.S. EPA Office of A r Quality Planning and Standards (OAQPS) pro ides technical support to assist State and local a r pollut on con rol agencies in de eloping and implementing air toxics programs. This is done by compiling and publishing emission data for agencies and others who are in erested in locating potential emitters of toxic air compounds and in making preliminary estima es of air toxic emissions. This report is not intended to provide exact estimates of air toxics releases from specific facilities. The objective of the current study is to produce a second edition of the Air Emissions Species Manual (EPA- 50/2-88-003a	b)â€ document. The updated VOC species prof le data base is contained in Volume I of his second edition document. The VOC prof le data base includes VOC profiles from primarily three sources: (1) the 1988 VOC Data Manual	(2) new VOC prof les de elope d from readily a ailable existing data	and (3) new VOC profiles de elope d from original data as a result of the VOC specia io n field sampling program. In addition to the VOC profiles	Volume I contains profile assignme nts hat link a profile to a source category. For categorie s where profile data are not a a lable	the profile assignme nts are based on engineeri ng judgeme nt.	undefine d	https://nepis.epa.go /Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	http //doi.org/10 1016/000 -6981(76)90231-6	1.3128E-11	0.1 7228	5.06581	4.53656	0	NO	DTXSID 9021689	N-undecane	32 1	1

F xed Roof Tank - Commercial Jet Fuel (Jet A)	100	GAS	Volatiliza ion	Tank	Jet Fuel	-	3.2	Uncon r olled	-	0 to 0	10 9	629-62-9	629629	629629	7.2	0.072	1661 1629	Not A ailable	Pentadec ane | n-Pentadec ane	Pentadec ane	-99	N/A	Yes	NO	N_PEND	212. 21	NO	-	6 82	DTXSID 6027268	C15H32	CCCCCCCCCCCCCCC	2.039833	0 931651	0. 5779975	-	GAS	-	-	-	-	3	-	-	-	-	32513	Engineering e aluation of l terature da a.	100	-	-	-	NO	-	-	1	-	-	-	-	-	-	-	-	JET FUEL	-	-	Mayrsoh n1967 Mayrs ohn1976 Rad an 1990	Mayrsohn H. & Crabtree JH. 1967. Source reconciliation of atmospheric hydrocarbons'. Atmospheric En ironment. 10(2): 137-1 3. http://doi.org/10.1016/000-6981(76)90231-6 Mayrsohn H. and J. Crabtree. 1976. Source Reconciliation of Atmospheric Hydrocarbons in the South Coast Air Basin. 1975. California Air Resources Board. 1990. â€˜Air Emissions Species Manual. Volume I: Volatile Organic Compound Species Prof les. 2nd Editionâ€™. Radian Corporation for US EPA. Research Triangle Park. NC. EPA-EPA- 50/2-90-001a. (NSCEP 50290001A). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	Fixed Roof Tank - Commercial Jet Fuel (Jet A) 5. F xed Roof Tank - Commercial Jet Fuel (Jet A) The U.S. EPA. Office of Air Quality Planning and Standards (OAQPS) pro ides technical support to assist State and local a r pollut on control agencies in de eloping and implementing air toxics programs. This is done by compiling and publ shing emission data for agencies and others who are interested in locating potential emitters of toxic air compounds and in making preliminary estimates of toxic air emissions. This report is not intended to pro ide exact estimates of air toxics releases from specific facilities. The objecti e of the current study is to produce a second ed tion of the Air Emiss ons Species Manual (EPA 50/2-88-003a)	Add document. The updated VOC species prof le data base is contained in Volume I of this second edition document. The VOC prof le data base includes VOC prof les from primarily three sources: (1) the 1988 VOC Data Manual	(2) new VOC prof les de eloped from readily a ailable existing data	and (3) new VOC profiles de eloped from original data as a result of the VOC specia io n field sampling program. In addition to the VOC profiles	Volume I contains profile assignme nts hat link a profile to a source category. For categorie s where profile data are not a a lable	the profile assignme nts are based on engineeri ng judgeme nt.	undefine d	https //n epis.epa. go /Exe/ ZyPURL. cgi?Dock ey=00001 VFS.TXT	http //doi .org/10 1 016/000 - 6981(76)9 0231-6	2.216E-11	0.0038959	7.25917	7.339	0	NO	DTXSID 6027268	Pentadec ane	-	1
F xed Roof Tank - Commercial Jet Fuel (Jet A)	100	GAS	Volatiliza ion	Tank	Jet Fuel	-	3.2	Uncon r olled	-	0 to 0	1051	629-59-	62959	62959	11.7	0.117	2699 38977	Not A ailable	n-Tetradec ane | Tetradec ane	Tetradec ane	-99	N/A	Yes	NO	N_TETD	198 39	NO	-	6 808	DTXSID 1027267	C1 H30	CCCCCCCCCCCCCC	.919596	2 8 659	1 5 652187	-	GAS	-	-	-	-	3	-	-	-	-	32513	Engineeri ng e aluatio n of l terature da a.	100	-	-	-	NO	-	-	1	-	-	-	-	-	-	-	-	JET FUEL	-	-	Mayrsoh n1967 Mayrs ohn1976 Rad an 1990	Mayrsohn H. & Crabtree JH. 1967. Source reconciliation of atmospheric hydrocarbons'. Atmospheric En ironment. 10(2): 137-1 3. http://doi.org/10.1016/000-6981(76)90231-6 Mayrsohn H. and J. Crabtree. 1976. Source Reconciliation of Atmospheric Hydrocarbons in the South Coast Air Basin. 1975. California Air Resources Board. 1990. â€˜Air Emissions Species Manual. Volume I: Volatile Organic Compound Species Prof les. 2nd Editionâ€™. Radian Corporation for US EPA. Research Triangle Park. NC. EPA-EPA- 50/2-90-001a. (NSCEP 50290001A). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=00001VFS.TXT	Fixed Roof Tank - Commercial Jet Fuel (Jet A) 5. F xed Roof Tank - Commercial Jet Fuel (Jet A) The U.S. EPA. Office of Air Quality Planning and Standards (OAQPS) pro ides technical support to assist State and local a r pollut on control agencies in de eloping and implementing air toxics programs. This is done by compiling and publ shing emission data for agencies and others who are interested in locating potential emitters of toxic air compounds and in making preliminary estimates of toxic air emissions. This report is not intended to pro ide exact estimates of air toxics releases from specific facilities. The objecti e of the current study is to produce a second ed tion of the Air Emiss ons Species Manual (EPA 50/2-88-003a)	Add document. The updated VOC species prof le data base is contained in Volume I of this second edition document. The VOC prof le data base includes VOC prof les from primarily three sources: (1) the 1988 VOC Data Manual	(2) new VOC prof les de elope d from readily a ailable existing data	and (3) new VOC profiles de elope d from original data as a result of the VOC specia io n field sampling program. In addition to the VOC profiles	Volume I contains profile assignme nts hat link a profile to a source category. For categorie s where profile data are not a a lable	the profile assignme nts are based on engineeri ng judgeme nt.	undefine d	https //n epis.epa. go /Exe/ ZyPURL. cgi?Dock ey=00001 VFS.TXT	http //doi .org/10 1 016/000 - 6981(76)9 0231-6	1.9197E-11	0.018	99	6.70363	7 59851	0	NO	DTXSID 1027267	Tetradec ane	-	1

Assume 100% of Liquid Evaporates

Conversion lbs to tons	2000	lbs/ton
Total Vapor Flow of Jet Fuel Vapor	29,000	lbs/yr
Total Vapor Flow of Jet Fuel Vapor	14.5	tons/yr

Table 4-2. Compositional Analysis of 14 Samples of Jet A Fuel

[redacted]

(b) (3) (A)

4. CHEMICAL AND PHYSICAL INFORMATION

4.1 CHEMICAL IDENTITY

Information regarding the chemical identities of JP-5, JP-8, and Jet A fuels is located in Table 4-1. Nearly all jet fuel is made from kerosene derived from petroleum; however, a small percentage is made from oil sands (Chevron 2006). Kerosene is manufactured from the distillation of crude oil at atmospheric pressure (straight-run) or from catalytic, thermal, or steam cracking of heavier petroleum streams (cracked kerosene). Figure 4-1 depicts a general schematic of a refinery capable of producing jet fuels along with other light, middle, and heavy distillates of crude oil. The exact composition of any particular batch of jet fuels is dependent upon the crude oil from which it was derived and on the refinery processes used for its production. Regardless of the source and production process, kerosenes and jet fuels primarily consist of C9 to C16 hydrocarbons that boil in the range of 145–300°C (API 2010a).

Analytical techniques are not capable of separating and characterizing each molecular species of these complex mixtures (likely >1,000 individual components); however, the predominant components of jet fuels are branched and linear paraffins and naphthenes (cycloalkanes) which usually account for over 70% of the components by volume (API 2010a; Chevron 2006). Aromatic hydrocarbons such as alkylbenzenes and naphthalenes do not exceed 25% of the total. Olefins represent an insignificant fraction of the total composition of JP-5, JP-8, and Jet A fuels. The final product must meet all of the performance and regulatory requirements of the specific fuel. ASTM International (formerly known as the American Society for Testing and Materials) and the U.K. Ministry of Defense publish specifications and test methods for commercial jet fuels and more information regarding these standards may be obtained from these organizations. These requirements, including a description on the different additives used in aviation fuels have been summarized in an ExxonMobil report on world jet fuel specifications (ExxonMobil 2005). The U.S. government and other nations' governments maintain specifications for jet fuels for military use (Chevron 2006).

Two important types of jet fuels exist for commercial aviation, Jet A and Jet A-1. Jet A is predominantly used in the continental United States while Jet A-1 is used throughout the rest of the world (ExxonMobile 2005). These fuels are nearly identical; however the most important difference between them is that

Jet A-1 is refined to have a lower maximum freezing point (-47°C) than Jet A (-40°C). The lower freezing point makes Jet A-1 a better choice for international flights, especially on polar routes during the winter season (Chevron 2006). In addition, Jet A typically does not contain a static dissipator additive that may be required for Jet A-1 fuels (ExxonMobil 2005). Table 4-2 lists some compositional data for 14 different Jet A fuel samples provided by the American Petroleum Institute (API).

Table 4-1. Chemical Identity of JP-5, JP-8, and Jet A Fuels

Characteristic	Information

Chemical name JP-5 JP-8 Jet A Synonym(s) NATO F-44; AVCAT; NATO F-34; AVTUR; MIL- No data

aviation kerosene; DTL-83133H; aviation kerosene; fuel oil no. 1; kerosene; kerosene; fuel jet kerosene; turbo fuel A; oil no. 1;

jet kerosene; straight run kerosene; turbo fuel A; straight run distillate fuel oils, kerosene; distillate fuel light[a,b,c,d]

oils, light[a,b,c,d,e]

Registered trade name(s)	No data	No data	No data
Chemical formula[f]	No data	No data	No data
Chemical structure[f]	No data	No data	No data
Identification numbers:			
CAS registry	8008-20-6[g]/70892-10-3[h]	8008-20-6[g]/70892-10-3[h]	8008-20-6[g]/70892-10-3[h]
NIOSH RTECS	OA5500000[b] (kerosene)	OA5500000[b] (kerosene)	OA5500000[b] (kerosene)
EPA hazardous waste	No data	No data	No data
OHM/TADS	7217063[g] (kerosene)	7217063[g] (kerosene)	7217063[g] (kerosene)
DOT/UN/NA/IMDG shipping	UN 1223; IMO 3.3[b] (kerosene)	UN 1223; IMO 3.3[b] (kerosene)	UN 1223; IMO 3.3[b] (kerosene)
HSDB	632[b] (kerosene)	632[b] (kerosene)	632[b] (kerosene)
NCI	No data	No data	No data

[a]RTECS 1998
[b]HSDB 2012
[c]IARC 1989
[d]Army 1988
[e]DOD 2013
[f]Fuel oils are mixtures of various hydrocarbons designed to meet specifications set forth by the American Society for Testing and Materials (DOD 1992); therefore, chemical structure and chemical formula cannot be determined. [g]NTP/NIH 1986
[h]OHM/TADS 1985

CAS = Chemical Abstracts Service; DOT/UN/NA/IMDG = Department of Transportation/United Nations/North America/International Maritime Dangerous Goods Code; EPA = Environmental Protection Agency;
HSDB = Hazardous Substances Data Bank; NCI = National Cancer Institute; NIOSH = National Institute for Occupational Safety and Health; OHM/TADS = Oil and Hazardous Materials/Technical Assistance Data System; RTECS = Registry of Toxic Effects of Chemical Substances

Figure 4-1. Kerosene/Jet Fuel Processing

Adapted from API 2010a; Chevron 2006

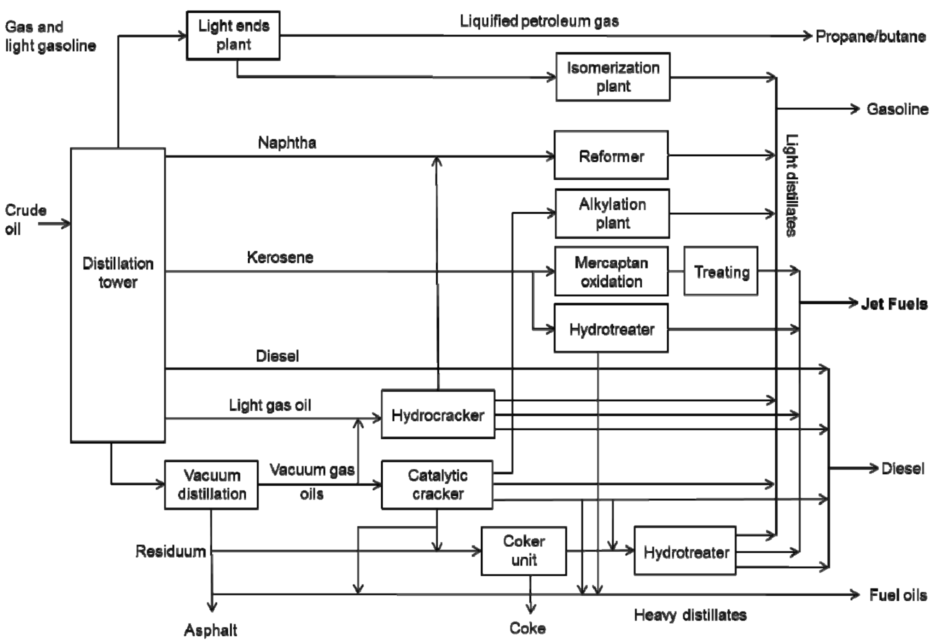


Table 4-2. Compositional Analysis of 14 Samples of Jet A Fuel

Component	Average weight percentage	Minimum weight percentage	Maximum weight percentage
Hydrocarbon types by mass spectrometry ASTM Method D2425			
Paraffins	46.66	32.60	59.10

Monocycloparaffins	26.19	13.80	34.20
Dicycloparaffins	5.89	4.10	8.50
Tricycloparaffins	0.77	0.40	1.40
Benzenes	12.99	9.50	16.50
Indanes/tetralins	4.05	2.50	6.60
C_nH_{2n-10}	0.96	0.60	1.80
Naphthalene	0.44	0.00	1.10
Naphthalenes	1.46	0.90	2.00
C_nH_{2n-14}	0.34	0.20	0.50
C_nH_{2n-16}	0.23	0.00	0.50
C_nH_{2n-18}	0.00	0.00	0.00
Total aromatics	21.18	17.90	27.20
Total olefins	0.00	0.00	0.00
Total paraffins + napthenes	78.82	72.80	82.10
Total aromatics by gas chromatography /mass spectrometry ASTM Method D57 69			
Benzene	0.01	0	0.02
Toluene	0.14	0.06	0.50
Ethylbenzene	0.15	0.08	0.26
m,p-xylene	0.54	0.24	1.25
1,2-Dimethylbenzene	0.27	0.11	0.51
Isopropylbenzene	0.07	0.05	0.11
Propylbenzene	0.14	0.06	0.25
1-Methyl-3-ethylbenzne	0.50	0.21	1.02
1-Methyl-4-ethylbenzne	0.13	0.04	0.24
1,3,5-Trimethylbenzene	0.25	0.11	0.65
1-Methyl-2-ethylbenzene	0.18	0.02	0.30
1,2,4-Trimethylbenzene	0.94	0.50	1.78
1,2,3-Trimethylbenzene	0.33	0.20	0.43
Indane	0.06	0.00	0.12
Alkyl Indanes	0.61	0.06	1.13
1,4-Diethyl + butylbenzene	0.32	0.11	0.50
1,2-Diethylbenzene	0.18	0.02	0.41
1,2,4,5-Trimethyl benzene	0.11	0.09	0.20
1,2,3,5-Tetramethylbenzene	0.46	0.08	0.72
Total C10 benzenes	1.34	0.08	2.76
Total C11 benzenes	2.88	0.10	4.53
Total C12 benzenes	0.18	0.69	0.34
Naphthalene	0.18	0.07	0.30
2-Methylnaphthalene	0.38	0.18	0.57
1-Methylnaphthalene	0.28	0.13	0.37

Source: API (2010b)

The U.S. military uses two kerosene-based aircraft fuels, JP-5 and JP-8. JP-8 is the military equivalent of Jet A-1; however, it contains a corrosion inhibitor and anti-icing additive that is not required in the ASTM specification of Jet A-1. The primary difference between the two military fuels is that the flash point temperature for JP-5 is higher (60°C) as compared to JP-8 (38°C). The higher flash point for JP-5 is more suitable for safe handling and fueling practices aboard aircraft carriers and this is the primary fuel used by the U.S. Navy (Chevron 2006). An important additive for military fuels is enhanced thermal stability additives. Jet fuels act as a heat sink for modern aircraft engines. They absorb heat from engine oil, hydraulic fluid and air conditioning apparatus (Chevron 2006). Jet fuels used for high performance military aircraft engines have even greater need of thermal stability as compared to commercial aviation fuels. In the late 1990s, the U.S. Air Force began development of an additive to increase the thermal stability of jet fuels. JP-8 fuel containing this additive package is usually referred to as JP-8+100 because this additive increased the thermal stability of the fuel by 100°F; however, this particular additive is not currently approved for use in commercial aircraft fuels (Chevron 2006). Beginning in 2013, the U.S. Air Force began using Jet A (plus additives) rather than JP-8 for continental flight usage in order to save on fuel costs (Air Force 2013).

Potter and Simmons provided general compositional data for JP-5 and JP-8 fuels and these data are provided in Tables 4-3 and 4-4, respectively.

4.2 PHYSICAL AND CHEMICAL PROPERTIES

[redacted]

Table 4-3. Compositional Data for JP-5[a]

(b) (3) (A)

[redacted]

(b) (3) (A)

[redacted]

(b) (3) (A)

[redacted]

(b) (3) (A)

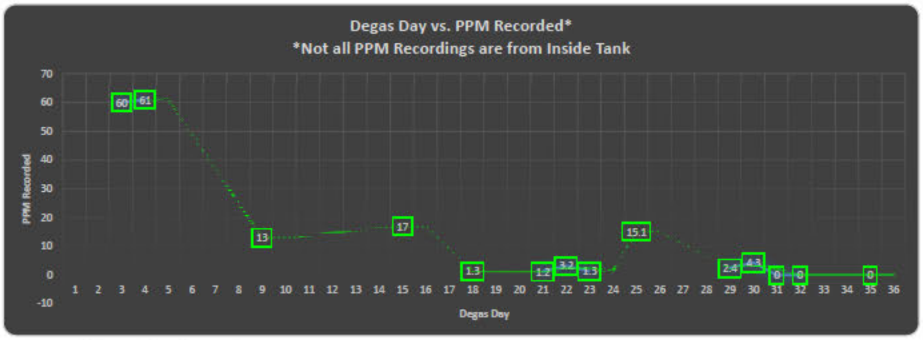
[redacted]

RH Tank Cleaning - Degassing and Final/Finishing Venting Timelines in the 6/1/23 Schedule

	Initial Degassing to ~50PPM VOC		**Final/Finishing venting to <15 PPM VOC**
Tank 16 & Tank 12	26 FEB 2024 - 15 MAR 2024		Thru/till 16 APR 2024
Tank 15 & Tank 11	19 JUN - 10 JUL 2024		Thru/till 9 AUG 2024
Tank 10 & Tank 8	15 OCT - 4 NOV 2024		Thru/till 6 DEC 2024
Tank 9 & Tank 7	12 FEB - 5 MAR 2025		Thru/till 4 APR 2025
Tank 6 & Tank 4	9 JUN - 27 JUN 2025		Thru/till 25 JUL 2025
Tank 5 & Tank 3	2 OCT - 23 OCT 2025		Thru/till 25 NOV 2025
Tank 20 & Tank 2	2 FEB - 23 FEB 2026		Thru/till 25 MAR 2026
	Ave 15 wdays/ea interval for initial degassing		

(b) (3) (A) [redacted]

2/14/2024							
Start	End				days	tanks	
2/26/2024	3/14/2024	17	12.14285714		760	14	54.2857
6/19/2024	7/10/2024	21	15				
10/15/2024	11/4/2024	20	14.28571429				
2/12/2025	3/5/2025	21	15				
6/9/2025	6/27/2025	18	12.85714286				
10/2/2025	10/23/2025	21	15				
2/2/2026	2/23/2026	21	15				
		days	Tanks	Year			
2/26/2024	4/16/2024	50	2	1			
6/19/2024	8/9/2024	51	2	1			
10/15/2024	12/6/2024	52	2	1			
2/12/2025	4/4/2025	51	2	2			
6/9/2025	7/25/2025	46	2	2			
10/2/2025	11/25/2025	54	2	2			
2/2/2026	3/25/2026	51	2	3			



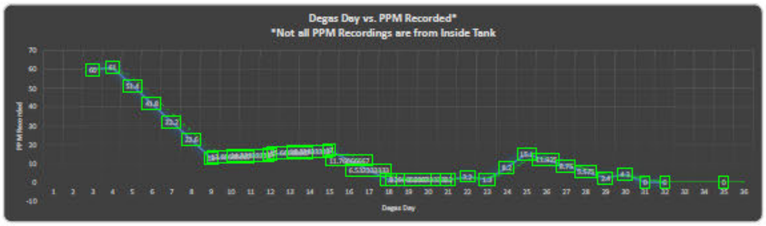
Assumed Total Degas Hours:
744

Workdays:
31

Tank 18 Degassing, Detailed Description of Degassing:

(PPM Reading, Activity and Reading Location columns: [redacted] (b) (3) (A))

Date:	Degas Day:	PPM Reading	Activity:	Reading Location	Degas hours/day:
Thursday, May 21, 2020		[redacted]	[redacted]	[redacted]	
Friday, May 22, 2020					
Saturday, May 23, 2020					
Sunday, May 24, 2020					
Monday, May 25, 2020					
Tuesday, May 26, 2020	1				24
Wednesday, May 27, 2020	2				24
Thursday, May 28, 2020	3				24
Friday, May 29, 2020	4				24
Saturday, May 30, 2020	5				24
Sunday, May 31, 2020	6				24
Monday, June 1, 2020	7				24
Tuesday, June 2, 2020	8				24
Wednesday, June 3, 2020	9				24
Thursday, June 4, 2020	10				24
Friday, June 5, 2020	11				24
Saturday, June 6, 2020	12				24
Sunday, June 7, 2020	13				24
Monday, June 8, 2020	14				24
Tuesday, June 9, 2020	15				24
Wednesday, June 10, 2020	16				
Thursday, June 11, 2020	17				24
Friday, June 12, 2020	18				24
Saturday, June 13, 2020	19				
Sunday, June 14, 2020	20				
Monday, June 15, 2020	21				24
Tuesday, June 16, 2020	22				24
Wednesday, June 17, 2020	23				24
Thursday, June 18, 2020	24				24
Friday, June 19, 2020	25				24
Saturday, June 20, 2020	26				24
Sunday, June 21, 2020	27				
Monday, June 22, 2020	28				24
Tuesday, June 23, 2020	29				24
Wednesday, June 24, 2020	30				24
Thursday, June 25, 2020	31				24
Friday, June 26, 2020	32				24
Saturday, June 27, 2020	33				
Sunday, June 28, 2020	34				
Monday, June 29, 2020	35				24
Tuesday, June 30, 2020	36				24
Wednesday, July 1, 2020	37				24
Thursday, July 2, 2020					
Friday, July 3, 2020					
Saturday, July 4, 2020					
Sunday, July 5, 2020					
Monday, July 6, 2020					



Assumed Total Degas Hours:
744

Workdays:
31

Tank 18 Degassing, Detailed Description of Degassing:

Date:	Degas Day:	PPM Reading / Activity: / Reading Location	Degas hours/day:	
Thursday, May 21, 2020		[redacted]		
Friday, May 22, 2020				
Saturday, May 23, 2020				
Sunday, May 24, 2020				
Monday, May 25, 2020				
Tuesday, May 26, 2020	1		24	
Wednesday, May 27, 2020	2		24	
Thursday, May 28, 2020	3		24	
Friday, May 29, 2020	4		24	
Saturday, May 30, 2020	5		24	9.6
Sunday, May 31, 2020	6		24	
Monday, June 1, 2020	7		24	
Tuesday, June 2, 2020	8		24	
Wednesday, June 3, 2020	9		24	0.666666667
Thursday, June 4, 2020	10		24	
Friday, June 5, 2020	11		24	
Saturday, June 6, 2020	12		24	
Sunday, June 7, 2020	13		24	
Monday, June 8, 2020	14		24	
Tuesday, June 9, 2020	15		24	5.233333333
Wednesday, June 10, 2020	16			
Thursday, June 11, 2020	17		24	
Friday, June 12, 2020	18		24	0.033333333
Saturday, June 13, 2020	19			
Sunday, June 14, 2020	20			
Monday, June 15, 2020	21		24	
Tuesday, June 16, 2020	22		24	
Wednesday, June 17, 2020	23		24	6.9
Thursday, June 18, 2020	24		24	
Friday, June 19, 2020	25		24	
Saturday, June 20, 2020	26		24	3.175
Sunday, June 21, 2020	27			
Monday, June 22, 2020	28		24	
Tuesday, June 23, 2020	29		24	
Wednesday, June 24, 2020	30		24	
Thursday, June 25, 2020	31		24	
Friday, June 26, 2020	32		24	
Saturday, June 27, 2020	33			
Sunday, June 28, 2020	34			
Monday, June 29, 2020	35		24	
Tuesday, June 30, 2020	36		24	
Wednesday, July 1, 2020	37		24	
Thursday, July 2, 2020				
Friday, July 3, 2020				
Saturday, July 4, 2020				
Sunday, July 5, 2020				
Monday, July 6, 2020				

(b) (3) (A)

[redacted]

Tank 18 Degassing, Detailed Description of Degassing:

Date:	Degas Day:	PPM Reading	Mole Fraction	Mass Flow Rate (lbs/day)
5/28/2020	3	60	6 00E-05	1.15E+03
5/29/2020	4	61	6.10E-05	1165.194765
5/30/2020	5	51.4	5.14E-05	981.8198515
5/31/2020	6	41 8	4.18E-05	798.4449376
6/1/2020	7	32 2	3 22E-05	615.0700237
6/2/2020	8	22.6	2 26E-05	431.6951098
6/3/2020	9	13	1 30E-05	248.3201959
6/4/2020	10	13.66666667	1 37E-05	261.0545649
6/5/2020	11	14 33333333	1.43E-05	273.788934
6/6/2020	12	15	1 50E-05	286 523303
6/7/2020	13	15.66666667	1 57E-05	299 257672
6/8/2020	14	16 33333333	1.63E-05	311 992041
6/9/2020	15	17	1.70E-05	324.72641
6/10/2020	16	11.76666667	1.18E-05	224.7616132
6/11/2020	17	6.533333333	6 53E-06	124.7968164
6/12/2020	18	1.3	1 30E-06	24.83201959
6/13/2020	19	1.266666667	1 27E-06	24.19530114
6/14/2020	20	1.233333333	1 23E-06	23.55858269
6/15/2020	21	1.2	1 20E-06	22.92186424
6/16/2020	22	3.2	3 20E-06	61.1249713
6/17/2020	23	1.3	1 30E-06	24.83201959
6/18/2020	24	8.2	8 20E-06	156.632739
6/19/2020	25	15.1	1 51E-05	288.4334583
6/20/2020	26	11 925	1.19E-05	227.7860259
6/21/2020	27	8.75	8.75E-06	167.1385934
6/22/2020	28	5.575	5 58E-06	106.4911609
6/23/2020	29	2.4	2.40E-06	45.84372848
6/24/2020	30	4.3	4 30E-06	82.13668019
6/25/2020	31	0	0.00E+00	0
6/26/2020	32	0	0.00E+00	0
6/27/2020	33	0	0.00E+00	0
6/28/2020	34	0	0.00E+00	0
6/29/2020	35	0	0.00E+00	0
6/30/2020	36	0	0.00E+00	0
7/1/2020	37	0	0.00E+00	0
7/2/2020	0	0	0.00E+00	0
7/3/2020	0	0	0.00E+00	0

Total VOC per tank	8749.4666	Lbs/Tank
Total VOC for 14 Tanks	122492.532	Lbs
Total VOC Per Year	61246 2662	Lbs/Year

Chemicals of Potential Concern (COPCs) Recommendations
Fuel Additives

Red Hill Bulk Fuel Storage Fuel Facility

A meeting was held on May 10, 2016 to discuss the recommended approach to addressing the objectives of the Administrative Order on Consent (AOC) In the Matter of Red Hill Bulk Fuel Storage Facility (herein referred to as "the Facility") Statement of Work (SOW) Section 6 and Section 7 with the Regulatory Agencies (State of Hawaii Department of Health [DOH] and United States Environmental Protection Agency Region IX [EPA]) and various subject matter experts (SMEs). The following attended the meeting: Parties of the AOC (Regulatory Agencies, Department of Navy [Navy], and Defense Logistics Agency [DLA]) and SMEs to the Regulatory Agencies (University of Hawaii [UH]; State of Hawaii Department of Land and Natural Resources [DLNR] Commission on Water Resources Management [COWRM]; United States Geological Survey [USGS] Pacific Islands Water Science Center; City and County of Honolulu Board of Water Supply [BWS]). Also in attendance were the Navy's contractor, AECOM, and BWS' contractor, Intera Geoscience & Engineering Solutions (Intera). One of the action items from the meeting was for the Navy and DLA to evaluate fuel additives and determine if additional analytes need to be included on the chemicals of potential concern (COPCs) list for the Facility, as previously agreed upon by the Parties of the AOC on February 4, 2016. The following discussion and table present the results of the fuel additives evaluation:

Table 1 summarizes 18 chemical constituents of additives associated with fuel stored at the Facility. Six groups of fuel additives were identified and evaluated: (1) metal deactivators; (2) corrosion inhibitors and lubricity improvers; (3) icing inhibitors; (4) static dissipaters; (5) lubricity improvers; and (6) antioxidants. To better assess and determine which chemical constituents could potentially pose a concern to the groundwater resource, the following attributes were evaluated for each additive group and associated chemical constituents: estimated/projected quantities of chemicals present per 10,000 barrels of fuel; physical, chemical, and toxicity properties; and associated EPA and DOH screening criteria (if available).

Based on the information gathered and data evaluated, Table 1 details the following results:

- Four of the 18 chemicals, while common, are proprietary (trade-secret) and permitted chemicals for which no information could be obtained at this time. These 4 chemicals are:
  (b) (3) (A) [redacted]

- Five of the 18 chemicals are already included on the COPCs list for the Facility:
  1. benzene;

2. ethylbenzene;
3. toluene;
4. xylene; and
5. naphthalene

- Seven of the 18 chemicals have no associated regulatory screening criteria, and are present at extremely dilute concentrations in fuel and/or have very low water-solubility. Therefore, these seven chemicals are not anticipated to pose concerns for the groundwater resource. These 7 chemicals are:
  1. solvent naphtha (petroleum; chemical component, (b) (3) (A) [redacted]
  2. dinonylnaphthylsulphonic acid (chemical component, (b) (3) (A) [redacted]
  3. propan-2-ol (chemical component, (b) (3) (A) [redacted]
  4. N,N-disalicylidene-1,2-propanediamine (the metal deactivator additive);
  5. tertiary butylated phenol;
  6. o-terbutylphenol; and
  7. 2,4,6-tri-terbutylphenol (chemical components of the antioxidant additive AO-37).

- (b) (3) (A), (b) (5) [redacted]

The half-lives of 2-[2-methoxyethoxy]-ethanol in water is 15 days and phenol in soil is less than 5 days. It is estimated that, at most, 26.4 gallons of 2-(2-methoxyethoxy)-ethanol may have been released as part of the (b) (3) (A) [redacted] fuel release in January 2014. Phenol is not a chemical constituent in additives used for the fuel type released in January 2014. Furthermore, these two chemicals have the following properties:

- readily biodegradable and water-soluble;
- only present in fuel at small concentrations (b) (3) (A) [redacted]
- each chemical has associated EPA Tap Water Regional Screening Levels (RSLs)

EPA Method 8270D will need to be added to the sampling and analysis program proposed in the May 4, 2016 Work Plan/Scope of Work for AOC SOW Section 6 and Section 7 in order to analyze for these two chemicals.

Table 1. Summary of Chemical Information and Estimated/Projected Quantities of Fuel Additives, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii

(b) (3) (A), (b) (5)

[redacted]

(b) (3) (A), (b) (5)

[redacted]

(b) (3) (A), (b) (5)

[redacted]