PROPOSED

Covered Source Permit Review Summary (Renewal)

Application File No.: 0098-03

Permit No.: 0098-01-C

Applicant: Chevron Products Company

Facility: Chevron Marine Mooring Terminal
Located 1.5 mile off the coast of Campbell Industrial Park

Mailing Address: Chevron Products Company
91-480 Malakole Street
Kapolei, Hawaii 96707-1883

Responsible Official: Alan Davis
Refinery Manager
Chevron Products Company
(808) 682-5711

Point of Contact: Marcus Ruscio
Environmental Specialist
Chevron Products Company
(808) 682-2282

Application Date: August 15, 2013 and additional information dated October 22, 2013

Proposed Project:

SICC: 4612 (Crude Petroleum Pipelines)

Chevron submitted an application to renew the covered source permit for the marine mooring terminal. The current terminal operations are unchanged since the original Title V permit application.

Chevron Hawaii's marine mooring terminal receives various crude oils via marine tankers, as well as intermediate components that require further processing. The terminal also accommodates loading of gasoline products and intermediate components for export. The liquids are transported by pipeline to and from separate onshore stationary facilities at the Chevron Hawaii Refinery. The mooring terminal is located 1.5 miles off the coast of the island of Campbell Industrial Park.

The mooring terminal is a seven-point mooring, which has seven mooring buoys and can accommodate one tanker or ocean barge at a time. The mooring terminal is served by two (2) submerged pipelines, which currently have diameters of 20 and 30 inches, respectively. Both pipelines may be used to unload crude, fuel oil, low sulfur waxy residuum, black oil and heavy hydrocarbon streams from marine vessels to the refinery, or to load motor gasoline, naphtha and other petroleum products from refinery storage facilities onto marine barges or other vessels. The seaward end of each pipeline has a string of hoses to provide interconnection with the vessel.

A tanker or barge pulls up to the buoys of the marine mooring facility and ties-off. The vessel then uses a small crane to latch onto a pickup buoy. Each pipeline has its own pickup buoy. The pickup buoy is connected by chain to the string of hoses. The chain is pulled in until the hoses are reached and then connected to the vessel's piping system. Vessel loading is accomplished by shore-based pumps that are powered by electric motor drivers. Off-loading of crude oil uses ship-based electric pumps that are ultimately powered by onboard engines burning fuel oil.

Off-loading tankers may use water ballast in the petroleum storage area, have segregated petroleum storage and water ballast compartments, or use a combination of these ballasting methods. Vapors are emitted during off-loading of crude, if the water ballast is placed in the petroleum storage area. Off-loading of vessels with segregated ballast and storage areas do not generate emissions. In the latter case, generated inert gas is charged into the petroleum storage area to blanket the remaining liquids and vapors and prevent fugitive emissions during off-loading. Chevron's marine mooring terminal covered source permit does not allow water to be used as a ballast in the petroleum storage areas of the marine vessel, i.e., it requires segregated ballast and storage areas or don't require ballast during offloading such that Volatile Organic Compound (VOC) emissions are not generated.

All off-loaded petroleum liquids are pumped through the pipeline into the storage vessels of the petroleum refinery onshore. Off-loading occurs an average of once per week. A typical ship delivers approximately 400,000 barrels of crude, but vessel capacity can range from 250,000 to 1,000,000 barrels. On-loading of refinery products onto barges occurs roughly once per quarter. During on-loading, displaced gases in the petroleum storage compartment are released to the atmosphere as the compartments are filled, resulting in emissions of VOCs and HAPs.

The throughput capacity of the mooring terminal is dependent upon the pumping capacity of the various vessels that use the facility. The off-loading throughput ranges from 5,000 to 26,000 barrels per hour (bbl/hr). The on-loading capacity is 1,000 to 8,000 bbl/hr.

There are no permitted combustion sources associated with the mooring terminal. On-board fuel combustion is used to provide vessel power, including pumping in support of crude oil off-loading operations. However, as specified in HAR §11-60.1-82(d)(3), ocean-going vessels are considered insignificant activities.

In the renewal application, there is a proposed modification to the marine mooring terminal consisting of increasing the gasoline component products throughput limit to 3.6 million barrels per year from 2.8 million barrels per year and the crude oil component products throughput limit to 1.0 million barrels per year from 500,000 barrels per year.

An application fee of $3000.00 was submitted and processed for the renewal of the covered source permit.

Equipment Description:

1. Seven (7) mooring buoys
2. One (1) 20-inch diameter submerged pipeline
3. One (1) 30-inch diameter submerged pipeline

Air Pollution Controls:

There are no air pollution controls for this facility.

Applicable Requirements:

Hawaii Administrative Rules (HAR)

Title 11, Chapter 11-59	Ambient Air Quality Standards
Title 11, Chapter 11-60.1	Air Pollution Control
Subchapter 1	General Requirements
Subchapter 2	General Prohibitions
11-60.1-31	Applicability
Subchapter 5	Covered Sources
Subchapter 6	Fees for Covered Sources, Noncovered sources, and Agricultural Burning
11-60.1-111	Definitions
11-60.1-112	General Fee Provisions for Covered Sources
11-60.1-113	Application Fees for Covered Sources
11-60.1-114	Annual Fees for Covered Sources

Non-applicable Requirements:

Hawaii Administrative Rules (HAR)

Title 11, Chapter 60.1	Air Pollution Control
Subchapter 7	Prevention of Significant Deterioration Review
Subchapter 8	Standards of Performance for Stationary Sources
Subchapter 9	Hazardous Air Pollutant Sources

Federal Requirements

40 Code of Federal Regulations (CFR) Part 52.21 – Prevention of Significant Deterioration of Air Quality
40 CFR Part 60 - Standards of Performance for New Stationary Sources (NSPS)
40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAP)
40 CFR Part 63 - National Emission Standards for Hazardous Air Pollutants for Source Categories (Maximum Achievable Control Technologies (MACT) Standards)
The marine mooring terminal is not subject to 40 CFR 63 Subpart Y - National Emission Standards for Marine Vessel Tank Loading Operations, because it is defined as an existing offshore loading terminal (40 CFR §63.560(d)(6)).

Best Available Control Technology (BACT):

A Best Available Control Technology (BACT) analysis is applicable only to new covered sources or significant modifications to covered sources that have the potential to emit or increase emissions above significant levels as defined in HAR §11-60.1-1. The project emissions for the marine mooring terminal are above the significant level for VOC. Therefore, a BACT analysis is applicable as shown in the table below.

Pollutant	Potential Emissions [1] (tpy)	Potential Emissions [2] (tpy)	Net Emissions Change (tpy)	Significant Level (tpy)	Significant?
NO_x	0	0	0	40	no
SO_x	0	0	0	40	no
CO	0	0	0	100	no
TSP	0	0	0	25	no
PM_{10}	0	0	0	15	no
VOC	213.8	165.8	48.0	40	yes
Lead	0	0	0	0.6	no

[1] Based on an on-loading throughput of 3.6 million barrels per year of gasoline component products and 1.0 million barrels per year of crude oil component products.

[2] Based on an on-loading throughput of 2.8 million barrels per year of gasoline component products and 500,000 barrels per year of crude oil component products.

BACT Analysis

The applicant used the U.S. EPA's top-down approach for conducting the BACT analysis. Under the top-down approach, progressively less stringent control technologies are analyzed until a level of control considered BACT is reached based on the environmental, energy, and economic impacts. The EPA's recommended five (5) step top-down approach was utilized in this BACT analysis:

Step 1: Identify all available control technologies for the emission unit and regulated pollutant;
Step 2: Eliminate all technically infeasible control technologies;
Step 3: Rank remaining control technologies by effectiveness and tabulate a control hierarchy;
Step 4: Evaluate most effective controls and document results; and
Step 5: Select BACT, which will be the most effective practical option not rejected, based on economic, environmental, and/or energy impacts.

Step 1 and 2:
Available control technologies used to reduce VOC and HAP emissions at marine tank vessel loading operations include vapor collection systems routed to either combustion or recovery devices and the use of submerged fill. Being conservative, there were no control technologies that were eliminated as technically infeasible.

Step 3:
The used of submerged fill versus splash fill can reduce VOC emissions by 65 percent. This technology represents the baseline for the BACT analysis because it is required by 40 CFR Part 63, Subpart Y. The highest ranked control options involve the use of a vapor collection system routing captured vapors to either a combustion or recovery device. Four separate types of control devices have been identified for further evaluation: Lean-oil absorption vapor recovery, vapor combustion in a thermal oxidizer, vapor recovery by adsorption, and vapor recovery by condensation. Vapor combustion, with achievable control efficiencies of 99 percent or more, is most effective. Vapor recovery technologies are somewhat less effective.

Step 4:
The applicant did not perform the costly, site-specific engineering design study that would be required in order to determine the equipment scope, economic costs, and utility impacts associated with a vapor collection and control system for the Chevron mooring terminal. In lieu of such site-specific information, the applicant is relying on the data relied upon by the EPA in its

recent Subpart Y rulemaking. This resulted in the following: The cost effectiveness of a vapor collection system and a vapor combustor for a loading operation with a throughput of 3.6 million barrels per year is $14,000 per ton of VOC reduction. In addition, the cost effectiveness of a vapor collection system and a vapor recovery system using lean oil absorption technology for a loading operation with a throughput of 3.6 million barrels per year is $12,442 per ton of VOC reduction. Both of these costs were concluded by the EPA as unreasonable.

Step 5:
The applicant proposed the use of submerged fill of marine vessels as BACT, since the capture and control technologies are economically infeasible. An emission limit of 2.6 lbs VOC per 1000 gallons of throughput was also proposed as BACT.

Prevention of Significant Deterioration (PSD):

This facility is not a major stationary source nor are there modifications proposed that by itself constitute a major stationary source that is subject to PSD review. Therefore, PSD is not applicable.

Insignificant Activities:

The facility does not have any insignificant activities.

Alternate Operating Scenarios:

The applicant did not propose any alternate operating scenarios.

Synthetic Minor Source:

This facility is not a synthetic minor source, it is a major source.

Air Emissions Reporting Requirements (AERR):

40 CFR Part 51, Subpart A – Air Emissions Reporting Requirements, is based on the emissions of criteria air pollutants from Type B point sources (as defined in 40 CFR Part 51, Subpart A), that emit at the AERR triggering levels as show in the table below.

Pollutant	Type B AERR Triggering Levels [1] (tpy)	Pollutant	In-house Total Facility Triggering Levels [1] (tpy)	Total Facility Emissions [1] (tpy)
NO_x	≥ 100	NO_x	≥ 25	0
SO_x	≥ 100	SO_X	≥ 25	0
CO	≥ 1000	CO	≥ 250	0
$PM_{10}/PM_{2.5}$	≥ 100/100	PM/PM_{10}	≥ 25/25	0
VOC	≥ 100	VOC	≥ 25	213.8
		HAPS	≥ 5	24.0

[1] Based on potential emissions

This facility emits at the AERR triggering level for VOC. Therefore, AERR is applicable.

The Clean Air Branch also requests annual emissions reporting for all covered sources and from those facilities that have facility-wide emissions of a single air pollutant exceeding in-house triggering levels. Annual emissions reporting is required for this facility because it is a covered source.

Compliance Assurance Monitoring (CAM):

40 CFR Part 64

Applicability of the CAM Rule is determined on a pollutant specific basis for each affected emission unit. Each determination is based upon a series of evaluation criteria. In order for a source to be subject to CAM, each source must:

- Be located at a major source per Title V of the Clean Air Act Amendments of 1990;
- Be subject to federally enforceable applicable requirements;
- Have pre-control device potential emissions that exceed applicable major source thresholds;
- Be fitted with an “active” air pollution control device; and
- Not be subject to certain regulations that specifically exempt it from CAM.

Emission units are any part or activity of a stationary source that emits or has the potential to emit any air pollutant.

CAM is not applicable since this facility does not have equipment with an “active” air pollution control device.

Project Emissions:

Hydrocarbon emissions are not expected to occur at the Chevron marine mooring terminal during off-loading of hydrocarbon liquids from ocean-going vessels to onshore facilities because water is not permitted to be placed in the vessel hydrocarbon storage areas during this operation (ballasting). The vessels which off-load at the facility have either water ballast compartments that are segregated from the hydrocarbon storage area, or do not need to ballast while off-loading. During off-loading operations, air or inert gas is drawn into the hydrocarbon storage area to blanket the residual cargo material. Consequently, there are no displaced vapors emitted from the mooring terminal during this type of hydrocarbon liquid off-loading. The base operating scenario does not include emissions from off-loading operations.

Emissions of hydrocarbon vapors occur during on-loading of hydrocarbon liquids from onshore facilities onto ocean-going vessels. During on-loading, residual vapors in the onboard hydrocarbon storage areas are displaced as the loaded liquid fill the vessel storage compartments. A variety of hydrocarbon stocks and gasoline liquids maybe on-loaded onto the vessels. Gasoline products are the most volatile petroleum liquids that are handled at the mooring terminal. Therefore, the maximum on-loading emission scenario consists of loading gasoline products onto vessels.

Another activity that results in emissions is the on-loading of diesel onto the marine vessels. The diesel is pumped onto the marine vessel, stored in a cargo hold until the off-loading operations are complete, then pumped back into the pipeline. The diesel displaces the crude in the pipeline, to prevent the crude from setting up due to the cold water temperatures. The

maximum emissions of this diesel material occur when the diesel is pumped into a crude or slop oil tank; therefore, the emissions are estimated assuming crude characteristics.

Volatile organic emissions from the mooring terminal have been quantified based on gasoline loading using emission factors from AP-42 (6/08), Table 5.2-2 and a calculated emission factor for diesel on-loading (for line displacement) from AP-42, Chapter 5. The associated HAP emissions were speciated using the vapor weight fractions of gasoline in a typical tank headspace.

The emission factors are shown below:

- VOC: 2.6 lb/1000 gallons
- Benzene: 1.67 wt % x VOC emissions
- Toluene: 3.00 wt % x VOC emissions
- Ethylbenzene: 1.0 wt % x VOC emissions
- Hexane (-n): 3.83 wt % x VOC emissions
- 2,2,4 Trimethyl pentane: 0.8 wt % x VOC emissions
- Xylenes (mixed isomers): 1.86 wt % x VOC emissions

The calculations are based on a maximum of 3.6 million barrels of gasoline loaded per year and a loading rate of 8,000 barrels per hour. The maximum estimated hourly and annual loading emissions are shown in the table below.

Marine Mooring Terminal Emissions

Pollutant	Emissions (lb/hr) [1]	Emissions (tpy)
VOC	873.6	213.8 [2]
Benzene	14.6	3.3 [3]
Toluene	26.2	5.9 [3]
Ethylbenzene	8.7	2.0 [3]
Hexane (-n)	33.5	7.5 [3]
2,2,4 Trimethyl pentane	7.0	1.6 [3]
Xylenes (mixed isomers)	16.2	3.7 [3]
Total HAPs		24.0

[1] Lb/hr emissions based on gasoline on-loading at a rate of 8,000 bbl/hr, which is the maximum hourly emission scenario.
[2] Annual emissions are estimated based on 3.6 million barrels of gasoline loaded and 1.0 million barrels of diesel loaded for line displacement = 196.6 tpy + 17.2 tpy = 213.8 tpy.
[3] Annual emissions are estimated based on 3.6 million barrels of gasoline loaded.

Ambient Air Quality Assessment:

The only emissions are fugitive VOCs from the facility and any HAPs associated with these VOCs. An ambient air quality impact assessment was not performed for the following reasons: 1) VOCs do not have an ambient air quality standard, and 2) The Department of Health air modeling guidance generally exempts an applicant from performing an ambient air quality impact assessment for fugitive sources.

Significant Permit Conditions:

1. The maximum on-loading throughput at the mooring terminal shall not exceed 4.6 million (4,600,000) barrels of petroleum products (gasoline component products and crude oil component products) per rolling twelve (12) month period.

2. The maximum on-loading throughput at the mooring terminal shall not exceed 3.6 million (3,600,000) barrels of gasoline component products per rolling twelve-month (12-month) period.

3. Under no circumstance shall ballast water be loaded into the hydrocarbon storage areas of a marine vessel during off-loading.

4. The on-loading of petroleum products to a marine vessel shall be by submerged fill loading.

Conclusion and Recommendations:

Recommend issuing the renewal for Covered Source Permit, CSP No. 0098-01-C, subject to the significant permit conditions shown above, a 30-day public comment period and 45-day EPA review period.

Reviewer: Darin Lum
Date: 1/2014