Attachment 1

Best Available Control Technology (BACT) Analysis

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Tesoro Savage Vancouver Energy Distribution Terminal
Vancouver, Washington

Best Available Control Technology (BACT) Analysis

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1 INTRODUCTION

In Washington, Best Available Control Technology (BACT) is required for new and modified industrial sources of criteria and toxic air pollutants (TAPs). This document presents a BACT analysis for new emission units associated with the Tesoro Savage Vancouver Energy Distribution Terminal (Facility). The basis for the emissions-related analyses is a maximum design throughput of 360,000 barrels of crude oil per day and year-round operation (365 days per year). The proposed project, as currently configured, will involve the following major emission units and processes:

- Three natural gas-fired package boilers,[1] each with a nominal heat input capacity of 62 million British thermal units per hour (MMBtu/hr), that will provide steam to heat crude oil railcars before unloading;
- Six crude oil tanks totaling approximately two million barrels of usable storage;
- Crude oil receiving and handling facilities for railcars, storage tanks, and vessels;
- Three nominal 225-hp diesel engines to power emergency fire water pumps; and
- Fugitive emissions from piping components.

Table 1-1 provides a summary of proposed BACT for each emission unit.

Table 1-1.Summary of Proposed BACT

Emission Unit	Pollutant	Proposed Means of Achieving BACT
Unloading Area Boilers	NO_X	Ultra-Low NO_X Burners
	CO & VOCs	Good Combustion Practices
	PM & SO_2	Use of Pipeline Natural Gas
	TAPs	Good Combustion Practices & Use of Pipeline Natural Gas
Marine Vessel Loading	VOCs & TAPs	Use of a Marine Vapor Combustion Unit
Marine Vapor Combustion Unit	NO_X	Good Combustion Practices
	CO & VOCs	Good Combustion Practices
	PM & SO_2	Use of Pipeline Natural Gas
	TAPs	Good Combustion Practices & Use of Pipeline Natural Gas
Crude Oil Storage Tanks	VOCs & TAPs	Fixed-Roof Tank with an Internal Floating Roof with Primary and Secondary Seals
Fugitive Piping Component Leaks	VOCs & TAPs	Leak Detection and Repair Program that Meets the Requirements of 40 CFR 63 Subpart H

[1] Only two of the three boilers in the unloading area will be operated at any given time, except occasionally for a brief period when the third boiler is started up as one shuts down.

Emission Unit	Pollutant	Proposed Means of Achieving BACT
Emergency Firewater Pump Engines	NO_X	Compliance with 40 CFR 60 Subpart IIII
	CO & VOCs	Compliance with 40 CFR 60 Subpart IIII
	PM & SO_2	Use of Ultra-Low Sulfur Diesel and Compliance with 40 CFR 60 Subpart IIII
	TAPs	Use of Ultra-Low Sulfur Diesel and Compliance with 40 CFR 60 Subpart IIII

1.1 Project description

The Facility will unload crude oil delivered by railcar and load crude oil to vessels. As necessary, crude oil will be stored in onsite tanks. Steam, provided by natural gas-fired boilers, will be used as needed to heat, and thereby decrease the viscosity of, certain crude oils to allow it to flow more easily from railcars. A network of pipes, and associated components (i.e., valves, pumps, etc.), will be used to convey crude oil from the railcar unloading facility to the tanks, and from the tanks for the marine terminal, where crude oil will be loaded onto vessels.

1.2 BACT Review Process

BACT, as it applies to regulated pollutants not subject to major new source review, is defined in WAC 173-400-030 (and adopted by reference via WAC 463-78-005) as:

> "…an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under chapter 70.94 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. "

BACT as it applies to sources located in attainment areas and subject to major new source review is almost identically defined in 40 CFR 52.21 (the PSD regulations, adopted by reference in WAC 463-78-005).

In a December 1, 1987 memorandum from the EPA Assistant Administrator for Air and Radiation, the agency provided guidance on the "top-down" methodology for determining BACT. The "top-down" process involves the identification of all applicable control technologies according to control effectiveness. Evaluation begins with the "top," or most stringent, control alternative. If the most stringent option is shown to be technically or economically infeasible, or if environmental impacts are severe enough to preclude its use, then it is eliminated from consideration and then the next most stringent control technology is similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by technical or economic considerations, energy impacts, or environmental impacts. The top control alternative that is not eliminated in this process becomes the proposed BACT basis.

This top-down BACT analysis process can be considered to contain five basic steps described below:

- Step 1: Identify all available emission reduction alternatives with practical potential for application to the specific emission unit for the regulated pollutant under evaluation;
- Step 2: Eliminate all technically infeasible alternatives;
- Step 3: Rank remaining alternatives by effectiveness;
- Step 4: Evaluate the economic, energy, and environmental impacts starting with the most effective alternative; and
- Step 5: Select BACT, which will be the most effective practical alternative not rejected in the previous steps.

Formal use of these steps is not always necessary. However, both EPA and the Washington Department of Ecology have consistently interpreted the statutory and regulatory BACT definitions as containing two core requirements, which EPA believes must be met by any BACT determination, irrespective of whether it is conducted in a "top-down" manner. First, the BACT analysis must include consideration of the most stringent available technologies: i.e., those that provide the "maximum degree of emissions reduction." Second, any decision to require a lesser degree of emissions reduction must be justified by an objective analysis of "energy, environmental, and economic impacts" contained in the record of the permit decisions.

Additionally, the minimum control efficiency to be considered in a BACT analysis must result in an emission rate no less stringent than the applicable New Source Performance Standard (NSPS) emission rate, if any NSPS standard for that pollutant is applicable to the source.

This BACT analysis was conducted in a manner consistent with this stepwise approach. Control options for potential reductions in criteria pollution emissions were identified for each emission unit. These options were identified by researching the EPA database known as the RACT/BACT/LAER[2] Clearinghouse (RBLC), drawing upon previous environmental permitting experience for similar units and surveying available literature. Available controls that are judged to be technically feasible are further evaluated based on an analysis of economic, environmental, and energy impacts.

Assessing the technical feasibility of emission control alternatives is discussed in EPA's draft "New Source Review Workshop Manual." Using terminology from this manual, if a control technology has been "demonstrated" successfully for the type of emission unit under review, then it would normally be considered technically feasible. For an undemonstrated technology, "availability" and "applicability" determine technical feasibility. An available technology is one that is commercially available; meaning that it has advanced through the following steps:

- Concept stage;
- Research and patenting;
- Bench scale or laboratory testing;
- Pilot scale testing;

[2] RACT is an acronym for Reasonably Available Control Technology, and LAER is an acronym for Lowest Achievable Emission Rate

- Licensing and commercial demonstration; and
- Commercial sales.

Suitability for consideration as a BACT measure involves not only commercial availability (as evidenced by past or expected near-term deployment on the same or similar type of emission unit), but also involves consideration of the physical and chemical characteristics of the gas stream to be controlled. A control method applicable to one emission unit may not be applicable to a similar unit, depending on differences in the gas streams' physical and chemical characteristics.

2 NATURAL GAS-FIRED BOILER BACT ANALYSIS

Three natural gas-fired package boilers will provide steam to heat certain crude oil to facilitate transfer by reducing the viscosity of the oil. The boilers, each with a nameplate firing rate of 62 MMBtu/hr, will be used to heat railcars. Tesoro-Savage expects to operate only two of the boilers at a given time; there would be one redundant boiler.

Utilization of the boilers will be dependent upon the quantity of crude oil that must be heated to achieve a viscosity conducive to transfer operations. The boilers could operate throughout the year (i.e., 8,760 hours per year), but at varying loads dictated by railcar arrival schedules and the viscosity of the crude oil contained in the railcars.

Pollutant emissions from the natural gas boilers are expected to include NO_X, PM (including PM_{10} and $PM_{2.5}$), CO, SO_2, VOCs, and TAPs.

2.1 Identify Commercially-Available Emission Reduction Alternatives

Review of the federal RBLC database and selected state permit information indicates that several emission reduction alternatives have been identified in BACT determinations. Table A-1 lists a number of recent BACT determinations associated with natural gas-fired boilers with capacities less than 100 MMBtu/hr. The RBLC database survey results indicate that available BACT options for the pollutants emitted from natural gas-fired boilers include:

- Good Combustion Practices (GCP)
- Low-NO_X burners (LNB)
- Ultra-Low-NO_X burners (ULNB)
- Oxidation Catalysts
- Flue Gas Recirculation (FGR)
- Selective Catalytic Reduction (SCR)
- Low sulfur fuels

2.2 Eliminate Technically Infeasible Alternatives

All emission reduction alternatives identified in the previous section are considered technically feasible for natural gas-fired boilers, except SCR, which is not technically feasible because of the inconsistent operating schedule of the proposed boilers. SCR systems utilize a catalyst to promote the reduction reaction between NO_X and ammonia (NH_3) at a lower temperature than it would otherwise occur. While catalysts are available that promote the reaction over a range of temperatures, a consistent temperature is required. For boilers that operate at a given load for

extended periods, such a system can provide a reduction in NO_X emissions. Boilers with fluctuating steam demands, such as those proposed for this project, variations in flue gas temperature can lead to ineffective NO_X reduction, and unacceptably high emissions of unreacted NH_3. For this reason, SCR is removed from consideration as BACT for reducing NO_X emissions from the proposed natural gas-fired boilers.

In the following sections, these controls will be ranked and evaluated for each pollutant for which BACT is required.

2.3 NO_X BACT

Several of the identified alternatives are commercially available combustion and post-combustion control technologies which are capable of reducing NO_X emission from a natural gas-fired boiler. These controls include low-NO_X burners and flue gas recirculation.

2.3.1 Ranking of Remaining Alternatives

In top-down order of decreasing stringency, the feasible NO_X controls are listed with the approximate emission factor achieved by each technology:

- Ultra-Low-NO_X Burners – 0.011 lb/MMBtu[3]
- Low-NO_X Burners with FGR – 0.032 lb/MMBtu[4]
- Low-NO_X Burners with GCP – 0.050 lb/MMBtu[4]
- Conventional Burners with GCP, Conventional Burners – 0.10 lb/MMBtu[4]

2.3.2 Consideration of Energy, Environmental and Cost Factors

Because Tesoro-Savage proposes to meet the most stringent emission rate, no evaluation of energy, environmental, or cost was conducted. However, were an environmental and/or energy evaluation performed, utilizing low-NO_X burners with SCR would be identified as having greater impacts than utilizing ultra-low-NO_X burners.

2.3.3 Proposed BACT Limits and Control Option

Tesoro-Savage proposes an emission factor of 0.011 lb/MMBtu as BACT for NO_X emitted by all three of the proposed natural gas-fired boilers, achieved using ultra-low NO_X burners.

2.4 CO and VOC BACT

The only post-combustion control available for reducing emissions of CO and VOCs emitted by the proposed boilers is an oxidation catalyst module. Based on the RBLC review presented in Table A-1, the range of BACT CO emission limits for recently permitted natural gas-fired boilers (since 2004) is from 0.037 lb/MMBtu to 0.08 lb/MMBtu, and the range for VOCs is 0.0044 lb/MMBtu to 0.0054 lb/MMBtu. BACT for CO and VOCs on most units in the RBLC is GCP.

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[3] Provided by Cleaver Brooks; equivalent to 9 parts per million by volume.

[4] From EPA's AP-42, Section 1.4 (Natural Gas Combustion), Table 1.4-1.

2.4.1 Ranking of Available Control Technologies

The identified control technologies, GCP and oxidation catalyst, are considered technically feasible for gaseous fuel fired boilers. In top-down order of decreasing stringency, the feasible CO and VOC controls are listed with the approximate level of control that could be achieved:

- Oxidation Catalyst and GCP – CO - 0.0036 lb/MMBtu, VOC - 0.0025 lb/MMBtu
- GCP – CO - 0.036 lb/MMBtu, VOC - 0.005 lb/MMBtu

2.4.2 Consideration of Energy, Environmental and Cost Factors

The use of oxidation catalyst modules as add-on emission control is available and technically feasible for reduction in CO emissions from natural gas-fired boilers. These are in addition to combustion controls (i.e., GCP) in combination with Low-NO_X burners.

With respect to energy considerations, add-on post-combustion controls on boilers of the capacity range proposed will noticeably reduce the thermal efficiency of the unit. Catalyst modules increase the back-pressure downstream of the combustion chamber by between 0.05 and 0.5 in H_2O per inch of catalyst bed depth, depending upon design.[5] Secondary environmental impact issues associated with spent catalyst module disposal are common among boiler installations that employ post-combustion catalytic systems. While landfill disposal fees for spent catalyst are not expensive, the potential liability associated with disposal is difficult to assess from a monetary perspective. Catalyst recycling options are not fully developed, and have their own specific liabilities associated with transport, processing, and disposal of by-products.[6]

Prohibitively high annualized cost is the primary factor that argues against costly add-on control technologies for natural gas-fired boilers. Because the proposed boilers will not be operated at a consistent load, it is likely that the catalyst performance will be uneven (i.e., the maximum reduction of CO and VOCs may not be achieved at all times).

As demonstrated in the attached cost-effectiveness calculations, add-on CO and VOC control technology for the proposed boilers would be cost-prohibitive in terms of cost per ton abated. Assuming an oxidation catalyst could provide 90 percent reduction of CO and 50 percent reduction of VOCs consistently throughout the year (highly unlikely given the planned method of operation), implementation of a catalytic oxidizer on one of the boilers has an estimated annualized cost of over $138,000, and provides a combined CO and VOC reduction of 9.4 tons per year, compared with GCP. From these results, the cost-effectiveness of the catalytic oxidizer option is conservatively estimated to be just less than $15,000 per ton reduced. This cost is not economically feasible, and so catalytic oxidation is eliminated as a BACT alternative.

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[5] Cooper, C.D. and F.C. Alley, "Air Pollution Control: A Design Approach," Waveland Press, 1994. Page 359.

[6] Electric Power Research Institute (EPRI), "Recycling and Disposal of Spent Selective Catalytic Reduction Catalyst," Report No. 1004888, October 2003.

2.4.3 Proposed BACT Limits and Control Option

Tesoro-Savage proposes that BACT for CO and VOCs from the proposed natural gas-fired boiler is 0.036 lb/MMBtu (approximately 50 ppm) for CO, and 0.005 lb/MMBtu for VOC, both achieved by employing GCP.

2.5 PM and SO_2 BACT

This BACT analysis assumes that all PM emissions from the proposed boilers are $PM_{2.5}$, and that the PM, PM_{10}, and $PM_{2.5}$ emission rates are all equivalent. Any reference to PM emissions in this BACT analysis represents all definitions of particulate matter emissions: PM, PM_{10}, and $PM_{2.5}$.

2.5.1 Ranking of Available Control Technologies

For these pollutants, the commercially-available control measures that are identified in the most-stringent BACT determinations are use of low-sulfur, pipeline natural gas, and GCP. Based on review of the RBLC database, a summary of which is presented in Table A-1, add-on controls were not implemented to achieve BACT limits for these pollutants. The ranges of BACT emission limits for these pollutants are:

- SO_2 – 0.0006 lb/MMBtu to 0.082 lb/MMBtu
- PM – 0.0044 lb/MMBtu to 0.0075 lb/MMBtu

The two most-stringent available technologies are to be adopted for the proposed boilers, so further evaluation is unnecessary.

2.5.2 Proposed BACT Limits and Control Option

The use of pipeline natural gas and GCP are proposed as BACT for PM and SO_2 emissions from the natural gas-fired boilers. Boiler vendor information indicates that the hourly average PM emission factor will be 0.0075 lb/MMBtu, and mass balance calculations based on the sulfur content of the expected source of natural gas indicates that the daily average SO_2 emission factor will be approximately 0.00725 lb/MMBtu. However, Tesoro-Savage does not propose that these emission factors be used as numeric permit limits. Instead, BACT should be considered the use of pipeline natural gas and GCP.

2.6 Startup and Shutdown BACT

Boilers startup and shutdown operations will be conducted as prescribed by the boiler manufacturer. Periods of overlapping operation will be minimized to avoid unnecessary fuel use and the corresponding emissions. The proposed boilers are high-efficiency, natural gas-fired units that are capable of starting and shutting down quickly, and perform consistently across a broad range of operating levels. Large field-erected boilers typically experience increased emissions per unit of heat input during startup and shutdown that are not relevant.

2.7 Toxic Air Pollutant BACT

Toxic air pollutant (TAP) compounds emitted by a natural gas-fired boiler are, in general, either volatiles (VOCs) or particles (PM). The proposed BACT for VOC and PM are also proposed to be BACT for VOC and PM TAPs, respectively. BACT for TAPs that contain chlorine (e.g., hydrogen chloride) and sulfur (e.g., sulfuric acid) is proposed to be the same as that

proposed for SO_2. For nitrogen-containing compounds (e.g., nitric oxide), BACT is proposed to be the same as that proposed for NO_X.

3 MARINE VESSEL LOADING BACT ANALYSIS

Crude oil will be transferred from the facility to vessels. During the loading process, vapors, and inert gas present in the tank before loading began will be displaced by the crude oil entering the tank, and some of the crude oil will volatilize as it is being loaded. To comply with US Coast Guard regulations (33 CFR 154 Subpart E), these vapors must be captured and diluted, enriched, or inerted. Inerting systems will be used on each vessel loaded at the facility.

Pollutant emissions from marine vessel loading are expected to include VOCs and TAPs.

3.1 Identify Commercially-Available Emission Reduction Alternatives

The federal RBLC database, facility permits, and other sources were reviewed to identify commercially-available alternatives to reduce emissions from marine vessel loading operations. indicates that emission reduction alternatives include:

- Volatility reduction
- Vapor balancing
- Vapor recovery units (VRU)
- Marine vapor combustion units (MVCU)

3.2 Eliminate Technically Infeasible Alternatives

Reducing the volatility of crude oil by heating and separating volatiles prior to transport is theoretically possible, but implementation of this technology is not yet at the research stage, and is, therefore, considered technically infeasible and removed from consideration.[7]

Vapor balancing is frequently used when tank trucks are loading underground tanks, where the vapors displaced from the underground tank are retrieved by the tank truck and returned to the loading terminal. However, vapor balancing is typically not used for marine loading because the on-shore source of the crude (i.e., railcars or tanks equipped with floating roofs) is not able to accept vapors from the vessel. Even if the shore-side vessel were properly equipped to receive the vapors, the temperatures of the supplying and receiving vessels may be different, which could pressurize or create a vacuum in one or both of the vessels. Also, vapors that remain from the previous contents of the marine vessel could potentially contaminate the on-shore vessel. For these reasons, vapor balancing is technically infeasible, and is removed from consideration.

Vapor combustion units and vapor recovery units are frequently used for various types of petroleum product loading to marine vessels, and are considered technically feasible.

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[7] Rudd, Howard J, and Nikolas A. Hill. "Measures to Reduce Emissions of VOCs during Loading and Unloading of Ships in the EU." European Commission, Directorate General – Environment. Report No. AEAT/ENV/R/0469. August 2001. http://ec.europa.eu/environment/air/pdf/vocloading.pdf

3.3 Ranking of Remaining Alternatives

In top-down order of decreasing stringency, the feasible VOC and TAP controls are listed with the approximate control efficiency achieved by each technology:

- MVCU – 99 percent control or greater
- VRU – 99 percent control or greater

3.4 Consideration of Energy, Environmental and Cost Factors

The Facility is designed to employ an MVCU system to reduce VOC and TAP emissions. Because this is the most effective alternative, no additional evaluation of energy, environmental, or cost is necessary. MVCU systems are typically employed to control VOCs from crude oil loading operations because they are able to adapt to shifting quantities and types of VOCs as the nature of the crude loaded changes. A VRU system is not as adaptable, and is, therefore, more often applied to smaller loading operations with more uniform products (e.g., gasoline).

3.5 Proposed BACT Limits and Control Option

Based on the analysis presented above, Tesoro-Savage proposes that BACT for reducing VOC and TAP emissions from the proposed marine vessel loading operations is the use of an MVCU system, designed and operated to achieve maximum destruction of VOCs and TAPs.

4 MARINE VAPOR COMBUSTION UNIT BACT ANALYSIS

Vapors displaced from vessels as they are filled with crude oil will consist primarily of hydrocarbons. Assist-gas is added to the vapor as needed to ensure good combustion efficiency during certain times that the vessels are being loaded. All vapors, including any additional gas, will be collected and routed to a marine vapor combustor unit (MVCU) for safe disposal. Pollutant emissions from the MVCU are expected to include NO_X, PM (including PM_{10} and $PM_{2.5}$), CO, SO_2, VOCs, and TAPs.

4.1 Identify Commercially-Available Emission Reduction Alternatives

A broad review of permitted MVCUs, thermal oxidizers (TOs), and flares included in the federal RBLC database indicates that emission reduction alternatives are limited to:

- Good combustion practices
- Proper design and operation
- Use of gaseous fuels and/or pipeline natural gas

By combusting the displaced vapors using a MVCU, loading operations will comply with U.S. Coast Guard safety requirements in 33 CFR 154 Subpart E. Pollutant emissions from the MVCU fall into two categories: 1) vapors, typically VOCs, that escape the MVCU without being destroyed as intended; and 2) combustion products of the destroyed vapors and any supplemental fuel used to ensure sufficient flame temperature. Proper design and operation of the MVCU are intended to minimize the quantity of vapors that escape destruction.

In most cases, the VOC stream that an MVCU, TO, or flare controls is of variable composition and concentration. As a result, the associated burner must be designed to handle a wide range of combustion conditions, and cannot be optimized. In contrast, gas-fired burners associated with

boilers or process heaters can be designed to minimize specific pollutants, such as NO_X or CO. While NO_X emissions vary among MVCU, TO, and flare combustor designs, none can utilize a true "Low-NO_X burner" design similar to a boiler or process heater.

NO_X emissions associated with MVCU, TO, and flare designs are typically in the range of 20 to 40 ppmvd. BACT for current Low-NO_X burner designs associated with small (i.e., less than 100 MMBtu/hr) natural gas-fired boilers is typically in the range of 9 to 11 ppmvd. When a MVCU, TO, or flare manufacturer or vendor says their product incorporates a "Low-NO_X burner," the burner in question does not incorporate the same technology as a burner intended for use in a boiler, and will not achieve the same NO_X emission rate. For purposes of this BACT analysis, minimizing NO_X emissions while maintaining an acceptable destruction efficiency is considered part of "good combustion practices, and "Low-NO_X burner" is not considered an available technology for the proposed MVCU.

A permit issued to the Tidewater Terminal Co. for a facility in Pasco, Washington, on September 23, 2013 by Ecology's Eastern Regional Office, included BACT and tBACT (BACT for toxic air pollutants) determinations for an MVCU. The Tidewater Terminal Co. MVCU is described in the permit as a "98.6% efficient John Zink Company Marine Vapor Combustion System enclosed flare." Conditions placed on this unit by the permit are:

- Propane is used to fuel the pilot and as an auxiliary fuel to maintain combustion,
- Combustion temperature must be maintained at 1,400°F,
- VOC emissions from the unit shall not exceed 7 milligrams per liter of gasoline (mg/L) transferred from the facility to barges, and
- No visible emissions except water vapor are allowed from the unit.

4.2 Eliminate Technically Infeasible Alternatives

Because no pollutant-specific emission reduction alternatives were identified, all pollutants will be considered together in this and the following sections.

The emission reduction alternatives identified in the previous section are all considered technically feasible for MVCUs.

4.3 Ranking of Remaining Alternatives

Good combustion practices, proper design and operation, and use of "clean fuels" (i.e., pipeline natural gas or propane) are all considered baseline controls for MVCUs; therefore, it is not possible to rank the remaining alternatives. However, the following is a comparison of the MVCU proposed for the Project to each of the BACT elements identified in the Tidewater Terminal permit.

The proposal that the Project's MVCU combust natural gas as an assist gas and for pilot flames compares favorably with the corresponding Tidewater Terminal MVCU permit requirement. Both natural gas and propane are considered "clean fuels" that minimize emissions of criteria, toxic, and greenhouse gas (GHG) emissions. Therefore, requiring the Project MVCU to employ natural gas is equivalent to the Tidewater Terminal requirement to employ propane.

The Project's MVCU will operate at a temperature that yields high destruction efficiency consistent with the aim of the Tidewater Facility MVCU combustion temperature. Optimal control temperature varies with unit design. At this time, we do not know the combustion

temperature prescribed by the Project's MVCU manufacturer to achieve the designed-for destruction efficiency. Maintaining the proper combustion temperature is a component of the "good combustion practices," and "proper design and operation" proposed as BACT for the Project's MVCU. When such information is available, it will be incorporated into the portion of the facility Operations and Maintenance Plan (O&M Plan) covering the MVCUs. Therefore, the Project MVCU will be operated consistent with the Tidewater Terminal MVCU.

The Project's MVCU will meet the 7 milligrams of VOC or less per liter of product loaded emission rate that is required for the Tidewater Facility. According to the manufacturer, the proposed Project MVCU system is expected to achieve at least 99.8 percent destruction of delivered hydrocarbons. In the Tidewater Terminal permit, the expected destruction efficiency is 98.6 percent. In this regard, the Project MVCU will perform consistent with the Tidewater Terminal MVCU.

The Project's MVCU will be designed to ensure that no visible emissions except for water vapor are emitted from the unit. Elimination of visible emissions other than water vapor is the result of using "good combustion practices" and "proper design and operation," which were both proposed in the permit application as BACT and tBACT for the Project MVCU. In this regard, the performance of the Project MVCU will be consistent with the Tidewater Terminal MVCU.

4.4 Consideration of Energy, Environmental and Cost Factors

Because Tesoro-Savage proposes to use the most effective alternatives, no evaluation of energy, environmental, or cost was conducted.

4.5 Proposed BACT Limits and Control Option

Tesoro-Savage proposes that BACT for reducing criteria pollutant and TAP emissions from the proposed MVCU is achieved by implementing good combustion practices, proper design and operation, and use of pipeline natural gas as an assist gas and for pilot flames.

5 CRUDE OIL STORAGE TANK BACT ANALYSIS

The proposed project will include an onsite tank farm, which will store crude oil delivered by railcar when a ship or barge is not available for loading. The tank farm will consist of up to six storage tanks, each approximately 240 feet in diameter, 48 feet tall, and with a maximum storage capacity of approximately 360,000 barrels. Two of the six tanks will be electrically heated, as needed, to control the viscosity of certain crude oil during loading and unloading.

Fugitive emissions are expected to occur due to evaporative loss of crude oil during storage and as a result of changes in the level of oil in the tanks. Pollutant emissions from the tanks are expected to include VOCs and TAPs. For purposes of this BACT analysis, a maximum annual throughput of 131.4 million barrels per year was assumed.

5.1 Identify Commercially-Available Emission Reduction Alternatives

Tanks constructed after July 23, 1984 are subject to the requirements of the NSPS for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984 (40 CFR Part 60 Subpart Kb). As stated in Section 1.3, EPA guidance indicates that a BACT determination can be no less stringent than the applicable NSPS

requirements. A review of NSPS Subpart Kb, permits issued to facilities with oil storage tanks, and permits included in the federal RBLC database indicates that emission reduction alternatives for crude oil storage tanks include:

- Fixed-roof tank operated under pressure
- Fixed-roof tank with an internal floating roof with primary and secondary seals, and a vapor collection system routed to a process or fuel gas system or a control device (e.g., thermal oxidizer or carbon adsorber assumed to be at least 95 percent effective at reducing VOCs)
- Fixed-roof tank with an internal floating roof with primary and secondary seals
- External floating roof tank with primary and secondary seals
- Fixed-roof tank with a vapor collection system routed to a process or fuel gas system or a control device (e.g., thermal oxidizer or carbon adsorber assumed to be at least 95 percent effective at reducing VOCs)
- Fixed-roof tank operated at atmospheric pressure

Some identified BACT determinations for crude oil storage tanks are summarized in Table 5-1.

Table 5-1. Summary of VOC BACT Determinations for Crude Oil Tanks

Facility	State	Date Permitted	Equipment	BACT
Enbridge Superior Terminal	WI	6/12/2014	3 crude oil tanks – 24.5 million gal ea.	External floating roof with primary and secondary seals
Holly Refinery	UT	11/18/2013	3 crude oil tanks – 67,155 bbl, 80,306 bbl, 106,811 bbl	Fixed roof, pending review of vapor pressure variation. If vapor pressure exceeds NSPS levels, internal floating roof with primary and secondary seals.
Plains Marketing – Cushing Terminal Crude Storage Facility	OK	10/12/2010	46 crude oil tanks – 31 x 270,000 bbl ea., 2 x 300,000 bbl ea., and 13 x 570,000 bbl ea.	External floating roof with primary and secondary seals.
Hyperion Energy Center	SD	8/20/2009	10 crude oil tanks – 21 million gal ea.	Internal floating roof for liquids with a true vapor pressure less than 0.3 psia; add capture system with thermal oxidizer for liquids with a true vapor pressure equal to or greater than 0.3 psia.
ConocoPhillips Wood River Refinery	IL	8/5/2008	2 crude oil tanks – 11 million gal ea.	Internal floating-roof tanks with primary and secondary seals to comply with 40 CFR 60 Subpart Kb & 40 CFR 63 Subpart CC

Facility	State	Date Permitted	Equipment	BACT
Marathon Petroleum Garyville Refinery	LA	9/23/2006	12 crude oil tanks – 21 million gal ea.	External floating-roof tanks that comply with 40 CFR 63 Subpart CC
Arizona Clean Fuels Yuma	AZ	9/15/2006	7 crude oil tanks - 7,560,000 gal ea.	Internal floating-roof tanks with closed-vent system routed to thermal oxidizer.
Valero Refining - St. Charles Refinery	LA	2/5/2005	51 heavy materials tanks - 2,100 to 425,000 bbl ea.	Fixed-roof tanks, comply with 40 CFR 63 Subpart CC.

5.2 Eliminate Technically Infeasible Alternatives

While some petroleum products (i.e., those that are gases at atmospheric pressure) are stored in pressure vessels, crude oil is not. Therefore, a fixed-roof tank operated under pressure is considered technically infeasible, and is removed from further consideration. The facility will not include a process or fuel gas system, therefore, a closed vent system could not be routed to such a system, and that alternative is removed from consideration.

A fixed-roof tank operated at atmospheric pressure is technically feasible; but, because NSPS Subpart Kb does not include fixed-roof tank designs as an option and BACT can be no less stringent than the applicable NSPS, such a design cannot be considered as BACT.

All other emission reduction alternatives identified in the previous section are considered technically feasible for controlling emissions from oil storage tanks.

5.3 Ranking of Remaining Alternatives

The least effective control is a tank with a fixed roof operated at atmospheric pressure. Using the EPA's TANKS 4.0.9d emission calculation program, the total annual VOC emissions from the tanks, assuming a fixed-roof tank design is used, would be approximately 793 tons per year (tpy). As discussed in the previous section, a fixed-roof tank design operated at atmospheric pressure cannot be considered in the BACT analysis because the requirements of NSPS Subpart Kb are more stringent. Nevertheless, a fixed-roof design is an emission baseline worth noting. When ranking the VOC emission reduction alternatives as presented below, the percent reduction relative to the BACT baseline (the least effective alternative that complies with NSPS Subpart Kb), as well as the percent reduction relative to a fixed-roof design operated at atmospheric pressure, are both provided along with the total VOC emissions associated with each alternative.

In top-down order of decreasing stringency, the feasible VOC control alternatives are as follows:

- Fixed-roof tank with an internal floating roof with primary and secondary seals and vapor collection system routed to a control device (e.g., thermal oxidizer or carbon adsorber system assumed to be at least 95 percent effective at reducing VOCs) – 95.27 percent

incremental reduction compared to BACT baseline, 99.76 percent reduction compared to fixed-roof design at atmospheric pressure (1.9 tpy);

- Fixed-roof tank with an internal floating roof with primary and secondary seals – 90.55 percent incremental reduction compared to BACT baseline, 99.53 percent reduction compared to fixed-roof design at atmospheric pressure (3.7 tpy);
- External floating roof tank with primary and secondary seals – 90.00 percent incremental reduction compared to BACT baseline, 99.50 percent reduction compared to fixed-roof design at atmospheric pressure (4.0 tpy); and
- Fixed-roof tank with a vapor collection system routed to a control device (e.g., thermal oxidizer or carbon adsorber system assumed to be at least 99.5 percent effective at reducing VOCs) – BACT baseline, 95.00 percent reduction compared to fixed-roof design at atmospheric pressure (39.6 tpy).

The emission reductions presented above were calculated using USEPA's TANKS 4.0.9d program.

5.4 Consideration of Energy, Environmental and Cost Factors

The most stringent alternative is a fixed-roof tank with an internal floating roof with primary and secondary seals and vapor collection system routed to a control device (e.g., thermal oxidizer or carbon adsorber system assumed to be at least 95 percent effective at reducing VOCs). Based on review of the RBLC and other issued permits, it appears that this alternative has been determined to be BACT for a single permitted facility, Arizona Clean Fuels Yuma, which was first permitted in April 2005, and then again in September 2006. The facility has never been constructed. This combination of control alternatives (i.e., internal floating roof with vapor collection system) has been considered is several BACT analyses, but, outside of the Arizona Clean Fuels Yuma project, never identified as BACT for crude oil storage tanks.

There are several instances of fixed-roof tanks equipped with a vapor collection system routed to a control device employed as LAER for reducing VOC emissions from crude oil storage tanks in ozone nonattainment areas. The primary difference between BACT and LAER is that, while BACT takes the economic impact of an emission reduction alternative into account, cost is not considered when determining LAER. A fixed-roof tank with vapor collection and control system was considered for the Cushing Terminal Crude Oil Storage Facility in Oklahoma, and the cost-effectiveness was determined to be over $39,000 per ton of VOC reduced.[8]

The Hyperion Energy Center project in South Dakota considered applying a capture and thermal oxidizer system to between 59 and 89 tanks, 10 of which would contain crude oil; the calculated cost-effectiveness ranged between $12,000 and $22,000, depending upon the scenario. Because many more tanks containing substances more volatile than crude oil were involved in this analysis, it is not considered a good cost-effectiveness example for the proposed TSVEDT crude oil tanks. The Hyperion Energy Center project has not been constructed, and the permit has expired.

[8] http://www.deq.state.ok.us/aqdnew/permitting/permissue/2003104-c4p.pdf

In June 2014, Enbridge Energy received a permit that included the construction and operation of three 24.5-million-gallon (584,232 bbl) crude oil storage tanks. The Wisconsin Department of Natural Resources (WDNR) deemed BACT for VOC emissions from the tanks to be an external floating roof with primary and secondary seals. The cost-effectiveness analysis submitted to WDNR indicated that an internal floating roof tank with a capture system controlled by a carbon adsorption system had an incremental cost-effectiveness of $16,334 per ton of VOC reduced. All capture system and control device combinations were rejected as economically infeasible.[9]

In light of these facts, the use of a vapor collection system routed to a control device to control VOC emissions from the proposed tanks is removed from consideration. Almost all recently constructed crude oil tanks in Washington use an internal floating roof with primary and secondary seals to control VOC emissions.

5.5 Proposed BACT Limits and Control Option

Tesoro-Savage proposes that BACT for VOC and TAP emissions from the proposed crude oil storage tanks is the use of properly designed and operated internal floating-roof tanks with primary and secondary seals. Tesoro-Savage believes that emission rate limits are not appropriate for a fugitive source, and, therefore, does not propose any such limits as BACT.

6 COMPONENT LOSSES BACT ANALYSIS

The Facility will include piping, valves, connectors, pumps, and other components to transfer crude oil from railcars to tanks, and from tanks to vessels. All components are subject to minute vapor leakage, and fugitive VOC and TAP emissions are expected to occur when components are in service.

6.1 Identify Commercially-Available Emission Reduction Alternatives

A broad review of permitted operations included in the federal RBLC database and other permitted sources indicates that fugitive emissions from leaking petroleum service components are reduced through a combination of proper equipment selection and a leak detection and repair (LDAR) program. Identified alternatives include:

- Use of components using leakless technology
- Implementation of an LDAR program

LDAR programs involve periodic monitoring of components with a hydrocarbon analyzer, identification of components that leak above the leak definition levels specified in the equipment leak standard, and subsequent repair of the leaking components. LDAR programs are frequently defined by regulations; those in the RBLC deemed to represent BACT for other facilities permitted in the past ten years include:

- 40 CFR 63 Subpart H (National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks)

[9] http://dnr.wi.gov/cias/am/amexternal/AM_PermitTracking2.aspx?id=3002436

- 40 CFR 63 Subpart CC (National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries)
- 40 CFR 63 Subpart UU (National Emission Standards for Equipment Leaks—Control Level 2 Standards)
- 40 CFR 60 Subpart VVa (Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006)
- 40 CFR 60 Subpart GGGa (Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006)
- 40 CFR 61 Subpart V (National Emission Standard for Equipment Leaks (Fugitive Emission Sources))
- Louisiana Refinery MACT (Louisiana Administrative Code §2121, §2122, and Chapter 51)

The RBLC findings are summarized in Table 6-1.

Table 6-1. Summary of BACT Determinations for Component Losses from the RBLC

Facility	State	Date Permitted	BACT Determination
Valero Refining - St. Charles Refinery	Louisiana	11/17/2009	LA Refinery MACT, 40 CFR 63 Subpart H, 40 CFR 61 Subpart V
Sunoco Toledo Refinery	Ohio	2/23/2009	40 CFR 63 Subpart CC, 40 CFR 60 Subparts VV & GGG
Marathon Petroleum Garyville Refinery	Louisiana	12/27/2006	40 CFR 63 Subpart CC, 40 CFR 60 Subpart GGG, LA Refinery MACT
ConocoPhillips Wood River Refinery	Illinois	8/5/2008	40 CFR 63 Subpart H
Arizona Clean Fuels Yuma	Arizona	4/14/2005	40 CFR 63 Subpart H[1]

[1] In addition, the following leak definitions have been included: 100 ppmv for valves and connectors in gas/vapor and light liquid service and 500 ppmv for all other components. All pumps must be equipped with a shaft sealing system that prevents or detects emissions of VOC from the seal. All compressors must be equipped with a seal system that includes a barrier fluid system that prevents leakage of process fluid to the atmosphere. Other requirements exist for other connector types and valves. The percent of leaking components cannot exceed the following: 1.0% for pumps in light liquid service and compressors on a source-wide basis, 1.0% for the total number of pressure relief devices on a source-wide basis, 0.3% for total number of connectors in gas/vapor service and connectors in light liquid service on a source-wide basis, 0.3% of the total number of valves in gas/vapor service and valves in light liquid service on a source-wide basis, and not more than 0.025% of valves in gas/vapor service and valves in light liquid service shall be leaking with a concentration in excess of 10,000 ppmv.

6.2 Eliminate Technically Infeasible Alternatives

Proper equipment selection and implementing an LDAR program based on any of the regulations identified in the previous section are considered technically feasible for reducing fugitive VOC and TAP emissions from component leaks.

6.3 Ranking of Remaining Alternatives

There are many LDAR programs available, some codified in regulations (e.g., NSPS, NESHAP, etc.), some developed by state agencies for consent decrees, and others developed by industry groups. Some of the non-regulatory alternatives include:

- Remote sensing technology
- Enhanced LDAR standards
- Audio/visual/olfactory methods

The effectiveness of these alternative programs has not been quantified, but none is thought to be any more effective than a regulatory LDAR program that includes implementation of EPA Method 21 (Determination of Volatile Organic Compound Leaks). All of the regulations identified in the previous section that require implementation of a formal LDAR program include Method 21.

A comparison of fugitive component emissions regulations compiled by the Louisiana Department of Environmental Quality (LDEQ) is provided in Table A-2. Taken as a whole, the requirements of 40 CFR 63 Subpart H are the most stringent. Implementation of an LDAR program and proper equipment selection are considered baseline alternatives, so there is no ranking.

6.4 Consideration of Energy, Environmental and Cost Factors

Because Tesoro-Savage proposes to use the most effective alternatives, no evaluation of energy, environmental, or cost was conducted.

6.5 Proposed BACT Limits and Control Option

Tesoro-Savage proposes that implementation of an LDAR program that meets the requirements of 40 CFR 63 Subpart H represents BACT for VOC and TAP component leaks at the Facility. Tesoro-Savage believes that emission rate limits are not appropriate for a fugitive source, and, therefore, does not propose any such limits as BACT. It should be noted that the proposed facility is not subject to the requirements of Subpart H as a result of the regulatory applicability criteria, but would meet the requirements of the rule, as appropriate, because it represents the most stringent implementation of an LDAR program.

7 EMERGENCY ENGINE BACT ANALYSIS

7.1 Process Description

Three pumps powered by nominal 225 hp diesel engines will be installed to provide water for fire suppression. Other than plant emergency situations, the engine will be operated a maximum of 34 hours per year for routine testing, maintenance, and inspection purposes.

The fire pump engines will emit criteria pollutants and TAPs associated with diesel engines. Although the engine make and model have not yet been specified, the engines will comply with the emission standards for stationary fire pump engines in 40 CFR Part 60 Subpart IIII (Stationary Compression Ignition Reciprocating Engine NSPS).

7.2 NO_X BACT

7.2.1 Available Control Technologies and Technical Feasibility

There are a limited number of technically-feasible NO_X control technologies that are commercially available for internal combustion engines. Two general types of control options have emerged as technically feasible: combustion process modifications, and post combustion

controls. In practice, the high temperature and relatively low volumetric flow of the engine exhaust eliminates post-combustion controls from consideration. Table A-3 summarizes recent BACT determinations for internal combustion engines.

7.2.1.1 Combustion Process Modifications

This option is incorporated in the engine design. Typical design features include electronic fuel/air ratio and timing controllers, pre-chamber ignition, intercoolers, and lean-burn fuel mix. Currently available new engines include these features as standard equipment; accordingly this measure is deemed the baseline case for purposes of the BACT analysis.

7.2.1.2 Selective Catalytic Reduction (SCR)

In this technology, nitrogen oxides are reduced to gaseous nitrogen by reaction with ammonia in the presence of a supported precious metal catalyst. The SCR system includes a catalyst module downstream of the engine exhaust. Just upstream of the catalyst, a reagent liquid (typically ammonia or urea solution) is injected directly into the exhaust stream. The method is considered feasible with lean-burn internal combustion engines.

7.2.1.3 Non-Selective Catalytic Reduction (NSCR)

Similar to automobile catalytic converters, this method employs noble metal catalysts to oxidize nitrogen oxides to molecular nitrogen. It operates in regimes with less than four percent oxygen in the exhaust, which corresponds to fuel-rich operation. The method is not feasible with lean-burn internal combustion engines.

7.2.2 Energy and Environmental Considerations

Several factors distinguish the two technically-feasible options with regard to energy and environmental impacts. One drawback associated with SCR systems is the environmental risk of handling and using ammonia reagent solutions. Most SCR catalyst modules can operate well without excess reagent. However, this requires particular attention to the controlled injection of the reagent in response to changes in load, temperature, and other parameters. Absent an emergency situation, the proposed fire pump engines will only operate infrequently for brief testing and maintenance checks (Subpart IIII limits these checks to 100 hours per year). These short, transient operating periods significantly reduce the effectiveness of the post-combustion controls.

Further, it should be assumed that ammonia emissions associated with SCR operation will occur under some or all operating conditions. This represents an additional air pollutant that is not emitted when SCR is not used for these engines. Also, the handling and storage of substantial volumes of the required ammonia or urea reagent solutions can pose an additional safety risk to facility personnel, and the risk of environmental harm in the event of an accidental release.

The SCR catalyst requires periodic cleaning due to fouling of the surfaces due to the presence of trace contaminants, such as sulfur compounds, particulate, and organic species. This requirement generates a secondary waste stream of contaminated cleaning solutions that must be disposed as hazardous waste.

When SCR or any add-on emission control technology is used, additional auxiliary equipment such as pumps and motors must be added. Also, the presence of the catalyst module adds an

increment of pressure drop to the exhaust train. To avoid a substantial drop-off in engine performance, the SCR modules must be designed to minimize the increase in back pressure. However, the energy requirements of auxiliary equipment and even minor back-pressure increases reduce the net energy efficiency of the plant. In contrast, the implementation of combustion process controls does not require an add-on system with increased energy use by auxiliary equipment, or the use of catalyst and ammonia materials. There is some additional complexity in the engine controls for this option. Proper engine tuning and fuel/air ratio is needed across the full load range to achieve reduced emissions while avoiding a reduction in engine efficiency. The automatic fuel/air ratio controller helps accomplish this objective.

7.2.3 Ranking of Control Options

With regard to NO_X emission abatement, the ranking of the technically-feasible options is straightforward. The use of SCR offers the highest potential level of control for the proposed diesel-fired emergency engines. Up to 90 percent reduction in NO_X mass emission at all load levels is claimed for typical internal combustion engines.

The option offering the next highest control level is combustion process modifications, as would be implemented as standard equipment (i.e. no additional cost) in the selected engines. Advanced combustion design allows the engines to operate at rated horsepower, while burning an optimized fuel mix. This feature includes ignition timing retard to reduce cylinder temperatures for lean mixtures. The controls are also designed to optimize the air/fuel ratio and ignition timing in response to actual operating conditions.

7.2.4 Economic Analysis for Controls

Since advanced NO_X controls is a standard feature of the currently available new engines, the emissions reported by vendors for this package are taken as the base case in this BACT analysis. Addition of SCR is then analyzed as the next incremental control technology, in terms of both control level and cost.

The annualized operating costs for addition of SCR to the fire water pump engine would be about $44,000 per year. The estimated total capital investment is almost $127,000, based on purchased equipment cost estimates. Capital recovery is the single largest annual expense, based on 7 percent prevailing interest rate, and 10-year service period. Additional maintenance charges are also encountered for operation of the systems and annual catalyst cleaning. This investment would provide about 0.11 tons of NO_X reduction per year, assuming 90 percent emission control efficiency. Cost-effectiveness is more than $385,000 per ton, which represents a prohibitively high cost for this BACT option (see attached calculations).

7.2.5 Proposed BACT

A cost-effectiveness analysis has shown that use of SCR is cost prohibitive as a more-stringent control for the proposed fire water pump engines. The proposed BACT for these engines is the suite of combustion modifications supplied as standard equipment with the candidate types of engines which enable the manufacturer to certify the engine under Subpart IIII. As required by Subpart IIII, non-emergency hours of operation would be limited to 34 hours per year.

7.3 CO and VOC BACT

As for NO_X, CO and VOC emissions for the proposed fire water pump engines would be certified by the manufacturer to achieve the applicable standards in Subpart IIII, and would be operated no more than 34 hours per year in a non-emergency mode, which is less than the 100-hour limit imposed by Subpart IIII.

7.3.1 Technically-Feasible Controls

For CO emissions, the commercially available control means for IC engines are:

Combustion Process Modifications - This option is implemented in the design of the internal combustion engine. Typical design features include an electronic fuel/air ratio control and ignition retard, turbocharging, intercoolers, and lean-burn fuel mix. Currently available engines include these features as standard equipment, so these measures are used as the base case for the BACT cost-effectiveness analysis.

Catalytic Oxidation – This control technology employs a module containing an oxidation catalyst that is located in the exhaust path of the engines. In the catalyst module, CO and VOCs diffuse through the surfaces of a ceramic honeycomb structure coated with noble metal catalyst particles. Oxidation reactions on the catalyst surface forms carbon dioxide and water. Typical vendor indications are that 95 percent reduction in CO and 50 percent reduction in VOC emissions should be achieved.

7.3.2 Cost-Effectiveness Analysis

Given the low number of routine operating hours per year, the cost of catalytic oxidation for CO and VOC control will be prohibitive. The estimated annualized cost to add catalytic oxidation to the fire water pump engines is approximately $30,300. This investment would reduce CO and VOC emissions by 0.013 and 0.0017 tons per year, respectively, assuming a 95 percent reduction in emissions and 34 hours per year of non-emergency operation. Cost-effectiveness for this equipment would be more than $2,100,000 per ton of CO and VOC abated for the fire pump engines, which represents a prohibitively high cost for this BACT option.

7.3.3 Proposed BACT

Based on the cost-effectiveness analysis for application of catalytic oxidation as a more-stringent increment of control, the proposed BACT for the fire pump engines is the suite of combustion modifications supplied by the manufacturer as standard equipment that enable the engine to meet the emission standards in Subpart IIII. Annual emissions would be limited by restricting non-emergency hours of operation to 100 hours per year as required by Subpart IIII.

7.4 SO_2 and PM BACT

The proposed fire pump engines will use ultra-low sulfur diesel (ULSD) fuel which has a sulfur content of no more than 0.0015 percent (15 ppm) by weight. Given the low emission rates expected as a result of using ULSD fuel, there are no available technologies beyond good combustion controls that are considered to provide feasible or cost-effective emission control. Use of engines certified by manufacturers to meet Subpart IIII emission standards, use of ULSD fuel, and limitation of non-emergency operation to a maximum of 34 hours per year (less than

the 100-hour limit imposed by Subpart IIII) will provide low emissions of SO_2 and PM, and are proposed as BACT measures for these pollutants.

8 TAPS BACT

The majority of TAPs emitted by the proposed emission units can be classified as either volatile organic compounds (i.e., VOCs) or particles (i.e., PM). The proposed BACT for VOC and PM are also proposed to be BACT for VOC TAPs and PM TAPs, respectively. BACT for TAPs that contain chlorine (e.g., hydrogen chloride) and sulfur (e.g., sulfuric acid) is proposed to be the same as that proposed for SO_2, and BACT for nitrogen-containing TAPs (e.g., NO_2) is proposed to be the same as that proposed for NO_X.

Table A-1. Recent RBLC Entries for Natural Gas-Fired Boilers Less Than 100 MMBtu/hr

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
FL-0335	09-05-12	Klauser Holding USA, Inc.	Suwannee County, FL	Boiler	46 MMBtu/hr	NO_X – 0.036 lb/MMBtu CO – 0.039 lb/MMBtu $PM_{10}/PM_{2.5}$ – 2 gr of s/100 scf SO_2 – 2 gr of s/100 scf VOC – 0.003 lb/MMBtu	LNB, FGR, GCP	BACT-PSD, Other Case-by-Case
NJ-0079	07-25-12	CPV Shore, LLC	Middlesex, NJ	Boiler	91.6 MMBtu/hr	NO_X – 0.01 lb/MMBtu CO – 0.038 lb/MMBtu $PM_{10}/PM_{2.5}$ – 0.005 lb/MMBtu SO_2 – 0.0018 lb/MMBtu VOC – 0.0015 lb/MMBtu	LSF, LNB, GCP	LAER, Other Case-by-Case, BACT-PSD
OH-0350	07-18-12	Republic Steel	Lorain, OH	Boiler	65 MMBtu/hr	NO_X – 0.07 lb/MMBtu CO – 0.04 lb/MMBtu PM_{10} – 0.0074 lb/MMBtu SO_2 – 0.0006 lb/MMBtu VOC – 0.0054 lb/MMBtu	GCP	BACT-PSD
CA-1189	01-24-12	Petrorock – Tunnell Lease	Santa Barbara, CA	Boiler	2 MMBtu/hr	NO_X – 20 ppmvd @ 3% O_2	LNB	Other Case-by-Case
CA-1192	06-21-11	Avenal Power Center, LLC	Kings, CA	Auxiliary Boilers	37.4 MMBtu/hr	NO_X – 9 ppmvd CO – 50 ppmvd PM_{10} – 0.0034 gr/dscf	ULNB, LSF, Operational Restriction of 46,675 MMBtu/yr	BACT-PSD
CA-1185	06-07-11	Santa Barbara Airport	Santa Barbara, CA	Boiler	3 MMBtu/hr	NO_X – 12 ppmvd @ 3% O_2 CO – 100 ppmvd @ 3% O_2	GCP, FGR	Other Case-by-Case

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
LA-0246	12-31-10	Valero Refining – New Orleans, LLC	St. Charles, LA	Boiler	99 MMBtu/hr	NO_X – 0.04 lb/MMBtu CO – 0.082 lb/MMBtu PM_{10} – 0.0075 lb/MMBtu SO_2 – 0.026 lb/MMBtu VOC – 0.0054 lb/MMBtu	GCP	BACT-PSD
OR-0048	12-29-10	Portland General Electric	Morrow, OR	Boiler	91 MMBtu/hr	NO_X – 0.05 lb/MMBtu PM_{10} – 2.5 lb/MMcf	LNB, CF	BACT-PSD
MO-0082	10-05-10	Archer Daniels Midland	Audrain County, MO	Boiler	85.6 MMBtu/hr	VOC – 0.0055 lb/MMBtu	GCP	BACT-PSD
LA-0240	06-14-10	Flopam, Inc.	Iberville Parish, LA	Boiler	25.1 MMBtu/hr	NO_X – 9 ppmv CO – 0.037 lb/MMBtu PM_{10} – 0.005 lb/MMBtu VOC – 0.008 lb/MMBtu	ULNB, LSF, GCP	LAER (NO_X, VOC), BACT-PSD
CA-1191	03-11-10	City of Victorville	Victorville, CA	Auxiliary Boilers	35 MMBtu/hr	NO_X – 9 ppmvd CO – 50 ppmvd $PM_{2.5}$ – 0.2 gr/100 dscf	Restricted Hours of Operation (500), LSF	BACT-PSD
NV-0049	08-20-09	Harrah's Operating Company, Inc.	Clark County, NV	Boilers	14.3, 16.8, 24, 31.4, 33.5, and 35.4 MMBtu/hr	NO_X – 0.0353, 0.03, 0.0108, 0.0306, 0.0367, and 0.035 lb/MMBtu CO – 0.0705, 0.0173, 0.037, 0.0172, 0.0075, and 0.0073 lb/MMBtu PM_{10} – 0.0075, 0.0077, 0.0075, 0.0076, 0.0075, and 0.0076 lb/MMBtu SO_2 – 0.0006, 0.0042, 0.0006, 0.0006, 0.0006, and 0.0006 lb/MMBtu VOC – 0.0054 lb/MMBtu	LNB, FGR, LSF, GCP	BACT-PSD (NO_X, SO_2), Other Case-by-Case
NH-0015	02-27-09	Concord Steam Corp.	Merrimack County, NH	Auxiliary Boiler	76.8 MMBtu/hr	NO_X – 0.049 lb/MMBtu	LNB, FGR, Restricted Hours of Operation (700)	LAER

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
OK-0135	02-23-09	Pryor Plant Chemical Co.	Mayes County, OK	Boilers	80 MMBtu/hr	NO_X – 0.05 lb/MMBtu CO – 0.0825 lb/MMBtu PM_{10} – 0.00625 lb/MMBtu SO_2 – 0.0025 lb/MMBtu VOC 0.00625 lb/MMBtu	LNB, GCP	BACT - PSD
OK-0137	02-09-09	ConocoPhillips	Kay County, OK	Boilers	95 MMBtu/hr	NO_X – 0.036 lb/MMBtu CO – 0.04 lb/MMBtu	ULNB, GCP	BACT-PSD
OK-0129	01-23-09	AEC, Inc.	Mayes County, OK	Auxiliary Boiler	33.5 MMBtu/hr	NO_X – 0.07 lb/MMBtu CO – 0.15 lb/MMBtu SO_2 – 0.0009 lb/MMBtu VOC – 0.016 lb/MMBtu	LNB, LSF, GCP	BACT-PSD
MD-0040	11-12-08	Competitive Power Ventures, Inc.	Charles County, MD	Boiler	93 MMBtu/hr	NO_X – 0.011 lb/MMBtu CO – 0.02 lb/MMBtu $PM_{10}/PM_{2.5}$ – 0.005 lb/MMBtu VOC – 0.002 lb/MMBtu	LNB, FGR, LSF	LAER ($PM_{2.5}$, VOC), BACT-PSD
OH-0323	06-05-08	Titan Tire Corp.	Williams County, OH	Boiler	50.4 MMBtu/hr	NO_X – 0.049 lb/MMBtu CO – 0.082 lb/MMBtu PM_{10} – 0.0019 lb/MMBtu VOC – 0.0054 lb/MMBtu	None	BACT-PSD (NO_X, CO, VOC)
NV-0047	02-26-08	Nellis AFB	Clark County, NV	Boilers	6.5 MMBtu/hr (representative of 125 regulated units)	NO_X – 25 ppmvd @ 3% O_2 CO – 50 ppmvd @ 3% O_2 PM_{10} – 0.0077 lb/MMBtu SO_2 – 0.0015 lb/MMBtu VOC – 0.0062 lb/MMBtu	LNB, FGR, LSF	BACT-PSD (SO_2), Other Case-by-Case
MD-0037	01-28-08	Medimmune, Inc.	Frederick County, MD	Boilers/Heaters	29.4 MMBtu/hr	NO_X – 0.011 lb/MMBtu	ULNB	LAER
MN-0070	09-07-07	Minnesota Steel Industries, Inc.	Itasca County, MN	Boilers/Heaters	99 MMBtu/hr	NO_X – 0.0035 lb/MMBtu CO – 0.08 lb/MMBtu PM_{10} – 0.0025 gr/dscf	None	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
AL-0230	08-17-07	Thyssen-Krupp Steel and Stainless USA, LLC	Mobile County, AL	Boilers	64.9 MMBtu/hr	NO_X – 0.035 lb/MMBtu CO – 0.04 lb/MMBtu PM_{10} – 0.0076 lb/MMBtu SO_2 – 0.0006 lb/MMBtu VOC -0.0055 lb/MMBtu	ULNB, FGR	BACT-PSD
GA-0130	07-27-07	Kia Motors	Troup County, GA	Boilers	30 MMBtu/hr	NO_X – 30 ppm @ 3% O_2	LNB	BACT-PSD
AL-0231	06-12-07	Nucor Corp.	Morgan County, AL	Boiler	95 MMBtu/hr	NO_X – 0.035 lb/MMBtu CO – 0.061 lb/MMBtu PM_{10} – 0.0076 lb/MMBtu SO_2 – 0.0006 lb/MMBtu VOC -0.0026 lb/MMBtu	ULNB	BACT-PSD
OH-0309	05-03-07	Daimler Chrysler Corp.	Lucas County, OH	Boiler	20.4 MMBtu/hr	NO_X – 0.035 lb/MMBtu CO – 0.083 lb/MMBtu PM_{10} – 0.0075 lb/MMBtu SO_2 – 0.0006 lb/MMBtu VOC -0.0054 lb/MMBtu	LNB, FGR	LAER (NO_X, VOC), BACT-PSD
MS-0085	01-31-07	Dart Container Corp., LLC	Clarke County, MS	Boiler	33.5 MMBtu/hr	VOC – 0.0055 lb/MMBtu	None	BACT-PSD
FL-0285	01-26-07	Progress Energy Florida (PEF)	Pinellas County, FL	Auxiliary Boiler	99 MMBtu/hr	CO – 0.08 lb/MMBtu	LSF	BACT-PSD
FL-0286	01-10-07	Florida Power And Light Company	West Palm Beach County, FL	Auxiliary Boiler	99.8 MMBtu/hr	NO_X – 0.05 lb/MMBtu CO – 0.08 lb/MMBtu PM_{10}/SO_2 – 2 gr/100 scf	LSF	BACT-PSD
NV-0044	01-04-07	Harrah's Operating Company, Inc.	Clark County, NV	Boilers	35.4 MMBtu/hr	NO_X – 0.035 lb/MMBtu CO – 0.036 lb/MMBtu PM_{10} – 0.0075 lb/MMBtu SO_2 – 0.001 lb/MMBtu VOC -0.005 lb/MMBtu	LNB, FGR, LSF, GCP	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
TX-0501	07-11-06	Texstar FS, LP	Henderson County, TX	Boiler	93 MMBtu/hr	NO_X – 0.090 lb/MMBtu CO – 0.076 lb/MMBtu PM_{10} – 0.0069 lb/MMBtu SO_2 – 0.00054 lb/MMBtu VOC -0.0049 lb/MMBtu	None	BACT-PSD
WA-0316	06-14-06	Northwest Pipeline Co.	Skagit County, WA	Boiler	4.19 MMBtu/hr	NO_X – 0.04 lb/MMBtu	GCP	BACT-PSD
CA-1128	05-16-06	Cottage Health Care	Santa Barbara County, CA	Boiler	25 MMBtu/hr	NO_X – 9 ppmv @ 3% O_2 CO – 50 ppmv @ 3% O_2	ULNB	BACT-PSD
NV-0048	05-16-06	Kern River Gas Transmission Co.	Clark County, NV	Boiler	3.85 MMBtu/hr	NO_X – 0.1 lb/MMBtu CO – 0.083 lb/MMBtu PM_{10} – 0.0078 lb/MMBtu SO_2 – 0.0015 lb/MMBtu VOC - 0.005 lb/MMBtu	LSF, GCP	BACT-PSD (SO_2), Other Case-by-Case
NY-0095	05-10-06	Caithness Bellport, LLC	Suffolk County, NY	Auxiliary Boiler	29.4 MMBtu/hr	NO_X – 0.011 lb/MMBtu CO – 0.036 lb/MMBtu PM_{10} – 0.0033 lb/MMBtu SO_2 – 0.0005 lb/MMBtu	LNB, FGR, LSF, GCP	BACT-PSD
AR-0090	04-03-06	Nucor Steel	Mississippi, AR	Boilers	12.6 MMBtu/hr	NO_X – 0.075 lb/MMBtu CO – 0.084 lb/MMBtu PM_{10} - SO_2 - VOC -	LNB, GCP	BACT-PSD (except SO_2)
CA-1127	09-27-05	Genentech, Inc.	San Mateo County, CA	Boiler	97 MMBtu/hr	NO_X - CO -	ULNB	BACT-PSD
AK-0062	08-19-05	BP Exploration Alaska	North Slope Borough, AK	Reboiler	1.34 MMBtu/hr	NO_X - CO - SO_2 -	LSF, GCP	BACT-PSD

TABLE A-2. FUGITIVE EMISSIONS REGULATIONS COMPARISON TABLE

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Stream Applicability	> 5% VHAP by weight In organic HAP service > 300 hrs	> 5% VHAP by weight or as defined in the referencing Subpart	Elastomer Product Process Units	> 5% VHAP by weight In organic HAP service > 300 hrs	5% wt of the sum of Class I and II organics TAPs or >10% wt of the sum of Class I, II and III organic TAPs	> 10% VOC by weight	> 5% VHAP by weight In organic HAP service > 300 hrs	5% wt of the sum of Class I and II organics TAPs or >10% wt of the sum of Class I, II and III organic TAPs	>10% VOC by weight For sources in non-attainment areas for ozone	>10% wt VTAP (vinyl chloride or benzene)	> 10% VOC by weight	> 5% VHAP by weight or as defined in the referencing Subpart	> 10% by weight	>10% VOC by volume (2121)	"In Gasoline Service" (R) or "In Hydrogen Fluoride Service", as defined
Leak Definition	**Valves-Gas/LL:** 500 **HL:** No visual/500 **Pumps-LL:** 1,000 **HL:** No visual/2,000 **Compressors:** 500 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 500 **Connectors:** 500 **Agitators:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 500 **HL:** No visual/500 **Pumps-LL:** 5,000 – polymers 2,000 – food/med 1,000 – other **HL:** 5,000 – polymers 2,000 – food/med 2,000 – other **Compressors:** 500 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 500 **Connectors:**500 **Agitators:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 500 **HL:** No visual/500 **Pumps-LL:** 1,000 **HL:** No visual/2,000 **Compressors:** 500 **CVS:** 500 **PRVs-Gas:**500 **Liquid:** 500 **Connectors:** 500 **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 500 **HL:** No visual/500 **Pumps-LL:** No visual/2,000 **HL:** No visual/2,000 **Compressors:** 500 **CVS:** 500 **PRVs-Gas:**500 **Liquid:** No visual/ 500 **Connectors:** 500 **Agitators:** No visual/10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 200 / 500 **HL:** No visual/1,000 **Pumps-LL:** 2,000 **HL:** No visual/2,000 **Compressors:** 5,000 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 1,000 **Connectors:** 1,000 **Agitators-HL:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 500 **HL:** No visual/10,000 **Pumps-LL:** 5,000 – monomer 2,000 – other **HL:** No visual/10,000 **Compressors:** Seal system failure **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 10,000 **Connectors-Gas/ LL:** 500 **HL:** No visual/10,000 **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 1,000 **HL:** No visual/1,000 **Pumps-LL:** 2,000 **HL:** Reciprocating pumps exempt **Compressors:** 500 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 500 **Connectors:** 1,000 **Agitators:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 1,000 **HL:** No visual/1,000 **Pumps-LL:** 2,000 **HL:** No visual/2,000 **Compressors:** 5,000 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 1,000 **Connectors:** 1,000 **Agitators-HL:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 1,000 **HL:** No visual/1,000 **Pumps-LL:** 5,000 **HL:** No visual/5,000 **Compressors:** 5,000 **CVS:** No visual **PRVs-Gas:** 1,000 **Liquid:** No visual/ 1,000 **Connectors:** No visual /1,000 **Agitators:** 10,000 **Process Drains:** 1,000 **Sampling Points:** No visual leak	**Valves-Gas/LL:** 10,000 **HL:** No visual /10,000 **Pumps-LL:** 10,000 **HL:** No visual /10,000 **Compressors:** No visual leak **CVS:** 500 **PRVs-Gas**:500 **Liquid**: 10,000 **(HH)All:** 10,000 **Connectors:** No visual leak **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 10,000 **HL:** No visual/10,000 **Pumps-LL:** 10,000 **HL:** No visual/10,000 **Compressors:** Seal system failure **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 10,000 **Connectors:** No visual/10,000 **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 10,000 **HL:** No visual/10,000 **Pumps-LL:** 10,000 **Pumps-HL:** No visual/10,000 **Compressors:** Seal system failure **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 10,000 **Connectors:** No visual/10,000 **Agitators:** No visual leak/10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 10,000 **HL:** No visual/10,000 **Pumps-LL:** 10,000 **HL:** No visual/10,000 **Compressors:** 10,000 **CVS:** 10,000 **PRVs-Gas:** 10,000 **Liquid:** 10,000 **Connectors:** Visual **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**All equipment:** 10,000 Subpart III – annually or after reinstallation	**All equipment:** Evidence of potential leak detected by visual, audible, or olfactory means.
Leak Definition	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/500 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/500 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** 500 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/500 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/1,000 **Open-ended lines:** 1,000	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/1,000 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/1,000 **Open-ended lines:** 1,000	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**All equipment:** 10,000	

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Monitoring Frequency: Light Liquid valves	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking Every 2 years if <0.25%	Monthly if > 4% Quarterly if < 4%	Monthly If ND leak for 2 successive months = quarterly	**Monthly:** ->5% (with connectors) ->4%(without) **Quarterly:** - <5% (with connectors) - <4% (without) **Semiannual:** - <4% (with) - <3% (without) **Annual:** - <3% (with) - <2% (without)	Monthly if > 4% Quarterly if < 4%	Quarterly	Monthly	Monthly If ND leak for 2 successive months = quarterly	Monthly If ND leak for 2 successive months = quarterly	Monthly If ND leak for 2 successive months = quarterly	Quarterly Annually (pipeline valves)	Monthly (63 R) -or- Once per shift (63 YY)
Monitoring Frequency: Gas Valves	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking Every 2 years if <0.25%	Monthly if > 4% Quarterly if < 4%	Monthly If ND leak for 2 successive months = quarterly	**Monthly:** ->5% (with connectors) ->4%(without) **Quarterly:** - <5% (with connectors) - <4% (without) **Semiannual:** - <4% (with) - <3% (without) **Annual:** - <3% (with) - <2% (without)	Monthly if > 4% Quarterly if < 4%	Quarterly	Monthly	Monthly If ND leak for 2 successive months = quarterly	Monthly If ND leak for 2 successive months = quarterly	Monthly If ND leak for 2 successive months = quarterly	Quarterly	Monthly (63 R) -or- Once per shift (63 YY)
Monitoring Frequency: Gas Pressure Relief Valves	Monitor within 5 days of a release	Monitor within 5 days of a release	Monitor within 5 days of a release	Monitor within 5 days of a release	Monitor within 5 days of a release	Monitor within 5 days of release	Monitor within 5 days of a release	Monitor within 5 days of a release	Quarterly and within 24 hours of an atmospheric release	Monitor within 5 days of release	Monitor within 5 days of release	Monitor within 5 days of release	Monitor within 5 days of release	Quarterly and within 24 hours of an atmospheric release	Monitor within 5 days of detection by sight, sound, or smell
Monitoring Frequency: Liquid Pressure Relief Valves	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of a release or detection by sight, smell, or sound	Monitor within 5 days of a release or detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 24 hours of an atmospheric release	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 24 hours of an atmospheric release	Monitor within 5 days of detection by sight, smell, or sound
Monitoring Frequency: Light Liquid Pumps	Monthly monitor & weekly visual Pump repair not required unless leak > 2000 ppm	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Quarterly if <3% leaking Monthly if <10% or 3 leaking, whichever is greater	Quarterly monitor & weekly visual	Quarterly monitor & weekly visual (seals)	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Quarterly monitor & weekly visual Pump seals (annually)	Monthly (63 R) -or- Once per shift (63 YY)

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Monitoring Frequency: Compressors	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Quarterly Or Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Quarterly Or Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Quarterly monitor (seals)	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Quarterly monitor & weekly visual (seals)	Monthly (63 R) -or- Once per shift (63 YY)
Monitoring Frequency: Flanges/ Connectors	Initial monitor Monitor annually if >0.5% leaking Monitor biennially if <0.5% leaking Monitor every 4 years if <0.5% leaking for 2 years HL connectors: Monitor within 5 days of detection by sight, smell, or sound	Initial monitor Monitor annually if >0.5% leaking Monitor every 4 years if <0.5% and >0.25% Monitor at least 50% of connectors within four years if <0.25% HL connectors: Monitor within 5 days of detection by sight, smell, or sound	Monitor annually if >0.5% leaking Monitor biennially if <0.5% leaking Monitor every 4 years if <0.5% leaking for 2 years	Initial monitor Monitor annually if >0.5% leaking Monitor biennially if <0.5% leaking Monitor every 4 years if <0.5% leaking for 2 years HL connectors: Monitor within 5 days of detection by sight, smell, or sound	Annually (random 200 or 10% by unit) If <2% leaking = annually If >2% leaking = quarterly until <2% obtained for 4 qrts otherwise monitor all connectors Monitor within 90 days after welding (xray, etc.) or breaking the seal (OVA)	Monitor within 5 days of detection by sight, smell, or sound	**2 Option**s(if monitoring connectors): **Random 200** - monitor within 1st 12months after Phs III date - every 6 mos. if >2% - annual if <2% and >1% - biannaul if <1% and >.5% - every 4 years if <0.5% **Inspection Alternative** - monitor all gas/ vapor connctors within 12 months after Phs III date - inspect all light liquid connectors (> 3 drops/minute) - annual if >2% leaking - biannual if ,2% and >1% leaking - every 4 years if <1% leaking	Annually (random 200 or 10% by unit) If <2% leaking = annually If >2% leaking = quarterly until <2% obtained for 4 qrts otherwise monitor all connectors Monitor within 90 days after welding (xray, etc.) or breaking the seal (OVA)	Weekly visual (no records) Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monthly (63 R) -or- Once per shift (63 YY)
Monitoring Frequency: Process Drains	NA	NA	NA	NA	NA	NA	NA	NA	Annually monitor	NA	NA	NA	NA	Annually monitor	NA
Monitoring Frequency: Heavy Liquid Equipment	Monitor within 5 days of detection by sight, smell, or sound. Repaired systems do not require monitoring	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound. Repaired systems do not require monitoring	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound. Repaired systems do not require monitoring	Monitor within 5 days of detection by sight, smell, or sound	Monitor if leak suspected by sight, smell, or sound	NA	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor if leak suspected by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Monitoring Frequency: Closed Vent Systems	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor	Hard Piping: Annual visual Duct Work: Annual monitor	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor	Annually monitor	Hard piping: Initial monitoring Annual visual Duct work: Annual monitor	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor	Annually monitor	NA	Annually monitor	Hard piping: Initial monitoring Annual visual Duct work: Annual monitor	Hard piping: Initial monitoring Annual visual Duct work: Annual monitor	Hard piping: Initial monitoring Annual visual	Monitor if leak suspected by sight, smell, or sound	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor
Monitoring Frequency: Open-ended valves/lines	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve Monitor annually	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve Monitor if leak suspected by sight, smell, or sound	Requires cap, plug, blind flange, or 2nd valve
Monitoring Frequency: Sampling Points/ Connections	Requires closed purge, closed loop, or closed vent system Return or recycle purge	Requires closed purge, closed loop, or closed vent system Return or recycle purge	Requires closed purge, or closed loop system	Requires closed purge, closed loop, or closed vent system Return or recycle purge	Requires closed purge, or closed vent system Return or recycle purge Zero emissions to atm	Requires closed purge system, or closed vent system Return or recycle purge	Requires closed purge, closed loop, or closed vent system Return or recycle purge	Requires closed purge, or closed vent system Return or recycle purge Zero emissions to atm	NA	Requires closed purge, closed vent system Return or recycle purge Zero purge to atm	Requires closed purge system, or closed vent system Return or recycle purge	Requires closed purge system, or closed vent system Return or recycle purge	Requires closed purge system, or closed vent system Return or recycle purge	Monitor within 5 days of detection by sight, smell, or sound	Requires closed purge, closed loop, or closed vent system Return or recycle purge
Monitoring Frequency: Agitators	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Within 5 days of detection by sight, smell, or sound	NA	Monthly monitor & weekly visual	Within 5 days of detection by sight, smell, or sound	NA	NA	NA	Monthly monitor & weekly visual	NA	Monitor within 5 days of detection by sight, smell, or sound	Monthly monitor & weekly visual
Monitoring Frequency: Surge Control Vessels and Bottoms Receivers	Requires closed vent system	NA	Requires closed vent system Exempt from requirements if contains a latex and located downstream of stripping operation.	Requires closed vent system	Requires closed vent system	NA	Requires closed vent system	Requires closed vent system	NA	Requires closed vent system	NA	NA	NA	Monitor within 5 days of detection by sight, smell, or sound	Requires closed vent system
Monitoring Frequency: Visual Leaks	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound			Monitor within 5 days of detection by sight, smell, or sound		Monitor immediately any component leaking based on sight, smell, or sound			Monitor within 5 days of detection by sight, smell, or sound	NA	Monitor immediately any component leaking based on sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound
Monitoring Frequency: Instrument-ation Systems	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	NA	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	NA	NA	NA	Monitor within 5 days of detection by sight, smell, or sound	NA	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Skip periods	**Valves only:** Initial performance of 2% leaks = quarterly Initial performance of 1% leaks = semi-annually **Pumps only:** No skip period only avoid QIP requirements Batch process monitoring Historical performance acceptable without prior approval	**Valves only:** Monthly if >2% Quarterly if <2% Semiannually if <1% Annually if <0.5% Biennally if <0.25% **Pumps only:** No skip period only avoid QIP requirements	**Valves only:** Initial performance of 2% leaks = quarterly Initial performance of 1% leaks = semi-annually **Pumps only:** No skip period only avoid QIP requirements Batch process monitoring	**Valves only:** Initial performance of 2% leaks = quarterly Initial performance of 1% leaks = semi-annually **Pumps only:** No skip period only avoid QIP requirements Batch process monitoring Historical performance acceptable without prior approval	**Valves only:** Not Allowed	**Valves only:** 2 consecutive quarters <2% = skip 1 quarter 5 consecutive quarters <2% = skip 3 quarters	**Valves (with connectors):** Initial performance of 5% leaks = quarterly Initial performance of 4% leaks = semi-annually **Valves (without connectors):** Initial performance of 4% leaks = quarterly Initial performance of 3% leaks = semi-annually **Pumps only:** No skip period only avoid QIP requirements Historical performance acceptable without prior approval	**Valves only:** 2 consecutive quarters <2% = semi-annual 2 consecutive semi-annual < 2% = annual >2% leaking = increase monitoring Historical performance acceptable without prior approval	**Valves only:** 2 consecutive quarters < 2% = skip 1 quarter 5 consecutive quarters < 2% = skip 3 quarters Total leaking FECs cannot be > 4% Historical performance acceptable without prior approval	**Valves only:** 2 successive months ND = first month of every qtr until leak detected 2 consecutive qtrs < 2% = skip 1 qtr 5 consecutive qtrs < 2% = skip 3 qtrs Vinyl Chloride NESHAP allows 200 or 90% valves if <2%	**Valves only:** 2 consecutive quarters <2% = skip 1 quarter 5 consecutive quarters <2% = skip 3 quarters	**Valves only:** 2 consecutive quarters <2% = skip 1 quarter 5 consecutive quarters <2% = skip 3 quarters Monthly if >2%	**Valves only:** 2 consecutive quarters <2% = skip 1 quarter 5 consecutive quarters <2% = skip 3 quarters	**Valves only:** 2 consecutive quarters <2% = skip 1 qtr for valves and pumps (LL) 5 consecutive quarters <2% = skip 3 qtrs	None for 63 R
Light/heavy liquid definition and exemptions	Light liquid has VP > 0.3 kPa @ 20 degC	Light liquid has VP > 0.3 kPa @ 20 degC	Light liquid has VP > 0.2 kPa @ 20 degC	Light liquid has VP > 0.3 kPa @ 20 degC & is 20%w of total process stream	Light liquid has VP > 0.3 kPa @ 20 degC or a 10% evaporation point > 150 degC using ASTM D-86	Light liquid has VP > 0.3 kPa @ 20 degC & is 20%w of total process stream	Light liquid has VP > 0.3 kPa @ 20 degC or a 10% evaporation point > 150 degC using ASTM D-86	Light liquid has VP > 0.3 kPa @ 20 degC or a 10% evaporation point > 150 degC using ASTM D-86		Light liquid has VP >0.3 kPa @ 20 degC or a 10% evaporation point > 150 degC using ASTM D-86	Light liquid has VP > 0.3 kPa @ 20 degC & is 20%w of total process stream	Light liquid has VP > 0.3 kPa @ 20 degC	Light liquid has VP > 0.3 kPa @ 20 degC	NA	
Liquid dripping definition										Visible leakage including spraying, misting, clouding and ice formation				Per HON	
Materials included in VOC definition					Consistent with LAC 33:III.2117	TOC excluding methane, ethane, 1-1-1-TCE, methylene chloride, and various CFCs		Consistent with LAC 33:III.2117			TOC excluding methane, ethane, 1-1-1-TCE, methylene chloride, and various CFCs		Consistent with LAC 33:III.2117		
Monitoring Method	Method 21 Calibrate within 2000 ppm	Method 21 Calibrate within 2000 ppm	Method 21	Method 21 Calibrate within 2000 ppm	LAC 33:III.6077	Method 21	LAC 33:III Chapter 60, 61 or 63	LAC 33:III.6077	Method 21	Method 21	Method 21	40 CFR 264.1063 (b)	Method 21	Visual, audible, or olfactory	
Monitoring Distance	Consistent with EPA protocol	Consistent with EPA protocol	Consistent with EPA protocol	Consistent with EPA protocol	Not specified	Consistent with EPA protocol	Consistent with EPA protocol	Not specified	Consistent with EPA protocol	Consistent with EPA protocol	Consistent with EPA protocol	Consistent with EPA protocol	Not specified	NA	

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Comments			Comply with Subpart H of SOCMI HON This table outlines HON requirements for Elastomer MACT	Comply with HON except for specific deviations These two regulations are carbon copies of each other											
Post repair inspection	Valves, after repair, monitored at least once within 3 months Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Valves, after repair, monitored at least once within 3 months Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Valves, after repair, monitored at least once within 3 months Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Valves, after repair, monitored at least once within 3 months If monitoring connectors, monitor repaired connector within 2st 3 months after repair. Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Valves, after repair, monitored at least once within 3 months	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	No visible leak or holds a test pressure
Repair periods (1st/Final Attempt)	5 day/15 days	5 day/15 days	5 days/15 days	5 days/15 days	5 days*/15 days *Includes monitoring	5 days/15 days	5 day/15 days	5 days/15 days	15 days	5 days/15 days	5 days/15 days	5 days/15 days	5 days/15 days	15 days	5 days/15 days
Calibration gas	Zero air, and mixtures dependent on phase monitored	Zero air, methane or n-hexane and air at a concentration of approximately 2,000 ppm	Zero air, air mixtures dependent of phase monitored	Zero air, methane or n-hexane and air at a concentration of approximately 2,000 ppm	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Zero air, methane or n-hexane and air at a concentration no more than 2,000 ppm above leak definition and highest scale with a calibration gas of approximately 10,000 ppm	Zero air, and mixtures dependent on phase monitored	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Not specified in rule	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Not specified in rule	NA
Calibration Frequency	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Not specified in rule	Before use each day	Before use on each day	Before use on each day	Before use on each day	Not specified in rule	NA
Criteria for unsafe to monitor exemption	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves, connectors & CVS:** Immediate danger Follow written plan to monitor when safe	**Valves:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves, connectors & CVS:** Immediate danger Follow written plan to monitor when safe	No criteria, but monitor when safe	**Valves:** Immediate danger Follows written plan to monitor when safe	**Valves:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves:** Immediate danger Follow written plan to monitor when safe	No criteria, but monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe

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Criteria for inaccessible components exemption	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Random 200 option** - only accessible connectors **Inspection Alternative** - only accessible connectors	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)				**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)			**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)
Criteria for difficult to monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor
Exemptions	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor <.75" FECs in instrumentation systems PRVs equipped with rupture disk	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor <.75" FECs in instrumentation systems PRVs equipped with rupture disk	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals Vapor pressure <0.0435 psia R&D facilities (< 100 FEC) Insulated components	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor	Vacuum service Unsafe to monitor Dual Mechanical seals Vapor pressure <0.0435 psia R&D facilities (< 100 FEC) Check valves	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system Difficult to monitor Open ended lines for emergency PRVs equipped with rupture disk
Exemptions (Continued)	Unmanned sites: Monthly visual inspections allowed Compressors operated <300 hrs or tied to CVS or VRU	Open ended lines for emergency PRVs equipped with rupture disk	Open ended lines for emergency PRVs equipped with rupture disk	Open ended lines for emergency PRVs equipped with rupture disk	Open ended lines for emergency PRVs equipped with rupture disk		Unmanned sites: Monthly visual inspections allowed Compressors operated <300 hrs or tied to CVS or VRU	Open ended lines for emergency PRVs equipped with rupture disk	Components of shutdown repair list						Unmanned sites: Monthly visual inspections allowed Compressors operated <300 hrs or tied to CVS or VRU

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Delay of repair	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connector, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOTAP service **Valves, connectors & agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device Drill and tap required on non-control valves, if feasible, before placing on delay of repair All components on delay of repair must be monitored per routine monitoring **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOC service **Valves:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOTAP service **Valves, connectors & agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Requires a PU shutdown Isolated or bypassed to reduce leakage Shutdown would create more emissions than repair would eliminate	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VHAP service **Valves:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOC service **Valves:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOC service **Valves:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Requires a PU shutdown Isolated or bypassed to reduce leakage Shutdown would create more emissions than repair would eliminate	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)
Delay of repair beyond PU shutdown	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion		**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion		**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.
Tagging	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components and affected components	Leaking components	Leaking components	Physical tag required	Leaking components	None
Use of background concentration data	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Not specified in rule	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance		Not specified in rule	NA

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Recordkeeping	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data Batch Process Monitoring HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data Batch Process Monitoring HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data Batch Process Monitoring HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data Batch Process Monitoring HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule Valves records Exemption data CVS system design and operation DORs must be signed within 30 days of leak identifcation	Leak and repair records Component Inventory CVS design and operation records Valve records Exemption data	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule Valves records Exemption data CVS system design and operation	Leak and repair records Component inventory Calibration records	Leak and repair records CVS design and operation records Component Inventory Valve records Exemption data	Leak and repair records Component Inventory CVS design and operation records Valve records Exemption data	Leak and repair records Component Inventory CVS design and operation records Valve records Exemption data	Leak and repair records Component Inventory CVS design and operation records Valve records Exemption data Compliance Test Results	Leak and repair records Component inventory Calibration records	Maintain log book of inspections, and leaking components, with summary descriptions.
Recordkeeping Period	2 years	Per referencing Subpart	2 years	5 years	5 years	2 years	2 years	5 years	2 years	2 years	2 years	Per referencing Subpart (5 years)	2 years	2 years	5 years
Reporting	LDAR Performance reports semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	LDAR Performance reports semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	LDAR performance report semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	LDAR Performance reports semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	Initial notification Quarterly LDAR Performance reports 3 months after initial report	Initial report LDAR Performance reports semi-annually	LDAR Performance reports semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	Initial notification Quarterly LDAR Performance reports 3 months after initial report	Quarterly LDAR Performance reports, including repair data	Initial report Semi-annual reports starting 6 months after initial	Initial report LDAR Performance reports semi-annually	Per referencing Subpart	LDAR Performance reports semi-annually	Quarterly LDAR Performance reports, including repair data	63 Subpart R: Quarterly 63 Subpart YY: Records only

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Effective dates	Group I Oct 24, 1994 Oct 24, 1995 Apr 24, 1997 Group II Jan 23, 1995 Jan 23, 1996 Jul 23, 1997 Group III Apr 24, 1995 Apr 24, 1996 Oct 24, 1997 Group IV Jul 24, 1995 July 24, 1996 Dec 24, 1997 Group V Oct 23, 1995 Oct 23, 1996 Apr 23, 1997		One year after promulgation for compressors 6 months after promulgation for other equipment		Jan 1, 1995, unlessotherwise specified in Air Toxics Compliance Plan, but no later than Dec 20, 1996	Nov. 16, 2007	New Sources - upon startup Existing Sources - Phase I- Aug 18, 1998 Phase II - Aug 18, 1999 Phase III - Feb 18, 2001	Jan 1, 1995, unlessotherwise specified in Air Toxics Compliance Plan, but no later than Dec 20, 1996	Jan1, 1996	June 6, 1984 Vinyl Chloride NESHAP Oct 21, 1976	Jan 5, 1981		As required by permit		

Note: For this table –

CVS = closed vent systems; DMS = dual mechanical seal system; Gas = in gas/vapor service; HL = in heavy liquid service; Liquid = in liquid service;
LL = in light liquid service; ND = no leak is detected; PRVs = pressure relief valves/devices; PU = process unit; QIP = quality improve program;
SurgeCtrlVessel = surge control vessel; TOC = total volatil organic compounds; VRU = vapor recovery unit.

Table A-3. Recent BACT Determinations For Internal Combustion Emergency Fire Pump Engines ≤ 500 HP

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
OH-0352	06-18-13	Arcadis, US, Inc.	Lucas County, OH	Emergency Fire Pump	300 HP	NO_x – 1.7 lb/hr CO – 1.7 lb/hr PM_{10} – 0.1 lb/hr SO_2 – 0.003 lb/hr VOC – 0.25 lb/hr CO_2e – 87 ton/yr	Purchased certified to the standards in NSPS Subpart IIII	BACT-PSD
PA-0286	01-31-13	Moxie Energy, LLC	Lycoming County, PA	Fire Pump	Not Provided	NO_x – 2.6 g/HP-hr CO – 0.5 g/HP-hr PM_{10}/ $PM_{2.5}$ – 0.09 g/HP-hr VOC – 0.1 g/HP-hr	Not provided	Other Case-by-Case
IN-0158	12-03-12	St. Joseph Energy Center, LLC	St. Joseph County, IN	Diesel Fire Water Pumps	371 BHP	NO_x – 3 g/HP-hr CO – 2.6 g/HP-hr PM_{10}/ $PM_{2.5}$ – 0.15 g/HP-hr SO_2 – 0.0015% S diesel fuel VOC – 0.16 lb/hr CO_2e – 172 ton/yr	GCP, ULSD	BACT-PSD
IA-0105	10-26-12	Iowa Fertilizer Company	Lee County, IA	Fire Pump	14 gal/hr	NO_x – 3.75 g/kW-hr CO – 3.5 g/kW-hr PM_{10}/ $PM_{2.5}$ – 0.2 g/kW-hr VOC – 0.25 g/kW-hr VE – 5% CO_2e – 91 ton/yr	GCP	BACT-PSD
WY-0070	08-28-12	Black Hills Power, Inc.	Laramie County, WY	Diesel Fire Pump	327 HP	NO_x – not provided CO – not provided SO_2 – not provided	EPA Tier 3 rated, ULSD	BACT-PSD
VA-0319	08-27-12	Gateway Green Energy	Prince George County, VA	Firewater Pump	1.86 MMBtu/hr	PM_{10}/ $PM_{2.5}$ – 0.15 g/HP-hr CO_2e – 30.5 ton/yr	GCP, ULSD	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
SC-0113	02-08-12	Pyramax Ceramics, LLC	Allendale County, SC	Fire Pump	500 HP	NO_x – 4 g/kW-hr CO – 3.5 g/kW-hr SO_2 – not provided VOC – 4 g/kW-hr	Purchase of certified engine based on NSPS, Subpart IIII, ULSD, Sulfur content less than 0.0015%, operating hours less than 100 hr/yr for maintenance and testing	BACT-PSD
TX-0612	11-10-11	Lower Colorado River Authority	Llano County, TX	Diesel Fire Water Pumps	617 HP	CO_2e – 7027.8 lb/hr	Best work practice	BACT-PSD
LA-0254	08-16-11	Entergy Louisiana, LLC	Jefferson Parish, LA	Emergency Fire Pump	350 HP	CO – 2.6 g/HP-hr PM_{10}/ $PM_{2.5}$ – 0.15 g/HP-hr VOC – 1 g/HP-hr	ULSD, GCP	BACT-PSD
CA-1192	06-21-11	Avenal Power Center, LLC	Kings County, CA	Emergency Firewater Pump	288 HP	NO_x – 3.4 g/HP-hr CO – 0.447 g/HP-hr PM_{10} – not provided	Equipped with a turbocharger and an intercooler/ aftercooler, ULSF not to exceed 15 ppmvd fuel sulfur, operational limit of 50 hr/yr	BACT-PSD
LA-0251	04-26-11	Flopam, Inc.	Iberville Parish, LA	Fire Pump	444 HP	NO_x – 5.82 lb/hr CO – 0.65 lb/hr PM_{10} – 0.01 lb/hr	GCP	BACT-PSD
FL-0322	12-23-10	Southeast Renewable Fuels (SRF), LLC	Hendry County, FL	Emergency Diesel Fire Pump	Not Provided	CO – 2.6 g/HP-hr PM – 0.15 g/HP-hr	Not provided	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
MI-0399	12-21-10	Detroit Edison	Monroe County, MI	Diesel Quench Pump	252 HP	NO_x – 7.8 g/HP-hr CO – 2.6 g/HP-hr $PM_{10}/PM_{2.5}$ – 0.4 g/HP-hr VE – 20% opacity	GCP	BACT-PSD, Each – Test Protocol
NH-0018	07-26-10	Laidlaw Berlin BioPower, LLC	Coos County, NH	Fire Pump	2.27 MMBtu/hr	PM_F – 0.3e-5 lb/MMBtu	Not provided	MACT
ID-0018	06-25-10	Idaho Power Company	Payette County, ID	Fire Pump	235 kW	NO_x – 4 g/kW-hr CO – not provided PM – 0.2 g/kW-hr VOC – 4 g/kW-hr	Tier 3 engine-based	BACT-PSD
CA-1191	03-11-10	City of Victorville	San Bernardino County, CA	Emergency Firewater Pump	135 kW	NO_x – 3.8 g/kW-hr CO – 3.5 g/kW-hr $PM_{2.5}$ – 0.2 g/kW-hr	Operational restriction of 50 hr/yr, operate as required for fire safety testing	BACT-PSD
MI-0389	12-29-09	Consumers Energy	Bay County, MI	Fire Pump	525 HP	CO – 2.6 g/HP-hr PM_{10} – 0.31 lb/MMBtu	Engine design and operation 15 ppm sulfur fuel	BACT-PSD
				Fire Booster Pump	40 kW	CO – 5 g/kW-hr PM_{10} – 0.31 lb/MMBtu	Engine design and operation 15 ppm sulfur fuel	BACT-PSD
OK-0129	01-23-09	Associated Electric Cooperative, Inc.	Mayes County, OK	Emergency Diesel Fire Pump	267 HP	NO_x – 4.59 lb/hr CO – 2.6 g/HP-hr PM_{10} – 0.24 lb/hr SO_2 – 0.11 lb/hr VOC – 0.66 lb/hr	GCP, LSDF	BACT-PSD
OH-0317	11-20-08	Ohio River Clean Fuels, LLC	Columbiana County, OH	Fire Pump	300 HP	NO_x – 4.89 lb/hr CO – 1.72 lb/hr PM_{10} – 0.27 lb/hr VOC – 0.26 lb/hr VE – 20%	GCP, Turbocharger, Low temperature aftercooler	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
MD-0040	11-12-08	Competitive Power Ventures, Inc./CPV Maryland, LLC	Charles County, MD	Emergency Firewater Pump	300 HP	NO_x – 3 g/HP-hr CO – 2.6 g/HP-hr $PM_{10}/PM_{2.5}$ – 0.15 g/HP- hr SO_2 – not provided VOC – 0.66 lb/hr	Not provided	BACT-PSD
FL-0304	09-08-08	Florida Municipal Power Agency (FMPA)	Osceola County, FL	Emergency Fire Pump	> 300 HP	NO_X – 3 g/bhp-hr CO – 2.6 g/bhp-hr PM – 0.15 g/bhp-hr	Not provided	BACT-PSD
LA-0224	03-20-08	Southwest Electric Power Co.	Caddo Parish, LA	Diesel Fire Pump	310 HP	NO_x – 9.61 lb/hr CO – 2.07 lb/hr PM_{10} – 0.68 lb/hr SO_2 – 0.64 lb/hr VOC – 0.77 lb/hr	Low-Sulfur fuel, limited operation hours, and proper engine maintenance	BACT-PSD
MN-0070	09-07-07	Minnesota Steel Industries, LLC	Itasca County, MN	Diesel Fire Water Pumps	Not Provided	SO_2 – 0.05% in fuel VE – 5%	Limited Sulfur in fuel, limited hours	BACT-PSD
CA-1144	04-25-07	Caithness Blythe II, LLC	Riverside County, CA	Fire Pump	303 HP	NO_x – 7.5 lb/hr CO – 0.7 lb/hr PM_{10} – 0.1 lb/hr	Fuel with less than 0.05% sulfur by weight	BACT-PSD
IA-0084	11-30-06	ADM Corn Processing	Clinton County, IA	Fire Pump Engine	500 HP	VOC – 3 g/HP-hr	GCP	BACT-PSD
NC-0101	09-29-05	Forsyth Energy Projects, LLC	Forsyth County, NC	Emergency Firewater Pump	11.40 MMBtu/hr	NO_x – 36.48 lb/hr CO – 9.69 lb/hr PM_{10} – 1.14 lb/hr SO_2 – 0.58 lb/hr VOC – 1.04 lb/hr	Emergency use only	BACT-PSD
LA-0192	06-06-05	Cresent City Power, LLC	Orleans County, LA	Firewater Pump	425 HP	NO_x – 8.9 lb/hr CO – 1.88 lb/hr PM_{10} – 0.14 lb/hr SO_2 – 0.61 lb/hr VOC – 0.05 lb/hr	Good engine design and proper operating practices	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
OH-0252	12-28-04	Duke Energy Hanging Rock ,LLC	Lawrence County, OH	Firewater Pump	265 HP	NO_x – 8.2 lb/hr CO – 1.8 lb/hr PM – 0.66 lb/hr SO_2 – 0.10 lb/hr VOC – 0.66 lb/hr	500 hr/yr	BACT-PSD