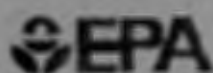


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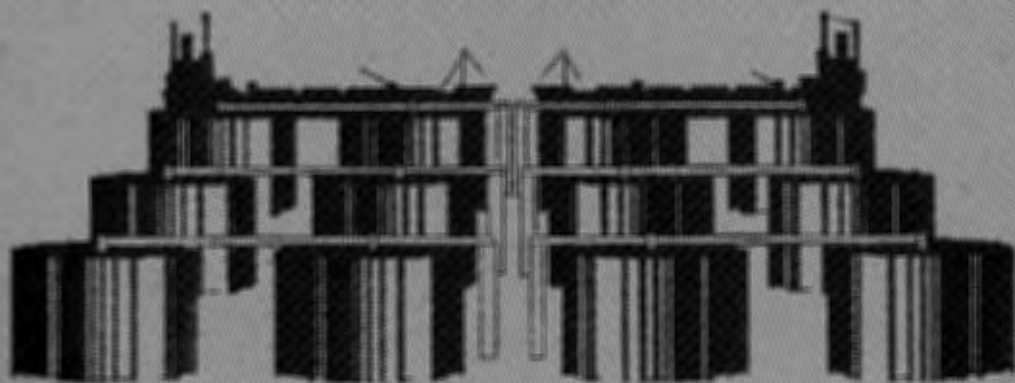
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Research Triangle Park, NC 27711

EPA/656-B-00-011 ✓  
November 2000  
[www.epa.gov/oqa/maact/petroleumrefineries.html](http://www.epa.gov/oqa/maact/petroleumrefineries.html)



# Petroleum Refinery MACT Standard Guidance

(Revised to Include Rule Amendments)



**Revised Document**  
November 2000

EPA-456/B-00-001

# **Petroleum Refinery MACT Standard Guidance**

**(Revised to include Rule Amendments)**

Prepared for:

Office of Air Quality Planning and Standards  
US Environmental Protection Agency  
Research Triangle Park, NC 27711

Prepared by:

Eastern Research Group

November, 2000

**Revised Document**

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## **ACKNOWLEDGMENTS**

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\* This updated document was prepared by the Environmental Research Group Inc. under the direction of Larry Brockman of EPA's Office of Air Quality Planning and Standards, under Task Order 68-D6-011.

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## **ADDITIONAL RESOURCES**

- Applicability Determination Index (ADI):  
<http://134.67.104.12/cfdocs/adiwww/adiwww.html-ssi>

Additional information and guidance on the applicability of the MACT standard can be obtained through the EPA's Applicability Determination Index (ADI). The ADI is a database that contains memoranda issued by EPA on the applicability and compliance issues associated with the New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (with categories for both NESHAP, Part 61, and MACT, Part 63), and chlorofluorocarbons (CFC). Recently issued determinations are added to the database on a quarterly basis.

The National Compliance Assistance Clearinghouse is your guide to compliance information on the Internet. It provides quick access to compliance tools, contacts, and planned activities from across EPA as well as other compliance assistance providers. To find out more about the Clearinghouse, go to [www.epa.gov/clearinghouse](http://www.epa.gov/clearinghouse)

## **CONTACT LIST**

EPA Regional Contact List (see Appendix H)

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## **I. INTRODUCTION**

In August 1995, the United States Environmental Protection Agency (EPA) promulgated the National Standards for Hazardous Air Pollutants (NESHAP) for petroleum refineries that were originally proposed in July 1992. These standards require petroleum refineries, that are major sources of Hazardous Air Pollutants (HAPs), to meet emission standards reflecting the application of the maximum achievable control technology (MACT). The affected sources at petroleum refineries are defined to include all process vents, storage vessels, marine tank vessel loading operations, gasoline rack operations, equipment leaks, and wastewater treatment systems located at the refinery. This manual was developed to assist refineries in determining the applicability of these new standards to their operations, and to provide guidance to assist facilities in achieving and maintaining compliance.

The manual is presented in five chapters. Chapter 1 states the purpose, scope, and layout of the document. Chapter 2 summarizes the major parts of the regulation, applicability of the regulation to specific process units, applicable control requirements, and processes not covered under the new rule. Chapter 3 discusses general standards applicable to all process units. Chapter 4 builds on the general requirements, and discusses requirements specific to each type of process unit and for facilities that use emissions averaging. Finally, Chapter 5 shows where the new Petroleum Refinery MACT standard overlaps with existing regulations.

## **2. THE PETROLEUM REFINERY MACT STANDARD: AN OVERVIEW**

The maximum achievable control technology (MACT) standard for petroleum refineries stems from the Clean Air Act Amendments (the Act) of 1990. Under the Act, EPA is required to regulate emissions of 188 listed hazardous air pollutants (HAPs), also known as air toxics. On July 16, 1992, EPA published a list of source categories (industry groups) that emit one or more of these HAPs. For listed categories of "major" sources (those that emit 10 tons annually or more of a listed pollutant or 25 tons or more of a combination of pollutants annually- see Appendix I of this document for additional information on "major sources"), the Act requires EPA to develop standards that will require the application of maximum achievable control technology.

The list of industry groups to be regulated includes petroleum refineries, because they are a major source of HAP emissions. Consequently, the MACT standard was developed to help control this source of emissions.

The Petroleum Refinery MACT standard applies to petroleum refining process units and related emission points. The standard MACT includes testing, monitoring, reporting, recordkeeping, and control requirements. Requirements in the MACT standard include control of HAP emissions from the following emission points within petroleum refining process units: process vents, storage vessel loading, wastewater collection and treatment systems, gasoline loading racks, marine tank vessel loading, and equipment leaks. There are two general approaches to comply with the MACT standard's control requirements:

- (1) Implement controls on all emission points that meet the criteria for control in the rule; **or**
- (2) Use a method called ***emissions averaging***. This method allows the facilities flexibility to choose certain emission points for control in order to achieve the required emissions reductions in the most cost-effective manner. In some situations, facilities may find it more cost-

### **Who Will Be Affected By The Petroleum Refinery MACT Standard?**

There are approximately 165 petroleum refineries as of January 1, 1997 in the United States, all of which are anticipated to be major sources of HAPs, and therefore, may be subject to this regulation.

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effective to overcontrol certain emission points and undercontrol others, so that the overall result would be greater emissions reductions at less control cost. The MACT standard spells out how facilities may use emissions averaging and which emission points may be included. This approach can only be used for **existing sources**. A detailed explanation of emissions averaging is found in Chapter 4 of this manual.

**NOTE**

Under the Petroleum Refinery MACT standard, the term "source" refers to the entire refinery, whereas under New Source Performance Standards (NSPS), and State Implementation Plans (SIPs), sources are most commonly process units. The MACT standard applies only to major sources. Under the MACT standard, there are different requirements depending on whether the facility is an *existing source* or a *new source*. The MACT Standard defines existing and new sources as follows:

**Existing sources** - sources that commenced construction *on or before* July 14, 1994.

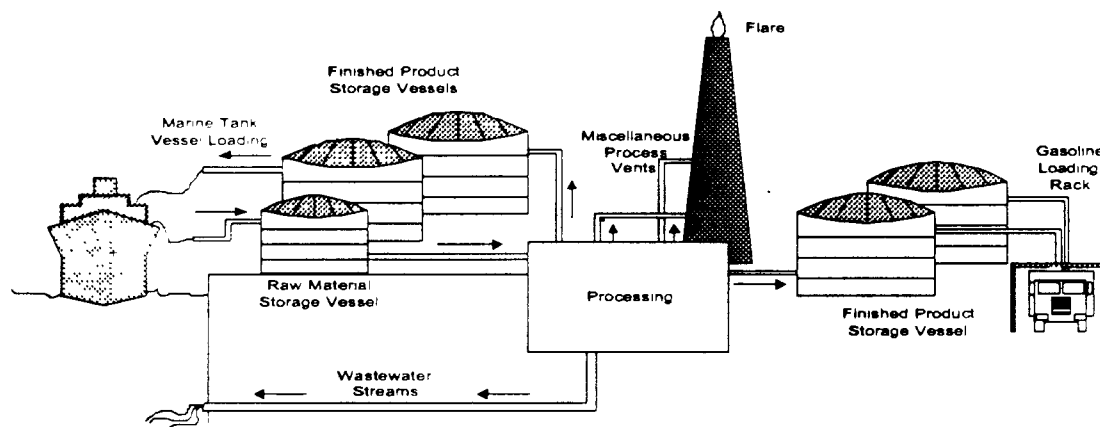
**New sources** - sources that commenced construction *after* July 14, 1994. A process unit constructed at an existing source is subject to new source requirements if the new unit has the potential to emit 10 tons per year (tpy) or more of any one HAP or 25 tpy or more of total HAPs. Otherwise it is subject to the requirements applicable to existing sources. A change to an existing source or an addition of an emission point is subject to existing source standards, unless it is a reconstructed source, which is subject to new source standards.

This chapter provides an overview of the major elements of the rule, including general applicability, control requirements, and compliance deadlines. General information on testing, monitoring, reporting, and recordkeeping is given in Chapter 3 and a detailed discussion of individual emission points is found in Chapter 4.

## **2.1 APPLICABILITY OF THE RULE**

The affected source is the combination of all the emission points located at a refinery, and each point is considered part of the single affected source. The MACT standard also applies only to major sources as defined by Section 112(a) of the Clean Air Act with the potential to emit hazardous air pollutants. For clarification on whether a source is a major source, see Appendix E. Figure 2-1 gives an example of each of the emission points

**FIGURE 2-1. Emission Points Within an Affected Source**



within an affected source. TABLE 2-1 presents the emission points to which the Petroleum Refinery MACT standard applies. If any of the points in TABLE 2-1 is not located at the refinery, the MACT standard does not apply.

**TABLE 2-1. Applicability of the Petroleum Refinery MACT Standard**

The Rule Applies To	The Rule Does Not Apply To
---------------------	----------------------------

<ul style="list-style-type: none"> <li>• Refineries that are major HAP sources under either of the following definitions: <ul style="list-style-type: none"> <li>- Potential to emit <math>\geq 10</math> tons per year (tpy) of any of the 188 HAPs in Appendix A of this manual; or</li> <li>- Potential to emit <math>\geq 25</math> tpy of total HAPs</li> </ul> </li> <li>• Refining process units at refineries that are major sources and emit or contain any of the 28 HAPs in Appendix B of this manual</li> <li>• The following emission points within petroleum refining process units at major sources: <ul style="list-style-type: none"> <li>- Miscellaneous process vents that contain <math>\geq 20</math> ppmv total organic HAP</li> <li>- Storage vessels (pressure vessels and vessels <math>&lt; 40</math> m<sup>3</sup> are exempt)</li> <li>- Wastewater streams and treatment operations</li> <li>- Equipment containing or contacting a fluid is <math>\geq 5\%</math> by weight total organic HAPs.</li> </ul> </li> <li>• The following emission points if located at refineries that are major sources: <ul style="list-style-type: none"> <li>- Marine vessel loading operations</li> <li>- Gasoline loading racks in SIC 2911</li> <li>- Storage vessels and equipment leaks associated with bulk gasoline terminals in SIC 2911.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Refineries that are not major HAP sources</li> <li>• Equipment that does not emit or contain any of the HAPs in Appendix B of this manual</li> <li>• Catalytic cracking and reforming catalyst regeneration vents</li> <li>• Sulfur recovery plant vents</li> <li>• Research and development facilities</li> <li>• Units processing natural gas</li> <li>• Units for recycling discarded oil</li> <li>• Shale oil extraction units</li> <li>• Ethylene processes</li> <li>• Units subject to the hazardous organic NESHAP (HON) [40 CFR 63 Subparts F, G, H, and I]</li> <li>• Storm water from segregated storm water sewers</li> <li>• Spills</li> <li>• Equipment in organic HAP service <math>&lt; 300</math> hours during the calendar year</li> </ul>
--	--

## 2.2 HOW DOES A FACILITY DETERMINE THE EMISSION POINTS TO WHICH THE CONTROL REQUIREMENTS APPLY?

The introduction to this chapter presented how a facility determines if it is classified as an *existing* or *new* source. Once this determination has been made, a facility must assess whether it meets the criteria for requiring controls on its emission points. TABLE 2-2

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presents the control applicability criteria for each type of emission point. Emission points that meet these criteria are called Group 1 emission points, while all other emission points are called Group 2 emission points. Group 1 emission points are subject to all applicable requirements of the MACT standard. **Group 2 emission points are not subject to the control or monitoring requirements of the MACT standard.** However, Group 2 emission points are subject to certain recordkeeping requirements.

**TABLE 2-2. Control Applicability Criteria for Emission Points**

Emission points	For Existing Sources, Controls Must Be Used If:	For New Sources, Controls Must Be Used If:
Miscellaneous Process Vents	(1) Organic HAP concentration $\geq$ 20 ppmv, <b>and</b> (2) Total VOC emissions $\geq$ 33 kg/day.	(1) Organic HAP concentration $\geq$ 20 ppmv, <b>and</b> (2) Total VOC emissions $\geq$ 6.8 kg/day
Storage Vessels	(1) Capacity $\geq$ 177 m <sup>3</sup> , <b>and</b> (2) Vapor pressure $\geq$ 10.4 kPa (maximum) and $\geq$ 8.3 kPa (annual average), <b>and</b> (3) Organic liquid HAP concentration $>$ 4% by weight (annual average).	(1) Capacity $\geq$ 151 m <sup>3</sup> , <b>and</b> (2) Vapor pressure $\geq$ 3.4 kPa (maximum), <b>and</b> (3) Organic liquid HAP concentration $>$ 2% by weight (annual average).  <b>OR</b> (1) Capacity $\geq$ 76 and $<$ 151 m <sup>3</sup> , <b>and</b> (2) Vapor pressure $\geq$ 77 kPa (maximum), <b>and</b> (3) Organic liquid HAP concentration $>$ 2% by weight (annual average).

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Emission points	For Existing Sources, Controls Must Be Used If:	For New Sources, Controls Must Be Used If:
Wastewater Streams	(1) Total annual benzene loading $\geq$ 10 megagrams per year, <b>and</b> (2) Flow rate $\geq$ .02 liters per minute, <b>and</b> (3) Benzene concentration $\geq$ 10 ppm by weight, <b>and</b> (4) Not exempt from controls under 40 CFR 61 Subpart FF.	(1) Total annual benzene loading $\geq$ 10 megagrams per year, <b>and</b> (2) Flow rate $\geq$ .02 liters per minute, <b>and</b> (3) Benzene concentration $\geq$ 10 ppm by weight, <b>and</b> (4) Not exempt from controls under 40 CFR 61 Subpart FF.
Gasoline Loading Racks	Part of bulk gasoline terminal located at facilities designated under SIC 2911 with gasoline throughput $>$ 75,700 liters per day.	Part of bulk gasoline terminal located at facilities designated under SIC 2911 with gasoline throughput $>$ 75,700 liters per day.
Marine Tank Vessel Loading	(1) Vapor pressure of liquid loaded $\geq$ 10.3 kPa, <b>and</b> (2) Emission $>$ 9.1 megagrams of any HAP or $>$ 22.7 megagrams of total HAP per year after August 18, 1999.	(1) Vapor pressure of liquid loaded $\geq$ 10.3 kPa (2) No parallel emission rate cutoffs for new sources.
Equipment Leaks	Equipment containing or contacting fluid that is 5% by weight total organic HAPs.	Equipment containing or contacting fluid that is 5% by weight total organic HAPs.

Included at the end of this chapter in Figure 2-2 through 2-6 are decision flowcharts which show how a facility can determine first if it is subject to the MACT standard, and second if Group 1 or Group 2 requirements apply. Decision flowcharts have been included for each emission point that is potentially subject to the MACT standard (i.e., miscellaneous process vents, storage vessels, wastewater streams, gasoline loading racks, marine tank vessel loading, and equipment leaks).

### **2.3 WHAT ARE THE CONTROL REQUIREMENTS?**

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TABLE 2-3 summarizes the control requirements for emission points meeting the criteria in TABLE 2-2. **Please note that while TABLE 2-3 provides an inclusive (as of September 1997) summary of the control requirements for these emissions points, specific requirements can be found in the referenced section of the Code of Federal Regulations.**

## **2.4 WHEN MUST A FACILITY COMPLY?**

The MACT standard specifies the dates by which each emission point at new and existing sources must be in compliance with the control requirements. All emission points at new sources must be in compliance at startup or by August 18, 1995, whichever is later.

There is a specific compliance date for each emission point at existing sources. Miscellaneous process vents and gasoline loading racks have a compliance date of August 18, 1998. Wastewater streams also have a compliance date of August 18, 1998, and sources should be in compliance with the benzene waste operations NESHAP found in 40 CFR 61 Subpart FF.

Fixed roof storage vessels must be in compliance by August 18, 1998 as well; however, the preamble suggests compliance by August 18, 1999 if the tank must be replaced.

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**TABLE 2-3. Control Requirements for Process Units/Emission Points**

<b>Emission points</b>	<b>Control Requirements</b>
Miscellaneous Process Vents	<ul style="list-style-type: none"> <li>• Reduce organic HAPs by 98% or to 20 ppmv using incinerators, boilers, process heaters, or other devices; <b>or</b></li> <li>• Use a flare.</li> </ul>
Storage Vessels	<ul style="list-style-type: none"> <li>• Comply with storage vessel NESHAP [40 CFR 63 Subpart C], which requires: <ul style="list-style-type: none"> <li>- Internal floating roof with specified seals; <b>or</b></li> <li>- External floating roof with specified seals; <b>or</b></li> <li>- External floating roof converted to internal floating roof with specified seals; <b>or</b></li> <li>- Closed vent system with 95% efficient control device.</li> </ul> </li> </ul>
Wastewater Streams	<ul style="list-style-type: none"> <li>• Comply with benzene waste operations NESHAP [40 CFR 61 Subpart FF], which requires: <ul style="list-style-type: none"> <li>- Reducing benzene mass emissions by 99% using suppression followed by another treatment process (e.g., steam stripping or biotreatment); <b>and</b></li> <li>- Reducing emissions from vents from stream strippers, other waste management, or treatment units by 95% with a control device or to 20 ppmv at the outlet of the control device.</li> </ul> </li> </ul>
Gasoline Loading Racks	<ul style="list-style-type: none"> <li>• Comply with gasoline distribution NESHAP [40 CFR 63 Subpart D], which requires: <ul style="list-style-type: none"> <li>- Reducing emissions of total organic compounds to 10 milligrams per liter of gasoline loaded; <b>and</b></li> <li>- Loading only in vapor tight cargo tanks that have been tested to assure vapor tightness.</li> </ul> </li> </ul>
Marine Tank Vessel Loading	<ul style="list-style-type: none"> <li>• Comply with marine tank vessel loading NESHAP [40 CFR 61 Subpart Y], which requires: <ul style="list-style-type: none"> <li>- Reducing HAP by 97% for existing sources</li> <li>- Reducing HAP by 98% for new sources.</li> </ul> </li> </ul>

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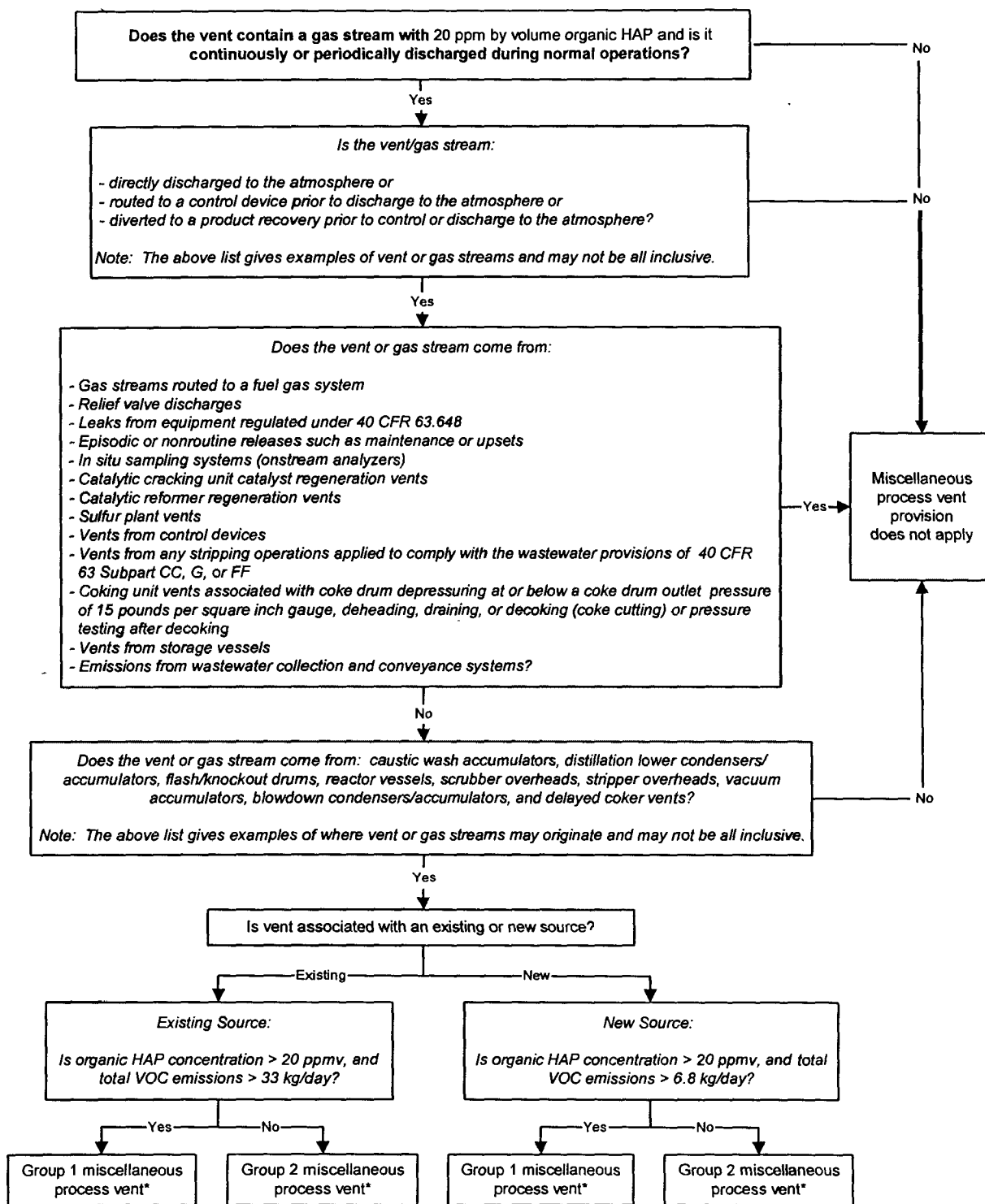
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Emission points	Control Requirements
Equipment Leaks	<ul style="list-style-type: none"><li>• Comply with equipment leak rules [40 CFR 63 Subpart H or 40 CFR 60 Subpart VV] for existing sources and [40 CFR 63 Subpart H] for new sources, which require:<ul style="list-style-type: none"><li>- Leak detection and repair with specified leak definitions and monitoring frequencies</li><li>- Equipment specifications for some types of equipment.</li></ul></li></ul>

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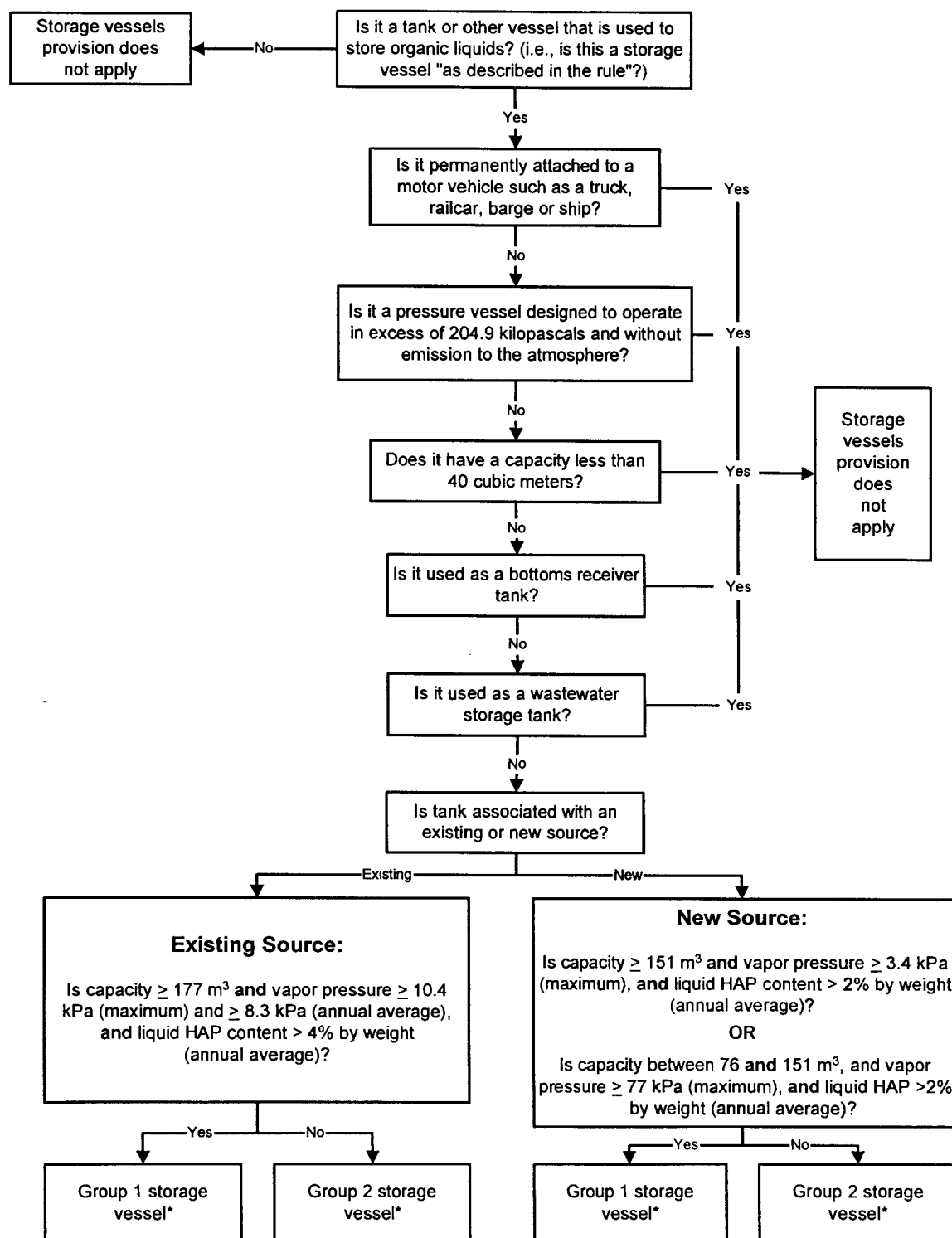
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**FIGURE 2-2. Determination of Applicability for Miscellaneous Process Vents**



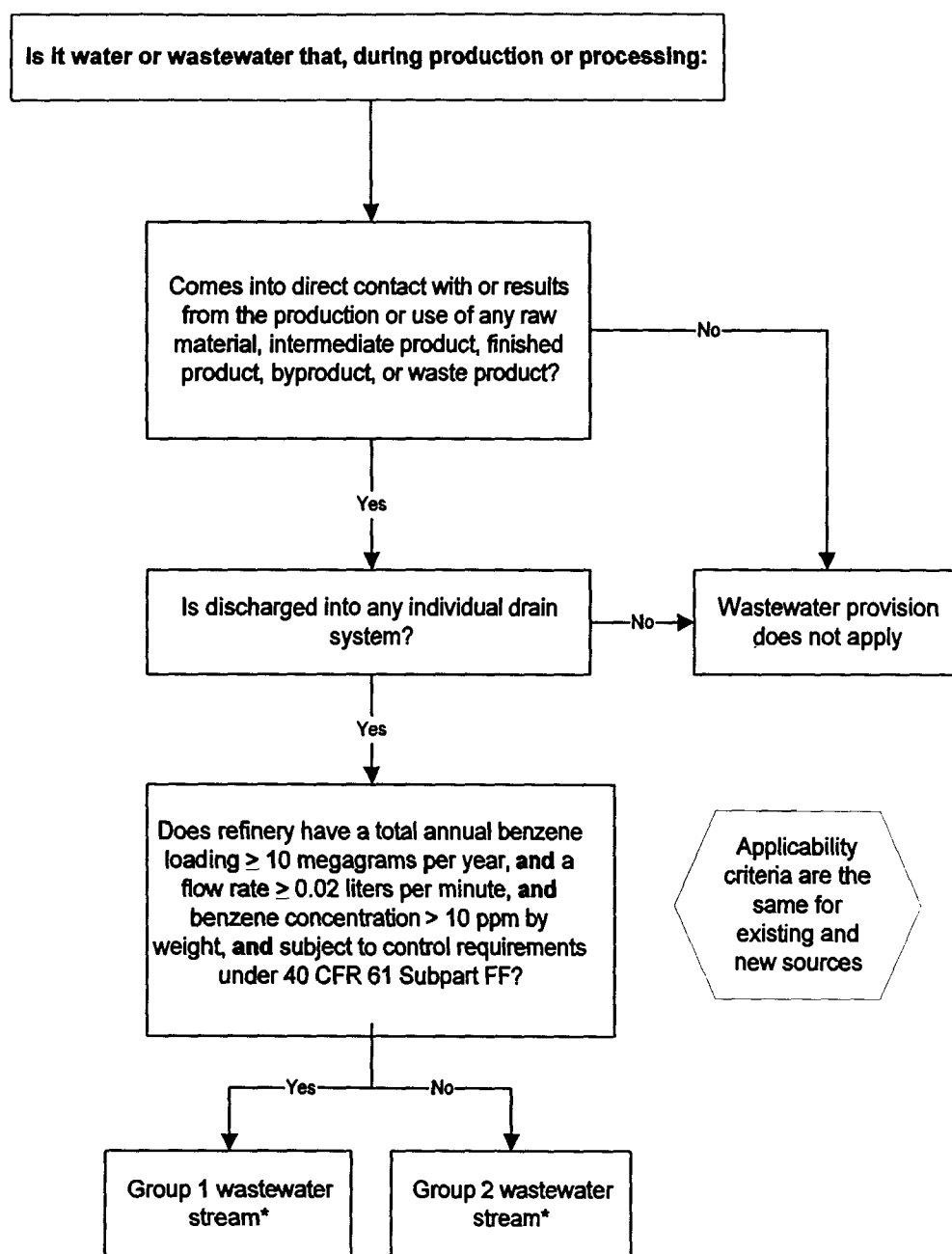
\* See Chapter 4 for applicable requirements for Group 1 and Group 2 emission points

**FIGURE 2-3. Determination of Applicability for Storage Vessels**



\* See Chapter 4 for applicable requirements for Group 1 and Group 2 emission points.

**FIGURE 2-4. Determination of Applicability for Wastewater Streams**

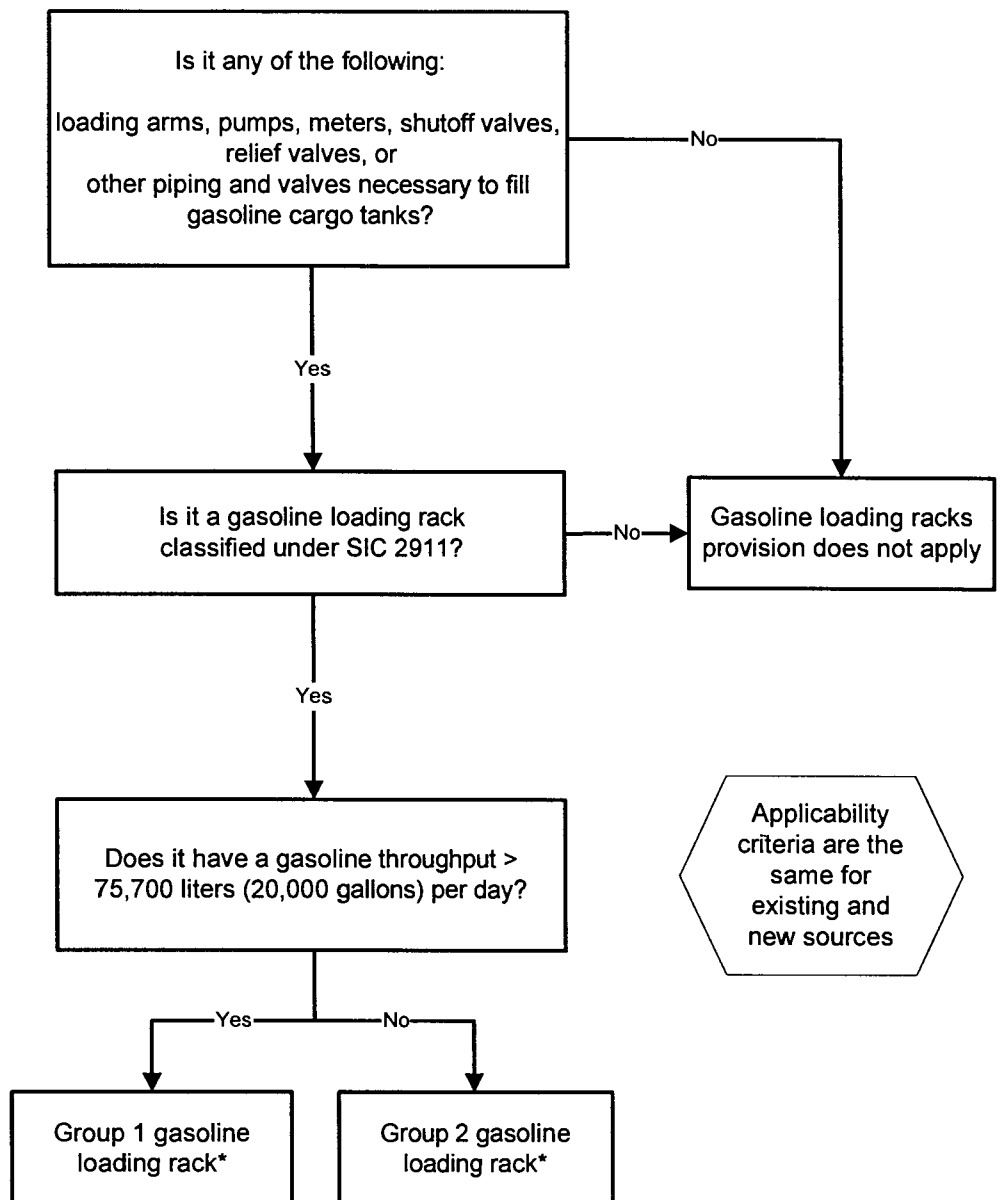


[Examples of wastewater are: feed tank drawdown; water formed during a chemical reaction or used as a reactant; water used to wash impurities from organic products or reactants; water used to cool or quench organic vapor streams through direct contact; and condensed steam from jet ejector systems pulling vacuum on vessels containing organics.]

\* See Chapter 4 for applicable requirements for Group 1 and Group 2 emission points.

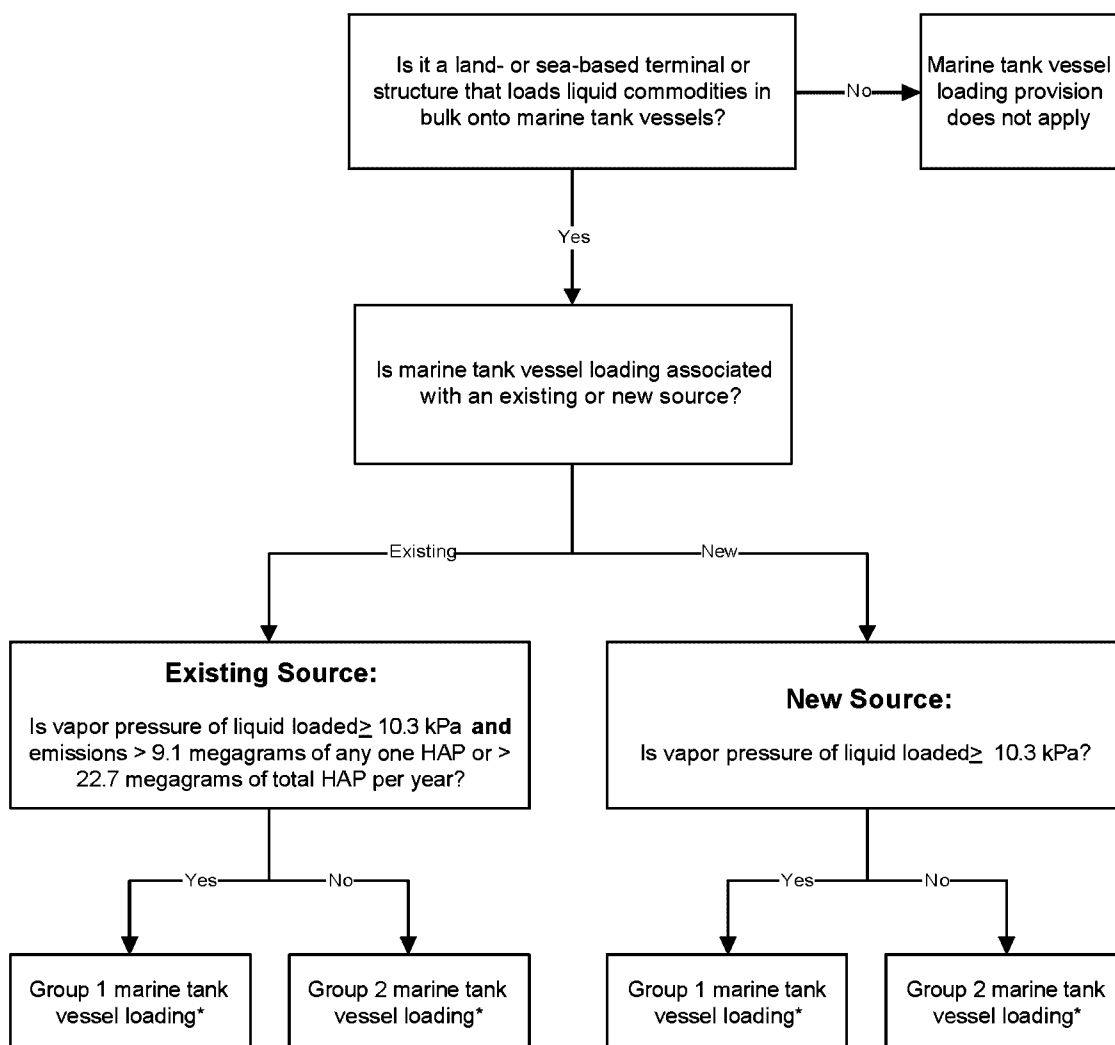


**FIGURE 2-5. Determination of Applicability for Gasoline Loading Racks**



\* See Chapter 4 for applicable requirements for Group 1 and Group 2 emission points.

**FIGURE 2-6. Determination of Applicability for Marine Tank Vessel Loading**



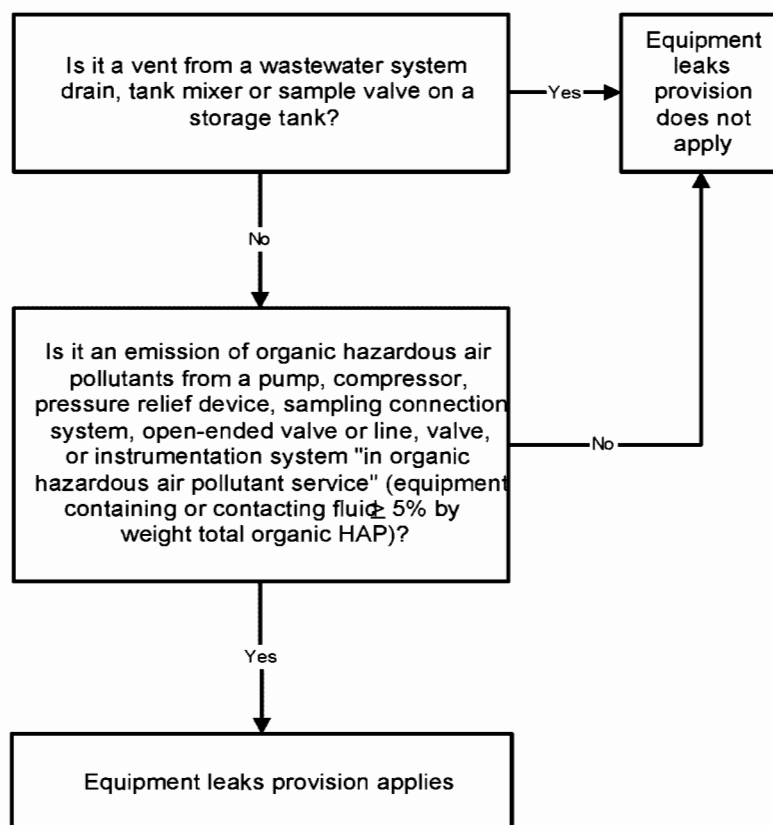
\* See Chapter 4 for applicable requirements for Group 1 and Group 2 emission points

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FIGURE 2-7. Determination of Applicability for Equipment Leaks



\* See Chapter 4 for applicable requirements for Group 1 and Group 2 emission points

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Floating roof storage vessels have a compliance date of August 18, 2005, or the next scheduled maintenance and degassing after August 18, 1998, whichever is first.

Marine tank vessel loading must be in compliance by August 18, 1999, unless used in emissions averaging. If used to generate credit in an emissions average, it must comply by August 18, 1998, unless a case-by-case 1-year extension is granted.

A compliance date of August 18, 1998 is set for equipment leaks. Sources have the option of complying with 40 CFR 60 Subpart VV or 40 CFR 63 Subpart H, which allows for 3 phases of emissions reductions. (See Chapter 4 for more detailed information on compliance dates for equipment leaks.)

## **2.5 CONCLUSIONS**

Chapter 2 provided an overview of the MACT Standard answering the questions of which facilities must comply; what facilities must do to comply, and when must they comply. The overview defined the applicability of the MACT Standard to affected sources, and the various types of emission points associated with the affected sources. Chapter 2 also defined the control requirements applicable to the various emission points, noting which points are required to maintain control equipment, and the types of control or associated emission limit. Finally, Chapter 2 provided compliance deadlines for each category of emission point. After reviewing the applicability determination flow charts in Chapter 2, a facility should be able to determine whether the general requirements to be discussed in Chapter 3, or the specific requirements in Chapter 4 will apply.

### **3. GENERAL STANDARDS**

Once the refinery has determined which of its emission points are required to comply with the Petroleum Refinery MACT standard (MACT standard), the refinery must determine the specific requirements applicable to each emission point. While the control requirements are specific to each type of emission point at the refinery, the MACT standard also contains general provisions that are applicable to all emission points. These general requirements include performance testing, monitoring, reporting, and recordkeeping. In addition, some reporting requirements apply only to refineries conducting certain activities.

Chapter 3 discusses the general requirements applicable to all emission points at refineries. Chapter 4 describes the control requirements applicable only to specific emission points, as well as emissions averaging – an alternative method to controlling emissions.

**General requirements for all emission points include:**  
performance testing, monitoring, reporting (including permit applications and notifications of compliance status), and recordkeeping.

#### **3.1 WHAT ARE THE PERFORMANCE TESTING REQUIREMENTS THAT MUST BE MET BY ALL REGULATED EMISSION POINTS?**

All facilities are required to conduct an initial performance test of certain pollution control equipment. (No performance tests are required for floating roofs or process heaters > 44 MW with vent introduced into the flame zone.) These initial performance tests must be approved by EPA. To conduct the test, the facility must:

- Notify regulatory authority 30 days prior to conducting a performance test [40 CFR 63.642(d)(2)]
- Conduct tests at maximum representative operating capacity, with controls operating at either maximum or minimum representative operating conditions for monitored parameters, whichever result in lower emission reduction [40 CFR 63.642 (d)(3)].

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### **3.2 WHAT ARE THE MONITORING REQUIREMENTS FOR ALL REGULATED EMISSION POINTS?**

Monitoring is required for some Group 1 emission points. Requirements range from once an hour for miscellaneous process vents routed to a flare, to no monitoring requirements for Group 1 storage vessels equipped with an external floating roof. Specific monitoring requirements for each process unit are presented in Chapter 4.

### **3.3 WHAT ARE THE REPORTING REQUIREMENTS FOR ALL REGULATED EMISSION POINTS?**

Reporting requirements range from permit applications, and initial notification of compliance status, to those requesting compliance extensions. With the exception of periodic reports, all reports are one-time submittals, or one time per incident submittals. The following types of information/reports must be submitted, where applicable, for each emission point to the appropriate EPA Regional Office [40 CFR 63.13](See Appendix H for a list of EPA Regional Offices):

- Permit Applications
- Applications for Approval of Construction or Reconstruction
- Notification of Compliance Status
- Periodic Reports
- Startup, Shutdown, and Malfunction Reports
- Reports Required for Special Situations
- Requests for Extension of Compliance
- Applications for a Performance Test Waiver.

Each of these requirements is presented in the following subsections.

### **3.3.1 WHAT ARE THE REQUIREMENTS FOR PERMIT APPLICATIONS?**

All owners or operators of a source subject to the rule are required to apply for a one-time Part 70 or Part 71 operating permit from the appropriate authority. A source may apply for the permit from either EPA or its State authority, depending on whether EPA has approved a State operating permit program. [40 CFR 63.642(a)]

The source must apply for a permit from its state if EPA has approved a State operating permit program under Part 70. The source must apply for a permit from its EPA Regional Office if the State does not have an EPA operating permit program under Part 71.



### **3.3.2 WHAT ARE THE REQUIREMENTS FOR APPLICATIONS FOR APPROVAL OF CONSTRUCTION OR RECONSTRUCTION?**

All new or reconstructed sources are required to submit an application for approval of construction or reconstruction. Existing sources are not required to submit the application, unless new construction or reconstruction occurs at the source. General application requirements include [40 CFR 63.5(d)]:

- Applicant's name and address
- Notification of intent to construct a new major affected source
- Source description and address
- Identification of relevant standard that is the basis of the application
- Expected commencement and completion dates of construction or reconstruction
- Anticipated date of startup
- Determination of rule applicability for each process unit (e.g., distillation units, storage vessels, flexible operation units)
- Actual or expected type and quantity of HAPs emitted
- Additional relevant information as requested by the Administrator.

**Construction** means the on-site fabrication, erection, or installation of an affected source.

**Reconstruction** means the replacement of components of an affected or a previously unaffected stationary source to the extent that

- (1) The fixed capital cost of the new component exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and
- (2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator (or a state) pursuant to section 112 of the Clean Air Act.

### **3.3.3 WHAT ARE THE REQUIREMENTS FOR NOTIFICATION OF COMPLIANCE STATUS (NCS)?**

All refineries are required to inform EPA of their compliance status with respect to the MACT standard. Facilities must submit a NCS report within 150 days after each applicable compliance deadline. (See Section 2.4 of this manual for compliance dates.) There are two exceptions: When a new Group 1 emission point is added or a floating roof storage vessel is brought into compliance, the NCS may be included in the next periodic report.<sup>1</sup> The report must identify each emission point and method of compliance. This information may be included as a separate report, as an operating permit application, or in an amendment to an operating permit application. [40 CFR 63.654(f)] NCS report requirements include the following:

- Determination of rule applicability to flexible operation units and storage vessels and distillation units for which use varies from year to year [40 CFR 63.654(h)(6)]<sup>1</sup>
- Information on individual emission points to demonstrate compliance, such as range of monitored parameters. [40 CFR 63.654(f)(1) and (f)(3)]
- Results of continuous monitoring system performance evaluations. [40 CFR 63.654(f)(4)]
- If initial performance tests are required, one example complete test report for each test method used must be submitted. For additional tests using the same method, only the results must be submitted. [40 CFR 63.654 (f)(2)]

### **3.3.4 WHAT ARE PERIODIC REPORTS, AND WHEN ARE THEY REQUIRED?**

Periodic reports are required only if compliance exceptions occur within any 6-month reporting period. If compliance exceptions do occur, periodic reports must be submitted. The reports must be submitted within 60 days after the end of each 6-month period. If

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<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998. For more information, see Appendix G.

facilities use emissions averaging, reports must be submitted quarterly. [40 CFR 63.654(g)]

Periodic reports must include information on compliance exceptions, such as a description and cause of the exception and corrective action taken. (See Chapter 4 for each type of emission point.) If a performance test is done for an emission point that is added or changed from Group 2 to Group 1, include the results, such as percent emissions reduction or concentration, in the next periodic report. [40 CFR 63.654(g)(7)]

### **3.3.5 WHAT ARE THE REQUIREMENTS FOR STARTUP, SHUTDOWN, AND MALFUNCTION PLAN AND REPORTS?**

All refineries must develop and implement a startup, shutdown, and malfunction plan (SSMP) for the entire facility, with the exception of wastewater stream management units. An SSMP is not required for wastewater stream management units unless they receive streams subject to 40 CFR Part 63 Subpart G. The malfunction plan must describe procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction. In addition, the plan must include a program of corrective action for malfunction of process and air pollution control equipment used to comply with the relevant standard. EPA typically defines malfunctions as rare, unforeseeable occurrences and does not allow for facilities to operate in malfunction for extended periods of time.

**A Startup, Shutdown, and Malfunction Report is required to document**

- The start of operation of a process unit for production.
- The cessation of a process unit for maintenance, repair, or equipment replacement
- Any malfunction of a process unit.

If corrective actions to address the malfunction are consistent with the startup, shutdown, and malfunction plan, submit a statement to this effect in the semi-annual report. [40 CFR 63.10(d)(5)(I)]

If a malfunction occurs and corrective actions are not consistent with the startup, shutdown, and malfunction plan, this must be reported in the next periodic report.<sup>1</sup>

If a malfunction does not occur during a reporting period, a startup, shutdown, and malfunction report is not required.

### **3.3.6 WHAT ARE REPORTS REQUIRED FOR SPECIAL SITUATIONS?**

The MACT standard has detailed requirements for testing, monitoring, and recordkeeping. However, the rule allows for flexibility in meeting these requirements. If facilities intend to use alternative procedures or devices, additional reports and approvals are required. For these facilities, the following information must be submitted 18 months before the compliance date for existing sources, or with the application for approval of construction for new sources:

- Request for approval to monitor an alternative control device operating parameter, with supporting justification [40 CFR 63.654(h)(4)]
- Request for approval to use data compression systems instead of keeping hourly records, with supporting information [40 CFR 63.654(h)(5)]
- Request to use other alternative monitoring methods, with supporting justification [40 CFR 63.654(h)(5)(iv) and 63.8(f)(4)(ii)]
- Request to establish an alternative emission standard, with a test plan or results of testing and monitoring. [40 CFR 63.6(g)(2)] (If EPA finds the alternative standard equivalent to the MACT standard, EPA will request public comment and publish a Federal Register notice allowing its use.)

### **3.3.7 WHEN CAN FACILITIES SUBMIT REQUESTS FOR EXTENSION OF COMPLIANCE?**

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<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998. For more information, see Appendix G.

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An extension of compliance may be requested if emission reductions have been achieved early, or if the source is unable to comply with the relevant standard. Requests for extension of compliance are allowed only for existing sources and must be submitted at least 12 months before the compliance date, or 18 months prior if emissions averaging is used. [40 CFR 63.6(l)(2-3)] (See Chapter 2, Section 2.4 for compliance dates.) Requests must include the following:

- Description of controls to be installed
- Compliance schedule
- Interim emission control steps.

### **3.3.8 WHAT ARE THE REQUIREMENTS FOR APPLICATIONS FOR A PERFORMANCE TEST WAIVER?**

If a facility is unable to conduct a performance test for reasons such as technical or economic infeasibility, an extension of compliance has been requested, or other reasons, the facility must submit an application for waiver of a performance test to the Administrator. The application must include information justifying the request and detailing the infeasibility. [40 CFR 63.7(h)(3)(iii)]

### **3.4 WHAT ARE THE RECORDKEEPING REQUIREMENTS?**

All refineries are required to keep records of reports submitted, monitoring results, and other records for at least 5 years. [40 CFR 63.642(e) and 63.654(l)(4)] In addition, records must be kept so that they are accessible within 24 hours of request in either hard copy or computer-readable form. If acceptable to the Administrator, reports may be submitted on electronic media. [40 CFR 63.642(e)] The following records must be maintained on site:

- Records of the occurrence and duration of each startup, shutdown, or malfunction in operation and air pollution control equipment [40 CFR 63.10(b)(2)(i-ii)]
- Records of actions that are consistent and inconsistent with the startup, shutdown, and malfunction plan [40 CFR 63.10(b)(2)(iv-v)]

- Records of continuous monitoring system calibration checks (if continuous monitoring is required) [40 CFR 63.10(b)(x)]
- Records for storage vessels [40 CFR 63.654(l)(1)]
- Complete test reports and reported results for any required performance tests [64.654(l)(2)]
- Values of continuously monitored parameters [40 CFR 63.654(l)(3)]
- Any additional records required by permit.

### **3.5 CONCLUSIONS**

Chapter 3 discussed the general requirements of the MACT Standard (i.e., those requirements applicable to all regulated emission points). The chapter presented the requirements for performance testing, monitoring, reporting, and recordkeeping that apply to all regulated emission points. For each of these requirements, Chapter 3 discussed only those requirements that apply to every emission point. Additional requirements applicable to individual emission points are discussed in Chapter 4.

## **4. EMISSION POINTS SUBJECT TO THE REGULATION**

This chapter summarizes the detailed testing, monitoring, reporting and recordkeeping requirements specific to each emission point regulated by the MACT standard. In addition, control requirements for each emission point are described. Unless otherwise noted, the requirements in Chapter 4 apply only to Group 1 emissions points. With few exceptions, Group 2 emissions points are subject only to record keeping requirements.

Chapter 4 discusses each of the regulated emission points (i.e., miscellaneous process vents, storage vessels, wastewater streams, gasoline loading racks, marine tank vessel loading, and equipment leaks) presenting the applicable requirements. Chapter 4 concludes with a discussion emissions averaging and how this technique can be used by existing sources in lieu of complying with the applicable control requirements for the individual emission points. **Please note that this chapter does not discuss the details of all of the MACT Standard requirements for each of these regulated emissions points.** In particular, in the discussion of storage vessels, wastewater streams, gasoline loading racks, marine tank vessels and equipment leaks this chapter references other sections of the federal code of regulations to which the refinery may be required to comply. **For further detail on the referenced sections, see the appropriate section of the Code of Federal Regulations.**

### **4.1 WHAT ARE THE REQUIREMENTS FOR MISCELLANEOUS PROCESS VENTS?**

Once the refinery has determined which process vents are subject to the MACT standard, the refinery must then determine the requirements applicable to each vent. These requirements include controls, monitoring, reporting, and recordkeeping. To determine if a process vent is subject to the MACT standard, refer to the applicability flowchart for miscellaneous process vents in Chapter 2.

#### **4.1.1 WHAT ARE THE CONTROL REQUIREMENTS FOR MISCELLANEOUS PROCESS VENTS?**

If a vent meets the applicability criteria, it must be controlled by:

- Using a flare; or

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- Reducing organic HAPs by 98% or to 20 ppmv using incinerators, boilers, process heaters, or other devices; **or**
- If a boiler or process heater is used, the vent stream must be introduced into the flame zone of the control device, or in a location such that the required percent reduction or concentration is achieved.

The following sections discuss the applicable testing, monitoring, reporting and recordkeeping requirements associated with each of these control methods.

#### **4.1.2 WHAT ARE THE TESTING REQUIREMENTS FOR MISCELLANEOUS PROCESS VENTS?**

The MACT standard requires that miscellaneous process vents be controlled by routing the vents to a flare, incinerator, boiler, process heater, other approved device, or bypass lines. Some control devices for miscellaneous process vents are required to be tested during a one-time initial performance test, and in follow-up tests in the event of process changes. This performance test must confirm that control equipment is operating properly, and that emissions are within specified limits. While some of the components of the test are similar for all miscellaneous process vents, the MACT standard also applies testing requirements based on the control device as described below.

**Miscellaneous Process Vents are to be Controlled if:**

- It is an **existing source**, and the vent contains 20 ppmv or more of organic HAPs, and emits 33 kg/day or more of VOCs
- It is a **new source**, and the vent contains 20 ppmv or more of organic HAPs, and emits 6.8 kg/day or more of VOCs.

#### **INITIAL PERFORMANCE TESTS**



Initial performance tests are required for vents routed to a flare and vents using other approved control devices. When performance tests are required, the test measures whether equipment is operating according to manufacturer specifications, or whether equipment is meeting a specified emissions reduction. Vents routed to a flare have testing requirements designed to measure whether equipment is operating properly, while other categories of process vents must have more sophisticated equipment that measures the level of emissions from each controlled vent. Performance tests are not required to determine percent reduction when a flare is used.

For vents routed to a flare, the initial performance test must show that the flare is operating properly, and that the emission rate does not exceed the capacity of the flame to control the emissions. Based on these criteria, the initial performance test is required to measure the following:

- Emissions visibility (There should be no visible emissions.)
- Net heat value of combusted gas.
- Flow rate of gases being combusted.

**Performance tests are not required for:**

- Vents routed to a boiler or process heater  $\geq 44$  MW (150 MMBtu/hr)
- Vent streams that are introduced into the flame zone of the boiler or process heater
- A control device for which a performance test was conducted for determination of compliance with an NSPS if no process changes have been made.

For vents routed to an incinerator or a boiler or process heater  $< 44$  Megawatts (MW) (150 MMBtu/hr) where the vent streams are not introduced into the flame zone of the boiler or process heater, the initial performance test must show compliance with the requirement to reduce organic HAPs by 98% or to 20 ppmv. [40 CFR 63.645 and 63.116 except (d) and (e)]. The organic HAP concentration and percent reduction may be measured either as total organic HAP or as total organic compounds (TOC) minus methane and ethane. The sampling point varies depending on whether the facility is measuring total organic HAP or TOC.

***Determining Compliance Using Total Organic HAP***

Sample sites must be located at both the inlet and outlet of the control device, but the inlet sampling site must be located after the final product recovery device. If a process vent stream is introduced with the combustion air or as a secondary fuel into a boiler or process heater with a design capacity < 44 MW, selection of the location of the inlet sampling site is required to ensure the measurement of total organic HAP or TOC (minus methane and ethane) concentrations in all process vent streams and primary and secondary fuels introduced into the boiler or process heater.

***Determining Compliance Using TOC***

As noted above, for vents that must show organic HAP reduction, owners and operators can measure that reduction either as total organic HAP or as TOC minus methane and ethane. To measure the reduction as TOC minus methane and ethane, the refinery first must determine TOC according to the procedures specified below.

Samples must be taken:

- After the last product recovery device, **but**
- Prior to the inlet of any control device, **and**
- Prior to any dilution of the process vent stream and release to the atmosphere

Test Method 1 describes appropriate testing for sample and velocity traverses to stationary sources. Test Method 1A describes appropriate testing for sample and velocity

**Calculating the TOC Emissions Rate:**

TOC can be calculated using Method 18 or Method 25A of 40 CFR 60 Appendix A, or any other method or data validated according to the protocol in Method 301 of 40 CFR 60 Appendix A. When selecting the sampling site, refineries are required to use Test Methods 1 or 1 A of 40 CFR 60 Appendix A, as appropriate. Additional guidance on using these methods can be found in 40 CFR 63(f), (g), and (h)

traverses for stationary sources with small stacks or ducts. Traverse site selection methods are not needed for vents smaller than 0.10 meter in diameter.

### **FOLLOW-UP TESTS TO PROCESS CHANGES**

For Group 2 process vents, whenever the refinery conducts a process change, the TOC emission rate must be recalculated to determine whether the vent remains a Group 2 process vent or becomes a Group 1 process vent. Recalculation may be based on vent stream flow rate and TOC measurements as specified for initial performance tests or best engineering assessment practices.

#### **4.1.3 WHAT ARE THE MONITORING REQUIREMENTS FOR MISCELLANEOUS PROCESS VENTS?**

Monitoring devices are not required for boilers or process heaters  $\geq 44\text{MW}$  or in which all vent streams are introduced into the flame zone. The type and frequency of monitoring depends on the type of combustion device. All continuous monitoring devices must be installed, calibrated, maintained, and operated according to manufacturer specifications. Table 4-1 lists the type of monitoring required for each combustion device. Refineries with Group 1 miscellaneous process vents may request approval to monitor parameters other than those listed in Table 4-1 if the refinery uses a control device other than an incinerator, boiler, process heater, or flare, or wants to monitor a parameter other than those specified in the table. Refineries that use a vent system with bypass lines have separate requirements that are described in Table 4-2.

For facilities using other approved control devices, or requesting to monitor other parameters, a site-specific determination can be requested from the permitting authority.

#### **What Constitutes a Process Change?**

Process changes include, but are not limited to, changes in production capacity, production rate, or catalyst type; whenever there is replacement, removal, or addition of recovery equipment; and debottlenecking activities.

Process changes do not include process upsets, unintentional, temporary process changes, or changes that are within the range on which the original calculation was based.



**TABLE 4-1. Monitoring Requirements for Combustion Devices**

<b>Combustion Device</b>	<b>Type of Monitoring Required</b>	<b>Monitoring Location</b>
Flare	Device capable of continuously detecting the presence of a pilot flame (including, but not limited to a thermocouple, an ultraviolet beam sensor, or an infrared sensor)	Not specified
Incinerators other than catalytic incinerators	Temperature monitoring device with a continuous recorder	In the firebox or in the duct work immediately downstream of the firebox in a position before any substantial heat exchange occurs
Catalytic incinerators	Temperature monitoring device with a continuous recorder	In the gas stream immediately before and after the catalyst bed
Boiler or process heater with a design heat input capacity $\geq$ 44 megawatts, or any boiler or process heater in which all vent streams are introduced into the flame zone	No monitoring required	Not applicable
Boiler or process heater with a design heat input capacity < 44 megawatts where the vent streams are <u>not</u> introduced into the flame zone	Temperature monitoring device with a continuous recorder	In the firebox

**TABLE 4-2. Monitoring Requirements for Miscellaneous Process Vents with Bypass Lines**

<b>Type of Bypass Line Control</b>	<b>Type of Monitoring Required</b>	<b>Monitoring Location</b>
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Refineries that use a vent system with bypass line valves that have not been sealed or secured	Flow indicator that determines at least every hour whether a vent stream flow is present	At the entrance to an bypass line that could divert the vent stream away from the control device to the atmosphere
Refineries that use a vent system with bypass lines, where the valves have been secured in the closed position with a car-seal or a lock-and key-type configuration	Visual inspection at least every other month to ensure that the valve is maintained in the closed position and the vent stream is not diverted through the bypass line	At the valve

#### **4.1.4 WHAT ARE THE REPORTING REQUIREMENTS FOR MISCELLANEOUS PROCESS VENTS?**

Reporting requirements for miscellaneous process vents include some requirements applicable to all control devices, and additional reporting based on the specific control device. This section discusses the two reports with specific requirements for miscellaneous process vents: Notice of Compliance Status reports, and Periodic reports.

##### **NOTICE OF COMPLIANCE STATUS REPORT**

As noted in Chapter 3, all refineries are required to submit a Notice of Compliance Status report. The NCS may be submitted in an operating permit application, an amendment to an operating permit application, a separate submittal, or any combination of the three. If the required information has been submitted at an earlier date, or at different times, and/or in different submittals, later submittals may refer to earlier submittals instead of duplicating and resubmitting previously submitted information.

##### **When Are NCS Reports Required?**

Notice of Compliance Status reports are required at startup, or within 150 days of an applicable compliance deadline. If the refinery submits an NCS report prior to the compliance deadline, it does not need to submit an additional report within 150 days of the deadline. It does, however need to send a letter to the Administrator referencing the earlier notification.

For example, if a new facility submits an NCS report at startup in 1995, it is required to submit a letter referring to the NCS (and noting that no process changes have occurred) when an applicable 1998 compliance deadline occurs.

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Information required to be included in the NCS depends on the type of emission point. For all miscellaneous process vents, the NCS must identify each vent, whether the process vent is Group 1 or Group 2, and, for each Group 1 vent that is not included in an emissions average, the method of compliance (e.g., use of a flare or other control device meeting the requirements of the MACT standard). [40 CFR 63.643(a)]

In addition, miscellaneous process vents with control devices required to be tested under the MACT standard must submit information on each testing method, and results of the performance test since there are different requirements for each test and test method used. Supporting information required for each test method used is indicated in the box below. Test results must include the following information:

- The percentage reduction of organic HAPs or TOC or the outlet concentration of organic HAPs or TOC (ppm by volume on a dry basis corrected to 3 percent oxygen), determined as specified in 40 CFR 63.116(c)
- For vents controlled by flares, all visible emission readings, heat content determinations, flow rate measurements, and exit velocity determinations made during the compliance determination [40 CFR 63.654(f)(1)(iv)(A)]
- For vents controlled by flares, a statement of whether a flame was present at the pilot light over the full period of the compliance determination [40 CFR 63.654(f)(1)(iv)(B)]

### **Required Supporting Information For Each Test Method Used:**

- 1) Sampling site description
- 2) Description of sampling and analysis procedures, and any modifications to standard procedures
- 3) Quality assurance procedures
- 4) Record of operating conditions during the test
- 5) Record of preparation of standards
- 6) Record of calibrations
- 7) Raw data sheets for field sampling
- 8) Raw data sheets for field and laboratory analyses
- 9) Documentation of calculations
- 10) Any other information required by the test method.

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- The value of the monitored parameter specified in 40 CFR 63 Subpart CC Table 10 (shown in Table 4-3), or a site specific parameter approved by the permitting authority, averaged over the full period of the performance test.

Results of a prior performance test can be used if that test was conducted using the methods specified in 40 CFR 63.645 and test conditions were representative of current operating conditions.

**TABLE 4-3. 40 CFR Part 63, Subpart CC, Table 10 Parameters**

Control Device	Parameters to be Monitored
Thermal incinerators	Firebox temperature
Catalytic incinerators	Temperature upstream and downstream of the catalyst bed
Boiler or process heater with a design heat capacity < 44 MW where the vent stream is <u>not</u> introduced into the flame zone	Firebox temperature
Flare	Presence of a flame at the pilot light
All Control Devices	Presence of flow diverted to the atmosphere from the control device, or monthly inspections of sealed valves

***Specific NCS Reports For Vents Controlled By a Flare***

In addition to the above requirements, vents controlled by a flare are required to include performance test results applicable to the specific testing of the flare. For vents routed to a flare, the NCS report must include the following performance test information:

- All visible readings
- Heat content determinations
- Flow rate measurements
- Exit velocity determinations



- A statement of whether a flame was present at the pilot light over the full period of the compliance determination
- If a parameter other than the presence of a pilot flame is monitored, the acceptable range for the parameter and the rationale (including any supporting data or calculations) for the range.

***Specific NCS Reports For Vents Routed to an Incinerator or Boiler or Process Heater < 44 MW Where the Vent Streams are NOT Introduced Into the Flame Zone.***

In addition to the above requirements, vents routed to an incinerator or boiler or process heater < 44 MW where the vent streams are not introduced into the flame zone must include the following in the NCS report:

- Average firebox temperature (or gas stream temperature for catalytic incinerators) over the duration of the performance test
- Acceptable range for the daily average firebox temperature and rationale for the range
- Times at which an operating day begins and ends.

**Do NCS Reports Have to be Submitted If the Same Test is Conducted for Multiple Emission points?**

Vents for which initial performance tests are required must also submit one complete test report for each test method used for each emission point. If the refinery uses the same method for additional tests, the additional test results must be submitted, but additional complete test reports are not required.

### **PERIODIC REPORTS**

***When Are Periodic Reports Required?***

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Periodic reports are required only if the refinery experiences any compliance exceptions or periods of excess emissions. Periods of excess emissions are defined as shown in the box on the following page. Compliance exceptions include any of the exceptions described in Section 3.3. Compliance exceptions and periods of excess emissions do not include periods of startup, shutdown, malfunction, performance testing and monitoring system calibration.

### ***If Periodic Reports Are Required, When Must They Be Submitted?***

Periodic reports must be submitted no later than 60 days after the end of each 6-month period when any compliance exceptions occur. (The first 6-month period begins on the date the NCS report is required to be submitted.) Quarterly reporting is required if the refinery uses emissions averaging, which is discussed in Section 4.7 below.

### ***What Must Be Included In Periodic Reports?***

General contents of periodic reports are described in Chapter 3. For miscellaneous process vents, periodic reports must also include excess emissions for the operating parameters applicable to the vents (either parameters in Table 4-4 of this manual, or others specified by the permitting authority).

#### **What is a Period of Excess Emissions?**

- 1) An operating day when the daily average value of a monitored parameter, except presence of a flare or pilot flame, is outside the range specified in the NCS.
- 2) For each vent routed to a flare, operating days when all pilot flames of a flare are absent
- 3) An operating day when monitoring data required to be recorded (see section 4.1.6) is available for less than 75% of the operating hours.
- 4) For approved data compressions systems, an operating day when the monitor operated for less than 75% of the operating hours or a day when less than 18 monitoring values were recorded.

#### **4.1.5 WHAT ARE THE RECORDKEEPING REQUIREMENTS FOR MISCELLANEOUS PROCESS VENTS?**

As with the reporting requirements for miscellaneous process vents, there are also overlapping recordkeeping requirements for the various control devices, as well as some recordkeeping requirements specific to individual control devices. For all control devices, it is necessary to retain for 5 years all information that must be reported.

In addition to information that must be reported, refineries may be required to maintain records applicable to specific process vents as shown in Table 4-4.

**TABLE 4-4. Additional Recordkeeping Requirements**

<b>Control Device</b>	<b>Required Records</b>
Control devices for which an initial performance test is required (flare, incinerator, and boiler or process heater < 44 MW where the vent streams are not introduced into the flame zone)	<ul style="list-style-type: none"><li>• Complete test report for initial performance test results</li><li>• Times and duration of periods when monitoring devices are not operating</li></ul>
Vents routed to a flare	<ul style="list-style-type: none"><li>• Record of each pilot flame determination (or alternate parameter upon request and approval)</li></ul>
Vents routed to an incinerator or boiler or process heater < 44 MW where the vent streams are <u>not</u> introduced into the flame zone	<ul style="list-style-type: none"><li>• Record of each firebox temperature value or a block average of values for periods of one hour or less</li><li>• Record of the daily average of firebox temperature. However, if all hourly temperature values are within the range reported in the NCS, the facility may record that all values are within the range instead of daily average values.</li></ul>

For additional information on general recordkeeping requirements applicable to miscellaneous process vents and all other process units, refer to Section 3.4 of this manual.

#### **4.2 WHAT ARE THE REQUIREMENTS FOR STORAGE VESSELS?**

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Group 1 storage vessels covered by the MACT standard include vessels storing organic liquids that contain organic HAPs. In order to determine if a storage vessel is subject to the MACT standard, refer to the applicability flowchart for storage vessels in Chapter 2.

The HAP weight percent criteria may be determined using engineering judgement or test results. The vapor pressure criteria may be determined by using one of the following:

- Information in standard reference texts
- Methods described in API publication 2517 (Evaporative Loss from External Floating-Roof Tanks)
- Tests conducted using ASTM Method D2879-83
- Any other approved method.

### **4.2.1 WHAT ARE THE CONTROL REQUIREMENTS FOR STORAGE VESSELS?**

Storage vessels, that store a liquid with a maximum true vapor pressure of total organic HAPs < 76.6 kPa, must be controlled by one of the following control methods [40 CFR 63.119(a)(1)]:

#### ***Floating Roofs***

- (1) Internal floating roof with specified seals; **or**
- (2) External floating roof with specified seals; **or**
- (3) External floating roof converted to internal floating roof with specified seals. (i.e., fixed roof installed above the external floating roof)

#### ***Closed Vent Systems***

- (4) Closed vent system routed to a flare or other control device that reduces HAP emissions by 95% or to 20 ppmv.

Storage vessels that store a liquid with a maximum true vapor pressure of total organic HAPs  $\geq$  76.6 kPa must be controlled by a closed vent system and control device. [40 CFR 63.119(a)(2)] In addition, work practices, as specified in 40 CFR 63.119(b) through (e), must be followed for each of the control methods.

The above control methods apply to both existing and new sources. For storage vessels at new sources, deck fitting controls, as specified in 40 CFR 63.119(c)(2)(i) through (xii), must be installed on all floating roof tanks. In addition, the control requirements of 40 CFR 63.119(b)(5) and (b)(6) also apply.

As indicated above, the four control methods for storage vessels generally fit into two categories for testing, monitoring, reporting, and recordkeeping requirements. The first three methods fall under the category of floating roofs, while the last item is in the category of closed vent systems with control device. Although some of the requirements described below are specific to individual control methods within the two categories, most of the requirements apply to all control methods within each of the two categories.

### **4.2.2 WHAT ARE THE TESTING REQUIREMENTS FOR STORAGE VESSELS?**

As with other emission points, certain storage vessels are required to be tested during an initial performance test, and follow-up tests in the event of process changes. This initial test is required to ensure that the control equipment is operating properly, and that emissions are within specified limits.

For storage vessels equipped with a closed vent system routed to control device, an initial performance test must be performed. However, there are no testing requirements for storage vessels equipped with a floating roof.

#### **INITIAL PERFORMANCE TESTS**

##### ***Closed Vent System Routed to a Flare***

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For storage vessels equipped with a closed vent system routed to a flare, testing requirements include an initial performance test or compliance determination, as specified in 40 CFR 63.11(b), to ensure compliance with the control requirement to reduce total organic HAP emissions by 95% or to 20 ppmv. The test must include the measurement/determination of the following:

- Emissions visibility
- Net heat value of combusted gas
- Flow rate of gases being combusted
- Exit velocity.

### ***Closed Vent System Routed to a Control Device Other Than a Flare***

For storage vessels equipped with a closed vent system routed to a control device other than a flare, testing requirements include either an initial design evaluation, as specified in 40 CFR 63.120(d)(1)(i), or an initial performance test, as specified in 40 CFR 63.120(d)(1)(ii).

### **4.2.3 WHAT ARE THE MONITORING AND INSPECTION REQUIREMENTS FOR STORAGE VESSELS?**

For storage vessels that must apply controls, there are monitoring and inspection requirements to ensure continuing compliance with the control requirements. The requirements vary according to the control method used, with similarities for all closed vent systems and similarities for all floating roofs.

#### **MONITORING REQUIREMENTS**

For storage vessels equipped with a closed vent system, the facility must monitor the parameters proposed in the Notice of Compliance Status report to ensure that the control device is being properly operated and maintained. There are no monitoring requirements for storage vessels equipped with floating roofs.

### **INSPECTION REQUIREMENTS**

#### ***Closed Vent Systems***

Inspections of control equipment are also required periodically to demonstrate compliance with the control requirements. For a closed vent system routed to a control device, the facility must inspect the closed vent system, as specified in 40 CFR 63.148, every 12 months.

#### ***Floating Roofs***

Storage vessels with floating roofs may have a single-seal system or a double-seal system. For vessels with a double seal, the requirements for the secondary (outer) seal do not apply when gaps in the primary (inner) seal are being measured. For storage vessels equipped with a fixed roof and an internal floating roof or an external floating roof converted to an internal floating roof, the following inspection requirements apply for each type of seal system:

##### ***Single-Seal System***

- ✓ Visually inspect the internal floating roof and primary seal through manholes and roof hatches at least once every 12 months after initial fill, or at least every 12 months after the compliance date.
- ✓ Visually inspect the internal floating roof and primary seal each time the storage vessel is emptied and degassed and at least once every 10 years after the compliance date.
- ✓ Visually inspect gaskets, slotted membranes, and sleeve seal (if any) each time the storage vessel is emptied and degassed and at least once every 10 years after the compliance date (new source only).

##### ***Double-Seal System***

- ✓ Visually inspect the internal floating roof, primary seal, and secondary seal each time the vessel is emptied and degassed and at least once every 5 years after the compliance date; **or**

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- ✓ Visually inspect the internal floating roof and the secondary seal through manholes and roof hatches at least once every 12 months after initial fill, or at least every 12 months after the compliance date; **and**
- ✓ Visually inspect the internal floating roof, primary seal, and secondary seal each time the vessel is emptied and degassed and at least once every 10 years after the compliance date.

For storage vessels equipped with an external floating roof, the facility must visually inspect the external floating roof, the primary and secondary seals, and fittings each time the vessel is emptied and degassed. In addition, the following inspection requirements apply for each type of seal system:

### *Single-Seal System*

- ✓ Measure the gaps between the vessel wall and the primary seal by the compliance date and at least once a year, until a secondary seal is installed. When a secondary seal is installed, measure gaps between the vessel wall and both the primary and secondary seal within 90 calendar days of installation, and then comply with the double-seal inspection requirements below. [40 CFR 63.120(b)(1)(ii)]

### *Double-Seal System*

- ✓ Measure the gaps between the vessel wall and the primary seal during hydrostatic testing or by the compliance date and at least once every 5 years thereafter
- ✓ Measure the gaps between the vessel wall and the secondary seal by the compliance date and at least once a year.

## **4.2.4 WHAT ARE THE REPORTING REQUIREMENTS FOR STORAGE VESSELS?**

Reporting requirements for storage vessels include Notice of Compliance Status reports, periodic reports, and internal inspection notification. As with testing and monitoring reporting requirements for storage vessels include some requirements applicable to all four control methods, some requirements applicable to the two general control categories (i.e., closed vent systems and floating roofs), and some requirements specific to individual



control methods. The following subsections discuss the specific information required for storage vessels in each of these reports.

### **NOTICE OF COMPLIANCE STATUS REPORT**

Section 3.3.3 of this manual lays out the basic requirements for a NCS report. The MACT standard sets out additional NCS requirements for storage vessels equipped with closed vent systems, but not for storage vessels with floating roofs.

#### ***Closed Vent System Routed to a Flare***

For storage vessels equipped with a closed vent system routed to a flare, the NCS must also contain the results of the initial performance test, including:

- Flare design, such as steam-assisted, air-assisted, or non-assisted
- Visible emissions readings
- Heat content determinations
- Flow rate measurements
- Exit velocity determinations
- Periods during the compliance determination when the pilot flame is absent.

#### ***Closed Vent System Routed to a Control Device Other Than a Flare***

For storage vessels equipped with a closed vent system routed to a control device other than a flare, the NCS must also include:

- Description of the parameter(s) to be monitored to ensure proper operation and maintenance of the control device
- Explanation of the parameter selection
- Frequency of monitoring

- Design evaluation documentation, as specified in 40 CFR 63.120(d)(1)(I), or results of the initial performance test including identification of emission points sharing the control device.

## **PERIODIC REPORTS**

As mentioned previously in this section and in Chapter 3, periodic reports are only required if compliance exceptions occur. The information required in periodic reports falls into the 2 general categories of control methods: closed vent systems and floating roofs, with a few additional requirements for external floating roofs.

### ***Closed Vent Systems Routed To Any Control Device***

For storage vessels equipped with a closed vent system routed to a control device, periodic reports must include a description of the following:

- Routine maintenance for the control device that was performed during the previous 6 months

### **What Are Compliance Exceptions For Storage Vessels?**

Compliance exceptions refer to the following failures or defects in the control equipment:

- Floating roof not resting on the surface of the liquid inside the vessel and not resting on the leg supports
  - Liquid floating on the floating roof
  - Seal detached from the floating roof
  - Holes, tears, or other openings in the seal or seal fabric
  - Visible gaps between the seal and the wall of the vessel
  - Gaskets no longer close off the liquid surface from the atmosphere
  - Slotted membrane has more than a 10% open area (new source only).

Compliance exceptions also include occurrences when monitored parameters are outside the parameters established in the NCS.

- Routine maintenance anticipated for the control device for the next 6 months
- For a control device that is a flare, each occurrence and cause when the requirements specified in 40 CFR 63.11(b) are not met
- For a control device other than a flare, each occurrence and cause of monitored parameters being outside the ranges documented in the NCS.

### ***Floating Roofs***

For storage vessels equipped with any type of floating roof, periodic reports must contain the results of each inspection in which a failure was detected. Periodic reports must include the following information:

- Date of inspection
- Identification of the storage vessel
- Description of the failure
- Nature and date of repair or date the vessel was emptied.

If a failure or defect is detected during inspection, the facility must repair or empty and remove the vessel from service within 45 days. If the vessel cannot be repaired or emptied within 45 days, the facility may utilize up to 2 extensions of up to 30 additional days each. If an extension is used, periodic reports must also include the following information:

- Description of the failure
- Statement that alternate storage capacity is unavailable
- Schedule of actions that will ensure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

Additional reporting requirements for storage vessels equipped with an external floating roof include notifying the Administrator 30 days in advance of any gap measurement. Results of each gap measurement in which the requirements of 40 CFR 63.120(b)(3), (4), (5), or (6) are not met must also be reported in the periodic reports. Such results must include the following information:

- Date of seal gap measurement
- Raw data and calculations described in 63.120(b)(5) or (6)
- Description of seal conditions that are not met
- Nature and date of repair or date the vessel was emptied.

Periodic reports should also include a Notification of Compliance Status (NCS) report if a floating roof storage vessel is brought into compliance during the reporting period <sup>1</sup>

The NCS must include the following information:

- The method of compliance for each storage vessel brought into compliance
- The expected compliance date for all floating roof storage vessels subject to control requirements that are not yet in compliance (floating roof storage vessels have until August 15, 2005 or the next scheduled emptying and degassing to be brought into compliance).
- For floating roof vessels that are in compliance, the actual compliance date

### **INTERNAL INSPECTION NOTIFICATION**

The third category of reporting directly applicable to storage vessels is notifying the Administrator of scheduled internal inspections and refilling of empty storage vessels with organic HAPs. Refineries are required to notify the Administrator at least 30 calendar days prior to filling or refilling each storage vessel with organic HAPs. The 30-day notification is required except if:

- The internal inspection required by 40 CFR 1209(a)(2), 63.1299(a)(3), or 63.120(b)(10) is not planned, **and**
- The owner/operator of the refinery could not have known about the inspection 30 calendar days in advance of refilling the vessel with organic HAPs.

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<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998. For more information, see Appendix G.

If the inspection is not planned and the owner/operator could not have known about it in advance, the Administrator must be notified at least 7 calendar days prior to refilling the storage vessel. Notification may be made by telephone and immediately followed by written documentation demonstrating why the inspection was unplanned. The notification may also be made in writing provided that it is received by the Administrator at least 7 calendar days prior to the refilling.

If the State or local permitting authority has received delegation of the Refinery MACT (not all states have as of August 1997), they can waive the notification requirements for all or some storage vessels at petroleum refineries. The State or local permitting authority may also grant permission to refill storage vessels sooner than 30 days after submitting the required notification under 40 CFR 64.654(h)(2)(i)(A) or sooner than 7 days after submitting the notification under 40 CFR 64.654(h)(2)(i)(B) on a case-by-case basis.

### **4.2.5 WHAT ARE THE RECORDKEEPING REQUIREMENTS FOR STORAGE VESSELS?**

There are recordkeeping requirements common to all storage vessels, as well as some recordkeeping requirements specific to the different control methods. For all storage vessels, it is necessary to maintain records of Group 1 or Group 2 determinations, vessel dimensions, and analysis of capacity. In addition, all information required to be reported must be retained for 5 years.

#### ***Closed Vent Systems Routed To Any Control Device***

For storage vessels equipped with a closed vent system routed to a control device, additional recordkeeping requirements include:

- Complete test report for initial performance test results
- Measured values of monitored parameters
- Planned routine maintenance performed, including:

- The first time of day and date the control requirements are not met at the beginning of the planned routine maintenance, **and**
- The first time of day and date the control requirements are met at the conclusion of the planned routine maintenance.

### ***Floating Roofs***

For storage vessels equipped with any type of floating roof, recordkeeping requirements include retaining records of each inspection performed. [40 CFR 63.123(c) and (e)] For storage vessels equipped with an external floating roof, additional requirements involve retaining records of each seal gap measurement, including date, raw data obtained in the measurement, and the calculations described in 40 CFR 63.120(b)(3) and (4)

## **4.3 WHAT ARE THE REQUIREMENTS FOR WASTEWATER STREAMS?**

In order to determine if a wastewater stream is subject to the MACT Standard, refer to the applicability flowchart for wastewater streams in Chapter 2. Refineries in compliance with the benzene waste NESHAP [40 CFR 61 Subpart FF] are considered to be in compliance with the refinery MACT standard. Provisions of the benzene waste NESHAP apply to the following wastewater streams at petroleum refineries:

- (1) Total benzene loading  $\geq$  10 Mg per year, **and**
- (2) Flow rate  $\geq$  .02 liters per minute, **and**
- (3) Benzene concentration  $\geq$  10 ppm by weight, **and**
- (4) Not exempt from controls under the benzene waste NESHAP.

### **4.3.1 WHAT ARE THE CONTROL REQUIREMENTS FOR WASTEWATER STREAMS?**

Wastewater streams meeting the applicability criteria above are required to comply with the control requirements of the benzene waste NESHAP [40 CFR 61 Subpart FF]. These control requirements include the following:

- Wastewater streams must reduce benzene mass emissions by 99% by using suppression followed by steam stripping, biotreatment, or other treatment process.

- Vents from steam strippers and other waste management or treatment units must have a control device that achieves 95% emission reduction or 20 ppmv at the outlet of the control device.

#### **4.3.2 WHAT ARE THE TESTING REQUIREMENTS FOR WASTEWATER STREAMS?**

All wastewater streams must comply with the testing requirements of the benzene waste NESHAP found in 40 CFR 61.340 through 61.355. These sections also specify the frequency for which testing must be done. If required, periodic measurements of benzene concentration in the wastewater must be performed.

#### **4.3.3 WHAT ARE THE MONITORING REQUIREMENTS FOR WASTEWATER STREAMS?**

All wastewater streams must also comply with the monitoring requirements of the benzene waste NESHAP found in 40 CFR 61.340 through 61.355. If required, monitoring of the process or control device operating parameters must be performed.

#### **4.3.4 WHAT ARE THE REPORTING AND RECORDKEEPING REQUIREMENTS FOR WASTEWATER STREAMS?**

All wastewater streams must comply with the reporting requirements of the benzene waste NESHAP found in 40 CFR 61.356 and 61.357. [40 CFR 63.654(a)] In addition, all information required to be reported must be retained for 5 years. [40 CFR 63.654(l)(4)] Since affected sources should already be in compliance with 40 CFR 61 Subpart FF, they will not need to make any changes to their current reporting and recordkeeping procedures.

### **4.4 WHAT ARE THE REQUIREMENTS FOR GASOLINE LOADING RACKS?**

In order to determine if a gasoline loading rack is subject to the MACT standard, refer to the applicability flowchart for gasoline loading racks in Chapter 2.

#### **4.4.1 WHAT ARE THE CONTROL REQUIREMENTS FOR GASOLINE LOADING RACKS?**

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Gasoline loading racks that are subject to the MACT standard must be in compliance with the gasoline distribution facilities NESHAP found in 40 CFR 63 Subpart R, which requires the following:

- (1) Reduce emissions of total organic compounds (TOC) to 10 milligrams per liter of gasoline loaded; and
- (2) Load gasoline only in vapor tight cargo tanks that have been tested to assure vapor tightness.

### **4.4.2 WHAT ARE THE TESTING AND MONITORING REQUIREMENTS FOR GASOLINE LOADING RACKS?**

For all gasoline loading racks subject to the MACT standard, the facility must comply with the testing and monitoring requirements of the gasoline distribution facilities NESHAP. These tests are found in 40 CFR 63.425(a) through (c) (performance tests), 63.425(e) (annual certification), 63.425(f) (leak detection tests), 63.425(g) (nitrogen pressure decay field tests), 63.425(h) (continuous performance pressure decay test) and 63.427 (continuous monitoring).

#### **Procedure For Initial Performance Testing of Gasoline Loading Racks:**

Initial performance tests must determine a monitored operating parameter value for the vapor processing system using the following procedure:

- 1) During the performance test, continuously record the operating parameters under 40 CFR 63.427.
- 2) Determine an operating parameter value based on the parameter data monitored during the performance test, supplemented by engineering assessments and the manufacturer's recommendations. and
- 3) Provide for the Administrator's approval the rationale for the selected operating parameter value, and monitoring frequency and averaging time. This includes data and calculations used to develop the value and a description why the value, monitoring frequency, and averaging time demonstrate continuous compliance with the emission standard in 40 CFR 63.422(b) or 60.112b(a)(3)(ii).



### **INITIAL PERFORMANCE TEST**

The initial performance test is required to be conducted according to the test methods and procedures in 40 CFR 60.503, except a reading of 500 ppm must be used to determine the level of leaks to be repaired under 40 CFR 60.503.

For follow-up tests (required to be conducted following process changes), the refinery is required to document the reasons for any change in the operating parameter value since the previous test.

#### ***What If A Closed Vent System Is Used To Control Emissions?***

If a closed vent system and control device, as specified in 40 CFR 60.112b(a)(3), is required to comply with the control requirements for gasoline loading racks, initial performance tests are required. [40 CFR 63.423]

#### ***What If a Flare Is Used To Control Emissions?***

If a flare is used, and emissions from the gasoline loading rack cannot be measured using the methods specified in 40 CFR 60.503, the refinery is required to comply with the provisions of 40 CFR 63.11(b).

### **ANNUAL CERTIFICATION TESTS**

In addition to the initial performance test, gasoline cargo tanks are required to be tested annually to certify that emissions controls are functioning properly. The annual performance test must be conducted according to the vacuum and pressure tests described in Method 27 of 40 CFR 60 Appendix A.

### **LEAK DETECTION TESTS**

During loading operations, the facility is required to conduct a leak detection test for gasoline cargo tanks according to Method 21 of 40 CFR 60

#### **How Are Leaks Defined for gasoline cargo tanks?**

A leak is defined as a reading of 21,000 ppm or more propane.

Appendix A. The tests are required to be conducted on each compartment during the loading of that compartment, or while the compartment is still under pressure. In addition to Method 21, the following additional requirements for the test apply [40 CFR 63.425]

- To eliminate a positive instrument drift, the dwell time for each leak detection may not exceed two times the instrument response time. The instrument must be purged with ambient air between each leak detection, and the duration of the purge must be in excess of two instrument response times.
- The facility must attempt to block the wind from the area being monitored and record the highest detector reading and location for each leak.

### **ADDITIONAL TESTING REQUIREMENTS**

Cargo tanks with manifolded product lines are required to conduct a nitrogen pressure decay field test on each compartment of each tank. This test is described in 40 CFR 63.425(g). A continuous performance pressure decay test, as described in 40 CFR 63.425 (h), is also required.

### **CONTINUOUS MONITORING**

Gasoline loading racks are required to be in compliance with the continuous monitoring requirements of 40 CFR 63.427(a) and (b). The continuous monitoring system must be installed, calibrated, certified, operated and maintained according to manufacturer specifications. The location where the continuous monitoring system must be installed depends on the type of system used (e.g., carbon adsorption, refrigeration condenser, thermal oxidation, or flare).

### **4.4.3 WHAT ARE THE REPORTING AND RECORDKEEPING REQUIREMENTS FOR GASOLINE LOADING RACKS?**

For gasoline loading racks, the facility must comply with the reporting and recordkeeping requirements of the gasoline distribution facilities NESHAP found in 40 CFR 63.428(b), (c), (g)(1), and (h)(1) through (h)(3). The initial notification report under 40 CFR 63.428(a)

is to be submitted with the initial NCS for the refinery, 150 days after the compliance date.<sup>1</sup> All required records must be retained for 5 years.

## **4.5 WHAT ARE THE REQUIREMENTS FOR MARINE TANK VESSEL LOADING?**

In order to determine if marine tank vessel loading is subject to the MACT standard, refer to the applicability flowchart for marine tank vessel loading in Chapter 2.

### **4.5.1 WHAT ARE THE CONTROL REQUIREMENTS FOR MARINE TANK VESSEL LOADING?**

Marine tank vessel loading operations that are subject to the MACT standard must be in compliance with the marine tank loading NESHAP found in 40 CFR 63 Subpart Y, which requires the following.

- |                          |   |
|--------------------------|---|
| <i>Existing Sources:</i> | <ul style="list-style-type: none"><li>• Collect vapors discharged during loading</li><li>• Load only in vapor tight vessels</li><li>• Reduce collected HAP emissions by 97% or use vapor balancing.</li></ul> |
| <i>New Sources:</i>      | <ul style="list-style-type: none"><li>• Same as existing sources, except reduce collected HAP by 98% or use vapor balancing.</li></ul>  |

### **4.5.2 WHAT ARE THE TESTING AND MONITORING REQUIREMENTS FOR MARINE TANK VESSEL LOADING?**

For all marine tank vessel loading operations subject to the MACT Standard, the refinery must comply with the testing and monitoring requirements of the marine tank loading NESHAP found in 40 CFR 63.560 through 63.567.

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<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998. For more information, see Appendix G.

#### **4.5.3 WHAT ARE THE REPORTING AND RECORDKEEPING REQUIREMENTS FOR MARINE TANK VESSEL LOADING?**

For all marine tank vessel loading subject to the MACT standard, the refinery must comply with the reporting and recordkeeping requirements of the marine tank loading NESHAP found in 40 CFR 63.566, 63.567(a) and (c) through (l). The Initial Notification Report under 40 CFR 63.567(b) is not required. All required records must be retained for 5 years.

### **4.6 WHAT ARE THE REQUIREMENTS FOR EQUIPMENT LEAKS?**

In order to determine if an equipment leak is subject to the MACT standard control requirements, refer to the applicability flowchart for equipment leaks in Chapter 2. The NESHAP service criterion is determined using test methods and procedures specified in 40 CFR 63.180.

#### **4.6.1 WHAT ARE THE CONTROL REQUIREMENTS FOR EQUIPMENT LEAKS?**

For equipment leaks at existing sources, the facility must comply with either of the following equipment leaks provisions:

- (1) 40 CFR 60 Subpart VV (synthetic organic chemical manufacturing industry (SOCMI) equipment leaks NSPS), or
- (2) Modified 40 CFR 63 Subpart H (hazardous organic NESHAP (HON) negotiated regulation).

For equipment leaks at new sources, the facility must comply with modified 40 CFR 63 Subpart H.

#### **4.6.2 WHAT ARE THE TESTING, INSPECTION, AND MONITORING REQUIREMENTS FOR EQUIPMENT LEAKS?**

For all equipment leaks subject to the MACT standard, the refinery must comply with the testing, inspection, and monitoring requirements for equipment leaks in 40 CFR 60.1046.

and 60.1047 (40 CFR 60 Subpart VV), or 40 CFR 63.162 through 63.180 (40 CFR 63 Subpart H).

### **4.6.3 WHAT ARE THE REPORTING AND RECORDKEEPING REQUIREMENTS FOR EQUIPMENT LEAKS?**

For all equipment leaks subject to the MACT Standard, the refinery must comply with the reporting and recordkeeping requirements for equipment leaks found in 40 CFR 60.1048 and 60.1049 (40 CFR 60 Subpart VV) (except that the name rather than the signature of the person deciding to delay repair must be recorded)<sup>1</sup>, or 40 CFR 63.181 and 63.182 (40 CFR 63 Subpart H) (except for 63.182(b), (c)(2), and (c)(4)).

## **4.7 EMISSIONS AVERAGING**

The Petroleum Refinery NESHAP [40 CFR 63 Subpart CC] is stated as a source-wide emissions allowance, as represented by the equation in 40 CFR 63.642. As mentioned in Chapter 2, there are 2 general approaches for petroleum refineries to comply with the MACT standard's control requirements for achieving the emissions allowance:

- (1) Implement controls on all emission points, as discussed in the previous sections of this chapter; or
- (2) Use a method called emissions averaging, which allows flexibility in applying controls.

Emissions averaging allows facilities to overcontrol some emission points and undercontrol others in order to achieve the required emissions reductions in the most cost-effective manner. Additional flexibility is provided by permitting the use of emissions averaging among petroleum refineries, gasoline distribution facilities, and marine terminal loading operations located at the same site. Emissions averaging can only be used for **existing** sources.

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<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998. For more information, see Appendix G.

#### **4.7.1 EMISSIONS AVERAGING APPLICABILITY**

Emissions averaging is allowed for miscellaneous process vents, storage vessels, wastewater streams, gasoline loading racks, and marine tank vessel loading operations in SIC 2911 at a refinery. Emissions averaging is not allowed across sources, such as across different plant sites or between refinery and HON sources (i.e., units having a hazardous organic air pollutant as its *primary product*) at the same plant site. In addition, an emissions estimation is only required for points included in emissions averages, not for all points in the source.

A limitation on the emissions averaging provision is that States have the authority to disallow emission averaging and require the application of standard control requirements to all emission points.

#### **4.7.2 EMISSIONS AVERAGING CREDIT/DEBIT SYSTEM**

Emissions averaging provides a credit/debit system for calculating emissions to comply with the overall emissions allowance. Facilities receive credits for overcontrol of emission points – control above what is required in Subpart CC, and debits for undercontrol of emission points – control below what is required in Subpart CC. Emission credits and debits are calculated on a mass basis using equations in 40 CFR 63.652(g) and (h) to estimate emissions based on actual operations. Credits calculated must be greater than or equal to debits calculated on an annual basis. [40 CFR 63.652(e)(3)] In addition, debits may not exceed credits by more than 30% in any one quarter. [40 CFR 652(e)(4)]

The following emission points can be used to generate emissions averaging credits [40 CFR 63.652(c)(1) through (3)]:

- Group 2 emission points
- Group 1 emission points controlled by technology with a higher nominal efficiency than the reference control technology

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- Emission points from which emissions are reduced by pollution reduction measures, alone or in conjunction with other controls, that get more emission reduction than required

The following emission points cannot be used to generate emissions averaging credits [40 CFR 63.652(d)]:

- Emission points already controlled on or before November 15, 1990, unless the level of control was increased after November 15, 1990. If so, credit is allowed for the increase only
- Group 1 emission points that are controlled by a reference control technology, unless the technology has been approved for use in a different manner and a higher nominal efficiency has been assigned. For example, it is not allowable to claim that an internal floating roof meeting only the specifications stated in the reference control technology definition in 40 CFR 63.641 applied to a storage vessel is achieving greater than 95 percent control
- Emission points on shutdown process units
- Emission points controlled to comply with a State or other Federal rule, unless the level of control has been increased after November 15, 1990 above what is required by the State or other Federal rule. If so, credit is allowed for the increase only.

Debits are generated if the required level of control of a Group 1 emission point, such as 98% for miscellaneous process vents and 95% for storage vessels, is not achieved. [40 CFR 63.652(g)] (See Table 2.3 for required level of control.) Debits and credits are calculated using formulas found in 40 CFR 63.652(g) and (h). Calculations may not include emissions from the following:

- Wastewater that is not process wastewater or wastewater streams treated in biological treatment units. Group 1 wastewater streams cannot be left undercontrolled or uncontrolled to generate debits [40 CFR 63.652(d)(4)]

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- More than 20 individual emission points in addition to those controlled by pollution prevention measures. Where pollution prevention measures are used, no more than 25 emission points total may be included in the average [40 CFR 63.652(f)(1)],
- Emission points during periods of startup, shutdown, and malfunction [40 CFR 63.652(f)(2)]
- Emission points for which continuous monitors are used and excess emissions occur. [40 CFR 63.652(f)(3)] For these periods, the monthly credits and debits will be adjusted as specified in 40 CFR 63.652(f)(3)(i) through (iii).

#### **4.7.3 APPROVAL OF EMISSIONS AVERAGING PLAN**

Facilities that wish to use emissions averaging to comply with the source-wide emissions allowance, must submit for approval an emissions averaging plan in the Implementation Plan or Operating Permit Application. The plan must demonstrate that the credits will be sufficient to offset the debits under representative operating conditions. [40 CFR 63.652(e)(3)(i)] The plan may include use of innovative technologies, different from the reference control technology, provided that the innovative technologies achieve greater than the level of control required for a Group 1 emission point. In addition, the facility must include a risk assessment in the plan of any hazards or risks of the plan, such as the risk from one large emission point versus the risk from combined emission points. Such hazards and risks must be reviewed and compared to point-by-point compliance

#### **4.7.4 TESTING, MONITORING, REPORTING, AND RECORDKEEPING FOR EMISSIONS AVERAGING**

For each emission point included in an emissions average, facilities must perform testing, monitoring, reporting, and recordkeeping equivalent to the requirements for Group 1 emission points that are not included in emissions averaging. [40 CFR 63.653(a)] See Chapter 3 for general requirements and previous sections in this chapter for emission point specific requirements. One additional requirement is to maintain the monthly calculations of debits and credits.

#### **4.7.5 RECORDKEEPING FOR EMISSIONS AVERAGING**

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Requirements for emissions averaging include maintaining the following:

- Initial performance test results (if applicable)
- Monthly debits, credits, and calculations using EPA-specified calculation procedures
- Operating parameter monitoring results.

### **4.8 CONCLUSIONS**

Chapter 4 completed the discussion of requirements of the MACT standard by detailing requirements that are specific to each emission point, and discussed the alternative compliance method of emissions averaging. This chapter explained the requirements for emissions from miscellaneous process vents, storage vessels, wastewater streams, gasoline loading racks, marine tank vessel loading, and equipment leaks. For each type of emission point, the chapter discussed control requirements, followed by an explanation of testing, monitoring, reporting and record keeping requirements. The chapter concluded by discussing how a facility could use emissions averaging to meet the requirements of the standard, rather than control each emission point.

## **5. INTERRELATIONSHIP OF THE PETROLEUM REFINERY MACT STANDARD WITH OTHER REGULATIONS**

This chapter summarizes the interrelationship between the MACT standard and other regulations. As described in previous chapters, the MACT standard requires that HAP emissions be controlled from various emission points within the petroleum refinery. Some of these emission points may also be subject to other existing regulations including the New Source Performance Standards (NSPS) or other NESHAPs. It was not EPA's intent to have redundant regulations that put an undue burden on the owner/operator of a petroleum refinery, but to allow sources to comply with only the most stringent regulation which will demonstrate compliance with all applicable regulations.

The applicability of 40 CFR 63 Subpart CC versus 40 CFR 63 Subpart G, hazardous organic NESHAP (HON), or some other MACT standard, to an emission point is determined by the primary product produced at the unit. The primary product is that produced in the greatest mass or volume by the unit. For instance, if the unit produces a hazardous organic as the primary product, then it is subject to the HON. If a unit is integral to the petroleum refinery's operations, and produces hazardous organics in small quantities, it is subject to the petroleum refining MACT standard.

EPA has also included a SIC code reference for petroleum refining (SIC 2911) in the MACT Standard in order to clarify the applicability of the rule and reduce the potential confusion of regulatory overlap.

The following describes the relationship of the MACT standard to existing regulations for each process unit and related emission points:

**Miscellaneous Process Vents:** There are no existing regulations governing miscellaneous process vents. Both Group 1 and Group 2 have to comply with the MACT standard.

**Storage Vessels:** For storage vessels, there is an overlap between the MACT standard and the following NSPS:

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- 40 CFR 60 Subpart K, performance standards for petroleum liquid storage vessels that were built or have undergone some kind of modification after June 11, 1973 but before May 19, 1978

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- 40 CFR 60 Subpart Ka, performance standards for petroleum liquid storage vessels that were built or have undergone some kind of modification after May 18, 1978, but before July 7, 1984
- 40 CFR 60 Subpart Kb, performance standards for volatile organic storage vessels that have been modified after July 23, 1984.

The control requirements in the MACT standard reference the storage vessel provisions in 40 CFR 63 Subpart G. The MACT standard is applicable to all new Group 1 storage vessels and to existing facilities not governed by 40 CFR 60 Subpart Kb. For Group 2 storage vessels, if the control requirements of Subparts K, Ka or Kb do not apply, the vessel is subject to Subpart CC. All units that are not subject to Subparts K, Ka or Kb are subject to the MACT Standard.

Owners/operators of internal floating roof or external floating roof tanks are allowed to defer upgrading their seals to meet the NESHAP requirements until the next scheduled inspection and maintenance activity or within 10 years, whichever comes first.

**Wastewater Streams:** For wastewater streams, the following regulations are cross-referenced in the MACT standard:

- 40 CFR 60 Subpart QQQ, performance standards for VOC emissions from petroleum refinery wastewater systems
- 40 CFR 61 Subpart FF, benzene waste operations NESHAP (BWON)
- 40 CFR 63 Subpart G, synthetic organic chemical manufacturing industry (SOCMI) NESHAP (Subpart G).

New and existing sources in compliance with BWON are in compliance with the MACT standard. The MACT standard is applicable only to Group 1 streams that are subject to 40 CFR 60 Subpart QQQ. For wastewater stream management units that receive streams subject to the BWON and streams subject to 40 CFR Part 63 Subpart G, the MACT standard clarifies which provisions of the BWON and which provisions of Subpart G must be complied with. The specific provisions of each regulation that apply are specified in

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§63.640(o)(2). Alternately, the owner/operator may comply with all of the requirements of Subpart G only.<sup>1</sup>

**Gasoline Storage Racks:** Existing sources are governed by 40 CFR 63 Subpart R gasoline distribution facilities, NESHAP, which is referenced in the MACT standard. New sources are subject to 40 CFR Part 60 Subpart XX, but are required to comply only with the requirements of the MACT standard.<sup>1</sup>

**Marine Tank Vessel Loading:** These sources are subject to 40 CFR 63 Subpart Y marine tank loading NESHAP, which is referenced in the MACT standard.

**Equipment Leaks:** For equipment leaks, the following regulations are cross-referenced in the MACT standard:

- 40 CFR 60 Subpart VV, performance standards for equipment leaks from SOCM process units
- Modified 40 CFR 63 Subpart H, HON negotiated equipment leak standard

There are no group designations for equipment leaks. New sources must comply with the 40 CFR 63 Subpart H at startup, whereas existing sources can choose to comply with either 40 CFR 60 Subpart VV or 40 CFR 63 Subpart H. Also, the MACT standard does not apply to units that are also subject to provisions of the HON.

Table 5-1 presents a summary of the existing regulations that may be applicable to each emission point controlled under the MACT standard.

## **CONCLUSIONS**

Chapter 5 discussed the relationship between the MACT Standard and existing regulations. As was indicated in this chapter, the MACT Standard overlaps with certain requirements for storage vessels, wastewater streams, gasoline storage racks, marine

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<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998. For more information, see Appendix G.

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tank vessel loading, and equipment leaks. Miscellaneous process vents are the one type of emission point for which there are no existing requirements, and thus no overlap. This chapter also described other federal standards with which refineries are required to comply that are referenced in the MACT standard.

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**TABLE 5-1. Overlap of the Petroleum Refinery MACT Standard (40 CFR 63 Subpart CC) with Existing Regulations**

Source Category	Source Type	Source Group	Existing Regulation	Must Comply With	Comments
Miscellaneous Process Vents	New/Existing	1 / 2	N/A	40 CFR 63 Subpart CC: NESHAP for petroleum refineries	No existing regulation
Storage Vessels	Existing	1	40 CFR 60 Subpart K or Ka: NSPS for petroleum liquids	40 CFR 63 Subpart CC: NESHAP for petroleum refineries, which references 40 CFR 63 Subpart G	
			40 CFR 60 Subpart Kb: NSPS for volatile organic liquids	40 CFR 60 Subpart Kb: NSPS for volatile organic liquids	
		2	40 CFR 60 Subpart K or Ka: NSPS for petroleum liquid storage	40 CFR 60 Subpart K or Ka: NSPS for petroleum liquids	If subject to control requirements of 40 CFR 63 Subpart K or Ka
			40 CFR 60 Subpart Kb: NSPS for volatile organic liquids	40 CFR 60 Subpart Kb: NSPS for volatile organic liquids	
	New	1	40 CFR 60 Subpart K or Ka: NSPS for petroleum liquids	40 CFR 63 Subpart CC: NESHAP for petroleum refineries, which references 40 CFR 63 Subpart G	
			40 CFR 60 Subpart Kb: NSPS for volatile organic liquids		
		2	40 CFR 60 Subpart K or Ka: NSPS for petroleum liquids	40 CFR 60 Subpart K or Ka: NSPS for petroleum liquids	
			40 CFR 60 Subpart Kb: NSPS for volatile organic liquids	40 CFR 60 Subpart Kb: NSPS for volatile organic storage vessels	If subject to control requirements in 40 CFR 63 Subpart K or Ka

**TABLE 5-1. Overlap of the Petroleum Refinery MACT Standard (40 CFR 63 Subpart CC)  
with Existing Regulations**

Source Category	Source Type	Source Group	Existing Regulation	Must Comply With	Comments
Miscellaneous Process Vents	New/ Existing	1 / 2	N/A	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries	No existing regulation
Storage Vessels	Existing	1	<b>40 CFR 60 Subpart K or Ka:</b> NSPS for petroleum liquids	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart G	
			<b>40 CFR 60 Subpart Kb:</b> NSPS for volatile organic liquids	<b>40 CFR 60 Subpart Kb:</b> NSPS for volatile organic liquids	
		2	<b>40 CFR 60 Subpart K or Ka:</b> NSPS for petroleum liquid storage	<b>40 CFR 60 Subpart K or Ka:</b> NSPS for petroleum liquids	If subject to control requirements of 40 CFR 60 Subpart K or Ka
			<b>40 CFR 60 Subpart Kb:</b> NSPS for volatile organic liquids	<b>40 CFR 60 Subpart Kb:</b> NSPS for volatile organic liquids	
	New	1	<b>40 CFR 60 Subpart K or Ka:</b> NSPS for petroleum liquids	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart G	
			<b>40 CFR 60 Subpart Kb:</b> NSPS for volatile organic liquids		
		2	<b>40 CFR 60 Subpart K or Ka:</b> NSPS for petroleum liquids	<b>40 CFR 60 Subpart K or Ka:</b> NSPS for petroleum liquids	



**TABLE 5-1. Overlap of the Petroleum Refinery MACT Standard (40 CFR 63 Subpart CC)  
with Existing Regulations (continued)**

Source Category	Source Type	Source Group	Existing Regulation	Must Comply With	Comments
Wastewater Streams	New/ Existing	1	40 CFR 61 Subpart FF: benzene waste operations NESHAP (BWON)	40 CFR 61 Subpart FF: benzene waste operations NESHAP (BWON)	
			40 CFR 60 Subpart QQQ: NSPS for VOC emissions from petroleum refinery wastewater systems only	40 CFR 63 Subpart CC: NESHAP for petroleum refineries	
		2	40 CFR 60 Subpart QQQ: NSPS for VOC emissions from petroleum refinery wastewater systems	40 CFR 60 Subpart QQQ: NSPS for VOC emissions from petroleum refinery wastewater systems	
		1 / 2	40 CFR 63 Subpart G: NESHAP for SOCM process vents, storage vessels, transfer operations, and wastewater	40 CFR 63 Subpart G: 63.133 - 63.137 & 63.140	For equipment used in storage and conveyance of wastewater streams
				40 CFR 61 Subpart FF and 40 CFR 63 Subpart G: 63.138 - 63.139	For treatment and control of wastewater streams
				40 CFR 63 Subpart G: 63.143 - 63.148	For monitoring and inspection of equipment, reporting, and recordkeeping requirements
				OR	
				40 CFR 63 Subpart G: 63.133 - 63.148 & 63.151 - 63.152	Alternately, comply with only the requirements of Subpart G. <sup>1</sup>

**TABLE 5-1. Overlap of the Petroleum Refinery MACT Standard (40 CFR 63 Subpart CC)  
with Existing Regulations (continued)**

Source Category	Source Type	Source Group	Existing Regulation	Must Comply With	Comments
Gasoline Loading Racks	New/ Existing	N/A	<b>40 CFR 63 Subpart R:</b> gasoline distribution facilities NESHAP	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart R	
	New	N/A	<b>40 CFR 60 Subpart XX:</b> New Source Standard for Bulk Gasoline Terminals	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart R <sup>1</sup>	
Equipment Leaks	Existing	N/A	<b>40 CFR 60 Subpart VV:</b> NSPS for equipment leaks  <b>OR</b> <b>40 CFR 63 Subpart H:</b> HON equipment leaks	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart H  <b>40 CFR 60 Subpart VV:</b> NSPS for equipment leaks	The new petroleum refinery NESHAP allows owners and operators of existing sources to choose between the two regulations.
	New	N/A	<b>40 CFR 63 Subpart H:</b> HON equipment leaks	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart H	New sources do not have a choice like existing sources.

<sup>1</sup> This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998. For more information, see Appendix G.

**TABLE 5-1. Overlap of the Petroleum Refinery MACT Standard (40 CFR 63 Subpart CC) with Existing Regulations (continued)**

Source Category	Source Type	Source Group	Existing Regulation	Must Comply With	Comments
Wastewater Streams	New/Existing	1	40 CFR 61 Subpart FF: benzene waste operations NESHAP (BWON)	40 CFR 61 Subpart FF: benzene waste operations NESHAP (BWON)	
			40 CFR 60 Subpart QQQ: NSPS for VOC emissions from petroleum refinery wastewater systems only	40 CFR 63 Subpart CC: NESHAP for petroleum refineries	
		2	40 CFR 60 Subpart QQQ: NSPS for VOC emissions from petroleum refinery wastewater systems	40 CFR 60 Subpart QQQ: NSPS for VOC emissions from petroleum refinery wastewater systems	
		1 / 2	40 CFR 63 Subpart G: NESHAP for SOGMI process vents, storage vessels, transfer operations, and wastewater	40 CFR 63 Subpart G: 63.133 - 63.137 & 63.140	For equipment used for storage and conveyance of wastewater streams
				40 CFR 61 Subpart FF and 40 CFR 63 Subpart G: 63.138 - 63.139	For treatment and control of wastewater streams
				40 CFR 63 Subpart G: 63.143 - 63.148	For monitoring and inspection of equipment, reporting, and recordkeeping requirements
				OR	
				40 CFR 63 Subpart G: 63.133 - 63.148 & 63.151 - 63.152	Alternatively, comply only the requirements of Subpart G

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**TABLE 5-1. Overlap of the Petroleum Refinery MACT Standard (40 CFR 63 Subpart CC) with Existing Regulations (continued)**

Source Category	Source Type	Source Group	Existing Regulation	Must Comply With	Comment:
Gasoline Loading Racks	New/Existing	N/A	<b>40 CFR 63 Subpart R:</b> gasoline distribution facilities NESHAP	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart R	
	New	N/A	<b>40 CFR 60 Subpart XX:</b> New Source Standard for Bulk Gasoline Terminals	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart R <sup>1</sup>	
Equipment Leaks	Existing	N/A	<b>40 CFR 60 Subpart VV:</b> NSPS for equipment leaks  <b>OR</b> <b>40 CFR 63 Subpart H:</b> HON equipment leaks	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart H  <b>40 CFR 60 Subpart VV:</b> NSPS for equipment leaks	The new petroleum NESHAP allows owners and operators of existing sources to choose between the two regulations.
	New	N/A	<b>40 CFR 63 Subpart H:</b> HON equipment leaks	<b>40 CFR 63 Subpart CC:</b> NESHAP for petroleum refineries, which references 40 CFR 63 Subpart H	New sources do not have the same choice like existing sources.

<sup>1</sup> This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998. For more information, see Appendix G.

**APPENDIX A. HAZARDOUS AIR POLLUTANTS (HAPs)**

<b>Chemical Name</b>	<b>CAS Number</b>
Acetaldehyde	75070
Acetamide	60355
Acetonitrile	75058
Acetophenone	98862
2-Acetylaminofluorene	53963
Acrolein	107028
Acrylamide	79061
Acrylic acid	79107
Acrylonitrile	107131
Allyl chloride	107051
4-Aminobiphenyl	92671
Aniline	62533
o-Anisidine	90040
Asbestos	1332214
Benzene (including benzene from gasoline)	71432
Benzidine	92875
Benzotrichloride	98077
Benzyl chloride	100447
Biphenyl	92524
Bis(2-ethylhexyl)phthalate (DEHP)	117817

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<b>Chemical Name</b>	<b>CAS Number</b>
Bis(chloromethyl)ether	542881
Bromoform	75252
1,3-Butadiene	106990
Calcium cyanamide	156627
Captan	133062
Carbaryl	63252
Carbon disulfide	75150
Carbon tetrachloride	56235
Carbonyl sulfide	463581
Catechol	120809
Chloramben	133904
Chlordane	57749
Chlorine	7782505
Chloroacetic acid	79118
2-Chloroacetophenone	532274
Chlorobenzene	108907
Chlorobenzilate	510156
Chloroform	67663
Chloromethyl methyl ether	107302
Chloroprene	126998
Cresols/Cresylic acid (isomers and mixture)	1319773
o-Cresol	95487

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Chemical Name	CAS Number
m-Cresol	108394
p-Cresol	106445
Cumene	98828
2,4-D, salts and esters	94757
DDE	3547044
Diazomethane	334883
Dibenzofurans	132649
1,2-Dibromo-3-chloropropane	96128
Dibutylphthalate	84742
1,4-Dichlorobenzene(p)	106467
3,3-Dichlorobenzidene	91941
Dichloroethyl ether (Bis(2-chloroethyl)ether)	111444
1,3-Dichloropropene	542756
Dichlorvos	62737
Diethanolamine	111422
N,N-Diethyl aniline (N,N-Dimethylaniline)	121697
Diethyl sulfate	64675
3,3-Dimethoxybenzidine	119904
Dimethyl aminoazobenzene	60117
3,3-Dimethyl benzidine	119937
Dimethyl carbamoyl chloride	79447
Dimethyl formamide	68122

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Chemical Name	CAS Number
1,1-Dimethyl hydrazine	57147
Dimethyl phthalate	131113
Dimethyl sulfate	77781
4,6-Dinitro-o-cresol, and salts	534521
2,4-Dinitrophenol	51285
2,4-Dinitrotoluene	121142
1,4-Dioxane (1,4-Diethyleneoxide)	123911
1,2-Diphenylhydrazine	122667
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	106898
1,2-Epoxybutane	106887
Ethyl acrylate	140885
Ethyl benzene	100414
Ethyl carbamate (Urethane)	51796
Ethyl chloride (Chloroethane)	75003
Ethylene dibromide (Dibromoethane)	106934
Ethylene dichloride (1,2-Dichloroethane)	107062
Ethylene glycol	107211
Ethylene imine (Aziridine)	151564
Ethylene oxide	75218
Ethylene thiourea	96457
Ethylidene dichloride (1,1-Dichloroethane)	75343
Formaldehyde	50000

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<b>Chemical Name</b>	<b>CAS Number</b>
Heptachlor	76448
Hexachlorobenzene	118741
Hexachlorobutadiene	87683
Hexachlorocyclopentadiene	77474
Hexachloroethane	67721
Hexamethylene-1,6-diisocyanate	822060
Hexamethylphosphoramide	680319
Hexane	110543
Hydrazine	302012
Hydrochloric acid	7647010
Hydrogen fluoride (Hydrofluoric acid)	7664393
Hydroquinone	123319
Isophorone	78591
Lindane (all isomers)	58899
Maleic anhydride	108316
Methanol	67561
Methoxychlor	72435
Methyl bromide (Bromomethane)	74839
Methyl chloride (Chloromethane)	74873
Methyl chloroform (1,1,1-Trichloroethane)	71556
Methyl ethyl ketone (2-Butanone)	78933
Methyl hydrazine	60344

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<b>Chemical Name</b>	<b>CAS Number</b>
Methyl iodide (Iodomethane)	74884
Methyl isobutyl ketone (Hexone)	108101
Methyl isocyanate	624839
Methyl methacrylate	80626
Methyl tert butyl ether	1634044
4,4-Methylene bis(2-chloroaniline)	101144
Methylene chloride (Dichloromethane)	75092
Methylene diphenyl diisocyanate (MDI)	101688
4,4-Methylenedianiline	101779
Naphthalene	91203
Nitrobenzene	98953
4-Nitrobiphenyl	92933
4-Nitrophenol	100027
2-Nitropropane	79469
N-Nitroso-N-methylurea	684935
N-Nitrosodimethylamine	62759
N-Nitrosomorpholine	59892
Parathion	56382
Pentachloronitrobenzene (Quintobenzene)	82688
Pentachlorophenol	87865
Phenol	108952
p-Phenylenediamine	106503

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Chemical Name	CAS Number
Phosgene	75445
Phosphine	7803512
Phosphorus	7723140
Phthalic anhydride	85449
Polychlorinated biphenyls (Aroclors)	1336363
1,3-Propane sultone	1120714
beta-Propiolactone	57578
Propionaldehyde	123386
Propoxur (Baygon)	114261
Propylene dichloride (1,2-Dichloropropane)	78875
Propylene oxide	75569
1,2-Propylenimine (2-Methyl aziridine)	75558
Quinoline	91225
Quinone	106514
Styrene	100425
Styrene oxide	96093
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016
1,1,2,2-Tetrachloroethane	79345
Tetrachloroethylene (Perchloroethylene)	127184
Titanium tetrachloride	7550450
Toluene	108883
2,4-Toluene diamine	95807

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Chemical Name	CAS Number
2,4-Toluene diisocyanate	584849
o-Toluidine	95534
Toxaphene (chlorinated camphene)	8001352
1,2,4-Trichlorobenzene	120821
1,1,2-Trichloroethane	79005
Trichloroethylene	79016
2,4,5-Trichlorophenol	95954
2,4,6-Trichlorophenol	88062
Triethylamine	121448
Trifluralin	1582098
2,2,4-Trimethylpentane	540841
Vinyl acetate	108054
Vinyl bromide	593602
Vinyl chloride	75014
Vinylidene chloride (1,1-Dichloroethylene)	75354
Xylenes (isomers and mixture)	1330207
o-Xylenes	95476
m-Xylenes	108383
p-Xylenes	106423
Antimony Compounds	0
Arsenic Compounds (inorganic including arsine)	0
Beryllium Compounds	0

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Chemical Name	CAS Number
Cadmium Compounds	0
Chromium Compounds	0
Cobalt Compounds	0
Coke Oven Emissions	0
Cyanide Compounds <sup>1</sup>	0
Glycol ethers <sup>2</sup>	0
Lead Compounds	0
Manganese Compounds	0
Mercury Compounds	0
Fine mineral fibers <sup>3</sup>	0
Nickel Compounds	0
Polycyclic Organic Matter <sup>4</sup>	0
Radionuclides (including radon) <sup>5</sup>	0
Selenium Compounds	0

Note: For all listings above which contain the word 'compounds' and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the name chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure

- <sup>1</sup> X'CN where X=H' or any other group where a formal dissociation may occur. For example KCN or Ca(CN)<sub>2</sub>.
- <sup>2</sup> Includes mono- and di-ethers or ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH<sub>2</sub>CH<sub>2</sub>)<sub>n</sub>-OR' where n=1, 2, or 3; R=alkyl or aryl groups; R'=R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH<sub>2</sub>CH<sub>2</sub>)<sub>n</sub>-OH. Polymers are excluded from the glycol category.

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- <sup>3</sup> Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.
- <sup>4</sup> Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C.
- <sup>5</sup> A type of atom which spontaneously undergoes radioactive decay.

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**APPENDIX B. ORGANIC HAZARDOUS AIR POLLUTANTS  
(ORGANIC HAPs)**

<b>Chemical Name</b>	<b>CAS Number</b>
Benzene	71432
Biphenyl	92524
Butadiene (1,3)	10990
Carbon disulfide	75150
Carbonyl sulfide	463581
Cresol (mixed isomers)	1319773
Cresol (m-)	108394
Cresol (o-)	95487
Cresol (p-)	106445
Cumene	98828
Dibromoethane (1,2) (ethylene debromide)	106934
Dichloroethane (1,2)	107062
Diethanolamine	111422
Ethylbenzene	100414
Ethylene glycol	107211
Hexane	110543
Methanol	67561
Methyl ethyl ketone (2-butanone)	78933

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Chemical Name	CAS Number
Methyl isobutyl ketone (hexone)	108101
Methyl tert butyl ether	1634044
Naphthalene	91203
Phenol	108952
Toluene	108883
Trimethylpentane (2,2,4)	540841
Xylene (mixed isomers)	1330207
Xylene (m-)	108383
Xylene (o-)	95476
Xylene (p-)	106423

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**APPENDIX C. U.S. PETROLEUM REFINERIES AFFECTED BY THE  
PETROLEUM REFINERY STANDARDS**

Facility Name	City	State	1994 Capacity Units*
Tesoro Alaska Petroleum	Kenai	AK	72,000
Arco Alaska Inc.	Kuparuk	AK	12,000
Mapco Inc.	North Pole	AK	128,200
Petro Star Inc.	North Pole	AK	10,000
Arco Alaska Inc.	Prudhoe Bay	AK	15,000
Petro Star Inc.	Valdez	AK	26,300
Coastal Mobile Refining Co.	Chickasaw/Mobile Bay	AL	16,500
Shell Oil Products Co.1	Saraland	AL	76,000*
Hunt Refining Company Inc.	Tuscaloosa	AL	33,500
Lion Oil Co. Inc.	El Dorado	AR	51,000
Cross Oil & Refining Co. Inc.	Smackover	AR	6,200
Berry Petroleum Co.	Stephens	AR	6,700
Anchor Refining Co.	McKittirck	CA	10,000*
Kern Oil & Refining Co.	Bakersfield	CA	21,400
San Joaquin Refining Co. Inc.	Bakersfield	CA	24,300
Sunland Refining Corp.	Bakersfield	CA	12,000
Texaco Refining and Marketing Inc.	Bakersfield	CA	56,000
Exxon Corporation	Benecia	CA	128,000
Huntway Refining Co.	Benecia	CA	8,600
Chevron USA Products Co.	El Segundo	CA	230,000

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## *Petroleum Refinery MACT Standard Guidance*

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Facility Name	City	State	1994 Capacity Units*
Atlantic Richfield Co.	Carson	CA	255,000
Unocal Corp.	Los Angeles/Wilmington	CA	118,750
Shell Martinez Refining Co.	Martinez	CA	148,900

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## *Petroleum Refinery MACT Standard Guidance*

Facility Name	City	State	1994 Capacity Units*
Tosco Corporation	Martinez	CA	160,000
Witco Corporation	Oildale	CA	0
Tenby Inc.	Oxnard	CA	4,000
Paramount Petroleum Corp.	Paramount	CA	46,500
Chevron USA Products Co.	Richmond	CA	230,000
Santa Maria Refining Co. <sup>2</sup>	Santa Maria	CA	10,000*
Unocal Corp.	San Francisco/Santa Maria	CA	103,645*
Lunday Thagard Co	South Gate	CA	8,100
Mobile Oil Corp.	Torrance	CA	130,000
Huntway Refining Co	Wilmington	CA	5,500
Texaco Refining and Marketing	Wilmington	CA	64,000
Ultramar Inc.	Wilmington	CA	68,000
Conoco Inc	Commerce City	CO	57,500
Total Petroleum Inc. <sup>3</sup>	Denver	CO	28,000*
Star Enterprise	Delaware City	DE	140,000
Young Refining Corporation	Douglasville	GA	5,540
Citgo Asphalt Refining Co.	Savannah	GA	28,000
BHP Hawaii Inc.	Kapolei	HI	93,500
Chevron USA Products Co	Barbers Point	HI	54,000
Clark Oil & Refining Corp	Blue Island	IL	80,515
Clark Oil & Refining Corp.	Hartford	IL	62,500
Mobil Oil Corporation	Joliet	IL	188,000
Indian Refining Partnership	Lawrenceville	IL	80,750

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## *Petroleum Refinery MACT Standard Guidance*

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Facility Name	City	State	1994 Capacity Units*
Uno-Ven Company	Lemont	IL	147,000
Marathon Oil Company	Robinson	IL	175,000
Shell Wood River Refining Co. <sup>4</sup>	Wood River	IL	271,000
Laketon Refining Corp	Laketon	IN	11,100

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## *Petroleum Refinery MACT Standard Guidance*

<b>Facility Name</b>	<b>City</b>	<b>State</b>	<b>1994 Capacity Units*</b>
Countrymark Cooperative Inc.	Mount Vernon	IN	22,000
Amoco Oil Co.	Whiting	IN	410,000
Farmland Industries Inc.	Coffeyville	KS	68,600
Texaco Refining and Marketing Inc.	El Dorado	KS	94,600
National Coop Refinery Assoc.	Mc Pherson	KS	75,600
Ashland Petroleum Co.	Russell/Catlettsburg	KY	213,400
Somerset Refinery Inc.	Somerset	KY	5,500
Exxon Corporation	Baton Rouge	LA	424,000
BP Exploration & Oil Inc.	Belle Chasse	LA	231,500
Mobil Oil Corporation	Chalmette	LA	170,000
Canal Refining Co.	Church Point	LA	9,500
Star Enterprise	Convent	LA	225,000
Calumet Lubricants Co.	Cotton Valley	LA	7,800
Marathon Oil Company	Garyville	LA	255,000
Basis Petroleum, Inc. <sup>5</sup>	Krotz Springs	LA	67,100*
Calcasieu Refining Co.	Lake Charles	LA	12,500
Citgo Petroleum Corporation	Lake Charles	LA	305,000
American International Refining Inc. <sup>6</sup>	Lake Charles	LA	27,600*
Cit-Con Oil Corp.	Lake Charles	LA	7,350
Murphy Oil USA Inc	Meraux	LA	100,000
Shell Norco Refining Co.	Norco	LA	215,000
Placid Refining Co.	Port Allen	LA	48,500
Calumet Lubricants Co. Ltd.	Princeton	LA	8,200

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Facility Name	City	State	1994 Capacity Units*
Atlas Processing Co. Div. Of Pennzoil	Shreveport	LA	46,200
Shell Chemical Co. <sup>7</sup>	St. Rose	LA	40,000
Conoco Inc.	Westlake	LA	191,000
Lakeside Refining Co.	Kalamazoo	MI	5,600

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<b>Facility Name</b>	<b>City</b>	<b>State</b>	<b>1994 Capacity Units*</b>
Total Petroleum Inc.	Alma	MI	45,600
Marathon Oil Company	Detroit	MI	70,000
Koch Refining Company LP	Rosemount	MN	230,000
Ashland Petroleum Co.	Saint Paul Park	MN	67,100
Southland Oil Company	Lumberton	MS	5,800
Chevron USA Products Co	Pascagoula	MS	295,000
Southland Oil Company	Sandersville	MS	11,000
Ergon Inc.	Vicksburg	MS	23,000
Conoco Inc.	Billings	MT	49,500
Exxon Co.	Billings	MT	44,000
Montana Refining Co	Great Falls	MT	7,000
Cenex	Laurel	MT	41,450
Amoco Oil Co	Mandan	ND	58,000
Tosco Refining Co. <sup>a</sup>	Linden	NJ	240,000*
Citgo Asphalt Refining Co.	Paulsboro	NJ	40,000
Mobil Oil Corp.	Paulsboro	NJ	126,000
Chevron USA Products Co.	Perth Amboy	NJ	80,000
Amerada Hess Corporation	Port Reading	NJ	0
Coastal Eagle Point Oil Co.	Westville	NJ	125,000
Navajo Refining Company	Artesia	NM	57,000
Giant Refining Co. <sup>e</sup>	Bloomfield	NM	16,800*
Giant Refining Co.	Gallup	NM	20,800
Petro Source Refining Partners	Eagle Springs	NV	7,000

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## *Petroleum Refinery MACT Standard Guidance*

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Facility Name	City	State	1994 Capacity Units <sup>a</sup>
Ashland Petroleum Co.	Canton	OH	68,000
BP Oil Co.	Lima	OH	161,000
BP Oil Co.	Toledo (Oregon)	OH	136,000
Sun Refining & Marketing Co. <sup>10</sup>	Toledo	OH	125,000

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## *Petroleum Refinery MACT Standard Guidance*

Facility Name	City	State	1994 Capacity Units*
Total Petroleum Inc	Ardmore	OK	68,000
Conoco Inc.	Ponca City	OK	140,000
Sinclair Oil Corporation	Tulsa	OK	54,000
Sun Refining & Marketing Co.	Tulsa	OK	85,000
Gary-Williams Co. <sup>11</sup>	Wynnewood	OK	45,000*
Chevron USA Products Co <sup>12</sup>	Portland (Willbridge)	OR	15,000*
Witco Corporation	Bradford	PA	10,000
Sun Refining & Marketing Co	Marcus Hook	PA	175,000
Sun Refining & Marketing Co.	Philadelphia-Girard Pt <sup>13</sup>	PA	177,000*
Sun Refining & Marketing Co.	Philadelphia-Pt. Breeze <sup>14</sup>	PA	130,000*
Pennzoil Products Company	Rouseville	PA	15,700
United Refining Inc	Warren	PA	60,000
Mapco Petroleum Inc	Memphis	TN	89,000
Pride Companies L P	Abilene	TX	42,750
Exxon Co. USA	Baytown	TX	396,000
Mobil Oil Corporation	Beaumont	TX	315,000
Fina Oil and Chemical Co	Big Spring	TX	55,000
Phillips Petroleum Company	Borger	TX	110,000
Howell Hydrocarbons & Chemicals Inc.	Channelview	TX	1,400
Citgo Petroleum Corp <sup>15</sup>	Corpus Christi	TX	130,000*
Coastal Refining & Marketing Inc.	Corpus Christi	TX	95,000
Koch Refining Company Inc.	Corpus Christi	TX	255,000
Neste Trifinery Petroleum Services	Corpus Christi	TX	27,000

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## *Petroleum Refinery MACT Standard Guidance*

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<b>Facility Name</b>	<b>City</b>	<b>State</b>	<b>1994 Capacity Units<sup>1</sup></b>
Valero Refining Company	Corpus Christi	TX	29,901
Deer Park Refining Ltd. Partnership	Deer Park	TX	215,901
Chevron USA Products Co.	El Paso	TX	87,001
Basis Petroleum, Inc. <sup>16</sup>	Houston	TX	67,601

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## *Petroleum Refinery MACT Standard Guidance*

Facility Name	City	State	1994 Capacity Units*
Lyondell-Citgo Refining Co.	Houston	TX	265,000
Shell Odessa Refining Co.	Odessa	TX	28,600
Crown Central Petroleum Corp.	Pasadena	TX	100,000
Clark Oil & Refining Corp. <sup>17</sup>	Port Arthur	TX	185,000*
Fina Oil and Chemical Co.	Port Arthur	TX	175,000
Star Enterprise	Port Arthur/Neches	TX	235,000
Age Refining & Marketing	San Antonio	TX	6,000
Diamond Shamrock Corp.	Three Rivers	TX	
Diamond Shamrock Corp.	Sunray (McKee)	TX	132,000
Phillips Petroleum Company	Sweeny	TX	185,000
Amoco Oil Company	Texas City	TX	433,000
Marathon Oil Company	Texas City	TX	70,000
Basis Petroleum Inc. <sup>18</sup>	Texas City	TX	125,400*
La Gloria Oil & Gas Co.	Tyler	TX	55,000
Big West Oil Company	Salt Lake City	UT	24,000
Amoco Oil Company	Salt Lake City	UT	44,000
Chevron USA Products Co	Salt Lake City	UT	45,000
Crysen Refining Inc	Woods Cross	UT	12,500
Phillips Petroleum Company	Woods Cross	UT	25,000
Amoco Oil Company	Yorktown	VA	53,000
Hess of Virgin Islands Corp.	St. Croix	VI	505,000
Shell Anacortes Refin Co. <sup>19</sup>	Anacortes	WA	108,200*
Texaco Refining and Marketing	Anacortes	WA	136,000

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Facility Name	City	State	1994 Capacity Units
Atlantic Richfield Company	Ferndale	WA	189,000
Tosco Corporation	Ferndale	WA	95,000
Chevron USA Products Co. <sup>20</sup>	Seattle	WA	0
Sound Refining Inc.	Tacoma	WA	11,900

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Facility Name	City	State	1994 Capacity Units*
US Oil & Refining Co.	Tacoma	WA	32,400
Murphy Oil USA Inc.	Superior	WI	33,200
Quaker State oil Refining Corp.	Newell	WV	11,500
Frontier Refining Inc.	Cheyenne	WY	38,670
Little America Refining Co.	Evansville/Casper	WY	24,500
Wyoming Refining Co	Newcastle	WY	12,555
Sinclair Oil Corporation	Sinclair	WY	54,000

\* Barrels/Calendar day (one barrel=42 U.S. Gallons). Data extracted from Report 1 --Comparative Profile Petroleum Refining. EPA Regional or State Reviewers, Regional Review Draft. 10/25/96.

+ Charge Capacity, b/cd. Data extracted from Oil and Gas Journal. Dec. 23, 1996, pp. 85-94.

### Endnotes

1. Formerly LL&E Petroleum Marketing
2. Formerly Conoco
3. Formerly Colorado Refining
4. Possibly same refinery as Shell Oil Company in Roxana Wood River
5. Formerly Phibro Energy USA Inc.
6. Leases Gold Line Refining Ltd.
7. Formerly St. Rose Refining Inc.
8. Formerly Bayway Refining Company
9. Formerly Bloomfield Refining Company
10. Same as Sun Company Inc. (r & M)
11. Same as Kerr-Mcgee Refining Corp.
12. Same as Chevron U.S.A. Inc.
13. Previously combined with Point Breeze Refinery
14. Previously combined with Girard Point Refinery
15. Same as Citgo Refining and Chemical Inc.
16. Previously Phibro Energy USA Inc.
17. Formerly Chevron USA Inc.
18. Formerly Diamond Shamrock Corp. in Three Rivers, TX
19. Formerly Shell Oil Company

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20 Same as Chevron USA Inc.

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## **APPENDIX D. ADDITIONAL RESOURCES FOR PETROLEUM REFINING MACT STANDARD GUIDANCE DOCUMENT**

### **DOCUMENTS/REPORTS AVAILABLE ON THE INTERNET:**

#### **Clean Air Act signed rules**

[134.67.104.12/html/caa/rules.htm](http://134.67.104.12/html/caa/rules.htm)

Includes compressed files of the Clean Air Act.

**Sector Notebook: Profile of the Petroleum Refining Industry.** EPA Office of Compliance. September 1995.<http://es.inel.gov/>.

This sector notebook provides general information on the petroleum refining industry, including: industrial processes, chemical releases and transfer profile, and pollution prevention opportunities. The report also summarizes applicable federal statutes and regulations, provides a compliance and enforcement history, and presents compliance assurance and initiatives for the industry.

#### **Air Toxics Regulations: Petroleum Refining. Final Air Toxics Rule for the Petroleum Refining Industry. July 28, 1995.**

[www.epa.gov/oar/oaqps/airtox/fsrefine.html](http://www.epa.gov/oar/oaqps/airtox/fsrefine.html)

Document written following EPA's issuance of final regulation to reduce emissions of air toxics from petroleum refineries. Discusses health and environmental benefits of new rule and flexibility of rule for the industry. Provides background and cost of information, discusses who will be affected, and includes a FACT sheet.

#### **AIRS Facility Subsystem (AFS Data) - USA Emissions Ranking Report - VOC**

[www.epa.gov/airs/afsd-voc.html](http://www.epa.gov/airs/afsd-voc.html)

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This report ranks the 100 largest stationary sources of volatile organic compounds (VOC) emissions in the United States, as of February 28, 1997.

### **AIRS Facility Subsystem (AFS Data) - USA Emissions Ranking Report - CO**

[www.epa.gov/airs/afsd-co.html](http://www.epa.gov/airs/afsd-co.html)

This report ranks the 100 largest stationary sources of carbon monoxide (CO) emissions in the United States, as of February 28, 1997.

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### **National Ambient Air Quality Standards (NAAQS)**

[www.epa.gov/airs/criteria.html](http://www.epa.gov/airs/criteria.html)

Document lists EPA's national standards set for the six principal pollutants, called "criteria" pollutants.

### **EPA Operating Permits Program -- Information**

[www.epa.gov/oar/oaqps/permits/](http://www.epa.gov/oar/oaqps/permits/)

Provides a mechanism for gathering all the federal, state, and local requirements applicable to air pollution sources. Answers questions like: What are the requirements? What guidance has been prepared? Who are responsible for implementing the permits programs? What is the approval status for each of the state and local permitting authorities? What changes are coming?

### **Environment Canada**

[www.ns.doe.ca/soe/ch4-31.html](http://www.ns.doe.ca/soe/ch4-31.html)

State of the Environment in Atlantic Region report. Includes chapters describing process releases from petroleum refining and presents data on air emissions from refineries.

### **Center for Transportation and Analysis**

[www-cta.ornl.gov/data/tedb15/tab21.htm](http://www-cta.ornl.gov/data/tedb15/tab21.htm)

Includes the table Refinery Yield of Petroleum Products from a Barrel of Crude Oil, 1978-1993(a).

## **WEBSITES**

### ***U.S. EPA Office of Air and Radiation (OAR):***

#### **OAR Homepage**

[www.epa.gov/oar/](http://www.epa.gov/oar/)

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Includes information on prevention and air toxics. Lists publications, regulations, and resources. Provides search tool.

### **OAR Regulations**

[www.epa.gov/oar/oarregul.html](http://www.epa.gov/oar/oarregul.html)

Contains information on Clean Air Act documents, Clean Air Act operating permits program, ozone depletion regulations, OAQPS air regulations - schedule, air toxics regulations - fact sheets, and other regulations, including the federal register online

### **OAR Resources**

[www.epa.gov/oar/oarrsrc.html](http://www.epa.gov/oar/oarrsrc.html)

Lists various services, networks, webpages, databases, software, and contacts that may be useful.

### ***U.S. EPA Office of Air Quality Planning and Standards (OAQPS):***

#### **Transfer Technology Network 2000 (TTN 2000) Home Page**

[www.epa.gov/oar/ttn\\_bbs.html](http://www.epa.gov/oar/ttn_bbs.html)

Provides access to various electronic bulletin board systems containing information about many areas of air pollution science, technology, regulation, measurement, and prevention. Serves as a public forum for the exchange of technical information and ideas among users and EPA staff. Includes tools to: 1) estimate air pollutant emissions, 2) download computer code for regulatory models, 3) read summaries or details of the Clean Air Act, 4) find a course offered by the Air Pollution Training Institute, or 5) seek technical support in implementing air pollution programs

#### **Unified Air Toxics Website: Home Page**

[www.epa.gov/oar/oaqps/airtox/](http://www.epa.gov/oar/oaqps/airtox/)

Contains basic facts, summaries of EPA regulations, information on pollutants and sources of pollutants, technical resources, EPA program and contacts, and state and local programs.

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### **Unified Air Toxics Website: Pollutants & Sources**

[www.epa.gov/oar/oaqps/airtox/pollsour.html](http://www.epa.gov/oar/oaqps/airtox/pollsour.html)

Provides a list of 188 toxic air pollutants to be regulated by EPA, defines the types of sources of pollutants, and provides a list of 174 categories of industrial and commercial sources that emit toxic air pollutants.

### **Unified Air Toxics Website: EPA Programs**

[www.epa.gov/oar/oaqps/airtox/epaprogs.html](http://www.epa.gov/oar/oaqps/airtox/epaprogs.html)

Describes the following three programs: Hazardous Air Pollutants Strategic Implementation Plan, National Emission Standards for Hazardous Air Pollutants (NESHAP), and Maximum Achievable Control Technology (MACT) Standards.

### **Publications**

[www.epa.gov/oar/oaqps/publicat.html](http://www.epa.gov/oar/oaqps/publicat.html)

Contains air quality and emissions trend reports, newsletters, fact sheets, and various guides to evaluating exposure to air pollutants.

### **American Petroleum Institute (API)**

[www.api.org/](http://www.api.org/)

Representing the Nation's oil and gas industries. Contains industry data, facts about the petroleum industry, and publications such as: NO<sub>x</sub> Emissions from Petroleum Industry Operations, October 1979; Petroleum Emission Factor Information Retrieval System (PEFIRS), July 1993; The Cost Effectiveness of Carbon Dioxide from Petroleum Sources, July 1991; and, Electric Exchange of Environmental Compliance Information. A Proposed Approach, August 1995.

One of many documents available from API is the *Summary of Question and Answer Sessions for American Petroleum Institute's Refinery MACT Rule Workshop*, October 23-24, 1995.

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## **APPENDIX E. DEFINITIONS**

**Affected source** means the combination of all emission points at a petroleum refinery. Each point is considered part of the single affected source.

**Boiler** means any closed combustion device that extracts useful energy in the form of steam and is not an incinerator.

**Closed vent system** means a system that is not open to the atmosphere and is composed of piping, ductwork, connections, and, if necessary, flow inducing devices that transport gas and vapor from an emission point to a control device or back into the process. If gas or vapor from regulated equipment is routed to a process (e.g., petroleum refinery fuel gas system), the process is not considered a closed vent system and is not subject to the closed vent system standards.

**Combustion device** means an individual unit of equipment such as a flare, incinerator, process heater, or boiler used for the combustion of organic hazardous air pollutant (HAP) vapors.

**Construction** means the on-site fabrication, erection, or installation of an affected source.

**Control device** means any equipment used for recovering, removing, or oxidizing hazardous organic pollutants (HAPs). Such equipment includes, but is not limited to, absorbers, carbon absorbers, condensers, incinerators, flares, boilers, and process heaters.

**Deck fitting controls** means the fittings that pass through or are attached to the deck or roof of a floating roof tank, and include hatches, gauge floats, and support columns. Controls may be installed to minimize evaporative losses from the fittings.

**Double-seal system** means a floating roof having both primary and secondary seals.

**Dwell time** means the time feeds spend in a reactor (allowing for reactions to occur) or the time feeds or products spend in a tank.

**Emissions averaging** means a method of complying with emission limitations, whereby the affected source may create emission credits by reducing emissions from specific points to a level below that required by the relevant standard, and those credits are used to offset emissions from points that are not controlled to the level required by the relevant standard.

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**Emission point** means an individual miscellaneous process vent, storage vessel, wastewater stream, or equipment leak associated with a petroleum refining process unit; an individual storage vessel or equipment leak associated with a bulk gasoline terminal or pipeline breakout station classified under SIC 2911; a gasoline loading rack classified under SIC 2911; or a marine tank vessel loading operation located at a petroleum refinery.

**Existing source** means a source that commenced construction on or before July 14, 1994.

**External floating roof** means a pontoon-type or double-deck-type cover that rests on the liquid surface in a storage vessel or waste management unit with no fixed roof.

**Firebox** means a chamber (e.g., boiler) where fuels are burned.

**Fixed roof** means a cover that is mounted on a storage vessel or waste management unit in a stationary manner and that does not move with fluctuations in liquid level.

**Flame zone** means the portion of a combustion chamber of a boiler or process heater occupied by the flame envelope.

**Flare** means a device used in refineries to combust undesirable volatile gases (e.g., methane, ethane, hydrogen sulfide) from process units. Flares also take momentary surges in gas manufacturing by burning the excess. When burned, these gases are converted to more favorable compounds which can be emitted into the air.

**Flow indicator** means a device that indicates whether gas is flowing, or whether the valve position would allow gas to flow, in a line.

**Gasoline** means any petroleum distillate or petroleum distillate/alcohol blend having a Reid vapor pressure of 27.6 kilopascals or greater that is used as a fuel for internal combustion engines.

**Hazardous organic pollutant or HAP** means one of the 188 chemicals listed in section 112(b) of the Clean Air Act, and listed in Appendix A of this manual.

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**Incinerator** means an enclosed combustion device that is used for destroying organic compounds. Auxiliary fuel may be used to heat waste gas to combustion temperature. Any energy recovery section is a separate section following the combustion section and the two are joined by ducts or connections carrying flue gas.

**Internal floating roof** means a cover that rests or floats on the liquid surface (but not necessarily in complete contact with it) inside a storage vessel or waste management unit that has a permanently affixed roof.

**Major source** means a source that has the potential to emit 10 tons per year or more annually of any of the 188 listed hazardous air pollutants (HAPs), or 25 tons per year or more annually of any combination of HAPs.

**Malfunction** means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

**Maximum achievable control technology or MACT** means demonstrated technologies which may be used to achieve acceptable air emissions limits for specific compounds

**Maximum true vapor pressure** means the equilibrium partial pressure exerted by the stored liquid at the temperature equal to the highest calendar-month average of the liquid storage temperature for liquids stored above or below the ambient temperature or at the local maximum monthly average temperature as reported by the National Weather Service for liquids stored at the ambient temperature.

**New source** means a source that commenced construction after July 14, 1994.

**Organic hazardous air pollutant or organic HAP** means any of the 28 organic chemicals listed in Appendix B of this manual.

**Primary seal** means the seal that slides against a wall of a floating roof tank as the roof is raised and lowered. It closes the annular space between the roof and tank wall and can be constructed of metal or polymer.

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**Process heater** means an enclosed combustion device that primarily transfers heat liberated by burning fuel directly to process streams or to heat transfer liquids other than water.

**Process unit** means the equipment assembled and connected by pipes or ducts to process raw and/or intermediate materials and to manufacture an intended product. A process unit includes any associated storage vessels, and includes, but is not limited to, chemical manufacturing process units and petroleum refining process units.

**Reconstruction** means the replacement of components of an affected or a previously unaffected stationary source to the extent that:

- (1) The fixed capital cost of the new component exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and
- (2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator (or a state) pursuant to Section 112 of the Clean Air Act.

**Recovery device** means an individual unit of equipment capable of and used for the purpose of recovering chemicals for use, reuse, or sale. Recovery devices include, but are not limited to, absorbers, carbon absorbers, and condensers.

**Secondary seal** means the seal that provides addition evaporative loss control. It is mounted on the roof rim or tank wall over the primary seal.

**Single-seal system** means a floating roof having one continuous seal that completely covers the space between the wall of the storage vessel and the edge of the floating roof.

**Total organic compound or TOC** means those compounds, excluding methane and ethane, measured according to the procedures of method 18 of 40 CFR 60 Appendix A. Method 25A may be used alone or in combination with Method 18 to measure TOC as provided in 40 CFR 63.645.

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**APPENDIX F. COMPLIANCE CHECKLIST FOR THE  
PETROLEUM REFINERY MACT STANDARD  
40 CFR PART 63, SUBPART CC**

**NOVEMBER, 2000**

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### I. GENERAL APPLICABILITY

<p>1. Is the refinery a major HAP source?</p> <p><input type="checkbox"/> Potential to emit <math>\geq</math> 10 tons per year (tpy) of any of the 188 HAPs listed in § 112(b) of the Clean Air Act; or</p> <p><input type="checkbox"/> Potential to emit <math>\geq</math> 25 tpy of total HAPs.</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>																														
<p>2. Do the refining process units at refineries that are major HAP sources emit or contain any of the following 28 organic HAPs? Please check the substances below that apply</p> <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Benzene</td> <td><input type="checkbox"/> Ethylene glycol</td> </tr> <tr> <td><input type="checkbox"/> Biphenyl</td> <td><input type="checkbox"/> Hexane</td> </tr> <tr> <td><input type="checkbox"/> Butadiene (1,3)</td> <td><input type="checkbox"/> Methanol</td> </tr> <tr> <td><input type="checkbox"/> Carbon disulfide</td> <td><input type="checkbox"/> Methyl ethyl ketone (2-butanone)</td> </tr> <tr> <td><input type="checkbox"/> Carbonyl sulfide</td> <td><input type="checkbox"/> Methyl isobutyl ketone (hexone)</td> </tr> <tr> <td><input type="checkbox"/> Cresol (mixed isomers)</td> <td><input type="checkbox"/> Methyl tert butyl ether</td> </tr> <tr> <td><input type="checkbox"/> Cresol (m-)</td> <td><input type="checkbox"/> Naphthalene</td> </tr> <tr> <td><input type="checkbox"/> Cresol (o-)</td> <td><input type="checkbox"/> Phenol</td> </tr> <tr> <td><input type="checkbox"/> Cresol (p-)</td> <td><input type="checkbox"/> Toluene</td> </tr> <tr> <td><input type="checkbox"/> Cumene</td> <td><input type="checkbox"/> Trimethylpentane (2,2,4)</td> </tr> <tr> <td><input type="checkbox"/> Dibromoethane (1,2)</td> <td><input type="checkbox"/> Xylene (mixed isomers)</td> </tr> <tr> <td style="padding-left: 20px;">(ethylene dibromide)</td> <td><input type="checkbox"/> Xylene (m-)</td> </tr> <tr> <td><input type="checkbox"/> Dichloroethane (1,2)</td> <td><input type="checkbox"/> Xylene (o-)</td> </tr> <tr> <td><input type="checkbox"/> Diethanolamine</td> <td><input type="checkbox"/> Xylene (p-)</td> </tr> <tr> <td><input type="checkbox"/> Ethylbenzene</td> <td></td> </tr> </table>	<input type="checkbox"/> Benzene	<input type="checkbox"/> Ethylene glycol	<input type="checkbox"/> Biphenyl	<input type="checkbox"/> Hexane	<input type="checkbox"/> Butadiene (1,3)	<input type="checkbox"/> Methanol	<input type="checkbox"/> Carbon disulfide	<input type="checkbox"/> Methyl ethyl ketone (2-butanone)	<input type="checkbox"/> Carbonyl sulfide	<input type="checkbox"/> Methyl isobutyl ketone (hexone)	<input type="checkbox"/> Cresol (mixed isomers)	<input type="checkbox"/> Methyl tert butyl ether	<input type="checkbox"/> Cresol (m-)	<input type="checkbox"/> Naphthalene	<input type="checkbox"/> Cresol (o-)	<input type="checkbox"/> Phenol	<input type="checkbox"/> Cresol (p-)	<input type="checkbox"/> Toluene	<input type="checkbox"/> Cumene	<input type="checkbox"/> Trimethylpentane (2,2,4)	<input type="checkbox"/> Dibromoethane (1,2)	<input type="checkbox"/> Xylene (mixed isomers)	(ethylene dibromide)	<input type="checkbox"/> Xylene (m-)	<input type="checkbox"/> Dichloroethane (1,2)	<input type="checkbox"/> Xylene (o-)	<input type="checkbox"/> Diethanolamine	<input type="checkbox"/> Xylene (p-)	<input type="checkbox"/> Ethylbenzene		<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<input type="checkbox"/> Benzene	<input type="checkbox"/> Ethylene glycol																														
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<input type="checkbox"/> Diethanolamine	<input type="checkbox"/> Xylene (p-)																														
<input type="checkbox"/> Ethylbenzene																															
<p>3. Are any of the following emission points located within petroleum refining process units? Please check the emission points below that apply.</p> <p><input type="checkbox"/> Miscellaneous process vents that contain <math>\geq</math> 20 ppmv total organic HAP</p> <p><input type="checkbox"/> Storage vessels (pressure vessels and vessels <math>&lt;</math> m<sup>3</sup> are exempt)</p> <p><input type="checkbox"/> Wastewater streams and treatment operations</p> <p><input type="checkbox"/> Equipment containing or contacting a fluid that is <math>\geq</math> 5% by weight total organic HAPs</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>																														

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<p>4 Are any of the following emission points located at a refinery that is a major source? Please check the emission points below that apply.</p> <p><input type="checkbox"/> Marine vessel loading operations</p> <p><input type="checkbox"/> Gasoline loading racks in SIC 2911</p> <p><input type="checkbox"/> Storage vessels and equipment leaks associated with bulk gasoline terminals in SIC 2911</p>	<p>Yes      No</p> <p><input type="checkbox"/>      <input type="checkbox"/></p>
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### II. APPLICABILITY FOR SPECIFIC EMISSION POINTS

<b>A. Miscellaneous Process Vents</b>	
1. Does the vent contain a <u>gas stream with &gt; 20 ppmv organic HAP</u> and is it <u>continuously or periodically discharged during normal operations</u> ?	Yes [ <input type="checkbox"/> ]    No [ <input type="checkbox"/> ]
2. Is the vent or gas stream any of the following? Please check the descriptions below that apply.  <input type="checkbox"/> <u>Directly discharged</u> to the atmosphere <input type="checkbox"/> <u>Routed to a control device prior</u> to discharge to the atmosphere <input type="checkbox"/> <u>Diverted to a product recovery</u> prior to control or discharge to the atmosphere  <i>Note:</i> The above list gives examples of vent or gas streams and may not be all inclusive.	Yes [ <input type="checkbox"/> ]    No [ <input type="checkbox"/> ]
3. Does the vent or gas stream come from any of the following? Please check the items below that apply.  <input type="checkbox"/> Gas streams routed to a fuel gas system <input type="checkbox"/> Relief valve discharges <input type="checkbox"/> Leaks from equipment regulated under 40 CFR 63.648 <input type="checkbox"/> Episodic or nonroutine releases such as maintenance or upsets <input type="checkbox"/> <i>In situ</i> sampling systems (on stream analyzers) <input type="checkbox"/> Catalytic cracking unit catalyst regeneration vents <input type="checkbox"/> Catalytic reformer regeneration vents <input type="checkbox"/> Sulfur plant vents <input type="checkbox"/> Vents from control devices <input type="checkbox"/> Vents from any stripping operations applied to comply with the wastewater provisions of 40 CFR 63 Subpart CC, G, or FF <input type="checkbox"/> Coking unit vents associated with coke drum, depressuring at or below a coke drum outlet pressure of 15 pounds per square inch gauge, deheading, draining, or decoking (coke cutting) or pressure testing after decoking <input type="checkbox"/> Vents from storage vessels <input type="checkbox"/> Emissions from wastewater collection and conveyance systems  <i>Note:</i> If the answer to question 3 is "Yes", the miscellaneous process vents provision does not apply.	Yes [ <input type="checkbox"/> ]    No [ <input type="checkbox"/> ]

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<p>4 Does the vent or gas stream come from any of the following? Please check the items below that apply</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <p><input type="checkbox"/> Caustic wash accumulators</p> <p><input type="checkbox"/> Distillation lower condensers/accumulators</p> <p><input type="checkbox"/> Blowdown condenser/accumulators</p> <p><input type="checkbox"/> Flash/knockout drums</p> <p><input type="checkbox"/> Scrubber overheads</p> </div> <div style="width: 50%;"> <p><input type="checkbox"/> Stripper overheads</p> <p><input type="checkbox"/> Vacuum accumulators</p> <p><input type="checkbox"/> Delayed coker vents</p> <p><input type="checkbox"/> Reactor vessels</p> </div> </div> <p><i>Note.</i> The above list gives examples of where vent or gas streams originate and may not be all inclusive.</p>	<p>Yes [     ] No [     ]</p>
<p>5. Is the vent associated with an existing or new source?</p> <p><input type="checkbox"/> Existing source</p> <p><input type="checkbox"/> New source</p> <p><b>Existing sources</b> - sources that commenced construction <i>on or before</i> July 14, 1994.</p> <p><b>New sources</b> - sources that commenced construction <i>after</i> July 14, 1994. A process unit constructed at an existing source is subject to new source requirements if the new unit has the potential to emit 10 tons per year (tpy) or more of any one HAP or 25 tpy or more of total HAPs. Otherwise it is subject to existing source standards. A change to an existing source or an addition of an emission point is subject to existing source standards, unless it is a reconstructed source, which is subject to new source standards.</p>	
<p><b>For an existing source:</b></p> <p>6 Is the organic HAP concentration <math>\geq</math> 20 ppmv, <b>and</b> total VOC emissions <math>\geq</math> 33 kg/day?</p> <p><i>Note:</i> If the answer to question 6 is "Yes", it is a Group 1 miscellaneous process vent. If the answer is "No", it is a Group 2 miscellaneous process vent.</p>	<p>Yes [     ] No [     ]</p>

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<p><b>For a new source:</b></p> <p>7 Is the organic HAP concentration <math>\geq</math> 20 ppmv, <b>and</b> total VOC emissions <math>\geq</math> 6.8 kg/day?</p> <p><i>Note:</i> If the answer to question 7 is "Yes", it is a Group 1 miscellaneous process vent. If the answer is "No", it is a Group 2 miscellaneous process vent.</p>	<p>Yes [ ] No [ ]</p>
<p><b>B. Storage Vessels</b></p>	
<p>1 Is it a tank or other vessel used to store <u>organic</u> liquids?</p>	<p>Yes [ ] No [ ]</p>
<p>2 Is it permanently attached to a motor vehicle such as a truck, railcar, barge, or ship?</p>	<p>Yes [ ] No [ ]</p>
<p>3. Is it a pressure vessel designed to operate in excess of 204.9 kPa and without emission to the atmosphere?</p>	<p>Yes [ ] No [ ]</p>
<p>4. Does it have a capacity less than 40 m<sup>3</sup>?</p>	<p>Yes [ ] No [ ]</p>
<p>5 Is it used as a bottoms receiver tank?</p>	<p>Yes [ ] No [ ]</p>
<p>6 Is it used as a wastewater storage tank?</p>	<p>Yes [ ] No [ ]</p>
<p><i>Note:</i> If any of the answers to questions 2 through 6 is "Yes", the storage vessels provision does not apply</p>	

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<p>7. Is tank associated with an existing or new source?</p> <p style="margin-left: 20px;"> <input type="checkbox"/> Existing source  <input type="checkbox"/> New source         </p> <p><b>Existing sources</b> - sources that commenced construction <i>on or before</i> July 14, 1994.</p> <p><b>New sources</b> - sources that commenced construction <i>after</i> July 14, 1994. A process unit constructed at an existing source is subject to new source requirements if the new unit has the potential to emit 10 tons per year (tpy) or more of any one HAP or 25 tpy or more of total HAPs. Otherwise it is subject to existing source standards. A change to an existing source or an addition of an emission point is subject to existing source standards, unless it is a reconstructed source, which is subject to new source standards.</p>	
<p>For an <b>existing source</b>.</p> <p>8. Is the capacity <math>\geq 177 \text{ m}^3</math> <b>and</b> vapor pressure <math>\geq 10.4 \text{ kPa}</math> (maximum) and <math>\geq 8.3 \text{ kPa}</math> (annual average) <b>and</b> liquid HAP content <math>&gt; 4\%</math> by weight (annual average)?</p> <p><i>Note:</i> If the answer to question 8 is "Yes", it is a Group 1 storage vessel. If the answer is "No", it is a Group 2 storage vessel.</p>	<p>Yes      No  <input type="checkbox"/>      <input type="checkbox"/></p>
<p>For a <b>new source</b>:</p> <p>9. Is the capacity <math>\geq 151 \text{ m}^3</math> <b>and</b> vapor pressure <math>\geq 3.4 \text{ kPa}</math> (maximum) <b>and</b> liquid HAP content <math>&gt; 2\%</math> by weight (annual average)?</p> <p style="text-align: center; margin: 10px 0;"><b>OR</b></p> <p>10. Is the capacity between 76 and <math>151 \text{ m}^3</math> <b>and</b> vapor pressure <math>\geq 77 \text{ kPa}</math> (maximum) <b>and</b> liquid HAP <math>&gt; 2\%</math> by weight (annual average)?</p> <p><i>Note:</i> If the answer to question 9 or 10 is "Yes", it is a Group 1 storage vessel. If both answers are "No", it is a Group 2 storage vessel.</p>	<p>Yes      No  <input type="checkbox"/>      <input type="checkbox"/></p> <p>Yes      No  <input type="checkbox"/>      <input type="checkbox"/></p>

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<b>C. Wastewater Streams</b>  1. Is it water or wastewater that, during production or processing:  <u>Comes into direct contact</u> with or <u>results from the production</u> or use of any raw material, intermediate product, finished product, byproduct, or waste product?  Is discharged into any individual drain system?	Yes [ ] No [ ] ]  Yes [ ] No [ ] ]
2. Does refinery have a total annual benzene loading $\geq 10$ megagrams per year, and a flow rate $\geq 0.02$ liters per minute, and benzene concentration $\geq 10$ ppm by weight, and subject to control requirements under 40 CFR 61 Subpart FF?  <i>Note: Wastewater streams applicability criteria are the same for existing and new sources. If the answer to question 2 is "Yes", it is a Group 1 wastewater stream. If the answer is "No", it is a Group 2 wastewater stream.</i>	Yes [ ] No [ ] ]
<b>D. Gasoline Loading Racks</b>  1. Is it any of the following equipment, which is necessary to fill gasoline cargo tanks? Please check the equipment below that applies.  <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;">[ ] Loading arms</div> <div style="width: 50%;">[ ] Shutoff valves</div> <div style="width: 50%;">[ ] Pumps</div> <div style="width: 50%;">[ ] Relief valves</div> <div style="width: 50%;">[ ] Meters</div> <div style="width: 50%;">[ ] Other piping and valves</div> </div>	Yes [ ] No [ ] ]
2. Is it a gasoline loading rack classified under SIC 2911?	Yes [ ] No [ ] ]
3. Does it have a gasoline throughput $> 75,700$ liters (20,000 gallons) per day?  <i>Note: Gasoline loading racks applicability criteria are the same for existing and new sources. If the answer to question 3 is "Yes", it is a Group 1 gasoline loading rack. If the answer is "No", it is a Group 2 gasoline loading rack.</i>	Yes [ ] No [ ] ]
<b>E. Marine Tank Vessel Loading</b>  1. Is it a land- or sea-based terminal or structure that loads liquid commodities in bulk onto marine tank vessel loading?	Yes [ ] No [ ] ]

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<p>2 Is vessel loading associated with an existing or new source?</p> <p style="margin-left: 20px;"> <input type="checkbox"/> Existing source  <input type="checkbox"/> New source         </p> <p><b>Existing sources</b> - sources that commenced construction <i>on or before</i> July 14, 1994;</p> <p><b>New sources</b> - sources that commenced construction <i>after</i> July 14, 1994. A process unit constructed at an existing source is subject to new source requirements if the new unit has the potential to emit 10 tons per year (tpy) or more of any one HAP or 25 tpy or more of total HAPs. Otherwise it is subject to existing source standards. A change to an existing source or an addition of an emission point is subject to existing source standards, unless it is a reconstructed source, which is subject to new source standards.</p>	
<p>For an <b>existing source</b>:</p> <p>3. Is vapor pressure of liquid loaded <math>\geq 10.3</math> kPa <b>and</b> emissions <math>&gt; 9.1</math> megagrams of any one HAP or <math>&gt; 22.7</math> megagrams of total HAPs per year?</p> <p><i>Note:</i> If the answer to question 3 is "Yes", it is a Group 1 marine tank vessel loading. If the answer is "No", it is a Group 2 marine tank vessel loading.</p>	Yes <input type="checkbox"/> No <input type="checkbox"/> ]
<p>For a <b>new source</b>:</p> <p>4. Is vapor pressure of liquid loaded <math>\geq 10.3</math> kPa?</p> <p><i>Note:</i> If the answer to question 4 is "Yes", it is a Group 1 marine tank vessel loading. If the answer is "No", it is a Group 2 marine tank vessel loading.</p>	Yes <input type="checkbox"/> No <input type="checkbox"/> ]
<p><b>F. Equipment Leaks</b></p> <p>1. Is it a vent from a wastewater system drain, tank mixer, or sample valve on a storage tank?</p> <p><i>Note:</i> If the answer to question 1 is "Yes", the equipment leaks provision does not apply</p>	Yes <input type="checkbox"/> No <input type="checkbox"/> ]

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<p>2 Is it an emission of organic HAPs from any of the following which is/are "in organic hazardous air pollutant service" (equipment containing or contacting fluid <math>\geq</math> 5% by weight total organic HAP):</p> <ul style="list-style-type: none"> <li>- pump?</li> <li>- compressor?</li> <li>- pressure relief device?</li> <li>- sampling connection system?</li> <li>- open-ended valve or line?</li> <li>- valve?</li> <li>- instrumentation system?</li> </ul> <p><i>Note:</i> Equipment leaks applicability criteria are the same for existing and new sources.</p> <p><i>Note to inspector:</i> The applicability sections of this checklist (i.e., General Applicability and Applicability for Specific Emission Points) determines whether the Petroleum Refinery MACT Standard applies to a particular refinery, and whether it applies to a particular emission point. Unless otherwise noted, refineries are required to control emissions from all Group 1 emission points to which the MACT standard applies. Group 2 emission points are subject only to recordkeeping requirements unless otherwise noted in the inspection guide.</p>	<div style="text-align: right;">             Yes [ ] No [ ]              ]              Yes [ ] No [ ]              ]              Yes [ ] No [ ]              ]              Yes [ ] No [ ]              ]              Yes [ ] No [ ]              ]              Yes [ ] No [ ]              ]           </div>
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### III. COMPLIANCE DEADLINES

<p><b>A. All new sources</b></p> <p>Were all emission points in compliance at startup or by August 18, 1995, whichever was later?</p>	Yes [ ] No [ ]
<p><b>B. Existing Miscellaneous Process Vents and Gasoline Loading Racks</b></p> <p>Were all emission points in compliance by August 18, 1998?</p>	Yes [ ] No [ ]
<p><b>C. Existing Wastewater Streams</b></p> <p>1. Were all emission points in compliance by August 18, 1998?</p>	Yes [ ] No [ ]
<p>2. Are all wastewater streams in compliance with the benzene waste operations NESHAP (40 CFR 61, Subpart FF)?</p>	Yes [ ] No [ ]

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<b>D. Existing Storage Vessels</b>	
1. Were all fixed roof vessels in compliance by August 18, 1998?	Yes [ ] No [ ]
2. Were fixed roof vessels for which the tanks that must be replaced in compliance by August 18, 1999?	Yes [ ] No [ ]
3. Were floating roof vessels in compliance by August 18, 2005, or the next scheduled maintenance and degassing after August 18, 1998, whichever is first?	Yes [ ] No [ ]
<b>E. Marine Tank Vessel Loading Operations</b>	
1. Were operations in compliance by August 18, 1999?	Yes [ ] No [ ]
2. Are operations used to generate credit in an emissions average?	Yes [ ] No [ ]
If yes, were operations in compliance by August 18, 1998?	Yes [ ] No [ ]
If operations were <u>not</u> in compliance by August 18, 1998, was a case-by-case 1-year extension granted?	Yes [ ] No [ ]
<b>F. Equipment Leaks</b>	
1. Were equipment leaks in compliance by August 18, 1998?	Yes [ ] No [ ]
2. For sources that are complying with 40 CFR 60 Subpart VV or 40 CFR 63 Subpart H, are they meeting the deadlines in the 3 phases of emissions reductions?	Yes [ ] No [ ]

### IV. GENERAL STANDARDS TO ALL APPLICABLE EMISSIONS POINTS

<b>A. Performance Testing</b>	
1. Did the facility conduct and initial performance test of all pollution control equipment for which it is required?  (See Section I of this checklist for applicability. If the pollution control equipment is required by the MACT standard, an initial performance test is required. Note that no performance tests are required for floating roofs or process heaters > 44 MW with vent introduced into the flame zone.)	Yes [ ] No [ ]
2. Was the initial performance test <u>approved by EPA</u> ?	Yes [ ] No [ ]

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3. Did the facility <u>notify the regulatory authority 30 days prior</u> to conducting each performance test?	Yes [ ]    No [ ]
4. Were the tests conducted at the <u>maximum representative operating capacity</u> ?	Yes [ ]    No [ ]
- Were controls operating at either maximum or minimum representative operating conditions for monitored parameters, whichever result in lower emission reduction? [40 CFR 63.642 (d)(3)]	Yes [ ]    No [ ]
<b>B. Operating Permits</b>  Did the owner or operator of the source subject to the standard apply for a one-time Part 70 or Part 71 operating permit from the appropriate authority?	Yes [ ]    No [ ]
<b>C. Application for Approval of Construction or Reconstruction</b>  If the source is a new or reconstructed source, did it submit an application for approval of construction or reconstruction?	Yes [ ]    No [ ]
<b>D. Notification of Compliance Status (NCS) Reports</b>  1. Did the facility submit a Notification of Compliance Status (NCS) <u>within 150 days</u> after each applicable compliance deadline, or with the next periodic report for new Group 1 emission points or floating roof storage vessels brought into compliance after August 18, 1998? <sup>1</sup>  (See part III of this checklist for applicable compliance deadlines.)  <i>Note: The NCS report may be included as a separate report, as an operating permit application, or in an amendment to an operating permit application).</i>	Yes [ ]    No [ ]
2. Did the report identify each <u>emission point and method of compliance</u> ?	Yes [ ]    No [ ]
3. Did the report include the following:  a) Information on <u>individual emission points</u> to demonstrate compliance, such as range of monitored parameters? [40 CFR 63.654(f)(1) and (f)(3)]	Yes [ ]    No [ ]
b) <u>Results of continuous monitoring</u> system performance evaluations? [40 CFR 63.654(f)(4)]	Yes [ ]    No [ ]

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c) <u>Determination of rule applicability to flexible operation units</u> and storage vessels and distillation units for which use varies from year to year? [40 CFR 63.654(h)(6)] <sup>1</sup>	Yes [ ] No [ ]
4. If the facility was required to conduct initial performance tests, did it submit <u>one example complete test report</u> for each test method used?  <i>Note: For additional tests using the same method, only the results of the each additional test must be submitted. [40 CFR 63.654 (f)(2)]</i>	Yes [ ] No [ ]
<b>E. Periodic Reports</b>	
1. Have any <b>compliance exceptions</b> occurred within any 6-month reporting period?	Yes [ ] No [ ]
a) If yes, has the facility submitted periodic reports within 60 days after the end of each 6- month period?	Yes [ ] No [ ]
b) If the facility uses emissions averaging, has the facility submitted reports quarterly? [40 CFR 63.654(g)]	Yes [ ] No [ ]
2. Were any new Group 1 emission points added or did any Group 2 emission points become Group 1 emission points during the last 6-month period?	Yes [ ] No [ ]
a) If yes, was an NCS report included with the periodic report?	Yes [ ] No [ ]
3. Were any floating storage vessels brought into compliance during the last 6-month period?	Yes [ ] No [ ]
a) If yes, was an NCS report included with the periodic report?	Yes [ ] No [ ]

<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998.  
For more information, see Appendix G.

<b>F. Startup, Shutdown and Malfunction Plans and Reports</b>	
1. Has the facility developed and implemented a startup, shutdown, and malfunction <b>plan</b> for the entire facility?	Yes [ ] No [ ]
<i>Note: The plan is not required to include wastewater.</i>	
a) If yes, does the malfunction plan <u>describe procedures for operating and maintaining</u> the source during periods of startup, shutdown, and malfunction?	Yes [ ] No [ ]

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<p>b) Does the plan also include a <u>program of corrective action</u> for malfunction of process and air pollution control equipment used to comply with the relevant standard?</p> <p><i>Note: EPA typically defines malfunctions as rare, unforeseeable occurrences and does not allow for facilities to operate in malfunction for extended periods of time.</i></p>	<p>Yes [ ]    No [ ]</p>
<p>2. Has the facility prepared a <b>Startup, Shutdown, and Malfunction Report</b> to document each:</p>	
<p>a) <u>Start</u> of operation of a process unit for production?</p>	<p>Yes [ ]    No [ ]</p>
<p>b) <u>Cessation</u> of a process unit for maintenance, repair, or equipment replacement?</p>	<p>Yes [ ]    No [ ]</p>
<p>c) <u>Malfunction</u> of a process unit?</p>	<p>Yes [ ]    No [ ]</p>
<p>3 Are corrective actions to address each malfunction consistent with the startup, shutdown, and malfunction plan?</p>	<p>Yes [ ]    No [ ]</p>
<p>a) If yes, has the facility submitted a statement to this effect in the semi-annual report? [40 CFR 63.10(d)(5)(I)]</p>	<p>Yes [ ]    No [ ]</p>
<p>b) If a malfunction occurs and corrective actions are <u>not</u> consistent with the startup, shutdown, and malfunction plan, has the facility reported this in the periodic report for the time period in which the malfunction occurred?</p> <p><i>Note: If a malfunction does not occur during a reporting period, a startup, shutdown, and malfunction report is not required.</i></p>	<p>Yes [ ]    No [ ]</p>
<p><b>G. Reports Required for Special Situations</b></p>	
<p>1. Does the facility use/intend to use <u>alternative procedures</u> (e.g., procedures other than those described in the MACT Standard) or devices to comply with the MACT standard?</p>	<p>Yes [ ]    No [ ]</p>
<p>a) If yes, has the facility submitted the following information 18 months before the compliance date for existing sources, or with the approval of construction for new sources:</p>	<p>Yes [ ]    No [ ]</p>
<p>• Request for approval to <u>monitor an alternative</u> control device operating parameter, with supporting justification? [40 CFR 63.654(h)(4)]</p>	<p>Yes [ ]    No [ ]</p>

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<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1995.  
For more information, see Appendix G.

<ul style="list-style-type: none"> <li>Request for approval to use <u>data compression systems</u> instead of keeping hourly records, with supporting information? [40 CFR 63.654(h)(5)]</li> </ul>	Yes [ ]    No [ ]
<ul style="list-style-type: none"> <li>Request to use other alternative monitoring methods, with supporting justification? [40 CFR 63.654(h)(5)(iv) and 63.8(f)(4)(ii)]</li> </ul>	Yes [ ]    No [ ]
<ul style="list-style-type: none"> <li>Request to establish an alternative emission standard, with a test plan or results of testing and monitoring? [40 CFR 63.6(g)(2)]</li> </ul> <p><i>Note:</i> If EPA finds the alternative standard equivalent to the MACT standard, EPA will request public comment and publish a Federal Register notice allowing its use. Prior to conducting the inspection, the inspector should determine whether EPA has recently adopted any alternative standards equivalent to the MACT standard, with which the facility intends to comply.</p>	Yes [ ]    No [ ]
<b>H. Requests for Extension of Compliance</b>	
1. Has the facility requested an extension of compliance either:	
a) at least 12 months before the compliance date? <b>or</b>	Yes [ ]    No [ ]
b) 18 months prior if emissions averaging is used?	Yes [ ]    No [ ]
<p><i>Note:</i> Facilities may request an extension of compliance if emissions reductions been achieved early, or is the source is unable to comply with the relevant standard. Requests for an extension of compliance can only be made for existing sources.</p>	

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2. If the facility submitted a request for an extension, did the request include the following	
a) Description of controls to be installed?	Yes [ ] No [ ]
b) Compliance schedule?	Yes [ ] No [ ]
c) Interim emission control steps?	Yes [ ] No [ ]
<b>I. Applications for a Performance Test Waiver</b>	
1. Is the facility unable to conduct a performance test for reasons such as technical or economic infeasibility, or other reasons, has an extension of compliance been requested?	Yes [ ] No [ ]
2. If yes, has the facility submitted an application for waiver of a performance test to the Administrator?	Yes [ ] No [ ]
3. Did the application include information justifying the request and detailing the infeasibility? [40 CFR 63.7(h)(3)(iii)]	Yes [ ] No [ ]
<b>J. Recordkeeping</b>	
1. Does the facility keep records of reports submitted, monitoring results, and other records for at least 5 years? [40 CFR 63.642(e) and 63.654(l)(4)]	Yes [ ] No [ ]
2. Are records kept so that they are <u>accessible within 24 hours</u> of request in either hard copy or computer-readable form? [40 CFR 63.642(e)]	Yes [ ] No [ ]
3. Are the following records maintained on site:	
• Records of the <u>occurrence and duration</u> of each startup, shutdown, or malfunction of operation and air pollution control equipment? [40 CFR 63.10(b)(2)(i-ii)]	Yes [ ] No [ ]
• Records of <u>actions that are consistent and inconsistent</u> with the startup, shutdown, and malfunction plan? [40 CFR 63.10(b)(2)(iv-v)]	Yes [ ] No [ ]
• Records of continuous monitoring system <u>calibration</u> checks (if continuous monitoring is required)? [40 CFR 63.10(b)(x)]	Yes [ ] No [ ]
• Records for <u>storage vessels</u> ? [40 CFR 63.654(l)(1)]	Yes [ ] No [ ]

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<ul style="list-style-type: none"><li>• Complete <u>test reports and reported results</u> for any required performance tests? [64.654(l)(2)]</li></ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<ul style="list-style-type: none"><li>• Values of continuously monitored parameters? [40 CFR 63.654(l)(3)]</li></ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<ul style="list-style-type: none"><li>• Any additional records required by permit?</li></ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>

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### V. REQUIREMENTS FOR MISCELLANEOUS PROCESS VENTS

<b>A. Miscellaneous Process Vents Control Requirements</b>		
1. Is the source an <b>existing source</b> , and the vent contains 20 ppmv or more of organic HAPs, and emits 33 kg/day or more of total VOCs?	Yes [ ]	No [ ]
2. Is the source a <b>new source</b> , and the vent contains 20 ppmv or more of organic HAPs, and emits 6.8 kg/day or more of VOCs?	Yes [ ]	No [ ]
a) If yes to 1 or 2, does the facility control its Miscellaneous Process Vents by:		
• Using a flare? or	Yes [ ]	No [ ]
• Reducing organic HAPs by 98% or to 20 ppmv using incinerators, boilers, process heaters, or other devices? or	Yes [ ]	No [ ]
• If a boiler or process heater is used, the vent stream must be introduced into the flame zone of the control device, or in a location such that the required percent reduction or concentration is achieved?	Yes [ ]	No [ ]
<b>B. Miscellaneous Process Vents Testing Requirements</b>		
<b>1. Initial Performance Tests</b>		
a) Vents routed to a flare		
Does the facility control Miscellaneous Process Vents emissions by routing vents to a <b>flare</b> or by using other control devices?	Yes [ ]	No [ ]
1) If the facility uses a <b>flare</b> , has the facility conducted an initial performance test for each control device?	Yes [ ]	No [ ]
2) Did the initial performance test show that the flare is operating properly, and that the emission rate does not exceed the capacity of the flame to control the emissions?	Yes [ ]	No [ ]
3) For vents routed to a <b>flare</b> , did the initial performance test measure the following.		
• Emissions visibility?	Yes [ ]	No [ ]

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<ul style="list-style-type: none"> <li>• Net heat value of combusted gas?</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<ul style="list-style-type: none"> <li>• Flow rate of gases being combusted?</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><b>b) Vents routed to an Incinerator or a boiler or process heater &lt; 44 MW</b></p> <p>For vents routed to an incinerator or a boiler or process heater &lt; 44 MW (150 MMBtu/hr) where the vent streams are <u>not</u> introduced into the flame zone of the boiler or process heater, did the initial performance test show compliance with the requirement to reduce organic HAPs by 98% or to 20 ppmv? [40 CFR 63.645 and 63.116 except (d) and (e)]</p>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><b>c) Vents routed to other control devices</b></p> <p>Does the facility control Miscellaneous Process Vents emissions with:</p>	
<p>1) Vents routed to a <u>boiler or process heater</u> &gt; 44 MW (150 MMBtu/hr)? <b>or</b></p>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p>2) Vent streams that are <u>introduced into the flame zone of the boiler or process heater</u>? <b>or</b></p>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p>3) <u>A control device for which a performance test was conducted</u> for determination of compliance with an NSPS if no process changes have been made?</p>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><i>Note: If the facility answered yes to any of these questions (B.1.c) performance tests are not required for these vents.</i></p>	
<p><b>2. Sampling for Initial performance tests</b></p>	
<p>a) Does the facility conduct performance test sampling and analysis according to the prescribed EPA-approved methods?</p>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><b>3. Follow-up tests to process changes</b></p>	
<p>a) Have any process changes occurred at the facility?</p>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p>1) If yes, for each process change affecting a Group 2 process vent, did the facility recalculate the TOC emission rate to determine whether the vent remains a Group 2 process vent or becomes a Group 1 process vent?</p>	Yes <input type="checkbox"/> No <input type="checkbox"/>

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<p>2) Was recalculation based on <u>vent stream flow rate and TOC</u> measurements as specified for initial performance tests or best engineering assessment practices?</p> <p><i>Note:</i> That process changes include, but are not limited to, changes in production capacity, production rate, or catalyst type; whenever there is replacement, removal, or addition of recovery equipment; and debottlenecking activities.</p> <p>(Process changes do <u>not</u> include process upsets, unintentional, temporary process changes, or changes that are within the range on which the original calculation was based.)</p>	<p>Yes [ ]    No [ ]</p>
<p><b>C. Miscellaneous Process Vents Monitoring Requirements</b></p>	
<p><b>1. Miscellaneous process vents routed to a flare</b></p> <p>For miscellaneous process vents routed to a flare, is a monitoring device capable of <u>continuously detecting</u> the presence of a pilot flame (including, but not limited to a thermocouple, an ultraviolet beam sensor, or an infrared sensor) used?</p>	<p>Yes [ ]    No [ ]</p>
<p><b>2. Miscellaneous process vents routed to incinerators other than catalytic incinerators</b></p> <p>For miscellaneous process vents routed to incinerators other than catalytic incinerators, is a <u>temperature monitoring device</u> with a continuous recorder used?</p>	<p>Yes [ ]    No [ ]</p>
<p>Is the device located in the <u>firebox</u> or in the <u>duct work</u> immediately downstream of the firebox in a position <u>before any substantial heat exchange</u> occurs?</p>	<p>Yes [ ]    No [ ]</p>
<p><b>3. Miscellaneous Process Vents routed to catalytic incinerators</b></p> <p>For Miscellaneous Process Vents routed to catalytic incinerators, is a <u>temperature</u> monitoring device with a continuous recorder used?</p>	<p>Yes [ ]    No [ ]</p>
<p>Is the device located in the gas stream immediately before and after the catalyst bed?</p>	<p>Yes [ ]    No [ ]</p>

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<p><b>4. Miscellaneous process vents routed to boiler or process heaters with a design heat capacity &lt;44 megawatts where the vent streams are not introduced into the flame zone</b></p> <p>For miscellaneous process vents routed to boiler or process heaters with a design heat capacity &lt;44 megawatts where the vent streams are not introduced into the flame zone, is a <u>temperature</u> monitoring device with a <u>continuous recorder</u> used?</p>	<p>Yes [ ] No [ ]</p>
<p>Is the device located in the firebox?</p> <p><i>Note:</i> No monitoring is required for boilers or process heaters.</p>	<p>Yes [ ] No [ ]</p>
<p><b>5. Refineries that use a vent system with bypass line valves that have not been sealed or secured.</b></p> <p>For refineries that use a vent system with bypass line valves that have not been sealed or secured, is a <u>flow indicator</u> that determines at least every hour whether a vent stream flow is present used?</p>	<p>Yes [ ] No [ ]</p>
<p>Is the indicator located at the entrance to any bypass line that could divert the vent stream away from the control device to the atmosphere?</p>	<p>Yes [ ] No [ ]</p>
<p><b>6. Refineries that use a vent system with bypass lines, where the valves have been secured in the closed position with a car-seal or a lock-and key-type configuration.</b></p> <p>For refineries that use a vent system with bypass lines, where the valves have been secured in the closed position with a car-seal or a lock-and key-type configuration, are the valves <u>visually inspected</u> at least every other month to ensure that they are maintained in the closed position and the vent stream is not diverted through the bypass line?</p>	<p>Yes [ ] No [ ]</p>
<p><b>7. Refineries using other approved control devices</b></p> <p>For refineries using other approved control devices or requesting to monitor other parameters, is the facility complying with any site-specific monitoring requirements?</p>	<p>Yes [ ] No [ ]</p>

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<b>D. Miscellaneous Process Vents Reporting Requirements</b>	
<b>1. Notice of Compliance Status (NCS) reports</b>	
<b>a) All miscellaneous process vents affected by the MACT standard</b>	
For miscellaneous process vents affected by the MACT standard, has the refinery submitted an NCS report that identifies the following:	
1) Each vent?	Yes [ ]    No [ ]
2) Whether the process vent is Group 1 or Group 2?	Yes [ ]    No [ ]
3) For each Group 1 vent that is not included in an emissions average, the method of compliance (e.g., use of a flare or other control device meeting the requirements of the MACT standard)? [40 CFR 63.643(a)]	Yes [ ]    No [ ]
<i>Note.</i> If the required information has been submitted at an earlier date, or at different times, and/or in different submittals, later submittals may refer to earlier submittals instead of duplicating and resubmitting previously submitted information.	
4) For miscellaneous process vents with control devices required to be tested under the MACT standard, did the NCS include information on each <u>testing method</u> , and <u>results</u> of the performance test since there are different requirements for each test and test method used?	Yes [ ]    No [ ]
5) For each test method used, did the NCS include the following test results.	
a) The percentage reduction of organic HAPs or TOC or the outlet concentration of organic HAPs or TOC (ppm by volume on a dry basis corrected to 3 percent oxygen), determined as specified in 40 CFR 63.116(c)?	Yes [ ]    No [ ]
b) The value of the monitored parameter specified in 40 CFR 63 Subpart CC, Table 10 or a site specific parameter approved by the permitting authority, averaged over the full period of the performance test?	Yes [ ]    No [ ]

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6) For each test method used, does the NCS include the following supporting information:	
a) Sampling site description?	Yes <input type="checkbox"/> No <input type="checkbox"/>
b) Description of sampling and analysis procedures, and any modifications to standard procedures?	Yes <input type="checkbox"/> No <input type="checkbox"/>
c) Quality assurance procedures?	Yes <input type="checkbox"/> No <input type="checkbox"/>
d) Record of operating conditions during the test?	Yes <input type="checkbox"/> No <input type="checkbox"/>
e) Record of preparation of standards?	Yes <input type="checkbox"/> No <input type="checkbox"/>
f) Record of calibrations?	Yes <input type="checkbox"/> No <input type="checkbox"/>
g) Raw data sheets for field sampling?	Yes <input type="checkbox"/> No <input type="checkbox"/>
h) Raw data sheets for field and laboratory analyses?	Yes <input type="checkbox"/> No <input type="checkbox"/>
i) Documentation of calculations?	Yes <input type="checkbox"/> No <input type="checkbox"/>
j) Any other information required by the test method?	Yes <input type="checkbox"/> No <input type="checkbox"/>
7) If the same test is conducted for multiple emission points, did the facility submit the following:	
a) one complete test report for each test method used for each emission point?	Yes <input type="checkbox"/> No <input type="checkbox"/>
b) for additional tests using the same method, the additional test results?	Yes <input type="checkbox"/> No <input type="checkbox"/>
8) <b>Miscellaneous Process Vents Controlled by Flares</b>	
a) For vents controlled by flares, did the NCS include the following test results.	
- all visible emission readings?	Yes <input type="checkbox"/> No <input type="checkbox"/>
- heat content determinations?	Yes <input type="checkbox"/> No <input type="checkbox"/>
- flow rate measurements?	Yes <input type="checkbox"/> No <input type="checkbox"/>
- exit velocity determinations made during the compliance determination? [40 CFR 63.654(f)(1)(iv)(A)]	Yes <input type="checkbox"/> No <input type="checkbox"/>

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b) For vents controlled by flares, a <u>statement of whether a flame was present</u> at the pilot light over the full period of the compliance determination? [40 CFR 63.654(f)(1)(iv)(B)]	Yes [ ]    No [ ]
c) If a parameter other than the presence of a pilot flame is monitored, the acceptable range for the parameter and the rationale (including any supporting data or calculations) for the range?  <i>Note: Results of a prior performance test can be used if that test was conducted using the methods specified in 40 CFR 63.645 and test conditions were representative of current operating conditions.</i>	Yes [ ]    No [ ]
<b>9) Vents routed to an incinerator or boiler or process heater &lt; 44 MW where the vent streams are <u>not</u> introduced into the flame zone</b>  In addition to the information required for all miscellaneous process vents, do NCS reports for vents routed to an incinerator or boiler or process heater < 44 MW where the vent streams are <u>not</u> introduced into the flame zone include the following information:	
a) Average firebox temperature (or gas stream temperature for catalytic incinerators) over the duration of the performance test?	Yes [ ]    No [ ]
b) Acceptable range for the daily average firebox temperature and rationale for the range?	Yes [ ]    No [ ]
c) Times at which an operating day begins and ends?	Yes [ ]    No [ ]
<b>2. Periodic reports</b>  a) Has the refinery experienced any <u>compliance exceptions or periods of excess emissions</u> ?  (Compliance exceptions and periods of excess emissions do not include periods of startup, shutdown, malfunction, performance testing and monitoring system calibration.)	Yes [ ]    No [ ]
b) Has the refinery <u>submitted the appropriate periodic reports</u> regarding the compliance exceptions or periods of excess emissions?	Yes [ ]    No [ ]

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<p>1) Were the reports submitted no later than 60 days after the end of each 6-month period when any compliance exceptions occur?</p> <p><i>Note:</i> The first 6-month period begins on the date the NCS report is required to be submitted.</p>	<p>Yes [ ] No [ ]</p>
<p>2) If the refinery uses emissions averaging, were the reports submitted quarterly?</p>	<p>Yes [ ] No [ ]</p>
<p>3) For control devices for which an initial performance test is required (flare, incinerator, and boiler or process heater &lt; 44 MW where the vent streams are not introduced into the flame zone), did the facility submit the following information in the periodic report:</p> <ul style="list-style-type: none"> <li>• Complete test report for initial performance test results?</li> </ul>	<p>Yes [ ] No [ ]</p>
<ul style="list-style-type: none"> <li>• Times and duration of periods when monitoring devices are not operating?</li> </ul>	<p>Yes [ ] No [ ]</p>
<p><b>4) Periodic Reports for vents routed to a flare</b></p> <p>For vents routed to a flare, did the facility submit a record of each pilot flame determination (or alternate parameter upon request and approval) in the periodic report?</p>	<p>Yes [ ] No [ ]</p>
<p><b>5) Periodic Reports for vents routed to an incinerator or boiler or process heater &lt; 44 MW where the vent streams are <u>not</u> introduced into the flame zone</b></p> <p>For vents routed to an incinerator or boiler or process heater &lt; 44 MW where the vent streams are <u>not</u> introduced into the flame zone, did the facility submit the following information in the periodic report:</p> <ul style="list-style-type: none"> <li>• Record of <u>each firebox temperature</u> value or a block average of values for periods of 1 hour or less?</li> </ul>	<p>Yes [ ] No [ ]</p>
<ul style="list-style-type: none"> <li>• Record of the <u>daily average</u> firebox temperature?</li> </ul> <p><i>Note:</i> If all hourly temperature values are within the range reported in the NCS, the facility may record that all values are within the range instead of daily average values.</p>	<p>Yes [ ] No [ ]</p>

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### VI. REQUIREMENTS FOR STORAGE VESSELS

<b>A. Control Requirements for Storage Vessels</b>	
1. For storage vessels with <b>floating roofs</b> does the facility use one of the following control devices?	Yes [ ]    No [ ]
a) Internal floating roof with specified seals?	Yes [ ]    No [ ]
b) External floating roof?	Yes [ ]    No [ ]
c) External floating roof converted to an internal floating roof (i.e., fixed roof installed above the external floating roof)?	Yes [ ]    No [ ]
2. For storage vessels with <b>closed vent systems</b> , does the facility use a closed vent system routed to a flare or other control device that reduces HAP emissions by 95% or to 20 ppmv?	Yes [ ]    No [ ]
3. Are all storage vessels that store a liquid with a maximum true vapor pressure of total organic HAPs $\geq$ 76.6 kPa controlled by a closed vent system and control device? [40 CFR 63.119(a)(2)]	Yes [ ]    No [ ]
- If yes, are, work practices, as specified in 40 CFR 63.119(b) through (e), followed for each of the control methods?	Yes [ ]    No [ ]
<b>4. Storage vessels at new sources</b>	
a) In addition to the above control requirements, did storage vessels at new sources also install deck fitting controls, as specified in 40 CFR 63.119(c)(2)(i) through (xii), on all floating roof tanks?	Yes [ ]    No [ ]
b) Do storage vessels at new sources also apply the control requirements of 40 CFR 63.119(b)(5) and (b)(6)?	Yes [ ]    No [ ]
<b>B. Testing Requirements for Storage Vessels</b>	
<b>1. Initial Performance Tests for Closed Vent Systems Routed to a Flare</b>	
a) For storage vessels equipped with a closed vent system routed to a flare, has the facility conducted an initial performance test or compliance determination, as specified in 40 CFR 63.11(b), to ensure compliance with the control requirement to reduce total organic HAP emissions by 95% or to 20 ppmv?	Yes [ ]    No [ ]

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1) If yes, did the test include the measurement/determination of the following <ul style="list-style-type: none"> <li>• Emissions visibility?</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<ul style="list-style-type: none"> <li>• Net heat value of combusted gas?</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<ul style="list-style-type: none"> <li>• Flow rate of gases being combusted?</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<ul style="list-style-type: none"> <li>• Exit velocity?</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>2. Initial Performance Tests for Closed Vent Systems Routed to a Control Device Other Than a Flare</b>  a) For storage vessels equipped with a closed vent system routed to a control device other than a flare, did the facility conduct either an initial design evaluation, as specified in 40 CFR 63.120(d)(1)(i), or an initial performance test, as specified in 40 CFR 63.120(d)(1)(ii)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>C. Monitoring and Inspection Requirements for Storage Vessels for Storage Vessels Required to Apply Controls</b>	
<b>1. Storage vessels equipped with a closed vent system</b>  For storage vessels equipped with a closed vent system, does the facility monitor the parameters proposed in the Notice of Compliance Status (NCS) report to ensure that the control device is being properly operated and maintained?  <i>Note: There are no monitoring requirements for storage vessels equipped with floating roofs.</i>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>2. Closed vent systems routed to a control device</b>  Does the facility inspect closed vent systems routed to a control device every 12 months as specified in 40 CFR 63.148?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>3. Storage Vessels with floating roofs</b>  a) Do the storage vessels have a single-seal system or a double-seal system?	Yes <input type="checkbox"/> No <input type="checkbox"/>

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<p><b>b) Storage vessels with a single seal system</b></p> <p>For storage vessels with a single seal system and equipped with a fixed roof and an internal floating roof or an external floating roof converted to an internal floating roof, does the refinery conduct the following inspections:</p> <p>1) <u>Visually inspect</u> the internal floating roof and primary seal through manholes and roof hatches at least once every 12 months after initial fill, or at least every 12 months after the compliance date?</p>	<p>Yes [ ]    No [ ]</p>
<p>2) <u>Visually inspect</u> the internal floating roof and primary seal each time the storage vessel is <u>emptied and degassed</u> and at least once <u>every 10 years</u> after the compliance date?</p>	<p>Yes [ ]    No [ ]</p>
<p>3) <u>Visually inspect</u> gaskets, slotted membranes, and sleeve seal (if any) each time the storage vessel is <u>emptied and degassed</u> and at least once <u>every 10 years</u> after the compliance date (new source only)?</p>	<p>Yes [ ]    No [ ]</p>
<p><b>c) Storage vessels with a double single seal system</b></p> <p>For storage vessels with a double single seal system and equipped with a fixed roof and an internal floating roof or an external floating roof converted to an internal floating roof, does the refinery conduct the following:</p> <p>1) <u>Visually inspect</u> the internal floating roof, primary seal, and secondary seal each time the vessel is emptied and degassed and at least once <u>every 5 years</u> after the compliance date? or</p>	<p>Yes [ ]    No [ ]</p>
<p>2) <u>Visually inspect</u> the internal floating roof and the secondary seal through manholes and roof hatches at least once every <u>12 months</u> after initial fill, or at least every 12 months after the compliance date; and</p>	<p>Yes [ ]    No [ ]</p>
<p>3) <u>Visually inspect</u> the internal floating roof, primary seal, and secondary seal each time the vessel is emptied and degassed and at least once <u>every 10 years</u> after the compliance date?</p>	<p>Yes [ ]    No [ ]</p>

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<p><b>d) Storage vessels equipped with an external floating roof</b></p> <p>1) For storage vessels equipped with an external floating roof, does the facility visually inspect the following, <u>each time the vessel is emptied and degassed</u>:</p> <ul style="list-style-type: none"> <li>- external floating roof?</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>- the primary and secondary seals?</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>- fittings?</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>2) For storage vessels equipped with an external floating roof, does the facility conduct the following additional inspections:</p> <ul style="list-style-type: none"> <li>• <b>For single-seal systems, does the facility:</b> <ul style="list-style-type: none"> <li>- Measure the gaps between the vessel wall and the primary seal by the compliance date and at least once a year, until a secondary seal is installed?</li> </ul> </li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>- When a secondary seal is installed, measure gaps between the vessel wall and both the primary and secondary seal within 90 calendar days of installation, and then comply with the double-seal inspection requirements? [40 CFR 63.120(b)(1)(ii)]</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>• <b>For double-seal systems, does the facility:</b> <ul style="list-style-type: none"> <li>- Measure the gaps between the vessel wall and the primary seal during hydrostatic testing or by the compliance date and at least once every 5 years thereafter?</li> </ul> </li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>- Measure the gaps between the vessel wall and the secondary seal by the compliance date and at least once a year?</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>

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<b>D. Reporting Requirements for Storage Vessels Equipped with Closed Vent Systems</b>	
<b>1. Notice of Compliance Status Reports</b>	
<b>a) Storage vessels equipped with a closed vent system routed to a flare</b>	
For storage vessels equipped with a closed vent system routed to a flare, does the NCS contain the results of the initial performance test, including:	
<ul style="list-style-type: none"> <li>• Flare design, such as steam-assisted, air-assisted, or non-assisted?</li> </ul>	Yes [ ]      No [ ]
<ul style="list-style-type: none"> <li>• Visible emissions readings?</li> </ul>	Yes [ ]      No [ ]
<ul style="list-style-type: none"> <li>• Heat content determinations?</li> </ul>	Yes [ ]      No [ ]
<ul style="list-style-type: none"> <li>• Flow rate measurements?</li> </ul>	Yes [ ]      No [ ]
<ul style="list-style-type: none"> <li>• Exit velocity determinations?</li> </ul>	Yes [ ]      No [ ]
<ul style="list-style-type: none"> <li>• Periods during the compliance determination when the pilot flame is absent?</li> </ul>	Yes [ ]      No [ ]
<b>b) NCS Reports for storage vessels equipped with a closed vent system routed to a control device other than a flare</b>	
For storage vessels equipped with a closed vent system routed to a control device other than a flare, does the NCS also include:	
<ul style="list-style-type: none"> <li>• Description of the parameter(s) to be monitored to ensure proper operation and maintenance of the control device?</li> </ul>	Yes [ ]      No [ ]
<ul style="list-style-type: none"> <li>• Explanation of the parameter selection?</li> </ul>	Yes [ ]      No [ ]
<ul style="list-style-type: none"> <li>• Frequency of monitoring?</li> </ul>	Yes [ ]      No [ ]
<ul style="list-style-type: none"> <li>• Design evaluation documentation, as specified in 40 CFR 63.120(d)(1)(i), or results of the initial performance test including identification of emission points sharing the control device?</li> </ul>	Yes [ ]      No [ ]

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<b>2. Periodic Reports</b>	
a) Have any <b>compliance exceptions</b> regarding storage vessels occurred?	Yes <input type="checkbox"/> No <input type="checkbox"/>
If yes, has the facility submitted the appropriate periodic reports for storage vessels?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>b) Periodic Reports for storage vessels equipped with a closed vent system routed to a control device</b>  For storage vessels equipped with a closed vent system routed to a control device, do periodic reports include a description of the following.	
• Routine maintenance for the control device that was performed during the previous 6 months?	Yes <input type="checkbox"/> No <input type="checkbox"/>
• Routine maintenance anticipated for the control device for the next 6 months?	Yes <input type="checkbox"/> No <input type="checkbox"/>
• For a control device that is a flare, each occurrence and cause when the requirements specified in 40 CFR 63.11(b) are not met?	Yes <input type="checkbox"/> No <input type="checkbox"/>
• For a control device other than a flare, each occurrence and cause of monitored parameters being outside the ranges documented in the NCS?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>c) Periodic reports for storage vessels equipped with any type of floating roof</b>  For storage vessels equipped with any type of floating roof, do the periodic reports contain the results of each inspection in which a failure was detected, including:	
1) Date of inspection?	Yes <input type="checkbox"/> No <input type="checkbox"/>
2) Identification of the storage vessel?	Yes <input type="checkbox"/> No <input type="checkbox"/>
3) Description of the failure?	Yes <input type="checkbox"/> No <input type="checkbox"/>
4) Nature and date of repair or date the vessel was emptied?	Yes <input type="checkbox"/> No <input type="checkbox"/>
d) Did the facility apply for an extension beyond the 45 day period for correcting failures identified during inspections of storage vessels?	Yes <input type="checkbox"/> No <input type="checkbox"/>

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1) If the facility applied for an extension, did the corresponding periodic reports also include the following information	
• Description of the failure?	Yes [ ] No [ ]
• Statement that alternate storage capacity is unavailable?	Yes [ ] No [ ]
• Schedule of actions that will ensure that the control equipment will be repaired or the vessel will be emptied as soon as possible?	Yes [ ] No [ ]
<i>Note</i> If the vessel cannot be repaired or emptied within 45 days, the facility may utilize up to 2 extensions of up to 30 additional days each.	
<b>e) Storage vessels equipped with an external floating roof</b>	
For storage vessels equipped with an external floating roof, did the facility <u>conduct any gap measurement</u> ?	Yes [ ] No [ ]
1) If yes, did the facility notify the Administrator 30 days in advance of the gap measurement?	Yes [ ] No [ ]
2) Were the requirements of 40 CFR 63.120(b)(3), (4), (5), or (6) not met for any of the gap measurements?	Yes [ ] No [ ]
- If yes, were the results of the gap measurement in which the requirements were not met included in the periodic reports?	Yes [ ] No [ ]
- Was the following information included in the reports.	
• Date of seal gap measurement?	Yes [ ] No [ ]
• Raw data and calculations described in 63.120(b)(5) or (6)?	Yes [ ] No [ ]
• Description of seal conditions that are not met?	Yes [ ] No [ ]
• Nature and date of repair or date the vessel was emptied?	Yes [ ] No [ ]
<b>f) Floating Roof Storage Vessel Brought Into Compliance after August 18, 1998.</b>	
Do the Periodic Reports include a NCS for each floating roof storage vessel brought into compliance during the reporting period? <sup>1</sup>	Yes [ ] No [ ]
a) If yes, does the NCS include the method of compliance?	Yes [ ] No [ ]

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b) If yes, does the NCS include a list of all other floating roofs subject to control requirements that are not yet in compliance and their expected compliance date?	Yes [ ] No [ ]
c) If yes, for floating roof vessels brought into compliance, including those brought into compliance during the last reporting period, does the NCS include the actual date of compliance?	Yes [ ] No [ ]
<b>3. Internal Inspection Notifications</b>	
a) Did the facility <u>notify the Administrator</u> of filling or refilling of each storage vessel with organic HAPs?	Yes [ ] No [ ]
b) Did the facility notify the Administrator <u>at least 30 calendar days prior</u> to any scheduled internal inspections?	Yes [ ] No [ ]
- If not, was the internal inspection not planned? <b>and</b>	Yes [ ] No [ ]
- Could the owner/operator of the refinery not have known about the inspection 30 calendar days in advance of refilling the vessel with organic HAPs?	Yes [ ] No [ ]
c) If the inspection is not planned and the owner/operator could not have known about it in advance, did the facility notify the Administrator <u>at least 7 calendar days</u> prior to refilling the storage vessel?	Yes [ ] No [ ]
- If the notification was made by telephone, was it immediately followed by written documentation demonstrating why the inspection was unplanned?	Yes [ ] No [ ]

<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 14, 1993.  
For more information, see Appendix G.

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<p style="text-align: center;">- If the notification was made in writing, was it received by the Administrator at least 7 calendar days prior to the refilling?</p> <p><i>Note:</i> If the State or local permitting authority has received delegation of the Refinery MACT (not all states have as of August 1997), they can waive the notification requirements for all or some storage vessels at petroleum refineries. The State or local permitting authority may also grant permission to refill storage vessels sooner than 30 days after submitting the required notification under 40 CFR 64.654(h)(2)(i)(A) or sooner than 7 days after submitting the notification under 40 CFR 64.654(h)(2)(i)(B) on a case-by-case basis.</p>	Yes [ ]    No [ ]
<b>E. Recordkeeping Requirements for Storage Vessels</b>	
<b>1) All Storage Vessels</b>	
- For all storage vessels, does the facility maintain records of Group 1 or Group 2 determinations, vessel dimensions, and analysis of capacity for 5 years?	Yes [ ]    No [ ]
- In addition, does the facility maintain all information required to be reported for 5 years?	Yes [ ]    No [ ]
<b>2) Storage vessels equipped with a closed vent system routed to a control device</b>	
For storage vessels equipped with a closed vent system routed to a control device, does the facility also maintain the following records for 5 years:	
a) Complete test report for initial performance test results?	Yes [ ]    No [ ]
b) Measured values of monitored parameters?	Yes [ ]    No [ ]
c) Planned routine maintenance performed, including:	
- The first time of day and date the control requirements are <u>not</u> met at the beginning of the planned routine maintenance? <b>and</b>	Yes [ ]    No [ ]
- The first time of day and date the control requirements are met at the conclusion of the planned routine maintenance?	Yes [ ]    No [ ]
4) For storage vessels equipped with any type of floating roof, does the facility retain records of <u>each inspection performed</u> ? [40 CFR 63.123c and (e)]	Yes [ ]    No [ ]

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| 5) For storage vessels equipped with an external floating roof, does the facility retain records of each <u>seal gap measurement</u> , including date, raw data obtained in the measurement, and the calculations described in 40 CFR 63.120(b)(3) and (4)? | Yes <input type="checkbox"/> No <input type="checkbox"/> |
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### VII. REQUIREMENTS FOR WASTEWATER STREAMS

<p><b>A Control Requirements for Wastewater Streams</b></p> <p><i>Note:</i> If a refinery is in compliance with the benzene waste NESHAP [40 CFR 61 Subpart FF], it is considered to be in compliance with the refinery MACT standard. Provisions of the benzene waste NESHAP apply to the following wastewater streams at petroleum refineries:</p> <p>(1) Total benzene loading <math>\geq</math> 10 Mg per year, <b>and</b>          (2) Flow rate <math>\geq</math> .02 liters per minute, <b>and</b>          (3) Benzene concentration <math>\geq</math> 10 ppm by weight, <b>and</b>          (4) Not exempt from controls under the benzene waste NESHAP.)</p> <p>1. Has the refinery reduced benzene mass emissions from wastewater streams by 99% by using suppression followed by steam stripping, biotreatment, or other treatment process?</p>	<p>Yes [ ]    No [ ]</p>
<p>2. For vents from steam strippers and other waste management or treatment units, does the facility utilize a control device that achieves 95% emission reduction or 20 ppmv at the outlet of the control device?</p>	<p>Yes [ ]    No [ ]</p>
<p><b>B. Testing and Monitoring Requirements for Wastewater Streams</b></p> <p>1. Do all wastewater streams at the facility comply with the testing requirements of the benzene waste NESHAP found in 40 CFR 61.340 through 61.355?</p>	<p>Yes [ ]    No [ ]</p>
<p>2. Is testing done at the required frequency?</p>	<p>Yes [ ]    No [ ]</p>
<p>3. If required, are periodic measurements of the benzene concentration in the wastewater performed?</p>	<p>Yes [ ]    No [ ]</p>
<p>4. If required, does the facility conduct monitoring of the process or control device operating parameter?</p>	<p>Yes [ ]    No [ ]</p>
<p><b>C. Reporting and Recordkeeping Requirements for Wastewater Streams</b></p> <p>1. Do all wastewater streams comply with the reporting requirements of the benzene waste NESHAP found in 40 CFR 61.356 and 61.357? [40 CFR 63.654(a)]</p>	<p>Yes [ ]    No [ ]</p>

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<p>2 In addition, is all information required to be reported retained for 5 years? [40 CFR 63.654(l)(4)]</p> <p><i>Note:</i> Since affected sources should already be in compliance with 40 CFR 61 Subpart FF, they will not need to make any changes to their current reporting and recordkeeping procedures in order to comply with the Petroleum MACT standard</p>	<p>Yes      No</p>
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### VIII. REQUIREMENTS FOR GASOLINE LOADING RACKS

<p><b>A. Control Requirements for Gasoline Loading Racks</b></p> <p>Is the facility in compliance with the gasoline distribution facilities NESHAP found in 40 CFR 63 Subpart R, which requires the facility to:</p> <ol style="list-style-type: none"> <li>1. Reduce emissions of total organic compounds (TOC) to 10 milligrams per liter of gasoline loaded, and</li> <li>2. Load gasoline only in vapor tight cargo tanks that have been tested to assure vapor tightness?</li> </ol>	<p>Yes [ ]    No [ ]</p>
<p><b>B. Testing and Monitoring Requirements for Gasoline Loading Racks</b></p> <ol style="list-style-type: none"> <li>1. Is the facility in compliance with the testing and monitoring requirements of the gasoline distribution facilities NESHAP found in 40 CFR 63.425(a) through (c) (performance tests), 63.425(e) through (h) (annual certification), 63.425(f) (leak detection tests), 63.425(g) (nitrogen pressure decay field tests), and 63.427 (continuous monitoring)?</li> </ol>	<p>Yes [ ]    No [ ]</p>
<p><b>2. Initial Performance Tests</b></p> <ol style="list-style-type: none"> <li>a) Did the facility conduct an initial performance test for gasoline racks according to the test methods and procedures in 40 CFR 60.503 (except using a reading of 500 ppm to determine the level of leaks to be repaired under 40 CFR 60.503)?</li> </ol>	<p>Yes [ ]    No [ ]</p>
<ol style="list-style-type: none"> <li>b) Did the facility conduct any follow-up tests following process changes?</li> </ol>	<p>Yes [ ]    No [ ]</p>
<p>If yes, did the refinery document the reasons for any change in the operating parameter value since the previous test?</p>	<p>Yes [ ]    No [ ]</p>
<ol style="list-style-type: none"> <li>c) If the facility is using a closed vent system and control device as specified in 40 CFR 60.112b(a)(3) to control emissions from gasoline loading racks, did the facility conduct initial performance tests on the control devices? [40 CFR 63.423]</li> </ol>	<p>Yes [ ]    No [ ]</p>
<ol style="list-style-type: none"> <li>d) If the facility uses a flare to control emissions, and emissions from the gasoline loading rack cannot be measured using the methods specified in 40 CFR 60.503, is the refinery in compliance with the provisions of 40 CFR 63.11(b)?</li> </ol>	<p>Yes [ ]    No [ ]</p>

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<b>3. Annual Certification Tests</b>	
Does the facility conduct annual tests on gasoline cargo tanks to certify that emissions controls are functioning properly?	Yes <input type="checkbox"/> No <input type="checkbox"/>
- If yes, is the annual performance test conducted according to the vacuum and pressure tests described in Method 27 of 40 CFR 60 Appendix A?	Yes <input type="checkbox"/> No <input type="checkbox"/>

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<b>4. Leak Detection Tests</b>  During loading operations, does the facility conduct a leak detection test for gasoline cargo tanks according to Method 21 of 40 CFR 60 Appendix A?	Yes [ ]    No [ ]
a) Are the tests conducted on each compartment <u>during the loading</u> of that compartment, or <u>while the compartment is still under pressure</u> ?	Yes [ ]    No [ ]
b) In addition to Method 21, are the following requirements for the test met [40 CFR 63.425]: <ul style="list-style-type: none"> <li>• To eliminate a positive instrument drift, does the dwell time for each leak detection not exceed two times the instrument response time?</li> </ul>	Yes [ ]    No [ ]
<ul style="list-style-type: none"> <li>• Is the instrument purged with ambient air between each leak detection?</li> </ul>	Yes [ ]    No [ ]
<ul style="list-style-type: none"> <li>• Is the duration of the purge in excess of two instrument response times?</li> </ul>	Yes [ ]    No [ ]
<ul style="list-style-type: none"> <li>• Does the facility attempt to block the wind from the area being monitored, and record the highest detector reading and location for each leak?</li> </ul>	Yes [ ]    No [ ]
<b>5. Additional Testing Requirements</b>  a) For cargo tanks with manifolded product lines, does the facility conduct a nitrogen pressure decay field test on each compartment of each tank? (This test is described in 40 CFR 63.425(g).)	Yes [ ]    No [ ]
b) Does the facility also conduct a continuous performance pressure decay test, as described in 40 CFR 63.425 (h)?	Yes [ ]    No [ ]
<b>6. Continuous Monitoring</b>  Are gasoline loading racks in compliance with the continuous monitoring requirements of 40 CFR 63.427(a) and (b)?	Yes [ ]    No [ ]
a) Is the continuous monitoring system installed, calibrated, certified, operated and maintained according to manufacturer specifications?	Yes [ ]    No [ ]

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b) Is the location where the continuous monitoring system is installed appropriate to the type of system used (e.g., carbon adsorption, refrigeration condenser, thermal oxidation, or flare)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>C. Reporting and Recordkeeping Requirements for Gasoline Loading Racks</b>	
1. Did the facility include the NCS for the gasoline loading racks in the initial NCS for the refinery?	Yes <input type="checkbox"/> No <input type="checkbox"/>
2. For gasoline loading racks, does the facility comply with the reporting and recordkeeping requirements of the gasoline distribution facilities NESHAP found in 40 CFR 63.428(b), (c), (g)(1), and (h)(1) through (h)(3)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
3. Does the facility retain all required records for 5 years?	Yes <input type="checkbox"/> No <input type="checkbox"/>

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### IX. REQUIREMENTS FOR MARINE TANK VESSEL LOADING

<b>A. Control Requirements for Marine Tank Vessel Loading</b>  Are all marine tank vessel loading operations that are subject to the MACT standard in compliance with the marine tank loading NESHAP found in 40 CFR 63 Subpart Y, which requires the following:		
1. For <b>existing sources</b> does the facility utilize controls that:		
• Collect vapors discharged during loading?		Yes [ ] No [ ]
• Load only in vapor tight vessels?		Yes [ ] No [ ]
• Reduce collected HAP emissions by 97% or use vapor balancing?		Yes [ ] No [ ]
2. For <b>new sources</b> does the facility utilize controls that:		
• Collect vapors discharged during loading?		Yes [ ] No [ ]
• Load only in vapor tight vessels?		Yes [ ] No [ ]
• Reduce collected HAP by 98% or use vapor balancing?		Yes [ ] No [ ]
<b>B. Testing and Monitoring Requirements for Marine Tank Vessel Loading</b>  For all marine tank vessel loading subject to the MACT Standard, does the refinery comply with the testing and monitoring requirements of the marine tank loading NESHAP found in 40 CFR 63.560 through 63.567?		Yes [ ] No [ ]
<i>Note: The Initial Notification Report under 40 CFR 63.567(b) is not required.</i>		
<b>C. Reporting and Recordkeeping Requirements for Marine Tank Vessel Loading</b>  1. For all marine tank vessel loading subject to the MACT standard, does the refinery comply with the reporting and recordkeeping requirements of the marine tank loading NESHAP found in 40 CFR 63.566, 63.567(a) and (c) through (l)?		Yes [ ] No [ ]
2. Does the facility retain all records required to be kept for 5 years?		Yes [ ] No [ ]

### X. REQUIREMENTS FOR EQUIPMENT LEAKS

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<p><b>A. Control Requirements for Equipment Leaks</b></p> <p>1. For equipment leaks at <b>existing sources</b>, does the facility comply with either of the following equipment leaks provisions:</p> <p style="padding-left: 40px;">(a) 40 CFR 60 Subpart VV (synthetic organic chemical manufacturing industry (SOCMI) equipment leaks NSPS)? or</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p style="padding-left: 40px;">(b) Modified 40 CFR 63 Subpart H (hazardous organic NESHAP (HON) negotiated regulation)?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>2. For equipment leaks at <b>new sources</b>, does the facility must comply with modified 40 CFR 63 Subpart H?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p><b>B. Testing, Inspection, and Monitoring Requirements for Equipment Leaks?</b></p> <p>For all equipment leaks subject to the MACT standard, does the refinery comply with the testing, inspection, and monitoring requirements for equipment leaks in 40 CFR 60.1046 and 60.1047 (40 CFR 60 Subpart VV), or 40 CFR 63.162 through 63.180 (40 CFR 63 Subpart H)?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p><b>C. Reporting and Recordkeeping Requirements for Equipment Leaks</b></p> <p>For all equipment leaks subject to the MACT Standard, does the refinery comply with the reporting and recordkeeping requirements for equipment leaks found in 40 CFR 60.1048 and 60.1049 (40 CFR 60 Subpart VV), (except the name rather than the signature of the person deciding to delay repair must be recorded)<sup>1</sup>, or 40 CFR 63.181 and 63.182 (40 CFR 63 Subpart H) (except for 63.182(b), (c)(2), and (c)(4))?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>

### **XI. EMISSIONS AVERAGING**

<p><b>A. Emissions Averaging Applicability</b></p> <p>Did the facility conduct emissions averaging?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
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<p>- If yes, did the facility conduct emissions averaging only for emission points at a single refinery?</p> <p><i>Note.</i> Emissions averaging is not allowed across sources, such as across different plant sites or between refinery and HON sources (i.e., units having a hazardous organic air pollutant as its <i>primary product</i>) at the same plant site. In addition, an emissions estimation is only required for points included in emissions averages, not for all points in the source.</p> <p>A limitation on the emissions averaging provision is that States have the authority to disallow emissions averaging and require the application of standard control requirements to all emission points.</p>	<p>Yes [ ]    No [ ]</p>
<p><b>B. Emissions Averaging Credit/Debit System</b></p>	
<p>1. Were emission credits and debits calculated on a <u>mass basis</u> using equations in 40 CFR 63.652(g) and (h) based on actual operations?</p>	<p>Yes [ ]    No [ ]</p>
<p>2. Were credits calculated <u>greater than or equal to debits</u> calculated on an <u>annual basis</u>? [40 CFR 63.652(e)(3)]</p>	<p>Yes [ ]    No [ ]</p>
<p>3. Did debits exceed credits by more than 30% in any one quarter? [40 CFR 652(e)(4)]</p>	<p>Yes [ ]    No [ ]</p>

<sup>1</sup>This requirement reflects an amendment to 40 CFR Part 63 Subpart CC made on August 18, 1998. For more information, see Appendix G.

<p>4. Were any emission points other than the following used to generate emissions averaging credits [40 CFR 63.652(c)(1) through (3)]:</p> <ul style="list-style-type: none"> <li>• Group 2 emission points.</li> <li>• Group 1 emission points controlled by technology with a higher nominal efficiency than the reference control technology.</li> <li>• Emission points from which emissions are reduced by pollution reduction measures, alone or in conjunction with other controls, that get more emission reduction than required?</li> </ul>	<p>Yes [ ]    No [ ]</p>
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<p>5 Did the facility use any of the following emission points to generate emissions averaging credits [40 CFR 63.652(d)]:</p> <ul style="list-style-type: none"> <li>• Emission points already controlled on or before November 15, 1990, unless the level of control was increased after November 15, 1990? (If so, credit is allowed for the increase only.)</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>• Group 1 emission points that are controlled by a reference control technology, unless the technology has been approved for use in a different manner and a higher nominal efficiency has been assigned?</li> </ul> <p>(For example, it is not allowable to claim that an internal floating roof meeting only the specifications stated in the reference control technology definition in 40 CFR 63.641 applied to a storage vessel is achieving greater than 95 percent control.)</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>• Emission points on shutdown process units?</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>• Emission points controlled to comply with a State or other Federal rule, unless the level of control has been increased after November 15, 1990 above what is required by the State or other Federal rule?</li> </ul> <p><i>Note:</i> If the facility used any of these emission points, credit is allowed for the increase only.</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p><i>Note:</i> Debits are generated if the required level of control of a Group 1 emission point, such as 95% for miscellaneous process vents and 95% for storage vessels, is not achieved. [40 CFR 63.652(g). (See Table 2.3 for required level of control.) Debits and credits are calculated using formulas found in 40 CFR 63.652(g) and (h).</p>	
<p>6. Did the facility conduct calculations from any of the following:</p> <ul style="list-style-type: none"> <li>• Wastewater that is not process wastewater or wastewater streams treated in biological treatment units? (Group 1 wastewater streams cannot be left undercontrolled or uncontrolled to generate debits) [40 CFR 63.652(d)(4)]</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>• More than 20 individual emission points in addition to those controlled by pollution prevention measures?</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>- Where pollution prevention measures are used, no more than 25 emission points total? [40 CFR 63.652(f)(1)]</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<ul style="list-style-type: none"> <li>• Emission points during periods of startup, shutdown, and malfunction? [40 CFR 63.652(f)(2)]</li> </ul>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>

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<ul style="list-style-type: none"> <li>Emission points for which continuous monitors are used and excess emissions occur? [40 CFR 63.652(f)(3)] (For these periods, the monthly credits and debits will be adjusted as specified in 40 CFR 63.652(f)(3)(i) through (iii).)</li> </ul>	Yes [ ] No [ ]
<b>C. Approval of Emissions Averaging Plan</b>	
1. Did the facility submit for approval an emissions averaging plan in the Implementation Plan or Operating Permit Application?	Yes [ ] No [ ]
2. Did the plan demonstrate that the credits will be sufficient to offset the debits under representative operating conditions? [40 CFR 63.652(e)(3)(i)]  <i>Note: The plan may include use of innovative technologies, different from the reference control technology, provided that the innovative technologies achieve greater than the level of control required for a Group 1 emission point.)</i>	Yes [ ] No [ ]
3. Did the facility include a <u>risk assessment</u> in the plan of any hazards or risks of the plan, such as the risk from one large emission point versus the risk from combined emission points?	Yes [ ] No [ ]
- Did the facility review such hazards and risks and compare them to point-by-point compliance?	Yes [ ] No [ ]
<b>D. Testing, Monitoring, Reporting, and Recordkeeping for Emissions Averaging</b>	
1. For <u>each emission point included in an emissions average</u> , did the refinery perform testing, monitoring, reporting, and recordkeeping equivalent to the requirements for Group 1 emission points that are not included in emissions averaging? [40 CFR 63.653(a)]	Yes [ ] No [ ]
2. In addition, did the facility <u>maintain the monthly calculations</u> of debits and credits?	Yes [ ] No [ ]
3. Does the facility maintain the following records for emissions averaging:	
<ul style="list-style-type: none"> <li>Initial performance test results (if applicable)?</li> </ul>	Yes [ ] No [ ]
<ul style="list-style-type: none"> <li>Monthly debits, credits, and calculations using EPA-specified calculation procedures?</li> </ul>	Yes [ ] No [ ]
<ul style="list-style-type: none"> <li>Operating parameter monitoring results?</li> </ul>	Yes [ ] No [ ]

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## **APPENDIX G. RECENT CHANGES**

On August 18, 1998, EPA amended the MACT standard. A summary of the changes made through the amendments is provided in the preamble to the amendments (63 FR 44135) and below.

### **Startup, Shutdown and Malfunction Plans for Wastewater (Section 3.3.5)**

The MACT standard was revised to clarify that a Startup, Shutdown Malfunction Plan (SSMP) is not required for wastewater stream management units (unless the owner or operator elects to comply with 40 CFR Part 63, Subpart G.) The MACT standard references the Benzene Waste Operations NESHAP for wastewater requirements. The EPA did not intend to add additional requirements for wastewater beyond the Benzene Waste Operations NESHAP.

### **Wastewater stream control requirements (Section 2, Table 2-3 and Section 5 Table 5-1)**

Previously, wastewater stream management units that received streams subject to the MACT standard and 40 CFR Part 63, Subpart G (the HON) were required to comply with a combination of requirements from 40 CFR Part 61, Subpart FF (the Benzene Waste Operations NESHAP) and Subpart G. The standard was revised to allow owners/operators the option to comply with only the requirements of Subpart G for wastewater stream management units that receive both streams subject to Subpart G and the MACT standard.

### **Startup, Shutdown and Malfunction Reports (Section 3.3.5)**

Previously, refineries were required to report an action taken that is inconsistent with the SSMP within two days of commencing the action and within seven days of completing the action. These requirements have been replaced with the requirement to report actions taken that are inconsistent with the SSMP in the next periodic report.

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### **Clarification of Requirements for Installation and Calibration of Continuous Monitoring Systems (CMS)**

Previously, the MACT standard required a continuous monitoring system (CMS) to be installed and calibrated according to manufacturer's specifications. This requirement has been revised to allow procedures other than those specified by the manufacturer to be followed.

### **Requirement to Record Signature Owner or Operator When Equipment Leak Repairs are Delayed (Section 4.6.3)**

Previously, when an equipment leak was detected and could not be repaired within 15 days, the signature of the owner or operator (or designate) whose decision it was that repair could not be affected was to be recorded. This requirement has been revised to allow the name of the owner or operator (or designate) to be recorded instead.

### **Exemption of Secondary Seal From Requirements During Primary Seal Gap Measurements (Section 4.2.3)**

The MACT standard was revised to extend the provision exempting secondary seals from seal gap requirements during primary seal gap measurements to storage vessels subject to the Petroleum Refineries NESHAP that are to comply with Subpart Kb of 40 CFR Part 60. The EPA has determined the provision provides a necessary clarification that was not considered in development of Subpart Kb.

### **Documentation of Compliance (Section 3.3.3 and 4.4.3)**

Refineries with co-located gasoline loading racks that are subject to the MACT standard are generally required to comply with the requirements of the Gasoline Distribution MACT (40 CFR Part 63 Subpart R). The Gasoline Distribution MACT references notification requirements of the General Provisions. It was not clear when the Notification of Compliance status was required for gasoline loading racks at petroleum refineries. The requirement has been clarified to state that any notifications of compliance status required

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by the Gasoline Distribution MACT for gasoline loading racks co-located at refineries are to be submitted within 150 days of the Petroleum Refinery NESHAP compliance date.

### **Revision of Notification of Compliance Status (NCS) Report Requirement for New Group 1 Emission Point (Section 3.3.3)**

Previously, facilities were required to provide a NCS report for a new Group 1 emission point within 150 days of the change or addition of that point. The reporting requirements are amended to allow the NCS report to be provided in the periodic report for the reporting period in which the Group 1 emission point is added.

### **Semiannual Reporting of Inspection Results (Section 4.2.4)**

For storage vessels complying with the reporting requirements of the MACT standard, if a failure is detected during an inspection, it is required to be reported in the next periodic report. Previously, for storage vessels complying with Subpart Kb or Subpart Ka, if a failure is detected during an inspection, a report is to be provided to the Administrator within 30 days or 60 days, respectively. Now, when a failure is detected during an inspection of a storage vessel subject to the Petroleum Refineries NESHAP that is to comply with Subpart Kb or Subpart Ka, the failure is to be reported in the next periodic report.

### **Extensions for EFR Seal Gap Measurements**

As discussed previously, storage vessels subject to the MACT standard and a new source performance standard (40 CFR Part 60 Subpart K, Ka or Kb) are only required to comply with one of the standards. Procedures are specified for external floating roof storage vessels that must comply with the MACT standard to allow seal gap measurements to be delayed if it is determined that it is unsafe to perform the measurement. Provisions allow the gap measurements to be delayed for 30 days while the unsafe conditions are corrected. If the unsafe conditions cannot be corrected within that time period, the vessel is to be emptied within 45 days of the determination that the roof is unsafe. The owner or operator may use up to two extensions of 30 days each to empty the tank. These provisions have been extended to storage vessels complying with Subparts Ka and Kb.

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### **Extensions for Storage Vessel Repairs**

In the MACT standard, when an internal floating roof is discovered to not meet the requirements of the standard, it must be repaired or the associated storage vessel taken out of service and emptied within 45 days. If a storage vessel cannot be emptied or repaired within 45 days, the owner or operator may use up to two extensions of 30 days each. If an extension is utilized, the owner or operator must, in the next periodic report identify the vessel, provide a description of the failure, document that alternate storage capacity is unavailable, and specify a schedule of actions that will ensure that the control equipment will be repaired or the vessel will be emptied as soon as possible. This requirement has been extended to vessels complying with Subpart Kb, which does not include provisions to be followed in the event that a failure is detected during an inspection of a storage vessel control device and the storage vessel cannot be repaired or emptied within 45 days.

### **Definition of Gasoline (Appendix E)**

A definition for gasoline was added to the definitions in the MACT standard. The definition was taken from 40 CFR Part 60 Subpart XX Standards of Performance for Bulk Gasoline Terminals.

### **Report of Determination of Applicability for Flexible Operation Units and for Distillation Columns and Storage Vessels for Which Use Varies (Section 3.3.3)**

The MACT standard was revised to allow applicability determinations for flexible operation units and distillation columns and storage vessels for which use varies to be reported in the initial Notification of Compliance Status report (rather than 18 months prior to the compliance date).

### **Compliance of Agitators with Equipment Leaks Provisions (Figure 2-7)**

Currently, owners and operators of refineries can comply with the equipment leaks provisions of the MACT standard by complying with the equipment leaks provisions of Subpart H. Some of the referenced provisions of Subpart H refer to agitators in heavy liquid service. It is possible that, due to the references to agitators in Subpart H, the MACT standard could be interpreted as applying to agitators. The MACT standard was revised

to specifically state that owners and operators are not required to comply with Subpart H for agitators in heavy liquid service.

### **Overlap of Subparts XX and R for Gasoline Loading Racks (Section 5)**

The current MACT standard requires gasoline loading racks located at refineries to be in compliance with the control requirements of 40 CFR Part 63 Subpart R National Emission Standards for Gasoline Distribution Facilities. New gasoline loading racks are also subject to 40 CFR Part 60 Subpart XX New Source Performance Standard (NSPS) for Bulk Gasoline Terminals. It is currently possible for a gasoline loading rack at a petroleum refinery to be subject to both Subparts R and XX. The MACT Standard was revised to require petroleum refineries with gasoline loading racks subject to both Subparts R and XX to comply with the control requirements of Subpart R.

### **Corrections to Miscellaneous Process Vent Equations**

Following promulgation of the Petroleum Refineries NESHAP, two errors were discovered in two equations to be used to calculate kilograms per day of volatile organic compounds (VOC) in miscellaneous process vent streams. These errors have been corrected.

### **Revision of Notification of Compliance Status Report Requirement for Existing Group 1 Storage Vessels Brought Into Compliance After August 18, 1998 (Sections 3.3.3 and 4.2.4)**

The MACT standard allows floating roof storage vessels to be brought into compliance up to 10 years after August 18, 1998, the compliance date for other emission points. A Notification of Compliance Status (NCS) report is required to be submitted when these vessels are brought into compliance. Previously, it was not clear when the NCS report is to be submitted. The MACT standard has been revised to require a NCS report to be submitted for storage vessels brought into compliance after August 18, 1998 with the periodic report for the reporting period in which the vessel was brought into compliance. The report will include a list of all Group 1 storage vessels and either the actual or anticipated date of compliance for each vessel.

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**APPENDIX H. EPA REGIONS AND REGIONAL CONTACTS FOR THE  
PETROLEUM REFINERY MACT STANDARD IMPLEMENTATION**

No Petroleum Refineries in  
EPA Region I

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EPA Region VI (6EN-AT)  
1445 Ross Avenue, Suite 700  
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Bill Peterson  
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Kathy Keith  
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15. SUPPLEMENTARY NOTES		

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## Petroleum Refinery MACT Standard Guidance

<b>16 ABSTRACT</b> This document can help you (both the regulated community and regulators) understand the requirements for the Petroleum Refinery MACT Standard by helping you determine the following things: <ul style="list-style-type: none"> <li>• if the rule applies to your plant and process</li> <li>• what emission points are subject to the rule</li> <li>• the control, testing, monitoring, and reporting requirements</li> <li>• dates by which you must meet requirements, contacts, how to get more information, etc</li> </ul>		
<b>17 KEY WORDS AND DOCUMENT ANALYSIS</b>		
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