Petroleum Refinery MACT

Determining Applicability

(Revised to include rule amendments, November 2000)

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* This applicability information was taken from the *Updated Petroleum Refinery MACT Standard Guidance* document, (EPA/305-B-97-010), November, 2000. For comments or questions concerning the technical content of this document, please contact Jim Durham at 919-541-5672 or at (durham.jim@epa.gov).

I. GENERAL APPLICABILITY

1. Is the refinery a major HAP source? [ ] Potential to emit $ 10 tons per year (tpy) of any of the 188 HAPs listed in § 112(b) of the Clean Air Act; or [ ] Potential to emit $ 25 tpy of total HAPs.	Yes [ ] No [ ]
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. [ ] Benzene [ ] Biphenyl [ ] Butadiene (1,3) [ ] Carbon disulfide [ ] Carbonyl sulfide [ ] Cresol (mixed isomers) [ ] Cresol (m-) [ ] Cresol (o-) [ ] Cresol (p-) [ ] Cumene [ ] Dibromoethane (1,2) (ethylene dibromide) [ ] Dichloroethane (1,2) [ ] Diethanolamine [ ] Ethylbenzene [ ] Ethylene glycol [ ] Hexane [ ] Methanol [ ] Methyl ethyl ketone (2-butanone) [ ] Methyl isobutyl ketone (hexone) [ ] Methyl tert butyl ether [ ] Naphthalene [ ] Phenol [ ] Toluene [ ] Trimethylpentane (2,2,4) [ ] Xylene (mixed isomers) [ ] Xylene (m-) [ ] Xylene (o-) [ ] Xylene (p-)	Yes [ ] No [ ]
3. Are any of the following emission points located within petroleum refining process units? Please check the emission points below that apply. [ ] Miscellaneous process vents that contain $ 20 ppmv total organic HAP [ ] Storage vessels (pressure vessels and vessels < m^3 are exempt) [ ] Wastewater streams and treatment operations [ ] Equipment containing or contacting a fluid that is $ 5% by weight total organic HAPs	Yes [ ] No [ ]
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. [ ] Marine vessel loading operations [ ] Gasoline loading racks in SIC 2911 [ ] Storage vessels and equipment leaks associated with bulk gasoline terminals in SIC 2911	Yes [ ] No [ ]

II. APPLICABILITY FOR SPECIFIC EMISSION POINTS

A. Miscellaneous Process Vents 1. Does the vent contain a gas stream with $ 20 ppmv organic HAP **and** is it continuously or periodically discharged during normal operations?	Yes [ ] No [ ]
2. Is the vent or gas stream any of the following? Please check the descriptions below that apply. [ ] Directly discharged to the atmosphere [ ] Routed to a control device prior to discharge to the atmosphere [ ] Diverted to a product recovery prior to control or discharge to the atmosphere *Note:* The above list gives examples of vent or gas streams and may not be all inclusive.	Yes [ ] No [ ]
3. Does the vent or gas stream come from any of the following? Please check the items below that apply. [ ] Gas streams routed to a fuel gas system [ ] Relief valve discharges [ ] Leaks from equipment regulated under 40 CFR 63.648 [ ] Episodic or nonroutine releases such as maintenance or upsets [ ] *In situ* sampling systems (on stream analyzers) [ ] Catalytic cracking unit catalyst regeneration vents [ ] Catalytic reformer regeneration vents [ ] Sulfur plant vents [ ] Vents from control devices [ ] Vents from any stripping operations applied to comply with the wastewater provisions of 40 CFR 63 Subpart CC, G, or FF [ ] 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 [ ] Vents from storage vessels [ ] Emissions from wastewater collection and conveyance systems *Note:* If the answer to question 3 is “Yes”, the miscellaneous process vents provision does not apply.	Yes [ ] No [ ]

4. Does the vent or gas stream come from any of the following? Please check the items below that apply. [ ] Caustic wash accumulators [ ] Stripper overheads [ ] Distillation lower condensers/ accumulators [ ] Vacuum accumulators [ ] Blowdown condenser/ accumulators [ ] Delayed coker vents [ ] Flash/knockout drums [ ] Reactor vessels [ ] Scrubber overheads *Note:* The above list gives examples of where vent or gas streams originate and may not be all inclusive.	Yes [ ] No [ ]
5. Is the vent associated with an existing or new source? [ ] Existing source [ ] New source ***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 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.	
For an existing source: 6. Is the organic HAP concentration $ 20 ppmv, **and** total VOC emissions $ 33 kg/day? *Note:* 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.	Yes [ ] No [ ]
For a new source: 7. Is the organic HAP concentration $ 20 ppmv, **and** total VOC emissions $ 6.8 kg/day? *Note:* 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.	Yes [ ] No [ ]
B. Storage Vessels 1. Is it a tank or other vessel used to store <u>organic</u> liquids?	Yes [ ] No [ ]

2. Is it permanently attached to a motor vehicle such as a truck, railcar, barge, or ship?	Yes [ ] No [ ]
3. Is it a pressure vessel designed to operate in excess of 204.9 kPa and without emission to the atmosphere?	Yes [ ] No [ ]
4. Does it have a capacity less than 40 m^3?	Yes [ ] No [ ]
5. Is it used as a bottoms receiver tank?	Yes [ ] No [ ]
6. Is it used as a wastewater storage tank?	Yes [ ] No [ ]
Note: If any of the answers to questions 2 through 6 is "Yes", the storage vessels provision does not apply.	
7. Is tank associated with an existing or new source? [ ] Existing source [ ] New source ***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 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.	
For an **existing source**: 8. Is the capacity $ 177 m^3 **and** vapor pressure $ 10.4 kPa (maximum) and $ 8.3 kPa (annual average) **and** liquid HAP content > 4% by weight (annual average)? *Note:* 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.	Yes [ ] No [ ]

For a **new source**: 9. Is the capacity $ 151 m^3 **and** vapor pressure $ 3.4 kPa (maximum) **and** liquid HAP content > 2% by weight (annual average)? **OR** 10. Is the capacity between 76 and 151m^3 **and** vapor pressure $ 77 kPa (maximum) **and** liquid HAP > 2% by weight (annual average)? *Note:* 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.	Yes [ ] No [ ] Yes [ ] No [ ]
C. Wastewater Streams 1. Is it water or wastewater that, during production or processing: Comes into direct contact with or results from the production 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 $ 10 megagrams per year, **and** a flow rate $ 0.02 liters per minute, **and** benzene concentration $ 10 ppm by weight, **and** subject to control requirements under 40 CFR 61 Subpart FF? *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.	Yes [ ] No [ ]
D. Gasoline Loading Racks 1. Is it any of the following equipment, which is necessary to fill gasoline cargo tanks? Please check the equipment below that applies. [ ] Loading arms [ ] Shutoff valves [ ] Pumps [ ] Relief valves [ ] Meters [ ] Other piping and valves	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? *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.	Yes [ ] No [ ]

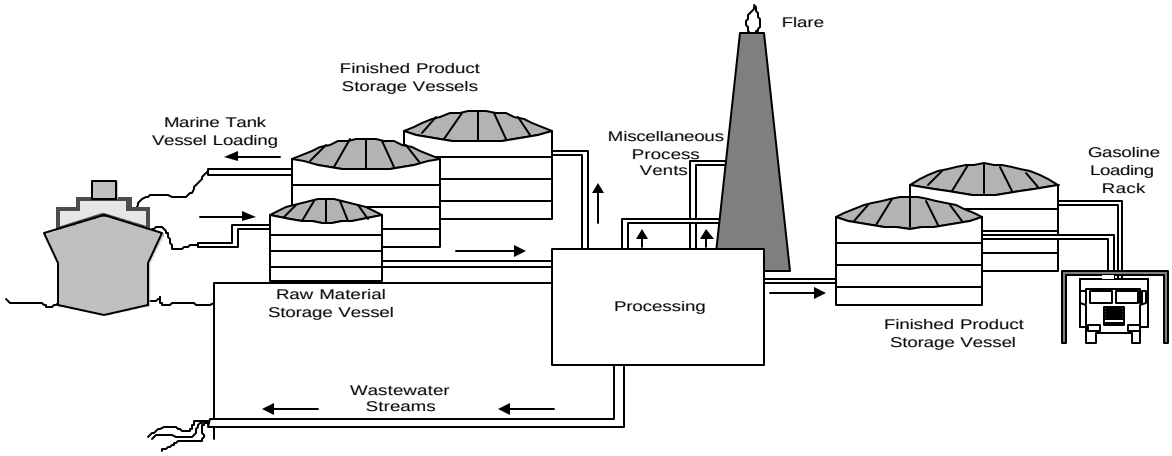
E. Marine Tank Vessel Loading 1. Is it a land- or sea-based terminal or structure that loads liquid commodities in bulk onto marine tank vessel loading?	Yes [ ] No [ ]
2. Is vessel loading associated with an existing or new source? [ ] Existing source [ ] New source ***Existing sources*** - sources that 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 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.	
For an **existing source**: 3. Is vapor pressure of liquid loaded $ 10.3 kPa **and** emissions > 9.1 megagrams of any one HAP or > 22.7 megagrams of total HAPs per year? *Note:* 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.	Yes [ ] No [ ]
For a **new source**: 4. Is vapor pressure of liquid loaded $ 10.3 kPa? *Note:* 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.	Yes [ ] No [ ]
F. Equipment Leaks 1. Is it a vent from a wastewater system drain, tank mixer, or sample valve on a storage tank? *Note:* If the answer to question 1 is "Yes", the equipment leaks provision does not apply.	Yes [ ] No [ ]

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 $ 5% by weight total organic HAP): - pump? - compressor? - pressure relief device? - sampling connection system? - open-ended valve or line? - valve? - instrumentation system? *Note:* Equipment leaks applicability criteria are the same for existing and new sources. *Note to inspector*: 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.	Yes [ ] No [ ] Yes [ ] No [ ] Yes [ ] No [ ] Yes [ ] No [ ] Yes [ ] No [ ] Yes [ ] No [ ] Yes [ ] No [ ]

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

FIGURE 2-1. Emission Points Within an Affected Source



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 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 Rules Does Not Apply To

C Refineries that are major HAP sources under either of the following definitions: - Potential to emit $ 10 tons per year (tpy) of any of the 188 HAPs in Appendix A of this manual; **or** - Potential to emit $ 25 tpy of total HAPs C Refining process units at refineries that are major sources and emit or contain any of the 28 HAPs in Appendix B of this manual C The following emission points within petroleum refining process units at major sources: - Miscellaneous process vents that contain $ 20 ppmv total organic HAP - Storage vessels (pressure vessels and vessels < 40 m^3 are exempt) - Wastewater streams and treatment operations - Equipment containing or contacting a fluid is $ 5% by weight total organic HAPs. C The following emission points if located at refineries that are major sources: - Marine vessel loading operations - Gasoline loading racks in SIC 2911 - Storage vessels and equipment leaks associated with bulk gasoline terminals in SIC 2911.	C Refineries that are not major HAP sources C Equipment that does not emit or contain any of the HAPs in Appendix B of this manual C Catalytic cracking and reforming catalyst regeneration vents C Sulfur recovery plant vents C Research and development facilities C Units processing natural gas C Units for recycling discarded oil C Shale oil extraction units C Ethylene processes C Units subject to the hazardous organic NESHAP (HON) [40 CFR 63 Subparts F, G, H, and I] C Storm water from segregated storm water sewers C Spills C Equipment in organic HAP service < 300 hours during the calendar year.

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 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 $ 20 ppmv, **and** (2) Total VOC emissions $ 33 kg/day.	(1) Organic HAP concentration $ 20 ppmv, **and** (2) Total VOC emissions $ 6.8 kg/day.
Storage Vessels	(1) Capacity $ 177 m^3, **and** (2) Vapor pressure $ 10.4 kPa (maximum) and $ 8.3 kPa (annual average), **and** (3) Organic liquid HAP concentration > 4% by weight (annual average).	(1) Capacity$ 151 m^3, **and** (2) Vapor pressure $ 3.4 kPa (maximum), **and** (3) Organic liquid HAP concentration > 2% by weight (annual average). **OR** (1) Capacity $ 76 and < 151 m^3, **and** (2) Vapor pressure $ 77 kPa (maximum), **and** (3) Organic liquid HAP concentration > 2% by weight (annual average).
Wastewater Streams	(1) Total annual benzene loading $ 10 megagrams per year, **and** (2) Flow rate $ .02 liters per minute, **and** (3) Benzene concentration $ 10 ppm by weight, **and** (4) Not exempt from controls under 40 CFR 61 Subpart FF.	(1) Total annual benzene loading $ 10 megagrams per year, **and** (2) Flow rate $ .02 liters per minute, **and** (3) Benzene concentration $ 10 ppm by weight, **and** (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 $ 10.3 kPa, **and** (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 $ 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?

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 November) *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.

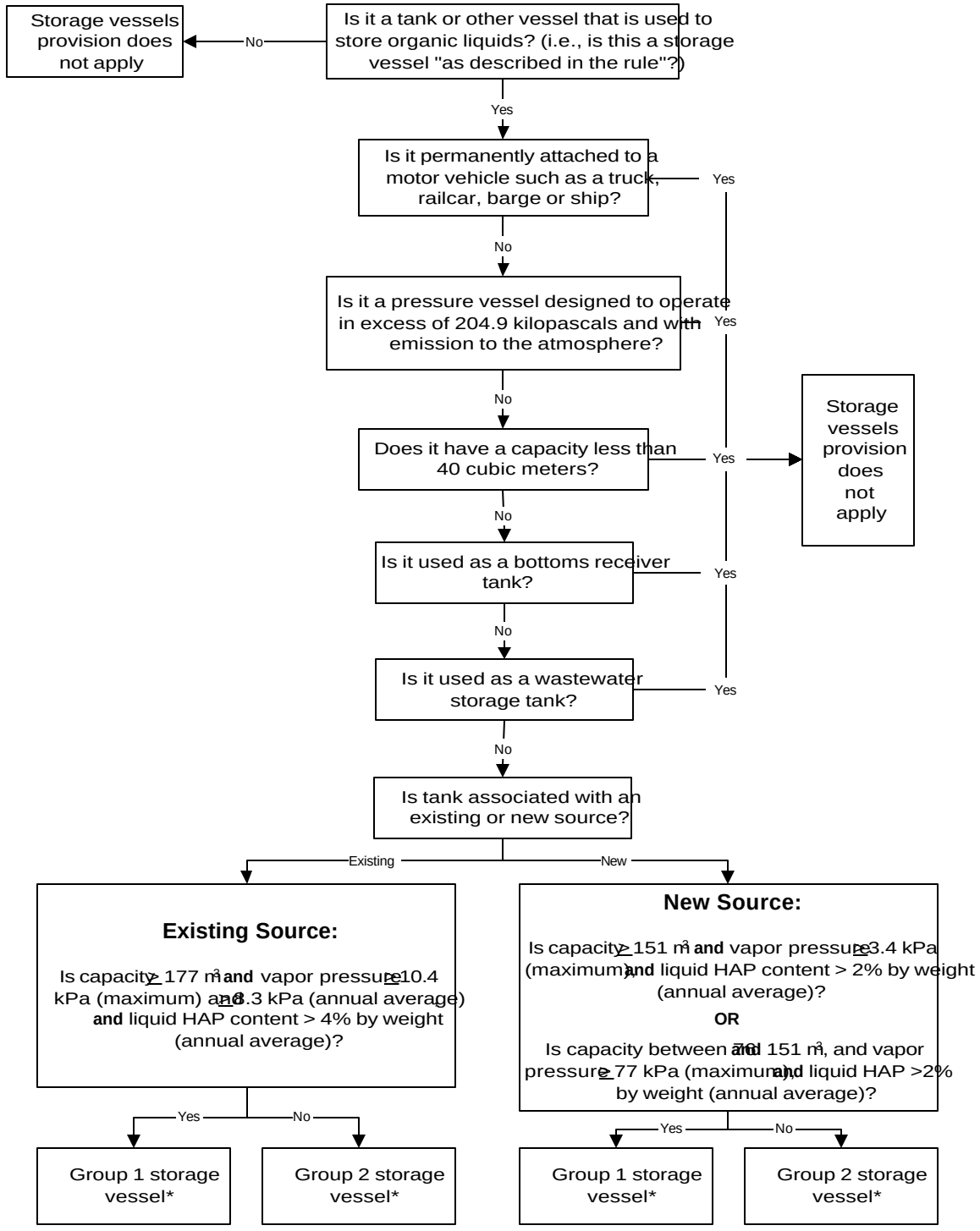
There is a specific compliance date for each emission point at existing sources. Miscellaneous process vents and gasoline loading racks have a compliance date of August 18, 1998. Wastewater streams also have a compliance date of August 18, 1998, and sources should be in compliance with the benzene waste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

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

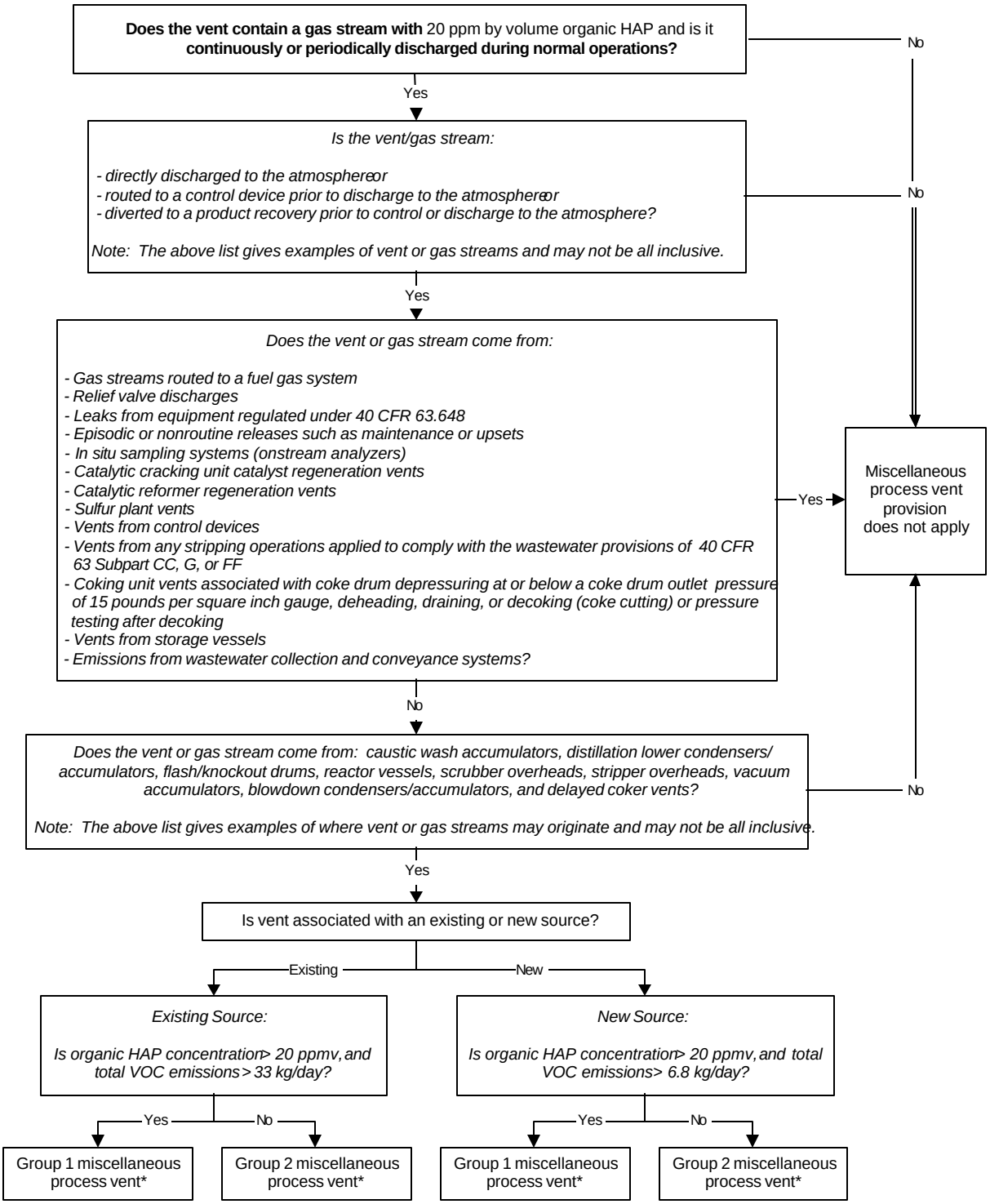
Emission points	Control Requirements
Miscellaneous Process Vents	• Reduce organic HAPs by 98% or to 20 ppmv using incinerators, boilers, process heaters, or other devices; **or** • Use a flare.
Storage Vessels	C Comply with storage vessel NESHAP [40 CFR 63 Subpart G], which requires: - Internal floating roof with specified seals; **or** - External floating roof with specified seals; **or** - External floating roof converted to internal floating roof with specified seals; **or** - Closed vent system with 95% efficient control device.
Wastewater Streams	• Comply with benzene waste operations NESHAP [40 CFR 61 Subpart FF], which requires: - Reducing benzene mass emissions by 99% using suppression followed by another treatment process (e.g., steam stripping or biotreatment); **and** - 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.
Gasoline Loading Racks	• Comply with gasoline distribution NESHAP [40 CFR 63 Subpart R], which requires: - Reducing emissions of total organic compounds to 10 milligrams per liter of gasoline loaded; **and** - Loading only in vapor tight cargo tanks that have been tested to assure vapor tightness.
Marine Tank Vessel Loading	• Comply with marine tank vessel loading NESHAP [40 CFR 63 Subpart Y], which requires: - Reducing HAP by 97% for existing sources - Reducing HAP by 98% for new sources.
Equipment Leaks	• 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: - Leak detection and repair with specified leak definitions and monitoring frequencies - Equipment specifications for some types of equipment.

FIGURE 2-3. Determination of Applicability for Storage Vessels



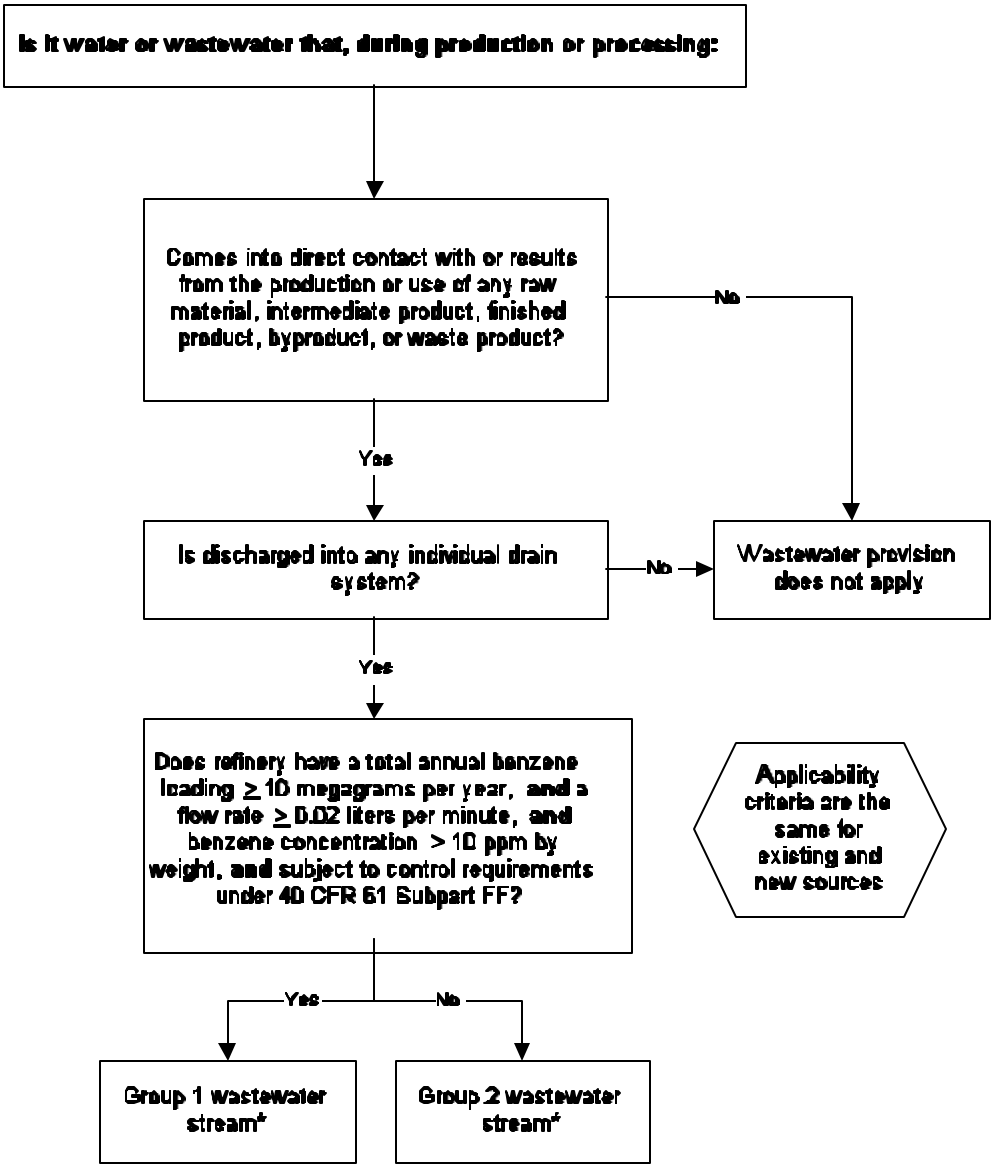
* See Chapter 4 for applicable requirements for Group 1 and Group 2 emission points.

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



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

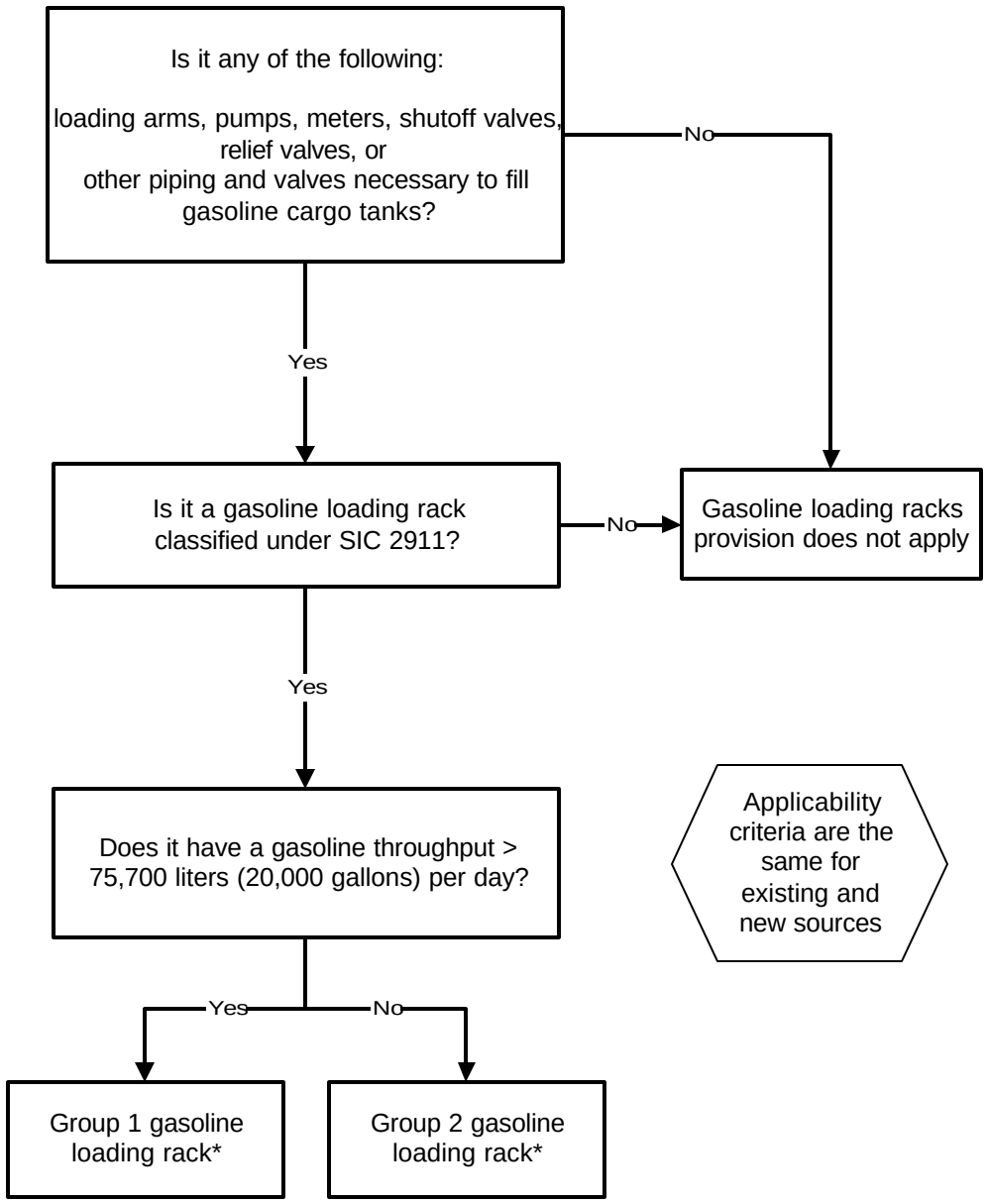
FIGURE 2-4. Determination of Applicability for Wastewater Streams



[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.]

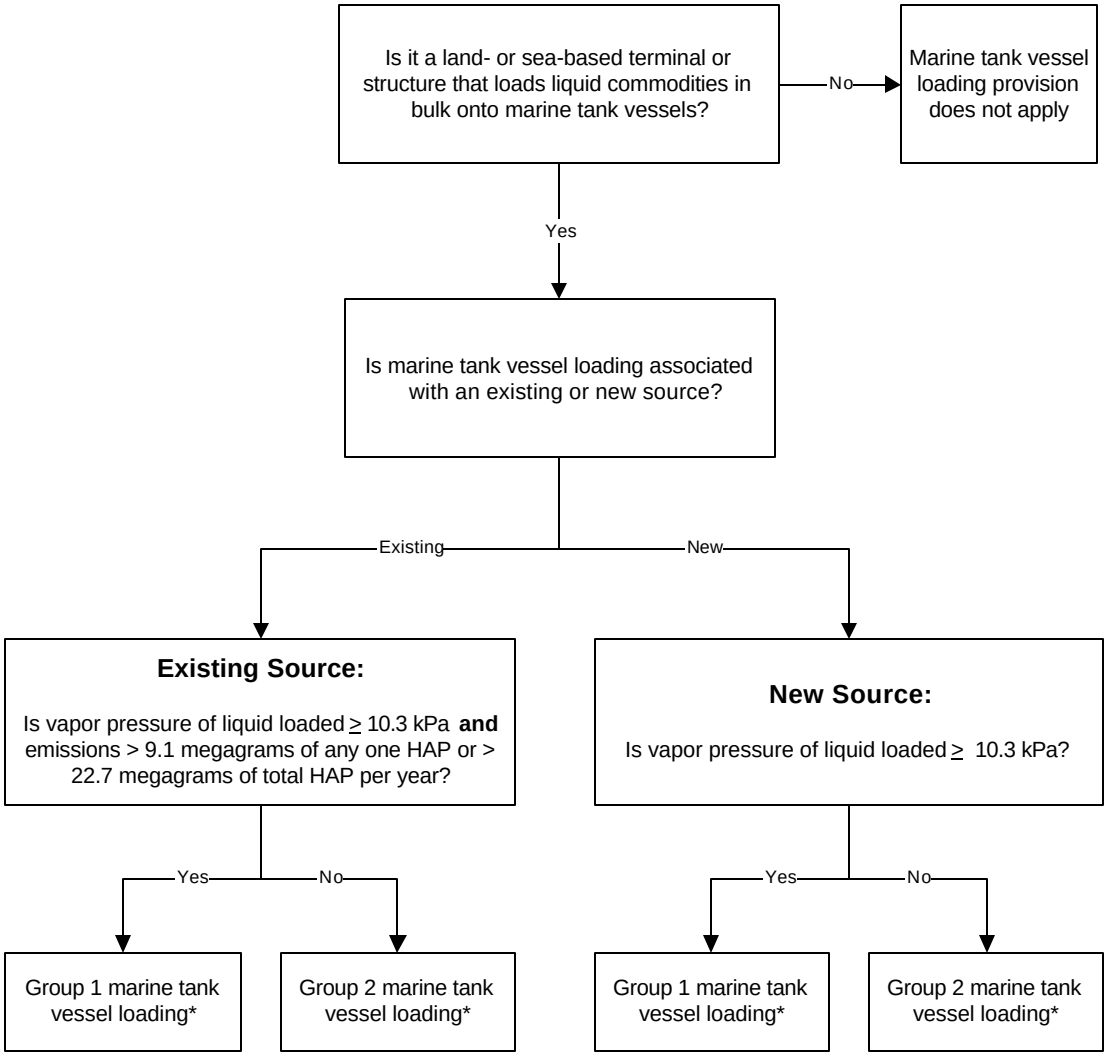
* See Chapter 4 for applicable requirements for Group 1 and Group 2 emission points.

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



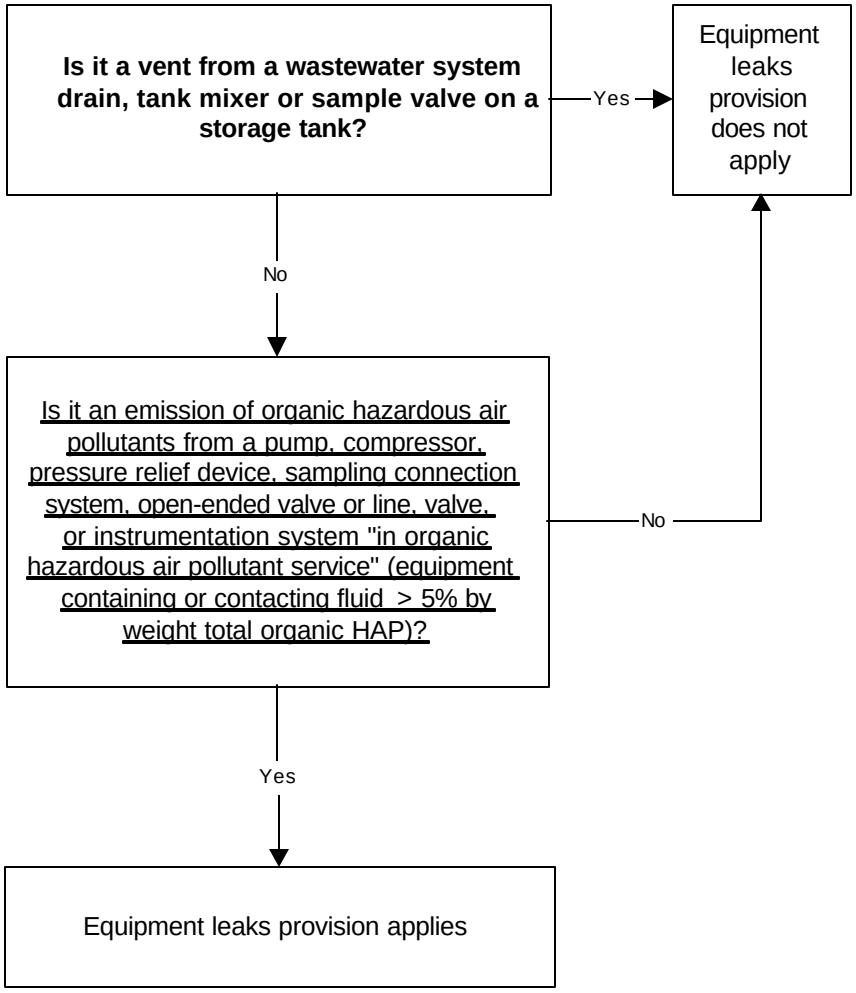
* See Chapter 4 for applicable requirements for Group 1 and Group 2 emission points.

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.

FIGURE 2-7. Determination of Applicability for Equipment Leaks



* See Chapter 4 of the updated PR Guidance Document for Group 1 and Group 2 emission points.

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.)

* This above applicability information was taken from the ***Updated*** *Petroleum Refinery MACT Standard Guidance* document, (EPA/305-B-97-010), November, 2000. For comments or questions concerning the technical content of this document, please contact Jim Durham at 919-541-5672 or at (durham.jim@epa.gov).