**PETROLEUM REFINERY COMPLIANCE PAPER ON BENZENE WASTE NESHAP**

**US ENVIRONMENTAL PROTECTION AGENCY'S OFFICE OF COMPLIANCE**

**COMPLIANCE ASSESSMENT AND MEDIA PROGRAM DIVISION**

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**Petroleum Refinery Compliance Paper on Benzene Waste NESHAP**

## I. Introduction

The objective of this paper is to provide a technical overview and understanding of CAA compliance issues that affect the petroleum refinery industry in relation to the benzene waste NESHAPs. Benzene waste NESHAPs is one of four "marquee" issues that the Office of Compliance has identified as problems at facilities and has identified steps to return or maintain compliance with the CAA. The other "marquee" issues, which are discussed separately, are:

1) New Source Review/ Prevention of Significant Deterioration (NSR/ PSD);

2) Leak Detection and Repair (LDAR); and

3) Flaring and good air pollution control practices.

## II. Background

Benzene is a major industrial chemical used in the manufacturing of many household products such as plastic, insecticides and polyurethane foam. Benzene is also present in automobile exhaust, auto refueling operations, cigarette smoke and many other consumer products. Because of its link to adult leukemia, the EPA has classified benzene as a known human carcinogen and exposure to industrial benzene emissions represents and important long-term (chronic) health concern, particularly for people living close to major sources of emissions.

In an effort to cut air emissions of the hazardous pollutant benzene, the EPA issued in 1990, standards to regulate benzene emissions from waste operations. The standards are codified under the National Emission Standards for Hazardous Air Pollutants (NESHAPs) at 40 CFR Part 61, Subpart FF. The standards apply to owners and operators of chemical manufacturing plants, coke by-product recovery plants, and petroleum refineries as well as owners and operators of hazardous waste treatment, storage, and disposal facilities that treat, store, or dispose of hazardous waste generated from the above facilities.

## III. Problem Statement

Routine Subpart FF inspections at petroleum refineries by NEIC have revealed that many facilities consistently underestimate their total annual benzene (TAB). Common reasons for noncompliance have included:

- Many streams are not included on annual reports (e.g., spent caustic/caustic hydrocarbon, desalter hydrocarbon undercarry, tank waterdraws, sample wastes, remediation wastes, most materials transported via vacuum truck)
- The amount of benzene in included streams is often under-represented
- Control/treatment equipment operated improperly

## IV. Regulatory Overview

### General Requirements and calculation of the TAB quantity

Subpart FF applies to owners and operators of chemical manufacturing plants, coke by-product recovery plants, and petroleum refineries. Also commercial treatment, storage, and disposal facilities (TSDFs) that receives, treat, store, or dispose of hazardous waste generated from the above facilities.

Owners or operators of facilities subject to the Subpart FF regulations must calculate the TAB quantity from facility waste. According to 40 CFR §61.342, the TAB quantity from facility waste is the sum of the annual benzene quantity for each waste stream at the facility that has a flow-weighted average water content greater than 10 percent or that is mixed with water, or other wastes, at any time and has an annual average water content greater than 10 percent. The total annual benzene quantity is determined based on the quantity of benzene in the waste before any waste treatment occurs to remove the benzene except as specified in 40 CFR §61.355(c)(1)(i)(A) through (D).

Where the owner or operator of a facility has chosen to treat the wastewater to achieve a TAB quantity from facility waste less than 1 megagram/year (Mg/yr), then the TAB from facility process

wastewater shall be determined by adding together the annual benzene quantity at the point of waste generation for each untreated process wastewater stream plus the annual benzene quantity exiting the treatment process for each process wastewater stream treated.

At a facility where the benzene content of each wastestream entering the waste management unit is less than 10 ppmw on a flow-weighted annual average basis and the TAB quantity contained in all waste streams managed or treated in exempt waste management units comprising the facility wastewater treatment systems is less than 1 Mg/yr, the TAB quantity shall be calculated as the sum of the individual benzene quantities determined at each location where a waste stream first enters an exempt waste management unit. The benzene quantity discharged from an exempt waste management unit shall not be included in this calculation.

**The following table summarizes the regulatory requirements and compliance options of Subpart FF**

| If the TAB Quantity is . . . | Then the Regulatory Requirements are . . . (Recordkeeping & Monitoring requirements) | |
|---|---|---|
| Less than 1 Mg/yr (1.1 ton/yr) | Then submit an initial report only, maintain a record of documentation, and update and resubmit the report annually. Repeat the determination of the TAB quantity from facility waste whenever there is a change in the process generating the waste that could cause the total annual benzene quantity from facility waste to increase to 1 Mg/yr (1.1 ton/yr) or more. (CFR Citation: 40 CFR §61.356 and 61.357) | None |

| If the TAB Quantity is . . . | Then the Regulatory Requirements are . . . (Recordkeeping & Monitoring requirements) | |
|---|---|---|
| Less than 10 Mg/yr (11 ton/yr) but is equal to or greater than 1 Mg/yr (1.1 ton/yr) | Then submit annual reports. Repeat the determination of the TAB quantity from facility waste at least once per year and whenever there is a change in the process generating the waste that could cause the total annual benzene quantity from facility waste to increase to 10 Mg/yr (11 ton/yr) or more. (CFR Citations: 40 CFR §61.356 and 61.357) | None |

| If the TAB Quantity is . . . | Then the Regulatory Requirements are . . . (Recordkeeping & Monitoring requirements) | Compliance options |
|---|---|---|
| Equal to or greater than 10 Mg/yr (11 ton/yr) | Then control/treat wastes, monitor operations, and submit quarterly/annual reports. (CFR Citations: 40 CFR §61.342 (c), (d), or (e)) | **General** – Control/treat all waste streams, can exempt streams <10 ppm and those with low flows;<br>**2 Mg** –Control/treat all waste streams except for 2 Mg of benzene; all waste streams <10 ppm exempt;<br>**6 Mg** –Control/treat all waste streams except for 6 Mg of benzene; no exemptions;<br>**1 Mg** (infrequently used) – Control/treat all non-process wastewater streams, can exempt up to 1 Mg of benzene in process wastewater streams. |

## V. Observations for Determining Non-Compliance for Subpart FF at Petroleum Refineries

The following is a list of observations or "clues" that have been developed by NEIC through numerous Subpart FF compliance investigations at petroleum refineries. Although deviations from these

observations have occasionally occurred due to unique process operations, the observation herewith should find strong applicability at a majority of refineries.

1. More often than not, refineries with crude unit capacities above 70,000 barrels per day (bpd) produce over 10 megagrams (Mg) of benzene wastes per year. When Subpart FF was constructed, the regulatory writers assumed that most refineries under 40,000 bpd would not be subject (to control/treatment requirements), but that refineries over 70,000 likely would be covered. Between 40,000 and 70,000 bpd, varying process operations would dictate which refineries would be subject. With the exception of 1-2 facilities out of approximately 30 inspected, this observation has found widespread applicability. Exceptions to the observation have been identified for facilities refining predominantly one, heavy (low-benzene) crude oil and managing organic waste benzene sources in a different manner.

2. The amount of oil recovered from the refinery sewer system at the wastewater treatment plant (WWTP), in barrels per day, is approximately the crude unit capacity divided by 1000. For example, a 150,000 bpd refinery will frequently recover 150 bpd of oil from the sewer system. This observation can vary depending on upstream oil-recovery operations, the refinery crude slate (how varied the crude sources are), desalter operation, and other factors. Large variability in crude slate frequently results in desalter upsets and oil undercarry to the process sewer, and specific desalter operations such as mud-washing also increase oil undercarry. This oil is usually recovered at the WWTP unless it is removed first by upstream recovery operations.

3. In a well-mixed oil/water stream, the concentration of benzene in the oil phase will be approximately 100 times the concentration of benzene in the aqueous phase. This observation comes almost directly from the chemistry books, being based off the equilibrium partitioning coefficient for benzene between oil and water. The refinery desalting operation is usually the

best place to observe the rule because of the intense mixing that occurs in order to "wash" salts and other impurities from the crude oil. If the concentration of benzene in the crude (obtained through assays or other sampling) is determined to be 2,000 parts per million (ppm), then roughly 20 ppm of benzene will be found in the desalter effluent water stream.

4. A desalter is commonly used at refineries to remove salts and impurities from the crude oil before being further processed. In the desalter, the crude oil is contacted with water which absorbs the salts and impurities, and in addition, a small amount of hydrocarbon. If benzene is present in the crude oil, the effluent water stream from the desalter will frequently be the largest contributor of benzene to the TAB value.

5. The desalter effluent water stream flowrate is typically 5 percent of the crude unit oil flowrate. For example, a 100,000 bpd refinery will frequently have a desalter effluent water flowrate of 5,000 bpd. Although the flowrate can range from 1-6 percent of crude, most refiners have found that 5 percent water achieves the best results.

6. In most cases, refineries should report at least one "Spent Caustic" stream on the annual submittal. Caustic is used in many refinery processes to remove sulfur-containing compounds from hydrocarbon streams and is usually shipped off-site for regeneration. Benzene absorbed from the hydrocarbon streams must be accounted for in the TAB calculation.

7. Up to 60 percent of the benzene present in wastewater streams at the point of waste generation can volatilize from an open sewer system by the time the stream exits the oil/water separator at the WWTP (based on the Final NESHAP Standards for Waste Operations: Basis for Impact Calculations, U.S. EPA, February 16, 1990). Sampling performed at the WWTP will therefore underestimate the amount of benzene entering the uncontrolled (uncovered) sewer

system. If a facility has reported an uncontrolled benzene quantity of 2 Mg/yr (under the 6 Mg compliance option, for example), and sampling performed at the uncontrolled WWTP shows 5.9 Mg/yr, a case can be made that the compliance limit has been exceeded. Sampling the process sewer at upstream locations where less volatilization has occurred may prove de facto noncompliance.

## VI. Compliance Check

A facility with a TAB value greater than 10 Mg/yr must install control/treatment equipment and monitor operations to ensure compliance with Subpart FF. Control equipment can range from water traps/seals, conservation vents, and sealed covers on sewer drains and hubs to floating roofs for oil/water separators and tanks or closed vent systems on fixed-roof units (see Figure 2). Treatment units include strippers, evaporation units, and waste incinerators, with strippers being most commonly used.

Compliance with the control/treatment and monitoring requirements of Subpart FF is generally evaluated by: 1) ensuring that all sources of waste benzene have been accounted for; 2) determining if the amount of uncontrolled benzene exceeds the compliance option chosen (such as the 2 or 6 Mg options); and 3) performing visual and/or instrument checks to test the effectiveness of the control/treatment equipment. Step one refers to the facility TAB value, whereas step two pertains to the uncontrolled benzene quantity (commonly referred to as the BQ value). Sampling is usually performed to arrive at both values, although a facility may use process knowledge to estimate the benzene waste in a particular stream.

## VII. End-Of-Line Sampling Approach

In order to reduce the number of samples required to calculate the refinery TAB or BQ value, samples may be collected at the "end of line" where most aqueous waste streams are collected for

treatment; i.e., the wastewater treatment plant. The result will be a conservative estimate, as stated in the previous section (see observation #7), due to volatilization which may occur before the waste reaches the WWTP, and because some streams are not drained or are drained only intermittently to the process sewer. The volatilization problem can be remedied by sampling further upstream at combined sewer locations (the larger branches in Figure 1), moving upstream increases the number of samples, eventually to the number of individual benzene sources at the "point of generation." Sampling at upstream locations may also prove more difficult to characterize the benzene contribution from free oil compared to at the exit of the WWTP oil/water separator because oil flow through the sewer is usually only a fraction of the water flow. The latter issue of waste benzene sources which do not drain to the process sewer can be managed by identifying and sampling those sources at the point of generation. An estimate of the benzene contribution from intermittent sources can be obtained from previous facility sampling and/or TAB report data and added to the "end of line" TAB/BQ estimate, if these sources were not draining to the sewer during sampling at the WWTP.

Thus, a TAB value of 12 Mg/yr calculated at the wastewater treatment plant (the last or "end-of-line" unit at most facilities) means that at least 12 Mg/yr of benzene waste are generated at the facility. In addition to volatilization, the end-of-line calculation may be further reduced if one or more waste benzene sources do not drain to the process sewer. In this case, samples must be taken of the individual sources and the benzene quantity added to the TAB value at the WWTP. The same methodology applies in calculations of the BQ value. If the combined process streams are uncontrolled in the process sewer, then all of the benzene in the sewer must be counted toward the BQ value (unless the benzene may be excluded due to low flow/concentration exemptions). These means that, under the 6 Mg compliance option, for example, all waste benzene which passes an uncontrolled sample location may be added to the BQ calculation. Under the 2 Mg option, however, if the same combined flow in the uncontrolled process sewer consists of one or more waste streams which, at their source, are less than 10 parts per million by weight (ppmw) benzene on an annual, flow-weighted average, the

contribution of these <10 ppmw waste streams must first be removed before calculating the uncontrolled benzene quantity.

Control/treatment equipment must be checked on a periodic basis to ensure benzene cannot escape to the atmosphere. Visual checks must be performed quarterly to ensure, among other things, that hatches are closed, vents are not continuously relieving, and drain seals still have water in them. Subpart FF also requires annual inspections using a VOC analyzer to identify equipment leaks, and specifies a "no detectable emission" level of 500 ppm VOC, as determined by EPA Reference Method 21 (40 CFR Part 60 Appendix A).

## VIII. Glossary

**Control** Means to ensure that benzene emissions cannot escape

**Desalter hydrocarbon** The desalter mixes the hydrocarbon stream with a small amount of fresh water (e.g., 10 percent by volume) forming a water-in-oil emulsion. The resulting emulsion is subjected to an electric field wherein the water is coalesced as an under flow from the upper flow of a relatively water-free, continuous hydrocarbon phase. The desalted hydrocarbon stream is produced at relatively low cost and has a very small residual salt content.

**Point of waste generation** Means the location where the waste stream exits the process unit component or storage tank prior to handling or treatment in an operation that is not an integral part of the production process, or in the case of waste management units that generate new wastes after treatment, the location where the waste stream exits the waste management unit component.

**Parts per million (ppm)** the unit commonly used to designate the concentration of a substance in a wastewater in terms of weight ie. One pound per million pounds, etc. PPM is synonymous with the more commonly used term mg/L (milligrams per liter).

**TAB** The TAB quantity from facility waste is the sum of the annual benzene quantity for each waste stream at the facility that has a flow-weighted annual average water content greater than 10 percent or that is mixed with water, or other wastes, at any time and the mixture has an annual average water content greater than 10 percent. The EPA has used the term "total annual benzene quantity managed" or "total annual benzene quantity" several places in the regulation where a summation of annual benzene waste is required. However, when people refer to TAB, they are referring only to the summation of annual aqueous wastes which determines whether a facility needs to install controls and treat wastes. The term "total annual benzene quantity" is also used in certain compliance approaches, and these calculated quantities will be different from the TAB.

**Treatment** Means to remove or destroy the benzene present by 99% or to below 10 ppm

## IX. Petroleum Refinery Resources on the Web

**Office of Enforcement and Compliance Assurance (OECA) Website for Petroleum Refinery**

http://es.epa.gov/oeca/main/compasst/petol.html

**Benzene NESHAP FAQ Handbook for Subparts FF and BB**

http://es.epa.gov/oeca/metd/benzene.pdf

EPA developed the Benzene NESHAP FAQ Handbook to improve the understanding of these Subparts FF and BB by compliance and enforcement personnel and members of the regulated community. The FAQ Handbook addresses typical questions that might arise involving compliance and enforcement in unusual or unique circumstances. For your convenience, we have attached a copy of the handbook in the appendix section.

# Appendix

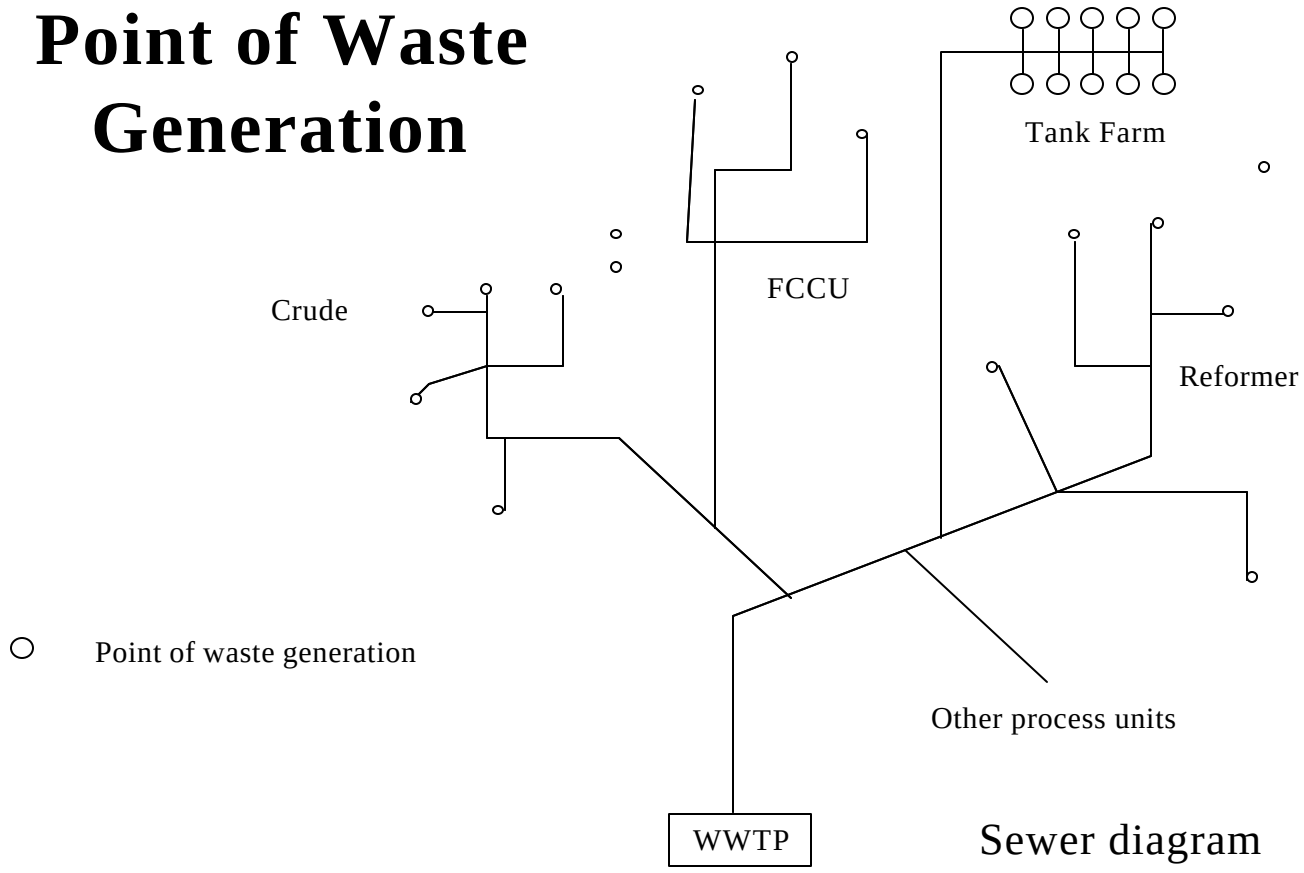


Figure 1. This figure illustrates the point of waste generation where the Total Annual Benzene (TAB) Quantity is to be calculated

# Control Devices

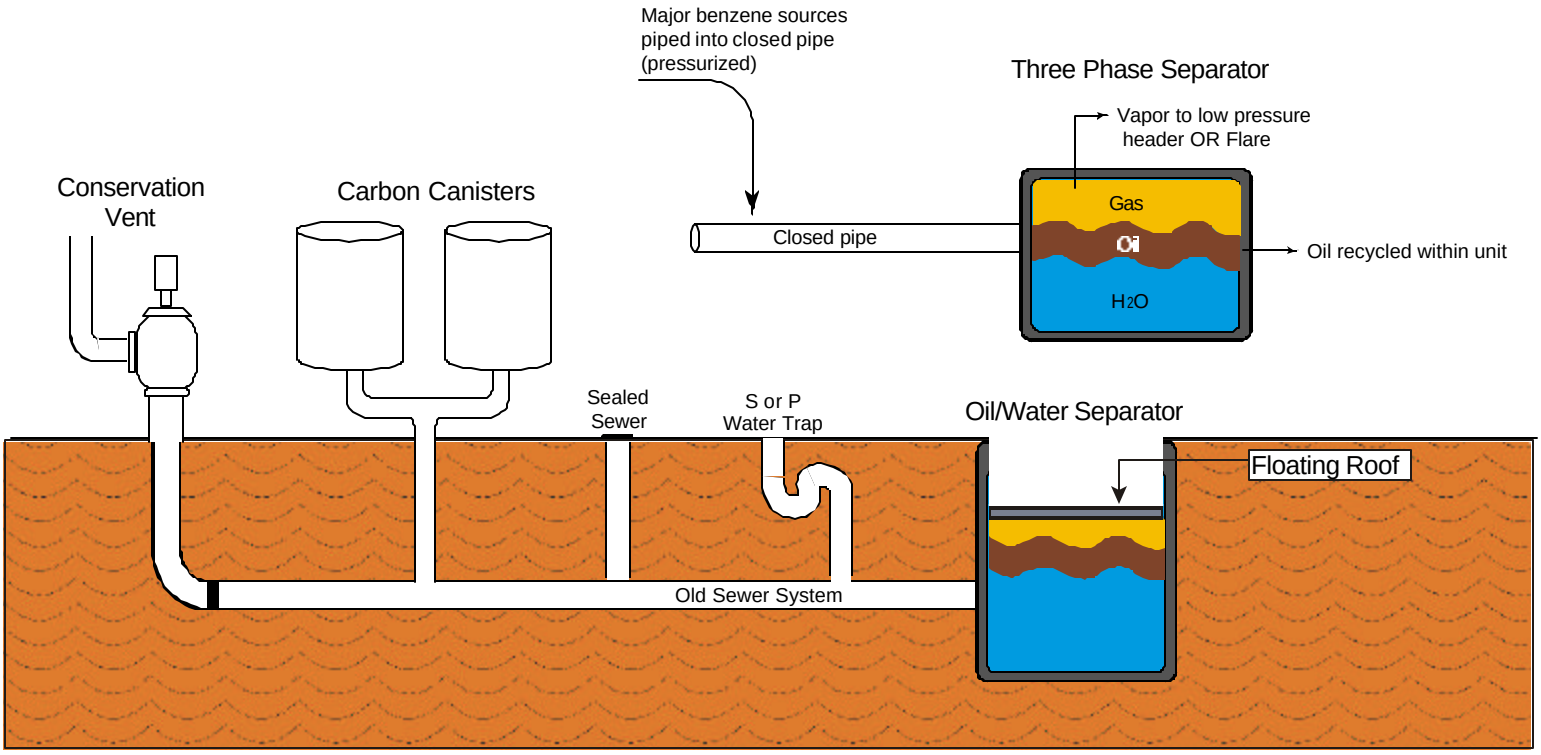


Figure 2. This figure illustrates the control equipment used to comply with the Subpart FF regulations.

# Benzene NESHAP FAQ Handbook for Subparts BB and FF

## Acknowledgments

The U.S. Environmental Protection Agency's (EPA) Manufacturing, Energy & Transportation Division in the Office of Enforcement and Compliance Assurance would like to express thanks and appreciation to everyone who helped make this *Benzene NESHAP FAQ Handbook* possible.

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# Contents

## Background

In September 1989, the U.S. Environmental Protection Agency promulgated National Standards for Hazardous Air Pollutants (NESHAP) to limit benzene emissions from several source categories. These source categories included benzene transfer (Subpart BB) and benzene waste operations (Subpart FF). Due to the complexity of these regulations, EPA developed this *Benzene NESHAP FAQ Handbook* to improve the understanding of these subparts by compliance and enforcement personnel and members of the regulated community that already have a basic knowledge of what these NESHAPs require. It is the intent of the *FAQ Handbook* to address typical questions that might arise involving compliance and enforcement in unusual or unique circumstances. This *FAQ Handbook* will also provide interpretation of compliance provisions of the standards based on the regulatory development history.

# Frequently Asked Questions on the Benzene NESHAPs: Subparts BB and FF

## Subpart BB: Benzene Transfer Operation

***Exemptions***

**(1) Is a loading rack at a bulk terminal, that loads benzene-laden liquid originating from a coke by-product plant, and subsequently transports that product out via truck, tank car, and/or marine vessel, exempt from the NESHAP for Benzene Transfer Operations?**

Loading racks at which benzene-laden liquid from coke by-product recovery plants are loaded are specifically exempted from Subpart BB (see 40 CFR §61.300). Since a bulk terminal may include more than one loading rack, the language only exempts individual loading racks. Further, it is the intent of the regulation to exempt loading racks that handle only exempt liquids, for example, coke by-product recovery plant liquid. However, if any part of a loading rack that handles coke by-product recovery plant liquid also is used to handle liquid benzene (a non-exempt liquid), the source must comply with the record keeping and reporting requirements of 40 CFR §61.305(i). Additionally, if the quantity of liquid benzene handled by the affected facility exceeds 1.3 million liters of 70 weight-percent or more benzene annually, the standards specified in 40 CFR §61.302 shall apply.

*[Citations: 40 CFR §61.300, 40 CFR §61.305(i), and 40 CFR §61.302]*

**(2) Are transfer operations which occur from marine vessel to marine vessel (such as ship to barge, or barge to barge) regulated by Subpart BB? These operations do not use the land-based loading racks to transfer benzene from vessel-to-vessel, but, instead, use portable pumps. No vapor collection or vapor balancing occurs during these transfers.**

Yes. But Subpart BB as written, does not exclude vessel-to-vessel benzene transfers that take place at a benzene production facility or a bulk terminal from vapor collection and emission control requirements. Moreover, Subpart BB does not limit the vapor collection and emission control requirements to shore-based transfers. However, the Agency has previously stated that despite the language in the rule, the intent of Subpart BB, when drafted was not to include offshore or vessel-to-vessel transfer operations.

[Citation: 40 CFR §63.561]

**(3) Are flare performance tests required during loading of a barge when the loading takes approximately 24 hours?**

Yes. A performance test according to Method 22 of appendix A of part 61, shall be performed to determine visible emissions (Section 61.304(b)). The observation period shall be at least 2 hours and shall be conducted according to method 22. Performance testing shall be conducted during at least three complete loading cycles with a separate test run for each loading cycle.

[Citation: 40 CFR §61.304(b)]

***Definitions***

**(4) What is the definition of a loading cycle?**

Loading cycle means the time period from the beginning of filling a tank, truck, railcar, or marine vessel until flow to the control device ceases, as measured by the flow indicator. The loading cycle definition should not be interpreted to mean the time from the start of loading an empty vessel; the vessel can be partially full when a loading cycle is initiated. The definition of a loading cycle may be found in 40 CFR §61.301.

[Citation: 40 CFR §61.301]

## Subpart FF - Benzene Waste Operations

***Reporting***

**(5) Do amendments to Subpart FF, promulgated on January 7, 1993, expand the reporting requirements to facilities that are not subject to Subpart FF (circa 1988)?**

No. The EPA did not intend, with the amendments to Subpart FF, to expand the reporting requirements to facilities that are not subject to Subpart FF. There is no statement or discussion in the preamble that would lead the reader to believe that this was the EPA's intent. The only facilities that must submit a

report under 40 CFR §61.357 are owners and operators of chemical manufacturing plants, petroleum refineries, coke by-product recovery plants, and hazardous waste treatment, storage and disposal facilities that handle wastes from these facilities.

[Citation: 40 CFR §61.357]

**(6) With respect to the initial report required under 40 CFR §61.357(a), must a source that has less than 10 Mg/yr total annual benzene-in-waste (TAB) report the information specified for all waste streams or for just the waste streams containing more than 10 percent water?**

Yes. The regulation states that the initial report should summarize the regulatory status of each waste stream subject to Subpart FF that was found to contain benzene according to the methods in 40 CFR §61.355(c) regardless of the water content.

Section 61.357(a) lists three items that must be included in the initial report. The third item, 40 CFR §61.357(a) (3) asks for the following six items for each waste stream not being controlled for benzene emissions in accordance with Subpart FF:

1) whether or not the water content of the waste stream is greater than 10 percent
2) whether or not the waste stream is a process wastewater stream, product tank drawdown, or landfill leachate
3) the annual waste quantity for each waste stream
4) the range of benzene concentrations for the waste stream
5) the annual flow-weighted benzene concentration for the waste stream; and
6) the annual benzene quantity for the waste stream

From this list, it is clear that the rule calls for all waste streams to be described in the initial report.

[Citations: 40 CFR §61.355(c), 40 CFR §61.357(a) and (a)(3)]

**(7) May sources without the one year's worth of benzene monitoring data that establishes the average annual benzene concentration in waste use data obtained in the 90 days following promulgation of the regulation to estimate the annual average?**

Yes. Monitoring data obtained in the 90 days following promulgation of the regulation to estimate the annual average benzene concentration is acceptable. One year's worth of monitoring data is not a requirement if the facility can justify that its data is representative of a year. The facility can use the estimation until new information is obtained to update the annual average.

[Citations: 40 CFR §61.10, and 40 CFR §61.357]

**(8) May a company change its annual report timing (due date)?**

Yes, facilities may change their reporting schedule after obtaining approval and mutual agreement from EPA or its delegated agency under the provisions of 40 CFR §61.10 (e), (f), (g) and (j).

The rule specifies the following reporting time periods:

a) The initial report required by 40 CFR §61.357(a) is for all sources that are subject to the 40 CFR Part 61, Subpart FF standard(s) and is to be submitted within 90 days after January 7, 1993, or by the initial startup date for a new source with an initial startup after the effective date of Subpart FF, which is January 7, 1993.

b) The report required by 40 CFR §61.357 (b) is for all FF sources with a TAB quantity that is < 1 Mg/yr, and is only to be submitted for updates of the report required by 40 CFR §61.357 (a) and within 30 days of any change that could cause the facility's TAB to increase to 1 Mg/yr or more.

c) The report required by 40 CFR §61.357 (c) is only for sources with a TAB that is $\geq$ 1 Mg/yr and < 10 Mg/yr and is to be submitted annually for updates of the report required by 40 CFR §61.357 (a) and within 30 days of any change that could cause the facility's TAB to increase to 10 Mg/yr or more [i.e., see 40 CFR §61.10(c)]. The annual report that is required by 40 CFR §61.357 (c) shall, therefore, be submitted no later than April 7 of each calendar year (i.e., within 90 days after January 7) by existing facilities or by the initial startup date (i.e., day and month) for a new source with an initial startup after the effective date of January 7, 1993, for Subpart FF.

d) The annual report required by 40 CFR §61.357 (d)(2) is only for sources with a TAB quantity $\geq$ 10 Mg/yr and is to be submitted annually as follows: [See 40 CFR §61.357 (d)(1) &(2).]

   i) For those sources that did not obtain a waiver of compliance under 40 CFR §61.11, the annual report is required to be submitted on the date (i.e., day and month), which has been certified by the source that the necessary equipment to comply with the FF standards had been installed and that the required inspections or tests had been carried out in accordance with Subpart FF, and in no event later than April 7 of each year.

   ii) For a new source with an initial startup after the effective date of Subpart FF (January 7, 1993), the annual report is required to be submitted each year no later than the date of its initial startup.

   iii) For those sources that did obtain a waiver of compliance under 40 CFR §61.11, the annual report is required to be submitted on the date that the sources certified that installation of the necessary equipment and tests had been completed to

comply with Subpart FF, and in no event later than the expiration date of its waiver of compliance.

Reports must cover a year's time period, not just part of a year.

[Citations: 40 CFR §61.10(c), 40 CFR §61.11, 40 CFR §61.357(a), (b), (c), and (d)]

**(9) Does the rule require controls for any wastes at TSDFs that contain benzene when the benzene in the wastes does not originate from petroleum refineries, chemical plants, or coke by-product recovery plants?**

No.

[Citations: 40 CFR §61.340, and memorandum dated September 26, 1991 from Douglas M. Skie, Chief, Air Programs Branch, EPA Region 8 to Dakota Gasification Company]

***Definitions***

**(10) How should the total annual benzene quantity be determined in order for the benzene to be properly managed?**

40 CFR §61.342 states that the total annual benzene quantity from facility waste is the sum of the annual benzene quantity for each waste stream at the facility that has a flow-weighted average water content greater than 10 percent or that is mixed with water, or other wastes, at any time and has an annual average water content greater than 10 percent. The total annual benzene quantity is determined based on the quantity of benzene in the waste before any waste treatment occurs to remove the benzene except as specified in 40 CFR §61.355(c)(1)(i)(A) through (D).

Where the owner or operator of a facility has chosen to treat the wastewater to achieve a total annual benzene quantity from facility process wastewater less than 1 Mg/yr, total annual benzene from facility process wastewater shall be determined by adding together the annual benzene quantity at the point of waste generation for each untreated process wastewater stream plus the annual benzene quantity exiting the treatment process for each process wastewater stream treated.

At a facility where the benzene content of each wastestream entering the waste management unit is less than 10 ppmw on a flow-weighted annual average basis and the total annual benzene quantity contained in all waste streams managed or treated in exempt waste management units comprising the facility wastewater treatment systems is less than 1 Mg/yr, the total annual benzene quantity shall be calculated as the sum of the individual benzene quantities determined at each location where a waste stream first enters an exempt waste management unit. The benzene quantity discharged from an exempt waste management unit shall not be included in this calculation.

The Agency used the term "total annual benzene quantity managed" or "total annual benzene quantity" several places in the regulation where a summation of annual benzene waste is required. However, when

people refer to TAB, they are referring only to the summation of annual aqueous wastes which determines whether a facility needs to install controls and treat wastes. The term "total annual benzene quantity" is also used in certain compliance approaches, and these calculated quantities will be different from the TAB.

[Citations: 40 CFR §61.342(d), 40 CFR §61.348(b) and (c)]

### (11) Define "point of waste generation"?

"Point of waste generation" is the location where the waste stream exits the process unit component or storage tank prior to handling or treatment in an operation that is not an integral part of the production process (e.g. a waste management unit), or in the case of waste management units that generate new wastes after treatment, the location where the waste stream exits the waste management unit component.

[Citation: 40 CFR §61.341]

### (12) Do hydrocarbons, specifically benzene, that have been lost through leaks and/or spills at a refinery and have collected underground on the surface of groundwater meet the definition of a waste under the Benzene Waste NESHAP (40 CFR §61.341)?

"Waste" is defined by the standard as any material resulting from industrial, commercial, mining, or agricultural operations, or from community activities that is discarded or is being accumulated, stored or physically, chemically, thermally, or biologically treated prior to being discarded, recycled or discharged. The subject hydrocarbons, including Benzene, as described, are not considered to meet this standard's definition of waste until such time as they are discarded or they are being accumulated, stored or etc. Upon remediation of the hydrocarbons, however, they become remediation waste (i.e., accumulated, stored, etc.) and are addressed by the standard in the following manner. Remediation waste are excluded from a facility's TAB calculation by the standard to encourage facilities with a TAB < 10 Mg/yr to undertake voluntary remediation actions. Although remediation wastes are excluded from TAB, at facilities having a TAB $\geq$ 10 Mg/yr, remediation wastes are subject to the rule's control requirements in the same manner as any other wastes.

[Citations: 40 CFR §61.341, 40 CFR §61.342(a)(3), and 58 FR 3074]

### (13) Do cooling towers meet the definition of a process unit under the Benzene Waste NESHAP?

No. Cooling towers do not produce products, they merely provide a means for different streams to be cooled. Cooling towers serve as support for the actual processing units. Therefore, cooling towers are not process units.

[Citation: 40 CFR §61.341]

**(14) What is the definition of a container under Subpart FF?**

The definition of a *container* under Subpart FF 40 CFR §61.341 is: "*Container* means any portable waste management unit in which a material is stored, transported, treated, or otherwise handled. Examples of containers are drums, barrels, tank trucks, barges, dumpsters, tank cars, dump trucks, and ships."

This standard definition of *container* in Subpart FF does not include capacity or size limitations. However, a determination has been made that size and capacity limitations for *containers* specified in the Hazardous Organic NESHAP (HON), Subpart G, codified at 40 CFR 63.111 are applicable to the benzene NESHAPs, Subpart FF. The definition of a *container* under Subpart G is: "Container, as used in the wastewater provisions means any portable waste management unit that has a capacity greater than or equal to 0.1 cubic meters (26.4 gallons) in which a material is stored, transported, treated, or otherwise handled. Examples of containers are drums, barrels, tank trucks, barges, dumpsters, tank cars, dump trucks, and ships." Additionally, containers which are less than or equal to 0.42 cubic meters (111 gallons) and meet the DOT specifications and testing requirements under 49 CFR Part 178 are exempt from monitoring requirements under Subpart FF provided that these containers are covered and not vented to the atmosphere. The determinations on size and capacity limitations were promulgated in a June 27, 1995 letter from Samuel Coleman, EPA Region 6, Director - Air, Pesticides and Toxics Division, to the Dow Chemical Company.

[Citations: 40 CFR §61.341, 40 CFR §63.111, June 27, 1995 letter from Samuel Coleman, EPA Region 6, Director - Air, Pesticides and Toxics Division, to the Dow Chemical Company]

**(15) Are individual drain systems, which often contain junction boxes, included in the definition of waste management units and subject to 40 CFR §61.346?**

Yes. Individual drain systems, which may contain junction boxes, are included in the definition of waste management units, and are subject to 40 CFR §61.346.

[Citation: 40 CFR §61.346]

**(16) How does the regulation define the terms facility and stationary source?**

A facility is all process units and product tanks that generate waste within a stationary source, and all waste management units that are used for waste treatment, storage, or disposal within a stationary source. A stationary source is any building, structure, facility, or installation which emits or may emit any air pollutant which has been designated as hazardous by the Administrator. These terms are defined in the General Provisions at 40 CFR §61.02.

[Citations: 40 CFR §61.341 and 40 CFR §61.02]

**(17) What is the definition of waste stream?**

40 CFR §61.341 states that a waste stream is the waste generated by a particular process unit, product tank, or waste management unit. The characteristics of the waste stream (e.g., flow rate, benzene concentration, water content) are determined at a the point of waste generation. Examples of a waste stream include process wastewater, product tank drawdown, sludge and slop oil removed from waste management units, and landfill leachate.

[Citation: 40 CFR §61.341]

***Spent Caustic From Refineries***

**(18) Does spent caustic always meet the definition of waste found at 40 CFR §61.341?**

No. Spent caustic does not always meet the definition of waste found at 40 CFR §61.341. Where spent caustic is used as a raw material for manufacturing or is processed into a final product it does not meet the definition of a waste because it is not discarded, recycled or discharged. However, the manufacturing process that transforms the spent caustic into another product may well generate other waste streams containing benzene that would be required to be addressed under Subpart FF.

[Citation: 40 CFR §61.341]

**(19) Is benzene containing spent caustic generated by a refinery or other Subpart FF facility, which is then sold, a Subpart FF waste for the generating facility?**

Yes. Benzene containing spent caustic generated by a refinery or other Subpart FF facility, which is sold, is a Subpart FF waste for the generating facility.

[Citations: 40 CFR §61.342(a) and 40 CFR §61.355(a)]

**(20) Must spent caustic be included in a refinery's total annual benzene determination?**

Any subject facility, not just refineries, that generates spent caustic as a waste must include it in their total annual benzene determination. If the generating facility processes the spent caustic into a final product that is not discarded, recycled or discharged, it does not meet the definition of waste and does not need to be included in the TAB determination.

[Citation: 40 CFR §61.355(a)]

**(21) Are facilities which elect to comply with the compliance option specified in 40 CFR §61.342(e)(i.e., benzene quantity equal to or less than 6.0 (Mg/yr) required to include the benzene quantity of all spent caustic waste in the determination in accordance with methods described in 40 CFR §61.355(k)?**

Yes. The benzene quantity of all spent caustic waste must be included in the determination in accordance with methods described in 40 CFR §61.355(k). However, where spent caustic is processed into a final product at the facility generating it and, the spent caustic, therefore, does not constitute a waste, it would not be included as part of the determination for the 6 Mg/yr treat to target Benzene Quantity (BQ).

[Citations: 40 CFR §61.355(a) and (k) and 40 CFR §61.342(e)]

**(22) If a refinery sends spent caustic solutions to a chemical manufacturing company, when must the refinery measure the benzene quantity in spent caustic solutions?**

For measuring TAB, EPA acknowledges that "*spent caustic*" may or may not meet the definition of waste and should, therefore, be reviewed on a case by case basis. The rule for measuring TAB pertains to spent caustic solutions; i.e. refineries must measure the benzene quantity in spent caustic solutions at the first unit which does not comply with appropriate control requirements of Subpart FF. That first unit can be at the generating facility or at an off-site location.

Spent caustic that do not meet any of the applicable exemptions for "*control & treatment*" of Subpart FF at the generating refinery are classified as wastes.

When the spent caustic solutions are a waste at the facility where it is generated, that refinery must measure the benzene quantity in spent caustic solutions at its point(s) of generation and include that Benzene quantity in the refinery TAB, even though the spent caustic will be made into a product offsite by another facility. The facility receiving the spent caustic must meet the control requirements of Subpart FF at its facility until the spent caustic solution is transformed into another product. That transformation process may also generate other benzene containing waste streams that the chemical manufacturing facility will have to address under Subpart FF. It is also worthy to note that the provisions of 40 CFR §61.342 (f) for treating wastes offsite do not apply to facilities opting to comply with 40 CFR §61.342 (e). See 40 CFR §61.342 (e)(2)(i).

Refineries using the benzene quantity from an off-site location require documentation from the off-site facility. Refineries without this documentation for offsite wastes must use the benzene quantity determined at the point where the transferred waste leaves the facility.

[Citations: 40 CFR §61.342(e) and (f)]

***Containers***

**(23) How should certain types of equipment such as vacuum trucks be treated?**

Vacuum trucks meet the definition of "containers" at 40 CFR §61.341 and must comply with the requirements of 40 CFR §61.345. Each opening shall be maintained in a closed, sealed position at all times except when it is necessary to use the opening for waste loading, removal, inspection, or sampling.

[Citations: 40 CFR §61.341 and 40 CFR §61.345]

### (24) Are containers which are not opened at a transfer/storage facility required to be counted as part of the total annual benzene quantity in a facilities waste determination?

The benzene in all wastes received from petroleum refineries, chemical plants, and coke by-product plants should be included in the determination of total annual benzene quantity for the facility. If the facility's TAB is equal to or greater than 10 Mg/yr, then all waste management units at the facility in which these wastes are managed are subject to the control requirements of the rule.

[Citation: 40 CFR §61.355(a)]

### (25) Are containers at a transfer/storage facility subject to the container standards of 40 CFR §61.345?

A container at a transfer/storage facility would be subject to the control requirements of 40 CFR §61.345 if either of the following conditions exists: 1) the facility has a TAB equal to or greater than 10 Mg/year based on wastes received from petroleum refineries, chemical plants, and coke by-product plants and the waste in the container does not qualify for any of the exemptions in the rule; or 2) the generator of the waste notified your facility that the waste must be controlled to meet Subpart FF as required under 40 CFR §61.342(f)(2) if a generator ships offsite a waste that would have had to be controlled at the generator site.

[Citation: 40 CFR §61.342(f)(2) and 40 CFR §61.345]

### (26) What containers under Subpart FF are not subject to monitoring requirements?

Containers are exempt from monitoring requirements if they have a volume less than or equal to 0.42 cubic meters (111 gallons) and meet the DOT specifications and testing requirements under 49 CFR 178, provided these containers are covered and not vented to the atmosphere. This determination was promulgated in a June 27, 1995 letter from Samuel Coleman, EPA Region 6, Director - Air, Pesticides and Toxics Division, to the Dow Chemical Company.
[Citations: June 27, 1995 letter from Samuel Coleman, EPA Region 6, Director - Air, Pesticides and Toxics Division, to the Dow Chemical Company, 40 CFR 63.111]

**(27) Are activities such as liquefying, filtering, and mixing or agitation considered treatment under the container standard?**

Yes. Activities such as liquefying, filtering, and mixing or agitation would be considered treatment under the container standard. Liquefying, filtering, mixing, or agitation are considered treatment of the waste as described in 40 CFR §61.345(a)(3) and therefore need to be appropriately controlled.

[Citation: 40 CFR §61.345(a)(3)]

***Facility Applicability***

**(28) Are mixing or blending facilities subject to 40 CFR Part 61 Subparts BB and FF even if they are not involved in the original manufacturing of the chemicals?**

Yes. There is no exclusion for chemical mixing facilities. A facility's general process description as a mixing facility does not give a full explanation of whether or not they create benzene-containing waste streams. The preamble to Subpart FF (55 FR 8319) states "Examples of the affected industries include SIC codes 2911, 3212, 2800's, 4959, and 9511." Chemical mixing is generally included under the 2800 SIC series. However, this does not mean that chemical mixing processes covered under other SIC codes are exempt.

[Citations: 40 CFR § 61.340 and 55 FR 8319]

**(29) Did EPA intend for sources to include the benzene in organic waste in their Total Annual Benzene in Waste (TAB) determinations, if the organic waste is mixed with wastewater at some point after its generation?**

Yes. EPA intended for sources to include the benzene in organic waste in the TAB determination, if the organic waste is mixed with wastewater at some point after its generation and the resulting mixture is greater than 10 percent water.

[Citation: 40 CFR §61.355(b)]

**(30) Are aqueous wastes that are generated infrequently, accidentally, or intermittently included in the calculation of TAB?**

Yes. If aqueous benzene wastes are generated infrequently, the initial report should include the facility's estimate of the quantity and concentration for these wastes based on measurements, historical data, or engineering judgement. If a new or unexpected aqueous waste is generated, this waste must be added to the initial report and included in the facility's determination of TAB. Wastes that are generated infrequently or intermittently are subject to control under the rule if the TAB and benzene concentration criteria are exceeded.

[Citations: 40 CFR §61.355(b)(5) and 40 CFR §61.355(k)(7)(ii)]

**(31) What is the basis for the term annual in the determination of TAB?**

This determination of TAB is based on any 12 consecutive months of operation as identified in the facility's annual report. If the waste has not been generated for a full year, the facility should provide its best estimate and the basis for an annual projected quantity. If the waste is generated periodically every few years, the estimate of TAB should be based on the quantity produced during the year with the highest generated quantity.

[Citations: 40 CFR §61.355(b)(4) and (5)]

**(32) If a company installs equipment to remove or recover benzene from a waste (and perhaps claims that this equipment is part of the production process) can they use the quantity of benzene in aqueous waste leaving this unit to estimate TAB instead of using the quantity of benzene in aqueous waste entering the unit?**

No. The TAB is based on the waste at the point of generation. In addition, controls may be required on the treatment unit.

[Citation: 40 CFR §61.342(d)(2)(i)]

**(33) For sour water strippers at petroleum refineries, is the TAB based on the quantity of benzene in the waste entering the stripper, or is it based on the quantity of benzene leaving the stripper?**

40 CFR 61.355(b)(1) states that the TAB for sour water streams that are processed in sour water strippers shall be determined at the point that the water exists the sour water stripper. Also, 40 CFR 61.355(c)(1)(i)(A) states that the flow-weighted annual average benzene concentration determination for sour water streams that are processed in sour water strippers shall be made at the point that the water exists the sour water stripper.

[Citations: 40 CFR §61.355(b)(1) and 40 CFR §61.355]

**(34) Is the benzene in aqueous wastes generated at RCRA corrective action sites or sites under Superfund remedial action programs included in the calculation of the TAB? For example, is the benzene in contaminated ground water or landfill leachate counted in the calculation of TAB?**

40 CFR §61.342(a)(3) states that benzene in aqueous wastes generated by remediation activities conducted at the facility, such as the excavation of contaminated soil, pumping and treatment of groundwater, and the recovery of product from soil or groundwater, are not included in the calculation of total annual benzene quantity for that facility. Although exempt from TAB calculations, remediation wastes may be subject to the requirements of section 61.342(c)-(h). If the facility is managing remediation wastes generated offsite, the benzene in this waste shall be included in the calculation of the total annual benzene quantity in facility waste, if the waste streams have an annual average water content greater than 10 percent, or if they are mixed with water of other wastes at any time and the mixture has an annual average water content greater than 10 percent. The benzene waste rule would not apply to any wastes at a closed or abandoned site if the site is not part of an active plant at one of the three affected industries.

{Citations 40 CFR §61.342(a)(3) and 40 CFR §61.342(c)-(h)}

**(35) Are organic wastes that contain less than 10 percent water and are discharged to the wastewater system included in the calculation of TAB? For example, drainings from low points in lines or pumps that handle an organic product (or even pure benzene) may enter the sewer system**.

Organic wastes that contain less than 10 percent water and are discharged to the wastewater system are included in the calculation of TAB if, as stated in Section 40 CFR §61.342(a)(1), "They have an annual average water content greater than 10 percent, or if they are mixed with water or other wastes at any time and the mixture has an annual average water content greater than 10 percent."

[Citations: 40 CFR §61.342(a)(1)]

**(36) Some companies have used samples of the water in the initial separation. Is this an acceptable procedure for determining TAB?**

No. The waste from tank drawdown includes not only the water that is removed initially, it also includes the oily interface and any oil removed during the separation, which may contain higher concentrations of benzene. Representative samples of the entire drawdown must be analyzed to include both the oil and water to determine the TAB.

[Citation: 40 CFR §61.341]

**(37) Are process wastewaters that qualify for the low flow cutoff (0.02 L/min or 10 Mg/yr) in Section 61.342 (c)(3) included in determining the TAB for the facility?**

40 CFR §61.342 (c)(3)(i) states that a facility at which the TAB quantity from facility waste is 0.02 L/min or an annual waste water quantity less than 10 Mg/ye is exempt from waste stream controls at 40 CFR §61.342 (c)(1). The low flow cutoff does not apply in calculating the TAB.

{Citations 40 CFR §61.342(c)}

**(38) If a facility periodically washes down an area with water, is the benzene in the runoff included in the determination of TAB, even if the runoff is collected in a stormwater sewer?**

Yes.

[Citation: 40 CFR §61.340(c)(2)]

**(39) Is the benzene in wastewater discharged from a facility counted in the determination of TAB?**

The quantity of benzene in the wastewater discharge is not counted unless the discharge is the point of generation for the waste. Facilities should avoid double counting, such as adding the quantity at the point of generation in the process to the quantity that is eventually discharged.

[Citations: 40 CFR §61.341 and 40 CFR §61.342(d)(2)(i)]

**(40) Is the benzene in the condensate from coke oven gas lines counted in the determination of TAB?**

Benzene in any aqueous waste that is generated within the facility boundary of a coke by-product recovery plant is counted. However, condensate generated outside the by-product recovery plant, such as in the steelmaking complex, is not counted in the TAB determination.

[Citations: 40 CFR §61.300(a) and 40 CFR §61.340(a)]

**(41) If a facility has two separate wastewater treatment systems on its contiguous property, does the 10 Mg/yr cutoff for TAB apply to each one separately or to both collectively?**

The 10 Mg/yr cutoff for the TAB applies to the facility as a whole unit, including all aqueous wastes, not to each wastewater treatment system.

[Citation: 40 CFR §61.342(c)]

**(42) Is the determination of flow-weighted annual average water content (for comparison to a value of 10 percent) based on percent by volume or by weight?**

The flow-weighted annual average water content of 10 percent or greater is determined on a volume basis as total water, as stated in 40 CFR §61.342(3)(2), amended by 58 FR 3074.

[Citations: 40 CFR §61.342 and 58 FR 3074]

**(43) Is there a (de minimis) concentration cutoff that can be used for calculating and reporting TAB, such as parts per trillion?**

No. Facilities are required to include the benzene from all waste streams in its TAB calculation, and they are required to maintain detailed records supporting the TAB calculation submitted.

[Citation: 40 CFR §61.357]

**(44) When are controls required for newly constructed or modified process units that generate new waste streams?**

Controls are required for benzene wastes from newly constructed or modified units when the facility total for TAB, recalculated to include the new process units, reaches or exceeds 10 Mg/yr.

[Citation: 40 CFR §61.05(b)]

**(45) Do all chemical plants, petroleum refineries, coke by-product recovery plants, and commercial hazardous waste facilities have to submit an initial report of their determination of TAB, even if they do not use or produce benzene or manage wastes that contain benzene?**

Only TSDFs that receive waste from refineries, chemical plants and coke-by product plants are required to submit the initial notification. If the plant does not use or produce benzene, if it is present only in small quantities, or if no wastes containing benzene are managed, the initial report should state this clearly. Whether waste streams should be controlled is determined by the TAB and benzene concentration data presented in the report.

[Citation: 40 CFR §61.340]

**(46) What is the point of generation for wastes at coke by-product plants that are processed in sources that are already controlled by the benzene NESHAP for coke by-product recovery plants? For example, are TAB and benzene concentration determinations made before or after the ammonia stripper?**

For these sources, the point of generation is defined as the location where the waste exits a unit that is controlled by the by-product plant NESHAP (40 CFR §61 Subpart L) and before it is exposed to the atmosphere. If the units up to the ammonia stripper are controlled (as required for metallurgical coke plants), and the ammonia stripper is a closed system (vented back to the coke oven gas), the point of generation is the wastewater leaving the ammonia stripper.

[Citation: 40 CFR §61 Subpart L]

### (47) Is there a "once you are subject, you are always subject" philosophy taken with Subparts BB and FF?"

No. The regulation does not imply a philosophy of "once you need controls and treatment, you will always need controls and treatment". The idea of waste minimization is promoted by the regulation. For example, if a facility installed a new desalter and reduced the quantity of waste below 10 Mg/yr controls would not be required. No where in the regulations does it imply that EPA would be able to require controls and treatment at a facility where the TAB had dropped below 10 Mg/yr.

[Citations: 40 CFR §61.342(a) and 40 CFR §61.342(c)(3)]

### (48) Does the rule apply to Publicly-Owned Treatment Works (POTW) and municipal solid waste landfills (MSWLF)?

The rule does not apply to POTW or to MSWLF in the vast majority of cases. When the coverage of the rule was clarified in a *Federal Register* notice (54 FR 51423) on December 15, 1989, POTW and MSWLF were not included. There are two special cases in which the rule could apply: 1) when these facilities also are a commercial hazardous waste facility with a permit under Subtitle C of RCRA, or 2) when these facilities accept affected waste streams from chemical plants, petroleum refineries, or coke by-product recovery plants. It is the generator's responsibility to obtain an agreement from the offsite treatment or disposal facility to assure compliance with the benzene waste rule for treatment of the benzene waste.

[Citation: 54 FR 51423]

### (49) Does the rule apply to bulk liquid terminals?

Typically, independent bulk liquid terminals are independently owned and operated and would not be affected by the benzene waste rule. However, bulk terminals located on contiguous properties and commonly owned or operated by a petroleum refinery, chemical plant, or coke byproduct recovery plant could be affected by the benzene waste rule. As an example, wastes from on-site terminals or storage facilities at a petroleum refinery would not be excluded from treatment under the benzene waste standard.

The benzene waste operation standard would not apply to specific storage equipment containing benzene. However, benzene storage equipment could be subject to the national emission standard for benzene storage (54 FR 38044). Also, transfer through loading racks where benzene is loaded into tank trucks, rail cars, or marine vessels at production facilities and bulk terminals would be subject to the national emission standard for transfer operations (55 FR 8292). Again, if either the transfer or storage operations are commonly owned or operated and located on contiguous property to one of the benzene waste industry categories, then benzene wastes generated from these operations could be affected by the benzene waste standard.

[Citation: 40 CFR §61.300(a), 54 FR 38044 and 55 FR 8292]

**(50) When must commercial hazardous waste facilities control wastes that contain benzene?**

Commercial hazardous waste facilities that must obtain a permit under Subtitle C of RCRA must apply controls when they receive benzene waste from any of the affected facilities (petroleum refineries, chemical plants, and coke-by-product plants) that are subject to Subpart FF and have wastes with a TAB greater than or equal to 10 Mg/yr. This applies to benzene wastes at commercial facilities even if controls are not required based on the generators initial determination. In addition, commercial hazardous waste facilities must comply with the control requirements for a specific waste stream if that waste stream has been identified by the generator as requiring control under 40 CFR §61.342(f)(2).

[Citation: 40 CFR §61.342(f)(2)]

**(51) Does the rule apply to ballasts water containing benzene received by a refinery, chem plant or coke-by-product recovery plant?**

No. Since this waste is not generated in the refinery, chemical plant, or coke by-product recovery plant.

[Citations: 40 CFR §61.340(a) and 40 CFR §61.357(a)]

***Waste Stream Applicability***

**(52) Does an enhanced biodegradation unit meet the requirements of Subpart FF 40 CFR §61.348(b)(2)(i) when the owner or operator plans to combine streams of greater than 10 ppmw benzene with those less than 10 ppmw to form a combined feed into the enhanced biodegradation unit of less than 10 ppmw for the purpose of facilitating treatment? (The total quantity of benzene in combined wastewater will be greater than 1 Mg)**

When an owner or operator aggregates or mixes individual waste streams in order to facilitate management or treatment of waste, the facility shall apply Section 61.348(b)(1) controls to all wastewater treatment units up to the point where the benzene concentration is below 10 ppmw and when one of the following occurs: (1) the total quantity of benzene in the wastewater for the facility is reduced below 1

Mg; or (2) the waste has reached the biological treatment unit. Biological treatment units would need to be controlled only if the benzene concentration of the waste entering the unit is 10 ppmw or greater. Enhanced biodegradation units routinely remove up to 80% of the organics in dilute waste streams and thus would not be required to meet the 1 Mg per year limit if the concentration entering the unit is less than 10 ppmw.

[Citations: 40 CFR §61.348(b)(2)(i)]

**(53) When is a treatment process or waste stream in compliance with the requirements of 40 CFR Subpart FF 40 CFR §61.348(d) and exempt from the requirements of Section 61.348(c)?**

A treatment process or waste stream is in compliance with the requirements of Section 61.348(d) and exempt from the requirements of Section 61.348(c) provided that the owner or operator documents that the treatment process or waste stream is in compliance with the other regulatory requirements listed in Sections 61.348(d)(1)-(d)(5).

[Citation: 40 CFR §61.348]

**(54) Was 40 CFR Part 61, Subpart FF designed to regulate the waste generated in subject facilities laboratories from counter top applications, of less than 1 gallon at a time? 55 gallon drums?**

No. As stated in the memorandum dated March 13, 1991 from Ms. Carolyn J. Pina, Environmental Engineer, Control Technology and Compliance Section, EPA Region 1 to Daniel Couturier, EPA Stationary Source Compliance Division (now the Manufacturing, Energy & Transportation Division), if lab work is performed under a hood, no waste streams are generated, and if everything is bottled and disposed of through waste transfer operations, Subpart FF does not apply. For 55 gallon drums, unless waste transferred into drums is transferred from a waste stream (in which case the waste stream itself falls under Subpart FF) the drums are covered under RCRA, not Subpart FF.

[Citation: letter from Carolyn Pina, EPA Region 1, dated March 13, 1991 to Daniel Couturier, EPA Stationary Source Compliance Division]

**(55) If a facility hardpipes several waste streams to a single point or location, are they required to measure each individual waste stream at the point of generation or can they measure the flow and concentration of the combined stream? When are mixed wastes exempt from control requirements?**

Sections 40 CFR §61.355(b) and 40 CFR §61.355(c)(i) require measurement of flow and concentration be made at the point of generation for each individual waste stream.

Mixed waste streams are exempt from control requirements when the conditions of one of the following paragraphs of 40 CFR §61.342 are met. Under paragraph 40 CFR §61.342(c)(2), facilities can exempt waste streams from control requirements if it can be demonstrated at least once per year that the flow weighted annual average benzene concentration for the waste stream is less than 10 ppmw. Under paragraph section 40 CFR §61.342(c)(3), facilities can exempt a waste stream from control requirements if it is a process wastewater that has a flow rate less than 0.02 liters per minute or an annual wastewater quantity of less than 10 Mg/yr. Under section 40 CFR §61.342(c)(3)(ii) process wastewater can be exempt from controls if it is not exempt under section 40 CFR §61.342(c)(3)(i) and if the TAB does not exceed 2.0 Mg/yr.

Under section 40 CFR §61.342(d)(iii) the untreated process wastewater is exempt from control requirements when the TAB, determined from the sum of the TAB in the untreated streams at the point of generation and the TAB for each treated stream at its exit from the treatment process, is less than 1 Mg/yr. A facility may only use one of these exemptions.

[Citations: 40 CFR §61.342, 40 CFR §61.355(b), (c), and (d)]

### (56) What is enhanced biodegradation under 40 CFR §61.348(b)(2)(ii)(B)?

40 CFR §31.348(b)(2)(ii)(B) defines enhanced biodegradation as suspended-growth process that generates biomass, uses recycled biomass, and periodically removes biomass from the process. The parameters provided in the referenced section are guidelines or typical values for enhanced biodegradation units.

[Citations: 40 CFR §61.348(b)(2)(ii)(B)]

### (57) When are enhanced biodegradation units exempt from controls?

To operate without controls, each waste stream entering the unit must be less than 10 ppmw on a flow-weighted annual average basis. The determining factor for whether or not an enhanced biodegradation unit needs to be controlled is whether or not it meets the definition in 40 CFR § 61.348(b)(2)(ii)(B).

Covers and closed-vent system controls are not required if the feed to the enhanced biodegradation unit is less than 10 ppmw benzene. When an owner or operator aggregates or mixes individual waste streams in order to facilitate management and treatment, Section 61.348(b)(2)(i), management and treatment requirements must be met as discussed in the March 7, 1992 preamble (page 8331). The preamble states that the facility shall “apply controls to all wastewater treatment units up to the point where the benzene concentration is below 10 ppmw and one of the following occurs: (1) the total annual quantity of benzene in the wastewater for the facility is reduced below 1 Mg; or (2) the waste has reached the biological treatment unit. Biological treatment units would need to be controlled only if the benzene concentration of the waste entering the unit is 10 ppmw or greater.”

[Citations: 40 CFR §61.342(e), 40 CFR §61.348(b)(2) and 40 CFR §61.355(k)(4)]

**(58) What waste streams must be included in a facilities initial report for TAB determinations, and at which accuracy? Can the report be amended, and should controls be identified in the report?**

These questions arose because some facilities have hundreds of waste streams, many of which have not been measured for benzene quantity or concentration, and their data collection effort may not be completed within the 90-day period. The purpose of the initial report is to identify facilities subject to the control requirements, to identify which streams must be controlled, and to provide the basis for exemption of streams. There are situations where knowledge of the waste could be the basis for the estimates. Knowledge of waste could be based on engineering analysis, material balances, similarity of streams, purchase records, etc. Wastes that do not contact materials containing benzene do need not to be listed. A report may need to be resubmitted when new or more accurate information is obtained, or when the process is redesigned. Controls do not need to be in place at facilities which submitted the initial report and which currently do not (and have not) manage(d) materials subject to the FF regulation.

[Citation: 40 CFR §61.357(a)]

**(59) Are controls required for spent activated carbon generated by any of the affected sources if the benzene concentration in the carbon is 10 ppm or higher?**

*Scenario #1* for this question would be where the spent activated carbon is generated and/or results as a solid waste (to be discarded and not regenerated) from either a process unit or from a carbon adsorption control device being used to comply with 40 CFR §61.349(a)(2)(ii) and 40 CFR §61.354(c)(7)&(d) of Subpart FF, then the following answer applies.

Yes. If the benzene concentration in the solid carbon waste exceeds 10 ppm, and the facility's TAB is 10 Mg/yr or more, the spent waste carbon must be controlled. [See FR 3074&3075, 01/07/93, for handling solid waste containing 10 ppmw or greater benzene in waste management units (e.g., containers).] Note that this scenario excludes any regeneration either on or off-site of the FF facility. This would require that the carbon be treated to less than 10 ppm, and that emissions from the treatment process be controlled in accordance with 40 CFR §61.349(a)(2)(ii) emission limits.

*Scenario #2* for this question would be where the spent activated carbon results from only the need to be regenerated after being used in a carbon adsorption control device to comply with the applicable regulation of Subpart FF for a facility with a TAB $\geq$ 10 Mg/yr, then the following answer applies.

Yes in the following manner. When regeneration of the carbon is indicated by a break through of the control device by either 10 ppmv of benzene or 5000 ppmv of total organics above background or in excess of the emission limit(s) of 40 CFR §61.349 (a)(2)(ii), any emissions that result from the carbon's regeneration must also be controlled with the same emission limits either on or off-site such that no benzene emissions greater than 10 ppmv result after regeneration. The solid regenerated carbon would not necessarily have to result in a less than 10 ppmw benzene concentration because it has not yet become a waste.

[Citations: 40 CFR §61.349(a)(2)(ii) and 40 CFR §61.354(c)(7) and (d)]

***Controls & Standards***

**(60) Can facilities subject to the control requirements exempt any benzene waste from controls and treatment?**

Yes. In accordance with the provisions of 40 CFR §61.342(c), (d) and (e), facilities subject to the control requirements can exempt certain waste streams from controls and treatment. However, if these "generator-exempted" wastes are shipped to another facility subject to this NESHAP, the wastes continue to be subject to the provisions of the Subpart.

For example, the owner or operator of a hazardous waste treatment, storage, and disposal facility (TSDF) receiving benzene-containing hazardous wastes which have been "generator-exempted," must still include those wastes in the total annual benzene quantity determination. The owner or operator of a TSDF at which the total annual benzene quantity is equal to or greater than 10 Mg/yr would still need to control and treat those "generator-exempted" wastes which have benzene concentrations greater than or equal to 10 ppmw, unless the owner or operator decided to include those particular wastes in the TSDF's exemption.

[Citation: 40 CFR §61.342(c), (d) and (e)]

**(61) What part of the rule applies to dewatering devices, such as belt presses, and what controls are required?**

Dewatering devices are included in the definition of tank, and the regulations for tanks in 40 CFR §61.343 apply. If the TAB and benzene concentration cutoffs are exceeded, the dewatering device must be enclosed. For example, the dewatering device may be housed within an enclosure that is vented to a control device. Doors and access hatches on the enclosure may be used for access for maintenance or adjustments in the operation.

[Citation: 40 CFR §61.343]

**(62) Are controls for intermediate product tanks and day tanks required under the rule?**

No. The rule does not require controls for tanks that manage products or intermediates. The rule applies only to tanks that manage wastes containing benzene.

[Citations: 40 CFR §61.343 and 40 CFR §61.357]

**(63) What standards apply to coke oven by-product plant tar decanter sludge (K087), when it is collected and transported in a bin mixed with coal, and charged into the coke ovens?**

If the TAB and benzene concentration cutoffs are exceeded, the rules for containers apply to the bin used to collect and transport the sludge. The bin must be kept covered except during the filling operation, and the sludge must be transported in a closed-vent system. According to 40 CFR §61.340, a closed vent system is defined as 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 or vapor from an emission source to a control device.

[Citation: 40 CFR §61.340]

**(64) Does the rule require water seals on the junction box vent?**

No. The rule indicates that water seals are required on the junction box and not on the vent. The purpose is to isolate the junction box to prevent wind or induced air drafts from sweeping through the wastewater collection system.

**(65) What type of flow indicator is required for the vent on the junction box?**

The type of flow indicator is left to the discretion of the owner or operator. EPA's intent is that if the liquid level fluctuates significantly in the junction box, periodic flow would be indicated and the junction box should be vented to a control device. If the liquid level remains nearly constant, no flow would be indicated and a control device would not be required for the vent.

[Citations: 40 CFR §61.346(3), and 40 CFR §61.349(a)]

**(66) How is breakthrough determined for carbon emission control devices?**

Breakthrough is determined when a concentration of either 10 ppmv of benzene or 500 ppmv of total organics above the background concentrations are identified in the control device's vent gas.

[Citations: 40 CFR §61.356(j)(10), 40 CFR §61.341, and 40 CFR §61.355(h)]

***Cement Kiln Facilities***

*The questions in this section are based on the following information:*

*Companies listed in Subpart FF (i.e., chemical manufacturing plants, coke by product recovery plants, and petroleum refineries) along with other companies not listed under Subpart FF send their hazardous waste to a third party fuel blending facility. The fuel blending facility blends the*

*wastes and then sends the hazardous waste to the cement kiln as fuel in 5,000 gallon tank trucks. A hazardous waste manifest accompanies each tank truck, but the cement kiln facility does not know who was the originator of the waste. The hazardous waste is then burned in the cement kiln. The waste in the tank trucks is less than 10% water, some tanks have greater than 10 ppm benzene, and some tanks have less than 10 ppm benzene.*

**(67) Is the cement kiln subject to any of the requirements under Subpart FF?**

If a material is subject to Subpart FF, the cement kiln is a TSDF for the blending facility. Any disposal facility that treats, stores, or disposes of hazardous waste is subject to the provisions of Subpart FF.

[Citation: 40 CFR §61.340(b)]

**(68) If the cement kiln is subject to Subpart FF, are there cutoff levels which will exempt them from the regulation?**

No. The facility is either subject or not. Since it is a TSDF receiving waste from a facility in 40 CFR §61.340(a), it is subject. The regulations are divided into three sections according to TAB, they are: 1) TAB< 1 Mg, 2) $1 \leq$ TAB < 10 Mg , and 3) TAB $\geq$ 10 Mg. The facility must comply with the appropriate regulations pertaining to its TAB.

[Citations: 40 CFR §61.340(a) and 40 CFR §61.342(d)]

**(69) How does a TAB calculation apply to the cement kiln facility, since it does not generate waste?**

The answer needs to be broken into two parts:

1) If the TSDF facility receives waste from a facility listed in 40 CFR §61.340(a), the TSDF is considered to be an extension of that facility for the purposes of control and treatment. If the TSDF receives any amount (even just a bucket full) of waste from a facility listed in 40 CFR §61.340(a), whose TAB is equal to or greater than 10 Mg, then the TSDF is considered to be a 10 Mg facility and must comply with the specified control treatment requirements. This holds true even if the waste is mixed with other facilities not listed in 40 CFR §61.340(a) and the waste received has less than 10% water. All waste with greater than 10 ppm benzene will need to be treated and controlled, regardless of the water content (see 40 CFR §61.342(c)(1)). The TSDF facility receiving the waste will need to calculate their own TAB, regardless of the generating facilities' TAB, at the point waste is received and submit initial and annual reports updating TAB. The TSDF is always considered an extension of the facilities in 40 CFR §61.340(a) and at a minimum will have to comply with regulations governing those facilities.

2) If the TSDF receives waste from facilities in 40 CFR §61.340(a) that are less than 10 Mg/yr facilities, the TSDF will need to calculate its own TAB at the point waste is

received, and submit initial and annual reports updating TAB. The TSDF must determine its own TAB regardless of the generating facilities' TAB. The TAB is calculated only on those wastes with 10% (or greater) water content. If the TSDF TAB is greater than or equal to 10 Mg/yr, then the TSDF has to comply with regulations regulating 10 Mg facilities.

[Citations: 40 CFR §61.340(a) and 40 CFR §61.342(a)]

**(70) Does a waste have to contain 10 percent water in order to be subject to the Subpart FF requirements?**

No. Only those streams with 10% (or greater) water content need to be considered in calculating the TAB. If the source is 10 Mg, then all waste with greater than 10 ppmw benzene will need to be treated and controlled, regardless of the water content (see 40 CFR §61.342(c)(1)).

[Citation: 40 CFR §61.342(c)(1)]

**(71) What if the facility has not been issued a final RCRA permit under part 264, but has submitted a part A and part B application and is operating under interim status. Is the facility eligible for the exemption in 40 CFR §61.348(d)?**

No. A final permit has to be issued and interim status does not qualify for the exemption.

[Citation: 40 CFR §61.348(d)]

***Miscellaneous***

**(72) How is the flow-weighted annual average benzene concentration calculated from the equation given in 40 CFR §61.355 (c)(2)(v) when there are multiple concentration measurements and a single steady-state flow rate?**

For this case, only one flow rate is used in the equation and the total annual waste quantity ($Q_t$) equals the number of concentration measurements times the flow rate. Note, only one steady-state flow rate is needed for averaging the concentration measurements. If flow rate is constant, then flow-weighted annual average is equal to average concentration.

[Citations: 40 CFR §61.355(c)(2)(v)]

**(73) If multiple measurements of flow are made, how is the total annual waste quantity ($Q_t$) calculated?**

For this case, $Q_t$ is the sum of the individual flow measurements**.**

**(74) Must the three samples required in 61.355 (c)(2)(i) be collected at different times or can they be collected at the same time?**

The rule does not specify a time between samples. The applicable requirement is that the samples be reasonably representative of the waste that is being analyzed.

[Citation: 40 CFR §61.355(c)(2)(i)]

**(75) In some cases a facility cannot comply with the static mixer requirements because it is not feasible for their particular waste or process. Do they have any other options for obtaining samples?**

Yes. The most important point is to obtain a representative sample of the waste. Other procedures can be devised, such as multiple samples from different depths in a tank, sampling from the discharge side of a gear pump, and etc. The company is responsible for assuring that their reported results are representative of the waste being sampled.

[Citations: 40 CFR §61.355(b)(7) and 40 CFR §61.355(c)(3)(i)]

**(76) One petroleum refinery reported measuring a TAB that was less than 10 Mg/yr at the point of generation at the process units; however, they measured a TAB much greater than 10 Mg/yr leaving the API separator. How could this occur?**

If the TAB at the API separator is greater than the facility's point of generation TAB, then either 1) the facility has not included all waste streams; 2) data in the point of generation TAB is not representative; or 3) the API TAB was not determined during representative operations at the facility.
[40 CFR § 61.341 and 40 CFR § 61.347]

# Appendices

### Internet Availability

This *FAQ Handbook* is available through the EPA public access server at the following Office of Enforcement and Compliance Assurance website: http://es.epa.gov/oeca/main/compasst/petol.html

### Additional Resources

- **Applicability Determination Index (ADI):** http://134.67.104.12/cfdocs/adiwww/adiwww.html-ssi
  The memoranda cited in this handbook can be obtained through ADI. ADI is a database that contains memoranda issued by EPA on 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). There are also separate categories for asbestos (Part 61, Subpart M) and woodstoves (Part 60, Subpart AAA). Recently issued determinations are added to the database on a quarterly basis.

- **Environ$en$e:** http://www.epa.gov/envirosense
  Enviro$en$e is an integral part of the U.S. Environmental Protection Agency's web site. It attempts to provide a single repository for pollution prevention, compliance assurance, and enforcement information and data bases. Included are pollution prevention case studies, technologies, points of contact, environmental statutes, executive orders, regulations, and compliance and enforcement policies and guidelines. A major component of Enviro$en$e is the data base umbrella architecture for "solvent alternatives."

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