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Inspection Tool for the Hazardous Organic NESHAP (HON)

Volume I: Overview of Emission Points, Control Technologies, and HON Provisions

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1.0 BACKGROUND AND PURPOSE OF THIS DOCUMENT

This inspection tool is consistent with the promulgated hazardous organic national emission standard for hazardous air pollutants (hazardous organic NESHAP, or HON). The final rule was published in the Federal Register on April 22, 1994 (59 FR 19402) and June 6, 1994 (59 FR 29196) with final revisions published on September 20, 1994 (59 FR 48175); January 27, 1995 (60 FR 5320); April 10, 1995 (60 FR 18020); December 12, 1995 (60 FR 63624); June 20, 1996 (61 FR 31435), December 5, 1996 (61 FR 64572), and January 17, 1997 (62 FR 2722).

Section 112 of the Clean Air Act directed the U. S. Environmental Protection Agency (EPA) to set national emission standards for hazardous air pollutants (NESHAP). Section 112(b) lists 188 hazardous air pollutants (HAP's). Section 112 also required the EPA to publish a list of categories of sources that emit HAP's and to develop regulations for these source categories. The synthetic organic chemical manufacturing industry (SOCMI) was subsequently listed as a source category emitting HAP's.

The hazardous organic NESHAP (HON) regulates emissions of 111 of the 188 listed organic HAP's from the SOCMI. In addition, the HON also lists 21 specific compounds that are polycyclic organic matter. The regulation can be found in the Code of Federal Regulations (40 CFR Part 63) in Subparts F, G, and H. Subpart F contains provisions for determining applicability of the HON, definitions, and general procedures for testing, compliance, reporting, and recordkeeping. The specific control, monitoring, reporting, and recordkeeping requirements are stated in Subpart G for process vents, transfer operations, storage vessels, and wastewater streams, and in Subpart H for equipment leak emissions. Subpart I provides the applicability criteria for non-SOCMI processes subject to the negotiated regulation for equipment leaks and requires compliance with Subpart H.

The purpose of this document is to assist federal, state, and local regulatory personnel with enforcement of the process vent, transfer operation, storage vessel, and wastewater provisions of Subpart G. The emissions averaging provisions of Subpart G and the equipment leak provisions of Subpart H are not included. For equipment leaks, refer to Inspection Manual: *Federal Equipment Leak Regulations for the Chemical Manufacturing Industry* (EPA-305-B-96-005). Because the process vents provisions of the HON are similar to new source performance standards (NSPS) for SOCMI air oxidation reactors and distillation operations, this document will also be useful for enforcement of those NSPS. While this document does not describe the NSPS in detail, an appendix identifies key differences between the HON process vents provisions and the NSPS.

Volume I. Overview of Emission Points, Control Technologies and HON Provisions

This document is organized in two volumes. Volume I contains descriptions of the background information on emission points and control technologies. These descriptions cover process vents, transfer operations, storage vessels, and wastewater provisions. Within Volume I, there are sections on an overview of the HON, applicability of the rule, descriptions of emission points, descriptions of emission control technologies, and descriptions of the relevant provisions. Volume II contains checklists to assist the inspector during the actual inspection.

Five appendices are included in this document. Appendix A lists Code of Federal Regulations citations for the HON, the NESHAP General Provisions, test methods required by the HON, and the air oxidation and distillation NSPS. This will allow inspectors to easily locate the complete text of these rules. Appendix B contains a comparison of the HON process vents provisions with those in the NSPS for distillation, air oxidation, and reactors. Appendix C illustrates the calculation of total resource effectiveness (TRE) index value for process vents. The TRE index value is used to determine whether process vent emissions must be controlled. Appendix D lists the information on wastewater that must be reported in the Notification of Compliance Status. Appendix E has a conversion table for all exemptions, cutoffs, and other numbers referenced in the rule. The table gives English units for all of these values.

2.0 OVERVIEW OF THE HAZARDOUS ORGANIC NESHAP

The HON regulates emissions from five kinds of emission points at SOCMI sources: (1) process vents, (2) transfer operations, (3) storage vessels, (4) air emissions from wastewater streams and wastewater collection and treatment operations, and (5) equipment leaks. The organization of the regulation is shown in Table 2-1.

2.1 SUBPART F

Section 63.100 contains provisions to determine which chemical manufacturing processes at a plant are subject to the HON. Table 1 of Subpart F contains a list of SOCMI chemicals, and Table 2 of Subpart F contains a list of organic HAP's regulated by the HON. In general, if a process both (1) produces one of the listed SOCMI chemicals and (2) either uses as a reactant or produces a listed organic HAP in the process, then that process is subject to the HON. Section 63.100 contains additional details for determining applicability in situations where a process makes multiple products. If a chemical manufacturing process is subject to the HON, then the emission points associated with that process are regulated. Details on how to determine which storage vessels, transfer racks, and distillation units are part of a chemical manufacturing process are also contained in §63.100.

Section 2.0 Overview of the Hazardous Organic NESHAP

Definitions of terms used in Subparts F, G, and H are contained in §63.101. Sections 63.102 and 63.103 contain general standards, compliance, recordkeeping, and reporting provisions and override certain portions of the NESHAP General Provisions (40 CFR 63, Subpart A). These sections specify general performance test conditions, require records to be maintained for 5 years, and clarify where reports required under Subparts G and H are to be sent. Section 63.104 contains requirements for heat exchange systems and §63.105 contains requirements for maintenance wastewater.

2.2 SUBPART G

Subpart G contains the standard for process vents, transfer operations, storage vessels, and wastewater. It includes emissions averaging provisions. The first section of Subpart G (§63.110) contains applicability provisions that clarify potential overlaps between the HON and other subparts that regulate process vents, transfer operations, storage vessels, wastewater, and equipment leaks. The second section (§63.111) contains definitions.

Section 63.112 provides an equation representing a site-specific allowable overall emission limit for each source. The "source" is the combination of all emission points subject to the HON at a

TABLE 2-1. ORGANIZATION OF HON

Section Number[a]	Title of Section
Subpart F -- National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry	
63.100	Applicability and designation of source.
63.101	Definitions.
63.102	General standards.
63.103	General compliance, reporting, and recordkeeping provisions.
63.104	Heat exchange system requirements.
63.105	Maintenance wastewater requirements.
63.106	Delegation of authority.
Subpart G -- National Emission Standards for Organic Hazardous Air Pollutants from Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater.	
63.110	Applicability.
63.111	Definitions.
63.112	Emission standard.
63.113	Process vent provisions.
63.114	Process vent provisions - monitoring requirements.
63.115	Process vent provisions - methods and procedures for process vent group determination.
63.116	Process vent provisions - performance test methods and procedures to determine compliance.
63.117	Process vents provisions - reporting and recordkeeping requirements for group and TRE determinations and performance tests.
63.118	Process vents provisions - periodic reporting and recordkeeping requirements.
63.119	Storage vessel provisions - reference control.
63.120	Storage vessel provisions - procedures to determine compliance.
63.121	Storage vessel provisions - alternative means of emission limitation.
63.122	Storage vessel provisions - reporting.
63.123	Storage vessel provisions - recordkeeping.
63.124	Reserved.
63.125	Reserved.
63.126	Transfer operations provisions - reference control technology.
63.127	Transfer operations provisions - monitoring requirements.
63.128	Transfer operations provisions - test methods and procedures.
63.129	Transfer operations provisions - reporting and recordkeeping for performance tests and notification of compliance status.
63.130	Transfer operations provisions - periodic recordkeeping and reporting.
63.131	Reserved.

TABLE 2-1. ORGANIZATION OF HON

Section Number[a]	Title of Section
63.132	Process wastewater provisions - general.
63.133	Process wastewater provisions - wastewater tanks.
63.134	Process wastewater provisions - surface impoundments.
63.135	Process wastewater provisions - containers.
63.136	Process wastewater provisions - individual drain systems.
63.137	Process wastewater provisions - oil-water separators.
63.138	Process wastewater provisions - (performance standards for treatment processes managing Group 1 wastewater streams and/or residuals removed from Group 1 wastewater streams).
63.139	Process wastewater provisions - control devices.
63.140	Process wastewater provisions - delay of repair.
63.141	Reserved.
63.142	Reserved.
63.143	Process wastewater provisions - inspections and monitoring of operations.
63.144	Process wastewater provisions - test methods and procedures for applicability and Group 1/Group 2 determinations (determining which wastewater streams require control).
63.145	Process wastewater provisions - test methods and procedures to determine compliance.
63.146	Process wastewater provisions - reporting.
63.147	Process wastewater provisions - recordkeeping.
63.148	Leak inspection provisions.
63.149	Control requirements for certain liquid streams in open systems within a chemical manufacturing process unit.
63.150	Emissions averaging provisions.
63.151	Initial Notification.
63.152	General reporting and continuous records.
Subpart H -- National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks.	
63.160	Applicability and designation of sources.
63.161	Definitions.
63.162	Standards: General.
63.163	Standards: Pumps in light liquid service.
63.164	Standards: Compressors.
63.165	Standards: Pressure relief devices in gas/vapor service.
63.166	Standards: Sampling connection systems.
63.167	Standards: Open-ended valves or lines.
63.168	Standards: Valves in gas/vapor service and in light liquid service.

TABLE 2-1. ORGANIZATION OF HON

Section Number[a]	Title of Section
63.169	Standards: Pumps, valves, connectors, and agitators in heavy liquid service; instrumentation systems; and pressure relief devices in liquid service.
63.170	Standards: Surge control vessels and bottoms receivers.
63.171	Standards: Delay of repair.
63.172	Standards: Closed-vent systems and control devices.
63.173	Standards: Agitators in gas/vapor service and in light liquid service.
63.174	Standards: Connectors in gas/vapor service and in light liquid service.
63.175	Quality improvement program for valves.
63.176	Quality improvement program for pumps.
63.177	Alternative means of emission limitation: General.
63.178	Alternative means of emission limitation: Batch processes.
63.179	Alternative means of emission limitation: Enclosed-vented process units.
63.180	Test methods and procedures.
63.181	Recordkeeping requirements.
63.182	Reporting requirements.
Subpart I -- National Emission Standards for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks.	
63.190	Applicability and designation of source.
63.191	Definitions.
63.192	Standard.
63.193	Delegation of Authority.

[a] Section numbers of 40 CFR Part 63.

plant site (contiguous area under common control). The standard requires sources to meet the allowable emission limit; however, the equation in §63.112 is not used to determine compliance with the standard, and source owners or operators are not required to calculate their allowable emission limit. As provided in §63.112(c), the owner or operator of an existing source must demonstrate compliance using one of two approaches: the point-by-point compliance approach or the emissions averaging approach. As provided in §63.112(d), the owner or operator of a new source must demonstrate compliance using the point-by-point approach. Emissions averaging is not allowed for new sources.

Under the point-by-point approach, the owner or operator would apply control to each "Group 1" emission point. A Group 1 emission point is a point which meets the control applicability criteria, and the owner or operator must reduce emissions to specified levels; whereas a Group 2 emission point is one that does not meet the criteria and no emission reduction is required. These Group 1 and Group 2 emission points are defined in §63.111. Owners or operators selecting the point-by-point compliance approach must comply with the process vent provisions in §63.113 through §63.118, the storage vessel provisions in §63.119 through §63.123, the transfer operation provisions in §63.126 through §63.130, and the wastewater provisions in §63.132 through §63.149. These sections include applicability criteria, emission limits, equipment and work practice standards, testing, monitoring, recordkeeping, and reporting provisions. The specific criteria for Group 1/Group 2 determinations and required control levels for process vents, transfer operations, storage vessels, and wastewater streams are listed in Section 7 of this volume.

Under the emissions averaging approach, an owner or operator may elect to control different groups of emission points within the source to different levels than specified in §63.113 through §63.147 and §63.149, as long as the overall emissions do not exceed the overall allowable emission level. An owner or operator can choose not to control a Group 1 emission point (or to control the emission point with a less effective control technique) if the owner or operator over-controls another emission point within the source. Emission "debits" (in Mg of HAP emissions) are generated for each Group 1 emission point that is uncontrolled or under-controlled. Emission "credits" (also in Mg) are generated for over-controlled points. Credits can be generated if a Group 2 point is controlled, or if a Group 1 point is controlled by a distinct technology that EPA approves as having a greater efficiency than the level of control required for Group 1 points. Credits have to equal or exceed debits for a source to be in compliance. Section 63.150 of the rule contains additional emission averaging requirements and detailed equations for calculating debits and credits. The preamble of the final rule (April 22, 1994, 59 FR 19402) describes, in more detail, the emissions averaging requirements.

2.3 SUBPART H

Subpart H contains the standard for equipment leaks. Equipment regulated includes pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and instrumentation systems in organic HAP service. A piece of equipment is in organic HAP service if it contains or contacts a fluid that is at least 5 percent organic HAP by weight. The applicability of Subpart H and definitions are contained in §63.160 and §63.161, respectively. Sections 63.162 through 63.179 contain the standards for the various kinds of equipment and alternative means of emission limitation. These include leak detection and repair provisions and other control requirements. Sections 63.180 through 63.182 contain test methods and procedures, and reporting and recordkeeping provisions.

2.4 SUBPART I

Subpart I provides the applicability criteria for the non-SOCMI processes subject to the negotiated regulation for equipment leaks. Regulated equipment is the same as that for Subpart H: pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and instrumentation systems in organic HAP service. The applicability criteria for Subpart I and the definitions are specified in §63.190 and §63.191, respectively. Section 63.192 contains the standard which requires compliance with Subpart H.

2.5 GENERAL REPORTING

Sections 63.151 (Initial Notification) and 63.152 (General Reporting) of Subpart G require sources to submit the following five types of reports:

1. Initial Notification,
2. Implementation Plan (for new sources if an operating permit application has not been submitted),
3. Notification of Compliance Status,
4. Periodic Reports, and
5. other reports.

Sources subject to the HON are also subject to the NESHAP General Provisions (40 CFR Part 63 Subpart A), which include additional reporting requirements. Table 3 of Subpart F of the HON identifies which parts of the General Provisions apply to HON sources and Section 4 of this report outlines the requirements of the General Provisions as they apply to the HON.

Records of reported information and other information necessary to document compliance with the regulation are required to be kept for 5 years. A few records pertaining to equipment design would be kept for the life of the equipment.

2.5.1 Initial Notification

The purpose of the Initial Notification is to establish an early dialogue between the source and the regulatory agency, allowing both to plan for compliance activities. The notice is due August 20, 1994, for existing sources. For a new source with an initial startup on or after July 21, 1994, the application for approval of construction or reconstruction required by §63.5(d) of subpart A must be submitted instead of the Initial Notification. This application is due as soon as practicable before commencement of construction or reconstruction but no earlier than July 21, 1994.

For a new source with an initial startup before July 21, 1994, the Initial Notification is due on July 21, 1994, but the application described in §63.5(d) of subpart A is not required.

The notification must list the chemical manufacturing processes at the source that are subject to Subpart G, and which provisions may apply (e.g., process vents, transfer operations, storage vessel, and/or wastewater provisions). A detailed identification of emission points is not required. The Initial Notification must include a statement of whether the source can achieve compliance by the specified compliance date, but a request for a compliance extension may be submitted later (by 120 days before the compliance date - see Section 3.3.4 for a description of the compliance dates). Section 11 of Volume II of this document has a checklist of items required in the Initial Notification.

2.5.2 Implementation Plan

The Implementation Plan details how the source plans to comply with Subpart G. The plan identifies Group 1 and Group 2 emission points, and specifies the control technique that will be applied to each Group 1 emission point. Implementation Plans are only required for new sources that have not submitted an operating permit application or for emission points to be included in an emissions average. An operating permit application would contain all of the information required in the Implementation Plan, therefore, it would be redundant to require sources to submit both.

For points included in emission averages, existing sources must submit the Implementation Plan 18 months prior to the compliance date; for emission points not included in an emissions average, the Implementation Plan is due 12 months prior to the compliance date. For a new source with an initial startup on or after July 21, 1994, the Implementation Plan must be submitted with the application for approval of construction or reconstruction (i.e., as soon as practical before commencement of construction or reconstruction but no earlier than July 21, 1994).

For a new source with an initial startup before July 21, 1994, the Implementation Plan was due July 21, 1994.

2.5.3 Notification of Compliance Status

The Notification of Compliance Status must be submitted within 150 days after the source's compliance date. The date of compliance for existing sources is 3 years after the date of promulgation. The date of compliance for new sources is the date of promulgation or the startup date, whichever is later. The Notification of Compliance Status contains the information necessary to demonstrate that compliance has been achieved, such as the results of performance tests for process vent and transfer control devices, process vents TRE determinations, and monitoring system performance evaluations.

Sources with a large number of emission points are likely to submit results of multiple performance tests. For each test method used for a particular kind of emission point (e.g., a process vent), one complete test report must be submitted. For additional tests performed for the same kind of emission point using the same method, the results must be submitted, but the complete test reports may be kept at the plant.

Another type of information to be included in the Notification of Compliance Status is the specific range for each monitored parameter for each emission point, and the rationale for why this range indicates proper operation of the control device. (If this range has already been established in the operating permit, it need not be repeated in the Notification of Compliance Status). As an example, for a process vent controlled by an incinerator, the notification would include the site-specific minimum firebox temperature that will ensure proper operation of the incinerator, and the data and rationale to support this minimum temperature.

Section 11 of Volume II of this document has a checklist of items required in the Notification of Compliance Status.

2.5.4 Periodic Reports

Periodic Reports are required to demonstrate that the standards continue to be met and that control devices are operated and maintained properly. Generally, Periodic Reports will be submitted semiannually. However, if monitoring data are insufficient, or if monitoring results show that the parameter values for an emission point are outside the established range for more than the excused number of days specified in §63.152, the Administrator (or delegated regulatory authority) may request that the owner or operator submit quarterly reports for that emission point. After 1 year, the source can return to semiannual reporting, unless the regulatory authority requests continuation of quarterly reports.

Periodic Reports specify periods when the daily average values of continuously monitored parameters are outside the ranges established in the Notification of Compliance Status or operating permit. For some kinds of emission points and controls, periodic (e.g., monthly, quarterly, or annual) inspections or measurements are required instead of continuous monitoring. Records that such inspections or measurements were done must be kept; results are included in Periodic Reports only if a problem is found. Periodic reports may also include information on startups, shutdowns, and malfunctions if any occurred during the reporting period. Details of the information required are specified in §63.10(d)(5) of Subpart A.

The first periodic report is due no later than 8 months after the date the notification of compliance status is due. All other semiannual reports are due no later than 60 days after the end of each 6 month period. Quarterly reports, if required, are due 60 days after the end of each quarter. Section 11 of Volume II of this document has a checklist of items required in the periodic reports.

2.5.5 Other Reports

There are a very limited number of other reports. Where possible, Subpart G is structured to allow all information to be reported in the semiannual (or quarterly) Periodic Reports. However, in a few cases it is necessary for the source to provide information to the regulatory authority shortly before or after a specific event. For example, for storage vessels, notification prior to internal tank inspections is required to allow the regulatory authority the opportunity to have an observer present. The semi-annual start-up, shutdown, and malfunction reports may be submitted on the same schedule as the Periodic Reports.

2.6 USE OF CONTINUOUS MONITORING TO DETERMINE COMPLIANCE

This section summarizes the basic approaches for determining compliance for Group 1 emission points where continuous monitoring is required. As described in Section 7 of this document, performance tests and continuous monitoring of control device operating parameters are required for most kinds of devices used to control Group 1 emission points. For wastewater streams, it is necessary to have monitoring information on the treatment processes (e.g., steam stripper) as well as on the control device receiving the gas stream vented from the treatment process or waste management unit. Compliance with the 98 percent reduction or 20 ppmv outlet concentration requirement is determined by performance testing. Results of the tests are reported in the Notification of Compliance Status. Continuous parameter monitoring results are not used to determine compliance with the percent reduction or emission limit; however, monitoring results are used to determine compliance with operating requirements.

Each source must establish site-specific ranges for monitored parameters that will demonstrate proper operation of each control device for which continuous monitoring is required. These site-specific ranges can be set through performance testing supplemented by engineering assessments and manufacturers' recommendations (the performance test is not required to be conducted over the entire range of permitted parameter values). The justification for the site-specific range is included in the operating permit application or Notification of Compliance Status. The ranges are then incorporated in the sources' operating permit. Each source must continuously monitor and record the operating parameter(s) for each control device and report any daily average value of an operating parameter that is outside the established range as well as any days when insufficient monitoring data are collected. These excursions are reported in the quarterly or semiannual reports described in Section 2.5.4. If, during a reporting period, a monitored operating parameter is outside the established range or insufficient data are collected for more than the number of days specified in §63.152(c) of Subpart G, this is considered a violation of the operating permit requirements.

An owner or operator may request approval to use alternatives to continuous operating parameter monitoring, as allowed by §63.151(g) of Subpart G. Continuous monitoring is not required for storage vessels or for some treatment processes for wastewater streams. The compliance determination approaches for storage and wastewater are described in Sections 7.3.4 and 7.4.5 of this document, respectively.

3.0 APPLICABILITY OF THE RULE

In determining the applicability of the HON, the first step is to determine whether the facility is a major source for Hazardous Air Pollutants (HAP's). The second step is to determine which chemical manufacturing process units (CMPU's) at a plant site are subject to the HON. The third step is to identify the equipment within those CMPU's subject to the HON. Next, the source must be designated as a new source or an existing source. The final step in determining the applicability of the rule is to determine which emission points within the CMPU satisfy the HON definitions of process vent, storage vessel, transfer rack, and wastewater stream. This chapter will explain in more detail the first four steps. The sources Title V permit application and Title V permit will address much of the material concerning applicability of the HON to the source. The final step of determining applicability to specific emission points is addressed in Section 7.

3.1 IDENTIFICATION OF SOCMI PROCESS UNITS

For the HON to apply to a plant site, it has to be a major HAP source as defined in Section 112(a) of the Act, i.e., any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit, considering controls, in the aggregate, 10 tons per year (tpy) or more of any hazardous air pollutant or 25 tpy or more of any combination of hazardous air pollutants. For the HON to apply to a CMPU, the CMPU must meet three criteria. First, the CMPU must be a SOCMI unit, which means a SOCMI chemical in Table 1 of Subpart F is the primary product made in the unit. Second, organic HAP's regulated by the HON, which are listed in Table 2 of Subpart F, have to be used as a reactant or manufactured in the CMPU. Finally, the plant site where the CMPU is located has to be a major HAP source.

Section 3.0 Applicability of the Rule

Identification of the primary product of a CMPU may not be obvious. In the chemical manufacturing industry, most facilities consist of integrated operations involving some combination of refinery processes, SOCMI processes, polymers and resins processes, agricultural chemical production, pharmaceutical production, and specialty chemical production. Thus, a CMPU may produce multiple chemicals including valuable co-products and materials that will be used as reactants for downstream units. Also, some CMPU's are designed and operated as flexible operation units, that is, the equipment is used to make different chemicals at different times during the year. Determining applicability of a rule and what equipment is subject to the rule is complex and requires detailed information about the facility and its operations.

To address this complexity, the rule includes procedures for determining the primary product of a CMPU. The rule also exempts certain units and equipment from all requirements. Specifically, the HON does not apply to the following processes:

- Research and development facilities, even if they are located at the same plant site as the CMPU that is subject to the HON;

- Petroleum refining and ethylene process units, even if they supply feedstocks that are SOCMI chemicals to CMPU's that are subject to the HON;
- CMPU's located in coke by-product recovery plants; and
- Solvent reclamation, recovery, or recycling operations at hazardous waste treatment, storage, and disposal facilities (TSDF) that are not part of a SOCMI unit.

Table 3-1 of Volume II is a checklist for determining whether a CMPU is subject to the HON. Table 3-2 of Volume II contains questions for determining the primary product and applicability for flexible operation units in particular. Table 3-3 of Volume II addresses determination of primary product in all other cases.

3.2 DETERMINATION OF THE HON SOURCE

The source to which the HON applies is defined as the collection of the following emission points within SOCMI CMPU's:

- Process vents;
- Storage vessels;
- Transfer racks;
- Wastewater and the associated treatment residuals; and
- Pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, instrumentation systems, surge control vessels, and bottoms receivers (equipment leaks).

However, certain emission points are exempted from the rule. The HON does not apply to the following points:

- Equipment that is located with a CMPU subject to the HON but does not contain organic HAP's;
- Vents from CMPU's that are designed and operated as batch operations;
- Stormwater from segregated sewers;
- Water from fire-fighting and deluge systems in segregated sewers;
- Spills;
- Water from safety showers;
- Water from testing of deluge systems;
- Water from testing of firefighting systems;
- Vessels storing organic liquids that contain organic HAP's only as impurities;

- Loading racks, loading arms, and loading hoses that only transfer liquids containing organic HAP's only as impurities;
- Loading racks, loading arms, and loading hoses that vapor balance during all loading operations; and
- Equipment as defined in § 63.101 of subpart F that is intended to operate in organic HAP service for less than 300 hours per calendar year.

In large chemical manufacturing facilities, it is often difficult to determine where one process unit ends and the next begins. For example, a storage vessel may contain a chemical that is the product of one CMPU and the raw material for another CMPU. A transfer rack may load the products of several CMPU's, some that are SOCMI and others that are not. Distillation columns may be used to purify a product for sale or to remove inhibitors and impurities from a raw material. To clarify the applicability of the HON in these situations, the rule includes procedures for assigning storage vessels, transfer racks, and distillation columns to the appropriate CMPU. In order to determine the boudaries of the CMPU, the storage vessels, transfer racks, and distillation columns are assigned to the CMPU according to the predominant use of each one. Tables 4-2, 4-5 and 4-8 of Volume II are checklists for these procedures.

3.3 DETERMINATION OF NEW SOURCE VS. EXISTING SOURCE

Once the HON source has been identified, it must be classified as a new or existing source because the rule contains different requirements for new versus existing sources. Many of these requirements pertain only to specific kinds of emission points and are therefore discussed in later sections of this document. This section addresses the definitions, MACT requirements, and compliance dates for new sources, existing sources, and other process changes.

3.3.1 New Sources

A source is subject to the HON's new source MACT requirements if it meets the criteria for a new source or a reconstructed source. A source would be a new source if all of the following criteria are true:

- An entire CMPU or group of CMPU's is being added (The addition of a single emission point, e.g., a storage vessel, cannot be a new source regardless of the magnitude of emissions from the vessel);
- The additional CMPU produces a SOCMI chemical listed in Table 1 of Subpart F and uses as a reactant or produces an organic HAP listed in Table 2 of Subpart F;
- The additional CMPU meets the definition of construction in 40 CFR 63.2, Subpart A (i.e., fabrication, erection, or installation);
- Construction of the additional CMPU started after December 31, 1992; and
- The additional CMPU has the potential to emit 10 tpy or more of a single HAP or 25 tpy or more of any combination of HAP's.

A source would be a reconstructed source if all of the following were true:

- Changes to the source meet the definition of reconstruction in 40 CFR 63.2, Subpart A (i.e., the source is changed to such an extent that the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost required to construct a comparable new source); and

- The reconstruction started after December 31, 1992.

3.3.2 Existing Sources

A source is subject to the HON's existing source MACT requirements if it does not meet the criteria in Section 3.3.1 for a new source or reconstructed source. Examples of existing sources could include CMPU's that were already in operation prior to December 31, 1992; addition of an individual emission point such as a storage vessel or transfer rack; and addition of a CMPU with emissions below the 10 tpy/25 tpy threshold.

3.3.3 Other Process Changes

As is common in any manufacturing facility, chemical plants are characterized by frequent changes in operations. Cost concerns, market needs, and product improvement efforts mean individual equipment and often entire process units, may be changed or added to an existing plant site. As defined in the HON, process changes include, but are not limited to:

- Changes in production capacity, feedstock type, or catalyst type; and

- Replacement, removal, or addition of recovery equipment.

Process changes do not include:

- Process upsets;

- Unintentional temporary process changes; and

- Changes that are within the equipment configuration and operating conditions documented in the Notification of Compliance Status.

Section 3.3.1 listed the criteria for determining whether additions or changes would be considered new or reconstructed sources. It is also possible that an addition or change would satisfy neither set of criteria. If a change did not exceed the 50 percent fixed capital cost to be a reconstruction or the 10 tpy/25 tpy emission potential to be a new source, the added or changed equipment might still be subject to the HON. For example, an owner or operator may switch from using a non-HAP raw material to using a HAP as a raw material. Or, a change in catalyst type could increase capacity thereby causing an increase in emissions above the 10 tpy/25 tpy threshold. In such cases, if the addition or change did not satisfy the criteria for new or reconstructed source, but the additions or changes were made to part of the HON source, the added or changed equipment would be subject to the HON's existing source MACT requirements.

3.3.4 Compliance Dates

Table 3-1 lists the compliance dates for existing, new, and reconstructed sources and for additions or changes that are not subject to new source requirements. For compliance with the equipment leak provisions in Subpart H, process units have been placed in five groups with different compliance dates. Group designations are listed in Table 1 of Subpart F.

TABLE 3-1. COMPLIANCE DATES FOR EXISTING, NEW, AND RECONSTRUCTED SOURCES

Kind of Emission Point	At Existing Sources	In a New or Reconstructed Source [a]	Part of a Change or Addition that is not Subject to New Source Requirements
Process vents, storage vessels, transfer racks	4/22/97	New source construction or reconstruction begun after 12/31/92 and before 8/27/96: New source MACT upon initial startup or 4/22/94, whichever is later.[b] New source construction or reconstruction begun after 8/26/96: New source MACT upon initial startup or 1/17/97, whichever is later.	Existing source MACT upon initial start-up or by 4/22/97, whichever is later. Special case: If a deliberate process change to an existing CMPU causes a Group 2 point to become a Group 1 point, the owner or operator may request a longer compliance schedule in accordance with §63.100(l)(4)(ii)(B) and (m). However, the compliance date cannot be later than 3 years after the point becomes Group 1.
Process wastewater, equipment subject to §63.149, maintenance wastewater, and heat exchange systems	4/22/99 [c]	New source construction or reconstruction begun after 12/31/92 and before 8/27/96: New source MACT upon initial startup or 180 days after 1/17/97, whichever is later. New source construction or reconstruction begun after 8/26/96: New source MACT upon initial startup or 1/17/97, whichever is later.	Existing source MACT upon initial start-up or by 4/22/97, whichever is later. Special case: The special case listed above applies to process wastewater.
Equipment leaks[d]	Group I: 10/24/94 Group II: 1/23/95 Group III: 4/24/95 Group IV: 7/24/95 Group V: 10/23/95	New source construction or reconstruction begun after 12/31/92 and before 8/27/96: New source MACT upon initial startup or 4/22/94, whichever is later.[b] New source construction or reconstruction begun after 8/26/96: New source MACT upon initial startup or 1/17/97, whichever is later.	Existing source MACT upon initial start-up or by April 22, 1997, whichever is later. Special case: If a deliberate process change to an existing CMPU causes a surge control vessel or bottoms receiver to become subject to §63.170 or a compressor to become subject to §63.164, the owner or operator may request a longer compliance schedule in accordance with §63.100(l)(4)(ii)(B) and (m). However, the compliance date cannot be later than 3 years after the change.

[a] Sources constructed or reconstructed after December 31, 1992.
[b] Compliance must be achieved by 1/17/97 with the HON as revised on 1/17/97.
[c] If a process wastewater stream is used to generate credits in an emissions average according to §63.150, it must be in compliance by 4/22/97. If a process wastewater stream or equipment subject to §63.149 is subject to Subpart G due to nitrobenzene, it must be in compliance by 1/18/2000.
[d] The compliance date for compressors depends on site specific conditions, see §63.100(k)(4), (k)(5), and (k)(6). The compliance date for existing sources to meet the provisions of §63.170 is 4/22/97.

4.0 GENERAL PROVISIONS APPLICABLE TO THE HON

The regulations in 40 CFR 63, Subpart A (*i.e.,* the General Provisions) contain "boilerplate" requirements that apply, in general, to all affected sources subject to applicable requirements in other subparts of Part 63. Rather than repeat common standards or administrative specifications as sections within subsequent NESHAPs, Subpart A provides a common, consolidated repository of these requirements.

Subsequent NESHAPs do, however, may override some parts of the General Provisions as may be warranted by the particular conditions of the affected source and its compliance obligations. Because of the complexity and timing of the HON, it superceded certain portions of the General Provisions. Accordingly, this section of the guide summarizes only those sections of the General Provisions not overridden by the HON. Where the HON did supercede pieces of the General Provisions, the other sections of this guide address such requirements. Table 3 of Subpart F of the rule specifically list the overrides applicability of the General Provisions by the HON.

4.1 APPLICABILITY AND DEFINITIONS

The General Provisions provided in subpart A apply to owners and operators subject to the HON rule except when otherwise specified in the HON rule subpart. Part 63 emission standards or other requirements do not diminish or replace the requirements of a more stringent emission limitation or other applicable requirement established under the Clean Air Act or under state authority. Time periods and deadlines may be changed by agreement between the owner or operator and the administrator. In addition to complying with applicable requirements in the HON rule and the General Provisions, the owner or operator of a subject source may be required to obtain a Title V operating permit. Extension of compliance for some requirements does not delay the owner's or operator's obligation for compliance with all other parts.

Some terms used in the HON are defined in the General Provisions.

Section 4. General Provisions Applicable to the HON

4.2 PROHIBITED ACTIVITIES AND CIRCUMVENTION

The owner or operator of an affected source shall not operate the source in violation of the requirements except under an extension of compliance granted by the administrator or by a state with an approved permit program or under an exemption granted by the President. After the effective date of an approved permit program in a state, the owner or operator of an affected source that is required to have a Title V operating permit must operate in compliance with the provisions of the State's permit program. No owner or operator shall fail to keep required records or file reports as required. The owner or operator of an affected source must comply with the requirements by the compliance date(s) regardless of whether a Title V permit has been issued or, if a Title V permit has been issued, whether such permit has been modified to incorporate HON rule requirements.

The owner/operator of an affected source may not conceal an emission that would otherwise constitute noncompliance. Concealment includes:

- Diluting an effluent stream to meet concentration standards, and
- Fragmentation of an operation to avoid a standard.

The provisions of the HON rule and the general provisions are federally enforceable regardless of how they may be incorporated into a Title V permit.

4.3 CONSTRUCTION AND RECONSTRUCTION

A new source that is constructed after the promulgation date of the HON rule is subject to the relevant requirements for new sources, including compliance dates. After the promulgation date of the HON rule no major source can be constructed or reconstructed without written approval. A separate application for approval must be submitted for each construction or reconstruction. The requirements for the application for approval are provided in checklist format (see Table 11-10 of Volume II of this document). The administrator may request additional information after submittal of the application. Approval will be granted if the administrator determines that the source will not cause an emission violation or a violation of the relevant standards or other federally enforceable requirements. In addition, for reconstructions, the administrator will consider:

- Fixed capital costs compared to cost of a new facility,
- Estimated life of the source compared to a new source,
- Extent to which components being replaced contribute to emissions, and
- Economic or technical limitations on compliance with relevant standards that are inherent in proposed replacements.

The applicant will be notified of the completeness status of the application within 30 days of receipt of an application or of additional information for an application. The applicant will be notified of approval or intent to deny approval within 60 days of having a complete application. After notification of intent to deny, applicant has 30 days to provide additional information or arguments. Final determination is made within 60 days of receiving additional information and/or arguments.

4.4 COMPLIANCE WITH STANDARDS AND MAINTENANCE REQUIREMENTS

Section 63.6 applies to an affected source unless it has received an extension of compliance from the Administrator or an exemption from compliance granted by the President. Further, it outlines the process for and content of the extension or denial. This section would also apply to an area source that otherwise would be subject to a relevant standard or other requirement if the area source's potential to emit subsequently increases above major source levels. This section allows sources commencing construction or reconstruction between proposal and promulgation up to three years after the effective date to comply with the promulgated standard if it is more stringent that the proposed standard, provided that the source complies with the proposed standard in the interim.

Section 63.6 requires that malfunctions be corrected as soon as practicable after their occurrence in accordance with the source's Startup, Shutdown and Malfunction Plan. It also requires that the owner or operator operate and maintain emission source and air pollution control equipment in accordance with the procedures in Startup, Shutdown and Malfunction Plan. This section also allows the Administrator to require that the owner or operator make changes to the Plan to address inadequacies. Contents of the Startup, Shutdown and Malfunction Plan are listed on Table 11-7.

Section 63.6 also indicates that demonstrating compliance with nonopacity emission standards may be accomplished by performance tests, conformance with operation and maintenance requirements, monitoring data, records, or inspection of the source.

4.5 PERFORMANCE TESTING REQUIREMENTS

Section 63.7 gives the Administrator the authority to request the owner or operator of an affected source to conduct performance testing any time allowed by Section 114 of the Clean Air Act. If required to do performance testing, the owner or operator of the affected source shall supply the necessary testing facilities, including sampling ports, platforms, utilities, etc. This section stipulates that testing be conducted under representative conditions, which do not include startup, shutdown, or malfunction. The Administrator may request records from the source to determine these representative conditions. This section also requires performance test to be conducted and data to be reduced in accordance with the test methods and procedures set forth in Part 63 or the applicable appendices of Parts 51, 60, 61, and 63 unless the Administrator approves:

- Minor changes in methodology,
- The use of an alternative method,
- Shorter sampling times or smaller sampling volumes unless the Administrator waives the requirement for performance tests.

4.6 MONITORING REQUIREMENTS

Section 63.8 specifies general monitoring requirements such as those governing the conduct of monitoring and those in requests to use alternative monitoring methods. It also specifies detailed requirements that apply to affected sources required to use continuous monitoring systems (CMS) under a relevant standard. This section allows the Administrator to approve minor changes in methodology or use alternative monitoring requirements or procedures.

When more than one CMS is used to measure the emissions from one affected source, the owner or operator shall report the results as required for each CMS. However, if a CMS is installed with the intent of serving as a backup, then its data should only be reported during periods when it is required to gather compliance monitoring data (*i.e.,* is serving in place of the primary CMS). The owner or operator shall: operate and maintain each CMS consistent with good air pollution control practices, ensure the correction of routine or predictable CMS malfunctions, with spare parts readily available. Such repairs shall be reported in the semiannual startup, shutdown, and malfunction report. All CMS must acquire representative data and must be located according to procedures contained in the applicable performance specifications. CMS operational status verification shall include, at a minimum, completion of the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system. CMS data shall be verified either prior to or in conjunction with conducting performance tests.

The Administrator may approve a request for alternative monitoring procedures related to the following issues:

- Interferences caused by substances (including water) within effluent gases,
- Infrequent source operation,
- Accommodation of additional measurements to correct for stack gas moisture,
- Alternative locations provided the data will still be representative,
- Alternate methods for converting pollutant concentration measurements,
- Alternate procedures for performing daily checks of zero and high-level drift,
- Alternatives to ASTM or other sampling procedures,

- Alternative CMS that do not meet the design or performance requirements of the General Provisions but that adequately demonstrate a definite and consistent relationship, or
- Alternative monitoring when the effluent from a single affected source or the combined effluent from multiple sources is released through more than one point.

The application for an alternative monitoring method shall contain a description of the proposed alternative monitoring system and information justifying the owner or operator's request for the alternative monitoring method such as technical or economic infeasibility or the impracticality of the affected source using the required method.

4.7 NOTIFICATION REQUIREMENTS

Section 63.9 describes the conditions and timing under which affected sources must provide notification to the EPA or the appropriate delegated authority of becoming subject to applicable requirements. It also addresses overlap of state and federal notifications, allowing that any notification required by a state (*i.e.,* the delegated authority) that contains all the information required in any notification of this section may be submitted to the EPA in lieu of the otherwise required federal notification. The specific information required in the notifications is addressed in Table 11-9 of Volume II of this document. This section also provides for adjustments to time periods or postmark deadlines for submittal and review of required communications upon mutual agreement of the owner or operator with the Administrator.

4.8 RECORDKEEPING AND REPORTING REQUIREMENTS

Section 63.10 describes the conditions and timing under which affected sources must submit reports to the EPA or the appropriate delegated authority to demonstrate compliance with applicable requirements. It also addresses overlap of state and federal reports, allowing that any report required by a state (*i.e.,* the delegated authority) that contains all the information required in a report required by this section may be submitted to the EPA in lieu of the otherwise required federal report. For an owner or operator that supervises more than one stationary source affected by more than one standard in Part 63 or by a standard in Part 63 as well as a standard in Part 60 and/or Part 61, this section allows the Administrator and the owner or operator to agree to a common schedule for which all relevant periodic reports may be submitted.

This section also indicates that, under specific conditions, progress reports pursuant to compliance extensions and startup, shutdown and malfunction reports may need to be submitted to the administrator. The submittal schedules vary according to the content of the reports. Also included in this section is the option for the owner or operator of an affected source to submit a request for a waiver of recordkeeping or reporting requirements. Contents of the Startup, Shutdown, and Malfunction Report is outlined in Table 11-8 of Volume II of this document.

4.9 CONTROL DEVICE REQUIREMENTS

Section 63.11 contains general requirements for control devices used to comply with applicable requirements in regulations in Part 63. Specifically, it requires owners or operators to monitor flares to assure that they are operated and maintained in conformance with their designs. Detailed requirements for flares are addressed in Table 10-1 in Volume II of this document.

4.10 AVAILABILITY OF INFORMATION AND CONFIDENTIALITY

Section 63.15 specifies that the following materials are deemed a matter of public record with the exception of information protected as confidential:

- Reports,
- Records,
- Information collected by the Administrator,
- Permit applications,
- Compliance plans (including compliance schedules),
- Notifications of compliance status,
- Excess emissions reports,
- Continuous monitoring system performance reports, and
- Title V permits.

5.0 DESCRIPTION OF EMISSION POINT

5.1 PROCESS VENTS

A chemical manufacturing process consists of reactors, recovery units, or a combination of the two. The design of a process will vary at each facility depending on the product, the type of process, and the design capacity. Therefore, each process will have a different number, type, and configuration of process vents.

Manufacture of organic chemicals may involve conversion and separation processes. Reactor and air oxidation processes are conversion processes involving chemical reactions that alter the molecular structure of chemical compounds and form one or more new compounds. An air oxidation process uses air, or a combination of air and oxygen, as an oxygen source in a chemical reaction. Separation processes are used to produce or recover a product from a mixture and are often used following a conversion process. Distillation, stripping, absorption, adsorption, filtration, crystallization, and extraction are all separation processes which divide chemical mixtures into distinct fractions, such as products and by-products. All of these processes have potential emission points. The process vent provisions of the hazardous organics NESHAP (HON) and the SOCMI distillation, air oxidation, and reactor processes NSPS focus primarily on vents from reactor and air oxidation processes and distillation operations. They cover both vent streams emitted directly from these operations, as well as vent streams that are emitted indirectly (e.g., through a recovery device).

Section 5.0 Description of Emission Point

Reactor processes may involve liquid-phase or gas-phase reactions. Gas-phase reactions usually have at least one recovery device used to produce a liquid product. Reactors may have an atmospheric vent, may vent to one or more recovery devices, or both. Also, any vent from a reactor or recovery device may vent to a combustion device. Figure 5-1 shows four vent types, including:

(A) Direct reactor process vents from liquid-phase reactors;

(B) Process vents from recovery devices applied to vent streams from liquid phase reactors;

(C) Process vents from gas-phase reactors after a recovery device;

(D) Process vents from combustion devices applied to vent types A, B, and C.

These four diagrams represent only a few of the possible vent configurations. For example, a reactor may have both A and B type vents, or multiple type B vents. Air oxidation reactor processes vent large quantities of vapors with low concentrations of volatile organic compounds (VOC's) because large quantities of air or air enriched with oxygen act as the oxidizing agent in

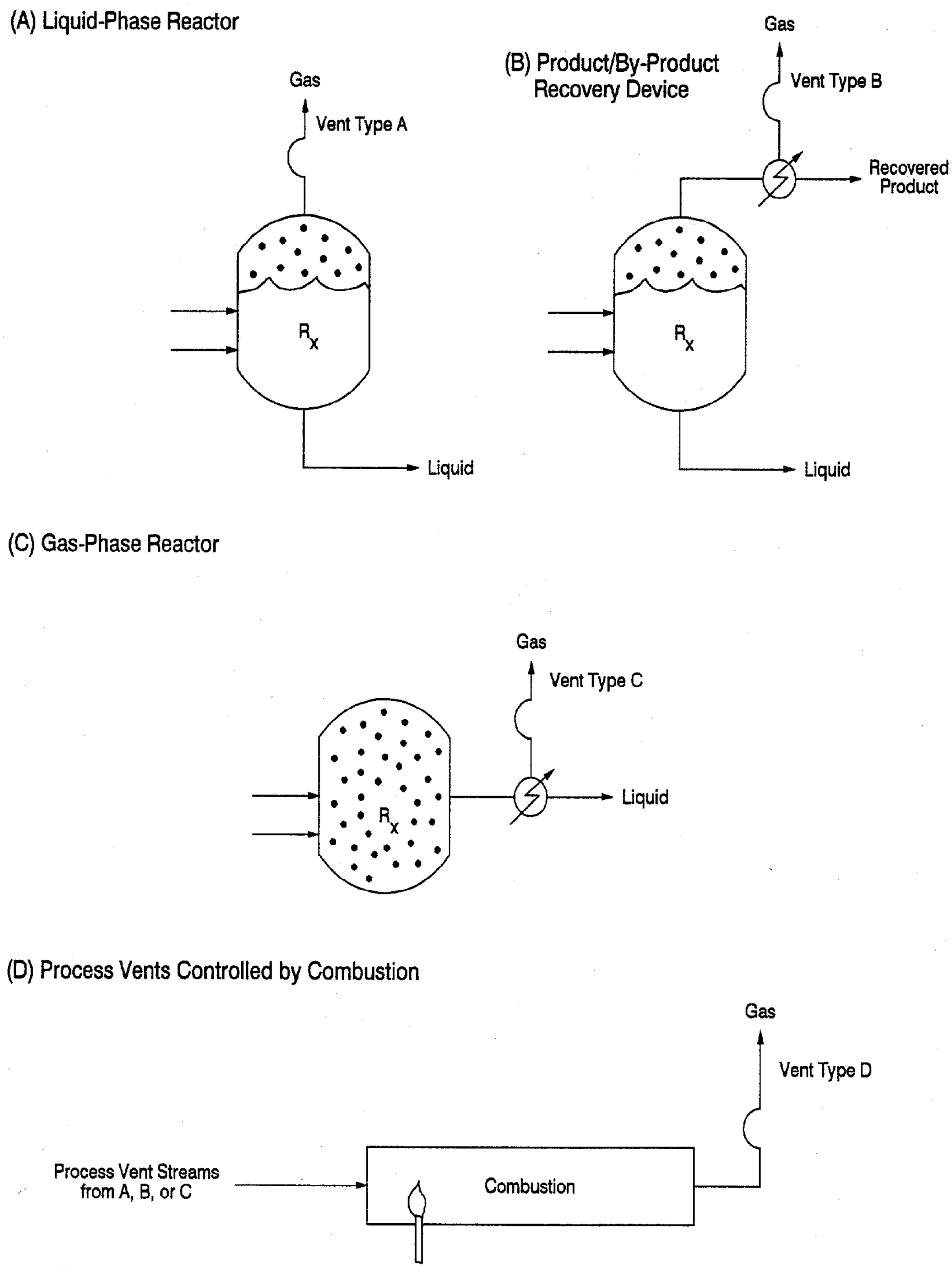

Figure 5-1. Examples of Reactor-related Vents

the process. Because of the increased air flow, these vents are typically larger in size. An air oxidation process typically occurs in a reactor over a catalyst bed, followed by a condensation/extraction process which is usually vented to the atmosphere.

Distillation is the most widely used separation process and has the potential to release larger amounts of VOC's and hazardous air pollutants (HAP's) from multiple emission points than other separation processes. Distillation processes occur at various temperatures and pressures and require varying numbers of distillation stages. Six potential emission points for atmospheric and vacuum distillation columns are shown in Figures 5-2 and 5-3. These emission points can include vents on: (1) condensers, (2) overhead receivers, (3) hot wells, (4) steam jet ejectors, (5) vacuum pumps, and (6) pressure relief valves. Strippers are a type of fractionating distillation column and will have emission points similar to those shown in Figures 5-2 and 5-3. [It should be noted that emissions from hotwells are subject to the wastewater provisions of the HON rather than the process vent provisions because the emissions result from a contaminated stream[1]. Also, pressure relief valves are not considered to be process vents in the HON because the gas stream is discharged intermittenly, not continuously during operation of the unit.]

5.2 TRANSFER OPERATIONS

The principal method of transferring liquid product to tank trucks and railcars is submerged loading, including submerged fill pipe loading and bottom loading. In submerged fill pipe loading, the fill pipe enters the vessel from the top but extends almost to the bottom of the vessel such that the fill pipe opening is completely submerged in the liquid product. In bottom loading, the fill pipe enters the vessel from the bottom, so that the fill pipe opening is positioned below the liquid level. Figures 5-4 and 5-5 illustrate submerged fill pipe and bottom loading. Both submerged loading techniques significantly reduce liquid turbulence and liquid surface area resulting in low vapor generation.

Top splash loading, rarely used in SOCMI facilities, is another loading technique in which the fill pipe enters the vessel through the top but does not extend below the surface of the liquid. This type of loading results in high vapor generation.

The loading rack is the equipment used to transfer materials into tank trucks and railcars. The loading rack and the transfer vehicle are emission points during loading operations. A typical loading rack consists of loading arms, pumps, meters, shutoff valves, relief valves, and other associated piping necessary to perform either loading or unloading operations.

Figures 5-6 and 5-7 illustrate tank truck bottom- and top-loading rack arrangements. Sections 4.1 and 4.2 of the Benzene Transfer Operation Inspection Manual[2] provide additional details, including illustrations of various transfer loading operations. They describe transfer equipment, transfer emission points, and the requirements of the Benzene NESHAP. In some cases, the requirements of the HON will differ from the requirements of the Benzene NESHAP.

5.3 STORAGE VESSELS

Two types of storage vessels are of concern in inspecting a SOCMI facility: fixed-roof storage vessels (i.e., with no internal floating roof) and floating roof storage vessels. They are exclusively above-ground and cylindrical in shape with the axis perpendicular to the foundation. There are also horizontal tanks, but these are generally smaller and not as widely used.

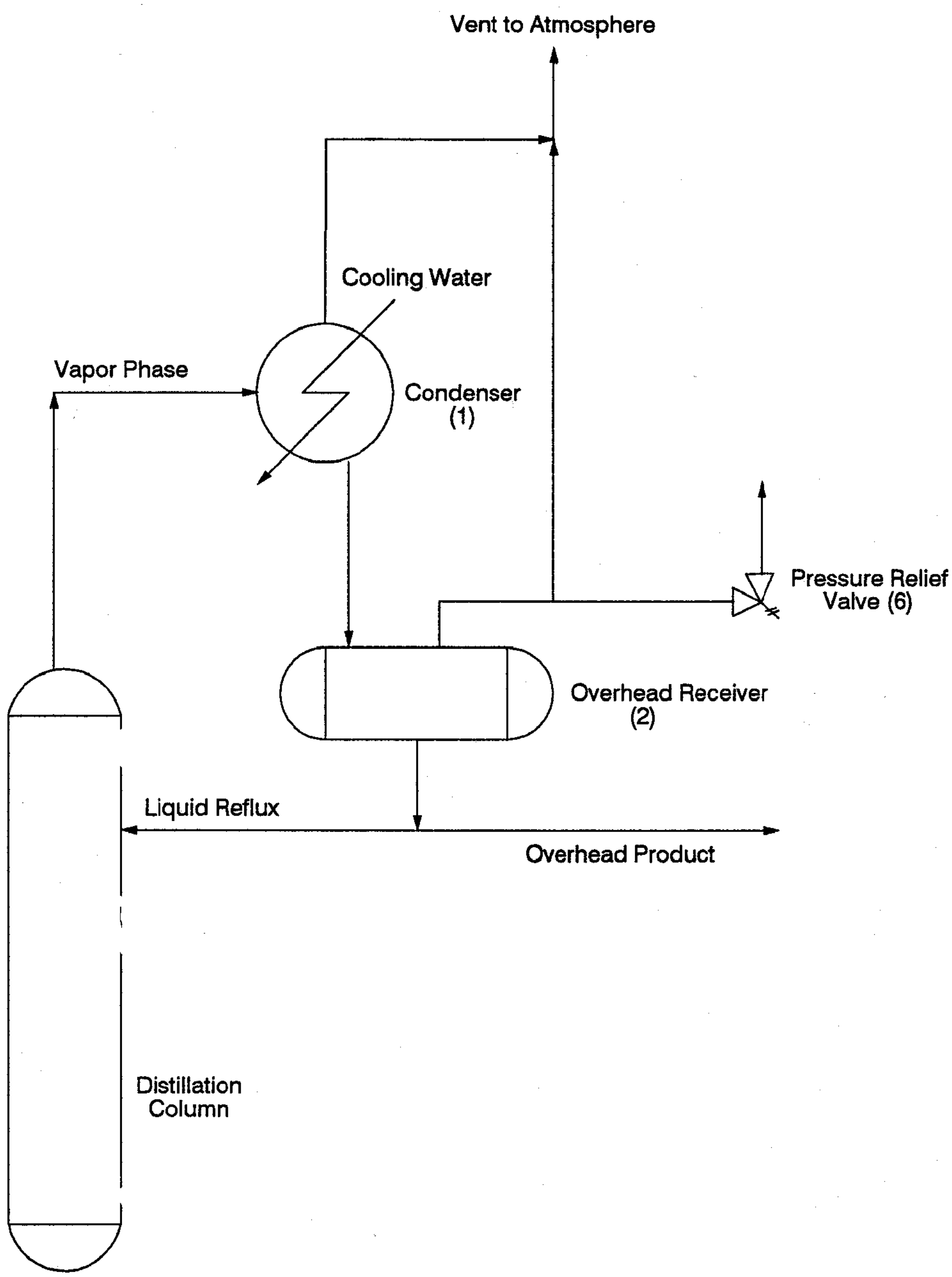

Figure 5-2. Potential VOC and HAP Emission Points for An Atmospheric (Nonvacuum) Distillation Column

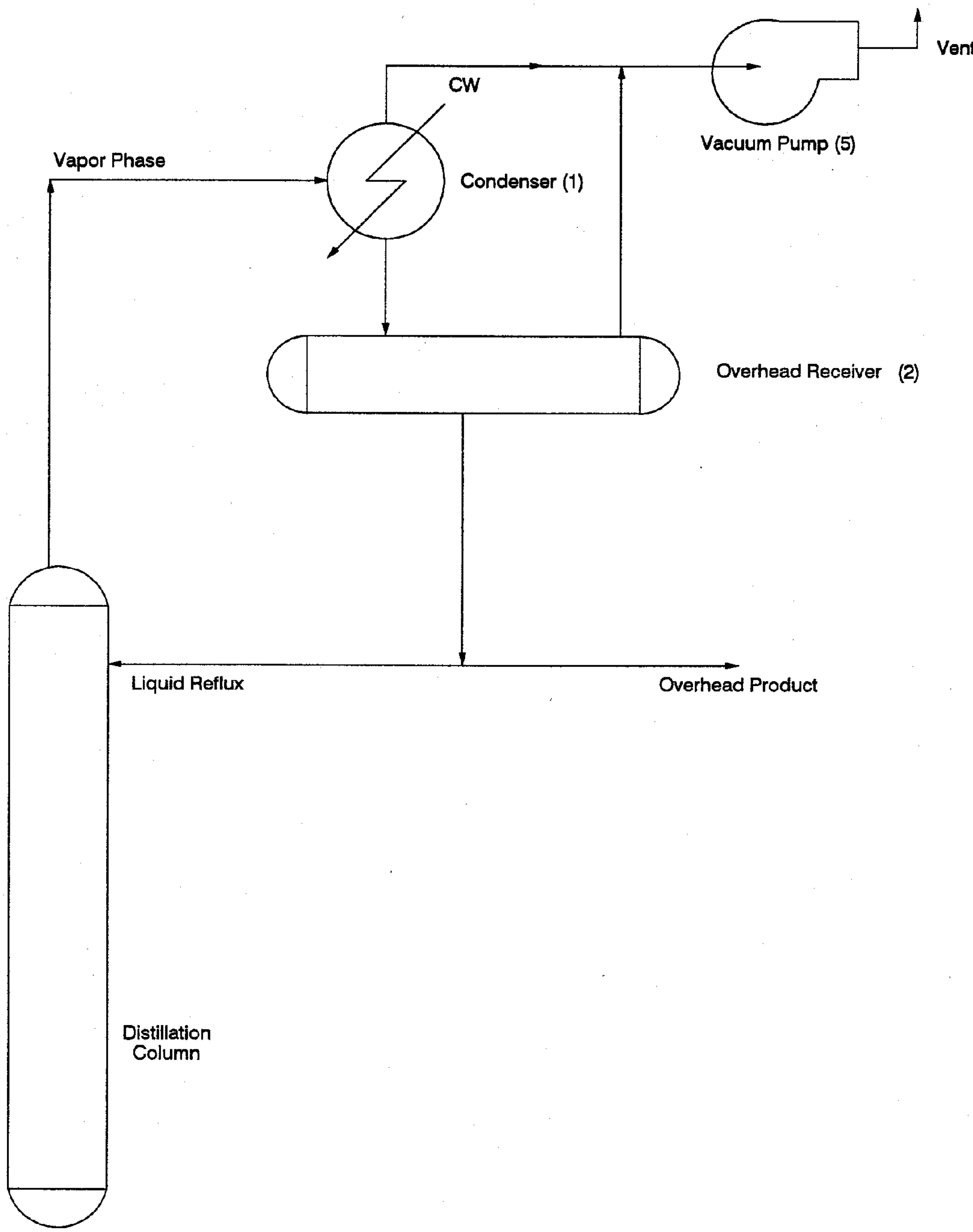

Figure 5-3. Potential VOC and HAP Emission Points for a Vaccum Distillation Column Using a Vacuum Pump

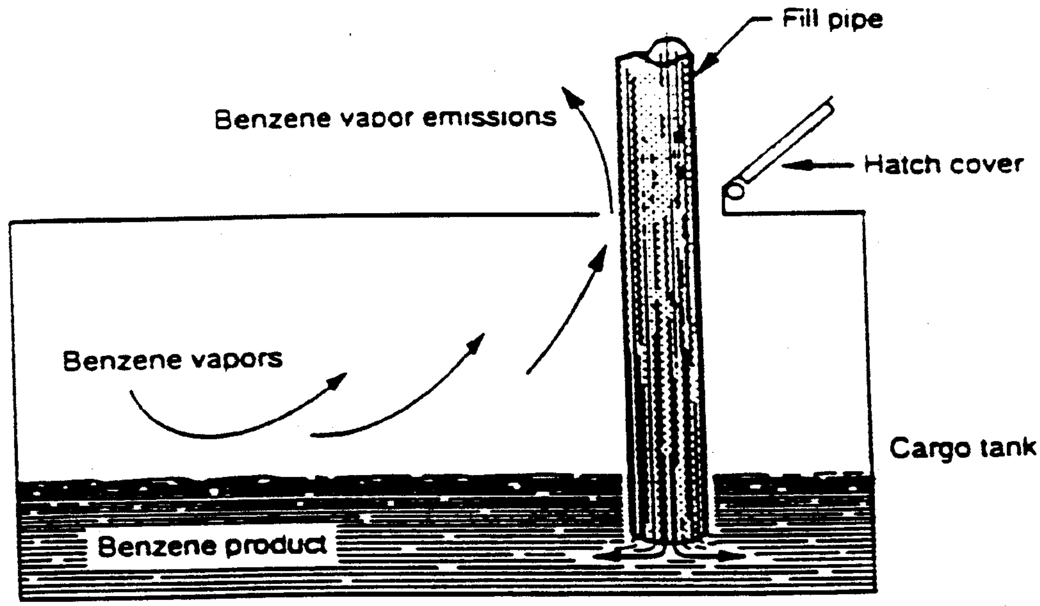

Figure 5-4. Submerged Fill Pipe

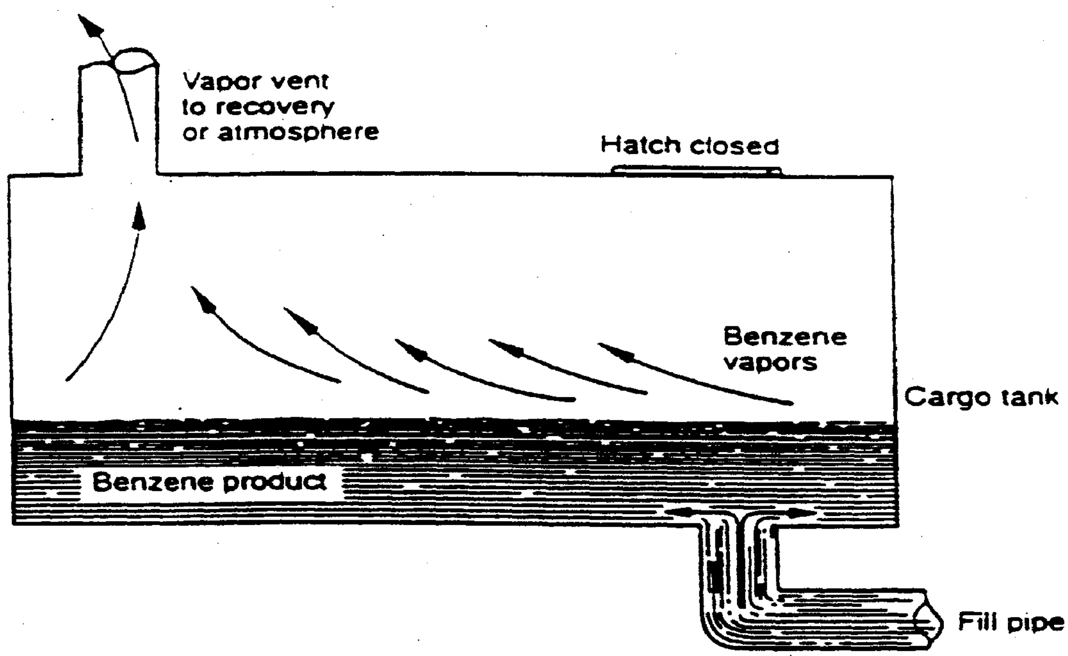

Figure 5-5. Bottom Loading

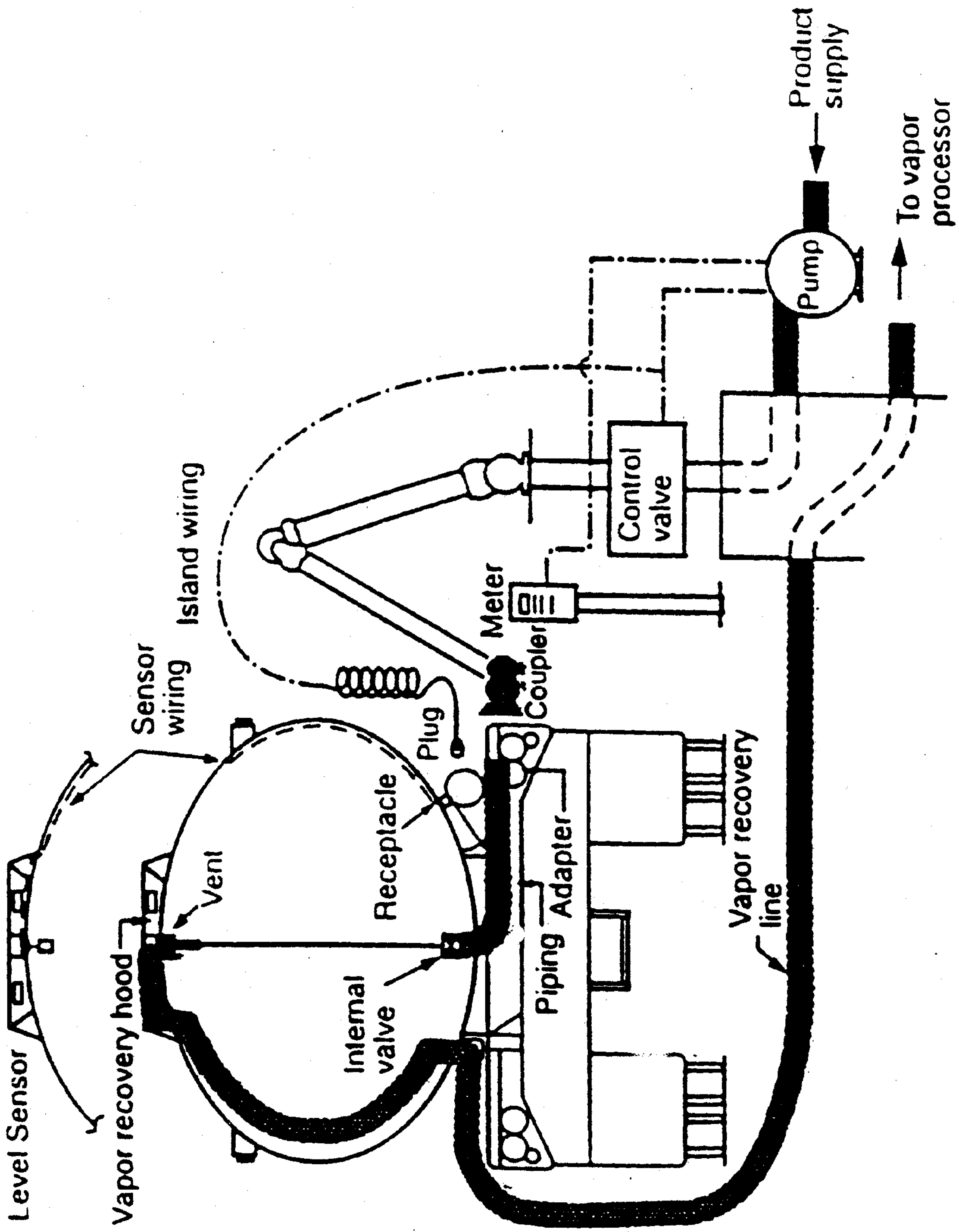

Figure 5-6. Tank Truck Bottom Loading

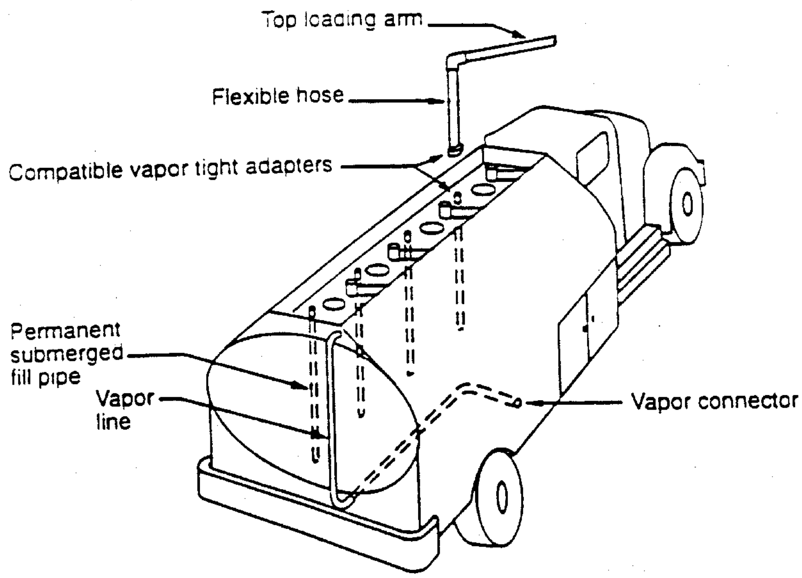

Figure 5-7. Tank Truck Top Loading

5.3.1 Fixed-Roof Storage Vessel

A typical fixed-roof vessel is a cylindrical steel shell with a cone- or dome-shaped roof permanently affixed to it. Refer to Section 4.1.1 of the Benzene Storage Inspection Manual[3] for a description of typical fixed-roof vessels and their potential emission points. Figure 5-8 illustrates a fixed-roof vessel with a closed-vent system and control device. As described in the Benzene Storage Inspection Manual[3], most emissions from these vessels are released through roof vents. Gauge hatches/sample wells, float gauges, and roof manholes on the fixed roof, which provide access to these tanks, also are potential but less significant sources of emissions.

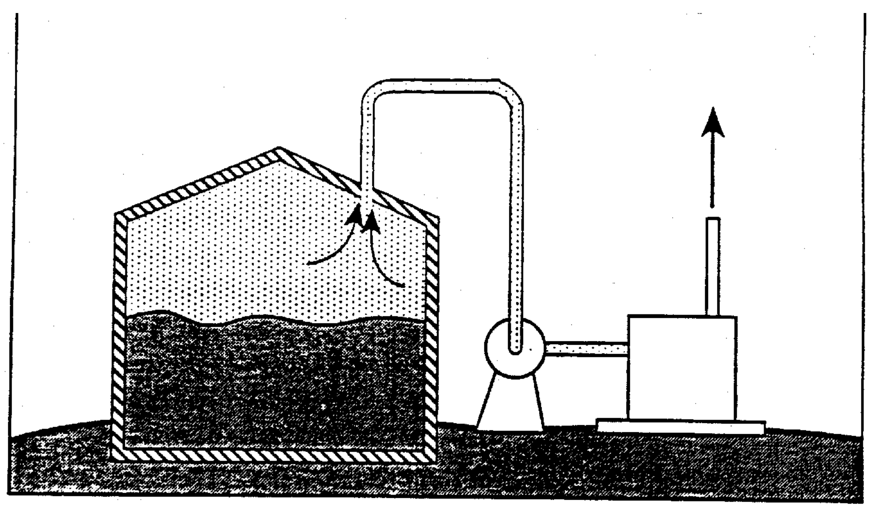

Figure 5-8. Fixed Roof Tank with Closed-Vent System and Control Device

5.3.2 Floating Roof Storage Vessel

A floating roof vessel is a cylindrical steel shell equipped with a disk-shaped deck with a diameter slightly less than the inside tank diameter. The floating deck floats freely on the surface of the stored liquid, rising and falling with the liquid level. The liquid surface is completely covered by the floating deck, except in the small annular space between the deck and the shell. A rim seal attached to the floating deck slides against the vessel wall as the deck is raised or lowered, covering the annular space where the deck is not covering the liquid. Refer to Section 4.1.2 of the Benzene Storage Inspection Manual[3] for a general description of a floating roof vessel and a general discussion of emissions from these vessels. Figure 5-9 illustrates a floating roof tank.

For compliance with the storage vessel provisions, the HON allows three specific types of floating roof storage vessels: an external floating roof (EFR) vessel, an internal floating roof (IFR) vessel (i.e., a fixed roof vessel with an IFR), and an EFR vessel converted to an IFR vessel (i.e., a fixed roof installed above an EFR). These floating roof storage vessel types are described below. Each discussion refers to specific sections and figures in the Benzene Storage Inspection Manual[3] for

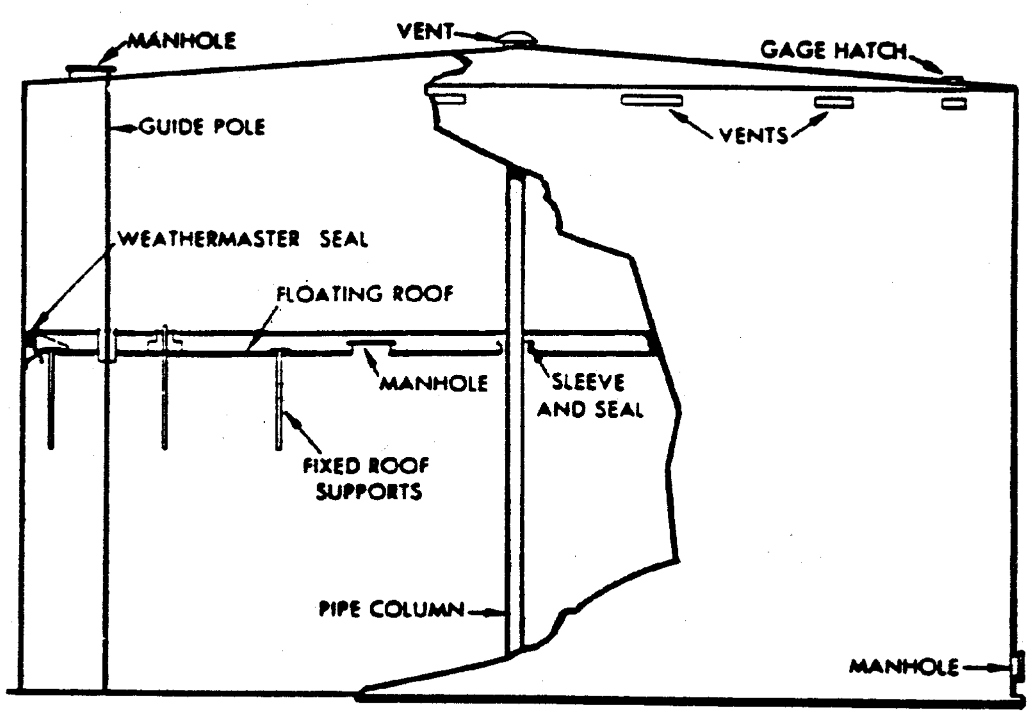

Figure 5-9. Floating Roof Tank

more detail. The sections referred to in the Benzene Storage Inspection Manual[3] include discussions about the requirements of the Benzene Storage NESHAP and descriptions of the vessel types. In some cases, the requirements in the HON will differ from the requirements of the Benzene Storage NESHAP.

5.3.2.1 External Floating Roof Vessel

An EFR vessel does not have a fixed roof; instead, its floating deck is the only barrier between the stored liquid and the atmosphere. An EFR vessel may have several types of rim seals and deck fittings. Figure 5-10 shows an EFR vessel. Refer to Section 4.1.2.1 of the Benzene Storage Inspection Manual[3] for a description of a typical EFR vessel and associated emissions. Two types of deck fittings, a gauge hatch and a sampling port, are not shown in Figure 5-10, but are mentioned in Section 4.1.2.1 of the Benzene Storage Inspection Manual,[3] Rim seals associated with EFR vessels are described in Section 4.1.2.3 of the Benzene Storage Inspection Manual[3] and the associated figures.

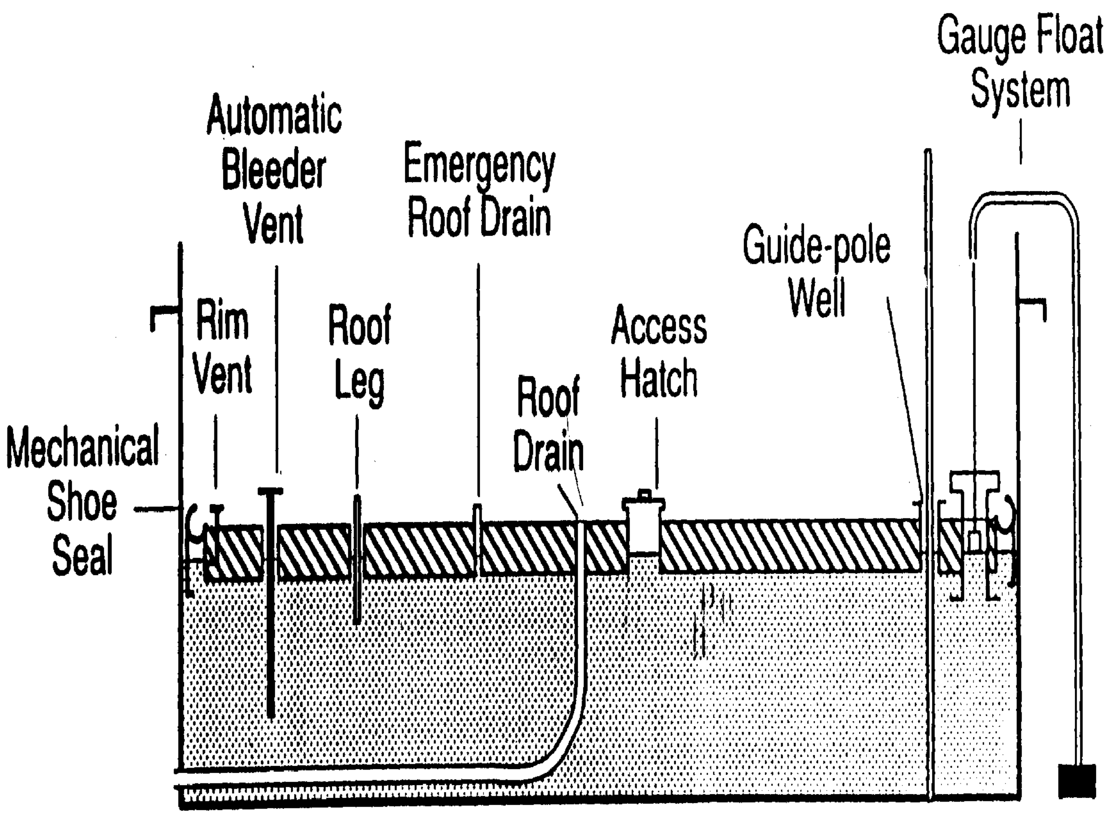

Figure 5-10. External Floating Roof Tank

5.3.2.2 Internal Floating Roof Vessel

An IFR vessel is equipped with a permanently affixed roof above the floating deck. Refer to Section 4.1.2.2 of the Benzene Storage Inspection Manual[3] for details. Figure 5-11 illustrates an IFR vessel. In reviewing Figure 5-11, note that the deck fittings and the rim space vent for a mechanical shoe seal are not shown. A rim space vent is illustrated in Figure 5-10 an EFR vessel, and would be the same on an IFR vessel equipped with a mechanical shoe seal. Seals associated with IFR vessels are described in Section 4.1.2.3 of the Benzene Storage Inspection Manual[3] and the associated figures.

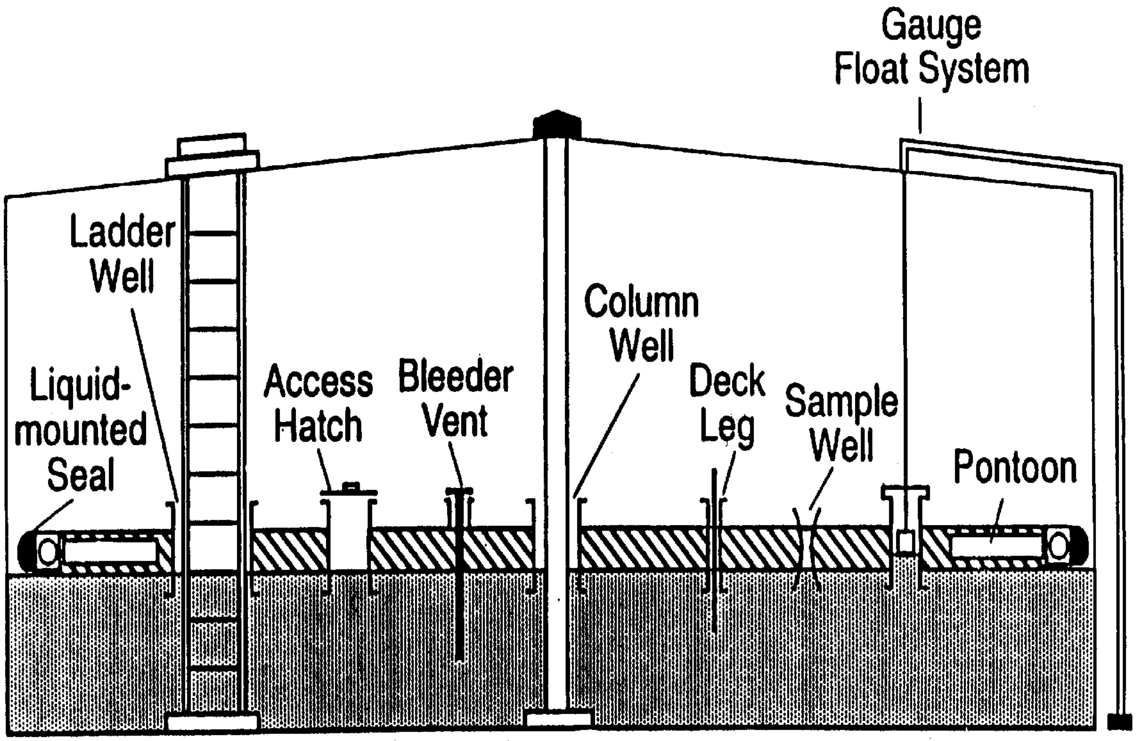

Figure 5-11. Internal Floating Roof Tank

5.3.2.3 External Floating Roof Vessel Converted to an Internal Floating Roof Vessel

The HON specifies that an EFR vessel may be converted to an IFR vessel in order to comply with the storage provisions. This conversion is accomplished by affixing a permanent roof to an EFR vessel, above the floating deck, and equipping the EFR with a seal mechanism equivalent to those required for an IFR. These converted vessels would have the external appearance of an internal floating roof vessel, deck fittings required for an external floating roof vessel, and a rim seal with the characteristics of an IFR vessel. Figure 5-11 shows the characteristics of the permanently affixed roof applicable to a vessel converted from an EFR to an IFR, and Figure 5-10 shows the characteristics of the floating deck applicable to an EFR converted to an IFR. The types of seals applicable to an EFR converted to an IFR would be the same as those for an IFR vessel described in Section 4.1.2.3 of the Benzene Storage Inspection Manual[3] and its associated figures.

5.4 WASTEWATER

The HON regulates wastewater streams that are generated when HAP's listed on Table 9 of Subpart G of the HON exit the last recovery device or chemical manufacturing process unit equipment. Water that contacts HAP's may be categorized as in-process liquid streams, process wastewater, maintenance wastewater, or cooling water. Process wastewater is in-process liquid streams that have been discarded and constitutes the majority of wastewater generated at a SOCMI facility. There are requirements under the HON applicable to in-process liquid stream. Maintenance wastewater is generated periodically. Cooling water is not categorized as wastewater.

In addition to the process wastewater requirements, the HON regulates the emissions from certain process waters. Specifically, it provides control requirements for equipment coming in contact with certain liquid streams containing hazardous air pollutants in open systems within the manufacturing process.

Examples of process wastewater include, but are not limited to, water used to wash impurities from organic products or reactants, water used to cool or quench organic vapor streams through direct contact, condensed steam from jet ejector systems pulling vacuum on vessels containing organics, product and feed tank drawdown. Maintenance wastewater streams include, but are not limited to, those generated by descaling heat exchanger tubing bundles, cleaning distillation column traps, draining of pumps into an individual drain system, and wastewater generated during equipment washes and spill cleanups. Cooling water is water that has been contaminated with organic HAP's by leaking heat exchange systems.

Process wastewater typically passes through a series of collection units and primary and secondary treatment units. As defined in the HON, the wastewater emission point at a SOCMI source comprises numerous pieces of equipment such as wastewater tanks, surface impoundments, containers, individual drain systems, oil-water separators, treatment systems, closed-vent systems, and control devices. The wastewater requirements of the HON apply at the point where the wastewater stream exits the last recovery device. Each of the wastewater collection and treatment units must be inspected to ensure compliance with the HON.

Collection and treatment scenarios for process wastewater are facility-specific. The flow rate and organic composition of process wastewater streams at a particular facility are functions of the processes used and influence the sizes and types of collection and treatment units that must be employed. Table 5-1 lists common components of wastewater collection and treatment systems at SOCMI facilities. The following sections briefly discuss each of these emission components. A detailed discussion of wastewater collection and treatment systems, including diagrams, typical design parameters, emission mechanisms, and factors affecting emissions, is contained in the Control Technology Center (CTC) document.[4] In addition, emission estimation models and example calculations for VOC emissions are presented in Appendices A and B of the same document.

TABLE 5-1. COMMON COMPONENTS OF WASTEWATER COLLECTION SYSTEMS AND TREATMENT PROCESSES

Waste Management Units and Treatment Processes[a]:

Biological treatment basins
Clarifiers
Containers
Drains
Equalization basins or neutralization basins
Junction boxes
Lift stations
Manholes
Oil-water separators
Steam strippers
Sumps
Surface impoundments
Treatment tanks
Trenches
Weirs

[a]This list includes equipment that may be handling in-process streams and not handling wastewater.

5.4.1 Individual Drain Systems

Wastewater streams from various equipment throughout a given process are introduced into the collection system through process drains. Individual drains usually connect directly to the main process sewer line, but may also drain to trenches, sumps, or ditches. Some drains are dedicated to a single piece of equipment, while others, known as area drains, serve several units. In the HON, "individual drain system" is defined as the stationary system used to convey wastewater streams or residuals to a waste management unit or to discharge or disposal. The term includes all hard-piping, process drains and junction boxes, together with their associated sewer lines and other junction boxes, manholes, sumps, and lift stations conveying wastewater streams or residuals. A segregated stormwater sewer system, which is a drain and collection system designed and operated for the sole purpose of collecting rainfall-runoff at the facility, and which is segregated from all other individual drain systems, is excluded from the definition.

5.4.2 Manholes

Manholes are service entrances into process sewer lines that permit inspection and cleaning of the sewer line. They are placed at periodic lengths along the sewer line or where sewers intersect or change significantly in direction, grade, or line diameter. A typical manhole opening is about 2 ft in diameter and is covered with a heavy cast-iron plate that contains two to four holes so that the manhole cover can be more easily grasped for removal.

5.4.3 Trenches

Trenches are used to transport wastewater from the point of process equipment discharge to wastewater collection units. In older plants, trenches may be the primary mode of wastewater transportation in the collection system. Trenches are often interconnected throughout the process area and handle equipment pad water runoff, water from equipment wash down and spill cleanups, and process wastewater discharges. Trench length is determined by the locations of the process equipment and the downstream collection system units, and typically ranges from 50 to 500 ft. Depth and width are dictated by the flow rate of the wastewater discharged from process equipment and must be sufficient to accommodate emergency wastewater flows from the process equipment. Trenches are typically open or covered with grates.

5.4.4 Sumps

Sumps are used to collect and equalize wastewater flow from trenches before treatment. They are usually quiescent and open to the atmosphere. Sumps are sized based on the total flow rate of the incoming wastewater stream.

5.4.5 Junction Boxes

A junction box is defined as a manhole or access point to a wastewater sewer line or lift station. A junction box may combine multiple wastewater streams into one stream which flows downstream. Generally, the flow rate from the junction box is controlled by the liquid level in the junction box. Junction boxes are either square or rectangular and are sized based on the total flow rate of the entering streams. Junction boxes are typically open, but may be closed (for safety) and vented to the atmosphere.

5.4.6 Lift Stations

A lift station is normally the last collection unit before the treatment system and accepts wastewater from one or several sewer lines. The main function of the lift station is to collect wastewater for transport to the treatment system. A pump provides the necessary head pressure for transport and is usually designed to switch on and off based on preset high and low liquid levels. Lift stations are typically rectangular in shape and greater in depth than length or width and are either open or closed and vented to the atmosphere.

5.4.7 Weirs

Weirs act as dams in open channels. The weir face is usually aligned perpendicular to the bed and the walls of the channel. Water from the channel normally overflows the weir but may pass through a notch, or opening, in the weir face. Because of this configuration, weirs provide some control over the level and flow rate through the channel. Weirs may also be used for wastewater flow rate measurement. Water overflowing the weir may proceed down steps, which aerates the wastewater. This increases diffusion of oxygen into the water, which may benefit the biodegradation process (often the next treatment step). However, this increased contact with air also accelerates the volatilization of organic compounds contained in the wastewater.

5.4.8 Oil-Water Separators

Oil-water separation is often the first step in wastewater treatment, but oil-water separators may also be found in the process area. These units separate and remove oils, scum, and solids from the wastewater by gravity. Most of the separation occurs as the wastewater stream passes through a quiescent zone in the unit. Oils and scum with specific gravities less than water float to the top of the aqueous phase, while heavier solids sink to the bottom. Some of the organic compounds contained in the wastewater will partition to the oil phase and then can be removed with the skimmed oil, leaving the separated water.

5.4.9 Equalization Basins

Equalization basins are used to reduce fluctuations in the temperature, flow rate, pH, and organic compound concentrations of the wastewater going to the downstream treatment processes. The equalization of the wastewater flow rate results in more uniform effluent quality from downstream units and can also benefit biological treatment performance by damping any influent concentration and flow rate fluctuations. This damping protects biological processes from upset or failure caused by shock loadings of toxic or treatment-inhibiting compounds. Equalization basins normally use hydraulic retention time to ensure equalization of the wastewater effluent leaving the basin. However, some basins are equipped with mixers or surface aerators to enhance the equalization, accelerate wastewater cooling, or saturate the wastewater with oxygen before secondary treatment.

5.4.10 Treatment Tanks

Several different types of treatment tanks may be used in wastewater treatment systems. Tanks designed for pH adjustment are typically used preceding the biological treatment step. In these tanks, the wastewater pH is adjusted using acidic or alkaline additives to prevent shocking the biological system downstream. Flocculation tanks, on the other hand, are usually used to treat wastewater after biological treatment. Flocculating agents are added to the wastewater to promote the formation or agglomeration of larger particle masses from the fine solids formed during biological treatment. These larger particles precipitate more readily out of the wastewater in the clarifier, which usually follows flocculation in the treatment system.

5.4.11 Biological Treatment Basins

Biological waste treatment is normally accomplished using aeration basins. Microorganisms require oxygen to carry out the biodegradation of organic compounds, which results in energy and biomass production. The aerobic environment in the basin is normally achieved with diffused or mechanical aeration. This aeration also maintains the biomass in a well-mixed regime. The performance of aeration basins is particularly affected by (1) mass of organics per unit area of wastewater, (2) temperature and wind patterns, (3) hydraulic retention time, (4) dispersion and mixing characteristics, (5) characteristics of the solids in the influent, and (6) amount of essential microbial nutrients present.

5.4.12 Clarifiers

The primary purpose of a clarifier is to separate solids from wastewater through gravitational settling. Most clarifiers are equipped with surface skimmers to clear the water of floating oil deposits, grease, and scum. Clarifiers also have sludge-raking arms that remove the accumulation of organic solids that collects at the bottom of the tank. The depth and cross-sectional area of a clarifier are functions of the settling rate of the suspended solids and the thickening characteristics of the sludge. Clarifiers are designed to provide sufficient retention time for the settling and thickening of these solids.

5.4.13 Surface Impoundments

Surface impoundments are used for evaporation, polishing, storage before further treatment or disposal, equalization, leachate collection, and as emergency surge basins. They may be quiescent or mechanically agitated.

5.4.14 Containers

Containers which are compatible with the material(s) held may be used to collect residuals generated by treatment prior to offsite shipment and for other purposes that require mobility. Containers may vary in size and shape ranging from a 55-gallon drum to a tanker truck.

5.5 REFERENCES

1. Memorandum from Paul, D., J.A. Probert, and R. Mead (Radian Corporation), to Dr. Janet S. Meyer (U.S. Environmental Protection Agency, Standards Development Branch). Characterization of Product Accumulator Vessels. January 18, 1994. p. 20.

2. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Stationary Source Compliance Division. Level II Inspection Manual: Benzene Transfer Operation. Washington, DC. January 1993.

3. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Stationary Source Compliance Division. NESHAP Inspection Manual: Benzene Storage Vessels. EPA-455/R-92-006. Washington, DC. September 1991.

4. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Office of Research and Development. Control Technology Center, Industrial Wastewater Volatile Organic Compound Emissions - Background Information for BACT/LAER Determinations. EPA 450/3-90-004. Research Triangle Park, NC. January 1990.

6.0 DESCRIPTION OF EMISSION CONTROL TECHNOLOGIES

Combustion is the most universally applicable technique for control of organic HAP and VOC emissions. Combustion devices can be applied to reactor, air oxidation, and distillation process vents, storage vessels, or emissions from transfer racks and wastewater streams and can achieve efficiencies of 98 percent reduction in organic HAP or VOC emissions, or an outlet HAP or VOC concentration of 20 parts per million by volume (ppmv) dry basis, corrected to 3 percent oxygen. Combustion control devices are described in Section 6.1.

As described in Section 5.1, recovery devices are used in many chemical manufacturing processes. The most common types of recovery devices are described in Section 6.2. Recovery devices are not considered "control devices" for purposes of meeting the 98 percent reduction requirements of the process vents provisions of the HON. However, the HON allows the use of recovery devices to achieve compliance if certain conditions are met. If a recovery device is used to increase the total resource effectiveness (TRE) index value to greater than 1.0, then the process vent is considered to be in compliance. The TRE is an index of the cost effectiveness of control and is calculated from measurements or estimates of vent stream flow and HAP and VOC concentrations after the final recovery device. A recovery device may also be used alone or in combination with one or more control devices to meet the 98 percent reduction if the following three conditions are met: (1) the control system was installed before December 31, 1992; (2) the recovery device used to meet the 98 percent reduction is the last recovery device before release to the atmosphere; and (3) the recovery device alone or in combination with one or more control devices can meet the 98 percent reduction but is not capable of reliably reducing emissions to a concentration of 20 ppmv or less.

Section 6.0 Description of Emission Control Technologies

A recapture device may also be used to meet the 98 percent reduction or 20 ppmw concentrations. Recapture devices are considered control devices for the purposes of the process vent provisions and are the same types of devices as recovery devices, however the material that is recovered is not normally used, reused, or sold. For example, the materials may be recovered primarily for disposal. The most common recapture devices are also described in Section 6.2.

Information on the specific compliance options for process vents, transfer operations, storage vessels, and wastewater streams are presented in Section 7.

6.1 COMBUSTION CONTROL DEVICES

Combustion control devices include incinerators, flares, boilers, and process heaters. Combustion control devices operate on the principle that any VOC heated to a high enough temperature in the presence of sufficient oxygen will oxidize to carbon dioxide and water. The theoretical combustion temperature varies because VOC's are oxidized at different temperatures, depending on their properties. A consistent VOC destruction efficiency can usually be achieved in combustion devices, regardless of the amount and type of VOC in the vent stream. Scrubbers can be used downstream of combustion control devices (other than flares) to treat halogenated streams. Scrubbers reduce emissions of halogens and hydrogen halides, such as chlorine and hydrogen chloride, formed during combustion.

6.1.1 Thermal Incinerators

Thermal incinerators are usually refractory-lined chambers containing a burner (or set of burners). An efficient thermal incinerator provides: (1) a chamber temperature high enough to completely oxidize the VOC's; (2) sufficient mixing of combustion products, air, and the process vent streams; and (3) sufficient residence time to allow for complete oxidation of VOC's. Figure 6-1 shows the premixing chamber and combustion chamber of a discrete burner thermal incinerator. As shown in the figure, heat can be recovered to preheat combustion air or the process vent stream, or to generate steam. All thermal incinerators operate using excess air to ensure a sufficient supply of oxygen.

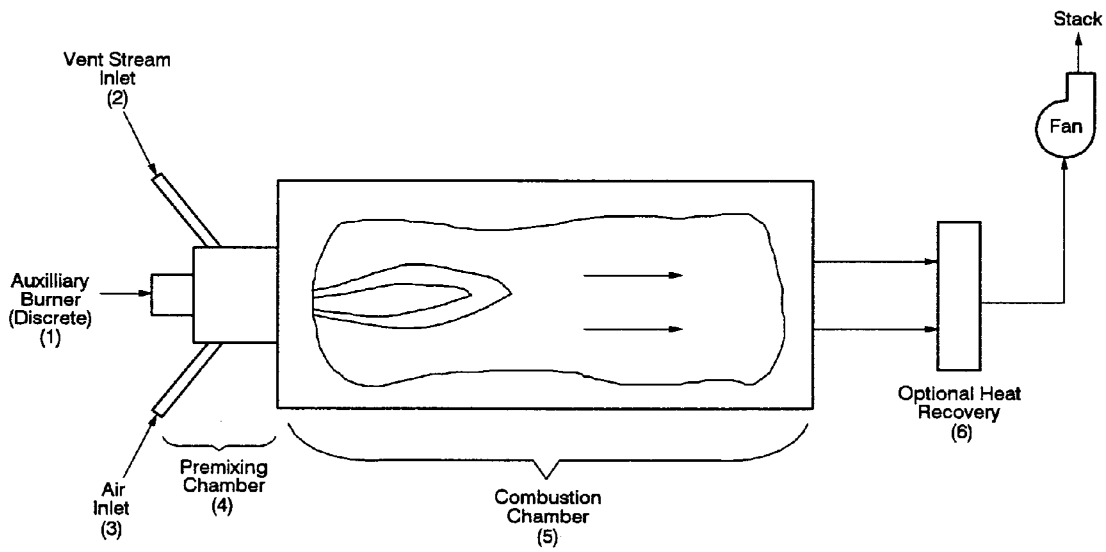

Figure 6-1. Discrete Burner, Thermal Incinerator

Thermal incinerators can achieve at least 98 percent destruction for most VOC's. For vent streams with VOC concentrations below 1,000 ppmv, all new thermal incinerators can achieve outlet concentrations of 20 ppmv or lower. Thermal incinerators are technically feasible control options for most vent streams. Excessive fluctuations in flow rate may prevent the use of a thermal incinerator; in such situations, a flare could be used.

6.1.2 Catalytic Incinerators

Catalytic incinerators operate at lower temperatures than thermal incinerators because some VOC's are oxidized at lower temperatures in the presence of a catalyst. A schematic of a catalytic incinerator is shown in Figure 6-2. The vent stream is preheated in the mixing chamber, and oxidation takes place on the catalyst bed. As with thermal incinerators, heat can be recovered from the exiting gas stream.

Catalytic incinerators can achieve overall VOC destruction efficiencies of 95 to over 98 percent. The efficiency depends on temperature, oxygen content, catalyst activity, and the characteristics and concentration of the VOC. Catalytic incinerators are typically used for vent streams with stable flow rates and stable concentrations. They cannot be used on vent streams that poison or block

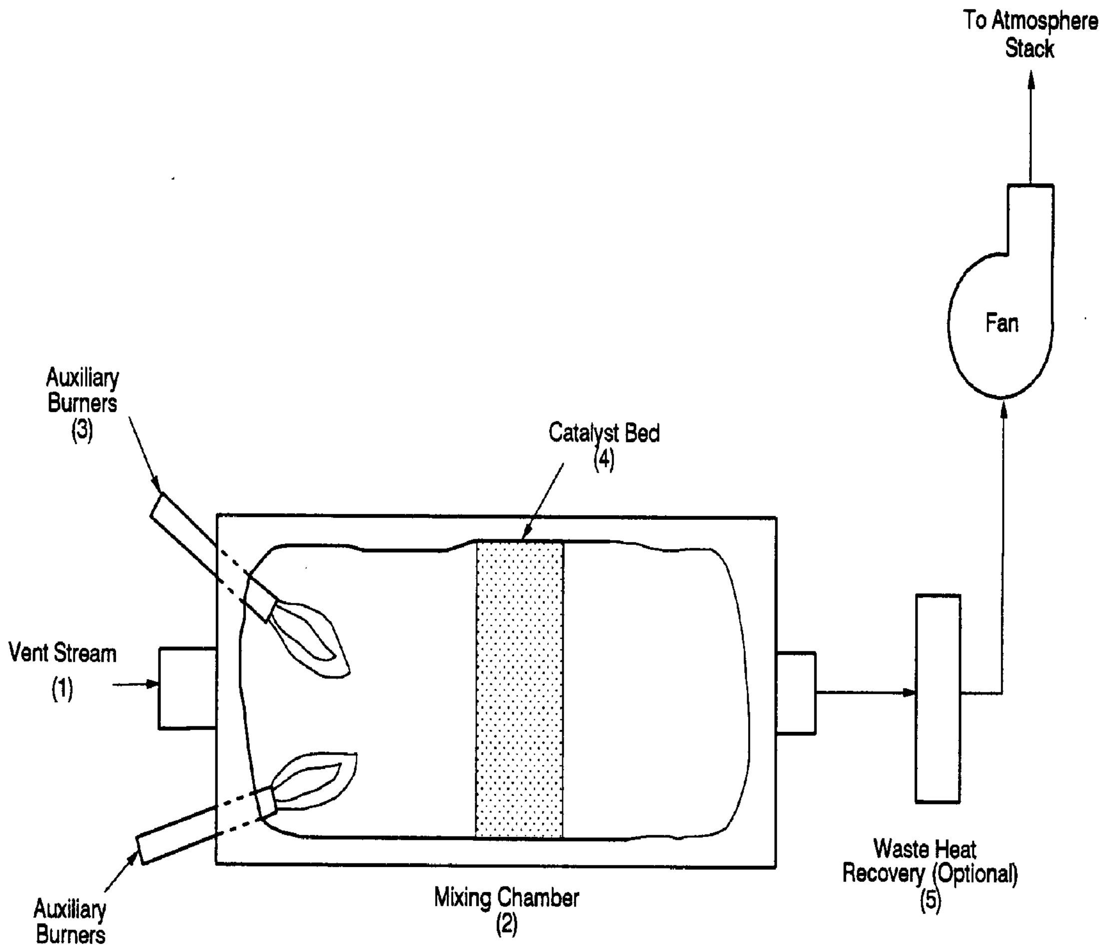

Figure 6-2. Catalytic Incinerator

the catalyst reactive sites, or on vent streams with high inlet concentrations or flow rates.

6.1.3 Industrial Boilers and Process Heaters

Industrial boilers and process heaters combust VOC's by incorporating the vent stream into the inlet fuel or by feeding the vent stream into the boiler or heater through a separate burner. Industrial boilers are used to produce steam. When boilers fire natural gas, forced- or natural-draft burners mix the incoming fuel and combustion air. A VOC-containing vent stream can be added to this mixture or it can be fed into the boiler through a separate burner. The majority of industrial boilers used in the chemical industry are of watertube design, where hot combustion gases contact the outside of heat transfer tubes which contain hot water and steam. Process heaters are used to raise the temperature of process streams using a similar tube design, where the process fluids are contained in the tubes. Heat recovery from the exiting gas stream is achievable for both industrial boilers and process heaters.

Boilers and process heaters can achieve efficiencies of at least 98 percent. They can be used to reduce VOC emissions from any vent streams that will not reduce the performance or reliability of the boiler or process heater. For example, the varying flow rate and organic content of some vent streams can lead to explosive mixtures or flame instability. Boilers and process heaters are most applicable where the potential exists for heat recovery from the combustion of the vent stream. Vent streams with a high VOC concentration and high flow rate can provide enough equivalent heat value to act as a substitute for fuel. Because boilers and process heaters cannot tolerate wide fluctuations in the fuel supply, they are not widely used to reduce VOC emissions from batch operations and other noncontinuous vent streams. Vent streams with sulfur or halogenated compounds are not usually combusted in boilers or process heaters because these streams are corrosive.

6.1.4 Flares

Flaring is an open combustion process in which the oxygen necessary for combustion is provided by the air around the flame. High combustion efficiency in a flare is governed by flame temperature, residence time of the organic compound in the combustion zone, turbulent mixing to complete the oxidation reaction, and the amount of available oxygen. Steam-assisted elevated flares are the most common type used in the chemical industry (see Figure 6-3). The high flow rate of the vent stream into the flare requires more combustion air than diffusion of the surrounding air to the flame can supply. Steam injection nozzles are added to increase gas turbulence.

Flares can achieve 98 percent destruction efficiencies. Flares are most applicable to vent streams with wide flammability limits, low auto-ignition temperatures, and high heat contents. Flares can be designed to control both normal process releases and emergency upsets. Flares can be used to control almost any VOC stream and can handle fluctuations in VOC concentration, flow rate, heat content, moisture content, and inerts content. Flaring is appropriate for continuous, batch, and variable flow vent streams. However, halogenated or sulfur-containing vent streams are usually not flared because they can corrode the flare tip or cause the formation of acid gases or sulfur dioxide. The HON provisions do not allow vent streams above a specified halogen content to be routed to a flare.

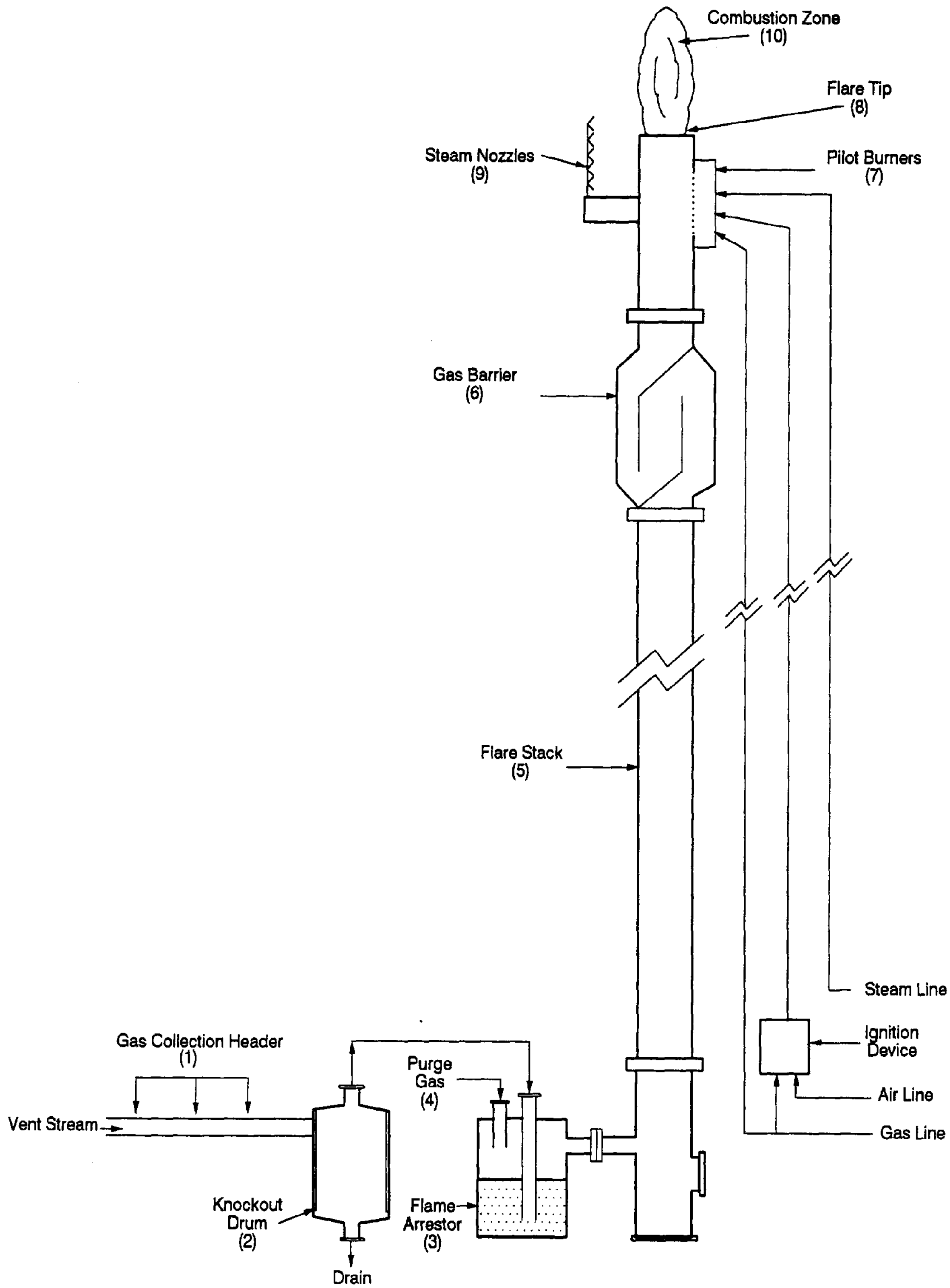

Figure 6-3. Steam-Assisted Elevated Flare System

6.1.5 Halogenated Streams

Combustion equipment used for control of halogenated streams is usually followed by additional control equipment to remove corrosive combustion products (acid gases). The flue gas temperature is lowered, and the flue gas is then routed to a halogen reduction device such as a packed tower or liquid jet scrubber. Absorption equipment (e.g., scrubbers) can also be used as recovery devices and are discussed in Section 6.2 of this manual.

6.2 PRODUCT RECOVERY AND RECAPTURE DEVICES

Product recovery devices and recapture devices include absorbers, carbon adsorbers, and condensers, and the specific device used is determined by the vent stream characteristics. These characteristics affect the performance of recovery or recapture devices, therefore no single technology is applicable to all vent streams.

6.2.1 Condensers

Condensation is a separation technique in which one or more volatile components are separated from a vapor mixture through saturation followed by a phase change. Condensation can be achieved by lowering the temperature at a constant pressure, and refrigeration can be used to obtain the lower temperatures needed for compounds with lower boiling points.

Surface condensers and direct contact condensers are the two most commonly used types. In surface condensers, heat transfer occurs through tubes or plates in the condenser. Thus, the coolant fluid does not contact the vent stream which allows for reuse of the coolant fluid. Furthermore, the VOC's can be directly recovered from the gas stream. A shell-and-tube condenser which circulates the coolant fluid on the tube side is shown in Figure 6-4. Direct contact condensers spray the coolant directly into the vent stream. Therefore, the coolant cannot be reused directly and VOC's cannot be recovered without further processing.

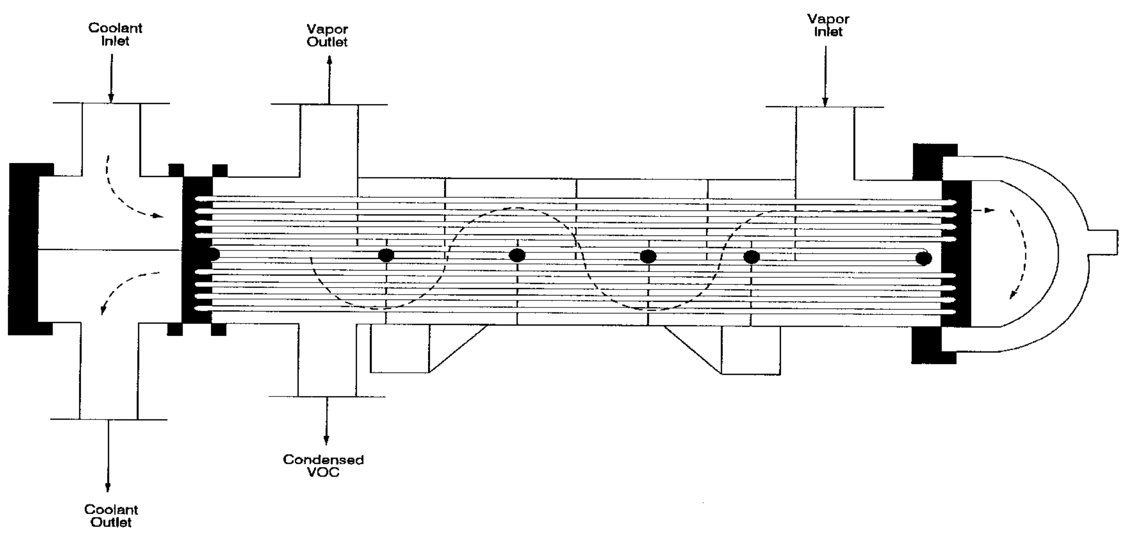

Figure 6-4. Schematic Diagram of a Shell and Tube Surface Condenser

Condensers may be used to recover raw materials and/or products. The removal efficiencies of condensers range from 50 to 95 percent, and the efficiency is dependent upon the vent stream flow rate, concentration, temperature, moisture content, and physical properties. Condensers are more economically feasible for streams with higher condensation temperatures. Vent streams with high concentrations of non-condensables will require a condenser with a larger surface area.

6.2.2 Adsorption

Adsorption is a mass-transfer operation where the gas-phase (adsorbate) is captured on the solid-phase (adsorbent) by physical or chemical means. A physically adsorbed molecule is easily removed from the adsorbent, whereas, the removal of chemisorbed molecules is much more difficult.

The most common industrial adsorption systems use activated carbon as the adsorbent. Activated carbon captures organic vapors by physical adsorption. Since oxygenated adsorbents selectively capture water vapor, they are not suitable for high-moisture process vent streams. Activated carbon beds are regenerated with steam or nitrogen which release the captured vapors. Figure 6-5 shows a typical fixed-bed, regenerative carbon adsorption system. When one bed is saturated, the vent stream is routed to an alternate bed while the saturated carbon bed is regenerated. The steam-laden vapors from regeneration are sent to a condenser and then to a VOC recovery system to separate the VOC's from the condensed steam.

Continuous VOC removal efficiencies of more than 95 percent are achievable using adsorption. The VOC removal efficiency of an adsorption unit depends on the vent stream characteristics, the physical properties of the compounds in the vent stream and of the adsorbent, and the condition of the bed. Carbon adsorption is not recommended for vent streams with high VOC concentrations, high or low molecular weight compounds, mixtures of high and low boiling point VOC's, or vent streams with a high moisture content.

6.2.3 Absorption

Absorption is the selective transfer of one or more components of a gas mixture (solute) into a liquid solvent. Devices based on absorption principles include spray towers, Venturi and wet impingement scrubbers, packed columns, and plate columns. Spray towers have the least effective mass transfer capability and are generally restricted to particulate matter removal and control of high-solubility gases. Venturi scrubbers are also limited to particulate matter and high-solubility gases. Therefore, VOC control by gas absorption is limited to packed or plate columns. A countercurrent packed column is shown in Figure 6-6.

Control efficiencies for absorbers vary from 50 to greater than 95 percent. Efficiency depends on the selected solvent, the contact surface area (absorber size), and the temperature. The applicability of absorption to vent streams is dependent on the availability of a suitable solvent, and the solubility of the VOC in the solvent. If a VOC cannot be easily desorbed from the solvent, then absorption is less viable. Absorption is usually considered for streams with a VOC concentration above 200 to 300 ppmv.

Scrubbers are used downstream of combustion devices to control emissions of halogens and halogen halides formed during combustion. The typical scrubbing solvents used are water or a caustic solution. Either plate or packed bed scrubbers can be used, and these scrubbers can

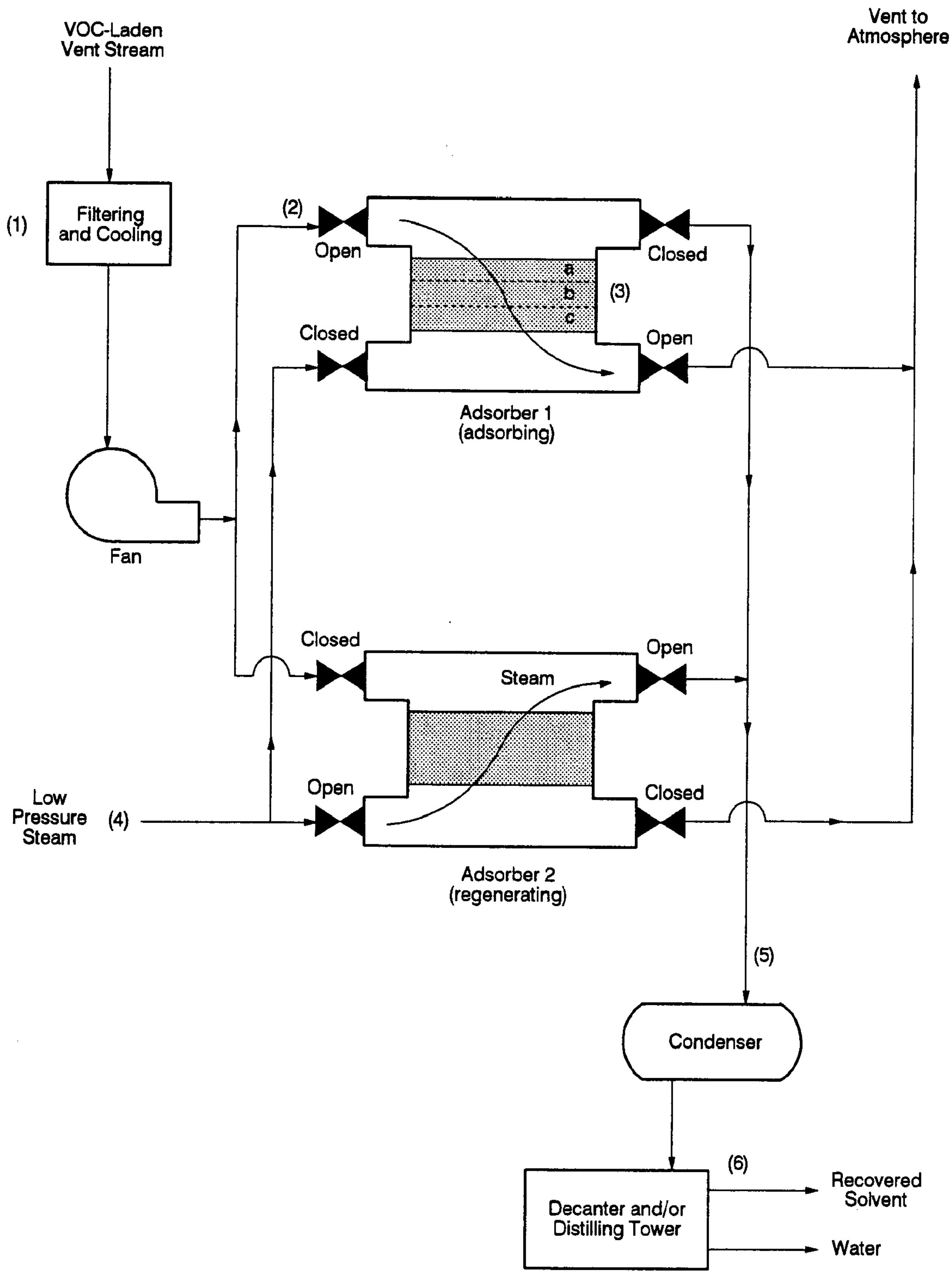

Figure 6-5. Two-Stage Regenerative Adsorption System

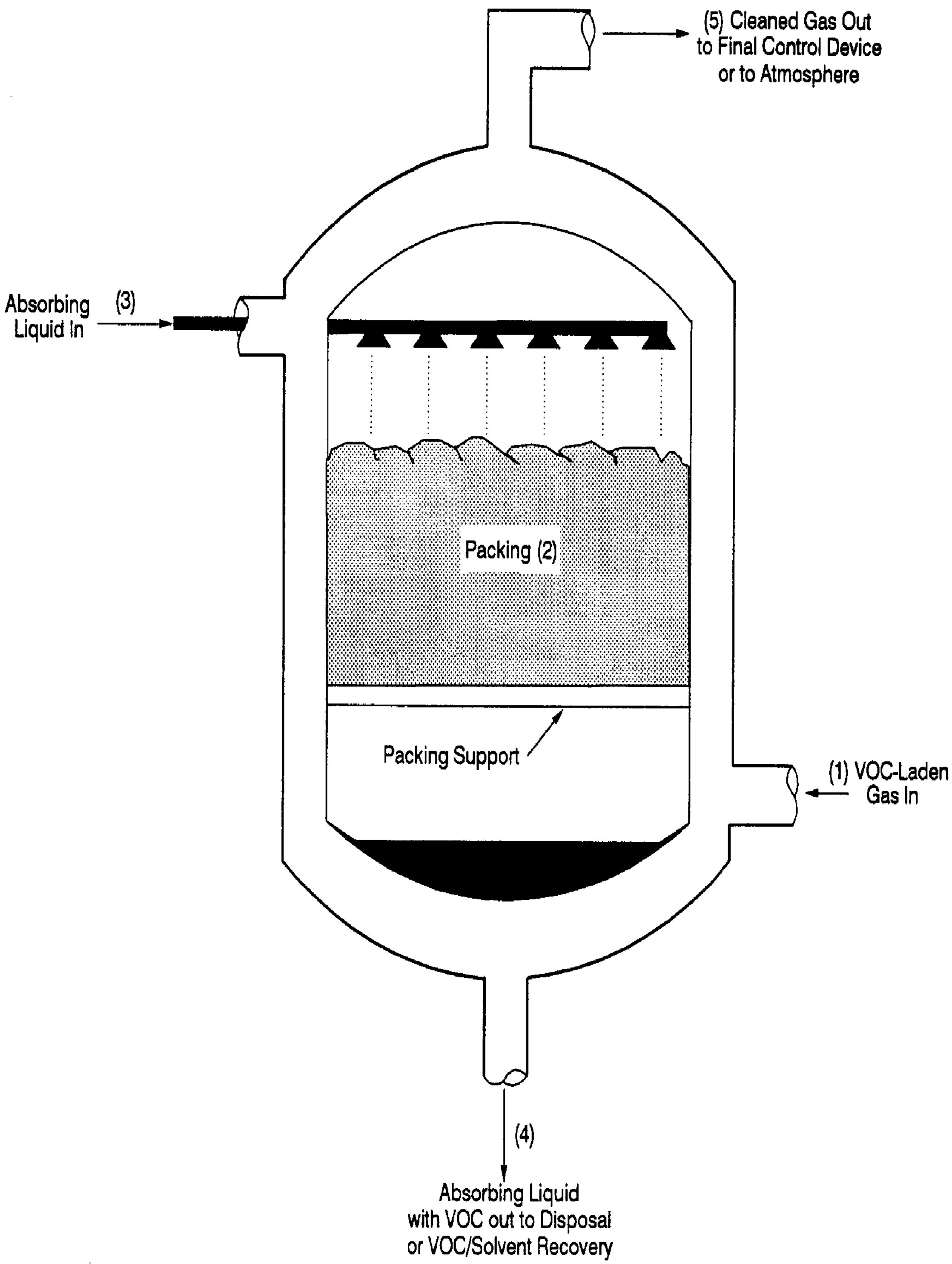

Figure 6-6. Packed Tower Absorption Process

have countercurrent or crosscurrent flow. The type and orientation of the scrubber used depends on liquid and gas flow rates.

Scrubber efficiencies for removal of halogens and halogen halides will vary depending on the type of scrubber and the type of solvent used, and the equilibrium relationship between the gas and liquid. However, most systems can achieve efficiencies from 90 percent to greater than 99 percent.

6.3 CONTROL TECHNIQUES SPECIFIC TO TRANSFER OPERATIONS

Organic HAP and VOC emissions from tank truck and railcar transfer racks can be collected in a vapor collection system and routed to a control device. Unlike process vents, the HON definition of "control device" for transfer racks includes recovery devices as well as combustion devices. Any device that achieves 98 percent reduction of organic HAP or VOC or achieves a 20 ppmv outlet concentration of organic HAP or VOC can be used to comply with the HON transfer provisions. Figure 6-7 shows a tank truck vapor return line routed to a vapor recovery device. Alternatively, transfer rack emissions can be controlled by using a vapor balancing system or routing to a process or fuel gas system.

6.3.1 Vapor Collection System

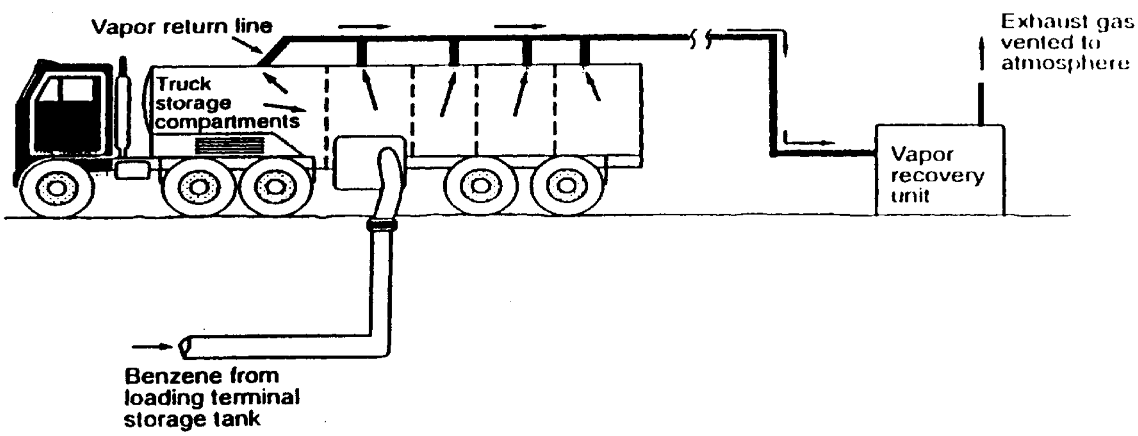

Figure 6-7. Tank Truck Loading with Vapor Recovery

Vapor collection systems consist of piping or ductwork that captures and transports to a control device organic compounds from the vapor space of a transport vessel. Loading rack systems that incorporate the product and vapor lines into a single system are preferred since both connections can be conveniently moved out to the vessel simultaneously. The vapor return line can either be a flexible hose or a metal pipe incorporated into the loading rack arrangement using a dual style orientation. Figure 6-7 shows a tank truck with a vapor collection system (vapor return line), and Figure 6-8 illustrates a dual arm loading rack.

Section 4.2.1 of the Benzene Transfer Operation Inspection Manual[1] provides additional details on transfer vapor collection systems and control techniques, however, this section also discusses the transfer requirements of the Benzene NESHAP. In some cases, these requirements will differ from the requirements of the HON. For example, the Benzene NESHAP applies to marine vessels, but the HON does not.

6.3.2 Vapor Balancing

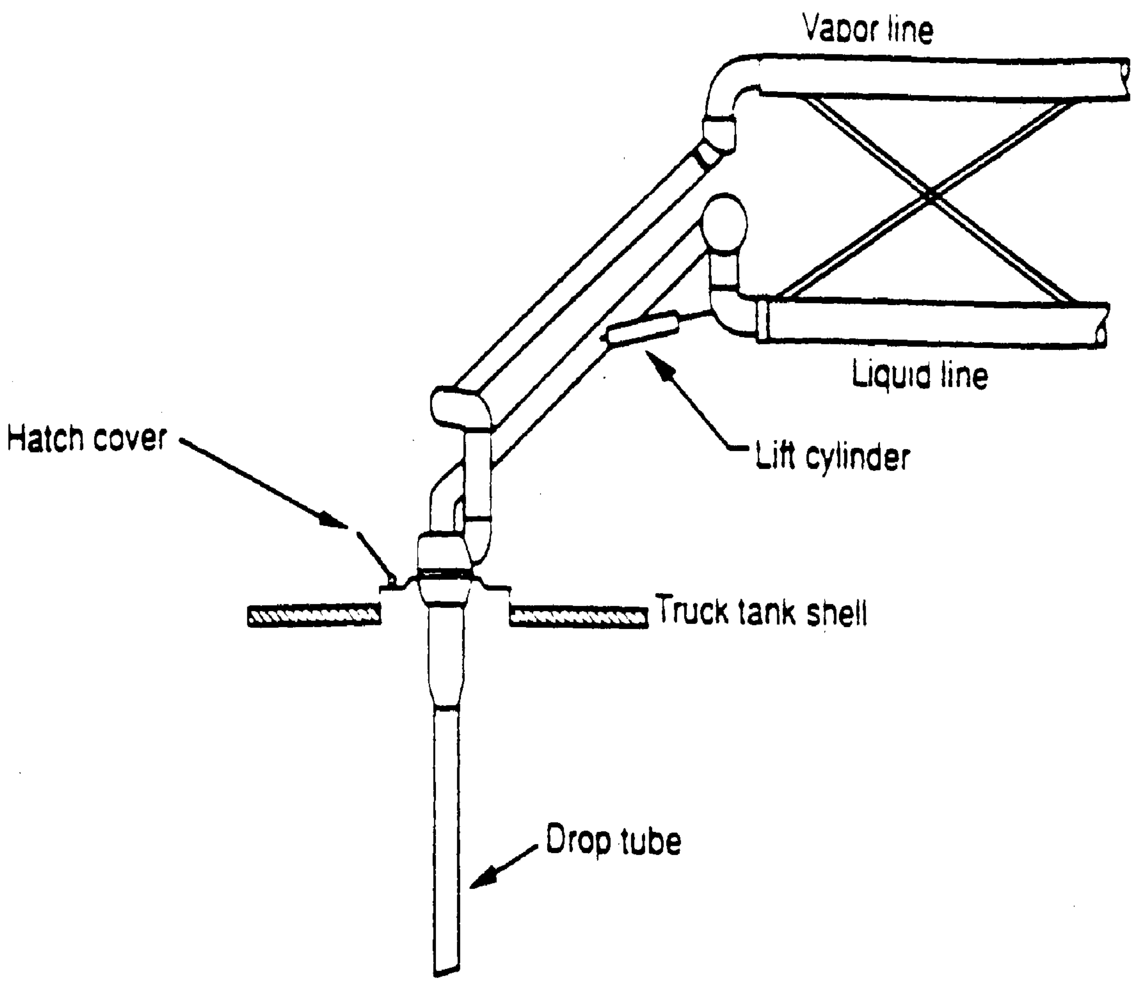

Figure 6-8. Dual Arm Loading Rack

Vapor balancing is another means of collecting vapors and reducing emissions from transfer operations. Vapor balancing is most commonly used where storage facilities are adjacent to the loading facility. As shown in Figure 6-9, an additional line is connected from the transport vessel to the storage tank to return any vapor that is displaced from the transport vessel to the vapor space of the storage vessel from which the transferred liquid was pumped. Because this is a direct volumetric exchange, there should be no losses to the atmosphere.

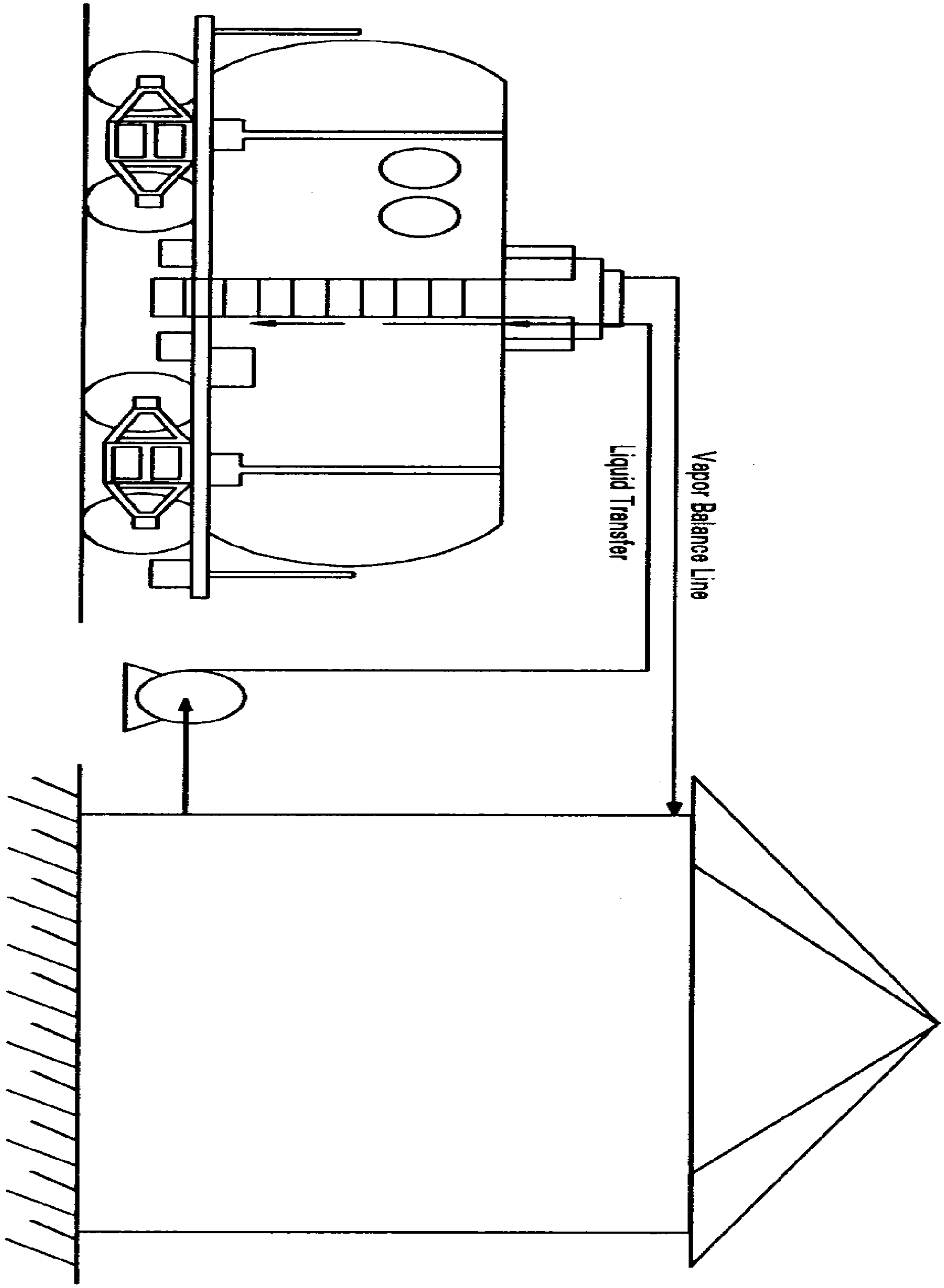

Figure 6-9. Vapor Balancing System

6.3.3 Route to a Process or Fuel Gas System

Emissions from transfer operations may be routed to a process or to a fuel gas system to comply with the transfer control requirements. Fuel gas systems contain large boilers or process heaters that easily combust the HAP and VOC emissions from transfer operations. Section 6.1.3 describes industrial boilers and process heaters. Section 7.2.3 describes the conditions that must be met for emissions routed to a process.

6.4 CONTROL TECHNIQUES SPECIFIC TO STORAGE VESSELS

The control techniques to reduce emissions from storage vessels include equipment designs (e.g., seal design and fittings closure) and work practices.

6.4.1 Fixed-Roof Vessels

Emissions from a fixed-roof vessel may be reduced by equipping it with either a floating roof (i.e., converting it to an IF vessel) or by using a closed vent system routed to a 95-percent efficient control device. Under the HON, if a fixed roof vessel is equipped with an IFR, it is considered an IFR vessel and would be required to be equipped with certain controls and meet certain work practices for an IFR as described in Section 6.4.2.

A closed vent system captures the vapors released by the fixed roof vessel and transfers them to a product recovery or combustion control device. Refer to Section 5.2 of this manual for a description of product recovery and combustion control devices. These same devices would be allowed by the storage provisions.

A closed vent system and control device could also be applied to a horizontal tank. Because of the tank configuration, a floating roof cannot be applied to a horizontal tank.

6.4.2 Floating Roof Vessels

As discussed in Section 5.3.2, the three types of floating roof vessels are IFR vessels, EFR vessels, and EFR vessels converted to IFR vessels.

There are three methods for controlling emissions from floating roof vessels: applying controls to deck fittings, employing certain types of seals, and employing certain work practices. Examples of these three methods are to equip the covers on certain deck fittings with gaskets, to equip an EFR or IF with a liquid-mounted seal instead of a vapor-mounted seal, and to keep all covers associated with deck fittings closed at all times except for access, respectively. Refer to Sections 4.1.2.1 and 4.1.2.2 in the Benzene Storage Inspection Manual[2] for descriptions of the equipment and work practice controls that may be applied to deck fittings on EFR vessels and IFR vessels, respectively. For information on applying controls to the deck fittings of an EFR converted to an IFR, refer to the discussion about controls applied to fittings of EFR vessels in Section 4.1.2.1 of the Benzene Storage Inspection Manual.[2] For a description of the types of seals that can be used to control emissions from floating roof vessels, refer to Section 4.1.2.3 of the Benzene Storage Inspection Manual.[2]

The deck fitting control requirements in the HON are similar but not equivalent to the control requirements of the Benzene NESHAP which are described in the Benzene Storage Inspection Manual.[2] The HON specifies a few additional deck fitting controls that are not discussed in the Benzene Storage Inspection Manual.[2] For example, for EFR vessels the HON specifies the following three additional controls: (1) roof drains must have a slotted membrane fabric cover that covers 90 percent of the area of the opening, (2) openings with covers must be bolted when closed, and (3) guide pole wells must have a sliding cover or flexible fabric sleeve seal and, if the guide pole is slotted, a gasketed float inside the guide pole. For IFR vessels, the HON specifies the following two additional controls: (1) ladder wells must have a gasketed sliding cover, and (2) rim vents must be gasketed and closed except when the IFR is not floating on the stored liquid or when the pressure beneath the rim seal exceeds the manufacturer's recommended setting. Sections 4.1.2.1 and 4.1.2.2 in the Benzene Storage Inspection Manual[2] should be consulted to gain familiarity with the control options for deck fittings on floating roof vessels.

6.4.3 Route to a Process or a Fuel Gas System

Similar to transfer operations, emissions from storage vessels may be routed to a process or to a fuel gas system to comply with the storage vessel requirements. Fuel gas systems contain large boilers or process heaters that easily combust the HAP and VOC emissions from storage vessels. Section 6.1.3 describes industrial boilers or process heaters. Section 7.3.3 describes the conditions that must be met for emissions routed to a process.

6.5 CONTROL TECHNIQUES SPECIFIC TO WASTEWATER

The technologies used to reduce emissions from SOCMI wastewater systems involve a combination of control equipment and good work practices. This section describes applicable emission control technologies for collection and waste management units, and treatment processes. For each of the control technologies discussed in this section, the design and operation of the control device or system is described including an explanation of the physical and/or chemical processes that destroy the organic HAP's or remove them from the wastewater stream. Additionally, the factors affecting the efficiency of the control device, such as operating parameters, are provided. Several emission control technologies including combustion technologies (e.g., flares, incinerators), fixed and floating roofs, and product recovery devices (e.g., condensers, adsorbers) that can be used to control emissions from wastewater are also applicable to process vents, storage vessels, and/or transfer operations. In such cases, this section discusses the applicability of the control technology to emissions from wastewater and refers to the respective sections in this document for details.

6.5.1 Waste Management Units

As described in Section 5.4, wastewater collection systems and waste management units are the equipment, structure(s) and/or devices used to convey, store, treat, or dispose of wastewater streams or residuals. Examples of waste management units include wastewater tanks, surface impoundments, individual drain systems (which include process drains, junction boxes, manholes, etc.), and biological treatment units. Examples of equipment that may be waste management units include containers, air flotation units, oil-water separators or organic-water separators, or organic removal devices such as decanters, strippers, or thin-film evaporation units. If such equipment is used for recovery, then it is part of a chemical manufacturing process unit and is not a waste management unit. Emissions from wastewater collection system components must be controlled through the use of emission suppression technologies. Suppression technologies reduce volatilization of HAP's and prevent the release of volatile HAP's to the ambient air. This allows the treatment process(es) following the collection system to achieve greater removal and/or destruction of HAP's. The following sections describe the suppression techniques suitable for the different components in a wastewater collection system.

6.5.1.1 Controls for Process Drains

Water seal controls reduce emissions by limiting the effects of convection and diffusion on VOC's in the wastewater. Water seals can be either P-legs or seal pots. P-leg sealed drains are similar to open drains, which are usually 4 to 6 inches in diameter and extend vertically to a height of 4 to 6 inches above grade, except that a "P" bend in the pipe is found below grade. The P-bend provides a liquid seal for the individual drain, similar to that found in household plumbing. A seal pot drain has a cap covering the drain opening, and the bottom edge of the cap extends below the level of the drain entrance. Liquid from the various drain pipes falls into the drain area outside of the cap and then flows under the edge of the cap into the drain line. The drain cap can easily be removed to clean the drain entrance and drain line. Various drain configurations are illustrated in Figure 6-10.

Water seals will result in emission control only if the liquid levels in the water seals are properly maintained, thereby minimizing mass transfer from the wastewater to the ambient air. Therefore, the control equipment must be coupled with work practices to ensure maximum effectiveness.

A second method for controlling VOC emissions from process drains is to use a closed drain system. In closed drain systems, emission control is achieved by mechanical and/or physical barriers inherent to the drain design and are not dependent on operating procedures (e.g., maintaining an appropriate level of water). Typically, a drain riser extends approximately 12 to 18 inches above grade. The top of the riser is completely sealed with a flange. Drain pipes are welded directly to the riser. This line is normally closed with a valve, but provides access to the closed drain system for intermittent and infrequent needs such as pump drainage. Hoses or flexible lines can be connected to the riser valve from the liquid source. The emission control achieved by a closed system can be as high as 95 percent, depending on the maintenance of the system. A diagram illustrating a closed drain system is in Figure 6-11.

6.5.1.2 Controls for Junction Boxes, Manholes, Trenches, Weirs, Sumps, and Lift Stations

Control of emissions from individual drain system components is based on an equipment standard supported by appropriate work practices. For example, the most feasible method of reducing emissions from a junction box is by installing a tightly fitting solid cover. Figure 6-12 shows a typical junction box. The cover reduces the exposure of the wastewater to the atmosphere, thereby minimizing the effects of diffusion and convection on the HAP's present in the wastewater stream. The cover may be vented to reduce the buildup of pressure and/or explosive concentrations of gases or have openings necessary for operation, inspection or maintenance. In such cases, the vent could be routed to a recovery or combustion control device to prevent the volatilized HAP's from being released to the atmosphere. Emission suppression may also be achieved through the use of other totally enclosed equipment such as hard-piping in place of open trenches.

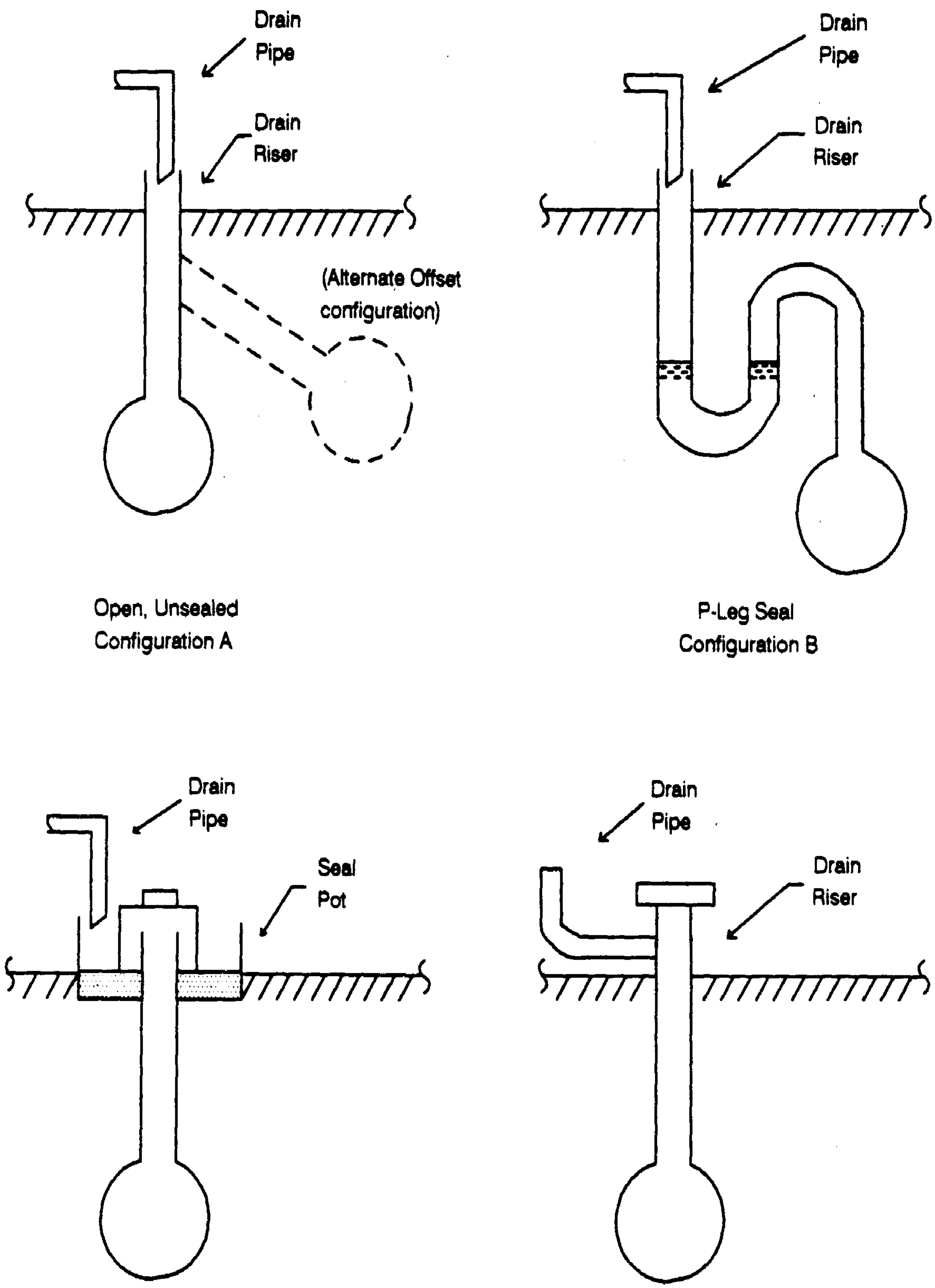

Figure 6-10. Types of Drains

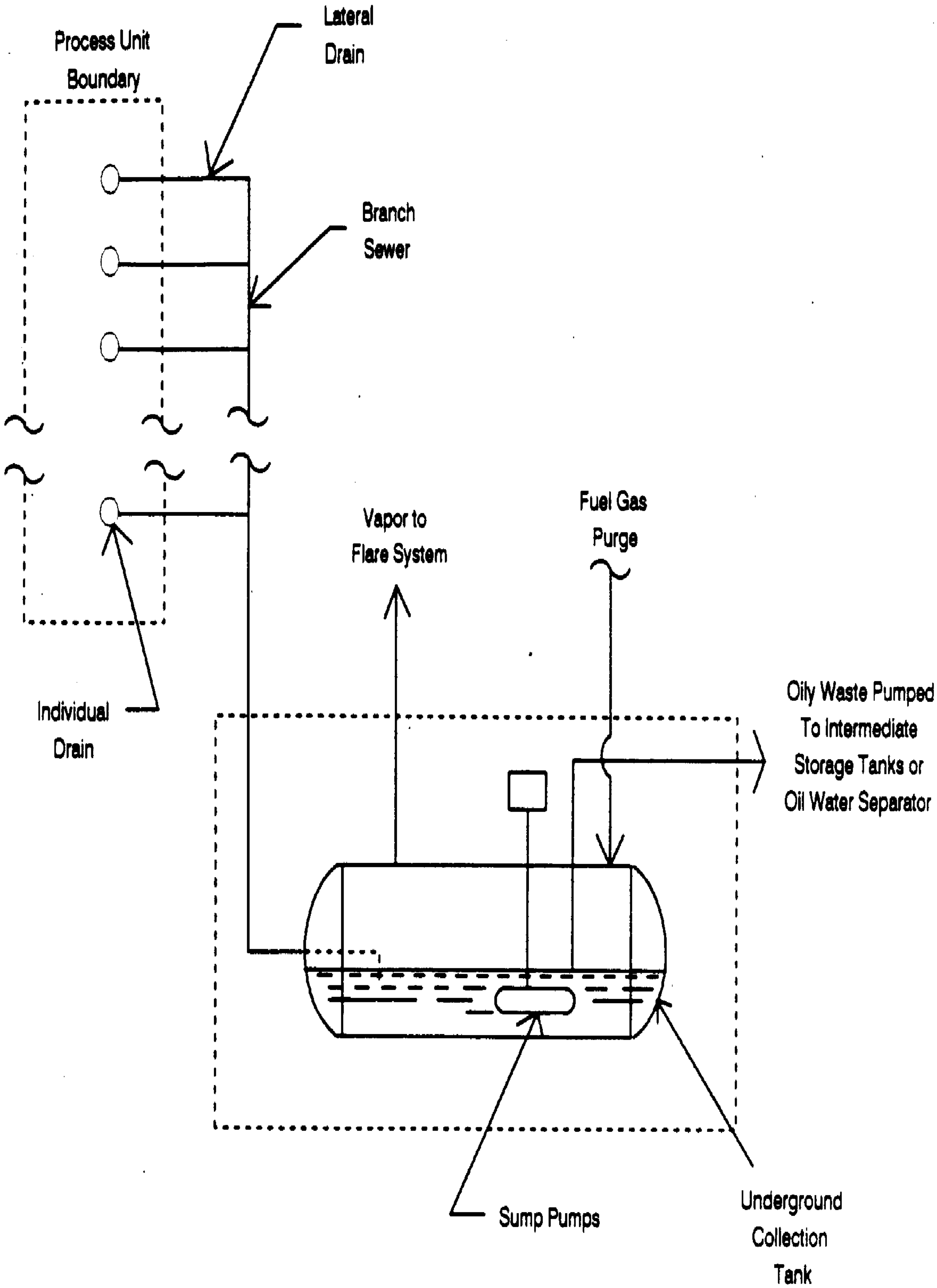

Figure 6-11. Closed Drain System

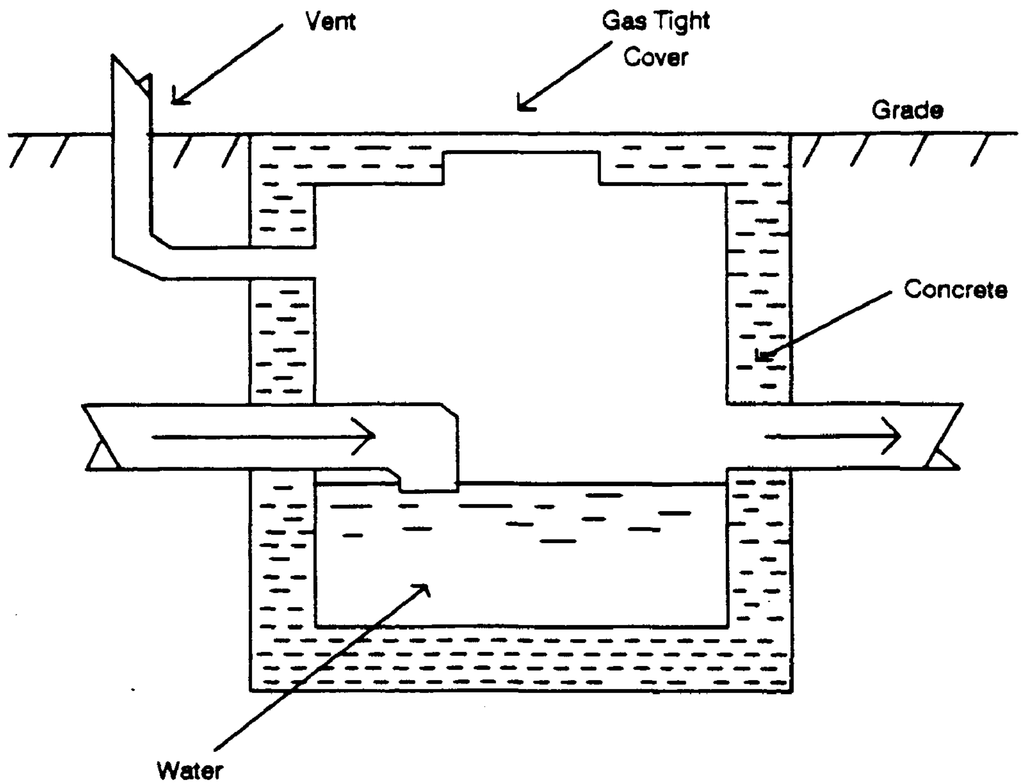

Figure 6-12. Drain System Junction Box

6.5.1.3 Controls for Wastewater Tanks and Oil-Water Separators

Emissions from wastewater tanks and oil-water separators can be reduced by installing either a floating roof over the liquid surface of the separator or tank, or a fixed roof vented to a control device. The roof reduces the effects of evaporation, wind speed, and solar radiation.
Fixed roofs can be constructed of various materials and can be mounted on the sides of the tank or separator or supported by horizontal beams set in the sides of the tank or separator. The space between the roof and the edge of the tank or separator, and the spaces around any access doors, can be sealed with gaskets to prevent the release of any HAP's that volatilize from the wastewater. The vent from the tank would be routed to a recovery or combustion control device.

Floating roofs actually float on the liquid surface, thereby minimizing the vapor space above the wastewater. Floating roofs can be constructed of various materials including plastic, glass foam blocks, aluminum pontoons, or fiberglass. Seals are placed between the roof and the wall of the separator to minimize VOC emissions. A primary seal consists of a foam or liquid-filled seal mounted, in contact with the liquid, between the floating roof and the wall of the separator. Emission reductions from floating roofs can be greater than 95 percent for tanks and oil-water separators holding wastewater. The effectiveness of the roofs in reducing emissions depends on a variety of factors -- the most important being maintenance of the seals around the roofs, doors, and other openings. The HON includes work practices to ensure optimal performance of the control technology. Section 6.4 of this document provides additional details on both fixed and floating roofs.

6.5.1.4 Containers

The technologies used for controlling emissions from containers include the use of covers, submerged-fill pipes, and enclosures. When wastewater or residuals from wastewater treatment are added to a container, use of a submerged-fill pipe minimizes the loss of HAP's during filling. As discussed in Section 5.2 of this manual, in submerged loading the fill pipe is below the liquid level, thus reducing the amount of turbulence and resulting in lower vapor generation. Covers reduce losses due to evaporation and wind. Any container that must be opened can be placed in an enclosure that is vented to a closed-vent system and control device. The conveyance of the gases to a control device reduces the potential for buildup of pressure and/or explosive concentrations of gases in the enclosure. To be subject to the HON, a container must have a capacity greater than or equal to 0.1 m^3.

6.5.2 Treatment Processes

For wastewater, the primary treatment processes are steam stripping and biological treatment. This section provides a detailed discussion of each.

6.5.2.1 Steam Stripping

Steam stripping involves the fractional distillation of wastewater to remove HAP's. As the wastewater flows down the column, it contacts the steam flowing countercurrently up the column. Organic compounds are vaporized through heat transfer from the steam. As the organics vaporize in the column, they are transferred from the liquid phase into the gas phase. The vaporized organic constituents flow out the top of the column with any uncondensed steam and undergo a phase change to a liquid in the overhead condenser. From the condenser, the liquid is sent to a decanter where the organic compounds separate from the condensed steam due to differences in density (e.g., the organic layer may float on top of the aqueous phase). The organic layer is usually either recycled and reused in the process or incinerated in an on-site combustion device for heat recovery.[3] If the organic layer is reused or recycled then the steam stripper is considered part of a chemical manufacturing process unit, not a waste management unit.

The wastewater effluent leaving the bottom of the steam stripper is usually either routed to an on-site wastewater treatment plant and discharged to a National Pollutant Discharge Elimination System (NPDES)-permitted outfall, or sent to a publicly-owned treatment works (POTW).

Steam stripper systems may be operated in batch or continuous mode. Batch steam strippers are more prevalent when the wastewater feed is generated by batch processes, when the characteristics of the feed are highly variable, or when small volumes of wastewater are generated. Batch strippers may also be used if the wastewater contains relatively high concentrations of solids, resins, or tars.

In contrast to batch strippers, continuous steam strippers are designed to treat wastewater streams with relatively consistent characteristics. A typical continuous steam stripper system is in Figure 6-13. Design of the continuous stripper system is based on the flow rate and composition

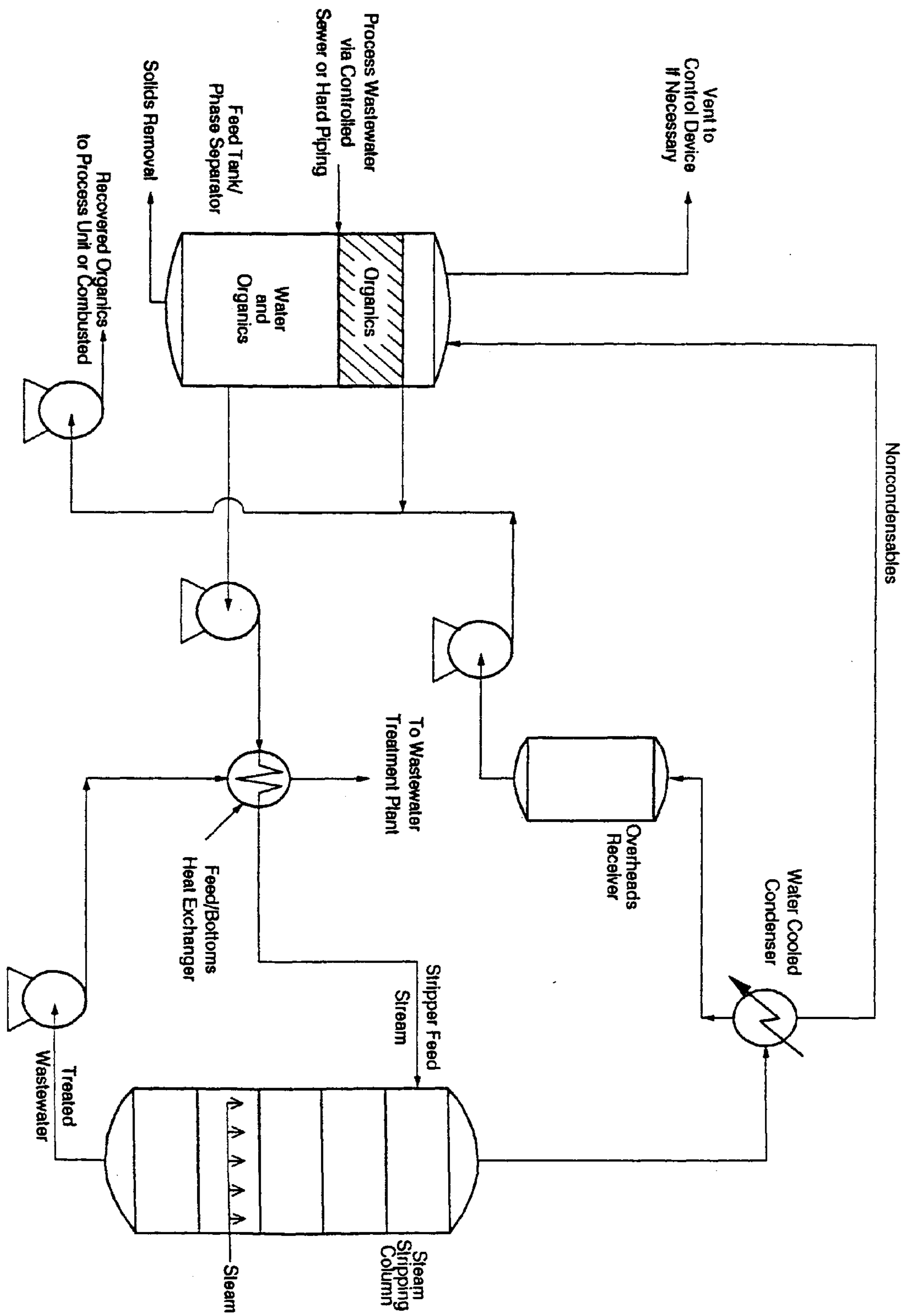

Figure 6-13. Continuous Steam Stripper System.

of a specific wastewater feed stream or combination of streams. Multi-stage, continuous strippers normally achieve greater efficiencies of organic compound removal than batch strippers.

Wastewater streams continuously discharged from process equipment are usually relatively consistent in composition. Such wastewater streams would be efficiently treated with a continuous steam stripper system. However, batch wastewater streams can also be controlled by continuous steam strippers by incorporating a feed tank with adequate residence time to provide a consistent outlet composition. In such cases, the feed tank serves as a buffer between the batch process and the continuous steam stripper. During periods of no wastewater flow from the batch process, wastewater stored in the feed tank is fed to the stripper at a relatively constant rate.

Steam stripping achieves emission reductions of 0 to 99 percent, based on the chemical characteristics (e.g., strippability) of the wastewater stream. However, 95 to 99 percent reduction can be achieved for the majority of organic compounds regulated by the HON. The organic compound removal performance of the steam stripper depends on the degree of contact between the steam and the wastewater. Several factors affecting the degree of contact that occurs in the steam stripper column are: (1) the dimensions of the column (height and diameter); (2) the contacting media in the column (trays or packing); and (3) operating parameters such as the steam-to-feed ratio, column temperatures, and pH of the wastewater.

Steam stripping is most applicable to treating wastewaters with organic compounds that are highly volatile and have a low solubility in water. Oil, grease, and solids content and the pH of a wastewater stream also affect the feasibility of steam stripping. High levels of oil, grease, and solids can cause fouling of the stripper system. High or low pH may prove to be corrosive to equipment. However, these problems can usually be circumvented by design or wastewater preconditioning techniques. Section 2.2.3 of "Hazardous Air Pollutant Emissions from Process Units in the SOCMI -- Background Information for Proposed Standards, Volume 1B: Control Technologies" provides additional details on steam stripping.[4]

6.5.2.2 <u>Biological Treatment</u>

The use of biological treatment systems as a control technology can be an effective method for the removal of numerous HAP's through microbial degradation. Such systems involve the use of bacteria, algae, fungi, and microorganisms to stabilize, absorb, alter, or destroy organic compounds. The most common form of biological treatment is aerobic (i.e., in the presence of oxygen). In the presence of excess oxygen, organic chemicals are oxidized by bacteria to carbon dioxide and water. Initially, the wastewater stream(s) entering the system must be equalized in order to prevent either the flow rate or concentration from chemically shocking the bacteria. Mixing from aerators combines organic compounds and the activated sludge. The effluent is allowed to settle in a clarifier where a fraction of the sludge is returned to the aeration lagoon to reseed the population of microorganisms. The remaining sludge is usually land disposed.

The design and operating parameters of a biological treatment unit are facility-specific and are dependent on the composition of the wastewater feed stream. The primary factors that affect the removal of HAP's from wastewater in a biological treatment unit include the food-to-microorganism ratio, oxygen availability, mixed liquor suspended solids ratio, pH, temperature, and residence time. Another consideration is the maintenance of a suspended-growth process that generates biomass, uses recycled biomass, and periodically removes biomass from the process.

6.6 REFERENCES

1. U. S. Environmental Protection Agency, Office of Air Quality Planning Standards, Stationary Source Compliance Division. Level II Inspection Manual: Benzene Tranfer Operation. Washington, DC. January 1993.

2. U. S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Stationary Source Compliance Division. NESHAP Inspection Manual: Benzene Storage Vessels. EPA-455/R-92-006. Washington, DC. September 1991.

3. LaGrega, Michael and associates. Hazardous Waste Management. McGraw-Hill, Inc. New York, NY. 1994.

4. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Office of Research and Development. Hazardous Air Pollutant Emissions from Process Units in the SOCMI -- Background Information for Proposed Standards, Volume 1B: Control Technologies. EPA-453/D-92-016b. Research Triangle Park, NC. November 1992.

7.0 THE PROVISIONS

7.1 PROCESS VENT PROVISIONS

This section summarizes the process vent provisions in §63.113 through §63.118 of Subpart G. The checklists in Sections 5, 9 and 10 of Volume II provide additional details of the process vent provisions.

7.1.1 Process Vent Definition

For purposes of the HON, a "process vent" is a gas stream containing greater than 0.005 weight percent total organic HAP that is continuously discharged during operation of the unit from an air oxidation reactor, other reactor or distillation unit within a chemical manufacturing process unit that meets all applicability criteria in §63.100 of Subpart F. Process vents are gas streams discharged to the atmosphere (with or without passing through a control device) either directly or after passing through one or more recovery devices. Relief valve discharges, gaseous streams routed to a fuel gas system(s), and leaks from equipment regulated under Subpart H are not process vents.

7.1.2 Process Vent Group Determination

Group 1 and Group 2 process vents are defined in §63.111 of Subpart G. A Group 1 process vent is a process vent with a flow rate of 0.005 scmm or greater, a total organic HAP concentration of 50 ppmv or greater and a total resource effectiveness (TRE) index value of 1.0 or less. A Group 2 process vent is a process vent that is not a Group 1 process vent. The TRE index value is a measure of the supplemental total resource requirement per unit reduction of organic HAP associated with a process vent stream. The TRE index value is a cost-effectiveness index, associated with an individual process vent stream and is dependent on the process vent flow rate, net heating value, total organic compounds (TOC) emission rate, and HAP emission rate. Equations that must be used to calculate the TRE index value for a process vent stream are provided in Appendix C. The coefficients used in the equation to calculate the TRE index value are different for process vents at new and existing sources.

Volume I. The Provisions

Table 5-1 of Volume II is a applicability and group determination checklist for process vents. Process vents that are not subject to the process vent provisions may be subject to the equipment leak provisions in Subpart H (NESHAP for SOCMI equipment leaks) or the wastewater provisions in Subpart G, as noted in the checklist. Group 1/Group 2 determinations are required for each process vent stream that is subject to the process vent provisions, unless the process vent is already in compliance with the Group 1 requirements (98 percent reduction, 20 ppmv outlet concentration, or flare control).

7.1.3 Process Vent Control Requirements

Group 1 process vents must meet the control requirements in §63.113 of Subpart G unless they are included in an emissions average. Compliance options for Group 1 process vent streams include:

- Reducing emissions of organic HAP's using a flare meeting the specification in §63.11(b) of Subpart A (the NESHAP General Provisions);
- Reducing emissions of total organic HAP or TOC by 98 weight percent or to an exit concentration of 20 parts per million by volume, whichever is less stringent (product recovery devices are considered part of the process and cannot be included in determining compliance with this option except for recovery devices meeting certain conditions as described below); or
- Achieving and maintaining a TRE index value greater than 1.0 (e.g., by process modification or a product recovery device).

A recovery device may also be used alone or in combination with one or more control devices to meet the 98 percent reduction if the following three conditions are met: (1) the control system was installed before December 31, 1992; (2) the recovery device used to meet the 98 percent reduction is the last recovery device before release to the atmosphere; and (3) the recovery device alone or in combination with one or more control devices can meet the 98 percent reduction but is not capable of reliably reducing emissions to a concentration of 20 ppmv or less.

A recapture device may also be used to meet the 98 percent reduction. Recapture devices are considered control devices and are the same types of devices as recovery devices, however the material that is recovered is not normally used, reused, or sold. For example, the materials may be recovered primarily for disposal.

If a process vent stream with a mass rate of total hydrogen halides and halogen atoms greater than 0.45 kilograms per hour is combusted, a control device must be installed following the combustion device to reduce emissions of halogens and hydrogen halides. Halogen reduction devices installed after December 31, 1992, must reduce overall emissions of halogens and hydrogen halides by 99 percent or reduce the outlet mass of total hydrogen halides and halogens to less than 0.45 kilograms per hour, whichever is less stringent. Halogen reduction devices installed prior to December 31, 1992, must reduce overall emissions of halogens and hydrogen halides by 95 percent or reduce the outlet mass of total hydrogen halides and halogens to less than 0.45 kilograms per hour, whichever is less stringent.

A halogen reduction device may be used to reduce the vent stream halogen atom mass emission rate to less than 0.45 kilograms per hour prior to any combustion control device, and thus make the vent stream nonhalogenated. Flares cannot be used to control halogenated process vent streams.

If a boiler or process heater is used to comply with the 98 percent reduction or 20 ppmv outlet concentration, then the vent stream must be introduced into the flame zone of the control device.

If an owner or operator elects to achieve and maintain a TRE index value greater than 1.0, the vent would become a Group 2 vent and must comply with the provisions for Group 2 vents. Group 2 vents are not required to apply any additional emission controls, however, they are subject to certain monitoring, reporting, and recordkeeping requirements to ensure that they were correctly determined to be Group 2 and that they remain Group 2.

7.1.4 Process Vent Testing, Monitoring, Recordkeeping, and Reporting

Procedures for determining group status of vents, including test procedures and TRE equations, are contained in §63.115 of Subpart G. Performance test procedures are specified in §63.116. The initial performance testing and initial reporting and recordkeeping requirements for process vents that are controlled with an incinerator, boiler, process heater, or flare are outlined in Table 7-1. Note that compliance can be demonstrated by measuring either HAP or TOC emissions. Initial testing, reporting, and recordkeeping requirements for scrubbers used downstream of a combustion device used to control halogenated streams are also shown in Table 7-1. A performance test is not required for flares. However, a compliance determination by visible emissions observation is required.

Performance tests are not required for boilers and process heaters with a design heat input capacity of 44 Megawatts or greater, or for boilers or process heaters where the vent stream is introduced with or used as the primary fuel. A boiler or process heater burning hazardous waste which is permitted under 40 CFR Part 270 (the RCRA hazardous waste permit program) and is in compliance with 40 CFR Part 266 Subpart H (standard for hazardous waste burned in boilers and industrial furnaces) does not require a performance test under the HON. The compliance demonstrations under these rules replace the performance test under the HON. Performance tests are also not required under the HON for hazardous waste incinerators that are permitted under 40 CFR Part 270 and comply with the requirements of 40 CFR Part 264, Subpart O, or has certified compliance with the interim status requirements of 40 CFR Part 265, Subpart O. The compliance demonstrations under these rules replace the performance test under the HON. In addition, a performance test is not required if (1) a performance test was already conducted to determine compliance with a regulation promulgated by EPA, (2) the test was conducted using the same methods as required by the HON, and (3) either no process changes have been made since the test or it can be demonstrated that the performance test results can reliably demonstrate compliance despite process changes.

Table 7-2 shows the group determination, reporting and recordkeeping requirements for Group 2 process vent streams. As described in Section 7.1.2, a Group 2 vent may be classified Group 2 on the basis of flow, concentration, or TRE index value. If the TRE index value is less than 4.0, the TRE index value calculation must be based on the test measurement parameters summarized in Table 7-2. If the TRE index value is expected to be greater than 4.0, then the parameters (e.g., flow and concentration) used in the TRE index value calculation may be estimated using engineering assessments instead of a test.

Monitoring provisions for process vents are contained in §63.114 of Subpart G. Continuous monitoring, recordkeeping, and reporting requirements for complying with the 98 percent reduction requirement or 20 ppmv outlet concentration are presented in Table 7-3. Continuous monitoring, recordkeeping, and reporting requirements for maintaining a TRE index value greater than 1.0 and less than or equal to 4.0 are presented in Table 7-4. Any boiler or process heater in which all vent streams are introduced with the primary fuel or where the design heat input capacity is greater than or equal to 44 Megawatts is exempt from monitoring requirements. Hazardous

waste boilers that are permitted under 40 CFR Part 270 and are in compliance with 40 CFR Part 266 do not have additional continuous monitoring requirements under the HON. The monitoring under these rules replace the monitoring under the HON. Monitoring is also not required for process vents with a TRE index value greater than 4.0, a flow rate less than 0.005 standard cubic meters per minute, or a concentration less than 50 ppmv.

For each parameter monitored according to Tables 7-3 and 7-4, the owner or operator must establish a site-specific range for the parameter that indicates proper operation of the control or recovery device. If an owner or operator uses a control device or recovery device other than those listed in Tables 7-3 and 7-4, or wishes to monitor parameters other than those specified in Tables 7-3 and 7-4, the owner or operator must submit a description of, and rationale for, the planned monitoring, recordkeeping and reporting in the operating permit application or by other appropriate means.

For Group 2 process vents, any process changes which can cause a change in the TRE index value, the flow rate, or the outlet concentration must be reported. Any recalculation or remeasurement of the parameter(s) used to determine Group 2 status, TRE index value, flow rate, or outlet concentration, must also be reported. If the process change causes the flow rate to increase to 0.005 standard cubic meter per minute or the HAP concentration to increase to 50 ppmv, a TRE index value calculation must be performed if either of these parameters are used to determine Group 2 status.

7.2 TRANSFER OPERATION PROVISIONS

This section summarizes the transfer operation provisions in §63.126 through §63.130 of Subpart G. The checklists in Sections 6, 9 and 10 of Volume II provide additional details of the transfer operation provisions.

7.2.1 Transfer Operations Definition

A "transfer operation" is defined as the loading of one or more liquid organic HAP's from a transfer rack assigned to a chemical manufacturing process that is subject to the HON into a tank truck or railcar. A transfer rack is defined as the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill tank trucks or railcars. Transfer operations loading at an operating pressure greater than 204.9 kPa are not subject to the HON. Racks that transfer liquids that contain organic HAP's only as impurities are not subject to the HON. Racks that vapor balance during all loading operations are not subject to the transfer provisions in §63.126 through §63.130.

7.2.2 Transfer Operations Group Determination

Group 1 and Group 2 transfer racks are defined in §63.111 of Subpart G. A Group 1 transfer rack is a transfer rack that loads 0.65 million liters per year, or greater, of liquids that contain organic HAP's with a rack weighted average vapor pressure of 10.3 kPa or greater. A Group 2 transfer rack is not a Group 1 transfer rack.

Tables 4-4 and 4-5 of Volume II are applicability and group determination checklists for transfer operations.

7.2.3 Transfer Operation Control Requirements

Group 1 transfer racks must meet the control requirements in §63.126 of Subpart G when the operating pressure of the transfer operation is less than or equal to 204.9 kilopascals, unless the rack is included in an emissions average. Each Group 1 loading rack must be equipped with a vapor collection system and control device. The control device must comply with one of the following criteria:

- Reduce emissions of total organic HAP's by 98 weight-percent or to an exit concentration of 20 parts per million by volume, whichever is less stringent;
- Reduce emissions of organic HAP's using a flare which meets the specifications in §63.11(b) of Subpart A (the NESHAP General Provisions);
- Reduce emissions of organic HAP's using a vapor balancing system; or
- Reduce emissions of organic HAP's by routing emissions to a fuel gas system or to a process.

In contrast to the process vents provisions which do not allow use of product recovery devices to determine compliance with the first option above, for transfer racks, the 98 weight percent reduction or 20 ppmv exit concentration can be achieved using either a combustion device or a product recovery device.

Each vapor collection system used to comply with the transfer provisions must achieve the following:

- Collect the displaced vapors from the transfer operation and route them to a control device; and
- Prevent organic HAP vapors collected in one arm from passing through another loading arm to the atmosphere.

If a vapor balancing system is used to comply with the transfer provisions, the vapor balancing system must achieve the following:

- Collect the displaced vapors from the transfer operation and either:
  - route them to the storage vessel from which the transferred liquid originated; or
  - compress the vapors and commingle the liquid with the raw feed to the chemical manufacturing process unit.

If the emissions are routed to a process, the organic HAP emissions shall meet one or a combination of the following ends:

- Recycled and/or consumed in the same manner as a material that fulfills the same function in that process;
- Transformed by chemical reaction into materials that are not organic hazardous air pollutants;

- Incorporated into a product; and/or
- Recovered.

If a transfer rack vent stream with a mass rate of total hydrogen halides and halogen atoms greater than 0.45 kilograms per hour is combusted, a halogen reduction device must be installed following the combustion device to reduce emissions of halogens and hydrogen halides. Halogen reduction devices installed on or after December 31, 1992, must reduce overall emissions of halogens and hydrogen halides by 99 percent or reduce the outlet mass of total hydrogen halides and halogens to less than 0.45 kilograms per hour, whichever is less stringent. Halogen reduction devices installed prior to December 31, 1992, must reduce overall emissions of halogens and hydrogen halides by 95 percent or reduce the outlet mass of total hydrogen halides and halogens to less than 0.45 kilograms per hour, whichever is less stringent.

A halogen reduction device may be used to reduce the vent stream halogen atom mass emission rate to less than 0.45 kilograms per hour prior to any combustion control device, and thus make the vent stream nonhalogenated. Halogenated streams cannot be routed to a flare.

If a boiler or process heater is used to control the vent stream from a transfer rack, the vent stream must be introduced into the flame zone.

The tank truck or railcar vapor collection equipment must be compatible with and connected to the loading rack's vapor collection system. The owner or operator must ensure that any pressure-relief device will not open during loading and that all vents that could divert the vapor flow to the atmosphere are either secured using a car seal or a lock-and-key type configuration, or equipped with a flow indicator. Also, organic HAP's may only be loaded into a tank truck or railcar which has a current certification for the U.S. Department of Transportation (DOT) pressure test requirements, or which has been demonstrated to be vapor-tight within the preceding 12 months.

Group 2 transfer racks are not required to apply emission controls, but recordkeeping and reporting is required to verify that they are Group 2.

7.2.4 Transfer Operations Testing, Monitoring, Recordkeeping, and Reporting

Initial performance testing, initial reporting, and recordkeeping requirements for Group 1 transfer racks are summarized in Table 7-5. A performance test is not required for flares. However, a compliance determination is required which includes determining visible emissions.

If a control device is shared between a process vent and a transfer rack, the performance test procedures for process vents shall be followed and a separate performance test for the transfer operation's use of the control device does not have to be conducted. Performance tests are not required for vapor balancing systems, or boilers or process heaters with a design heat input capacity of 44 Megawatts or greater or where the vent stream is introduced with the primary fuel. A boiler or process heater burning hazardous waste which is permitted under 40 CFR Part 270 and is in compliance with 40 CFR Part 266 Subpart H also does not require a performance test under the HON. The compliance demonstration under these rules replace the compliance demonstration under the HON. A performance test is not required when emissions are routed to

a fuel gas system or recycled to a process. Hazardous waste incinerators that are permitted under 40 CFR Part 270 and comply with the requirements of 40 CFR Part 264, Subpart O or have certified compliance with the interim status requirements of 40 CFR Part 265, Subpart O are not required to have performance tests conducted under the HON. The compliance demonstration under these rules replace the compliance demonstration under the HON.

For transfer racks that transfer less than 11.8 million liters per year of liquid containing organic HAP's, the owner or operator may submit a design evaluation for the control device, and monitor the design parameters instead of conducting performance tests.

Continuous monitoring, recordkeeping, and reporting requirements for transfer racks are presented in Table 7-6. Any boiler or process heater in which all vent streams are introduced with the primary fuel or where the design heat input capacity is greater than or equal to 44 Megawatts is exempt from monitoring requirements. Hazardous waste boilers that are permitted under 40 CFR Part 270 and are in compliance with 40 CFR Part 266 do not have continuous monitoring requirements.

The HON also requires periodic inspection of vapor collection and vapor balancing systems to detect leaks. The provisions are specified in §63.148 of Subpart G.

For each parameter monitored in Table 7-6, the owner or operator must establish a site-specific range for the parameters that indicates proper operation of the control device. If an owner or operator uses a control device other than those specified in Table 7-6, or wishes to monitor a parameter other than those specified in Table 7-6, the owner or operator must submit a description of and rationale Group 1 transfer racks may only load tank trucks and railcars that are vapor tight. Vapor tightness must be demonstrated by either: (1) having a current certification in accordance with the U.S. Department of Transportation pressure test requirements of 49 CFR 180 for tank trucks or 49 CFR 173.31 for railcars or (2) having been shown to be vapor tight within the preceding 12 months using Method 27.

Each owner or operator must maintain a record of the transfer rack vent system which lists all valves and vent streams that could divert the vent stream from the control device. The valves which are secured by car-seals or lock-and-key type configurations and the position of these valves must be identified.

The owner or operator of a Group 1 or Group 2 transfer rack must record and update annually an analysis demonstrating the design and actual annual throughput of the transfer rack, the weight-percent organic HAP of the liquid loaded, and the annual rack weighted average HAP vapor pressure. For Group 2 transfer racks that only transfer organic HAP's with vapor pressures less than 10.3 kilopascals, the owner or operator must only document each individual HAP that is transferred. For Group 2 transfer racks that transfer organic HAP's with vapor pressures both above and below 10.3 kilopascals, the owner or operator must calculate and document the rack weighted average vapor pressure.

7.3 STORAGE VESSEL PROVISIONS

This section summarizes the storage vessel provisions in §63.119 through §63.123 of Subpart G. The checklists in Sections 7, 9 and 10 of Volume II provide additional details of the storage vessel provisions.

7.3.1 Storage Vessel Definition

A "storage vessel" is a tank or other vessel that is used to store liquid organic HAP's and is assigned to a chemical manufacturing process subject to the HON. Storage vessels do not include vessels permanently attached to motor vehicles, pressure vessels, vessels with capacities less than 38 m^3, or vessels storing liquids that contain organic HAP's only as impurities. Bottoms receiver tanks and surge control vessels are not considered storage vessels because they are covered by the equipment leak provisions, and wastewater storage tanks are not considered storage vessels, since they are covered by the wastewater provisions.

7.3.2 Storage Vessel Group Determination

Group 1 and Group 2 storage vessels are defined in §63.119 of Subpart G. The vessel's design capacity and the vapor pressure of the stored liquid are used to determine whether a storage vessel is Group 1 or Group 2. Group 1 storage vessels at existing sources are storage vessels with capacities of 75 m^3 or greater but less than 151 m^3 storing liquids with a vapor pressure of total organic HAP of 13.1 kPa or greater. Storage vessels at existing sources with capacities of 151 m^3 or greater storing liquids with a vapor pressure of total organic HAP of 5.2 kPa or greater are also Group 1 storage vessels. Group 1 storage vessels at new sources are storage vessels with capacities or 38 m^3 or greater but less than 151 m^3, storing liquids with a vapor pressure of total organic HAP of 13.1 kPa or greater. Storage vessels at new sources with capacities of 151 m^3 or greater storing liquids with a vapor pressure of total organic HAP of 0.7 kPa or greater are also Group 1 storage vessels. Table 7-1 of Volume II is a checklist for applicability and group determination for storage vessels. Group 1/Group 2 determinations are required for each storage vessel that is subject to the storage vessel provisions, unless the storage vessel is already in compliance with the Group 1 requirements.

7.3.3 Storage Vessel Control Requirements

Group 1 storage vessels must meet the control requirements in §63.119 of Subpart G unless they are included in an emissions average. Compliance options for Group 1 storage vessels include:

- Reducing emissions of organic HAP's using a fixed-roof tank equipped with an internal floating roof which is operated according to specified work practices (e.g., keeping access hatches closed and bolted), equipped with specified deck fittings, and equipped with specified seal configurations (i.e., a single liquid-mounted seal, a single metallic shoe seal, or double seals);

- Reducing emissions of organic HAP's using an external floating roof tank operated according to specified work practices, equipped with specified deck fittings, and equipped with specified seal configurations (i.e., double seals, with the primary seal to be either a liquid-mounted or a metallic shoe seal);

- Reducing emissions of organic HAP's using an external floating roof tank converted to a fixed-roof tank equipped with an internal floating roof, which is operated according to specified work practices, equipped with specified deck fittings, and equipped with specified seal configurations (i.e., a single liquid-mounted seal, a single metallic shoe seal, or double seals);

- Reducing emissions of organic HAP's by 95 weight percent using a closed vent system (i.e., vapor collection system) and control device or combination of control devices (or reducing emissions of organic HAP's by 90 weight percent using a closed-vent system and control device if the control device was installed before December 31, 1992); or

- Reducing emissions of organic HAP's by routing the emissions to a process or a fuel gas system, if emissions are routed to a process the emissions must meet one of the same ends listed in Section 7.2.3 for transfer operation emissions routed to a process or fuel gas system.

A detailed list of the work practices and deck fittings specified for internal floating roof vessels, external floating roofs, and external floating roof vessels converted to internal floating roof vessels is provided in Table 7-7, which is discussed in the next section.

Group 2 storage vessels are not required to apply any emission controls, but recordkeeping and reporting is required to verify that they are Group 2.

7.3.4 Storage Vessel Testing, Monitoring, Recordkeeping, and Reporting

Compliance determination for storage vessels using floating roofs is different than for process vents and transfer operations in that performance testing and continuous monitoring are not required. Instead, periodic inspections of the floating roofs and their seals and fittings are required, and any defects must be repaired within specified time periods.

For both Group 1 and Group 2 storage vessels, a record must be kept which provides the dimensions and an analysis showing the capacity of each Group 1 and Group 2 storage vessel. For Group 2 storage vessels, this recordkeeping requirement is the only requirement under the HON, unless the vessel is included in an emission average.

Initial testing for visible emissions (i.e., as specified in §63.11(b) of Subpart A) is required for Group 1 storage vessels controlled with flares. The initial testing is not a performance test, but is a compliance determination. The compliance determination also involves gathering data such as the heat content, the flow rate, and the exit velocity for all periods when the pilot flame is absent. The initial recordkeeping and reporting (i.e., as part of the Notification of Compliance Status) includes records and reports of flare design; visible emission readings and measurements of the heat content, the flow rate, and the exit velocity made during the compliance determination; and, periods when the pilot flame is absent.

Initial performance tests are not required for vapor collection systems or control devices other than flares. Instead, a report is required to be submitted as part of the Notification of Compliance Status which demonstrates that the control device being used achieves the required percent reduction, during reasonably expected maximum loading conditions. This documentation must include a design evaluation of the control device and a description of the gas stream which enters the control device, including flow and organic HAP content under varying liquid level conditions (dynamic and static). This documentation is not required for the following control devices:

- A boiler or process heater with a design heat input capacity of 44 MW or greater;

- A boiler or process heater into which the vent stream is introduced with the primary fuel;

- A boiler or process heater burning hazardous waste which has been issued a final permit under 40 CFR Part 270 and complies with the requirements of 40 CFR Part 266, Subpart H, or has certified compliance with the interim status requirements of 40 CFR Part 266, Subpart H; or

- A hazardous waste incinerator which has been issued a final permit under 40 CFR Part 270 and complies with the requirements of 40 CFR Part 264, Subpart O or has certified compliance with the interim status requirements of 40 CFR Part 265, Subpart O.

For enclosed combustion devices with a minimum residence time of 0.5 seconds and a temperature of at least 760^{o}C documentation that these conditions exist is sufficient for the design evaluation. For thermal incinerators, carbon adsorbers, and condensers, the design evaluation must include additional information specified in the storage provisions under §63.120(d)(1). If the control device used to comply with the storage provisions is also used to comply with the process vent, transfer, or wastewater provisions, the performance test required by the process vent, transfer, or wastewater provisions is acceptable to demonstrate compliance with the storage provisions and a design evaluation would not be required.

As part of the Notification of Compliance Status, the owner or operator must also submit a monitoring plan including the following: (1) a description of the parameter(s) to be monitored to ensure that the control device is operated and maintained in conformance with its design, (2) an explanation of the criteria used for selection of the parameter(s), and (3) the frequency with which monitoring will be performed. The owner or operator must also submit in the Notification of Compliance Status the operating range for each monitoring parameter identified. This specified operating range must represent the conditions for which the control device can achieve the 95 percent or greater emission reduction, or a 90 percent or greater emission reduction if installed prior to December 31, 1992.

For storage vessel emissions that are routed to a process, a design evaluation or engineering assessment is required that demonstrates the extent to which one or more of the following ends are being met:

- Recycled and/or consumed in the same manner as a material that fulfills the same function in that process;

- Transformed by chemical reaction into materials that are not organic hazardous air pollutants;

- Incorporated into a product; and/or

- Recovered.

This design evaluation is to be submitted with the Notification of Compliance Status.

Initial performance testing is not required for Group 1 storage vessels equipped with an internal floating roof, an external floating roof, external floating roof converted to an internal floating roof, or a system that routes emissions to a fuel gas system. However, for external floating roof vessels, an initial measurement of seal gap area and maximum seal gap width for both the primary seal and the secondary seal is required to be performed and recorded during the hydrostatic testing of the vessel or by the compliance date, whichever is later, and to be reported in the first periodic report. For systems that route emissions to a fuel gas system, the owner or operator must include a report as part of the Notification of Compliance Status that the emission stream is connected to the fuel gas system and whether it is subject to §63.148 of Subpart G.

Periodic inspection, measurement, recordkeeping, and reporting requirements for storage vessels equipped with an internal floating roof, an external floating roof, or an external floating roof converted to an internal floating roof are presented in Table 7-7. Continuous and periodic monitoring, recordkeeping, and reporting requirements associated with closed vent systems and control devices for storage vessels are presented in Table 7-8. Included in the tables are both "periodic reports", which are submitted semi-annually, and "other reports", which are submitted as needed, on an irregular basis.

The HON also requires periodic inspection of closed vent systems to detect leaks. The provisions are specified in §63.148 of Subpart G. The provisions of §63.148 also apply to any system other than hard-piping that is operated under positive pressure used to route emissions to a fuel gas system or to a process.

Bypassing the fuel gas system or process is permitted if one of the following conditions are met:

- The level in the storage vessel is not increased;
- The emissions are routed through a closed-vent system to a control device that is complying with the storage vessel provisions for control devices in §63.119(e) of Subpart G; or
- The total aggregate amount of time during the year that the emissions bypass the fuel gas system or process and are not routed to a control device does not exceed 240 hours.

For owners or operators that bypass the fuel gas system or process shall have a record available of the reason it was necessary to bypass the process equipment or fuel gas system, and a record of the duration of the period when the process equipment or fuel gas system was bypassed. Also, the record must include certification of which of the three conditions were met.

7.4 WASTEWATER PROVISIONS

This section summarizes the wastewater provisions of the HON. The discussion focuses on the process wastewater provisions in §63.132 through §63.147 of Subpart G. However, Sections 7.4.6, 7.4.7, and 7.4.8 address process water provisions in §63.149 of Subpart G, the cooling water provisions in §63.104 of Subpart F, and the maintenance wastewater provisions in §63.105 of Subpart F. The checklists in Sections 8, 9 and 10 of Volume II provide additional details of the storage vessel provisions.

7.4.1 Wastewater Definition

For the purpose of the HON, "wastewater" is defined as organic HAP-containing water, raw material, intermediate, product, by-product, co-product, or waste material that exits equipment in a SOCMI chemical manufacturing process unit (including the last recovery device) and enters an individual drain system and either: (1) contains an annual average concentration of Table 9 compounds of at least 5 ppmw and has an annual average flow rate of 0.02 ℓ/min or greater; or (2) contains an annual average concentration of Table 9 compounds of at least 10,000 ppmw at

any flow rate. Wastewater includes both process wastewater and maintenance wastewater. Table 9 compounds are those compounds listed on Table 9 of subpart G of the HON. Table 8 compounds, which will be referred to later are those compounds listed on Table 8 of subpart G of the HON.

"Process wastewater" means wastewater which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product. Examples are product tank drawdown or 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. Process water is considered wastewater when it exits the last recovery device in the chemical manufacturing process.

"Maintenance wastewater" means wastewater generated by the draining of process fluid from components in the chemical manufacturing process unit into an individual drain system prior to or during maintenance activities. Maintenance wastewater can be generated during planned and unplanned shutdowns and during periods not associated with a shutdown. Examples of activities that can generate maintenance wastewaters include descaling of heat exchanger tubing bundles, cleaning of distillation column traps, draining of low legs and high point bleeds, draining of pumps into an individual drain system, and draining of portions of the chemical manufacturing process unit for repair.

Other terms that are critical to understanding the HON wastewater provisions are "residual," "annual average concentration," and "point of determination."

"Residual" means any liquid or solid material containing Table 9 compounds that is removed from a wastewater stream by a waste management unit or treatment process that does not destroy organics (nondestructive units). Examples of residuals from nondestructive wastewater management units are: the organic layer and bottom residue removed by a decanter or organic-waste separator and the overheads from a steam stripper or air stripper. Examples of materials which are not residuals are: silt; mud; leaves; bottoms from a steam stripper or air stripper; and sludges, ash, or other materials removed from wastewater being treated by destructive devices such as biological treatment units and incinerators.

The term "annual average concentration" is defined as the flow-weighted annual average concentration, as determined in §63.144(b).

"Point of determination" means each point where process wastewater exits the chemical manufacturing process unit (after the last recovery device). NOTE: The regulation allows determination of wastewater stream characteristics (1) at the point of determination or (2) downstream of the point of determination if corrections are made for changes in flow rate and annual average concentration. Such changes include losses by air emissions; reduction of annual average concentration or changes in flow rate by mixing with other water or wastewater streams; and reduction in flow rate or annual average concentration by treating or otherwise handling the wastewater stream to remove or destroy HAP's.

Spills, water from safety showers, testing of deluge systems or firefighting systems, wastewaters that are discharged from a CMPU not subject to the HON are all wastewaters not subject to the HON. Stormwater and water from firefighting and deluge systems are also not subject to the HON if they are in a segregated sewer. HON is not applicable to wastewater with an annual average concentration of Table 9 compounds of less than 10,000 ppmw at a flow rate less than 0.02 ℓpm, or to wastewater streams less than 5 ppmw of Table 9 compounds at any flow. Table 4-10 in volume II of this manual is an applicability determination checklist for maintenance wastewater and process wastewater. If a maintenance wastewater stream is subject to the HON, the stream must comply with the requirements described in Section 7.4.8 of this chapter. If a process wastewater stream is subject to the HON, the stream must be categorized as either a Group 1 or Group 2 stream to determine which process wastewater provisions apply.

7.4.2 Sourcewide 1 Mg/yr Exemption

This exemption will be used most often for process wastewater streams which have a high concentration of HAP's but have a low flow rate. It includes two options. The first option is an applicability exemption in §63.138(i)(1), which exempts all Group 1 wastewater streams at a source from process wastewater control requirements if the total source mass flow rate for all Table 8 and/or Table 9 compounds is less than 1 Mg/yr [calculated according to procedures specified in §63.138(i)(1)(i) and (I)(1)(ii)].

The second option is a control option in §63.138(i)(2), which exempts untreated and partially treated Group 1 wastewater streams at a source from compliance with process wastewater control requirements if the source ensures that the total source mass flow rate for untreated and partially-treated Group 1 process wastewater streams is less than 1 Mg/yr [calculated according to procedures specified in §63.138(i)(2)(i) and (I)(2)(ii)]. Therefore, the source may elect to treat or partially treat some wastewater streams so that the total source mass flow rate of the untreated and partially-treated Group 1 process wastewater steams for the source is less than 1 Mg/yr. Also, all waste management units used to receive, manage, or treat Group 1 process wastewater streams must be in compliance with the control requirements described in Section 7.4.4.

7.4.3 Process Wastewater Group Determination

Group 1 and Group 2 wastewater streams are defined in §63.111 of Subpart G based on flow rate, annual average concentration, and whether the stream is part of a new or existing source. It is important to identify whether the source is new or existing because process wastewater streams from new sources are evaluated using more stringent criteria than streams from existing sources. Streams from new sources must be evaluated for concentration and flow rate of HAP's listed on Table 8 of Subpart G of the HON. Table 8 is a list of those HAP's more volatile than benzene. Whether or not a wastewater stream from a new source is a Group 1 stream for HAP's listed on Table 8 of Subpart G of the HON, it must still be evaluated for HAP's listed on Table 9 of Subpart G of the HON. Table 8 is a subset of Table 9. To be considered a Group 1 wastewater stream, the stream must consist of process wastewater as defined in §63.101 of Subpart F. For existing sources, Group 1 wastewater streams have a total annual average concentration of greater than or equal to 10,000 ppmv of Table 9 compounds at any flow, or a concentration of 1,000 ppmw or greater of Table 9 compounds at an annual average flow rate of 10 ℓpm or greater. For new sources, Group 1 wastewater streams have an annual average concentration of 10 ppmv or greater of Table 8 compounds and an annual average flow rate of 0.02 ℓpm or greater. Wastewater streams at new sources are also considered Group 1 wastewater streams if they meet the criteria for Group 1 status at existing sources -- Group 1 status for Table 9 compounds.

Process wastewater streams from existing sources do not need to be evaluated using the more stringent concentration and flow rate values that apply to Table 8 HAP's. Rather, process wastewater streams from existing sources must be evaluated using only the concentration and flow rate criteria for Table 9 HAP's.

Both new and existing facilities also may designate either a single process wastewater stream or a combination of process wastewater streams a Group 1 process wastewater stream instead of determing the group status using process knowledge or through sampling and analysis. This option allows sources to declare that at a designated location downstream of the point(s) of determination, all wastewater streams at this location and upstream are Group 1 and will therefore be controlled. The source is required to meet all requirements for Group 1 process wastewater streams (both upstream of the point of determination and downstream) for the designated Group 1 wastewater stream. For example, if a Group 1 and Group 2 stream were mixed, and hard piped together, the combined stream could be designated as a Group 1 process wastewater stream and managed accordingly. Designating process wastewater streams as Group 1 streams will be used most commonly for combinations of streams.

Table 8-1 of Volume II of this manual is a Group determination checklist for process wastewater streams.

7.4.4 Process Wastewater Control Requirements

Group 1 process wastewater streams and equipment managing such streams at both new and existing sources must meet control requirements in §63.132 through §63.139 of Subpart G and the leak detection requirements in §63.148 of Subpart G unless they are included in emissions averaging. Existing sources are not required to meet control requirements if Group 1 process wastewater streams are included in the 1 Mg/yr source-wide exemption discussed in Section 7.4.2 of this section. Group 2 wastewater streams and equipment managing only Group 2 streams are not required to apply additional controls unless the 95-percent biological treatment option, which is discussed in Section 7.4.4.2, is used.

The HON wastewater provisions include control requirements for: (1) waste management units including wastewater tanks, surface impoundments, containers, individual drain systems, and oil-water separators; (2) treatment processes including the design steam stripper, biological treatment units, or other treatment devices; and (3) closed-vent systems and control devices such as flares, catalytic incinerators, etc. This section provides an overview of the control requirements for such equipment when it receives, manages, or treats Group 1 process wastewater streams or residuals removed from process wastewater streams.

7.4.4.1 <u>Waste Management Units</u>

Waste management units are the equipment, structures, or devices used to convey, store, treat, or dispose of wastewater streams or residuals.

<u>Wastewater tanks</u>. The control requirements for tanks holding Group 1 process wastewater are dependent on tank capacity and vapor pressure criteria. Table 7-9 provides the tank capacity and vapor pressure thresholds with a corresponding summary of control requirements. Wastewater tanks holding only Group 1 process wastewater streams must meet the control requirements in §63.133 of Subpart G unless the wastewater is included in an emissions average. Wastewater tanks holding only Group 2 wastewater streams are not required to apply any additional controls. Compliance options for wastewater tanks holding Group 1 process wastewater streams include:

TABLE 7-9. WASTEWATER TANK EMISSION CONTROL REQUIREMENTS

<table>
<tr><th>Capacity (m^3)</th><th>Vapor Pressure (kPa)</th><th>Control Requirements[a]</th></tr>
<tr><td>< 75</td><td>N/A</td><td rowspan="3">Use of a fixed roof as specified in §63.133(a)(1) of Subpart G</td></tr>
<tr><td>≥ 75 and < 151</td><td>< 13.1</td></tr>
<tr><td>≥ 151</td><td>< 5.2</td></tr>
<tr><td>≥ 75 and < 151</td><td>≥ 13.1</td><td rowspan="2">Use of a fixed roof and a closed-vent system that routes HAP vapors to a control device; <u>or</u>
Use of a fixed roof and an internal floating roof that meets the requirements specified in §63.119(b) of Subpart G; <u>or</u>
Use of an external floating roof that meets the requirements specified in §§63.119(c), 63.120(b)(5), and 63.120(b)(6) of Subpart G; <u>or</u> an equivalent means of emission limitation as specified in §63.133(a)(2)(iv).</td></tr>
<tr><td>≥ 151</td><td>≥ 5.2</td></tr>
</table>

[a] To simplify the table, only an abbreviated description of the control requirement is given. Refer to the text for a more detailed description of the requirements.

- Reducing emissions of organic HAP's using a fixed-roof tank which is operated according to specified work practices (e.g., keeping hatches closed and bolted except during sampling, removal, or for equipment inspection maintenance or repair). If the wastewater tank is used for heating wastewater or treating by means of exothermic reaction, or the contents of the tank are sparged, this option can not be used for this tank;

- Reducing emissions of organic HAP's using a fixed-roof tank and a closed-vent system that routes organic HAP vapors to a control device. The fixed roof must be operated according to specified work practices (e.g., keeping hatches closed and bolted) and equipped with a lid that remains in a closed position (e.g., covered by a lid). The closed-vent system, which is subject to the requirements of §63.148 of Subpart G, and the control device, which is subject to the requirements of §63.139 of Subpart G, are discussed in Section 7.4.4.3 of this inspection tool;

- Reducing emissions of organic HAP's using a fixed-roof tank equipped with an internal floating roof which is operated according to specified work practices, equipped with specified deck fittings, and equipped with specified seal configurations (i.e., a single liquid-mounted seal, a single metallic shoe seal, or double seals);

- Reducing emissions of organic HAP's using an external floating roof tank operated according to specified work practices, equipped with specified deck fittings, and equipped with specified seal configurations (i.e., double seals, with the primary seal to be either a liquid-mounted or a metallic shoe seal); or

- Using another means of emission limitation approved in accordance with §63.102(b) of Subpart F.

A detailed checklist of the work practices and deck fittings specified for fixed-roof tanks, internal floating roof tanks, and external floating roof tanks is provided in Sections 7 and 8, Volume II.

Surface Impoundments. Surface impoundments holding Group 1 process wastewater streams must meet the control requirements in §63.134 of Subpart G unless the wastewater is included in an emissions average. Surface impoundments holding Group 2 wastewater streams are not required to apply any additional controls. The control requirement for surface impoundments holding Group 1 process wastewater streams is:

- Reducing emissions of organic HAP's using a cover (e.g., air-supported structure or rigid cover) and a closed-vent system that routes organic HAP vapors to a control device. The cover must be operated according to specified work practices (e.g., keeping hatches, sampling ports, and gauge wells closed). The closed-vent system, which is subject to the requirements of §63.148 of Subpart G, and the control device, which is subject to the requirements of §63.139 of Subpart G, are discussed in Section 7.4.4.3 of this document; or

- Reducing emissions of organic HAP's using a floating flexible membrane. The floating flexible membrane must float on the surface of the liquid and form a continuous barrier over the entire surface area of the liquid. Requirements are given for the fabrication of the membrane material (HDPE of 2.5 millimeters or any material with equivalent organic permeability properties). The flexible floating membrane must be installed properly, have a closure device, and emergency cover drains (for stormwater removal). The closure device must minimize exposure of HAP's to the atmosphere, and be operated according to specified work practices (e.g., keeping closed except for inspection, maintenance, or repair).

Containers. The control requirements for containers holding Group 1 process wastewater are dependent on container capacity thresholds. Table 7-10 provides the container capacity criteria and corresponding summary of control requirements. Containers holding Group 1 process wastewater streams must meet the control requirements in §63.135 of Subpart G unless the wastewater is included in an emissions average. Containers holding Group 2 wastewater streams are not required to apply any additional controls.

TABLE 7-10. CONTAINER[a] EMISSION CONTROL REQUIREMENTS

Capacity (m^3)	Control Requirements
0.1 ≤ capacity < 0.42	Container must meet DOT specifications and testing requirements under 49 CFR Part 178; or The cover and all openings must be maintained without leaks as specified in §63.148 of Subpart G
≥ 0.42	The cover and all openings must be maintained without leaks as specified in §63.148 of Subpart G; and Submerged fill pipes which meet specifications (e.g., fill pipe outlet can extend no more than six inches or within two fill pipe diameters of the bottom of the container) must be used; and Emissions of organic HAP's must be reduced using an enclosure. The enclosure must be operated with a closed-vent system routed to a control device.

[a] The term container is defined in the HON (§63.111) to have a capacity greater than or equal to 0.1 m^3.

Individual Drain Systems. Individual drain systems holding Group 1 process wastewater streams must meet the control requirements in §63.136 of Subpart G unless the wastewater is included in an emissions average. Individual drain systems holding Group 2 wastewater streams are not required to apply any additional controls. The control requirements for individual drain systems holding Group 1 process wastewater streams include:

- Reducing emissions of organic HAP's using a cover on each opening in the individual drain system and, if vented, a closed vent system that routes organic HAP vapors to a process or control device. The cover must be operated according to specified work practices (e.g., keeping access hatches and sampling ports closed). The closed-vent system, which is subject to the requirements of §63.148 of Subpart G, and the control device, which is subject to the requirements of §63.139 of Subpart G, are discussed in Section 7.4.4.3 of this document; or

- Reducing emissions of organic HAP's using drains equipped with water seal controls (e.g., p-trap) or a tightly fitting cap or plug which are operated according to specified work practices; and junction boxes equipped with a cover and, if vented, a closed vent system that routes organic HAP vapors to a process or a control device. Junction boxes that are fed by gravity or are operated with slight flunctuations in the liquid level are not required to use a closed vent system routing emissions to a process or control device. Instead the vent pipe is to be operated according to specified equipment standards and work practices. The closed-vent system, which is subject to the requirements of §63.148 of Subpart G, and the control device, which is subject to the requirements of §63.139 of Subpart G, are discussed in Section 7.4.4.3 of this document. Each sewer line shall not be open to the atmosphere and shall be covered or enclosed in a manner so as to have no visible gaps or cracks in joints, seals, or other emission interfaces.

Oil-water separators. Oil-water separators holding Group 1 process wastewater streams must meet the control requirements in §63.137 of Subpart G unless the wastewater is included in an emissions average. Oil-water separators holding Group 2 wastewater streams are not required to apply any additional controls. The control requirements for oil-water separators holding Group 1 process wastewater streams include:

- Reducing emissions of organic HAP's using a fixed roof and a closed-vent system that routes organic HAP vapors to a control device. The fixed roof must be operated according to specified work practices (e.g., keeping hatches bolted and closed). The closed-vent system, which is subject to the requirements of §63.148 of Subpart G, and the control device, which is subject to the requirements of §63.139 of Subpart G, are discussed in Section 7.4.4.3 of this document;

- Reducing emissions of organic HAP's using a floating roof operated according to specifications provided in 40 CFR Part 60 Subpart QQQ §§63.693-2(a)(1)(i), (a)(1)(ii), (a)(2), (a)(3), and (a)(4). Where a floating roof is infeasible, such as over a weir mechanism, a fixed roof and closed-vent system routed to a control device may be used; or

- Using another equivalent means of emission limitation approved in accordance with §63.102(b) of Subpart F.

A detailed checklist of work practices and equipment standards is provided in Volume II.

7.4.4.2 Treatment Processes

Treatment processes are techniques that remove or destroy the organics in a wastewater stream or residual. Section 63.138 of the HON wastewater provisions includes several compliance options and specifies how treatment processes may be used to achieve compliance with one or more of the compliance options. The compliance options may be used individually or in combination to achieve the required emission control.

The following is a list of all of the compliance options covered in §63.138. However, it should be noted that not all of the listed options may be used by all sources. For example, some options are available only for existing sources. Other options may be used to treat only certain types of wastewater streams. All Group 1 wastewater streams not included in an emissions average must be controlled for air emissions prior to treatment and must be treated. Steam stripping and biological treatment are two common methods used for treating wastewater, but other methods not specified in the rule (e.g., thin film evaporation) also may be used. In many plant wastewater systems, Group 1 streams are combined with other Group 1 streams or with Group 2 streams before they are treated. Tables 7-11 and 7-12 provide details on the use of the available compliance options. The following are the compliance options for Group 1 wastewater streams for both Table 8 and Table 9 compounds, unless otherwise indicated:

1. At new or existing sources, reduce, by removal or destruction, the total concentration of Table 9 compounds to a level less than 50 ppmw as specified in §63.145(b). [Note: cannot use biological treatment process or dilution with this option]; or

2. At new sources, reduce, by removal or destruction, individual Table 8 compounds to a level less than 10 ppmw as specified in §63.145(b). [Note: cannot use biological treatment process or dilution with this option]; or

3. Use a design steam stripper which meets the design criteria specified in §63.138(d); or

4. Use a waste management unit or treatment process to reduce by at least 99 percent, by removal or destruction, the total mass flow rate of Table 8 or Table 9 compounds; or

5. Use a waste management unit or treatment process to reduce, by removal or destruction, the mass flow rate of <u>each</u> Table 9 and/or Table 8 compound by at least the fraction removed (Fr) values specified in Table 9 and/or Table 8. [Note the Fr value for all Table 8 compounds is 0.99]; or

6. Use a waste management unit or treatment process to achieve the required mass removal (RMR) of Table 8 compounds at new sources or Table 9 compounds at new or existing sources. To determine compliance for: nonbiological treatment use procedures in §63.145(e); aerobic biological treatment use §63.145(e) or (f); closed biological treatment use §63.145(e); or open biological treatment use §63.145(f); or

7. For new or existing sources, use a biological treatment unit that achieves a RMR of at least 95 percent for all compounds listed on Table 9, or at new sources, use a biological treatment unit that achieves a RMR of 95 percent for all Table 8 compounds. [Note: all Group 1 and Group 2 wastewater stream entering the biological treatment unit that are subject to subpart F must be included in the demonstration of 95 percent removal]; or

8. Treat the wastewater or residual in a permitted RCRA hazardous waste incinerator, a RCRA permitted process heater or boiler, or discharge it to a properly permitted underground injection well.

TABLE 7-11. PROCESS WASTEWATER COMPLIANCE OPTIONS FOR NEW SOURCES

Compliance Options[a,b]	Group 1 for Table 8[c] Compounds	Group 1 for Table 9[c] Compounds	Group 2 Streams Only[d]
1. Use a steam stripper which meets the design criteria specified in §63.138(d) of Subpart G	**M**	**M**	N/A
2. Reduce mass flow rate of each Table 8 and/or Table 9 compound by Fr values specified in Table 9 of Subpart G [Fr values for Table 8 compounds are all 0.99]	**M**	**M**	N/A
3. Reduce HAP mass flow rate by 99%	**M**	**M**	N/A
4. Achieve required mass removal as specified in §63.145(e) and/or §63.145(f) of Subpart G	**M**	**M**	N/A
5. Treat in a biological treatment unit that achieves 95% HAP removal[e]	**M**	**M**	**M**
6. Reduce total concentration of Table 9 compounds to less than 50 ppmw[f]	N/A	**M**[g]	N/A
7. Reduce the concentration of each individually specified Table 8 HAP to less than 10 ppmw	**M**	N/A	N/A
8. Treat in a RCRA permitted waste incinerator, process heater or boiler, or underground injection well	**M**	**M**	N/A
9. Demonstrate that the total source mass flow rate of Table 8 and/or Table 9 compounds is less than 1 Mg/yr using procedures in §63.138(i)(1)(i) and (ii)	**M**	**M**	N/A

M means the compliance option can be used for the wastewater stream; and N/A means the compliance option is not applicable.

[a] Options correspond to those listed in Section 7.4.4.2. To simplify the table, only an abbreviated description of the option is given. Refer to Section 7.4.4.2 for a more detailed description of the requirements of the option.

[b] This table provides a list of compliance options. The stream(s) also need(s) to meet the suppression and control requirements described in Section 7.4.4.1.

[c] If a stream is Group 1 for Table 8 and/or Table 9 compounds, it must meet the treatment requirements for Table 8 and/or Table 9 compounds, as applicable.

[d] Group 2 streams that are not combined with Group 1 do not require treatment, except for the fifth compliance option - biological treatment unit achieving 95% HAP removal.

[e] If the option to achieve a 95-percent HAP destruction using biological treatment is selected, all Group 1 and Group 2 wastewater streams subject to the HON must be routed to the biological treatment unit.

[f] When meeting a concentration-based compliance option, the source must ensure that each Group 1 wastewater stream achieves the required average concentration. Dilution is not allowed as a method for reducing concentration.

[g] New sources selecting a concentration-based compliance option must ensure that the total concentration of each individual compound listed on Table 8 of Subpart G are reduced to less than 10 ppmw.

TABLE 7-12. PROCESS WASTEWATER COMPLIANCE OPTIONS FOR EXISTING SOURCES

Compliance Options[a,b]	Group 1 for Table 9 Compounds[c]	Group 2 Streams Only[d]
1. Use a steam stripper which meets the design criteria specified in §63.138(d) of Subpart G	**M**	N/A
2. Reduce mass flow rate of each Table 9 organic HAP by the Fr values specified in Table 9 of Subpart G	**M**	N/A
3. Reduce mass flow rate of Table 9 compounds by 99%	**M**	N/A
4. Achieve required mass removal as specified in §63.145(e) or (f) of Subpart G	**M**	N/A
5. Treat in a biological treatment unit that achieves 95% HAP removal[e]	**M**	**M**
6. Reduce total concentration of Table 9 compounds to less than 50 ppmw[f]	**M**	N/A
7. Treat in a RCRA permitted waste incinerator, process heater or boiler, or underground injection well	**M**	N/A
8. Demonstrate that the total source flow rate of Table 9 compounds is less than 1 Mg/yr using procedures in §63.138(i)(1)(i) and (i)(1)(ii)	**M**	N/A

M means the compliance option can be used for the wastewater stream; and N/A means the compliance option is not applicable.

[a] Options correspond to those listed in Section 7.4.4.2. To simplify the table, only an abbreviated description of the option is given. Refer to Section 7.4.4.2 for a more detailed description of the requirements of the option.

[b] This table provides a list of compliance options. The stream(s) also need(s) to meet the suppression and control requirements described in Section 7.4.4.1.

[c] Existing sources must comply with requirements only for HAP's listed on Table 9 of Subpart G.

[d] Group 2 streams that are not combined with Group 1 do not require treatment, except for the fifth compliance option - biological treatment unit achieving 95% HAP removal.

[e] If the option to achieve 95-percent destruction using biological treatment is selected, all Group 1 and Group 2 wastewater streams subject to the HON must be routed to the biological treatment unit.

[f] When meeting a concentration-based compliance option, the source must ensure that each Group 1 wastewater stream achieves the required annual average concentration. Dilution is not allowed as a method for reducing concentration.

Sources complying with any of the options, except the design steam stripper or RCRA option, must conduct either a design evaluation or performance test to prove compliance with the chosen option(s). Sources using open biological treatment processes must conduct a performance that (except as noted in Table 36 of Subpart G). The design evaluation must address the operating characteristics of the treatment process based on operation at representative wastewater flow and a concentration under which it would be most difficult to demonstrate compliance. Performance tests must be conducted as specified in §63.145 of Subpart G.

It should be noted that wastewater streams are exempt from the above compliance options if the total source mass flow rate for Table 8 and/or Table 9 compounds is less than 1 megagram per year, based on the mass before the wastewater stream is treated. A detailed checklist of the requirements for each of the treatment compliance options is provided in Section 8 of Volume II.

7.4.4.3 Closed-Vent Systems and Control Devices

Closed-vent systems are used to transport organic HAP vapors from waste management units and treatment processes to control devices. In order to reduce emissions during transport, the duct work or piping in the closed-vent system is subject to periodic leak inspections in §63.148 of Subpart G. There are also provisions in §63.148 to prevent releases through by-pass lines.

Control devices are used to recover or destroy organic HAP vapors. Section 63.139 of the HON wastewater provisions requires that control devices reduce by 95 percent the organic HAP emissions routed to them from waste management units and treatment processes or allow an outlet concentration of 20 ppmv or less. A variety of control devices may be used including flares; enclosed combustion devices such as thermal and catalytic incinerators, boilers, and process heaters; vapor recovery systems such as condensers and carbon adsorbers; scrubbers; and any other devices that can reduce total organic HAP emissions by 95 weight percent or greater, or reduce the outlet concentration to 20 ppmv or less.

7.4.4.4 Residuals Management

Residuals may be generated during the treatment of wastewater. As described in Section 7.4.1, residuals can include, among other things, the organic layer removed by a decanter or the overheads condensate from a steam stripper or air stripper. Residuals generated from the management of a Group 1 process wastewater stream must be managed according to §63.138(k) of Subpart G. Specifically, they must be controlled for air emissions by one of the following compliance options:

- Recycling the residual to a production process;
- Selling the residual for the purpose of recycling or for any other purpose. Residuals being stored prior to sale must be in compliance with waste management unit control requirements. Additionally, once residuals are sold, they must continue to be managed in accordance with the HON;
- Returning the residual to a treatment process (e.g., send to a boiler);
- Treating the residual to destroy the total combined mass flow rate of Table 8 and/or Table 9 compounds by 99 percent or more; or
- Comply with RCRA treatment options given in §63.138(h).

Any residuals generated from Group 2 streams do not require control under the HON; however, other regulations such as RCRA may be applicable.

7.4.5 Process Wastewater Testing, Monitoring, Recordkeeping and Reporting

For both Group 1 and Group 2 process wastewater streams, a record must be kept which provides the annual average flow rate and the annual average concentration for each process wastewater stream. If process knowledge is used to determine that a process wastewater stream is Group 2, a record of how the process knowledge was used to make the decision must be maintained.

As part of the Notification of Compliance Status, sources must submit more specific details on the waste management units, treatment processes, and control devices that are being used, including design analyses, performance test results, and compliance determination results. For HAP's listed on Table 8 and/or Table 9 of Subpart G, each new source must submit the information described in Appendix D, Table D-1.

For each treatment process or waste management unit identified in Tables D-1, the sources also must complete Table D-2 for treatment processes and Table D-3 for waste management units. For each residual removed from a Group 1 process wastewater stream, sources must submit the information described in Table D-4.

If the vapors from a waste management unit or treatment process are routed to a flare, the sources must submit records and reports of flare design, visible emission readings, heat content determinations, flow rate measurements, exit velocity, and periods when the pilot flame is absent. For each control device that is not a flare, the source must submit information justifying site-specific monitoring parameter ranges and either the results of performance tests or a design evaluation for a thermal incinerator, catalytic incinerator, boiler or process heater, condenser, carbon adsorption system, or scrubber. The documentation must include the vent stream composition, constituent concentrations, flow rate, and control device operating parameters. Some control devices are not required to submit design evaluation criteria, including: (1) boilers or process heaters either with a design heat input capacity of 44 MW or greater, or into which the emission stream is introduced with the primary fuel; or (2) boilers or process heaters burning hazardous waste for which the owner or operator has been issued either a final permit or a certification of interim status under RCRA 40 CFR Parts 270 and 266, Subpart H.

For waste management units, treatment processes, and control devices, sources must submit results of inspections and monitoring as part of the Periodic Report, which is submitted semi-annually. A list of inspection and monitoring requirements is provided for waste management units in Table 7-13, for treatment processes in Table 7-14, and for control devices in Table 7-15. Table 7-16 provides a list of reporting and recordkeeping requirements for control devices.

7.4.6 Process Water Control Requirements

The approach used in the HON to regulate wastewater emissions assumed that all process water containing HAP's would be managed in closed systems to minimize the loss of recoverable materials. The provisions on the control of emissions from process water were included to ensure that process fluids containing hazardous air pollutants within the manufacturing process would be

handled in amanner consistent with the requirements for wastewater streams subject to control. The process waters regulated by the HON are certain liquid streams in open systems within a chemical manufacturing process unit. The provisions in §63.149 contain control requirements for equipment that comes in contact with such process water streams. Table 7-17 lists the control requirements for equipment coming in contact with such streams.

7.4.7 Heat Exchange Systems and Cooling Water Management Requirements

A heat exchange system, as defined in the HON, includes any recirculating heat exchange system (i.e., cooling tower system) or once-through cooling water system (e.g., river or pond water). A heat exchange system can include more than one heat exchanger and can include an entire recirculating or once-through cooling system. The requirements for managing cooling water are provided in §63.104 of Subpart F.

The HON requires sources using heat exchange systems (either recirculating or once-through heat exchange systems) to monitor cooling water for leaks. The HON requires sources using recirculating heat exchange systems to monitor for leaks of HAP's listed on Table 4 of Subpart F. Sources using once-through heat exchange systems are required to monitor for leaks of all Table 9 compounds.

All heat exchange systems must be monitored for leaks using one of the following parameters: total HAP, total VOC, speciated HAP's, TOC, or other representative substances that would indicate the presence of a leak in the heat exchange system. Monitoring must be performed monthly for the first six months and quarterly thereafter.

Monitoring parameter (e.g., total HAP, total VOC) concentrations in cooling water must be determined using any EPA-approved method listed in 40 CFR Part 136 that is sensitive to concentrations as low as 10 ppm. The same method must be used to measure the inlet and the outlet concentration of the heat exchange system. A leak is detected if a statistically significant difference in concentration of at least 1 ppm at a 95 percent confidence level is observed. Leaks must be repaired no more than 45 days after monitoring tests indicate a leak is present unless the source provides documentation meeting the criteria in §63.104(e) for delay of repair. After a leak is repaired, the source must monitor monthly for six months and quarterly thereafter to ensure that the leak does not recur.

Sources are not required to comply with leak detection monitoring requirements if either: (1) the heat exchange system is operated with the minimum pressure on the cooling water side at least 35 kilopascals greater than the maximum pressure on the process side; or (2) there is an intervening cooling fluid containing less than 5 percent by weight of the compounds listed in Table 4 of subpart F; or (3) the once-through heat exchange system has an NPDES permit with an allowable discharge limit of less than 1 ppm; or (4) the once-through heat exchange system has an NPDES permit that requires monitoring conditions or parameters to detect a leak of process fluid, specifies the normal range of the parameters or conditions, requires monitoring for the parameters or conditions no less frequently than every month for the first six months and quarterly thereafter, and requires the owner or operator to report and repair leaks when parameter conditions exceed the normal range; or (5) the recirculation heat exchange system is used to cool process fluids that contain less than 5 percent by weight of the compounds listed in Table 4 of subpart F; or (6) the once-through heat exchange system is used to cool process fluids that

TABLE 7-17. CONTROL REQUIREMENTS FOR ITEMS OF EQUIPMENT THAT MEET THE CRITERIA OF §63.149 OF SUBPART G

Item of Equipment	Control Requirements[a]
Drain or drain hub	(a) Tightly fitting solid cover (TFSC); or (b) TFSC with a vent to either a process, to a fuel gas system, or to a control device meeting the requirements of § 63.139 (c); or (c) Water seal with submerged discharge or barrier to protect discharge from wind.
Manhole[b]	(a) TFSC; or (b) TSFC with a vent to either a process, to a fuel gas system, or to a control device meeting the requirements of § 63.139 (c); or (c) If the item is vented to the atmosphere, use a TFSC with a properly operating water seal at the entrance or exit to the item to restrict ventilation in the collection system. The vent pipe shall be at least 90 cm in length and not exceeding 10.2 cm in nominal inside diameter.
Lift station	(a) TFSC; or (b) TFSC with a vent to either a process, to a fuel gas system, or to a control device meeting the requirements of § 63.139 (c); or (c) If the lift station is vented to the atmosphere, use a TFSC with a properly operating water seal at the entrance or exit to the item to restrict ventilation in the collection system. The vent pipe shall be at least 90 cm in length and not exceeding 10.2 cm in nominal inside diameter. The lift station shall be level controlled to minimize changes in the liquid level.
Trench	(a) TFSC; or (b) TSFC with a vent to either a process, to a fuel gas system, or to a control device meeting the requirements of § 63.139 (c); or (c) If the item is vented to the atmosphere, use a TFSC with a properly operating water seal at the entrance or exit to the item to restrict ventilation in the collection system. The vent pipe shall be at least 90 cm in length and not exceeding 10.2 cm in nominal inside diameter.
Pipe	Each pipe shall have no visible gaps in joints, seals, or other emission interfaces.
Oil/Water separator	(a) Equip with a fixed roof and closed vent system that routes vapors to process equipment or to a control device meeting the requirements of § 63.139 (c); or (b) Equip with a floating roof that meets the equipment specifications of § 60.693 (a)(1)(i), (a)(1)(ii), (a)(2), (a)(3), and (a)(4).
Tank[c]	Maintain a fixed roof[d]. If the tank is sparged[e] or used for heating or treating by means of an exothermic reaction, a fixed roof and a closed vent system shall be maintained that routes the organic HAP vapors to other process equipment or to a control device that meets the requirements of 40 CFR § 63.119(e)(1) or (e)(2).

[a] Where a tight fitting solid cover is required, it shall be maintained with no visible gaps or openings, except during periods of sampling, inspection, or maintenance.
[b] Manhole includes sumps and other points of access to a conveyance system.
[c] Applies to tanks with capacities of 38 m^3 or greater.
[d] A fixed roof may have openings necessary for proper venting of the tank, such as pressure/vacuum vent, j-pipe vent.
[e] The liquid in the tank is agitated by injecting compresses air or gas.

contain less than 5 percent by weight of the Table 9 compounds. Table 8-5 of Volume II provides a detailed checklist of requirements for heat exchange systems requiring leak detection monitoring.

7.4.8 Maintenance Wastewater Management Requirements

Maintenance wastewater is defined as wastewater generated by the draining of process fluid from components in the chemical manufacturing process unit into an individual drain system prior to or during maintenance activities. Maintenance wastewater can be generated during planned and unplanned shutdowns and during periods not associated with a shutdown. Examples of activities that can generate maintenance wastewater include descaling of heat exchanger tubing bundles, cleaning of distillation column traps, draining of low legs and high point bleeds, draining of pumps into an individual drain system, and draining of portions of the chemical manufacturing process unit for repair. The requirements for managing maintenance wastewater are provided in §63.105 of Subpart F.

As part of the facility's startup, shutdown, and malfunction plan required by §63.6(e)(3) of 40 CFR Part 63 Subpart A, the HON requires sources to prepare a description of procedures for managing maintenance wastewater. The description must include maintenance procedures for managing wastewater generated from emptying and purging equipment during temporary shutdowns that are necessary for inspections, maintenance, and repair (i.e., maintenance-turnaround) and during periods which are not shutdowns (i.e., routine maintenance). At a minimum, the description must specify: (1) the process equipment and/or maintenance tasks that are expected to create wastewater during maintenance activities; (2) the procedure for properly managing the wastewater and controlling HAP emissions to the atmosphere; and (3) the procedures for clearing materials from process equipment.

The description is to be modified and updated as needed following each maintenance procedure. Records of the maintenance procedures must be kept as part of the startup, shutdown, and malfunction plan. A detailed checklist of the maintenance wastewater requirements are provided in Table 8-6 of Volume II.