EPA-453/R-94-003b

Hazardous Air Pollutant Emissions from Process Units in the Synthetic Organic Chemical Manufacturing Industry-- Background Information for Final Standards

Volume 2B: Comments on Wastewater

Emission Standards Division

U.S. Environmental Protection Agency
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

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DISCLAIMER

ENVIRONMENTAL PROTECTION AGENCY

Background Information and Final Environmental Impact Statement for Hazardous Air Pollutant Emissions from Process Units in the Synthetic Organic Chemical Manufacturing Industry Volume 2B: Comments on Wastewater

Prepared by:

[signature] 2/8/94

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1. The standards regulate emissions of organic hazardous air pollutants (HAP's) emitted from chemical manufacturing process units in the Synthetic Organic Chemical Manufacturing Industry (SOCMI) and from other processes subject to the negotiated regulation for equipment leaks. Only those chemical manufacturing process units that are part of major sources under Section 112(d) of the Clean Air Act (Act) will be regulated. The standards will reduce emissions of 112 of the organic chemicals identified in the Act list of 189 HAP's.

2. Copies of this document have been sent to the following Federal Departments: Labor, Health and Human Services, Defense, Transportation, Agriculture, Commerce, Interior, and Energy; the National Science Foundation; and the Council on Environmental Quality. Copies have also been sent to members of the State and Territorial Air Pollution Program Administrators; the Association of Local Air Pollution Control Officials; EPA Regional Administrators; and other interested parties.

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4. Paper copies of this document may be obtained from:

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OVERVIEW

Emission standards under section 112(d) of the Clean Air Act (Act) apply to new and existing sources in each listed category of hazardous air pollutant (HAP) emission sources. This background information document (BID) provides summaries and responses for public comments received regarding the Hazardous Organic National Emission Standard for Hazardous Air Pollutants (NESHAP), commonly referred to as the HON. The HON will primarily affect the Synthetic Organic Chemical Manufacturing Industry (SOCMI). However, the provisions for equipment leaks also apply to certain polymer and resin production processes, certain pesticide production processes, and certain miscellaneous processes that are subject to the negotiated regulation for equipment leaks.

This BID comprises six volumes as follows:

- Volume 2A: Comments on Process Vents, Storage Vessels, Transfer Operations, and Equipment Leaks (EPA-453/R-94-003a);
- Volume 2B: Comments on Wastewater (EPA-453/R-94-003b);
- Volume 2C: Comments on Emissions Averaging (EPA-453/R-94-003c);
- Volume 2D: Comments on Applicability, National Impacts, and Overlap with Other Rules (EPA-453/R-94-003d);
- Volume 2E: Comments on Recordkeeping, Reporting, Compliance, and Test Methods (EPA-453/R-94-003e); and
- Volume 2F: Commenter Identification List (EPA-453/R-94-003f).

Volume 2A is organized by emission point and contains discussions of specific technical issues related to process vents, storage vessels, transfer operations, and equipment leaks. Volume 2A discusses specific technical issues such as control technology, cost analysis, emission estimates, Group 1/Group 2 determination, compliance options and demonstrations, and monitoring.

Volume 2B addresses issues related to controlling emissions from wastewater. Specific technical issues include control technology, cost analysis, emission estimates, Group 1/Group 2 determination, compliance options and demonstrations, and monitoring.

Volume 2C contains the EPA's decisions regarding emissions averaging. Specific issues include the scope of emissions averaging in the HON, specific provisions related to credits and banking, and enforcement of an emissions averaging system for the HON.

Volume 2D discusses applicability of the HON in terms of selection of source category, selection of source, and selection of pollutants. Volume 2D also addresses the process for determination of the MACT floor and selection of the specific applicability thresholds for process vents, storage vessels, transfer racks, wastewater operations, and equipment leaks.

Volume 2E discusses the provisions for compliance, recordkeeping and reporting. Volume 2E also discusses issues related to the use of EPA test methods.

Volume 2F of each volume contains a list of commenters, their affiliations, and the EPA docket and item number assigned to each comment.

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ACRONYM AND ABBRIEVIATION LIST

ACRONYM	TERM
Act	Clean Air Act
ALAPCO	Association of Local Air Pollution Control Officers
ASPEN	advanced system for process engineering
BACT	best available control technology
BAT	best available technology
BD	butadiene
BID	background information document
BIF	boilers and industrial furnaces
CEM	continuous emissions monitoring
CFR	Code of Federal Regulations
CMA	Chemical Manufacturers Association
CMPU	chemical manufacturing process unit
CO	carbon monoxide
CTG	control techniques guideline
CWA	Clean Water Act
DMS	dual mechanical seal
DOT	Department of Transportation
DRE	destruction and removal efficiency
EB/S	ethylbenzene/styrene
EDC	ethylene dichloride
EFR	external floating roof
EO	ethylene oxide
E.O.	Executive Order
EPA	Environmental Protection Agency
Fe	fraction emitted
Fm	fraction measured
FR	FEDERAL REGISTER
Fr	fraction removed
FTIR	Fourier transform infrared
HAP	hazardous air pollutant

ACRONYM AND ABBREVIATION LIST, CONTINUED

ACRONYM	TERM
HON	hazardous organic national emission standards for hazardous air pollutants
IFR	internal floating roof
LDAR	leak detection and repair
LAER	lowest achievable emission rate
MACT	maximum achievable control technology
MIBK	methyl isobutyl ketone
MR	mass removal (actual)
NCS	Notification of Compliance Status
NESHAP	national emission standards for hazardous air pollutants
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRDC	Natural Resources Defense Council
NSPS	new source performance standards
NSR	new source review
OCCM	Office of Air Quality Planning and Standards Control Cost Manual
OCPSF	organic chemicals, plastics, and synthetic fibers
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
P.L.	Public Law
PAV	product accumulator vessel
POM	polycyclic organic matter
POTW	publicly owned treatment works
PRA	Paperwork Reduction Act
PRV	pressure relief valve
PSD	prevention of significant deterioration
QIP	quality improvement program

ACRONYM AND ABBREVIATION LIST, CONTINUED

ACRONYM	TERM
R & D	research and development
RCRA	Resource Conservation and Recovery Act
RCT	reference control technology
RIA	Regulatory Impact Analysis
RMR	required mass removal
SARA	Superfund Amendment and Reauthorization Act
SIP	State Implementation Plan
SMS	single mechanical seal
SOCMI	synthetic organic chemical manufacturing industry
STAPPA	State and Territorial Air Pollution Program Administrators
TAC	total annual cost
TACB	Texas Air Control Board
TCI	total capital investment
THC	total hydrocarbon
TIC	total industry control
TOC	total organic compound
TRE	total resource effectiveness
TRI	toxics release inventory
TSDF	treatment, storage, and disposal facility
VHAP	volatile hazardous air pollutant
VO	volatile organics measurable by Method 25D
VOC	volatile organic compound
VOHAP	volatile organic hazardous air pollutant

ABBREVIATION	UNIT OF MEASURE
bbl	barrel
BOE	barrels of oil equivalent

ACRONYM AND ABBREVIATION LIST, CONTINUED

ABBREVIATION	UNIT OF MEASURE
Btu	British thermal unit
Btu/kW-hr	British thermal unit per kilowatt-hour
^{o}C	degrees Celsius
^{o}F	degrees Fahrenheit
gal	gallon
gpm	gallons per minute
hr	hour
kg/hr	kilograms per hour
kPa	kilopascals
kW-hr/yr	kilowatt-hour per year
$\ell/hour \cdot m^2$	liters per hour per square meter
ℓpm	liters per minute
gal	gallons
m^3	cubic meters
Mg	megagrams
mg	milligrams
mg/dscm	milligram per dry standard cubic meter
MW	megawatts
ppb	parts per billion
ppm	parts per million
ppmv	parts per million by volume
ppmw	parts per million by weight
psia	pounds per square inch absolute
scm/min	standard cubic meter per minute
TJ	terajoules
yr	year

LIST OF FREQUENTLY USED TERMS

<u>Act</u> means the Clean Air Act as amended in 1990.

<u>Administrator</u> means the Administrator of the U. S. Environmental Protection Agency or his or her authorized representative (e.g., a State that has been delegated the authority to implement the provisions of part 63).

<u>Enhanced monitoring rule</u> means the rule to be located in sections 64.1 through 64.9 of part 64 of title 40 of the Code of Federal Regulations. This rule implements section 702(b) of title VII of the 1990 Clean Air Act Amendments. This rule establishes the criteria and procedures that owners or operators must satisfy in evaluating, selecting and demonstrating enhanced monitoring, and includes appendices containing enhanced monitoring performance and quality assurance requirements. The enhanced monitoring rule does not apply to sources subject to 40 CFR part 63, and therefore does not apply to sources subject to the HON. The proposed rule was published in the <u>Federal Register</u> on October 22, 1993 (58 FR 54648).

<u>General Provisions</u> means the general provisions located in subpart A of part 63 of title 40 of the Code of Federal Regulations. These General Provisions codify national emission standards for hazardous air pollutants (NESHAP) for source categories covered under section 112 of the Act as amended November 15, 1990.

<u>Implementing agency</u> means the Administrator of the U. S. Environmental Protection Agency or a State, federal, or other agency that has been delegated the authority to implement the provisions of part 63. Under section 112(l) of the Act, States and localities may develop and submit to the Administrator for approval a program for the implementation and enforcement of emission standards. A program submitted by

the State under section 112(l) of the Act may provide for partial or complete delegation of the Administrator's authorities and responsibilities to implement and enforce emission standards.

Operating permit program rule means the rule located in sections 70.1 through 70.11 of part 70 of chapter I of title 40 of the Code of Federal Regulations. This rule implements section 502(b) of title V of the 1990 Clean Air Act Amendments. Under this rule, States are required to develop, and to submit to the EPA, programs for issuing operating permits to major stationary sources (including major sources of hazardous air pollutants listed in section 112 of the Act), sources covered by New Source Performance Standards (NSPS), sources covered by emissions standards for hazardous air pollutants pursuant to section 112 of the Act, and affected sources under the acid rain program. The final rule was published in the Federal Register on July 21, 1992 (57 FR 32250).

Permitting authority means: (1) the State air pollution control agency, local agency, other State agency, or other agency authorized by the Administrator to carry out a permit program under part 70; or (2) the Administrator, in the case of EPA-implemented permit programs under part 71.

Section 112(g) rule means the rule to be located in subpart B of part 63 of title 40 of the Code of Federal Regulations. This rule implements section 112(g) of the 1990 Clean Air Act Amendments. This rule will impose control technology requirements on "constructed, reconstructed or modified" major sources of hazardous air pollutants not already regulated by a section 112(d) or 112(j) MACT standard.

Section 112(l) rule means the rule located in subpart E of part 63 of title 40 of the Code of Federal Regulations. Under this rule, a State or locality may submit a program to the Administrator to request partial or complete delegation of the Administrator's authorities and responsibilities to implement and enforce section 112 emission standards. The final rule was published in the Federal Register on November 26, 1993 (58 FR 62262).

Title III means title III of the 1990 Clean Air Act Amendments. Section 112 of the Act authorizes the EPA to establish MACT standards.

Title V means title V of the 1990 Clean Air Act Amendments, which authorizes the EPA to establish the operating permit program.

Title VII means title VII of the 1990 Clean Air Act Amendments. Section 702(b) of the Act authorizes the EPA to establish compliance certification procedures. The part 64 enhanced monitoring rule implements section 702(b).

1.0 INTRODUCTION

On December 31, 1992, the U.S. Environmental Protection Agency (EPA) proposed the Hazardous Organic National Emission Standard for Hazardous Air Pollutants (NESHAP) for process units in the synthetic organic chemical manufacturing industry, commonly referred to as the HON (57 FR 62608). The HON was proposed under the authority of section 112(d) of the Clean Air Act. Public comments were requested on the proposed standard and comment letters were received from industry representatives, governmental entities, environmental groups, and private citizens. Also, two public meetings were held, one in Research Triangle Park, North Carolina, on February 25, 1993, and another in Baton Rouge, Louisiana, on March 18, 1993. Five people at the North Carolina meeting and 45 people at the Louisiana meeting presented oral testimony on the proposed NESHAP.

On August 11, 1993, the General Provisions for part 63 (58 FR 42760) were proposed. In order to allow the public to comment on how the General Provisions relate to the Hazardous Organic NESHAP (HON), a supplemental notice was published in the Federal Register (October 15, 1993; 58 FR 53478). Public comments were requested on the overlap between the General Provisions and the HON and on some specific emissions averaging issues. Comment letters regarding the supplemental notice were received from 80 commenters.

The written comments that were submitted and verbal comments made at the public hearings regarding the technical and policy issues associated with wastewater in the proposed rule and supplemental notice, along with responses to these comments, are summarized in the following chapters. In chapter 2.0, the EPA addresses issues associated with control requirements including steam stripping as the reference control technology, the use of biological treatment as a control technology, and clarification of other waste management issues. Chapter 3.0 presents the impacts analysis which includes cost analysis, emission estimates, environmenta impacts, and energy impacts. In chapter 4.0, the EPA provides information on issues related to applicability and Group 1/Group 2 determination including clarification of definitions and discussion of overlapping regulations. Chapter 5.0 includes discussion about compliance options. Chapter 6.0 provides information on compliance demonstrations, which comprises biological treatment, performance testing, inspections, and monitoring. In chapter 7.0, the EPA addresses recordkeeping and reporting issues. Chapter 8.0 presents several clarifications concerning wording of the provisions. The summary of comments and responses serves as the basis for the revisions made to the NESHAP between proposal and promulgation.

2.0 CONTROL REQUIREMENTS

In response to commenter confusion, the EPA clarifies the use of the terms "VOHAP concentration" and "HAP" to reflect the proper use of the terms throughout the preamble, regulation, and BID documents. The term "volatile organic hazardous air pollutant concentration" or "VOHAP concentration" means the concentration of an individually-speciated organic HAP in a wastewater stream or a residual as measured by Method 305. The term "VOHAP" does not refer to the lists of organic HAP's in tables 8 and 9 of subpart G. The wastewater provisions of the HON regulate emissions from wastewater of those organic HAP's listed in table 8 for new sources and in table 9 for new and existing sources. The applicability of the requirements in the HON to wastewater streams is based on the VOHAP concentration of the HAP's present in the wastewater stream. The VOHAP concentration of a compound can be calculated by multiplying the HAP concentration of the compound by the compound-specific fraction measured (Fm) value listed in table 34 of subpart G.

2.1 REFERENCE CONTROL TECHNOLOGY

2.1.1 Clarification of the Definition of "Reference Control Technology"

Comment: One commenter (A-90-19: IV-D-73) stated that the definition of reference control technology for wastewater attempts to identify all reference control technologies for collection systems. The commenter (A-90-19: IV-D-73) further stated that there are so many options available for the management and treatment of wastewater that it may not be possible to reiterate them in the definition of reference control technology. The commenter (A-90-19: IV-D-73) suggested revising the definition to clarify that the cited technologies are examples and not all inclusive.

Response: The EPA clarifies that the definition of reference control technology (RCT) for wastewater does not attempt to identify all control technologies for collection systems. The definition of RCT for wastewater does not include collection systems. There is not a reference control technology for collection systems; it is merely a work practice standard.

The EPA agrees that there are a number of options available for complying with the wastewater provisions of the HON. However, the technologies cited in the definition of RCT for wastewater are not examples. The reference control technologies cited in the definition are the bases for determining the equivalent performance of those treatment technologies that an owner or operator may want to employ as alternatives to the RCT. The HAP emission reduction achieved by any alternate treatment technology must be equivalent to or exceed the HAP emission reduction achieved by the RCT.

2.1.2 Steam Stripping as RCT

Comment: One commenter (A-90-19: IV-D-85) stated that highly volatile compounds may evaporate before biological treatment systems have time to work. Therefore, the commenter (A-90-19: IV-D-85) supported steam stripping as an RCT.

Response: The EPA agrees that volatile HAP compounds may be emitted to the atmosphere before reaching the biological treatment unit. However, the EPA recognizes that biological treatment units can achieve high levels of HAP destruction if operated properly. Therefore, the EPA maintains the requirement for suppression of HAP emissions from the collection system down to the treatment process, such as a steam stripper or a properly operated biological treatment unit. Once volatile compounds reach the biological treatment unit, a performance test using Method 304A, Method 304B, or other methods described in appendix C of part 63, is required to ensure that the biological treatment unit is working properly and that the biological treatment unit is achieving the required destruction efficiency.

Comment: Several commenters (A-90-19: IV-D-9; IV-D-45 and IV-F-7.7; IV-D-57; IV-D-70; IV-D-85; IV-D-118; IV-D-124; IV-D-125; IV-F-7.39 and IV-F-12) supported the use of steam strippers and suppression system components such as covers, and other control devices to limit air emissions from wastewater streams. One commenter (A-90-19: IV-F.39 and IV-F-12) stated that steam stripping is an improvement over biological treatment. Another commenter (A-90-19: IV-D-57) stated that the list of HAP's for process wastewater in tables 8 and 9 of subpart G is correct based on both the RCT of steam stripping and the volatility of the chemicals. Several commenters (A-90-19: IV-D-9; IV-D-118; IV-D-124; IV-D-125) claimed that the provisions which allow biological treatment as a substitute to steam stripping weaken the regulation.

Response: While the EPA agrees with the commenter that steam stripping and suppressed collection units provide good control of HAP emissions, the EPA does not agree that allowing biological treatment weakens the regulation. The wastewater collection system must be suppressed down to the treatment process that is used to achieve compliance, including biological treatment, which meets the treatment provisions of §63.138. Additionally, the biological treatment unit must achieve an organic HAP emission reduction equivalent to steam stripping.

Comment: One commenter (A-90-19: IV-D-75) claimed that steam stripping should not be RCT for wastewater, because it does not meet the 12-percent criteria. The commenter (A-90-19: IV-D-75) stated that the primary application of steam stripping is for product recovery and recycle, and not for control. The commenter (A-90-19: IV-D-75) claimed that the EPA could also designate biological treatment as a reference control technology if it is used by 12 percent of sources and achieves the required efficiency.

Response: The amount of emissions reduction achieved by biological treatment, even for biologically degradable compounds, will vary widely among different facilities due to the wide range in operating and design parameters which define a biological treatment system. The parameters which affect the emission rate of volatile organic compounds include, but are not limited to, the biological degradation rate, surface area, amount of aeration, hydraulic residence time, and the active biomass concentration. Therefore, the performance of individual biological treatment systems with respect to volatile organic compound emission reduction will also vary greatly. For these reasons, the EPA determined that biological treatment would not be appropriate as the RCT. Furthermore, it was not possible to predict the performance of biological treatment units without site-specific data, and therefore, the EPA selected steam stripping as the basis of the standard.

The EPA is aware that many SOCMI facilities use biological treatment units as part of their wastewater treatment systems. However, because biological treatment systems are typically located at or near the end of the wastewater treatment process, many of the volatile regulated compounds are emitted to the atmosphere prior to reaching the biological treatment unit. Additionally, not all of the regulated compounds are significantly biodegradable.

Steam stripping was selected as the reference control technology (RCT) because it is the most universally applicable treatment technology for removing volatile organic compounds from wastewater.

It is assumed that by the term "12-percent criteria" that the commenter was referring to the requirement in section 112(d) of the Act that MACT standards for existing sources must be at least as stringent as the best-performing 12 percent of existing sources. The MACT standard for controlling HAP emissions from HON wastewater collection and treatment systems was based on the best control technology that was universally applicable to all emission points in the SOCMI.

2.1.3 Comparison of Biological Treatment and Steam Stripping

Comment: Four commenters (A-90-19: IV-D-62; IV-D-63; IV-F-1.2 and IV-F-4); (A-90-23: IV-D-17) stated that biological treatment is at least as effective at minimizing emissions as the design stripper and should therefore be included as an RCT.

Response: The EPA agrees that some HAP's regulated under the wastewater provisions of the HON can be biologically degraded at a level equivalent to or exceeding the removal efficiency achieved by steam stripping. However, this will depend on the site-specific design and operating parameters of the biological treatment system. Hence, facilities must demonstrate that their biological treatment system achieves a volatile organic HAP emissions reduction equivalent to steam stripping. The EPA has added an additional biological treatment option to the final regulation. Under this option, the owner or operator may biologically treat all process wastewater. Compliance is achieved by demonstrating 95-percent biodegradation of total mass of HAP's listed on table 9 of subpart G. Facilities complying with this option must comply with §63.133 through §63.137 for all process wastewater streams. However, facilities do not have to comply with either the applicability determination requirements of §63.144 or the Group 1/Group 2 determinations.

Comment: One commenter (A-90-19: IV-D-32) provided data depicting a typical configuration of an activated sludge system that would effectively treat biodegradable HAP's when a suppressed collection and treatment system is also used. The commenter (A-90-19: IV-D-32) stated that many of the same assumptions that the EPA used in the development of the BACT/LAER document were used by the commenter in developing the typical activated sludge unit configuration.

The commenter (A-90-19: IV-D-32) provided treatment efficiency estimates for biological treatment units that were derived using WATER7. One commenter (A-90-19: IV-D-92) cited a study that was completed by the CMA using WATER7 that indicates that biological treatment has a significantly higher removal rate than steam stripping. The commenter (A-90-19: IV-D-92) claimed that biological treatment produces limited air emissions and has a 99-percent removal efficiency for each HAP in proposed strippability groups A, B, and C.

Two commenters (A-90-19: IV-D-92) (A-90-23: IV-D-9) stated that biological treatment effectively removes HAP's and generates a low level of air emissions.

One commenter (A-90-19: IV-D-92) included a report funded by the EPA which indicates that biological treatment is an effective way to treat HAP's in wastewater.

One commenter (A-90-23: IV-D-9) stated that a design steam stripper should not be designated as the RCT for wastewater because it is infeasible for batch processes. The commenter (A-90-23: IV-D-9) claimed facilities would have a difficult or impossible task determining which streams are subject to the rule because pharmaceutical batch processes generate numerous wastewater streams. The commenter (A-90-23: IV-D-9) claimed that batch processes produce wastewaters which are variable in composition and concentration, and consequently make the use of a single steam stripper design impossible. The commenter (A-90-23: IV-D-9) claimed that achieving the required 95 percent strippability for low concentration streams would be difficult.

Response: In section 3.2.2 of this BID volume, the EPA explains why claims by the commenter are based on a flawed analysis. The biological treatment system described by the commenter does not achieve 99 percent removal of strippability group A, B, and C compounds according to WATER7 results. As stated in other responses to comments regarding biological treatment, the level of biodegradation achieved will vary among different facilities. The EPA agrees that, under some conditions, biological treatment will achieve HAP emissions reduction equal to or exceeding that obtained by steam stripping. For this reason, the EPA has included biological treatment options in the proposed and final rule.

Steam stripping is feasible for batch processes. Wastewater can be stored until enough of it is accumulated for treatment. Batch steam strippers are currently available from vendors. The commenter provided no data to demonstrate that achieving the required removal efficiencies at low concentrations will be difficult. Nor did the commenter (A-90-23: IV-D-9) define "low" concentration. The applicability threshold of the regulation was chosen to prevent the inclusion of low concentration streams. The estimates made by the EPA indicate that the removal efficiencies required in the HON are achievable for Group 1 wastewater streams.

Comment: Three commenters (A-90-19: IV-D-61; IV-D-92; IV-D-108) asserted that steam stripping is not justified as an RCT and that biological treatment should be specified as an RCT for several reasons. Three commenters (A-90-19: IV-D-32; IV-D-92), (A-90-23: IV-D-20) claimed that the EPA did not provide any scientific analysis of HAP removal from steam stripping in the proposal BID volume 1B. The commenter (A-90-19: IV-D-92) stated that the strippability groups and target removal efficiencies in table 9 of the proposed rule are not consistent with the laws of chemistry and thermodynamics, and that the use of Henry's law constants must include consideration of solubility. Two commenters (A-90-19: IV-D-92; IV-D-108) claimed that water soluble HAP's cannot be removed from wastewater by steam stripping, but the concentrations of these HAP's can be reduced by biological treatment. One commenter (A-90-19: IV-D-92) added that the EPA's inaccurate emissions estimates for biological treatment units and steam strippers led the EPA to propose the wrong RCT. One commenter (A-90-19: IV-D-32) requested that the EPA submit supporting documentation for estimating target removal efficiencies to the docket prior to promulgation of the final rule.

Response: It is assumed that the commenter is referring to the basis for the HAP removal efficiencies achieved by the design steam stripper. The commenter is correct that this was not discussed in the proposal BID. However, the EPA has documented the RCT performance estimates, for both the proposed and final regulation. For the proposed rule, steam stripper performance was documented in a memorandum titled *"Approach for Estimating Emission Reductions of Hazardous Air Pollutants from Wastewater Streams in the HON,"* (Docket No. A-90-23, Item II-B-5). For the final rule, steam stripper performance is documented in a memorandum titled *"Estimating Steam Stripper Performance and Size,"* to M.T. Kissell, U.S. Environmental Protection Agency from C. Bagley, Radian Corporation, August 24, 1993.

The commenter did not indicate what laws of chemistry and thermodynamics the target removal efficiency groups and removal efficiencies are inconsistent with.

It is unclear what the commenter means by stating that Henry's law constants must consider solubility. The Henry's law constant describes the proportional relationship between the concentration of a compound dissolved in a liquid, and the pressure of that compound in the gas phase above the liquid. The Henry's law constant of a compound in solution in water is a function of the temperature and pressure of the system, and the solubility of the compound.

Water-soluble HAP's are removed by steam stripping. It is true that if a condenser is present, steam may condense out with the soluble organics. However, steam strippers are typically operated at less than 1 kilogram of steam per kilogram of wastewater. Therefore, water soluble compounds are concentrated in the overhead stream.

The commenter's statement that the EPA's emission estimates for biological treatment units are inaccurate is based on an analysis submitted by another commenter (A-90-19: IV-D-32). As described in section 3.2.2 of this BID volume, an input error in the referenced analysis led to erroneous results. Therefore, the EPA concludes that emissions from biological treatment units are not overestimated and that the EPA has not proposed the wrong RCT.

Comment: One commenter (A-90-19: IV-D-92) stated that some HAP's are current food sources for microbes in biological treatment systems. One commenter (A-90-23: IV-D-4) stated that the EPA's requirement to steam strip methanol would remove a necessary food source and require the addition of a different nutrient at the biological treatment plant. The commenter (A-90-23: IV-D-4) stated that the methanol is necessary for the control of nitrogen-containing pollutants in the facility's wastewater streams.

Response: The EPA clarifies that steam stripping is only one option for complying with the wastewater provisions of the HON. Any treatment technology may be used, including biological treatment, provided that the emissions reductions achieved are equivalent to that achieved by steam stripping. The EPA also notes that the target removal efficiency for methanol is relatively low.

Comment: One commenter (A-90-19: IV-D-97) stated that steam stripping is not a control, but rather a separation process which requires thermal treatment of concentrated organic streams. The commenter (A-90-19: IV-D-97) contended that fuel and organic stream treatment will generate NO_x and CO_2 pollution, which would not be generated by biological treatment.

Response: The EPA agrees that steam stripping is a separation process, which can be used to remove volatile organic compounds from wastewater. By separating the volatile organic compounds from the wastewater, their emissions to the atmosphere could be reduced. The recovered organics from steam stripper overheads can be recycled, burned as fuel, or incinerated. Therefore, steam stripping acts as a control device.

The EPA's analysis shows that secondary emissions resulting from steam production for steam stripping are approximately 100 times lower than the resulting HAP-emission reductions. Therefore, an overall environmental benefit is achieved. The EPA's analysis is documented in the memorandum "*Secondary Impact Factors used in the Framework for Steam*

Stripping of Wastewater," to M.T. Kissell, U.S. Environmental Protection Agency, from K. Pelt, Radian Corporation, February 1, 1994.

Comment: Two commenters (A-90-19: IV-D-108); (A-90-23: IV-D-9), who expressed a preference for the use of biological treatment, indicated that biological treatment converts HAP's to nonhazardous constituents, while steam stripping merely concentrates the hazardous constituents and requires further treatment. One commenter (A-90-19: IV-D-108) summarized the results from several studies which seem to indicate that biodegradation rather than volatilization is the principal fate of many HAP's in biological treatment units unless the HAP is highly volatile and resistant to biodegradation.

Response: The data summarized by the commenter demonstrate the wide range of biodegradation that can be achieved. For example, the data show that the percent of methylene chloride biodegraded is reported to be from 43 to 97.1 percent and the amount volatilized is reported to be from 2 to 43 percent. Other compounds for which data are summarized by the commenter exhibit similarly wide ranges for the percent biodegraded and/or volatilized.

The EPA agrees that a degree of biodegradation can be achieved for many organic compounds, but that the degree of biodegradation for any given compound achieved will vary widely, depending on the site-specific biological treatment unit design and operating parameters. Furthermore, the recovered organics from steam stripper overheads can be recycled, or burned as fuel, in addition to being incinerated.

Comment: One commenter (A-90-19: IV-D-85) stated that the EPA should not allow facilities to use biological treatment to demonstrate equivalence with steam stripping when treating streams that contain low volatility compounds because a small percentage of the highly volatile compounds, which would be removed by steam stripping, will volatilize into the air during biological treatment.

Response: The EPA allows any technology to be used for treatment, provided that organic HAP emissions reductions can be demonstrated to be equivalent to steam stripping. Therefore, every compound must have an emission reduction in the biological treatment unit that is equivalent to the emission reduction in a steam stripper. For a biological treatment system, the owner or operator must demonstrate equivalence per §63.138(b)(1)(iii)(C), §63.138(c)(1)(iii)(D), or §63.138(e). Because of the site-specific variability in performance of biological treatment units, it would not be appropriate to exempt such units from the equivalency demonstration.

Comment: Several commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-113; IV-D-77; IV-D-108) stated that biological treatment is more cost effective than steam stripping and that the cost of disposing of consumed biomass generated by biological treatment units is less than the cost of disposing of residuals generated by steam strippers.

One commenter (A-90-19: IV-D-71) stated that biological treatment should be encouraged, where appropriate, since it can perform the necessary emissions reductions with little negative impact on the environment.

Response: The commenters (A-90-19: IV-D-113; IV-F-1.2 and IV-F-4) present no emission or cost data to substantiate their statement that biological treatment is more cost-effective than steam stripping. The EPA agrees that biological treatment units may be more cost-effective to operate than a steam stripper when the biological treatment unit is demonstrated to achieve mass removal of HAP's equal to or exceeding that achieved by steam stripping. However, this depends on the cost (if any) of modifying the biological unit to achieve the required mass removal. Without data, the EPA cannot respond more fully.

The EPA has added an additional biological treatment option to the final regulation. Under this option, the owner or operator may biologically treat all process wastewater. Compliance is achieved by demonstrating 95-percent biodegradation of total mass of table 9 HAP's. Facilities complying with this option must comply with §63.133 through §63.137 for all process wastewater streams.

The cost of disposing of residuals generated by steam stripping depends on the disposal method. The highest disposal cost can be expected to occur for off-site incineration. However, facilities may choose to incinerate residuals in on-site boilers or to recycle residuals to the process. Multiple disposal methods, such as landfarming, composting, and on- and off-site incineration, are also utilized for disposal of consumed biomass. Depending on the disposal method, residual disposal cost may or may not exceed the cost of consumed biomass disposal.

The EPA agrees that a properly operated biological treatment unit may achieve emission reduction equivalent to that achieved by steam stripping for some organic HAP's with little negative impact on the environment. For this reason, the EPA included the required mass removal provisions in §63.138(b)(1)(iii)(C), §63.138(c)(1)(iii)(D), or §63.138(e) of the final rule.

Comment: Two commenters (A-90-19: IV-F-1.2 and IV-F-4: IV-D-108) contended that biological treatment was better for the environment than steam stripping because it uses less energy and does not generate additional pollution from fuel combustion.

Response: The EPA agrees that biological treatment of wastewater consumes less energy than steam stripping and does not generate the secondary criteria pollutant emissions associated with the burning of fuel required to generate steam for steam stripping. However, the HAP emissions reduction achieved by biological treatment will vary widely among different facilities. Additionally, not all of the regulated compounds are significantly biodegradable. Steam stripping is the most universally applicable treatment technology for removing volatile organic compounds from wastewater. The secondary impacts analysis conducted by the EPA shows that the secondary criteria pollutant impacts of the HON are 100 times less than the HAP emission reduction resulting from steam stripping of wastewater. Therefore, the EPA concludes that steam stripping of wastewater is an environmentally acceptable treatment technology.

The secondary impacts estimated by the EPA are based on the assumption that all facilities will treat all the Group 1 streams using steam stripping. However, some facilities may choose other treatment technologies, including biological treatment, which use less energy and generate less secondary criteria pollutant emissions than steam stripping. Therefore, the EPA's estimate of secondary impacts represents conservative estimates of the secondary impacts associated with the HON.

2.1.4 Use of Biological Treatment as a Control Technology

Comment: Several commenters (A-90-19: IV-D-58; IV-D-77; IV-D-92; IV-F-1.2 and IV-F-4) (A-90-23: IV-D-4; IV-D-9; IV-D-20) stated that the most common type of wastewater treatment currently employed by existing SOCMI sources is biological treatment.

Several commenters (A-90-19: IV-D-32; IV-D-34; IV-D-55; IV-D-62; IV-D-63; IV-D-67; IV-D-77; IV-D-79; IV-D-86; IV-D-92; IV-D-97; IV-D-113; IV-F-1.2 and IV-F-4) (A-90-23: IV-D-4; IV-D-171; IV-D-20) asserted that the EPA's decision should include biological treatment as an RCT in the final rule.

One commenter (A-90-19: IV-D-71), who supported biological treatment as an RCT, stated that biological treatment systems are being used successfully for control of wastewater and for the remediation of groundwater and soils.

Three commenters (A-90-19: IV-D-32; IV-D-86; IV-D-113) recommended the use of biological treatment as an RCT option because it will provide treatment for organic HAP's in many wastewater streams, such as Group 2 streams, that are not subject to the control requirements of the proposed rule.

Two commenters (A-90-19: IV-D-77; IV-D-79) stated that the EPA's assessment of MACT was flawed by the omission of biological treatment as an RCT.

Response: Steam stripping was selected as the RCT because it is the most universally applicable treatment technology for removing volatile organic compounds from wastewater.

Typically, the biological treatment system at a SOCMI facility is at or near the end of the wastewater treatment process. Therefore, many of the regulated compounds could be emitted to the atmosphere prior to reaching the biological treatment unit due to their volatility if there is no emission suppression up to the biological treatment unit. Additionally, not all of the regulated compounds are significantly biodegradable. The amount of emissions reduction achieved by biological treatment, even for biologically degradable compounds, will vary widely among different facilities due to the wide range in operating and design parameters which define a biological treatment system. The parameters which affect the emission rate of volatile organic compounds include, but are not limited to, the biological degradation rate, surface area, amount of aeration, hydraulic residence time, and the active biomass concentration. These parameters will vary widely among facilities. Therefore, the performance of individual biological treatment systems with respect to volatile organic compound emission reduction will also vary greatly.

The EPA is aware that many SOCMI facilities employ biological treatment units as part of their wastewater treatment systems. However, for the reasons discussed above, the EPA did not select biological treatment as the reference control technology.

It would be inappropriate for the EPA to define the wastewater RCT as biological treatment based on the fact that biological treatment units will treat organic HAP's other than those regulated under the HON. Steam strippers will also remove organic HAP's not regulated by the HON wastewater provisions, to the extent that such compounds exist in Group 1 streams.

<u>Comment</u>: One commenter (A-90-19: IV-D-32) stated that the wastewater MACT floor should include biological treatment with suppressed sewer systems.

Response: In order for the MACT floor to reflect biological treatment with suppressed sewer systems, the EPA would have to demonstrate that this level of control currently exists at the average of the top 12 percent of SOCMI facilities. In the preamble to the proposed HON regulation, the EPA requested specific information which would support an analysis to determine if biological treatment with suppressed sewer systems in fact reflects the MACT floor for wastewater in the SOCMI. Although the EPA did receive information during the comment period, the data were not sufficient to indicate a MACT floor based on biological treatment with suppressed sewer systems.

However, information provided by the commenter (A-90-19: IV-D-32) was used to revise estimates of volatile organic HAP emissions from wastewater. These revisions included accounting for some suppression of the wastewater collection and treatment system, whereas in the original analysis, the EPA had assumed the wastewater collection and treatment system was unsuppressed. The EPA clarifies that biological treatment units were included in the original analysis.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-75) (A-90-23: IV-D-2) suggested the EPA incorporate a combination of an emissions-suppressed collection system with a biological treatment unit as an RCT in the HON for those chemicals that are effectively biodegradable. One commenter (A-90-19: IV-D-97) stated that biological treatment should be the primary RCT choice, followed by steam or air stripping for those HAP's that are nonbiodegradable.

The commenters (A-90-19: IV-D-32; IV-D-75) (A-90-23: IV-D-2) referred to the following references which indicate that biological treatment is an effective means of biodegrading a wide range of chemical compounds:

1. A table from an EPA publication entitled "*Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form,*" which indicates that most nonchlorinated organics have high percent removal and low volatilization in an acclimated biological treatment system,

2. The NETAC data base, associated with the University of Pittsburgh and maintained for the biological treatment industry, which indicates that there are microbes that can remove chlorinated compounds, and

3. A nomograph plotting the percent biodegraded for 18 compounds as a function of the compounds' Henry's law constants and biokinetic rate constants, K_1.

Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-58; IV-D-71; IV-D-75) asserted that many of the HAP's listed in the regulation are not volatile and cannot be removed by steam stripping but can be removed using biological treatment. Two commenters (A-90-19: IV-D-32; IV-D-75) suggested that the EPA should specify biological treatment as RCT for all VOHAP's with Henry's law constants less than 10^{-4} atm-m^3/mole, which are biodegraded at an efficiency of 98 percent or greater.

Response: The EPA agrees that biological treatment can play an important role in the reduction of organic HAP emissions from wastewater, and has therefore included provisions for biological treatment as a compliance option in the wastewater provisions of the HON. Steam stripping was selected as the wastewater RCT because it is the most universally applicable treatment method for removing volatile organic HAP's from wastewater and thereby preventing their release to the atmosphere. Steam stripping effectively removes all the compounds regulated under the wastewater provisions of the HON, including those which are not readily biologically degradable. The development of the design steam stripper which is the basis for the performance standards for the wastewater provisions of the HON is documented in the memorandum *"Estimating Steam Stripper Performance and Size,"* to M.T. Kissell, U.S. Environmental Protection Agency from C. Bagley, Radian Corporation, August 24, 1993.

The table referenced by one commenter (A-90-23: IV-D-21) from the EPA publication *"Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form,"* does not fully indicate that most chlorinated compounds have high percent removals in acclimated biological treatment systems. The document states that a number of design and operational factors will affect the fate of the listed compounds at any given treatment plant and the data should be used only as a rough approximation.

Table 2-1 of this BID volume summarizes some of the contents of the referenced table for eight of the chlorinated compounds regulated by the wastewater provisions of the HON. Each of these compounds has a steam stripper removal efficiency in excess of 99 percent, based on the design and operating parameters of the design steam stripper. This exceeds the percent biodegradation values in table 2-1 of this BID volume for all the compounds listed. However, facilities may choose to use biological treatment if it can be demonstrated to meet the applicable requirements in §63.138(b)(1)(iii)(C), (c)(1)(iii)(D), or (e).

Based on a comment received from one commenter, the EPA obtained data from the National Environmental Technology Applications Corporation (NETAC) data base. This corporation provides profiles and descriptions of technical principles, applications, operating features, and innovative technologies for waste treatment technologies. However, this information is provided for a fee, and the commenter did not include data. The EPA encourages sources to use all available information at their disposal, but cannot comment further on this particular source without specific data.

The EPA has also reviewed the third data set submitted by commenters; which is nomograph that presents data for 18 compounds. The fraction biodegraded values used in the analysis are based on a faulty estimation of the percent of biodegradation and are discussed in more detail in section 3.2.2 of this BID volume. Therefore, the revisions suggested by the commenters have not been implemented. The EPA clarifies that, based on these and additional comments received, seven compounds were deleted from regulation under

TABLE 2-1. EXAMPLE OF BIOLOGICAL FATE DATA IN ACCLIMATED BIOLOGICAL TREATMENT SYSTEMS[1]

Compound	% Volatilized to Air	% Partitioned to Sludge	% Biodegraded
1,2-Dichloroethane	45	5	41
1,1,2,2-Tetrachloroethane	36	4	50
Tetrachloroethane	40	0	40
1,1,2-Trichloroethane	76	1	18
Vinyl chloride	86	2	8
Trichloroethylene	67	6	23
Chloroform	63	2	25

1 "Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form."

subparts F and G, as discussed in section 3.2 of this BID volume.

2.1.5 Consistency of HON with Benzene Waste NESHAP, OCPSF, and Other Rules

Comment: Several commenters (A-90-19: IV-F-1.6 and IV-F-6; IV-D-67; IV-D-55; IV-D-32; IV-D-62; IV-D-63; IV-D-58; IV-D-92) (A-90-19: IV-D-20) suggested that by adding biological treatment as an RCT to treat all of the organic HAP's addressed in the rule, the HON would be consistent with the Benzene Waste NESHAP requirements.

Response: Although the EPA has not included biological treatment as the RCT in the final rule, biological treatment remains an allowable method of treatment using mass removal calculations to show compliance. With regard to the consistency with the Benzene Waste NESHAP, the EPA has allowed the use of biological treatment as an alternative compliance option to treat benzene waste that is subject to the Benzene Waste NESHAP because the EPA determined that biological treatment systems would sufficiently biodegrade benzene in dilute wastewater streams. However, the HON includes many more regulated HAP's in addition to benzene. The EPA continues to allow the use of biological treatment units as treatment for HAP's regulated by the HON as long as the biological treatment systems achieve the RMR of HAP's from the wastewater stream as determined by §63.145(h)(2). The EPA has added a compliance option to the final rule that allows for the treatment of all process wastewater streams in a biological treatment unit. An owner or operator who elects to use this option in §63.138(e) must ensure that the biological treatment unit achieves 95-percent HAP removal from the wastewater streams as specified in §63.145(i).

Comment: Two commenters (A-90-19: IV-D-67; IV-D-58) suggested listing ranges for the operating parameters of a biological treatment unit, as in the Benzene Waste NESHAP. One commenter (A-90-19: IV-D-67) also suggested that the EPA should provide a maximum inlet concentration for each individual pollutant entering a biological treatment system to minimize risk of volatilization (i.e., 10 ppmw as in the Benzene Waste NESHAP).

Response: The Benzene Waste NESHAP regulates only a single chemical. However, the HON regulates 75 additional HAP's, and the EPA was unable to determine a set of operating parameters for biological treatment units which would ensure HAP emission reductions of all regulated compounds at levels equivalent to steam stripping. Therefore, the EPA has not listed operating ranges for biological treatment units in the HON.

Comment: Three commenters (A-90-19: IV-D-55; IV-D-58; IV-F-1.6 and IV-F-6) stated that many facilities are currently using biological treatment units to comply with Benzene Waste NESHAP requirements. Several commenters (A-90-19: IV-D-55; IV-D-58; IV-D-62; IV-F-1.6 and IV-F-6) are concerned that many compliance uncertainties and complexities will result when SOCMI and non-SOCMI wastewater streams (e.g., refinery wastewater streams) are combined in the collection system or the biological treatment unit.

Response: The commenter does not provide details concerning the types of uncertainties and complexities that could result from treating wastewater streams that are subject to both the HON and the Benzene Waste NESHAP. However, the final regulation addresses overlap with other regulations for wastewater at §63.110(e). In the final rule, after the dates of compliance specified in §63.100(k) of subpart F, streams subject to the HON and to the Benzene Waste NESHAP must comply with both regulations. The EPA cannot anticipate every site-specific situation, but has developed the regulation to provide flexibility in the methods available for compliance.

Comment: One commenter (A-90-19: IV-D-89) claimed that the type of steam stripper required in the Benzene Waste NESHAP may not be acceptable under the proposed HON. Another commenter (A-90-19: IV-D-92) stated that refineries which have chosen to comply with the Benzene Waste NESHAP using biological treatment will be required to adopt additional, expensive treatment methods to comply with both the HON and the future petroleum refinery MACT standards.

Response: An existing steam stripper that was installed to comply with the Benzene Waste NESHAP can still be used to comply with the HON. For an existing source, any treatment process can be used to demonstrate compliance with the HON wastewater provisions as long as the treatment process complies with any of the required treatment options in §63.138.

Comment: Two commenters (A-90-19: IV-D-64; IV-D-86) supported biological treatment as the RCT for SOCMI facilities and stated that (1) biological treatment is the most common technology used by direct dischargers in the OCPSF wastewater category, and (2) companies have made significant expenditures to meet OCPSF limitations using biological treatment.

Response: Owners and operators may use existing biological treatment units to meet the HON wastewater treatment requirements by demonstrating the required level of biodegradation. In cases where biological treatment cannot meet the required biodegradation, facilities may need to install additional treatment equipment such as a steam stripper. In the final rule for OCPSF effluent guidelines (52 FR 42561), the EPA stated that facilities should consider incorporating steam stripping as the treatment method for meeting the effluent guidelines because subsequent air emission regulations may require steam stripping.

Comment: One commenter (A-90-19: IV-D-85) indicated that the EPA had strongly recommended in the Federal Register (52 FR 42561) that facilities incorporate steam stripping to comply with the OCPSF effluent guidelines to avoid costly retrofit requirements that may subsequently be imposed under the Act. Therefore, the commenter (A-90-19: IV-D-85) contended that the EPA should not allow facilities to comply with the HON through the use of treatment that is less effective than steam stripping.

Response: The EPA clarifies that steam stripping is an effective method of treatment to reduce HAP emissions from wastewater. However, the EPA continues to allow other treatment processes that can achieve equivalent HAP emission reductions in order to allow flexibility in compliance and the opportunity for sources to use existing control equipment.

Comment: One commenter (A-90-19: IV-D-92) stated that the OCPSF Effluent Guidelines and Standards cite biological treatment as the best available technology for SOCMI and as a control technology associated with the NSPS for new SOCMI sources, and allows the use of biological treatment to comply with pre-treatment requirements. The commenter (A-90-19: IV-D-92) also claimed that subpart I (Direct Discharge Point Sources That Use End-of-Pipe Biological Treatment) of these standards gives effluent limits in the low parts per billion range for many of the chemicals subject to the HON. The commenter (A-90-19: IV-D-92) cited these other regulations as support for including biological treatment as the RCT in the HON.

Response: The EPA continues to allow treatment processes other than steam strippers to meet HAP emission reduction requirements. Facilities that have previously installed biological treatment systems to comply with other regulations may continue to use them to comply with the HON as long as they meet the required HAP emission reductions.

Comment: One commenter (A-90-23: IV-D-9) expressed concern that future pharmaceutical NPDES effluent guidelines may conflict with the type of steam stripping designated by the HON.

Response: The commenter does not provide any details about how the two regulations may conflict. Neither the NPDES effluent guidelines nor the HON specify that a steam stripper must be used to achieve compliance, therefore, without more information, no conflict has been identified.

Comment: One commenter (A-90-19: IV-D-92) reported that SOCMI facilities holding NPDES permits are required to conduct "whole effluent biological testing" to determine if the effluent from the facilities causes mortality or morbidity in "exquisitely sensitive" biological organisms (e.g., 7-day old fat head minnows). The commenter (A-90-19: IV-D-92) stated that this type of testing was completed and the results do not indicate that the chemicals on the HAP list in the HON are toxic to these organisms.

Response: Although facilities holding NPDES permits may be required to conduct whole effluent biological testing, the results of such tests do not necessarily indicate compliance with the HON. Furthermore, the tests required for facilities holding NPDES permits are designed to determine the toxicity of the effluent and do not determine anything about air emissions. Additionally, toxicity does not always correlate with concentration or quantity. For example, a large amount of one compound may not be as toxic as a small amount of another compound.

2.1.6 Steam Stripper Design Specifications

Comment: Two commenters (A-90-19: IV-D-104; IV-D-108) argued that the EPA should not specify the design of a steam stripper. One commenter (A-90-23: IV-D-9) claimed that the EPA's design steam stripper does not reflect practical performance. Several commenters (A-90-19: IV-D-75; IV-D-104; IV-D-108) contended that the design of the steam stripper does not adequately consider site-specific conditions such as steam quality, the specific mix of chemicals in the wastewater, quantity of wastewater, wastewater salinity, total carbon, and the method by which individual strippabilities were determined. Two commenters (A-90-19: IV-D-75; IV-D-108) said that these variables must be considered to optimize effectiveness and cost and are best addressed on a site-specific basis. Two commenters (A-90-19: IV-D-104; IV-D-108) recommended that the agency allow an alternative steam stripper design which meets the performance criteria of the RCT.

Response: The provisions in §63.138(g) of the final rule for a design steam stripper is one option for complying with the wastewater treatment provisions of the HON. Other control technologies, including steam strippers with alternative designs, are also allowed as long as they meet the performance criteria of the RCT (e.g., outlet concentration or required mass removal). However, a steam stripper meeting the design criteria in §63.138(g) does not require a compliance demonstration, whereas a compliance demonstration is required for any alternative design. Owners and operators are required to comply with the appropriate monitoring, reporting, and record keeping provisions regardless of whether the treatment device complies with the design steam stripper provisions in §63.138(g) or is an alternative design.

Steam stripper performance was determined using the Kremser equation. The Kremser equation can be used to determine the removal efficiency of a steam stripper at a given steam-to-feed ratio, number of theoretical trays, and compound-specific Henry's law constants. The commenters (A-90-19: IV-D-104; IV-D-108) did not propose a method for accounting for the site-specific conditions specified in their comments, or suggest how these parameters might affect the design of the steam stripper.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-64; IV-D-108) (A-90-23: IV-D-20) stated that the EPA's design of the RCT steam stripper should include only the minimum design specifications needed to achieve the performance standard. Two commenters (A-90-19: IV-D-32; IV-D-108) requested that the EPA require a performance standard rather than an equipment standard to be achieved by the RCT steam stripper. The commenters (A-90-19: IV-D-32; IV-D-108) suggested that the EPA could implement a performance-oriented standard by including a minimum number of equilibrium stages and a HAP removal target rather than extensive design specifications.

Response: The RCT for wastewater is not limited to an equipment standard. The RCT for wastewater includes the following options: (1) an equipment standard in §63.138(g); (2) performance standards in §63.138(b)(1)(ii)(A) or (C), §63.138(b)(1)(iii)(A) or (C), §63.138(c)(1)(ii)(B), (C), or (D), and §63.138(c)(1)(iii)(B), (C), or (D); or (3) work practice standards in §63.138(b)(1)(i) or (c)(1)(i). The EPA selected this approach for defining RCT in order to provide flexibility while ensuring equivalent levels of control. The design steam stripper specified in §63.138(g) is only one of several compliance options. Facilities may use existing steam strippers not meeting the design specifications of §63.138(g), but must demonstrate the existing steam stripper is equivalent to the RCT by demonstrating compliance with the applicable performance standards. For example, an existing facility using an existing steam stripper to treat a combination of Group 1 wastewater streams has a choice of demonstrating compliance with §63.138(c)(1)(iii)(B), (C), or (D).

A combination of a standard including a minimum number of equilibrium stages and a HAP removal target would not serve to augment or simplify the current wastewater provisions of the HON. The current wastewater provisions provide a compliance option of meeting a target HAP removal. Combining this with a required number of theoretical plates would be more restrictive than the current provisions for meeting the target HAP removal which does not require a set number of theoretical plates.

<u>Comment</u>: One commenter (A-90-19: IV-D-73) alleged that only the removal efficiency should be specified for the RCT and that all other design parameters should be specified by the owner or operator on a case-by-case basis using a process simulation model and the required HAP removal. The commenter (A-90-19: IV-D-73) was specifically concerned with specifying one steam-to-feed mass ratio and cited a report which shows different steam-to-feed ratios that can be used to achieve a 99-percent removal in columns operating at different pressures for a benzene-water mixture.

<u>Response</u>: The current wastewater provisions of the HON allow owners or operators to meet the target HAP removal requirements using a steam stripper with different operating and design parameters than those specified in §63.138(g) of the final rule. Owners and operators may also use treatment technologies other than steam stripping to meet target HAP removal requirements. However, any treatment device which differs from the design and operating requirements of

§63.138(g) is subject to a compliance demonstration by the procedures in either paragraph §63.138(j)(1) or (j)(2).

Comment: One commenter (A-90-23: IV-D-4) stated that the detailed operating parameter ranges for the plate-type atmospheric pressure steam stripper do not represent a modern steam stripper design or a commonly employed technology for wastewater treatment in the SOCMI. The commenter (A-90-23: IV-D-4) suggested that a way to increase flexibility in steam stripper design is to specify a modeling procedure, such as ASPEN, and accept as an RCT any design predicted to achieve performance equal to that of the design steam stripper for compounds of concern.

Response: Section 63.138(j)(1) allows owners or operators to demonstrate performance equivalent to that of the design steam stripper using a design analysis and supporting documentation.

2.1.6.1 Tray Efficiency

Comment: One commenter (A-90-19: IV-D-78) claimed that since the design steam stripper requires at least 10 theoretical trays, the EPA should not specify column height. The commenter (A-90-19: IV-D-78) indicated that packing is more efficient and could achieve the required theoretical trays with less height.

Response: The 10 theoretical trays specified in the proposed regulation has been changed to reflect 10 actual trays. Steam strippers require adequate tray spacing to prevent flooding. The space between each tray multiplied by the number of trays gives the active column height. Therefore, it is necessary to specify the active column height as well as the number of trays.

The EPA agrees that packing may be more efficient under some conditions than spacing trays. Additionally, there is nothing in §63.138 which prevents an owner or operator from installing a packed column steam stripper for treating Group 1 streams. However, the packed column design must meet the performance criteria of the RCT. The EPA chose to base the cost analysis on a tray column because they are more universally applicable (i.e., packed columns are more susceptible than tray columns to problems as a result of wastewater particulate loading).

Comment: One commenter (A-90-23: IV-D-17) disagreed with the concept of defining a minimum number of theoretical trays for the design steam stripper. The commenter (A-90-23: IV-D-17) claimed that column dynamics and vapor-liquid equilibrium based on actual data from a steam stripper must be known in order to determine the number of theoretical stages. The commenter (A-90-23: IV-D-17) then stated that scale-up is difficult even if actual data is known because of dispersion caused by radial and axial mixing.

Response: The EPA agrees with the commenter regarding defining the number of trays, and has revised §63.138(g) of the final rule to specify the number of actual trays. However, actual steam stripper data is not required to determine the number of theoretical trays. The number of theoretical trays can be determined using the Kremser equation knowing only the steam-to-feed ratio, the desired treatment performance, and compound-specific Henry's law constants. Scale-up from the number of theoretical trays to actual trays can be accomplished using an overall tray efficiency which corrects for the assumption that vapor-liquid equilibrium is not reached at each individual stage in the column. For the final rule, the EPA used an overall tray efficiency of 30 percent to scale from theoretical to actual trays.

Comment: One commenter (A-90-19: IV-D-75) provided results of steam stripper simulations using a PRO-II program. The results indicate that every separation in the study was achieved with three or four theoretical stages by using a steam rate of > 100 lb/hr, corresponding to a steam-to-feed ratio of 0.12 to 0.14 kilogram of steam per kilogram of wastewater.

Response: The EPA agrees that the required treatment performance levels can be achieved by a steam stripper with three theoretical trays. However, the commenter assumes a different wastewater feed temperature to the steam stripper. Whereas the commenter assumed a feed temperature of 35 °C, the EPA assumed that the wastewater feed would be preheated to 95 °C before entering the steam stripper column. Therefore, the commenter's steam-to-feed ratio of 0.12 to 0.14 kilograms of steam per kilogram of wastewater is higher than would be required for a system in which the wastewater feed to the steam stripper is preheated. The EPA's analysis shows that a steam-to-feed ratio of 0.04 kilograms of steam per kilogram of wastewater is sufficient to achieve the required performance.

Comment: One commenter (A-90-19: IV-D-32) expressed several concerns with the EPA's current design and stated that the EPA must correct the inconsistency between the number of theoretical and physical trays required for the steam stripper in the proposed rule. Based on an 80 percent tray efficiency, the commenter (A-90-19: IV-D-32) calculated that 13 physical trays instead of 10 physical trays, as stated in the proposed rule, would be required for a steam stripper with ten theoretical stages.

Response: The EPA agrees with the commenter and has corrected the inconsistency in the proposed rule. The final rule requires 10 actual trays, assuming a 30-percent tray efficiency.

Comment: One commenter (A-90-19: IV-D-32) disagreed with the EPA's assumption of an 80-percent tray efficiency in the RCT design stripper, stating that it overestimates stripping performance. The commenter (A-90-19: IV-D-32) stated that Dr. James Fair of the Department of Chemical Engineering at the University of Texas at Austin was contracted to calculate tray efficiencies for each HAP listed in table 9 of subpart G using the Kremser equation. The commenter (A-90-19: IV-D-32) included the tray efficiency estimates in appendix K of the comment letter. The commenter (A-90-19: IV-D-32) stated that the EPA may have overlooked the possibility that tray efficiency is a function of the vapor/liquid ratio. The commenter (A-90-19: IV-D-32) contended that to achieve the EPA's target strippabilities for less-strippable HAP's, a bigger column and more steam would be required, thus, increasing both capital and operating costs of the steam stripper.

Response: The EPA agrees with the commenter that a tray efficiency of 80 percent is too high, and the EPA has revised the design steam stripper to include a tray efficiency of 30 percent. Three theoretical trays are required to achieve the target removal efficiencies, and therefore, ten actual trays are required to achieve the target removal efficiencies. The revised capital and annual costs were both based on a steam stripping column with ten actual trays. Therefore, a bigger column and more steam are not required, and the capital and annual costs are not underestimated.

Furthermore, the commenter (A-90-19: IV-D-32) did not provide tray efficiencies for each compound; appendix K only provides data on the tray efficiency for toluene. The EPA had to consider the tray efficiency of every table 9 compound in their analysis.

Comment: One commenter (A-90-19: IV-D-32) suggested that the EPA specify the number of theoretical "stages" rather than the number of trays in §63.138(f)(2) because this approach would be more consistent with design terminology for steam strippers.

Response: The EPA intended to specify 10 actual trays, not 10 theoretical trays as is found in §63.138(f)(2) of the proposed regulation [§63.138(g)(2) of the final provisions]. When specifying theoretical trays, the term "theoretical stages" is often used. However, in the final regulation, §63.138(g)(2) specifies 10 actual trays. The EPA has chosen to use the term "trays" instead of "stages" to clarify that §63.138(g)(2) requires the design steam stripper to have 10 actual, not theoretical, trays.

2.1.6.2 Condenser

Comment: One commenter (A-90-19: IV-D-32) stated that the EPA should not specify the type of condenser used for the RCT steam stripper in §63.138(f)(6) of the proposed rule because downstream vapor control requirements ensure that emissions from the primary condenser will be controlled.

One commenter (A-90-19: IV-D-78) reasoned that the EPA should specify the vapor temperature at the outlet of the final steam stripper overheads condenser, since some steam strippers will have a series of overheads condensers.

Response: The EPA has deleted the specification for a condenser from §63.138(f) of the proposed rule (i.e., §63.138(g) of the final rule). If a primary condenser is used as part of a steam stripper, the non-condensible gas stream from the primary condenser must be controlled per the requirements of §63.138(i).

Comment: One commenter (A-90-23: IV-D-20) stated that in §63.138(f)(6) of the proposed rule, the steam stripper requirements should not require the use of a water-cooled condenser because refrigerated condensers can achieve the same results.

Response: Although the design steam stripper defined by §63.138(g) did require a specific type of condenser, the EPA has reviewed public comments and concluded that any air pollution control device, including but not limited to a condenser, is allowable under the final rule as long as the steam stripper achieves all emission control requirements required in §63.138(i).

Comment: One commenter (A-90-23: IV-D-18) suggested that the EPA remove from tables 8 and 9 in proposed §63.131 all chemicals that have boiling points less than 50 °C, because the condenser of the design steam stripper will not be able to liquify the vapor emitted from the steam stripper. The commenter (A-90-23: IV-D-18) stated that the design steam stripper would evaporate those HAP's with boiling points less than 50 °C directly into the air without any reduction in air emissions.

Response: The intention of the design steam stripper provisions in §63.138(g) of the final rule is not to allow HAP's removed from wastewater by steam stripping to be emitted to the atmosphere. The regulation requires control of these emissions, as specified in §63.138(i). Therefore, rather than removing chemicals with boiling points below 50 °C, as suggested, the condenser requirement in proposed §63.138(f)(6) has been removed. However, the owner or operator must comply with §63.138(i) of the final rule, which specifies options for controlling the emissions from the steam stripper overheads primary condenser.

2.1.6.3 Steam-to-Feed Ratio

Comment: One commenter (A-90-19: IV-D-32) stated that the steam-to-feed ratio and liquid loading of steam strippers will depend on site-specific design and operating conditions. The commenter (A-90-19: IV-D-32) provided information [in appendix M of the comment letter (letter from B. Davis to J. Meyer, April 1, 1993)], which indicates that the steam-to-feed ratio will vary depending on the chemicals, their concentrations, and the operating pressure of the tower.

Response: The steam-to-feed ratio and the liquid loading specified in §63.138(g)(3) and (g)(5) of the final rule will achieve the required performance levels under the conditions specified for the design steam stripper in §63.138(g) of the final rule. However, some facilities may choose to install a steam stripper design other than that specified in §63.138(g). For example, an owner or operator may choose to install a packed column rather than a tray column, or operate the steam stripper under vacuum. Any steam stripper design is allowed under the wastewater provisions as long as it meets the performance criteria of the RCT. However, for any steam stripper not consistent with the design and operating requirements in §63.138(g), the owner or operator must demonstrate compliance with the required performance levels. A compliance demonstration is not required if the steam stripper meets the provisions of §63.138(g).

2.1.7 Biological Treatment System Specifications

Comment: One commenter (A-90-19: IV-D-34) recommended general guidelines for a well-operated biological system including the use of maximum or minimum limits instead of ranges, the specification of operating parameters that are controllable or can be modified to meet MACT, the elimination of redundant or conflicting parameters such as food-to-microorganisms ratio and sludge age, the use of typical operating conditions for existing sources, and the control of new sources with more stringent designs.

Response: The commenter (A-90-19: IV-D-34) provided only a general set of qualitative guidelines, but provided no numerical data or suggestions regarding how these general guidelines could be used in the HON. Neither did the commenter (A-90-19: IV-D-34) provide information regarding the HAP emission reductions that would result from implementing such guidelines. In order to assess the feasibility of implementing the general guidelines suggested by the commenter (A-90-19: IV-D-34), the EPA requires data, as requested in the preamble to the proposed regulation. Without data to support the general guidelines suggested by the commenter (A-90-19: IV-D-34), it is not possible for the EPA to implement these guidelines into the final regulation.

2.2 OTHER CONTROL REQUIREMENTS

Comment: One commenter (A-90-19: IV-D-32) recommended that the EPA develop a definition of an emissions-suppressed wastewater collection and treatment system and include the following system components: individual drains fitted with s-traps and p-traps; junction boxes with water seals; junction boxes that are flooded to eliminate flow of air from inlets; covered drop boxes and lift stations where splashing may occur; and covered treatment and storage tanks. The commenter (A-90-19: IV-D-32) provided several figures illustrating the components of an emissions-suppressed collection system and included component data in appendix P of the comment letter that were collected by Enviromega for CMA (1993, Measurement of Hazardous Air Pollutant Emissions from Drop Structures and Process Drains, Burlington, Ontario), which indicated that a suppressed collection system consisting of these components would decrease HAP emissions from wastewater.

Response: The EPA agrees that a suppressed wastewater collection and treatment system will decrease organic HAP emissions from wastewater. Emissions suppression of the wastewater collection and treatment system is the result of applying covers and water seal controls on the individual components of the wastewater collection and treatment system. The terms "cover" and "water seal controls" are defined in §63.111 of the regulation. The term "emissions-suppressed wastewater collection and treatment system" has not been added to the final regulation because separate requirements for individual wastewater collection and treatment components are detailed in the regulation. These requirements apply only to those individual wastewater collection and treatment components which receive, manage, or treat Group 1 wastewater streams or residuals removed from Group 1 streams. The issue of flooded sewers is addressed in section 2.2.2 of this BID volume.

Comment: One commenter (A-90-19: IV-D-64) stated that in §63.136(c)(1) in the proposed rule the second sentence should be changed to read, "for each drain using a p-trap or s-trap, the owner or operator shall maintain a water seal in the p-trap or s-trap" and the remainder of the paragraph should be deleted. The commenter (A-90-19: IV-D-64) stated that the purpose for established operating practices is to maintain a water level in these traps. The commenter (A-90-19: IV-D-64) contended that the examples in the proposed HON are unreasonable and that SOCMI sources should be responsible for failure to operate equipment properly.

Response: The EPA contends that maintaining water in a p-trap or s-trap will ensure that a water seal will be maintained in a p-trap or s-trap, thus preventing emissions to the atmosphere. Furthermore, for monitoring purposes, an owner or operator must ensure that water is maintained in the trap either by visual inspection of the trap or by an alternative means. Maintaining continuous water flow to the trap is only one example of how an owner or operator would ensure that there is water in the trap. The owner or operator may monitor traps in numerous other ways if continuous flow is unreasonable for the particular situation.

Comment: One commenter (A-90-19: IV-F-1.2 and IV-F-4) stated that the EPA has presented no valid data for its claim that additional environmental benefits can be derived by requiring an enclosed collection system prior to steam stripping. The commenter (A-90-19: IV-F-1.2 and IV-F-4) claimed that the EPA could not justify the additional cost of using an enclosed collection system and a design steam stripper instead of using a biological treatment system.

Response: Estimates conducted by the EPA based on several studies indicate that significant volatilization of organic HAP's occurs from unenclosed collection systems. The final wastewater provisions are based on cost-effective control of HAP emissions from wastewater assuming that the Group 1 wastewater streams are hard-piped to a steam stripper. Enclosed individual drain systems are allowed as an alternative control approach that can be combined with any treatment device, including biological treatment units, that meets the required treatment level. A biological treatment system without an enclosed individual drain system is the baseline level of control that results in significant HAP emissions.

Comment: One commenter (A-90-19: IV-D-64) stated that in §63.138(h)(3)(i), the EPA should not require that every cover on a treatment process or waste management unit have a vent. The commenter (A-90-19: IV-D-64) stated that the paragraph should require that each opening from the treatment process or waste management unit be covered, and any opening, treatment process, or management unit that is vented should be covered.

Response: The EPA disagrees with the commenter (A-90-19: IV-D-64) that the provisions in §63.138(h)(3)(i) of the proposed rule be changed. Any treatment process or waste management unit requiring control that is covered shall also be vented to a control device to control HAP emissions from the vapors in the treatment process or waste management unit.

Comment: One commenter (A-90-19: IV-D-73) claimed that the requirements in §63.136(c)(2) to cover junction boxes, and if the junction boxes are vented, to have a vent pipe of certain dimensions, do not serve any emission control purpose since this subsection deals with water-sealed drain systems. One commenter (A-90-23: IV-D-9) claimed that the requirements to cover and treat emissions from wastewater management tanks would be costly for biological treatment units and would offer little emissions benefits. The commenter (A-90-23: IV-D-9) said that adopting biological treatment as an RCT would eliminate the requirements to cover these units.

Response: The basis for the commenter's claim is unclear. Provisions for drains are stated in §63.136(e)(1), not §63.136(c)(2), as suggested by the commenter. The provisions for junction boxes are stated separately in §63.136(e)(2). Only junction boxes receiving Group 1 process wastewater streams must be covered.

The EPA clarifies that, although the proposed rule and final rule allow biological treatment to be used, equipment used to receive, manage, or treat Group 1 process wastewater streams must meet the provisions of §63.133 through §63.137 for covering the units and venting HAP emissions to a control device.

A properly operated biological treatment unit which meets the mass removal requirements of §63.138(b)(1)(iii)(C) or §63.138(c)(1)(iii)(D) or meets the 95-percent HAP mass reduction requirements of §63.138(e) need not be covered and vented to a control device.

Comment: One commenter (A-90-23: IV-D-2) suggested that covering surface impoundments and individual drain systems may cause fire, explosion, and confined-entry danger. Another commenter (A-90-19: IV-D-45) stated that organic vapors from wastewater, which are trapped inside tanks with fixed lids, may pose a major explosion hazard.

Response: The EPA agrees that covering surface impoundments may cause fire and explosion danger if the cover and closed-vent system are incorrectly designed. The EPA also agrees that the incorrect and unsafe use of fixed roof tanks for storage or treatment of wastewater may pose the risk of fire or explosion. However, the EPA anticipates that facilities will avoid such unsafe conditions in specifying and designing these systems. Most individual drain systems currently exist as subsurface structures with the potential for explosive vapor buildup. The EPA does not anticipate that covering individual drain systems and venting them to a closed-vent control system will import additional risk of fire or explosion greater than that which may currently exist. Confined-entry areas currently exist in most wastewater systems. The EPA does not anticipate that covering individual drain systems and surface impoundments will significantly increase confined-space entry hazards at typical SOCMI facilities.

Comment: One commenter (A-90-19: IV-D-92) disagreed with the requirements to cover surface impoundments claiming that the covers would be very costly and that this requirement would produce little environmental benefit. The commenter (A-90-19: IV-D-92) claimed that it is unlikely that wastewaters with high concentrations of HAP's would be stored in surface impoundments, because of RCRA prohibitions of using surface impoundments to store hazardous waste or hazardous wastewater.

Response: The EPA clarifies that RCRA does not prohibit the use of surface impoundments for the storage or treatment of hazardous wastes, but does require that these surface impoundments be equipped with a double liner. Emissions estimates made by the EPA indicate that surface impoundments are significant emission sources. Therefore, the requirement to cover surface impoundments receiving Group 1 wastewater streams is retained in the final rule.

Because RCRA requires surface impoundments which receive hazardous wastes to be double lined, and requires monitoring to detect leaks, many facilities have replaced their surface impoundments with tanks. Similarly, the EPA anticipates that owners or operators will not place Group 1 wastewater streams into surface impoundments if alternative devices, such as tanks or containers, are more cost effective to collect and/or treat Group 1 wastewater streams.

Comment: One commenter (A-90-23: IV-D-9) claimed that separate treatment equipment should not be required for each stream because most sources have a centralized treatment system.

Response: The EPA clarifies that separate treatment of each Group 1 wastewater stream is not required by the HON. Streams may be combined for more efficient and cost effective treatment.

2.2.1 Clarification of Requirements for Control Devices

Comment: One commenter (A-90-19: IV-D-32) stated that §63.139(h)(1) and (2) in the proposed rule, which require flow monitoring or a locked valve on bypasses, should be modified to exempt emergency relief valves from these bypass requirements.

Response: The EPA clarifies that emergency relief devices are not subject to requirements for car seals, locked valves, and flow monitoring.

Comment: Two commenters (A-90-19: IV-D-32; IV-D-54) stated that §63.139(c)(2) should be expanded to allow scrubbers, particularly scrubbers controlling non-halogenated gas streams, to show compliance through the use of design analysis as an alternative to performance testing.

Response: The provisions in §63.139 apply to control devices used to control the organic vapors removed from Group 1 wastewater streams. In response to comments, the EPA has added specific language into §63.139 of the final rule which allows the use of scrubbers as a control device. Scrubbers could also be used in the proposed rule under the general allowance in §63.139(c)(4), which is paragraph (c)(5) in the final rule. In the final rule, the EPA specifies that if a scrubber is used it must achieve 95 percent by weight destruction of HAP's by chemical reaction with the scrubbing liquid.

The EPA has added a new paragraph (c)(4) to §63.139 which reads:

> A scrubber shall reduce the total organic compound emissions, less methane and ethane, or total organic HAP emissions in such a manner that 95 weight percent is destroyed by chemical reaction with the scrubbing liquid.

Additionally, in §63.139(d)(2)(vii), the EPA has added the following:

> For a scrubber, the design evaluation shall consider the vent stream composition; constituent concentrations; liquid-to-vapor ratio; scrubbing liquid flow rate and composition; temperature; and the reaction kinetics of the constituents with the scrubbing liquid. The design evaluation shall establish the design exhaust vent stream organic compound concentration level and will include the additional information in paragraph (d)(2)(vii)(A) of this section for a tray column scrubber or paragraph (d)(2)(vii)(B) of this section for a packed column scrubber.
>
> (A) Type and total number of theoretical and actual trays;
>
> (B) Type and total surface area of packing for entire column, and for individual packed sections if column contains more than one packed section.

This language parallels the requirements of §63.139(d)(2)(iv), (v), and (vi) for the other control devices.

Comment: One commenter (A-90-19: IV-D-54) stated that emission control devices installed to comply with the provisions for closed-vent systems and control devices (§63.139) and that are located upstream of an RCT (e.g., flare) device should not be subject to testing and monitoring requirements. The commenter (A-90-19: IV-D-54) contended that for controls in series, only testing at the outlet of the train of the control system should be required, and only monitoring which is necessary to ensure performance of the overall train of control systems should be required.

Response: The requirements of §63.139 are not intended to mean that a separate performance demonstration is required for each individual control device operated in a series. A facility must comply with only one of the four paragraphs under §63.139(c) of the final rule. If compliance is achieved with one of the control devices in a series, then compliance need only be demonstrated for that one device.

Another option would be to demonstrate the reduction of the total organic compound emissions, less methane and ethane, or total organic HAP emissions by 95 weight percent or greater. This could be done across a single control device or across a series of control devices. However, control devices in series, up to and including the control devices which achieves compliance with §63.139(c), are subject to §63.139(d), (e), and (f). Any control device or series of control devices located after the control device where the owner or operator demonstrates compliance is not subject to either §63.139 or the inspection and monitoring requirements in §63.143 because such a control device or series of control devices achieves reductions in excess of the requirements of §63.139(c).

The owner or operator need only monitor those control devices in series which are used to comply with §63.139. As an option to show compliance with §63.139, the owner or operator may install an organic monitoring device at the outlet of the control device in accordance with §63.143(e)(2). The owner or operator may also request approval from the implementing agency per §63.143(e)(3) to monitor parameters other than those specified in §63.143(e)(1) or (2).

The EPA clarifies that regardless of how the owner or operator chooses to comply with the monitoring requirements in §63.143, the owner or operator must establish, for each parameter monitored, a range that indicates proper operation of the closed-vent system.

2.2.2 Water Seal Controls

Comment: One commenter (A-90-23: IV-D-14) claimed that the HON definition of "water seal controls" is different than the definition in the Benzene Waste NESHAP. The commenter (A-90-23: IV-D-14) recommended adding to the HON definition the specifications from the Benzene Waste NESHAP, which state that "the water level of the seal must be maintained in the vertical leg of a drain in order to be considered a water seal."

Response: The EPA has changed the proposed definition of "water seal controls" in §63.111 of subpart G of the final rule. The EPA agrees with the commenter that the definition in the Benzene Waste NESHAP and the HON should be the same, and has therefore amended definition as follows:

> "Water seal controls means a seal pot, p-leg trap, or other type of trap filled with water (e.g., flooded sewers that maintain water levels adequate to prevent air flow through the system) that creates a water barrier between the water level of the seal and the atmosphere. The water level of the seal must be maintained in the vertical leg of a drain in order to be considered a water seal."

The objective of the controls specified for drains and junction boxes in an individual drain system is to isolate them such that the free flow of vapors within the system is prevented. By including additional examples in the final rule, the EPA has clarified that other types of water seals such as flooded sewers also are acceptable.

2.2.3 Definition of "Cover"

Comment: Two commenters (A-90-19: IV-D-90; IV-D-100) requested that the EPA include a definition of "cover" in the wastewater provisions.

Response: The EPA has added the following definition of "cover" to §63.111 of subpart G to clarify the term as it is used throughout the wastewater provisions:

> Cover, as used in the wastewater provisions, means a device or system which is placed on or over a waste management unit containing wastewater or residuals so that the entire surface area is enclosed and sealed to minimize air emissions. A cover may have openings necessary for operation, inspection, and maintenance of the waste management unit such as access hatches, sampling ports, and gauge wells provided that each opening is closed and sealed when not in use. Examples of covers include a fixed roof installed on a wastewater tank, a lid installed on a container, and an air-supported enclosure installed over a waste management unit.

2.2.4 Submerged Fill Pipes

Comment: Two commenters (A-90-19: IV-D-86; IV-D-32) stated that the proposed provisions in §§63.135(c)(1) and (2), which require the use of submerged fill pipes for filling a container with residuals should be deleted because wastewater residuals such as sludge may clog the outlet of the fill pipe.

Response: The EPA agrees that the use of submerged fill pipes for viscous materials may be difficult because the thick material may clog the pipe. In developing the final rule, the EPA reconsidered the use of submerged fill and has changed the requirements. Submerged filing is required for containers with a capacity of 0.42 m^3 or greater that are filled by pumping the Group 1 wastewater or residual. The HAP emissions generated by filling containers warrants the use of submerged fill pipes.

Comment: One commenter (A-90-19: IV-D-32) contended that the proposed emission control requirement for containers in §§63.135(d)(1) through (3), which requires that treatment in a container (including aeration, thermal, or other treatment) be conducted within an enclosure with a closed-vent system that is routed to a control device, discourages treatment in containers. The commenter (A-90-19: IV-D-32) stated that treatment in containers provides environmental and safety benefits with little potential for emissions. The commenter (A-90-19: IV-D-32) stated that the proposed control requirement will complicate such management methods to the point that some facilities may decide to omit the treatment step. The commenter (A-90-19: IV-D-32) suggested that if this requirement is retained in the rule, it should apply only to treatment in containers that is shown to cause significant HAP emissions.

Response: The EPA maintains that whenever it is necessary for a container to be open, treatment in a container of a Group 1 wastewater stream or residual removed from a Group 1 wastewater stream, must be conducted within an enclosure with a closed-vent system that is routed to a control device. If the container is not open and cannot emit

HAP's, then the container is not required to be within an enclosure with a closed-vent system that is routed to a control device. The commenter provided no data to substantiate their statement that treatment in containers provides little potential for emissions.

Comment: One commenter (A-90-23: IV-D-18) opposed the EPA's proposal to require the filling of tanks and containers using a submerged fill pipe that must extend within two pipe diameters of the bottom of the vessel being filled. The commenter (A-90-23: IV-D-18) has developed corporate-wide mechanical piping standards that require a distance of 6 inches to prevent undue wear to the vessel during filling using a 2-inch submerged pipe. In addition, the commenter (A-90-19: IV-D-18) stated that a submerged fill pipe that is too close to the bottom of a tank will impart a sideways force on the pipe, deflecting the fill pipe sideways with a potential of the pipe breaking off due to this movement. The commenter (A-90-23: IV-D-18) requested that the EPA allow three fill pipe diameters instead of two.

Response: The EPA clarifies that the filling of tanks does not require the use of a submerged fill pipe. The EPA has re-evaluated the requirement that submerged fill pipes must be located within two pipe diameters of the bottom of the vessel being filled. In the final rule, the EPA is allowing submerged fill pipes to be located no more than 6 inches or two pipe diameters from the bottom of the container and has deleted the requirement for submerged fill for containers less than 0.42 m^3. This will not increase HAP emissions but will provide greater flexibility for industry compliance.

2.2.5 Maintenance Wastewater

Comment: One commenter (A-90-19: IV-D-34) stated that the wastewaters from routine maintenance do not result in significant HAP emissions. The commenter (A-90-19: IV-D-34) stated that one facility roughly estimates that less than 0.05 Mg/yr is lost to the process sewer from pump maintenance. The commenter (A-90-19: IV-D-34) recommended deleting the requirement to control maintenance-turnaround and routine maintenance wastewaters.

Response: It is difficult for the EPA to assess the commenter's data. The commenter who provided an estimate of maintenance wastewater emissions from pump maintenance for only one facility did not provide documentation of the estimate and did not provide an estimate of emissions from other maintenance activities.

The EPA has made a change from the proposed rule so that requirements for routine maintenance and maintenance-turnaround wastewaters are now addressed in the facility's start-up, shutdown, and malfunction plan as was proposed for only maintenance-turnaround wastewaters. Given the variability in maintenance wastewaters and the difficulty in measuring their flow rates and concentrations, the EPA has determined that it is more appropriate for individual facilities to determine site-specific housekeeping procedures to properly manage maintenance wastewater and control organic HAP emissions to the atmosphere from maintenance wastewaters. The requirements to collect and manage routine maintenance wastewaters in a controlled drain system have been eliminated.

Comment: One commenter (A-90-19: IV-D-77) stated that the EPA should include provisions allowing maintenance-related wastewater to bypass the control devices (e.g., design steam stripper) because variable feed composition and dissolved and suspended solids create operational and maintenance problems. The commenter (A-90-19: IV-D-77) suggested that the EPA incorporate an exclusion for five-percent downtime to allow for maintenance of the steam stripper.

Response: The HON does not require maintenance wastewaters to be treated in control devices. The rule only requires that owners or operators include a description of procedures in their start-up, shutdown, and malfunction plan that, when followed, ensure that maintenance wastewaters are properly managed and HAP emissions are minimized. Process wastewater will sometimes have variable feed compositions and dissolved and suspended solids also. Therefore, it is reasonable to assume that facilities will have equipment such as feed tanks and filters already in place to account for composition variation and solids in process wastewater streams. Therefore, if the owner or operator chooses to do so, this same equipment may be used for maintenance wastewater streams.

Furthermore, the wastewater provisions do not require the design steam stripper to operate continuously. If a steam stripper requires repair, wastewaters can be collected in a hold tank and routed to the steam stripper once the repairs are complete. The wastewaters cannot bypass the steam stripper during the repair period.

Comment: Two commenters (A-90-19: IV-D-97) (A-90-23: IV-D-20) recommended that the EPA specify one type of maintenance wastewater, just as there is only one type of process wastewater, and address the management of all maintenance-generated wastewater in each facility's start-up/malfunction plan per §63.102(b)(1)(i) of the proposed rule. Two commenters (A-90-19: IV-D-32; IV-D-75) objected to the requirement that routine maintenance wastewater be collected in a closed system. One commenter (A-90-19: IV-D-75) claimed that the requirement is inconsistent with the Benzene Waste NESHAP which allows the owner or operator to determine if control of these wastewaters is required. Two commenters (A-90-19: IV-D-97) (A-90-23: IV-D-20) stated that maintenance-related wastewater should not be regulated in the same manner as process wastewater (i.e., Group 1/Group 2 determination).

One commenter (A-90-19: IV-D-34) stated that the EPA should clarify one of the management options for maintenance wastewater in §63.102(b)(2)(ii) of the proposed rule, which specifies that the maintenance wastewater can be collected and managed in a controlled drain system. The commenter (A-90-19: IV-D-34) expressed concern that because the EPA has not defined a "controlled drain system," requirements for managing maintenance wastewater could be interpreted to mean that maintenance wastewater must be collected and managed in a drain system that meets the requirements of §63.133 through §63.140. The commenter (A-90-19: IV-D-34) contended that the preamble to the proposed rule (57 FR 62677-8), which states that routine maintenance wastewater will be controlled using general procedures contained in a start-up, shut-down, and malfunction plan, does not seem to be consistent with the possible interpretations of "controlled drain system." The commenter (A-90-19: IV-D-34) requested that the EPA restate the rule to be consistent with the concepts discussed in the preamble.

One commenter (A-90-19: IV-D-73) recommended that routine maintenance wastewaters and wastewaters generated during shutdown be subject to the same requirements and also suggested dealing with maintenance and shutdown wastewaters using one site-specific plan. The commenter (A-90-19: IV-D-73) claimed that volume and hydrocarbon content need to be considered before controlling maintenance wastewater and that the requirement for routine maintenance wastewater to be collected and recycled, destroyed, or collected and managed in a controlled drain is not related to developing a maintenance wastewater plan. One commenter (A-90-19: IV-D-33) expressed concern that in §63.102(b)(1)(ii) of the proposed rule, which requires that routine maintenance wastewaters are either collected and recycled or are destroyed or are collected and managed in a controlled drain system, seems to require a special procedure and system to manage such wastewater. The commenter (A-90-19: IV-D-33) stated that most wastewaters, both routinely and non-routinely generated, are handled through the same systems pursuant to CWA requirements and that the EPA should not require special systems to handle only maintenance wastewater subject to the HON.

Response: The requirements for routine maintenance wastewaters have been revised. Routine maintenance wastewater and maintenance-turnaround wastewater as defined in §63.101 of the proposed rule will now both be referred to as "maintenance wastewater" as defined in §63.101 of subpart F. Both types of maintenance wastewater are now subject to the requirements proposed for maintenance-turnaround wastewater. The requirements for all maintenance wastewaters are addressed in the facility's start-up, shutdown, and malfunction plan. Routine maintenance wastewaters are no longer required to be collected and recycled, destroyed, or collected and managed in a controlled drain system as specified in §63.102(b)(1)(ii) of the proposed rule. The owner or operator must only specify the procedures that will be followed to properly manage maintenance wastewater and minimize HAP emissions from maintenance wastewater. All maintenance wastewater can be handled in the same sewer systems.

The Benzene Waste NESHAP requires control of wastewaters with a concentration greater than 10 ppmw if the facility total annual benzene (TAB) is 10 megagrams per year or greater. The requirements do not allow the owner or operator to determine if control of maintenance wastewater is required.

It is assumed that the commenter means routine maintenance wastewater when referring to maintenance-related wastewater. As stated above, routine maintenance wastewater is not subject to the same requirements as process wastewater.

Comment: One commenter (A-90-23: IV-D-20) stated that compliance with an NPDES permit for a SOCMI facility should be sufficient to treat maintenance-related wastewater. Therefore, the commenter (A-90-23: IV-D-20) recommended that requirements for all maintenance-related wastewater streams be eliminated from the HON.

Response: An NPDES permit only specifies the amount of organics that may be present in the wastewater before it is discharged from the facility. These permits do not limit the air emissions that can be released from wastewater prior to their discharge from the facility. Therefore, compliance with an NPDES permit is not sufficient to reduce air emissions from maintenance wastewater. The HON requirements for maintenance wastewater are now listed in §63.105 of subpart F and ensure that maintenance wastewater will be properly managed and HAP emissions to the air from these wastewaters will be controlled.

2.2.6 Control of Steam Stripper Overheads

Comment: One commenter (A-90-19: IV-D-85) stated that the control device at the end of the process should be required to meet at least a 98-percent reduction standard, and that the EPA should conduct an analysis assuming 98 percent control of stripped organics.

Response: The EPA assumes that the commenter means the overheads from the steam stripper when referring to "the end of the process." The EPA requires that the HAP emissions from the steam stripper overheads primary condenser to be reduced by 95 percent. The EPA allows the use of recovery devices such as secondary condensers and carbon adsorbers to recover the overheads from the steam stripper, and these devices may not be able to achieve a 98 percent reduction. Recovery devices typically achieve removal efficiencies of 95 percent, and therefore, combustion would be required to achieve removal efficiencies of 98 percent for many compounds. Requiring a 98-percent control of stripped organics would discourage resource recovery, because many of the overhead streams would have to be treated by combustion.

3.0 IMPACTS ANALYSIS

3.1 COST ANALYSIS

Comment: One commenter (A-90-19: IV-D-85) supported the EPA's cost analysis for justifying steam stripping as RCT and stated that the EPA justified the cost of steam stripping in 1987 while establishing effluent limitations for OCPSF regulations (52 FR 42561). The commenter (A-90-19: IV-D-85) stated that if further cost comparisons are made between steam stripping and biological treatment, section 112(d) of the Act requires the EPA to consider both the air and water quality benefits that could be achieved by each treatment technology.

Response: The EPA based effluent limitations and compliance costs for OCPSF regulations on steam stripping with product recovery and justified the cost of steam stripping in the OCPSF regulation. The EPA has determined that the cost estimate in the HON represents the true cost of installing and operating a steam stripper. The cost impacts for controlling wastewater for the HON are based on steam stripping and are presented in section IV.C of the preamble to the final rule. If further cost comparisons are made between biological treatment and steam stripping, the EPA will consider air and water quality benefits, along with energy impacts, NO_X emissions, CO emissions, and solid waste generation.

Comment: One commenter (A-90-23: IV-D-17) claimed that the EPA's estimate of TCI for a steam stripper was several orders of magnitude too low. The commenter (A-90-23: IV-D-17) provided an attachment indicating that the TCI for a steam stripper is $3,456,200, and listed several reasons why the EPA's estimate of TCI is lower.

Response: The EPA's estimate of the steam stripper TCI was based on published data and vendor information. The TCI is composed of the BEC, the PEC, and direct and indirect installation costs. The BEC that was estimated by the EPA differs from the estimate provided by the commenter by less than 20 percent. However, the PEC and the indirect and direct installation costs estimated by the commenter are 44 to 91 percent larger than those estimated by the EPA. According to the Office of Air Quality Planning and Standards Control Cost Manual (OCCM), the PEC and the direct and indirect installation costs are based on the BEC. In the EPA's estimate of TCI, the components of the PEC, and the direct and indirect installation costs are represented as a percentage of the BEC as published in the OCCM. The estimates from the OCCM are accurate to within ± 30 percent. The commenter's estimates of PEC and direct and indirect installation costs do not agree with the guidelines presented in the OCCM. The commenter listed significantly larger engineering costs and direct installation costs, and these estimates are not representative of typical costs. The commenter (A-90-23: IV-D-17) did not provide support for these higher costs.

Comment: Two commenters (A-90-19: IV-D-77; IV-D-110) stated that the EPA should account for the costs associated with adding a steam stripper to an existing facility with limited space or requiring installation in a remote location.

Response: When developing regulatory options, the EPA must consider impacts on a nationwide basis. Therefore, cost-effectiveness for control of wastewater for the regulatory option chosen ($495/ton for new and existing sources in the fifth year) represents a nationwide estimate. Estimates are based on control equipment arrangements that are most common in the industry. Most facilities using a steam stripper to control wastewater streams will have adequate space and will not have to install the steam stripper in a remote location. Therefore, these types of facility-specific cost considerations were not accounted for in the HON impacts analysis. If the use of a steam stripper is not cost-effective for a particular facility, §63.138 includes several other alternatives the facility can use to comply with the regulation, including biological treatment.

Comment: One commenter (A-90-19: IV-D-98) stated that the costs associated with enclosing a wastewater treatment plant to avoid installing expensive internal piping and process changes is not a cost-effective option for facilities with multi-acre wastewater treatment lagoons.

Response: The impacts analysis done by the EPA indicated that control of Group 1 wastewater streams using steam stripping is cost-effective. Therefore, facilities have the option to use steam stripping for control of Group 1 wastewater streams. Covering smaller lagoons or surface impoundments may also be cost-effective for some facilities. However, covering larger wastewater lagoons or other surface impoundments may not be cost-effective for every facility, and most facilities will not opt to cover multi-acre wastewater lagoons. Such facilities can select another one of the compliance options described in §63.138 of the wastewater provisions in subpart G.

Comment: Two commenters (A-90-19: IV-D-32; IV-D-62) stated that biological treatment could be a more cost effective option than the steam stripper for biodegradable HAP's. One commenter (A-90-23: IV-D-9) stated that the cost of biological treatment was less than the installation cost of steam stripping for a wide variety of waste streams with low HAP concentrations. The commenter (A-90-23: IV-D-9) claimed that many facilities have invested in pre-treatment facilities for biological treatment units that will need to be abandoned at a great economic loss. The commenter (A-90-23: IV-D-9) stated that steam strippers would offer no advantage over the existing systems in emission reduction.

Response: The EPA allows the use of biological treatment as a compliance option for treating wastewater streams when the biological treatment unit can achieve removal efficiencies at least as high as steam stripping. Therefore, a facility treating a wastewater stream containing highly biodegradable

HAP's has the option to use either biological treatment or steam stripping, whichever is more cost-effective. Facilities treating wastewater streams with low HAP concentrations also have the option to use biological treatment if the biological treatment unit can achieve removal efficiencies at least as high as steam stripping. For those wastewater streams where biological treatment cannot achieve removal efficiencies equivalent to steam stripping, the EPA has shown that the installation of a steam stripper is cost-effective.

Comment: One commenter (A-90-19: IV-D-98) concluded that the energy costs associated with wastewater controls appear to be underestimated by at least a factor of 10. The commenter (A-90-19: IV-D-98) stated that the EPA assumes a national energy impact of 5,300x10^{9} Btu/yr based on the use of steam stripping in the proposed rule. The commenter (A-90-19: IV-D-98) contended that if only 300 facilities are subject to the HON, the energy estimate would be sufficient to treat only 5 gal/minute/site or less at an expenditure of $50,000 to $100,000 per year.

Response: Based on the options chosen for new and existing sources of wastewater, it was estimated in the proposal preamble that approximately 8,000 liters per minute of wastewater would be controlled at new sources and approximately 27,000 ℓpm of wastewater would be controlled at existing sources. It was also estimated that 89 wastewater streams would be controlled at new sources, and 127 wastewater streams would be controlled at existing sources. It was estimated, based on the enthalpy of water and steam, that the energy required to produce steam for use in the steam stripper is 1.46x10^{8} Btu/year/ℓpm of wastewater treated (Memorandum from Chuck Zukor, Radian, to Penny Lassiter, EPA/CPB, *"Development of Secondary Environmental Impact Factors for Steam Stripping Wastewater Streams in the HON,"* January 31, 1992). Therefore, the total energy required for new and existing sources for the final rule to steam strip wastewater is approximately 5,100x10^{9} Btu/year.

In the cost analysis done by the EPA, it was determined that steam stripping is cost-effective for the treatment of SOCMI wastewater streams. The cost of the steam required by the steam stripper was included in the calculation of annual cost and was estimated to be $9.26 per megagram (Memorandum from Chris Bagley, Radian, to Mary Tom Kissell, EPA/SDB, *"Steam Costs,"* August 23, 1993). Assuming a heat content of 1,206 Btu per pound, approximately 4.23×10^9 pounds per year of steam are required to steam strip the wastewater streams subject to the HON. This equates to a steam cost of 17.8 million dollars for all facilities subject to the wastewater provisions of the HON.

It is unclear where the commenter (A-90-19: IV-D-98) obtained the cited data. The commenter's estimate of the number of facilities affected by the wastewater provisions of the HON does not agree with the EPA's estimate. However, a steam cost of $50,000 to $100,000 per facility per year for 300 facilities equates to a cost of 15 to 30 million dollars per year for all affected facilities which agrees with the EPA's estimate.

Comment: One commenter (A-90-19: IV-D-85) claimed that the EPA did not consider the cost savings of all the wastewater options when determining cost-effectiveness exemptions. The commenter (A-90-19: IV-D-85) stated that the EPA should consider the cost savings from pollution prevention and from routing multiple wastewater streams to a single steam stripper.

Response: The EPA did consider the cost savings from combining wastewater streams and routing them to a single steam stripper, because the EPA's cost analysis assumed one steam stripper for each SOCMI facility. If an owner or operator chooses to use pollution prevention techniques, a wastewater stream will not be generated and the facility will not have a control cost. A cost-effectiveness analysis was done only for those facilities that would be required to apply additional controls based on the applicability criteria in the wastewater provisions.

3.1.1 Recycling vs. Disposal of Residuals

Comment: Several commenters (A-90-19: IV-D-32; IV-D-77; IV-D-110) (A-90-23: IV-D-20) stated that the EPA underestimated the cost for steam stripping by incorrectly assuming that SOCMI facilities could recycle HAP's that are collected in the overhead. One commenter (A-90-23: IV-D-17) disagreed with the recovery credit that the EPA included in its estimate of TAC. The commenter (A-90-23: IV-D-17) claimed that the organics in wastewater cannot be reused without further processing because contaminants can interfere with the process.

One commenter (A-90-23: IV-D-17) alleged that TAC may be higher than the EPA has estimated because steam stripper overheads may not be able to be incinerated onsite and may have to be handled as a hazardous waste. Two commenters (A-90-19: IV-D-32; IV-D-77) contended that the disposal costs for residuals may be a significant fraction of total annual operating costs. One commenter (A-90-19: IV-D-110) stated that the EPA should account for the cost of disposing of residuals offsite. Two commenters (A-90-19: IV-D-32) (A-90-23: IV-D-20) stated that the EPA needs to include in its cost analyses the management of the aqueous-phase waste generated by the decanter.

Response: The cost analysis for the proposed rule did not assume that HAP's recovered from the steam stripper overheads were recycled to the process. Rather, the cost analysis for the proposed rule assumed that the recovered VOHAP's are incinerated in a boiler, and thus generate a fuel credit.

The credit for incinerating recovered HAP overheads was eliminated from the total annual cost of the steam stripper for the final rule. However, the annual cost of the steam stripper was not underestimated because the fuel credit only represented approximately 3 percent of the total annual cost. Therefore, eliminating the fuel credit did not greatly affect the total annual cost.

Information submitted to the EPA by the CMA indicated that the residuals from the operation of a steam stripper are managed in one of three ways:

(1) by on-site incineration;

(2) by off-site incineration; or

(3) by recycling to the process.

For simplicity, the CMA suggested that the EPA assume that these three methods are used in equal proportion. Both on-site incineration and recycling to the process generate a fuel or raw material credit for the facility. Off-site incineration generates a waste disposal cost for the facility. It is assumed that the waste disposal cost and fuel and raw material credits cancel each other, so that residuals disposal results in a net cost of zero.

3.1.2 Carbon Steel vs. Stainless Steel

Comment: Two commenters (A-90-19: IV-D-32; IV-D-110) stated that the EPA underestimated the cost of the design steam stripper by using carbon steel as the primary construction material. One commenter (A-90-19: IV-D-32) stated that the EPA should have based the cost on stainless steel.

Response: Based on comments and new information, the EPA has revised the cost of the steam stripper (Memorandum from Kristine Pelt, Radian, to Mary Tom Kissell, EPA/SDB, "*Steam Stripper Total Capital Investment and Total Annual Costs,*" December 1, 1993). The final nationwide impacts are based on the revised costs estimate. The costs of the steam stripping column and trays, the primary condenser, the overheads collection decanter, and the pumps are based on stainless steel construction. The feed preheater cost is based on a carbon steel shell with copper tubing. The cost of the wastewater feed storage tanks was based on carbon steel construction, because these tanks would not contain any materials that would require stainless steel construction (e.g., steam or water at elevated temperatures). Therefore, carbon steel is an adequate material of construction for the feed tanks.

3.1.3 Heat Transfer Coefficient and Heat Exchange System

Comment: Two commenters (A-90-19: IV-D-32) (A-90-23: IV-D-20) stated that the EPA should reevaluate the heat transfer coefficient of 180 Btu/hr per square foot per degree F (Btu/hr • ft^2 • ^oF) for the feed preheater, because the EPA's estimate is too high for use with a shell and tube heat exchanger in aqueous-to-aqueous service. The commenters (A-90-19: IV-D-32) (A-90-23: IV-D-20) also recommended the use of a plate-and-frame heat exchanger, instead of the proposed shell-and-tube exchanger because the latter is only appropriate for wastewaters with no suspended solids. One commenter (A-90-19: IV-D-32) recommended that the EPA re-evaluate the effect that such changes may have on cost.

Response: One heat exchange system vendor contacted by the EPA suggested that a heat transfer coefficient of approximately 180 Btu/hr • ft^2 • ^oF is low unless there is a large amount of fouling. Furthermore, the heat transfer coefficient used by the EPA in the preliminary design calculation for the preheater is slightly less than the range of values recommended by accepted references (M.S. Peters and K.D. Timmerhaus, Plant Design and Economics for Chemical Engineers, 3rd ed., McGraw-Hill Book Co., 1980). Therefore, the information received by the EPA contradicts the information provided by the commenter (A-90-19: IV-D-32). Based on the vendor information and the references cited, the EPA has concluded that the value the EPA used for the heat transfer coefficient is not too high.

According to an article in Chemical Engineering Magazine, shell and tube heat exchangers are less likely to be clogged by particulate matter than plate and frame heat exchangers (J. Boyer and G. Trumpfheller, *"Specification Tips to Maximize Heat Transfer,"* Chemical Engineering, May 1993). Therefore, a shell and tube design is a reasonable basis for the preheater cost.

3.1.4 Use of "Temporary" Tanks

Comment: One commenter (A-90-23: IV-D-20) stated that the EPA should not require the addition of a control technology (e.g., a floating-roof tank) for storage of a wastewater stream during occasional shutdowns of a wastewater treatment unit if the wastewater is hardpiped directly to the treatment unit. The commenter (A-90-23: IV-D-20) provided an example and stated that the cost for compliance with such a provision would be excessive, and should not be imposed. The commenter (A-90-23: IV-D-20) suggested that storage of streams for 14 days or less in temporary storage vessels or vessels that are usually not used for the storage of wastewater should not be subject to control requirements when a wastewater treatment unit is nonfunctional. The commenter (A-90-23: IV-D-20) stated that the facility uses an open pond for storage of wastewater in these situations.

Response: The control cost for wastewater is based on steam stripping, and the EPA assumed in the cost analysis that the facility would install holding tanks upstream of the steam stripper and not hard pipe the wastewater directly to the steam stripper. These holding tanks would be available for temporary storage of wastewater if the steam stripper needed repair, and do not present an excessive cost to the facility. The wastewater stream cannot bypass control during shutdowns of the treatment unit. The wastewater must either be stored until the treatment unit is functional or routed to an alternate treatment unit. It is inherent in the startup, shutdown, and malfunction plan required under §63.6(e)(3) of subpart A of this part that when wastewater is stored in a "temporary" tank because a wastewater tank or treatment unit is non-functional, the "temporary" tank is uncontrolled. The startup, shutdown, and malfunction plan requires repair of wastewater tanks and control equipment as soon as technically feasible because "temporary" tanks are uncontrolled.

3.1.5 Cost of RCRA Permitting

Comment: One commenter (A-90-19: IV-D-98) stated that the EPA should consider the cost of developing and obtaining a BIF permit under 40 CFR part 266 of RCRA in order for SOCMI facilities to incinerate residuals in high-temperature combustion devices.

Response: Information submitted to the EPA indicated that residuals from the operation of a steam stripper are managed in one of three ways: (1) by on-site incineration; (2) by off-site incineration; (3) or by recycling to the process. Therefore, if the cost of on-site incineration is high due to the cost of obtaining a RCRA permit, the facility has two other options for disposing of residuals.

3.2 EMISSION ESTIMATES

Comment: Several commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-32; IV-D-75; IV-D-77; IV-D-58; IV-D-108) (A-90-23: IV-D-9) stated that some compounds (e.g., methanol) in the list of volatile organic HAP's are non-volatile or semi-volatile and are not likely to be emitted during normal wastewater handling and treatment. One commenter (A-90-19: IV-D-97) recommended that the wastewater portion of the HON be limited to only significant streams of truly volatile compounds and that monitoring, recordkeeping, and reporting be minimal considering the small amount of emissions that will be controlled.

Response: The EPA has reviewed its estimates of the volatility of the HAP's subject to the wastewater provisions, which are listed in table 9 of subpart G. Based on this analysis, the following seven compounds have been dropped from the list of HAP's on table 9 of subpart G:

- 2-Chloroacetophenone (532274)
- Aniline (62533)
- o-Cresol (95487)
- 3,3'-Dimethylbenzidine (119937)
- Diethylene glycol diethylether (112367)
- Diethylene glycol dimethylether (111966)
- Ethylene glycol monoethylether acetate (111159)

The EPA's analysis has shown that the remaining 76 compounds, including methanol, are volatile and can potentially be emitted during wastewater handling and treatment.

It is assumed that by "significant streams," the commenter (A-90-19: IV-D-97) means wastewater streams with significant flow rates and significant concentrations. There are flow rate and concentration criteria in the wastewater provisions to ensure that "insignificant" streams will not be subject to the control requirements in the wastewater provisions (i.e., the "insignificant" wastewater streams will not meet the definition of wastewater, or will be Group 2 wastewater). Furthermore, monitoring, recordkeeping, and reporting is only required for wastewater streams that contain volatile organic HAP's and meet the flow rate and concentration criteria. Monitoring, recordkeeping, and reporting are not required for wastewater streams not meeting the definition of wastewater. These are the wastewater streams with the highest emission potential.

Comment: One commenter (A-90-19: IV-D-85) supported the wastewater provisions of the HON, but stated that the EPA may have underestimated the proportion of emissions from wastewater in the SOCMI.

Response: The commenter did not provide any detail regarding reasons why the proportion of organic HAP emissions from wastewater in the SOCMI may have been underestimated. The wastewater emission estimates are based on information obtained from the SOCMI via a section 114 survey and from public comment. Therefore, the EPA maintains that the wastewater emission estimates are representative of the SOCMI.

Comment: Two commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-97) stated that the EPA has overestimated total emissions from wastewater operations by including non-volatile and semi-volatile compounds in baseline emission estimates, and by estimating emission reductions from control based on these substances. One commenter (A-90-19: IV-F-1.2 and IV-F-4) asserted that, by incorrectly estimating the removal efficiency of certain compounds and including insignificant wastewater streams in the regulation, the EPA overestimated total emissions from wastewater.

Response: The list of HAP's that is subject to the wastewater provisions of the HON has been revised to include only those HAP's that volatilize from wastewater. Seven compounds have been dropped from the list of HAP's shown in table 9 of subpart G of the proposed rule. The EPA's analysis indicated that the remaining 76 compounds are volatile and can potentially be emitted from wastewater. Baseline emissions and emissions reduction estimates are not greatly affected by including semi-volatile and non-volatile compounds. The EPA calculated baseline emissions using the fraction emitted (Fe) values for each compound and calculated the emission reduction using the fraction removed (Fr) values for each compound. Most of the baseline emissions and emission reductions are generated by the highly volatile compounds (those with the largest Fe and Fr values) that are readily emitted from wastewater during handling operations and that are readily removed from wastewater during treatment operations.

The EPA has revised the estimates for Fe values for the HAP's listed in table 9 of subpart G and has included these values in table 34 of subpart G of the final rule. This analysis indicated that some of the Fe values increased and some of the Fe values decreased. Although compound-specific emissions may change, the total baseline emissions from wastewater would not change. Furthermore, "insignificant" streams will not greatly affect the magnitude of baseline emissions from wastewater, because these streams have low flow rates, low concentrations, or contain low volatility compounds.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-34; IV-D-53; IV-D-54; IV-D-77; IV-D-97; IV-D-110; IV-D-112) (A-90-23: IV-D-20) claimed that the requirements for maintenance wastewater and maintenance-turnaround wastewater are "resource-intensive" compared to the significance of the emissions from these sources. The commenters (A-90-19: IV-D-32; IV-D-34; IV-D-53; IV-D-110; IV-D-112) stated that the EPA has not done an emissions analysis of maintenance and maintenance-turnaround wastewater and has not shown if emissions from these wastewaters are significant. One commenter (A-90-19: IV-D-34) stated that the EPA has not complied with the requirements of §112(d) of the Act for maintenance wastewater, which specifies that the EPA must provide data on emissions, the floor, cost, and environmental impacts. The commenter (A-90-19: IV-D-53) stated that all maintenance and maintenance-turnaround wastewaters should be classified as maintenance wastewaters and exempted from the HON.

One commenter (A-90-23: IV-D-17) favored having a *de minimis* level for maintenance wastewater. The commenter (A-90-23: IV-D-17) claimed that the *de minimis* level should be higher than the 2 Mg/yr level in the Benzene Waste NESHAP because several HAP's may be present in the wastewater.

Response: In the final HON, the EPA continues to regulate maintenance wastewater in a facility's start-up, shutdown, and malfunction plan because the General Provisions in §63.6(e)(1)(i) require that a source be operated in a manor consistent with good air pollution control practices. The EPA has determined that it is appropriate to address the handling of wastewater generated by maintenance activities in a facility's start-up, shutdown, and malfunction plan. The EPA has concluded that the concentration and flow rates of maintenance wastewater streams are extremely difficult to determine. Thus, facility determination of a *de minimis* level for maintenance wastewater and subsequent enforcement would be difficult. The EPA decided that it was more appropriate to require facilities to develop a site-specific plan for reducing emissions from all maintenance-related wastewater, rather than to try to distinguish between which maintenance-related wastewaters should be subject to additional control in the final rule. Therefore, the requirements for routine maintenance wastewater have been changed and are now the same as the requirements proposed for maintenance-turnaround wastewater. Routine maintenance and maintenance-turnaround wastewaters are now both being referred to as "maintenance wastewater." The provisions in proposed §63.102(b)(1)(ii) which required routine maintenance wastewater to be collected and recycled, destroyed, or collected and managed in a closed-drain system have been eliminated. The control requirements for maintenance wastewater are to properly manage and control HAP emissions. The commenters did not define what was meant by "significant emissions" or "resource-intensive."

The EPA is not required to determine a floor for the control of maintenance wastewater. The Act requires the EPA to ensure that control of maintenance wastewater is at least as stringent as the floor. Because estimating air emissions from maintenance wastewater is difficult, the EPA reduced the control requirements for routine maintenance to wastewater recordkeeping and reporting requirements which are addressed in the start-up, shutdown, and malfunction plan.

Comment: One commenter (A-90-19: IV-D-32) provided the results of a study which examined several different conditions for both drop structure and process drain collection system components. Two commenters (A-90-19: IV-D-32; IV-D-108) stated that the study on drains and drop structures indicated that the EPA overestimated emissions for a number of chemicals and suggested that these chemicals be removed from the HAP lists. One commenter (A-90-19: IV-D-108) stated that the CMA's study on drop/drain systems specifically indicated that methanol was not emitted. The commenter (A-90-19: IV-D-108) stated that methanol volatilized very slowly. The commenter (A-90-19: IV-D-108) claimed that if methanol does not volatilize from drop/drain systems, then it is unlikely that methanol will volatilize in a steam stripper operated at higher temperatures. The commenter (A-90-19: IV-D-108) suggested that only HAP's listed in table 8 of subpart G will be emitted from wastewater collection and treatment.

Response: The cited report presents emissions data on four compounds: 1,4-dichlorobenzene, tetrachloroethylene, trichloroethylene, and toluene. In the study, pilot scale structures were used to simulate full scale operating conditions for drains and drop structures. Based on the results of the study, the EPA revised the emission models for junction boxes, sumps, lift stations and drains to include the assumption that the organic HAP compound vapor phase concentration above the wastewater corresponds to approximately one-half of the saturated vapor concentration. In the proposal analysis, it was assumed that the vapor phase was at equilibrium with the wastewater. The EPA also revised the emission model for junction boxes to be based on a quiescent surface rather than turbulent flow. Emission measurement for drains presented in the study were within approximately six percent of EPA's original estimates.

The revised emission models were used to revise estimates of Fe for junction boxes, open drains, open sumps, and lift stations. Further review of the CMA drop/drain study indicates that the EPA's assumption that water seal controls would be equivalent to hard piping is in error. Based on this finding, the EPA revised the requirements for water seals. In §63.136(e) of the final wastewater provisions if a water seal is used on a drain hub receiving a Group 1 wastewater, the owner or operator shall either extend the drain pipe discharging the wastewater below the liquid surface in the water seal, or install a flexible cap (or other enclosure which restricts wind motion) that encloses the space between the drain discharging the wastewater to the drain hub receiving the wastewater.

Comment: Two commenters (A-90-19: IV-D-75; IV-D-32) provided data indicating that chemicals with Henry's law constants less than 10^{-4} atm/(mole/m^3) have little potential for emissions from wastewater and that this value should be the cutoff for VOHAP's.

One commenter (A-90-19: IV-D-33) stated that the process wastewater provisions in §63.131 should apply only to those chemicals with significant potential for emissions. The commenter (A-90-19: IV-D-33) stated that the range of Fe values for table 8 compounds varies from 0.72 to 0.99, and agreed that these 24 chemicals have a significant emission potential. The commenter (A-90-19: IV-D-33) suggested that all chemicals in table 9 with Fe values less than the lowest

Fe value for the 24 table 8 chemicals should be deleted from §63.131(b) table 9 and not be subject to all HAP regulatory requirements.

Response: The EPA has revised the list of HAP's that are included in table 9 of subpart G of the wastewater provisions. In the proposed HON, the EPA identified 83 compounds in table 9 of subpart G to be regulated in the wastewater provisions. These HAP's are a subset of the HAP's regulated by the HON. In selecting the HAP's identified in the proposed table 9, the EPA eliminated compounds that do not exist in water and compounds the EPA determined would be unlikely to be emitted in significant quantities. Another factor that influenced the EPA selection of compounds was the biodegradability and the fraction removed by steam stripping. The lower volatility compounds that were eliminated from the table 9 list are already biodegraded to a significant extent and are not removed to a significant extent by steam stripping. Based on comments received from industry, the EPA re-evaluated the emission estimates. Changes were made to the emission models and new scenarios were developed. Based on these revisions, new emission estimates were calculated. The EPA reviewed the new values and decided to eliminate seven additional compounds that were on proposed table 9 of subpart G based upon the same criteria used to develop the proposed table 9 list. Therefore, these 76 compounds are included in table 9 of subpart G and are subject to the wastewater provisions of the HON.

Comment: One commenter (A-90-19: IV-D-34) stated that the EPA has not established a sound technical basis for the cutoff range of table 9 organic HAP's. The commenter (A-90-19: IV-D-34) stated that the EPA should use ambient conditions at 25 °C to determine a compound's volatility for the purpose of estimating emissions rather than using steam stripper operating conditions at 100 °C. The commenter (A-90-19: IV-D-34) provided a list of compounds including methanol, which are miscible in water or have a Henry's law constant less than 2x10-5 atm/(mole/m^3) and stated that such compounds should be removed from tables 9, 11, 13, and 33.

Response: For the HON analysis, the EPA did not use steam stripper operating conditions at 100 °C to estimate organic HAP emissions from wastewater. Rather, the wastewater temperature was assumed to be 30 °C and Henry's law constants at 30 °C were used for the purpose of estimating organic HAP emissions from wastewater.

The commenter provided no technical basis, other than compound volatility, for deleting from the wastewater provisions of the HON those compounds with a Henry's law constant less than 2×10^{-5} atm/(mole/m^3). There are other factors which must be considered in excluding compounds from the regulation, including the compound's potential to be emitted as indicated by the Fe value.

The revised emission estimates completed by the EPA show that removing compounds with a Henry's law value less than 2×10^{-5} atm/(mole/m^3) from the list of regulated organic HAP's would result in regulation of only those organic HAP's with Fe values greater than 20 percent. To revise the list of organic HAP's as suggested by the commenter would result in nine additional organic HAP's being removed from table 9 of subpart G, all of which have the potential to be emitted from wastewater. Therefore, the EPA has not revised the list of regulated HAP's as suggested by the commenters. As discussed in a previous response, the EPA has removed seven HAP's from the list of table 9 HAP's.

Comment: One commenter (A-90-19: IV-D-108) claimed that methanol is not strippable but is, according to WATER7, highly biodegradable. One commenter (A-90-19: IV-D-92) stated that water-soluble HAP's cannot be effectively removed by steam stripping, making it unlikely that such HAP's would volatilize in wastewater collection and treatment systems. One commenter (A-90-23: IV-D-18) stated that aqueous methanol solutions do not readily volatilize because of the hydrogen bonding that occurs between the -OH radicals of water and methanol and consequently cannot be stripped to the level indicated in table 33 (i.e., 0.829).

Response: Methanol can be removed from wastewater by steam stripping. According to revised estimates made by the EPA, the design steam stripper removal efficiency for methanol is 31 percent (Fr = 0.31) (Memorandum from Clark Allen, Research Triangle Institute, to Elaine Manning, EPA/CPB, *"Efficiency of Steam Stripper Trays to Treat Wastewater Streams: Prediction of the Fraction Removed (Fr) for Specific Compounds,"* January 7, 1994). Water soluble compounds, including HAP's, are stripped from wastewater and are concentrated in the overheads vent stream. Revised estimates completed by the EPA also indicate that water soluble compounds, including HAP's, are emitted from wastewater (Memorandum from Clark Allen, Research Triangle Institute, to Elaine Manning, EPA/CPB, *"Estimation of Air Emissions from Model Wastewater Collection and Treatment Plants,"* February 2, 1994).

Comment: One commenter (A-90-19: IV-D-32) stated that the Fe value used in the equations in §63.150 to calculate uncontrolled emissions from wastewater collection and treatment devices should be related to the specific type and design of management units used at a plant, not simply the Fe values in table 13 of the proposed rule, which are based on entire treatment systems with uncontrolled components. The commenter (A-90-19: IV-D-32) suggested that the current equations could serve as the default format for sources that do not wish to use more detailed emissions factors.

Response: As discussed previously, the revised Fe values are based on the average of a range of conditions for the type and design of the wastewater collection and treatment system, including controls. The EPA judges these estimates as a reasonable basis for determining both the emission reduction benefits of the HON and the credits and debits for emission averaging. The increased burden on the industry and the permitting authorities that would occur if site-specific emission estimates are judged to be unreasonable compared to the potential for increased accuracy in the emissions estimates is negligible.

Comment: One commenter (A-90-19: IV-D-110) stated that the EPA used a flawed methodology to calculate the removal efficiencies (Fr) of HAP's in wastewater. The commenter (A-90-19: IV-D-110) stated that the EPA's estimates are incorrectly based on a model that assumes a linear relationship between stripping efficiency and the Henry's law coefficients of specific VOHAP's at 25 °C. The commenter (A-90-19: IV-D-110) contended that the EPA's methodology is incorrect because there is a sigmoidal, rather than a linear relationship between these two variables, and because removal efficiency (Fr) is not simply a function of the Henry's law constant of a compound. The commenter (A-90-19: IV-D-110) stated that the use of a flawed methodology results in an overestimation of target removal efficiencies in table 9 and an inaccurate removal efficiency (Fr) estimate for many compounds in table 33.

Response: After reviewing additional technical information, the EPA has revised the values for Fe and Fr in the final rule. The Fe values in the final rule were estimated for each individual compound using the revised scenarios and are in table 34 of subpart G. Additionally, the Fr values estimated for the proposed rule using the linear relationship between Fe and the Henry's law constant have been replaced in the final rule with the revised values estimated using the Kremser equation in table 9 of subpart G.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-75; IV-D-97) (A-90-23: IV-D-20) argued that the EPA's national emissions estimates and their estimates of removal efficiencies are based on outdated information, and that the EPA should use the data supplied by CMA to re-evaluate the basis of the regulation. One commenter (A-90-19: IV-D-110) urged the EPA to review any inaccurate and outdated information used in selecting the RCT. Several commenters (A-90-19: IV-D-32; IV-D-75; IV-D-97) (A-90-23: IV-D-20) recommended using revised physical property data, refined emissions models, and SOCMI plant scenarios to update emission factors (Fe) and estimates of removal efficiency factors (Fr) and to ensure that the rule meets the proposed cost effectiveness targets. One commenter (A-90-19: IV-D-32) stated that data were provided in the comment letter for use in updating emission factors (Fe) and removal efficiency factors (Fr). Two commenters (A-90-19: IV-D-32; IV-D-73) suggested using individual compound Fr values because many of the group B and group C compound removal efficiencies are overestimated. Two commenters (A-90-19: IV-D-32; IV-D-73) suggested using the Kremser equation to estimate removal efficiency factors (Fr).

Response: The national emissions estimates and removal efficiency estimates made by the EPA for the proposed HON were not based on outdated information, but on information available at the time of the analyses. The CMA did provide information regarding SOCMI plant wastewater system scenarios and emissions models after the HON was proposed. Some of this information has been incorporated into the final national emissions estimates (Memorandum from Clark Allen, Research Triangle Institute, to Elaine Manning, EPA/CPB, *"Estimation of Air Emissions from Model Wastewater Collection and Treatment Plants,"* February 2, 1994) and (Memorandum from Clark Allen, Research Triangle Institute, to Elaine Manning, EPA/CPB, *"Efficiency of Steam Stripper Trays to Treat Wastewater Streams: Prediction of the Fraction Removed (Fr) for Specific Compounds,"* January 7, 1994).

It is assumed that by "revised physical property data," the commenters are referring to revised Henry's law constants. Henry's law constants were updated as part of a joint effort between the EPA and the CMA. These revised Henry's law constants have been used in the final estimates of national impacts (Memorandum from Randy McDonald, EPA/CPB, to HON Wastewater Docket, *"Henry's law Constants for the 83 HAP's Regulated in the Proposed HON Wastewater Provisions,"* May 15, 1993).

The revised Fr values for the final HON regulation are estimated using revised Henry's law constants at 100 °C. The EPA clarifies that the Kremser equation was the basis for the estimated values in the proposed regulation. In the final HON regulation, table 9 of subpart G lists individual compound Fr values, rather than grouping compounds by a range of Fr values into the target removal efficiency groups used in the proposed regulation. The individual Fr values were estimated using the Kremser equation and are used to demonstrate compliance with mass removal or percent mass reduction treatment options.

Comment: One commenter (A-90-23: IV-G-2) submitted a copy of a memorandum, which summarizes raw process wastewater concentration and loading data gathered in section 114 questionnaires for the OCPSF Industry. The commenter (A-90-23: IV-G-2) stated that the data indicate that the EPA may have substantially underestimated the extent of wastewater emissions and the extent of the use of steam stripping in the industry.

Response: The information submitted by the commenter was based on responses to a section 114 questionnaire submitted by the EPA to the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) industry in July 1986. This survey did not specifically target the SOCMI nor did it specifically target the SOCMI chemicals listed in §63.105 of the proposed HON. Not all of the processes summarized in the data presented by the commenter (A-90-23: IV-G-2) are SOCMI processes, and not all of these processes emit HAP's. Additionally, the results of the June 1986 survey report total organic concentrations, but not individual compound concentrations, and, therefore, cannot be used to estimate HAP emissions. The total organic concentration includes both HAP and non-HAP compounds.

The data cannot be used to estimate HAP emissions from wastewater because individual compound concentrations are not reported. Additionally, processes other than SOCMI processes are represented. The EPA's estimates of wastewater emissions for the proposed and final HON are based on responses to a section 114 survey conducted in March of 1990. The section 114 survey specifically targets the SOCMI and organic HAP's. Therefore, the EPA concludes that HAP emissions from wastewater, which were estimated using the section 114 data for the SOCMI, are representative of the source.

Further, the data submitted by the commenter do not substantiate the claim that the EPA may have substantially underestimated the extent of the use of steam stripping in the SOCMI. The OCPSF data indicate that out of a total of 356 streams, only 27 are treated by steam stripping (7.6 percent). This indicates that, while steam stripping is employed in the OCPSF industry, it is not used to control a significant portion of the wastewater streams. It is not possible to estimate how many of the 27 steam strippers are actually used to control emissions from HAP-containing wastewater streams. The EPA determined that the MACT floor for wastewater was no control.

Comment: One commenter (A-90-23: IV-D-2) stated that the wastewater provisions are based only on the HAP concentrations in wastewater and the assumption that SOCMI processes are significant sources of HAP emissions. The commenter (A-90-23: IV-D-2) claimed that HAP emissions from wastewater depend on the true partial pressure of the HAP and the degree of exposure to the atmosphere. The commenter (A-90-23: IV-D-2) stated that the true partial pressure for a compound depends on concentration, temperature, and interactions with other chemicals. The commenter (A-90-23: IV-D-2) indicated that all of these factors should be considered when determining control levels for wastewater streams and closed-vent systems.

Another commenter (A-90-23: IV-D-17) claimed that the EPA has ignored the variation in vapor-liquid equilibrium in HON wastewater streams which is caused by interaction between some volatile organics. The commenter (A-90-23: IV-D-17) specifically cited the interaction between benzene and acetone in water.

Response: The wastewater provisions in both the proposed and final HON are based on several technical analyses. These analyses estimate the impacts of implementing the HON. The impact analyses include a quantitative review of emissions reduction, cost effectiveness, energy impacts, secondary environmental impacts, and economic impacts.

In reviewing the emission reduction impact of the HON, the EPA agrees that several factors including partial pressure, degree of exposure to the atmosphere, HAP concentration, and temperature affect HAP emissions from wastewater. However, there are other factors which also affect HAP emissions from wastewater including wind speed, wastewater depth, wastewater flow rate, and physical and chemical properties of the compounds (e.g., diffusivity, molecular weight, Henry's law constant, etc.) in the wastewater.

For purposes of determining Fe values for HAP compounds, the wastewater was assumed to have an average temperature of 30 ^{o}C, and the partial pressure of the organic HAP's in wastewater is assumed to be described by Henry's law at 30 ^{o}C. The EPA also assumes that multi-component interactions are negligible. The commenter, who cited the interaction of benzene and acetone in water as an example of multi-component interaction, did not provide any data. None of the wastewater streams used in the analyses conducted by the EPA contain a mixture of benzene and acetone.

Comment: One commenter (A-90-23: IV-D-17) claimed that the EPA has ignored the effects of fouling and surfactants or detergents on the removal efficiency of the design steam stripper. The commenter (A-90-23: IV-D-17) asserted that surfactants, which may be present in wastewater, alter the surface tension or wetting characteristics of the column and may also cause foaming.

Response: The commenter did not describe any specific causes of fouling in the steam stripper or discuss the effects of fouling and foaming on steam stripper performance. In the absence of such information, the EPA is unable to further address the comment. The EPA recognizes that fouling and the effect of surfactants and detergents on the performance of a steam stripper are site-specific considerations for which information is not available. The EPA notes that a variety of defoaming agents are available for many applications, including wastewater treatment.

Comment: One commenter (A-90-19: IV-D-85) stated that the EPA seems to have underestimated the capabilities of the steam stripper by not accounting for the added emission reductions by the condenser.

Response: The emission reductions from wastewater result from the removal of organic HAP's from the wastewater due to steam stripping. Once the organic compounds are stripped, they cannot be vented to the atmosphere, but must be routed to a control device, as required by §63.138(i). The emission of HAP'S from a control device used to meet the provisions of §63.138(i) will be negligible. Additionally, once the HAP's are removed from the wastewater and the treated wastewater exits the steam stripper, no further reduction of HAP emissions from wastewater is required if the provisions of the regulation have been met. The condenser referred to by the commenter was specified in §63.138(f) of the proposed rule and was intended to control the emission of HAP's removed by the steam stripper. Although the condenser does reduce emissions from residuals (i.e., organics removed from wastewater), the EPA has determined that this reduction is too difficult to predict and does not make a large difference when calculating emission credits and debits for averaging. Therefore, the capabilities of the steam stripper have not been overestimated.

It should be noted that the requirement for a condenser in proposed §63.138(f) has been deleted from the final rule in §63.138(g). The primary condenser may not be used to demonstrate compliance with the 95-percent control requirement for control devices.

3.2.1 Emissions from Biological Treatment Units

Comment: One commenter (A-90-19: IV-D-32) stated that the EPA's emission factors for wastewater collection and treatment systems overestimate the air emissions from biological treatment. The commenter (A-90-19: IV-D-32) contended that the design and operating parameters used by the EPA to define a typical biological treatment unit did not represent those typically found in the SOCMI.

Response: The commenter used WATER7 to estimate the values for F_{bio} and Fe for those table 9 compounds for which biokinetic data are present in WATER7 and which the commenter believes are biodegradable. Table 3-1 of this section summarizes the required WATER7 input parameters defined by the EPA and those suggested by the commenter as being typical of a SOCMI biological treatment unit.

Using the input parameters suggested by the commenter, the EPA was unable to reproduce the commenter's results. The EPA then requested a computer disk copy of the WATER7 input files used by the commenter. Examination of the WATER7 input files provided by the commenter revealed that the numerical value for inlet solids (2,000) was entered as the input for active biomass concentration. That is, the results presented by the commenter correspond to a biomass concentration of 2,000 g/ℓ. Typical biomass concentrations range from 1 to 6 g/ℓ. This overestimation of active biomass concentration results in the overestimation of the biodegradation rate and underestimation of the air emission rate from biological treatment units.

Using the input parameters summarized in table 3-1 of this section, the EPA used WATER7 to estimate the Fe for a biological treatment unit. A summary of the results is shown in table 3-2 of this section. The results indicate that use of the commenter's suggested inputs, after correction of the biomass concentration value, results in even higher estimated emissions from biological treatment units compared to the estimated emissions using the EPA input values. For example, the Fe for benzene is 0.198 using the EPA input parameters, whereas the Fe for benzene is 0.34 using the commenter's suggested inputs. Therefore, the EPA concludes that emissions from biological treatment units were not overestimated in the EPA's impact analysis for the HON. Refer to a memorandum from

TABLE 3-1. SUMMARY OF EPA AND COMMENTER WATER7 INPUT PARAMETERS

	EPA	COMMENTER
Water Flow Rate (m^3/s)	0.0693	0.0693
Total dissolved organics (mg/ℓ)	0	1000
Inlet solids (mg/ℓ)	0	2000
Width of aeration (m)	132.9	39.2
Length of aeration (m)	132.9	39.2
Depth of aeration (m)	1.981	3.5
Active biomass (g/l)	4	4
Aeration air flow (m^3/s)	0	0
Number of units	1	1
Number of agitators	8	2
Area of agitation (each aerator, m^2)	530	530
Aerator alpha (default=0.83)	0.83	0/83
Power of agitation (each aerator, HP)	75	75
Impeller diameter (cm)	61	61
Impeller rotation (HP)	1203	1203
Enter 1 if plug flow	0	0
Wind velocity(cm/s at 10m)	447	447
Wastewater temperature (°C)	30	30
Enter 1 if covered and vented	0	0

TABLE 3-2. COMPARISON OF FE VALUES PREDICTED BY WATER7 FOR SELECTED TABLE 9 HAP'S

	EPA	COMMENTER
Benzene	0.1979	0.3398
Methanol	0.0103	0.0173
Naphthalene	1100	0.1806
Nitrobenzene	0.030	0.076
Toluene	0.1192	0.2025

Clark Allen, Research Triangle Institute, to Elaine Manning, EPA/CPB, *"Estimation of Air Emissions from Model Wastewater Collection and Treatment Plants,"* February 2, 1994, for further information.

3.2.2 Use of Wastewater Models

Comment: Several commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-112; IV-D-77) stated that the EPA's approach for estimating total emissions from wastewater operations is inaccurate because the EPA used data solely generated from models. One commenter (A-90-19: IV-D-75) indicated that the EPA's model plant was oversimplified and unrealistic and that wastewater streams are not centrally collected for treatment at a single steam stripper. One commenter (A-90-19: IV-F-1.2 and IV-F-4) credited the EPA for conducting several field studies, but concluded that these studies were poorly designed and resulted in questionable data.

Response: The data used by the EPA for estimating organic HAP emissions from wastewater are not based solely on models. In March 1990, a section 114 wastewater questionnaire was submitted to nine corporations. While the proposal BID mistakenly cited that 84 model streams were used, actually, a total of 461 wastewater streams from 110 SOCMI production processes were reported in responses. An additional 107 model wastewater streams were developed for 75 SOCMI product processes that were not characterized by wastewater streams in the section 114 responses. These 107 model wastewater streams were developed based on a combination of process knowledge, engineering judgement, and information provided in the section 114 responses.

The EPA agrees that some facilities may choose to treat all or some of their Group 1 streams in multiple locations. However, the EPA's final impact analysis indicates that only approximately 8 percent of the total SOCMI industry wastewater will be affected under this rulemaking. Therefore, the assumption that a single steam stripper is adequate to treat the Group 1 streams in a facility is reasonable for developing cost impacts.

For the proposed rule, the wastewater emission estimates were based on three example wastewater collection and treatment scenarios. Based on public comment, new wastewater collection and treatment scenarios were developed to more accurately represent the SOCMI.

It is not clear what field studies are being referenced by the commenter. The commenter provided no information regarding which aspects they considered to be poorly designed and provided no data to substantiate their claim that the data is questionable. The EPA has thoroughly reviewed the studies in *"Technical Support for the Identification of Collection Systems at Major Emission Sources,"* January 4, 1994. These studies were used to revise the fraction emitted (Fe) values as described in the memorandum from Clark Allen, Research Triangle Institute, to Elaine Manning, EPA/CPB, *"Estimation of Air Emissions from Model Wastewater Collection and Treatment Plants,"* February 2, 1994.

Comment: Two commenters (A-90-19: IV-D-68; IV-D-71) claimed that the wastewater emission models and data used in EPA's HON analysis are outdated and overestimate wastewater emissions. One commenter (A-90-19: IV-D-108) asserted that the EPA overestimated emissions from wastewater collection systems by making unrealistic modeling assumptions. Two commenters (A-90-19: IV-D-68; IV-D-71) claimed that the EPA has ignored data from a study entitled, *"Amoco/USEPA Pollution Prevention Project, Project Summary,* January 1992, Revised June 1992, page 2-6 and Figure 2-8" which indicates that air emissions from wastewater have been overestimated by the models by a factor of 21. One commenter (A-90-19: IV-D-97) contended that the EPA dismissed actual emission measurement data from a large facility containing both SOCMI and non-SOCMI processes.

One commenter (A-90-19: IV-D-108) cited pilot-scale studies done by the EPA at a pharmaceutical company which indicate that methanol removal by steam stripping is typically less than 50 percent.

Response: The EPA assumes that the commenter's use of the term "data" refers to the information obtained from a section 114 survey of the SOCMI. The data were collected in March and April of 1990. It is unlikely that significant changes in SOCMI process design and operation have taken place and/or been implemented since 1990. Therefore, the EPA maintains that the data are current.

The commenters (A-90-19: IV-D-68; IV-D-71) did not explain which of the emission models they consider to be outdated and/or unrealistic; nor were any data or alternative approaches submitted. Therefore, it is not possible for the EPA to act on this comment.

The EPA did not ignore data from the Amoco/USEPA Pollution Prevention Project. The EPA's viewpoint is documented in a report titled *"EPA Follow-Up to the Recommendations of the EPA/Amoco Yorktown Project."* This report includes a discussion of basic methodological limitations which the EPA believes resulted in an underestimation of air emissions from wastewater. These methodological limitations include location of emission measurement points in the wastewater system that, in the EPA's view, were located after substantial emissions could have occurred. Ambient monitoring cross-checks performed to validate emission estimates indicated that benzene emissions may have underestimated by a factor of 2 or more at several sampling points.

The EPA revised the estimates for the removal efficiencies of all compounds regulated under the wastewater provisions of the HON, including methanol. The new estimates reflect revisions to the Henry's law constants and steam stripper removal efficiencies calculated using the Kremser equation. The revised steam stripper removal efficiency for methanol is approximately 30 percent, which agrees with the commenter's statement that methanol removal via steam stripping is typically less than 50 percent.

Comment: One commenter (A-90-19: IV-F-4) objected to the EPA using model streams, model collection and treatment systems, and emission models to estimate national impacts from wastewater collection and treatment systems. The commenter (A-90-19: IV-F-4) acknowledged that the EPA did conduct several field studies, but said that the studies were poorly designed and resulted in questionable data. The commenter (A-90-19: IV-F-4) concluded that the theoretical methods used by the EPA result in an overprediction of emissions, but did not suggest an alternative approach. Two commenters (A-90-19: IV-D-69; IV-D-75) said the assumption that wastewater streams are centrally collected for steam stripping at a single stripper, and stripped materials are burned in an auxiliary incinerator were unrealistic assumptions.

Response: The EPA recognizes that some facilities may choose to treat all or some of their Group 1 wastewater streams in multiple locations. However, the EPA's final impact analysis indicates that only approximately 8 percent of the total SOCMI industry wastewater draw is affected under this rulemaking. Therefore, the assumption made in developing cost that a single steam stripper is adequate to treat the Group 1 streams in a facility is reasonable.

In the proposed HON, a fuel credit for stripped materials sent to a boiler was included in estimating the total national annual costs of steam stripping. Based on comments to the proposed rule, the EPA removed this credit for the stripped materials in estimating total national annual cost of steam stripping in the final rule. The EPA believes that some sources may earn recovery credits due to recycling or firing of recovered organics in boilers to produce steam while other facilities may incur a debit due to disposal costs. However, for estimating national impacts, the EPA has assumed that the credits and debits will cancel with no net impact on costs.

3.3 OTHER ENVIRONMENTAL IMPACTS

Comment: Several commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-77) (A-90-23: IV-D-1) expressed concern that there would be negative environmental impacts caused by steam stripping, such as the use of large amounts of energy to generate steam, the generation of residuals, and the emission of additional pollutants to the air and other media.

Response: The EPA's analysis shows that secondary impacts associated with steam stripping of wastewater are not significant compared to the reduction of HAP's. The residuals generated by steam stripping must be handled by either on-site incineration, off-site incineration, or by recycling to the process. The additional fuel required to generate steam can be partially offset by recovering organics and using them as supplementary fuel. Furthermore, combustion of recovered organics generates less SO_2 and PM than combustion of fossil fuels. Recycled organic compounds do not contribute to secondary impacts. Steam stripping has a positive impact on the quality of water being discharged to a wastewater treatment system or a POTW. The issue concerning use of large amounts of energy to generate steam is addressed in more detail in section 3.4 of this BID volume.

Comment: One commenter (A-90-19: IV-D-50) alleged that the EPA underestimated the impacts of NO_x emissions from wastewater control, claiming that the EPA did not consider the NO_x generated from steam stripping.

Response: The EPA did estimate the NO_x emissions that are generated from the combustion of fossil fuels to produce steam for use in steam strippers. The EPA's estimate of the NO_x emissions generated by steam stripping is 600 Mg/yr as presented in table 5-4 of the proposal BID volume 1A.

3.4 ENERGY IMPACTS

Comment: One commenter (A-90-19: IV-D-110) stated that steam stripping requires large amounts of energy to generate steam, and typically uses fossil fuels. The commenter (A-90-19: IV-D-110) indicated that cooling stripper bottoms may require additional energy, which may increase the negative impact on global warming. The commenter (A-90-19: IV-D-110) suggested that the EPA review these factors to accurately determine the costs and benefits of steam stripping.

Response: The EPA has assumed that the latent heat from the steam stripper bottoms is used to preheat the wastewater entering the steam stripper. Therefore, only a small amount of additional energy may be required to cool the steam stripper bottoms. The EPA has also reviewed the energy and secondary impacts generated from the use of steam strippers and has determined that these impacts are insignificant compared to the achieved emission reduction from wastewater. Energy and secondary impacts are presented in proposal BID volume 1C and the proposal preamble.

4.0 APPLICABILITY AND GROUP 1/GROUP 2 DETERMINATION

4.1 APPLICABILITY

Comment: One commenter (A-90-19: IV-D-98) stated that the EPA should describe its legal authority under the Act to establish the applicability of MACT-based standards based on the VOHAP concentration at the point of wastewater generation (i.e., before HAP's can be emitted).

Response: In the final rule, the EPA requires that the owner or operator determine applicability of the regulation at the point of generation or downstream of the point of generation. Once applicability is determined (that is, once the Group 1 wastewater streams are identified), the owner or operator must ensure that Group 1 wastewater streams are controlled for HAP emissions. The EPA clarifies that emission controls are not required until the owner or operator identifies a Group 1 wastewater stream. At which time, such a stream must be controlled from the point of generation in accordance with all applicable regulations.

Comment: One commenter (A-90-19: IV-D-91) stated that petroleum refinery wastewater collection and treatment systems should not be regulated by the HON because these systems will be regulated by a separate MACT rulemaking.

Response: If wastewater is generated by a SOCMI process unit and is managed in a combined collection and treatment system (i.e., the system collects and treats wastewater from both SOCMI and petroleum refinery units), the HON remains applicable to wastewater generated by SOCMI units. The owner or operator of a facility that generates wastewater from SOCMI process units must first determine whether such wastewater is a Group 1 wastewater stream and consequently must be controlled. If the owner or operator elects to manage Group 1 wastewater streams in a combined collection and treatment unit, the HON provides several compliance options. If a SOCMI Group 1 wastewater stream or a residual generated from a Group 1 stream is generated at a petroleum refinery facility, the wastewater and any residuals are still subject to the HON. The HON applies to all SOCMI processes. Therefore, even if the primary function of a facility is non-SOCMI, any SOCMI process unit at the facility is regulated by the HON assuming the facility is a major source.

Comment: One commenter (A-90-23: IV-D-20) supported raising the flow rate component of the applicability criteria in §63.110(e)(1) from 0.02 ℓ/m to 0.2 ℓ/m because the proposed criteria will include streams with very low flow rates. The commenter (A-90-23: IV-D-20) stated that a facility's resources could be used more effectively in controlling streams with higher flow rates.

Response: The definition of "wastewater" in §63.101 of subpart F, which includes both process wastewater and maintenance wastewater, defines the applicability criteria for wastewater below which wastewater streams are not subject to the HON. Wastewater streams with a total VOHAP concentration less than 5 ppmw or a flow rate less than 0.02 ℓ/m are not subject to the HON. The owner or operator of a wastewater stream that meets the definition of "wastewater" in §63.101 of subpart F must determine whether the wastewater stream is a Group 1 or Group 2 wastewater stream. Both Group 1 and Group 2 streams are subject to subparts F and G, but only Group 1 streams require treatment.

Comment: One commenter (A-90-19: IV-D-97) supported the deletion of groups D and E from the strippability groups and recommended that the EPA delete all HAP's from table 9 that have a Henry's law constant value lower than 1.0×10^{-3} atm/(mole/m^3). One commenter (A-90-19: IV-D-32) claimed that many of the excluded compounds would be biodegradable and can be effectively treated in biological treatment units.

Response: Prior to the issuance of the proposed HON, the EPA determined that the chemicals in strippability groups D and E should not be subject to regulation by the HON because such chemicals were not emitted at levels that required control. The EPA agrees that the HON should not regulate chemicals with little or no potential to emit, and therefore deleted strippability groups D and E from the proposed HON.

The EPA also agrees that many of these chemicals may be effectively treated using biological treatment and encourages facilities to do so.

Comment: One commenter (A-90-19: IV-D-92) urged the EPA to exempt water-soluble HAP's from the steam stripping control requirements in the HON because such HAP's cannot be effectively removed by steam stripping.

Response: The EPA has removed seven compounds from the list of regulated HAP's in table 9 of subpart G based on their low Fe values. Furthermore, any HAP's that the EPA has determined to be water-soluble or water-reactive are not regulated by the HON wastewater provisions. For the 76 remaining regulated HAP's, the EPA continues to allow steam stripping as one of the options for treatment, but also allows other compliance options in §§63.138(b)(1), (c)(1), (d), and (e) including recycling and biological treatment.

Comment: One commenter (A-90-23: IV-D-20) suggested that the EPA clarify language in §63.138(c)(1)(ii) regarding whether facilities may treat several individual streams in the same waste management unit.

Response: Although §63.138(c)(1)(ii) discusses the treatment of individual wastewater streams, the EPA allows other options for treatment of wastewater streams. According to §63.138(c)(1)(iii), facilities may aggregate several wastewater streams to facilitate treatment.

Comment: One commenter (A-90-19: IV-D-33) stated that the requirements concerning maintenance wastewater and heat exchangers in §63.102(b) and the associated definition in §63.101 should be modified and removed from subpart F and placed in subpart G. The commenter (A-90-19: IV-D-33) stated that subpart F should be reserved for general applicability issues. The commenter (A-90-19: IV-D-33) recommended that the provisions in §63.102(b) should be moved to a new subparagraph §63.110(f) and the associated definitions should be moved from §63.101 to §63.111. By creating a new subparagraph, the commenter (A-90-19: IV-D-33) stated that the regulation would clearly not require such wastewater streams to be subject to Group 1/Group 2 determination procedures.

Response: The heat exchange system and maintenance wastewater provisions were placed in subpart F to distinguish cooling waters and maintenance wastewaters from process wastewaters, because they are subject to different requirements than process wastewaters. For example, cooling waters do not require a Group 1/Group 2 determination. Furthermore, subpart G requirements address routine emissions from SOCMI operations, while subpart F addresses applicability and general requirements, such as leak detection and repair and the start-up, shutdown, and malfunction plan.

The heat exchange system provisions have been moved from the general standards provisions in §63.102 of subpart F to a separate heat exchange system section in §63.104 of subpart F. The maintenance wastewater provisions have been moved from the General Standards provisions in §63.102 of subpart F to a separate maintenance wastewater section in §63.105 of subpart F. Therefore, §63.102 of subpart F only contains the general applicability provisions. The definitions of heat exchange system and maintenance wastewater remain in §63.101 of subpart F. Changes to the maintenance wastewater provisions are provided in a previous discussion in this section.

4.1.1 Definition of "Residuals"

Comment: Several commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-112; IV-D-32) (A-90-23: IV-D-21) requested clarification from the EPA on the definition of "residuals." Several commenters (A-90-19: IV-D-32; IV-D-53; IV-D-60; IV-D-110; IV-D-112) (A-90-23: IV-D-2; IV-D-20) stated that the definition of "residuals" in the proposed rule was too broad and could be interpreted to include settled inorganic solids, polymers, and similar inert materials which may contain only trace amount of HAP's.

Response: Based on comments received about the definition of residuals, the EPA has changed the definition in §63.111 of subpart G to read:

> Residual means any HAP-containing water or organic that is removed from a wastewater stream by a waste management unit or treatment process that does not destroy organics (nondestructive unit). Examples of residuals from nondestructive wastewater management units are: the organic layer and bottom residue removed by a decanter or organic-water separator; and the overheads condensate stream 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.

In response to several commenters who expressed concern about the inclusion of polymers in the definition of residual, the EPA has concluded, based on input from industry, that polymers may be recycled to a production process. The EPA encourages this management option for polymers; however, if polymers generated from the treatment of a Group 1 wastewater stream are not recycled to a production process, they must be managed as residuals.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-53; IV-D-60; IV-D-79; IV-D-110; IV-D-112); (A-90-23: IV-D-20) suggested that the definition of "residuals" be limited to materials derived from treatment of Group 1 wastes and should include a *de minimis* VOHAP concentration based on Group 1 wastewater criteria. For example, the commenters (A-90-19: IV-D-32; IV-D-53; IV-D-60; IV-D-79; IV-D-110; IV-D-112); (A-90-23: IV-D-20) recommended that a residual would have greater than 1,000 ppmw based only on those HAP's in table 9 of the rule, and for new units, greater than 10 ppmw for table 8 HAP's. One commenter (A-90-19: IV-D-60) suggested that the EPA should clarify that residuals removed from a

Group 1 wastewater stream should be subject to the residual treatment requirements only when the residual is generated during treatment which is required in order to achieve compliance. For example, the commenter (A-90-19: IV-D-60) stated that residuals, which are generated from the treatment of a Group 1 wastewater stream and also comply with the 1 Mg/yr cutoff in §63.138(c)(5), should not be required to be controlled under HON.

Response: The EPA agrees with the commenters that residuals that are subject to regulation by the HON are limited to those residuals that are removed from a Group 1 wastewater stream, which is also subject to control requirements in the HON. Residuals removed from the following wastewater streams are not required to be controlled by the HON: (1) Group 2 wastewater streams, if the Group 2 wastewater stream is managed separately from Group 1 wastewater streams; and (2) Group 1 wastewater streams that are not required to be controlled because the facility meets the criteria for the 1 Mg/yr source-wide exemption in §63.138(c)(5) or (6).

The EPA specifies in §63.138(h) that only residuals removed from Group 1 wastewater streams must be controlled. The EPA considered the incorporation of a *de minimis* VOHAP concentration based on Group 1 wastewater criteria for residuals; however, the EPA has concluded that all residuals must be managed by: (1) being recycled to the process unit or sold for the purpose of recycling; (2) being returned to the treatment process; or (3) being treated to destroy the total HAP mass flow rate by 99 percent or greater. For each of these management options, the EPA clarifies that residuals must be managed in accordance with the requirements in §§63.133 through 63.137 until they are actually returned to the process unit or treatment process; are destroyed; or are converted to a raw material. The owner or operator must ensure proper management of residuals even if they are handled offsite. The EPA clarifies that the purpose of the residuals provisions is to ensure that HAP emissions are actually controlled and not just shifted to another part of the facility.

Comment: One commenter (A-90-19: IV-D-73) recommended adding a minimum cut-off criteria of greater than 10 tons per year and/or 1,000 ppm of table 9 substances for defining wastewater or residual organic HAP levels at which control of wastewater tanks, surface impoundments, containers, individual drain systems, and oil water separators is required.

One commenter (A-90-19: IV-D-86) suggested that control of residuals be required only for concentrations of at least 10,000 ppm. The commenter (A-90-19: IV-D-86) alleged that only HAP's listed on table 9 and not total HAP's in residuals should require 99 percent reduction.

Two commenters (A-90-19: IV-D-86), (A-90-23: IV-D-17) favored having a *de minimis* level for total annual HAP quantity in wastewater similar to the 10 Mg/yr total annual benzene *de minimis* in the Benzene Waste NESHAP.

Response: The HON specifies the applicability criteria for wastewater streams in the definition of "wastewater" in §63.101 of subpart F. If a wastewater stream does not meet these applicability criteria, the wastewater stream is not subject to the HON. The commenter (A-90-19: IV-D-73) provided no reason why the EPA should raise the Group 1/Group 2 criteria for wastewater to 10 tons per year and/or 1,000 ppm for table 9 HAP's. The Group 1/Group 2 determination criteria for existing facilities specifies that any process wastewater stream with either (1) a total VOHAP average concentration of table 9 compounds equal to or greater than 1,000 ppm and a flow rate equal to or greater than 10 ℓ/m, or (2) with a total VOHAP average concentration equal to or greater than 10,000 ppmw and any flow rate is a Group 1 stream and must be treated in accordance with the requirements of §63.138.

The EPA does not specify minimum concentration cutoffs for residuals because only those residuals that are generated from the treatment of Group 1 wastewater streams must be controlled. If such residuals were not controlled, there would be no point in requiring separation of the organic residuals from wastewater.

The HON is a technology-based rule and the Benzene Waste NESHAP is a risk-based rule. The 10 Mg/yr total annual benzene threshold in the Benzene Waste NESHAP [40 CFR subpart FF] is a facility-wide applicability threshold based on risk and is therefore not relevant to the HON. Furthermore, the 10 Mg/yr threshold applies to the total annual benzene quantity from all facility waste with greater than 10 percent water, and not just process wastewater. The wastewater provisions of the HON apply to wastewater and residuals generated by treatment of Group 1 wastewater streams but not to all emission points at the source. Therefore, the 10 Mg/yr threshold that is specified in the Benzene Waste NESHAP has not been incorporated.

Comment: Two commenters (A-90-19: IV-D-89; IV-D-92) claimed that the Benzene Waste NESHAP excludes streams with concentrations of less than 10 ppm while the HON includes streams with concentrations of greater than 5 ppm. One commenter (A-90-19: IV-D-89) claimed that these inconsistencies may require piping modifications. One commenter (A-90-19: IV-D-89) alleged that §63.110(e) of the proposed regulation includes streams with concentrations greater than 5 ppm. The commenter (A-90-19: IV-D-92) indicated that §63.132 excludes streams having a concentration less than 10 ppm (table 8). The commenter (A-90-19: IV-D-92) urged the EPA to be consistent with the Benzene Waste NESHAP by excluding all streams with concentrations less than 10 ppm. The commenter (A-90-19: IV-D-92) claimed that this would prevent facilities that are in compliance with the Benzene Waste NESHAP from having to rework any equipment.

Response: The HON defines "wastewater" in §63.101 of subpart F as "organic hazardous air pollutant-containing water or process fluid that is discharged from a chemical processing unit that meets all applicability criteria specified in §63.100(b)(1) through (b)(3) of this subpart and that is discharged into an individual drain system and either

(1) contains at least 5 ppmw total volatile organic HAP's and has a flow rate equal to or greater than 0.02 ℓ/m, or (2) contains a concentration of at least 10,000 ppmw total volatile organic HAP's and any flow rate." This definition provides the applicability criteria for whether a wastewater stream will be designated as a wastewater by the HON. The definition of "wastewater" does not specify which wastewaters will be controlled by the HON. Rather, it specifies which wastewaters that the owner or operator must check for Group 1 or Group 2 status. If a waste stream has less than 5 ppmw total volatile organic HAP's, it is not considered a wastewater stream under the HON, which means it will not be subject to Group 1/Group 2 determination (i.e., stream cannot be a Group 1 or a Group 2 stream).

Under the HON, the Group 1/Group 2 determination for a wastewater stream designates whether the stream must be controlled. The Benzene Waste NESHAP does not have a Group 1/Group 2 determination. The Benzene Waste NESHAP requires the owner or operator to determine whether the facility-wide total annual benzene quantity from facility waste is greater than or equal to 10 Mg/yr. The 10 Mg/yr threshold was selected because the Benzene Waste NESHAP is risk-based and 10 Mg/yr exceeded the 1×10^{-4} MIR. If the total annual quantity of benzene is greater than or equal to 10 Mg/yr, the owner or operator must control all streams with a flow-weighted annual average benzene concentration of 10 ppmw or greater unless the waste stream is a process wastewater that has a flow rate less than 0.02 ℓ/m. To compare the wastewater control requirements for the HON and the Benzene Waste NESHAP, the EPA reviewed the control requirements for the Benzene Waste NESHAP with the requirements for both new and existing SOCMI sources subject to the HON.

For both new and existing sources, the HON requires the SOCMI owner or operator to determine whether each process wastewater stream is a Group 1 or Group 2 wastewater stream with respect to the compounds listed on table 9 of subpart G.

A wastewater stream is a Group 1 wastewater stream and must be controlled in accordance with the HON if the total VOHAP average concentration for a process wastewater stream at a new or existing facility is (1) greater than or equal to 10,000 ppmw of the compounds on table 9; or (2) has an average flow rate greater than or equal to 10 ℓ/m and a total VOHAP average concentration greater than or equal to 1,000 ppmw. When the EPA compared these criteria for controlling air emissions at new and existing facilities subject to the HON with the control criteria for the Benzene Waste NESHAP, the EPA concludes that the Benzene Waste NESHAP is more stringent.

In the case of new SOCMI sources that are subject to the HON, the EPA has developed control criteria based on compounds listed on table 8 of subpart G. The compounds on table 8, which the EPA has determined are very volatile compounds, are a subset of those on table 9. For these more volatile compounds, the EPA has developed more stringent control criteria than those required for the table 9 compounds at new and existing SOCMI sources. For new sources, the HON requires the SOCMI owner or operator to determine whether each process wastewater stream is a Group 1 or Group 2 wastewater stream with respect to the compounds listed on table 8. A wastewater stream is a Group 1 wastewater stream and must be controlled in accordance with the HON if the average flow rate is greater than or equal to 0.02 ℓ/m and the wastewater stream has an average VOHAP concentration of 10 ppmw or greater of any one of the compounds listed in table 8. For new sources, the control criteria for Group 1/Group 2 determinations for compounds that are listed on table 8 are the same as the control criteria for the Benzene Waste NESHAP.

While for new sources, the HON is consistent with the Benzene Waste NESHAP's control criteria (i.e., 0.02 ℓ/m and 10 ppmw), the Benzene Waste NESHAP remains more stringent than the HON for control of compounds listed on table 9 for both new and existing sources. The EPA disagrees with the commenters' statement that the 5 ppmw VOHAP concentration in the definition of "wastewater" in the HON is inconsistent with the 10 ppmw concentration in the Benzene Waste NESHAP. As previously discussed, the 5 ppmw concentration that is specified in both the definition of "wastewater" in §63.101 and the applicability criteria for wastewater in §63.110(e) does not require the control of wastewater streams with organic HAP concentrations greater than 5 ppmw and less than 10 ppmw. In fact, wastewater streams in this concentration range would meet the definition of a Group 2 stream for both new and existing facilities for compounds listed on both tables 8 and 9. The EPA continues to include the 5 ppmw applicability threshold to indicate that waste streams containing below 5 ppmw total volatile organic HAP's are not defined as wastewater streams by the HON. The commenter (A-90-19: IV-D-92) did not provide any details about why the equipment may require "rework."

Comment: Several commenters (A-90-19: IV-D-32; IV-D-60; IV-D-79; IV-D-112) stated that the VOHAP concentration in some residual materials such as inorganic grits and settleable solids will typically be low, and in such cases a 99-percent HAP removal for residuals will be unachievable. The commenters (A-90-19: IV-D-32; IV-D-60; IV-D-79; IV-D-112) suggested that the EPA establish a *de minimis* level for HAP's in residuals.

Response: Although the EPA has not incorporated an additional *de minimis* level for VOHAP concentrations in residuals, materials such as leaves, silt, mud, and sludge removed from a treatment device such as a biological treatment unit have been specifically excluded from the definition of "residual." Such materials will not contain significant HAP's. The EPA continues to limit residuals to those streams that are generated from Group 1 wastewater streams. Also, because the HON provides other residual management options, which include recycling the residual to a production process and returning the residual to the treatment process, the option to treat all residuals generated by a Group 1 wastewater stream by 99 percent or greater will remain in the final rule.

Comment: One commenter (A-90-19: IV-D-34) stated that the EPA has not considered the safety aspects associated with treatment of residuals.

Response: The EPA has considered the safety issue associated with treatment of residuals and has not identified any safety hazards. The commenter also did not explain any specific concerns.

Comment: One commenter (A-90-19: IV-D-34) stated that the EPA should develop rules for residual treatment under the upcoming rule for TSDF facilities or defer the rulemaking until a cost analysis is completed.

Response: The EPA clarifies that control of emissions from residuals is an integral part of the HON and cannot be separated into another rulemaking. Also, because all residuals generated by SOCMI facilities are not sent to a TSDF, the upcoming TSDF rulemaking would not necessarily apply to residuals generated by SOCMI sources.

4.1.2 Definition of "Wastewater"

Comment: Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-53; IV-D-54; IV-D-60; IV-D-102; IV-D-113; IV-D-110; IV-F-1.2 and IV-F-4) (A-90-23: IV-D-9; IV-D-17; IV-D-20) expressed concern that the current definition of wastewater in §63.101 of subpart F seems to include, and thus regulate, process fluids, products, and intermediate streams, which the EPA did not intend to regulate. Three commenters (A-90-19: IV-D-53; IV-D-86) (A-90-23: IV-D-9) recommended that the definition of "wastewater" should not include raw materials, intermediate products, finished products, or byproducts. One commenter (A-90-23: IV-D-9) claimed that the transfer of process fluids is central to production for batch processes and that such process fluids are not wastewaters.

Response: The EPA agrees with the commenters that process fluids, products, and intermediate streams that are in use in a production or manufacturing process are not subject to the HON. However, the EPA intends to regulate any such stream if it is discharged to an individual drain system and either (1) has a total VOHAP concentration that is equal to or greater than 5 ppmw and has a flow rate equal to or greater than 0.02 ℓpm; or (2) has a total VOHAP concentration of 10,000 ppmw or greater at any flow rate. The EPA has revised the definition of wastewater in §63.101 of subpart F as follows:

> Wastewater means organic hazardous air pollutant-containing water, raw material, intermediate, product, by-product, co-product, or waste material that exits a chemical manufacturing process unit equipment that meets all of the criteria specified in §63.100(b)(1) through (b)(3) of this subpart and either (1) contains a total volatile organic hazardous air pollutant concentration of at least 5 ppmw and has a flow rate of 0.02 ℓpm or greater; or (2) contains a total volatile organic hazardous air pollutant concentration of at least 10,000 ppmw at any flow rate. Wastewater includes both process wastewater and maintenance wastewater.

The EPA has removed the term "process fluid" from the definition of wastewater in response to commenter confusion over its use in the proposed rule.

Comment: One commenter (A-90-19: IV-D-98) stated that the EPA should provide a technical and legal rationale for the broad scope of the definition of "wastewater." The commenter (A-90-19: IV-D-98) indicated that the Act authorized the EPA to regulate the emissions of HAP's by setting emission limitations, but questioned the EPA's authority to broadly define wastewater as "HAP-containing water or process fluid."

Response: The EPA has modified the definition of "wastewater" in the final rule. The EPA intends to regulate any HAP-containing water, raw material, intermediate product, by-product, co-product or waste material that is managed in an open wastewater collection and treatment system and has the potential to emit a significant level of HAP's. The definition of "wastewater" emphasizes that such streams are not regulated unless they enter an individual drain system.

The EPA has developed the wastewater requirements in the HON in accordance with the Act. Because wastewater is a component of the SOCMI source category, the Act provides the EPA with the authority to control emissions from wastewater. The EPA has reviewed the emission data submitted by the SOCMI on the 114 questionnaires and has determined that the wastewater provisions in the HON are sufficient to control air emissions.

Comment: One commenter (A-90-19: IV-D-86) stated that the definition of process wastewater, which is found within the definition of wastewater in §63.101 should not include non-contact cooling water, utility wastewaters, general site surface runoff, groundwater, and other non-process wastewaters generated on-site.

Response: In order to further clarify the definition of "wastewater" in §63.101 of subpart F, the EPA has separated the definitions of "process wastewater" and "maintenance wastewater" from the definition of "wastewater," and deleted the definition of "maintenance-turnaround wastewater." Each definition remains in §63.101 of subpart F, but is listed as a separate entry in the definition list. The EPA agrees that any waste stream that does not meet the definition of "wastewater" in §63.101 of subpart F is not subject to the rule. The EPA has not specifically excluded non-contact cooling water, utility wastewater, and other non-process wastewater generated onsite because such waste streams will likely not meet the definition of wastewater in §63.101 of subpart F. However, if these waste streams exceed the criteria for flow rate and VOHAP concentration, and are discharged into an individual drain system, such streams would be considered wastewater.

Comment: Several commenters (A-90-19: IV-D-53; IV-D-86; IV-D-102; IV-D-110) (A-90-23: IV-D-20) recommended that the EPA specify a percentage of water that must be present in a waste stream in order for it to be considered a wastewater in §63.101. One commenter (A-90-23: IV-D-20) suggested that a waste stream must have at least 10 percent water to be considered wastewater under the HON. One commenter (A-90-19: IV-D-73) favored changing the definition of a wastewater stream by incorporating a minimum 90 weight percent water content. One commenter (A-90-19: IV-D-53) suggested that the definition of maintenance wastewater in subpart F should include "aqueous process fluids" or "draining water used to wash process fluids." Two commenters (A-90-19: IV-D-33; IV-D-110) suggested that the EPA clarify the definition of "wastewater" so that the regulated liquid must be water or have an aqueous fraction, have contact with process fluids or organic HAP's, and be destined for disposal.

Response: The EPA does not specify a percentage of water that must be present in wastewater in order for it to be considered a wastewater as defined in §63.101 of subpart F. The EPA clarifies that the water content in a wastewater stream is not a critical issue; but rather, when any wastewater is discharged to an individual drain system, it is essential that HAP emissions be controlled. The EPA maintains that regulating wastewater streams based on VOHAP concentration and flow rate is sufficient to determine whether a wastewater stream has the potential to emit HAP's. The EPA intends to regulate both water and process fluid waste streams that are discharged from SOCMI chemical manufacturing process units and into an individual drain system and either (1) have a VOHAP concentration equal to or greater than 5 ppmw and a flow rate equal to or greater than 0.02 ℓ/m; or (2) have a VOHAP concentration of at least 10,000 ppmw at any flow rate.

Comment: One commenter (A-90-19: IV-D-86) urged EPA to be consistent with the Benzene Waste NESHAP and OCPSF guidelines in the HON definition of wastewater.

Response: The EPA recognizes the importance of consistency with other regulations and has written the language in the definitions of the final rule to be consistent, where possible, with other regulations. The commenter did not provide specific information about which portions of the proposed HON definitions were inconsistent or how any inconsistency would have a negative impact.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-77; IV-D-102) provided background data on the ethylene oxide production process to illustrate the importance to the industry that the EPA clarify the definitions of "wastewater," "wastewater stream," "individual drain system," and "point of generation." The commenters (A-90-19: IV-D-32; IV-D-33; IV-D-77; IV-D-102) expressed concern that the definition of "wastewater" could be interpreted to include process water used as a reactant or a carrier which has not yet left the process units. For example, one commenter (A-90-19: IV-D-77) stated that one of the processes necessary for ethylene oxide production generates water, which is recirculated in the production process. The commenter (A-90-19: IV-D-77) expressed concern that the Agency may not classify this part of the ethylene oxide production as "integral to the process," which would result in all water from the process being classified as a wastewater rather than a recirculated process fluid.

Response: The EPA clarifies that a waste stream is not subject to the HON unless it is generated from a chemical processing unit that meets all applicability criteria specified in §63.100(b)(1) through (b)(3) of subpart F and until the waste stream exits the process unit and enters an individual drain system. In addition, such a waste stream is not regulated by the HON unless the waste stream meets the applicability criteria in the definition of wastewater in §63.101, which specifies that an organic-HAP containing water or process fluid shall contain either (1) a total VOHAP concentration of 5 ppmw or greater and have a flow rate equal to or greater than 0.02 ℓ/m; or (2) contain a total VOHAP concentration of at least 10,000 ppmw at any flow rate.

The EPA maintains that process water used as a reactant or a carrier which has not yet left the process unit cannot be a regulated wastewater under the HON because it has not entered an individual drain system. The EPA has further addressed the commenters' concerns in the responses to each of the comments on the definitions of "wastewater," "wastewater stream," and "individual drain system."

Comment: One commenter (A-90-19: IV-D-53) claimed that the concentration cutoff specified in the definition of wastewater should refer to total VOHAP concentration and not total organic HAP's.

Response: The EPA agrees with the commenter, and the definition of wastewater has been changed in the final rule to refer to total VOHAP concentration.

Comment: One commenter (A-90-19: IV-D-33) stated that definitions of "wastewater" in §63.101 and "wastewater stream" in §63.111 contain several confusing differences and should be clarified. Several commenters (A-90-19: IV-D-33; IV-D-53; IV-D-77) (A-90-19: IV-G-5; IV-G-10) provided suggestions to the EPA about how to clarify the confusion between the two definitions including: (1) combining the definitions into one definition in §63.101; (2) consistently using the same terms and examples; (3) adding the phrase "Group 1 or Group 2" before the term "wastewater" in the definition of "wastewater stream" in subpart G to clarify which wastewaters are subject to the control requirements under the HON; and (4) consistently using the terms "concentration of total organic HAP's" and "VOHAP concentration."

Two commenters (A-90-19: IV-G-10) (A-90-23: IV-G-5) claimed that the definitions of wastewater in §63.111, §63.132(f)(1), and §63.132(f)(2) of subpart G are inconsistent. The commenters (A-90-19: IV-G-10) (A-90-23: IV-G-5) claimed that the flow and concentration cutoffs that define Group 1 and Group 2 wastewater streams are inconsistent in these three sections.

Response: In the final rule, the EPA has clarified the definitions of "wastewater" in §63.101 of subpart F and "wastewater stream" in §63.111 of subpart G by including all relevant information about wastewater identification in the definition of "wastewater" in subpart F, §63.101. The EPA continues to include the definition of "wastewater stream" in subpart G, §63.111 because the term is used throughout subpart G. However, the EPA has simplified the definition of "wastewater stream" in subpart G, §63.111 by referencing the definition of "wastewater" in subpart F, §63.101.

The EPA further clarifies the definition of "wastewater" in subpart F, §63.101 by creating separate definitions for "process wastewater" and "maintenance wastewater." These definitions remain in subpart F, §63.101, but are no longer located within the definition of "wastewater."

The definitions for "Group 1 wastewater stream" and "Group 2 wastewater stream" remain unchanged in subpart G, §63.111. As a further clarification, the EPA has added a definition for "process wastewater stream" in subpart G, §63.111, which references the definition of "process wastewater" in subpart F, §63.101.

The EPA also clarifies that the parameters for determining whether a waste stream is a wastewater and therefore subject to the HON are intended to be different than the Group 1/Group 2 criteria, which must be checked for each wastewater stream to determine applicable control requirements. However, the concentration criteria used in the definition of wastewater in subpart F is listed in terms of VOHAP concentration and not total organic HAP concentration in the final rule.

4.1.3 Definition of "Wastewater Stream"

Comment: Several commenters (A-90-19: IV-D-1; IV-D-53; IV-D-73; IV-D-97; IV-D-102) (A-90-23: IV-D-20) requested the following changes in the definition of "wastewater stream" in §63.111 of subpart G: (1) the term "indirect contact" should be deleted because it seemed to include stormwater and non-contact cooling water; (2) the term "reflux" should be deleted because it is confusing and usually refers to materials that will never be discharged to an individual drain system. One commenter (A-90-19: IV-D-53) claimed that the current definition of "wastewater stream" in subpart G, §63.111 can include any process stream that has been in contact with wastewater. The commenter (A-90-19: IV-D-53) recommended adding the phrase "destined for disposal" to the definition of wastewater stream. Two commenters (A-90-19: IV-D-53) (A-90-23: IV-D-20) stated that the definition of "wastewater stream" should be limited to HAP-containing aqueous (at least 10 percent water) liquid or aqueous material separated from the liquid. Several commenters (A-90-19: IV-D-53; IV-D-73; IV-D-97) (A-90-23: IV-D-20) suggested that the definition exclude cooling water blowdown, residuals, safety showers, eye washes, water from fighting fires, spills, maintenance wastewater, maintenance-turnaround wastewater, steam trap condensate, once-through cooling water, and landfill leachate. One commenter (A-90-19: IV-D-53) claimed that boiler water is carefully treated to remove impurities which would cause scaling, and therefore, the EPA did not need to include steam trap condensate as an example of a wastewater stream. One commenter (A-90-19: IV-D-73) indicated that it was unclear whether further control was necessary once the wastewater stream has been treated according to §63.138(b) or (c).

Response: The EPA agrees that several of the examples that were included in the proposed definition of "wastewater stream" in subpart G, §63.111 were confusing and could have been misinterpreted to regulate materials that would not normally contain HAP's or would not be discharged to an individual drain system. In response to comments on such waste streams, the EPA has removed "cooling tower blowdown," "steam trap condensate," and "reflux" from the definition of "wastewater stream." Cooling tower blowdown was deleted from the list of wastewater examples because it is regulated by §63.104 in subpart F. Steam trap condensate was deleted as an example of a wastewater stream because the boiler water is already treated to remove any chemical impurities including HAP's that could cause scaling. Numerous industry comments were received that stated "reflux" was a commonly used term, which refers to a stream that is still within a process unit and has not been discharged. Such streams do not have a potential for HAP emissions.

The EPA has clarified the definition of "wastewater stream" in subpart G, §63.111 by stating that wastewater stream means a stream that contains only wastewater as defined in subpart F, §63.101.

4.1.4 Definition of "Individual Drain System"

Comment: Several commenters (A-90-19: IV-D-32; IV-D-32; IV-D-33; IV-D-53; IV-F-1.2 and IV-F-4) (A-90-23: IV-D-20) requested clarification on the definition of individual drain system. Two commenters (A-90-19: IV-D-32; IV-D-53) stated that the proposed definition of "individual drain system" should be clarified to allow the combination of stormwater, Group 2 wastewaters, and non-SOCMI wastewaters in collection systems. Three commenters (A-90-19: IV-D-33; IV-D-53) (A-90-23: IV-D-20) disagreed with the requirements to segregate the vapors within the individual drain system because it would be impractical. One commenter (A-90-19: IV-D-53) recommended that the requirements to segregate the vapors within the individual drain system be deleted from the definition because it may be difficult, because at many SOCMI facilities, storm water from process areas will enter the individual drain system. Three commenters (A-90-19: IV-D-33; IV-D-53) (A-90-23: IV-D-20) suggested adding a sentence to the definition of individual drain system that exempts drains and sewers that feed an individual drain system if the system is designed to isolate the vapor connection between the two. One commenter (A-90-19: IV-D-32) expressed concern that the proposed definition of individual drain system would require the segregation of vapor spaces of sewers carrying non-SOCMI wastewaters and stormwaters from vapor spaces of sewers in SOCMI service. Two commenters (A-90-19: IV-D-32) (A-90-23: IV-D-20) recommended a definition of "individual drain system" that they determined was consistent with the definition in the NSPS for petroleum refinery wastewater systems at 40 CFR part 60 subpart QQQ §60.691.

<u>Response</u>: In response to commenter concerns that the definition of "individual drain system" is too broad and inclusive, the EPA restates that segregated stormwater sewers are not subject to the HON. However, if stormwater is mixed with HAP-containing wastewater streams in the individual drain system, then all of the streams must be treated because the stormwater will be in direct contact with the HAP-containing wastewater that is subject to the HON.

The EPA continues to require vapors which are generated in an individual drain system that is subject to the HON to be segregated from other drain systems. The EPA requires this provision in order to eliminate fugitive emissions that would escape through connecting drain systems. The EPA recognizes that the definitions of "individual drain system" in the HON and in the Petroleum Refinery NSPS (40 CFR subpart QQQ) have different wording. The definition of "individual drain system" in the Petroleum Refinery NSPS includes drains, junction boxes, and associated sewer lines, and extends down to the point where the wastewater enters the oil-water separator. The HON, however, requires control from the point of generation through treatment that meets specified levels. Both regulations are the same conceptually. That is, both regulations require emission suppression from the point of first control (i.e., drain hub for the Petroleum Refinery NSPS and the exit of the process unit equipment for the HON) to the treatment unit (i.e., oil-water separator for the Petroleum Refinery NSPS and options in §63.138 for the HON). Therefore, the EPA maintains that the definition of "individual drain system" in the HON should be and is different from the definition in the Petroleum Refinery NSPS.

Comment: One commenter (A-90-19: IV-D-33) stated that the definition of "individual drain system" should be modified to mean a system used to convey wastewater streams from a process unit, product or feed storage tank, or emission control unit to a waste management unit. The commenter (A-90-19: IV-D-33) stated that an individual drain system should not be a system that conveyed wastewater from one waste management unit to another waste management unit. Another commenter (A-90-19: IV-D-32) stated that §63.138(b) and (c), which provide the treatment options for Group 1 wastewater streams, should clearly state that after Group 1 wastewater streams are treated to target levels they are no longer regulated.

Response: The EPA continues to regulate individual drain systems that convey wastewater from one waste management unit to another waste management unit, because HAP's can be emitted between the units if the wastewater stream is uncontrolled.

For example, a wastewater stream that first passes through an oil-water separator and is then conveyed to a steam stripper must be conveyed in a controlled drain system when it leaves the oil-water separator until it enters the steam stripper in order to prevent HAP emissions between the waste management units. The EPA also notes that if a wastewater stream first enters a steam stripper, which treats the wastewater to comply with the HON, the wastewater may be conveyed in an uncontrolled drain system to any other treatment system such as a biological treatment unit.

The requirements for Group 1 wastewater streams in §63.138(b)(1) and (c)(1) state that a Group 1 wastewater stream must be either recycled to the process or treated to a target level. Section 63.138 also lists the requirements for any residuals that are removed from the Group 1 wastewater stream during the treatment process. After a Group 1 wastewater stream is treated in accordance with §63.138 it is no longer subject to the HON. However, treated Group 1 wastewaters may be subject to other regulations (e.g., they may require NPDES discharge permits).

4.1.5 <u>Clarification of "Point of Generation"</u>

<u>Comment</u>: Several commenters (A-90-19: IV-D-32; IV-D-53; IV-D-110) stated that the definition of "point of generation," should specifically include provisions to allow worker health and safety, and other applicable State and Federal regulations, to be considered (e.g., where OSHA regulations may preclude flow monitoring and sampling of wastewater because of the presence of adjacent equipment or wastewater characteristics that could endanger worker health and safety).

Three commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-32; IV-D-34) stated that the proposed definition for "point of generation" was confusing because of the inclusion of the phrase "integral to the process unit". Three commenters (A-90-19: IV-D-34; IV-D-77; IV-D-102) requested clarification of "integral to the process unit." Some equipment may be essential to a unit's normal mode of operation, but may be removed for short periods during maintenance without shutting down the entire process. One commenter (A-90-19: IV-D-102) stated that such equipment should be considered an integral part of the process. One commenter (A-90-19: IV-D-53) claimed that some control devices are integral to the process unit, because they cannot be shut down without violating a permit.

Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-46; IV-D-53; IV-D-62; IV-D-73; IV-D-77; IV-D-79; IV-D-92; IV-D-110; IV-D-112; IV-F-1.2 and IV-F-4) (A-90-23: IV-D-17) suggested that the point of generation should be designated as the first point downstream of a process unit where emissions can enter the atmosphere. One commenter (A-90-19: IV-D-53) claimed that there is no potential for emissions before the wastewater enters the process sewer because many facilities have emissions-suppressed piping systems. The commenter (A-90-19: IV-D-53) claimed that this definition of "point of generation" would allow direct sampling and flow monitoring.

Several commenters (A-90-19: IV-D-32; IV-D-62; IV-D-77; IV-D-102; IV-D-110) stated that this approach would allow facilities where waste is hardpiped to a sewer to maintain the current configuration without equipment modification. One commenter (A-90-23: IV-D-9) claimed that, for some processes, it will be impossible to determine the flow rate and concentration at the point of generation because sampling will be too difficult. Three commenters (A-90-19: IV-D-53; IV-D-73; IV-D-110) claimed that the proposed "point of generation" may be in closed piping or closed piping routed to controls, and these piping systems may have to be disconnected or a process unit shut down to determine whether a stream is a Group 1 or Group 2.

Three commenters (A-90-19: IV-D-32; IV-D-53; IV-D-75) claimed that the EPA should not be concerned with dilution of Group 1 streams because non-contact cooling waters and wastewaters are required to be separated and processes will not generate large enough quantities of non-HAP-containing wastewaters to dilute Group 1 streams. Two commenters (A-90-19: IV-D-32; IV-D-75) reasoned that the incompatibility of the streams and the costs associated with this method of wastewater management would discourage mixing. One commenter (A-90-19: IV-D-53) cited a report entitled "EPA, Contractors Engineering Report, Analysis of Organic Chemicals and Plastics/Synthetic Fibers Industries, Appendix S," Contract No. 68-01-6024, Effluent Guidelines Division, November 16, 1981, which presents process flow diagrams of SOCMI wastewater systems. The commenter (A-90-19: IV-D-53) claimed that these diagrams should be used to determine which wastewater streams are subject to the HON. Two commenters (A-90-19: IV-D-53; IV-D-112) stated that a decrease in the level of HAP's in wastewater due to mixing with other wastewater streams usually results in a decrease in overall HAP emissions. One commenter (A-90-19: IV-D-46) claimed that reduction of pollutants may occur in the hard-piped systems because chemicals may continue to react due to mixing.

Response: Although the final rule does not change the conceptual basis of the point of generation, the definition has been simplified and the phrase "integral to the process unit" has been deleted from the definition of point of generation. The EPA has determined that the point of generation means the location where process wastewater exits the chemical manufacturing process unit equipment. The primary function of chemical manufacturing process unit equipment is to produce chemical products. Wastewater management units may, in the process of treating wastewater, produce small amounts of product that can be recycled to the process. For example, steam strippers would generally be wastewater treatment units because they would not produce an appreciable amount of product.

The final rule allows the owner or operator to determine the characteristics of a wastewater stream (1) at the point of generation, or (2) downstream of the point of generation if corrections are made for changes in flow rate and VOHAP concentration. Such changes include losses by air emissions, reduction of VOHAP concentration or changes in flow rate by mixing with other wastewater streams, and reduction in flow rate or VOHAP concentration by treating or otherwise handling the wastewater streams to remove or destroy HAP's. The EPA has concluded that by including two options for how to determine the characteristics of a wastewater stream, the need for specifying whether a piece of equipment is integral to the process unit is irrelevant because HAP emissions will be accounted for if the Group 1/Group 2 determination is made downstream of the point of generation and an accurate flow rate and VOHAP concentration can be determined.

In response to comments about sampling within closed piping, the EPA agrees that options must be available to ensure worker safety, and clarifies that the owner or operator has several options under the HON when determining flow rate and concentration at the point of generation. Besides sampling, the owner or operator has the option to determine VOHAP concentration using process knowledge and bench-scale or pilot-scale test data, instead of sampling at the point of generation as summarized in §63.144(b) of the final rule. In §63.144(c) of the final rule, the EPA also allows other options for determining flow rate, including use of process knowledge based on production capacity and historical records. In addition, the EPA has added a provision in §63.144(d) of the final rule to allow an owner or operator to designate as a Group 1 wastewater stream a single wastewater stream or a mixture of wastewater streams. By choosing this option, an owner or operator is not required to make a Group 1/Group 2 determination. The owner or operator who elects to use this option must suppress emissions from the point(s) of generation by complying with all requirements in §§63.133 through 63.137 and must treat the stream in accordance with the requirements for Group 1 wastewater streams in §63.138. The EPA has added the option of designating a single wastewater stream or mixture of wastewater streams as a Group 1 wastewater stream because several commenters, who have facilities where HAP emissions are already suppressed from the point of generation to a downstream location, will not be required to determine wastewater stream characteristics at each point of generation.

The owner or operator will still need to determine stream characteristics for the point of generation where stream(s) are designated as Group 1 wastewater streams in order to ensure that the stream is treated in accordance with §63.138. The primary difference between the final rule and the proposed rule is the addition of the option to designate Group 1 wastewater streams.

The EPA continues to prohibit dilution of Group 1 wastewater streams to meet compliance. The owner or operator who elects to determine flow rate and concentration for a mixture of wastewater streams at a location downstream of the point(s) of generation, and determines that the mixture of wastewater streams is a Group 2 wastewater stream, must verify whether each wastewater stream in the mixture is Group 1 or Group 2. All Group 1 streams in the mixture are subject to the control requirements of the wastewater provisions in §63.133 through §63.139. Commenters provided no data that dilution reduces the fraction of individual HAP's emitted from a given wastewater stream. The EPA maintains that the emission estimates for the HON represent reasonable estimates of the concentration of HAP's in the wastewater system and that the benefits of wastewater controls are not overstated.

Comment: One commenter (A-90-19: IV-D-102) stressed that the wastewater definition should clarify that a material is subject to the HON only at the point that it exits a process unit and enters an individual drain system. One commenter (A-90-19: IV-D-77) stated that the point of generation should be established after the last product recovery device and before the discharge to a wastewater treatment unit or disposal system.

Response: The EPA clarifies that a wastewater stream is subject to the wastewater provisions in the HON (1) where it exits the process unit equipment, and (2) if it meets the criteria in the definition of "wastewater" in §63.101 of subpart F. The EPA continues to allow the owner or operator to recycle wastewater and recover HAP's as a compliance option; however, the EPA emphasizes that when a Group 1 process wastewater exits a piece of process unit equipment, HAP emissions must be suppressed until the wastewater stream meets the treatment requirements.

Comment: One commenter (A-90-23: IV-D-9) suggested that the EPA define the point of generation as the point at which waste is combined with other waste and no longer has the potential for reuse or recycling. Two commenters (A-90-19: IV-D-32; IV-D-75) claimed that this definition would be consistent with RCRA and would encourage pollution prevention and recycling. Several commenters (A-90-19: IV-D-32; IV-D-34; IV-D-53; IV-D-62; IV-D-75; IV-D-77; IV-D-110) (A-90-23: IV-D-9; IV-D-20) stated that the definition of "point of generation" could be simplified by using the approach that is used to define a solid waste under RCRA, which would be the first air-water interface after the stream reaches the point where it is "destined for disposal." One commenter (A-90-19: IV-D-89) claimed that the definition of point of generation is inconsistent with RCRA and the Pollution Prevention Act and leads to a definition of waste which is not consistent with the Act, RCRA, and other air regulations such as NSPS subpart QQQ. One commenter (A-90-23: IV-D-9) claimed that the definition of point of generation will discourage waste recovery operations. One commenter (A-90-19: IV-D-89) claimed that the EPA defines the point of generation as the first point where a stream must be controlled, regardless of its potential to emit HAP's. Two commenters (A-90-19: IV-D-89; IV-D-92) claimed that the controls required at the point of generation and the definition of point of generation discourage, inhibit, and may disallow the reuse, reprocessing, or recycling of materials. One commenter (A-90-19: IV-D-89) argued that the material which is recycled to a process unit does not have the potential to emit HAP's and claimed that a resource recovery unit should be considered a process unit and material streams exiting the unit should only be subject to controls if they have the potential to emit HAP's. One commenter (A-90-19: IV-D-53) claimed that units used for recycling of wastewater will be regulated under the current definition of point of generation, even if the entire recycle system is suppressed.

Response: The EPA disagrees with the commenters who claim that the HON does not promote recycling and reuse of materials: Owners or operators are encouraged to recycle wastewater and residuals. Although control of HAP emissions is required from the point of generation, only Group 1 process wastewater streams, which the EPA has determined are a source of HAP emissions, require control. If an owner or operator generates Group 2 wastewater streams, the owner or operator is not obligated to control such streams.

The EPA maintains that the definition of "point of generation" in the HON is consistent with the concept of point of generation in RCRA. Because the point of generation is not explicitly defined in the RCRA regulations, but is commonly known to be the point at which a waste is destined for disposal, the EPA considers the HON and RCRA to be consistent. When a Group 1 wastewater stream exits any process unit equipment and enters an individual drain system, the stream must be controlled, treated, and disposed to suppress and destroy HAP's contained in the wastewater stream. The commenters did not provide examples where the definition of "point of generation" in the HON would be inconsistent with the Petroleum Refinery NSPS in 40 CFR part 60, subpart QQQ.

Comment: Two commenters (A-90-19: IV-D-32; IV-D-53) contended that the EPA's concern for dilution and combination of waste streams is based on the erroneous assumption that equilibrium between the liquid phase and the vapor phase of VOHAP's occurs in the collection system.

One commenter (A-90-19: IV-D-53) indicated that the concentration of the VOHAP in the wastewater, and not the total mass of HAP in the wastewater, affects the emissions when vapor-liquid equilibrium is not reached. The commenter (A-90-19: IV-D-53) asserted that a decrease in concentration leads to a decrease in the driving force for volatilization, and therefore, the commenter (A-90-19: IV-D-53) claimed that dilution decreases HAP emissions.

Response: Based on information provided by commenters, the EPA has modified the collection system emission models. In the final rule, the EPA bases the emission estimates on 50 percent of equilibrium being achieved rather than equilibrium.

The EPA maintains, however, that mixing Group 1 and Group 2 wastewater streams in an individual drain system does not reduce the fraction of HAP's emitted from the system. The emission estimates for SOCMI facilities are based on characterization of the wastewater collection and treatment systems and the mixture of Group 1 and Group 2 process wastewaters that are managed in these systems. The EPA did not estimate emissions based on Group 1 streams alone so the reason for the comment is not clear. The rule is based on managing and treating Group 1 wastewater streams to remove or destroy HAP's which will reduce not only the VOHAP concentration but also the mass of HAP's in the wastewater stream. The emission reduction that will occur as a result of this treatment is due only to the reduction in the mass of HAP's, not the VOHAP concentration.

Comment: One commenter (A-90-23: IV-D-17) claimed that the current definition of "point of generation" will result in a significant increase in sampling, analysis, and recordkeeping. Although the HON allows the use of process knowledge to determine VOHAP concentration at the point of generation, the commenter (A-90-23: IV-D-17) claimed that regulatory agencies rarely accept process knowledge without analyses to demonstrate compliance.

Response: The EPA has tried to minimize sampling requirements by not requiring sampling at each point of generation. The HON includes additional sampling options downstream of the point of generation for a single wastewater stream or after mixing different wastewater streams. Additionally, the HON allows the owner or operator to designate that a wastewater stream or combination of wastewater streams is a Group 1 wastewater stream without sampling. The implementing agency may require additional data if an owner or operator uses process knowledge to determine whether the HON applies to a particular waste stream; however, the EPA continues to allow owners or operators to use process knowledge.

Comment: One commenter (A-90-19: IV-D-98) contended that by determining the applicability of the emissions standard at the "point of generation", the EPA is regulating HAP's before they can be emitted and should explain its authority to regulate emissions prior to the point of the first air/water interface.

Response: Emissions enter the atmosphere at the first point where an air/water interface exists. However, the EPA did not define the point of generation as the point where emissions can first enter the atmosphere, because a stream with a high VOHAP concentration may be mixed with more dilute streams prior to reaching the first air/water interface. Mixing a Group 1 stream with a Group 2 stream may result in a single Group 2 stream because of dilution. The total mass of HAP's however, is unaffected by dilution. Therefore, the HAP emissions from the combined streams will be the same or greater than the original Group 1 stream, depending on the HAP mass contribution of the Group 2 stream. Consequently, the EPA defined the point of generation at a point before dilution can occur in order to control emissions from all Group 1 streams.

Furthermore, HAP emissions are not "regulated" prior to the point of the first air/water interface. Rather, determination of whether or not a wastewater stream requires control may be done prior to the point of the first air/water interface. This determination must be performed before the wastewater stream is diluted and before any of the HAP's in the wastewater have a chance to volatilize. If a wastewater stream is determined at the point of generation to be a Group 1 wastewater stream, control is not required until the first air/water interface. If a Group 1 wastewater stream is never exposed to the atmosphere, control is not required at all.

4.1.6 Definition of "Waste Management Unit"

Comment: One commenter (A-90-19: IV-D-54) contended that since §63.138 specifies requirements for wastewater treatment processes, it should not also impose requirements on waste management units, which are regulated by §63.133 through §63.137. The commenter (A-90-19: IV-D-54) is confused because the use of the term "waste management unit" in §63.138 seems to include wastewater tanks, surface impoundments, etc., which each have individual provisions specified in §63.133 through §63.137. The commenter (A-90-19: IV-D-54) stated that if §63.138 is meant to impose additional requirements on units regulated under §63.133 through §63.137, then the additional requirements should be specified in the individual sections and the term "waste management unit" should be deleted.

Response: The EPA clarifies that the definition of "treatment process" is a subset of "waste management unit" and both terms are defined in §63.111 of subpart G. The EPA continues to use both terms in §63.138 because the term "waste management unit" defined in §63.111 of subpart G is not limited to those collection and conveyance units that are specified in §§63.133 through 63.137. In fact, a waste management unit could be used to comply with the provisions of §63.138. Therefore, the EPA continues to use both terms throughout the regulation.

4.1.7 Solvent Use as a Feedstock

Comment: One commenter (A-90-19: IV-D-60) expressed concern that used solvents that are routinely collected in containers and either sent to offsite locations or used as a feedstock onsite, and which never enter an individual drain system, may be construed to be wastewater streams under the proposed definition of wastewater. The commenter (A-90-19: IV-D-60) provided an example scenario and requested clarification.

Response: The definition of "wastewater" in §63.101 of subpart F clearly states that a wastewater stream must enter an individual drain system in order to be considered a wastewater. If the solvents are used as feedstocks onsite or are sent offsite, then such streams would not be wastewaters.

4.1.8 Wastewater Generated from Fire Fighting

Comment: Two commenters (A-90-19: IV-D-33; IV-G-4) stated that §63.100(b)(3)(vi), which lists materials that are not subject to control under the wastewater provisions, should also exclude water generated from both fire fighting and deluge systems. Another commenter (A-90-19: IV-D-34) stated that covering drain systems may result in safety hazards during non-routine conditions (e.g., deluge water during fire or spill events). The commenter (A-90-19: IV-D-34) recommended that a provision be added for sources to obtain a waiver for process-specific safety reasons.

Response: The EPA agrees with the commenter and has added as §63.100(f)(3) of subpart F, an exclusion from the HON wastewater provisions for water that is generated by fire fighting and deluge systems and is discharged to a segregated sewer. It is unclear why the commenter states that covering drain systems may result in unsafe conditions during non-routine conditions. The EPA anticipates that properly designed wastewater collection and treatment systems will be equipped to handle non-routine conditions and that the installation of covers on drain systems will present no additional hazards.

4.1.9 Relationship Between Wastewater Tank and Storage Vessel Provisions

Comment: Several commenters (A-90-19: IV-D-17; IV-D-32; IV-D-33; IV-D-54; IV-D-64; IV-D-73; IV-D-75; IV-D-112) (A-90-23: IV-D-2; IV-D-20) argued that control of wastewater tanks should be managed under the storage vessel provisions instead of the wastewater provisions. The commenters (A-90-19: IV-D-17; IV-D-32; IV-D-33; IV-D-54; IV-D-64; IV-D-73; IV-D-75; IV-D-112) (A-90-23: IV-D-2; IV-D-20) stated that having two different requirements for tanks does not make sense in terms of the relative potential for the two types of tanks to emit HAP's. Three commenters (A-90-19: IV-D-17; IV-D-32) (A-90-23: IV-D-20) stated that the EPA should change the definition of "storage vessel" in §63.101 to include product storage tanks and wastewater storage tanks. One commenter (A-90-19: IV-D-73) suggested including subparagraphs (1), (2), and (3) of the storage vessel definition from subpart F in the definition of wastewater tank.

Several commenters (A-90-19: IV-D-32; IV-D-75; IV-D-112) (A-90-23: IV-D-2) stated that the requirements should be based on the partial pressure of the HAP's in the tank. One commenter (A-90-19: IV-D-31) claimed that there is a potential for wastewater vessels to be classified as Group 1 although they would be classified as Group 2 storage vessels based on partial pressure. The commenter (A-90-19: IV-D-31) provided a hypothetical example of such a case. The commenter (A-90-19: IV-D-31) also claimed that not considering partial pressure for wastewater tanks will result in considerable expense to achieve marginal reductions in HAP emissions. The commenter (A-90-19: IV-D-31) stated that by using the storage vessel definition, the cost of controlling wastewater tanks would be reduced. The commenter (A-90-19: IV-D-31) supported the use of proposed wastewater tank definitions in cases where determining the total HAP partial pressure is difficult because of a highly mixed matrix or highly variable concentrations. Two commenters (A-90-23: IV-D-2; IV-D-77) claimed that the control of wastewater tanks should also be based on the size of the tank. One commenter (A-90-19: IV-D-32) provided partial pressure data for chemicals in strippability groups A, B, and C.

One commenter (A-90-19: IV-D-64) requested that the EPA set *de minimis* cutoffs based on size and vapor pressure for wastewater tanks in §63.133 and surface impoundments in §63.134, and stated that surface impoundments and controlled oil water separators should be regulated as a Group 1 or Group 2 storage vessels, based on their capacity and maximum total HAP vapor pressure.

Response: The EPA agrees that it is appropriate to regulate wastewater tanks based on their potential for HAP emissions. Thus, the EPA has added language to the wastewater tank provisions in §63.133 that reflects the tank capacity and vapor pressure criteria used in the HON storage vessel provisions. The EPA also felt that it would be appropriate for the final HON wastewater provisions to be consistent with the proposed RCRA tank and container requirements, which will be in 40 CFR part 264 subpart CC.

In the final rule, the owner or operator must determine whether their wastewater tanks meet the criteria in table 4-1 of this section (in the final rule as table 10 of subpart G), which specifies both tank capacity and vapor pressure criteria.

TABLE 4-1. WASTEWATER TANK CAPACITY AND VAPOR PRESSURE CRITERIA

Tank capacity (m^3)	Vapor pressure (kPa)
75≤ and ≤151	≤13.1
≥151	≤5.2

The owner or operator must make this determination for any wastewater tank that manages Group 1 wastewater streams or residuals removed from such streams at both new and existing sources. If a wastewater meets the criteria specified in table 10 of subpart G, then the owner or operator must operate and maintain a fixed roof. If a wastewater tank exceeds the criteria specified in table 10 of subpart G, then the owner or operator must comply with paragraphs (b) through (h) of §63.133 and shall operate and maintain one of the emission control techniques specified in §63.133(a)(2)(i) through (a)(2)(iv).

4.1.10 Previously Installed Steam Strippers

Comment: Three commenters (A-90-19: IV-D-18; IV-D-32; IV-D-110) stated that steam strippers installed for other purposes than compliance with the wastewater provisions in the HON, including meeting the requirements of other regulations, should be grandfathered and limited to treatment of wastewaters for which they were designed (e.g., OCPSF effluent limitation guidelines, Benzene Waste NESHAP, pretreatment standards, and corporate waste minimization targets).

Response: The EPA is directed by the Act to control HAP emissions from wastewater. Although the rules mentioned by the commenters were not originally intended to control HAP emissions, in some cases, the rules may result in a reduction in HAP emissions from wastewater. The EPA has reviewed the overlap issues associated with other regulations including OCPSF effluent limitations, the Benzene Waste NESHAP, and NPDES pretreatment standards. However, the EPA has concluded that in most cases the EPA is unable to provide an overall exemption for steam strippers that were installed to comply with other regulations.

In §63.110 of subpart G of the final rule, the EPA provides specific guidance about several regulatory overlap issues by (1) specifying a combination of different requirements from the overlapping rule; (2) deferring to the requirements of one rule; or (3) allowing a case-by-case determination. Through these approaches, the EPA can ensure compliance with the HON and minimize duplicative effort.

Comment: One commenter (A-90-19: IV-D-85) disagreed with the provisions in §63.110(b)(2) of the proposed rule which exempt vents in wastewater treatment processes from the process vents requirements. The commenter (A-90-19: IV-D-85) stated that the EPA offers no justification for exempting vents associated with wastewater treatment from the requirements for process vents and that the maximum achievable emissions reduction standard precludes this exemption.

Response: Proposed §63.110(b)(2) stated that vents from recovery devices installed to control emissions from treatment operations that are in compliance with the requirements in §63.133 through §63.147 are not regulated as process vents. Rather, such vents have separate regulatory requirements and must achieve a 95 percent HAP removal. Therefore, the EPA has neither exempted these vents from control nor dually regulated such vents under the process vent provisions. The EPA maintains that the flow and concentration of HAP's that will be removed from the wastewater and therefore vented to an air emissions control device will be low compared to that in a vent stream from a reactor, air oxidation reactor, or distillation unit. Thus, if such a stream were regulated under the process vent provisions, it might not meet the process vent control criteria because of having a high TRE index value. In this case, the process vent would not require control. The EPA has determined, however, that it is appropriate to require 95 percent control of such streams since low concentration streams cannot typically be controlled to levels of 98 percent.

4.1.11 <u>Control of Maintenance-Related Wastewater</u>

<u>Comment</u>: Several commenters (A-90-19: IV-D-32; IV-D-34; IV-D-36; IV-D-62; IV-D-79; IV-D-86; IV-D-89; IV-D-92) (A-90-23: IV-D-20) asserted that cooling towers should not be subject to the HON because a MACT Standard for Industrial Process Cooling Towers will be developed by November 15, 1994.

<u>Response</u>: The MACT Standard for Industrial Process Cooling Towers will regulate only hexavalent chromium emissions from cooling towers. The HON regulates organic HAP emissions. Additionally, the EPA notes that emissions from cooling towers are caused by leaks, which may be occurring throughout the cooling process, and not just in the cooling tower. Leaks of this nature would not be addressed by the MACT Standard for Industrial Process Cooling Towers.

<u>Comment</u>: Two commenters (A-90-19: IV-G-10) (A-90-23: IV-G-5) expressed confusion regarding which maintenance wastewaters were subject to the HON. The commenters (A-90-19: IV-G-10) (A-90-23: IV-G-5) claimed that if process wastewater includes maintenance and turnaround wastewater as established by §63.110(e), then most hydrocarbon drains and water drains where water contacts process fluids would be subject to subpart G. The commenters (A-90-19: IV-G-10) (A-90-23: IV-G-5) expressed particular concerned with a phenolic sewer system, claiming that the sewer system would not be subject to

the HON during normal operation because it only contains phenol, but would be subject to the HON during maintenance and turnaround because it is flushed with cumene. The commenters (A-90-19: IV-G-10) (A-90-23: IV-G-5) claimed that controlling the phenolic sewer would be the greatest expense, and that the impact of the HON on the phenolic sewer system was not evaluated. The commenters (A-90-19: IV-G-10) (A-90-23: IV-G-5) provided details on the phenol unit process.

Response: The proposed regulation did not include routine maintenance wastewater and maintenance-turnaround wastewater in the definition of process wastewater in §63.101. Routine maintenance wastewater, maintenance-turnaround wastewater, and process wastewater were listed as three separate types of wastewater in the definition of "wastewater" in §63.101 of the proposed rule. In the final rule, these terms have been clarified. The maintenance wastewater requirements have been moved to §63.105 of subpart F, and maintenance wastewater is now defined separately from wastewater in §63.101 of subpart F.

The phenolic sewer system is not subject to the HON wastewater provisions during normal operation, because phenol is not a regulated HAP for wastewater. Cumene and acetophenone are on the list of HAP's regulated for maintenance wastewater, so the maintenance operations are subject to the HON. However, the requirements for routine maintenance wastewater are now the same requirements as those proposed for maintenance-turnaround wastewater. There are no longer any specific control requirements for routine maintenance wastewater. The requirements of both types of maintenance wastewaters are addressed in the facility's start-up, shutdown, and malfunction plan.

Comment: One commenter (A-90-19: IV-D-33) stated that the EPA should clarify that §63.102(b)(1) and (b)(2) refer to those HAP's listed in §63.104.

Response: In the final rule, the maintenance wastewater provisions have been moved from §63.102(b)(1) of subpart F to a separate section, §63.105, entitled, maintenance wastewater requirements. In the final rule, the heat exchange system requirements have also been moved from §63.102(b)(2) to a separate section, §63.104, entitled, heat exchange system requirements. The provisions in §63.104 and §63.105 of subpart F clarify which HAP's are regulated for heat exchange systems and maintenance activities.

Comment: Two commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-112) stated that the proposed HON included several insignificant wastewater streams including infrequently generated sources such as maintenance-related streams, which one commenter (A-90-19: IV-F-1.2 and IV-F-4) declared should not be included in the regulation. The commenter (A-90-19: IV-F-1.2 and IV-F-4) pointed out that the Benzene Waste NESHAP excludes routine maintenance streams, and that the HON should be consistent on this point.

Response: Although several commenters contended that the Benzene Waste NESHAP does not regulate maintenance wastewater streams, the EPA notes that the Benzene Waste NESHAP controls all waste and wastewater streams if the facility's total annual benzene exceeds 10 Mg/yr. Furthermore, the Benzene Waste NESHAP does not contain a specific exclusion of maintenance wastewater streams. In the final rule, the EPA continues to require good air pollution control practices for maintenance-related wastewater streams, but is not requiring owners or operators to achieve specific removal efficiencies.

Comment: One commenter (A-90-19: IV-G-4) stated that wastewater that is generated as part of an unplanned shutdown should be exempt from control requirements. The commenter (A-90-19: IV-G-4) suggested that the EPA should complete the studies required by section 112(d) of the Act to determine whether such control is appropriate. If such a provision was deemed necessary, the commenter (A-90-19: IV-G-4) suggested that the provision be added to §63.102(b) or in the start-up, shutdown, and malfunction provisions of the General Provisions (subpart A) for part 63.

Response: Wastewater that is generated during an unplanned shutdown is maintenance-turnaround wastewater as described in the definition of "wastewater" in §63.101 of subpart F in the proposed rule. Maintenance-turnaround wastewater includes maintenance wastewater generated during planned and unplanned shutdowns. There were not any control requirements for maintenance-turnaround wastewater in the proposed rule. The requirements for maintenance-turnaround wastewater in the proposed and final rules are the same and are addressed in the facility's start-up, shutdown, and malfunction plan.

4.1.12 Indirect Discharges

Comment: One commenter (A-90-19: IV-D-86) stressed that indirect discharges should not be subject to the HON for two reasons. The commenter (A-90-19: IV-D-86) claimed that the EPA had not correctly estimated emissions from systems which discharge to POTW systems and that the EPA had not considered the effect of flow rate on Fe. The commenter (A-90-19: IV-D-86) claimed that these systems experience vapor suppression by dilution with sanitary wastewater. The commenter (A-90-19: IV-D-86) provided a derivation which the commenter (A-90-19: IV-D-86) claims relates Fe to flow rate. The commenter (A-90-19: IV-D-86) suggested that the EPA do a sensitivity analysis to determine the effect of the assumed design size criteria on transfer surface area and transfer coefficients which are used to develop Fe.

Response: It is assumed that the commenter is referring to the claims regarding the effect of flow rate and dilution on Fe when stating that the EPA incorrectly estimated emissions from systems discharging to POTW's. The derivation presented by the commenter, which presents Fe as a function of flow rate, ignores the effect of increased flow rates on transfer surface area. As transfer surface area increases, Fe increases. The derivation presented by the commenter assumes that the waste management unit remains the same size regardless of flow, which requires a proportional decrease in the residence time of the waste in the waste management unit.

The residence time is the volume of the waste management unit divided by the volumetric flow rate of the waste. In actual practice, a waste management unit of any given size has limited flexibility with regard to the flow rate of waste which it can accommodate. Therefore, larger waste flows require larger waste management units. Alternatively, multiple smaller waste management units may be employed. The end result is an increase in surface area which may result in an increase in Fe depending on the change in residence time. An increase in residence time will augment the increase in Fe resulting from any increase in transfer surface area. A decrease in residence time will offset the increase in Fe resulting from any increase in transfer surface area. Furthermore, the EPA does not recognize dilution as a viable treatment option.

4.1.13 <u>Clarification of Cooling Tower System</u>

<u>Comment</u>: One commenter (A-90-19: IV-D-34) stated that the EPA has not completed the analysis required under section 112(d) of the Act to include water from heat exchange systems (i.e., water from cooling towers and once-through cooling water systems) in the HON. Three commenters (A-90-19: IV-D-34; IV-D-50; IV-D-54) also stated that the EPA does not provide any information in the preamble or BID regarding emissions, the floor, or alternate control strategies from cooling water. The commenter (A-90-19: IV-D-34) stated that the CMA's study of leaks in chemical industry heat exchange systems (Cooling Tower Project Report, June 1992) indicates that heat exchanger leaks are "a rare occurrence" ranging from 3.4 to 12.9 years. The commenter (A-90-19: IV-D-34) suggested that the EPA delete all proposed controls on recirculating cooling water systems.

<u>Response</u>: Although leaks may not occur every year in a heat exchange system, the EPA has shown that leaks as small as 1 ppm can cause considerable emissions if left undetected. For example, an average size cooling tower (15,000 gpm) will emit almost 3 tons of organics in one month if a leak of 1 ppm is not detected. Table 4-2 of this chapter summarizes the

possible emissions from heat exchange systems with a leak of 1 ppm. Larger leaks will produce proportionately larger air emissions. For example, a leak of 3 ppm will produce emissions three times as great as those presented in the table.

TABLE 4-2. EMISSIONS FROM HEAT EXCHANGE SYSTEMS (TONS)

Flow Rate (gpm)	Time Period (Months)			
	1	3	6	12
20,000	3.7	11	22	44
10,000	1.8	5.5	11	22
5,000	0.92	2.75	5.5	11
2,000	0.37	1.1	2.2	4.4

The EPA met all statutory criteria in its analysis of whether or not to regulate HAP emissions from heat exchange systems. The heat exchange system provisions, which control leaks from cooling towers and once-through cooling water systems, require the owner or operator to comply with monitoring, recordkeeping, and reporting requirements. The heat exchange system requirements are a specific example of an emission control program necessary for the source to be operated in a manner consistent with good air pollution control practices as specified in the General Provisions §63.6(e)(1)(i). These provisions were specified in the rule based on the potential for high HAP emissions. The cost of monitoring the system for leaks was considered as part of the monitoring, recordkeeping, and reporting requirements in the rule; and thus, met the statutory criteria.

With regard to the floor determination, the EPA is not required to determine a floor for heat exchange systems. The EPA is required to ensure that the standard for heat exchange systems is at least as stringent as the floor. The EPA has reviewed currently available information and has determined that leaks in heat exchange systems are more common than the commenter suggested.

Comment: One commenter (A-90-19: IV-D-73) supported the proposed definition of "heat exchange system" stating that it implies that the scope of a heat exchange system can be defined by the source to be the entire cooling tower system rather than a single heat exchanger. However, the commenter (A-90-19: IV-D-73) stated that this definition might be interpreted to mean each individual heat exchanger. The commenter (A-90-19: IV-D-73) stated that the EPA should clarify the definition in §63.102(b) to state that a heat exchange system can include an entire recirculation system.

Response: The EPA intended for the definition of heat exchange system to mean the entire cooling tower system or the entire once-through cooling system and not a single heat exchanger. The EPA agrees with the commenter that the definition of heat exchange system may be misinterpreted. Therefore, the EPA has modified the definition in §63.101 of subpart F to clarify that a heat exchange system can include an entire recirculating system or once-through cooling system.

Comment: One commenter (A-90-19: IV-D-33) stated that the definition of "heat exchange system" should be clarified by excluding the parenthetical phrase "(river or pond water)", which actually limits the definition of heat exchange system. The commenter (A-90-19: IV-D-33) stated that the definition should include other sources of water as well.

Response: The definition of heat exchange system has been modified to clarify that river or pond water are only two examples of the type of water that is used in once-through cooling systems.

4.1.14 Alternative Methods for Determining Applicability

Comment: One commenter (A-90-19: IV-D-75) stated that direct injection gas chromatography methods should be allowed for determining applicability and for determining design criteria for equipment intended to treat single-phase streams. The commenter (A-90-19: IV-D-75) also stated that TOC methods should be allowed for determining applicability. The commenter (A-90-19: IV-D-75) claimed that direct injection gas chromatography and TOC methods are more readily available and more cost effective than Method 25D or Method 305.

Response: The commenter did not specify which direct-injection gas chromatography methods should be allowed. If the test method measures organic HAP concentrations in the wastewater and has been validated according to section 5.1 or 5.3 of Method 301, then the method meets the requirements of §63.144 and is therefore allowed for determining applicability and compliance. The EPA does not agree that TOC methods can be allowed for determining applicability. Currently available TOC methods measure organically bound carbon, not HAP concentration. The commenter provided no details on how TOC test results would be used as a surrogate parameter for VOHAP concentration. Without additional information, the EPA cannot further address the suggestions made by the commenter.

4.1.15 Exclusion for Laboratory Waste

Comment: One commenter (A-90-19: IV-D-54) suggested that laboratory waste should be specifically excluded from the definition of wastewater because such streams should not be subject to the Group 1/Group 2 determination requirements.

Response: Laboratory waste is exempt from subparts F, G, and H. Section 63.100(j)(1) of subpart F in the final rule exempts all research and development facilities, regardless of whether the facilities are located at the same plant sites as a chemical manufacturing process unit that is subject to subparts F, G, and H.

4.1.16 One Mg/yr Source-Wide Determination

Comment: One commenter (A-90-19: IV-D-77) suggested that the EPA should consolidate §§63.144(a) and (e) or explain why the paragraphs should remain separate.

Response: The EPA agrees that the relationship between paragraphs §63.144(a) and (e) in the proposed rule is confusing and has deleted the need to calculate an "annual wastewater quantity" as required by proposed paragraph (a). The EPA has reorganized §63.144 in the final rule to clarify the requirements an owner or operator to demonstrate whether the HON is applicable to a wastewater stream and to determine whether a wastewater stream is a Group 1 or Group 2 wastewater stream. In §63.144, the EPA continues to include the compliance demonstration for the 1 Mg/yr source-wide compliance option and also provides an additional option in paragraph (d), which allows an owner or operator to designate a single wastewater stream or a mixture of wastewater streams as a Group 1 wastewater stream.

In reorganizing §63.144, the EPA has changed proposed paragraph (e) to paragraph (c) in the final rule.

Comment: Two commenters (A-90-23: IV-D-1) (A-90-19: IV-D-86) agreed with having a mass flow rate *de minimis* value to minimize cost and secondary impacts from control of minor sources. Several commenters (A-90-19: IV-D-53; IV-D-62; IV-D-63; IV-D-73; IV-D-79; IV-D-86; IV-D-92; IV-D-110) (A-90-23: IV-D-1) expressed concern that the mass flow rate *de minimis* values for wastewater streams between the HON and Benzene Waste NESHAP are inconsistent. The commenters (A-90-19: IV-D-62; IV-D-63; IV-D-79; IV-D-86; IV-D-110) (A-90-23: IV-D-1) also expressed concern that the mass flow rate *de minimis* value of 2 Mg/yr in the Benzene Waste NESHAP is higher than the source-wide exemption from the control and treatment of Group 1 wastewater streams of 1 Mg/yr in the HON, even though many of the HAP's covered by the HON are less toxic than benzene. Several commenters (A-90-19: IV-D-32; IV-D-53; IV-D-63; IV-D-112) (A-90-23: IV-D-17) suggested that adopting the 2 Mg/yr mass flow rate cutoff used in the Benzene Waste NESHAP would minimize testing, collection, and treating of *de minimis* sources of HAP's while still allowing control of major emission sources. Another commenter (A-90-19: IV-D-85) disagreed with the facility-wide cutoff of 1 Mg/yr. The commenter (A-90-19: IV-D-85) claimed that a facility-wide exemption was allowed in the Benzene Waste NESHAP because the risk-based targets for benzene were exceeded by more than 1 megagram. The commenter (A-90-19: IV-D-85) stated that this justification does not apply to the HON.

Response: Although the HON is not a risk-based standard, the EPA continues to allow the 1 Mg/yr source-wide option in the final rule in §§63.138(c)(5) and (6) because compliance with the wastewater provisions for a SOCMI facility that generates only a low total HAP mass flow rate of table 9 compounds is very expensive. In addition, the EPA has determined that most facilities will elect to use this option to show compliance for wastewater streams with a low flow rate and high concentration. The EPA recognizes that having a source-wide *de minimis* value minimizes the impact of the HON on those facilities that have HAP-containing wastewater with low total loading. A source-wide compliance option was originally included in both the Benzene Waste NESHAP and the HON to address maintenance wastewater which often has a high concentration and a low flow rate. Because the requirements for managing maintenance wastewater in the HON have changed from the proposed rule, the EPA considered removing the 1 Mg/yr compliance option. However, the EPA continues to allow this option as it was proposed so that process wastewater streams which may have a high concentration and low flow rate are not subject to the control requirements in the HON.

4.1.17 Clarification of Requirements for Containers

Comment: Two commenters (A-90-19: IV-D-32; IV-D-73) stated that the EPA has failed to quantify emissions from containers and has failed to evaluate the environmental impact and cost of the proposed container regulations. Three commenters (A-90-19: IV-D-32; IV-D-73) (A-90-23: IV-D-20) argued that marine vessels, tank cars, and tank trucks should be excluded from the definition of container, because these vessels are best regulated in another section of the regulation (e.g., the transfer provisions) or another regulation. One commenter (A-90-19: IV-D-92) suggested making the requirements for containers similar to those found in RCRA [40 CFR 262.34(c)(1) and 261.4(d), (e), and (f)].

One commenter (A-90-19: IV-D-73) suggested excluding containers that are used less than 15 days. Several commenters (A-90-19: IV-D-32; IV-D-34; IV-D-54; IV-D-64; IV-D-73; IV-D-93) suggested that the EPA establish a *de minimis* capacity for containers, below which the containers would not be subject to the container requirements in §63.135. The commenters (A-90-19: IV-D-32; IV-D-34; IV-D-54; IV-D-64; IV-D-73; IV-D-93) recommended different capacities ranging from the size of laboratory sample bottles and shovels to 1 m^3. The commenters provided several reasons for this suggestion including: (1) small containers have little potential to emit HAP's; (2) a *de minimis* capacity would clarify the definition of "container" in §63.111 of subpart G; and (3) a cutoff level would narrow the definition of "container".

Response: The EPA maintains that containers holding HAP-containing water or process fluids at SOCMI facilities are a potentially significant source of HAP emissions, which are not adequately regulated by existing regulations. During the baseline analysis to estimate emissions from wastewater operations at SOCMI sources, the EPA estimated emissions from SOCMI sources using model plant scenarios. From this analysis, the EPA determined that SOCMI sources as a whole warranted emission control. The final rule specifies the management practices that must be followed to achieve HAP-emission reduction. The EPA's cost estimates assume that wastewater streams are routed to a feed tank for a steam stripper. Costs associated with containers are not relevant to this scenario. An owner or operator may elect to manage wastewater using containers, however, the EPA does not include this type of management as part of the emission control scenarios.

The EPA continues to include barges, ships, rail cars, and tank trucks as examples of containers in the definition of "container" in §63.111 of subpart G. This definition of container is consistent with the definition of "container" in both RCRA and the Benzene Waste NESHAP.

In response to several commenters' request that the EPA exempt smaller size containers from the control requirements for containers in §63.135, the EPA reviewed the types of smaller containers commonly used to manage Group 1 wastewaters or residuals generated from the treatment of such wastewaters, and concluded that very small containers with a capacity less than 0.1 m^3 (26.4 gallons) should not be subject to the container requirements in §63.135. The EPA has included this capacity threshold in the definition of "container" in §63.111 of subpart G. The EPA has decided not to regulate very small containers because: (1) such containers have little potential for air emissions; (2) the monitoring, recordkeeping, and reporting burden outweighs the environmental gain; and (3) lab bottles and small sampling containers were not intended to be regulated.

The EPA based this change on a review of container sizes commercially available from vendors which indicates that the capacities of safety cans, lab cans, disposal cans, and lab packs range from less than 0.004 m^3 (1 gallon) to 0.08 m^3. These types of small containers are used to collect small quantities of hazardous waste in laboratories and other ancillary operations at a SOCMI facility. The EPA incorporated the container size limitation into the definition of "container" in §63.111 of subpart G. In addition, the EPA has revised the control requirements for containers with a capacity less than 0.42 m^3. As discussed in section 2.2.4 of this BID volume, these containers are exempt from the submerged fill requirements. These containers are also not required to be inspected for leaks with Method 21 if DOT-approved containers are used.

The EPA has decided not to specifically exclude containers that are on-site for only a certain number of days. By providing a *de minimis* container size and allowing less burdensome compliance and monitoring requirements, the EPA decided that sufficient flexibility for complying with the HON is available without adding a specific exclusion for containers that are on-site for only a short time. A discussion about reduced monitoring requirements is provided in section 6.12 of this BID volume.

<u>Comment</u>: One commenter (A-90-19: IV-D-64) stated that if the EPA established *de minimis* cutoffs for wastewater tanks

and surface impoundments, there would be no need for the regulation of containers.

Response: The EPA clarifies that both the proposed and final rules contain regulatory requirements for each waste management unit including wastewater tanks, surface impoundments, and containers. The EPA has incorporated several changes to the wastewater tank provisions in §63.133 which include the addition of tank capacity and vapor pressure thresholds. For additional discussion of these changes, refer to section 4.1.9 of this BID volume. The EPA maintains that regardless of any changes made either to the wastewater tank provisions in §63.133 or the surface impoundment provisions in §63.134, the container requirements in §63.135 continue to be necessary to control HAP emissions from containers. Containers, which by definition are portable, are not a subset of either wastewater tanks or surface impoundments, which are both defined as stationary waste management units. Therefore, the container requirements in the HON are not directly affected by any changes to either the wastewater tank or surface impoundment requirements.

4.2 DETERMINATION OF MOST STRINGENT STANDARDS

Comment: One commenter (A-90-19: IV-D-110) stated that the EPA's attempt at resolving conflicts and overlaps between the HON and other regulations in §63.103(d)(2), which requires the owner or operator to comply with the most stringent standards applicable to the emissions point, does not sufficiently clarify all compliance issues. As an example, the commenter (A-90-19: IV-D-110) suggested that facilities that have steam strippers that meet Benzene Waste NESHAP requirements may need to be reconfigured to meet the HON requirements. The commenter (A-90-19: IV-D-110) recommended that the EPA modify proposed §63.103(d)(2) to require facilities to meet the most stringent standards applicable to "sources" rather than "emission points." The commenter (A-90-19: IV-D-110) stated that this approach will reduce the burden of making a stringency determination for each emission point and will make comparisons between the HON and other rules simpler.

Response: The EPA agrees with the commenter that several regulatory overlap issues were unclear in the proposed rule. The EPA has clarified many of these issues in §63.110 of subpart G. For the final rule, the EPA continues to address most regulatory overlap issues based on specific emission points because comparing different regulations on a broader scale may be misleading and could cause air emissions that are subject to the HON to be uncontrolled. Refer to chapter 6 of BID Volume 2D for additional discussion about regulatory overlap and stringency decisions.

4.2.1 Overlap with the Benzene Waste NESHAP

Comment: One commenter (A-90-19: IV-D-102) cited a portion of the supplemental final Benzene Waste NESHAP rule that clarifies the distinction between product and waste (58 FR 3072, 3076-7) and suggested that the EPA use the language to clarify the scope of the definitions in the HON.

Response: The distinction between product and waste in the Benzene Waste NESHAP is analogous to the definition of wastewater in the HON. The intent of the HON is the same as the Benzene Waste NESHAP; materials are subject to the standards at the point they exit the production process equipment. To the extent language in the Benzene Waste NESHAP rule clarifies the EPA's intent, the language is equally relevant to the HON. The EPA has not, however, added the specific language for the Benzene Waste NESHAP.

Comment: One commenter (A-90-19: IV-D-75) recommended that benzene-containing wastes which are subject to the Benzene Waste NESHAP be exempt from the HON. The commenter (A-90-19: IV-D-75) expressed concern that because some facilities have recently installed equipment to comply with the Benzene Waste NESHAP, conflicting requirements between the two NESHAP's may result in expensive rework with no environmental benefit.

Response: The EPA disagrees with the commenter because the HON regulates 75 additional chemicals other than benzene.

Without a compliance demonstration, the EPA cannot determine whether a piece of equipment that was installed to comply with the Benzene Waste NESHAP also will be in compliance with the HON. The EPA does encourage facilities to continue using equipment that was installed to comply with other regulations and nothing in the HON precludes the owner or operator from using such equipment. However, to comply with the HON, the equipment must reduce air emissions of all organic HAP's, including benzene, that are present in the wastewater stream and are listed on table 9 of subpart G of the final rule.

Comment: One commenter (A-90-23: IV-D-14) suggested deleting manholes, sumps, and lift stations from the HON definition of individual drain system to be consistent with the Benzene Waste NESHAP.

Response: The EPA maintains that air emissions from manholes, sumps, and lift stations should be controlled under the HON. Allowing such parts of a drain system to remain uncontrolled could allow emissions to escape to the atmosphere before the wastewater stream reaches a treatment process. Therefore, the EPA continues to include these components in the definition of individual drain system.

Comment: One commenter (A-90-23: IV-D-14) supported the exemption of POTW's from the Benzene Waste NESHAP and suggested adding this exemption to the HON. The commenter (A-90-23: IV-D-14) claimed that POTW's lack the funds to install the required controls. One commenter (A-90-19: IV-D-110) opposed the requirement for POTW's to comply with HON provisions, reasoning that the pretreatment requirements under the CWA are adequate to control HAP emissions. One commenter (A-90-19: IV-D-58) expressed concern that not allowing biological treatment as RCT may increase the potential for POTW's to decline to accept treated wastewater due to applicability and compliance uncertainty with the HON.

Response: Neither the Benzene Waste NESHAP nor the HON allow owners or operators to avoid control of HAP emissions by sending wastewater offsite for treatment. Under the HON, the POTW is not subject to the HON requirements, but the owner or operator of a SOCMI facility must ensure that Group 1 wastewater that is sent offsite to a POTW or other facility for treatment or recycling is handled in compliance with the HON.

4.2.2 Overlap with the Resource Conservation and Recovery Act

Comment: One commenter (A-90-19: IV-D-92) claimed that the definition of "waste management unit" is not consistent with RCRA, CWA, and other air quality rules such as NSPS subpart QQQ. The commenter (A-90-19: IV-D-92) also indicated that "waste" was not defined in the HON. The commenter (A-90-19: IV-D-92) urged the EPA to define "waste" and "waste management unit" consistent with RCRA (§261.3 and 260.10, respectively).

Response: The EPA points out that the HON does not define the term "waste" because the HON does not apply to waste. In §63.111 of subpart G, the HON provides definitions for both "wastewater stream" and "waste management unit." Although the definition of waste management unit in the HON may differ from the definition in other rules, the definition in the HON explains the scope, use, and meaning of the term as it is used in the HON.

Comment: Three commenters (A-90-19: IV-D-32; IV-D-54; IV-D-113) stated that the EPA has correctly exempted RCRA-permitted treatment units from the HON. However, the commenters (A-90-19: IV-D-32; IV-D-54) claimed that some of the provisions are contradictory and erroneously referenced. The commenters (A-90-19: IV-D-32; IV-D-54; IV-D-113) stated that §63.138(l) should declare that RCRA units, which are exempt under §63.138(l), are considered to be in compliance with §63.138(d), (b), (c), and (g). The commenters (A-90-19: IV-D-32; IV-D-54; IV-D-113) stated that these RCRA units should not be subject to §63.138(f) and (i). Furthermore, the commenter (A-90-19: IV-D-32) stated that since §63.138(c) references §63.131(d) and §63.138(f), these units should not be subject to either §63.131(d) or §63.138(f). One commenter (A-90-19: IV-D-54) stated that RCRA-regulated sources should comply with (e), (h), (j), and (k).

Response: The EPA agrees with the commenter that in the proposed rule §63.138(l) of subpart G contained several contradictory and erroneous references. In the final rule in §63.138(m) of subpart G, the EPA has corrected these errors so that a treatment process, wastewater stream, or residual is considered in compliance with the requirements of §§63.138(b), (c), and (h), as applicable and is exempt from the requirements of §63.138(j), which requires a design analysis or performance test, provided that the owner or operator is in compliance with §§63.138(f), (i), (k), and (l) and documents that the treatment process, wastewater stream, or residual is in compliance with §63.138(m)(1) through (3). Emissions from wastewater must be controlled until the point that the HAP's are destroyed. Prior to this point, an owner or operator must ensure compliance with §§63.133 through 63.137. The EPA notes that the placement in the final rule of several of the citations differs from the proposed rule.

Comment: One commenter (A-90-19: IV-D-92) requested that a definition of "empty container" similar to the definition under RCRA in 40 CFR part 261.7 be included in the HON.

Response: Because the HON does not apply to the disposal of hazardous waste, the issue of whether a container is "empty" under RCRA is not directly relevant to the HON. Regulatory overlap with RCRA may occur when an owner or operator of a SOCMI facility elects to send residuals placed in containers to an off-site treatment or recycling facility. In such cases, the owner or operator must ensure that the residuals are managed in compliance with the HON. In cases where the residuals also are hazardous waste, neither the HON nor RCRA apply to any material that may be remaining in a container that meets the "empty" criteria in 40 CFR part 261.7. Although the commenter does not specify why a definition of "empty container" should be added to the HON, the EPA clarifies that any container that has been emptied using practices that are commonly employed to remove materials from that type of container (e.g., pouring, pumping) are no longer required to meet the container requirements specified in §63.135 of subpart G of the HON.

Comment: One commenter (A-90-19: IV-D-92) suggested that the exemption for conditionally exempt small quantity generators found under RCRA in 40 CFR part 261.5 be included in the HON.

Response: The RCRA provision in 40 CFR part 261.5, which allows hazardous waste generators who generate small quantities of hazardous waste to be exempt from most of the hazardous waste management provisions, was established to relieve generators of small quantities of waste from the financial burden associated with RCRA compliance. These conditionally exempt small quantity generators (CESQG) are required to manage their waste using methods that protect human health and the environment.

Under the Act, provisions already exist which exempt small quantity generators of HAP emissions from the requirements in the HON. In section 112(a) of the Act, Congress defines "major source" as a stationary source or group of stationary sources that have the potential to emit in aggregate, 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAP's. Because the HON applies only to major sources, any SOCMI plant that is not a major source is not subject to the HON. Therefore, the EPA is not adding a provision similar to the CESQG exemption in RCRA.

Comment: One commenter (A-90-19: IV-D-92) suggested that listed and characteristic hazardous wastes should not be covered by the HON, because they are regulated under RCRA (40 CFR part 264 subparts AA and BB and 40 CFR part 265 subparts AA, BB, and CC).

Response: The HON wastewater provisions are applicable to all HAP's listed on table 9 of subpart G in the final rule regardless of whether some of the HAP's may also be classified as listed or characteristic wastes under RCRA. The primary purpose of the RCRA regulations is to require safe management of hazardous waste from "cradle to grave." Although the RCRA regulations do contain several provisions pertaining to the control of air emissions, the Act specifies that the EPA promulgate regulations that control the emission of HAP's to the air. The RCRA requirements in 40 CFR parts 264 and 265 subparts AA and BB focus on the control of emissions from process vents and equipment leaks. The EPA also has proposed subpart CC provisions which will require control of air emissions from tanks and containers, but these requirements have not been finalized. These RCRA requirements are not sufficient to control HAP emissions from SOCMI facilities. The EPA is trying to minimize the burden of overlapping regulations and has provided the option for a case-by-case determination for regulatory overlap between the HON and RCRA in §63.110 of subpart G of the final rule.

Comment: One commenter (A-90-19: IV-D-45 and IV-F-7.7) expressed concern that emissions from RCRA corrective action hazardous waste surface impoundments were excluded from control under the HON.

Response: The EPA clarifies that the HON does not apply to corrective actions under RCRA. The RCRA regulations designate the procedures for implementing corrective actions. The HON applies to chemical manufacturing process units at major sources that manufacture as the primary product one or more of the chemicals listed in table 1 of subpart F of the final rule and use as a reactant or manufacture as a product, by-product, or co-product one of the organic HAP's listed in table 2 of subpart F of the final rule. For additional discussion on the applicability of the HON, the commenter should refer to BID volume 2D.

4.2.3 Overlap with the Clean Water Act

Comment: One commenter (A-90-19: IV-D-34) disagreed with the provisions in §63.132(i)(2), which require that an owner or operator be responsible for the treatment of wastewater once it has been sent offsite to a facility that is not under the control of the owner or operator. The commenter (A-90-19: IV-D-34) stated that this provision is virtually impossible to comply with and does not consider the significant investment in place to control these wastewater discharges and comply with NPDES pretreatment requirements. Two commenters (A-90-19: IV-D-33; IV-D-110) stated that the HON should not impose redundant or conflicting requirements for wastewater treatment at plants which are already subject to CWA requirements. One commenter (A-90-19: IV-D-73) suggested deleting §63.132(i)(1) and (2) from the wastewater provisions, because small plants currently using POTW's cannot ensure that POTW's will comply with §63.138(c). The commenter (A-90-19: IV-D-73) claimed that these small plants would have to treat their own Group 1 wastewater streams which may not be technically feasible or cost effective.

Two commenters (A-90-19: IV-D-33; IV-D-34) suggested that wastewater transfers to an off-site POTW as defined by the 40 CFR 403 regulations should be exempt from §63.132(i), since POTW's will be subject to future MACT regulations. One commenter (A-90-19: IV-D-33) provided background information about the development and stringency of the pretreatment standards that must be met before wastewater is sent to a POTW. The commenter (A-90-19: IV-D-33) also provided a copy of an affiliated plant's permit with a local POTW to illustrate that the permit designates specific levels of pollutants that can be sent to the POTW.

The commenter (A-90-19: IV-D-33) agreed with the EPA that it is a facility's responsibility to manage wastewater onsite up to the point where it is discharged through a connection to the POTW system. The commenter (A-90-19: IV-D-33) contended, however, that the POTW is responsible for "transport" of the wastewater from the plant site to the POTW and for treatment of the industrial wastewater at the POTW. The commenter (A-90-19: IV-D-33) suggested that wastewater should no longer be regulated under the HON once it is discharged to a POTW.

Response: To ensure control of HAP emissions from wastewater, the EPA continues to require owners or operators to certify that any Group 1 wastewater stream that is sent offsite for treatment is controlled for air emissions in accordance with the HON. Without this requirement, nothing would prevent owners or operators from sending untreated wastewater to an offsite location where HAP's could be emitted. Even if the offsite location was a permitted POTW, the CWA may not require a reduction in HAP emissions that is equivalent to the HON, therefore owners or operators of SOCMI plants shall either comply with the requirements of the HON onsite or ensure that equivalent emission suppression and treatment techniques are used. Refer to section 6.0 in BID volume 2D for additional information about the overlap of the HON with other regulations.

However, the EPA has clarified §63.132(i)(2) to allow wastewater treatment offsite by facilities that meet the provisions of today's regulation, or a federally-approved alternative standard. The proposed rule would have required that a source treating wastewater covered by this rule meet only the applicable treatment requirements contained therein, unintentionally excluding sources where alternative standards in lieu of this regulation have been issued to the wastewater-treating source. Specifically, acceptable alternative standards include those granted under §63.102(c), where equivalent emission reductions have been demonstrated; and subpart D, the Early Reductions provisions, where a source has been granted a 6-year extension from meeting the provisions of this rule, in return for achieving reductions several years earlier than otherwise required and accepting a mass emissions "cap" limiting HAP emissions to 10 percent or less of what they were prior to reductions. While the latter alternative may or may not be as stringent as the provisions of this rule, the achievement of emission reductions earlier than otherwise required more than makes up for a tighter section 112(d) standard, and the emissions cannot exceed the alternative standard, including emissions from additional wastewater treated by the source. At the end of the Early Reductions compliance extension, the source must meet today's standards. Both types of alternative standards are subject to public review and comment and will become title V permit conditions.

Comment: One commenter (A-90-19: IV-D-32) argued that SOCMI plants that discharge wastewaters to POTW's should not be required to notify the POTW of such discharges, and should not have to demonstrate compliance with §§63.133 through 63.138 of the HON. Several commenters (A-90-19: IV-D-32; IV-D-86; IV-D-73) advised that indirect discharges be controlled under a future MACT standard for POTW's. One commenter (A-90-19: IV-D-32) suggested that generators of Group 1 wastewaters manage them as required by the HON up to the point of discharge to the POTW collection system, at which point the existing CWA regulatory programs should take precedence.

Response: The EPA disagrees with the commenters' suggestion to allow generators of Group 1 wastewater streams to manage such streams only up to the point of discharge to a POTW. The existing CWA regulatory programs require POTW's to comply with pollutant effluent limitations, which do not control air emissions. For this reason, the EPA continues to require generators of Group 1 wastewater streams to ensure that the receiving POTW is in compliance with all applicable requirements in §63.133 through §63.139 of the HON.

Comment: One commenter (A-90-23: IV-D-2) claimed that for materials that are easily biodegraded, the requirement to treat prior to discharge to a biological treatment system or to a POTW should be eliminated.

Response: The HON does not require treatment of wastewater prior to discharge to a biological treatment unit or a POTW. In §63.132(i) of the final rule, the HON does require suppression of emissions in accordance with §63.133 through §63.137 during transport from the point of generation to the waste management unit.

Comment: One commenter (A-90-19: IV-D-33) stated that the requirements in proposed §63.138(l) should be expanded to allow an exemption if the wastewater is treated pursuant to OCPSF 40 CFR Part 414 regulations, which are detailed in a CWA permit. The commenter (A-90-19: IV-D-33) stated that proposed §63.138(l) allows wastewater that is managed in compliance with a final permit under 40 CFR Part 270 (i.e., RCRA) to be exempt from certain HON wastewater provisions. To illustrate the similarity between RCRA permit requirements and CWA permit requirements, the commenter (A-90-19: IV-D-33) provided a portion of an NPDES permit, which requires extensive monitoring recordkeeping and reporting requirements to ensure compliance.

Response: The EPA clarifies that proposed §63.138(l) does not allow reduced requirements under the HON when treating wastewater using any treatment unit that is permitted under RCRA 40 CFR part 270, but rather allows reduced requirements only for those permitted RCRA treatment units that already meet the requirements of the HON. The EPA has not expanded proposed §63.138(l) [which is §63.138(m) in the final rule] to specifically include treatment that is performed in accordance with OCPSF requirements in 40 CFR part 414; however, nothing in the HON precludes an owner or operator from using such treatment to achieve compliance with the HON. In addition, owners or operators may demonstrate compliance with the HON through the use of the records and reports that are required by the OCPSF rules.

4.2.4 Underground Injection Wells

Comment: Three commenters (A-90-19: IV-D-32; IV-D-61; IV-D-112) stated that the requirements in proposed §63.138(l) should clearly state that all wastewater streams destined for disposal via an underground injection well are exempt from all requirements of proposed §63.138(e),(h),(j), and (k). The commenters (A-90-19: IV-D-32; IV-D-61; IV-D-112) also stated that the EPA should extend the exemption which is currently limited to RCRA permitted wells, to include any underground injection well permitted under 40 CFR 144-147. One commenter (A-90-19: IV-D-61) asserted that Class I nonhazardous wells have construction, operating, testing, monitoring, and reporting requirements identical to RCRA wells, with the exception that a "no migration" petition is not required for the permitting of a nonhazardous well.

Response: The EPA agrees with the commenters that the exemption in §63.138(m) of subpart G of the final rule should be expanded to include not only Class I hazardous waste wells that are permitted under RCRA in 40 CFR part 270, but also Class I nonhazardous wells, Class II, III, IV, and V wells permitted under 40 CFR 144. The EPA has expanded this provision to include additional categories of injection wells reasoning that once a wastewater is pumped into the ground, no air emissions will result. The owner or operator of a SOCMI facility who sends wastewater for disposal via an underground injection well must ensure that air emissions are suppressed in the collection and conveyance system for all Group 1 wastewater streams and that such a system is in compliance with all applicable HON requirements prior to the point where the wastewater is pumped into the ground.

4.3 GROUP 1/GROUP 2 DETERMINATION

Comment: One commenter (A-90-19: IV-D-33) stated that, since §63.144(b) of the proposed rule allows the use of engineering calculations to define the wastewater characteristics at the point of generation and such calculations may be based on samples taken at the first air/water interface, these calculations should also be available to determine Group 1/Group 2 applicability at the first air/water interface.

Response: The provisions in §63.144 of subpart G in the final rule include the test methods and procedures allowed for determining applicability of the HON wastewater provisions (i.e., whether a wastewater stream meets the flow and concentration criteria in the definition of "wastewater stream") and for determining Group 1/Group 2 status. In the final rule, the title of §63.144 of subpart G has been revised to clarify that the procedures in that section are for both applicability and Group 1/Group 2 determination.

Comment: One commenter (A-90-19: IV-D-77) stated that the EPA should change the minimum average flow rate for Group 1 wastewater streams at new sources from 0.02 ℓpm to 12 ℓpm for continuous flow streams, because equipment is not commercially available to treat streams with a flow less than 12 ℓpm.

Response: The EPA clarifies that process wastewater streams may be treated on an individual or a combined basis. An owner or operator may combine Group 1 process wastewater streams for treatment. The EPA also assumed that the wastewater streams that are subject to the wastewater provisions would be collected in a holding tank before being sent to the control equipment. Holding tanks can be used to equalize the flow of the wastewater to the control device. Therefore, wastewater streams with low flow rates can be collected in a holding tank and then pumped to the control device at the appropriate flow rate when the holding tank is full.

Comment: One commenter (A-90-19: IV-D-85) claimed that the EPA should lower the total VOHAP average concentration for Group 1/Group 2 criteria for existing sources to 10 ppmw to prevent emissions from wastewater streams which contain more hazardous or more volatile pollutants than benzene. The commenter (A-90-19: IV-D-85) also suggested that the 10 ppmw concentration cutoff apply to all HAP's regulated by the HON, and not just table 9 compounds. The commenter (A-90-19: IV-D-85) stated that the Act requires regulation of all compounds listed in section 112(b). The commenter (A-90-19: IV-D-85) expressed concern about the total emissions from compounds on table 1 that may be generated and not controlled because the Group 1/Group 2 criteria for existing sources is based on the concentration of only table 9 compounds.

The commenter (A-90-19: IV-D-85) recommended that the EPA eliminate cutoffs for existing sources, so that facilities will not be encouraged to pipe new source wastewater streams into existing systems. The commenter (A-90-19: IV-D-85) stated that if the EPA continues to require a concentration cutoff of 10 ppmw for new sources, the cutoff should apply to aggregated VOHAP's from all chemicals regulated under the rule or at least apply to aggregated table 8 compounds. The commenter (A-90-19: IV-D-85) claimed that a wastewater stream containing a total of 10 ppmw of several table 8 compounds is as significant as a waste stream containing 10 ppmw of a single table 8 compound.

Response: After reviewing the impact that the HON will have on existing SOCMI sources, the EPA is not lowering the Group 1/Group 2 determination criteria for compounds listed on table 9. The wastewater provisions in the HON focus on controlling air emissions from wastewater collection and treatment systems. The compounds listed on table 9 represent those volatile organic HAP's which will be emitted from wastewater if they are not controlled. The inorganic HAP's in section 112 of the Act will not be emitted into the air from wastewater handling and treatment operations. Thus, it is not necessary or appropriate to include them as regulated compounds. Many of the HAP's cannot exist in water because they react to form other compounds. Other organic compounds have inherent characteristics such that they are not emitted to the air, and the EPA finds no purpose for requiring emission suppression and treatment for chemicals with no potential to emit. In the case of cooling towers, the EPA does require the owner or operator to monitor for all HAP's listed on table 1 of subpart F because the cooling tower acts as an air stripper, which could generate air emissions from HAP's that are not on table 9 of subpart G.

In response to the commenter's concern that the control requirements for both new and existing sources should be based on a concentration of $\geq$ 10 ppmw, the EPA states that the wastewater provisions for new sources were established based on the best-controlled similar source at the floor. The best-controlled similar sources were subject to the Benzene Waste NESHAP (40 CFR part 61, subpart FF) and the Vinyl Chloride NESHAP (40 CFR part 61, subpart F), which require control of streams containing greater than or equal to 10 ppmw benzene or vinyl chloride. The EPA does not know of any source using steam stripping to treat wastewater streams that contain a total loading of 10 ppmw organic. Thus, requiring such a level of control would constitute control beyond the floor.

At the floor, the cost effectiveness of control for the proposed option was $495 per megagram. The EPA estimates that the cost effectiveness of implementing the commenter's preferred option would be $1,690 per megagram. The EPA has determined that the cost of implementing the commenter's option, which is more stringent than the floor, is burdensome and prohibitive.

Comment: One commenter (A-90-19: IV-D-85) recommended that the EPA regulate all wastewater streams from new and existing sources with a flow rate greater than 0.02 ℓpm regardless of their concentration. The commenter (A-90-19: IV-D-85) suggested that only streams falling below stringent concentration and flow rate limits should qualify for exemption. The commenter (A-90-19: IV-D-85) expressed concern about emissions from wastewater streams with low flow rates and high concentrations. The commenter (A-90-19: IV-D-85) claimed that the EPA has provided no justification for the Group 1/Group 2 determination flow rate and concentration criteria for existing sources other than cost-effectiveness and that the cost-effectiveness justification does not make sense in light of the low cost of treating wastewater streams.

Response: The concern expressed by the commenter is addressed by §63.132(g)(1) which states that process wastewater streams with either (1) a total VOHAP average concentration of table 9 compounds greater than 10,000 ppmw and any flow rate, or (2) a total VOHAP average concentration is greater than or equal to 1,000 ppmw and the average flow rate is greater than or equal to 10 ℓ/m, are Group 1 streams. The wastewater provisions of the HON require treatment of Group 1 wastewater streams. The commenter did not provide documentation supporting the statement that the cost-effectiveness approach used by the EPA in determining the applicability criteria for the wastewater provisions was unfounded. The commenter also did not provide any information on the cost of wastewater treatment. The details of the EPA's cost analysis were described in the proposed BID and revisions to the analysis are documented in memoranda in the docket. The EPA is required by §112(d)(2) of the Act to consider cost in establishing MACT standards.

4.3.1 Testing at Peak Levels for Applicability Determination

Comment: Several commenters (A-90-19: IV-D-32; IV-D-77) (A-90-23: IV-D-20) stated that the EPA should change the language defining "annual average flow rate" in §63.144(e)(1) to clarify that the maximum annual average production capacity should be used to calculate the annual average flow rate. The commenter (A-90-19: IV-D-32) stated that the EPA should clarify in §63.144(e)(2) that the selection of the "highest average flow rate" as referred to in §63.144(e)(2) is the same as the annual average flow rate. One commenter (A-90-23: IV-D-20) stated that §63.144(e)(3) should allow a source to use process knowledge to estimate the flow rate at the point of generation, which would be consistent with the option allowed in §63.144(e)(1).

Response: The language defining "annual average flow rate" in proposed §63.144(e)(1) has been revised in §63.144(c) of the final rule to clarify that the maximum annual average production capacity should be used in estimating the annual average wastewater flow rate or the total annual wastewater volume. The term "average flow rate" has been revised to read "annual average flow rate" to further clarify the intent of the procedures in §63.144(c) in the final rule. Owners or operators who desire to use process knowledge to estimate the annual average flow rate can use the provisions of §63.144(c).

4.3.2 Determining VOHAP Concentration

Comment: One commenter (A-90-19: IV-D-64) stated that in §63.144(b)(1) engineering judgment could be a satisfactory basis for concluding that the VOHAP concentration in a stream will be minimal. For example, the commenter (A-90-19: IV-D-64) stated that if the pressure of steam in a heat exchanger will always be higher than the pressure of the process fluid being heated or cooled, the probability of a HAP leak into the steam and eventually into the steam condensate system will be extremely low. The commenter (A-90-19:

IV-D-64) requested that such an example be added to the final rule.

Response: The EPA agrees with the commenter (A-90-19: IV-D-64) that engineering judgement is an allowed method for determining the VOHAP concentration in a wastewater stream for applicability and Group 1/Group 2 determination. The provisions in §63.144(b)(3) of the final rule specifically allow knowledge of the wastewater for determining the VOHAP concentration, provided the owner or operator has proper information to document the engineering judgement. Section 63.104 of subpart F exempts heat exchange systems operating at a pressure at least 35 kilopascals greater than the maximum pressure on the process side from the heat exchange system requirements. Heat exchangers using steam as the heating fluid are regulated by subpart G. However, §63.144(b) does not cite specific examples of how process knowledge can be used to determine the VOHAP concentration in a wastewater stream. The owner or operator would only need to provide documentation of the pressure of the steam and the pressure of the process fluid to demonstrate that the VOHAP concentration in the steam condensate is negligible.

Comment: One commenter (A-90-23: IV-D-20) suggested that §63.144(b) should be modified to allow an owner or operator to determine the average VOHAP concentration based on "process wastewater," rather than "wastewater stream," since both Group 1 and Group 2 wastewater streams include only process wastewater.

Response: Group 1/Group 2 determinations are made for wastewater that is discharged from a chemical manufacturing process unit to an individual drain system. The EPA has added a separate definition for "process wastewater" to the final rule to further clarify which wastewaters are subject to Group 1/Group 2 determinations.

Comment: Two commenters (A-90-19: IV-G-10) (A-90-23: IV-G-5) were unsure if the total volatile portion of the organic HAP meant the total VOHAP average concentration of only table 9 compounds. The commenters (A-90-19: IV-G-10)

(A-90-23: IV-G-5) claimed that there are compounds that do not appear on table 9 of §63.131 or table 1 of §63.104 that are volatile and that are included in the list of SOCMI production process chemicals regulated under subparts F and G. The commenter (A-90-23: IV-G-5) gave acetone as an example.

Response: The EPA clarifies that only those HAP's listed on table 8 and table 9 of subpart G are included in the determination of total VOHAP average concentration for the HON. Table 9 contains only those volatile organic HAP's for which the EPA has identified a potential to be emitted from wastewater. Table 8 is a subset of table 9 and contains compounds which have a volatility equal to or greater than the volatility of benzene, as defined by the Henry's law constant.

Acetone is not a HAP and is therefore not regulated under the HON. However, acetone is listed as a SOCMI production process subject to the HON in table 1 of subpart F because the acetone production process uses HAP compounds as raw materials which may be released to the environment.

Comment: One commenter (A-90-19: IV-D-73) supported the provisions which allow alternatives to direct measurement by EPA methods when determining VOHAP concentration at the point of generation.

Response: Section 63.144(b) of the final rule presents the different ways that an owner or operator can determine the VOHAP concentration for the point of generation. The provisions allow knowledge of the wastewater, bench-scale or pilot-scale test data, and direct measurement by EPA methods. The EPA has allowed alternatives to direct measurement to provide flexibility to owners or operators of a facility where other methods are sufficient.

4.3.3 Sampling at Point of Generation

Comment: One commenter (A-90-19: IV-D-46) advised that point of generation sampling may not be possible for tanks that are inaccessible, pressurized, constructed of special materials, or designed to flow to a common drain header.

Response: The EPA clarifies that sampling at the point of generation is not required. Owners or operators can use knowledge of the wastewater or bench-scale or pilot-scale test data; or may designate a single wastewater stream or a mixture of wastewater streams as a Group 1 wastewater stream without sampling at the point of generation.

Comment: One commenter (A-90-19: IV-D-46) suggested that point of generation sampling decisions be made by facility operators based on the product and system characteristics.

Response: In both the proposed and final rule, the EPA allows an owner or operator to apply knowledge to determine wastewater characteristics at the point of generation. In the final rule, both the total VOHAP average concentration or the average VOHAP concentration of each individual organic HAP and the annual average flow rate may be determined downstream of the point of generation at a location when two or more wastewater streams have been mixed and prior to treatment. However, the owner or operator must make corrections for any changes in VOHAP concentration and flow rate due to the mixture of wastewater streams. The EPA clarifies that the point of generation is a fixed point, as defined in the final rule.

Comment: One commenter (A-90-19: IV-D-89) reported that there were no sampling techniques specified for wastewater. The commenter (A-90-19: IV-D-89) stated that only the water phase of a sample should be analyzed because the hydrocarbon phase is usually recovered and recycled to the process. The commenter (A-90-19: IV-D-89) claimed that the hydrocarbon phase should only be analyzed if it enters an uncontrolled waste treatment unit.

Response: The EPA clarifies that Method 25D provides sampling methods and procedures for wastewater. The EPA disagrees that only the water phase of a sample should be analyzed because the total VOHAP concentration defines whether a wastewater stream is Group 1 or Group 2. Without analyzing the entire sample, HAP emissions would occur without control even if the oil was eventually recycled. Total VOHAP is determined at the point of generation or downstream of the point of generation if corrections are made for any HAP losses that occur after the point of generation.

5.0 COMPLIANCE OPTIONS

5.1 TARGET REMOVAL EFFICIENCIES

Comment: One commenter (A-90-19: IV-D-56) suggested that removal efficiency variances be allowed because removal efficiencies are dependent on the matrix of compounds in the wastewater and many of the strippability group A compounds cannot achieve the 99 percent target removal efficiency. The commenter (A-90-19: IV-D-56) suggested that the variance procedure be similar to the Clean Water Act Fundamentally Different Factor (FDF) variance. The commenter (A-90-19: IV-D-56) attached two reports entitled, "Development of Unit-Specific Predictive Emissions Equations for Chlorinated Hydrocarbons", and "Using Unit-Specific Correlations to Improve Equipment Emissions Inventory Estimates" which the commenter stated include data on variable removal efficiencies. The commenter also attached the executive summary of a report entitled, "Supplemental FDF Information."

Response: The two reports attached by the commenter ("Development of Unit-Specific Predictive Emissions Equations for Chlorinated Hydrocarbons," and "Using Unit-Specific Correlations to Improve Equipment Emissions Inventory Estimates") discuss the development of unit-specific equipment leak correlations and contain no data on wastewater or steam stripper removal efficiencies. Therefore, these reports do not support the allowance of a removal efficiency variance.

The executive summary submitted by the commenter contains a brief discussion regarding three steam strippers operated by the facility. The focus of the executive summary is that one of the steam strippers is unable to meet the chloroform discharge limits required by 40 CFR part 414 subpart J, which regulates the direct discharge of wastewaters from the OCPSF industry. The report does not present any data that demonstrate that the wastewater treatment requirements under §63.138 of the HON cannot be achieved by any of the three steam strippers. Specifically, the executive summary does not discuss the actual chloroform removal efficiencies of the steam strippers. Therefore, the executive summary does not support the allowance of a removal efficiency variance.

Comment: Two commenters (A-90-19: IV-F-1.2 and IV-F-4) (A-90-23: IV-D-4) stated that the proposed HON provided no evidence that the design steam stripper can achieve the target removal efficiency for strippability groups A, B, and C in table 9 of the proposed HON. Two commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-58) stated that the EPA had selected a target removal efficiency for strippability groups B and C based on the most volatile compounds in each group, thereby overestimating strippability for most compounds. One commenter (A-90-19: IV-D-32) stated that the target removal efficiencies for group B and group C compounds should be consistent with the true strippability for each compound using steam stripping. The commenter (A-90-19: IV-D-32) stated that the chemical-specific strippability data found in table 33 of the proposed rule was inconsistent with the target removal efficiencies in table 9. The commenter (A-90-19: IV-D-32) contended that a full-scale steam stripper cannot achieve the strippabilities required in the proposed regulation for some group B and group C compounds. Several commenters (A-90-19: IV-D-73; IV-D-79; IV-F-1.2 and IV-F-4) (A-90-23: IV-D-4) concluded that compounds at the lower end of the range of volatility in these two groups cannot be removed at the efficiency required even using the design steam stripper.

As an alternative, several commenters (A-90-19: IV-F-1.2 and IV-F-4; IV-D-32) (A-90-23: IV-D-20) recommended determining target removal efficiencies for each compound individually or removing the low volatility compounds from the list. Several commenters (A-90-19: IV-D-55; IV-D-58; IV-D-77; IV-D-79) (A-90-23: IV-D-4; IV-D-18) expressed concern that the Fr factors for several HAP's (e.g., methanol, 2,4-dinitrotoluene, and MTBE) in table 33 are unachievable using the RCT and requested that the EPA provide public documentation that the given removal efficiencies are achievable. One commenter (A-90-23: IV-D-4) stated that the use of a simple Henry's law model is not adequate estimating target removal efficiencies for all HAP's.

One commenter (A-90-19: IV-D-32) suggested that the EPA use ASPEN simulations for at least 25 HAP's that fully represent the range of volatilities in strippability groups A, B, and C in order to establish the points for a more accurate regression analysis. The commenter (A-90-19: IV-D-32) suggested that a logit transformation of the strippability and the logarithm of the Henry's law coefficients for each of the simulated chemicals could be used to develop a regression equation for estimating Fr values as a function of Henry's law constants. The commenter (A-90-19: IV-D-32) provided data in appendix K of the comment letter recommending that the EPA use the Kremser equation to individually simulate the strippability for each regulated HAP.

One commenter (A-90-19: IV-D-73) stated that based on simulation models, many steam strippers that are different from the design steam stripper can achieve the same or greater removal efficiencies than the design steam stripper. The commenter (A-90-19: IV-D-73) claimed that the owners of these steam strippers are penalized because they would be subject to a performance test showing HAP removal efficiency.

Response: The EPA clarifies that the basis for the HAP target removal efficiencies achieved by the design steam stripper was documented at proposal, although this basis was not discussed in the proposal BID. For the proposed rule, steam stripper performance was documented in a memorandum titled "Approach for Estimating Emission Reductions of Hazardous Air Pollutants from Wastewater Streams in the HON," (Docket No. A-90-23, Item II-B-5). For the final rule, steam stripper performance is documented in a memorandum titled "Estimating Steam Stripper Performance and Size." The EPA further clarifies that the Kremser equation was used to estimate both group target removal efficiencies for the proposed HON and individual HAP compound target removal efficiencies for the final regulation. At proposal, ASPEN was used to predict the removal efficiency (Fr) for five example organic compounds with Henry's law constants that spanned the possible range of Henry's law constants. The Fr values of the five compounds were plotted versus their Henry's law constants, and algorithms were used to develop the Fr values for the remaining HAP's ("Approach for Estimating Emission Reductions of Hazardous Air Pollutants from Wastewater Streams in the HON," Docket No. A-90-19: Item II-B-5). For the final rule, each Fr value was individually calculated using the Kremser equation. The EPA is not familiar with the term "logit" transformation used by the commenter, and therefore, cannot respond to the suggestion for its use.

The EPA agrees that the target removal efficiencies for the HAP's regulated under the wastewater provisions of the HON rule should be consistent with the Fr value for each individual compound. Therefore, the final rule has been revised such that the treatment provisions, which were based on target removal efficiency groups in the proposed rule, are based on the individual compound target removal efficiencies in the final rule.

The basis is not clear for the statement made by one commenter that the use of a model based on Henry's law is not adequate for estimating HAP target removal efficiencies. The commenter cites a comparison between the methanol removal efficiency in the proposed HON (70 percent), the methanol removal efficiency predicted in an ASPEN simulation (13 percent) and the methanol removal efficiency measured in a 1992 EPA contract report (47 percent) [Treatment of Pharmaceutical Waste by Steam Stripping and Air Stripping, EPA

Contract No. 68-CO-000, Risk Reduction Engineering Laboratory, Cincinnati, September 1992]. The revised steam stripper performance calculations performed by the EPA for the final HON indicate that the methanol target removal efficiency of the design steam stripper is 31 percent. This is less than the average 47 percent measured in actual stripping, as cited by the commenter. The ASPEN simulation cited by the commenter assumed the wastewater feed enters the steam stripper at 35 ^{o}C. The EPA analysis assumes the wastewater feed enters the steam stripper at 95 ^{o}C. This accounts for the difference between the EPA estimate of 31 percent and the ASPEN estimate cited by the commenter (13 percent). The EPA concludes that the Kremser equation, which uses the Henry's law constants, is adequate for estimating target removal efficiencies for individual compounds and that the target removal efficiencies in the final HON are achievable by the design steam stripper.

The EPA clarifies that owners or operators using steam strippers which differ from the design steam stripper as presented in §63.138(g) to comply with §63.138(b)(1), (c)(1), or (d) can either demonstrate compliance based on design evaluation that meets the requirements of §63.138(j)(1) or performance tests that meet the requirements specified in §63.145.

Comment: Several commenters (A-90-19: IV-D-75; IV-D-58) (A-90-23: IV-D-4) claimed that selecting a single target removal efficiency for a group of compounds makes it impossible to demonstrate equivalency using an alternate control option. One commenter (A-90-19: IV-D-110) stated that if the EPA relies on incorrect strippability estimates and target removal efficiencies, facilities that are attempting to demonstrate equivalency of alternate control technologies will be comparing their performance to levels of performance that cannot be reached by the proposed RCT. Two commenters (A-90-19: IV-D-32; IV-D-77) expressed concern that because facilities will be required to use the strippabilities in table 33 of the proposed rule to demonstrate equivalency of alternate control technologies to the designated RCT, the facilities will actually be comparing the performance of alternate systems to a level of performance that cannot be achieved by the EPA's design steam stripper. The commenters (A-90-19: IV-D-32; IV-D-77) contended that if the design steam stripper cannot achieve the strippability values in table 33 of the proposed rule, then alternate control technologies should not be compared to these values.

Response: The EPA has revised the Fr values based on revised Henry's law constants at 100 °C and a steam-to-feed ratio of 0.04 kg of steam per liter of wastewater. The revised Fr values were estimated using the Kremser equation for each of the HAP's regulated under the wastewater provisions of the final rule. The analyses conducted by the EPA demonstrated that the design steam stripper can achieve the target removal efficiencies. For the final rule, steam stripper performance is documented in a memorandum entitled "Estimating Steam Stripper Performance and Size."

Comment: Several commenters (A-90-19: IV-D-104; IV-D-108) (A-90-23: IV-D-1) stated that the target removal efficiencies in table 9 are inappropriately defined, because the strippability requirements do not account for multi-component streams or variable inlet concentration of HAP's. One commenter (A-90-23: IV-D-1) contended that owners will experience difficulty in achieving the current percent reductions for wastewater streams with low concentrations of HAP's. As an example, two commenters (A-90-23: IV-D-1; IV-D-4) cited data on the strippability of methanol from a study entitled, "Treatment of Pharmaceutical Wastewater by Steam Stripping and Air Stripping," published in a September 1992 report by Radian Corporation subcontracted to Battelle Memorial Laboratories under U.S. EPA Contract No. 68-CO-0003. Another commenter (A-90-19: IV-D-32) stated that the results of this study demonstrate that oxygenated organic compounds are poorly steam stripped. One commenter (A-90-23: IV-D-1) stated that the study also presents variable strippabilities for other organic HAP's. Several commenters (A-90-19: IV-D-104; IV-D-108) (A-90-23: IV-D-1) claimed that the strippability requirements in proposed table 9 of §63.131 are overestimated and unobtainable in an operating facility with multi-component streams, because such streams exhibit variable strippabilities.

Response: The report referenced by the commenter does not substantiate the commenter's claim that the strippability requirements are overestimated, and that multicomponent streams will exhibit variable strippabilities.

The purpose of the report was to obtain sufficient data to establish numerical effluent limitations for the pharmaceutical industry for specific volatile organic compounds based on steam stripping, and for ammonia based on air stripping. In the report, three different wastewaters were studied. For each wastewater, the organic compound removal efficiencies of the steam stripper were determined at different steam-to-feed ratios. The report presents steam stripper removal efficiencies for five table 9 HAP's: chloroform, methanol, MIBK, methylene chloride, and toluene. Other table 9 HAP's, if present in the wastewater, were reported as below the detection limit in the steam stripper influent and effluent, making it impossible to estimate the removal efficiency. The study results generally agree with EPA's revised estimates for the removal efficiencies for chloroform, MIBK, methylene chloride, and toluene.

The report indicates that the removal efficiency of methanol does show some variation. The report states that "the difficulty in accurately measuring the methanol concentrations in the feed and effluent streams is a likely contributing factor to the poor comparison between the computer simulation modeling results and experimental data." Difficulties with accurately measuring the methanol concentrations in the wastewater is indicated by data which show decreases in the methanol removal efficiency of the steam stripper as the steam-to-feed ratio increases. In reality, the methanol removal efficiency will increase as the steam-to-feed ratio increases. The report itself does not consider multicomponent interactions as a possible contributing factor to the variation in methanol removal variation. The EPA also notes that it is difficult to evaluate matrix effects and an infinite number of combinations exist which would require evaluation.

Comment: A commenter (A-90-23: IV-D-1) from a pharmaceutical company suggested that the outlet concentration resulting from treatment of wastewater should be used as a compliance option in lieu of target removal efficiencies. The commenter (A-90-23: IV-D-1) suggested that the outlet concentration of organic HAP's be established based on the inlet concentration instead of set at a single level with no regard to inlet concentration. The commenter (A-90-23: IV-D-1) claimed that facilities with wastewater streams having low concentrations would not be able to obtain the required percent reduction and proposed that the percent reduction requirement be replaced with a maximum steam stripper outlet concentration for each HAP.

Response: The commenter (A-90-19: IV-D-1) did not define what was meant by "low" concentration and did not provide any information showing that "low" concentration streams cannot achieve the required percent reduction. The definition of wastewater includes a threshold VOHAP concentration so that "low" concentration streams are not subject to the wastewater provisions of the HON. In order to be subject to the wastewater provisions of the HON, a wastewater stream must have a VOHAP concentration of at least 5 ppmw. Furthermore, there are VOHAP concentration thresholds associated with the control requirements for wastewater. For existing sources, the threshold VOHAP concentration for control is 1,000 ppmw and for new sources, the threshold VOHAP concentration for control is 10 ppmw. The EPA has calculated new compound-specific strippabilities which represent the target removal efficiencies for each compound. The EPA has determined, using the Kremser equation, that these removal efficiencies can be achieved in the design steam stripper for all Group 1 wastewater streams, regardless of their inlet concentration to the steam stripper. There are also other options that can be used to comply with the wastewater provisions in lieu of meeting the required percent reduction. For example, new sources can reduce the average VOHAP concentration of each HAP listed in table 8 of subpart G in the wastewater stream to below 10 ppmw.

Comment: One commenter (A-90-19: IV-D-73) agreed with the provisions in §63.138(c)(6)(i)(B) which allow determination of the VOHAP mass flow rate at the outlet of a treatment device that treats to less than reference control levels for purposes of determining the source-wide VOHAP mass flow rate for table 9 compounds. The commenter (A-90-19: IV-D-73) also supports the provision in §63.138(c)(6)(i)(C) which excludes Group 1 wastewater streams that are treated to reference control levels from the total source VOHAP mass flow loading determination claiming that both of these provisions provide incentive for pollution prevention.

Response: The EPA appreciates this support and agrees with the commenter that these provisions provide incentives for pollution prevention. However, the EPA clarifies that any Group 1 wastewater that is treated to comply with §63.138(c)(6) must comply with all applicable requirements in §63.133 through §63.139 until the treated wastewater is discharged.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-78) (A-90-23: IV-D-20) contended that the EPA should establish in §63.139(b)(4) a concentration-based cutoff of 20 ppmw for noncombustion control devices as allowed in §63.139(b)(1)(ii) for combustion devices.

Response: The EPA continues to require non-combustion control devices (i.e., recovery devices), except flares, to reduce emissions by 95 percent. An outlet concentration of 20 ppmv is allowed for combustion devices as an alternative to achieving a 95-percent removal efficiency, because 20 ppmv is the lower concentration limit for which combustion devices can achieve their removal efficiencies. Recovery devices do not have limits on their removal efficiencies at concentrations of

20 ppmv. Flares do not have percent reduction or concentration requirements, but must meet the requirements in 40 CFR 63.11(b).

5.2 MAINTENANCE WASTEWATER

Comment: One commenter (A-90-19: IV-D-32) stated that the proposed start-up, shutdown, and malfunction plan requirements for routine maintenance wastewaters will be part of a plant's air permit, which will ensure proper management of the wastewater. Two commenters (A-90-19: IV-D-32) (A-90-23: IV-D-20) requested that the EPA omit the last sentence in §63.102(b)(1)(ii) and therefore allow each plant more flexibility in selecting a site-specific wastewater management option for control of routine maintenance wastewaters.

Response: The proposed requirements for maintenance-turnaround wastewater are addressed in the facility's start-up, shutdown, and malfunction plan. This plan must ensure that maintenance-turnaround wastewaters are properly managed and that organic HAP emissions released from these wastewaters are controlled. If a facility's air permit specifies the proper management of maintenance-turnaround wastewater, then the permit can be submitted as part of the facility's start-up, shutdown, and malfunction plan.

The EPA is changing the requirements for routine maintenance wastewater as proposed in §63.102(b). Routine maintenance wastewater will not be subject to the proposed requirements in §63.102(b)(1)(ii) but will be subject to the same requirements as listed for maintenance-turnaround wastewater in §63.102(b)(1)(i) of the proposed rule. In the final rule, provisions for maintenance wastewater are in §63.105.

Comment: One commenter (A-90-23: IV-D-17) was unsure whether or not the control of routine maintenance emissions requires that all process equipment be drained and purged of all process fluids before opening. The commenter (A-90-23: IV-D-17) claimed that the fugitive emissions caused by purging a vessel before maintenance are greater than the emissions from the vessel during maintenance if it was not purged. The commenter (A-90-23: IV-D-17) claimed that the added equipment used to purge a vessel is in continuous service, whereas maintenance procedures are periodic. The commenter (A-90-23: IV-D-17) asserted that the EPA has not accurately assessed the emissions from purging and provided data which compares emissions from maintenance activities and equipment leaks from purging. One commenter (A-90-23: IV-D-17) stated that data provided in their comment letter indicate that the cost of controlling emissions from maintenance wastewater under the Benzene Waste NESHAP is $140,000/ton. The commenter (A-90-23: IV-D-17) contended that the fugitive emissions from the purge and block valves, which were added as part of the emission control equipment, actually exceeded the emissions that required control under the Benzene Waste NESHAP. Therefore, the commenter (A-90-23: IV-D-17) concluded that no net emission reductions were achieved.

Response: It is assumed that the commenter (A-90-23: IV-D-17) may have misinterpreted the provisions in §63.102(b)(1)(ii) of the proposed rule which require that an owner or operator provide a description of the procedures used when emptying and purging equipment during periods not associated with a process unit shutdown. The provisions do not require that all process equipment be drained and purged of process fluids before opening. Rather, the provisions require that wastewater generated during emptying and purging be properly managed if a piece of process equipment needs to be drained and purged in order for maintenance activities to be performed. The provisions do not require the installation of any additional equipment (i.e., purge and block valves) for purging equipment during routine maintenance procedures.

The requirements in §63.102(b)(1)(ii) in the proposed regulation for routine maintenance wastewaters have been revised. Routine maintenance wastewaters no longer have to be collected and recycled, destroyed, or collected and managed in a controlled drain system. They are now subject to the proposed requirements for maintenance-turnaround wastewaters.

These requirements are not control requirements but are general "good housekeeping" requirements.

The commenter's (A-90-23: IV-D-17) estimate of emissions from purge and block valves assumes that these valves are in operation continuously. The EPA has determined that the commenter (A-90-23: IV-D-17) overestimated the emissions from purge and block valves, because these valves are only in service during maintenance activities. Purge and block valves are used to drain all process fluids before opening equipment in order to perform maintenance activities.

5.3 MANAGEMENT OF RESIDUALS

Comment: One commenter (A-90-23: IV-D-21) suggested that wastewater residuals should not be regulated by the HON, but rather in a separate MACT standard. The commenter (A-90-23: IV-D-21) questioned why wastewater residuals are regulated by the HON while process residuals are not.

Response: The EPA is not regulating wastewater residuals under a separate MACT standard as suggested by the commenter because no benefit would be gained by separating the organics from the wastewater if the organic residuals are not treated. The Act requires that MACT standards be developed for source categories. The HON is the MACT standard for the SOCMI source category. The SOCMI source comprises several emission points including wastewater collection and treatment systems. Because wastewater residuals may be generated as a result of compliance with the wastewater provisions of the HON, such residuals are regulated by §63.138(h) as part of HON.

The EPA assumes that the term "process residuals" means wastes that are generated at a SOCMI facility but not as a result of complying with the HON. Residuals that are not generated as a result of implementing the HON are not regulated by the HON. Other wastes generated at SOCMI facilities may be addressed by regulations such as RCRA.

Comment: One commenter (A-90-19: IV-D-73) suggested changing the requirement to destroy 99 percent of the total HAP mass in residuals to 99 percent of the total VOHAP mass.

Response: The EPA has not made the change suggested by the commenter in the final regulation because it would involve an incorrect use of the term "VOHAP". However, the EPA has clarified that the requirement to treat the residual to destroy the total combined HAP mass flow rate by 99 percent or more is determined by the procedures specified in §63.145(c) or (d). The requirement applies only to those HAP's listed in tables 8 and 9 of the final regulation. Refer to section 2.0 of this BID volume for discussion on the correct use of the term "VOHAP concentration."

Comment: One commenter (A-90-19: IV-D-64) expressed concern that the requirements in §63.138 for 99 percent reduction in a treatment process and for 99 percent destruction of each residual could be extended to conventional control technologies, such as flares, incinerators, process heaters, and condensers. The commenter (A-90-19: IV-D-64) stated that those devices do not always achieve 99 percent removal or destruction, yet would be considered satisfactory control devices for closed-vent systems as regulated in §63.139. The commenter (A-90-19: IV-D-64) requested that the EPA either clarify the definitions of "residual" and "treatment process" so that such control devices could not be considered treatment processes or lower the 99 percent destruction requirement to 95 percent. The commenter (A-90-19: IV-D-64) stated that part of the problem is the use of a waste incinerator example in the definition of "treatment process." The commenter (A-90-19: IV-D-64) stated that the EPA seems to indicate that treatment processes apply to liquids and control technologies apply to gases. The commenter (A-90-19: IV-D-64) requested that the EPA distinguish the differences.

Response: In the final rule, the EPA continues to allow (1) several options for controlling HAP emissions from wastewater in §§63.138(b), (c), (d), and (e) of subpart G, which includes the requirement for a 99 percent reduction of HAP emissions; and (2) three options for controlling HAP emissions from residuals in §63.138(h), one of which requires the treatment of residuals to destroy the total combined HAP mass flow rate by at least 99 percent. The commenter seems confused about the relationship between the control requirements for treatment processes, which are by definition used to comply with §63.138, and control devices which are used to comply with §63.139. Combustion devices which are used in conjunction with waste management units must achieve either a 95 percent reduction in the total organic compound emissions or an outlet total organic concentration of 20 ppmv. Any other control device used in conjunction with waste management units must achieve a 95-percent reduction in the total organic compound emissions. The EPA clarifies that both treatment processes used to comply with §63.138 and control devices used to comply with §63.139 may be used to treat both liquids and gases. The HON does not specify that certain technologies must be used to treat specific materials.

Comment: One commenter (A-90-19: IV-D-54) contended that §63.138(e)(1), which states that recycled wastewater streams or residuals "shall not be exposed to the atmosphere," is overly broad and unnecessary. The commenter (A-90-19: IV-D-54) stated that this requirement is unnecessary because §63.138(e)(2) requires these streams to comply with §63.133 through §63.137. The commenter (A-90-19: IV-D-54) requested that the intent of §63.138(e)(1) either be clarified or the paragraph be deleted.

Response: The provisions in §63.138(f)(1) of the final rule [which was §63.138(e)(1) in the proposed rule] are intentionally broad because the manner in which recycling of wastewater streams or residuals is conducted may vary considerably from facility to facility and may not involve management in waste management units, including those regulated under §63.133 through §63.137. The inclusion of the phrase "shall not be exposed to the atmosphere" is intended to provide for suppression and control of management units other than those regulated by §63.133 through §63.137.

Comment: One commenter (A-90-19: IV-D-78) recommended that facilities be allowed to treat the overheads from a design steam stripper as a process vent and apply the associated RCT (or otherwise achieve 98 percent HAP reduction) instead of being required to install a condenser.

Response: The requirement to install a condenser as part of the design steam stripper provisions in §63.138(g) has been removed from the final regulation. The EPA clarifies that each treatment process or waste management unit that receives, manages, or treats a Group 1 wastewater stream or residual removed from a Group 1 wastewater stream must comply with §63.138(i)(3)(i) through (i)(3)(iv) of the final rule. The emissions from the primary condenser on the steam stripper overheads must be routed to a control device designed and operated in accordance with §63.139.

5.4 AVAILABILITY OF SERVICE FIRMS

Comment: One commenter (A-90-23: IV-D-28) expressed concern regarding the lack of discussion in the HON of the services that commercial firms can provide to help SOCMI facilities comply with the HON. The commenter (A-90-23: IV-D-28) claimed that commercial firms can collect and treat wastewaters on or offsite and treat newly generated and historical wastes. The commenter (A-90-19: IV-D-28) was unsure of the control, monitoring, recordkeeping, and reporting requirements that would apply to onsite or offsite commercial firms which manage SOCMI wastewaters. The commenter (A-90-23: IV-D-28) suggested clarifying the requirements for commercial firms in the preamble to prevent rule violations.

Response: The EPA clarifies that the HON does not apply to service firms. If a SOCMI plant owner or operator elects to contract with a commercial firm, the SOCMI plant owner or operator is still responsible for ensuring that any Group 1 wastewater sent offsite for treatment is managed in accordance with the HON.

5.5 BIOLOGICAL TREATMENT

Comment: One commenter (A-90-19: IV-D-32) stated that the EPA's mathematical formulation for biological degradation in the WATER7 model and similar calculations in other acceptable simulation models correctly assume that sorption of HAP's to the biological solids is a negligible removal pathway. The commenter (A-90-19: IV-D-32) provided chemical-specific sorption data substantiating this statement.

However, another commenter (A-90-19: IV-D-85) stated that the EPA should account for VOC sorption onto sludge, which may cause air emissions during disposal of the sludge.

Response: The EPA agrees that sorption of VOC's onto sludge generated by biological treatment units is negligible. Therefore, VOC emissions resulting from the disposal of sludge generated by biological treatment units is insignificant. However, VOC contained in sludges generated by other sources, such as API separator's, where no biodegradation occurs, may be significant. Such sludges are defined as residuals in the rule, and must be treated to destroy 99 percent of the organic HAP content in the sludge. Therefore, emissions of HAP's from sludges are subject to the control requirements of the HON.

5.6 PROCESS UNIT ALTERNATIVE

Comment: One commenter (A-90-23: IV-D-2) claimed that the 10 ppm concentration threshold specified by the process unit alternative in §63.138(d) should be replaced by a vapor pressure threshold. The commenter (A-90-23: IV-D-2) indicated that streams with concentrations as low as 10 ppm would have very low emissions.

Response: The EPA disagrees with the commenter's suggestion to use a vapor pressure threshold instead of the 10 ppmw threshold in the process unit alternative of §63.138(d). The EPA established the process unit alternative control option to provide greater flexibility to facilities for complying with the HON. Also, if an owner or operator chooses to comply with the HON using this option, a Group 1/Group 2 determination is not necessary because all wastewater streams from the process unit are controlled. Changing the alternative control option to be based on a vapor pressure rather than a concentration is not consistent with the other compliance thresholds that are established in the rule. To comply with the process unit alternative, the EPA therefore continues to require the owner or operator to achieve a total VOHAP average concentration of 10 ppmw for each process wastewater stream exiting a process unit.

6.0 COMPLIANCE DEMONSTRATIONS

6.1 BIOLOGICAL TREATMENT

Comment: One commenter (A-90-23: IV-D-20) indicated that proposed §63.145(i)(1), which discusses the procedure for determining compliance, does not address the situation where a biological treatment system is used in conjunction with other treatment systems or when a biological treatment system is used but is vented to a control device. The commenter (A-90-23: IV-D-20) stated that such treatment options are currently in use at some SOCMI facilities and should therefore be addressed in the rule.

Response: Situations where a biological treatment system is used in conjunction with other treatment technologies are covered by §63.145. If the biological treatment unit meets the required mass removal provisions of §63.138(b)(1)(iii)(C), (c)(1)(iii)(D), or (e), then the owner or operator must demonstrate compliance by the corresponding procedures in §63.145.

A biological treatment unit which meets the required mass removal provisions is not required to be covered and vented to a control device.

In the example cited by the commenter, the biological treatment unit is vented to a control device. Therefore, the owner or operator must demonstrate compliance by the procedures in §63.145(f) and (h)(1), for wastewater streams which are Group 1 for table 8 HAP's, or by the procedures in §63.145(g) and (h)(1) for wastewater streams which are Group 1 for table 9 HAP's. These procedures may be used to demonstrate compliance with the required mass removal provisions for treatment devices other than biological treatment units. It should also be noted that the control device to which the biological treatment unit is vented must be in compliance with §63.139.

Comment: One commenter (A-90-19: IV-D-85) stated that the EPA should either delete the equations in §63.145(i)(2), which allows for the use of biological treatment in lieu of steam stripping, or make sure that the equation cannot lead to increased emissions. The commenter (A-90-19: IV-D-85) suggested that if the equations remain available for use, the EPA should further evaluate them in terms of likely performance with complex mixed streams. The commenter (A-90-19: IV-D-85) suggested that the equations should not be available for conditions that the EPA is unable to validate.

The commenter (A-90-19: IV-D-85) objected to the use of total HAP's as the single parameter governing the equation and stated that all high-risk pollutants should be considered. The commenter (A-90-19: IV-D-85) argued that no SOCMI facility should be able to use the equation to demonstrate compliance unless the wastewater treatment system is completely covered up to the biological treatment system.

Response: The equation referred to by the commenter appears at §63.145(i)(2) of the proposed rule, and at §63.145(h)(2) of the final rule. The equation cannot lead to HAP emission reductions less than those achieved by steam stripping because the equation is used to demonstrate that HAP emission reductions achieved are equivalent to or greater than those achieved by steam stripping, as provided for in the provisions stated in §63.145(h)(2). Additionally, the rule requires that all Group 1 wastewater streams be covered up until all treatment requirements in §63.138 are achieved.

The commenter is correct that the equation at §63.145(h)(2) estimates the total HAP emission reduction, and not the HAP emission reduction of individual HAP's. Section 112(d) of the CAA requires the EPA to develop technology-based standards which obtain the maximum reduction in HAP emissions. The CAA does not require individual speciation of each HAP and the cost of such a demonstration and the additional monitoring, reporting, and recordkeeping requirements are not warranted.

The EPA clarifies that the equation in §63.145(h)(2) can account for multi-component interactions. For example, the use of WATER7 with site-specific biokinetic parameters determined by the procedures in appendix C of part 63 will account for multi-component interactions.

6.1.1 Method 304

Comment: One commenter (A-90-19: IV-D-32) stated that the regulation should allow the use of biodegradation kinetic coefficients predicted from respirometric studies (i.e., UNIFAC fragment approach) and chemical structure in the biological treatment unit simulation models. Two commenters (A-90-19: IV-D-32), (A-90-23: IV-D-20) contended that the EPA should allow kinetic constants predicted by this methodology to be substituted for the default constants in WATER7, or to be used in other acceptable biological treatment simulation models to predict the relative fractions of volatilization and biodegradation in full-scale treatment systems for the purpose of demonstrating equivalency to the RCT.

Response: The EPA has revised the final rule to provide more flexibility in determining site-specific biodegradation constants, and has included these provisions in appendix C of part 63. These provisions allow facilities to perform site-specific testing as an alternative to Method 304A or 304B.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-34; IV-D-75) (A-90-23: IV-D-20) recommended that plants should be allowed to use procedures other than Method 304 and WATER7, which are still under development, for determining biodegradation kinetics and demonstrating that biological treatment provides effective control of HAP's. Two commenters (A-90-19: IV-D-32; IV-D-75) proposed that a table of acceptable procedures be included in the rule and that a separate document describing these procedures be published. Two commenters (A-90-19: IV-D-32; IV-D-75) claimed that there are better methods than Method 304 to predict biodegradation kinetics for WATER7. The commenters (A-90-19: IV-D-32; IV-D-75) stated that the inclusion of Method 304 and WATER7 in the regulation will discourage efforts to develop more reliable and less labor-intensive methods.

One commenter (A-90-19: IV-D-32) recommended the use of an alternative, direct method for determining the fraction of a HAP that is biodegraded and the fraction that is emitted to the air on a site-specific basis. One commenter (A-90-19: IV-D-34) stated that Method 304 should be deleted as a required test method to demonstrate biodegradation, and alternate test methods recommended by the CMA should be included.

One commenter (A-90-19: IV-D-75) claimed that neither Method 304 nor any other method should be required for biological treatment, because a biological treatment unit that is operated within the ranges of certain parameters has stable removal efficiency. The commenter (A-90-19: IV-D-75) stated that these parameters are sufficient for demonstrating compliance and achieving efficient removal of HAP's.

Response: The EPA is allowing two other options in addition to Methods 304A and 304B for demonstrating effective treatment with biological systems. These are outlined in appendix C of part 63, "Determination of Fraction Biodegraded (Fbio) in a Biological Treatment Unit." When an option to determine Fbio requires a model to be used, BASTE and TOXCHEM will be allowed, as well as WATER7. The options in appendix C are discussed more fully in section 4.3 of BID volume 2E.

Operating parameters are sufficient to show compliance once Fbio is determined (i.e., once the mass removal is determined to be based on biodegradation rather than volatilization). However, the EPA disagrees with the commenter's assertion that monitoring alone is sufficient for demonstrating compliance for biological systems. The EPA emphasizes that after the owner or operator demonstrates that compliance is achieved through biodegradation not volatilization, the operating parameters, which are based on operating conditions during the performance test, are adequate to show compliance.

The EPA is considering the commenter's suggestion to write a guidance document as a companion to appendix C of part 63.

Comment: One commenter (A-90-19: IV-D-32) stated that the regulation should be clarified to state that for new treatment systems, an engineering estimate of the design hydraulic retention time should be used in Method 304 when the full-scale system is not in operation.

Response: The EPA clarifies that the hydraulic retention time used for new systems not yet in operation must be the same as the hydraulic retention time of the system as it will be operated.

6.1.2 Compliance Issues

Comment: One commenter (A-90-19: IV-D-97) recommended that the EPA simplify compliance demonstrations for biological treatment units so that both large and small SOCMI facilities can continue to use their existing biological treatment units.

Response: The commenter did not discuss which aspects of compliance demonstration for biological units should be simplified or how the compliance demonstration requirements should be revised. The proposed and final wastewater provisions allow SOCMI facilities to use existing biological units for treating Group 1 process wastewater streams, provided that the level of treatment achieved is equivalent to the reference control technology.

Comment: One commenter (A-90-19: IV-D-85) stated that since the efficiency of biological treatment units is based on many variables, the EPA should require a high degree of proof from industry to show that a biological treatment unit can achieve an equivalent level of treatment as the level achieved by the design steam stripper.

Response: The EPA believes the final rule does require a high degree of proof from industry to show that a biological treatment unit can achieve a level of treatment equivalent to the RCT. The rule requires that the actual HAP mass removal achieved by the biological treatment unit as determined by the procedures in §63.145(h)(2) is equal to or exceeds the required mass removal as determined by the procedures in §63.145(f) for new sources or §63.145(g) for new and existing sources. The required mass removal is the mass removal that would be achieved by the RCT. Alternatively, the owner or operator can demonstrate the biological treatment unit is achieving 95 percent HAP mass reduction by the procedures in §63.145(i). Additionally, the owner or operator must select parameters to be monitored which will insure that the biological treatment unit will remain in compliance.

6.2 MONOD EQUATION AND ALTERNATIVE KINETICS FORMULAS

Comment: One commenter (A-90-19: IV-D-32) supported the EPA's selection of the Monod equation to simulate biodegradation kinetics in the WATER7 model. Three commenters (A-90-19: IV-D-32; IV-D-34; IV-D-75) requested that simulation models such as PAVE, TOXCHEM, BASTE, and CINCI be acceptable methods for demonstrating that an enhanced biological treatment system complies with the HON.

Response: The EPA agrees that alternative kinetics formulations can be used to simulate biodegradation kinetics when such a formulation is found to provide reasonable site-specific emission estimates. The EPA has added appendix C to 40 CFR part 63 to provide detailed guidance for demonstrating compliance with the provisions for biological treatment in the final regulation.

The EPA has not included the PAVE model in appendix C. The Henry's law value is an important input parameter for estimating emissions from wastewater. The PAVE model does not allow for the input of the Henry's law constant, and it is unclear if or how the PAVE model estimates this parameter. In addition, PAVE is designed to evaluate one chemical at a time and it calculates the biomass as an output. Models used in appendix C need to be able to evaluate multicomponent streams, and input the biomass for the system.

6.3 PERFORMANCE TESTING

Comment: One commenter (A-90-19: IV-D-85) stated that the proposed HON may not provide a reliable basis for evaluating the equivalence of biological treatment units. The commenter (A-90-19: IV-D-85) stated that the models used for demonstrating compliance of biological treatment units in the proposed HON are based on the Monod equation, which may not be an appropriate basis for evaluating biodegradation of toxic streams. The commenter (A-90-19: IV-D-85) referenced an article authored by Clay, S.G., Boud, Jr., A.F.; Rozich, A.F.; Moran, N.R., titled "Using Respirometry to Assess Waste Streams and Set Surcharges." Water Environment and Technology. June 1992, pages 60-65, which indicated that the Monod equation may be an unreliable predictor of the rate of biodegradation.

Response: The article cited by the commenter suggests that the Monod equation will not accurately predict the specific growth rate of biomass when inhibitory substrates are present. Biomass growth rate inhibition may occur when the biomass is exposed to unexpectedly high concentrations of organic compounds or organic compounds to which the biomass is not climatized. The article referenced by the commenter suggests that the Haldane equation can be used to predict the specific growth rate of biomass when inhibitory substrates are present.

Facilities in the SOCMI will operate their biological treatment units in a manner consistent with wastewater discharge permit requirements and will avoid upset conditions. Upset conditions, if they occurred, could contribute to inhibition of the biomass growth rate, resulting in violations of permitted discharge limits. Inhibition of the biomass growth rate is not expected to occur except upon infrequent abnormal operations.

Also, the owner or operator of a biological treatment unit used to comply with the HON must use the procedures specified in appendix C of part 63 to ensure compliance with the HAP emission control requirements in §63.138 of subpart G.

Comment: One commenter (A-90-19: IV-D-85) stated that proposed §63.145(a)(1), which requires performance tests for demonstrating compliance with the wastewater treatment provisions of §63.138 in the proposed regulation, is inadequate because plant operators are not required to conduct performance tests to estimate future credits and debits.

The commenter (A-90-19: IV-D-85) disagreed with the use of either "process knowledge" or "records" of the mass concentrations and flow rates to estimate emissions debits and credits because this approach allows plant operators to pick and choose the method which suits them best, rather than requiring operators to choose the most accurate technique or to verify the accuracy of a record.

Another commenter (A-90-19: IV-D-45 and IV-F-7.7) opposed the use of engineering calculations instead of requiring initial performance testing for determining wastewater treatment plant compliance with the provisions of §63.138.

Response: In allowing the use of process knowledge the EPA took into consideration that different methods for determining debits and credits for emissions averaging or for demonstrating compliance with §63.138 have different uncertainties associated with them in terms of accuracy. The EPA also took into consideration that, for some facilities, sampling and testing may be impractical, unsafe, or too costly. In some cases, the availability of wastewater flow measurement data, analytical data, or design data may make sampling and testing unnecessary for all wastewater streams. Therefore, the EPA has provided facilities the option of using process knowledge and records for purposes of determining credits and debits for emissions averaging and for demonstrating compliance with §63.138.

Comment: Two commenters (A-90-19: IV-D-32; IV-D-77) recommended that the EPA clarify in proposed §63.138(f) that performance testing is not required for a design steam stripper.

Response: There is no language in the proposed or final rules to suggest that performance testing is required to demonstrate compliance with the design steam stripper provisions [§63.138(f) in the proposed rule and §63.138(g) in the final rule]. Therefore, the EPA maintains that clarification is not necessary.

Comment: Two commenters (A-90-19: IV-D-70; IV-D-99) asserted that design steam strippers should be subject to at least one performance test to establish control efficiency and design parameters to be monitored. The commenters (A-90-19: IV-D-70; IV-D-99) claimed that average parameter values should be determined hourly and should be based on data gathered every 15 minutes.

Response: The EPA's analysis shows that the design steam stripper will achieve the required treatment efficiencies required in the final rule. Therefore, performance tests are not required. The EPA clarifies the rule provides for monitoring of design parameters, including wastewater feed temperature, steam flow rate, and wastewater feed rate.

Comment: One commenter (A-90-19: IV-D-64) supported the acceptance of design analyses and documentation in proposed §63.138(i)(1) as an alternative to performance tests.

Response: The EPA clarifies that the acceptance of design analyses and documentation in 63.138(j)(1) of the final rule as an alternative to demonstrating compliance through testing applies only to 63.138(b)(1),(c)(1) and (d). If a biological treatment unit is used to comply with the HON, an owner or operator must follow the procedures in appendix C of part 63 to ensure compliance. The EPA does not intend for design analysis to be used for biological treatment units.

6.4 METHODS 25D AND 305

Comment: One commenter (A-90-19: IV-D-50) was concerned with the applicability of Method 25D and Method 305 because validation studies have not been released. The commenter (A-90-19: IV-D-50) specifically expressed concern with the detection abilities of these two methods in a wastewater containing VOC's other than HAP's, and the availability of labs to run the analysis.

Response: The draft validation study for Method 25D is available and is titled "Method 25D Recovery Factors," contract no. 68D90055, October 1991.

Comment: One commenter (A-90-19: IV-D-77) stated that the EPA should clarify that Method 305 is limited to testing for table 9 HAP's. The commenter (A-90-19: IV-D-77) also stated that the EPA needs to clarify §63.144(b), which provides options on how to determine whether HAP's are present, because Method 305 seems to test for more than just table 9 HAP's.

Response: In order to determine if a wastewater stream is subject to the wastewater provisions of the HON, the annual average flow rate, and the annual average VOHAP concentration must be determined. There are three options for measuring VOHAP concentrations.

The first option is to directly measure the VOHAP concentration of each individual hazardous air pollutant (HAP) in the wastewater using Method 305. The total VOHAP concentration is the sum of the individual compound VOHAP concentrations.

A second option is to use Method 25D and the total volatile organic (VO) concentration as a surrogate for VOHAP concentration. Method 25D does not provide speciation, and will measure both HAP and non-HAP compounds. The result is a single concentration which represents the total volatile organic concentration in the wastewater. Under this option, there is no speciation and it is assumed that the VO concentration equals the VOHAP concentration. Therefore, this option makes the most sense for wastewater streams containing only HAP's regulated under subpart G, or when the ratio of non-HAP's to HAP's is low.

The third option is to use a method other than Method 305 which measures individual organic HAP concentrations in the wastewater. The individual concentrations, however, can be corrected to their concentrations as if they had been measured by Method 305, by multiplying each concentration by the compound-specific fraction measured (Fm) values in table 34 of subpart G.

The applicability of Method 305 is not limited to testing for table 9 HAP's. Method 305 will detect organic compounds other than those specified in table 9 of subpart G. However, Method 305 will speciate, so that compounds listed on table 9 of subpart G can be identified. Only table 9 HAP's are subject to regulation under the wastewater provisions of the HON.

6.5 TESTING AT PEAK LEVELS FOR COMPLIANCE DEMONSTRATION

<u>Comment</u>: Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-110; IV-D-112) stated that the requirement in §63.145(a)(1) to test for compliance in treatment processes and waste management units when flow rates and VOHAP concentrations are at peak levels is technically infeasible and does not represent annual average conditions. One commenter (A-90-19: IV-D-112) suggested that compliance testing be performed when the SOCMI process is operating at the production rate or annual average flow rate determined pursuant to §63.144. One commenter (A-90-23: IV-D-20) indicated that if some facility processes only operated at a particular time of the year and others were only run at peak production capacity once every 2 years, conducting a compliance test on peak VOHAP concentration generation levels could be very difficult. The commenter (A-90-23: IV-D-20) suggested that if the most difficult compliance conditions are not reasonably available for performance testing, then the most difficult available conditions should be used.

<u>Response</u>: The EPA continues to maintain the same regulatory language in §63.145(a)(1), but clarifies that an owner or operator may use the most difficult available conditions and provide rationale through extrapolation for how compliance with the HON shall be achieved under the most difficult conditions.

6.6 USE OF MODELS TO SHOW COMPLIANCE FOR ALTERNATIVE CONTROL TECHNOLOGY

Comment: One commenter (A-90-19: IV-D-75) supported the use of models to determine whether an alternative control technology meets the RCT treatment requirements. The commenter (A-90-19: IV-D-75) claimed that the models are reliable when used with appropriate physical property information and that models were used to establish RCT performance and as a basis for EPA's economic evaluation. Several commenters (A-90-19: IV-D-32; IV-D-108) (A-90-23: IV-D-20) argued that facilities should be allowed to use ASPEN simulations to demonstrate the equivalency of alternative steam stripper designs with the RCT, since the EPA has based their design on ASPEN simulations. One commenter (A-90-19: IV-D-32) provided data in appendix N of the comment letter which contains examples of simulation model results. One commenter (A-90-19: IV-D-64) encouraged the EPA to streamline the process for approving alternative stripper designs under §63.143(d). One commenter (A-90-19: IV-D-75) said that the requirements for performance testing and monitoring are an unnecessary expense.

One commenter (A-90-19: IV-D-73) claimed that simulation models adequately determine HAP removal efficiency of steam strippers and also identify the critical parameters for monitoring, recordkeeping, and reporting.

Response: It is unclear what one commenter (A-90-19: IV-D-75) means by "alternate control technology". The EPA clarifies that any control technology can be used as a treatment device to meet the provisions of §63.138 if the technology achieves HAP emission reductions equivalent to the wastewater RCT. The demonstration of compliance can be made by a design analysis and supporting documentation as provided in §63.138(j)(1) or by conducting performance tests using the test methods and procedures in §63.145 as referenced by §63.138(j)(2).

Table 12 of the final rule provides for monitoring of alternative parameters for treatment processes. The request to the implementing agency for monitoring alternative parameters must include a description of the methods used to monitor. These methods may include the use of simulation models.

6.7 AVAILABILITY OF COMBUSTION TECHNOLOGIES

Comment: One commenter (A-90-19: IV-D-107) stated that several combustion or recovery technologies are available for use in meeting the requirements of the rule and each should be allowed to compete in the market place.

Response: The EPA clarifies that any control technology can be used to comply with the rule if the technology achieves HAP emission reductions equivalent to the RCT and meets the requirements for control devices specified in the rule.

6.8 USE OF EPA-APPROVED METHODS

Comment: Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-53; IV-D-79) asserted that methods previously approved by the EPA should not need to be validated using Method 301. One commenter (A-90-19: IV-D-33) stated that in addition to the analytical methods listed in §63.143(b) for the parameters that must be monitored, the HON should allow a facility to use any relevant method approved by the EPA for compliance with CWA requirements, and the facility should not be required to validate the method because the EPA will have already determined the method to be valid. One commenter (A-90-19: IV-D-32) included a preliminary list of EPA-validated methods, which industry currently uses when conducting performance tests. One commenter (A-90-19: IV-D-53) recommended that the EPA include a list of methods which do not have to be validated using Method 301. The commenter (A-90-19: IV-D-53) said that the list should at least include Methods 8020, 8021, 8240, 8260, 602, and 604. One commenter (A-90-19: IV-D-33) suggested language to amend §66.144(b)(3)(iii)(B). One commenter (A-90-19: IV-D-32) asserted that alternate testing and analytical procedures on which the CMA has commented should not require validation and approval by the EPA before they are used. The commenter (A-90-19: IV-D-32) stated that these methods, which the CMA has deemed equivalent or more appropriate than the proposed procedures, be cited as acceptable alternatives for monitoring for each situation and process to which they are applicable.

Response: The methods that the commenter suggested are OSW (SW-846) and OW methods. These methods were developed for different types of source categories for small subsets of compounds which are on the HON target list. Both those offices have less stringent acceptance criteria for when percent recovery is acceptable. For example, OSW methods allow 50 to 150 percent recovery of target compounds as acceptable, while Method 301 allows 70 to 130 percent recovery and a correction procedure. An owner or operator would have to validate the method, using Method 301, as if no other valid method existed. They validate the method as measuring the target compound in the water, then correct with the Fm factor. Therefore, no PEG sampling is required. The final rule continues to allow an owner or operator to use any method as long as it is verified by Method 301. In the proposal, the EPA requested evaluation data on other methods and did not receive any. Therefore, the EPA continues to require Method 301 for validation.

6.9 MONITORING REQUIREMENTS FOR RECYCLED STREAMS

Comment: One commenter (A-90-19: IV-D-54) stated that the monitoring requirements in proposed §63.143 in table 11 do not seem appropriate for wastewater streams that are recycled. The commenter (A-90-19: IV-D-54) stated that recycle streams should not be subject to the monitoring requirements in §63.143(b) and table 11 because the information that is obtained would not serve any useful regulatory purpose. One commenter (A-90-19: IV-D-32) stated that wastewaters that are recycled wholly within a SOCMI process, and which are not exposed to the atmosphere, represent no potential to emit and should not be subject to wastewater monitoring requirements.

Response: The EPA clarifies the monitoring requirements in table 11 of the proposed rule (table 12 of the final rule) did not apply to recycled streams. The monitoring requirements for waste management units in table 11 of the final rule do apply to recycled streams.

The treatment requirements in §63.138 allow an owner or operator to comply by either using one of the specified treatment processes for wastewater and residuals or by recycling the wastewater or residuals to the process. The provisions for recycled streams state that: (1) the wastewater stream or residual must not be exposed to the atmosphere; and (2) each waste management unit that treats the recycled residual or recycled wastewater, prior to or during recycle, must meet the requirements of §63.133 through 63.137 of subpart G. Sections 63.133 through 63.137 contain the inspection and monitoring requirements for waste management units. These requirements are listed in table 11 in the final rule.

6.10 VENDORS

Comment: One vendor (A-90-19: IV-D-8) provided information to the EPA on a leak detection device to be used instead of Method 21 for compliance with the inspection provisions for collection and treatment systems.

Response: The EPA has provided a discussion on this alternate leak detection device in section 5.0 of BID Volume 2A.

6.11 INSPECTIONS

Comment: One commenter (A-90-19: IV-D-73) supported the storage vessel floating roof inspection provisions for wastewater tanks that meet the Group 1 wastewater tank criteria in §63.133(c) and (d). The commenter (A-90-19: IV-D-73) stated that the semi-annual inspection requirement for wastewater tanks is excessive and should be replaced with the requirement for storage tank floating roof inspections. The commenter (A-90-19: IV-D-73) recommended deleting §63.133(f).

Response: The EPA has corrected an error in proposed §63.133(f) to clarify the original intent of the regulation. In the final rule, the EPA intends for improper work practices associated with wastewater tanks and for one type of control equipment failure in §63.133(g)(1)(ix) (i.e., cracked, gapped, or broken gaskets, joints, lids, covers, or doors) to be visually inspected initially and semi-annually thereafter. Regarding the inspection provisions for the remainder of the control equipment failures for wastewater tanks, the EPA has corrected the wording of the provisions in §63.133(f) to refer owners and operators to the inspection schedule for storage vessel floating roofs. The final rule no longer requires semi-annual inspections for such failures.

<u>Comment</u>: One commenter (A-90-19: IV-D-73) suggested establishing a uniform annual inspection frequency for all surface impoundments, containers, and individual drain systems.

<u>Response</u>: The EPA maintains that the inspection requirements for surface impoundments, containers, and individual drain systems are consistent and include: (1) an inspection to detect leaks in covers; and (2) inspections for improper work practices and control equipment failures. The leak inspection provisions in §63.148 of the final rule for surface impoundments, containers, and individual drain systems include an initial inspection of covers using Method 21 and semi-annual visual inspections of covers for visible, audible, or olfactory indications of leaks. Inspection of surface impoundments, containers, and individual drain systems for improper work practices and control equipment failures is required initially, and semi-annually thereafter. Semi-annual inspection for improper work practices and control equipment failures is required because these types of failures (e.g., leaving the cover off a container) would cause greater emissions than a leak in a cover.

<u>Comment</u>: One commenter (A-90-19: IV-D-117) suggested that operations personnel visually inspect drain covers at a minimum of once per day instead of semi-annually claiming that this would not cause an increase in control costs and would help prevent emissions.

<u>Response</u>: The EPA disagrees with the commenter (A-90-19: IV-D-117) that daily inspections would not increase the

control costs for wastewater. The annual cost of compliance with the HON includes a labor cost which is equal to the labor wage rate ($/hr) multiplied by the number of hours per year the laborer spends to keep the facility in compliance with the HON. Increasing the number of hours per year that the laborer spends on inspections will increase the annual cost, and thus, increase the control cost.

Comment: One commenter (A-90-19: IV-D-64) stated that the EPA should reconsider whether an LDAR program is justified in as many places as it appears in subpart G. The commenter (A-90-19: IV-D-64) expressed particular concern about the LDAR program as it applies to low pressure and low temperature closed-vent systems. The commenter (A-90-19: IV-D-64) contended that an LDAR program may not be necessary for this type of control device. The commenter (A-90-19: IV-D-64) stated that the EPA should set a de minimis VOHAP concentration in wastewater for the LDAR provisions below which monitoring would not be required. The commenter (A-90-19: IV-D-64) stated that monitoring should not be required for equipment in which the total VOHAP concentration is less than 5 percent by weight and contended that engineering assessments should be adequate for determination of total VOHAP concentration. The commenter (A-90-19: IV-D-64) contended that the delay of repair provisions in §63.171 of subpart H should also be included in the LDAR provisions in subpart G.

Response: The EPA has determined that a total VOHAP concentration in wastewater lower than 5 percent by weight can produce a concentration in the vapor space of a tank, container, etc., of 500 parts per million by volume above background from a leak. Therefore, the EPA has not added a de minimis VOHAP concentration for wastewater below which monitoring would not be required.

The leak inspection provisions for subpart G in §63.148(e) of the final rule specify that delay of repair can be invoked if the repair is technically infeasible without a process unit shutdown or if the emissions resulting from immediate repair would be greater than the fugitive emissions resulting from delay of repair.

Comment: One commenter (A-90-19: IV-D-73) requested that the inspection and monitoring requirements of wastewater closed-vent systems be regulated under the closed-vent provisions in §63.160(a) and §63.172 of subpart H, because common closed-vent systems often serve various types of emission points. The commenter (A-90-19: IV-D-73) agreed with the exclusions for bleeds and drains in §63.139(h), and for waiving component inspections if unsafe in §63.139(e). The commenter (A-90-19: IV-D-73) also agreed with the delay of repair provisions in §63.171 and favored retaining these three sections in the closed-vent system provisions.

Response: The EPA assumed by "drains," the commenter was referring to low leg drains. The EPA considered placing all of the inspection provisions that apply to closed-vent systems in §63.172 of subpart H; however, the EPA concluded that the regulation would be more clear if the closed-vent system requirements that apply to the SOCMI are consolidated within subpart G. Therefore, the EPA has combined the requirements for closed-vent systems into §63.148, which was a reserved section in the proposed rule. The reason for consolidating the closed-vent system requirements into one section is because common closed-vent systems often serve different emission points. This reorganization also reduces repetition within the regulation.

Comment: One commenter (A-90-19: IV-D-64) supported the provisions in §63.140 for delay of leak repairs when repair is infeasible without a process shutdown, but suggested that these provisions be moved to the general standards in §63.102 and be applied to all LDAR programs in subpart G.

Response: The leak inspection provisions for all of subpart G have been moved to §63.148 of subpart G in the final rule. Section 63.148(e) of subpart G allows delay of repair for leaks if the repair is technically infeasible without a process unit shutdown or if the emissions from immediate repair of the leak are greater than the emissions that would result from delay of repair. Since the provision in §63.148 of subpart G only apply to subpart G, they were not moved to the general standards provisions in §63.102 of subpart F in the final rule because subpart F applies to subpart H as well as subpart G.

6.12 MONITORING

Comment: Two commenters (A-90-19: IV-D-34) (A-90-23: IV-D-20) stated that the ranges required in tables 14a, 14b, 15a, 15b, and 16 should be deleted. One commenter (A-90-19: IV-D-34) stated that the requirements should be deleted because the concept of requiring ranges is not defined by the methods which are necessary to determine the data. The other commenter (A-90-23: IV-D-20) stated that §63.146, which requires a source to report the VOHAP concentration range provides no benefit because sources are required to make a Group 1 or Group 2 determination reflecting annual averages and ranges.

Response: In the final rule, the requirement to provide VOHAP concentration ranges in tables 14a, 14b, 15a, 15b, and 16 of subpart G has been eliminated. Furthermore, there are not specific methods required for the determination of VOHAP concentration. Section 63.144(b) of subpart G in the final rule allows knowledge of wastewater, bench-scale or pilot-scale test data, or sampling measurements to determine VOHAP concentration. Sampling measurements may be analyzed to determine VOHAP concentration using Method 305, Method 25D, or any other method validated according to section 5.1 or 5.3 of Method 301.

6.12.1 Treatment Processes

Comment: One commenter (A-90-23: IV-D-20) stated that the monitoring methods in table 11 in §63.143 should be made consistent by allowing Method 305 and any other applicable method, which has been validated using section 5.1 or 5.3 of Method 301, to be used to monitor items 1 and 3 of the table.

Response: The proposed rule did allow what the commenter has requested. The monitoring methods in table 11 in §63.143

of the proposed rule specified that Method 305 and any other applicable method which has been validated using section 5.1 or 5.3 of Method 301 could be used for items 1 and 3. In the final rule, monitoring items 1 through 6 have been eliminated from the monitoring requirements for treatment processes because these items are actually performance tests that can be used for demonstrating compliance. Section 63.145 of the final rule contains the provisions for determining compliance and these provisions allow the use of Method 305 or any other method that has been validated according to section 5.1 or 5.3 of Method 301 for the measurement of VOHAP concentration. The monitoring requirements for treatment processes are in table 12 of subpart G in the final rule.

Comment: One commenter (A-90-23: IV-D-20) stated that §63.145(c)(3)(i), which requires that flow meters be used on both the inlet and outlet flow of treatment processes, should be modified to allow a SOCMI source the option of placing a single flow meter at the inlet when the treatment process has an outlet flow that is not greater than the inlet (such as adsorption or biological treatment).

Response: The EPA agrees that in instances when the outlet flow is not greater than the inlet flow, a flow meter at either the inlet or outlet is sufficient for determining the flow rate.

Comment: One commenter (A-90-19: IV-D-73) suggested that the EPA reduce the frequency of monitoring for treatment alternatives 1 - 7 in table 11 of §63.143, and that the monitoring schedule should be based on the probability of emission exceedance estimated from one year of monthly monitoring data. The commenter (A-90-19: IV-D-73) provided a statistical approach to determine monitoring frequency. The commenter (A-90-19: IV-D-73) claimed that this approach would reward processes with high efficiencies and encourage facilities to install processes with high efficiencies to decrease required sampling frequency. One commenter (A-90-19: IV-D-89) suggested using quarterly monitoring requirements in table 11 of proposed subpart G. The commenter (A-90-19:

IV-D-89) recommended keeping continuous data on critical operating variables and considering a QA/QC program similar to the valve QA/QC program listed in subpart H.

Response: The monitoring requirements for treatment alternatives 1-6 in table 11 of the proposed subpart G have been eliminated. Proposed table 11 is table 12 in the final rule. The EPA has determined that these monitoring requirements were performance tests that are required by §63.145 of subpart G to demonstrate compliance. The monitoring requirements for treatment alternative 7 in table 11 of the proposed rule have been increased from monthly monitoring requirements to continuous monitoring requirements in order to be consistent with, and as stringent as, the monitoring requirements for steam stripping. For alternative 7 from table 11 of the proposed rule, Method 304A or 304B is required initially, and those parameters that are monitored upon approval from the permitting authority must be monitored continuously.

6.12.2 Waste Management Units

Comment: One commenter (A-90-19: IV-D-32) claimed that annual monitoring, semi-annual visual inspection, and repair may not be possible for all portable containers. The commenter (A-90-19: IV-D-32) reasoned that some portable containers may no longer be onsite or may not be owned by the plant owner. Thus, the commenter (A-90-19: IV-D-32) concluded that these requirements should be deleted from the rule.

Response: The EPA recognizes that many containers, which by definition must be portable, may be sent offsite or may be owned by someone other than the owner or operator of a SOCMI plant. In the final rule, the EPA has reduced the inspection requirements for containers. The EPA has revised table 11 of subpart G of the final rule to require the owner or operator to perform Method 21 testing initially but the EPA has deleted the requirement to inspect containers semi-annually for improper work practices. In fact, only certain large containers still require any monitoring. Refer to section 4.1.7 of this BID volume for more information.

<u>Comment</u>: Two commenters (A-90-19: IV-D-32), (A-90-23: IV-D-20) stated that the EPA should exempt surface impoundments that are operated under a vacuum from leak test requirements in §63.134.

<u>Response</u>: In the final rule, §63.134(b)(4) of subpart G exempts from the leak detection requirements any cover on a surface impoundment and the corresponding control device if the cover and control device are operated and maintained under negative pressure.

<u>Comment</u>: One commenter (A-90-19: IV-D-34) stated that the period of repair for floating roofs on oil-water separators is too short and would be difficult to complete within 15 days. The commenter (A-90-19: IV-D-34) suggested that 45 days be provided, which is the same time frame for wastewater tank repairs. Two commenters (A-90-19: IV-D-64) (A-90-23: IV-D-20) stated that allowing only 15 days for final repair of a leak in a surface impoundment in §63.134(d) and 45 days for final repair of a leak in a wastewater tank in §63.133(g) seems inconsistent. The commenters (A-90-19: IV-D-64) (A-90-23: IV-D-20) requested that the EPA modify the leak repair provisions for surface impoundments to be consistent with the requirements for wastewater tanks.

<u>Response</u>: The EPA believes that an error in the proposed rule has led to confusion regarding the period allowed for making repairs. The proposed §63.133(g) implied that 45 days would be allowed for repair of improper work practices, control equipment failures, and leaks. This was not the EPA's intent. The EPA intended to allow <u>15 days</u> for repair of leaks from all waste management units. In the final rule, this has been clarified by placing all subpart G provisions for leak detection and repair in a new section (§63.148). This new section includes provisions in §63.148(e) for delay of repair if the repair is technically infeasible without a process unit shutdown or if the emissions from immediate repair would be greater than the emissions from delay of repair. It should be

noted that a 15-day period for repair of leaks is consistent with subpart H of the HON and with previous rules for equipment leaks.

The EPA intended to allow 45 days for repair of control equipment failures (e.g., repair of a floating roof) because such repairs would likely take longer than 15 days to complete. In the proposed rule, §63.133(g) indicated that 45 days would be allowed for repair of control equipment failures for wastewater tanks. This repair period was selected because it is consistent with the provisions for repair of storage vessels. This allowance was inadvertently not included in the proposed provisions for surface impoundments and oil-water separators.

Because the repair provisions for control equipment failures were specified in the same paragraph in the proposed rule as those for leaks and improper work practices, it appeared that the 15-day period for leak repair for surface impoundments and oil-water separators would also apply for repair of control equipment failures for these units. This was not the EPA's intent.

In the final rule, it has been clarified that control equipment failures for wastewater tanks, surface impoundments, and oil-water separators must be repaired within 45 days.

It should be noted that both the proposed and final rule include provisions in §63.140 for delay of repair of control equipment failures and improper work practices if the repair is technically infeasible without a process unit shutdown or if the emissions from immediate repair would be greater than the emissions from delay of repair.

Comment: One commenter (A-90-19: IV-D-64) expressed concern about why an LDAR program should be required for the roof and roof fittings of a wastewater tank, surface impoundment, or oil-water separator when it is not required for a fixed roof or internal floating roof storage vessel. The commenter (A-90-19: IV-D-64) stated that the LDAR requirements should be removed from those appropriate sections of the proposed wastewater regulation.

Response: An LDAR program is not required for a fixed roof or internal floating roof storage vessel, because such vessels contain valuable product, and the EPA has determined that leaks in these types of tanks will be carefully monitored by the owner or operator to reduce product loss. Furthermore, the leak detection and repair provisions for fixed roofs on wastewater tanks, covers on surface impoundments, and fixed roofs on oil-water separators have been amended for the final rule. An inspection of the fixed roof or cover using Method 21 is required initially in the final rule, as proposed. However, the final rule requires an annual visual inspection for visible, audible, or olfactory indications of leaks, instead of an annual Method 21 inspection.

Comment: Two commenters (A-90-19: IV-D-32; IV-D-75) argued that allowing visual monitoring of p-traps and s-traps would eliminate unnecessary water flows and would be consistent with pollution prevention practices without increasing emissions. One commenter (A-90-19: IV-D-32) stated that drains which are regularly used for discharges should not be routinely inspected. The commenter (A-90-19: IV-D-32) stated that the regulation should allow the use of non-volatile organic liquids (e.g., glycols) to be used as a vapor barrier in p-trap and s-trap drains. One commenter (A-90-19: IV-D-73) suggested replacing the monitoring requirements for drains with a general duty requirement to operate traps and seals as designed.

Response: The requirements in §63.136(e)(1) of subpart G in the final rule require the owner or operator to ensure that water is maintained in a p-trap or s-trap. Verifying the continuous flow of water to the trap is only an example of how an owner or operator would verify the continuous presence of water in a trap. Therefore, an owner or operator may choose to visually monitor the p-traps and s-traps to verify the presence of water instead of monitoring the continuous flow of water to the traps. The monitoring requirements for p-traps and s-traps in table 11 of subpart G have been modified to clarify that monitoring the continuous flow of water to the traps is only one example of how to verify the presence of water in a trap.

Routine inspection of drains is not required. Rather, semi-annual inspections are required. It is unclear what the commenter (A-90-19: IV-D-32) means by "drains that are regularly used for discharges". If the owner or operator can verify the continuous flow of water to the p-traps and s-traps, then such drains would not require inspection.

It is not clear what the commenter (A-90-19: IV-D-73) means by a "general duty requirement to operate traps and seals as designed". However, if a "general duty requirement" can verify the continuous presence of water in the drain, then the traps and seals themselves need not be inspected.

The EPA does recommend "non-volatile" organic liquids such as glycols to be used as vapor barriers in p-trap and s-trap drains because water will work sufficiently as a vapor barrier. Furthermore, some glycols are regulated by the wastewater provisions of the HON.

6.12.3 Control Devices

Comment: One commenter (A-90-19: IV-D-32) stated that certain wastewater monitoring requirements for closed-vent systems in table 12 and §63.143 should be modified to make them more appropriate for the range of control options that may be used. The commenter (A-90-19: IV-D-32) suggested that scrubbers (absorbers) are an example of a closed-vent control device which is not listed in the monitoring requirements.

Response: The control devices listed in table 12 of proposed subpart G (table 13 of the final rule) are only examples of the control devices that can be used in conjunction with closed-vent systems. Section 63.139(c)(1) of the final rule states that an enclosed combustion device can include but is not limited to vapor incinerators, boilers, or process heaters, and §63.139(c)(2) states that a recovery device can include but is not limited to a carbon adsorption system or condenser. Furthermore, §63.139(c)(5) of the final rule allows the use of any control device for a closed-vent system that reduces emissions by 95 percent. The EPA realizes that the control devices listed in table 12 of the proposed rule are only examples, but the EPA cannot list the monitoring requirements for all possible control devices. If an owner or operator chooses to use a closed-vent control device other than those listed in table 13 of the final rule, the owner or operator must obtain approval from the permitting authority for the parameters that the owner or operator wishes to monitor.

The EPA did not include absorbers as an example of a closed-vent control device, because the most widely used scrubbing medium for absorbers is water. The EPA assumed that an owner or operator would not use an absorber with water as the scrubbing medium to control the emissions of HAP's that had previously been removed from wastewater. However, absorbers can be used as closed-vent control devices as long as they achieve an emission destruction of 95 percent.

Comment: One commenter (A-90-19: IV-D-89) suggested that the monitoring frequency for non-regenerative carbon adsorbers specified in table 12 of §63.143 should be extended to 50 percent of the design replacement interval if there are carbon adsorbers in series. The commenter (A-90-19: IV-D-89) stated that since a second canister is on line, the monitoring frequency can be extended beyond the normal single canister replacement interval.

Response: Regarding the monitoring frequency for non-regenerative carbon adsorbers as specified in table 13 of subpart G in the final rule, the EPA continues to require organic compound concentration monitoring of the adsorber exhaust either daily or at intervals no greater than 20 percent of the design carbon replacement interval, whichever is greater. The EPA continues to include as an alternative to this monitoring the option for the owner or operator to replace the carbon in the carbon adsorption system at a regular predetermined interval that is less than the carbon replacement interval. The owner or operator must consider (1) the maximum design flow rate and (2) the organic concentration in the gas stream that is vented to the carbon adsorber when determining how often to replace the carbon. Because the final rule allows for scheduled replacement of carbon in lieu of monitoring for non-regenerative carbon adsorption systems, the EPA maintains that the monitoring frequency stated in the proposed rule remains appropriate for owners or operators who elect to monitor.

6.12.4 Method 21

Comment: One commenter (A-90-19: IV-D-34) stated that many of the requirements for the use of containers in wastewater service are not reflected in any of the floor determinations and are difficult and expensive to achieve. The commenter (A-90-19: IV-D-34) expressed concern that the proposed rule requires for existing equipment, which meets the proposed definition of container, that all covers and openings for each container be "designed for and operated without leaks at the 500 ppmv level as determined by Method 21." The commenter (A-90-19: IV-D-34) recommended that the EPA develop work practice standards that focus on keeping containers closed when in use rather than a complex monitoring and replacement strategy. The commenter (A-90-19: IV-D-34) provided alternate regulatory language which incorporated all recommendations to the EPA.

Response: The floor for the control of wastewater emissions from containers is no control, because the EPA has determined that at proposal, covers, control devices, and submerged fill pipes were not used by industry for containers. Furthermore, the MACT floor for control of wastewater emissions from any waste management unit or drain system is no control. However, the Administrator determined that it was appropriate to establish wastewater requirements above the floor.

The inspection requirements for leaks in covers have been changed in the final rule. Section 63.148 of the final rule only requires an initial inspection using Method 21. Annual visual inspections for visible, audible, or olfactory indications of a leak are required in the final rule, instead of annual inspections using Method 21 as proposed.

Comment: One commenter (A-90-19: IV-D-33) stated that the monitoring requirements for treatment processes in proposed §63.143(b) are overly burdensome and should be modified to allow for greater flexibility and to minimize redundancy between the Act and the CWA monitoring requirements on the same waste streams.

Another commenter (A-90-19: IV-D-33) stated that facilities should be allowed to monitor surrogate parameters or monitor less frequently if a different parameter or reduced frequency is allowed by their CWA permit, which is issued pursuant to NPDES or an industrial pretreatment program. The commenter (A-90-19: IV-D-33) stated that the monitoring frequency is established on a case-by-case basis, taking into account such factors as toxicity, expected treatment efficiency, demonstrated performance of the treatment process, facility compliance history, sampling and analytical costs, and the resulting burden on the regulator to review records and process reports from the facility. The commenter (A-90-19: IV-D-33) stated that such case-by-case factors are relevant to wastewater monitoring for the HON.

Response: The EPA agrees with certain points raised by the commenter and has reduced the monitoring requirements for treatment processes. After determining that the performance criteria in §63.145 were sufficient to ensure compliance with the wastewater treatment requirements in the HON, the EPA deleted the monthly monitoring requirements that were in table 11 of subpart G of the proposed rule. The remaining monitoring requirements in table 12 of subpart G of the final rule (i.e., table 11 in the proposed rule) require continuous monitoring for certain operating parameters associated with the design steam stripper and biological treatment systems.

Comment: One commenter (A-90-19: IV-D-92) suggested only regulating surface impoundments with emissions greater than 500 ppmv above background, because this quantity of emissions is allowed from openings. Another commenter (A-90-19: IV-D-[illegible]) suggested using a mass threshold or a percentage of total facility emissions threshold for control of surface impoundments and individual drain systems to avoid controlling systems with low emissions.

Response: In response to the commenter's suggestion not to require emission controls on surface impoundments that emit less than 500 ppmv above background, the EPA clarifies that the 500 ppmv determination is a criterion for the inspection provisions. It is not an allowable emission rate, but rather an indication of whether a system has adequate emission suppression. The EPA requires emission controls on all surface impoundments managing wastewater streams that are subject to regulation.

The purpose of the equipment standard is to ensure that air emissions are suppressed. Emissions from wastewater are directly proportional to the exposed surface area. For this reason, modifying the regulatory requirements would result in substantially higher emissions than the control requirements of the proposed HON regulation. Therefore, the EPA has not implemented this suggestion in the final HON regulation.

To provide greater flexibility, the EPA has added a provision which allows an owner or operator to demonstrate through a pressure test that the surface impoundment and associated closed-vent system are under negative pressure. This type of demonstration satisfies the monitoring requirement so that the owner or operator is not also required to perform Method 21. In addition, both the applicability criteria (i.e., VOHAP concentration and flow rate) and the 1 Mg/yr sourcewide compliance option in §63.138(c)(5) and (6) are intended to exempt from the control requirements of §63.138 wastewater streams with low emissions relative to the cost of control. Therefore, the final rule avoids the unnecessary control of waste streams and wastewater streams that have a low potential for emissions.

The EPA clarifies that owners and operators must comply with §63.133 through §63.137 only when the wastewater collection and treatment units regulated under these parts of the HON regulation are used to receive, manage, or treat a

Group 1 wastewater stream or a residual removed from a Group 1 wastewater stream.

Comment: Two commenters (A-90-19: IV-D-32; IV-D-73) recommended that fugitive emissions monitoring requirements based on Method 21 be deleted from subpart G and suggested that if the EPA must include fugitive emissions testing requirements for wastewater management units, these sources should be included in subpart H. One commenter (A-90-19: IV-D-32) stated that the EPA has not performed an analysis of the cost and environmental benefits associated with requiring leak testing to be performed on sources of fugitive emissions.

Two commenters (A-90-19: IV-D-32; IV-D-102) stated that Method 21 is inappropriate for VOHAP measurements because it measures total VOC content, not just VOHAP's, and it is ineffective for measuring low levels of volatile organics. Two commenters (A-90-19: IV-D-97; IV-D-102) recommended that all references to the use of Method 21 for wastewater streams be deleted from the HON and replaced by visual inspection only. One commenter (A-90-19: IV-D-73) was unsure if Method 21 was valid for detecting leaks from fixed roof wastewater tanks and pointed out that no provisions are made for repair if a leak is found in a fixed roof.

One commenter (A-90-19: IV-D-31) claimed that the ability to measure and repair small leaks less than 500 ppmv is not practical. The commenter (A-90-19: IV-D-31) claimed that Method 21 was originally intended to evaluate leaks of pure compounds at levels of 10,000 ppmv. The commenter (A-90-19: IV-D-31) asserted that wastewater tanks with low to moderate concentrations may produce a vapor content much less than 500 ppmv, and Method 21 leak detection testing would be useless. The commenter (A-90-19: IV-D-31) supported exempting tanks with low concentrations of wastewater from Method 21 testing to avoid needless expenses.

Response: The EPA reviewed the option of consolidating all fugitive emission testing in subpart H. However, due to the structure of subpart H and to the different compliance schedules for subparts G and H, incorporating the leak inspection requirements from subpart G into subpart H would have generated additional confusion in the regulated community. In particular, the leak inspection provisions associated with wastewater management were not easily incorporated into subpart H. The EPA agrees that the leak inspection requirements which were located in separate sections for each emission point in subpart G should be condensed into a single section. Therefore, in the final rule, the EPA incorporated all leak inspection provisions for subpart G into §63.148.

In response to the technical comments about the use of Method 21, the EPA asserts that the method was designed to detect leaks from equipment. Method 21 is not used for measuring emission rates. Many existing rules have incorporated similar requirements. The EPA continues to require at least the initial use of Method 21 for leak detection followed by annual visual inspections for most waste management units. The EPA has incorporated all provisions for repairing any leaks detected by Method 21 in §63.148 of subpart G.

The EPA points out that Method 21 is effective for detecting concentrations of 500 ppmv VOC's in the air. For example, Method 21 testing will indicate that 500 ppmv VOC's is present in the air above an open wastewater tank when a concentration as low as five percent VOC's is present in the wastewater. For additional discussion about the capacity and vapor pressure thresholds for wastewater tanks that were incorporated into the final rule, refer to section 4.1.9 of this BID volume.

Comment: One commenter (A-90-23: IV-D-31) stated that it was unclear whether or not the two conditions described in subpart H as "unsafe to screen" and "inaccessible" for Method 21 leak detection would apply to subpart G. The commenter (A-90-19: IV-D-31) claimed that these exemptions would eliminate wastewater tanks and wastewater tank roofs where components cannot be reached safely.

Response: The Method 21 requirements from the proposed wastewater provisions have been moved to §63.148 of subpart G. Within §63.148 are provisions that are written to ensure that equipment that is "unsafe to inspect" is exempt from the initial Method 21 inspection requirements. There are also provisions in §63.148 that are written to ensure that equipment that is "difficult to inspect" is exempt from the initial Method 21 inspection requirements. Equipment that is "unsafe to inspect" or "difficult to inspect" is only subject to annual visible, audible, and olfactory inspection requirements. In this case, "difficult to inspect" encompasses any piece of equipment that is inaccessible. The Method 21 requirements in §63.148 of subpart G apply to wastewater tanks, as well as surface impoundments, containers, individual drain systems, oil-water separators, and closed-vent systems.

Comment: One commenter (A-90-19: IV-D-31) suggested that Method 21 leak detection should not be required for fixed roof wastewater tanks under a continuous negative pressure. The commenter (A-90-19: IV-D-31) claimed that no leaks can occur under these conditions and recommended adding a measurement of static pressure to the Method 21 applicability criteria for fixed roof tanks.

Response: In the final rule, §63.133(b)(4) of subpart G exempts any fixed roof wastewater tank and closed-vent system that is operated and maintained under negative pressure from leak inspections using Method 21.

Comment: One commenter (A-90-19: IV-D-31) claimed that restricting the Method 21 calibration gas to a mixture of methane in air limits Method 21 to the use of an instrument with an FID or NDIR detector, because a PID will not respond to methane. The commenter (A-90-19: IV-D-31) claimed that Method 21 can be used with several reference gases for which response factors of the affected HAP have been determined and/or published and that the PID has the optimum response for some HAP's.

Response: The EPA clarifies that Method 21 does not restrict the calibration gas to a mixture of methane and air, but rather requires an adjustment of the readings to a methane basis. Therefore, PID may be used, but must be adjusted to a methane basis. The reason that all must be adjusted to a methane base is because having a single base makes measurements from all instruments regardless of calibration gas comparable. Refer to chapter 5.0 of BID volume 2A for additional discussion of the issue.

Comment: One commenter (A-90-19: IV-D-31) claimed that using the predominant HAP in the wastewater stream to determine the Method 21 response factor could cause the screening values to be high. The commenter (A-90-19: IV-D-31) also claimed that the predominant HAP in the wastewater may not necessarily be the predominant HAP in the vapor stream.

Response: The EPA agrees that the predominant HAP in the wastewater may not be the predominant HAP in the vapor stream. Therefore, in the final rule, the EPA no longer requires response factor adjustments. For additional discussion of actual monitoring requirements, refer to chapter 5.0 of BID volume 2A.

Comment: One commenter (A-90-19: IV-D-64) requested that the EPA clarify language in §63.133 through §63.138, which states that a roof or cover "shall be designed and operated without leaks as indicated by an instrument reading of less than 500 ppm by volume..." The commenter (A-90-19: IV-D-64) stated that the EPA must specify which points on the roof or cover must be monitored because monitoring the entire surface would be unreasonable.

Response: The leak inspection provisions from §63.133 through §63.138 of the proposed rule have been moved to §63.148 in the final rule. In §63.148 of the final rule, the leak inspection provisions and the Method 21 requirements for all of subpart G are clarified. Section 63.148(c)(6) of the final rule specifies which points on the roof or cover must be monitored and includes "all potential leak interfaces".

Comment: One commenter (A-90-19: IV-D-34) suggested that the EPA should delete the annual monitoring requirement in §63.133(b)(1)(ii) and replace it with a provision to repair equipment if there is sensory evidence (visual, olfactory, or audible) of a leak.

Response: The annual Method 21 inspection requirements in §63.133(b)(1)(ii) of the proposed rule have been deleted. As described in §63.148 of subpart G and table 11 of subpart G of the final rule, the owner or operator must conduct an initial inspection using Method 21 and semi-annual visual inspections for visible, audible, or olfactory indications of leaks in fixed-roof tanks.

6.12.5 Heat Exchange Systems

Comment: Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-34; IV-D-36; IV-D-53; IV-D-67; IV-D-110; IV-D-112) (A-90-23: IV-D-4) stated that the sampling provisions in §63.102(b)(2)(ii) seem to require sampling cooling water at the entrance and exit of each heat exchanger system. One commenter (A-90-19: IV-D-89) claimed that most heat exchange systems are piped in parallel.

One commenter (A-90-19: IV-D-89) provided a figure to help clarify where sample ports should be located, showing sample ports at the cooling water supply and the cooling water return.

Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-34; IV-D-36; IV-D-53; IV-D-67; IV-D-110; IV-D-112) (A-90-23: IV-D-4) disagreed with requiring sampling of each heat exchanger and recommended that the EPA rewrite the provision to require sampling at the entrance and exit of each cooling tower system that services a unit.

One commenter (A-90-19: IV-D-38) claimed that cooling towers are the only source of emissions in heat exchange systems and further claimed that it should be specified in the regulation that monitoring is required for the return water and not the individual heat exchangers. One commenter (A-90-19: IV-D-50) claimed that it was unclear where cooling water samples are to be taken.

Response: The EPA requires sampling at the entrance and exit of each heat exchange system. A heat exchange system is not a heat exchanger. The EPA has defined a heat exchange system as any cooling tower system or once-through cooling water system (e.g., river or pond water). Therefore, sampling is not required at the entrance and exit of each heat exchanger. Rather, sampling is required at the entrance and exit of each cooling tower for recirculating systems, or the points at which the cooling water enters and exits the once-through cooling water system for nonrecirculating systems.

Sampling of both the cooling water supply and the cooling water return is necessary in order to determine the emissions from the cooling tower. Sampling only the return water would not demonstrate when there is a concentration differential across the tower, and would therefore not indicate when compounds are volatilizing from a heat exchange system.

Comment: One commenter (A-90-19: IV-D-86) argued that the sampling requirements for cooling towers are too burdensome for multi-purpose batch operations due to the variety of compounds in the cooling water.

Response: The monitoring requirements for heat exchange systems do not require speciation of HAP's. Facilities can monitor for speciated HAP, total HAP, total VOC concentration, or TOC for semi-volatile HAP's. Therefore, a variety of compounds in the cooling water will not overburden facilities when complying with monitoring requirements.

Comment: One commenter (A-90-19: IV-D-38) suggested two different options for monitoring heat exchange systems. The commenter (A-90-19: IV-D-38) recommended speciation of HAP's monthly for 6 months and then quarterly for the remainder of two years and then using an average concentration determined from this data to speciate any future leaks that are detected using more conventional methods. The commenter (A-90-19: IV-D-38) recommended using a monitoring frequency determined by the facility according to historical needs.

Response: The EPA will allow monitoring of speciated HAP, total HAP, total VOC concentration, or TOC for semi-volatile HAP's to detect leaks in a heat exchange system. The monitoring requirements for heat exchange systems do not include speciation of the inlet and outlet samples. Conventional methods may indicate when the average concentration in the cooling water increases, but conventional methods do not provide any information on the magnitude of the concentration differential across the cooling tower or the magnitude of emissions from the cooling tower. Furthermore, historical needs cannot indicate when a leak will occur in a heat exchange system. As heat exchange system equipment becomes older, it is more likely to develop a leak. A facility with relatively new equipment will probably have had few leaks, but as the facility becomes older, the equipment may develop more leaks.

Comment: One commenter (A-90-19: IV-D-89) suggested supplying a reference or guidance which clarifies the basis for the methodology used to determine leaks in heat exchange systems and requested that EPA specify which methods are acceptable to determine HAP concentration in the cooling water. One commenter (A-90-19: IV-D-38) presented a list of test methods and devices that the commenter (A-90-19: IV-D-38) claimed can detect a leak, determine its magnitude, and provide characteristics of the contaminant.

Response: The EPA allows several methods to detect leaks from cooling water, but has not provided a list in this BID volume.

Comment: One commenter (A-90-19: IV-D-89) favored allowing 30 days from initial knowledge of a heat exchanger leak until isolation, repair, or delay of repair is required, because of sample turnaround time. One commenter (A-90-19: IV-D-73) recommended that a 60-day repair period be provided and an additional 60-day extension be allowed for repairing a heat exchanger leak. The commenter (A-90-19: IV-D-73) claimed that it takes several days to determine which heat exchanger is leaking and that heat exchangers usually do not have a backup so shutdown is therefore required.

One commenter (A-90-19: IV-D-33) requested that the EPA clarify at what point the 15 calendar days for repair of a leaking heat exchanger begin. The commenter (A-90-19: IV-D-33) recommended that the 15 days begin when the results of any necessary analyses are known by the owner or operator of the facility.

One commenter (A-90-19: IV-D-34) stated that the proposed repair periods for heat exchanger leaks are impractical. The commenter (A-90-19: IV-D-34) contended that the 15 calendar days in which to repair a detected leak specified in §63.102(b)(2)(v) should be extended to 90 days because special parts may be needed and maintenance schedules may require adjustment. The commenter (A-90-19: IV-D-34) added that because the delay of repair provisions in §63.102(b)(3) reference a process unit shutdown, the term "process unit shutdown" should be defined in §63.101 rather than §63.161. The commenter (A-90-19: IV-D-34) contended that only planned process unit shutdowns and not emergency or unplanned shutdowns should trigger the requirement for repair.

Response: Based on comments received by the EPA, the amount of time that a facility has to repair a leak in a heat exchange system has been extended from 15 days to 45 days. The 45 days to repair a leak begins when the results of the monitoring tests indicate that a leak is present (i.e., when a 1 ppm differential across a heat exchange system is detected). A definition of process unit shutdown has been added to §63.101. The EPA has elected to keep the definition of process unit shutdown in §63.111 and §63.161 also. If a heat exchanger cannot be repaired without a process unit shutdown, a shutdown is required to repair the leak, unless the owner or operator can show that a shutdown would cause more emissions than the leak. Unplanned shutdowns are required for leaks in a heat exchange system, because large quantities of emissions can be released from an unrepaired leak in the system. For example, an average-size cooling tower (15,000 gpm) with a leak of only 1 ppm can emit almost 3 tons in one month if left unrepaired.

Extending the repair period for a leak in a heat exchange system by 30 days will allow a sufficient amount of time for a facility to determine which heat exchanger is leaking. The extension also allows enough time to adjust maintenance schedules and order special parts.

Comment: One commenter (A-90-19: IV-D-38) agreed with the delay of repair provisions for cooling water systems.

Response: Based on comments received, the EPA has extended the amount of time that a facility has to repair a leak in a heat exchange system from 15 to 45 days. The EPA has determined that 15 days is an insufficient amount of time for a facility to repair a leak in all cases. In certain cases, an owner or operator may have trouble identifying which heat exchanger is leaking, or may have to adjust maintenance schedules, or order special parts. Furthermore, a facility must now shut down if the leak cannot be repaired in 45 days, unless the owner or operator can demonstrate that the emissions from shutdown are greater than the emissions from the leak. This provision was added because the EPA has determined that a significant amount of emissions can occur from a cooling tower if the leak is left unrepaired (Memorandum from Kristine Pelt, Radian, to Mary Tom Kissell, EPA/SDB, "Leaks from a Heat Exchange System," November 23, 1993).

6.12.5.1 Cooling Tower Systems

Comment: Several commenters (A-90-19: IV-D-53; IV-D-73; IV-D-38) claimed that a 1 percent or 1 ppm variation of TOC levels in cooling water systems cannot be detected or duplicated because of the low VOHAP concentrations typically present in cooling water systems. Because of the inherent uncertainty of analytical methods, two commenters (A-90-19: IV-D-53; IV-D-110) recommended that the EPA use analytical method performance data to determine when a concentration increase indicates a leak. One commenter (A-90-19: IV-D-53) claimed that even the best analytical methods have precisions of about 9 or 10 percent and recommended dropping the 1 percent criterion to determine a leak from the rule. One commenter (A-90-19: IV-D-50) claimed that the definition of leak does not have any basis. Two commenters (A-90-19: IV-D-36) (A-90-20: IV-D-20) stated that the EPA should not consider a change in a reading of one part per million or one percent to be a cooling water system leak. The commenters (A-90-19: IV-D-36) (A-90-20: IV-D-20) stated that if the outlet stream had a low flow rate, a concentration of one part per million or one percent would not be a concern, and thus, the EPA should set action levels based on the size of the flow exiting the tower.

Two commenters (A-90-19: IV-D-32; IV-D-54) stated that the wastewater VOHAP concentration that is used to identify a leak in a cooling water system should be based on the potential to emit. Three commenters (A-90-19: IV-D-32; IV-D-54; IV-D-110) contended that the proposed leak detection action criteria in §63.102(f)(2)(iv) may be appropriate for cooling systems using large volumes of water for heat exchange, but are unnecessarily restrictive for smaller cooling systems since the potential to emit significant amounts of HAP's is proportionately smaller. One commenter (A-90-19: IV-D-32) provided a table of recommended action levels expressed as the concentration of total VOHAP in the wastewater which are dependent on water flow rate.

Response: A 1 ppm variation in concentration is the lowest variation that can be measured. The EPA defines a leak as a statistically significant difference of at least 1 ppm in speciated HAP, total HAP, or total VOC concentration at the 95 percent confidence level. The 95 percent confidence level allows for variation at low concentration levels. The one-percent variation in total HAP levels has been eliminated as a leak criterion.

Even for cooling towers with low flow rates, a 1 ppm variation across the cooling tower can cause significant emissions. For example, a 1 ppm variation across a cooling tower with a flow rate of only 2,000 gallons per minute will result in over 2 tons of emissions if left undetected for

6 months. Therefore, it is necessary to monitor cooling towers with low flow rates on a quarterly basis.

The EPA is allowing TOC as a monitoring parameter for semi-volatile HAP's listed in Method 625, but not for volatile HAP's.

<u>Comment</u>: Two commenters (A-90-19: IV-D-38; IV-D-89) claimed that the cooling water monitoring requirements for the large list of HAP's will be expensive, costing approximately $300 - $400 per sample analyzed. One commenter (A-90-19: IV-D-89) suggested performing the cheaper Total Purgeable Organic Carbon tests on the cooling water and only requiring a sampling program if the return water carbon is over 10 percent higher than the supply water at a 95 percent confidence limit.

One commenter (A-90-19: IV-D-38) suggested that each facility be allowed to develop a site-specific monitoring program for heat exchange systems. The commenter (A-90-19: IV-D-38) suggested using a TOC test to determine the "normal" level of organic material found in a cooling water system and using this "baseline" to determine system changes. The commenter (A-90-19: IV-D-38) also provided a list of "conventional ways" to determine a leak, including an increase in TOC, loss of heat transfer, oil sheen on the water surface, etc. One commenter (A-90-19: IV-D-53) claimed that process knowledge can be used to determine a heat exchanger leak.

Several commenters (A-90-19: IV-D-32; IV-D-54; IV-D-112) suggested that the EPA allow a surrogate parameter for routine testing and require more extensive testing if the surrogate parameter indicates a leak.

<u>Response</u>: The monitoring requirements for cooling towers in §63.104 of subpart F have been changed to allow testing of speciated HAP, total HAP, TOC for semi-volatile compounds, or total VOC concentration. A leak will be indicated by a statistically significant difference in speciated HAP, total HAP, or total VOC concentration of 1 ppm at the 95 percent confidence level. The one percent increase of total HAP concentration as a criterion for a leak has been eliminated from the final rule.

Performing a TOC test to determine the "normal" level or organic material does not guarantee that a leak will be detected. If the TOC test is performed when a heat exchanger is leaking, the "normal" level of organic material will be elevated. Furthermore, determining the "normal" level of TOC in cooling water does not provide any information on the concentration differential across the cooling tower or the quantity of emissions generated by the cooling tower.

Conventional ways of determining a leak or surrogate parameters cannot predict the magnitude of the leak and do not provide information on the concentration differential across the cooling tower. Conventional methods or surrogate parameters can help determine when a heat exchanger is leaking. However, the EPA's definition of a leak in a heat exchange system does not always coincide with a leak in a heat exchanger, unless the leaking compounds volatilize in the cooling tower.

The EPA is allowing the TOC test for only semi-volatile HAP's listed in Method 625. The EPA is not allowing TOC for volatile compounds as specified in Method 624 because too much of the volatile HAP may be lost during the handling of the sample. The method does not safeguard against emission losses when transferring the sample. In contrast, methods such as Methods 624 and 8020 require sealed caps and other sample preserving techniques. Method 301 may be used to validate other methods used to monitor volatile HAP's.

The EPA has no fundamental objection to using TOC as a monitoring parameter, but it is not appropriate for volatile HAP's. The EPA is allowing TOC as a monitoring parameter for semi-volatile HAP's because such HAP's are less likely to volatilize during sampling. Because the TOC test is less costly than a total HAP or speciated HAP test, the EPA has provided a more cost-effective method for owners or operators with semi-volatile HAP's.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-33; IV-D-54; IV-D-112) disagreed with the requirement in §63.102 which requires testing for total VOHAP concentrations in cooling water. The commenters (A-90-19: IV-D-32; IV-D-33; IV-D-54; IV-D-112) suggested that the EPA specify an action level based on HAP's in table 9 as the basis for implementing leak detection requirements.

One commenter (A-90-19: IV-D-73) concurred that monitoring of cooling water should be limited to table 9 HAP's because these HAP's will volatilize from water. One commenter (A-90-19: IV-D-110) stated that the EPA should require testing for total VOHAP concentration rather than total HAP concentration because only table 9 HAP's are subject to the wastewater provisions. One commenter (A-90-19: IV-D-53) claimed that treatment chemicals and variation of intake water quality could interfere with leak detection if the regulation requires testing of total HAP's. One commenter (A-90-19: IV-D-73) stated that cooling towers should only be monitored for HAP's present in the unit(s) being serviced by the cooling tower.

Response: The monitoring requirements for heat exchange systems allow for sampling of speciated HAP, total HAP, total VOC concentration, or TOC for semi-volatile HAP's. A leak is detected in a recirculating cooling system if the influent concentration to the cooling tower is at least 1 ppm higher than the effluent concentration from the cooling tower. Therefore, a leak is detected only if there are compounds volatilizing from the cooling tower. Compounds that do not readily volatilize from water (HAP's not listed on table 9) will not cause a concentration differential across the cooling tower. Therefore, the definition of leak is based on whether or not the compounds in the cooling water are volatile, and repair of leaks is only required when the compounds in the cooling water are volatile.

Comment: One commenter (A-90-19: IV-D-34) suggested that if the EPA is going to regulate new cooling tower emissions, a design standard such as the ASME code for heat exchange systems should be considered rather than a LDAR standard for new heat exchangers.

Response: A design standard such as the ASME code for heat exchange systems does not guarantee that the heat exchanger will not leak. ASME codes are written for design and safety purposes. They ensure that a piece of equipment, such as a heat exchanger, achieves the desired performance level and operates safely. Furthermore, it is the actual construction and not the construction code that will determine if the heat exchanger will leak. For example, the heat exchanger may be defective or the material of construction may corrode due to old age or due to the types of chemicals being processed. Therefore, a leak detection and repair program is still necessary to ensure that a heat exchanger is not leaking.

Comment: One commenter (A-90-19: IV-F-7.43 and IV-D-117) claimed that the cooling water monitoring requirements in §63.102(b)(2) provide a loophole which allows large emissions of volatile HAP's and other VOC's. The commenter (A-90-19: IV-F-7.43 and IV-D-117) claimed that lack of maintenance occurs with cooling towers. The commenter (A-90-19: IV-F-7.43 and IV-D-117) suggested requiring the installation of continuous TOC monitoring devices on all cooling water equipment in HAP service. The commenter (A-90-19: IV-F-7.43 and IV-D-117) further suggested that if the TOC reading of the cooling water reaches 15 ppm or greater, then a sample of the cooling water should be submitted for analysis. The commenter (A-90-19: IV-F-7.43 and IV-D-117) suggested that if TOC levels of 20 ppm and above are reached, the piece of equipment should be taken out of service and repaired as soon as possible. The commenter (A-90-19: IV-D-117) suggested that a reading of 15 ppm or greater should trigger periodic sampling of cooling tower stacks.

Response: Monitoring of cooling tower influent and effluent concentrations to detect leaks in a heat exchange system is required monthly for the first 6 months and quarterly thereafter. A leak in a heat exchange system is defined as a difference in concentration of 1 ppm at a

95 percent confidence level. The EPA has written these requirements to prevent large emissions of HAP's and other VOC's from occurring at the cooling tower. Lack of maintenance will not occur with cooling towers, because if a leak is detected, it must be repaired no later than 45 days after it is detected. If the leak cannot be repaired without process unit shutdown, the facility is required to shut the process down, unless the owner or operator can demonstrate that a shutdown will cause more emissions than the leak. The facility also has the option to isolate the leaking process equipment from HAP service until it is repaired.

Installations of continuous TOC monitoring devices would be prohibitively expensive to install on all cooling water equipment in HAP service, which would include every heat exchanger. Furthermore, a reading of 15 or 20 ppm on a piece of cooling water equipment does not indicate emissions from a cooling tower. Emissions from a cooling tower are indicated by a concentration differential across the cooling tower. For example, if the influent and effluent concentrations of a cooling tower are both 15 ppm, there are no emissions occurring from the cooling tower. However, an influent concentration of 15 ppm and an effluent concentration of 10 ppm indicate that emissions are occurring from a cooling tower. Therefore, monitoring the influent and effluent of a cooling tower is sufficient to determine when leaks are occurring.

Comment: Several commenters (A-90-19: IV-D-32; IV-D-53; IV-D-112) supported §63.102(b)(4) which exempts from monitoring non-contact cooling water systems which operate at water pressures exceeding process fluid pressures.

Response: Non-contact heat exchange systems which operate at water pressures exceeding process fluid pressures were exempted from monitoring requirements because any leaks would occur into the process fluid and not into the cooling water.

6.12.5.2 Once-Through Cooling Water

Comment: One commenter (A-90-19: IV-D-73) argued that monitoring should only be required for recirculating cooling water systems that are open to the atmosphere. Another commenter (A-90-19: IV-D-34) suggested that requirements for control of "once-through" cooling water systems should be deleted. One commenter (A-90-19: IV-D-53) urged the EPA to exempt once-through cooling water systems from the HON. One commenter (A-90-19: IV-D-34) stated that once-through cooling water is currently regulated under CWA regulations and the air emissions are insignificant because the potential for HAP's to enter the water is low and the driving force for volatilization is very small. Several commenters (A-90-19: IV-D-36; IV-D-53; IV-D-54; IV-D-73) (A-90-23: IV-D-20) claimed that once-through cooling water systems are already subject to NPDES wastewater discharge permit monitoring requirements and should therefore not be subject to the HON.

One commenter (A-90-19: IV-D-34) provided data from several NPDES permits, which document allowable discharge limits ranging from 4 ppm with continuous monitoring in place to 0.75 ppm with cooling water leak detection and repair as part of best management practices.

Response: Once-through cooling water systems with effluent discharge limits of less than 1 ppm are no longer subject to the HON monitoring requirements for heat exchange systems. A leak in a heat exchange system is defined as a 1 ppm differential in concentration across the heat exchange system at a 95 percent confidence level. When a heat exchanger in a once-through cooling water system is leaking, the effluent concentration will be higher than the influent concentration. Therefore, an effluent concentration limit of less than 1 ppm guarantees that the variation in concentration across a once-through heat exchange system is less than 1 ppm if a heat exchanger is leaking. For once-through cooling water systems with effluent discharge limits greater than or equal to 1 ppm, it is impossible to guarantee that the variation across the system is less than 1 ppm unless the influent concentration is monitored. Therefore, once-through cooling water systems with effluent discharge limits greater than or equal to 1 ppm are not exempt from the HON monitoring requirements for heat exchange systems.

7.0 RECORDKEEPING AND REPORTING

Comment: Two commenters (A-90-19: IV-D-70; IV-D-99) requested that the Administrator be notified when a heat exchanger is leaking, and the Administrator should have the option to require a unit shutdown and repair before the next scheduled shutdown. One commenter (A-90-19: IV-D-70) provided a copy of text from an air permit which details appropriate action levels and time required for repairs when cooling towers are emitting butadiene.

Response: The heat exchange system provisions in subpart F have been amended such that an owner or operator can no longer invoke delay of repair for a leaking heat exchange system if the repair is technically infeasible without a process unit shutdown as previously stated in §63.102(b)(3)(i) of subpart F of the proposed rule. In the final rule, a process unit shutdown is required to repair a leak in a heat exchange system, unless the owner or operator can demonstrate that a process unit shutdown would cause greater emissions than the emissions from the leaking heat exchange system until the next planned shutdown. The EPA has determined that significant emissions can occur from a leaking heat exchange system between planned process unit shutdowns and has determined that process unit shutdown is the appropriate "action level" and time required for repairs (Memorandum from Kristine Pelt, Radian, to Mary Tom Kissell, EPA/SDB, "Leaks from a Heat Exchange System," November 23, 1993.).

Comment: One commenter (A-90-19: IV-D-32) stated that the recordkeeping and reporting requirements for wastewater subject to the HON should not be required for RCRA-permitted treatment units because RCRA already specifies sufficient monitoring, reporting, and recordkeeping.

Response: The EPA recognizes that recordkeeping and reporting overlap exists between the HON and RCRA for RCRA-permitted treatment units. In the final rule, the EPA has addressed this issue by incorporating in §63.110(e)(2)(ii) of subpart G an option for case-by-case determination of requirements. This option allows owners or operators to work with the Administrator to minimize any duplicative testing, monitoring, recordkeeping, and reporting requirements.

Comment: One commenter (A-90-23: IV-D-20) stated that the information required to document operating conditions during the compliance test should be restricted to treatment process information and should not include all process information. The commenter (A-90-23: IV-D-20) stated that §63.145(a)(4) should be altered to reflect such changes.

Response: The provisions in §63.145(a)(4) of subpart G do not require an owner or operator to document all process information. Rather, §63.145(a)(4) requires that an owner or operator shall record all process information that is necessary to document operating conditions during the test.

Comment: One commenter (A-90-19: IV-D-33) stated that the EPA should explain why the recordkeeping requirements in §63.102(b)(1) are necessary and what degree of detail is required. The commenter (A-90-19: IV-D-33) stated that only a brief explanation was included in the proposal preamble (57 FR 62614). The commenter (A-90-19: IV-D-33) stated that other regulations (e.g., NPDES and pretreatment requirements) currently require paperwork for maintenance-related wastewater, and thus, §63.102(b)(1) is not necessary and should be deleted.

Response: The recordkeeping requirements for maintenance wastewater have been moved from §63.102(b)(1) of subpart F of the proposed rule to §63.105 of subpart F, entitled maintenance wastewater requirements in the final rule. The recordkeeping requirements for routine maintenance and maintenance-turnaround wastewater are the same and these requirements will help ensure that procedures will be followed to properly manage maintenance wastewater and control HAP emission from maintenance wastewater to the atmosphere. The level of detail for the recordkeeping requirements is not specified in the rule in order to provide flexibility. However, the owner or operator must provide a description of maintenance activities which meets the requirements specified in §63.105(b) of the final rule. The recordkeeping requirements for NPDES and pretreatment permits are not sufficient for compliance with the recordkeeping requirements for maintenance wastewater regulated by the HON. These types of permits only regulate the amount of organic material present in the wastewater when it is discharged from the facility. The maintenance requirements of the HON are written to ensure the proper management of maintenance wastewater and the control of HAP emissions to the atmosphere from maintenance wastewater.

Comment: One commenter (A-90-19: IV-D-33) stated that the reporting requirements of §63.146 require submittal of more information than is necessary to demonstrate compliance. The commenter (A-90-19: IV-D-33) indicated that table 14a in §63.146(a)(1) and table 14b in §63.146(a)(2) require almost identical information for new facilities. The commenter (A-90-19: IV-D-33) recommended that §63.146(a) be simplified by eliminating subparagraph (a)(1) and table 14a, re-numbering table 14b as 14, and re-numbering the subparagraphs. The commenter (A-90-19: IV-D-33) contended that the same problem arises with tables 15a and 15b in §63.146(b) and suggested the same solution for deleting the redundancy.

Response: The commenter (A-90-19: IV-D-33) has misinterpreted the reporting requirements for the Implementation Plan and the Notification of Compliance Status as listed in §63.146 of subpart G. The EPA did not intend for identical information to be listed in tables 14a and 14b or in tables 15a and 15b for new sources. The information in tables 14a and 15a is to be submitted for table 8 compounds at new sources. The information in tables 14b and 15b is to be submitted for table 9 compounds at new sources or for table 9 compounds at existing sources. The titles of tables 14a, 14b, 15a, and 15b and the text in §63.146 of subpart G have been revised to clarify these reporting requirements.

Comment: One commenter (A-90-19: IV-D-33) suggested that if an existing source, which elected to comply with the process unit alternative of §63.138(d), completed table 16 in §63.146(b)(3), then the facility should not also need to complete table 15.

Response: The EPA agrees with the commenter (A-90-19: IV-D-33). The provisions in §63.146(b)(3) of subpart G have been clarified and state that if an owner or operator completes table 16, then table 15b need not be completed. Table 15a applies only to table 8 compounds for new sources.

Comment: One commenter (A-90-19: IV-D-38) alleged that the Administrative Authority should have the ability to approve alternative heat exchanger and maintenance plans subject to subparts G and H without having to publish notice in the Federal Register.

Response: The EPA assumes that the commenter (A-90-19: IV-D-38) is referring to the provisions in §63.102(c) of subpart F in the proposed rule. These provisions stated that the Director of the EPA's Office of Air Quality Planning and Standards would determine when an alternative means of compliance with subparts G or H is permitted and would publish a notice to that effect in the Federal Register. The EPA would like to point out that this authority rests with the Administrator; thus the proposed rule contained an error. Since the heat exchange system and maintenance wastewater requirements are in subpart F, the provisions from §63.102(c) of the proposed rule do not apply. In the final rule, the general standards, heat exchange system, and maintenance wastewater requirements have been moved to separate sections in subpart F for clarity.

8.0 WORDING OF THE PROVISIONS

Comment: One commenter (A-90-19: IV-D-34) stated that the units for both MR and RMR in §63.145 must be the same in order to compare the values.

Response: The EPA has revised the equations and the wording of the provisions at §63.145(g) and (h), so that the units for required mass removal (RMR) and actual mass removal (MR) are consistent.

Comment: One commenter (A-90-19: IV-D-77) stated that the EPA should correct §63.133(f)(2) of the proposed rule, which addresses control equipment failures for wastewater tanks, because the section incorrectly references §§63.133(e)(2)(i)-(viii) when it should reference §63.133(f)(2)(i)-(ix).

One commenter (A-90-19: IV-D-73) pointed out that the preamble incorrectly references table 9 HAP's in §63.138 when the table is actually in §63.131.

One commenter (A-90-19: IV-D-33) stated that the reference in §63.133(a) should be changed from "(c)" to "(b)."

One commenter (A-90-19: IV-D-87) noted that §63.138(d)(1)(i) is referenced in §63.145(b)(1) and that this section does not exist.

One commenter (A-90-19: IV-D-85) stated that §63.112(c)(1)(ii) should not refer to §63.132(d)(4) but should refer to §63.138(d)(4). The commenter (A-90-19: IV-D-85) pointed out that the way the proposed provisions were written, sources are exempted from installing the RCT if they meet certain monitoring and recordkeeping requirements.

Response: The EPA agrees with the commenters that the references were incorrect in the proposed rule. The references in the final rule have been corrected. However, some paragraphs have been renumbered in the final rule, and, therefore, the cross-references may have changed.

Comment: One commenter (A-90-19: IV-D-73) suggested deleting the third sentence in the definition of individual drain system, because the sentence presents a design requirement.

Response: The commenter is correct, and this change has been incorporated.

Comment: One commenter (A-90-19: IV-D-64) stated that in proposed §63.138(g)(3), the 99 percent destruction should be of total VOHAP, rather than HAP.

Response: The wastewater provisions in §63.138(g)(3) of the proposed rule are found in §63.138(h)(3) of the final rule. The EPA disagrees with the commenter (A-90-19: IV-D-64) that the provisions in §63.138(h)(3) should refer to 99 percent destruction of VOHAP. These provisions refer to a 99 percent destruction of the total HAP mass flow rate. When referring to the mass flow rate, the EPA refers to HAP. The term "VOHAP" is used when referring to the concentration used to determine applicability and the concentration used for enforcement.

Comment: One commenter A-90-19: IV-D-64) stated that "enclosed combustion device" is an undefined term.

Response: The EPA is not adding a definition of "unenclosed combustion device" to the final rule because the only type of combustion device that is not specifically enclosed is a flare. In the final rule, requirements for operating flares associated with the control of HAP emissions from wastewater are located in §63.139 of subpart G.

Comment: One commenter (A-90-23: IV-D-20) stated that the units (i.e., kg/yr and kg/hr) in §63.145(h) and (i) should be expressed consistently in kg/hr.

Response: The EPA agrees with the commenter (A-90-19: IV-D-20) that the units in §§63.145(h) and (i) should be expressed consistently. Therefore, the mass flow rate units in §§63.145(h) and (i) have been changed and are all expressed as kg/hr.

Comment: One commenter (A-90-19: IV-D-33) stated that the "and" after §63.132(d)(2) should be moved to after §63.132(d)(4).

Response: The EPA agrees with the commenter (A-90-19: IV-D-33) and the "and" after §63.132(d)(2) of the final rule has been removed. However, an "and" was not placed after §63.132(d)(4) of the final rule because paragraphs (1) through (5) in §63.132(d) of the final rule are all independent sentences.

Comment: One commenter (A-90-19: IV-D-33) stated that the definition of "recovery device" appears in both §63.101 and §63.111 and should be moved from §63.101, which has a more concise definition, to §63.111, which would eliminate the need for the definition in §63.101.

Response: The definition of "recovery device" has been made consistent in §63.101 of subpart F and §63.111 of subpart G. However, the EPA has decided to leave the definition in §63.101 of subpart F and §63.111 of subpart G, because the term is used frequently in both subparts and is referred to by other definitions in both subparts.

Comment: One commenter (A-90-19: IV-D-33) stated that the definitions of "closed-vent system," "control device," "process unit," and "process unit shutdown" should remain in both §63.111 and §63.161, but the definitions should be made consistent or the same, if possible.

Response: The EPA agrees with the commenter (A-90-19: IV-D-33) that the definitions of "closed-vent system", "control device", "process unit", and "process unit shutdown" should remain in both §63.111 of subpart G and §63.161 of subpart H. The definitions have been made consistent when possible.

Comment: One commenter (A-90-19: IV-D-33) stated that English units should be placed in parentheses after the metric units throughout the HON in order to avoid confusion in converting metric units to English units and to be consistent with the preamble.

Response: The regulation specifies only metric units, because the EPA enforces standards based on the metric system. Previous NESHAP and NSPS are based on metric units. Adding English units would create confusion about which value is enforceable due to rounding differences between the two values.

Comment: One commenter (A-90-19: IV-D-33) stated that the EPA should add "regulated" prior to "wastewater streams" in §§63.131(a)(5), (a)(6), and (a)(7).

Response: The EPA disagrees with the commenter (A-90-19: IV-D-33) that the word "regulated" should be added prior to the words "wastewater streams" in §63.131(g), (h), and (i) in the final rule. These paragraphs refer to figures 5, 6, and 7 which show the control options for those wastewater streams subject to the control requirements of the wastewater provisions of the HON. These control options include treatment of Group 1 wastewater streams, a combination of Group 1 and Group 2 wastewater streams, or treatment of all Group 1 and Group 2 wastewater streams (as required by the process unit alternative illustrated in figure 8). Control of wastewater streams is required only if Group 1 wastewater streams are present at the facility. However, Group 2 wastewater streams are also "regulated" by the wastewater provisions of the HON, although they do not require control. The EPA is concerned that the change suggested by the commenter could cause confusion if the term "regulated" were misinterpreted to mean only Group 1 wastewater streams.

Comment: One commenter (A-90-19: IV-D-33) stated that the definition of oil-water separator or organic-water separator needs the word "equipment" added to the end.

Response: The EPA agrees with the commenter (A-90-19: IV-D-33), and the word "equipment" has been added to the end of the definition of oil-water separator.

Comment: Two commenters (A-90-19: IV-G-10) (A-90-23: IV-G-5) suggested that the EPA clarify the definition of wastewater in figure 2 of §63.131 by moving the term "flow rate < 0.02 liter per minute" to the decision box containing the term "<5 ppmw."

Response: The term "flow rate <0.02 liter per minute" cannot be moved to the decision box containing the term "<5 ppmw" without changing the meaning of the flow diagram and the applicability criterion. If the term "flow rate <0.02 liter per minute" is moved from the decision box containing the term "concentration < 10,000 ppmw," wastewater streams will be exempt from the HON wastewater provisions simply by having a concentration less than 10,000 ppmw. Wastewater streams having concentrations between 5 and 10,000 ppm are only exempt from the HON wastewater provisions if their flow rate is less than 0.02 ℓpm. All wastewater streams with concentrations less than 5 ppmw are exempt from the HON wastewater provisions.

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16. ABSTRACT

A final rule for the regulation of emissions of organic hazardous air pollutants (HAP's) from chemical processes of the synthetic organic chemical manufacturing industry (SOCMI) is being promulgated under the authority of sections 112, 114, 116, and 301 of the Clean Air Act, as amended in 1990. The emission standards were proposed in the Federal Register on December 31, 1992 (57 FR 62608). Public hearings were held. A supplemental notice was published in the Federal Register on October 15, 1993 (58 FR 53478). This volume of the background information document summarizes all comments and presents the agency's responses on wastewater operations.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution Pollution control SOCMI Hazardous air pollutant National impacts	Air pollution control	

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