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# ***OAR Box 1473***

*Prepped by Abdul Stroman*

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4/25/95

**ROUND TABLE DISCUSSION FOR TETRAHYDROBENZALDEHYDE**

**BACKGROUND**

**MEDIUM:** Conference Call

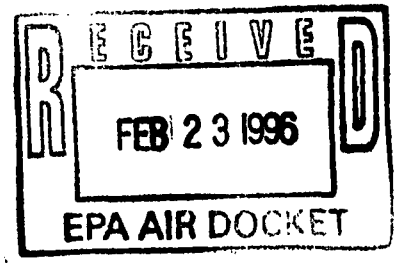
**DATE:** 3/29/95

**TIME:** 11:00 a.m. E.S.T.

**PARTIES:** U.S. Environmental Protection Agency (EPA)  
Louisiana Department of Environmental Quality (DEQ)  
Union Carbide Corporation

**TOPIC:** Possible Addition of Tetrahydrobenzaldehyde to List of HON affected chemicals

**CONTACT:** John Schaefer / U.S. EPA / (919) 541-0296



**PURPOSE**

The purpose of this conference call was to discuss development of a Maximum Achievable Control Technology (MACT) Standard for the manufacture of Tetrahydrobenzaldehyde (THBA). THBA is required by the Clean Air Act Amendments of 1990 to be regulated by November 15, 1997. Preliminary discussions between the EPA and Louisiana DEQ led to the initial conclusion that the best way to meet this requirement was to add Tetrahydrobenzaldehyde to the list of HON affected Synthetic Organic Chemical Manufacturing Industry (SOCMI) Chemicals, Code of Federal Regulations §63.105 (Table 2 Subpart F).

In meeting EPA's publicly stated goals of encouraging more participation in the regulatory process from groups outside the regulatory community this conference call was set up to discuss EPA's and the Louisiana DEQ's proposal. Union Carbide is the only known manufacturer of Tetrahydrobenzaldehyde in the nation and the only non-governmental party to express interest in the standard. This memo will list information discussed at the meeting as well as Union Carbide's stated concerns with the proposed option for regulating THBA and EPA's and the Louisiana DEQ's concerns.

**MEETING PARTICIPANTS**

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**UNION CARBIDE**

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<u>NAME</u>	<u>LOCATION</u>	<u>POSITION</u>
Kevin Batt	Technical Center - Charleston, WV	Environmental Engineering
Tom Covin	Taft Plant - Hahnville, LA	Plant HSE
Dick Galley	Boundbrook, NJ	Research & Development
Joe Hovius	Danbury, CT	Corporate HSE
Ron Hymel	Taft Plant - Hahnville, LA	Production
Dave Ladrot	Taft Plant - Hahnville, LA	Manufacturing Manager, SPU
Bill Nielsen	Taft Plant - Hahnville, LA	Research & Development
John O'Flynn	Taft Plant - Hahnville, LA	Production HSE
John Soice	Technical Center - Charleston, WV	Environmental Engineering
Dave Zimmer	Taft Plant - Hahnville, LA	Operations Improvement Manager

Union Carbide Contact: Tom Covin      Ph# (504) 468-4603  
HSE = Health, Safety and Environmental

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**U.S. ENVIRONMENTAL PROTECTION AGENCY**

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<u>NAME</u>	<u>LOCATION</u>	<u>POSITION</u>
Bob Rosensteel	Durham, NC	Environmental Engineer
John Schaefer	Durham, NC	Environmental Engineer
Susan Wyatt	Durham, NC	Chief, Organic Chemicals Group

EPA Contact:                      John Schaefer      Ph# (919) 541-0296

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**LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY**

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<u>NAME</u>	<u>LOCATION</u>	<u>POSITION</u>
Atly Brasher	Baton Rouge, LA	Assistant Administrator for Air Standards
Bliss Higgins	Baton Rouge, LA	Coordinator for Air Toxics
Bob Marting	Baton Rouge, LA	Program Manager for Air Toxics

Louisiana DEQ Contact: Atly Brasher      Ph# (504) 765-0100

**DISCUSSION**

The discussion can be broken up into two broad areas. The first area of the discussion concerned background information for the proposed addition of THBA to the list of HON affected chemicals (see attachment 1). The second area of discussion dealt with industry concerns with the proposal.

During the first part of the discussion Union Carbide representatives made several corrections to EPA information contained in the memo in attachment number 1. The corrections were made to Section IV. Current Controls. The corrections are as follows:

- 1) Not all valves at the Specialty Products Unit are bellows valves. Several are a type known as an orbital valve. Unlike bellows valves, orbital valves are not exempt from the periodic monitoring requirement in the HON LDAR protocol.
- 2) Not all flanges are welded, those that are not welded are maintained under a Union Carbide maintenance plan to prevent leaks.
- 3) Pumps are not sealless, they are of a dual mechanical seal type. Note: Dual mechanical seals w/ barrier fluid systems are exempt from monthly monitoring requirements like sealless pumps under the HON leak detection and repair program. HON Section 63.163, Pumps in light liquid service, paragraph (e) "Each pump equipped with a dual mechanical seal system that includes a barrier fluid system is exempt from the requirements of paragraph (b) of this section providing the following requirements are met:"
  - fluid pressure greater than pump stuffing box pressure at all times;
  - equipped with degassing reservoir connected to a closed vent-system connected to a control device;
  - equipped with a closed-loop system that purges fluid into a process stream. The barrier fluid must not be in light liquid service, have a sensor to detect failure of seal or barrier fluid system and each pump is visually inspected each calendar week for dripping liquid from the pump seal.

The bulk of the issues discussed were about Union Carbide's concerns about the possible addition of THBA to the HON list of affected chemicals. These concerns are covered in the next section. EPA and Louisiana DEQ concerns are discussed in the following section.

**UNION CARBIDE CONCERNS**

Representatives from Union Carbide Corporation indicated that they had three main concerns in developing a regulation for the Manufacture of Tetrahydrobenzaldehyde. Their main concerns are as follows:

1) Union Carbide indicated that their current wastewater control technology should be the reference control technology for THBA manufacturing. Union Carbide currently uses a Caustic Wastewater Treatment Reactor (CWTR) to control wastewater streams from the THBA process line. Union Carbide's concern hinged on the fact that if their current control system does not meet the HON for a methanol stream used produced in a different process but on the same product line they might have to replace their current system with a costly steam stripper system if THBA is added to the HON list of affected chemicals. A steam stripper would have few if any environmental benefits and might even have a negative environmental impact due to increased energy requirements. In addition they were also concerned about the cost to prove equivalency to the HON if their current system does indeed meet the HON requirements for all streams from the Unit.

The HON would require that 0.31 percent of the methanol in the stream be removed. In order for Union Carbide to prove equivalency to the reference control technology the following requirements under the HON must be met. First of all the streams must be hard piped to a biological treatment unit (not to a clarifier or other basin). Secondly EPA test method 304 would have to be used to determine equivalent control. Currently the pharmaceutical industry is doing a lot of work on modeling and estimating control of methanol laden streams. There is some possibility that this work could be used to prove equivalency without using method 304. However, EPA personnel involved in the development of the HON wastewater rule felt this path would be no easier than using method 304. In addition EPA personnel also felt that Union Carbide's current system (hard piped directly to a biological treatment unit) should be able to meet the HON requirement for removal of methanol.

2) Union Carbide believes their current system for Leak Detection and Repair (LDAR) should be accepted as meeting the Leak Detection and Repair requirements for the standard. Union Carbide currently uses an area monitoring system for acrolein to determine when repair needs to be affected on its equipment. The current system consists of 23 acrolein monitors spaced throughout the unit. The placement of these units is designed to account for prevailing wind conditions and wind direction changes. Union Carbide has indicated in the past that it feels that if Acrolein levels are in the low range it considers acceptable Butadiene should also be acceptable due to the stringent Acrolein requirements. In other words if the acrolein equipment is not leaking it is very unlikely that equipment containing butadiene is leaking. Union Carbide indicated that the Louisiana DEQ had accepted a BASF area monitoring system in Geismar, LA as equivalent to an LDAR requirement. If the HON LDAR requirement was implemented some of Union Carbide's equipment would be covered under its monitoring protocol. However, most of the equipment would be exempt.

3) Union Carbide also expressed some concern over the implementation schedule if this option was adopted. EPA and the Louisiana DEQ proposed using the current state implementation schedule for its MACT program. Union Carbide felt that additional time would be needed to comply with a federal MACT and would prefer a later date be adopted. The current compliance date for the Louisiana MACT program is December 20 ,1996.

Union Carbide plans a more detailed response about these concerns in a letter to EPA to be submitted by May 1.

**U.S. EPA AND LOUISIANA DEQ CONCERNS**

1) During the round table discussion Union Carbide indicated that they would prefer to not install a steam stripper in order to meet possible HON requirements. However, in their 1992 Air Toxics Compliance Program submittal to the State of Louisiana (see attachment 2), Union Carbide said they would install a "HON standard Steam Stripper upstream of the CWTR to remove acetaldehyde and methanol". The EPA has been working closely with Louisiana on the development of a federal standard for THBA production in large part to prevent potential conflicts between Federal and State regulations. In meeting this principle EPA feels that Union Carbide's concerns about the possible addition of a steam stripper should first be worked out with the State of Louisiana. It should be noted that a federal regulation would not preempt more stringent state requirements. Therefore, since Union Carbide's Louisiana MACT compliance plan submitted in December of 1992 requires the installation of a steam stripper, a federal rule would have no effect on this requirement regardless of whether or not THBA is added to the HON list of affected chemicals or an entirely separate standard is developed.

Similarly the same situation holds for equipment leaks. In their December 1992 Louisiana Air Toxics Compliance Plan Union Carbide said they would implement the HON LDAR protocol facility wide. Again a federal standard without this requirement would not remove the requirement to conduct the HON LDAR protocol on the THBA unit.

2) EPA's primary concern is the difficulty in justifying treating THBA differently from all the other chemical processes that have been regulated in the past. THBA was not included in the HON in the past due to a lack of understanding of the chemical itself and its manufacturing process. If EPA had investigated Tetrahydrobenzaldehyde prior to the proposal of the Hazardous Organic NESHAP (HON) it would have most likely added it to the list of HON affected chemicals. Given this fact it would be very difficult to justify treating Tetrahydrobenzaldehyde differently from other organic chemicals by accepting Union Carbide's first two concerns. In other words it would be extremely difficult for EPA to explain why over 400 organic chemicals that are very similar to THBA were regulated by one standard and why this one particular source category was regulated by itself.

3) If Tetrahydrobenzaldehyde was not added to the HON a separate standard with its associated analysis and other work would have to be developed. If we add it to the HON, the HON floor applies. If we develop a separate standard, it would be at least what the plant is currently doing. In some cases this is more stringent than the HON and a special rule would have to be developed. Developing a separate standard for THBA would go against the EPA administrators stated goal of developing one rule for one industry. Currently the Office of Air Quality Planning and Standards is engaged in an effort to combine eleven standards covering the Synthetic Organic Chemical Industry into one rule. If a separate rule was developed for THBA, one standard plus one for THBA would cover the Synthetic Organic Chemical Industry (SOCMI).

4) A separate standard would take a great deal of agency resources to develop. This is because EPA could not simply say that Union Carbide is currently doing MACT. EPA would have to justify its determination with technical and cost analysis. We would have to determine a floor, what controls in addition to those already being used are feasible, and the cost. Given that little if any emissions reductions are expected from this standard, it would be a poor use of agency resources to develop a separate standard. This concern however, must be weighed against industry concerns about additional associated cost if THBA is added to the list of HON affected chemicals.

5) EPA is also concerned about the acceptance of an area monitoring system to meet LDAR requirements. Data collected by the EPA in the past indicates that area monitoring and LDAR are not equivalent. Union Carbide would have to collect information to demonstrate equivalency.

**NEXT STEPS**

A consensus on an approach to use was not reached during this round table meeting. However, it was agreed that Union Carbide would further develop its concerns and present them to EPA by May 1, 1995. A discussion of Union Carbide's presentation will be held several days after May 1<sup>st</sup>, a date has not been set.

# **ATTACHMENT 1**

## **NOTE**

**FROM:** John Schaefer (EPA/OAQPS/ESD/OCG)  
Phone: (919) 541-0296

**TO:** Louisiana DEQ and Union Carbide

**SUBJECT:** Butadiene Dimers (Tetrahydrobenzaldehyde)

## **I. PURPOSE OF MEETING**

The purpose of this meeting is to discuss the addition of Tetrahydrobenzaldehyde (THBA) manufacturing to the list of HON affected chemicals. The expected results from this meeting are either concurrence from Union Carbide to pursue adding THBA to the list of HON affected chemicals, or general agreement on what areas need to be pursued to fulfill the requirements for a federal Maximum Achievable Control Technology (MACT) standard for the manufacture of THBA.

## **II. SOURCE CATEGORY BACKGROUND**

Butadiene Dimers (Tetrahydrobenzaldehyde) is a seven year MACT Source Category due for regulation by November 15, 1997. The only chemical covered by the source category is Tetrahydrobenzaldehyde. Tetrahydrobenzaldehyde is produced only by Union Carbide in Hahnville, LA. The Butadiene Dimers Source Category will be renamed Tetrahydrobenzaldehyde Production when the Source Category List is update at a future date (Expected within the next few months). Two HAPs are released by the manufacture of Tetrahydrobenzaldehyde: Acrolein and 1,3-Butadiene.



### **III. PROJECT BACKGROUND**

This project is being conducted as a MACT partnership in cooperation with the State of Louisiana. Originally dodecanedioic acid (DDDA) production (another source category chemical with only one producer) was included with this project. This chemical was added to the HON between proposal and promulgation due to the fact that its inclusion would have had no effect on HON impacts. However, at the time including butadiene dimers would have had an effect on HON impacts. Since, it would have changed the impacts of the HON a legal judgement was made that it must first be proposed in the Federal Register to add this chemical to the HON so comments on its addition could be taken. Since, that time a risk analysis was conducted on the facility in order to screen for possible delisting. The risk analysis was inconclusive, however it did suggest that it would be difficult to delist the source category using EPA's definition of potential to emit (i.e. operation of the process 365 days a year). A serious effort to delist the chemical was not pursued after the initial conversations with Union Carbide.

### **IV. CURRENT CONTROLS**

The current facility is very well controlled. Four process vents are used in the process, all of the vents are controlled by either a flare or an incinerator. All wastewater streams for which Union Carbide has measured HAPs are sent to what Union Carbide calls a caustic wastewater reactor and controlled. All HAP storage tanks are pressurized vessels with inerts from the vessels being vented to a flare. All pumps are sealless, flanges are welded, and valves are bellows valves. With the exception of a few pieces of equipment almost all of the 1,000 components meets HON requirements and would not require monitoring with a leak detector under the HON. Process vents, wastewater, and storage vessels currently meet or exceed HON requirements.

## V. STATE REGULATIONS

The State of Louisiana is in the process approving a federally enforceable state imposed MACT compliance plan for the entire facility. Union Carbide is committing to meet HON control and monitoring requirements for Wastewater, Process Vents, and Storage Tanks, and a Louisiana rule for equipment leaks. The equipment leaks rule is very similar to the HON.

## V. EPA/LOUISIANA DEQ PROPOSAL FOR REGULATION

In order to fulfill the requirement of Clean Air Act Amendments of 1990 EPA and the Louisiana DEQ propose to amend the list of HON affected chemicals (Subpart F Table 1) to include tetrahydrobenzaldehyde. This would be accomplished by proposing a rule in the federal register to add THBA to the HON. The proposal would then published in the federal register for comment. After reviewing any comments on the proposed addition of THBA to the HON a final rule would be published in the Federal Register several months later.

## VI. ISSUES

1. **Primary Product** - Under the definition of primary product in the HON a unit is either subject to the HON in its entirety for MACT compliance (365 days of the year even if it is not making a HON chemical at the time) or it is not subject to the HON and presumably be covered by another MACT standard. The primary product is determined by looking 5-years into the future and estimating the chemical that will a) be manufacture the largest percentage of time the unit is in operation, or b) if two chemicals are manufactured an equal amount of time the chemical manufactured in the greatest amount is the primary product.

If THBA is the primary product this would mean the entire unit is subject to the HON including the time when the unit is engaged in manufacturing campaigns other than THBA. If THBA is not the primary product the Federal Register notice could be written to specifically say THBA manufacture is covered by the HON regardless of primary product. This would have the effect of preventing any possible federal MACT rules that might affect the unit from superseding this regulation.

There are many other ways of handling this issue including doing nothing if THBA is not the primary product. This approach would give Louisiana the flexibility to implement its state MACT rule without regard to the federal rule.

**2. Compliance Date** - In order to more fully integrate the Federal and State MACT rules EPA and Louisiana feel that the compliance date for the federal MACT should be the same as the selected compliance date for the State MACT rule that Union Carbide has worked out with Louisiana.



**ATTACHMENT 2**

UNION CARBIDE CHEMICALS AND PLASTICS COMPANY INC.  
INDUSTRIAL CHEMICALS DIVISION

December 20, 1992

RECEIVED

Mr. G. Von Bodungen  
Department of Environmental Quality  
Office of Air Quality and Radiation Protection  
P. O. Box 82135  
Baton Rouge, LA 70884-2135

DEC 23 1992

LA. DEPARTMENT OF  
ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION

Re: Air Toxics Compliance Plan and Certification of Compliance Submittal - Union Carbide Chemical and Plastics Company, Inc., Taft Plant, St. Charles Parish

Dear Mr. Von Bodungen:

Pursuant to LDEQ Environmental Regulatory Code, Part III, Chapter 51, Comprehensive Toxic Air Pollutant Emission Control Program, attached are three copies of a compliance plan to bring the Union Carbide Taft Plant into compliance with the maximum achievable control technology (MACT) requirements of Chapter 51.

The compliance plan defines MACT for process vents, loading operations (excluding barge and drum loading), storage tanks, fugitive emission equipment and wastewater operations as the control technology specified by the EPA in the draft Hazardous Organic NESHAP (HON) for SOCOMI, 40CFR Part 63. MACT for barge loading is defined as the control requirements specified by LDEQ Air Quality Regulation 2108, Marine Vapor Recovery. If the final EPA HON Rule for SOCOMI MACT differs from the draft rule, Union Carbide may choose to revise this compliance plan accordingly. Our compliance plans may also change due to other unpredictable and/or uncontrollable reasons such as safety, environmental, design and economic considerations.

To summarize, the Union Carbide Taft Plant has five tanks, fugitive emission equipment components and four wastewater streams which do not presently meet MACT. The attached submittal describes the control technology being proposed to bring those emissions sources into compliance. All other emission points at the Plant are either exempt or presently meeting the MACT standards. The attached submittal also serves to certify that these other emission points are in compliance.

Your approval of the attached compliance plans and certification of compliance is respectfully requested.

If you have any questions, please call Tom Covin at (504) 468-4603. Written correspondences should be addressed to me.

Yours truly,

W. T. Gray, Jr.  
Union Carbide Chemical and Plastics  
Company, Inc.  
Taft Plant Manager

Attachment (3)  
WTG/TJC/tjc

6.2 Group 1 Wastewater Stream Data

Production Unit	Wastewater Stream	VOHAP Component	Flow (lb/hr)	Actual Conc. (ppm)	Adjusted Factor (Fm)	Adjusted Conc. (ppm)
Acrylic Esters I	Water Column Purge	Acrolein	4,000	14,650	0.85	12,453
Acrylic Esters II	EA Extract Decant Bottom Layer	Ethyl Acrylate	Unknown	14,101	0.788	11,112
Acrylic Esters II	Solvent Recovery Column Hotwell	Ethyl Acrylate	Unknown	3,753	0.788	2,957
Specialty Products	Caustic Waste Treatment Reactor	Acetaldehyde	20,100	4,300	0.724	3,113
		Methanol		3,000	0.321	963
		Acrolein		100	0.85	85
		Total VOHAPs				4,161

6.3 Wastewater - MACT Compliance Plan

UCC & P is in compliance with air toxic regulations for all wastewater streams except the four Group 1 streams.

The Acrylic Esters I Water Column Purge stream will be controlled by acrolein destruction within the Caustic Wastewater Treatment Reactor (CWTR) at this unit. The CWTR is more efficient than the required 95% for acrolein. The closed system transporting of this stream will be controlled by venting to an existing flare.

The Acrylic Esters II Unit's two Group 1 streams are currently closed systems (upstream of the control device) with vents. To comply with the SOCOMI HON and LDEQ MACT regulations these vents will be routed to an existing incinerator via the Vent Header Project. The liquid stream will be routed to the ethanol recovery column which is more efficient than the SOCOMI HON steam stripper technology and removes the required 95% of the Ethyl Acrylate of these streams. The vapors removed will be recycled back to the process unit.

*Safety  
Issue  
concerns  
by UCC.*

The Specialty Products Unit (SPU) CWTR feedwater stream will be controlled by installing a HON standard Steam Stripper upstream of the CWTR to remove the acetaldehyde and methanol. The liquids are then transported to the CWTR which again removes (by destruction) more than the required 95 % of the acrolein. The transport emissions of this stream will be routed to the existing SPU incinerator.

These four Group 1 streams will complete MACT by performing the required testing, monitoring, recordkeeping, and reporting of the SOCOMI HON (40 CFR 63.132 through 40 CFR 63.140). There are no anticipated impacts to other media with the implementation of these MACT controls

6.4.4 Wastewater Compliance Schedule

Source ID: Specialty Products WWT	Source Description: CWTR Feedwater				
TAPS Emitted:	Acetaldehyde, Methanol, and Acrolein				
MACT Controls to be Installed:	Install a steam stripper upstream of the CWTR. CWTR to remove acrolein. Closed transport system to vent to SPU incinerator.				
	<u>Schedule</u>				
	93	94	95	96	97
Construction Authorization Request-					
LDEQ Issues Constr. Authorization					
Contract Award					
Construction					
Control Equipment Testing and Certification					
Date of Final Compliance:					12/20/96

7.0 Fugitive Emissions Leak Detection and Repair (LDAR) Program

UCC&P currently has in place extensive leak detection and repair programs to control fugitive emissions. The programs meet the current Benzene NESHAP, NSPS and LDEQ LDAR regulations. MACT for fugitives is being defined in this compliance plan as the program specified within the SOCFI HON (40 CFR 63 Subpart H) which is not yet proposed by EPA. Whatever final fugitive emission standards are promulgated pursuant to 40 CFR 63 Subpart H will be implemented as MACT.

The draft SOCFI HON MACT for fugitive emissions as presently written applies to equipment in volatile hazardous air pollutant service for at least 300 hours per year at a process unit that produces or uses a chemical listed at 40 CFR 63.183 or is a process listed at 40 CFR 160(c). The rule will apply to pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, product accumulator vessels, instrumentation systems and control devices or systems. The standards as they apply to various fugitive emission equipment components are listed below:

Pumps

- Leak definition lowered from 10,000 ppm (phase I) to 5,000 ppm (phase II) to as low as 1,000 ppm (phase III).
- Weekly visual inspection for leaks or evidence of leakage.
- Leaks must be repaired as soon as practical but no later than 15 days after a leak is discovered.
- A first attempt at repairing a leak must be made within 5 days.

Compressors

- Must be equipped with seal system consisting of a barrier fluid that prevents leakage of process fluid to the atmosphere.
- Leaks must be repaired as soon as practical but no later than 15 days after a leak is discovered.
- A first attempt at repairing a leak must be made within 5 days.



Pressure Relief Devices in Gas/Vapor Service

- Must be maintained with a reading <500 ppm above background.
- Must be monitored within 5 days after each release.

Sampling Connecting Systems

- Must be equipped with closed-purge, closed-loop or closed-vent system.

Open-Ended Valves or Lines

- Must be capped, blind flanged, plugged or equipped with a second valve.

Valves in Gas/Vapor Service and Light Liquid Service

- Leak definition lowered from 10,000 ppm (phase I) to 500 ppm (phase II & III).
- Monitor quarterly for leaks during phases I & II.
- If leakers are >2%, implement a quality improvement program and monitor quarterly.
- If leakers are <2%, monitor quarterly.
- If leakers are <1%, monitor every 2 quarters.
- If leakers are <0.5%, monitor every 4 quarters.
- Leaks must be repaired as soon as practical but no later than 15 days after a leak is discovered.
- After a leak is repaired, monitor at least once within the first 3 months following the repair.

Pumps, Valves, Connectors and Agitators in Heavy Liquid Service;  
Instrumentation Systems; and Pressure Relief Devices in Liquid Service

- Monitor within 5 days following a leak detection by visual, audible, olfactory or any other monitoring means.
- A leak is defined as:
  - Agitators - 10,000 ppm
  - Pumps - 1,000 ppm
  - Valves - 500 ppm
  - Connectors - 500 ppm
  - Instrumentation - 500 ppm
  - Pressure Relief Device - 500 ppm
- Leaks must be repaired as soon as practical but no later than 15 days after a leak is discovered.

Product Accumulator Vessels

- Must be equipped with a closed-vent system capable of capturing and transporting any leakage from the vessel to a control device.

Closed Vent Systems and Control Devices

- Must reduce organic emissions with an efficiency of 95% or greater.
- Flares must meet standards at 40 CFR 60.18.
- Closed vent systems.
  - Must maintain <500 ppm above background.
  - Monitor initially and annually thereafter.
  - Leaks must be repaired as soon as practical but no later than 15 days after a leak is discovered.

Agitators in Gas/Vapor Service and in Light Liquid Service

- Must be monitored monthly.
- Must be visually inspected weekly for leaks/evidence of leakage.
- Leak definition is 10,000 ppm.
- Leaks must be repaired as soon as practical but no later than 15 days after a leak is discovered.

Connectors in Gas/Vapor Service and in Light Liquid Service

- Leak definition is 500 ppm.
- Monitoring frequency must be:
  - All connectors within first 12 months.
  - If leakers are <0.5%, subsequent monitoring may be divided over 2 year period.
  - If leakers during the previous 2 year period was <0.5%, monitoring may be divided over 4 year period.
  - If leakers during the previous 4 year period was 1% or greater, subsequent monitoring must be increased to annually.
  - If a connector is eliminated with a weld, the weld integrity must be checked.
  - Connectors which have been opened or cracked must be checked within the first 3 months after being returned to VHAP service.
  - A leaking connector which has been repaired must be monitored within the first 3 months after its repair.
  - Unsafe-to-monitor connectors must follow a written plan for monitoring when conditions are safe.
- Leaks must be repaired as soon as practical but no later than 15 days after a leak is discovered.
- Unsafe-to-repair connectors must be repaired during the next scheduled shutdown.
- Inaccessible connects found to be leaking, via visual, audible, olfactory, or other means, must be repaired as soon as practical but no later than 15 days after a leak is discovered.