



EPA Course Number AIR 206

***Miscellaneous Organic
Chemical Manufacturing
MACT Training***

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Miscellaneous Organic Chemical Manufacturing MACT Training

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Miscellaneous Organic Chemical Manufacturing MACT Training

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Miscellaneous Organic Chemical Manufacturing MACT Training

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EPA Course Number AIR 206

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Miscellaneous Organic Chemical Manufacturing MACT Training

Miscellaneous Organic Chemical Manufacturing MACT Training

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- Overview of Industry
- Overview of NESHAP
- Applicability
- Emission Standards
- Case Study
- Initial Compliance Requirements
- Ongoing Compliance Requirements
- Recordkeeping and Reporting
- Alternative Standard
- Pollution Prevention
- Practical Aspects of Inspection
- Comparison of Rule Requirements for PAI, PHARMA, and MON
- Review of Available Implementation Tools
- Other Questions and Answers

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National Emission Standards for Miscellaneous Organic Chemical Manufacturing

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1.0 Overview of the Industry

Overview of the Industry

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- Background
 - Section 112 of the Clean Air Act
 - Discussion of Source Category List and Subsumed Categories
 - Data Collection and Rule Development

Section 112

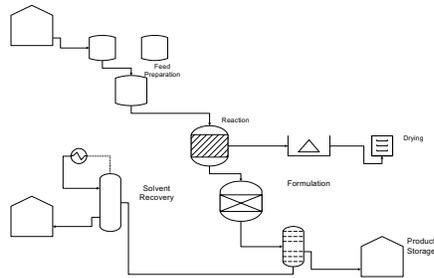
- Section 112 of the Clean Air Act Amendments of 1990
 - 112 (b) List of HAP
 - 112 (c) Source Category List
 - 112 (d) MACT
 - MACT Floor
 - Best 12% of sources (existing)
 - Best of best (new)

Source Categories

- Source Categories
 - www.epa.gov/ttn/atw/socatlst/socatpg.html
 - Latest list for major sources:
Feb 12, 2002 (67 FR 6521)
 - Specialty organic chemicals
 - Explosives
 - Certain polymers and resins
 - Pesticide intermediates
 - Implications for 112 (j)

Types of Processes

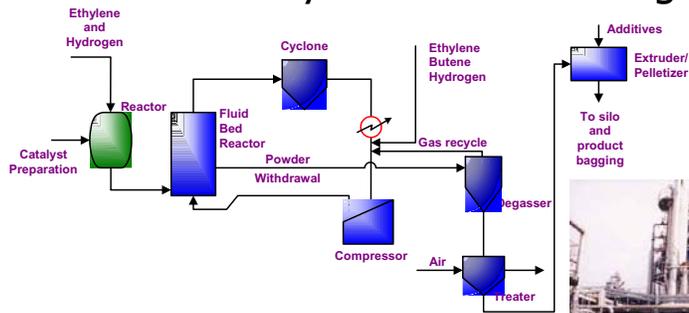
Chemical Manufacturing



1.0 Overview of the Industry

Types of Processes

Polymer Manufacturing



1.0 Overview of the Industry

Processing Scale



Small scale, batch manufacturers to



SOCMI facilities

1.0 Overview of the Industry

Non-Dedicated Equipment

Equipment	Reactors Process Tanks Filters Evaporators Crystalizers					
Production Areas	1	2	3	4	5	6



Production Activities at Factory A				
Bay	Process			
1	A			
2	A			
3	A	B	C	
4	A		C	
5			C	
6		B	C	D

1.0 Overview of the Industry

2.0 Overview of NESHAP (40 CFR part 63, subpart FFFF)

Overview of Subpart FFFF

- Development history
- Summary of requirements
- Key changes since proposal
- Impacts
- Compliance timeline

Development History

- Project started in 1995
- Data collection in 1997
- Proposal: April 4, 2002
- Promulgation: November 10, 2003
- Litigation...?

Organization of Subpart FFFF

- What's covered (applicability)
- Compliance dates
- Standards and compliance requirements
- Alternative means of compliance
- Notifications, Reports, and Records
- Other Requirements

Overview of Applicability

- Facility must be a major source of HAP emissions
- Process units that:
 - Produce organic chemicals that are not subject to other MACT standards
 - Process, use, or produce organic HAP or hydrogen halide and halogen HAP
- Batch process vents from HON process units
- Several cited exclusions

Overview of Standards

- Standards for:
 - Process vents
 - Storage tanks
 - Transfer operations
 - Wastewater
 - Equipment leaks
 - Heat exchange systems

Overview of Compliance Requirements

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- Most compliance requirements are specified by cross-referencing other rules

Emission Point/Equipment	Referenced Subparts
Continuous process vents	G and SS
Batch process vents	SS and GGG
Storage tanks	WW and SS and GGG
Equipment leaks	TT and UU
Process wastewater	G
Maintenance wastewater and heat exchange systems	F
Transfer operations	SS

2.0 Overview of NESHAP

Initial Compliance Overview

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- Determine Group status, or designate as Group 1
- Group 1 emissions vented to APCD
 - Performance test, design evaluation, or calculate controlled emissions
 - Establish operating limits for parameter monitoring
- Wastewater treatment units
 - Performance test or design evaluation
- Initial inspections
 - Floating roofs, closed-vent systems, waste management units

2.0 Overview of NESHAP

Ongoing Compliance Overview

- Vent streams to APCD or recovery device
 - Monitor parameters (generally continuously)
 - Average parameter readings (generally daily)
- Wastewater treatment unit parameter monitoring
- M21 monitoring and visual inspections for equipment leaks (LDAR program)
- Periodic inspections
 - Floating roofs, closed-vent systems, waste management units

Recordkeeping Overview

- Operating scenarios for each process
- Various written plans
 - Startup, shutdown, and malfunction plan
 - Maintenance wastewater plan
 - Plans for inspecting unsafe- or difficult-to-inspect equipment
- Ongoing records. For example,
 - Monitoring data and documentation of periods when operating limits are exceeded
 - Inspection results and documentation of repairs
 - Operating log or schedule
 - Documentation of SSM events

Reporting Overview

- Initial notification
- Precompliance report
- Notification of compliance status
- Compliance reports
- Miscellaneous reports required by the General Provisions
 - Notification of performance test (and test plan)
 - Notification of CEMS performance evaluation
 - Request for extension of compliance
 - Application for approval of construction or reconstruction

Exceptions to General Provisions

- Startup, shutdown, and malfunction
 - Records (occurrence, duration, and actions) and reports required only if excess emissions occur
 - No immediate SSM report

(continued)

Exceptions to General Provisions

- Performance tests
 - Must conduct no later than 150 days after compliance date
 - Site-specific test plan must be submitted with notification of performance test for batch process vents
 - Performance tests for batch process vents must be conducted under worst-case conditions rather than representative conditions

(continued)

Exceptions to General Provisions

- Compliance reports
 - Changes to information already submitted in NOCS are to be reported in compliance reports rather than within 15 days of the change
 - Required semiannually; the provisions that specify more frequent reporting do not apply
 - Only one type of report (i.e., not summary reports and excess emissions reports)
 - Information to report doesn't depend on percentage of time during which excess emissions occur
 - Certain CPMS records are excluded

Differences From Subpart SS

- Initial compliance
 - Must conduct performance tests for batch process vents under worst-case conditions, not maximum representative conditions
 - Design evaluation instead of performance test is allowed for small control devices
 - Correct concentrations to 3% oxygen for supplemental gases rather than supplemental combustion air
 - May elect to conduct design evaluation for halogen scrubbers regardless of scrubber size
 - Determine controlled emissions for condensers using procedure in subpart GGG rather than conducting performance test or design evaluation

(continued)

Differences From Subpart SS

- Ongoing compliance
 - Measure caustic strength as alternative to pH
 - Alternative monitoring for catalytic incinerators
 - Operating limits for batch operations may be averaged over the batch operations rather than daily
 - For batch process vent control devices, alternative to continuous monitoring is allowed if inlet HAP is <1 tpy
 - Monitoring data collected during periods of SSM are to be used in calculating daily averages
 - Excused excursions are not allowed

(continued)

Differences From Subpart SS

- Other
 - Install a flow indicator at inlet or outlet of control device if flow could cease periodically; Monitoring data collected during periods of no flow may not be used in averages
 - For storage tank emissions vented to control devices, follow the same provisions as for process vents, not the monitoring plan approach in §63.985(c)

Key Changes Since Proposal

- Significant changes to format
- Developed separate thresholds for control of partially soluble and soluble HAP in wastewater
- Added emission limits for hydrogen halide and halogen emissions from process vents
- Added less-stringent LDAR requirements for processes with batch process vents
- Deleted calibration and other QA/QC specifications in favor of the requirements in subpart SS
- Eliminated the immediate SSM reporting requirement
- Added "process unit group" compliance option for non-dedicated equipment

Process Unit Group

Process Vessels	Process A	Process B	Process C	Process D
R400	decanter		batch still	
R410	reactor		extraction	hold tank
R420	decant/wash			reactor
R270	reactor		reactor	
R250		hold tank	extraction	
R160		hold tank		chlorinator
R150		batch still	batch still	
R130		receiver	receiver	
R390		reactor	extractor	
R280		extraction	hold tank	pH adjust
R2400			separator	hold tank
T2300	hold tank		hold tank	
T1300		hold tank		receiver

2.0 Overview of NESHAP

Process Unit Group

- Create PUG
 - Process units with overlapping equipment
 - Projection of processes to be run in 5-year period
 - May add process units in the future if there is overlap

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2.0 Overview of NESHAP

Process Unit Group

- Determine primary product
 - Type of material projected to be made for the greatest operating time in the 5-year period
 - Redetermine at least every 5 years

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Process Unit Group

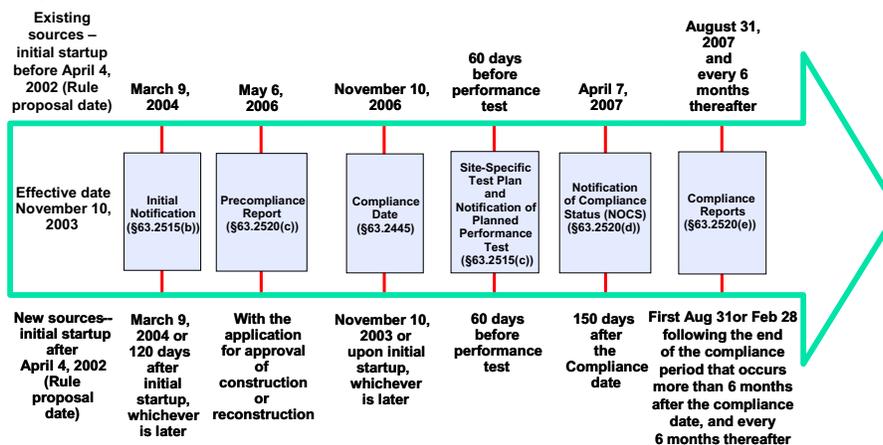
- Generally, comply with the rule that applies to the primary product for all process units in the PUG

Impacts

- Approximately 260 facilities with emission points that meet some of the thresholds for control
- Estimated HAP reductions: 16,800 tpy
- Estimated cost: \$75 million/yr

2.0 Overview of NESHAP

Compliance Timeline



2.0 Overview of NESHAP

3.0 Applicability

Applicability Topics

- Affected Source
- Definitions
- Types and Functions of Affected Units
- Questions and Answers

MON Applicability

§63.2435 (a) Specifies applicability to owners or operators of MCPU located at major sources of HAP

(b) Defines MCPU

(c) Provides Exemptions

Miscellaneous Organic Chemical Manufacturing Process Unit

§63.2435 (b): MCPU includes equipment necessary to operate a miscellaneous organic chemical manufacturing process that meets (b)(1) through (3):

- (1) manufacture materials or families of materials described by:
 - (i and ii) SIC codes 282,283,284,285,286,287,289,386 or NAICS code 325, with some noted exceptions
 - (iii) Quaternary ammonium compounds and ammonium sulfate produced from caprolactam

(continued)

Miscellaneous Organic Chemical Manufacturing Process Unit

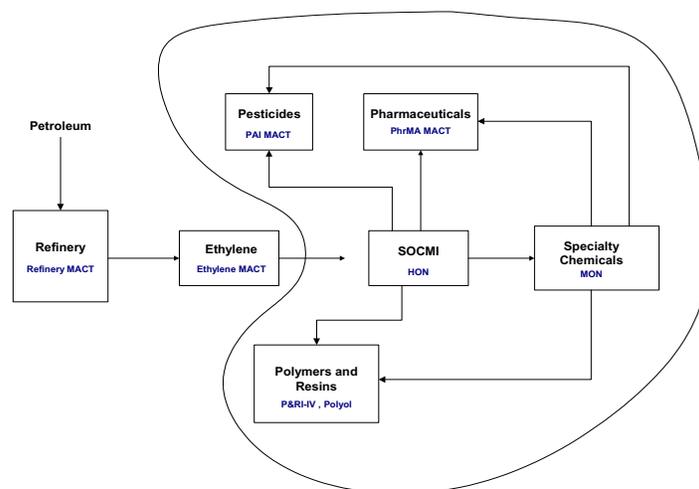
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- (iv) Hydrazine
- (v) Organic solvents recovered using nondedicated solvent recovery devices
- (2) The MCPU processes, uses or produces any of the organic HAP listed in the CAA section 112(b) or hydrogen halide and halogen HAP
- (3) The MCPU is not an affected source or not part of an affected under Part 63 (except for HON batch vents)

3.0 Applicability

Potential Reach of the MON

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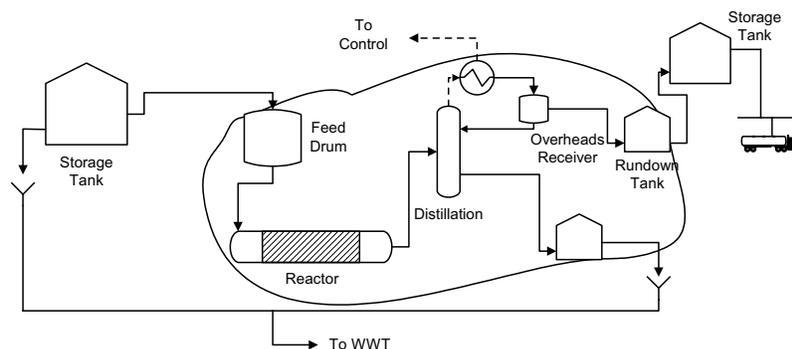
3.0 Applicability

Implications of Broad Applicability

- Chemical and polymer manufacturers that are major sources of HAP that have units that have not been affected by other MACT will likely be affected sources under the MON.
- HON CMPU may also have to be revisited because the MON will regulate batch vents.

3.0 Applicability

Miscellaneous Organic Chemical Manufacturing Process



3.0 Applicability

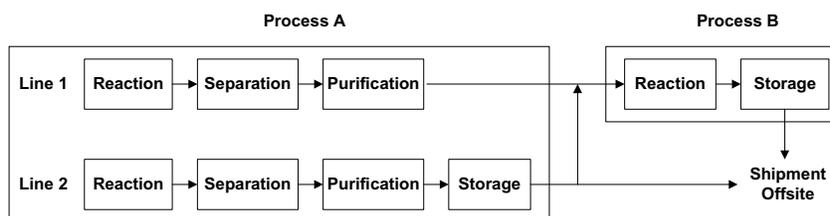
Isolated Intermediate

- Isolated intermediate means a product of a process that is stored before subsequent processing. An isolated intermediate is usually a product of a chemical synthesis, fermentation, or biological extraction process. Storage of an isolated intermediate marks the end of a process. Storage occurs at any time the intermediate is placed in equipment used solely for storage.

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3.0 Applicability

Isolated Intermediate



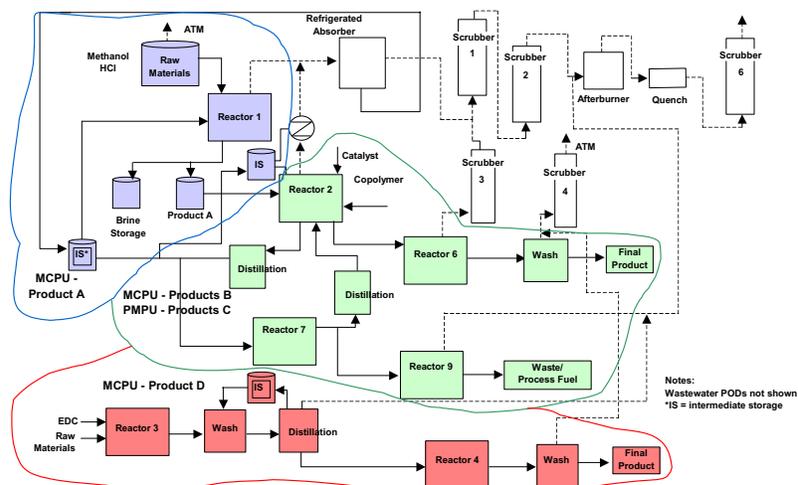
3.0 Applicability

Family of Materials

- A family is considered part of the same process
- A family is defined in Appendix J
- Based on the same emission profiles (see Appendix J for an example)

3.0 Applicability

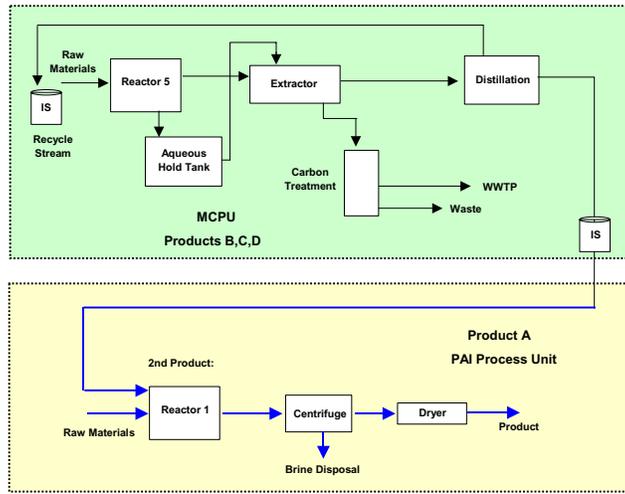
Example: MON Process Boundaries



3.0 Applicability

Example: MON Process Boundaries versus PAI

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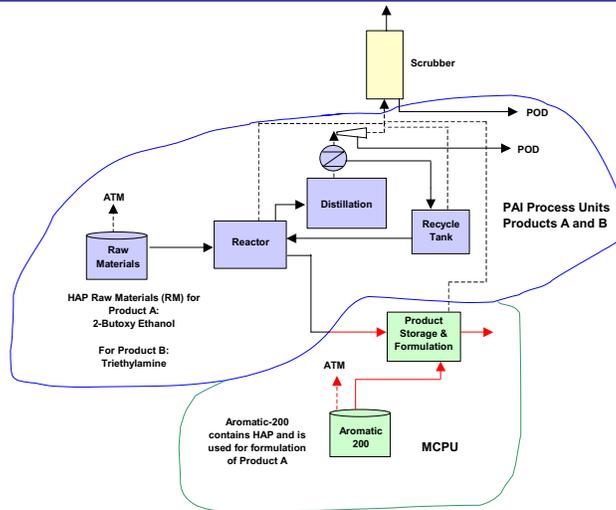


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3.0 Applicability

Example: MON Process Boundaries versus PAI

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3.0 Applicability

Process Vents

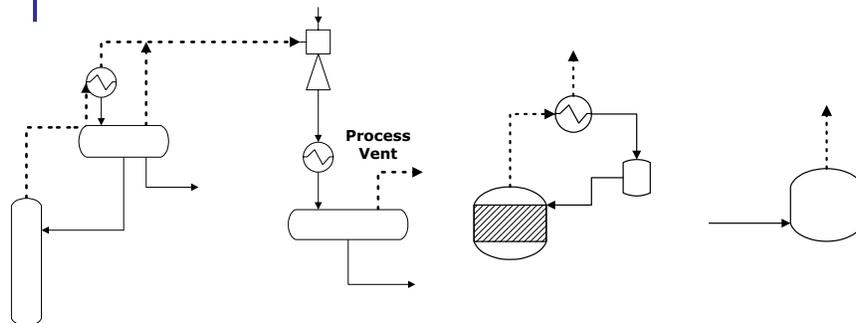
- **Batch:**
 - >50 ppmv HAP or >200 lb/yr HAP
- **Continuous:**
 - >.005 wt% total organic HAP



(continued)

3.0 Applicability

Process Vents

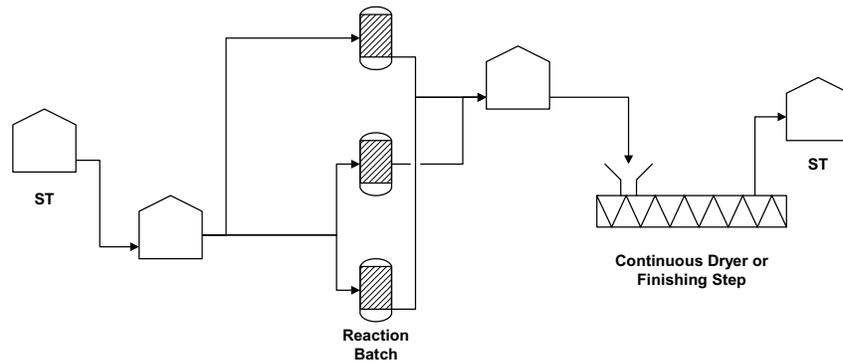


Continuous Vents are defined as in the HON-- from continuous distillation, air oxidation reaction or reaction.

Batch vents are essentially anything not explicitly defined as a continuous vent, a storage tank, wastewater tank, bottoms receiver or surge control vessel.

3.0 Applicability

Example: Process Vents

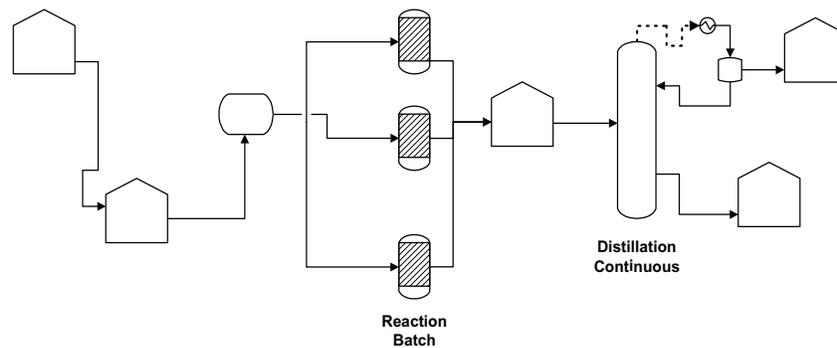


Note: although the dryer is operated continuously, it is considered a batch vent in the MON

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3.0 Applicability

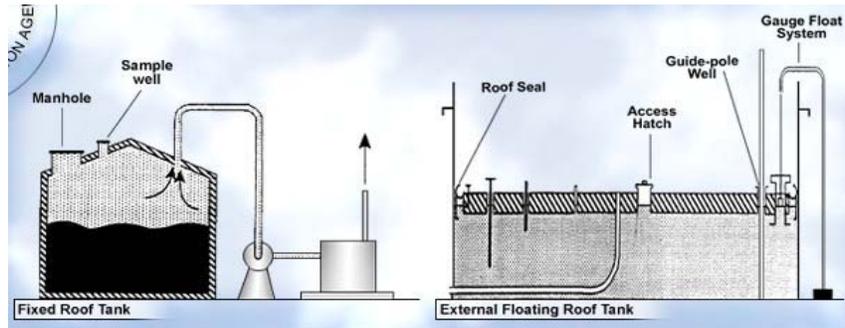
Example: Process Vents



The distillation unit vent is a continuous vent for MON purposes.

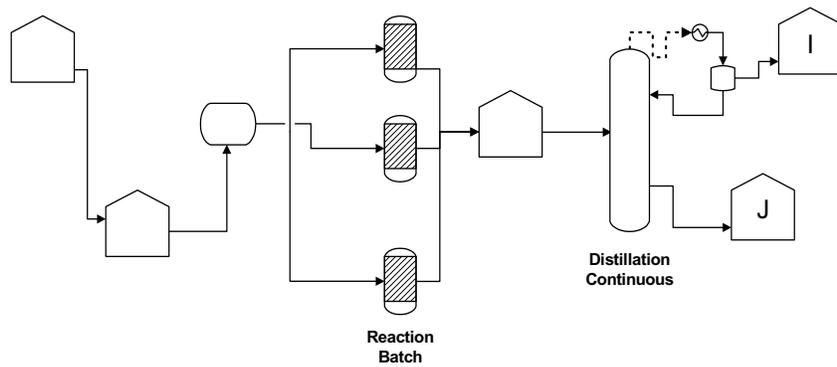
3.0 Applicability

Storage Tanks



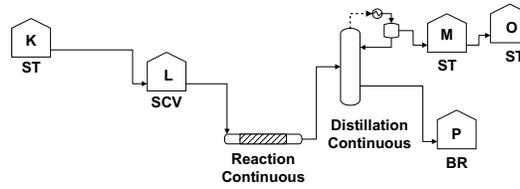
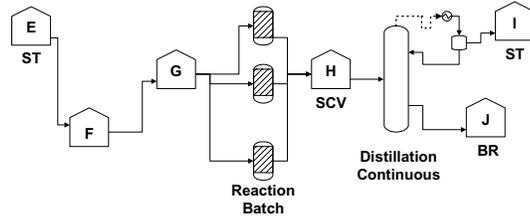
3.0 Applicability

Process Vents versus Storage Tanks



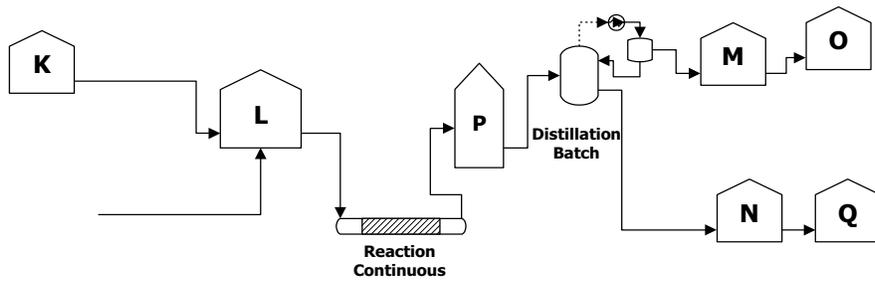
3.0 Applicability

Process Vents versus Storage tanks versus Surge Control Vessels and Bottoms Receivers



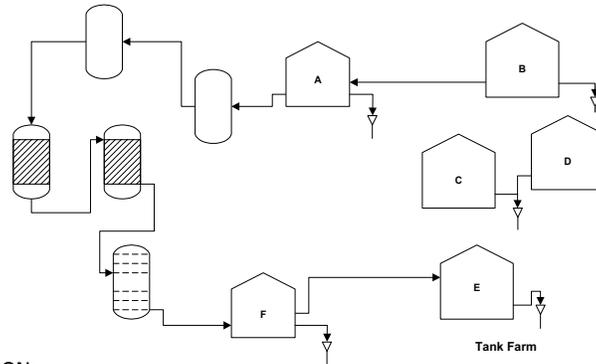
3.0 Applicability

Exercise



3.0 Applicability

Storage Tank Assignment



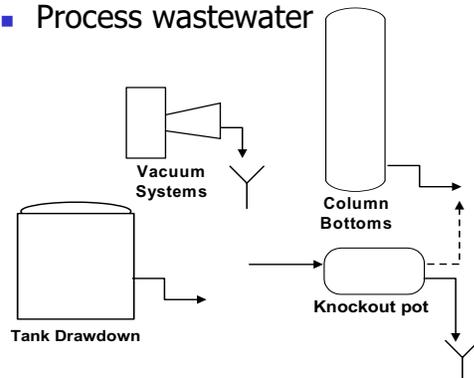
Under the HON:

- Tanks A and F are intervening tanks and assigned to the CPU;
- B and E will be subject to OLD MACT;
- C and D are not assigned to the CPU because they supply another process; if the process is a MCP, then the tanks will be MON associated tanks

3.0 Applicability

Wastewater

- Wastewater thresholds
 - ≥ 5 ppmw and ≥ 0.02 ppm, or
 - $\geq 10,000$ ppmw
- Process wastewater



(continued)

3.0 Applicability

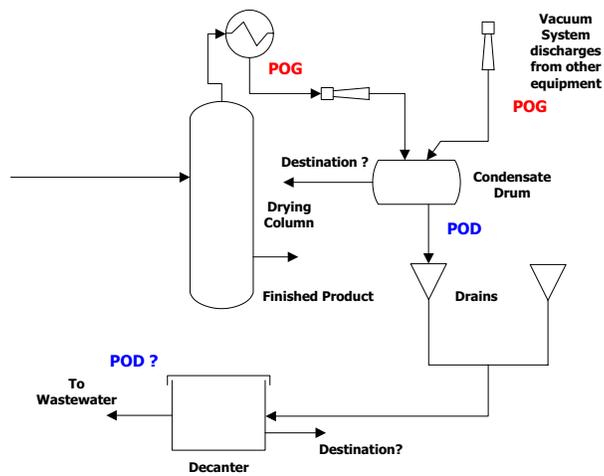
Wastewater

- Maintenance wastewater



3.0 Applicability

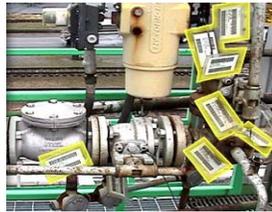
Wastewater versus Open Liquid In-Process Streams



3.0 Applicability

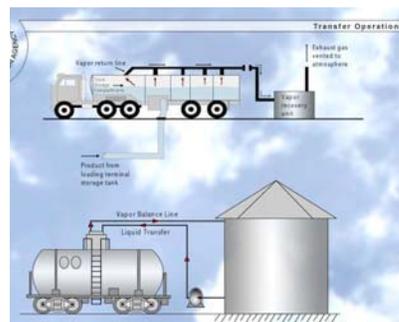
Equipment Leaks

- Piping components in 5% wt organic HAP service.



3.0 Applicability

Transfer Operations

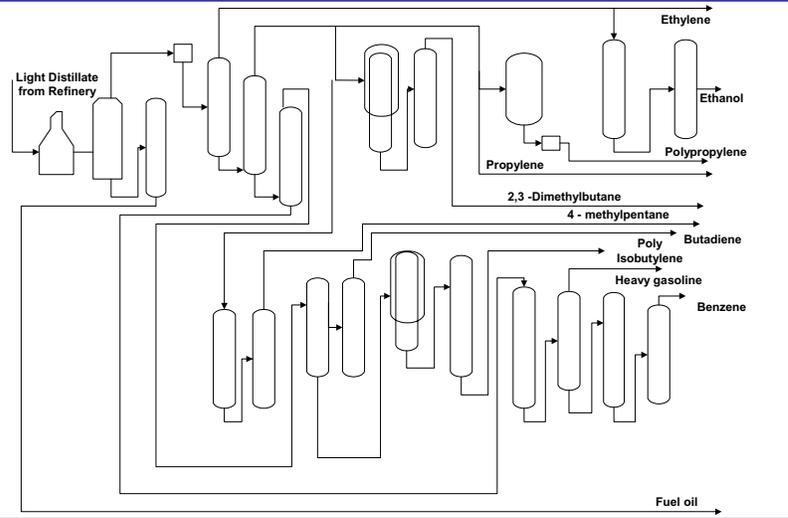


3.0 Applicability

Questions and Answers

3.0 Applicability

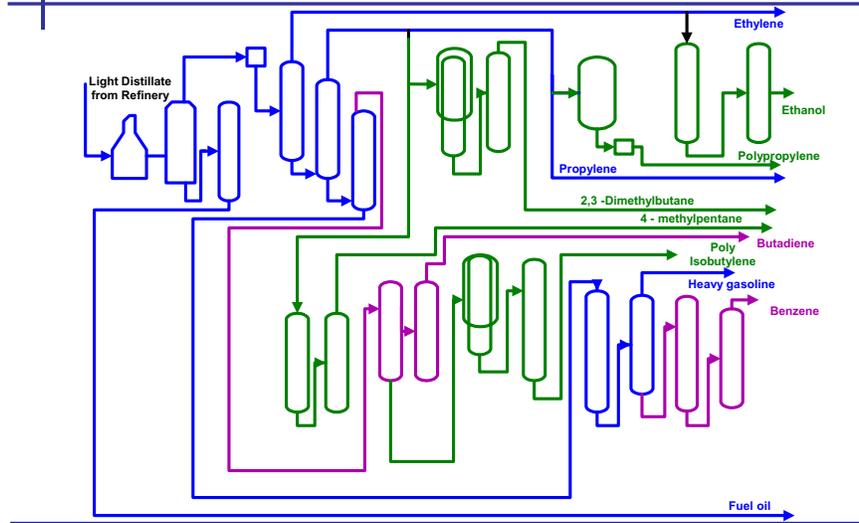
How many MACT standards would apply to this facility? What are they?



3.0 Applicability

How many MACT standards would apply to this facility? What are they?

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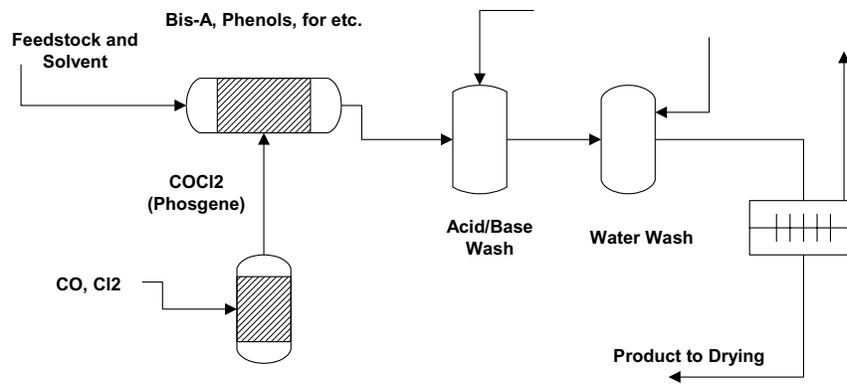


3.0 Applicability

What MACT standard(s) apply for this system?

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The diagram below presents a typical production scheme for polycarbonates, thiocarbamates, and chloroformates from phosgene. What MACT standard(s) apply for this system?



3.0 Applicability

What is the MACT applicability?

- A chemical manufacturer produces benzenesulfonic acid (a chemical listed in Table 1 of the HON) using a batch process, stores the material, and then produces fonofos (a non-SOCMI chemical) using the benzenesulfonic acid as a feedstock. What is the MACT applicability?

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4.0 Emission Standards

Emission Standards

- Standards are specified for
 - Group 1 CPV, BPV, ST, WW streams, and transfer racks
 - Process vents with uncontrolled hydrogen halide and halogen HAP emissions $\geq 1,000$ lb/yr/process
 - Process vents at new sources only with uncontrolled PM HAP emissions ≥ 400 lb/yr/process

(continued)

Emission Standards

- Standards specified for (*cont.*)
 - Equipment in organic HAP service ≥ 300 hr/yr
 - Heat exchange systems
- Generally, no requirements for Group 2 streams or emission points below thresholds listed above

Continuous Process Vents

- Group 1: $TRE \leq 1.9$ (existing) or ≤ 5.0 (new)
- Standards for Group 1 CPV
 - $\geq 98\%$ reduction in organic HAP
 - ≤ 20 ppmv as TOC or total organic HAP
 - Flare
 - Recovery device to maintain $TRE > 1.9$
 - Halogen reduction options if halogenated vent stream is combusted
- Requirements for Group 2 CPV
 - If $TRE \leq 5.0$, monitor recovery device parameters
 - If $TRE > 5.0$, no requirements

Batch Process Vents

- Group 1: collective uncontrolled organic HAP emissions $\geq 10,000$ lb/yr/process ($\geq 3,000$ lb/yr/process at new sources)
- Standards for Group 1 BPV
 - Collective reduction $\geq 98\%$ using control devices
 - Collective reduction $\geq 95\%$ using recovery devices
 - Other options for subset of vents:
 - Flare
 - ≤ 20 ppmv as TOC or total organic HAP

(continued)

Batch Process Vents

- Standards for Group 1 BPV *(cont.)*
 - Halogen reduction options same as for CPV
- Only recordkeeping (estimated emissions per batch and tracking the number of batches) for Group 2 batch process vents

Other Process Vent Standards

- For processes with uncontrolled hydrogen halide and halogen emissions $\geq 1,000$ lb/yr
 - ≥ 99 percent reduction
 - < 20 ppmv
- Process at a new source with uncontrolled PM HAP emissions from process vents ≥ 400 lb/yr
 - ≥ 97 percent reduction

Storage Tank Standards

- Group 1: $\geq 10,000$ gal; MTVP ≥ 6.9 kPa (existing) or ≥ 0.69 kPa (new)
- For Group 1 storage tank:
 - ≥ 95 percent reduction in organic HAP
 - ≤ 20 ppmv as TOC or total organic HAP
 - Flare
 - Floating roof as specified in subpart WW (but maximum true vapor pressure must be < 76.6 kPa)
 - Vent to a process or fuel gas system
 - Vapor balance
 - Halogen reduction options same as for CPV

Transfer Rack Standards

- Group 1: rack loads >0.65 million l/yr of material with average partial pressure ≥ 1.5 psia
- Standards for Group 1 transfer racks
 - $\geq 98\%$ reduction in organic HAP
 - ≤ 20 ppmv as TOC or organic HAP
 - Flare
 - Vent to a fuel gas system or process
 - Vapor balance to a storage tank
 - Halogen reduction options same as for CPV
- Group 2 transfer racks: none

4.0 Emission Standards

Group 1 Wastewater

HAP concentration, ppmw			Total HAP load, tpy	Wastewater flow, l/min
PSHAP	SHAP	Total		
> 50		$\geq 10,000$		Any
> 50		$\geq 1,000$		≥ 1
≤ 50	$\geq 30,000$		≥ 1	

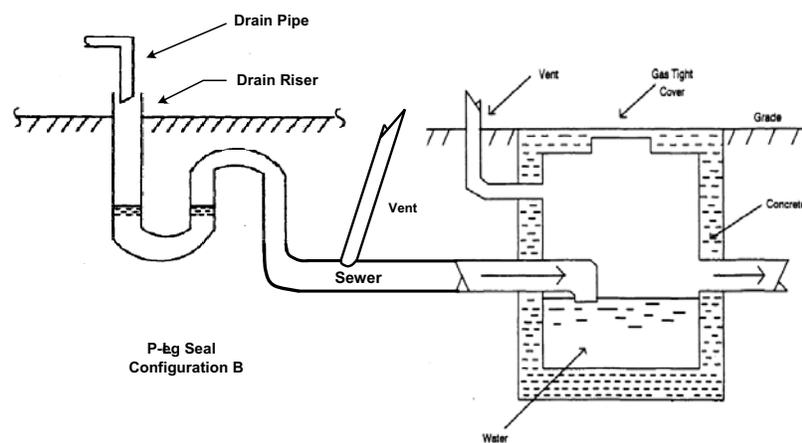
4.0 Emission Standards

Wastewater Standards

- Emission suppression (or management) required for waste management units:
 - Wastewater tanks
 - Surface impoundments
 - Containers
 - Individual drain systems
 - Oil-water separators

4.0 Emission Standards

Individual Drain Systems



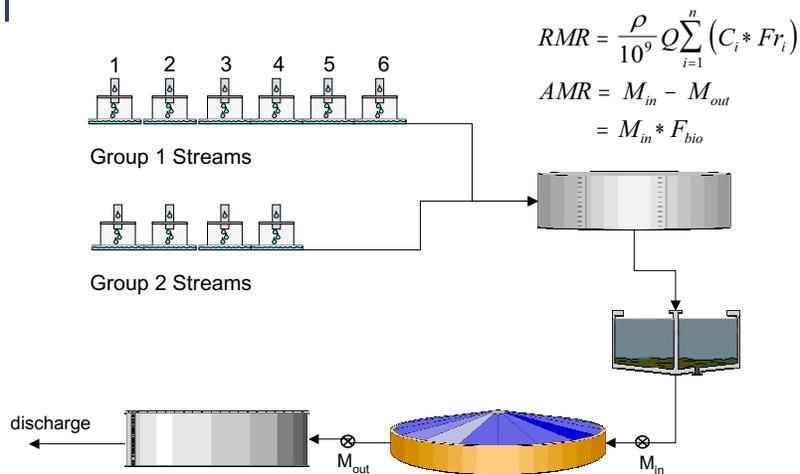
4.0 Emission Standards

Wastewater Treatment Options

- < 50 ppmw (not allowed for biotreatment or designated Group 1 streams)
- Design steam stripper
- Percent reduction (not for biotreatment)
 - $\geq 99\%$ removal
 - $\geq Fr$ value
- Mass removal
 - Based on Fr
 - $\geq 95\%$ for all Group 1 and Group 2 streams sent to biotreatment

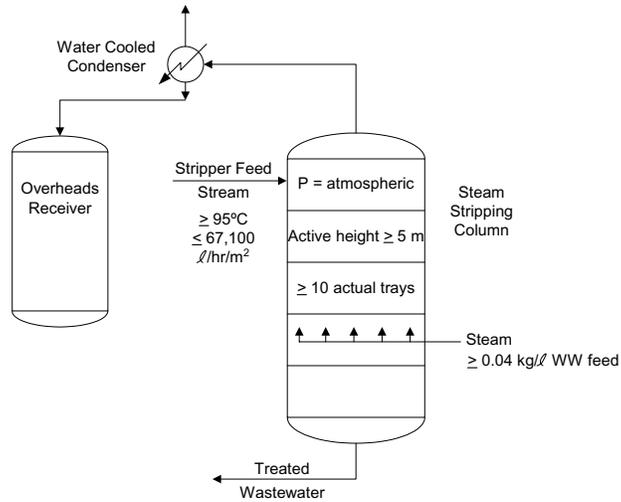
4.0 Emission Standards

Biotreatment Illustration



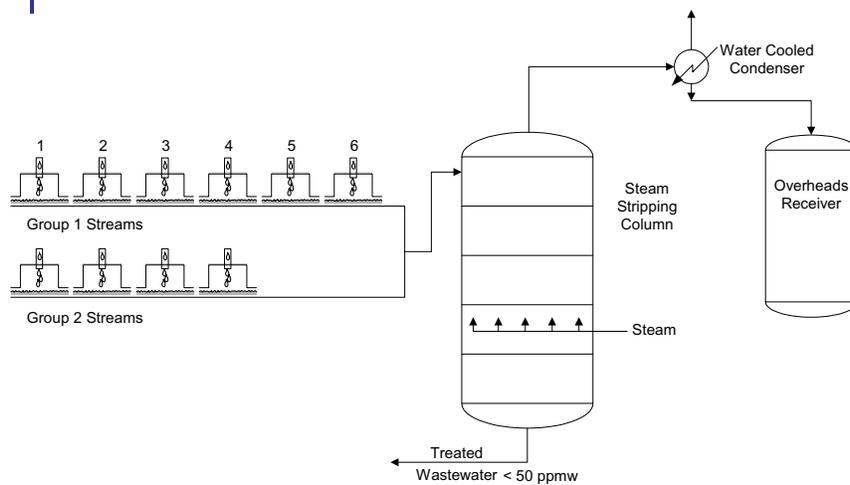
4.0 Emission Standards

Design Steam Stripper



4.0 Emission Standards

Exercise



4.0 Emission Standards

Wastewater Standards

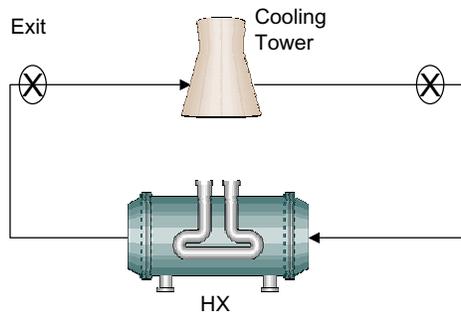
- For wastewater transferred offsite to biotreatment, less burdensome management requirements are an option (offsite only) if the wastewater contains < 50 ppmw of partially soluble HAP
- Must have a maintenance wastewater plan as part of the S/S/M plan

Equipment Leak Standards

- Comply with LDAR requirements in:
 - Generic MACT subpart TT
 - Not allowed for process units with continuous process vents
 - Not allowed for new sources
 - Generic MACT subpart UU, or
 - Consolidated Federal Air Rule (CAR; 40 CFR part 65, subpart F)

Miscellaneous Standards

- Heat exchange systems: monitor inlet and outlet of heat exchange system



(continued)

4.0 Emission Standards

Miscellaneous Standards

- Alternative means of compliance
 - Emissions averaging: same as in §63.150 of the HON
 - Pollution prevention
 - The "alternative standard"

4.0 Emission Standards

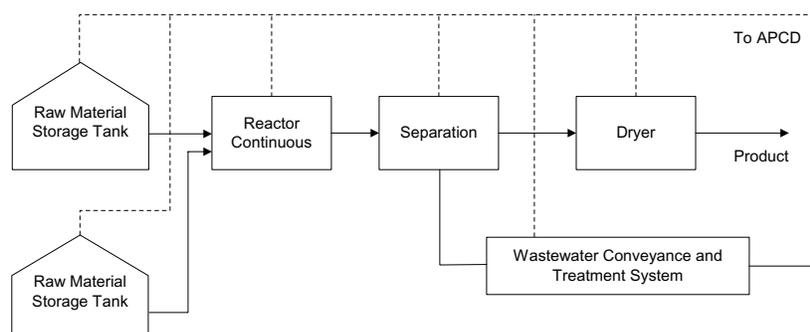
Hierarchy for Combined Streams

- Hierarchy used to select a single set of requirements for combined streams
 - Group 1 batch process vents
 - Continuous process vents to control device
 - Transfer operations
 - Group 1 wastewater streams
 - Storage tanks
 - Continuous process vents to recovery device

(continued)

4.0 Emission Standards

Hierarchy for Combined Streams



4.0 Emission Standards

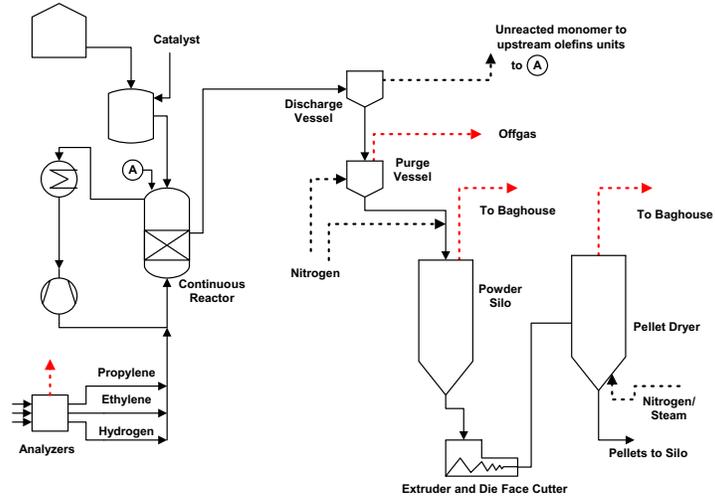
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5.0 Case Studies

Case Study

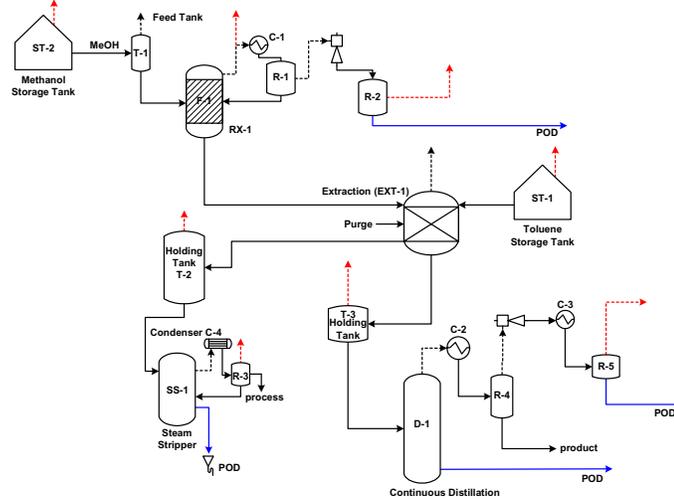
- Using the case study, we will:
 - Describe the process and equipment
 - Identify raw materials, products, wastes
 - Calculate HAP emissions from various emission generating steps
 - Review the requirements of FFFF in the context of the example
 - Develop a strategy for compliance with FFFF
 - Develop an emission profile for demonstrating compliance with FFFF

Case Study No. 1



5.0 Case Studies

Case Study No. 2



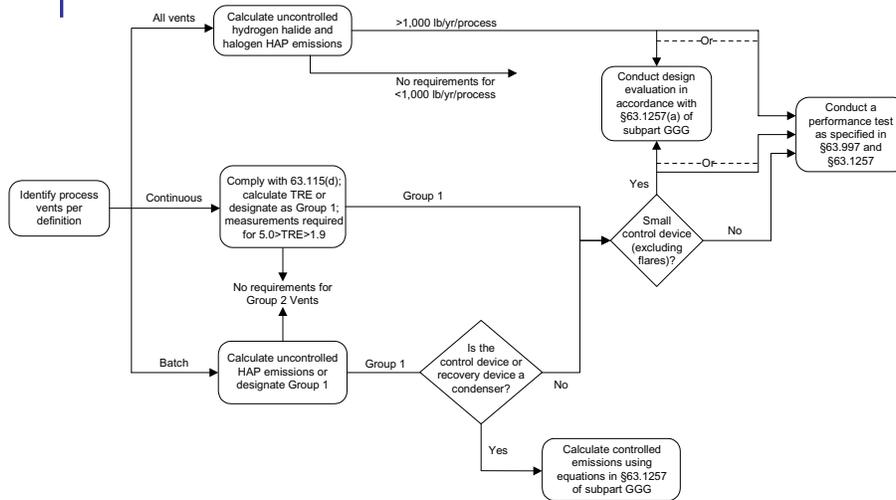
5.0 Case Studies

6.0 Initial Compliance Determination

Initial Compliance Demonstration

- Summary of Requirements
- Emission Calculations
- Initial Compliance Demonstration
Conditions
- Control Device Operation and Design
- Test Methods

Requirements for Process Vents



6.0 Initial Compliance Determination

Other Requirements for Process Vents

- Determine halogenated vent streams if using a combustion control device
- Conduct initial inspection of CVS (§63.983)
- Requirement for flares is called a "compliance assessment test" (§63.987)
- No performance test or design evaluation for certain boilers/process heaters (§63.988)
- No inspections or performance tests for final recovery devices used for CPV

6.0 Initial Compliance Determination

Requirements for Storage Tanks

Standard	Initial Compliance Requirements
1. CVS to control with percent reduction or outlet concentration	<ul style="list-style-type: none"> ■ CVS initial inspection and repair as specified in §63.983 ■ Conduct performance test or design evaluation at the reasonably expected maximum filling rate ■ A test for process vents may be used to demonstrate compliance ■ A previously conducted performance test may be used
2. CVS to flare	<ul style="list-style-type: none"> ■ CVS inspection ■ Conduct flare compliance assessment as specified in §63.987 of subpart SS
3. Vapor balancing to tank trucks or railcars	<ul style="list-style-type: none"> ■ Comply with 63.1253 (f) <ul style="list-style-type: none"> ■ Pressure relief setting ≥ 2.5 psig on the storage tank ■ Certification from offsite cleaning/reloading facility of compliance with the 95% standard ■ Records of DOT certification of tank trucks and railcars
4. Fuel gas system	<ul style="list-style-type: none"> ■ No design evaluation or performance test required (§63.984(b)(1))
5. Return to process	<ul style="list-style-type: none"> ■ Conduct design evaluation to demonstrate that the HAP in the stream meet any of four conditions specified in §63.984(b)(2)
6. Floating roof	<ul style="list-style-type: none"> ■ Comply with subpart WW design and inspection requirements

6.0 Initial Compliance Determination

Wastewater Initial Compliance

- Determine or designate Group 1 wastewater streams
- Requirements for treatment units (§63.138, 63.145)
 - Design Steam Stripper or RCRA-permitted unit: No design evaluation or performance test
 - Closed Biological Treatment or non-Biological Treatment: Performance Test or Design Evaluation
 - Open Biological Treatment: Performance test
 - Enhanced Biological Treatment
 - No performance test if 99% of compounds are on "List 1" of Table 36
 - If not, use Appendix C and default biodegradation rates to determine F_{bio}
- Initial inspections for WMUs (§63.143)
- Offsite: certification of compliance with the MON (§63.132)

6.0 Initial Compliance Determination

Wastewater Management Unit Vent Stream Initial Compliance

7

Standard	Initial Compliance Requirements (§§63.139, 63.143, and 63.145 of the HON)
1. CVS to 95% control with percent reduction or to 20 ppmv	<ul style="list-style-type: none"> ■ CVS inspection ■ Conduct performance test or design evaluation ■ A test for process vents may be used to demonstrate compliance
2. CVS to boiler or process heater: <ul style="list-style-type: none"> ■ w/ > 44MW ■ 40 CFR 266 Subpart H or 264 Subpart O ■ Where vent stream is introduced as primary fuel 	<ul style="list-style-type: none"> ■ CVS inspection ■ No design evaluation or performance test
3. CVS to flare	<ul style="list-style-type: none"> ■ CVS inspection ■ Comply with 63.11(b)
4. CVS to combustion device designed with residence time ≥ 0.5 second and temperature $\geq 760^{\circ}\text{C}$	<ul style="list-style-type: none"> ■ CVS inspection ■ Conduct design evaluation (document that conditions exist)

6.0 Initial Compliance Determination

Initial Compliance for Transfer Racks

8

Group	Standard	Initial Compliance Requirements
1	CVS to control device	Same as for process vents, except no need to calculate uncontrolled emissions
	Vent to fuel gas system	No requirements
	Vent to process	Same as for storage tanks
	Vapor balance	Design and operate system to collect and route HAP vapors to the originating storage tank
2	None	No requirements

6.0 Initial Compliance Determination

Exceptions to Subpart SS in Initial Compliance Demonstration

9

- Correct concentrations to 3% oxygen for supplemental gases rather than supplemental combustion air (also have to correct concentrations for supplemental gases when using noncombustion devices) (§§63.2450(i) and 63.2460(c)(6))
- Must conduct performance tests for batch process vents under worst-case conditions, not maximum representative conditions (§63.2460(c)(2)(ii))
- Design evaluations using procedures in §63.1257(a)(1) of subpart GGG are allowed for "small" control devices (§63.2450(h))
- Instead of performance test or design evaluation, may calculate controlled emissions for condensers used to control emissions from batch process vents (§63.2460(c)(2)(iii))

6.0 Initial Compliance Determination

Emission Estimation Equations for Batch Process Vents

10

- Refer to §63.1257(d)(2)(i), with some clarifications in §63.2460(b)
- Used to calculate uncontrolled HAP and condenser controlled HAP from batch operations when process vent compliance is required
- Based on ideal gas law

6.0 Initial Compliance Determination

Other Equations

- Draft EIIP Document: Chapter 16 of Volume II, "Methods for Estimating Air Emissions from Chemical Manufacturing"
 - Subsurface and above-surface charging of liquid that is miscible in liquid already in the vessel
 - Vessel-specific saturation factor for purge of partially filled vessel
 - Illustrations for all of the equations that are specified in the rule
 - <http://www.epa.gov/ttn/chief/eiip/index.html>

6.0 Initial Compliance Determination

Engineering Assessments for Batch Process Vents

- Refer to §63.1257(d)(2)(ii)
- Non-standard procedures and methods used to calculate uncontrolled HAP emissions, or to define process vents
- Engineering assessments require preapproval via the precompliance report
- Examples
 - Use of previous test results, bench-scale or pilot scale test data
 - Use of flow rates or HAP emission rates implied within a permit limit
 - Design information such as material balances, design flow rates, or concentration estimates

6.0 Initial Compliance Determination

Example

■ Description

- In the first step of case study No. 2, feed tank T-1 is charged with 200 gallons of methanol. The temperature of the vessel vapor space is assumed to be 25°C based on ambient conditions

6.0 Initial Compliance Determination

Procedure

- Using Equation 11, emissions are calculated as follows:

$$E = \frac{V}{(R)(T)} \sum_{i=1}^n (P_i)(MW_i) \quad (\text{Eq. 11})$$

1. In this case, there is only one component, methanol; therefore $n = 1$
2. Partial pressure of methanol, P_i , is calculated using Raoult's Law, or

$$x_i P_i^* = P_i$$

where:

x_i = mole fraction, 1 for single components

P_i^* = vapor pressure of methanol, 125 mmHg at 25°C

(Continued)

6.0 Initial Compliance Determination

Procedure

3. Plugging values into the equation

$$E = \frac{(200 \text{ gallons}) \left(\frac{\text{ft}^3}{7.48 \text{ gal}} \right) (125 \text{ mmHg}) \left(\frac{32 \text{ lb}}{\text{lbmole}} \right)}{\left(999 \frac{\text{mmHg ft}^3}{\text{lbmole K}} \right) (273 + 25\text{K})}$$

$$E = 0.36 \text{ lb methanol/event}$$

6.0 Initial Compliance Determination

Exercise

- Calculate uncontrolled emissions for a displacement
- See Appendix E of the workbook

6.0 Initial Compliance Determination

Initial Compliance Demonstration Conditions

17

- Batch process vents: worst case conditions
- Continuous process vents, transfer racks, and storage tanks: maximum representative conditions
- Wastewater vents: representative operating conditions

6.0 Initial Compliance Determination

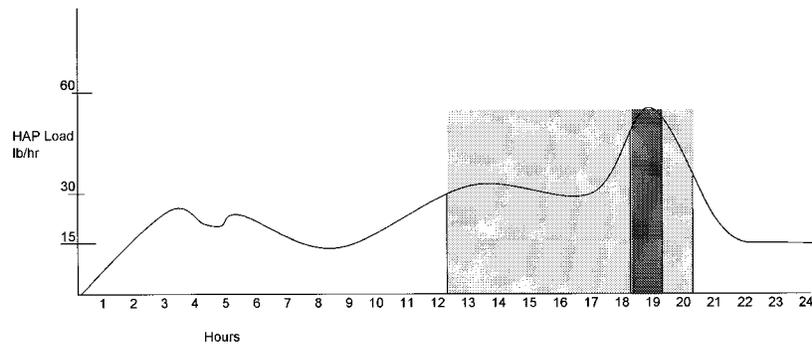
Emission Profile for Batch Vents

18

- By process
 - Most difficult; must consider all emission episodes that can vent to the control device in any given hour (see example – 53 lbs/hr)
- By equipment
 - Based on the limitations of the equipment; finding the highest emitting equipment, like a dryer, and test using the most volatile HAP even though operation in this manner does not represent any actual processes
- By limitations of the capture and conveyance system
 - Example: testing at the set point limits for bypasses or at the maximum flow based on the fan

6.0 Initial Compliance Determination

Emission Profile by Process



Total HAP load vented to the device over a 24-hour period: 600 lbs

8 -hour period with at least 50% of the total load: 320 lbs

Test over the one-hour period with the highest mass loading rate: 53 lbs

6.0 Initial Compliance Determination

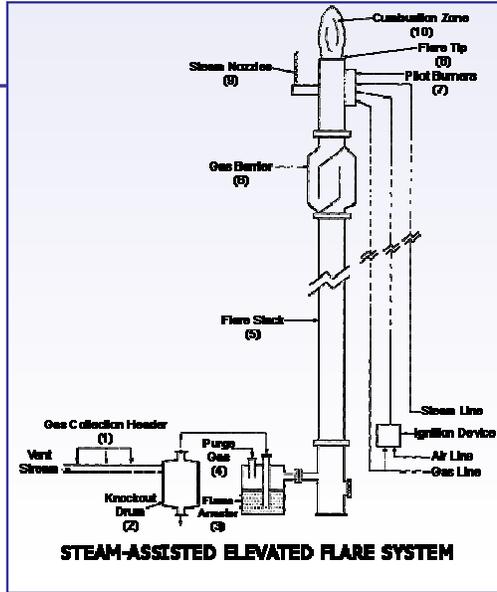
Control Devices Operation and Design

- Flares
- Incinerators
- Boilers and process heaters
- Carbon adsorption
- Gas absorbers
- Condensers

6.0 Initial Compliance Determination

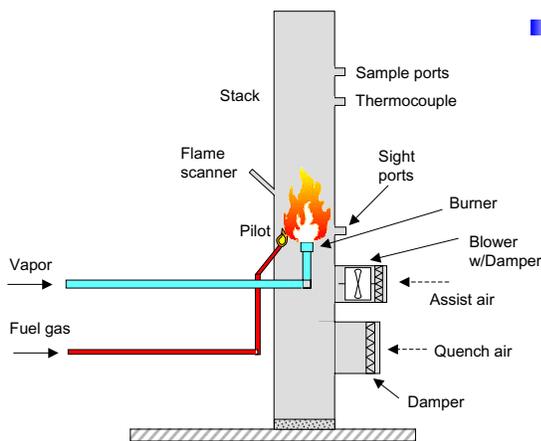
Flares

- General procedure outlined in 63.987(b)
- Compliance assessment tests are used to determine composition, tip velocity, and visible emissions



6.0 Initial Compliance Determination

Incinerators



■ Design Evaluation to establish:

■ Thermal Incinerators

- Minimum and average temperature of combustion zone
- Combustion zone residence time

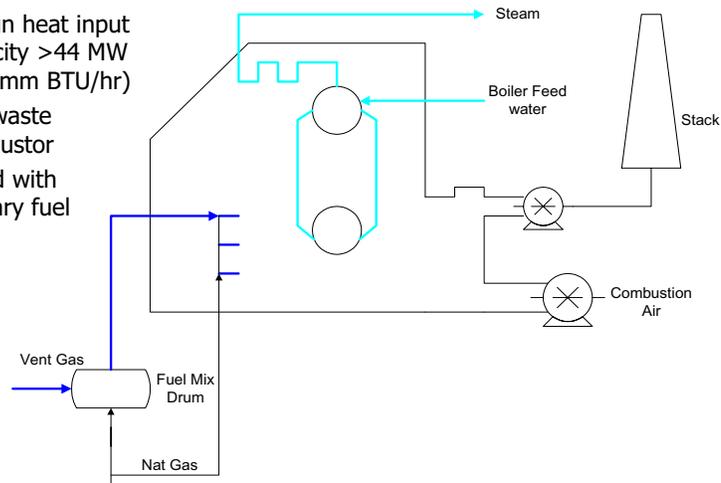
■ Catalytic Incinerators

- Minimum and average temperature across the catalysts bed

6.0 Initial Compliance Determination

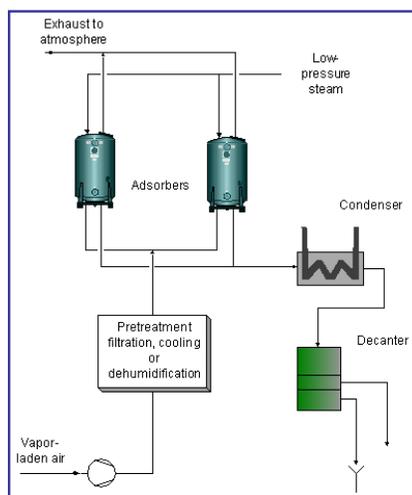
Boilers and Process Heaters

- Design heat input capacity >44 MW (150 mm BTU/hr)
- Haz waste combustor
- Mixed with primary fuel



6.0 Initial Compliance Determination

Carbon Adsorption



- Design evaluation to establish
 - Exhaust stream organic HAP composition
 - Cycle time
 - Regeneration mass flow
 - Design carbon bed temperature
 - Regeneration time
 - Service time of carbon

6.0 Initial Compliance Determination

Gas Absorbers

- Design evaluation to establish
 - Exhaust stream organic HAP composition
 - Type and total number of theoretical and actual trays
 - Type and surface area of packing column and for individual sections

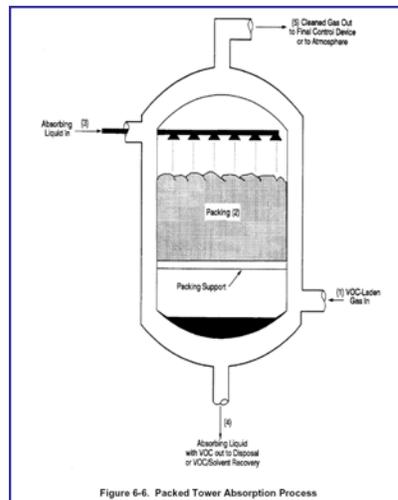
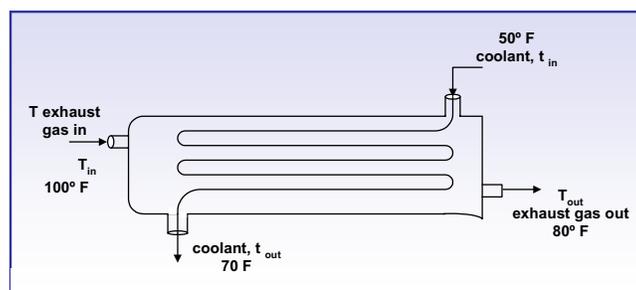


Figure 6-6. Packed Tower Absorption Process

6.0 Initial Compliance Determination

Condensers



Design equations for condensers:

Q = heat load, BTU/hr

$Q = U_o A \Delta T_{LM}$ ← heat exchanger design

$Q = m C_p \Delta T + m \Delta H_{vap}$ ← heat load in gas stream

$$\Delta T_{LM} = \frac{(T_{in} - t_{out}) - (t_{in} - T_{out})}{\ln \left(\frac{(T_{in} - t_{out})}{(t_{in} - T_{out})} \right)}$$

6.0 Initial Compliance Determination

Design Evaluation Example for Regenerative Carbon Adsorption

27

■ System description

The total flowrate of gas entering a carbon adsorption system is 2000 ft³/min. The maximum HAP load is 100 lb/hr of CH₃Cl (chloroform). The carbon system will operate in continuous mode. While operating, two carbon beds will be adsorbing, while a third will be desorbing/on standby.

100 lb/hr	lbmole	379 ft ³	= 2615 ppmv
(2000 ft ³ /min) (60min/hr)	119.4 lb	1 mole	

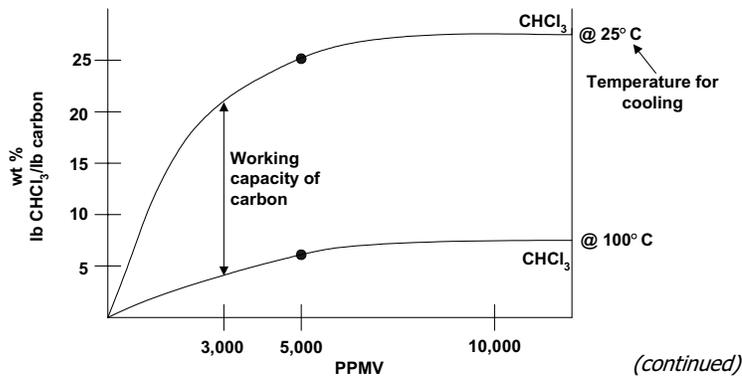
6.0 Initial Compliance Determination

Example Design Evaluation

28

■ Adsorptive capacity

The adsorption capacity of the carbon used in this design evaluation is presented below for chloroform:



6.0 Initial Compliance Determination

Example Design Evaluation

- Work capacity of carbon
 - For this concentration (~ 2500 ppmv), the working capacity is estimated from adsorption isotherm to be approximately 0.2 lb/lb carbon. Applying a 50 percent safety factor for dynamic working capacity, we will use a working capacity of 0.1 lb/lb.

(continued)

6.0 Initial Compliance Determination

Example Design Evaluation

- Carbon requirement

$$M_C = \frac{M_{\text{vol}}}{u_C} \theta_A \left(1 + \frac{N_D}{N_A} \right)$$

$$M_C = \left[\frac{100 \text{ lb / hr}}{\frac{.1 \text{ lb CHCl}_3}{\text{lb carbon}}} \right] [12 \text{ hours}] [1+.5]$$

$M_C = 18,000$ lbs carbon on adsorption cycle at all times

(continued)

6.0 Initial Compliance Determination

Example Design Evaluation

- Desorption time
 - Desorption time must be less than the following:

$$\theta_D \leq \theta_A \left(\frac{N_D}{N_A} \right) = 12 \text{ hours} \left[\frac{1}{2} \right] = 6 \text{ hours}$$

- Because the stated desorption time (5 hours) is less than 6 hours, the proposed bed configuration is feasible.

(continued)

6.0 Initial Compliance Determination

Example Design Evaluation

- Regeneration steam flowrate



Optimum steam flowrate = 15 lb/lb VOC
 = (15 lb/lb VOC) (100 lb VOC/hr) = 1,500 lb/hr

(continued)

6.0 Initial Compliance Determination

Example Design Evaluation

- Example carbon system design parameters
 - Regeneration duration: 5 hours
 - Regeneration frequency: 12 hours
 - Minimum bed temperature: 100°C
 - Maximum temperature for bed cooling: 25°C
 - Minimum steam flow: 1500 lbs/hr

6.0 Initial Compliance Determination

Humidity Concerns

- The manufacturer data indicate that adsorption will not be affected if the influent gas concentration is less than 50 percent relative humidity

6.0 Initial Compliance Determination

Test Methods

- Identified in §§63.1257(b) and 63.997
- Concentration
 - Method 18 for control efficiency determination
 - Method 25 for control efficiency for combustion devices
 - Method 25A for TOC
 - As calibrated on methane or
 - Predominant HAP
- Other
 - EPA Methods 2, 2A, 2C, 2D
 - Methods 3, 4 stack gas moisture

6.0 Initial Compliance Determination

Wastewater Test Methods

- HAP concentration using the following methods, per §§63.144(b)(5)(i) and 63.2485(h):
 - M305 of 40 CFR Part 63, Appendix A
 - M25D of 40 CFR Part 60, Appendix A
 - M624, M625 of 40 CFR Part 136, Appendix A
 - M1624, M1625 of 40 CFR Part 136, Appendix A
 - M1666, M1667 of 40 CFR Part 136, Appendix A
 - M8260, M8270 in EPA Pub. No. SW-846
 - Other EPA methods, with validation

6.0 Initial Compliance Determination

Questions and Answers

- Question #1:
 - If someone does not reflux back to the reactor, but sends recovered solvent offsite, is that a control device or process condenser?
- Answer #1:
 - Any condenser that supports a vapor-to-liquid phase change for operations above the boiling point is a process condenser.

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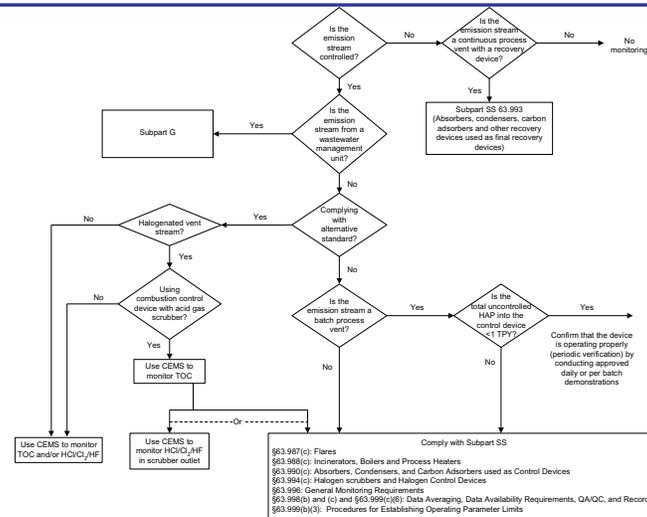
National Emission Standards for Miscellaneous Organic Chemical Manufacturing

1

7.0 Ongoing Compliance Requirements

Monitoring for Vent Streams

2



7.0 Ongoing Compliance Requirements

Monitoring for Vent Streams

- Generally, must continuously monitor operating parameters (as specified in subpart SS and subpart G)
- Additional parameters specified in the MON for halogen scrubbers and catalytic incinerators (§63.2450(k)(3) and (4))
- Slight differences in lists of devices for which subparts G and SS specify parameters

7.0 Ongoing Compliance Requirements

Requirements for Parameter Monitoring

- Procedures for setting operating limits
 - If initial compliance is based on performance tests (§§63.152(b)(2)(ii) and 63.999(b)(3)(ii)):
 - Operating limit based on values measured during the three test runs
 - May supplement test data with engineering assessment and manufacturer's recommendations
 - May set separate levels for different operating conditions if the APCD is used for batch process vents
 - Base on design evaluation for small control devices (§63.2450(h))

(continued)

7.0 Ongoing Compliance Requirements

Requirements for Parameter Monitoring

5

- Calibrate monitoring equipment according to manufacturer's specifications or other written procedures that assure accurate operation (§§63.143(g) and 63.996(c)(1))
- Accuracy requirements specified for:
 - Temperature monitoring devices (§§63.111 and 63.981)
 - Specific gravity monitoring devices (§§63.111 and 63.981)
 - Monitoring devices for carbon adsorber regeneration stream flow rate (§63.990 and Table 13 to subpart G)

(continued)

7.0 Ongoing Compliance Requirements

Requirements for Parameter Monitoring

6

- Data averaging periods
 - Daily for any emission stream (§§63.998(b)(3) and 63.147(d))
 - Operating block only for batch process vents (§63.2460(c)(4))
 - Include data from periods of startup, shutdown, and malfunction (§63.2450(l))

(continued)

7.0 Ongoing Compliance Requirements

Requirements for Parameter Monitoring

7

- Data availability requirements (§§63.999(c)(6) and 63.152(c)(2)(ii))
 - Must have sufficient data to constitute valid data for at least 75% of the operating hours in an operating day when operation is \geq 4 hr/d
 - No more than one hour of data may not be valid due to insufficient data if operation is $<$ 4 hr/d
 - Must have measured values for each of the 15-minute periods to have a valid hour of data

7.0 Ongoing Compliance Requirements

Other Monitoring Requirements for Vent Streams

8

- Inspections for closed vent systems and vapor collection systems (§§63.983 and 63.148(b)(1) and (2))
 - Annual visual inspections if system is constructed of hard-piping
 - Annual Method 21 inspection if system is constructed of ductwork

(continued)

7.0 Ongoing Compliance Requirements

Other Monitoring Requirements for Vent Streams

9

- Inspections for closed vent systems and vapor collection systems (§§63.983 and 63.148(b)(1) and (2)) *(cont.)*
 - Differences between subparts G and SS:
 - Subpart SS specifies an additional calibration gas for instruments that have multiple calibration scales
 - Subpart SS does not require visual indications of a leak to be considered a leak if a Method 21 inspection is also conducted and the reading is < 500 ppm

(continued)

7.0 Ongoing Compliance Requirements

Other Monitoring Requirements for Vent Streams

10

- Monitoring for bypass lines around APCDs (§§63.983(a)(3) and 63.148(f))
 - Continuously monitor using a flow indicator in the bypass line, or
 - Monthly visual inspection of car-seal on the bypass line valve

(continued)

7.0 Ongoing Compliance Requirements

Other Monitoring Requirements for Vent Streams

11

- Exceptions to requirement for continuous parameter monitoring
 - Complying with alternative standard?
Use CEMS (§§63.1258(b)(5)(i) and 63.2450(j))
 - BPV routed through CVS to APCD that receives uncontrolled HAP <1 tpy?
Conduct approved periodic verification (§63.2460(c)(5))

7.0 Ongoing Compliance Requirements

Ongoing Compliance Requirements for Floating Roofs

12

- Inspection requirements (§63.1063(c) and (d))
 - Annual inspections of IFRs for design and operational failures
 - Inspect for design and operational failures of IFRs and EFRs each time the tank is emptied and degassed (not to exceed every 10 years)
 - Seal gap measurements for EFRs
 - Annually for secondary seal
 - Every 5 years for primary seal

(continued)

7.0 Ongoing Compliance Requirements

Ongoing Compliance Requirements for Wastewater Treatment

13

- Parameter monitoring (§63.143(b), (c), and (d))
 - Steam strippers, continuously monitor:
 - Steam flow rate
 - Wastewater mass flow rate
 - Wastewater feed temperature
 - Other treatment units: request approval to monitor appropriate parameters that demonstrate proper operation

(continued)

7.0 Ongoing Compliance Requirements

Ongoing Compliance Requirements for Waste Management Units

14

- Inspections (§63.143(a), §63.148(b)(3), and Table 11 to subpart G)
 - Semiannual visual inspections for leaks, control equipment failures, and improper work practices
 - Periodic seal gap measurements for floating roofs used on wastewater tanks and oil-water separators

(continued)

7.0 Ongoing Compliance Requirements

Ongoing Compliance Requirements for Equipment Leaks

15

- Periodic monitoring using Method 21 and/or visual inspections to detect leaks (subparts TT and UU)

7.0 Ongoing Compliance Requirements

Monitoring Example

16

- As part of the compliance strategy chosen for case study No. 2, the source chose to control all process vents with a thermal incinerator. After the performance test, the minimum combustion temperature required to demonstrate 98% was determined to be 1760 F, based on the average of the minimum combustion temperatures measured during the three test runs.
- A 24-hour data sampling for this incinerator is provided in Appendix F. From the example, determine the following:
 - Is the incinerator in compliance with the standard for the 24-hour sampling period?
 - Does the data constitute a valid 24-hour period of data?
 - How would the source record and report the period of data presented?

7.0 Ongoing Compliance Requirements

8.0 Records and Reports

Recordkeeping Requirements

- Each applicable record required by Subpart A, and referenced subparts F, G, SS, UU, WW, and GGG (§63.2525(a))
 - S/S/M plan
 - Monitoring parameter measurements, periods of excess emissions or monitor breakdowns, and other requirements in General Provisions
 - Inspection records
 - LDAR records
- Operating scenarios (§63.2525(b))
- Schedule or log of operating scenarios updated each time a different scenario is put into operation (§63.2525(c))
- Other records specified in §63.2525(d) through (k)

Operating Scenarios

- Description of process and type of process equipment used
- Identification of related process vents, emission episodes (if not complying with alternative standard), wastewater PODs, storage tanks, and transfer racks
- Applicable control requirements
- Control or treatment devices used, and operating and testing conditions
- Vents routed to control
- Applicable monitoring requirements and parametric levels that assure compliance
- Calculations and engineering analyses required to demonstrate compliance

8.0 Records and Reports

Precompliance Report

- Submit 6 months prior to compliance date of the standard
- Should contain:
 - Alternative monitoring requests
 - Setting monitoring parameters outside those established during performance test
 - Periodic verification for control devices with less than 1.0 tpy HAP
 - Engineering assessment for calculation of uncontrolled process vent emissions and for defining process vents
 - P2 demonstration summary
 - Parameters to monitor for wastewater treatment units other than steam strippers

(continued)

8.0 Records and Reports

Precompliance Report

- Precompliance Report is a preapproval mechanism; the Administrator has 90 days to approve or disapprove
- For alternative monitoring and testing approval:
 - Who can approve?
 - What guidance is available?

Setting Monitoring Parameters Outside of Those Established During Performance Tests

- Request to set monitoring parameters outside of those established during performance tests, per §§63.999(b)(3)(ii)(A) and 63.2460(c)(3)(i)
Example: Incinerator tested at worst-case load. Results indicate 99.9% control efficiency achieved at a temperature of 2200°F. Owner or operator would like to set operating temperature at 1500°F. Cites EPA documentation that this temperature will ensure 98% destruction

		<u>Control</u>
Test operating temperature	2200°F	99.9%
Request to set at	1500°F	98%

Data and Rationale Used to Support Engineering Assessments

7

- Per §63.1257(d)(2)(ii), sources can use modified versions of emissions estimation equations provided:
 - The facility can demonstrate it has been used to meet other regulatory obligations
 - The modified equations do not affect applicability or compliance determinations

(continued)

8.0 Records and Reports

Data and Rationale Used to Support Engineering Assessments

8

- For example, a manufacturer requested approval to use a different heating equation to use up to 1°K below the boiling point, rather than as described in 63.1257(d)(2)(i)(C)(3)

$$E = \frac{\sum_{i=1}^n ((P_i^*)(x_i)(MW_i))}{760 - \sum_{i=1}^m (P_j^*)(x_j)} \times \Delta\eta$$

(continued)

8.0 Records and Reports

Data and Rationale Used to Support Engineering Assessments

9

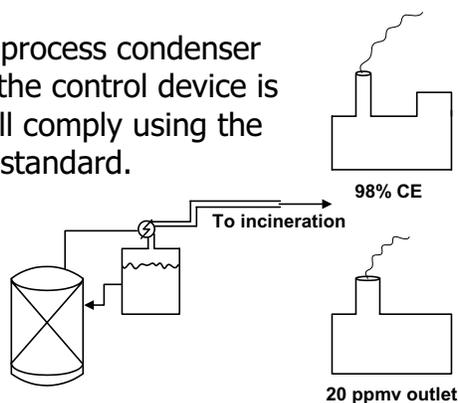
- May be a conservative approach for applicability (higher uncontrolled emissions will more likely trigger control requirements), but could bias control efficiency high, which could affect a compliance determination.
- EPA's position—not allowed unless the facility can demonstrate that it will not affect the compliance determination.

8.0 Records and Reports

One-Time Process Condenser Demonstration

10

- A request to skip the process condenser demonstration when the control device is an incinerator that will comply using the 98 percent reduction standard.
- EPA has not allowed this request because improper operation will ultimately result in higher actual emissions under the percent reduction requirement.



8.0 Records and Reports

Miscellaneous Requests in the Precompliance Report

11

- Request use of compliance extension at §63.6(i)(4) to install control equipment to become a synthetic minor.
- EPA response is that they must become synthetic minor by the compliance date. The extension at §63.6(i)(4) is to install equipment to comply with the rule.

8.0 Records and Reports

Notification of Compliance Status Report

12

- Results of applicability determinations, emission calculations, or analyses used to identify and quantify HAP emissions from the affected source
- Results of emission profiles, performance tests, engineering analyses, design evaluations, flare compliance assessment, inspections and repairs, and calculations used to demonstrate compliance
- Descriptions of monitoring devices, monitoring frequencies, and the operating limits established during the initial compliance determinations, including data and calculations to support levels established

(continued)

8.0 Records and Reports

Notification of Compliance Status Report

13

- All operating scenarios
- Descriptions of worst-case operating and/or testing conditions for control devices
- Identification of emission points subject to overlapping requirements
- Identification of storage tanks for which vapor balancing is used
- Records of process units used to create a process unit group

8.0 Records and Reports

Content of Compliance Report

14

- Information regarding deviations
 - Statement that none occurred, if applicable
 - For deviations that occur where CMS is not used to demonstrate compliance, report
 - Total operating time of affected source
 - Number, duration, and cause of deviations
 - Operating logs for day(s) when deviation occurred (except not required for deviations of standards for equipment leaks)

(continued)

8.0 Records and Reports

Content of Compliance Report

- Information regarding deviations (*cont.*)
 - For deviations that occur where CMS is used to demonstrate compliance, report
 - Date and time each CMS was inoperative
 - Date, time, and duration when any CEMS was out of control
 - Date and time each deviation started and stopped, and whether or not it occurred during a period of SSM
 - Total duration of deviations during the reporting period and as a percent of the total operating time

(continued)

8.0 Records and Reports

Content of Compliance Report

- Information regarding deviations (*cont.*)
 - For deviations that occur where CMS is used to demonstrate compliance, report (*cont.*)
 - The total duration of deviations caused by various types of known causes and those caused by unknown causes
 - Total deviation of CMS downtime during the reporting period and as a percent of the total operating time
 - The HAP in the emission stream(s) associated with the deviations
 - Descriptions of the process units and CMS associated with the deviations

(continued)

8.0 Records and Reports

Content of Compliance Report

- Information regarding deviations (*cont.*)
 - For deviations that occur where CMS is used to demonstrate compliance, report (*cont.*)
 - Operating logs for the days during which deviations occurred
 - Daily or block averages for the days that deviations occurred
 - For each CEMS, include a statement that there were no periods it was out-of-control, if applicable

(continued)

Content of Compliance Report

- Records of S/S/M during which excess emissions occur
- New operating scenarios
- Records of process units added to a PUG
- Notification of changes to information provided in the NOCS (note that plans for certain changes must be reported at least 60 days before the change)

(continued)

Content of Compliance Report

- Information required in periodic reports by referenced subparts. For example,
 - Reports of LDAR program
 - Results of tank and waste management unit inspections
 - CVS bypass and/or car seal breaks
 - Information about periods of planned routine maintenance of APCD for storage tanks
 - Delay of repair provisions for heat exchange systems

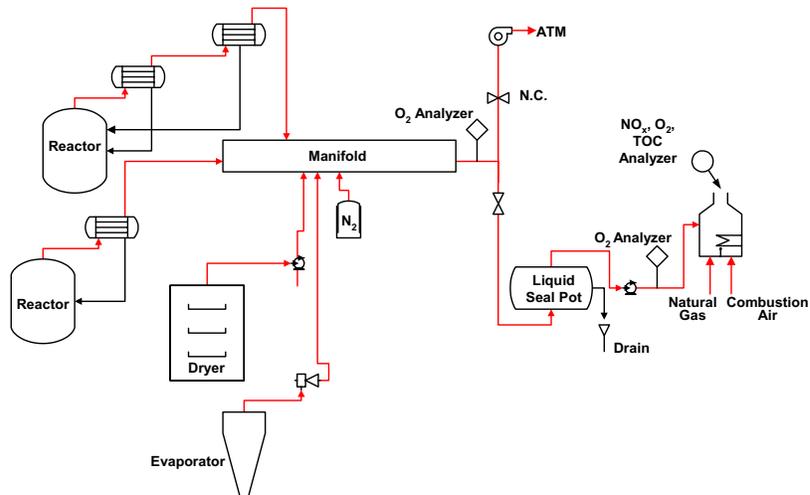
National Emission Standards for Miscellaneous
Organic Chemical Manufacturing

1

9.0 Alternative Standard

Alternative Standard

2



9.0 Alternative Standard

Alternative Standard

- Option for process vents and storage tanks
- Emission limits
 - 20 ppmv for combustion device
 - 50 ppmv for noncombustion device
 - 95% reduction alternative for scrubbers after combustion devices

9.0 Alternative Standard

Alternative Standard

- Compliance demonstration
 - Use CEMS (QA/QC as specified in 63.2450(j))
 - Correct concentrations for supplemental gases
 - Performance test and CPMS for scrubber if complying with 95% requirement
 - Average data over operating day
 - Closed-vent system operation and inspections per section 63.983

9.0 Alternative Standard

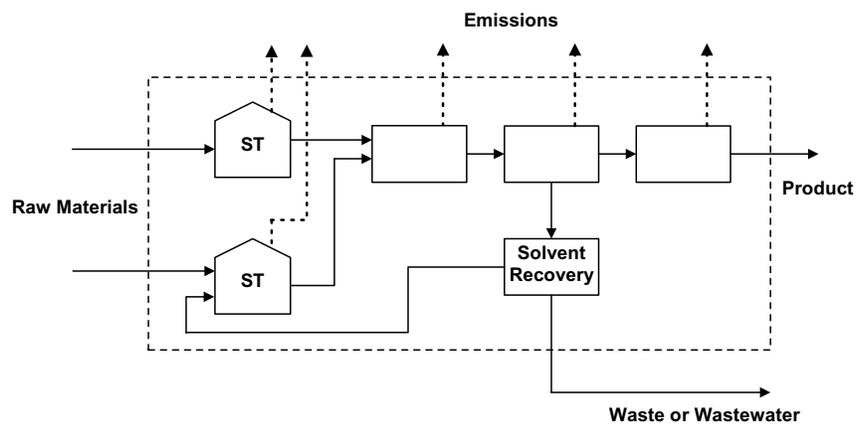
Alternative Standard

- Recordkeeping and reporting
 - Records of data, deviations, maintenance, calibrations, etc. as specified in 63.10(b) and (c) and 63.2525(h)
 - Descriptions of monitoring devices, monitoring frequencies, and emission limits (and supporting data) in notification of compliance status report (63.2520(d)(2)(iii))
 - Provide information about deviations in compliance report, as specified in 63.2520(e)(5)(iii)

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10.0 Pollution Prevention Alternative

Illustration

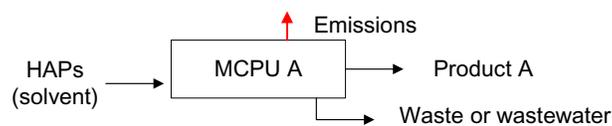


Pollution Prevention Alternative

- Allows compliance with the standards by demonstrating reductions in HAP usage, per unit of product
- Uses annual consumption factor
 - kg HAP / kg product
- Reduce the HAP consumption factor by at least 65% from the baseline
- Baseline: first 3 years of operation (beginning no earlier than 1994–1996)

10.0 Pollution Prevention Alternative

Consumption Factors



Determine baseline: 10,000 kg/yr HAP input for
20,000,000 kg/yr product

Baseline consumption factor	$\frac{10,000 \text{ kg/yr}}{20,000,000 \text{ kg/yr}} = 0.0005 \text{ kg/kg}$
Target consumption factor	$(0.35)(0.0005 \text{ kg/kg}) = 0.000175 \text{ kg/kg}$
Annual consumption factor	Must be less than target consumption factor

10.0 Pollution Prevention Alternative

Compliance Requirements

- P2 Demonstration Summary
 - Submit with precompliance report
 - Describes method of tracking consumption and production and provides supporting documentation
- Calculate baseline and target HAP and VOC consumption factors
- Calculate and record rolling annual factors monthly or every 10 batches
- Submit in compliance reports all days when annual factors exceed the target factors

10.0 Pollution Prevention Alternative

Exclusions From P2 Alternative

- May not apply to HAP generated in process or to HCl generated in combustion control devices
- May not merge nondedicated solvent recovery with any other processes
- May not merge solvent recovery currently performed offsite with an existing process
- May not eliminate steps by transferring them offsite
- P2 option not available for processes for which initial startup occurred after April 4, 2002

10.0 Pollution Prevention Alternative

Case Study

1. Manufacturer develops baseline using yearly consumption and production rates and averages the HAP consumption over 3 years

HAP: methylene chloride

Year	1994	1995	1996
MeCl ₂ usage, kg	24,800	25,960	28,320
Production kg	10,000	11,000	12,000
HAP baseline consumption factor, kg/kg	2.48	2.36	2.36
Average of 3 years	2.40 kg/kg ← HAP baseline consumption factor		
VOC usage, kg	45,600	47,520	48,290
VOC baseline factor, kg/kg	4.56	4.32	4.02
Average of 3 years	4.3 kg/kg ← VOC baseline consumption factor		

(continued)

10.0 Pollution Prevention Alternative

Case Study

2. Calculate target consumption factors

HAP	$2.40 \times 0.35 = 0.84$
VOC	MeCl ₂ is not a VOC. Therefore, target VOC factor is same as baseline VOC factor.

3. Manufacturer implements pollution prevention techniques to lower the amount of methylene chloride in the process.
4. Calculate annual HAP and VOC consumption factors for the MCPU on a rolling 12-month average. Production during this 12-month period was 20,000 kg.

	HAP	VOC
Usage, kg	10,000	84,000
Annual consumption factor, kg/kg	0.5	4.2

10.0 Pollution Prevention Alternative

Questions and Answers

- Question #1:
 - If an owner or operator switches from offsite solvent recovery to onsite solvent recovery, can the pollution prevention alternative be used?
- Answer #1:
 - No. This scenario is specifically excluded in the rule because the material originally sent offsite was not really waste. Simply moving the location of the recovery operation does not achieve pollution prevention.

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11.0 Comparison of Requirements in Subparts GGG, MMM, and FFFF

History

- MON is third MACT rule to focus on processes that consist primarily of batch operations (following pharmaceuticals production and pesticide active ingredient production)
- Big picture similarities among the rules
- Differences are in the details
- See tables 4 through 13 in appendix B of the workbook

Differences in Applicability

- Handling of intermediates
- Definitions of “dedicated” process units
- HAP that are subject to control

Differences in Standards

- Process vents
 - CPV/BPV in MON versus all process vents
 - Ways HCl/Cl₂/HF are handled
 - Percent reduction requirements
- MTVP thresholds for storage tanks
- Only MON allows sensory monitoring for equipment leaks from batch processes

(continued)

Differences in Standards

- Wastewater
 - Scrubber effluent
 - Maintenance wastewater
 - Wastewater from cleaning operations
 - Treatment options in subpart GGG versus options in the other rules

Differences in Initial Compliance Requirements

- Most differences are due to differences in the standards. For example,
 - Calculate TRE for CPV under MON
 - Test conditions under MON for CPV
 - Requirements for fuel gas systems under subparts GGG and MMM
 - Performance test or design evaluation for all steam strippers under subpart GGG

Differences in Ongoing Compliance Requirements

7

- Numerous relatively minor differences such as:
 - Accuracy and calibration requirements for CPMS
 - Monitoring options for catalytic incinerators, regenerative carbon adsorbers, and caustic scrubbers
 - Options for the alternative standard

11.0 Comparison of Rules

Differences in Recordkeeping

8

- All monitoring data versus daily averages
- No maintenance wastewater plan for subpart MMM
- Certification by offsite treatment facility not required under the MON if the wastewater is to be treated as a hazardous waste
- MON requires SSM records of actions taken only if excess emissions occur

11.0 Comparison of Rules

Differences in Reporting

- SSM reporting for the MON
 - Submit records of actions taken and a description of malfunctions only if excess emissions occur
 - No immediate SSM report requirement
 - Include the applicable records in the compliance report

(continued)

Differences in Reporting

- Compliance reports
 - Start date first reporting period
 - Submittal schedule
 - Language/structure of requirements
- Notification of process change
 - MON specifies that changes from Group 2 to Group 1 must be documented at least 60 days before the planned change

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12.0 Review of Available Implementation Tools

Available Implementation Tools

- <http://www.epa.gov/ttn/atw/mon/monpg.html>
 - Rule information (all FR notices)
- <http://www.gpoaccess.gov/cfr/index.html>
 - Code of Federal Regulations (CFR)
- <http://www.netionline.com> (at the site you must logon, select the classrooms, select AIR206, enter the classroom, and select reference materials under "course activities")
 - EPA 305-B-04-001 (Report with case studies illustrating compliance options for nondedicated equipment subject to the MON, PAI, and Pharmaceuticals MACT rules)
 - MON response to comments document
 - HON wastewater inspector training course
 - Draft EIIP chapter on emission estimation procedures for batch chemical manufacturing operations

Available Implementation Tools

- <http://www.epa.gov/reg3artd/airregulations/delegate/appdet.pdf>
 - How to Review and Issue Clean Air Act Applicability Determinations and Alternative Monitoring (Attachment 1 is July 10, 1998 memorandum from John Seitz delegating Part 63 General Provisions authority to State and local agencies)

13.0 Wrap-Up Questions and Answers
