United States Environmental Protection Agency | Office of Air Quality Planning and Standards RTP, NC 27711 | Office of Research and Development Cincinnati OH 45268

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EPA

Workshop – Organic Air Emissions from Waste Management Facilities

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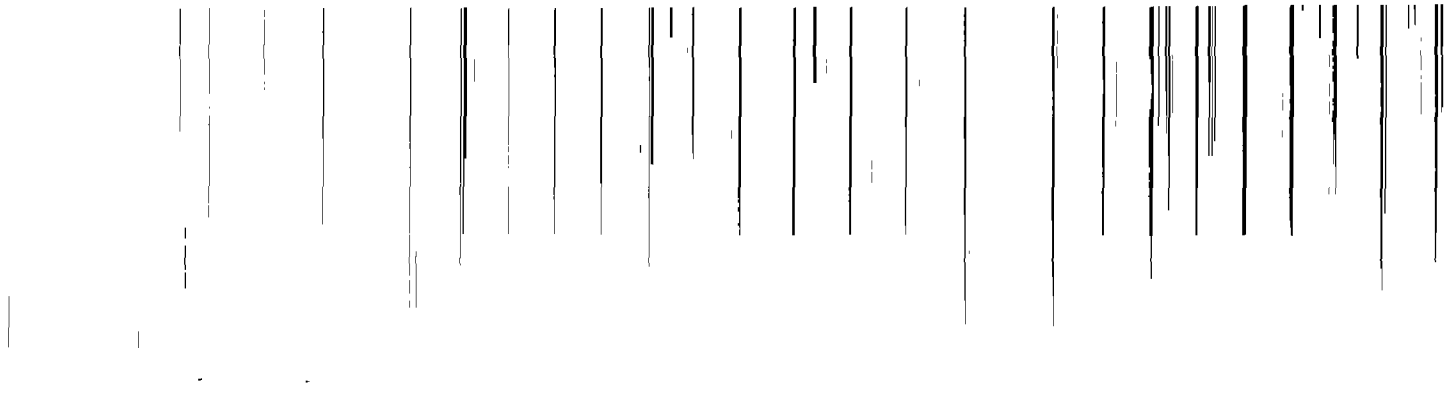

ORGANIC AIR EMISSIONS FROM WASTE MANAGEMENT FACILITIES

Speaker Slide Copies and Supporting Information

December 1990

Document Prepared by

PEER Consultants, P.C.
Dayton, OH 45432

and

Slides and Presentations Prepared by

Research Triangle Institute
RTP, NC 27709

for

Office of Research and Development
Cincinnati, OH 45268

and

Office of Air Quality
Planning and Standards
RTP, NC 27711

NOTICE

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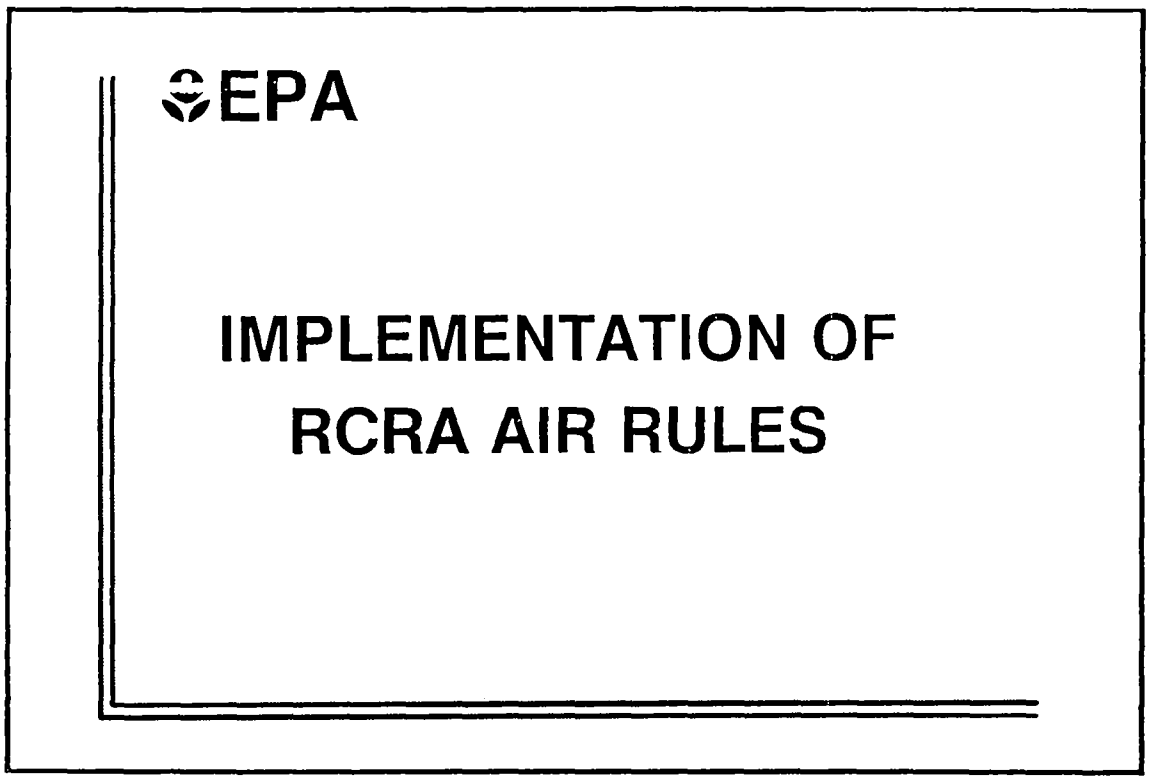
TABLE OF CONTENTS

ABBREVIATION INDEX

ACT	Alternative Control Techniques Document
API	American Petroleum Institute
ARAR	Applicable, Relevant, and Appropriate Requirements
ASTM	American Society for Testing and Materials
ASTSWMO	Association of State and Territorial Solid Waste Management Officials
Atm	Atmosphere
BDAT	Best Demonstrated Available Technology
Btu	British Thermal Units
BZ	Benzene
^{o}C	Celsius
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
CERI	Center for Environmental Research Information
CFC	Chlorofluorocarbons
cfm	Cubic Feet per Minute
CFR	Code of Federal Regulations
CPI	Corrugated Plate Interceptor
CTG	Control Techniques Guideline Document
CWA	Clean Water Act
DOT	Department of Transportation
DRE	Destruction and Removal Efficiency
dscm	Dry Standard Cubic Meter
EDC	Ethylene Dichloride

EP	Extraction Procedure
EPA	United States Environmental Protection Agency
ESD	Emission Standards Division
ER	Emission Rate
FID	Flame Ionization Detector
FR	Federal Register
ft	Feet
gal	Gallon
GC	Gas Chromatography
h	Hours
HAP	Hazardous Air Pollutant
HLC	Henry's Law Constant
HON	Hazardous Organic NESHAP
HSWA	Hazardous and Solid Waste Amendments
HWMU	Hazardous Waste Management Unit
IR	Infrared
kg	Kilograms
kPa	Kilopascal
L	Liters
lb	Pounds
LDAR	Leak Detection and Repair
LDR	Land Disposal Restrictions
m^3	Cubic Meters
Mg	Megagrams

MS	Mass Spectrometry
MW	Megawatts
NAAQS	National Ambient Air Quality Standards (CAA)
NAPCTAC	National Air Pollution Control Techniques Advisory Committee
NCP	National Contingency Plan (CERCLA)
NESHAP	National Emission Standard for Hazardous Air Pollutants (CAA)
NPDES	National Pollution Discharge Elimination System (CWA)
NSPS	New Source Performance Standards (CAA)
OAQPS	Office of Air Quality Planning and Standards
OAR	Office of Air and Radiation
ORD	Office of Research and Development
o/o	Owner/Operator
OSW	Office of Solid Waste
OSWER	Office of Solid Waste and Emergency Response
PCB	Polychlorinated Biphenyls
PM	Particulate Matter
POTW	Publicly Owned Treatment Works
ppm	Parts per Million
ppmv	Parts per Million by Volume
ppmw	Parts per Million by Weight
psia	Pounds per Square Inch Absolute
psig	Pounds per Square Inch Gauge
RAC	Reference Air Concentration
RACT	Reasonably Available Control Technology
RCRA	Resource Conservation and Recovery Act


EPA
IMPLEMENTATION OF
RCRA AIR RULES

ABSTRACT: IMPLEMENTATION OF RCRA AIR RULES

The Accelerated Rules (Phase I) as promulgated are self-implementing, composed of specific requirements. Compliance is possible from direct reading of the regulations. No need exists for interaction between the permittee and the permitting agency or for judgement in interpretation of the regulations.

The Phase I rules are HSWA regulations. As a result, the rules are effective immediately in all states. In nonauthorized states, the rules will be enforced by the U.S. EPA. In HSWA-authorized states, the rules will initially be enforced after state programs are revised. For the Phase I rule, state program revision should be completed by July 1, 1991 (or July 1, 1992, if a statutory change is required). The implementation of Phase II is essentially identical to Phase I with the schedule to be determined by the promulgation date.

The Phase I rules are effective as of December 21, 1990, six months from promulgation. The compliance date for specific facilities is tied to the classification of the facility (i.e., permitted, interim status, newly regulated, or new facility). Specific compliance requirements of facilities are tied to the facility classifications as well. By the effective date, all facilities must be in compliance, have a compliance schedule in the operating record, or document that the emission rate standard is not exceeded. Control equipment must be installed within 18 months after the effective date.

Proposed rules of Phase II will have impacts on Phase I rules. Changes proposed under Phase II include the elimination of permit as a shield and the inclusion of accumulation tanks and containers to comply with Subparts AA, BB, and CC. Accumulation is a RCRA regulation and would follow RCRA state implementation (as opposed to HSWA implementation) procedures. Phase II rules would become effective six months after promulgation which is anticipated in late 1991.

Highlights

- Regulations are self-implementing
- Effective date 6 months after promulgation (Dec. 21, 1990)
- Control equipment to be installed within 18 months after effective date depending on type of facility
- Changes under Phase II for Phase I

Topics

I. Background

II. Requirements of Phase I Rules

III. Changes under Phase II

Topics

I. **Background**
   - Self-Implementing Rules
   - State Authorization

II. Requirements of Phase I Rules

III. Changes under Phase II

Background

Regulations are Self-Implementing

- No need for interaction
- Specific requirements
- No judgment involved
- Requirements for 264 and 265 identical

Background

State Authorization

Air rules are pursuant to 3004(n) of HSWA, therefore:

- Effective immediately in all States
- Implemented by EPA in nonauthorized States
- Implemented by EPA in authorized States until State program is revised

Background

State Authorization
(continued)

- Authorized States must adopt Phase I regulations by:
  - July 1, 1991
  - July 1, 1992 (if statutory change required)
- Schedule can be extended in some cases

Topics

I. Background

II. **Requirements of Phase I Rules**

- Impacts on permitting
- Applicability to different types of facilities
- Compliance requirements
- Information for Part B applications
- Facilities without installed controls

III. Changes under Phase II

Phase I Rules

Implementation Impacts on Permitting

- Delays likely on permits scheduled in early 1991
- Minimize delays by:
  - Calling for Part B information early
  - Incorporating air requirements into draft permit

Phase I Rules

When To Expect Facility Information

Dependent upon

- **Effective date** of Phase I standards (Dec. 21, 1990)
- Compliance date tied to the **classification** of the facility

Phase I Rules

Applicability to Different Types of Facilities

- Interim status facility/unit
- Permitted facility
- Facility/unit newly subject to RCRA
- Newly constructed facility/unit
- Unit newly subject to air standards

Phase I Rules/Facility Type

Interim Status Facilities

- Subject to rules on the effective date (Dec. 21, 1990)
- Modified Part B applications submitted before effective date
- Up to 24 months (18 months from effective date) allowed to install control equipment (June 21, 1992)

Phase I Rules/Facility Type

Permitted Facility

- Permits issued **before** effective date (Dec. 21, 1990) are **shielded** from Phase air standards
- Agency can apply the standards when permit is:
  - Reissued
  - Modified
- Phase I rules provide cause for Agency to modify permit under 270.41

Phase I Rules/Facility Type

Facility/Unit Newly Subject to RCRA

Example: A unit or facility is brought under RCRA regulation because of a newly listed waste

- Air standards apply 6 months after listing date of waste
- Up to 24 months (18 months from listing of waste) allowed to install control equipment

Phase I Rules/Facility Type

Newly Constructed Facility

- Facility being permitted
  - Permits issued **after** Dec. 21, 1990, **must** include applicable air emission standards
  - Receive final permit prior to construction
  - Part B applications submitted prior to effective date (Dec. 21, 1990) to be modified
  - Controls in place and operating upon startup

Phase I Rules/Facility Type

Newly Constructed Facility/Unit (continued)

- New unit at permitted facility
  - Permit modification required
  - Standards apply on date permit modification approved
- New unit at interim status facility
  - Revised Part A application required
  - Standards apply on date revised Part A approved
- Controls installed and operating upon startup

Phase I Rules/Facility Type

Unit Newly Subject to Air Standards

Example: Facility experiences a change in waste concentration that exceeds waste classification limits (10 ppmw, Subpart AA, or 10%, Subpart BB)

- Air rules apply on the date facility exceeds limits
- Control must be installed and operating on effective date

Phase I Rules

Compliance Requirements for Phase I Rules

1. Documention of determinations must be complete by effective date

   Review:

   - Waste determinations
   - Emission estimates
   - Control device efficiencies

Phase I Rules

Compliance Requirements for Phase I Rules
(continued)

2. Review data placed in operating record:
   - Monitoring results / Test Results
   - Leak detection results
   - Repair records

Phase I Rules

Compliance Requirements
(continued)

3. By effective date, facility must:
   - Be in compliance
   - Have implementation schedule in operating record, or
   - Document that emission rate is not exceeded.

Phase I Rules

Compliance Requirements
(continued)

4. Control equipment must be installed within 24 months (18 months after effective date)

Phase I Rules

Information for Part B Applications

Documentation must include:

1. Equipment and process vent determinations
2. Determination that process vent emission rate limit is or will be met
3. Determination of equipment in heavy-liquid service

Phase I Rules

Information for Part B Applications
(continued)

4. Reports and records of leak detection and repair
5. Verification of:
   - Use of appropriate test methods, and/or
   - Engineering judgment
6. Implementation schedule (if controls not installed on effective date)

Phase I Rules

Procedure for Facilities without Controls Installed by Effective Date

1. Extension of up to 18 months allowed:
   - Interim status facilities
   - Newly regulated facilities

   Document that installation could not reasonably be expected to be completed earlier
3. Show dates by which design and construction will be completed

Phase I Rules

Procedure for Facilities without Controls Installed by Effective Date
(continued)

4. Install equipment within 2 years from promulgation
5. Document that any schedule change could not reasonably be avoided
6. Schedule in operating record on effective date

Topics

I. Background

II. Requirements of Phase I Rules

III. Changes under Phase II

Changes under Phase II

- Implementation of Phase II same as discussed under Phase I
- Changes to Phase I
  - Permit-as-a-shield
  - Accumulation tanks and containers
- Changes to Phase I effective 6 months after promulgation of Phase II (anticipated late 1991)

Phase II/
Permit-as-a-Shield

How Would Elimination of Permit-as-a-Shield Affect Phase I Rules?

1. Permitted facilities originally exempt from Phase I rules would become subject to interim status rules (Part 265)
   - Additional time allowed to install control equipment
2. Interim status rules would apply directly until permit is modified or reissued

Phase II/Accumulation Tanks and Containers

Phase II Regulatory Revisions

- Would require compliance with AA, BB, and CC control requirements to maintain permit exemption
- Would not affect:
  - Small-quantity generators
  - Satellite accumulation

Summary

- Rules are self-implementing
- Phase I regulations effective as of December 21, 1990
- Compliance date depends on classification of facility
- Phase I rules are HSWA rules, effective immediately
- Promulgation of Phase II affects implementation of Phase I air rules

Toxicity Characteristic

Background

- RCRA interprets "hazardous" characteristic as:
  - Ignitable
  - Reactive
  - Corrosive
  - Toxic
- 40 Toxic organic and inorganic compounds and elements
- Concentration-based limits for toxicity characteristic leaching procedure
- Effective date = September 25, 1990

Toxicity Characteristic

Relation to Section 3004(n) Standards

- Increases the volume of waste managed as hazardous

Land Disposal Restrictions

Background

- Treatment required before land disposal
- Land disposal units include:
  - Landfills
  - Surface impoundments
  - Wastepiles
  - Land treatment units
  - Underground injection wells
- Final effective date = May 8, 1990
- Surface impoundments (treatment) exempt if dredged annually

Land Disposal Restrictions

Air Emissions Reduced by Land Ban

Organic Emission Sources	Yes	No
Tanks		√
Containers		√
Process vents		√
Equipment leaks		√
Miscellaneous units		√
Surface impoundments		√
Landfills	√	
Land treatment units	√	
Wastepiles	√	
Underground injection wells	√	

Land Disposal Restrictions

Impact on TSDF Air Emissions

- Treatment can cause cross-media air emissions
- Treatment reduces air emissions from land disposal units

Land Disposal Restrictions

Relation to TSDF Air Standards

- Phase I addresses LDR treatment process emissions
- Phase II suppresses emissions to LDR treatment unit for removal or destruction

Corrective Action

Background

- Addresses constituent releases to air, water, and soil
- Applies to hazardous **and solid waste** management units at TSDF
- Establishes site-specific compliance standards for releases to each media

Corrective Action

Relation to Section 3004(n) Air Standards

- Corrective action units must comply with air rules
- Corrective action relies on Section 3004(n) for control of organic emissions

CERCLA/SARA

Background

- Authorizes EPA to "remove" and "remediate" hazardous substance releases
- "Removal"–short-term action to minimize exposure
  Example: cleanup of a transportation spill
- "Remediation"–long-term action to provide permanent remedy

CERCLA/SARA

Criteria

- Site-specific
- 10^{-6} target risk
- Meet ARARs

CERCLA/SARA

ARARs – "Applicable or Relevant and Appropriate Requirements"

- "Applicable" requirements - rules applicable to CERCLA actions
- "Relevant and appropriate" requirements - rules not applicable but similar

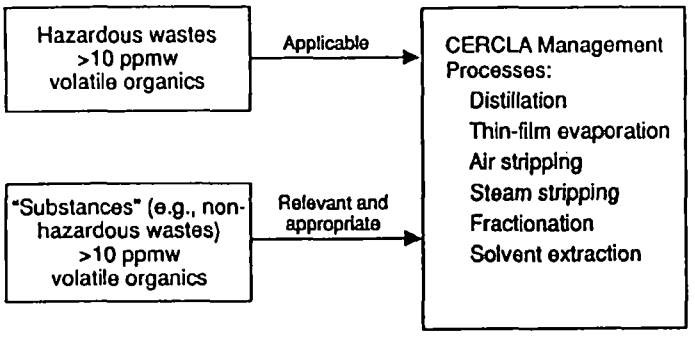
CERCLA/SARA

ARARs – Relation to TSDF Air Standards

- Phase I may be ARARs for certain processes
- Phase II when promulgated may be ARARs for certain processes
- Hazardous waste generated at CERCLA sites would be managed at TSDF (under air standards)

CERCLA/SARA

ARARS — Potential Relation to TSDF Air Standards



CERCLA/SARA

ARARs – Relation to TSDF Air Standards

- Phase I process vent standards are neither "applicable" nor "relevant and appropriate" to:
  - — Soil excavation
  - — In situ steam stripping of soil
  - — In situ stabilization
  - — In situ soil vapor extraction
  - — Soil washing
  - — Bioremediation
  - — Low-temperature thermal desorption

Summary

- Rules are self-implementing
- Phase I regulations become effective on December 21, 1990
- Compliance date depends on classification of facility
- Phase I rules are HSWA rules, effective immediately
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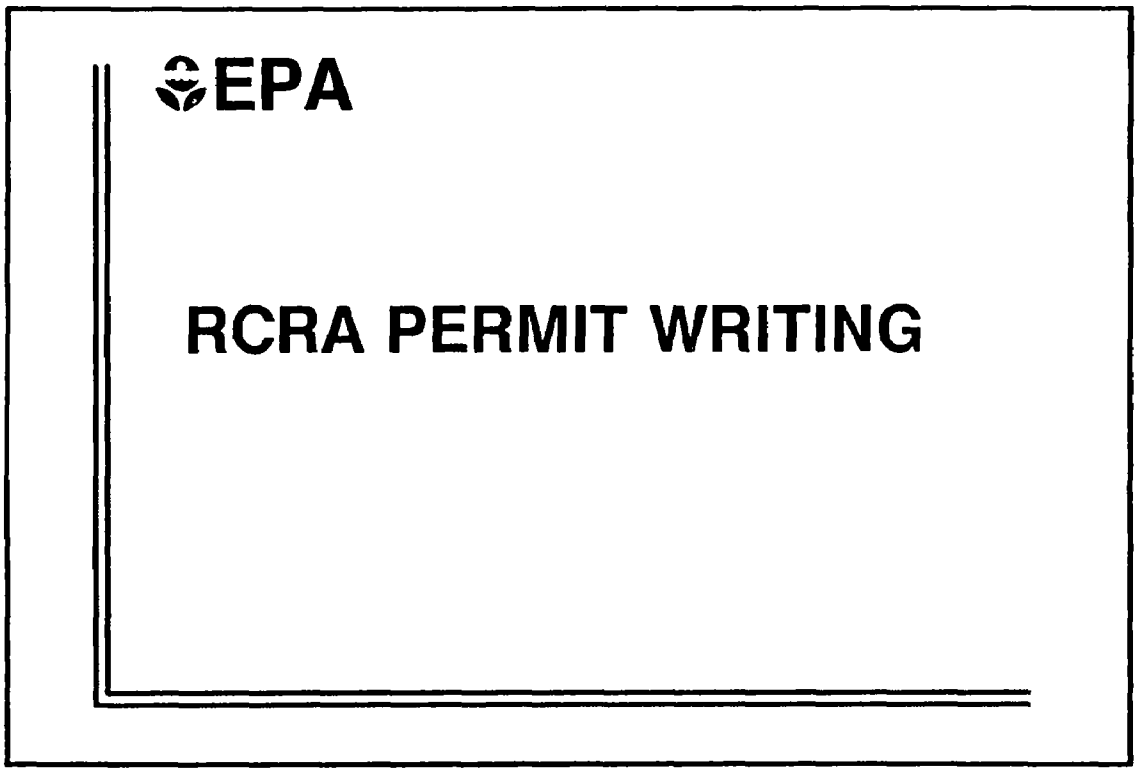

EPA
RCRA PERMIT WRITING

ABSTRACT: PERMIT WRITING

This section contains materials on information required in RCRA Part B permit applications regarding compliance with 40 CFR 264, Subparts—

AA— Air Emissions Standards for Process Vents, and
BB — Emission Standards for Equipment Leaks.

This section also provides a permit application completeness checklist for these Subparts and an instruction on how to evaluate this Part B information. Specific exercises on reviewing Part B information are provided in the Case Study.

BIBLIOGRAPHY: PERMIT WRITING

1. 55 FR 25454. Hazardous Waste Treatment, Storage, and Disposal Facilities; Organic Air Emission Standards for Process Vents and Equipment Leaks. Final Rule. June 21, 1990.

2. Permit Writer's Training Manual. A videotape sponsored by the Association of State and Territorial Solid Waste Management Officials. Produced by the University of Michigan. 1989.

3. Model RCRA Permit for Hazardous Waste Management Facilities. Draft. U. S. Environmental Protection Agency, Office of Solid Waste. September 1988.

4. RCRA Permit Quality Protocol. U.S. Environmental Protection Agency, Office of Solid Waste. September 1988.

RCRA Part B
Information Requirements
for Phase I Rules

Process Vents and Equipment Leaks

Part B Topics To Be Covered

- **Inspection and Monitoring Schedule**
- Documentation of Compliance
- Implementation Schedule

Process Vents and Equipment – Inspection and Monitoring Schedule

- Required in "General Inspection Schedule"
- Phase I inspection and monitoring procedures
  (40 CFR 264.1033 – Process Vents)
  (40 CFR 264.1052, .1053, and .1058 – Equipment)
- Schedule must address:
  - Control devices
  - Closed-vent systems
  - Equipment

PROCESS VENTS

Control Device Monitoring Schedule

Control devices	Parameters	Monitoring schedule	Notes
[Process vent flow rate to all control devices]		Hourly	—
Thermal vapor incinerator	Temperature	Continuous	One sensor required
Catalytic vapor incinerator	Temperature	Continuous	Two sensors required
Flare	Temperature	Continuous	Use heat sensing unit
Boiler or process heater	Temperature	Continuous	<44 MW
Boiler or process heater	Indicator of good combustion	Continuous	≥44 MW

PROCESS VENTS

Control Device Monitoring Schedule

Control devices	Parameters	Monitoring schedule
Condenser	Organic conc. or temperature	Continuous
Fixed-bed carbon adsorber	Organic conc. or indicator for predetermined regeneration time	Continuous Continuous
Nonregenerable carbon adsorber	Organic conc. or carbon consumption time	Daily, or interval not >20%

PROCESS VENTS

Control Device Inspection Schedule

Control devices	Inspection schedule
All control devices	At least daily

PROCESS VENTS

Closed-Vent Systems – Inspection and Monitoring Schedule

- Monitoring for leaks >500 ppm volatile organics
  - On date facility becomes subject to standards
  - Annually
  - Per Regional Administrator's request
- No inspection frequency specified

EQUIPMENT LEAKS

Inspection and Monitoring Schedule

Equipment	Monitoring	Inspection
Light liquid service pumps	Monthly (Method 21)	Weekly (visual)
Compressors	Not specified	Daily (failure sensor), or Monthly (audible alarm)
Heavy liquid service pumps	Within 5 days of finding potential leak, use Method 21	Use visual, audible olfactory, or other method (frequency not specified)
Pressure-relief devices (light or heavy liquids)		
Flanges		
Other connections		

Part B Topics To Be Covered

- Inspection and Monitoring Schedule
- **Documentation of Compliance**
- Implementation Schedule

PROCESS VENTS AND EQUIPMENT LEAKS -
DOCUMENTATION OF COMPLIANCE

Identification of Affected Vents and Equipment

- Inventory of all process vents and equipment - identity and location of each
- For each hazardous waste management unit with process vent and/or ancillary equipment:
  - Annual waste throughput
  - Operating hours
- Data to determine if process vents and equipment are subject to regulation

PROCESS VENTS AND EQUIPMENT LEAKS -
DOCUMENTATION OF COMPLIANCE

Performance Test Plan

Performance test plan is needed for control devices not specified in the regulation. Test plan must include:

- Test procedures
- Operating conditions
- Acceptable operating ranges of key process and control device parameters during testing

PROCESS VENTS AND EQUIPMENT LEAKS -
DOCUMENTATION OF COMPLIANCE

Design Information

- Flow rate and organic content of each equipment piece
- Detailed engineering description of closed-vent system and control device
  - Type
  - Manufacturer's name and model number
  - Dimensions
  - Capacity
  - Construction materials

PROCESS VENTS AND EQUIPMENT LEAKS -
DOCUMENTATION OF COMPLIANCE

Other Compliance Requirements

- List of all information sources supporting documentation
- Dates of compliance tests and other pertinent records
- Owner/operator certification of representativeness of operating parameters
- Owner/operator statement certifying 95% control device efficiency

PROCESS VENTS -
DOCUMENTATION OF COMPLIANCE

Emissions Determinations for Process Vents

- Estimated uncontrolled emission rate per process vent
- Cumulative TSDF process vent emission rate
- Data supporting estimated controlled process vent emission rates*
- Data supporting estimated emission reduction achieved*

*Data must reflect highest loading or capacity level of process vent reasonably expected.

Part B Topics To Be Covered

- Inspection and Monitoring Schedule
- Documentation of Compliance
- **Implementation Schedule**

Implementation Schedule

- Required when controls cannot be installed by the time affected vents and equipment become subject to Subparts AA and BB
- Content of schedule:
  - List of each closed-vent system and control device
  - Date each becomes fully operational

Implementation Schedule (continued)

- Content of schedule (continued):
  - Rationale why it cannot operate on effective date
    - Vendor's delivery constraints
    - Immediate installation causes greater emissions than delaying installation until routine shutdown

Instructions for Writing RCRA Permits

Current Model RCRA Permit – Contents

- Permit cover sheet
- 13 permit modules:*
  - I - II General permit conditions
  - III - IX Permit conditions by hazardous waste management unit type
  - X - XII Groundwater monitoring and corrective action permit conditions
  - XIII Post-closure care
- New air modules:
  - **XIV Process vents**
  - **XV Equipment**

*Source: EPA's *Model RCRA Permit for Hazardous Waste Management Facilities*, Draft, September 1988.

Options for Writing Permit Conditions

- Streamline approach, or
- Prepare detailed permit conditions

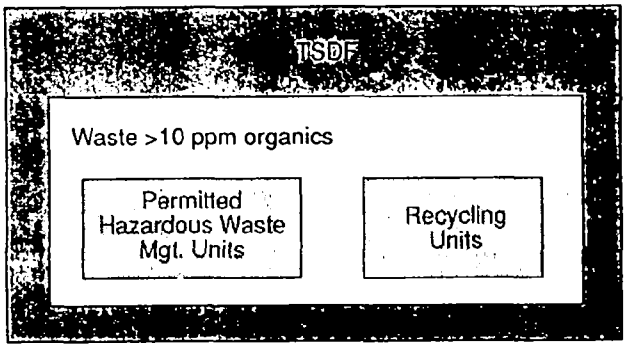
Streamlining Approach

Simply state in permit:

"The permittee shall comply with the air emissions requirements of 40 CFR 264, Subpart AA (for process vents) and/or Subpart BB (for equipment leaks) as applicable."

Preparing Detailed Permit Conditions for Process Vents (Module XIV)

Process Vents Applicability



PROCESS VENTS

Format for Model Permit Conditions

- Summary of regulated activities
- Permitted and prohibited waste identification
- Emission control technology
- Operating requirements
- Monitoring and inspection schedules and procedures
- Recordkeeping and reporting
- Compliance schedule

Summary of Regulated Activities

Permit includes a general description of air emission activities:

- Listing of each process vent with waste organic concentration >10 ppmw
- Each vent's approximate location at the facility
- Annual waste throughput per hazardous waste management or recycling unit connected to a process vent (including nonhazardous waste)

Summary of Regulated Activities (continued)

- Number of hours the unit operates annually
- Estimated uncontrolled and controlled organic emission rate per vent
- Estimated total facility organic emission rate from regulated process vents

Permitted and Prohibited Waste Identification

The permittee may vent emissions from the following wastes subject to the terms of this permit as follows:

Vent ID No.	Hazardous waste management or recycling unit	Description of hazardous waste	EPA hazardous waste number	Maximum waste volume
Example:				
A.1.	Treatment Tank A	Waste halogenated solvents	F001	11,000 gal/yr

The permittee is prohibited from managing hazardous waste that is not identified in permit condition XIV.B.1

PROCESS VENTS

Emission Control Technology

The permittee shall design, install, operate, and maintain the closed-vent system and control device(s) according to detailed plans and reports contained in permit attachment XIV-1. [40 CFR 264.1032(a)(2) and 264.1033]

Operating Requirements

The permittee shall operate each **vapor recovery** control device at an efficiency of **95 percent** or greater unless total organic emission limits of **3 lb/h and 3.1 ton/yr** for all affected process vents can be attained at an efficiency of less than 95 weight percent. [40 CFR 264.1033(b)]

Monitoring and Inspection Schedules and Procedures

The permittee shall monitor the closed-vent system and control devices in accordance with the monitoring schedule, permit attachment XIV-2, and shall comply with the following permit conditions as part of that monitoring.

- Each process vent flow rate shall be monitored hourly using the procedures in permit attachment XIV-2. [40 CFR 264.1033(f)(1)]
- For thermal vapor incinerators, temperature shall be monitored continuously using at least one sensor. [40 CFR 264.1033(f)(2)(i)]
- (More examples in model permit)

Recordkeeping and Reporting

The permittee shall keep on file at the facility in attachment XIV-4 the **implementation schedule** required in Subpart AA.

Recordkeeping and Reporting

The permittee shall report **semiannually** to the Regional Administrator the dates during the reporting period when a control device exceeded or operated outside the design specifications as defined in 40 CFR 264.1035(c)(4) as indicated by the control device monitoring required by 40 CFR 264.1033(f) and was not corrected within 24 hours. [40 CFR 264.1036(a)(2)]

[Note: For flares that operate with visible emissions as defined in 40 CFR 264.1033(d) as determined by Method 22 monitoring, the report shall include the duration and cause of each exceedance or visible emission and any corrective measures taken.]

Implementation Schedule

Permittee shall comply with the Implementation Schedule required by Subpart AA.

Item	Date
Example:	
1. Installation of carbon adsorber on tank A	June 26, 1991
2. Installation of condenser on distillation unit K	January 10, 1992

Permit Attachments Referenced in Module XIV – Process Vents

Permit Attachment No.	Plan or Document
XIV-1	Detailed plans and reports on the design, installation, operation, and maintenance of closed-vent systems and control devices
XIV-2	Closed-vent system and control device monitoring schedule and procedures
XIV-3	Closed-vent system and control device inspection schedule and procedures
XIV-4	Implementation schedule
XIV-5	Performance test plan for control devices other than those listed in the regulations

Omnibus Permitting Authority

Omnibus Permitting Authority

- RCRA Section 3005 states permits issued:
  - **"...shall contain such terms and conditions.. necessary to protect human health and the environment."**
- Omnibus permitting
  - Allows permit writers to **require more stringent controls** on a case-by-case basis

OMNIBUS PERMITTING

Potential Areas of Omnibus Controls

- For Phase I standards: in some cases unacceptably high risk remains
  - Require leakless valves and sealless pumps
  - Lower organic cutoff
  - Increase control device performance (>95% efficiency)
- Phase II standards may be considered on a site-specific basis after proposal

OMNIBUS PERMITTING -
IDENTIFICATION AND CONTROL OF SITE-SPECIFIC RISKS

Future Guidance Documents

- Procedures to identify high-risk TSDF
- Methods for providing additional emission controls:
  - Work practice controls
  - Technological controls
- Detailed example cases
- Checklists for permit writers to apply guidance

CHECKLIST FOR PART B INFORMATION REQUIREMENTS

Distributed at

U.S. Environmental Protection Agency
Workshop On
Air Emissions from Waste Mangement Facilities

PART 270	PART 264	SUBJECT REQUIREMENT	LOCATION IN APPLICATION	COMMENTS
		INSPECTION AND MONITORING		
270.14(b)(5)		- General Inspection Schedule and Specific Requirements		
	264.1033	- Process Vents		
	264.1033 (e)(1)	- Reference Method 22 (visible flare emissions) observation period = 2 hr.		
	(f)	- Monitor and inspect each control device		
	(f)(1)	- Process vent flow rate to control device At least once every hour		
	(f)(2)	- Continuous monitoring:		
	(i)	- thermal vapor incinerator (temperature; one sensor)		
	(ii)	- catalytic vapor incinerator (temperature; 2 sensors)		
	(iii)	- flare (heat sensing device)		
	(iv)	- boiler or process heater < 44 MW (temperature)		
	(v)	- boiler or process heater ≥ 44 MW (parameter indicating good combustion)		
	(vi)	- condenser (organic concentration or temperature)		
	(vii)	- fixed bed system carbon adsorption (organic concentration or other indicator parameter for predetermined regeneration cycle time)		
	(f)(3)	- Inspect readings at least daily		

PART 270	PART 264	SUBJECT REQUIREMENT	LOCATION IN APPLICATION	COMMENTS
270.14(b)(5)	264.1033 (h)(1)	- Nonregenerable carbon adsorption system (organic concentration)		
		- monitor daily, or		
		- monitor at interval no > 20% of carbon consumption time		
270.14(b)(5)	264.1033 (i)	- Alternate control device monitoring - monitoring frequency		
270.24(c)	264.1033(j)/ 264.1035 (b)(3)	- Other control devices: - sampling and monitoring frequency		
270.14(b)(5)	264.1033 (k)(1)	- Closed vent system		
		- visual inspections		
	(k)(2)	- Closed vent system monitoring		
		- Data system is subject to regulation		
		- Annually		
		- Other times per RA request		
	264.1057	- Valves in light liquid service		
	264.1057 (a)-(e)	- monitor monthly for leaks using Method 21		
	(f)-(h)	- exceptions		
	264.1061	- exceptions		
	264.1052	- Pumps in light liquid service		
	264.1052 (a)	- monitor monthly for leaks using Method 21		
		- inspect visually weekly for pump seal leakage		
	(d)-(f)	- exceptions		

PART 270	PART 264	SUBJECT REQUIREMENT	LOCATION IN APPLICATION	COMMENTS
270.14(b)(5)	264.1053	- Compressors		
	(e)(1)	- check failure sensor daily, or		
		- has audible alarm		
		- inspect alarm monthly		
	264.1058	- Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, flanges, and other connectors		
	(a)	- use visual, audible, olfactory, or any other methods to determine potential leak		
		- if potential leak detected, monitor within 5 days using Method 21		
270.14(b)(8)		- procedures, structures, or equipment used to—		
(iv)		- mitigate effects of equipment failure and power outages		
(v)		- prevent personnel exposure to hazardous waste		
(vi)		- prevent releases to the atmosphere		
		PROCESS VENTS		
270.24(a)	264.1033 (a)(2)	- Implementation schedule when closed vent system and control device can't be installed on Subpart AA's effective date (12/21/90)		

PART 270	PART 264	SUBJECT REQUIREMENT	LOCATION IN APPLICATION	COMMENTS
270.24(b)		- Documentation of compliance with process vent standards in 264.1032:		
	(1)	- identity of all affected process vents		
		- annual throughput and operating hours of each affected unit		
		- estimated uncontrolled and controlled emission rates per vent and for overall facility		
		- location of each affected unit in facility		
	(2)	- data supporting estimates of vent emissions and emission reduction by add-on control devices		
	(3)	- data used to determine if a process vent is subject to regulation		
	(c)	- for use of unspecified control device, performance test plan		
	(d)	- Documentation of compliance of process vent standards in 264.1033 including		
	(1)	- list of all information references and sources used to prepare documentation		
	(2)	- records including dates of compliance tests for 1033(k)		
	(3)	- basic control device design information		
	(4)	- o/o certification of representativeness of operating parameters		
	(5)	- o/o statement certifying $\geq$ 96 wt. percent control device efficiency		

PART 270	PART 264	SUBJECT REQUIREMENT	LOCATION IN APPLICATION	COMMENTS
		EQUIPMENT		
270.25 (a)		- For each piece of equipment		
(1)		Identification number		
		- Respective hazardous waste management unit identification		
(2)		- Location within the TSDF		
(3)		- Type of equipment		
(4)		- % (wt) total organics in equipments' waste stream		
(5)		- Physical state of waste		
(6)		- Method of compliance, e.g.,		
		• monthly leak detection and repair, or		
		• equipped with dual mechanical seals		
(b)	264.1033 (a)(2)	- Implementation schedule when closed vent system and control device can't be installed on Subpart BB's effective date (12/21/90)		
(c)	264.1035 (b)(3)	- For use of unspecified control device, a peformance test plan		
(d)	264.1052 & 264.1059	- Documentation of compliance with equipment standards in 264.1052 & 264.1059		
(e)	264.1060	- Documentation of compliance with equipment standard in 264.1060 including		
		- list of all information references and sources used to prepare documentation		

PART B INFORMATION REQUIREMENTS (continued)

PART 270	PART 264	SUBJECT REQUIREMENT	LOCATION IN APPLICATION	COMMENTS
270.25 (e) (2)		- records including dates of compliance tests for 264.1033 (k)		
(3)		- basic control device design information		
(4)		- o/o certification of representativeness of operating parameters		
(5)		- o/o statement certifying ≥ 95 wt. percent control device efficiency		

CASE STUDY

PERMIT WRITING/REVIEW

Presented at

U.S. Environmental Protection Agency
Workshop On
Air Emissions from Waste Mangement Facilities

GENERAL INFORMATION

The following exercises will give permit writers an opportunity to review and evaluate RCRA permit applications and information requirements of the Phase I TSDF air standards (40 CFR 264 and 265, Subparts AA and BB). It consists of a case study which covers both process vents and equipment leaks. First, you will be provided with general facility background information.

The case study will then be divided into five sections, as follows:

I. Description/Applicability Determinations (for both process vents and equipment)

II. Mass Balance/Emissions Estimation (for one vent)

III. Supporting Data for Emission Rate Determinations (for process vents)

IV. Control Device Design (for one vent)

V. Equipment Requirements

VI. Other Compliance Requirements

Each section within the case study contains:

- statement of purpose and what is expected in that section,
- fictitious Part B permit application information relevant to that section or subject matter, and
- questions specific to the section and supporting information which should be used as guidance in determining the completeness and adequacy of the information provided.

The scenarios used and information provided are simplified to emphasize the key points of permitting process vents and equipment. Information gaps and misinformation are placed intentionally in the Part B information provided by the applicant to train permit writers in the interpretation of the air standards and in the use of permit review/writing tools available.

For each section within the case study you should first familiarize yourself with the general contents. Each section will then be walked through to determine its completeness. The Part B Checklist provided during the permit writing lecture provides more detailed requirements along with the regulation citation for each requirement.

Upon completion of the case study, answer packages to the questions will be provided.

FACILITY BACKGROUND INFORMATION

ABC Chemicals, Inc.

- A chemical production facility.
- Operates its own hazardous waste treatment, storage, and disposal facility onsite.
- Also, recycles hazardous waste solvents and wastewaters containing other organics for reuse onsite.
- Only those recycling units designated for waste solvents have process vents venting emissions from wastes that exceed 10 ppmw.
- Wastewater recycled in the other units are below this concentration limit.
- This Part B permit application case study addresses only the regulated solvent recycling process vents.
- A general diagram of the facility and its operations are shown in Figure 1.
- A general diagram of the facility and it's operations including the installation of a control device on the distillation unit A.

ABC CHEMICALS --PART B

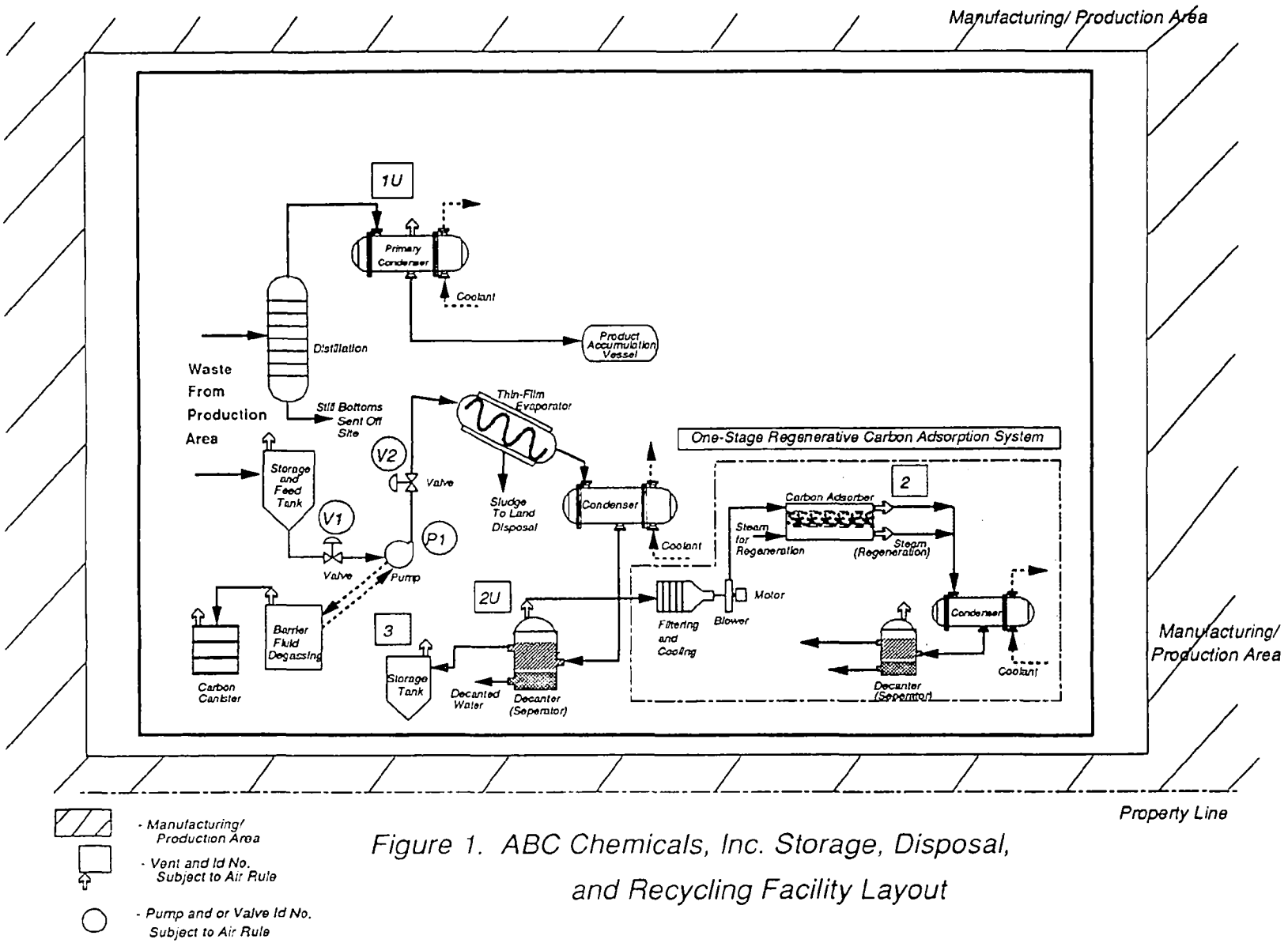


Figure 1. ABC Chemicals, Inc. Storage, Disposal, and Recycling Facility Layout

ABC CHEMICALS --PART B

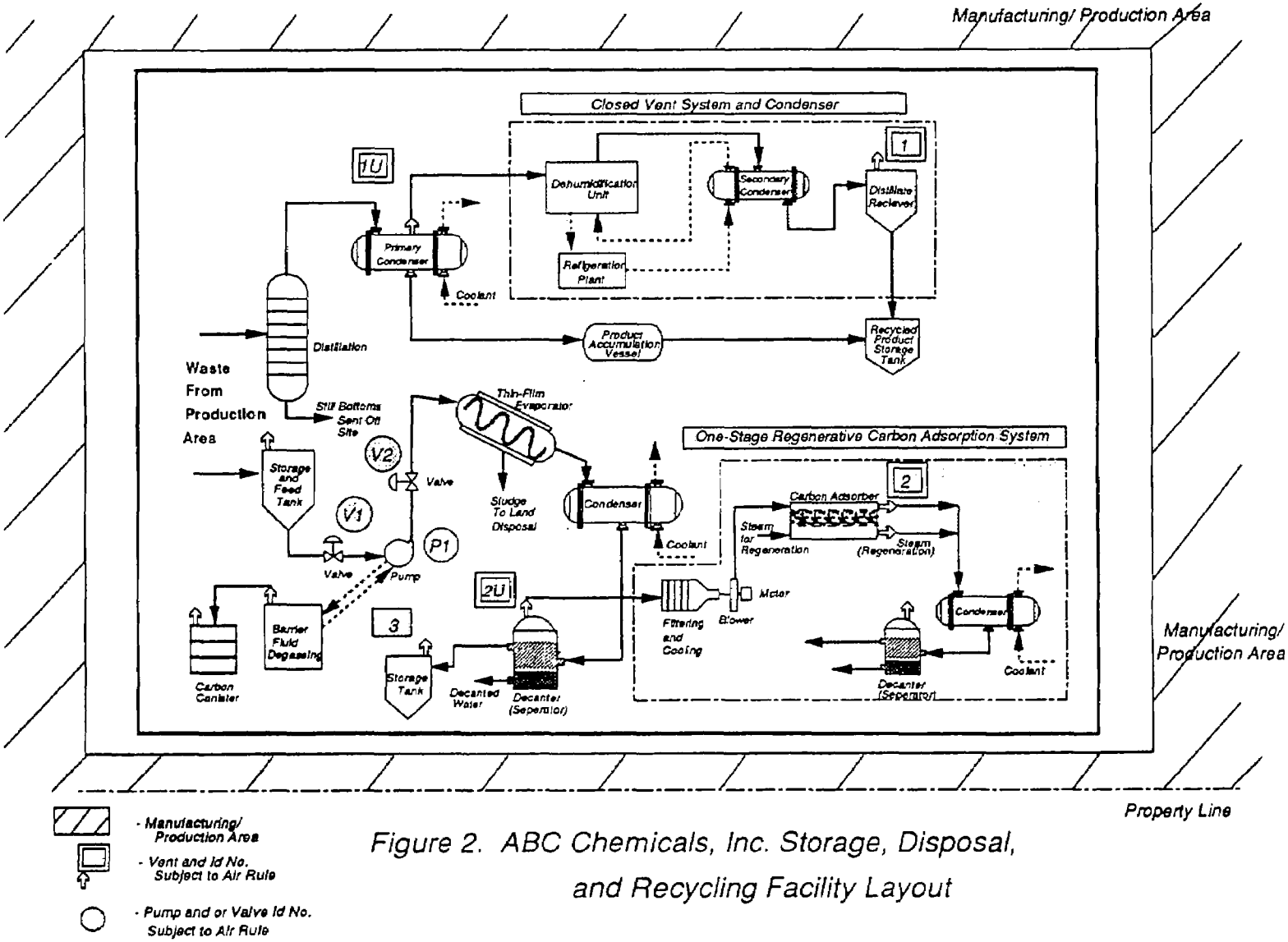


Figure 2. ABC Chemicals, Inc. Storage, Disposal, and Recycling Facility Layout

I. Description/Applicability Determinations

This section of the case study is concerned with the applicability determination and inventory requirements for process vents and equipment. The owner/operator (applicant) is required by the regulations to make a determination of all process vents which are affected by the Subpart AA air rules. For a process vent to be affected it must be:

- associated with a hazardous waste management unit (HWMU) at a regulated hazardous waste treatment storage and disposal facility,
- be associated with a hazardous waste distillation/separation unit specified in the rule (e.g., distillation, thin film evaporation), and
- this unit must manage, come in contact with, or be associated with hazardous waste streams with an organic content of greater than 10 ppmw

Once the process vents which are affected by the air rules are identified, the applicant must then fulfill inventory requirements. The applicant is required to provide an inventory of all affected process vents. This inventory must include:

- vent ID, including the hazardous waste management unit (HWMU);
- location of each vent within the facility;
- RCRA waste code associated with that vent;
- organic content of the waste stream (ppmw)
- design throughput of that waste stream;
- emissions estimates (both uncontrolled and controlled) for each process vent and total emissions from all affected process vents at the facility; and
- type of emissions control devices used (if needed) or determination that total facility emissions below emission rate limit (3.0 lb./hr and 3.1 tons/yr).

For equipment to be affected by the rules it must be:

- associated with a hazardous waste management unit (HWMU) at a regulated hazardous waste treatment storage and disposal facility,
- manages, comes in contact with, or is associated with waste streams with an organic content of greater than 10% organics.

Once the equipment which are affected by the air rules are identified, the applicant must then fulfill inventory requirements. The applicant is required to provide an inventory of all affected equipment. This inventory must include:

- equipment ID, equipment type, the hazardous waste management unit (HWMU);
- location of each equipment within the facility;
- RCRA waste code associated with that equipment;
- organic content of the waste stream (%)
- design throughput of that waste stream;
- designate whether that equipment is in light or heavy liquid service.

In this section of the case study you will be asked to review an applicant's submittal (covering both process vents 1 and 2 and equipment associated with the thin film evaporation unit) to determine the adequacy and correctness of the information provided.

Following is the information provided to you, the permit writer, from the applicant regarding the determination of applicability and inventory of process vents regulated under 40 CFR 264, Subpart AA, and equipment regulated under Subpart BB.

Vent Identification and Location

- Table 1 contains a list of process vents regulated under Subpart AA at the ABC Chemicals, Inc., hazardous waste treatment, storage, and disposal facility.
- The waste management units - Distillation Column A and Thin Film Evaporator A - are considered recycling units and are, therefore, not RCRA permitted. Thus, the waste information necessary to determine compliance is provided in this section, not in the Waste Analysis Plan of this Part B permit application.
- Figure 2 identifies the location of each waste management unit and regulated process vents and equipment.
- Table 2 provides information on waste throughput and the corresponding organic emissions for process vents 1 and 2.

TABLE 1. Process Vents Regulated Under 40 CFR 264, Subpart AA

Vent ID	HWMU Location (Fig. 1)	RCRA Waste Codes Managed	Annual Wtd. Avg. Organic Conc.(ppmw)
1	Distillation column A	F005 (toluene)	800,000
2	Thin film evaporator A	F002 (1,1,1-trichloroethane)	700,000

TABLE 1 (Cont...): Equipment Regulated under 40 CFR 264, Subpart BB

Equip ID	Type	HWMU	RCRA Waste Codes Managed	Total Organics (% by wght.)	Heavy or Light Liquid	Method of Compliance
P.1	Pump	Thin film evaporator	F002	70	Light	Dual mechanical seals with barrier fluid system to carbon adsorption canister
V.1 V.2	Valve	same	same	same	same	Monthly leak detection & repair in compliance with 40 CFR 264.1057(a)

TABLE 2. Process Vent Waste Throughput and Emissions Data

Vent ID	HWMU	Waste Throughput (ton/yr)	Maximum HWMU Operating Hours/year	Uncontrolled Emissions (lb/hr)	Uncontrolled Emissions (ton/yr)	Controlled Emissions (lb/hr)	Controlled Emissions (ton/yr)	Control Device
1	Distillation Column A	250	2,000	10	10	0.5	0.5	Condenser
2	Thin film evaporator A	392	1,500	17.3	12.97	maximum 0.34 average 0.23	maximum 0.26 average 0.17	Carbon Adsorber

QUESTIONS

Part B Permit Case Study (Section I)

Please mark correct answer on this sheet for each of the following questions.

Vent Description, Applicability

1. Does the application include an inventory of all affected process vents and equipment?

   1. Yes
   2. No

2. Does this inventory include the identity and location of each affected process vent and equipment?

   1. Yes
   2. No

3. For each unit with an affected process vent and/or equipment, has the annual waste throughput and operating hours been included?

   1. Yes
   2. No

4. Has there been a determination made that the process vents and equipment listed in the inventory are subject to the regulation?

   1. Yes
   2. No

5. Has data/information been included to support the determination?

   1. Yes
   2. No

6. Has the applicant estimated the uncontrolled and controlled emission rate per affected process vent?

   1. Yes
   2. No

7. Has the total controlled and uncontrolled emission rate from all affected process vents for the entire facility been estimated?

   1. Yes
   2. No

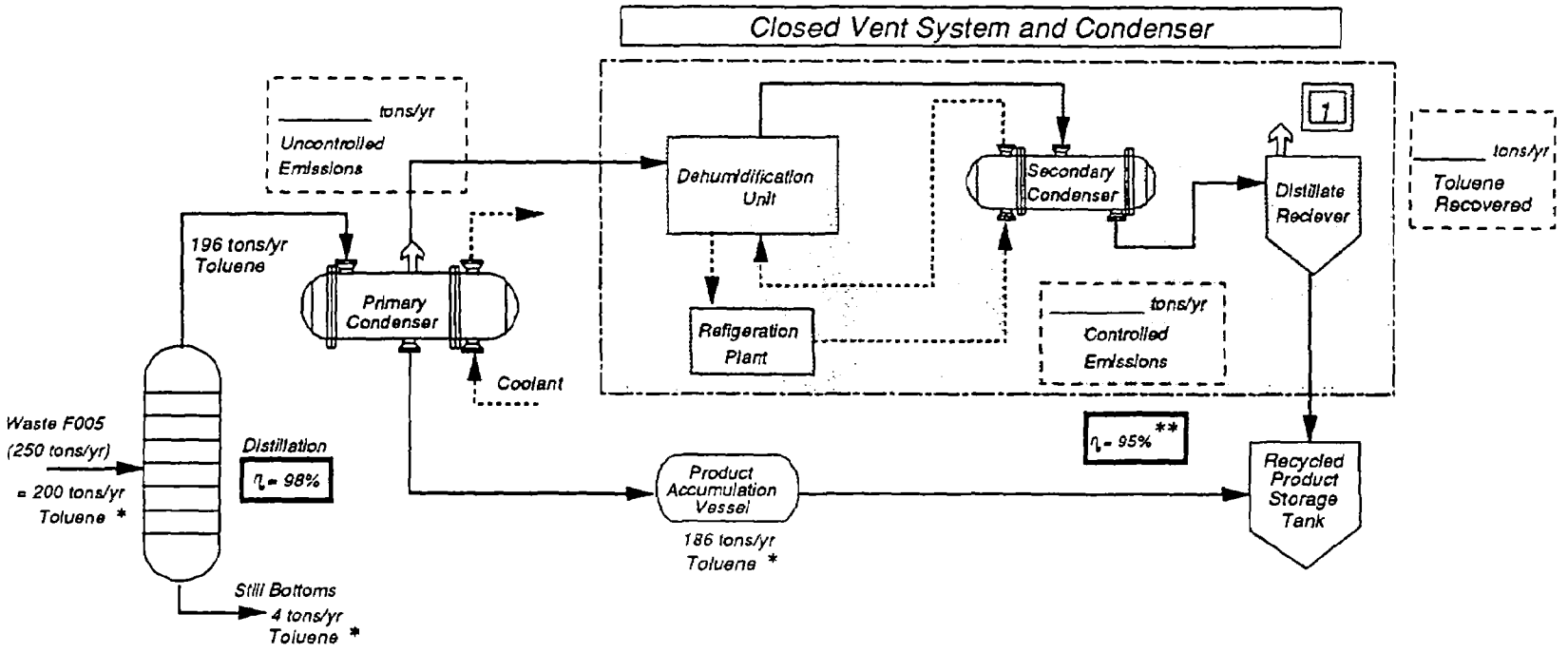
II. EMISSION ESTIMATION/MASS BALANCE

PROCESS VENTS

This section provides a sample exercise in mass balance calculations and is intended as a basic review in mass balance, to aid in visualizing issues regarding emissions estimates, and to cover several issues specific to the TSDF air rules regarding process vents.

To complete this exercise refer to Figure 3, which provides a schematic for the distillation unit A and it's control devices. Based on five years of operating records, the facility claims that annual waste throughput is 250 tons per year (tpy). Based on information provided in Table 1, the waste stream consists of 80% toluene or 200 tpy throughput. For the purposes of this mass balance exercise we will only focus on the (200 tpy) toluene. The facility also claims to have recovered 4 tpy in still bottoms from distillation unit A and 186 tpy of product from the primary condenser unit. The facility has determined a need for the addition of an emissions control device, and is proposing a secondary condenser. They have assumed a control efficiency of 95% for the secondary condenser on past performance, vent stream parameters, and engineering design.

ABC CHEMICALS --PART B



Vent and Id. No (Subject to Regulation)

η = Efficency

* = Based on 5 years operating records. Inputs to mass balance

** = Based on engineering design calculations and vendor certification

Figure 3. Enlargement of Distillation Unit A and Closed Vent System and Control Device (Secondary Condenser)

QUESTIONS

Part B Permit Case Study (Section II)

Please mark correct answer on this sheet for each of the following questions.

Emission Estimation/Mass Balance

1. Using data given in Figure 2 calculate the following emission rates (ER):

   a. $ER_{primary\ condenser}$= ____ tons/yr

   b. $ER_{secondary\ condenser}$= ____ tons/yr

2. Using the same information as given in question 1 above, calculate the organics (toluene) recovered (OR) from the secondary condensers:

   $OR_{secondary\ condenser}$ _____tons/yr.

3. If the applicant only predicted 80% control efficiency for the secondary condenser:

   a. $ER_{secondary\ condenser}$= _____ tons/yr

   b. Would the facility still be in compliance?

      1. Yes
      2. No
      3. Insufficient information provide to determine.

   If not, what is requirement of the TSDF air rules which has been violated? _____

   If yes, tell why. What is the maximum allowed emissions (short or long term), or lowest control efficiency which still allow the facility to be in compliance? What additional information is needed? _____

Calculations:

III. DATA SUPPORTING EMISSIONS ESTIMATE

This exercise will cover the review of the data and calculations that the applicant has submitted to support the emissions estimate. Once affected process vents have been identified the applicant is required to estimate the emissions from each affected process vent and for the total from all affected process vents at the facility. Once emissions estimates have been made, the need for emission reductions and emissions control devices can be assessed.

- Emissions control devices are required for affected process vents unless total facilities emissions from all affected process vents are less than 3.0 lbs./hr. and 3.1 tons/yr.

- If control devices are required, an overall control efficiency of 95% or meeting the total facility emission rate limits is required. Therefore it is important that emissions estimates be accurate and complete and meet all the emission determination criteria in the rules.

The method of estimating emissions is left to the discretion of the facility owner/operator (applicant). Emissions may be estimated through:

- the use of engineering calculations, based on:
  - operating records,
  - design criteria, or
  - engineering judgement, or
- from actual field test data, (from the specific site or from similar operations at other sites).

In this case study, two types of data have been used to estimate emissions.

- For process vent 1 (associated with distillation unit A) emissions were calculated based on 5 years of operating records.

- For process vent 2 (associated with the thin film evaporation unit) emissions were estimated based on field test data.

In this exercise you will be asked to review the data supporting the emissions estimates presented in Table 2. Data representing the mass balance previously covered in Figure 3 is provided for process vent 1 followed by a couple of questions. The process is then repeated for process vent 2.

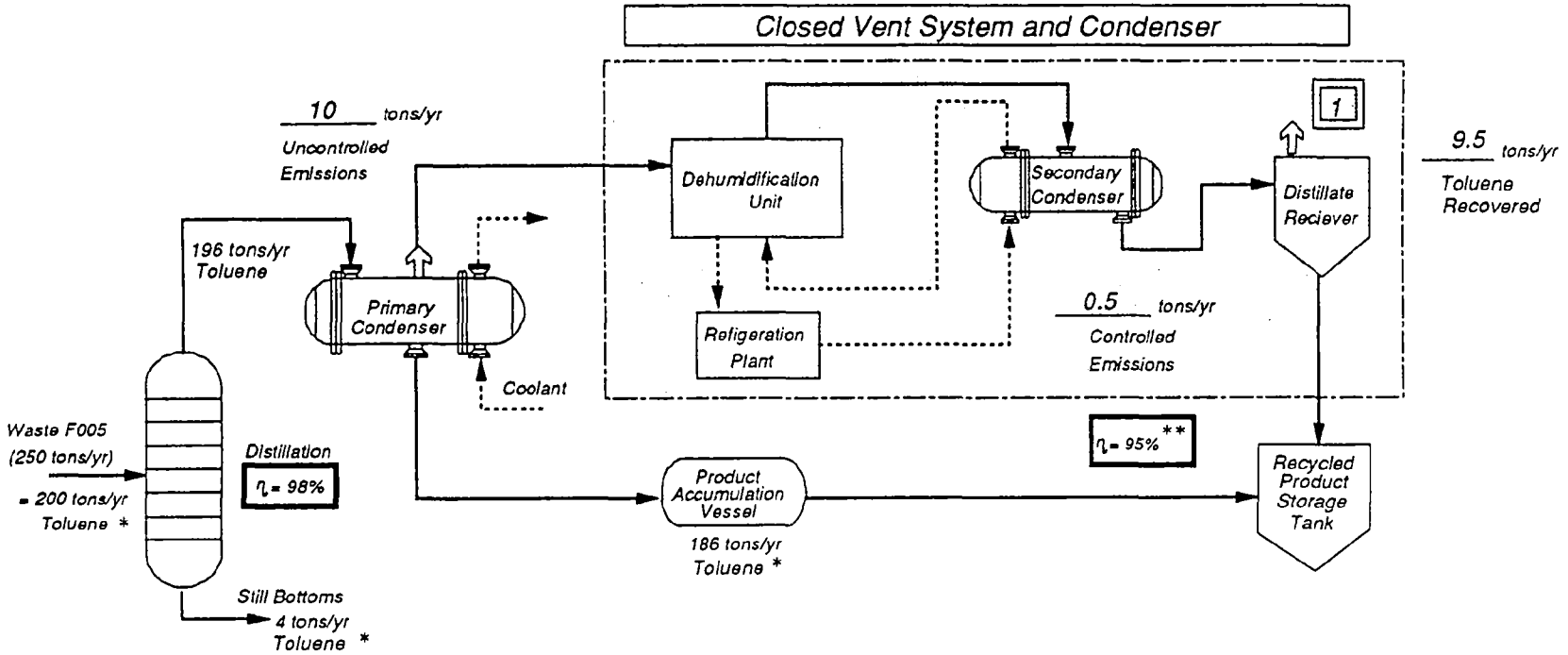
The following information represents the applicant's submittal to support the emissions estimates in Table 2. First data supporting the emissions estimates for process vent #1 will be covered followed by a review of the data for process vent #2.

A. Process Vent No. 1 (Distillation Unit)

To support the emission estimates listed above (demonstrating 95% condenser efficiency), the following data provide a mass balance of organic constituents in waste F005 entering the distillation unit and all emission or accumulation points afterwards.

- The mass balance is based on five years of operating records.
- Figure 3 displays the distillation unit, its control device, and the mass balance.
- The calculations in Table 3 below support the mass balance depicted in Figure 3.

ABC CHEMICALS --PART B



Vent and Id. No (Subject to Regulation)

η = Efficency

* = Based on 5 years operating records. Inputs to mass balance

** = Based on engineering design calculations and vendor certification

Figure 3. Enlargement of Distillation Unit A and Closed Vent System and Control Device (Secondary Condenser)

ABC CHEMICALS --PART B

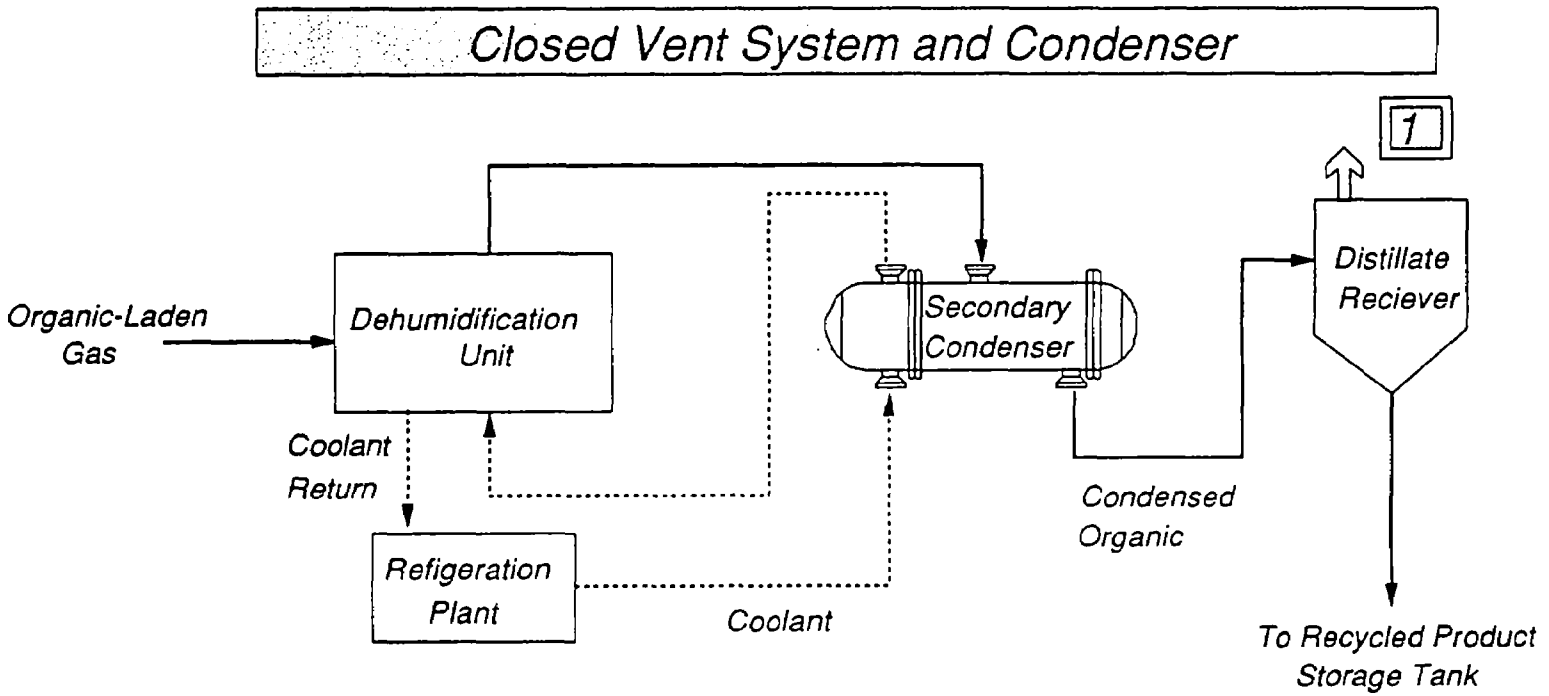


Figure 4. Enlargement of Condensation System

Table 3: MASS BALANCE

Process Vent No. 1 (Distillation Unit)

RCRA waste code:	F005 (toluene)
Maximum waste volume processed annually:	250 ton *
Total organic concentration of F005:	800,000 ppmw
Total organic processed/year: 800,000 ppmw x 250 ton/yr	=200 ton/yr *
Estimated still removal efficiency: 98% x 200 ton/yr = 196 ton/yr	98% =196 ton/yr
Total organics collected in still bottoms: (2% of total organics processed)	4 ton/yr *
Total volume of product recovered annually from primary condenser:	186 ton/yr *
(186 tons/yr ÷ 196 ton/yr x 100% = 95% recovery efficiency)	
Estimated uncontrolled losses via vent emissions: 200 - (4 + 186) = 10 ton/yr (10 lb/hr given 2,000 operating hr/yr)	10 ton/yr
Control device (condenser) efficiency:	95%
Amount of condensed organics recovered from control device (secondary condenser):	9.5 ton/yr
Estimated controlled vent emissions:	0.5 ton/yr =0.5 lb/hr

*Based on direct measurements of recovered organics over 5 year operating record.

TABLE 2. Process Vent Waste Throughput and Emissions Data

Vent ID	HWMU	Waste Throughput (ton/yr)	Maximum HWMU Operating Hours/year	Uncontrolled Emissions (lb/hr)	Uncontrolled Emissions (ton/yr)	Controlled Emissions (lb/hr)	Controlled Emissions (ton/yr)	Control Device
1	Distillation Column A	250	2,000	10	10	0.5	0.5	Condenser
2	Thin film evaporator A	392	1,500	17.3	12.97	maximum 0.34 average 0.23	maximum 0.26 average 0.17	Carbon Adsorber

QUESTIONS

Part B Permit Case Study (Section III)

Please mark correct answer on this sheet for each of the following questions.

Process Vent 1:

Supporting Emissions Estimates

1. Does the application include data supporting estimated emission rates of affected process vents in distillation unit A and its closed vent system?

   1. Yes
   2. No

2. Does the application include data supporting the estimated emission reduction achieved?

   1. Yes
   2. No

3. Have the estimated emission rates and the emission reduction achieved been calculated correctly from a numerical stand point?

   1. Yes
   2. No

4. Does this data reflect the highest loading or capacity level reasonably expected for both hourly and annually?

   1. Yes
   2. No
   3. Sufficient data not provided to make this determination

5. Are these data in this portion of the application (e.g., data used in calculating emission rates, and emission reduction achieved) of sufficient quality on which to base judgement?

   1. Yes
   2. No

If not, what additional data would you need to see or request?

_____
_____
_____
_____
_____

If yes, tell why. _____
_____
_____
_____
_____

III. DATA SUPPORTING EMISSION ESTIMATES (Cont...)

The following information represents the applicant's submittal to support the emissions estimates in Table 2 for process vent No. 2.

B. Process Vent No. 2 (thin film evaporator)

To document the emission estimates for process vent 2 listed in Table 2:

- A performance test has been undertaken.
- Field test data from the performance test are provided in Table 4.
- Additional information on the waste stream and operating conditions are provided below.

TABLE 2. Process Vent Waste Throughput and Emissions Data

Vent ID	HWMU	Waste Throughput (ton/yr)	Maximum HWMU Operating Hours/year	Uncontrolled Emissions (lb/hr)	Uncontrolled Emissions (ton/yr)	Controlled Emissions (lb/hr)	Controlled Emissions (ton/yr)	Control Device
1	Distillation Column A	250	2,000	10	10	0.5	0.5	Condenser
2	Thin film evaporator A	392	1,500	17.3	12.97	maximum 0.34 average 0.23	maximum 0.26 average 0.17	Carbon Adsorber

TABLE 4. Source Testing Results for ABC Chemicals' Thin Film Evaporator 1,1,1-Trichloroethane Emissions with Gas Phase, Fixed Bed Carbon Adsorber Applied[a]

Date	Exhaust from Thin Film Evaporator: mass flow rate (lb/hr)	Exhaust from Thin Film Evaporator: Conc. (ppmv)	Exhaust from Carbon Adsorber: max mass flow (lb/hr)	Exhaust from Carbon Adsorber: Conc. (ppmv)	Removal Efficiency (%)
18-Aug-90	20.5	27,000	0.42	550	98.0
19-Aug-90	16.7	22,000	0.33	435	98.0
20-Aug-90	14.7	19,000	0.27	356	98.2
Ave.=	17.3	22,700	0.34	447	98.1

Total annual emissions = $\frac{0.34 \text{ lb/hr} \times 1500 \text{ hr/yr}}{2000 \text{ lbs/ton}}$ = 0.26 tons/yr

[a] This table demonstrates the effectiveness of activated carbon as an adsorbent for 1,1,1-trichloroethane in gaseous streams.

QUESTIONS

Part B Permit Case Study (Section III)

Please mark correct answer on this sheet for each of the following questions.

Process Vent 2:

Supporting Emissions Estimates

1. Does the application include data supporting estimated control emission rates of affected process vents in the thin-film evaporator and closed vent system?

   1. Yes
   2. No

2. Does the application include data supporting the estimated emission reduction achieved?

   1. Yes
   2. No

3. Have the estimated emission rates and the emission reduction achieved been calculated correctly from a numerical stand point?

   1. Yes
   2. No

5. Does this data reflect the highest loading or capacity level reasonably expected for both hourly and annually?

   1. Yes
   2. No
   3. Sufficient data not provided to make this determination

5. Are these data in this portion of the application (e.g., emission rate data) of sufficient quality on which to base judgement?

   1. Yes
   2. No

If not, what additional data would you need to see or request?

_____
_____
_____
_____
_____

If yes, tell why. _____
_____
_____
_____
_____

IV.CLOSED VENT SYSTEMS / CONTROL DEVICE DESIGN

This section of the case study is concerned with the information requirements associated with the design of closed vent systems and control devices. If control devices are required because total facility emissions exceed the emission rate limits of 3.0 lb./hr or 3.1 tons/yr the owner/operator (applicant) is required by the regulations to submit detailed engineering design plans and details concerning closed vent systems and control device design. Design information required for closed vent systems and control devices includes:

- Flow rate and organic content for each equipment piece and vent
- Detailed engineering description of closed-vent system and control device
  - Type
  - Manufacturer's name and model number
  - Dimensions
  - Capacity
  - Construction materials
- Basic engineering design and operating parameters

Control devices specifically outlined in the regulation include: thermal destruction, carbon adsorption, and condensation. Should the owner/operator choose to use a control device not specified in the regulation a performance test plan is required to insure that emissions reduction achieved is acceptable. A performance test plan must include:

- test procedures used
- operating conditions
- acceptable operating ranges of key process and control device parameters during testing

Review of Applicant's Submittal
for Closed-Vent System and Control Device Design

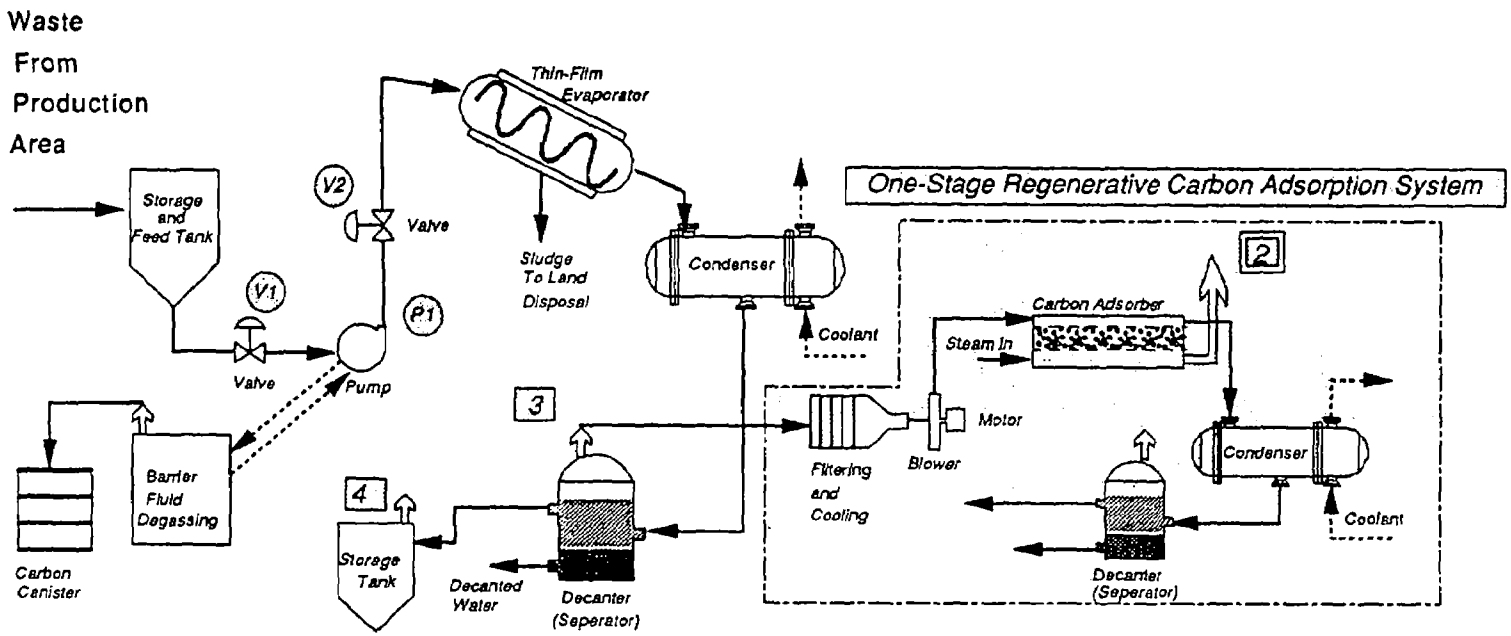
The closed-vent system and control device for process vent #2 (carbon adsorber) will be used to illustrate the design information requirements. You will be asked to review the information submitted by the applicant to assess it's adequacy and to determine what additional information, if any are required.

The following constitutes the applicant's submittal to satisfy the requirements associated with closed-vent system and control device design information.

Process Vent #2

- Figures 5 and 6 are diagrams for the closed vent system and control device installed on Process Vent 2 (carbon adsorber).
  - The adsorber was manufactured by Sorption Systems, Inc.
  - Design specifications and product performance data were developed by Sorption Systems for this vent stream and are provided in the following pages.

ABC CHEMICALS -- PART B

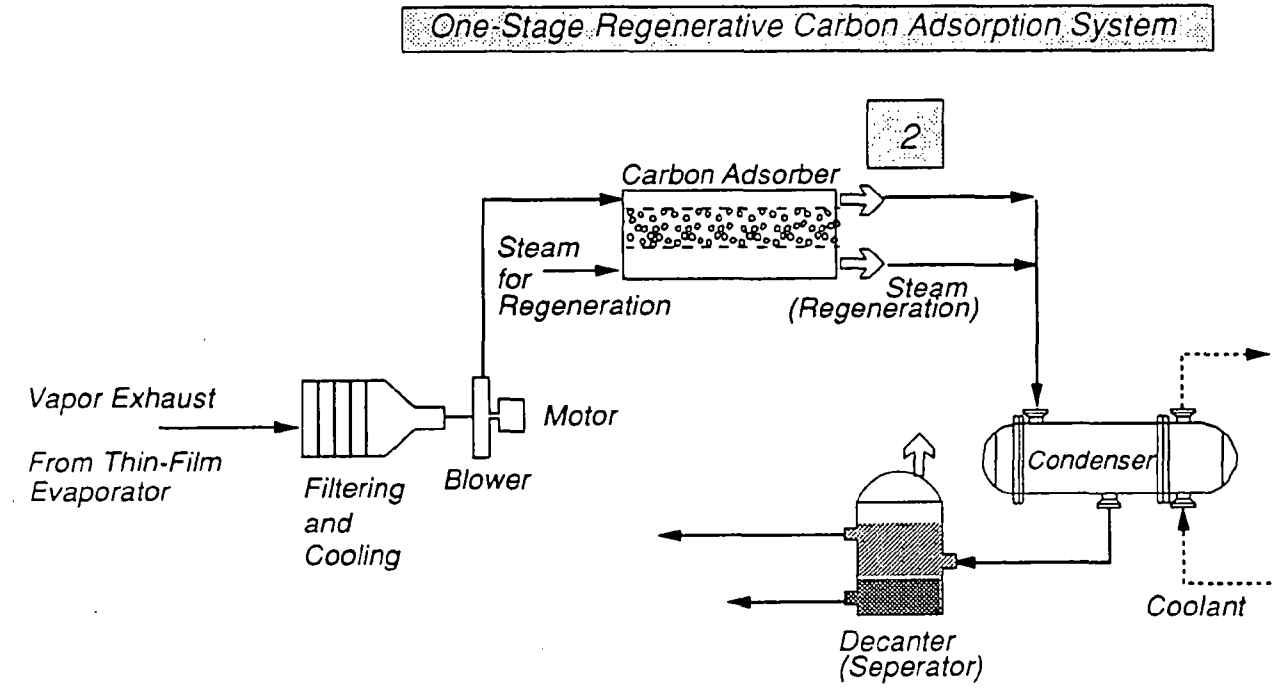


Vent and Id. No (Subject to Regulation)

Pump and or Valve Id.No. Subject to Air Rule

Figure 5. Enlargement of Thin-film Evaporator System Vented To a Carbon Adsorption System

ABC CHEMICALS -- PART B



Vent and Id. No
(Subject to Regulation)

Figure 6. Enlargement of Thin-film Evaporator System Vented To a Carbon Adsorption System

OPERATING PARAMETERS

Process Vent No. 2 (Thin film evaporator)

Vent stream composition:	1,1,1-trichloroethane, water
Constituent concentrations: 1,1,1 trichloroethane (vent gas)	$=8.5 \times 10^{-3}$ lb/ft^3 = 17.3 lb/hr = 2.28% by volume = 22,800 ppmv
Flow rate:	34 scfm
Relative humidity:	40%
Temperature:	21 °C (70 °F)
Design exhaust vent stream organic compound concentration level (carbon bed exhaust vent)	(max)-- $= 1.67 \times 10^{-4}$ lb/ft^3 = 0.34 lb/hr = 0.045% = 450 ppmv (avg.)-- $= 1.12 \times 10^{-4}$ lb/ft^3 = 0.23 lb/hr = 0.03% = 300 ppmv
Capacity of carbon bed (per 1,000 lb carbon):	= 150 lb organics
No. of carbon beds:	= 1
Capacity of carbon beds:	= 2,000 lb
Type of activated carbon used for carbon beds:	Sorption Systems Type 001
Working capacity of carbon beds (per 1,000 lb carbon):	= 70 lb
Design total steam flow over the period of each complete carbon bed regeneration cycle:	= 6,000 lb steam

OPERATING PARAMTERS

Process Vent No. 2 (Thin film evaporator)

Duration of carbon bed --

. steaming (heating and desorbing),	= 4 hours
. cooling/drying,	= 2 hours
. and standby cycles	= 2 hours
Total	= 8 hours

Design carbon bed temperature after regeneration: ambient

Design carbon bed regeneration time: = 8 hours total

Design service life of carbon: = 2 years

SORPTION SYSTEMS, INC.
Anytown, USA

This statement documents the design of a fixed-bed carbon adsorber to control the emissions from a condenser vent of a gas stream associated with a thin film evaporator (TFE) unit. The main pollutant to be collected/recovered is 1,1,1-trichloroethane (1,1,1-TCE). The condenser vent has a total gas flow rate of approximately 34 scfm and emits 17.3 lb/hr of 1,1,1-TCE (equal to 13 tons per year) based on 1,500 hours of operation per year. At this flow, the 1,1,1-TCE concentration exceeds the lower explosive limit (LEL). Typical safe practice is to operate at or below 25% of LEL, which would require dilution air to increase the flow rate to at least an acceptable level/concentration.

As the TFE at this facility is operated one shift per day, five days per week, there is ample time during the second and third shifts to regenerate the carbon bed while the TFE is not operating, and therefore, only one carbon bed is required for this application. The equilibrium capacity (w_e) of carbon for 1,1,1-TCE is 0.15 lb 1,1,1-TCE/lb carbon. The working capacity (w_c) is typically assumed to be $0.5w_e$ (EPA Cost Control Manual, 4th edition). Using a working capacity of w_c = 0.07 lb/lb of carbon and an 8-hour adsorption cycle, the amount of carbon required is:

$$\frac{(17.3 \text{ lb org./hr}) \times (8 \text{ hr})}{(0.07 \text{ lb org./lb carbon})} = 1{,}980 \text{ lb carbon}$$

According to the standard carbon adsorption design references (e.g., EPA Control Cost Manual, 4th ed.), a typical design velocity for the gas stream in a carbon bed is 60 ft/min. To achieve a reasonable bed configuration and to ensure safe operating range, the process vent stream will be diluted with ambient air. The total flow will be increased to 3,400 scfm. The stream temperature will be maintained at 70 ^{o}F. The dimensions of the column at a 3,400 scfm total flow rate are 12.75 ft long by 4.4 ft in diameter.

The manufacturer's experience has shown carbon life to be between two and five years and that three lb of steam are required to regenerate 1 lb of carbon. These values are within the ranges cited in various EPA documents (e.g., EPA Control Cost Manual, Control of Gaseous Emissions (APTI Course 415). The owner/operator has been informed by Sorption Systems that the use service life of this particular activated carbon is two years. The carbon type is Sorption Systems Type 001. Details regarding the carbon bed design parameters are provided in the attached table.

SORPTION SYSTEMS -- TYPE 001

CARBON BED DESIGN PARAMETERS:

Number of adsorbing vessels:	1
Number of desorbing vessels:	0
Work cap. carbon, lb VOC/lb carb:	0.07
Adsorption cycle time:	8
Lower explosive limit, ppmv:	10000
VO molecular weight:	133.0
VO removed (995% efficiency), MG/yr:	11.8
Total Organic Flow Rate, Mg/yr:	11.8
Calculated Values:	
Gas flow rate, cu ft/min:	3400.0
Weight of carbon, lbs:	1982.40
Carbon bed length, ft:	12.75
Carbon bed diameter, ft:	4.44
Carbon bed volume, cu ft:	197.63
Mass of VO to be adsorbed, lb/hr:	17.346

(Based on 5% percent of the waste being organic and 6% of that organic being the uncontrolled emissions from 116500 Mg/yr. Air flow @25% LEL= 336.3 scfm

VARIABLE NAMES

Volumetric gas flow rate, cu ft/min:	3400.00
Superficial bed velocity, ft/min:	60
Carbon bed diameter, ft:	4.44
Carbon bed volume, cu ft:	197.63
Number of vessels:	1
Weight of carbon, lbs:	1982
Price of carbon, $/lb:	1.8
Price of steam, $/thous lbs:	3.26
Price of cooling water, $/thous gal:	0.15
Price of electricity, $/hr:	0.0463
Operating labor wage rate, $/hr:	12
Maintenance labor wage rate, $/hr:	13.2
Operating hours, hrs/yr:	1500
Number of shifts/day:	1
Number of operating days/yr:	250
Service life for carbon, yrs:	2
Service life for adsorber systems, yrs:	10
Interest rate:	0.1
Site Preparation:	500

QUESTIONS

Part B Permit Case Study (Section IV)

Please mark correct answer on this sheet for each of the following sections.

Process Vent 2:

Control Device Design

1. Does the application include a detailed design and engineering description of the thin-film evaporator closed vent system and control devices?

   1. Yes
   2. No

2. Does this detailed engineering and design description include the following:

   I. Type of control device?
      a. Yes
      b. No

   II. Manufacturer's name and control device model number?
      a. Yes
      b. No

   III. Dimensions of control device?
      a. Yes
      b. No

   IV. Capacity?
      a. Yes
      b. No

   V. Construction materials?
      a. Yes
      b. No

   VI. Type of adsorption bed?
      a. Yes
      b. No

   VII. Desorption time?
      a. Yes
      b. No

   VII. Regeneration drying and cooling time?
      a. Yes
      b. No

3. List the types of control devices used at this facility:

   1. _____
   2. _____

4. Are there any control devices used at this facility not specified in the regulation?

   1. Yes
   2. No

5. Assume the answer to question 4 is "yes". Which of the following items should be included in the performance test?

   1. Test procedure used

   2. Operating conditions for the test

   3. Acceptable operating ranges of key process and control device parameters during testing

   4. None of the above

   5. All of the above

V. Equipment Requirements

This section of the case study is concerned with the specific requirements of Subpart BB. Once equipment has been identified as affected by the TSDF air emission standards there are several requirements which must be met. First, an inventory of all affected equipment must be made. This inventory should include designation of the type of service for each piece of equipment which depends on the characteristics of the waste stream (i.e., gas, light liquid, and heavy liquid service). This was covered in the first exercise of the case study. Specific inspection and monitoring requirements are a function of the type service for that equipment.

For equipment to be in light liquid service the organic waste stream must contain one or more organic constituents with a vapor pressure of greater than 0.3 kilopascals (2.26 mm Hg) at 20^{o}C, and the total concentration of these constituent(s) must be at least 20% by weight.

Specific inspection and monitoring requirements depend on the type of equipment. Examples of inspection and monitoring requirements are shown in the table below.

Equipment	Monitoring	Inspection
Light liquid or gas vapor valves	Monthly (Method 21)	Not specified
Light liquid pumps	Monthly (Method 21)	Weekly (visual)
Compressors	Not specified	Daily (failure sensor) Monthly (audible alarm)
Heavy liquid pumps or valves		
Pressure-relief devices	Within 5 days of finding potential leak using Method 21	Use visual, audible, olfactory, or other method (frequency not specified)
Flanges		
Other connnectors		

The applicant has several options to meet the equipment leak requirements. For example, for equipment in light liquid service compliance can be achieved through conformance with emission limits, equipment specifications, or work practices. Compliance can occur through the demonstration of no detectable emissions are likely to occur in the life of the equipment (e.g., use of sealess pumps), through the specification of the use of dual seals and closed vent systems, or through work practices of monthly monitoring (Method 21) and weekly inspection.

If the applicant chooses either no detectable emissions or selects the use of dual seals and closed vent systems monitoring requirements are minimized. Should the applicant choose conformance with emission limits, once no detectable emissions have been demonstrated weekly inspection and monthly monitoring are not required. If the equipment specification option using a dual mechanical seal system is chosen, monthly monitoring is not required. Weekly inspections are still required.

Table 1 gives an inventory of the affected equipment at the facility. This has been greatly simplified for the purposes of this case study. In actuality it is likely there would be numerous equipment which would be affected by the rules. The applicant has also submitted the following to demonstrate compliance with the equipment leak standards dealing with pumps.

Documentation of Compliance
with 40 CFR 264.1052 and 264.1059

-- 264.1052 (Pump standard)

This pump is in light liquid service. It is equipped with a dual mechanical seal system that includes a barrier fluid of water. The pump is equipped with a barrier fluid degassing reservoir that is connected by a closed vent system to a carbon adsorber canister that complies with 264.1060. (See below). Since the pump is equipped with a closed vent system to the carbon adsorber the system is capable of capturing and transporting any leakage from the seal(s) to the carbon adsorber. Therefore, this pump's seal system and barrier fluid system will not be inspected as required otherwise for pumps.

TABLE 1 : Equipment Regulated under 40 CFR 264, Subpart BB

Equip ID	Type	HWMU	RCRA Waste Codes Managed	Total Organics (% by wght.)	Heavy or Light Liquid	Method of Compliance
P.1	Pump	Thin film evaporator	F002	70	Light	Dual mechanical seals with barrier fluid system to carbon adsorption canister
V.1 V.2	Valve	same	same	same	same	Monthly leak detection & repair in compliance with 40 CFR 264.1057(a)

QUESTIONS

Part B Permit Case Study (Section V)

Please mark correct answer on this sheet for *each of the following questions.*

Equipment Requirements/Pumps

1. Does the applicants choice of venting *emissions from a pump with dual mechanical* seals to a carbon canister meet the requirements of Subpart BB?

   1. Yes
   2. No

2. The applicants proposes not to inspect or monitor the pump. Is this in compliance with Subpart BB?

   1. Yes
   2. No

   Why?

   _____
   _____
   _____

3. The applicant chose equipment specification (the use of dual mechanical seal system pumps vented to a control device) to meet compliance requirements. What other options were available?

   a)_____
   b)_____

4. If the applicant had chosen work practices as a *means of compliance,* what would be the requirements for:

   a) inspection?

   _____
   _____

   b) *monitoring?*

   _____
   _____

5. Is there anything missing from the applicants submittal to demonstrate compliance?

   1. Yes
   2. No

   If yes, what? _____
   _____
   _____

   If no, is there sufficient detail in what has been submitted? _____
   _____

VI. OTHER COMPLIANCE REQUIREMENTS / DOCUMENTATION

In addition to the specific data, design, and engineering requirements associated with process vents, equipment and their closed vent systems and control devices there are several administrative requirements. This section of the case study is concerned with the additional information required in Part B applications.

Additional information which is required in a Part B includes:

- List of all information sources supporting documentation (e.g., of emission estimates, control device performance and design)
- Dates of compliance tests and other pertinent data
- Owner/operator certification of representativeness of operating parameters
- Owner/operator statement certifying 95% control device efficiency

The following pages constitute the applicant's submittal to satisfy the other additional administrative requirements not previously covered in previous exercises. You will be asked to review this material to determine if all information has been included.

LIST OF INFORMATION REFERENCES AND SOURCES USED TO PREPARE DOCUMENTATION

Vent No. 2 (carbon adsorber)

Sorption Systems, Inc., Manufacturers Brochures

Control Cost Manual, 4th Ed., by U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Economics Analysis Branch

RECORDS PERTAINING TO COMPLIANCE WITH 40 CFR 264.1033(k)(2)

Appendix A contains closed vent system monitoring records demonstrating compliance with the 40 CFR 264.1033(k)(1) emission limit of less than 500 ppm. These records reflect both visual inspections and use of EPA Method 21 for both the condenser and carbon adsorber closed vent systems. Records show monitoring was conducted initially, when the facility became subject to the process vent air standards, and annually thereafter, The EPA Regional Administrator did not request any additional monitoring of the closed vent systems during interim status.

OWNER/OPERATOR CERTIFICATION OF REPRESENTATIVENESS OF OPERATING PARAMETERS AND GREATER THAN OR EQUAL TO 95 WEIGHT PERCENT CONTROL DEVICE

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the operating parameters selected for each process vent and control device are representative. I also certify that each control device attains greater than or equal to 95 weight percent efficiency under these operating parameters based on the design analysis provided by the vendors specified in this section. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signed _____

Title _____

Date _____

APPENDIX A

RECORDS PERTAINING TO COMPLIANCE WITH 40 CFR 264.1003(k)(2)

INITIAL MONITORING OF CARBON ADSORBER CLOSED VENT SYSTEM:

Monitoring Run No. 1-1

Date 8-31-90

Time 8 a.m. - 12 p.m.

1. Facility Name and Address ABC Chemicals
American City, USA

2. Purpose of Monitoring

To comply with 40 CFR 265.1033 (j)(i)

3. a. Monitoring Location Thin Film Evaporator

b. Description Monitored closed vent system from TFE condenser vent to inlet carbon adsorption system at each ductwork connection.

4. a. Number of Method 21 Readings Taken: 6

b. Duration of Readings: 45 seconds

5. Visual Inspection Results

No visual evidence of leakage

6. Followup actions taken:

None, all readings in compliance

Signature of Sampling Person: John Smith

ANNUAL MONITORING OF CARBON ADSORBER CLOSED VENT SYSTEM:

Monitoring Run No. 1-2 Date 8-28-91

Time 10 am - 2 pm.

1. Facility Name and Address ABC Chemicals
American City, USA

2. Purpose of Monitoring

To comply with 40 CFR 265.1033 (j)(1)

3. a. Monitoring Location Thin Film Evaporator.

b. Description Monitored closed vent system from TFE condenser vent to inlet carbon adsorption system at each ductwork connection.

4. a. Number of Method 21 Readings Taken:

6

b. Duration of Readings:

60 seconds

5. Visual Inspection Results

No visual evidence of leakage

6. Followup actions taken:

None, all readings in compliance

Signature of Sampling Person: John Smith

QUESTIONS

Part B Permit Case Study (Section VI)

Please mark correct answer on this sheet for each of the following questions.

Other Compliance Requirements

1. Were compliance tests conducted?

   1. Yes
   2. No

2. If compliance tests were conducted, were the dates of the compliance tests included?

   1. Yes
   2. No

3. Do the compliance tests contain other pertinent records?

   1. Yes
   2. No

4. Does the application include a list of all information sources supporting documentation of compliance with vent standards?

   1. Yes
   2. No

5. Is the owner/operator certification of representiveness of operating parameters included in the application?

   1. Yes
   2. No

6. Does the application include an owner/operator statement certifying 95% control device efficiency included in the application?

   1. Yes
   2. No

Compliance Inspections

General Aspects
Inspection Procedures
Monitoring Procedures
Follow-up Procedures
Violations

Compliance Inspections

Learning Objectives

- Understand elements and types of compliance inspections
- Understand pre-inspection, field inspection, and follow-up procedures to insure thorough inspections
- Understand use of checklists in carrying out inspections
- Understand monitoring procedures for equipment leaks (Method 21)
- Understand general aspects of performance standards for control devices for process vents
- Understand types of violations

General Aspects Of Inspection

- Types of inspection
  - Initial
  - Follow-up
- Scheduling of inspections
- Inspection checklists
- Key inspection elements

Inspection Checklists

- General aspects
  - Facility permit status
  - Identification of applicable units
  - Identification of equipment and process vents
- Worksheet for each type of equipment or control device
  - Performance standards
  - Records
  - Physical Inspection
- Glossary

Key Inspection Elements

- LDAR (leak detection and repair)
- Facility operating log/record
- Types of fluid covered
- Types of equipment and control devices
- Sampling procedures and methods
- Applicable units and process vents
- Dates for compliance

LDAR

- Definition of leak
  - ≥10,000 ppm
  - Visual
  - No detectable emission (NDE) > 500 ppm above background
  - Sensor exceeds criteria
- Repair
  - 5/15 days
  - Immediately/5 days
  - Immediately/24 hours
- Delay of repair
  - General
  - Pumps
  - Valves

Facility Operating Log/Record

- Determination of applicable units
- Identification and designation of units/equipment
- Monitoring and prior inspection results
- Leak detection and repair

Types of Fluids Covered

- Gas/vapor
- Light liquid
- Heavy liquid

Identification Of Equipment Covered By Rule

- Equipment
  - Pumps
    - General
    - Dual mechanical
    - NDE (sealless)
    - Closed vent/control device
  - Compressors
    - General
    - NDE (sealless)
    - Closed vent/control device
  - Valves
    - General
    - Leakless
    - Unsafe to monitor
    - Difficult to monitor
    - Alter allowable %
    - Alter skip period LDRP
  - Closed-Vent/Control Devices
    - General
    - Vapor recovery
    - Condensor
    - Regeneration adsorber
    - Non-regeneration adsorber

Identification Of Equipment Covered By Rule (Cont'd.)

- Equipment
  - Closed-Vent/Control Devices (Cont'd.)
    - Enclosed combustion
    - Process heater
    - Boiler
    - Catalytic vapor incinerator
    - Thermal vapor incinerator
  - Flares
    - Air-assisted
    - Steam-assisted
    - Non-assisted

Sampling Procedures and Methods

- Process Vent Rule
  - Waste stream organic composition: 10 ppmw
    - Knowledge or test
  - Hourly Process Vent Organic Emission Rate
    - Knowledge or test
  - Annual Process Vent Organic Emission Rate
    - From hourly rate

Sampling Procedures and Methods

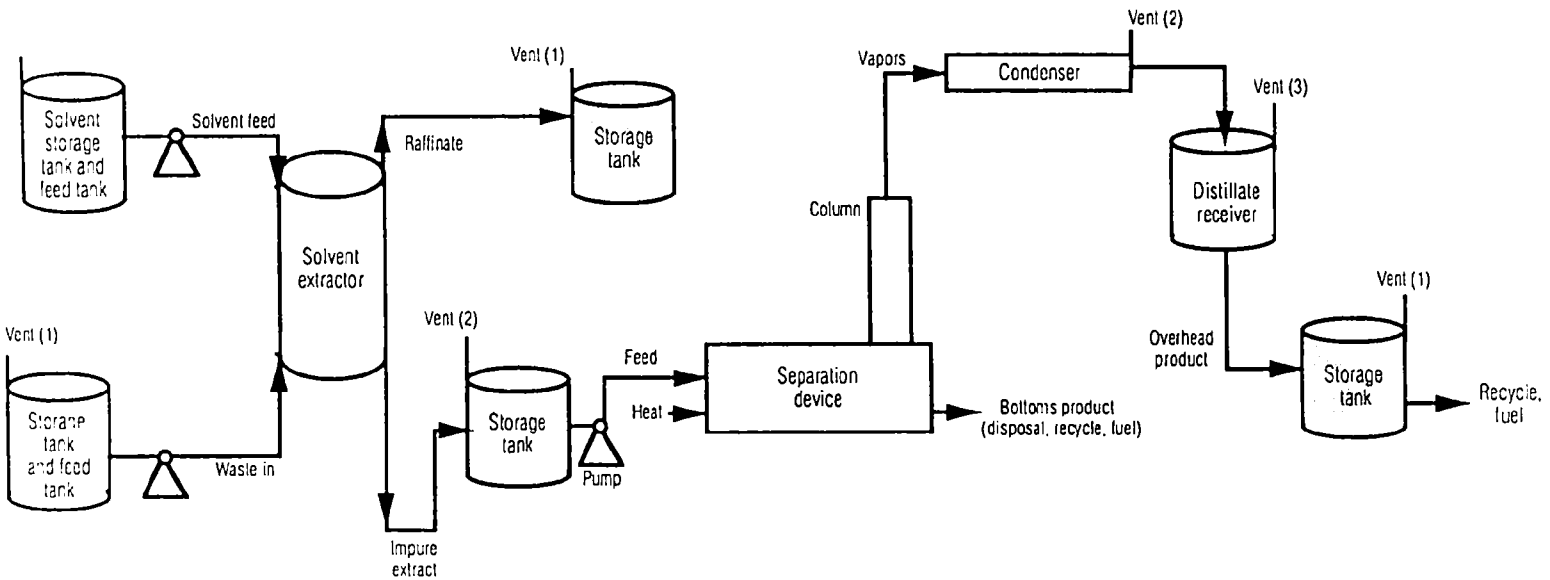
- Equipment Leaks
  - Leaks
    - 10,000 or NDE
    - Method 21
  - Waste Stream Organic Concentration: 10% wt.
    - Knowledge or test

Applicable Units for Process Vents

- Applicable Units
  - HW Management units using
    - Distillation
    - Fractionation
    - Thin-film evaporation
    - Solvent extractor
    - Air stripping
    - Steam stripping
  - Managing wastes with 10 ppmw or greater
- Exempt Units
  - "90-day" tanks
  - Part of "totally enclosed treatment facility"
  - Part of closed-loop reclamation unit
  - Part of wastewater or elementary neutralization unit regulated under CWA
  - Units of product separation (while waste is still in the product separation unit)

Applicable Units For Process Vents

- Passage of fluids into atmosphere due to mechanical or process-related means



Schematic diagram of solvent extraction system

Note:
(1) Vent is not subject to the requirements of Subpart AA because the passage of liquids, gases, or fumes into the atmosphere is not caused by mechanical or process-related means.
(2) Vent is subject to the requirements of Subpart AA.
(3) Vent is subject to the requirements of Subpart AA only if uncondensed overhead vapors from the batch still operation are vented through the tank

Dates

- Dec. 21, 1990 or the facility effective date
  - Initial waste stream organic concentration determination
  - Initial process vent organic emission rate determination
  - Identify and designate all equipment process vents in log
  - Have installation schedule written for closed-vent and control devices
  - Complete initial sampling and monitoring
- June 21, 1992 or 18 months after effective date
  - All closed-vent systems and control devices must be installed

Pre-Inspection Procedures

- Review permit and its status
- Information in permits/applications
  - Units
  - Waste streams – types and test methods
  - Equipment identification numbers, designation
- Previous inspection reports
  - Equipment with prior problems
  - Facility schematic and flow chart diagrams
  - From CAA benzene rule
- Discussions
  - With permit writers
  - With other inspectors
  - With CAA benzene rule inspectors

Pre-Inspection Procedures (Cont'd.)

- Review reports by facility
  - Semi-annual report
    - Equipment I.D. number for equipment not repaired, 5/15
    - Dates of unit shutdowns
    - Dates with operating exceedances
  - Notification to Regional Administrator to use alternative standards for valves

Field Inspection

Facility Interview

- Interview with facility representatives
  - Operating history of units/equipment
  - Changes to process or waste streams
  - Schematic/flow diagram with equipment I.D. numbers
  - Implementation schedule/plan for control device installation before 12/21/90 or applicable date
  - Equipment identified/designated
  - Initial and annual waste stream analyses in unit lines

Field Inspection (Cont'd.)

Facility Interview (cont'd)

- Verify checklist entries for changes
- Review of facility test results
  - Performance tests for emission rates
  - Process vent tests for 10 ppmv
  - Equipment tests for 10%
  - Light vs heavy, gas/vapor determinations

Field Inspection (Cont'd.)

Walk-Through and Monitoring

- *Inspect each piece of equipment*
  - Look for indication of leak such as visual, smell, alarm or sensor
  - Check date of tag for repair (5/15)
  - Check recording devices for control devices
- Monitoring
  - Use Method 21 for NDE and 10,000 ppm leaking levels
  - May want to have facility do their monthly monitoring at this time
- Note any equipment on line not identified in facility records, inconsistencies, or operational variances

Field Inspection (Cont'd.)

Record Review at Facility

- Review facility operating record
  - Weekly/monthly inspection records
  - Monthly alarm test records
  - Monthly Method 21 monitoring dates and results
  - LDAR procedure results
  - Compliance with Phase I Rule

Field Inspection (Cont'd.)

Close-Out Meeting

- Address concerns raised during inspection, as appropriate
- Complete checklists
- Miscellaneous matters

Follow-Up Procedures

- Inspection report
- Enforcement action if violations are found or determined

Identification and Documentation of Violations

- Types of violations – ten categories of violations
  - Equipment
  - Permits
  - Control devices
  - Emission levels
  - Analysis methods/performance tests
  - Reporting
  - Recordkeeping
  - Repair/maintenance
  - Monitoring
  - Inspections
- Use of checklist
  - There are over 100 separate violations in Parts 264/265 AA and BB

Types Of Violations

- Waste analysis and emission rate determination
  - Initially, annual, correctly, test plans
- Equipment and closed vent/control devices
  - Identified, designated, marked, design criteria and parameters for operation
- Closed vent/control devices
  - Installed or implementation plan
- Inspection
  - Visually, by sensor or alarm
- Monitoring
  - Emissions
    - within 5 days of leak, monthly, annually and initially
  - Parameter for process vents and control devices
    - temperature
    - flow indicator once an hour
    - other parameter as specified

Types Of Violations (cont'd)

- Repair
  - Equipment
    - 5/15 or delay
    - tagged
  - Process vents
    - immediately and complete by 15 days
- Everything put in the record
- Reports
  - Semi-annual reports if needed
  - RA not notified about alternative value management

Checklist
Process Vents Applications
Part 264/265 AA

General

1. Does the facility need authorization under RCRA Section 3005?

   1a. Facility status, interim or final?

   1b. Effective date for the facility: Dec. 21,1990 or permit renegotiation.

   1c. Have these rules been incorporated into Part B application submittal?

2. Hazardous waste management units using:

	permitted unit # or recycling unit #	waste stream #	vent #
separation			
distillation			
fractionation			
thin-film evaporation			
solvent extraction			
air stripping			
steam stripping			
waste streams			

   2a. Are any of the units RCRA exempt units?

Waste Streams

3. Which of the waste streams, contain 10 ppmw or greater organics concentration?

   3a. Method of determination? knowledge, 9060, or 8240

   3b. Date of initial determination

   3c. Dates of other analysis? annually, change to stream

   3d. Annual Average Concentration calculated correctly?

3e. Analysis had 4 grab samples, collected at entry to separation unit.

3f. Which of the process vents are considered?

Performance Standards

4. Hourly process vent organic emission rate => 3 lb/hr

4a. Method of determination; knowledge, Method 2, 18

4b. If Method 2 and 18, was test plan prepared and on record?

4c. Has owner/operator signed statement that test conditions portray worst case actual operating conditions?

4d. Dates of tests or calculations: initially, annually or at change?

4e. Check calculations
data needed: flow rate, org. conc., avg mole wt.

4f. Is yearly facility organic emission rate => 3 tons/yr?

4g. Check calculations
data needed: hourly rate, no. of operating hours

5. Is emission reduction required?

5a. Which method will they use to comply?

Install control devices to reduce emissions below 3 lb/hr and 3.1 tons/yr.

Implement process changes or hours to meet 3 lb/hr and 3.1 ton/yr.

Install control device to reduce emissions by 95%.

5b. For each process vent covered, identify closed-vent, and control device #.

(Use individual control device worksheets to continue inspection)

5c. For facilities that don't have control devices installed, do they have an installation plan?

5d. Is their projected date for installation and compliance 18 months after the facility effective date?

Checklist
Process Vents Applications
Part 264/265 AA

Identification of Facility Vents and Control Devices

Vent #	Control Device	CD #	Unit #
	Condenser	_____	_____
	Adsorber (Regen)	_____	_____
	Adsorber (Nonreg)	_____	_____
	Process Heater	_____	_____
	Boiler	_____	_____
	Catalytic Vapor Incinerator	_____	_____
	Thermal Vapor Incinerator	_____	_____
	Air Assisted Flare	_____	_____
	Steam Assisted Flare	_____	_____
	Nonassisted Flare	_____	_____

Condenser

Standard:
=> 95 wt% efficiency or
=> emission limits of 3 lb/hr and 3.1 tons/yr

Monitoring: A and either B or C
A. flow indicator
records hourly _____
installation point _____
daily inspection _____

B. [organic compd] in condenser exhaust vent stream
continuously record _____
daily inspection _____

C. temperature monitoring device
continuously record _____
two locations:
exhaust vent stream from condenser _____
coolent fluid exiting the condenser _____
accuracy:
+/- 1% of Temp being monitored or _____
.5 degrees C (whichever is greater _____
inspect daily _____

Repair:
immediately upon daily inspection _____

Recordkeeping: A, B, and C

A. Emissions reductions from condenser i or ii
i. Based on tests _____
test plan _____
design flow rate _____
design organic content _____
ranges of other parameters _____
insure using highest capacity loading _____
manufactures name, model number _____
type of control device _____
dimensions of control device _____
capacity _____
construction materials _____
description of sampling and monitoring _____
locations _____
equipment to be used _____
frequency _____
analytical procedures for analysis _____
all performance test results _____

ii. Based on engineering calculations _____
list of all reference and sources _____
dates of closed-vent monitoring _____
design analysis, specs, drawings, piping
(vendor info ok) _____
condenser parameters _____
vent stream composition _____
constituent concentration _____
flow rate _____
relative humidity _____
temperature _____
design outlet (organic compd) level _____

design average T of cond. exhaust vent stream _____
design avg. T of coolent fluid at inlet, outlet _____
owner/operator statements _____
realistic paramters used for high load, capacity _____
device designed to operate at 95% removal eff. _____
unless it reduces [organic] < 10 ppmw or unless it mets 3 lb/hr and 3.1 tons/yr _____

B. General Device Information
description and date of any modifications to CV/CD _____
id operating parameters _____
describe monitoring device _____
diagram of monitor sensor location _____
dates on device start up and shutdown _____

C. Exceedances:
if monitoring [organic] in exhaust:
when [organic] > 20% above design outlet [organic] _____
if monitoring T:
either T exhaust > 6 deg above design avg exhaust T _____
or T coolent out > 6 deg above design avg coolent T _____
cause of exceedance _____
measures taken to correct it _____

Closed-vent system _____
standard: No Detectable Emissions and no visual emissions _____
monitor: At facility effective date _____
Annually _____
RA requested times _____
repair: 5/15 _____

Catalytic Vapor Incinerator

Standard:
=> 95 wt% efficiency or
[TOC] = 20 ppmw, based on summation of compds, dry basis, 3% O2 or
RTm = .5 seconds at => 760 deg C

Monitoring: A and B
A. flow indicator
records hourly _____
installation point _____
daily inspection _____

B. temperature monitoring device
continuously record _____
two locations:
exhaust vent stream from condenser _____
coolent fluid exiting the condenser _____
accuracy:
+/- 1% of Temp being monitored or _____
.5 degrees C (whichever is greater _____
inspect daily _____

Repair:
immediately upon daily inspection _____

Recordkeeping: A, B, and C

A. Emissions reductions from condenser i or ii
i. Based on tests _____
test plan _____
design flow rate _____
design organic content _____
ranges of other parameters _____
insure using highest capacity loading _____
manufactures name, model number _____
type of control device _____
dimensions of control device _____
capacity _____
construction materials _____
description of sampling and monitoring _____
locations _____
equipment to be used _____
frequency _____
analytical procedures for analysis _____
all performance test results _____

ii. Based on engineering calculations
list of all reference and sources _____
dates of closed-vent monitoring _____
design analysis, specs, drawings, piping (vendor info ok) _____

3e. Analysis had 4 grab samples, collected at entry to separation unit. _____

3f. Which of the process vents are considered?
adsorber parameters _____
vent stream composition _____
constituent concentration _____
flow rate _____
design min. T across cat. bed inlet, outlet _____
design avg. T across cat. bed inlet, outlet _____
owner/operator statements _____

realistic paramters used for high load, capacity _____

device designed to operate at 95% removal eff. _____

unless it reduces [organic] < 10 ppmw or unless it mets 3 lb/hr and 3.1 tons/yr _____

B. General Device Information

description and date of any modifications to CV/CD id operating parameters _____

describe monitoring device _____

diagram of monitor sensor location _____

dates on device start up and shutdown _____

C. Exceedances:

T inlet > 28 deg C below design avg. T inlet _____

T diff. across bed < 80% design avg. T difference _____

cause of exceedance _____

measures taken to correct it _____

Closed-vent system

standard:	No Detectable Emissions and no visual emissions	_____
monitor:	At facility effective date	_____
	Annually	_____
	RA requested times	_____
repair:	5/15	_____

Thermal Vapor Incinerator

Standard:
- => 95 wt% efficiency or
- [TOC] = 20 ppmv based on sum of compd.,dry basis, 3% O2
- RTmin = .5 sec where => 760 deg C

Monitoring: A and B

A. flow indicator
- records hourly _____
- installation point _____
- daily inspection _____

B. temperature monitoring device
- continuously record _____
- one location:
  - in combustion chamber downstream of combustion zone _____
- accuracy:
  - +/- 1% of Temp being monitored or _____
  - .5 degrees C (whichever is greater) _____
- inspect daily _____

Repair:
- immediately upon daily inspection _____

Recordkeeping: A, B, and C

A. Emissions reductions from condenser i or ii
- i. Based on tests _____
  - test plan _____
    - design flow rate _____
    - design organic content _____
    - ranges of other parameters _____
    - insure using highest capacity loading _____
    - manufactures name, model number _____
    - type of control device _____
    - dimensions of control device _____
    - capacity _____
    - construction materials _____
    - description of sampling and monitoring _____
      - locations _____
      - equipment to be used _____
      - frequency _____
      - analytical procedures for analysis _____
  - all performance test results _____

ii. Based on engineering calculations _____
list of all reference and sources _____
dates of closed-vent monitoring _____
design analysis, specs, drawings, piping (vendor info ok) _____
incinerator parameters _____
vent stream composition _____
constituent concentration _____
flow rate _____
design min. T in combustion zone _____
design avg. T in combustion zone _____
RT in combustion zone _____
owner/operator statements _____
realistic paramters used for high load, capacity _____
device designed to operate at 95% removal eff. _____
unless it reduces [organic] < 10 ppmw or
unless it meets 3 lb/hr and 3.1 tons/yr

B. General Device Information
description and date of any modifications to CV/CD _____
id operating parameters _____
describe monitoring device _____
diagram of monitor sensor location _____
dates on device start up and shutdown _____

C. Exceedances:
if monitoring RT min: _____
when T < 760 deg C _____
if standard 95% eff: _____
when T conb zone > 28 deg C below design avg. _____
comb. zone T _____
cause of exceedance _____
measures taken to correct it _____

Closed-vent system
standard: No Detectable Emissions and no visual emissions _____
monitor: At facility effective date _____
Annually _____
RA requested times _____
repair: 5/15 _____

Boiler/Process Heater

Standard:
- => 95 wt% efficiency or
- [TOC] = 20 ppmv based on sum of compd, dry basis, 3% O_2
- RTmin = .5 sec with T => 760 deg C
- and vent stream must enter flame combustion zone of B/ph

Monitoring: A and B

A. flow indicator
- records hourly _____
- installation point _____
- daily inspection _____

If design heat input capacity < 44 MW _____

B. temperature monitoring device
- continuously record _____
- one location:
  - in furnace downstream of combustion zone _____
- accuracy:
  - +/- 1% of Temp being monitored or _____
  - .5 degrees C (whichever is greater) _____
- inspect daily _____

If design heat input capacity => 44 MW
- continuously record _____
- paramter that indicates good combustion practices _____
- inspect daily _____

Repair:
- immediately upon daily inspection _____

Recordkeeping: A, B, and C

A. Emissions reductions from condenser i or ii
- i. Based on tests _____
  - test plan _____
    - design flow rate _____
    - design organic content _____
    - ranges of other parameters _____
    - insure using highest capacity loading _____
    - manufactures name, model number _____
    - type of control device _____
    - dimensions of control device _____
    - capacity _____
    - construction materials _____
    - description of sampling and monitoring _____
      - locations _____
      - equipment to be used _____
      - frequency _____
      - analytical procedures for analysis _____
  - all performance test results _____

ii. Based on engineering calculations
- list of all reference and sources _____
- dates of closed-vent monitoring _____
- design analysis, specs, drawings,piping (vendor info ok) _____
- B/ph parameters _____
  - vent stream composition _____
  - constituent concentration _____
  - flow rate _____
  - design min. flame zone T _____
  - design avg. flame zone T _____
  - combustion zone RT _____
- description of method and location where vent stream goes in combusiton zone _____
- owner/operator statements _____
  - realistic paramters used for high load, capacity _____
  - device designed to operate at 95% removal eff. _____
    - uless it reduces [organic] < 10 ppmw or
    - unless it mets 3 lb/hr and 3.1 tons/yr

B. General Device Information
- description and date of any modifications to CV/CD _____
- id operating parameters _____
- describe monitoring device _____
- diagram of monitor sensor location _____
- dates on device start up and shutdown _____

C. Exceedances:
- T flame zone > 28 deg C below disign avg. flame zone T _____
- position changes where vent stream is introducted _____
- cause of exceedance _____
- measures taken to correct it _____

Closed-vent system
- standard: No Detectable Emissions and no visual emissions _____
- monitor: At facility effective date _____
  - Annually _____
  - RA requested times _____
- repair: 5/15 _____

Flares

Standard:
- no visible emissions > 5 minutes/any consecitive hrs
- flame present at all times
- if steam-assisted:
  - Ve < 60 ft/s and Ht > 300 BTU or
  - 60 ft/s <Ve< 400 ft/sec and Ht > 1000 BTU
  - Ve < Vmax < 400 and Ht > 300 BTU
- if air-assisted:
  - Ve < Vmax and Ht => 300 BTU or
  - Ve < 60 ft/sec and Ht => 300 BTU
- if non-assisted:
  - Ve < 60 ft/sec and Ht => 200 BTU or
  - 60 < Ve < 400 ft/sec and Ht > 1000 BTU
  - Ve < Vmax < 400 and Ht > 200 BTU

Monitoring: A and B

A. flow indicator
- records hourly _____
- installation point _____
- daily inspection _____

B. heat sensing device for continuous ignition of pilot flame
- continuously record _____
- inspect daily _____

Repair:
- immediately upon daily inspection

Recordkeeping: A, B, and C

A. Emissions reductions from condenser i or ii
- i. Based on tests _____
  - test plan _____
    - design flow rate _____
    - design organic content _____
    - ranges of other parameters _____
    - insure using highest capacity loading _____
    - manufactures name, model number _____
    - type of control device _____
    - dimensions of control device _____
    - capacity _____
    - construction materials _____
    - description of sampling and monitoring _____
      - locations _____
      - equipment to be used _____
      - frequency _____
      - analytical procedures for analysis _____
  - all performance test results _____

ii. Based on engineering calculations
- list of all reference and sources _____
- dates of closed-vent monitoring _____
- design analysis, specs, drawings, piping (vendor info ok) _____
- flare parameters _____
  - vent stream composition _____
  - constituent concentration _____
  - flow rate _____
  - no visible emissions _____
  - flame present _____
  - Ht _____
  - Ve _____
- owner/operator statements
  - realistic paramters used for high load, capacity _____
  - device designed to operate at 95% removal eff. _____
    - uless it reduces [organic] < 10 ppmw or
    - unless it mets 3 lb/hr and 3.1 tons/yr

B. General Device Information
- description and date of any modifications to CV/CD _____
- id operating parameters _____
- describe monitoring device _____
- diagram of monitor sensor location _____
- dates on device start up and shutdown _____

C. Exceedances:
- period when pilot flame is not ignited _____
- cause of exceedance _____
- measures taken to correct it _____

Closed-vent system

standard:	No Detectable Emissions and no visual emissions	_____
monitor:	At facility effective date	_____
	Annually	_____
	RA requested times	_____
repair:	5/15	_____

Carbon Adsorber System- Regenerative

Standard:
- => 95 wt% efficiency or
- => emission limits of 3 lb/hr and 3.1 tons/yr

Monitoring: A and either B or C
- A. flow indicator
  - records hourly _____
  - installation point _____
  - daily inspection _____
- B. [organic compd] in carbon bed exhaust vent stream
  - continuously record
  - daily inspection _____
- C. device to measure a parameter that indicates regeneration
  - on a regular, predetermined time cycle _____
  - continuously record _____
  - inspect daily _____
- D. replace carbon at regualr, predetermined time interval
  - that is < carbon service life _____

Repair:
- immediately upon daily inspection

Recordkeeping: A, B, and C
- A. Emissions reductions from condenser i or ii
  - i. Based on tests _____
    - test plan _____
      - design flow rate _____
      - design organic content _____
      - ranges of other parameters _____
      - insure using highest capacity loading _____
      - manufactures name, model number _____
      - type of control device _____
      - dimensions of control device _____
      - capacity _____
      - construction materials _____
      - description of sampling and monitoring _____
        - locations _____
        - equipment to be used _____
        - frequency _____
        - analytical procedures for analysis _____
    - all performance test results _____

ii. Based on engineering calculations
- list of all reference and sources _____
- dates of closed-vent monitoring _____
- design analysis, specs, drawings, piping (vendor info ok) _____
- adsorber parameters _____
  - vent stream composition _____
  - constituent concentration _____
  - flow rate _____
  - relative humidity _____
  - temperature _____
  - design outlet [organic compd] level _____
  - no. and capacity of beds _____
  - type and working capacity of act. Carbon for beds _____
  - design total stream flow over period of each complete carbon bed regenerative cycle _____
  - duration of carbon bed steaming and cooling/drying cycles _____
  - design carbon bed T after regeneration _____
  - design carbon bed regeneration time _____
  - design service life of carbon _____
- owner/operator statements
  - realistic paramters used for high load, capacity _____
  - device designed to operate at 95% removal eff. _____
    uless it reduces [organic] < 10 ppmw or
    unless it mets 3 lb/hr and 3.1 tons/yr

B. General Device Information
- description and date of any modifications to CV/CD _____
- id operating parameters _____
- describe monitoring device _____
- diagram of monitor sensor location _____
- dates on device start up and shutdown _____
- date when existing carbon is replaced _____

C. Exceedances:
- if [organic compd]:
  - [org] exhaust > 20% above design exhaust vent stream [org] _____
- if parameter for regen. on regular cycle _____
  - flow continuos past predetermined reg. time _____
- cause of exceedance _____
- measures taken to correct it

Closed-vent system
- standard: No Detectable Emissions and no visual emissions _____
- monitor: At facility effective date _____
  Annually _____
  RA requested times _____
- repair: 5/15 _____

Carbon Adsorber- Nonregenerative

Standard:
- => 95 wt% efficiency or
- => emission limits of 3 lb/hr and 3.1 tons/yr

Monitoring: A and either B or C
- A. flow indicator
  - records hourly _____
  - installation point _____
  - daily inspection _____
- B. [organic compd] in exhaust vent stream
  - monitor on regualr basis _____
  - inspect daily or at time < 20% time carbon life (which is longer) _____
  - replace carbon when this indicates need _____
- C. replace carbon at regular predetermined time interval less than design carbon replacement interval _____

Repair:
- immediately upon daily inspection _____

Recordkeeping: A, B, and C
- A. Emissions reductions from condenser i or ii
  - i. Based on tests _____
    - test plan _____
      - design flow rate _____
      - design organic content _____
      - ranges of other parameters _____
      - insure using highest capacity loading _____
      - manufactures name, model number _____
      - type of control device _____
      - dimensions of control device _____
      - capacity _____
      - construction materials _____
      - description of sampling and monitoring _____
        - locations _____
        - equipment to be used _____
        - frequency _____
        - analytical procedures for analysis _____
    - all performance test results _____
  - ii. Based on engineering calculations _____
    - list of all reference and sources _____
    - dates of closed-vent monitoring _____
    - design analysis, specs, drawings, piping (vendor info ok) _____
    - parameters _____
      - vent stream composition _____
      - constituent concentration _____
      - flow rate _____
      - relative humidity _____
      - temperature _____

design outlet [organic compd] level _____
capacity of carbon bed _____
type and working capacity of act. carbon in bed _____
design carbon replacement interval based on total carbon working capacity of CD and source operating schedule _____

owner/operator statements
realistic paramters used for high load, capacity _____
device designed to operate at 95% removal eff. unless it reduces [organic] < 10 ppmw or unless it mets 3 lb/hr and 3.1 tons/yr _____

B. General Device Information
description and date of any modifications to CV/CD _____
id operating parameters _____
describe monitoring device _____
diagram of monitor sensor location _____
dates on device start up and shutdown _____
date when carbon is replaced _____

C. Exceedances:
if monitoring [organic] in exhaust:
date and time when monitored fro breakthru and [ ] reading _____
date when carbon is replaced with fresh carbon _____
cause of exceedance _____
measures taken to correct it _____

Closed-vent system
standard: No Detectable Emissions and no visual emissions _____
monitor: At facility effective date _____
Annually _____
RA requested times _____
repair: 5/15 _____

Checklist
Equipment Leak Applications
Part 264/265 BB

General

1. Does the facility need authorization under RCRA Section 3005?

   1a. Facility status: interim or final permit?

   1b. Effective date for the facility: Dec 21,1990 or permit renegotiation?

Waste Streams

2. Identify all hazardous waste streams by storage tank #.

   2a. Which of the above HW streams contain at least 10% organics by weight?

   2b. Method of determination? knowledge, ASTM Methods D2267-88, E169-87, E168-88, E260-85 or Method 9060 or 8240

   2c. If knowledge, is it documented?

   2d. Date of initial determination

   2e. Dates of other analysis? annual, change, batch

3. For each waste stream that does qualify, determine fluid type. gas/vapor service, light-liquid service, heavy liquid service

   3a. Method for determining light liquid service.
   vapor pressures of constituents from standard texts
   ASTM D-2879-86

4. For each waste stream that does qualify, list the equipment that contains or contacts the HW?

5. Delete the equipment which is in vacuum service?

6. Delete the equipment associated with exempt units?

7. Do they have a list of equipment under this rule?

8. List the id numbers of NDE equipment with signature of owner/operator.

9. List of PRD in gas/vapor service.

10. Dates of test for NDE
    Background level
    Maximum instrument reading

11. List of ID numbers for equipment in vacuum service

12. List of ID numbers of "unsafe-to-monitor" and "difficult-to-monitor" valves, with explanation for each and plan for monitoring or schedule.

13. For skip period valves.

    13a. Schedule of monitoring.

    13b. Percent found leaking during each monitoring period.

Identification of Equipment Covered by Rule

Equipment	Equipment Id #	Waste Stream #	Fluid
Pumps			
general			
dual mechanical			
NDE (sealless)			
closedvent/control device			
Compressors			
general			
NDE Sealless			
CV/Control Device			
Pressure Relief Devices			
general			
CV/Control Devices			
Sampling Connecting Systems			
general			
Valves			
general			
leakless			
unsafe to monitor			
difficult to monitor			
alter allowable %			
alter. skip period LDRP			
Closed-Vent/Control Devices			
general			
vapor recovery			
condenser			
regeneration adsorber			
non reg. adsorber			

Identification of Equipment Covered by Rule (cont'd)

Equipment	Equipment Id #	Waste Stream #	Fluid
enclosed combustion			
process heater			
boiler			
catalytic vapor incinerator			
thermal vapor incinerator			
flares			
air assisted			
steam assisted			
nonassisted			

Recordkeeping

unit #
equipment id #
location
type of equipment
% wt. TOC at equipment
fluid state at equipment
designated method for compliance

Leak Recordkeeping

monitoring requipment id #
operators id
date of visual, audible, olfactory indication of leak
date of leak detection
date of repair attempt
repair methods at each attempt
"above 10,000"
"repair delayed" if after 15 days
documentation of valve repair delay
signature of person approving delay
expected date of repair

Physical Inspection

indication of leak by visual, audible or olfactory mean
monitoring equipment id #
calibration correct
operators id
correct monitoring techniques used
Method 21 results
tagged placed on if leak detected
if equipment already has tag:
    date leak detected
    date of expected repair or repair

Valves Gas/Vapor or Liquid Service

general
1. monitored monthly by Method 21
2. 10,000 ppm means a leak
3. two successive months without a leak, monitor first month or each quarter, after leak return to monthly monitoring
4. repair 5/15 or delay or repair

NDE
1. designated NDE in operating record
2. has no external actuating mechanism in contact with HW
3. meets NDE by Method 21 (500 ppm + bkgd)
4. initially tested by Dec. 21, 1990 and annually (or as RA specifies)

"Unsafe to Monitor"
1. designated as such in operating log
2. appers that monitoring personnel would be exposed to immediate danger
3. owner has a written plan to monitor during safe times

"Difficult to Monitor"
1. designated as such in opeating record
2. valve locatio requires personnel to climb over 2 meters above support
3. unit was in operating before June 21, 1990
4. owner has written plan to monitor at least once a year

Percentage % Allowed to leak (2%)
1. owner has notified RA that they will use this method
2. a performance test of all valves in unit during the same week by Dec. 21, 1990 by Method 21
3. repair 5/15 or delay of repair
4. % leaking calculated by:

$$\frac{\text{\# valves subject to rule leaking}}{\text{\# valves subject to rule within the unit}}$$

Skip Period
1. owner notified RA to use this portion
2. can skip one quarterly leak detection after 2 consecutive quarterly monitoring with 2% or less leaking
3. after 5 consecutive monitoring periods at 2% or less, can skip 3
4. return to monthly monitoring if exceed 2%

Heavy Liquid Service

general
1. Monitored by Method 21 within 5 days of indication of leak by sight, smell, or alarm
2. 10,000 ppm means a leak
3. repair 5/15 or delay of repair

Pumps Light Liquid Service

general
1. monitor monthly by Method 21
2. inspect visually weekly for leaks
3. leak is 10,000 ppm or above or a visual indication
4. repair 5/15 days

mechanical seal system
1. has one of the following:
   a) barrier fluid pressure above stuffing box pressure
   b) has barrier fluid degassing reservoir to CV-CD
   c) purges barrier fluid into HW stream with NDE to air
2. barrier fluid must not be HW with organics > 10%
3. barrier system must have sensor for failure of sys. or seal system
4. visual inspection weekly
5. daily check on sensor or audible alarm checked monthly
6. criterion must be set for failure for sensor
7. failure of sensor means a leak
8. repair 5/15 days

no detectable emissions
1. have no externally actuated shaft penetrating the pump housing
2. operate with NDE by Method 21 (500 ppm + bkg)
3. tested initially, annually and any other time by RA

equipped with closed vent system to control device
1. meets control device requirements of the process vent rule

Heavy Liquid Service
1. monitor within 5 days of potential leak determination by visual, audible, or olfactory method
2. leak is 10,000 ppm by Method 21
3. repair 5/15

Sampling Connecting System

1. does it have closed vent or closed purge system
2. do these systems (pick one)
   a) return purged HW to process line with NDE
   b) collect and recycle purged HW with NDE
   c) capture and transport all purged HW to control device (see control device for requirements)
3. has design, documentation, monitoring, operating and inspections been recorded and kept up to date in operating record

Open-ended valves or lines

general

1. is it equipped with cap, blind flange, plug or second valve which is on at all times execpt during the use of the line or valve
2. if second valve is used, must be closed after open-ended valve is closed
3. if doulble block and bleed system is used, the bleed valve or line may remain open during operations that require venting the line between the block valves, but must be closed at all other times.

Flanges and Other Connectors

general

1. have they monitored within 5 days of evidence of potential leak by visual, sound or smell.
2. 10,000 ppm means a leak
3. repair 5/15 or delay of repair

Pressure Relief Devices

gas/vapor service

1. operating with NDE as measured by Method 21
2. after release, return to NDE within 5 days
3. monitor within 5 days of release by Method 21

or

2. is it equiped with closed-vent, control device (Hooded)
3. design, monitoring of control device in facility operating record

light liquid or heavy liquid service

1. monitored by Method 21 within 5 days of visual, smell, audible indications of potential leak
2. over 10,000 ppm means a leak
3. repair 5/15

Closed-vent systems

1. meet NDE emissions requirements of 500ppm + bkgd using Method 21
2. monitor initially by Dec 21, 1990 (or when control devices installed) and annually or other by RA
3. detectable emissions by method 21 or visual
4. repair 5/15

Compressors

general

1. has a seal system with barrier fluid system
2. a) barrier fluid pressure greater than compressor stuffing box pressure or
   b) barrier fluid system with closed-vent to control device (see CVCD) or
   c) has a barrier fluid purge system for NDE
3. barrier fluid is not HW with 10% by weight or greater organics
4. equiped with sensor to detect failure of seal system and/or barrier fluid system
5. a) sensor checked daily or
   b) sensor with audible alsarm checked monthly or
   c) sensor with audible checked daily if at unmanned site
6. operator has set criterion for sensor failure
7. senosr idcicates failure means leak
8. repair 5/15

Closed-vent and control device (Hooded)

1. see CVCD requirements

NDE

1. is it meeting NDE by Method 21
2. was it certified NDE initally

PROCESS VENTS CASE STUDY

GOOD GUYS DISPOSAL COMPANY

Good Guys Disposal Company is a TSD facility with a final permit. Applicable portions of the air rule were included when their permit was re-issued on April 17, 1991. Their original permit was issued November 1990. They have two unit operations, an incinerator and a distillation unit. The wastes are generated off site and transported to GGD by rail car and tank truck.

The date of your inspection is January 14, 1993.

Permit Information: Issued April 17, 1991

Unit operations:
1. distillation
2. incineration

Storage tanks:
1. TOC = 120,000, light liquid, 200 million gallons/yr
2. TOC = 8 ppm, light liquid, 56 million gallons/yr
3. TOC = 450 ppm, heavy liquid, 35 million gallons/yr
4. TOC = 150,000, light liquid, 98 million gallons/yr
5. TOC = 160,000 ppm, light liquid, 45 million gallons

Vents at Facility: 8

Pumps: 5

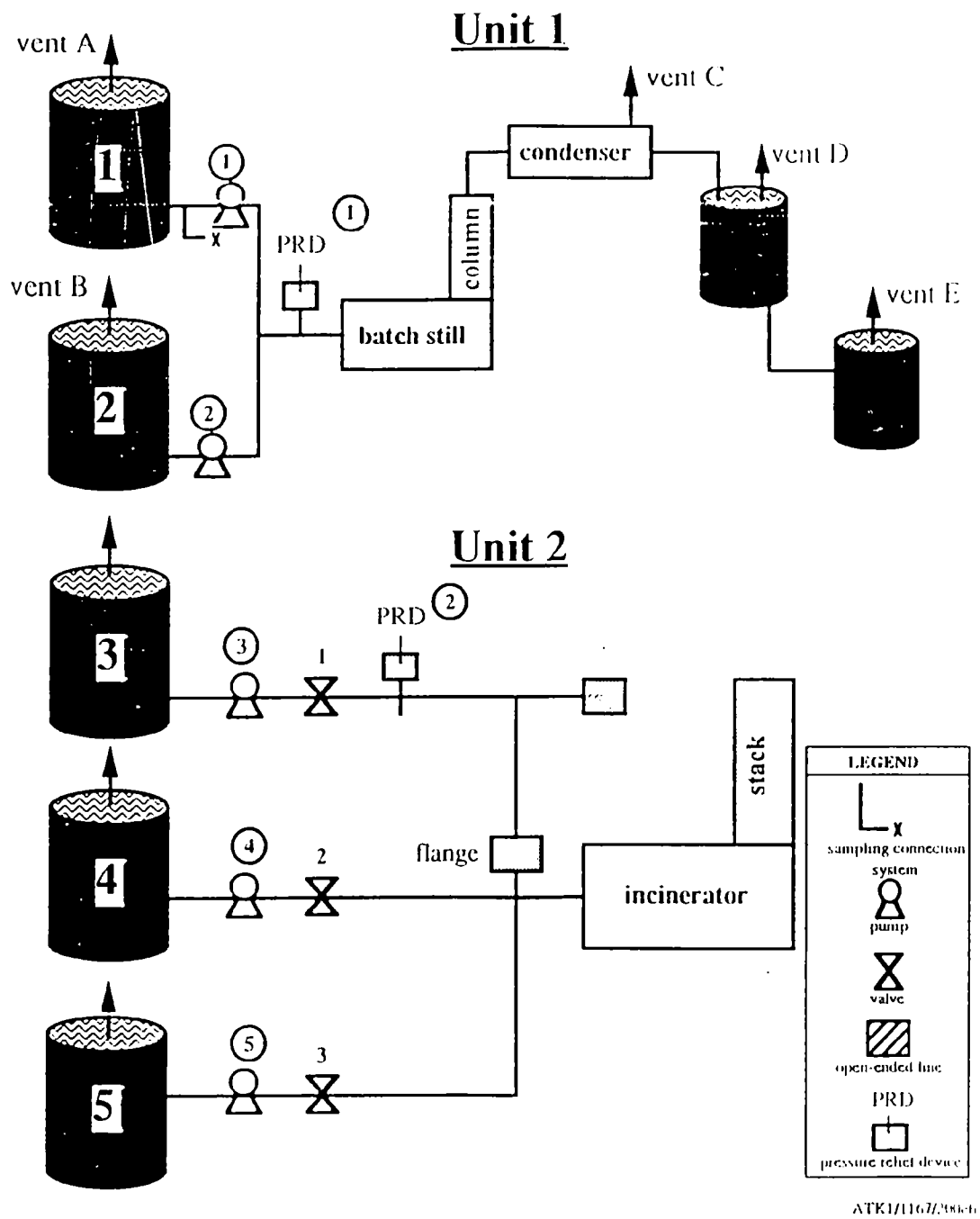
Valves: 3

Pressure Relief Devices: 2

Sampling Connection System: 1

Open-ended Line: 1

Facility: Good Guys Disposal Co.



Operating Record

Pumps:
- 1, 2 NDE
- 3 mech. dual seal
- 4, 5 general

Valves:
- 1, 2 general
- 3 leakless

PRD:
- both are closed vent/control device

TOC analysis:
- Initially conducted April 1, 1991
- Last one was April 1, 1992
- Method used: 9060

Fluid type conducted at the same time as TOC by vapor pressure knowledge

Statement that control device reduces emission by 95%

Monitoring:
- flow indicator records daily
- temperature at two locations, recorded daily, inspected weekly
- all correct general device information is included
- design avg exhaust T is 150°
- recorded on device a 175°

Weekly visual inspection of pumps and valves

Monthly monitoring of all pumps and valves

Monthly monitoring of all pumps and valves
Valve 2 was found leaking on Dec 12 and repaired by Jan 1

Your walk through:
- no tag on valve 2
- dripping at pump #4

QUESTIONS*

1. What is their effective date for these rules?

2. Based on the TOC concentrations of the storage tanks, which waste lines are we concerned with under the equipment leaks rule?

3. Which units fall under the process vent rule?

4. Which vents would we be concerned with here?

5. If the operating record only listed TOC values (or documentation) for units above 10 ppm, would they be in compliance?

6. What lists must be in the permit (or application) and record?

7. How often do waste stream analyees have to be done, are they in compliance here: what if distillation uses batch waste streams?

8. List the equipment under the leak rule.
Is PRD #1 covered and, if not, when would it be?

9. Assume this facility adds another unit to their operations. This new unit and its vents fall under the process vent rule. The following are the emissions rates, both hourly (En) and yearly(Ey), for the existing unit (Unit 1) and the new unit (Unit 3):

	En	Ey
Unit 1	1.6 lb/hr	1.7 tons/yr
Unit 3	2.5 lb/hr	2.6 tons/yr
Total for facility	4.1 lb/yr	4.3 tons/yr

If the facility installs only one control device on one of these two units, is it possible for the facility to be in compliance?

10. During your walk through of the facility, you observe the following:
no tags on any equipment
dripping from pump #4
flow indicator records daily
temperature indicator records hourly
exhaust temperature is 175° and has been for 48 hours
The previous leak detection was valve #2 on Dec 12, 1992
and repaired on Jan. 1, 1993.

What violations have you found?

11. If their records showed that pump #4 had been leaking on Dec. 12 and repaired by Dec. 20, would seeing dripping from the pump at this time be a violation?

12. What action is required based on what you saw on the walk through?

* For questions 1-9, assume the condenser is associated with the distillation unit.
For questions 10-13, assume the condenser has been added as a control device.

Leak Detection Monitoring

Leak Detection Levels
Types of Equipment
Equipment Preparation – General & Specific
Equipment Usage

Leak Detection Monitoring

- Learning Objective
  - Understand various emission levels signifying a leak
  - Understand the various types of equipment that can be used for leak detection monitoring
  - Understand the limitations of each type of leak detection monitoring equipment
  - Understand how to use the leak detection equipment – pre-check, calibration, field use considerations

Leak Detection Levels

- NDE – 500 ppm above background
- 10,000 ppm – 1%

Leak Detection Levels For Regulated Pieces Of Equipment*

Equipment	Service		
	Gas/Vapor	**Light Liquid**	**Heavy Liquid**
Pressure relief devices	NDE	10,000ppm	10,000ppm
Closed-vent systems	———	NDE	———
Compressors with seals	———	NDE	———
Pumps	-	10,000ppm	10,000ppm
Valves	———	10,000ppm	———
Flanges and other connectors	———	10,000ppm	———
Sampling connecting systems	——— equipment with closed-purge or closed-vent system - NDE ———		
Open-ended valves or lines	——— equipment with cap, blind flange, plug or second valve ———		

* *Frequency: Closed-vent systems – annual; all others – monthly*
Action: PRD in gas/vapor – 0i5, M 21; all others – 5i15, wg

Leak Detection Levels

- Method 21
  - 40 CFR Part 60, Appendix A – 3 pages; June 22, 1990 Federal Register (55 FR 25602)
  - Locator/confirmation of leaks, not quantifier of emission rates
  - Makes use of portable VOC analyzers
  - General guidance for
    - definitions
    - monitoring instruments (specifications, performance criteria)
    - calibration gases and procedures
    - sampling techinques: location for sampling for pieces of equipment for NDE and "leaks based on concentrations"
    - instrument evaluation procedures

Method 21

- Key Provisions
  - 1.1 – Identifies applicable equipment
  - 1.2 – No instruments are identified BUT all instruments must meet specifications
  - 2.0 – Definitions
  - 3.1.1 – Instrument specification
    a. 4 types identified
    b. Instruments must be capable of measuring concentrations in rules
    c. Meter readability = ± 2.5 percent of concentration
    d. Flow rate = 0.1 – 3 liters/minute
    e. Intrinsically safe, safety devices shall not be removed
    f. Probe diameter
  - 3.1.2 – Instrument performance
    a. Response factor < 10
    b. Response time ≤ 30 seconds
    c. Calibration precision < 10 percent
    d. Evaluation procedures – Section 4.4

Method 21

- Key Provisions (Cont'd)
  - 3.1.3 – Performance evaluation requirements
    a. Response factor – reference or by measurement
    b. Frequency of calibration test
    c. Response time test
  - 3.2 – Calibration gases
  - 4.0 – Procedures
    1. Pretest
    2. Calibration
    3. Sampling – to get background: 25 cm
    4. Instrument evaluation procedures
       Response factor, calibration precision,
       response times – 3 measurements for each element

Calibration Gases And Procedures

- Sections 264 and 265.1063 (b)
- To be done daily
- To be done with mixture of methane or n-hexane and air at concentration 10,000 ppm

Sampling Techniques

- Sections 264 and 265.1063 (b) & (c)
- "Probe shall be traversed around all potential leak interfaces as close to the interface as possible"

Types Of Equipment

- Flame ionization — common in field
- Photoionization
- Catalytic oxidation
- Infrared absorption — usually in lab

Types Of Equipment

- Flame ionization
  - Century OVA 108
  - Hydrogen flame ionizes carbon molecules ⟶ current ⟶ concentration
  - Range 0 – 10,000ppm
  - Easy to calibrate
  - Weight of 12 pounds
  - Humidity operating range 5 – 95%
  - Temperature range 10 – 40°C

Types Of Equipment

- Photoionization
  - ~~HNU~~
  - TIP
    - Makes use of light source - UV; to ionize VOC gas molecules ⟶ current ⟶ concentration
    - Range 0 – 2000ppm won't get 10,000ppm for example
    - Relatively eay to calibrate
    - Weight under 10 pounds
    - Humidity operating range – up to 90%
    - Wide temperature range

can learn to dilute by this use to extend to range

Types Of Equipment

- Catalytic oxidation
  - TLV Sniffer
  - Platinum catalyst element and a catalytically inert second element is used. Sample is passed between element and current generated ⟶ concentration
  - Range 0 – 10,000ppm
  - More difficult to calibrate
  - Weight of 5 pounds
  - Humidity operating range – none specified but instrument is sensitive to humidity
  - Wide temperature range
  - Difficulty: unit must be held in a consistent position for sampling

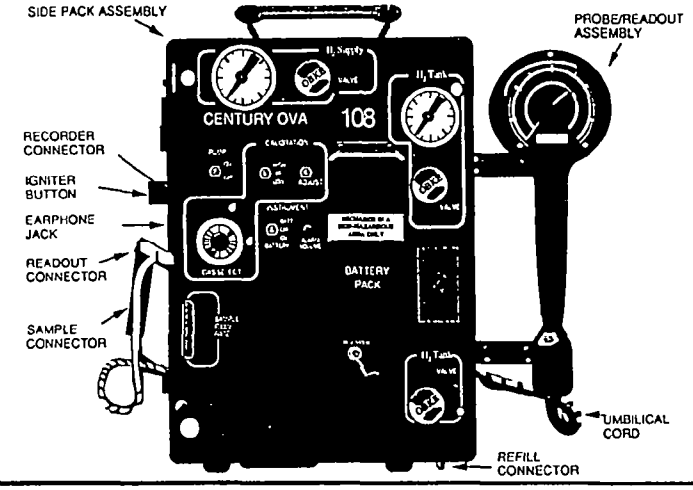
Equipment Preparation Procedure

- Pre-check
- Calibration

  [Movie]

  [Demonstration]

Model OVA 108 CENTURY Organic Vapor Analyzer



Equipment Usage – Field Sampling

- Method 21 Guidance
- Movie

REVIEW PROBLEM #2

What type or types of portable VOC analyzer would be appropriate for fugitive leak monitoring of chloroform emissions?

Type of Analyzer	Acceptable Yes	No
Flame Ionization	V T.8<10	___
Catalytic Combustion	~~[illegible]~~	___
Photoionization	yes 1.9	___

yes .87<10

Based on your review of response factors and other information, what instrument would you choose? ~~[illegible]~~

Photo Ionization 1.9

but can't see w/this w/o extra piece of equipment

REVIEW PROBLEM #3

The equipment in VOC service has a light liquid mixture 90% by weight 1,1,1,2 Tetrachloroethane and 10% by weight 1,1,2,2 Tetrachloroethane. Can a catalytic combustion analyzer be used for fugitive leak monitoring of equipment handling this mixture?

Yes ____, State justification _____

No ____, State justification _____

1,1,1,2 Response factor = 2.4(.9)

1,1,2,2 3.69(.1)

<10

REVIEW PROBLEM #4

To avoid inadvertently capturing any water or oil droplets into the instrument probe, the plant's monitoring personnel keep the probe tip at least 2 centimeters away from all valve stems and at least 6 centimeters away from all rotating shafts. Also, they attempt to complete the traversing of a valve (and other components) in about 5 seconds so that they can complete the large number of screening tests in a timely fashion. Are either of these practices inconsistent with Method 21 or Subpart BB requirements?

Answer ~~Just has to be "as close as possible"~~

Need to be w/in 1 cm of source

If find leak ≥10,000 ppm and transversed ~2 times

REVIEW PROBLEM #5

While conducting leak screening tests, the plant's monitoring personnel are yanking the probe away immediately after the instrument gauge pegs off-scale at 10,000 ppm. They are not keeping the instrument at the leak site for two times the instrument's response time as specified in Method 21. They are classifying each of the valves and other sources as "leakers" when the meter pegs off-scale. Is this screening technique consistent with subsection 4.3 of Method 21?

Answer

REVIEW PROBLEM #6

A pipefitter accompanies the plant monitoring person conducting the fugitive VOC screening tests. If a leak is detected, the pipefitter attempts to repair the leak immediately. If successful, the plant personnel do not tag the component that was leaking and they do not list it in their routine records. Is this consistent with the Subpart BB requirements?

Answer Must tag & document even if corrected immediately

APPENDIX A

REVISED METHOD 21

Drafting Information

The drafters of this regulaiton are John R. Ailyn, Radarman First Class, U.S. Coast Guard Group Grand Haven and M. Eric Reeves, Lieutenant Commander, U.S. Coast Guard, Project Attorney, Ninth Coast Guard District Legal Office.

Discussion of Regulation

The circumstances requiring this regulation result from a high-speed power boat race which will be conducted on Muskegon Lake, Muskegon, MI. during this time. The safety zone is needed to ensure the protection of life and property during the high-speed power boat race.

This regulation is issued pursuant to 33 U.S.C. 1225 and all 1231 as set out in the authority citation for all of part 165.

Federalism

This action has been analyzed in accordance with the principles and criteria contained in Executive Order 12612, and it has been determined that this rulemaking does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Economic Assessment and Certificaiton

These regulations are considered to be non-major under Executive Order 12291 on Federal Regulations and nonsignificant under Department of Transportation regulatory policies and procedures (44 FR 11034; February 26, 1979). Because of the short duration of these regulations, their economic impact has been found to be so minimal that a full regulatory evaluation is unnecessary. This event will draw a large number of spectator craft into the area for the duration of the event. This should have a favorable impact on commercial facilities providing services to the spectators. Any impact on commercial traffic in the area will be negligible.

Since the impact of these regulations is expected to be minimal, the Coast Guard certifies that they will not have a significant economic impact on a substantial number of small entities.

List of Subjects in 33 CFR Part 165

Harbors, Marine safety, Navigation (water), Security measures, Vessels, Waterways.

Regulation

In consideration of the foregoing, subpart C of part 165 of title 33, Code of Federal Regulations, is amended as follows:

PART 165—[AMENDED]

1. The authority citation for part 165 continues to read as follows:

Authority 33 U.S.C. 1225 and 1231; 50 U.S.C. 191; 49 CFR 1.46 and 33 CFR 1.05–1(g), 6.04–1, 6.04–6, and 160.5.

2. A new § 165.T0912 is added to read as follows:

§ 165.T0912 Safety Zone: Muskegon Lake, Muskegon, MI.

(a) *Location.* The following area is a safety zone: Muskegon Lake in its entirety.

(b) *Effective date.* This regulation will become effective at 10:30 a.m. (e.d.s.t.) 24 June 1990, and terminate at 4 p.m. (e.d.s.t.) 24 June 1990.

(c) *Regulations.* (1) In accordance with the general regulations in § 165.23 of this part, entry into this zone is prohibited, except when expressly authorized by the Coast Guard Patrol Commander (Commanding Officer, U.S. Coast Guard Station Grand Haven, MI.)

(2) The Coast Guard will Patrol the Safety zone under the direction of a designated Coast Guard Patrol Commander. The Patrol Commander may be contacted on channel 16 (156.8 MHZ) by the call sign "Coast Guard Patrol Commander". Operators of vessels, not participating in the event, desiring to transit the regulated area, may do so only with prior approval of the Patrol Commander and when so directed by that officer. Transiting vessels will be operated at bare steerageway, and will exercise a high degree of caution in the area.

(3) The Patrol Commander may direct the anchoring, mooring or movement of any boat or vessel within the regulated area. A succession of sharp, short signals by whistle or horn from vessels patrolling the area, under the direction of the Coast Guard Patrol Commander, shall serve as a signal to stop. Vessels so signaled shall stop and shall comply with the orders of the Patrol Commander. Failure to do so may result in expulsion from the area, citation for failure to comply, or both.

(4) The Patrol Commander may restrict vessel operation within the regulated area to vessels having particular operating characteristics.

(5) The Patrol Commander may terminate the marine event or the operation of any vessel at any time it is deemed necessary for the protection of life and property.

Dated: June 7, 1990.

L. L. Mizell,

Commander, U.S. Coast Guard, Captain of the Port, Grand Haven, MI.

[FR Doc. 90-14452 Filed 6-21-90; 8:45 am]

BILLING CODE 4910-14-M

ENVIRONMENTAL PROTECTION AGENCY

[AD-FRL-3727-3]

40 CFR Part 60

Standards of Performance for New Stationary Sources; Test Methods

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Method 21 applies to the determination of volatile organic compounds (VOC) leaks from process equipment such as valves, flanges and connections, pumps and compressors, and pressure relief devices. Since Method 21 was promulgated in 1983, several deficiencies in the method that could lead to inconsistencies in the determination of VOC leaks from such devices have come to the attention of EPA in the form of questions as to the proper application of the method. On May 30, 1989, EPA proposed appropriate additions and revisions to Method 21 to alleviate any deficiencies (54 FR 22920). This action promulgates those additions and revisions.

DATES: *Effective Date.* June 22, 1990.

Judicial Review. Under section 307(b)(1) of the Clean Air Act, judicial review of the actions taken by this notice is available only by the filing of a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this notice. Under section 307(b)(2) of the Clean Air Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

ADDRESSES: *Docket.* A docket, number A–88–29, containing information considered by EPA in development of the promulgated rulemaking is available for public inspection between 8 a.m. and 4 p.m., Monday through Friday, at EPA's Air Docket Section (LE–131), room M–1500, First Floor, Waterside Mall, 401 M Street SW., Washington, DC 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: William Grimley or Roger T. Shigehara, Emission Measurement Branch (MD–19), Technical Support Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541–2237.

SUPPLEMENTARY INFORMATION:

I. The Rulemaking

Section 2.4 is being revised to remove a description of the leak determination procedure, which is already given, and more properly belongs in section 4.3.2. The example of an acceptable increase in surface concentration versus local concentration is incorrect, and is being removed, as all existing regulatory subparts state that any reading less than 500 ppm constitutes "no detectable emissions." The definition is now expressed in terms of the instrument readability specification.

Section 3.1.1(b) is being revised because it is important to call attention to the possibility that the leak definition concentration may be beyond the linear response range of some instruments for some VOC. This potential problem is not identified by the existing calibration procedure, which specifies a single upscale VOC calibration gas. An argument could be made that a multipoint calibration should, therefore, be required. However, adding that requirement would increase the method's performance burden and cost.

Section 3.1.1(c) is being revised in consideration of existing regulatory subparts, where the intention is for the readability to be to the nearest 500 ppm. Since the leak definition in existing subparts is 10,000 ppm, the nearest 500 ppm represents ±2.5 percent, not ±5 percent.

Section 3.1.1(d) is being revised to prevent any flow interruption from occurring, such as could occur if a manually operated device was used for a pump. The minimum flow rate specification of 0.50 liter per minute is reduced to 0.10 liter per minute to prevent the exclusion of some instruments that do meet the response time specification and could be acceptable if this change was made. The flow rate specification has been qualified as to where, and under what conditions, it applies in order to prevent misunderstandings that it might apply at the instrument detector, or with no flow restriction in the probe. The upper flow limit specification of 3.0 liters per minute is retained because some upper limit on flow rate is required to prevent dilution of any leaking VOC to a concentration below the definition of a leak.

Section 3.1.1(e) is being revised in consideration of comments that have been made to EPA that the existing wording in not clear and should be more specific. In addition, it has been reported that inexperienced sampling personnel have been observed to use a portable flame ionization analyzer with the exhaust flame arrestor not replaced after removal for cleaning.

Section 3.1.1(f) is being added to emphasize that the instrument is meant to sample a discrete area. Some probes have been observed to have a relatively large inlet area. The addition is necessary so as to provide as much consistency in the identification of leaks as is reasonably possible. All measurements made by EPA in support of its VOC-leaks regulatory development activities have been made with probes not over ¼ in. in outside diameter.

Section 3.1.2(a) is being revised to include a procedure that is needed for those instances where an instrument is not available that meets the response factor criteria when calibrated with the specified (in regulation) VOC calibration gas. The new procedure should meet the spirit of existing VOC-leak regulations.

Finally, section 3.1.2(b) is being revised by replacing the word "configuration" with all of the items of sampling equipment that might be between the probe tip and the detector during testing.

This rulemaking does not impose emission measurement requirements beyond those specified in the current regulations, nor does it change any emission standard. Rather, the rulemaking would simply add methods for the achievement of emission testing requirements that would apply irrespective of this rulemaking.

II. Public Participation

The proposed amendment to 40 CFR part 60 that contained proposed revisions and additions to Method 21 was published in the Federal Register on May 30, 1989 (54 FR 22920). Public comments were solicited at the time of proposal. To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed action, a public hearing was scheduled for July 14, 1989 beginning at 10 a.m., but was not held because no one requested to speak. The public comment period was from May 30, 1989 to August 14, 1989. Two comment letters were received that contained comments concerning the proposed methods. The comments were supportive of the proposed additions and revisions, with one exception. That comment has been carefully considered, but no changes were made to the proposed rulemaking.

III. Comments and Changes to the Proposed Standards

Two comment letters were received from synthetic organic chemical manufacturers on the proposed methods. All but one of the comments therein were statements to the effect that the commenter agreed with the proposed additions and revisions. The one exception stated that the commenter did not agree that an electrically driven pump should be required in section 3.1.1(d).

The EPA believes it is necessary to specify that an electrically driven pump be used in order to eliminate any potential for imprecise results due to variations or interruptions in sample flow arising from the use of a hand operated squeeze pump. It may be possible for a given person to use a hand operated pump satisfactorily, but EPA believes that technique is too prone to operator fatigue over the course of an extensive leak survey to permit its use in a reference method, and is, therefore, not making any change in the requirement for an electrically driven pump.

IV. Administrative

The docket is an organized and complete file of all the information considered by EPA in the development of this rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docketing system is intended to allow members of the public and industries involved to identify readily and locate documents so that they can effectively participate in the rulemaking process. Along with the statement of basis and purpose of the proposed and promulgated standards, and EPA responses to significant comments, the contents of the docket, except for interagency review materials, will serve as the record in case of judicial review [Clean Air Act, section 307(d)(7)(A)].

Under Executive Order 12291, EPA is required to judge whether a regulation is a "major rule" and, therefore, subject to the requirements of a regulatory impact analysis. The Agency has determined that this regulation would result in none of the adverse economic effects set forth in section 1 of the Order as grounds for finding a regulation to be a "major rule." The rulemaking does not impose emission measurement requirements beyond those specified in the current regulations, but instead, provides methods for performing emission measurement requirements that would apply irrespective of this rulemaking. The Agency has, therefore, concluded that this regulation is not a "major rule" under Executive Order 12291.

The Regulatory Flexibility Act (RFA) of 1980 requires the identification of potentially adverse impacts of Federal regulations upon small business entities. The Act specifically requires the completion of an RFA in those instances

where small business impacts are possible. Because these standards impose no adverse economic impacts, an RFA has not been conducted.

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that the promulgated rule will not have any economic impact on small entities, because the rule does not add either to the existing requirement for flow rate measurements, or increase their associated performance cost.

This regulation was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291. Any written comments from OMB and any written EPA responses are in the docket.

List of Subjects in 40 CFR Part 60

Air pollution control, Intergovernmental relations, Synthetic Organic Chemicals Manufacturing Industry, Reporting and recordkeeping requirements.

Dated: June 7, 1990.

William K. Reilly,

Administrator.

Method 21, appendix A of 40 CFR part 60 is amended as follows:

1. The Authority for 40 CFR part 60 continues to read as follows:

Authority: Sections 101, 111, 114, 116, and 301 of the Clean Air Act, as amended (42 U.S.C. 7401, 7411, 7414, 7416, 7601).

Appendix A—[Amended]

2. By revising section 2.4 to read as follows:

2.4 No Detectable Emission. Any VOC concentration at a potential leak source (adjusted for local VOC ambient concentration) that is less than a value corresponding to the instrument readability specification of section 3.1.1(c) indicates that a leak is not present.

3. By revising section 3.1.1 (b), (c), (d), and (e) and adding (f) to read as follows:

3.1.1 Specifications.

* * * * *

(b) Both the linear response range and the measurable range of the instrument for each of the VOC to be measured, and for the VOC calibration gas that is used for calibration, shall encompass the leak definition concentration specified in the regulation. A dilution probe assembly may be used to bring the VOC concentration within both ranges; however, the specifications for instrument response time and sample probe diameter shall still be met.

(c) The scale of the instrument meter shall be readable to ±2.5 percent of the specified leak definition concentration when performing a no detectable emission survey.

(d) The instrument shall be equipped with an electrically driven pump to insure that a sample is provided to the detector at a constant flow rate. The nominal sample flow rate, as measured at the sample probe tip, shall be 0.10 to 3.0 liters per minute when the probe is fitted with a glass wool plug or filter that may be used to prevent plugging of the instrument.

(e) The instrument shall be intrinsically safe as defined by the applicable U.S.A. standards (e.g., National Electric Code by the National Fire Prevention Association) for operation in any explosive atmospheres that may be encountered in its use. The instrument shall, at a minimum, be intrinsically safe for Class 1, Division 1 conditions, and Class 2, Division 1 conditions, as defined by the example Code. The instrument shall not be operated with any safety device, such as an exhaust flame arrestor, removed.

(f) The instrument shall be equipped with a probe or probe extension for sampling not to exceed ¼ in. in outside diameter, with a single end opening for admission of sample.

4. By revising section 3.1.2 (a) and (b) to read as follows:

3.1.2 *Performance Criteria.*

(a) The instrument response factors for each of the VOC to be measured shall be less than 10. When no instrument is available that meets this specification when calibrated with the reference VOC specified in the applicable regulation, the available instrument may be calibrated with one of the VOC to be measured, or any other VOC, so long as the instrument then has a response factor of less than 10 for each of the VOC to be measured.

(b) The instrument response time shall be equal to or less than 30 seconds. The instrument pump, dilution probe (if any), sample probe, and probe filter, that will be used during testing, shall all be in place during the response time determination.

* * * * *

[FR Doc. 90-13845 Filed 6-21-90; 8:45 am]
BILLING CODE 6560-60-M

APPENDIX B

PUBLISHED RESPONSE FACTORS
(From EPA 340/1-88-015)

TABLE 1. RESPONSE FACTORS FOR TECO MODEL 580
PHOTOIONIZATION TYPE ORGANIC VAPOR ANALYZERS
10.0 ev Lamp

Compound	Ionization Potential (ev)	Response Factor
Acetone	9.58	1.7
Acetophenone	N.D.	4.2
Acrolein	N.D.	25.0
Ammonia	10.15	24.5
Aniline	7.70	0.6
Benzene	9.25	0.7
1,3 Butadiene	9.07	1.0
Carbon disulfide	10.0	2.3
Chlorobenzene	9.07	0.5
Cyclohexane	9.98	2.1
1,2-Dichloroethane	N.D	50.0
Diethylamine	N.D.	2.0
Dimethyl sulfide	8.69	1.3
Ethyl benzene	8.75	1.7
Ethylene oxide	10.57	33.8
Ethyl ether	9.53	1.5
Hexane	10.18	11.3
Hydrogen sulfide	10.45	7.3
Isopropanol	10.16	19.8
Methyl ethyl ketone	9.53	1.6
Methyl isocyanate	10.57	12.5
Methyl mercaptan	9.4	1.3
Methyl methacrylate	N.D.	4.2
Nitric oxide	9.25	44.9
Ortho chloro toluene	8.83	0.5
Ortho xylene	8.56	0.8
Pyridine	9.32	0.6
Styrene	N.D.	3.3
Sec butyl bromide	9.98	1.7
Tetrachloroethene	9.32	1.6
Tetrachloroethylene	N.D.	1.9
Tetrahydrofuran	9.54	3.7
Toluene	8.82	0.5
Trichloroethylene	N.D.	1.3

Table 2. RESPONSE FACTORS FOR THE HUN SYSTEMS, INC. MODEL ISPI-101 PHOTOIONIZATION ANALYZER

Compound	Actual Concentration	Instrument Concentration	Response Factor
Acetal	1000	925	1.1
	5000	7200	0.69
	10000	13200	0.76
Carbon Disulfide	1000	1990	0.50
	10000	12900	0.78
Carbon tetrachloride	500	784	0.64
	1000	1070	0.94
	10000	6070	1.6
Chloroform	1000	756	1.3
	5000	2550	2.0
	10000	5250	1.9
Diketene	1000	148	6.8
	5000	318	16.0
	10000	460	22.0
Perchloromethyl mercaptan	5000	103	48.0
Toluene	1000	1180	0.85
Tetrachloroethane,1,1,2,2-	1000	736	1.4
	5000	1170	4.3
	10000	1880	5.3
Trichloroethane,1,1,	1000	1020	0.98
	5000	6170	0.81
	10000	9430	1.1
Trichlorotrifluoroethane 1,1,2-	5000	155	32.0
	10000	430	23.0

Table 3. RESPONSE FACTORS FOR FOXBORO OVA-108 AND BACHARACH TLV SNIFFER AT 10,000 ppmv RESPONSE

Compound	Response Factor OVA-108	Response Factor TLV Sniffer
Acetic acid	1.64	15.60
Acetic ahydride	1.39	5.88
Acetone	0.80	1.22
Acetonitrile	0.95	1.18
Acetyl chloride	2.04	2.72
Acetylene	0.39	B
Acrylic acid	4.59	B
Acrylonitrile	0.97	3.49 I
Allene	0.64	15.00
Allyl alcohol	0.96	X
Amylene	0.44	1.03
Anisole	0.92	3.91
Benzene	0.29	1.07
Bromobenzene	0.40	1.19
Butadiene, 1,3-	0.57	10.90
Butane, N	1.44 I	4.11
Butanol, sec-	0.76	1.25
Butanol, tert	0.53	2.17
Butene, i-	0.56	5.84
Butyl acetate	0.66	1.38
Butyl acrylate, N-	0.70	2.57 I
Butyl ether, N	2.60	3.58 I
Butyl ether, sec	0.35	1.15
Butylamine, N	0.69	2.02
Butylamine, sec	0.70	1.56
Butylamine, tert-	0.63	1.95
Butyrandehyde, N-	1.29	2.30
Butyronitrile	0.52	1.47 I
Carbon disulfide	B	3.92
Chloroacetaldehyde	9.10	5.07
Chlorobenzene	0.38	0.88
Chloroethane	5.38 I	3.90 P
Chloroform	9.28	B
Chloropropene, 1-	0.67	0.87
Chloropropene, 3-	0.80	1.24
Chlorotoluene, M-	0.48	0.91
Chlorotoluene, O-	0.48	1.06
Chlorotoluene, P-	0.56	1.17 I

Table 3. RESPONSE FACTORS FOR FOXBORO OVA-108 AND BACHARACH TLV SNIFFER AT 10,000 ppmv RESPONSE

Compound	Response Factor OVA-108		Response Factor TLV Sniffer	
Crotonaldehyde	1.25			B
Cumene	1.87			B
Cyclohexane	0.47		0.70	
Cyclohexanone	1.50		7.04	
Cyclohexene	0.49		2.17	
Cyclohexylamine	0.57		1.38	
Diacetyl	1.54		3.28	
Dichloro-1-propene,2,3-	0.75		1.75	
Dichloroethane,1,1-	0.78		1.86	
Dichloroethane,1,2-	0.95		2.15	
Dichloroethylene,cis1,2-	1.27		1.63	
Dichloroethylene,trans1,2-	1.11		1.66	
Dichloromethane	2.81		3.85	
Dichloropropane,1,2-	1.03		1.54	
Diisobutylene	0.35		1.41	
Dimethoxy ethane,1,2-	1.22		1.52	
Dimethylformamide,N,N-	4.19		5.29	
Dimethylhydrazine 1,1-	1.03		2.70	
Dioxane	1.48		1.31	
Epichlorohydrin	1.69		2.03	
Ethane	0.65		0.69	I
Ethanol	1.78			X
Ethoxy ethanol, 2-	1.55		1.82	
Ethyl acetate	0.86		1.43	
Ethyl acrylate	0.77			X
Ethyl chloroacetate	1.99		1.59	
Ethyl ether	0.97		1.14	
Ethylbenzene	0.73		4.74	D
Ethylene	0.71		1.56	
Ethylene oxide	2.46		2.40	
Ethylenediamine	1.73		3.26	
Formic acid	14.20			B
Glycidol	6.88		5.55	
Heptane	0.41	I	0.73	
Hexane,N-	0.41		0.69	
Hexene,1-	0.49		4.69	D
Hydroxyacetone	6.90		15.20	
Isobutane	0.41		0.55	

Table 3. RESPONSE FACTORS FOR FOXBORO OVA-108 AND BACHARACH TLV SNIFFER AT 10,000 ppmv RESPONSE

Compound	Response Factor OVA-108	Response Factor TLV Sniffer
Isobutylene	3.13	B
Isoprene	0.59	X
Isopropanol	0.91	1.39
Isopropyl acetate	0.71	1.31
Isopropyl chloride	0.68	0.98
Isovaleraldehyde	0.64	2.19 D
Mesityl oxide	1.09	3.14
Methacrolein	1.20	3.49 D
Methanol	4.39 P	2.01
Methoxy-ethanol,2-	2.25	3.13
Methyl acetate	1.74	1.85
Methyl acetylene	0.61	6.79
Methyl chloride	1.44	1.84
Methyl ethyl ketone	0.64	1.12
Methyl formate	3.11	1.94
Methyl methacrylate	0.99	2.42
Methyl-2-pentanol,4-	1.66	2.00
Methyl-2-pentone,4-	0.56	1.63
Methyl-3-butyn-2-ol,2	0.59	X
Methylcyclohexane	0.48	0.84
Methylcyclohexene	0.44	2.79
Methylstyrene,a-	13.90	B
Nitroethane	1.40	3.45
Nitromethane	3.52	7.60
Nitropropane	1.05	2.02
Nonane-n	1.54	11.10
Octane	1.03	2.11
Pentane	0.52	0.83
Picoline,2-	0.43	1.18
Propane	0.55 I	0.60 P
Propionaldehyde	1.14	1.71
Proponic acid	1.30	5.08 D
Propyl alcohol	0.93	1.74
Propylbenzene,n-	0.51	B
Propylene	0.77	1.74 I
Propylene oxide	0.83	1.15
Pyridine	0.47	1.16
Styrene	4.22	B

Table 3. RESPONSE FACTORS FOR FOXBORO OVA-108 AND BACHARACH TLV SNIFFER AT 10,000 ppmv RESPONSE

Compound	Response Factor OVA-108	Response Factor TLV Sniffer
Tetrachloroethane,1,1,1,2	4.83 D	6.91
Tetrachloroethane,1,1,2,2	7.89	25.40
Tetrachloroethylene	2.97	B
Toluene	0.39	2.68 D
Trichloroethane,1,1,1-	0.80	2.40
Trichloroethane,1,1,2-	1.25	3.69
Trichloroethylene	0.95	3.93
Trichloropropane,1,2,3-	0.96	1.99
Triethylamine	0.51	1.48
Vinyl chloride	0.84	1.06
Vinylidene chloride	1.12	2.41
Xylene, p-	2.12	7.87
Xylene, m-	0.40	5.87 D
Xylene, o-	0.43	1.40

I Inverse Estimation Method
D Possible Outliers in Data
N Narrow Range of Data
X No Data Available
B 10,000 ppvm Response Unachievable
P Suspect Points Eliminated

Process Vents/Equipment Leaks

A. Knowledge of Waste Stream Concentration for Process Vents: Based on

1. Production process information showing no organic compounds used.
2. Waste is identical to another unit's or facility's determined by direct measurements.
3. Previous determination and documentation of no process change.

B. Performance test for Process Vents consists of:

1. 3 separate runs.
2. More than 1 hour per run at highest facility conditions.
3. Mass flow measurements.
4. Arithmetic means of results of 3 runs.

C. Method 21 for Equipment Tasks

1. Performance criteria for equipment.
2. Calibrated every day.
3. Calibration gases: zero air, mixture of methane or n-hexane in air with concentration of 10,000 ppm.

D. Location of Sampling for Equipment Leaks

1. Valves -- Measurements should be taken at interface where stem exits the packing gland (sample drawn at stem circumference), at the interface of the packing gland take-up flange seat (sample drawn at perphery), and around the valve housings of multipart assembly at the surface of all interfaces where a leak could occur.

2. Flanges and Other Connections -- Place probe at outer edge of the flange-gasket interface and sample circumference of the flange.

3. Pumps and Compressors -- Conduct a circumferential traverse of the outer surface of the pump or compressor shaft and seal surface (specifically, within 1 cm at a rotating shaft/seal interface), and sample all accessbible portions and joints where leaks could occur.

4. Pressure Relief Devices -- Only for those devices which are equiped with an enclosed extension (or horn), probe inlet should be placed near the center of the exhaust area to the atmosphere.

5. Process Drains -- For open drains, place probe in center of the open area/ for covered drains, place probe at surface of cover interface and conduct a peripheral traverse.

6. Open-Ended Line or Valves -- Place probe inlet near center of opening to the atmosphere.

7. Seal System Degassing Vents and Accumulator Vents -- Place probe inlet near center of opening to the atmosphere.

8. Access Door Seals -- Place probe inlet at surface of the seal interface and conduct a peripheral traverse.

E. Flows - No Visible Emissions:

1) Reference Method 22 of 40 CFR Part 60 shall be used.
2) The observation period is 2 hours.

F. Applicable Formulas

1. Flows

$$H_T = K[\sum_{i=1}^{n} C_i H_i]$$

$$\text{Log}_{10}\ V_{max} = (H_T + 28.8)/31.7 \text{ or}$$

$$V_{max} = 8.706 + 0.7084\ (H_T)$$

2. Waste Streams

Annual Average Concentration

$$C_A = \frac{\sum_{i=1}^{n} C_i\ Q_i}{\sum_{i=1}^{n} Q_i}$$

3. Emission Rates

Hourly ER (HER) = Flow rate (m^3/g) x organic concentration (ppm)

x average molecule weight (Kg/g) x

conversion factors OR

$$Q_{sd}[\sum_{i=1}^{n} C\ MW](.0416)(10^6)$$

Yearly ER = HER x number of operating hours per year

4. Facility Rate

$$FER = \sum_{i=1}^{n} ER_{pvi} \quad \text{or}$$

$$FER = ER_{pv1} + ER_{pv2} + ER_{pv3} + ...$$

G. Leak Detection and Repair

equipment	type of fluid	monitoring	leak	action
pump	light liquid	Monthly	10,000	5/15,tag
	heavy liquid	physical		
		21 within 5 days	10,000	5/15,tag
valve	gas/vapor or			
	light liquid	monthly 21	10,000	5/15,tag
	heavy liquid	physical		
	21 within 5 days	10,000		5/15,tag
compressor	all types	sensor	failure	5/15/tag
Pressure RD	light liquid or			
	heavy liquid	physical		
		21 within 5 days	10,000	5/15,tag
	gas/vapor		500+bkgd	0/5,M21
Flange	all types	physical		
		M21 within 5 days	10,000	5/15,tag
Sampling Connections Systems	all types		NDE	
Open-ended Valves or Lines	all types			

H. Exceedances

Condenser	alt. conc.	[org] > 20% above Design level
	alt. temp.	T out > 6° above Design level Temp or T coolant > 6° C above DAT
Adsorber	Reg. alt.	Conc. [org] exhaust > 20% above Design Conc Past dates for carbon replacement
	Fixed Reg.	Schedule flow beyond Determined Time Past dates for carbon replacement
Adsorber	Nonreg.	Past dates of replacement Beyond dates monitored manually for breakthrough Above monitoring device readings
Thermal Incin		95/20 T > 28° below Design Avg. Temp Alt. combustion T < 760°
Catalytic Incin.		Inlet T < 28° below Design Avg. Temp or [T out - T in] < 80% Design Avg. Temp Diff.
Boilers/Process Heaters		Comb. T > 28° below Design Avg Comb T position of vent stream to zone changes
Flares		Pilot flame not ignited

I. Process Vent Control Device Monitoring

Control Device	Required Monitoring	Method[a]
Flares	Pilot light flame detection Visible emissions	Thermocouples Method 22[b]
Thermal Incinerators	Combustion chamber temperature downstream of combustion zone	Thermocouples
Catalytic Incinerators	Vent temperatures at nearest feasible point to catalyst bed inlet and outlet	Thermocouples
Boilers < 44 MW	Furnace temperature downstream of combustion zone	Thermocouples
Boilers > 44 MW	A parameter that demonstrates good combustion operating practices are being used	Thermocouples for temperature monitors for CO or NO_x
Condensers	Concentration of organics in the exhaust vent OR Coolant outlet or exhaust vent temperature	Nonmethane hydrocarbon analyzer, Method 18 OR Thermocouples, dial thermometers
Carbon Adsorbers	Concentration of organics in exhaust vent OR A parameter that demonstrates that the bed is regenerated on a regular basis (for automatic regeneration)	Nonmethane hydrocarbon analyzer, Method 18 OR (Application specific)

a Unless otherwise indicated, these methods are not specified by Sections 264.1033(f) and 265.1033(f) and should be regarded as examples only.
b Specifically required by Sections 264.1033(f) and 265.1033(f).

Accelerated Rule On Organic Air Emissions At TSD Facilities

Units at TSFDs and recycling units located at TSD facilities that are otherwise subject to RCRA permitting requirements of Part 270

Units or lines with HW that contain 10 ppmw or greater of organic compounds

Process vents associated with distillation, fractionation, thin-film evaporation, and air or steam stripping operations

- Facility summation of volatile organic compound emissions from all applicable process vents
- Installation of control devices to achieve either 95% reduction of total value or 3 lbs/hr and 3.1 tons/yr.

Units or lines with HW with 10% or greater of organic compounds by weight

Equipment such as pumps, valves, pressure relief devices, sampling connecting systems, open-ended valves or lines, and compressors

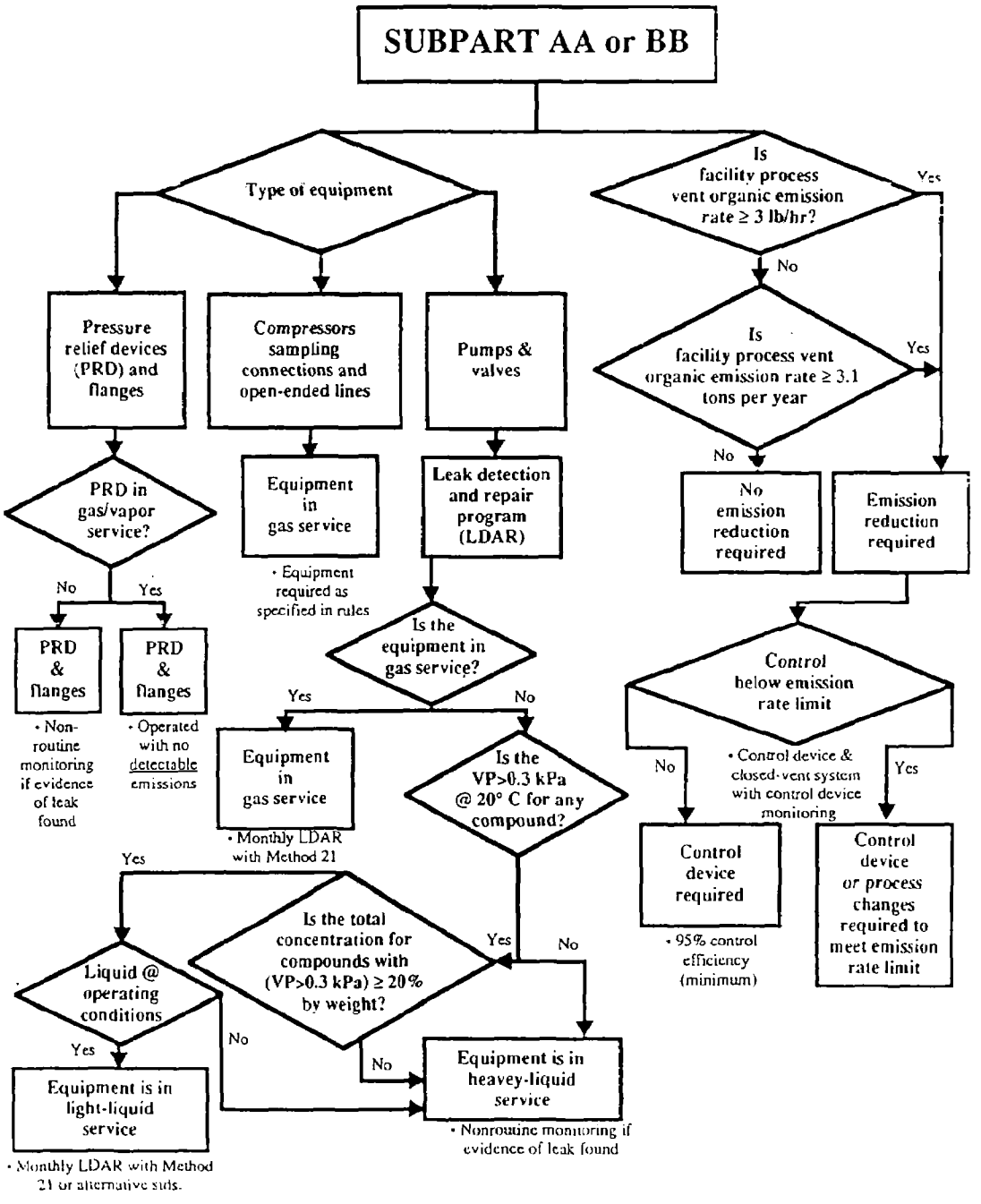
light-liquid or gas/vapor

- If designed for NDE then no reading over 500 ppm plus background
- If leaking value or pump at or above 10,000 ppm repair initiated within 5 days and completed within 15 days, recordkeeping required
- Monthly leak detection monitoring for pumps and valves

heavy liquid

- If pumps and valves are leaking at 10,000 ppm or above, initiate repair within 5 days and complete within 15 days, recordkeeping required
- Routine monitoring not required

Regulatory Decision Tree



7.5.2 Calculation of Emission Rate Using Carbon Dioxide Correction. The CO_2 concentration and the pollutant concentration may be on either a dry basis or a wet basis, but both concentrations must be on the same basis for the calculations. Calculate the pollutant emission rate using Equation 20-7 or 20-8:

$$E = C_d F_d \frac{100}{\%CO_2} \qquad \text{Eq. 20-7}$$

$$E = C_w F_w \frac{100}{\%CO_{2w}} \qquad \text{Eq. 20-8}$$

where:

C_w = Pollutant concentration measured on a moist sample basis, ng/sm³ (lb/scf).

$\%CO_{2w}$ = Measured CO_2 concentration measured on a moist sample basis, percent.

8. *Bibliography*

1. Curtis, F. A Method for Analyzing NO_x Cylinder Gases-Specific Ion Electrode Procedure, Monograph available from Emission Measurement Laboratory, ESED, Research Triangle Park, NC 27711, October 1978.

2. Sigsby, John E., F. M. Black, T. A. Bellar, and D. L Klosterman. Chemiluminescent Method for Analysis of Nitrogen Compounds in Mobile Source Emissions (NO, NO_2, and NH_3). "Environmental Science and Technology," 7:51-54. January 1973.

3. Shigehara, R.T., R.M. Neulicht, and W.S. Smith. Validating Orsat Analysis Data from Fossil Fuel-Fired Units. Emission Measurement Branch, Emission Standards and Engineering Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. June 1975.

Method 21—Determination of Volatile Organic Compounds Leaks

1. *Applicability and Principle*

1.1 Applicability. This method applies to the determination of volatile organic compound (VOC) leaks from process equipment. These sources include, but are not limited to, valves, flanges and other connections, pumps and compressors, pressure relief devices, process drains, open-ended valves, pump and compressor seal system degassing vents, accumulator vessel vents, agitator seals, and access door seals.

1.2 Principle. A portable instrument is used to detect VOC leaks from individual sources. The instrument detector type is not specified, but it must meet the specifications and performance criteria contained in Section 3. A leak definition concentration based on a reference compound is specified in each applicable regulation. This procedure is intended to locate and classify leaks only, and is not to be used as a direct measure of mass emission rates from individual sources.

2. *Definitions*

2.1 Leak Definition Concentration. The local VOC concentration at the surface of a leak source that indicates that a VOC emission (leak) is present. The leak definition is an instrument meter reading based on a reference compound.

2.2 Reference Compound. The VOC species selected as an instrument calibration basis for specification of the leak definition concentration. (For example: If a leak definition concentration is 10,000 ppmv as methane, then any source emission that results in a local concentration that yields a meter reading of 10,000 on an instrument calibrated with methane would be classified as a leak. In this example, the leak definition is 10,000 ppmv, and the reference compound is methane.)

2.3 Calibration Gas. The VOC compound used to adjust the instrument meter reading to a known value. The calibration gas is usually the reference compound at a concentration approximately equal to the leak definition concentration.

2.4 No Detectable Emission. The local VOC concentration at the surface of a leak source that indicates that a VOC emission (leak) is not present. Since background VOC concentrations may exist, and to account for instrument drift and imperfect reproducibility, a difference between the source surface concentration and the local ambient concentration is determined. A difference based on meter readings of less than a concentration corresponding to the minimum readability specification indicates that a VOC emission (leak) is not present. (For example, if the leak definition in a regulation is 10,000 ppmv, then the allowable increase in surface concentration versus local ambient concentration would be 500 ppmv based on the instrument meter readings.)

2.5 Response Factor. The ratio of the known concentration of a VOC compound to the observed meter reading when measured using an instrument calibrated with the reference compound specified in the application regulation.

2.6 Calibration Precision. The degree of agreement between measurements of the same known value, expressed as the relative percentage of the average difference between the meter readings and the known concentration to the known concentration.

2.7 Response Time. The time interval from a step change in VOC concentration at the input of the sampling system to the time at which 90 percent of the corresponding final value is reached as displayed on the instrument readout meter.

3. *Apparatus*

3.1 Monitoring Instrument.

3.1.1 Specifications.

a. The VOC instrument detector shall respond to the compounds being processed. Detector types which may meet this requirement include, but are not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization.

b. The instrument shall be capable of measuring the leak definition concentration specified in the regulation.

c. The scale of the instrument meter shall be readable to ±5 percent of the specified leak definition concentration.

d. The instrument shall be equipped with a pump so that a continuous sample is provided to the detector. The nominal sample flow rate shall be ⅛ to 3 liters per minute.

e. The instrument shall be intrinsically safe for operation in explosive atmospheres as defined by the applicable U.S.A. standards (e.g., National Electrical Code by the National Fire Prevention Association).

3.1.2 Performance Criteria.

a. The instrument response factors for the individual compounds to be measured must be less than 10.

b. The instrument response time must be equal to or less than 30 seconds. The response time must be determined for the instrument configuration to be used during testing.

c. The calibration precision must be equal to or less than 10 percent of the calibration gas value.

d. The evaluation procedure for each parameter is given in Section 4.4.

3.1.3 Performance Evaluation Requirements.

a. A response factor must be determined for each compound that is to be measured, either by testing or from reference sources. The response factor tests are required before placing the analyzer into service, but do not have to be repeated at subsequent intervals.

b. The calibration precision test must be completed prior to placing the analyzer into service, and at subsequent 3-month intervals or at the next use whichever is later.

c. The response time test is required prior to placing the instrument into service. If a modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required prior to further use.

3.2 Calibration Gases. The monitoring instrument is calibrated in terms of parts per million by volume (ppmv) of the reference compound specified in the applicable regulation. The calibration gases required for monitoring and instrument performance evaluation are a zero gas (air, less than 10 ppmv VOC) and a calibration gas in air mixture approximately equal to the leak definition specified in the regulation. If cylinder calibration gas mixtures are used, they must be analyzed and certified by the manufacturer to be within ±2 percent accuracy, and a shelf life must be specified. Cylinder standards must be either reanalyzed or replaced at the end of the specified shelf life. Alternately, calibration gases may be prepared by the user according to any accepted gaseous standards preparation procedure that will yield a mixture accurate to within ±2 percent. Prepared standards must be replaced each day of use unless it can be demonstrated that degradation does not occur during storage.

Calibrations may be performed using a compound other than the reference compound if a conversion factor is determined for that alternative compound so that the resulting meter readings during source surveys can be converted to reference compound results.

4. *Procedures*

4.1 Pretest Preparations. Perform the instrument evaluation procedures given in Section 4.4 if the evaluation requirements of Section 3.1.3 have not been met.

4.2 Calibration Procedures. Assemble and start up the VOC analyzer according to the manufacturer's instructions. After the appropriate warmup period and zero internal calibration procedure, introduce the calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value.

NOTE: If the meter readout cannot be adjusted to the proper value, a malfunction of the analyzer is indicated and corrective actions are necessary before use.

4.3 Individual Source Surveys.

4.3.1 Type I—Leak Definition Based on Concentration. Place the probe inlet at the surface of the component interface where leakage could occur. Move the probe along the interface periphery while observing the instrument readout. If an increased meter reading is observed, slowly sample the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately two times the instrument response time. If the maximum observed meter reading is greater than the leak definition in the applicable regulation, record and report the results as specified in the regulation reporting requirements. Examples of the application of this general technique to specific equipment types are:

a. Valves—The most common source of leaks from valves is at the seal between the stem and housing. Place the probe at the interface where the stem exits the packing gland and sample the stem circumference. Also, place the probe at the interface of the packing gland take-up flange seat and sample the periphery. In addition, survey valve housings of multipart assembly at the surface of all interfaces where a leak could occur.

b. Flanges and Other Connections—For welded flanges, place the probe at the outer edge of the flange-gasket interface and sample the circumference of the flange. Sample other types of nonpermanent joints (such as threaded connections) with a similar traverse.

c. Pumps and Compressors—Conduct a circumferential traverse at the outer surface of the pump or compressor shaft and seal interface. If the source is a rotating shaft, position the probe inlet within 1 cm of the shaft-seal interface for the survey. If the housing configuration prevents a complete traverse of the shaft periphery, sample all accessible portions. Sample all other joints on the pump or compressor housing where leakage could occur.

d. Pressure Relief Devices—The configuration of most pressure relief devices prevents sampling at the sealing seat interface. For those devices equipped with an enclosed extension, or horn, place the probe inlet at approximately the center of the exhaust area to the atmosphere.

e. Process Drains—For open drains, place the probe inlet at approximately the center of the area open to the atmosphere. For covered drains, place the probe at the surface of the cover interface and conduct a peripheral traverse.

f. Open-Ended Lines or Valves—Place the probe inlet at approximately the center of the opening to the atmosphere.

g. Seal System Degassing Vents and Accumulator Vents—Place the probe inlet at approximately the center of the opening to the atmosphere.

h. Access Door Seals—Place the probe inlet at the surface of the door seal interface and conduct a peripheral traverse.

4.3.2 Type II—"No Detectable Emission". Determine the local ambient concentration around the source by moving the probe inlet randomly upwind and downwind at a distance of one to two meters from the source. If an interferencc exists with this determination due to a nearby emission or leak, the local ambient concentration may be determined at distances closer to the source, but in no case shall the distance be less than 25 centimeters. Then move the probe inlet to the surface of the source and determine the concentration described in 4.3.1. The difference between these concentrations determines whether there are no detectable emissions. Record and report the results as specified by the regulation.

For those cases where the regulation requires a specific device installation, or that specified vents be ducted or piped to a control device, the existence of these conditions shall be visually confirmed. When the regulation also requires that no detectable emissions exist, visual observations and sampling surveys are required. Examples of this technique are:

(a) Pump or Compressor Seals—If applicable, determine the type of shaft seal. Preform a survey of the local area ambient VOC concentration and determine if detectable emissions exist as described above.

(b) Seal System Degassing Vents; Accumulator Vessel Vents, Pressure Relief Devices—If applicable, observe whether or not the applicable ducting or piping exists. Also, determine if any sources exist in the ducting or piping where emissions could occur prior to the control device. If the required ducting or piping exists and there are no sources where the emissions could be vented to the atmosphere prior to the control device, then it is presumed that no detectable emissions are present. If there are sources in the ducting or piping where emissions could be vented or sources where leaks could occur, the sampling surveys described in this paragraph shall be used to determine if detectable emissions exist.

4.3.3 Alternative Screening Procedure. A screening procedure based on the formation of bubbles in a soap solution that is sprayed on a potential leak source may be used for those sources that do not have continuously moving parts, that do not have surface temperatures greater than the boiling point or less than the freezing point of the soap solution, that do not have open areas to the atmosphere that the soap solution cannot bridge, or that do not exhibit evidence of liquid leakage. Sources that have these conditions present must be surveyed using the instrument techniques of 4.3.1 or 4.3.2.

Spray a soap solution over all potential leak sources. The soap solution may be a commercially available leak detection solution or may be prepared using concentrated detergent and water. A pressure sprayer or a squeeze bottle may be used to dispense the solution. Observe the potential leak sites to determine if any bubbles are formed. If no bubbles are observed, the source is presumed to have no detectable emissions or leaks as applicable. If any bubbles are observed, the instrument techniques of 4.3.1 or 4.3.2 shall be used to determine if a leak exists, or if the source has detectable emissions, as applicable.

4.4 Instrument Evaluation Procedures. At the beginning of the instrument performance evaluation test, assemble and start up the instrument according to the manufac-

turer's instructions for recommended warmup period and preliminary adjustments.

4.4.1 Response Factor. Calibrate the instrument with the reference compound as specified in the applicable regulation. For each organic species that is to be measured during individual source surveys, obtain or prepare a known standard in air at a concentration of approximately 80 percent of the applicable leak definition unless limited by volatility or explosivity. In these cases, prepare a standard at 90 percent of the saturation concentration, or 70 percent of the lower explosive limit, respectively. Introduce this mixture to the analyzer and record the observed meter reading. Introduce zero air until a stable reading is obtained. Make a total of three measurements by alternating between the known mixture and zero air. Calculate the response factor for each repetition and the average response factor.

Alternatively, if response factors have been published for the compounds of interest for the instrument or detector type, the response factor determination is not required, and existing results may be referenced. Examples of published response factors for flame ionization and catalytic oxidation detectors are included in Section 5.

4.4.2 Calibration Precision. Make a total of three measurements by alternately using zero gas and the specified calibration gas. Record the meter readings. Calculate the average algebraic difference between the meter readings and the known value. Divide this average difference by the known calibration value and mutiply by 100 to express the resulting calibration precision as a percentage.

4.4.3 Response Time. Introduce zero gas into the instrument sample probe. When the meter reading has stabilized, switch quickly to the specified calibration gas. Measure the time from switching to when 90 percent of the final stable reading is attained. Perform this test sequence three times and record the results. Calculate the average response time.

5. *Bibliography*

5.1 DuBose, D.A., and G.E. Harris. Response Factors of VOC Analyzers at a Meter Reading of 10,000 ppmv for Selected Organic Compounds. U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2-81-051. September 1981.

5.2 Brown, G.E., et al. Response Factors of VOC Analyzers Calibrated with Methane for Selected Organic Compounds. U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2-81-022. May 1981.

5.3 DuBose, D.A., et al. Response of Portable VOC Analyzers to Chemical Mixtures. U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2-81-110. September 1981.

Method 22—Visual Determination of Fugitive Emissions From Material Sources and Smoke Emissions from Flares

1. *Introduction*

This method involves the visual determination of fugitive emissions, i.e., emissions not emitted directly from a process stack or duct. Fugitive emissions include emissions that (1) escape capture by process equipment exhaust hoods; (2) are emitted during material transfer; (3) are emitted from buildings housing material processing or handling equipment; and (4) are emitted directly from process equipment. This method is used also to determine visible smoke emissions from flares used for combustion of waste process materials.

This method determines the amount of time that any visible emissions occur during the observation period, i.e., the accumulated emission time. This method does not require that the opacity of emissions be determined. Since this procedure requires only the determination of whether a visible emission occurs and does not require the determination of opacity levels, observer certification according to the procedures of Method 9 are not required. However, it is necessary that the observer is educated on the general procedures for determining the presence of visible emissions. As a minimum, the observer must be trained and knowledgeable regarding the effects on the visibility of emissions caused by background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor). This training is to be obtained from written materials found in References 7.1 and 7.2 or from the lecture portion of the Method 9 certification course.

2. *Applicability and Principle*

2.1 Applicability. This method applies to the determination of the frequency of fugitive emissions from stationary sources (located indoors or outdoors) when specified as the test method for determining compliance with new source performance standards.

This method also is applicable for the determination of the frequency of visible smoke emissions from flares.

2.2 Principle. Fugitive emissions produced during material processing, handling, and transfer operations or smoke emissions from flares are visually determined by an observer without the aid of instruments.

3. *Definitions*

Leak Detection Levels For Regulated Pieces Of Equipment*

Equipment	Service		
	Gas/Vapor	Light Liquid	Heavy Liquid
Pressure relief devices	NDE	10,000ppm	10,000ppm
Closed-vent systems	———	NDE	———
Compressors with seals	———	NDE	———
Pumps		10,000ppm	10,000ppm
Valves	———	10,000ppm	———
Flanges and other connectors	———	10,000ppm	———
Sampling connecting systems	——— equipment with closed-purge or closed-vent system – NDE ———		
Open-ended valves or lines	——— equipment with cap, blind flange, plug or second valve ———		

* *Frequency: Closed-vent systems - annual; all others - monthly*
Action: PRD in gas/vapor - 0\5, M 21; all others - 5\15, tag

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