Session 1
RCRA Air Emissions Regulations

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Session 1 Agenda:
RCRA Air Emissions Regulations

- Review of Important RCRA Background Concepts
- RCRA Air Emissions Regulatory Framework
- Subpart CC: Tanks, Containers, Surface Impoundments
- Subpart AA: Process Vents
- Subpart BB: Equipment Leaks
- Overlaps with the Clean Air Act
- Future of the RCRA Air Emissions Program

Resource Conservation and Recovery Act (RCRA) – enacted by Congress in 1976

- Promote protection of human health and the environment through effective waste management
- Conserve materials and energy resources through waste recycling and recovery
- Reduce or eliminate waste generation

Hazardous and Solid Waste Amendments (HSWA) of 1984 – expanded the program's scope

Resource Conservation Challenge (RCC) – future direction of the program

RCRA §1003(a)

Congress outlined four programs under RCRA

Subtitle	Focus	Details
C	Hazardous Waste	Management of hazardous wastes from point of generation to final disposal ("cradle to grave")
D	Solid Waste	Traditional, nonhazardous waste such as municipal garbage
I	Underground Storage Tanks (USTs)	Design and operating requirements to prevent leaks from underground product storage tanks
J	Medical Waste	Pilot program to track infectious waste; expanded by Medical Waste Tracking Act of 1988

What is a RCRA hazardous waste?

The term **“hazardous waste”** means a solid waste which because of its quantity, concentration, or characteristics may pose a substantial or potential hazard to human health or the environment

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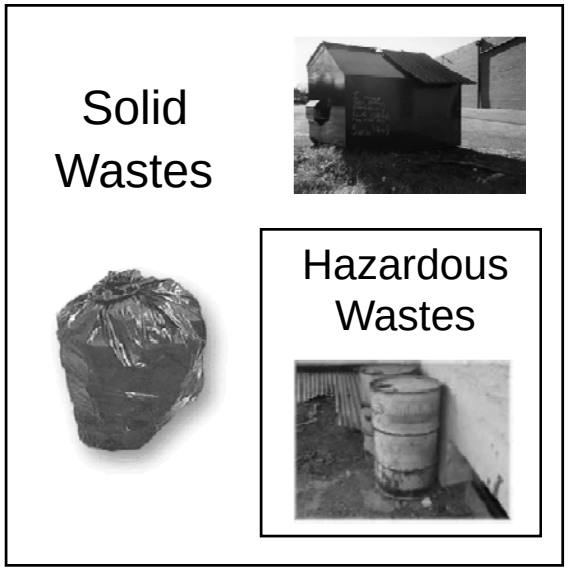
Hazardous waste is a *subset* of solid waste

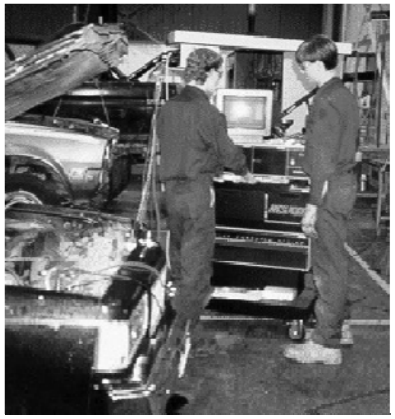
Hazardous waste **does not include products**



RCRA §1004(5)

Hazardous Waste Generator Classes

- Generators
  - **Large quantity generators** (LQGs) are subject to the most stringent requirements because they produce the most hazardous waste (1,000 kg or 2,200 lbs or more per month)
  - **Small quantity generators** (SQGs) produce between 100 and 1,000 kg per month
  - **Conditionally exempt small quantity generators** (CESQGs) produce 100 kg or less per month
- Air emissions regulations apply only to **LQGs**

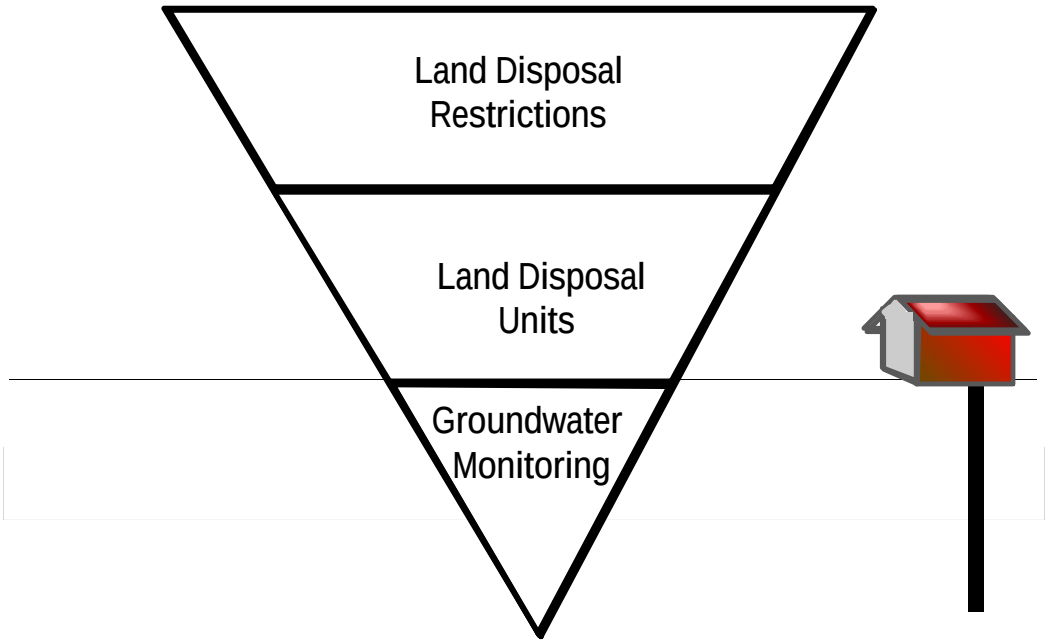


40 CFR §261.5, Part 262

Hazardous Waste Units

- Tank: a stationary unit that holds hazardous waste
- Container: a portable unit that holds hazardous waste
- Surface impoundment: pond, lagoon, or pit that holds hazardous waste – often part of facility wastewater treatment plant

Three-tiered Groundwater Protection Strategy (Prevention and Early Detection)



LDR Treatment Standards

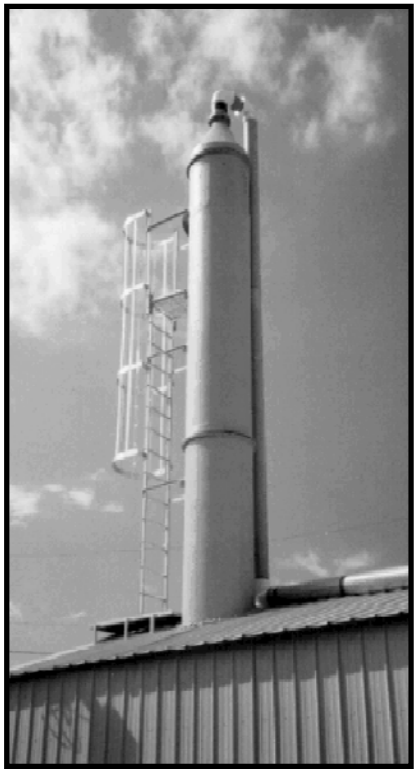
- Waste must be treated in one of two ways:
  - By meeting **constituent concentrations** (e.g., 5 mg/L TCLP)
  - By using **specified technologies** (e.g., combustion)

Waste Code	Waste Description	Regulated Hazardous Constituent	Wastewaters	Non-Wastewaters
D017	Exhibits TCLP toxicity characteristic for 2,4,5-TP (Silvex)	Silvex	CHOXD or CMBST	7.9 mg/L and meet UTS
D018	Exhibits TCLP toxicity characteristic for benzene	Benzene	0.14 mg/L and meet UTS	10 mg/L and meet UTS

40 CFR Sections 268.40 and 268.48

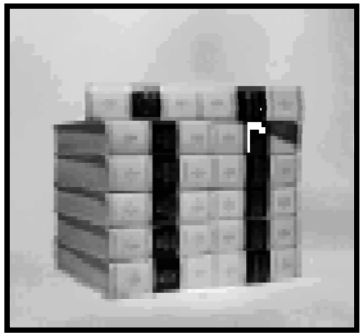
Why Does RCRA Regulate Air Quality?

- Combined coverage – RCRA air emissions regulations and the Clean Air Act (CAA)
- RCRA regulates organic air emissions from hazardous waste management
- RCRA statute Section 3004(n) requires promulgation of air emissions standards



RCRA §3004(n)

"The administrator shall promulgate such regulations for the monitoring and control of air emissions at hazardous waste treatment, storage, and disposal facilities, including but not limited to open tanks, surface impoundments, and landfills, as may be necessary to protect human health and the environment."



The RCRA Air Emissions Program Complements LDR by Preventing Cross-Media Contamination

Three Phases of RCRA Air Regulations

- **Phase I**: Subparts AA & BB
  - Process vents and equipment leaks
  - 55 FR 25454; June 21, 1990
- **Phase II**: Subpart CC
  - Tanks, containers, and surface impoundments
  - 59 FR 62896; December 6, 1994
  - 61 FR 59932; November 25, 1996
- **Phase III**: Regulations for Individual Constituents or Individual Industries

Subpart CC – Applicability

- Tanks, surface impoundments, and containers at **permitted and interim status TSDFs**
- Tanks and containers used by **Large Quantity Generators (LQGs)** as accumulation units

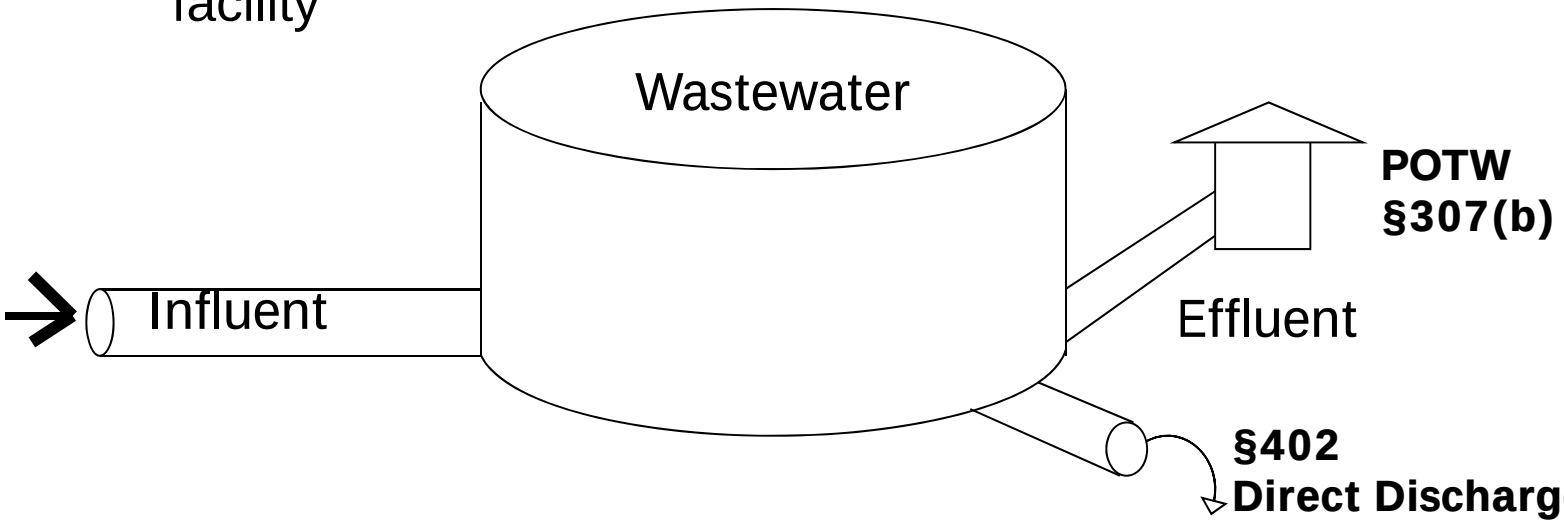
40 CFR Sections 264.1080 and 265.1080

Subpart CC – Exemptions

- Units exempted in §264/265.1
  - Wastewater Treatment Units (WWTUs)
  - Elementary Neutralization Units (ENUs)
  - Totally Enclosed Treatment Units (TETUs)
- Exempt from the entire RCRA permitting process, including all of the RCRA air emissions regulations

Wastewater Treatment Unit (WWTU)

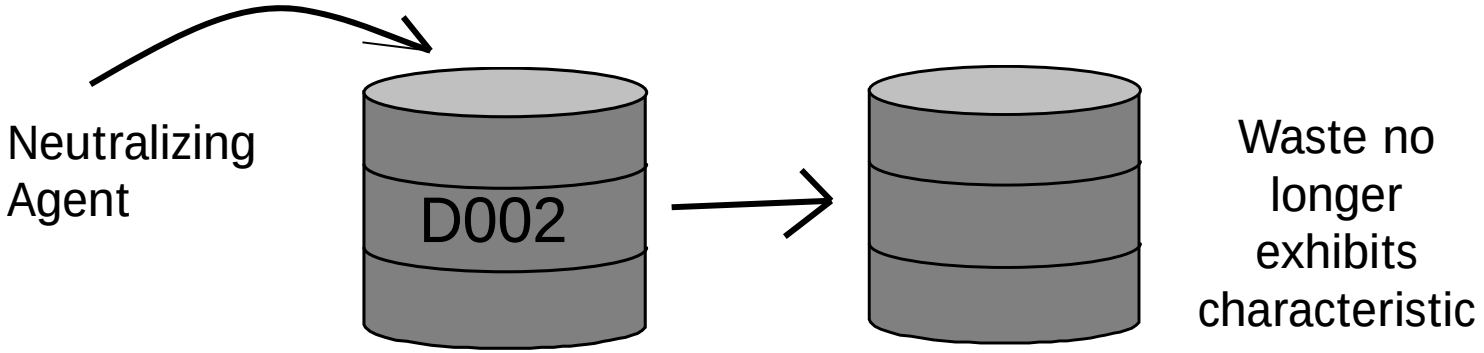
- Subject to regulation under the Clean Water Act (CWA)
- Meets the definition of tank or tank system
- Dedicated for treatment or storage of wastewater or sludge associated with an on-site wastewater treatment facility



40 CFR §§260.10, 264.1(g)(6), 265.1(c)(10), and 270.1(c)(v)

Elementary Neutralization Unit (ENU)

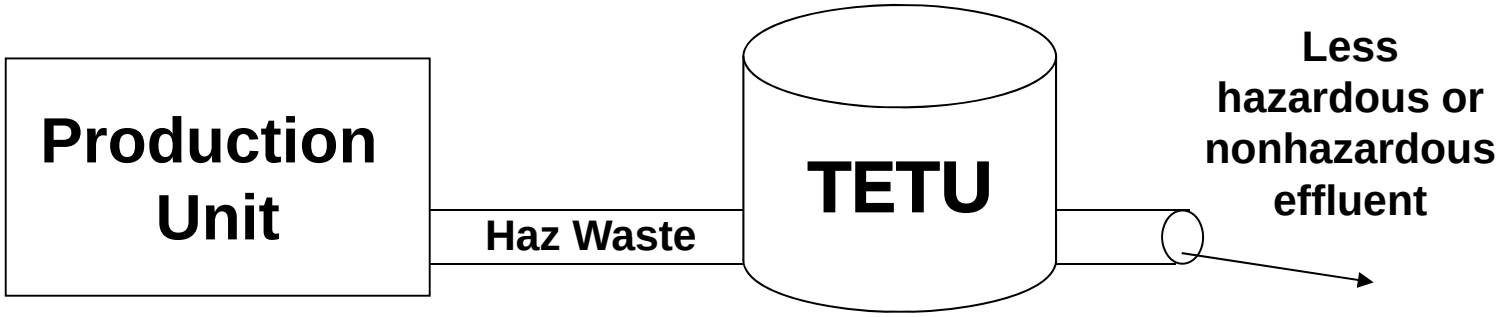
- Used to neutralize D002 corrosive wastes or listed wastes regulated only due to corrosivity
- Meets the definition of tank, tank system, container, transport vehicle, or vessel
- Considered low-risk treatment



40 CFR §§260.10, 264.1(g)(6), 265.1(c)(10), and 270.1(c)(v)

Totally Enclosed Treatment Unit (TETU)

- Connected to an industrial production process
- Used for treatment of hazardous waste
- Must be totally enclosed on all sides – can have valves or vents as long as there are no hazardous waste releases from these openings
- If unit leaks, it is no longer exempt



40 CFR §§260.10, 264.1(g)(5), 265.1(c)(9), and 270.1(c)(iv)

Subpart CC – Exemptions (cont'd)

- Units **listed in §264/265.1080(b)**
  - No waste added after effective date of CC (December 6, 1996)
  - Container with design capacity $\leq$ 0.1 m^3
  - Tanks or surface impoundments undergoing closure
  - Units managing remediation waste (to maintain flexibility)
  - Units holding radioactive mixed waste (to avoid duplicative regulation with Atomic Energy Act and Nuclear Waste Policy Act)

40 CFR Sections 264.1080(b) and 265.1080(b)

Subpart CC – Exemptions (cont'd)

- Units subject to **other air emissions requirements**
  - Tanks with a process vent regulated under RCRA Subpart AA
  - Units regulated under the Clean Air Act

    Part 60 (Performance Standards for Stationary Sources)

    Parts 61 and 63 (National Emission Standards for Hazardous Air Pollutants – NESHAPs)
  - Why? Emissions controls under the different programs provide substantively the same level of protectiveness
  - To qualify, the unit must be *equipped with and operating* appropriate controls (active control of emissions is required)

40 CFR Sections 264/265.1080(b)(7) and (b)(8)

Subpart CC – Exemptions (cont.)

- **Recycling units** where no waste storage occurs
- Units in **Satellite Accumulation Areas (SAAs)** (59 FR 62910; December 6, 1994)
- Units Satisfying a **Treatment Exemption** in Sections 264.1082(c) or 265.1083(c)
  - Organic content has been destroyed or removed by a specified process
  - Tank or surface impoundment used for biological treatment
  - Unit storing waste that meets its LDR treatment standards
  - Incinerator bulk feed tanks regulated under the benzene NESHAP

Subpart CC – Exemptions (cont.)

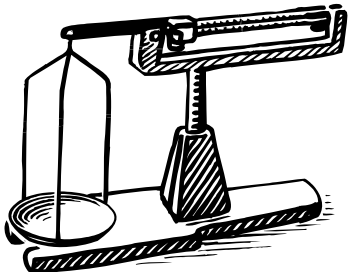
- Administrative stay for hazardous waste tanks and containers associated with **organic peroxide manufacturing**
  - Document potential safety hazards associated with installation and operation of Subpart CC air emission controls
  - Recordkeeping and notification requirements apply
- Regulatory deferrals under the Project XL Program
  - Merck Pharmaceutical Stonewall Manufacturing Plant in Elkton, Virginia (reduced scope of Subpart CC requirements)
  - OSi Specialties plant in Sistersville, West Virginia (alternate Subpart CC requirements)

40 CFR Sections 264/265.1080 (d) through (f)

Subpart CC – Exemptions (cont.)

- Units managing hazardous waste with a **VOC concentration less than or equal to 500 parts per million by weight** (ppmw) at the point of waste origination

- VOC concentration is a **mass-weighted average**
  - Determined by direct measurement (equivalent to Method 25D) or by applying knowledge
  - Need not include low volatility constituent concentrations (Part 265, Appendix VI)



- **Point of Waste Origination**
  - LQGs = point of waste generation
  - TSDFs = point of waste generation or waste acceptance

40 CFR Sections 264.1082(c)(1) and 265.1083(c)(1)

Subpart CC – Tank Types

- **Level 1 Units**
  - Meet maximum organic vapor pressure limits based on tank size
  - No heating above the temperature at which vapor pressure was determined
  - No waste stabilization
  - Includes most tanks at manufacturing facilities

- **Level 2 Units**
  - All tanks that do not meet definition of a Level 1 tank
  - Most TSDFs choose this path due to variability in wastestreams

40 CFR Sections 264.1084 and 265.1085

Subpart CC – Level 1 Tank Requirements

- Fixed roof
- Closure device or closed-vent system connected to control device on all openings
  - General operating and design requirements in 264.1087 and 265.1088
  - No specific performance standards
- Conservation vents allowed to maintain tank pressure

40 CFR Sections 264.1084(c) and 265.1085(c)

Subpart CC – Level 2 Tank Requirements

- Comply with one of the following:
  - Fixed roof and internal floating roof
  - External floating roof
  - Fixed roof vented through a closed-vent system to a control device
  - Pressure tank
  - Enclosure vented through a closed-vent system to an enclosed combustion device

40 CFR Sections 264.1084(d) and 265.1085(d)

Subpart CC – Container Types

- **Level 1 Containers**
  - Design capacity between 0.1 m^3 and 0.46 m^3, or greater than 0.46 m^3 and not in light material service
  - No waste stabilization

- **Level 2 Containers**
  - Design capacity greater than 0.46 m^3 and operating in light material service
  - No waste stabilization

- **Level 3 Containers**
  - All containers with a design capacity greater than 0.1 m^3 in which waste stabilization occurs

40 CFR Sections 264.1086(b) and 265.1087(b)

Subpart CC – Level 1 Container Requirements

- Meet one of the following conditions:
  - Container regulated by specific DOT standards (primarily 49 CFR Parts 178 and 179)
  - Covered container with no visible holes
  - Container with organic suppressing barrier (such as foam)

40 CFR Sections 264.1086(c) and 265.1087(c)

Subpart CC – Level 2 Container Requirements

- Meet one of the following conditions:
  - Container regulated by DOT standards
  - Container with no detectable emissions (as defined by CAA Method 21)
  - Vapor tight containers (as defined using CAA Method 27)

40 CFR Sections 264.1086(d) and 265.1087(d)

Subpart CC – Level 3 Container Requirements

- Meet one of the following conditions:
  - Container vented directly through a closed-vent system to a control device
  - Container vented into an enclosure that is exhausted through a closed-vent system to a control device

40 CFR Sections 264.1086(e) and 265.1087(e)

Subpart CC – Surface Impoundment Requirements

- Floating synthetic membrane cover forming a continuous barrier over the liquid surface
- Another type of cover where any openings are equipped with a closure device or vented through a closed-vent system to a control device

40 CFR Sections 264.1085 and 265.1086

Subpart CC – Inspection and Monitoring

- Tanks
  - Level 1 - initially and annually
  - Level 2 - specific to type of tank
- Surface impoundments
  - Initially and annually
  - Longer than 1 year if unsafe to inspect and monitor (worker exposure to unsafe, hazardous, or dangerous conditions)
- Containers
  - Initially (unless moved off site within 24 hours)
  - Annually

Subpart CC – Repairs

- Tank and Surface Impoundment Repair Schedule
  - First attempt within 5 calendar days after detection
  - Completed as soon as possible, but no later than 45 calendar days after detection
  - Delays allowable if repair requires emptying or temporarily removing the unit from service and no alternate unit is available

    Repair must be completed the next time waste generating process operations stop or another unit becomes available to hold waste
- Container Repair Schedule
  - First attempt within 24 hours of detection
  - Completed within 5 days after detection

40 CFR Sections 264.1084(k), 264.1085(f), and 264.1086

Subpart CC – Recordkeeping

- All records are placed in an operating record
  - Waste determination procedures
  - Verification of exempt units
  - Control device installation records
  - Test method results
  - Inspection logs
  - Maintenance records
- Keep all records for a minimum of three years

40 CFR Sections 264.1089 and 265.1090

Subpart CC – Reporting

- Only permitted facilities report
- Report all instances of noncompliance within 15 calendar days of discovery
  - When units that are exempted under 264.1082(c) are used to manage hazardous wastes that do not qualify for the exemptions
  - When Level 1 tanks do not meet vapor pressure criteria specified in 40 CFR Section 264.1084(b)
- Semi-annual report describing instances where:
  - Control devices were in noncompliance for 24 hours
  - Visible emissions were present for five minutes or more without an operating flare
  - No report if no noncompliance events during referenced period

Subpart CC – Implementation Issues

- Lack of regulatory detail
  - Permit conditions must be specific
  - EPA Region 4 Model Permit
  - Example permits available online
- Lack of facility awareness
  - Identification of subject units
  - Subpart CC does not apply to incinerators, boilers, furnaces
  - Subpart CC applies to Subpart X units
  - Subpart CC applies to Waste Transfer Stations
  - EPA Region 2 Model Information Request

Subpart CC – Implementation Issues (cont.)

- Specific monitoring methodologies
  - Specialized equipment and procedures
  - Complicated interpretation
- Monitoring and maintenance of control devices
  - Various devices = variable inspection items, anticipated defects, failure rates, and inspection frequencies
  - Maintenance of control device itself
    - Planned routine maintenance not to exceed 240 hours per year
    - Hazardous waste management can continue without controls during this time
    - Backup controls required if yearly maximum cannot be met

Subpart AA – Applicability

- **Process vents**: Any open-ended pipe or stack that is vented to the atmosphere directly, through a vacuum-producing system, or through a tank

- Emissions directly associated with **certain processes**:

  - Distillation
  - Fractionation
  - Air stripping
  - Thin film evaporation
  - Solvent extraction
  - Steam stripping

Subpart AA – Applicability (cont.)

- Process vents on:
  - Hazardous waste units subject to permitting or interim status
  - Hazardous waste recycling units managing waste for over 90 days at RCRA facilities
  - LQG accumulation units not used for recycling
- Managing hazardous waste with organic concentrations of at least 10 ppmw (confirmed annually)

40 CFR Sections 264.1030 and 265.1030

Subpart AA does NOT apply to process vents on:

- Generator hazardous waste accumulation units used for recycling
- Units not subject to RCRA permitting (SQG and CESQG units, WWTUs, ENUs, and TETUs)
- Production units conducting one of the big six operations, even if hazardous wastes are generated therein
  - Subpart AA standards are only applicable to process vents on units used to treat hazardous waste
- Units subject to and in compliance with CAA regulations
  - All process vents otherwise subject to Subpart AA must be equipped with and operating active air emission controls
  - Recordkeeping requirements apply
- Units at the Merck Pharmaceutical Stonewall Manufacturing Plant in Elkton, Virginia (Project XL deferral to CAA rules)

Subpart AA – Requirements

- **Allowable facility-wide total organics emissions rate =** three pounds per hour **AND** 3.1 tons per year

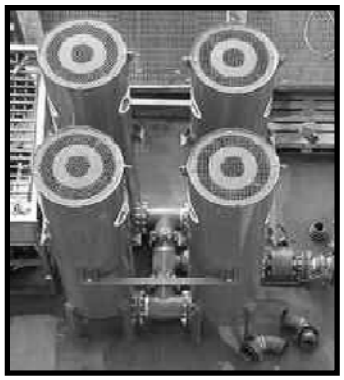
- If threshold is exceeded, facility must:
  - Reduce facility-wide emission rates from all subject process vents to levels below these thresholds

    OR

  - Reduce facility-wide total organic emissions from all sources by 95 percent

Subpart AA – Compliance Options

- Use of control devices to remove or destroy organics in exhaust stream
  - Vapor recovery systems
  - Flares
  - Enclosed combustion devices



- Use of closed vent systems to route exhaust gases to control devices
- Change process to reduce organics entering system
- Cease operations

40 CFR Sections 264.1033 and 265.1033

Subpart AA – Vapor Recovery Systems

- **Organic vapor recovery efficiency** of 95 percent by weight
  - Lower recoveries allowable if discharges from all affected process vents are less than 1.4 kg/hr or 2.8M g/year
- **Condensers** – remove organics from the vent stream by cooling and condensing vapors into liquids
  - Two monitoring options:

    Continuous measurement of organic concentration in exhaust

    Continuous monitoring of exhaust stream temperature

40 CFR Sections 264.1033(b) and (f)

Subpart AA – Vapor Recovery Systems (cont.)

- **Carbon Adsorption** – organic vapor molecules removed from exhaust stream by adhering to solid carbon material
  - Some units capable of onsite regeneration (fixed-bed units)
  - Some units require replacement and off-site regeneration (units equipped with carbon canisters)
  - Three monitoring requirements:

    Continuous monitoring of organics concentration in control device exhaust

    Daily evaluation of results to confirm that unit is operating appropriately and that breakthrough has not occurred

    Regular regeneration of carbon bed or replacement of carbon canister

40 CFR Sections 264.1033(b) and 264.1033(f) through (h)

Subpart AA – Flares

- Vent exhaust is fed into a stack, with combustion occurring near the top of the stack
- Designed for and operated with “no visible emissions”
  - Determined using CAA Method 22 (Part 60, Appendix A)
  - Visible emission periods not to exceed a total of five minutes during any two consecutive hours
- Flame must be present at all times
  - Confirmed by continuous monitoring with a heat sensing device at end of stack

- A flares must be steam-assisted, air-assisted, or nonassisted

40 CFR Sections 264.1033(d-e) and 265.1033(d-e)

Subpart AA – Flares (cont.)

- A steam-assisted or nonassisted flare is designed for and operated with an exit velocity
  - < 18.3 m/s (60 ft/s)
  - ≥ 18.3 m/s but < 122 m/s (400 ft/s) if the net heating value of the gas being combusted is > 37.3 MJ/scm (1,000 Btu/scf)
  - < V_{max} and < 122 m/s (400 ft/s) is allowed
- An air-assisted flare is designed and operated with an exit velocity < the maximum allowed velocity (V_{max})
- The net heating value of the gas being combusted is calculated by multiplying a constant ($1.74E^{-7}$) by the summation of the product of the sample components' concentrations and the net heat of these components (at 25° C and 760 mm Hg)

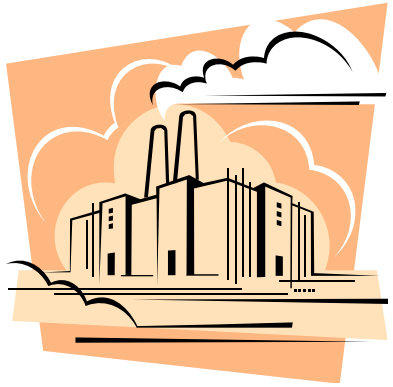
40 CFR Sections 264.1033(d-e) and 265.1033(d-e)

Subpart AA – Flares (cont.)

- The actual exit velocity of a flare is calculated by dividing the volumetric flow rate by the unobstructed cross-sectional area of the flare tip.
- The V_{max} of flare is calculated with the following equation: $Log_{10}(V_{max}) = (H_T+28.8)/31.7$ where H_T is the net heating value.
- The V_{max} of an air-assisted flare is calculated with the following equation: $V_{max} = (8.706+0.7084)(H_T)$ where H_T is the net heating value.

Subpart AA – Enclosed Combustion

- Rapid oxidation within a combustion chamber to destroy combustible organic constituents in vent exhaust stream



- Designed and operated to:
  - Reduce the organic emissions vented to it by 95 percent by weight or greater
  - Achieve a total organic compound concentration of 20 ppmv, expressed as the sum of actual compounds, OR
  - Provide a minimum residence time of 0.5 seconds at a minimum temperature of 760 °C

40 CFR Sections 264.1033(c) and 265.1033(c)

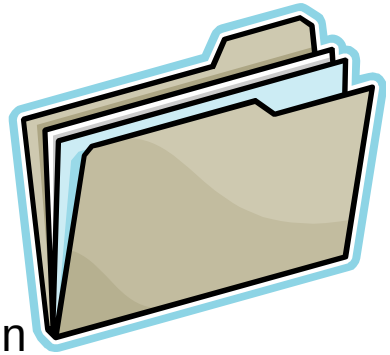
Subpart AA – Enclosed Combustion Devices

- Thermal Vapor Incinerator
  - Continuous temperature monitoring in combustion chamber downstream of combustion zone
- Catalytic Vapor Incinerator
  - Continuous temperature monitoring of vent stream feed at catalyst bed inlet and device exhaust at catalyst bed outlet
- Boiler or Process Heater – burn to produce steam
  - Vent stream introduced directly into flame combustion zone
  - Continuous temperature monitoring downstream of combustion zone (smaller units), or continuous monitoring of combustion efficiency (larger units)

40 CFR Sections 264.1033(f) and 265.1033(f)

Subpart AA – More Control Device Requirements

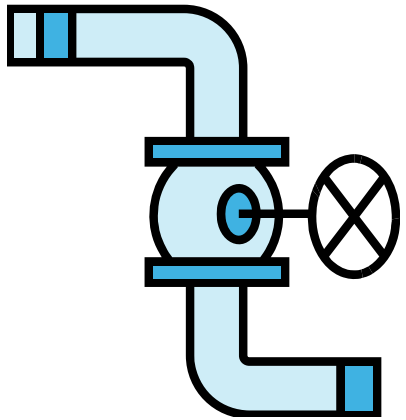
- **Equivalent control devices** can be used with adequate documentation (regulatory flexibility)
- **Flow indicator** installed and operated to record flow from each individual process vent
  - Monitor the vent stream as close as possible to the control device inlet but before vent streams are combined
  - Flow rate recorded at least once an hour
- **Recordkeeping** for each control device
  - Design details and analysis
  - Calculations used to document efficiency
  - Monitoring, operating, and inspection information
  - Kept up-to-date in the facility operating record



40 CFR Sections 264.1033(f) and (j); 264.1035

Subpart AA – Closed-Vent Systems

- Positive Pressure Systems
  - No detectable emissions
  - Joints, seams, flanges, and welds must be visually inspected and monitored using CAA Method 21
  - Instrument readings less than 500 ppm above background



- Negative Pressure Systems
  - Equipped with readily accessible pressure gauge to ensure that pressure vacuum is maintained when unit is operating

Subpart AA – Closed-Vent Systems (cont.)

- Leak Detection Monitoring
  - Initial leak evaluation when the system first becomes subject to Subpart AA
  - After a leak, entire system must be evaluated at least once per year or upon EPA request
  - Demonstrate no detectable emissions

    Measured using CAA Method 21

    Indicated by an instrument reading of less than 500 ppmv above background
  - Not required for portions deemed unsafe to monitor because personnel would be exposed to an immediate danger

    Must monitor as frequently as practicable during safe-to-monitor times; written plan required

Subpart AA – Closed-Vent Systems (cont.)

- Repair Schedule
  - First attempt no later than five calendar days after detection
  - Complete repair as soon as possible, but no later than 15 calendar days after detection
  - Delay is allowable:

    If process unit shutdown is required to complete repair, or

    If emissions from immediate repair would be greater than if delayed

    Must be completed by end of next process shutdown
  - Facility must record maximum instrument reading measured by CAA Method 21 after the defect is successfully repaired or determined to be nonrepairable

40 CFR Sections 264.1033 and 264.1035

Subpart AA – Reporting

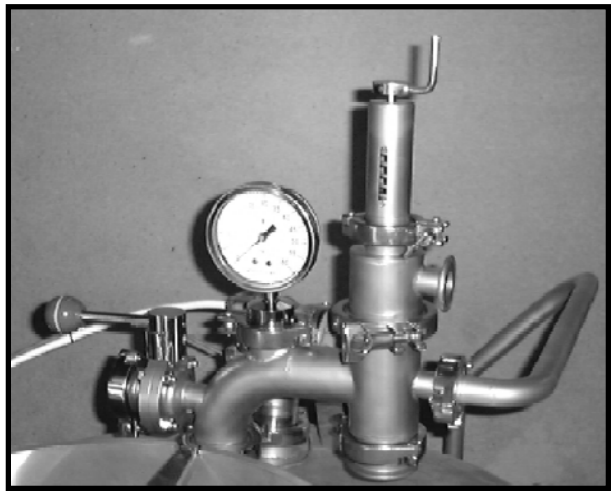
- Only permitted facilities report
- **Semi-annual report** describing instances where:
  - Control devices were in noncompliance for 24 hours
  - Flare operated with visible emissions
  - No report if no noncompliance events during referenced period
- **Certifications** in operating record
  - Design analysis reasonably represents highest load or capacity-level operating conditions
  - Control devices in use at the facility are designed to operate at an efficiency of 95 percent or greater (can be supported by vendor or manufacturer documentation)

40 CFR Sections 264.1036

Subpart AA – Implementation Issues

- Groundwater Remediation Operations (Air Stripping)
  - Wastewater treatment exemption in 264.1(g)(6) applies only to influent wastewaters classified as hazardous wastes
  - Environmental media are not solid wastes
  - Contained-in Policy applies: media contaminated with listed wastes must be managed as if they were hazardous wastes
  - Not excluded from Subpart AA (or Subpart BB)
- Inspections and Violations
  - Pre-inspection file review
  - Process and compliance strategy
  - Develop a facility-specific checklist

Subpart BB – Applicability



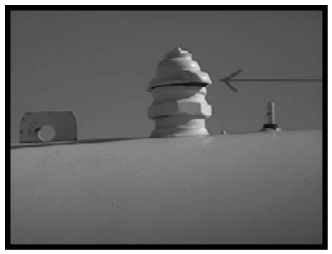
- **Equipment leaks** from:
  - Hazardous waste units subject to permitting or interim status
  - Recycling units at a permitted or interim status facility
  - LQG accumulation units

- **Equipment** includes valves, pumps, compressors, pressure relief devices, open-ended valves or lines, sampling ports, flanges or other connectors, and any control devices or systems required by Subpart AA (64 FR 3389; January 21, 1999)

- Containing or contacting hazardous waste with organic concentrations of at least 10 percent by weight

40 CFR Sections 264.1050 and 265.1050

Subpart BB, as a whole, does NOT apply to equipment leaks from:



- Generator hazardous waste accumulation units used for recycling
- Units not subject to RCRA permitting (SQG and CESQG units, WWTUs, ENUs, and TETUs)
- Units at the Merck Pharmaceutical Stonewall Manufacturing Plant in Elkton, Virginia (Project XL deferral to CAA rules)
- Purged coatings and solvents from surface coating operations subject to NESHAPs for surface coating of automobiles and light-duty trucks in 40 CFR part 63, Subpart IIII

Subpart BB Conditional Exclusions

- Equipment that contacts or contains hazardous waste with at least 10 percent by weight organic content for less than 300 hours in a calendar year
  - Excluded from equipment standards, inspection, and monitoring requirements
- Equipment in vacuum service
  - Excluded from equipment standards
- Must still comply with recordkeeping and reporting requirements

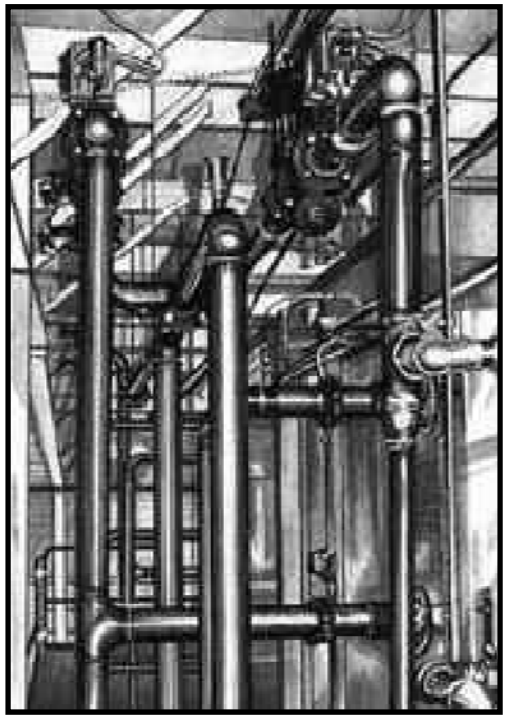
40 CFR Sections 264.1050 and 265.1050

Subpart BB – Definitions

- Light liquid service
  - Waste stream is a liquid at operating conditions
  - More than 20 percent of waste stream by weight must consist of organic components with a vapor pressure above 0.3 kPa
  - Includes those liquids most likely to result in air emissions
- Gas/vapor service
  - Waste stream is in the gaseous state at operating conditions
- Heavy liquid service
  - Waste stream does not meet above criteria for light liquid or gas/vapor service

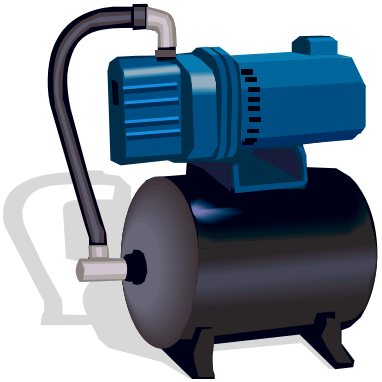
Subpart BB – Requirements

- Equipment must be **marked** in such a way that it can be readily distinguished from other pieces of equipment
- Specific standards for specific equipment
  - Design
  - Inspection
  - Monitoring



40 CFR Parts 264 and 265, Sections 1052 through 1062

Subpart BB – Equipment Standards



- Pumps in Light Liquid Service
  - Visually inspected for leaks weekly
  - Monitored monthly using CAA Method 21 (equipment reading of 10,000 ppm or more indicates that a leak has occurred)

    May be exempt if equipped with dual mechanical seal system and barrier fluid system
  - Exempt from visual and instrument monitoring and repair requirements if:

    Operating with no detectable emissions (instrument readings of less than 500 ppm above background) – must be confirmed annually

    No externally actuated shaft penetrating the pump housing

Subpart BB – Equipment Standards (cont.)

- Compressors
  - Must be equipped with seal and barrier fluid systems that prevent leakage of total organic emissions
  - Exempt from seal system requirements if equipped with a closed-vent system capable of capturing and transporting leakage from seal to a control device

  - Exempt from design standards and repair requirements if operating with no detectable emissions (instrument readings of less than 500 ppm above background) – must be confirmed annually

Subpart BB – Equipment Standards (cont.)

- Pressure relief devices in gas/vapor service
  - Must be operated with no detectable emissions (instrument readings of less than 500 ppm above background)
  - Leaks must be repaired as soon as practicable but no later than five calendar days after pressure release
  - Exempt from design standards and repair requirements if equipped with a closed-vent system capable of capturing and transporting leakage from pressure relief device to a control device

Subpart BB – Equipment Standards (cont.)

- Sampling Connection Systems
  - Must be equipped with a closed-purge, closed-loop, or closed-vent system

    Return the sample purge directly to the process line, or route it to the appropriate treatment or recycling system

    No detectable emissions from connection system

    Gases displaced during filling of the sample container are not required to be collected or captured

  - *In-situ* sampling systems and sampling systems without purges are exempt from design requirements

Subpart BB – Equipment Standards (cont.)

- Open-Ended Valves or Lines
  - Must be equipped with a cap, blind flange, plug, or second valve
  - Must seal the open end at all times except during operations requiring hazardous waste stream flow through the open-ended valve or line
  - Second valve must be operated in a manner such that the valve on the hazardous waste stream end is closed before the second valve is closed
  - When a double block and bleed system is being used, the bleed valve or line may remain open for venting between block valves

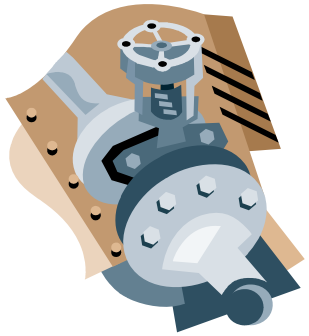
Subpart BB – Equipment Standards (cont'd)

- Valves in gas/vapor service or light liquid service
  - Specific schedule for leak monitoring (with diminishing frequency as appropriate)
  - Valves deemed unsafe to monitor are exempt if:
    - Valve cannot be monitored without elevating the monitoring personnel more than 2 meters above a support surface
    - Hazardous waste management unit within which the valve is located was in operation before June 21, 1990
    - Written plan requires monitoring of the valve at least once per calendar year
  - Exempt from monitoring if operating with no detectable emissions (confirmed annually) and unit has no external actuating mechanism in contact with waste

Subpart BB – Equipment Standards (cont.)

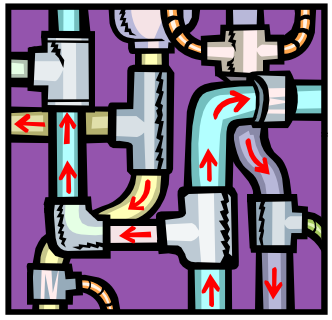
- Alternative standards for valves
  - Up to 2 percent of valves within a hazardous waste management unit are allowed to leak

    Determined by dividing the number of valves subject to Subpart BB requirements for which leaks have been detected by the total number of valves subject to Subpart BB within the hazardous waste management unit
  - If the percentage of leaking valves is greater than 2 percent, monthly monitoring is required
  - If the percentage of leaking valves is equal to or less than 2 percent, the frequency of leak detection monitoring can be reduced



Subpart BB – Equipment Standards (cont)

- Miscellaneous equipment
  - Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, flanges, and other connectors
    - Monitoring and repair requirements
    - Exemption from monitoring requirements for connectors that are inaccessible or are ceramic or ceramic-lined (e.g., porcelain, glass, or glass-lined)



  - Closed-vent systems and control devices
    - Implementation schedule for Subpart BB controls

Subpart BB – Leak Detection and Repair (LDAR)

- Repair Schedule (unless otherwise specified)
  - First attempt no later than five calendar days after detection
  - Complete repair as soon as possible, but no later than 15 calendar days after detection
  - Delay is allowable:

    If process unit shutdown is required to complete repair

    If equipment is isolated from the hazardous waste management unit and does not continue to contain or contact hazardous waste with organic concentrations at least 10 percent by weight

    If emissions from immediate repair would be greater than if delayed

    If necessary valve assembly supplies have been depleted

Subpart BB – Administrative Requirements

- Recordkeeping
  - List of equipment subject to Subpart BB
  - Equipment location
  - Percent-by-weight organics
  - Hazardous waste state (liquid/gas)
  - Methods of compliance
  - Leaking equipment must be tagged
  - Monitoring, operating, and inspection information
  - Kept up-to-date in the facility operating record
- Semi-annual reporting on noncompliance events

40 CFR Parts 264 and 265, Section 1064

Subpart BB – Implementation Issues

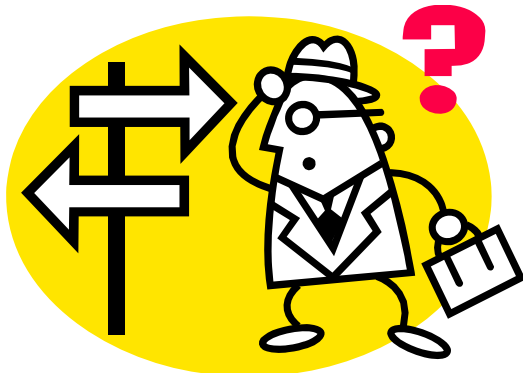
- Facility Awareness
  - Applicable to LQGs
  - Applicable in addition to general air permits
  - Manufacturing unit exemption
- Solvent Cleaning and Recycling Exemption
  - Automobile manufacturing enforcement
  - Solvent/paint mix is hazardous waste
  - Subpart BB requirements apply to management systems

Overlap with the Clean Air Act

- Statutory Direction
  - RCRA §3004(n) gives EPA specific authority to regulate air emissions from hazardous waste management sources
  - RCRA §1006(b) directs EPA to coordinate RCRA provisions with those of other laws
  - CAA §112(n)(7) seeks consistency between CAA and RCRA standards where practicable
- EPA Programming Goals
  - Development of complementary programs
  - Avoid duplicative regulation under RCRA and CAA
  - Minimize owner/operator burden

Overlap with the Clean Air Act (cont.)

- Subparts AA, BB, and CC Exemptions
  - Waste management units, process vents, and equipment components
  - Equipped with organic air emissions controls
  - Operating in accordance with CAA new source performance standards or national emission standards for hazardous air pollutants (NESHAPs)
  - As codified under CAA regulations in 40 CFR Parts 60, 61, or 63



Subpart AA Exemptions

- Owner or operator must certify that all process vents regulated by Subpart AA are equipped with and operating CAA air emission controls
  - Each and every process vent must be controlled
  - Different CAA rules can be used to regulate the vents
- Some CAA-compliant vents not exempt from Subpart AA
  - Vents exempt from CAA regulation
  - Vents not controlled due to NESHAP emissions averaging or bubbling provisions
  - Vents on units for which the CAA standard is “no control”

40 CFR Sections 264.1030(e) and 265.1030(d)

Subpart BB Exemptions

- Equipment does not need to comply with Subpart BB if:
  - The relevant equipment containing or contacting hazardous waste is also subject to CAA regulations in 40 CFR Parts 60, 61, or 63
  - The applicable CAA regulations include provisions for operation, monitoring, and repair of the equipment
  - Compliance with the applicable CAA requirements is adequately documented in the facility operating record
- Exemptions are not contingent on alternate CAA equipment leak requirements being equivalent to or more stringent than Subpart BB rules

Subpart CC Exemption

- Owner or operator must certify that the hazardous waste management unit is equipped with and operating CAA air emission controls under 40 CFR Parts 60, 61, and 63

- Limitations
  - Tanks using enclosures for air emissions control must meet requirements for enclosed combustion devices in 40 CFR §264.1084(i) or benzene waste operation emission standards in 40 CFR Part 61, Subpart FF
  - Uncontrolled units achieving CAA compliance via emissions averaging or bubbling do not qualify
  - Units with a CAA standard of “no control” do not qualify

40 CFR Sections 264.1080(b)(7) and 265.1080(b)(7)

Permitting Considerations

- Documentation of CAA compliance must be “readily available” in the facility’s on-site operating record

- Required Components for RCRA Permitting
  - Owner/operator certification of appropriate CAA compliance
  - Certification that the unit, process vent, or equipment is actively controlled (control device or control program)
  - Identification of each unit, process vent, or equipment component seeking exemption
  - Applicable CAA requirements
  - Copies of records and CAA compliance documentation

40 CFR Sections 264.1080(b)(7) and 265.1080(b)(7)

Where to Look for Help?

- Facility's CAA Permit and Supporting Documentation
  - Emissions estimates; test and monitoring reports
- Facility's Semi-Annual Report
- Initial Notifications for Non-Permitted Facilities
  - Applicability and compliance status
  - Routine excess emissions reports
- Additional information obtained using EPA's authority under Section 114 of the CAA
- EPA Region 4 Guidance on CAA and RCRA Overlap Provisions (available online)

Where is the RCRA Air Emissions Program Headed?

- Phase III, Industry-Specific Air Emissions Standards
  - Dependent on ability of Subparts AA, BB, and CC to effectively reduce volatile organic emissions
- Timeline is Not Specified
  - Joint CAA/RCRA focus has been on development of NESHAPs from hazardous waste combustors
  - Not included in December 2007 Regulatory Agenda
  - Beyond RCRA Vision includes moving away from traditional environmental regulatory systems (emissions limits) and toward incentives as a compliance tool

QUESTIONS?