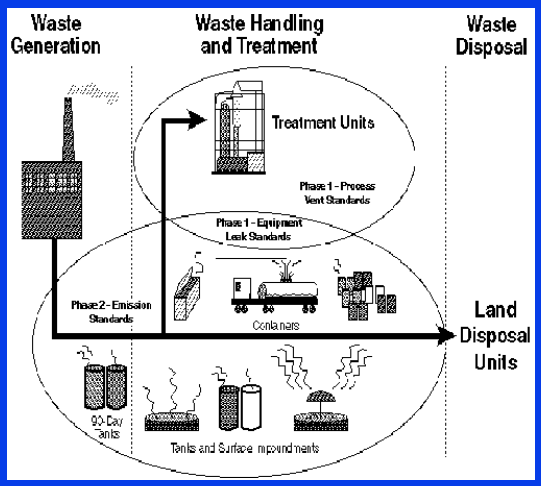
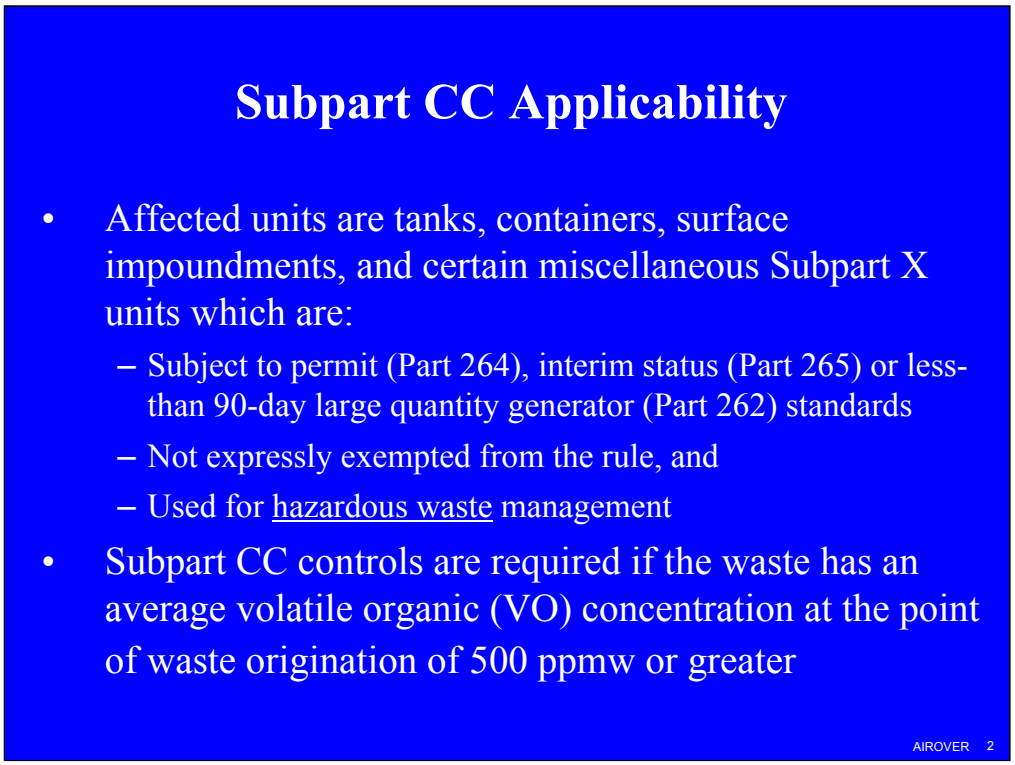
RCRA Subpart CC - Overview





On December 6, 1994, EPA modified §270.4 to require facilities that have already been issued a final RCRA permit (and whose permit does not address the Subpart CC requirements) to comply with Subpart CC standards. [62 FR 64658]

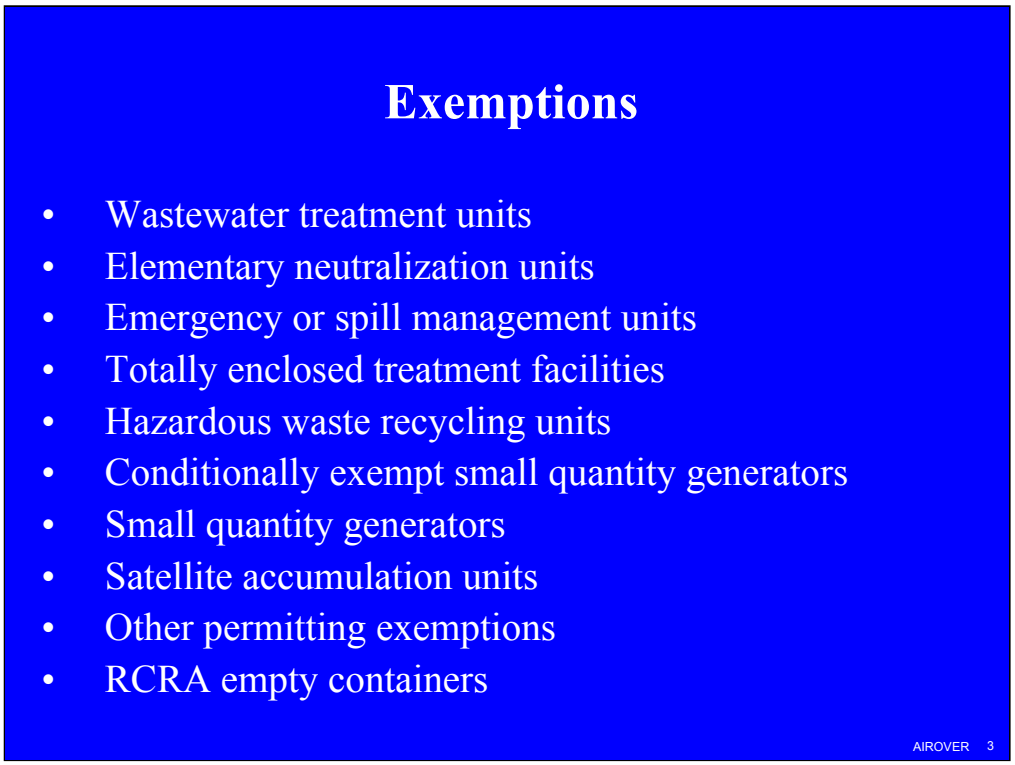
If a tank, container, surface impoundment or Subpart X unit contains hazardous waste, then Subpart CC is applicable unless there is an exemption or an exclusion.

As a separate issue, controls are required if the waste is above an average volatile organic (VO) threshold concentration or has an unknown concentration.

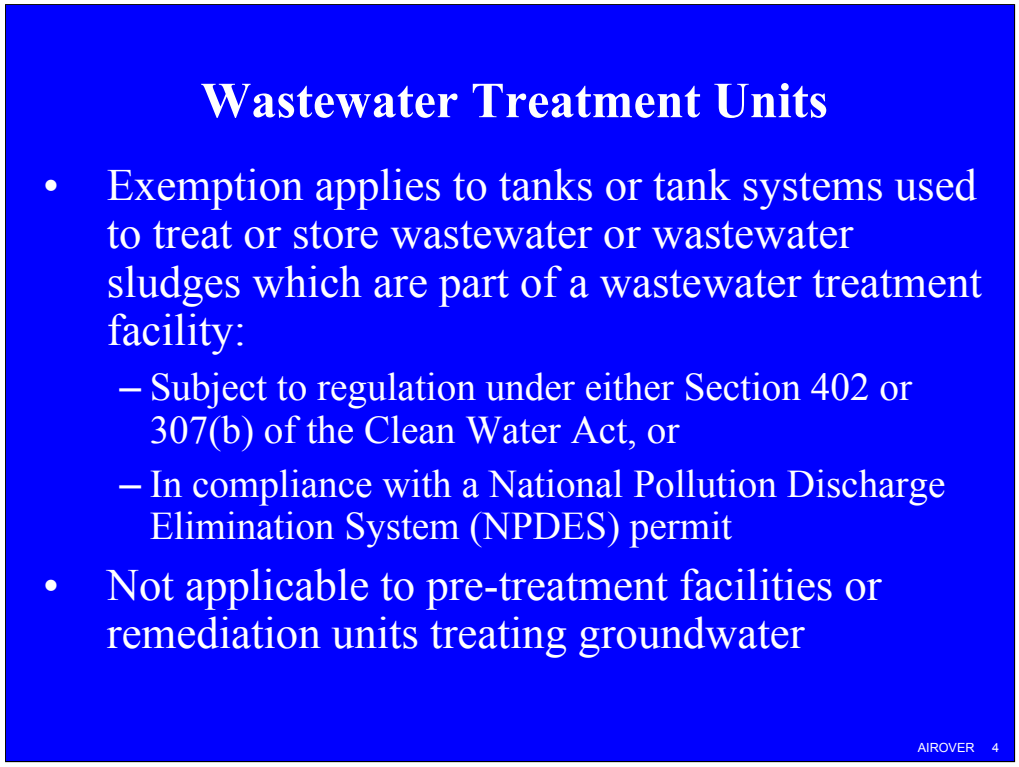
Average VO Concentrations: This term is defined as "the fraction by weight of the volatile organic compounds contained in a hazardous waste expressed in terms of parts per million (ppmw) as determined in accordance with the requirements of Sec. 265.1084 of Subpart CC by direct measurement or by knowledge of the waste.

Point of waste origination means (1) When the facility owner or operator is the generator of the hazardous waste, the point of waste origination means the point where a solid waste produced by a system, process, or waste management unit is determined to be a hazardous waste as defined in 40 CFR part 261. [Note: In this case, this term is being used in a manner similar to the use of the term point of generation in air standards established for waste management operations under authority of the Clean Air Act in 40 CFR parts 60, 61, and 63.] (2) When the facility owner and operator are not the generator of the hazardous waste, point of waste origination means the point where the owner or operator accepts delivery or takes possession of the hazardous waste.

For additional information on Subpart CC applicability, refer to EPA's *RCRA Subpart CC: Questions and Answers*, March 22, 2002.



Only units subject to RCRA permitting (and 90-day accumulation units) are subject to the Subpart CC standards. Hence, any unit (other than 90-day accumulation units) identified in 40 CFR §§264/265.1 that are not subject to interim status or permitted-unit standards are also not subject to Subpart CC standards. [§§264/265.1080(a)]



As outlined in 40 CFR §264.1(g)(6), §265.1(c)(10), and §260.10, the owner or operator of an elementary neutralization unit or a waste water treatment unit as defined in 40 CFR §260.10 is exempted from permitting requirements.

A waste water treatment unit is defined as a device which:

1) Is part of a wastewater treatment facility that is subject to regulation under either Section 402 or 307(b) of the Clean Water Act; and
2) Receives and teats of stores an influent wastewater that is a hazardous waste as defined in 40 CFR §261.3, or treats or stores a wastewater treatment sludge which is a hazardous waste as defined in 40 CFR §261.3; and
3) Meets the definition of a tank or tank system as outlined in 40 CFR §260.10.

Elementary Neutralization Units

- Exemption applies to tanks, surface impoundments and containers
  - Only when used to neutralize waste
  - Waste is hazardous by corrosivity characteristic only

Emergency or Spill Management Units

- Exemption applies to units used in an immediate response to discharge or threat of discharge of hazardous waste such as burst pipes, breached dikes, ruptured tanks or containers
- Units must be used solely for the immediate response to such releases
- This exemption is not applicable for subsequent storage of released material after the emergency has ended

This exemption is outlined in 40 CFR §264.1(g)(8)(i) and §265.1(c)(11)(i).

Totally Enclosed Treatment Facilities

- Exemption applies to units which are:
  - Directly connected to an industrial production process
  - Used to treat hazardous waste
  - Designed and managed so that no hazardous waste or constituents from hazardous waste are released to the environment during treatment

Refer to 40 CFR §264.1(g)(5) and §265.1(c)(9) for this exemption. 40 CFR §260.10 provides a definition of a totally enclosed treatment facility.

Hazardous Waste Recycling Units

- Exemption applies to units used to recycle hazardous wastes into useable products
- Units used for storage and transportation prior to point of recycling/re-creation of product are not exempt
- Residuals from recycling are not exempt if hazardous waste listing or characteristics retained
- Subparts AA and BB may be applicable to recycling units

This exemption is codified in 40 CFR §§264.1(g)(2) and 265.1(c)(6).

It is important to note that Subpart AA and Subpart BB regulations may still apply. The hazardous waste recycling unit exemption is only for Subpart CC requirements.

Conditionally Exempt Small Quantity Generators

- Exempt from Subpart CC are conditionally exempt small quantity generators, defined under 261.5(b) as those generators which:
  - Generate less than 100 kilograms per month (<220 lbs) of hazardous waste
  - Never accumulate on-site more than 1000 kilograms (2200 lbs) of hazardous waste
  - Neither generate in a month nor accumulate on-site more than 1 kg (2.2 lbs) of acute hazardous waste

Small Quantity Generators (SQGs)

- Exempt from Subpart CC are small quantity generators, defined under 40 CFR §§262.34(d) and (e) as those generators which:
  - Generate between 100 and 1,000 kilograms per month (220 to 2,200 lbs.) of hazardous waste
  - Never accumulate on-site more than 6,000 kilograms (13,200 lbs) of hazardous waste
- Exemption applies whenever generator meets criteria
- SQGs are subject to other tank and container technical standards, manifesting, etc.

The regulations applicable to small quantity generator 180/270-day containers specifically exempted the Subpart CC standards. [§262.34(d)(2)]

Satellite Accumulation Units

- Exempt from Subpart CC are satellite accumulation units, defined under 40 CFR §262.34(c) as units which are:
  - Located at or near the point of generation of the hazardous waste
  - Under the control of the operator
  - Used to accumulate no more than 55 gallons of hazardous waste or 1 quart of acute hazardous waste
  - Labeled hazardous waste

AIROVER 11

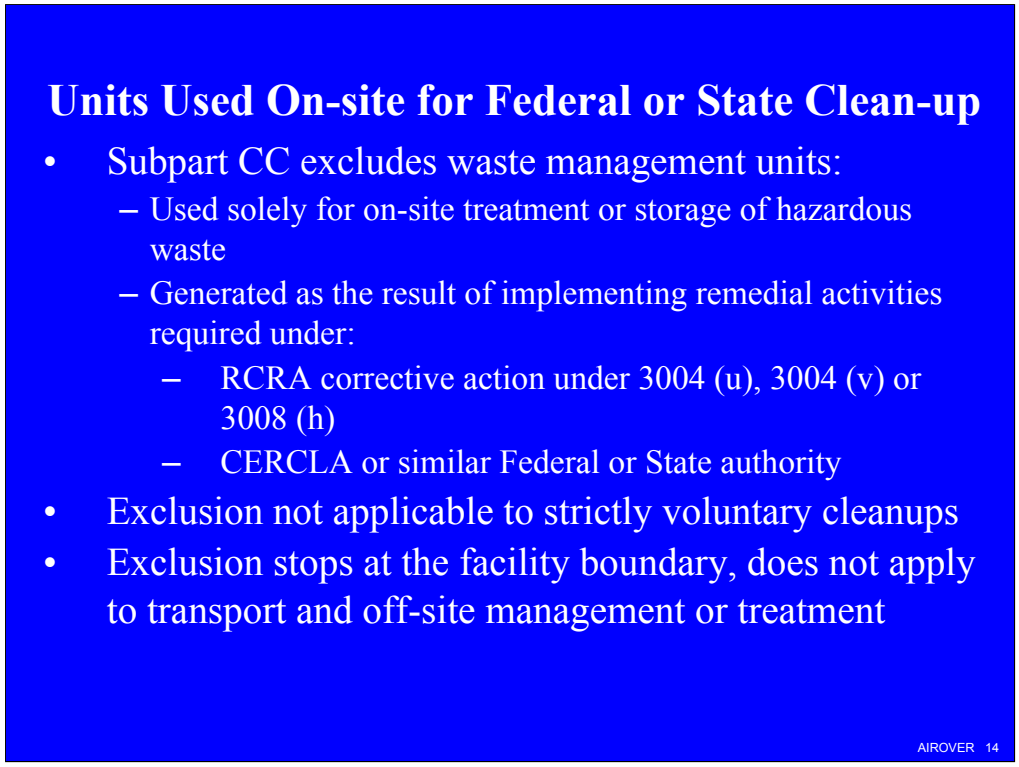
SAA containers are not subject to Subpart CC because these units are not interim status, permitted, or 90-day units. Additionally, 40 CFR §262.43 (c)(1)(i) specifies the applicable container standards and does not cite 40 CFR §265.178 which invokes Subpart CC.

Other Permitting Exemptions

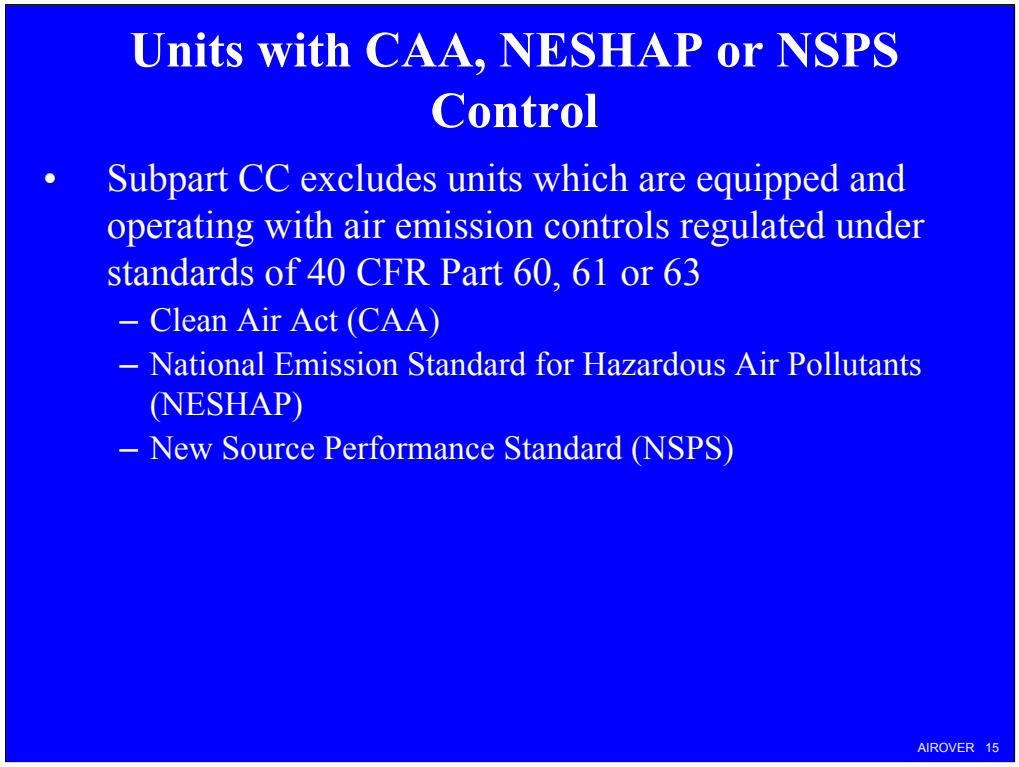
- Farmers disposing of waste pesticides in accordance with 40 CFR §264.1(g)(4), §265.1(c)(8)
- Transporters storing manifested hazardous wastes at transfer facilities for a period of no more than 10 days per 40 CFR§264.1(g)(9), §265.1(c)(12)
- Universal waste handlers, handling batteries, pesticides and thermostats per 40 CFR§264.1(g)(11) or §265.1(c)(14)
- RCRA empty containers, as defined in 40 CFR §261.7

Subpart CC Exclusions

- Units used on-site for federal or state clean-up
- Units with CAA, NESHAP or NSPS controls
- Mixed radioactive and hazardous waste
- Containers < 0.1 m^3 (approximately 26.4 gallons)
- Organic peroxide manufacturing waste
- Pre- December 6, 1996 units
- Tanks or surface impoundments in closure
- Tanks associated with process vents
- Units which have hazardous waste placed in them that meet the numerical concentration limits for organic regulations waste specified in 40 CFR §268 (Land Disposal Regulations)



Units used solely to treat or store onsite remediation wastes under state or federal RCRA corrective action or CERCLA authorities are not subject to Subpart CC requirements. Remediation wastes that are transported offsite will become subject to the Subpart CC regulations when moved outside the facility boundary. This exclusion is codified in 40 CFR §§264.1080(b)(5) and 265.1080(b)(5). In Federal Register notice 59 FR 62913, EPA stated that this was a temporary deferral that may be addressed under a Phase III air emissions rule.

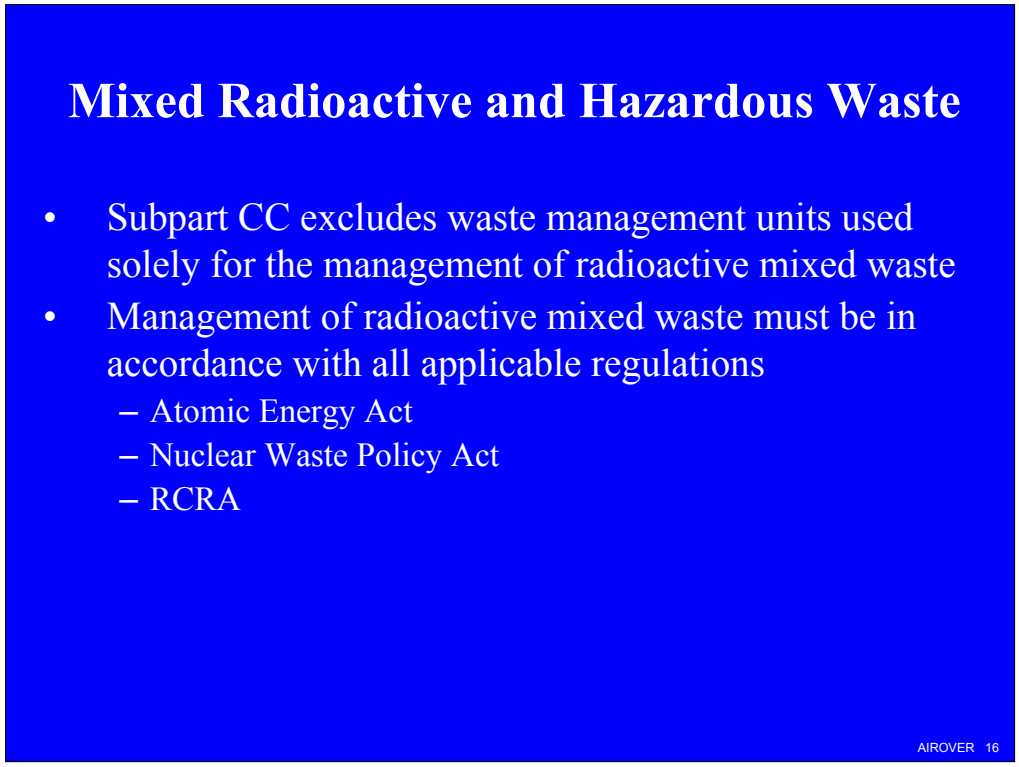


These exclusions are outlined in 40 CFR §264.1080(b)(7) and §265.1080(b)(7).

In order to avoid conflicts and overlaps between Subpart CC standards and air emission standards addressed under the Clean Air Act, EPA excluded the following "Units that are using air emission controls in accordance with the requirements of applicable Clean Air Act NESHAP or NSPS standards. [§§264/265.1080(b)(7)] For additional information regarding overlap of air emission standards for the Clean Air Act and RCRA refer to EPA's *CAA and RCRA Overlap Provisions in Subparts AA, BB, and CC of Parts 264 and 265*, October 2000.

Exclusion does not apply to CAA, NESHAP or NSPS-regulated units which are allowed to have no controls(e.g., MACT standard having "no control" as the floor). A unit that does not use the required air emission controls but is in compliance with NESHAP through "emissions averaging or bubbling" provision does not qualify for the exclusion since EPA lacks assurances that emissions from the unit are controlled to the extent necessary to protect human health and the environment. Refer to 61 FR 59938.

It should be noted that exclusions for units addressed by CAA or other overlapping regulations are not automatic and often require investigation to ensure that the units are using air emission controls. In addition, the facility must show how they operate and monitor the control devices.



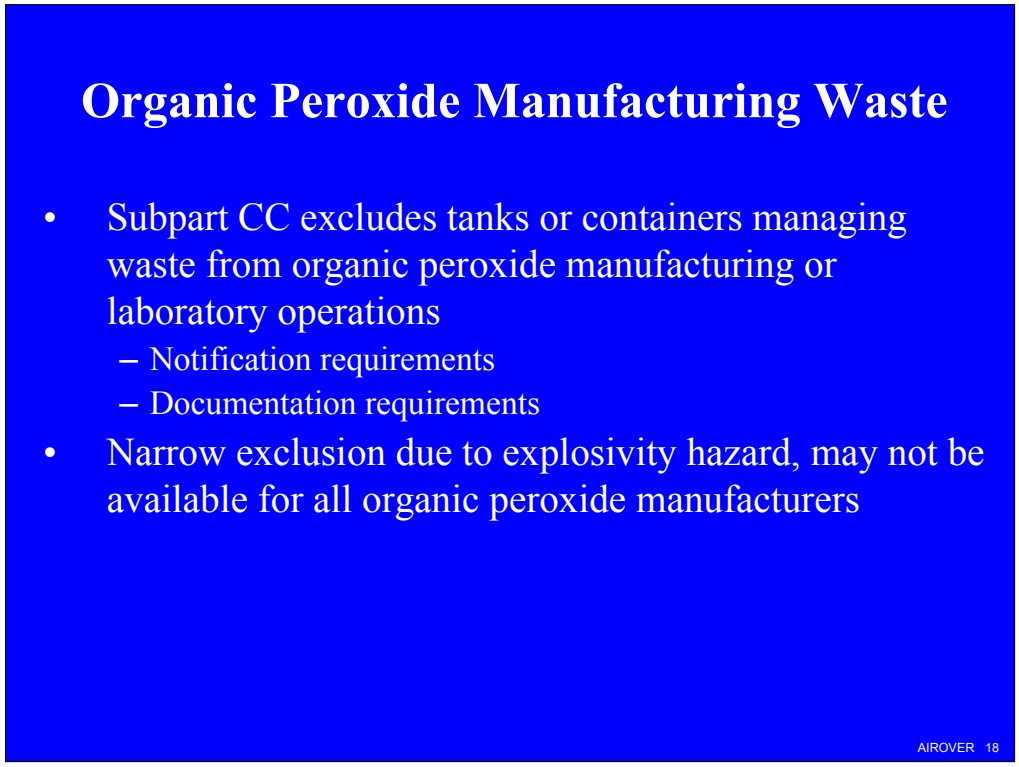
Units that receive radioactive mixed wastes are not subject to Subpart CC because air emission controls may be incompatible with NRC/DOE requirements for safe handling of radioactive materials. This exclusion is codified in 40 CFR §§264.1080(b)(6) and 265.1080(b)(6). In order to meet this exclusion, the unit containing the mixed waste must have air emission controls in place that meet NCR/DOE requirements.

It should be noted that exclusions for units addressed by NCR/DOE requirements or other overlapping regulations are not automatic and often require investigation to ensure that the units are using air emission controls.

Containers < 0.1 m^3 (Approximately 26.4 Gallons)

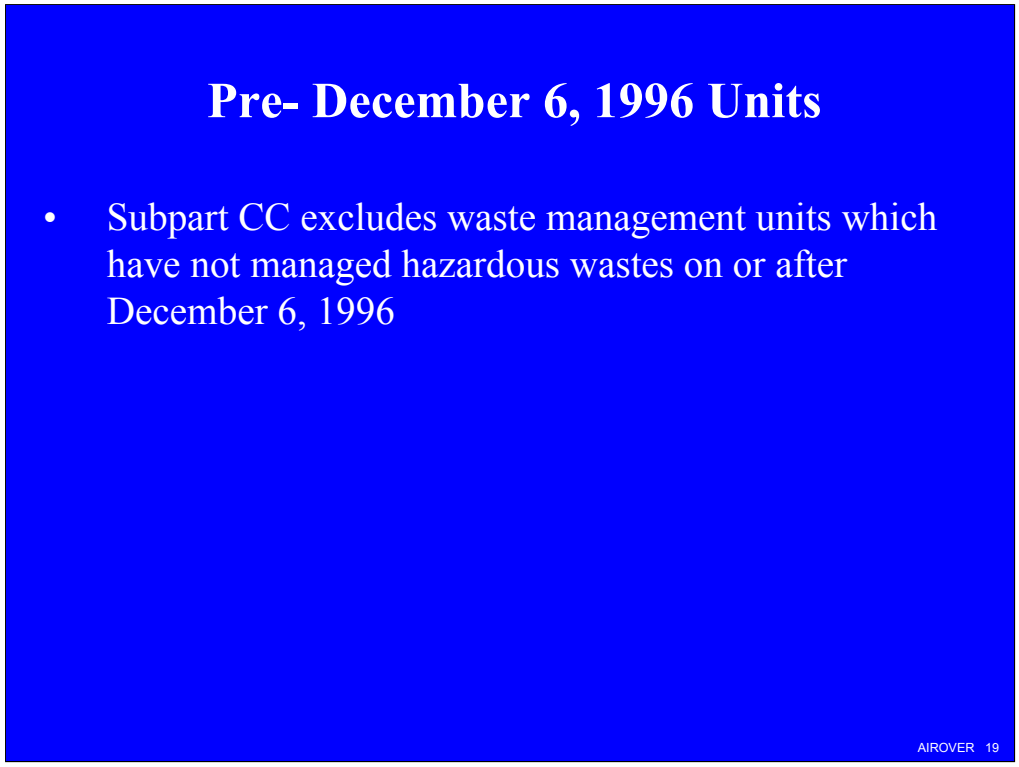
- Subpart CC excludes containers smaller than 0.1 m^3 (26.4 gallons) for management and treatment

This exclusion is codified in 40 CFR §§264.1080(b)(2) and 265.1080(b)(2).

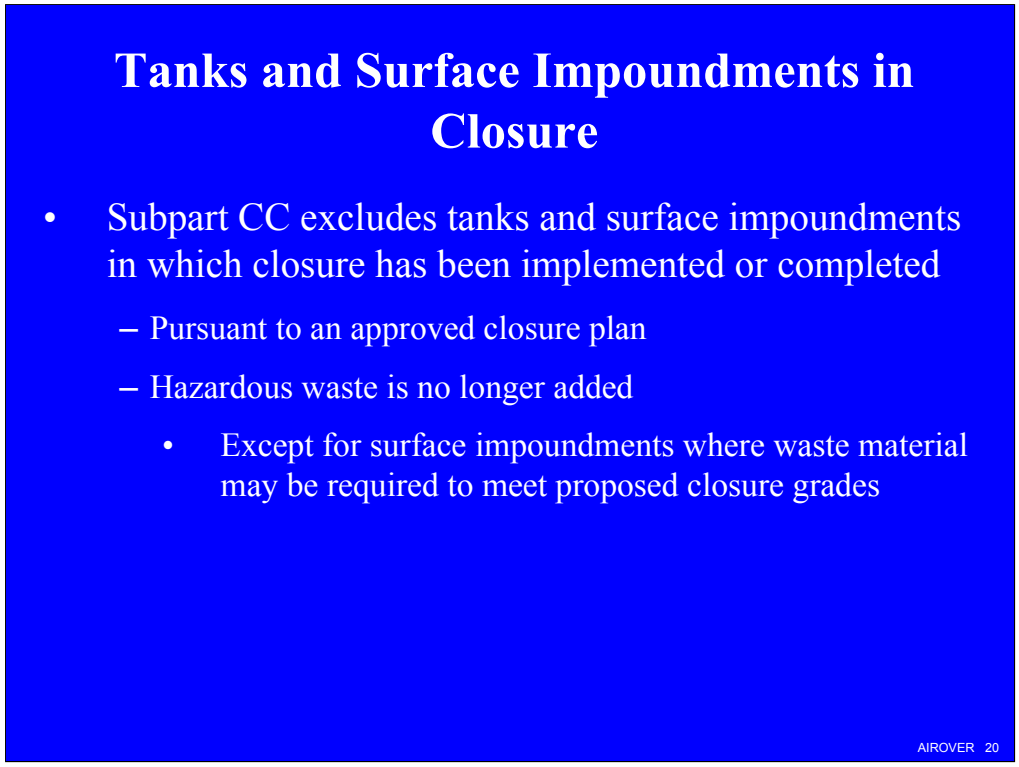


On September 29, 1995, EPA issued an administrative stay of the Subpart CC requirements for tanks or containers used to manage organic peroxide wastes. This exclusion is codified in 40 CFR §§264.1080(d) and 265.1080(d). Refer to 60 FR 50426 for additional details on this exclusion.

This exclusion only addresses a small universe of facilities.



As outlined in 40 CFR §§264.1080(b)(1) and 265.1080(b)(1), tanks, containers and surface impoundments are not subject to the Subpart CC standards if no hazardous waste us added to the unit on or after December 6, 1996.



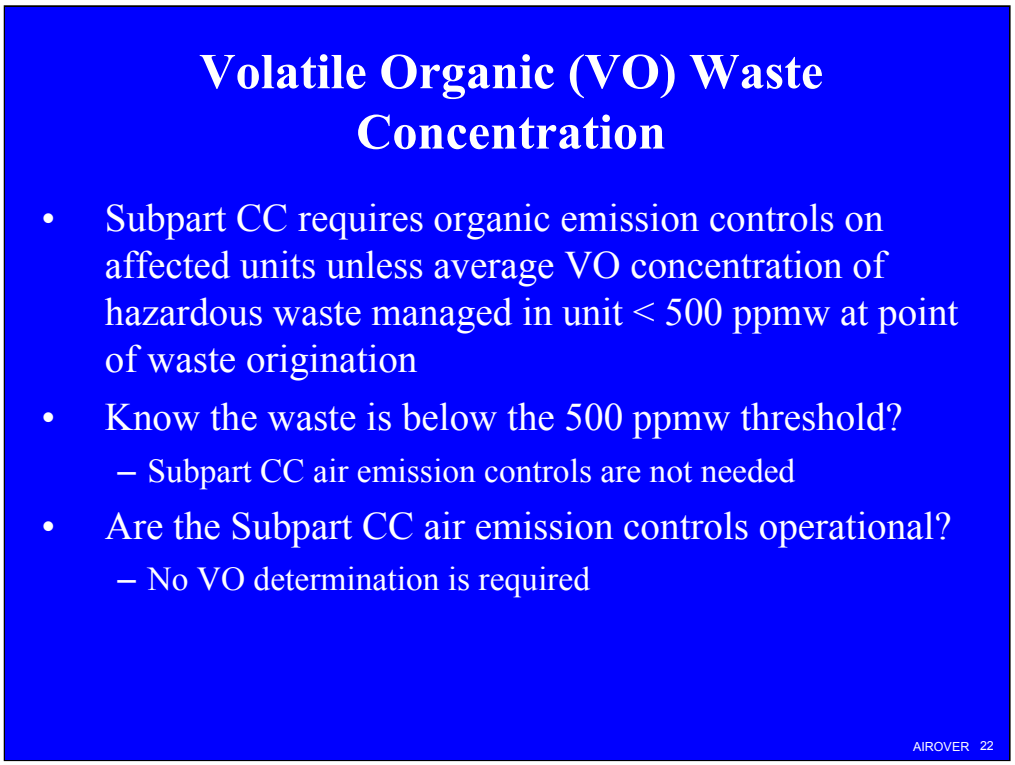
40 CFR §§264.1080(b)(3) and (4) and 265.1080(b)(3) and (4) states that if a tank or impoundment is closing or has closed pursuant to a closure plan, Subpart CC does not apply. It should be noted that an approved closure plan must be in place.

Tanks Associated with Process Vents

- Subpart CC excludes tanks associated with process vents
  - Process vents defined under 40 CFR §264.1031
  - Associated with hazardous waste distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations
- Exclusion eliminates duplicative regulation for units regulated under Subpart AA, but threshold levels are more severe

Since tanks which have process vents a regulated under Subpart AA should have emission controls, they are excluded from Subpart CC per 40 CFR §264.1080(b)(8) and §265.1080(b)(8).

Must look closely at the unit and determine if it meets the definition of "distillation" or "fractionation"



The preamble to the December 6, 1994Subpart CC rule states:

"If a hazardous waste has an average VO concentration equal to or greater than 500 ppmw based on the hazardous waste composition at the point of waste origination, then this waste is required under the Subpart CC standards to be managed in accordance with the air emission control requirements of the rule. Under those requirements, specific air emission controls must be installed and operated on every tank, surface impoundment, and container subject to the rule used in the waste management sequence from the point of waste origination through the point where the organics in the waste are removed or destroyed by a process that meets or exceeds the minimum level or performance specified in the rule. In other words, once a hazardous waste is treated to remove or destroy the organics in the waste in accordance with the rule requirements, the subsequent downstream tanks, surface impoundments, and containers used to manage this particular hazardous waste are not required to meet air emission control requirements of the Subpart CC standards." [59FR 62914]

Definition of Volatile Organic Compound

- Organic compounds with a Henry's law constant value of at least 0.1 mole-fraction-in-the-gas phase/mole-fraction-in-the liquid-phase at 25 degrees (º) Celsius (C) (40 CFR §265.1081)
- Appendix VI of Subpart CC presents a list of compounds know to have a Henry's law constant values less than the cutoff level

Determining the Point of Waste Origination

- For hazardous waste generated **on site**:
  - Often is the same point as the more familiar term "point of generation"
- For hazardous waste generated **off site:**
  - The point where the owner/operator accepts delivery or takes possession of the hazardous waste [§265.1081]
- Need for Subpart CC control is based on waste composition at the point of waste origination

Determining the Point of Waste Origination (cont'd)

- Determination must be made prior to first-time hazardous waste is placed in the affected unit
- Owner or operator responsible for ensuring waste determination representative of current condition
  - Repeat when conditions change or when waste stream changes
  - Update annually

Determination of VO

- Testing
  - Sample hazardous waste
  - Analyze samples using one of seven specified methods or other method validated using specified procedures
- Process knowledge
  - Application of owner/operator experience using appropriate information
- Determination for VO concentration must be made for each different waste stream

Waste determination means performing all applicable procedures in accordance with the requirements of Sec. 265.1084 of Subpart CC to determine whether a hazardous waste meets standards specified in Subpart CC . Examples of a waste determination include performing the procedures in accordance with the requirements of Section 265.1084 of Subpart CC to determine the average VO concentration of a hazardous waste at the point of waste origination; the average VO concentration of a hazardous waste at the point of waste treatment and comparing the results to the exit concentration limit specified for the process used to treat the hazardous waste; the organic reduction efficiency and the organic biodegradation efficiency for a biological process used to treat a hazardous waste and comparing the results to the applicable standards; or the maximum volatile organic vapor pressure for a hazardous waste in a tank and comparing the results to the applicable standards.

Direct Measurement of Waste VO Concentration

- Identify point of waste origination
- Designate and record averaging period
  - At least four sample results must be used to calculate average
  - Representative time period of up to one year

More than four samples will be required for facilities with large seasonal variations in waste quantity or fluctuations in ambient temperature.

The key issue is to properly identify the “point of waste origination”.

Direct Measurement of Waste VO Concentration (cont'd)

- Sampling plan required (e.g., in accordance with collection and handling procedures in SW-846)
  - Sample is representative of waste
  - Sample integrity is maintained
  - Sampling location
- Sample collection and analysis
- Calculate average VO concentration

It should be noted that it is very easy to lose VO in a sample due to improper sample collection procedures.

To ensure that a sample is representative of the waste, a sample should be collected while the unit is operating. This will ensure that the sample is more representative of the waste stream.

Specified Analytical Methods

- Analytical methods specified in Subpart CC
  - EPA Method 25D
  - EPA Method 624
  - EPA Method 625
  - EPA Method 1624
  - EPA Method 1625
  - EPA Method 8260(B)
  - EPA Method 8270

Methods 624, 625, 1624, 1625 (all from 40 CFR §136, Appendix A), 8260 and 8270 (both from SW-846) may be used to measure the VO concentration of specific compounds in simple wastes with known chemical constituents. EPA considers Method 25D to be an appropriate method for direct measurement of VO in hazardous waste, particularly in complex wastes with many or unknown organic constituents.

Where to Find the Methods

- Method 25D is found in 40 CFR §60, Appendix A
- Methods 624, 625, 1624, 1625 are found in 40 CFR §136, Appendix A
- Methods 8260 and 8270 are in EPA Publication SW-846
- http://TTN.WWW.RTPNC.EPA.GOV then click (Promulgated Methods)

Method 25D

- Determine volatile organic (VO) concentration
- Produces a number suitable for comparison with regulatory action levels
- Can be used for many different types of waste (well-mixed wastes, multi-phased, solids)
- Measures 100 percent of volatile compounds
- Does not simulate waste management unit emissions

Method 25D was promulgated on April 22, 1994 [59 FR 19311] in 40 CFR Part 60, Appendix A and involves suspending a sample of the waste in chilled polyethylene glycol (PEG) and then stripping the sample with nitrogen at 75°C. The nitrogen stripping gas is analyzed by GC for both carbon (as methane) and chlorine (as chloride), which are added together to establish the VO concentration.

Why is Method 25D So Special?

- Two detectors to measure the full complement of VOCs
  - Flame ionization detector (FID) measures the carbon content of vapors driven off the sample (total methane)
  - Electrolytic conductivity detector (ELCD) measures chlorine content of vapors driven off the sample (total chlorine)
- Sampling and analysis techniques that provide strict control on fugitive volatilization

The test costs approximately $300 to perform.

Samples must be collected and immediately placed in liquid nitrogen.

Method 25D Sample Collection and Analysis

- Collect 10 grams of waste (where least likely to volatilize) at point of waste origination
- Samples are collected in containers with 30 ml polyethylene glycol and kept on ice
- Controlled nitrogen purge (6 liters/minute) for 30 minutes to drive off organics in waste

Method 25D Sample Collection and Analysis (cont'd)

- Split analysis of carbon and chlorines
- Two column values added together to give results reported as parts per million by weight (ppmw) in waste
- Value used to compare to regulatory action levels (500 ppmw)

Specified Analytical Methods (cont'd)

- Method 624 or Method 625 calibration must be with target compounds
- If other methods are used they must be validated
  - Procedures specified in Section 5.1 or 5.3 of Method 301
- Less extensive validation procedures for EPA OW or OSW methods

Adjustment of Measured VO Concentrations

- Compounds with Henry's Law constant less than 0.1 Y/X (1.8×10^{-6} atm/gm-mole/m^3), at 25° C
- Adjust measured compound concentrations to compare with 500 ppm action level
- Published values of fraction measured (f_m) for specific compounds to make adjustments
- Adjustments may apply to any of the methods

Calculation of Average Volatile Organic Concentration

- Average VO concentration of waste at point of origination is calculated using the following equation

$$C_{ave} = \frac{1}{Q_T} \times \Sigma (Q_j \times C_j)$$

where: C_{ave} = average VO concentration of the hazardous waste at the point of waste origination, ppmw

Q_j = mass of the discrete quantity of the hazardous waste represented by C_j, kg

Q_T = total mass of the hazardous waste for the averaging period, kg

C_j = measured VO concentration by test run for discrete quantity "j" for the hazardous waste, ppmw

Recordkeeping Requirement for Waste Determination - Based on Testing

- The point of waste origination;
- Averaging period;
- Sampling plan; and
- The quality assurance program, including procedures to minimize loss of VO during sampling and measurement of accuracy of procedures

For additional information regarding recordkeeping refer to EPA's *General Recordkeeping and Reporting Guidance for Waste Management Units Requiring Air Emission Controls Under RCRA Air Standards Subpart CC*, November 27, 2000.

Process Knowledge

- Provides flexibility to use available information to determine VO concentration of a hazardous waste
- Information sources can be
  - Existing information collected for other purposes
  - New information collected specifically for the waste determination
  - For hazardous waste generated off-site, information provided to TSDF by waste generator

The conditions under which owners/operators can use knowledge instead of testing for VO concentrations are identified in §265.1084(a)(4).

Examples of Process Knowledge

- Material balance calculations for the process generating the hazardous waste
- Documentation that the process generating the hazardous waste uses no materials containing organics
- Documentation the hazardous waste is generated by a process substantially similar to a process for which the waste VO concentration < 500 ppmw using an analytical method specified in Subpart CC
- Test data obtained by using a method not specified or validated in accordance with Subpart CC

Recordkeeping Requirements for Waste Determination Based on Process Knowledge (Knowledge Based)

- Organic material balances of the source generating the waste
- Previous organic constituent test data, or
- Any other information (e.g., manifests, shipping papers and waste certification notices).

For additional information regarding recordkeeping refer to EPA's *General Recordkeeping and Reporting Guidance for Waste Management Units Requiring Air Emission Controls Under RCRA Air Standards Subpart CC*, November 27, 2000.

Recordkeeping Requirements For Waste Determination Based On Process Knowledge (With Some Testing)

- Test method
- Sampling protocol
- Sample variability, and
- Analytical variability associated with the test method used

For additional information regarding recordkeeping refer to EPA's *General Recordkeeping and Reporting Guidance for Waste Management Units Requiring Air Emission Controls Under RCRA Air Standards Subpart CC*, November 27, 2000.

Summary of Waste Determination

- Waste determination required if waste managed in affected unit not using Subpart CC air emission controls
- Direct measurement or knowledge of waste can be used
- Waste determinations needed
  - Prior to effective date
  - Prior to placing new waste
  - As determined by owner or operator to represent current conditions
- Averaging period up to one year
- Sampling in accordance with written procedures documented in site sampling plan

Subpart CC Exclusion for Waste That Meets LDRs

- Subpart CC control not required if the waste meets the LDR numerical concentration limits for organic hazardous constituents applicable to the waste
  - Numerical concentration limits of the LDRs
    - Treatment standards for listed organics (40 CFR §268.40)
    - Universal treatment standards for listed and characteristic organic constituents (40 CFR §268.48)
- Wastes which are listed only for inorganic constituents are not eligible for exclusion

Units are not required to have controls if the organic constituents in al wastes (including underlying hazardous constituents in characteristic wastes) placed in the unit meet the land disposal standards in 40 CFR Part 268 as is outlined in 40 CFR §§264.1082(c)(4)and 265.1083(c)(4). In the December 8, 1997 Federal Register Notice (62 FR 64644) EPA stated "To be eligible for this exemption from the Subpart CC standards, listed wastes must either meet treatment standards for organics by treatment which destroys or removes hazardous organic constituents, or the wastes must meet those standards as generated. Regarding characteristic hazardous wastes…the Subpart CC rule no longer applies once these wastes are decharacterized… Also, since the rules do not prohibit any method which removes a hazardous characteristic, dilution can be used for this purpose…"

Numerical Concentration Limits for Listed Wastes

- Organic constituents, with treatment standard established under 40 CFR §268.40
  - Meet the treatment standard for all of the organics
  - Example: F001 spent halogenated solvents

– Acetone	0.28 mg/l	160 mg/kg
– Benzene	0.14 mg/l	10 mg/kg
– n-Butyl alcohol	5.6 mg/l	2.6 mg/kg
– Carbon disulfide	3.8 mg/l	NA
– Carbon tetrachloride	0.057 mg/l	6 mg/kg
– etc.		

Numerical Concentration Limits for Characteristic Wastes

- Characteristic waste must be evaluated for any organic underlying hazardous constituents
  - Meet universal treatment standards (UTS) from 40 CFR §268.40 for each underlying hazardous constituent present
- And if waste is characteristic for organic hazardous constituent (Toxicity Characteristic [TC] organic waste)
  - Meet the treatment standard for the TC organic
    - Example: D018, TC benzene
      - -Wastewater 0.14 mg/l
      - -Nonwastewater 10 mg/l TCLP

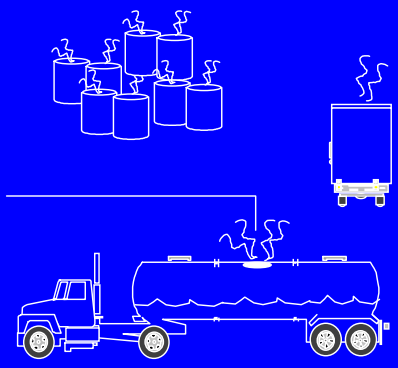
Numerical Concentration Limits for Various Waste Combination

- Waste combinations must meet treatment standards for all organic constituents, both listed and underlying
- Wastes intermingled with listed metal wastes may meet LDR treatment standards for disposal
  - Meet treatment standards for all organic constituents, both listed and underlying

Summary of LDR Requirements Under Subpart CC

- To gain an exit from Subpart CC requirements using LDR treatment standards, a waste must meet treatment standards for all organic constituents
- Organic constituents can be both listed and underlying
- Testing and documentation is a key consideration

Control Requirements for Containers



Container Standards are Organized into Three Levels

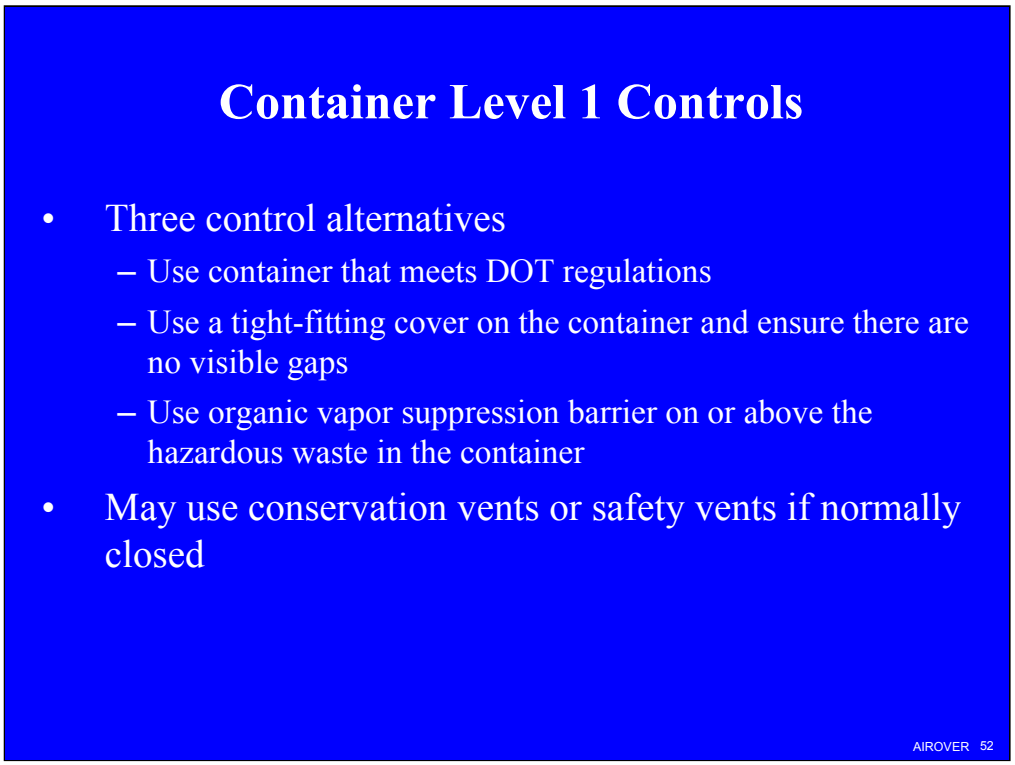
- Level 1
  - Less than or equal to 0.46 m^3 (122 gallons) [Exemption below 0.1 m^3 (26.4 gallons)], or
  - Larger than 0.46 m^3 AND do not manage hazardous waste in light material service
- Level 2
  - Larger than 0.46 m^3 AND manage hazardous waste in light material service
- Level 3
  - Larger than 0.1 m^3 (26.4 gallons) AND treat hazardous waste by a stabilization process

Apply to containers that manage a hazardous waste, which at the point of waste origination has a concentration greater than or equal to 500 ppmw volatile organics, and are NOT exempt from controls

Light Material Service

- "In light material service" means that hazardous waste in the container meets the following conditions:
  - Vapor pressure of one or more organic constituent in the waste is greater than 0.3 kilopascals (kPa) at 20 °C, and
  - Total concentration of the pure organic constituents having a vapor pressure greater than 0.3 kPa at 20 °C is equal to or greater than 20 percent by weight
- Used for Level 1/Level 2 determination for containers larger than 0.46 m^3 (122 gallons)

The term "in light material service" is addressed in §265.1081.



Containers that meet Department of Transportation standards are specified in §264.1086(f) and §265.1087(f). This information should be brought forward and placed in the facilities final RCRA Permit to facilitate rapid and clear inspections of facility hazardous waste storage in DOT HzMat compliant containers.

The use of covers to address Level 1 Controls is addressed in §264.1086(c)(1)(ii) and §265.1087(c)(1)(ii).

Cover means a device that provides a continuous barrier over the hazardous waste managed in a unit to prevent or reduce air pollutant emissions to the atmosphere. A cover may have openings (such as access hatches, sampling ports, gauge wells) that are necessary for operation, inspection, maintenance, and repair of the unit on which the cover is used. A cover may be a separate piece of equipment which can be detached and removed from the unit or a cover may be formed by structural features permanently integrated into the design of the unit.

Level 1 - Operating Requirements

- Whenever hazardous waste is in a Level 1 container, the covers, openings, and closure devices should be closed except as follows:
  - When transferring hazardous waste into or out of the container, including continuous transfer operations
  - When between batch transfers, if time does not exceed 15 minutes between transfers
  - If "RCRA empty"
  - While performing routine activities such as sampling and equipment access (manhole hatch)

Level 1 - Inspection Requirements

- When transferring waste into a container, check to make sure closure devices are in good condition and closed when transfer is complete
- If waste is received from off-site sources and unloading is not completed within 24 hours, then the container should be visually checked
- Repair any noted defects

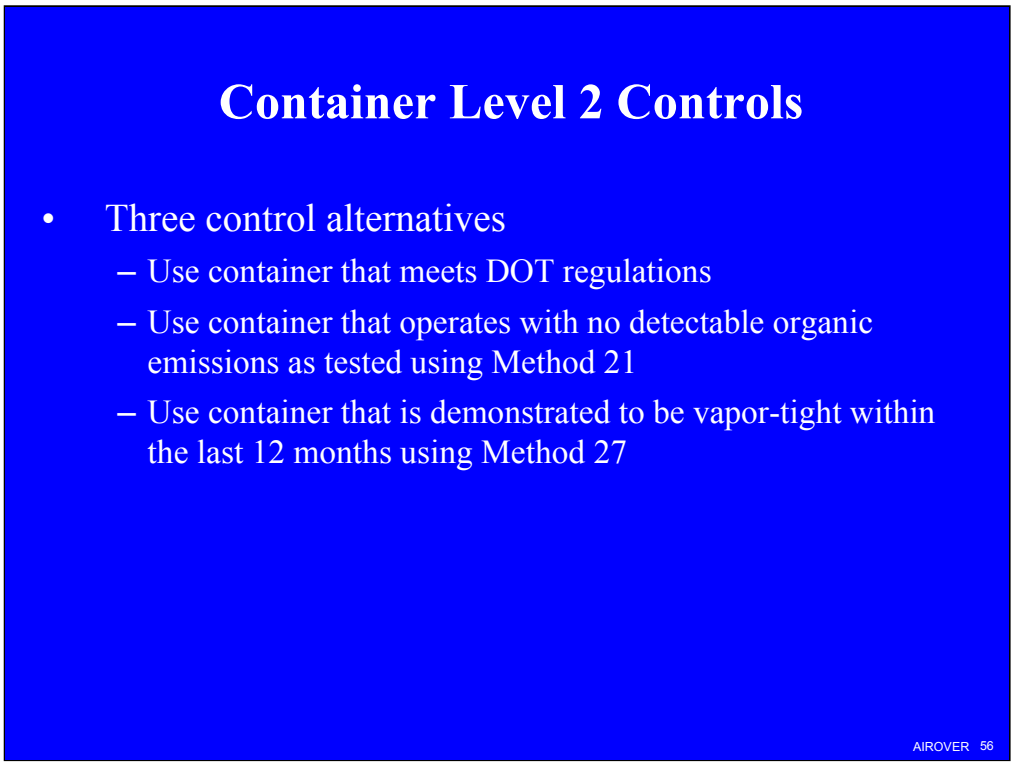
For additional information regarding inspection requirement of Subpart CC, refer to EPA's *General Inspection Guidance for Waste Management Units Requiring Air Emission Controls Under RCRA Air Standard Subpart CC*, November 27, 2000.

Level 1 - Recordkeeping and Repair Requirements

- Recordkeeping requirements
  - VO waste determination records
  - If container exceeds 0.46 m^3, records must be kept on procedures used to determine that the container is NOT managing hazardous waste "in light material service"
- Repair requirements
  - Attempt repair within 24 hours of defect detection
  - Complete repair within five calendar days, or empty the container and remove from service
  - Do not use container until defect is repaired

AIROVER 55

For additional information regarding recordkeeping refer to EPA's *General Recordkeeping and Reporting Guidance for Waste Management Units Requiring Air Emission Controls Under RCRA Air Standards Subpart CC*, November 27, 2000.



Containers that meet Department of Transportation standards are specified in §264.1086(f) and §265.1087(f). This information should be brought forward and placed in the facilities final RCRA Permit to facilitate rapid and clear inspections of facility hazardous waste storage in DOT HzMat compliant containers.

No detectable organic emissions means no escape of organics to the atmosphere as determined using the procedure specified in Sec. 265.1084(d) of Subpart CC.

Methods 21 and 27 are addressed in 40 CFR Part 60, Appendix A.

Level 2 - Waste Transfer Requirements

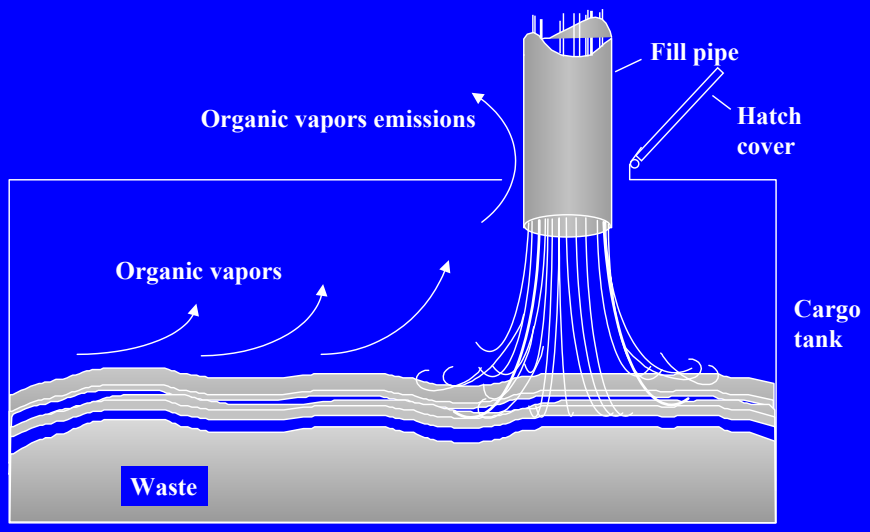
- Transfer waste into or out of a container in such a manner as to minimize exposure of the waste to the atmosphere, to the extent practical, considering the physical properties of the hazardous waste and good engineering and safety practices for handling flammable, ignitable, explosive or other hazardous materials

Requirements for filling and emptying Level 2 containers are codified in §264.1086(d)(2) and §265.1087(d)(2).

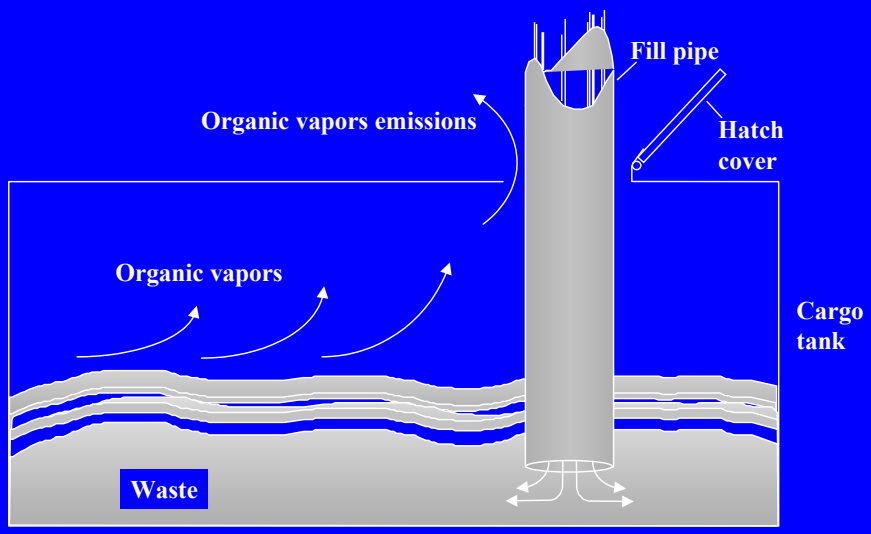
Example of Loading Procedures That Meet Transfer Requirement

- Submerged-fill pipe or other submerged-fill method
- Vapor-balancing system or a vapor recovery system
- Fitted opening in the top of a container through which the hazardous waste is filled, and purging the transfer line before removing it from the container opening

Splash Loading Method (Not Allowed for Level 2 Containers)

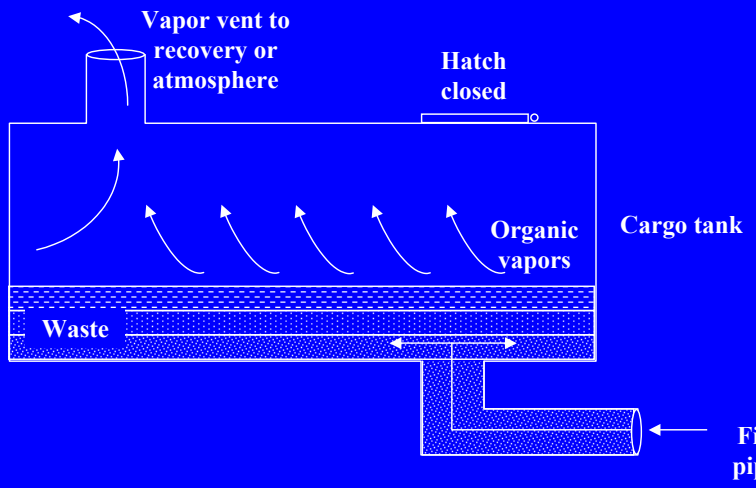


Submerged Fill Pipe



Bottom Loading Reduces

- Liquid turbulence
- Vapor and/or liquid contact



Level 2 - Operating Requirements

- All covers and closure devices should be secured and kept closed, except during filling and removal operations
- A cover need not be on a “RCRA empty” container, as defined in 40 CFR §261.7
- Level 2 containers may be open while performing routine activities such as sampling or equipment access (manhole hatch)
- Safety vents and conservation vents may be used if normally left in the closed position

Level 2 - Inspection Requirements

- When transferring waste into a container, check to make sure closure devices are in good condition and closed when transfer is complete
- If waste is received from off-site sources and unloading is not completed within 24 hours, then the container should be visually checked
- Repair any noted defects
- If wastes are stored in a container for greater than a year, then visually inspect at least once a year

AIROVER 63

For example, a roll-off container with a tarp.

•Does the tarp have pin holes, tears, gaps, etc.

•Should use an OVA to test for release.

Georgia EPA requires that facilities run an OVA over the entire tarp surface. Leaks tend to be identified at places where the tarp is fastened to the unit.

For additional information regarding inspection requirement of Subpart CC, refer to EPA's *General Inspection Guidance for Waste Management Units Requiring Air Emission Controls Under RCRA Air Standard Subpart CC*, November 27, 2000.

Level 2 - Recordkeeping and Repair Requirements

- Recordkeeping
  - Since Level 2 waste is "in light material service", no VO waste determination records need to be kept
  - If applicable, control device records must be maintained
- Repair requirements
  - Attempt repair within 24 hours of defect detection
  - Complete repair within five calendar days, or empty the container and remove from service
  - Do not use container until defect is repaired

AIROVER 64

For additional information regarding recordkeeping refer to EPA's *General Recordkeeping and Reporting Guidance for Waste Management Units Requiring Air Emission Controls Under RCRA Air Standards Subpart CC*, November 27, 2000.

Container Level 3 Controls

- Two control alternatives
  - Vent container directly through a closed-vent system to a control device, or
  - Vent container inside an enclosure which is exhausted through a closed-vent to a control device
- Specific design and operating criteria for venting vapors directly to a control device (same as for tanks)
- Enclosures must meet the design and operating criteria specified in "Procedure T - Criteria for and Verification of a Permanent or Temporary Total Enclosure" under 40 CFR §52.741

AIROVER 65

Approved containers for specific waste constituents can be found tabulated in 49 CFR §171.

Facility should include container information in their Part B permit application.

Note that EPA added loading requirements for Level 3 containers, which are identical to those for Level 2 containers, in its January 21, 1999 amendments. [64 FR 3389]

Level 3 - Recordkeeping, Repair Requirements, and Inspection

- Recordkeeping requirements depend upon how the organic emissions are vented
  - If an enclosure is used, records must be maintained for the most recent set of calculations and measurements performed to verify that the enclosure meets the criteria of a permanent total enclosure (Procedure T)
  - Records for the closed-vent and control device system are the same for those used on tanks
- Repair requirements
  - Necessary corrective measures shall be immediately implemented to ensure that the control device is operated in compliance
- Inspection requirements are the same as for tanks

AIROVER 66

For additional information regarding recordkeeping refer to EPA's *General Recordkeeping and Reporting Guidance for Waste Management Units Requiring Air Emission Controls Under RCRA Air Standards Subpart CC*, November 27, 2000.

For additional information regarding inspection requirement of Subpart CC, refer to EPA's *General Inspection Guidance for Waste Management Units Requiring Air Emission Controls Under RCRA Air Standard Subpart CC*, November 27, 2000.

Summary

- Required air emission controls determined by container capacity, waste organic content, and whether used for waste stabilization
- Capacity >0.1 m^3 but <0.46 m^3? Or >0.46 m^3 and no light material service? **Level 1 controls**
  - Three alternatives and no waste transfer requirements
- Light material service and >0.46 m^3? **Level 2 controls**
  - Three alternatives and waste transfer requirements
- Stabilization? Capacity >0.1 m^3? **Level 3 controls**
  - Vent directly or by enclosure to control device

Drums, the most common hazardous waste storage unit. Drums come in all types, usually made according to a set of DOT specifications. The question becomes is the drum used in accordance with the DOT specifications, especially is the waste contained in the drum appropriate for the drum type. Since the drum volume is less than 122 gallons, Subpart CC controls will be Level 1 if there is no stabilization, or Level 3 if there is.

AIROVER 69

Dumpsters are assumed to be Level 2 containers, since the volume is greater than 122 gallons, although they can be Level 3 if there is stabilization. A dumpster can be classified a Level 1 container if all wastes in the dumpster are proven to not be in light material service.

Dumpsters are difficult to seal, particularly along the top. There may be issues with the loading of dumpsters, as facilities may want to keep the top open at all times. A way to close the dumpster and seal in the vapors that compromises with the need to load the dumpster must be found or created.

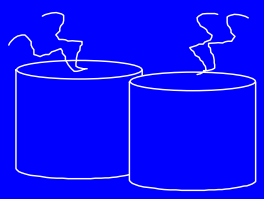
Tanker trucks are usually Level 2 containers, since the size is typically 4000 to 7000 gallons. Many trucks are fitted with vapor balancing systems, in which the tanker headspace is vented to the headspace of a fixed tank. At issue may be whether the vapor balancing system is actually used or not.

Rail cars are containers too. They may be on rails, or perhaps they are semi-permanently parked in place, maybe without wheels.

Roll offs can be Level 1 (with proof of no light material service), Level 2, or Level 3 (if there is stabilization), depending on service. Roll offs are difficult to seal because of openings along the top. Tarps may be used to close a roll off, but it must be visibly closed if Level 1, sealed from detectable emissions if Level 2.

Vacuum (vac) trucks are usually Level 1 or Level 2. There are special provisions in Subpart CC for vac truck venting, because of the high air inflow during vacuum operations.

Control Requirements for Tanks



Control Requirements Considerations

- Two levels of air emission controls for tanks containing hazardous waste which have V0 concentration $\geq$ 500 ppmw at point of waste generation
  - Level 1 (less extensive)
  - Level 2 (more extensive)
- Waste transfer
- Safety
- Repair requirements
- Record keeping
- Appendices

Tank Level 1

- Tank must meet ALL three conditions to qualify to use Tank Level 1 controls
  - Maximum organic vapor pressure of waste is less than cutoff for tank design capacity
  - Contents are not heated to temperatures above the temperature of vapor pressure determination
  - No waste stabilization in tank
- Sumps and wet wells often require Tank Level 1 controls

Tank Level 1 - Vapor Pressure Limits

- Tank size and waste vapor pressure limits consistent with existing NSPS for volatile organic liquid storage
- Vapor pressure established by determining the maximum organic vapor pressure of the waste contained in the tank
- Several ways to determine vapor pressure (e.g., Method 25E and knowledge of the waste)

Method 25E is outlined in 40 CFR Part 60, Appendix A

Tank Level 1 - Vapor Pressure Limits (cont'd)

Tank Design Capacity	Waste Maximum Organic Vapor Pressure
$\geq$ 151 m^3 (39,950 gal)	< 5.2 kPa (0.75 psi) (39 mm Hg)
$\geq$ 75 m^3 (19,840 gal) but < 151 m^3 (39,950 gal)	< 27.6 kPa (4.0 psi) (207 mm Hg)
< 75 m^3 (19,840 gal)	< 76.6 kPa (11.1 psi) (575 mm Hg)

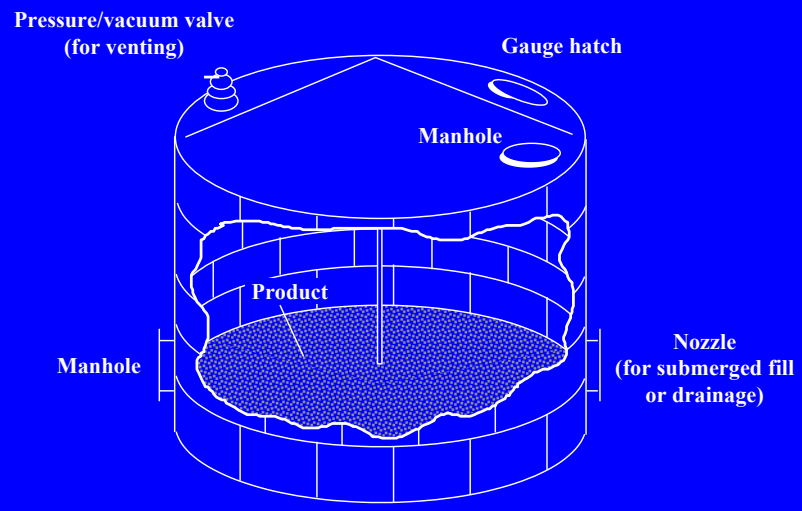
kPa - kilopascal

Tank Level 1 Controls - Fixed Roof

- Fixed roof is stationary (doesn't fluctuate with the level of material in tank)
  - An integral part of the structural design, or
  - May separate from rest of tank (e.g., removable top on a vertical tank)
- Fixed roof openings can be equipped with:
  - Closure devices **if** designed with no visible cracks, holes, gaps or other open spaces when secured in closed position
  - Permanent openings **if** vented to an organic emission control device
  - Pressure relief devices (e.g., conservation vent) that are vented to atmosphere

Per 40 CFR §264.1084(c) or §265.1085(c), openings in the roof must be secured in the closed position. The fixed roof must be made of material that will minimize exposure of hazardous wastes to the atmosphere. Closure devices (e.g., hatches) can be open whenever needed for normal operations. Pressure relief devices are allowed if necessary to maintain the internal pressure within safe operating ranges. The fixed roof and its closure devices must be visually inspected initially and then annually.

Typical Fixed-Roof Tank



Tank Level 2 Controls

- Tanks that hold waste exceeding the Level 1 criteria or can not be proved otherwise are required to use Level 2 controls
  - Optional use for tank Level 1-type wastes

The standards for Level 2 tanks are codified at §264.1084(d) and §265.1085(d).

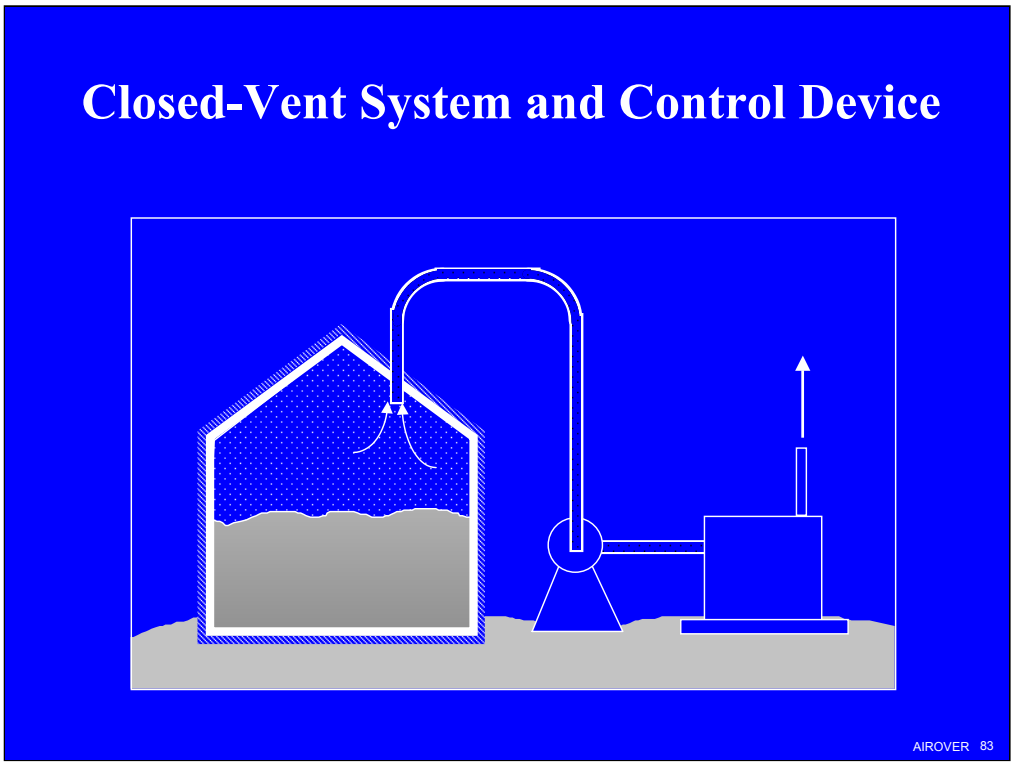
Tank Level 2 - Design Options

- Five design options allowed for Level 2 Tank Controls
  - Cover vented to control device
  - Pressure tank
  - Tank inside enclosure which is vented to combustion control device
  - Fixed roof with internal floating roof
  - External floating roof

If a tank is located in an enclosure, the enclosure must meet the standards specified in “Procedure T - Criteria for and Verification of a Permanent or Temporary Total Enclosure” under 40 CFR §52.741.

Level 2 tanks with a cover that are vented to a control device are the most common type of design option.

Tanks with floating roofs are usually found at a refinery or very large chemical manufacturer.



If system operates under negative pressure:

> Cover designed with no visible cracks, holes, gaps or other open spaces in cover seams, foundation mountings, and cover closure devices when secured in closed position

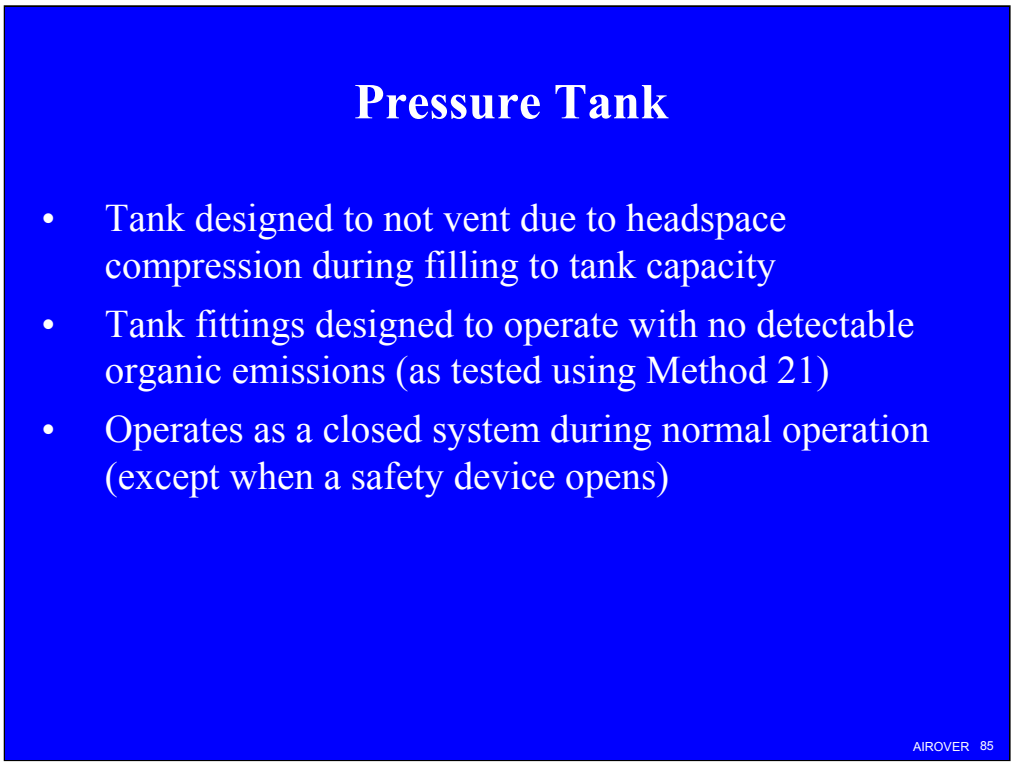
If system does not operate under negative pressure:

> Cover designed to operate with no detectable organic emissions (as tested using Method 21) when all cover closure devices are secured in a closed, sealed position, monitored annually

Closed-vent system and control device designed and operated to meet the requirements of 40 CFR §264.1087 and 40 CFR §265.1088

Cover Vented to Control Device - Operating Requirements

- Whenever the tank contains hazardous waste, the fixed roof and all closure devices must be closed and secured with the headspace vented to the control device except:
  - During routine inspections, maintenance and activities associated with normal operations
  - To remove accumulated sludge or residue from the tank bottom
- Following completion of maintenance activities, all closure devices must be promptly closed and secured or the cover must be promptly re-installed



The January 21, 1999 technical corrections (64 FR 3386) stated that inert materials could periodically be vented from pressure tanks complying with Subpart CC Level 2 tank standards, as long as the purge is vented to a control device.

Method 21 is outlined in 40 CFR Part 60, Appendix A.

Enclosure Vented to Combustion Control Device

- Enclosure designed and operated per criteria for permanent total enclosure under Procedure T in 40 CFR §52.741, Appendix B
- Enclosure must be vented to combustion control device
- Closed-vent system and combustion control device designed and operated to meet requirements of 40 CFR §264.1087 or 40 CFR §265.1088
- The verification procedure for enclosures outlined in Section 5.0 of "Procedure T - Criteria for and Verification of a Permanent or Temporary Total Enclosure" must be performed
  - When the enclosure is first installed
  - Annually thereafter

AIROVER 86

The control device standards are codified at 40 CFR §264.1087 and §265.1088. An activated carbon system might be used to achieve 95% VO control. If an enclosed combustion device is used, it must meet the standards of 40 CFR §264.1033 (c) or §265.1033(c), which requires:

- Reducing organics by at least 95 weight percent;
- Achieving an organic outlet concentration at 20 ppmv at 3% oxygen; or
- Operation with 0.5-second residence time at a minimum temperature of 760ºC (1,400°F).

If a flare is used, it must comply with the standards of 40 CFR §264.1033(d) or §265.1033(d).

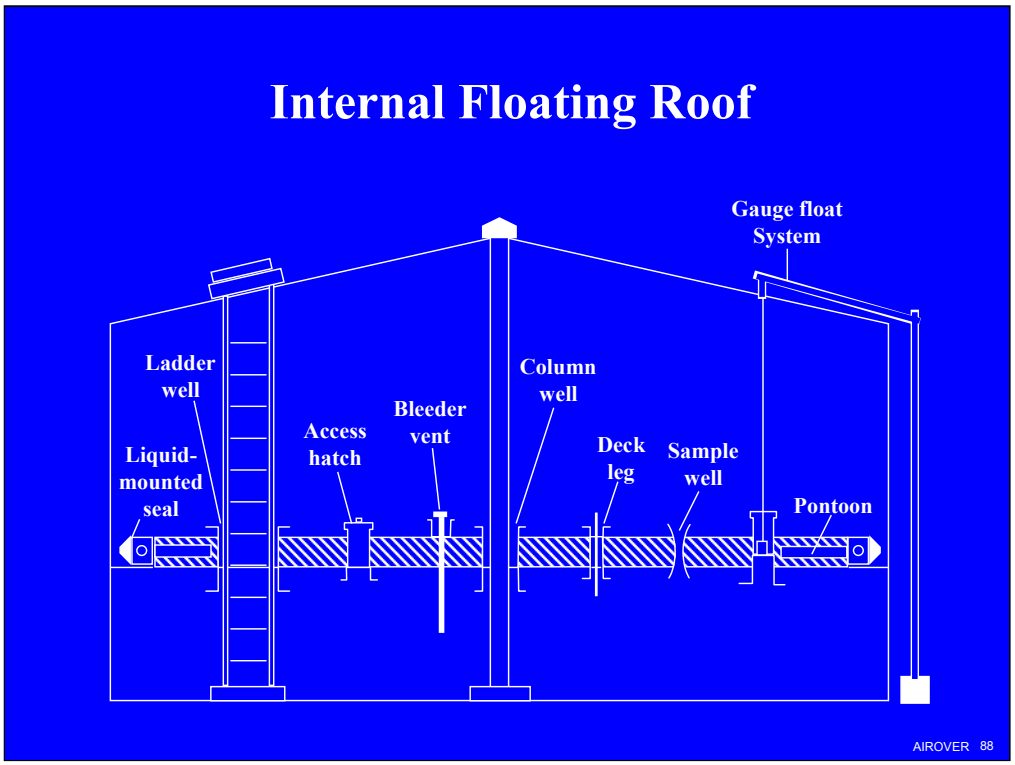
Control devices may be out-of-service for up to 240 hours per year to allow for routine maintenance and malfunctions.

The enclosure must be tightly sealed, caulked, etc.

Fixed Roof With Internal Floating Roof (IFR)

- Must float on the liquid surface unless resting on leg supports during maintenance operations
- Must have a continuous seal between the tank wall and the floating roof edge
  - Liquid mounted or metallic shoe seals, or
  - Two continuous seals mounted one above the other

Typically used for very large quantities of liquid.



Usually at least 200 feet across.

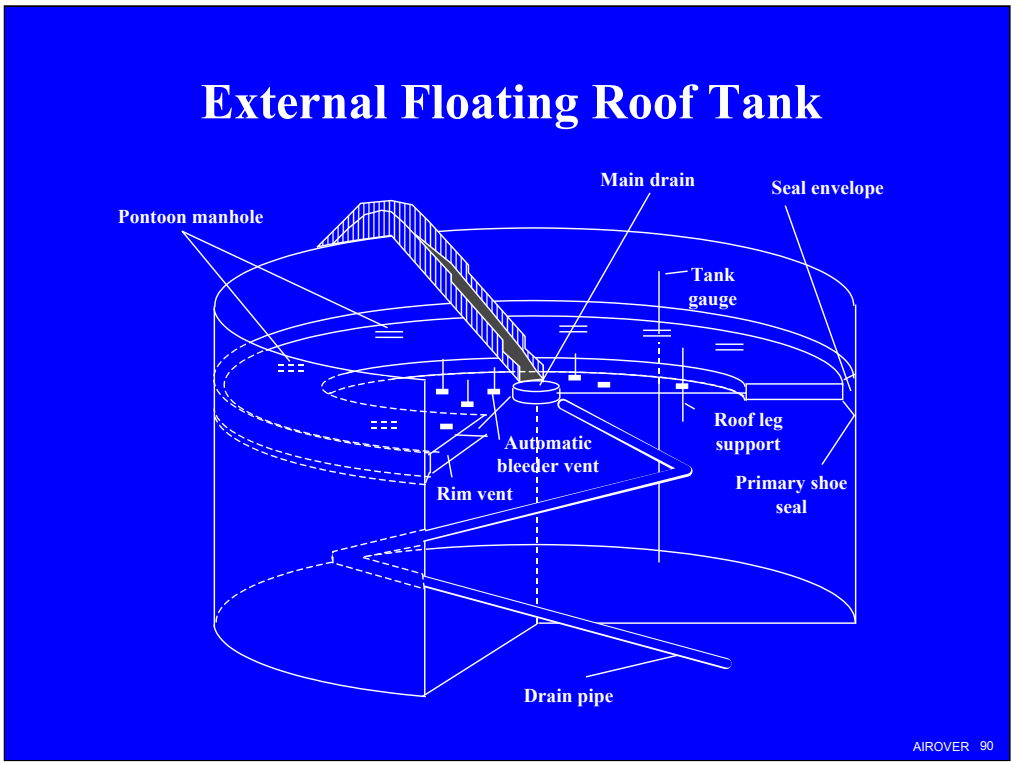
External Floating Roof (EFR)

- Must float on the liquid surface except when it must be supported by the leg supports (i.e., during filling/ emptying activity, during maintenance activities, etc.)
- Must be fitted with two continuous seals, one above the other between the tank wall and the roof edge
  - Liquid-mounted or metallic shoe seal for primary (or lower) seal
  - Secondary (or upper) seal must cover annular space between the tank wall and the floating roof
  - Very specific gap requirements

Often seen at refineries.

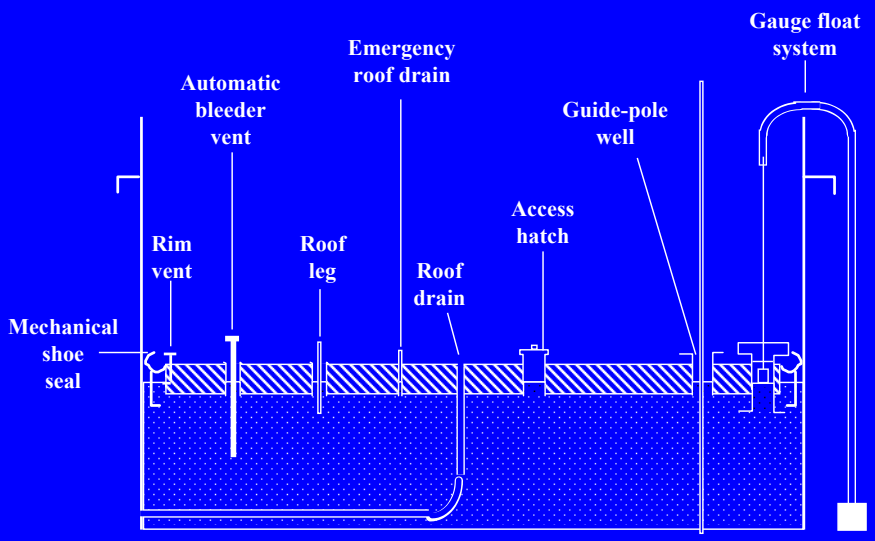
The seals are on the pontoon or barge.

The roof drains are a common source of emissions with these types of units.



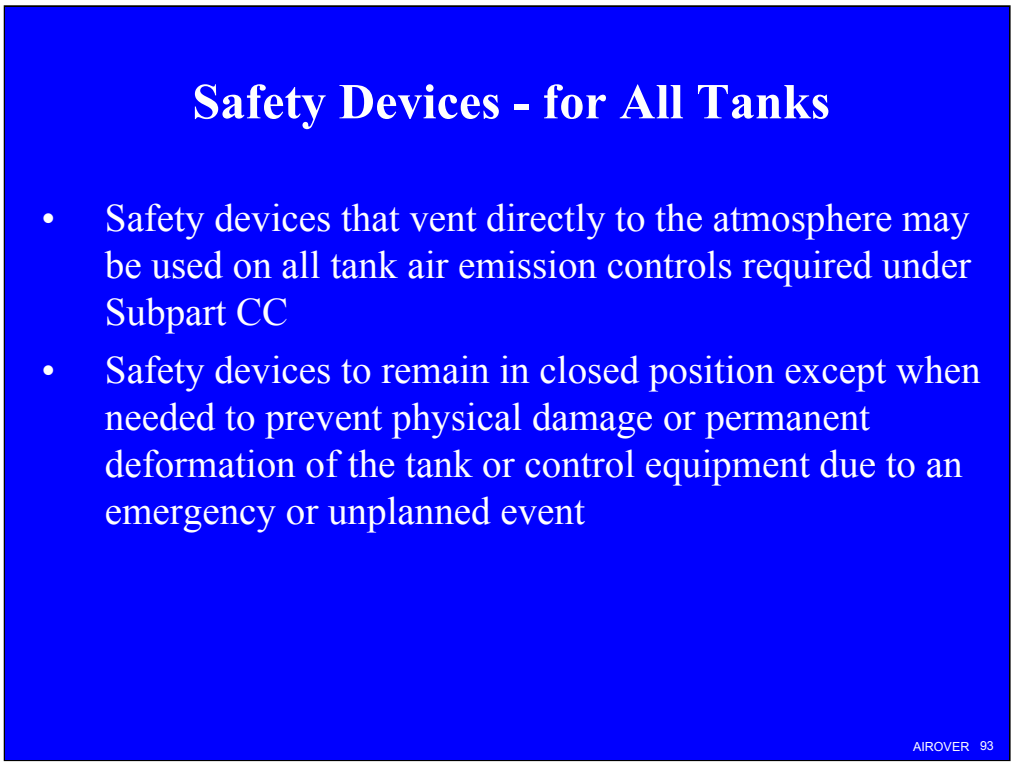
Typically used for very large quantities of liquid.

External Floating Roof



Waste Transfer Operations

- Transfer of hazardous waste among tanks and surface impoundments subject to Subpart CC must be conducted using hard-piping or other closed system that does not allow exposure of the waste to the atmosphere
- An individual drain system meeting the requirements of 40 CFR §63, Subpart RR is considered a closed system
- Waste exempted from Subpart CC controls are exempt from waste transfer requirements of 40 CFR §264.1084(j) or 40 CFR §265.1085(j)



Federal Register Notice (59 FR 62917) stated that safety devices that vent directly to the atmosphere may be used on the tank, cover, closed vent system, or control device provided that the safety device is not used for planned or routine venting of organic vapors.

Summary - Tank Operations

- Waste transfer to tank through hard-piping or other closed system under certain conditions
- Initial and annual visual inspections of covers are required
  - Special requirements for floating roofs
- Records required for vapor pressure determination, floating roof and enclosure design, and inspections

Summary - Tank Controls

- Tank Level 1 controls can be used if tank meets three conditions (vapor pressure, not heated above set point, no stabilization)
  - Fixed roof and visual inspections
- Tank Level 2 controls allow use of any one of five alternative control methods (cover vented to a control device, pressure tank, or enclosure vented to combustion device, IFR, EFR)

Stabilization in tank or no fixed roof moves control requirements up to Level 2. Level 2 control do not allow visual inspections.

20,000 gallon vertical tank for hazardous waste storage, probably Tank Level 1 because no apparent control device. Note vents at top, also manway likely next to ladder and fill piping.

40,000 gallon horizontal tank. Note manway at top, fill or overflow piping at end, and sonic level measure at top above far right support.

Open tank, very common in waste treatment. Not allowed under Subpart CC unless proven that biological activity is substantially reducing organics (under treatment options).

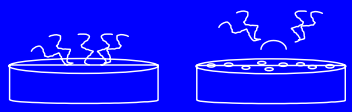
Small tank associated with waste treatment, in this case coagulation and precipitation of hazardous constituents from the waste stream (precipitation is a form of stabilization). Very typical tank type for hazardous waste operations. Level 3 tank (but note that no controls exist on this tank).

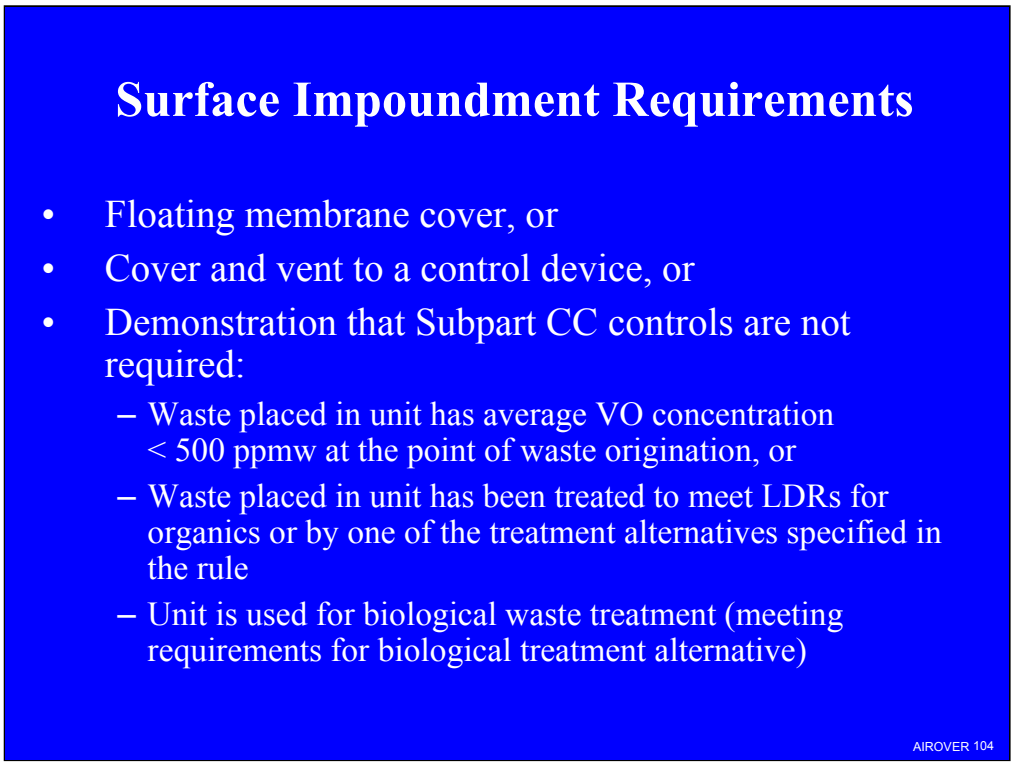
Treatment facility tanks, with a variety of tank types present. Note pressure tanks, the horizontal tanks in the center with the rounded ends. Note also the pressure/vacuum vents on top of the vertical tanks.

External floating roof (EF□R) tank. Very large tank, typical of refinery or large commodity transfer facility, usually associated with ships or large diameter pipelines. Seldom used at hazardous waste storage or treatment facilities unless used for flow equalization for when there is a large flow that varies significantly.

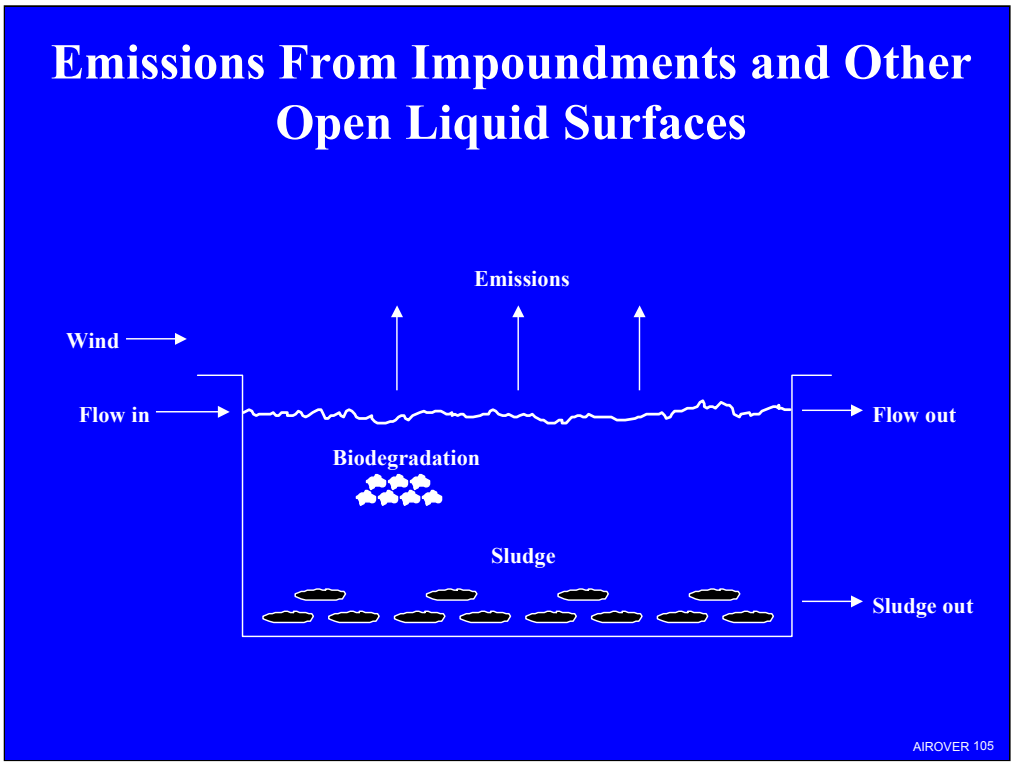
Cover and a control device for Level 2 Tank operation under Subpart CC. Cover is a geodesic dome cap, built with aluminum skin. Headspace is vented through the white piping to a control device.

Control Requirements for Surface Impoundments





The surface impoundment standards are codified in 40 CFR §264.1085 and §265.1086.



Surface impoundments are typically used to gain aeration which facilitates biodegradation. Once were very common, now there are few RCRA surface impoundments permitted. Most aeration is now done in tanks.

Floating Membrane Cover

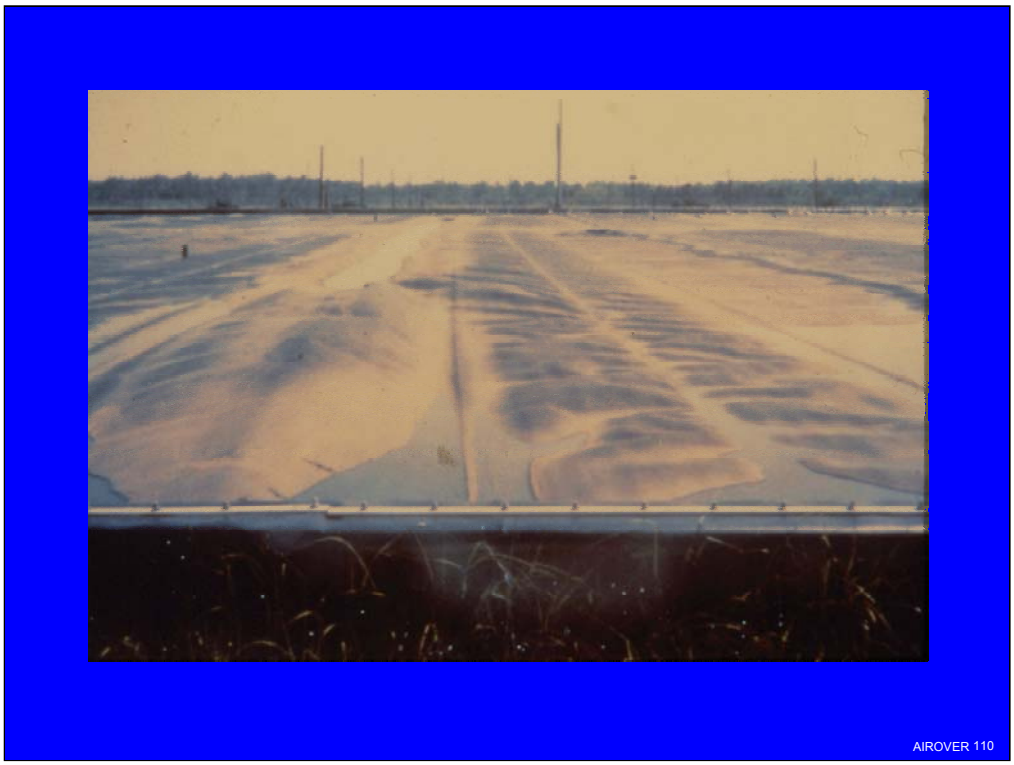
- A floating membrane cover must float on the liquid surface and form a continuous barrier over the entire surface
- The cover must be fabricated from
  - High-density polyethylene (HDPE) that is at least 2.5 mm thick, or
  - A material or composite with organic permeability properties equivalent to HDPE and chemical and physical properties needed to ensure material integrity over the intended service life
- The cover may be equipped with one or more emergency cover drains

Cover with Control Device

- The cover and associated closure devices must form a continuous barrier over the entire liquid surface and must be vented through a closed vent system to a control device
  - Negative pressure
  - No visible cracks, holes, gaps or other open spaces
- All openings not vented to a control device must be fitted with a closure device
- Closed-vent system and control device designed and operated per 40 CFR §264.1087 and 40 CFR §265.1088

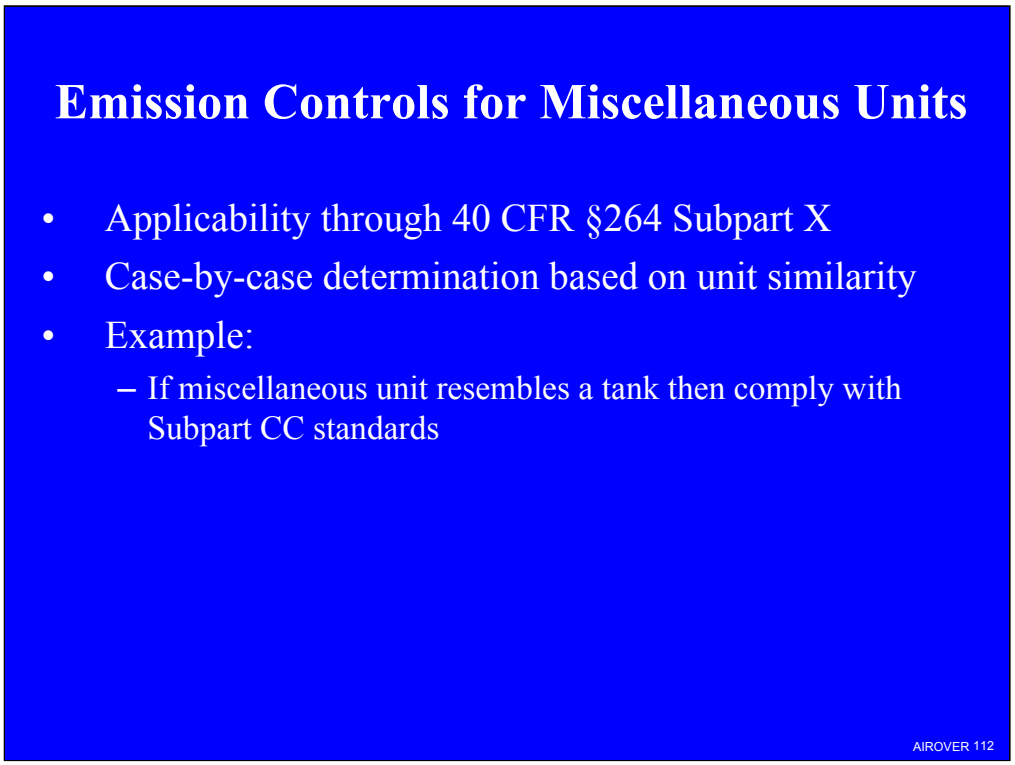
Lined surface impoundment, used to be very common in RCRA but not often seen today. Note that there is no control in place for organic air emission.

Treatment in a surface impoundment using aeration to stimulate microbial degradation. Allowed under Subpart CC with no air emission control if process meets treatment standard for this approach.



Floating cover above a surface impoundment. Note batten strip in foreground, must be made vapor tight to comply with Subpart CC. Note the pockets of air and vapor under the cover - because of these characteristics, it is hard to reach complete control unless the batten is air and vapor tight.

This is an example of an activated sludge basin with a cover that is vented to a control device.



Subpart CC standards apply to Subpart X units on a case-by-case basis.

Types of Control Devices

- Vapor recovery (e.g. condenser, carbon adsorption)
- Thermal catalytic vapor incinerator
- Flare
- Boiler or process heater

Vapor Recovery Units

- Condenser: condenses a vapor or mixture of vapors, either alone or in the presence of a non-condensable gas
- Carbon adsorber: process wherein molecules of a fluid or gas contact and adhere to the surface of a solid (carbon)

Enclosed Combustion Device

- Enclosed combustion device: performs rapid oxidation to destroy the combustible contaminants
- Requires that the incinerator operates at a very high temperature

Flare

- Flare: primarily used to dispose of large quantities of excess gas
- The gas containing the organics is continually fed to and discharged from a stack, with the combustion occurring near the top of the stack and characterized by a flame at the end of the stack

Boiler or Process Heater

- Boiler/process heaters: a device that transfers heat liberated by burning fuel to fluids contained in tubes to produce steam