Session 3: RCRA Air Emissions – Implementation, Issues, Examples, and Case Studies

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Session 3: RCRA Air Emissions – Implementation, Issues, Examples, and Case Studies

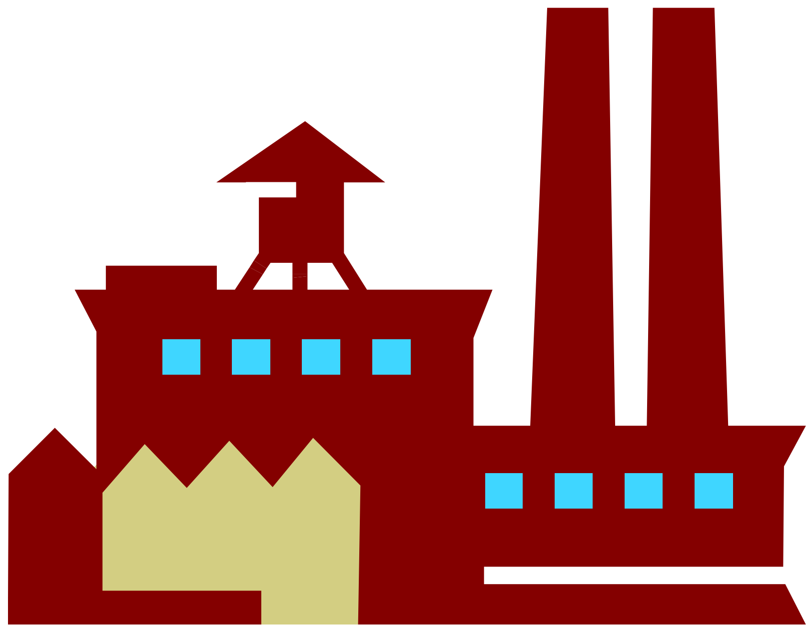
- Case Study #1: Oopsies Waste Service vs. Mr. Sparkle Disposal
  - Leak Detection and Repair (LDAR)
  - Control Technology
  - Tanks
  - Record Keeping, Equipment Labeling, and Interaction with Local Air Quality Programs
- Case Study #2: Pretty Large Chemical
  - Process Flow Diagram
  - Permit Application Checklists

Goals

- Understand implementation challenges that facilities face
  - LDAR
  - Control technology
  - Tanks
- Discuss best and worst practices
  - Two hypothetical companies
- Exercise to complete permit application checklists

OWS

Oopsies Waste Service

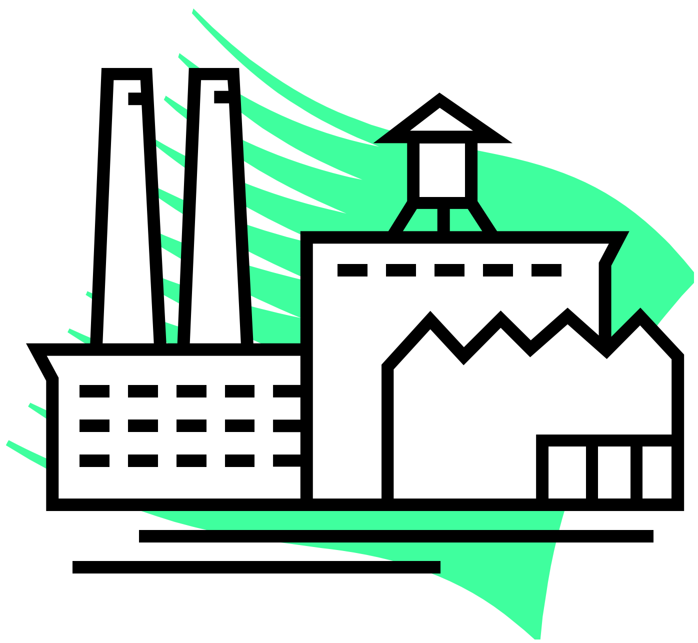


Oopsies Waste Services

- Old incineration facility
- Many owners – in bankruptcy
- Multiple compliance investigations

MSD

Mr. Sparkle Disposal



Mr. Sparkle Disposal

- Five year old facility
- Located on a brownfield site
- Operated by a major publicly traded corporation

LDAR – Implementation Challenges

- Program “Ownership”
- Monitoring Techniques
- Open Ended Lines
- Difficult to Monitor and Repair
- Frequent Leakers

Program Ownership

- LDAR is a complicated and not related to production
- Program needs a champion
- Operations must take ownership of LDAR
- Contractors are helpful, but ….
  - They get paid to monitor, not to take compliance
  - They have the ability to delegate authority but not the responsibility

Monitoring Techniques

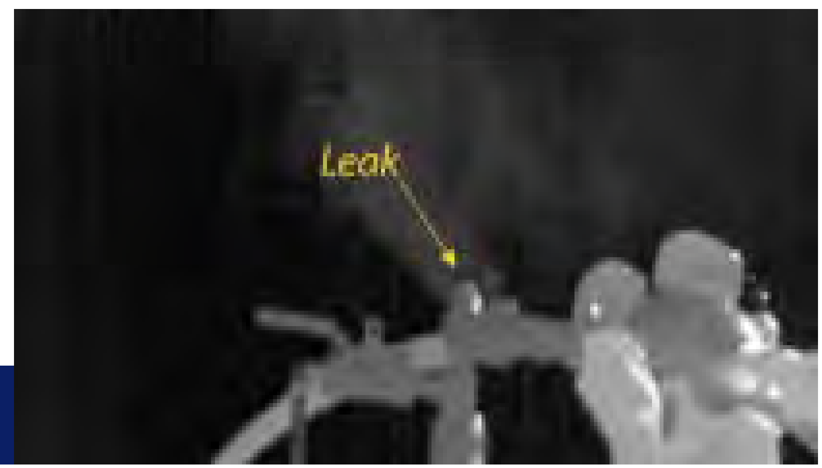
- Comparisons of “as written” vs. “in practice” LDAR techniques show significant differences
  - BAAQMD Study
  - NEIC enforcement
- Read Method 21 carefully
  - Monitor ***at*** the interface, not some distance ***away from*** the component
- Calibration gases and response factors

Open Ended Lines

- Difficult to make sure that every line is plugged
  - "Cigarette butt problem"
  - Cultural issues also play a factor
- Program design can improve compliance
  - Reduce number of open-ended lines
  - Reduce types of plugs
- Color-coding plugs and lines
- Tethering plugs to lines

Difficult to Repair or Monitor

- Older facilities were not designed with LDAR in mind
- It will be hard to monitor and repair components
  - IR Camera techniques can help to monitor components
- Facilities should set a standard for what is “difficult” to monitor or repair and apply it



Frequent Leakers

- Some components are in more severe need of service
- What is a good lifespan for gaskets, pumps, etc?
- Program design can improve compliance
  - Costs for exotic parts like mag drive pumps

Inspection Examples - OWS

- Uses a contractor for LDAR
  - “Oh, they keep the records”
  - “I’m not sure how they calibrate the instruments”
  - Contactor is paid by the component
- Open ended lines
  - Lots of uncapped lines
  - No system to audit open lines or improve compliance

Inspection Examples - MSD

- One staff member oversees LDAR
- Contractor uses MSD's EMIS system to enter LDAR leak data
- Occasional audits performed by a third party using IR camera
- Program to measure compliance of open ended-lines and improve compliance
- Looked at leak frequency as part of its PHA

Control Devices

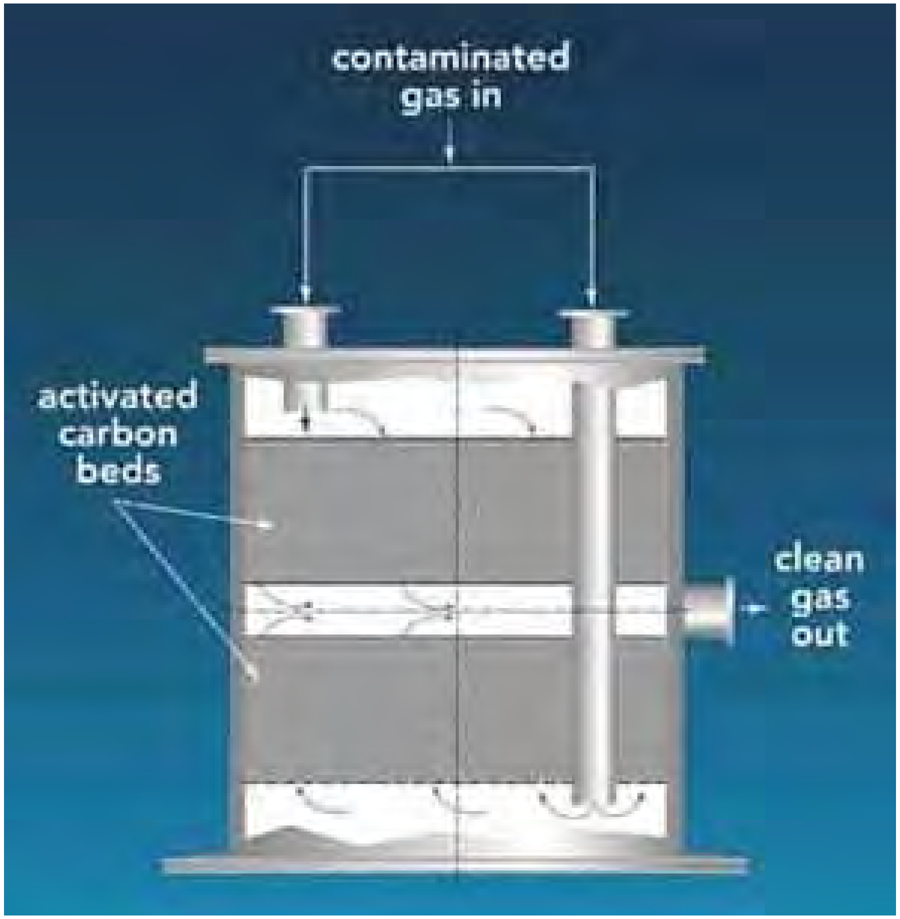
- The major control devices employed are:
  - Carbon Adsorbers
  - Oxidizers (Thermal and Catalytic)
  - Capture Systems

Control Device Selection

- Match the right technology to the process
- Using the wrong technology will be difficult at best
- Consider the nature of the process
  - Operating schedule
  - Variability of flow rate and VOC concentration
  - Difficulty in monitoring

Carbon Adsorbers

Carbon Adsorbers (cont'd)



When to Use Carbon – Fixed Bed

- Low flow rates
- Local control is desired
  - Isolated sources
  - Desirable not to mix streams
  - Economic / logistically easier for local control
- Open ended lines
  - Lots of uncapped lines
  - No system to audit open lines or improve compliance

When to Use Carbon – Regenerable

- Medium to high VOC concentration
- Consistent flow rates and/or concentrations
- Recovery of VOCs is desirable
- Steam supply and wastewater treatment must be available

Thermal Oxidizers

When to Use Oxidation

- Continuous streams
- Well characterized flow and concentration
  - Flow rate turndown is limited
  - Units can stay on “warm standby” but use fuel

When to Use Oxidation

- Low to moderate VOC concentrations
- Medium to high flow rates
- Economics will drive selection
  - Different thermal efficiencies available
  - Higher thermal efficiency means lower operating costs but higher capital costs
  - Lower thermal efficiency means higher turndown

Implementation Challenges - Carbon

- Changing out fixed-bed units
  - Having spare units on-site to make change-outs easy
  - Who does the change out? Who disposes of the carbon?
  - What to do with the vent stream while changing carbon?
- Monitoring fixed-bed units
  - Difficulty in monitoring variable streams
- Monitoring regenerable units

Implementation Challenges - Testing

- How to measure VOCs?
  - Method 18 and Method 25 vs. Method 25A
- % Control vs. ppm
  - Local air permits that may require more stringent control
- Measuring ppm vs ppmC
  - Must calculate control on a “actual VOC” basis

Closed Vent Systems

- Pressure control
  - Control devices will require pressure control
  - Too low and it pulls in outside air
  - Too high and it leaks, tanks overpressure
  - Difficult when tanks and processes are mixed
- Flow indicators for negative pressure systems

Inspection Examples - OWS

- Uses local carbon canisters
  - No monitoring records
  - No records of when canisters were placed into service
- Plans to upgrade to oxidizer system
  - No capital available

Inspection Examples - MSD

- Uses two oxidizers for control
- Vent header operates on pressure control to minimize flow; oxidizers are dispatched and idled as necessary
- Carbon canisters as backup
- Carbon canisters for local control where economical

Tanks

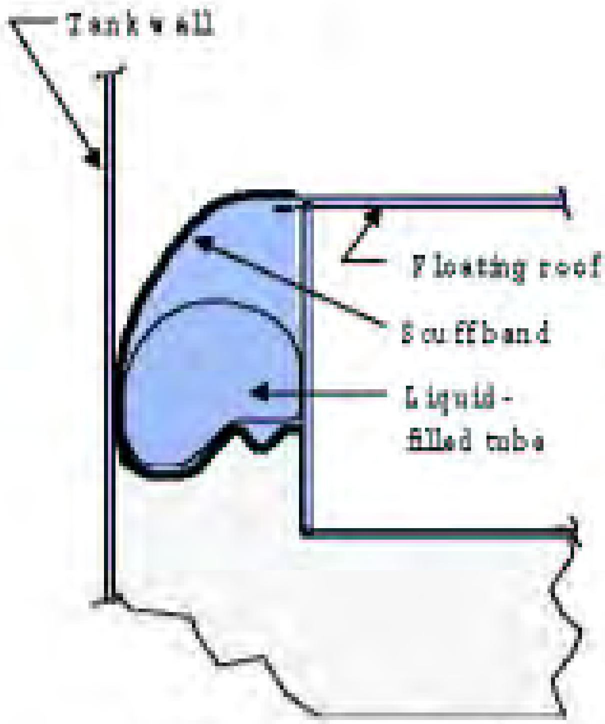
Tank Implementation Problems

- Floating Roof
- Fixed roof
- Containers
- Surface Impoundments

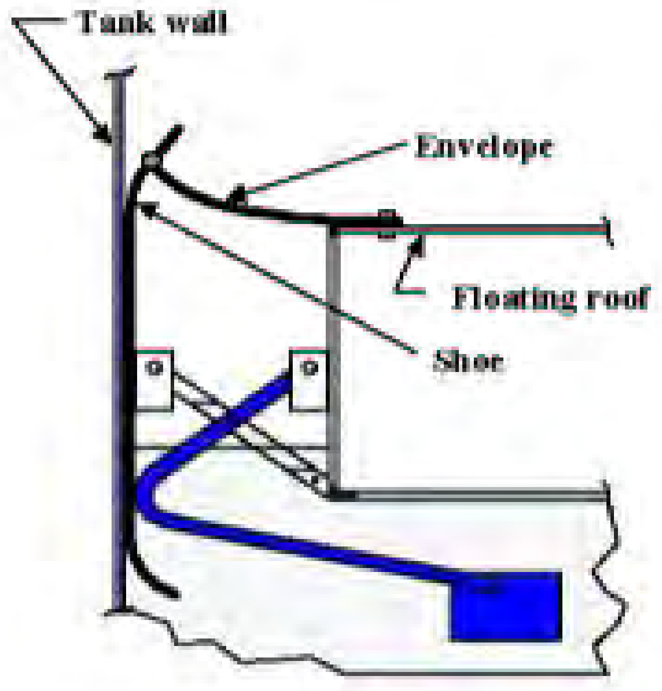
Internal Floating Roof

- Seal design
  - See rule details
  - Local requirements may be more stringent
- Seal inspection requirements
- Inspection for other items
  - Sampling hatches

Floating-Roof Tanks

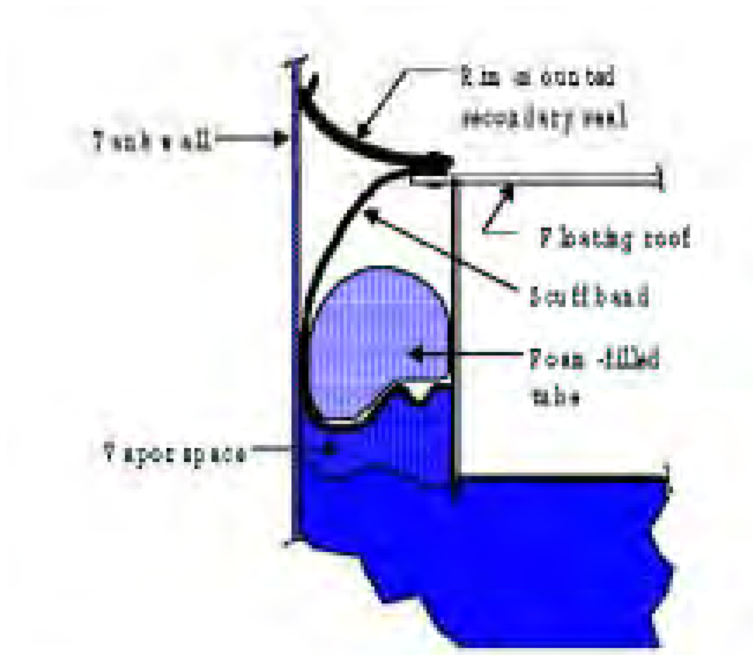


IFR Liquid-mounted seal

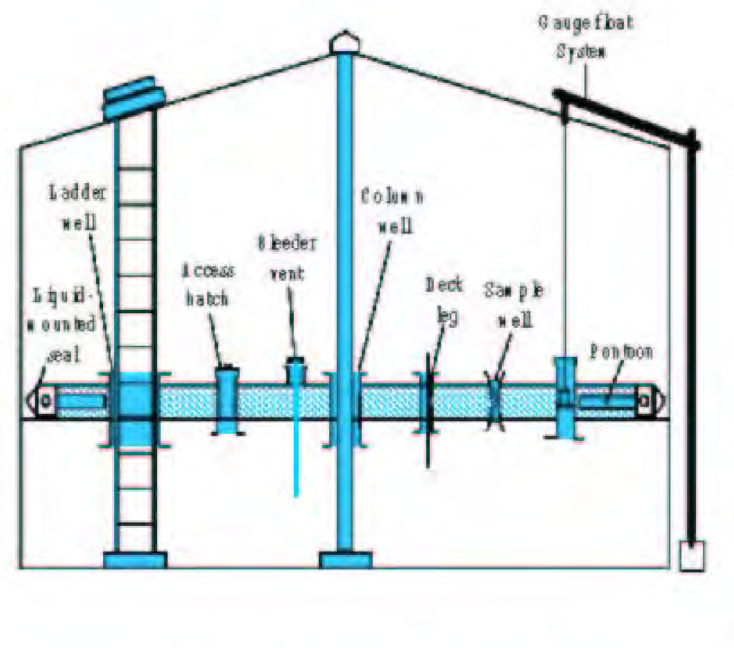


IFR Mechanical Shoe Seal

Floating-Roof Tanks (cont'd)



IFR Vapor-Mounted Seal with Secondary Seal



Internal Floating Roof

External Floating Roof

Fixed-Roof Tanks

Fixed Roof Tanks

- Better suited for storing some materials than IFR/EFR
- Pressure/vacuum vents can leak/stick open
- Issues with pressure control
  - Vent control systems
  - Nitrogen padding
- Possible to use local carbon canisters

Miscellaneous

- Keeping Records
- Equipment Labeling
- Interaction with Local Air Quality Programs

Required Records per §265.1035(b)

- Implementation schedule that includes dates by which the closed-vent system and control device will be installed and in operation
- Up-to-date documentation of compliance with the process vent standards
- A performance test plan if an owner or operator chooses to use test data to determine the organic removal efficiency or total organic compound concentration achieved by the control device
- Documentation of compliance with 265.1033 (including a list of all information references and sources used in preparing the documentation)

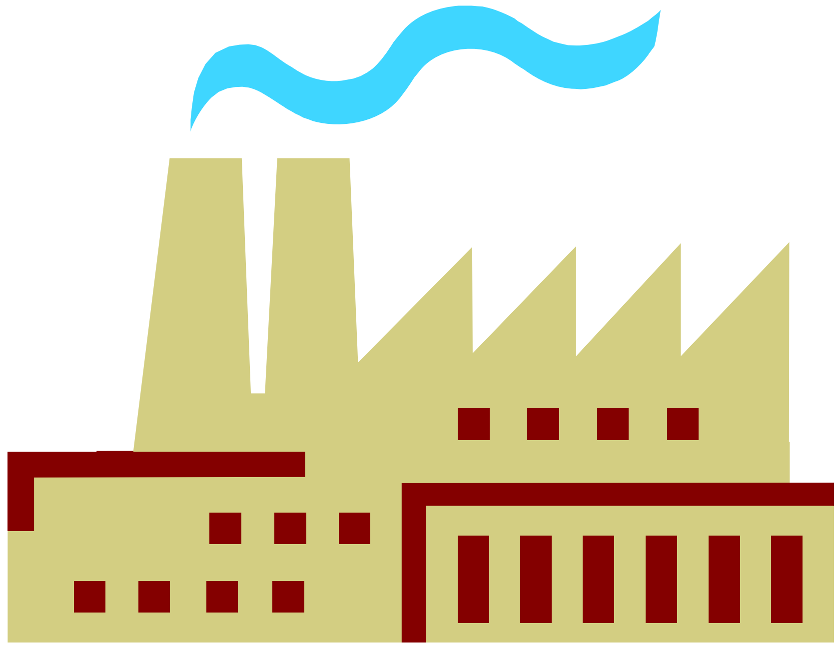
Equipment Marking

Interaction with Local AQ Programs

- Local programs may require less or more stringent controls
- Possibility of permit requirements that conflict with RCRA AA/BB/CC
- Work with local programs to set facilities up for compliance

PLC

Pretty Large Chemical, LLC



PLC Case Study

- The next few slides will present information about PLC LLC's operations
- Please also refer to the Process Flow Diagram (PFD) handout
- Attendees should fill out the Oklahoma DEQ RCRA AA/BB/CC Permit Application Checklists as/after we go through the next few slides

PLC Case Study

- Not all necessary information will be presented
- Think of this like reviewing information in a permit application – you may not have detailed regulatory applicability information from which to start
- What additional questions do you need to ask? Where is the application deficient?

Overview of PLC

- Pretty Large Chemical, LLC
- SOCMI operation
  - Continuous reaction and distillation process
  - Batch reaction and distillation process
- Subject to HON (MACT Subparts F, G, and H)
- BIF unit to handle on-site generated wastes
  - Still bottoms from batch operation
  - Off-spec benzene (also used to enhance BTU value)

Process No. 1

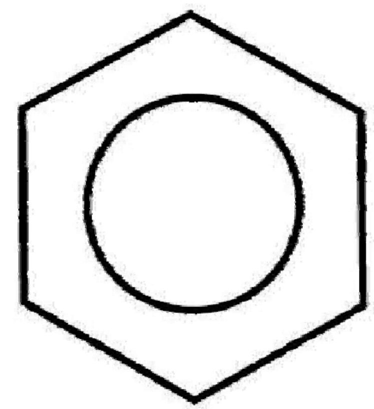
- Batch SOCMI; generates still bottoms as waste
  - Primary waste constituent is toluene
- Bottoms pumped to collection tank then to BIF collection / mixing tanks
  - 10,000 gal tank
  - Vented to common vent/tank header; controlled by oxidizer

Process No. 2

- Continuous SOCMI
- Generates off-spec and excess benzene as waste
- Benzene collected in day tank; benzene to be burned in BIF is transferred to BIF collection tanks
  - Day tank subject to SOCMI MACT (HON)

Process No. 3

- Emission Control System used for compliance with HON / MACT requirements
- Generates spent activated carbon as waste
- Stored in small canisters (55 gal drums) and roll-off boxes
- Off-site disposal
- Primary contaminants are benzene and toluene



Process No. 4

- Spent caustic from benzene storage
- Primary waste constituent is benzene
- Drawn directly from benzene day tank
- Off-site disposal
- Low volume waste stream

BIF Process

- Collection tank(s) for storing / blending wastes
- Blend tanks are sampled prior to burning
- Transferred to BIF feed tank
- Loading rack for truck transport of wastes for off-site disposal when BIF is not in service

Exercise

- Complete Oklahoma DEQ Permit Application Checklists for RCRA AA/BB/CC
  - Work solo or in groups
  - Note codes for applicable requirements (e.g., O-2a)
- Discussion of results


QUESTIONS?