Storage Tanks and Containment
Agenda

• Background
• Safety
• Facility design
• Large tanks
• Containment “do’s and don’ts”
Experience

• Bachelors degree in Construction Management
  • Colorado State University
• Large projects
  • Children’s Hospital (Denver)
  • Sun Microsystems (Broomfield)
  • Denver Botanical Gardens
• Hands on retail experience
• Design of modern retail facilities
Tanks, Containment and Plumbing.
Safety
It is the top priority!

- Send all your employees home safe
- Fall protection
  - OSHA defines hazards over 6’ (CFR 1926.501)
  - Engineer out fall hazards
    - Catwalks and stairs
  - PPE requires specific training
    - Do not tie them off and call it good
- Don’t rely on the safety guy
- Train your eye
Regulations are tightening
Do not get caught off guard!

• Changes after West Texas
  • Local code review on new and existing facilities
• WOTUS (Waters of the United States)
  • New facility design
  • Existing facility improvements
• Storm water run off control (BMP’s)
• Construction SWMPP (Usually over 1 acre disturbed)
Large Tanks

• Usually considered 100,000 gallons or more
• Construction – API 650 (American Petroleum Institute)
• Inspection – API 653 “Inspection, repair, alteration and reconstruction of steel aboveground storage tanks used in the chemical and petroleum industries”
  • Ensure inspector is API 653 Certified
    • Establish baseline tank condition and corrosion rates
Lined tanks vs. secondary containment structures

- Lined tanks (bladders)
  - Ensure there is a leak detection system installed
  - Review state and local regulations (more states requiring liners under tanks)
  - Is it true secondary containment? (valve boxes)
  - Recommend filling with partially with water before fertilizer. Liners can leak!
Large Tanks

• Lined tanks vs. secondary containment structures

• Secondary containment (no bladder)
  • When planning ensure adequate size
  • Plan for future growth
  • Consider access into containment after it is built
  • Large concrete structures can be a challenge to maintain
  • Double check calculations!
Containment
Steel or Concrete?

• Concrete
  • Traditionally used
  • Structurally sound
  • Contractor limitations
  • Weather limitations
  • Design thickness, reinforcement and placement are critical
    • Subbase preparation/compaction
  • Control joints, control joints, control joints!!
    • Floors, walls and load pads
  • Housekeeping
Containment
Steel or Concrete?

• Steel
  • Can be built in sections
  • Can be built in a controlled environment
  • Not as weather dependent
  • Does not crack like concrete
  • Good for leased facilities (movable)
  • Easier to modify/add on to
  • Still need good housekeeping!
Warehouse and Indoor Containment

• Indoor Tanks
  • Recommend indoor tank separation
  • Regularly inspect plumbing and valves
  • Ensure material compatibility
  • Consider automation for efficiency

• Warehouse
  • Authority Having Jurisdiction
  • Inspections
Questions/Discussion

Thank You!

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