Fluid Fertilizer Foundation

Storage Tanks and Containment

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Agenda

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

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Experience

- Bachelors degree in Construction Management
  - Colorado State University
- Large scale commercial construction
  - Children's Hospital (Denver)
  - Sun Microsystems (Broomfield)
  - Denver Botanical Gardens
- Hands on retail experience
- Design of modern retail facilities

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Tanks, Containment and Plumbing.

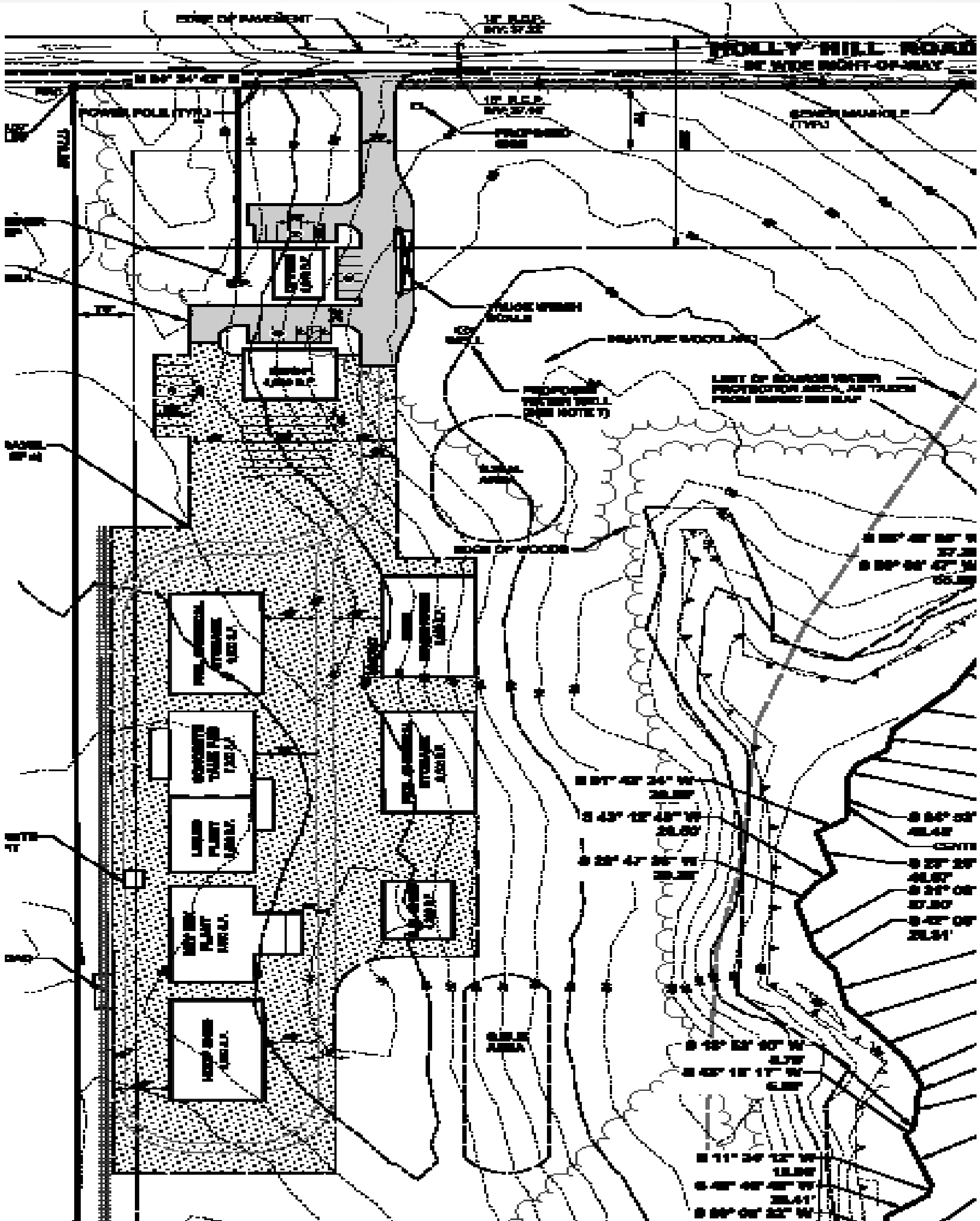
Safety
It is the top priority!

- Send all your employees home safe
  - Fall protection
    - OSHA Defines anything 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


CAUTION

Regulations are tightening
Do not get caught off guard!

- Changes after West Texas
  - Local code review on new and existing facilities
  - Fire Departments
  - Code Officials
  - Know your zoning and products stored!
  - OSHA and EPA


HOLLY HILL ROAD
EDGE OF PAVEMENT
POWER POLE (TYP.)
TRUCK WEIGH SCALE
LIMIT OF SOURCE WATER PROTECTION AREA, AS TAKEN
EDGE OF WOODS

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 on the chemical and petroleum industries"
  - Ensure inspector is API 653 Certified
    - Establish baseline tank condition and corrosion rates

Large Tanks

- Lined tanks vs. secondary containment

  - **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
  - **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
  - Control joints, control joints, control joints!!
    - Floors, walls and load pads
  - Housekeeping


SAFETY
FIRST
EMERGENCY
SHOWER
15-6-4
NO SMOKING/NO FUMAR
NOTICE
0
1
1
0500-GAL.


TANK #3
UN1X2
DANGER
PELIGRO
Tank-21
CATS


NOTICE
CAUTION
NOTICE
GLOVES AND GOGGLES
REQUIRED WHEN
TRANSFERRING THIS
PRODUCT
UN32%


THIS SIDE UP
ACTIVATOR #6

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!


EXTRACT
MAXIMUM N-PACT

Warehouse and Indoor Containment

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

- Warehouse
  - Authority Having Jurisdiction
  - Inspections

Tank Anchoring

- Wind
- Floatation
- Seismic

Questions/Discussion

Thank You!

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