PLANT DESIGN ISSUES:
SHORT AND LONG TERM

Scott Ramsdell
J.C. Ramsdell Enviro Services, Inc.
Flandreau, South Dakota
Ramsdell F&M, LTD
- 1952 – Mick Ramsdell
- 1975 – Full time SOB
  - retail locations

J.C. Ramsdell Enviro Services, Inc.
- Formed in 1992
- Design solution for sister company
Design Considerations
Common-Sense Design
Synthetic Liners
Secondary Containment
- Enviro-Guard Steel
- Rail Containment
- Wooden
- Earthen Dike
- Concrete
- Evaluate available land/space limitations
- NFPA 30 Requirements
- OSHA considerations
- Containment Calculations
  - Displacement volumes of smaller tanks
- Facility Operations
SECONDARY CONTAINMENT FOR LIQUID FERTILIZER

COMPUTATIONS

Volume Needed:
500,000gal x 1.25 = 625,000gal = 83,551cu.ft.
1 tank x 2,206cu.ft./ft. x 5.0' = 11,030cu.ft.
Total = 74,581cu.ft.

Containment Available:
16' x 11' x 5.0' = 94,620cu.ft.
Plus excess pooling volume:
140' x 24' x 5' = 6,780cu.ft.

Synthetic Liner:
60 mil Textured HDPE geomembrane

Geotextile Fabric:
8 oz/sq yd Nonwoven Geotextile Protective Fabric

All Field seams to be Vacuum or Pressure Tested and Reinspected. Learned According to Liner Manufacturer's Installation Guidelines. Manufacturer's Installation Guidelines are to be Followed During Installation.

Note:
Containment Berm and Floor should be compacted to 90% of standard proctor maximum dry density.
Interior of containment system must be free of rocks and other objects that may damage the liners. Surface should be steel rolled. It is the responsibility of the owner to insure the berms and floors have been properly constructed.

J.C. RAMSDELL ENVIRO SERVICES INC.

1439-01-095  SECOUNDARY CONTAINMENT SYSTEM

DESIGNED FOR A MAXIMUM FLUID DENSITY OF 85 POUNDS PER CU. FT.
Water Management
SubSurface Drainage

Ladder Install

Concrete Tank Pads
Filter Barrier
Pooling Basin
### TYPES – APPLICATIONS - THICKNESS

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<th>MATERIALS</th>
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Pros
• Economical – Small Scale
• Ease of Installation
• Durability
• Space Efficient

Cons
• Not approved for all applications
• Larger Application
  • Feasibility
  • Water Management
Containment Excavation

Installation Begins

Near Completion
**Pros**
- Strength/Availability

**Cons**
- Porous/Cracks
- Quickly Installed
- Adequate Use of Land Space
- Longevity
  - Won’t Crack
- Expandable
- Moveable
Water Management – Liner Protection – Corrugated Tank Ring
THANK YOU

Questions?