Mixing Loading Pads

“Design and Management for Productivity”

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Design Principles

- Implement the desired management plan
- Planned Space
  - ✓ Product Storage
  - ✓ Equipment
  - ✓ Workers
Design Principles

- Storage security and secondary containment
  - Pesticides
  - Fertilizer
- Safety
  - Environment
  - Workers
  - Product
- Labor efficient

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The Design Process

- Develop a “Rinsate” management plan
- Investigate and develop alternative designs to implement plan
- Evaluate design alternatives and options
- Choose the “best” system design
- Implement and troubleshoot the design
“Rinsate”

The liquid or solid generated from the rinsing of any equipment or container that has come in direct contact with any fertilizer, or pesticide, including wash water, contaminated precipitation, recovered sedimentation, or other contaminated debris.
“Waste”

- Rinsate that can not be used as intended.
  - The label defines the intended use.
    - The label is not always specific to proper methods for disposing of waste.
    - If it can’t be used according to label directions refer to regulatory agency
Rinsate vs. Waste

- Rinsate can be (re)used as part of the original application according to label directions.
- The product label is the best guideline available in making that determination
- The ability to use rinsate according to its “Intended use” maintains its identity as a rinsate and not a waste
Rinsate Generation

- Wash water
  - Rinsing out sprayer
  - Washing off application equipment
  - Washing off mix/load pad
- Contaminated precipitation
  - Mix/load pad
  - Fertilizer dike water
  - Pesticide dike water
- Contaminated debris
  - Mixing/Loading pad sump sludge
  - Mixing/Loading pad sweepings
Rinsate Management Plan

- Eliminate
  - Direct injection
  - Dedicated application equipment
  - Mixing/loading application equipment in field
  - Washing application equipment in field

- Minimize
- Segregate
- Apply
Rinsate Application

“In the real world”

• Even with good management there is always some rinsate to apply.
• Rinsate is likely contaminated with off label products.
• Intended use is to apply to crop.
• Need guidance from:
  • EPA to define acceptable levels of contamination to meet the legal requirements of label.
  • Manufacturer to define phytotoxicity to non labeled crops to minimize risk to crop and environment.
Rinsate Management
“Off the record”

• Application to land:
  – CRP or set aside
  – Fallow fields, (wheat stubble)
  – Fence row
  – Fall field going into labeled crop
Site Contamination

• Possible reasons for product getting off site:
  – Facility Design.
    • No roofs
    • Ineffective containment
    • Cracks
  – Poor management decisions and housekeeping.
    • Pumping over the dike (“clean water?”)
    • Improper waste disposal (pesticide container piles)
  – Practical problems
    • Tracking product off pad, (poor house keeping)
    • Parking areas, (washes off dirty equipment)
    • Operator error, (cover up mistakes)
    • Poor equipment maintenance, (leaking nozzles)
Rinsate Management
“Don’t Ask, Don’t Tell”

• Application to crop land either owned, rented, or contracted to apply rinsate generated in a calendar year.

• Land with mixed crop of all labeled crops.
  – A not very good mixed stand of:
    • Corn
    • Soybean
    • alfalfa
  – Fate of the crop in food chain
Design Concept and Reality

“The Rinsate Management Plan drives the Mixing and Loading Pad facility design”
Mixing Loading Pad Facility Concept
Concept

Figure 1.2. Small-scale facility, perspective view. Optional roof over entire facility.

Reality

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Figure 1.5. Large-scale facility, plan view. Optional roof over entire facility except fertilizer secondary containment and bulk unload pad.
Small Scale Design
Large Scale Design
Roof or No Roof??

“Plan the facility today for a roof in the future”
Work Space Layout

Large Scale

Small Scale
Mixing Loading Pad Design

Single Use

Multiple Use
Mixing Loading pad
Material Selection

Concrete
Asphalt
Concrete Floor Design

1. Wearing surface: Portland cement concrete, typically a thickness of 6 in. or greater.

2. Subbase material (optional): Compactibles, drainable fill. Typical thickness is (6 in. - 12 in.) and a fine material may be spread over the surface to fill voids (choker material), which reduces friction with concrete topping.

3. Subgrade: The natural soil at the site. The top 6 in. - 20 in. is usually compacted prior to the placement of the other layers of the slab.

Mixing Loading Pad

At least 2" but not greater than t/2.

Reinforcing bars in both directions. Use 60 grade steel. Interrupt reinforcing bars at control and construction joints. See Table 5.5 for reinforcing schedule.

Secondary Containment Floor

Two layers of reinforcing bars in both directions for each layer. Use 60 grade steel. Interrupt reinforcing bars at control and construction joint. See Table 5.3 for reinforcing schedule.

Figure 5.2. Concrete detail for mixing and loading pad floor with one layer of reinforcing. (See table 5.4 for concrete thickness, t).

Figure 5.1. Concrete detail for secondary containment floor with two layers of reinforcing. (See table 5.2 for concrete thickness, t).
Flatwork Joint Placement

- Minimize Joints exposed to standing water

**Side Sump**

**Center Sump**

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**Figure 5.8.** Common Joint in mixing and loading pad (side sump design). Note location of piping support outside mixing and loading pad.

**Figure 5.9.** Common joints in mixing and loading pad (center sump design). Note location of piping supports.
Sump Design

- Liquid Tight
- “The Smaller the Better”
Sump Management

- Keep it Clean!
- Allows recovery of product
Pipe Chase Design

No Underground “Inaccessible” Plumbing
Secondary Containment
Curb Details
Mixing Loading Pad
Curb Details

Keep Rainfall Out

Keep Rainfall In
Coating Concrete

• Design impacted by:
  – Product
  – Vehicle Traffic
  – Foot Traffic
  – Weather

• Use other’s experience in product selection
Resources

- State Fertilizer and Pesticide Storage Rules
- Wisconsin Minimum Design and Construction Standards for Concrete Mixing and Loading Pads and Secondary Containment Structures, David W. Kammel, February 2005
- [http://www.epa.gov/pesticides/regulating/containers.htm](http://www.epa.gov/pesticides/regulating/containers.htm)
- [http://www.dep.state.fl.us/water/stormwater/npdes/guidance_links.htm](http://www.dep.state.fl.us/water/stormwater/npdes/guidance_links.htm)