FLUID TECHNOLOGY ROUNDUP

OPERATION ISSUES / MAINTENANCE

CHRIS SCHULTZE
BUSINESS DEVELOPMENT MANAGER
HELENA CHEMICAL COMPANY

December 8, 2010

Load Out Pad

355 IAC 2-4-1 Load-out and unloading pads (Indiana State Chemist)
Sec. 1.

a) Areas used for the loading of fluid fertilizer into storage containers or for unloading fluid fertilizer from storage containers into mobile containers shall be curbed and paved with reinforced concrete or other suitable material that provides an impervious surface and is approved by the state chemist. All activities at the fluid fertilizer storage facility shall be carried out within this area.

Load Out Pad

b) The operational area containment shall be constructed and reinforced to support at least the foreseeable maximum gross load, including the following:

(1) The product.

(2) Equipment that utilizes the operational area.

(3) The mobile container.

(4) The motor vehicle.

Load Out Pad

c) The curbed and paved area shall have a minimum width of ten (10) feet, a minimum length of twenty (20) feet, and a minimum capacity of at least seven hundred fifty (750) gallons of discharged fluids. Any fill or unloading point of the mobile container shall be positioned over the paved area during loading or unloading.

Load Out Pad

Sump

- Zurn 887-24 catch basin 24" x 24"
- HDPE body
- Heavy duty Load Class E Ductile Iron Slotted Steel
- Manufactured for larger trench runs with easier transition between basin and trench
- Reducing seepage through and into ground below concrete pad

New Sump

Preparation of New Load Out Pad

Amenities of Load Out Pad

- #4 bars on 12" O.C.
- 4' wide by 4" thick side walk on a 2% slope towards load out pad
- 10' approach pads poured 8" thick to endure high traffic area when pad is not being used
- This Load Out Pad can contain 2,369 Gallons of fluid – Refer to your State Regulations on "Operational Area Containment"
- If the engineered specifications are not followed, the vendor may be jeopardizing the fluid capacity needed to meet the State Regulations causing the location potential fines and/or repairing the area to meet the requirements

Finished Load Out Pad – 2,369 Gallons

Two Part Polysulfide vs. Polyurethane Sealant in Joints

- Polyurethane (SL1)
  - Applications for abrasive and puncture resistant properties
    - Pavers, sidewalks, parking areas
  - It is a single component polyurethane sealant that cures by reaction with atmospheric moisture
- Sonolastic Two Part Polysulfide Sealant
  - Withstands constant water immersion and will not degrade under limited chemical exposure
  - It is a two part polysulfide – modified polyurethane sealant that cures by reaction of its component parts

What are Spill Prevention, Control and Countermeasure Plans (SPCC)

- An SPCC plan must be prepared by all facilities subject to regulation.[1] This plan is to help prevent any discharge of oil into navigable waters or adjoining shorelines. The main thrust of the SPCC regulation is **prevention** as opposed to after-the-fact reactive measures commonly described in Oil Spill Contingency Plans.
- The U.S. EPA's Oil Pollution Prevention Regulation was published in the Federal Register on December 11, 1973 and was promulgated under Section 311(j)(1)(C) of the Clean Water Act. It was amended by the Oil Pollution Act of 1990.

Old Fuel Pad

Fuel Pad Requirements

- Total above ground storage greater than 1,320 gallons is subject to Spill Prevention, Control and Countermeasure Plans (SPCC Regulations)
- This includes fuel being unloaded into fuel storage tanks or being loaded into vehicles from storage tanks
- Definition of oil; is of any kind and any form, not limited to, petroleum, fuel oil, sludge, oil refuse and oil mixed with wastes other than dredged spoil and oily mixtures (includes non-petroleum oils, synthetic oils, animal fats, oils and greases, and vegetables oils

Fuel Pad Requirements

- Non – Transportation Related Facility
  - Industrial, commercial, agricultural, or public facilities that use, store, drill for, produce, gather, process, refine or consume oil or oil products
  - Loading areas/racks, transfer hoses, loading arms and other equipment that are appurtenant to a non-transportation related facility

New Fuel Pad – 1,320 Gallons

Fuel Pad Sump

Containment Dikes

Containment Dikes

- The value of the organization's dollars spent just decreased as the integrity of the concrete wall has been jeopardized
- Useful life has decreased and will require continued maintenance
- This was a new pour
- Concrete is porous, this wall will deteriorate rapidly if not coated with an Epoxy

Containment Dikes

- If there is a spill and the dike is properly maintained, the location can recover the product
  - 20,000 gallons (116 Tons) of 10-34-0 * $600/Ton = $69,600 saved if tank ruptures and product is recovered
  - Excludes clean up cost because the dike was maintained and did not run through or over the dike into soil
  - Properly designed and well maintained facilities reduces risks to operations of the business

Concrete Containment Walls

355 IAC 5-4-2 (Indiana State Chemist)
Sec. 2.

a) The walls of secondary containment shall be constructed of steel, poured reinforced concrete, pre-casted concrete modules, or solid masonry and be designed to withstand a full hydrostatic head of any discharged liquid and weight load of material

b) Cracks and seams shall be sealed to prevent leakage.

Concrete Containment Walls

c) Walls shall not exceed six (6) feet in height above interior grade unless provisions are made for normal access this rule or upon suitable concrete footings which extend below the average frost depth. Joints between walls and the base shall be watertight

(*State Chemist of the State of Indiana; 355 IAC 5-4-2; filed Mar 8, 1991, 2:45 p.m.: 14 IR 1406; errata filed May 10)*

Containment Applied Coating

Containment Dike Applied Coating

- Carboline Polibrid Products
  - Ultra high build, flexible, plural component applied coating
  - Applications in aggressive immersion and containment applications
  - Combines polyurethane and poly-urea (compliment resin blends) technologies
  - Tends to yellow or darken in sunlight/UV exposure – will not affect performance

Containment Dike Applied Coating

- Recommendation from manufacturer representative
- Product life can be up to 30 years
- Spray apply one coat of Carboline, Polibrid 705
  - 20 to 25 Mils dry film thickness, while still tacky apply geo-thermal pad followed by top coat of Polibrid 705 at 20 to 25 Mils
  - Total of 40 to 50 Mils

Containment Dike Liners

355 IAC 5-4-3 Base liners (Indiana State Chemist)
Sec. 3.

a) The base of secondary containment shall be lined with concrete, steel, or other approved liners

b) Synthetic liners and installation plans shall be approved before use.

c) Synthetic liners shall have a minimum thickness of thirty (30) mils eight-tenths (0.8) millimeter) and be chemically compatible with the materials being stored within the containment.

Containment Dike Liners

d) Synthetic liners shall be installed under the supervision of a qualified representative of the manufacturer, and all field constructed seams shall be tested and repaired, if necessary, in accordance with the manufacturer's recommendations.

(State Chemist of the State of Indiana; 355 IAC 5-4-3; filed Mar 8, 1991, 2:45 p.m.: 14 IR 1406, eff. sixty (60) days after filing with secretary of state

Containment Liners

- Liner material depends upon your application and products being used
- Example
  - 1932 PTF (Seaman Corporation) - Primary and Secondary Containment of Aromatic Hydrocarbons
    - Base Fabric Type - Nylon
    - Coating Type - Polyester based polyurethane
    - Thickness - 35 mil (nominal)

Liquid Plumbing

Liquid Plumbing

Liquid Plumbing

Plumbing Design

- Controls depend on the operation processes of whether the location weighs product or through automation
- Improving plumbing design
  - Analyze and determine the location's current and future operational needs
    - % current/% potential future for:
      - Mini bulks
      - Truck load out
      - Truck load in based on truck load out
      - Concludes the location's gallons per minute needs

Plumbing Design

- Pumps that are closer to supply to push the product rather than pulling longer distance from the supply increases thru put
- Size pump to the product and/or loading/unloading operations
- Larger hose, HDPE, or stainless piping
- Plan for the future that may determine expansion of product line
  - Example; if current operation has 2" pumps, may want to evaluate 3" pumps

Plumbing Design

- This will allow 3" or 4" lines from supply to pump without losing thru put efficiencies, then decreasing to 2" if it is an operational necessity at the present time
- Increases efficiency and safety on site
- Improved operational efficiencies will decrease the location's variable expenses
  - Labor Wages
  - Fuel Expense
  - Reduce equipment maintenance

Plumbing Design

- Example;
  - Labor Wage
    - 60% more efficient would equal 16 loads

Old System Loading

Variable Expense of Labor per Time

Min/Load	Daily Loads	$/Hr	Total Min/Loading	Total Hours	Variable Exp $
40	10	$10.00	400	6.67	$66.67

New System Loading

Variable Expense of Labor per Time

Min/Load	Daily Loads	$/Hr	Total Min/Loading	Total Hours	Variable Exp $
20	20	$10.00	400	6.67	$66.67

Tank Painting

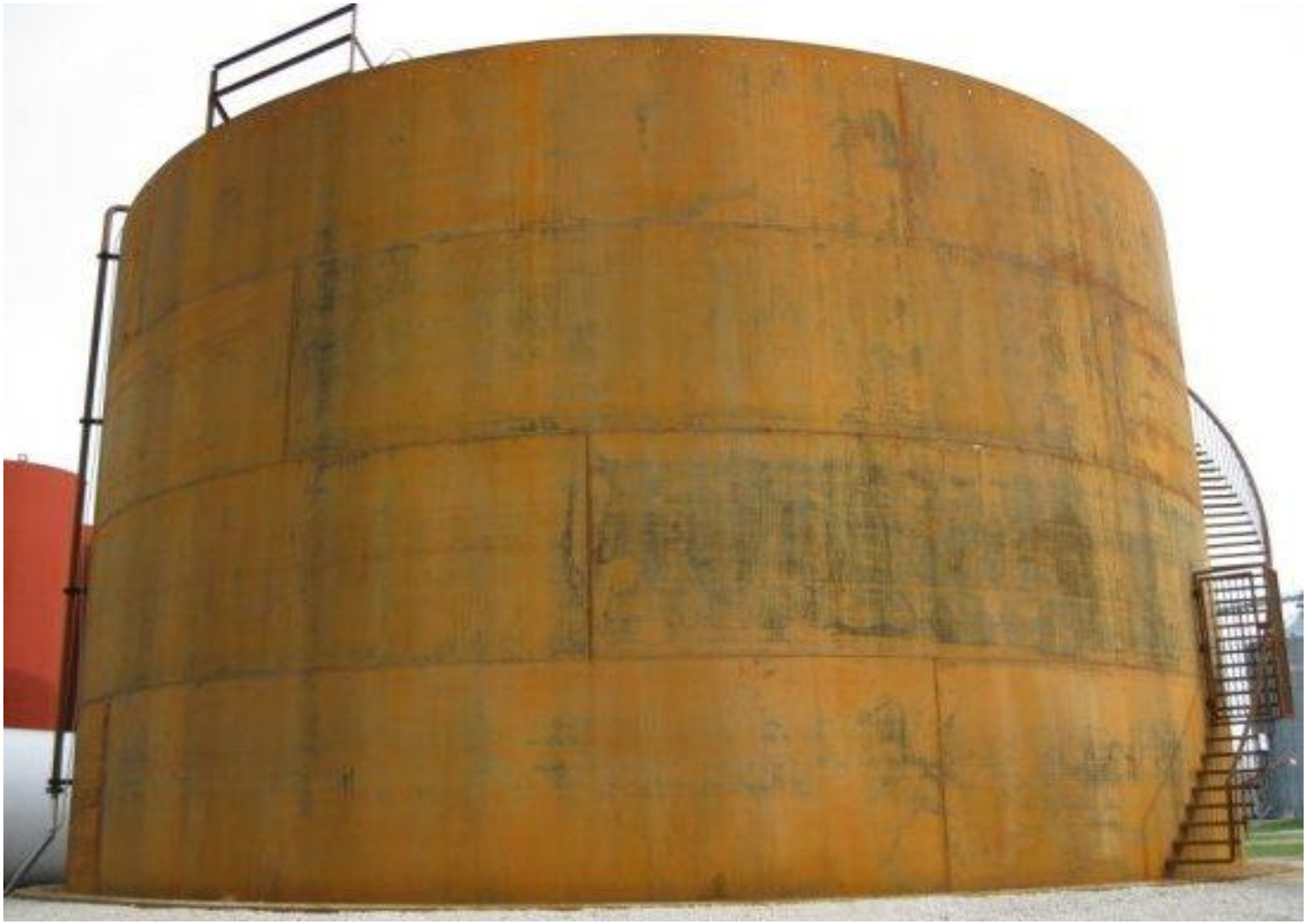
SSPC-SP 6/NACE No. 3 ISO 8501 1-1: 1988(E)
(SIS 05 59 00) Sa 2 - Commercial Blast Cleaning

Removal of mill scale, rust, rust scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree specified. All oil, grease, dirt, rust scale and foreign matter have been completely removed from the surface and all rust, mill scale and old paint have been completely removed except for slight shadows, streaks, or discolorations caused by rust stain, mill scale oxides or slight, tight residues of paint or coating that may remain; if the surface is pitted, slight residues of rust or paint may by found in the bottom of pits; at least two-thirds of each square inch of surface area shall be free of all visible residues and the remainder shall be limited to the light discoloration, slight staining or tight residues mentioned above.

Tank Painting

- 2 coats of primer to total 7 to 14 mils thick
- 1 coat of polyurethane to total at least 3 to 5 mils thick
- Dark colors should have a Clear UV protection material to reduce fading/chalking

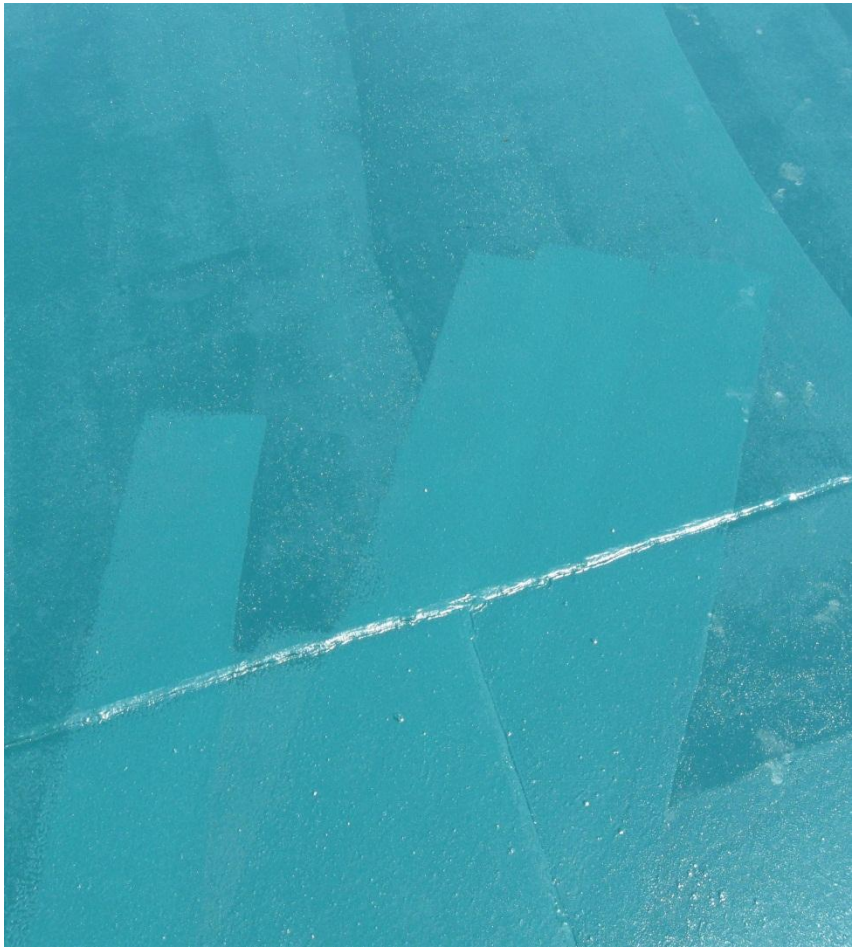
Tank Painting



Tank Painting

Tank Painting

- Paint Colors are not the same shade from different paint companies
- Ensure vendor has enough of same paint if outside their local area



Tank Painting

Tank Colors

- Dark Colors – UAN and Ammonium Thio-Sulfate
- Light Colors – 10-34-0 (Phosphates will precipitate out) and low salt starters
- Most smaller tanks are delivered factory white

Capital Funding

- Economic Development Corporation
- Local committees
- Rail road incentives
- TIF Funding (Tax Increment Financing)
  - Allows local government to fund economic development projects
  - TIF Districts used to create future increased tax revenue from project