Exhibit D1-1

CSA-1 Containment Calculations
Container Storage Area 1

Containment Calculation

Small Trench

11.25”W X 12”D X 41.75” L = 5,636.25 IN.²

5,636.25 IN.² / (1728 IN.²/cf) X 7.48 gal./cf = 24 gal.

Large Trench

1.75’W X 3.5’D X 11.75’L X 7.48 gal./cf = 538 gal.

Total CSA 1 Containment Volume = 562 gal.
Exhibit D1-2

CSA-2 Containment Calculations
Container Storage Area 2

Containment Calculation

Containment Pans

20'-0" X 15'-0" X 6" X 7.48 Gal./CF = +1,122 Gal.


Total CSA 2 Containment Volume = + 1,100 Gal.
Exhibit D1-3

Safety-Kleen Drum Spreadsheet
<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
<th>Manufactured Lining</th>
<th>Recertified Lining</th>
<th>UN-Rating</th>
<th>Primary Usage</th>
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<td>13348</td>
<td>Rust inhibitor, inside bottom head epoxy-phenolic (L-15X)</td>
<td>Rust inhibitor</td>
<td>1A2/Y1.6/200</td>
<td>Parts Washer</td>
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<td>Red (drum with 3/4&quot; flange in side wall, lid color red with 1 2&quot; and 3 3/4&quot; bungs, bolt ring 14 X 18 gauge) Pigmented 100% phenolic lining</td>
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<td>Solvent (Minimizer)</td>
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### SAFETY-KLEEN DRUMS

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<th>Category</th>
<th>Type</th>
<th>Size (gal)</th>
<th>Nestable</th>
<th>Open-Head</th>
<th>Tight-Head</th>
<th>Drum Only</th>
<th>Lined</th>
<th>Un-lined</th>
<th>Bung Gasket</th>
<th>Gauge</th>
<th>Description</th>
<th>Manufactured Lining</th>
<th>Reconditioned Lining</th>
<th>UN-Rating</th>
<th>Primary Usage</th>
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<td>Straight 18</td>
<td>Red</td>
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<td>UN-Rating</td>
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<td>Gauge</td>
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<td>Blue with two 2&quot; bungs one NPS and one buttress</td>
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Exhibit D1-4

Container Process Flow at Branch
Exhibit D1-5

Paint Waste Process Flow at Recycle Center
Exhibit D1-6

Immersion Cleaner Process Flow at Recycle Center
Exhibit D1-7

Dry Cleaner Process Flow at Recycle Center
**PRODUCT DESCRIPTION**

TILE-CLAD HIGH SOLIDS is a low VOC, two-package, epoxy-polyamide coating for use in industrial maintenance environments and high performance architectural applications.

- Chemical resistant
- Abrasion resistant
- Low VOC
- B60VZX70 Hardener - resists film attack by mildew
- Outstanding application properties

**PRODUCT CHARACTERISTICS**

**Finish:** Gloss and Eg-Shel

**Color:** Wide range of colors available, including safety colors

**Volume Solids:** 56% ± 2%, mixed, may vary by color

**Weight Solids:** 70% ± 2%, mixed, may vary by color

**VOC (EPA Method 24):**
- Unreduced: <400 g/L; 3.33 lb/gal
- Mixed: <413 g/L; 3.44 lb/gal

**Mix Ratio:** 1:1 by volume

**Recommended Spreading Rate per coat:**

<table>
<thead>
<tr>
<th>Wet mils (microns)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0 (100)</td>
<td>4.0</td>
<td>7.0 (175)</td>
</tr>
<tr>
<td>2.5 (63)</td>
<td>2.5</td>
<td>4.0 (100)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coverage sq ft/gal (m²/L)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>225 (5.5)</td>
<td>225</td>
<td>359 (8.8)</td>
</tr>
</tbody>
</table>

**Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft:**

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>896 (21.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

**Dry mils**

<table>
<thead>
<tr>
<th>30% RH</th>
<th>55°F/13°C</th>
<th>77°F/25°C</th>
<th>110°F/43°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>To touch:</td>
<td>3 hours</td>
<td>1 hour</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Tack free:</td>
<td>6 hours</td>
<td>2 hours</td>
<td>30 minutes</td>
</tr>
<tr>
<td>To recoat:</td>
<td>6 hours</td>
<td>2 hours</td>
<td>30 minutes</td>
</tr>
<tr>
<td>To stack:</td>
<td>18 hours</td>
<td>16 hours</td>
<td>3 hours</td>
</tr>
<tr>
<td>To cure:</td>
<td>21 days</td>
<td>14 days</td>
<td>7 days</td>
</tr>
</tbody>
</table>

If maximum recoat time is exceeded, abrade surface before recoating.

**Drying time is temperature, humidity, and film thickness dependent.**

**Pot life:** 4 hours

**Sweat-in-time:** 1 hour

**Flash Point:** 92°F (33°C), PMCC, mixed

**Reducer/Clean Up:** Reducer #54, R7K54-Spray R6K25-Brush & Roll

**Shelf Life:** 36 months, unopened

**Store indoors at 40°F (4.5°C) to 100°F (38°C).**

**Recommended Uses**

For use over prepared substrates such as steel, galvanizing, and concrete in industrial environments.

- Laboratories
- Masonry surfaces
- Offshore structures
- Storage tanks
- Structural & support steel
- Institutional kitchens
- DOE Nuclear Fuel Facilities
- Nuclear fabrication shops
- DOE Nuclear Weapons Facilities
- Chemical processing equipment
- Institutional & commercial wall coating
- Suitable for use in USDA inspected facilities
- Conforms to AWWA D 102, OCS #5
- Acceptable for use in high performance architectural applications.
- Conforms with MPI # 77
- This product meets specific design requirements for non-safety related nuclear plant applications in Level II, III and Balance of Plant, and DOE nuclear facilities.

* Nuclear qualifications are NRC license specific to the facility.

**Performance Characteristics**

**Substrate**: Steel

**Surface Preparation**: SSPC-SP6/NACE 3

**System Tested**:

- 1 ct. Recoatable Epoxy Primer @ 4.0 - 6.0 mils (100-150 microns) dft
- 1 ct. Tile-Clad HS @ 3.0 mils (25 microns) dft

*unless otherwise noted below

**Test Name** | **Test Method** | **Results**
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrasion Resistance</td>
<td>ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load</td>
<td>80 mg loss</td>
</tr>
<tr>
<td>Accelerated Weathering - QUV</td>
<td>ASTM D4587, QUVA- A, 5,000 hours</td>
<td>Passes</td>
</tr>
<tr>
<td>Adhesion</td>
<td>ASTM D4541</td>
<td>1050 psi</td>
</tr>
<tr>
<td>Corrosion Resistance</td>
<td>ASTM D5894, 10 cycles, 3336 hours</td>
<td>Rating 9 per ASTM D610 for rusting; Rating 10 per ASTM D714 for blistering</td>
</tr>
<tr>
<td>Nuclear Decontamination</td>
<td>ASTM D4256/ANSI N 5.12</td>
<td>99% Water Wash; 95% Overall</td>
</tr>
<tr>
<td>Direct Impact Resistance</td>
<td>ASTM D2794</td>
<td>95 in. lb.</td>
</tr>
<tr>
<td>Dry Heat Resistance</td>
<td>ASTM D2485</td>
<td>200°F (93°C)</td>
</tr>
<tr>
<td>Exterior Durability</td>
<td>1 year at 45° South</td>
<td>Excellent, chalks</td>
</tr>
<tr>
<td>Flexibility</td>
<td>ASTM D522, 180° bend, 1/4” mandrel</td>
<td>Passes</td>
</tr>
<tr>
<td>Moisture Condensation Resistance</td>
<td>ASTM D4585, 100°F (38°C), 1000 hours</td>
<td>Passes, no blistering, rust, or delamination</td>
</tr>
<tr>
<td>Pencil Hardness</td>
<td>ASTM D3363</td>
<td>F-H</td>
</tr>
<tr>
<td>Radiation Tolerance</td>
<td>ASTM D4082 / ANSI 5.12</td>
<td>Pass</td>
</tr>
<tr>
<td>Salt Fog Resistance</td>
<td>ASTM B117, 2,500 hours</td>
<td>Rating 10 per ASTM D610 for rusting; Rating 10 per ASTM D714 for blistering</td>
</tr>
</tbody>
</table>

Epoxy coatings may darken or yellow following application and curing. Provides performance comparable to products formulated to federal specification: 1T-C-535B

Continued on back
**PRODUCT INFORMATION**

**SURFACE PREPARATION**

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:
- Iron & Steel: SSPC-SP2
- Aluminum: SSPC-SP1
- Galvanizing: SSPC-SP1
- Concrete & Masonry: SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 1-3
- Wood, interior: Clean, smooth, dust free

* Primer required

**Surface Preparation Standards**

<table>
<thead>
<tr>
<th>Condition of Surface</th>
<th>ISO 8501-1</th>
<th>BS7079: A1</th>
<th>Swedish Std.</th>
<th>SSPC</th>
<th>NACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Metal</td>
<td>Sa 3</td>
<td>Sa 3</td>
<td>Sa 3</td>
<td>SP 2</td>
<td>1</td>
</tr>
<tr>
<td>Near White Metal</td>
<td>Sa 2.5</td>
<td>Sa 2.5</td>
<td>Sa 2.5</td>
<td>SP 10</td>
<td>2</td>
</tr>
<tr>
<td>Commercial Blast</td>
<td>Sa 2</td>
<td>Sa 2</td>
<td>Sa 2</td>
<td>SP 7</td>
<td>3</td>
</tr>
<tr>
<td>Brush-Off Blast</td>
<td>Sa 1</td>
<td>Sa 1</td>
<td>Sa 1</td>
<td>SP 4</td>
<td>4</td>
</tr>
<tr>
<td>Hand Tool Cleaning</td>
<td>Rusted</td>
<td>C St 2</td>
<td>C St 2</td>
<td>SP 2</td>
<td>-</td>
</tr>
<tr>
<td>Hand Tool Cleaning</td>
<td>Pitted &amp; Rusted</td>
<td>D St 3</td>
<td>D St 3</td>
<td>SP 2</td>
<td>-</td>
</tr>
<tr>
<td>Power Tool Cleaning</td>
<td>Rusted</td>
<td>C St 3</td>
<td>C St 3</td>
<td>SP 3</td>
<td>-</td>
</tr>
<tr>
<td>Power Tool Cleaning</td>
<td>Pitted &amp; Rusted</td>
<td>D St 3</td>
<td>D St 3</td>
<td>SP 3</td>
<td>-</td>
</tr>
</tbody>
</table>

**TINTING**

Tint Part A with Maxitoner colorants or Blend-A-Color Toner at 200% strength into Part A. Five minutes minimum mixing on a mechanical shaker is required for complete mixing of color.

**APPLICATION CONDITIONS**

- Temperature: 55°F (13°C) minimum, 110°F (43°C) maximum (air, surface, and material)
- Relative humidity: At least 5°F (2.8°C) above dew point
- 85% maximum

Refer to product Application Bulletin for detailed application information.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Packaging: Parts A &amp; B:</th>
<th>1 gallon (3.78L) and 5 gallon (18.9L) containers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight:</td>
<td>10.78 ± 0.2 lb/gal ; 1.3 Kg/L mixed, may vary by color</td>
</tr>
</tbody>
</table>

**SAFETY PRECAUTIONS**

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

**WARRANTY**

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
**Surface Preparations**

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

**Iron & Steel**
Minimum surface preparation is Hand Tool Clean per SSPC-SP2. Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. For better performance, use Commercial Blast Cleaning per SSPC-SP6/NACE 3, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils / 50 microns). Prime any bare steel within 8 hours or before flash rusting occurs. Primer Required.

**Aluminum**
Remove all oil, grease, dirt, oxide and other foreign material by Solvent Cleaning per SSPC-SP1. Primer Required.

**Galvanized Steel**
Allow to weather a minimum of six months prior to coating. Remove all oil, grease, dirt, oxide and other foreign material by Solvent Cleaning per SSPC-SP1. When weathering is not possible, or the surface has been treated with chromates or silicates, first Solvent Clean per SSPC-SP1 and apply a test patch. Allow paint to dry at least one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7 is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2, prime the area the same day as cleaned.

**Concrete and Masonry**
For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 1-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with Steel-Seam FT910.

**Wood**
Surface must be clean, dry and sound. Remove any oils and dirt from the surface using a degreasing solvent or strong detergent. Sand to remove any loose or deteriorated surface wood and to obtain a proper surface profile. Prime with recommended primer and paint as soon as possible. No painting should be done immediately after a rain or during foggy weather. Knots and pitch streaks must be scraped or sanded and spot primed before full coat of primer is applied. All nail holes or small openings must be properly caulked.

---

**Surface Preparation Standards**

<table>
<thead>
<tr>
<th>Surface Condition</th>
<th>ISO 8501-1</th>
<th>Swedish Std.</th>
<th>NACE</th>
<th>SSPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Metal</td>
<td>BS7079:A1</td>
<td>SIS055900</td>
<td>SP11</td>
<td>1</td>
</tr>
<tr>
<td>Near White Metal</td>
<td>Sa 3</td>
<td>Sa 3</td>
<td>SP 5</td>
<td>3</td>
</tr>
<tr>
<td>Commercial Blast</td>
<td>Sa 2.5</td>
<td>Sa 2.5</td>
<td>SP 12</td>
<td>2</td>
</tr>
<tr>
<td>Brush-Off Blast</td>
<td>Sa 2</td>
<td>Sa 2</td>
<td>SP 10</td>
<td>3</td>
</tr>
<tr>
<td>Hand Tool Cleaning</td>
<td>Rusted</td>
<td>C St 2</td>
<td>SP 7</td>
<td>2</td>
</tr>
<tr>
<td>Power Tool Cleaning</td>
<td>Rusted</td>
<td>D St 2</td>
<td>SP 3</td>
<td>2</td>
</tr>
</tbody>
</table>

---

**Application Conditions**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Temperature</th>
<th>Relative Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>55°F (13°C) minimum, 110°F (43°C) maximum</td>
<td>85% maximum</td>
</tr>
</tbody>
</table>

**Application Equipment**

- **Reducer/Clean Up:** Reducer #54, R7K54, R6K25
- **Airless Spray:**
  - Pressure: 2400 psi
  - Hose: 3/8" ID
  - Tip: 0.19"
  - Filter: 60 mesh
  - Reduction: R7K54 as needed up to 10% by volume
- **Conventional Spray:**
  - Gun: Binks 95
  - Fluid Nozzle: 66
  - Air Nozzle: 69 PB
  - Atomization Pressure: 60 psi
  - Fluid Pressure: 20 psi
  - Reduction: R7K54 as needed up to 10% by volume
- **Brush:**
  - Reduction: Nylon/Polyester or Natural Bristle
  - Reduction: R6K25 as needed up to 10% by volume
- **Roller:**
  - Cover: 1/4"-3/8" woven with solvent resistant core
  - Reduction: R6K25 as needed up to 10% by volume

If specific application equipment is not listed above, equivalent equipment may be substituted.
APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly with low speed power agitation. Make certain no pigment remains on the bottom of the cans. Then combine one part by volume of Part A with one part by volume of Part B. Thoroughly agitate the mixture with power agitation. Allow the material to sweat-in as indicated. Re-stir before using.

If reducer solvent is used, add only after both components have been thoroughly mixed, after sweat-in.

Apply paint at the recommended film thickness and spreading rate as indicated below:

<table>
<thead>
<tr>
<th>Spreading Rate per coat:</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet mils (microns)</td>
<td>4.0 (100)</td>
<td>7.0 (175)</td>
</tr>
<tr>
<td>Dry mils (microns)</td>
<td>2.5 (63)</td>
<td>4.0 (100)</td>
</tr>
<tr>
<td>Coverage sq ft/gal (m²/L)</td>
<td>225 (5.5)</td>
<td>359 (8.8)</td>
</tr>
<tr>
<td>Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft</td>
<td>896 (21.9)</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

**Drying Schedule @ 4.0 mils wet (100 microns):**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>RH</th>
<th>Drying Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>@ 55°F/13°C</td>
<td>50% RH</td>
<td>To touch: 3 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 hour 20 minutes</td>
</tr>
<tr>
<td>@ 77°F/25°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>@ 110°F/43°C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

**CLEAN UP INSTRUCTIONS**

Clean spills and splatters immediately with Reducer #54, R7K54. Do not mix previously catalyzed material with new.

**DISCLAIMER**

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

**APPLICATION BULLETIN**

**PERFORMANCE TIPS**

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excess film build.

Excessive reduction of material can affect film build, appearance, and adhesion.

Do not apply the material beyond recommended pot life.

Do not mix previously catalyzed material with new.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Reducer #54, R7K54.

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

Quik-Kick Epoxy Accelerator is acceptable for use. See data page 4.99 for details.

Insufficient ventilation, incomplete mixing, miscatalyzation, and external heaters may cause premature yellowing.

Excessive film build, poor ventilation, and cool temperatures may cause solvent entrapment and premature coating failure.

Refer to Product Information sheet for additional performance characteristics and properties.

**SAFETY PRECAUTIONS**

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**WARRANTY**

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Secondary Containment Crack Repair and Surface Epoxy Paint Coating
Secondary Containment Crack Repair and Surface Epoxy Paint Coating

Immediate Small Crack Repair (Container Storage Area 1)

All cracks and/or gaps in the containment are to be immediately repaired (or as soon as possible if inclement weather prevents the immediate repair) by branch personnel on the same day that the inspection discovered the flaw. This can be accomplished by thoroughly abrading and cleaning the surface to be repaired. Once the surface is prepared, apply a coating over the crack using a compatible, equivalent coating material (see below for example compatible coating materials for the respected areas).

Note: Due to the chemical make up of material coatings and the surface to be repaired, weather conditions may dictate the application of the repair. The surface being repaired must be clean and dry. Repairs must not be made either during or after rain and snow events until the surface area is completely dry. Extreme temperatures may also affect repair times. At temperatures >100F the epoxy resins in the material coating will react too quickly for the repair to be successful. At temperatures <32F (some coating brands suggest not applying if the temperature is <50F) the epoxy resins in the coating material will not react, creating an unsuccessful repair.

Large Crack Repair

If the scope of work is beyond the branch’s resources then branch personnel must temporarily repair the crack as outlined above and notify your branch engineer of the problem so that they may schedule a contractor to make a permanent repair.

Immediate Small Coating Repair (CSA 1 & 2 and R&F containment pans)

Minor coating degradation (small patches of coating missing or flaking) are to be immediately repaired (or as soon as possible if inclement weather prevents the immediate repair) by branch personnel on the same day that the inspection discovered the flaw. This can be accomplished by thoroughly abrading and cleaning the surface to be repaired. Once the surface is prepared, apply a coating over the area using an equivalent, compatible coating material (see below for example compatible coating materials for the respected areas).
Note: Due to the chemical make up of material coatings and the surface to be repaired, weather conditions may dictate the application of the repair. The surface being repaired must be clean and dry. Repairs must not be made either during or after rain and snow events until the surface area is completely dry. Extreme temperatures may also affect repair times. At temperatures >100F the epoxy resins in the material coating will react too quickly for the repair to be successful. At temperatures <32F (some coating brands suggest not using if the temperature is <50F) the epoxy resins in the coating material will not react, creating an unsuccessful repair.

Large Coating Repair

If the coating is delaminating in large areas (lifting from the surface) then re-coating of the entire containment area may be necessary. Branch personnel must temporarily repair the area as outlined above and notify your branch engineer of the problem so that they may schedule a contractor to make a permanent repair.

Location/Material Thickness/ Recommended Materials

| Drum Storage Areas Over Concrete: Minimum Thickness: new construction 125 mil (1/8”) |
| All new construction Drum Storage coatings shall contain an aggregate of garnet, granite or equal. An example product includes: |
| - Sherwin Williams TILE-CLAD® HIGH SOLIDS. |
| - Sherwin Williams Anchor Paint (if aggregate is not needed). |
| Equivalent products may be substituted, repairs of low traffic areas or small sections do not require aggregate. |

Safety-Kleen’s standard color for all concrete coatings is medium to dark gray.

The following are minimum physical strength requirements for containment area coatings:
Tensile Strength: Min. 3000 psi (ASTM D307)
Bond Strength to Concrete: 400 psi (ACI committee #5031 PP 1139-1141 concrete failure)
Shore D Hardness: 85 – 90 (ASTM D-2240/Shore D Durometer)
Flexural Strength: 1300 psi (ASTM C-580)

Drum Storage Areas:
Coating must resist the impact and abrasions of wheeled carts, fork trucks, drums and normal operating conditions.
Exhibit D2-1.1

Tank Manufacturer Plate
C.B. INC., dba TOPAZ TANK & MFG.
2269 S. LIBERTY
BOISE, IDAHO 83705

BUILT TO WEAK SHELL-TO-ROOF JOINT DESIGN

THIS TANK IS PROVIDED WITH A LONG BOLT MANHOLE, TEST PRESSURE NOT TO EXCEED 2.5 P.S.I.G.
Exhibit D2-2

Tank System Installation Assessment
INSTALLATION ASSESSMENT
USED MINERAL SPIRITS AND DRUM WASHER/DUMPSTER
STORAGE TANK SYSTEM
SAFETY-KLEEN CORPORATION BRANCH
BOISE, IDAHO

Facility No. 1-183-08

Prepared by:
QuesTec Corporation
4812 Santana Circle
Columbia, Missouri 65203
Project No. 92105.3

February 26, 1993
# INSTALLATION ASSESSMENT

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<td>i</td>
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<td>System Description</td>
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<td>2</td>
</tr>
<tr>
<td>1. Installation Inspection</td>
<td>2</td>
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<tr>
<td>2. Tightness Testing</td>
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<td>3. Ancillary Equipment</td>
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<td>4</td>
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Exhibits

- Appendix A - Design Documentation
- Appendix B - Field Data
I have supervised the installation assessment dated February 26, 1993 of the used mineral spirits and drum washer/dumpster storage tank system at the Safety-Kleen Corporation facility in Boise, Idaho. The EPA ID Number for the facility is IDD 981770498.

With regard to this duty, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Rick A. Bartelt
Registered Professional Engineer
Idaho Temporary Registration Number 93-2833

QuesTec Corporation
4812 Santana Circle
Columbia, Missouri 65203
This report documents the installation assessment for the used mineral spirits and drum washer/dumpster storage tank system at the Safety-Kleen facility in Boise, Idaho. The assessment was conducted to address the requirements of 40 CFR 264.192, 40 CFR 264.193, and the corresponding requirements of the Idaho Rules, Regulations and Standards for Hazardous Waste Title 1, Chapter 5, 01.05008.

**SYSTEM DESCRIPTION**

Liquid used mineral spirits is picked up from offsite generators in 16 and 30 gallon drums and brought to the Safety-Kleen Service Center where it is transferred into one of two hooded dumpsters. One of the dumpsters is equipped with a drum washer. From the drumwasher or dumpster, it is pumped into a steel aboveground vertical storage tank through a steel piping arrangement. Periodically, the used mineral spirits is transferred from this storage tank to a large tanker truck by which it is taken to a recycling facility. The sludge, solids and trash that accumulate in the tank are removed through the manway by a vacuum truck and taken offsite for reclamation.

The drum washer unit was manufactured specifically for Safety-Kleen by Southwest Industrial Constructors. The unit utilizes the used mineral spirits to clean the returned drums. Drawings for the unit are in Appendix A.

The drum washer is located in the Return/Fill shelter which has a series of interconnected metal pans for containment.

The storage tank is a vertical cylinder with a shallow cone roof, and a flange and dish bottom. The tank is supported by a 24 inch high skirt with four portholes which allow for tank bottom leak inspections.

The tank is located in a steel reinforced concrete diked containment area. The tank is vented to the atmosphere, and it is equipped with a gauge for daily liquid level readings and a liquid level alarm which provides audio and visual alerts when the tank volume reaches 95% of the permitted capacity.

A vicinity map, site plan, a tank farm plan, and a system schematic can be found in the exhibit section, Exhibits 1, 2, 3, and 4 respectively.

For the purpose of this assessment, the tank system shall be defined as the tank, the piping from the tank to the truck access connection, the piping from the drum washer and dumpster in the return/fill dock to the tank, the drum washer and dumpster, the dike which serves as secondary containment for the tank, and the metal pans which serve as secondary containment for the Return/Fill Area.
INSTALLATION ASSESSMENT - [40 CFR 264.192]

On January 18 and February 13, 1993 visual inspections were made of the tank system by QuesTec Corporation. First, the tank system was evaluated for compliance with the design drawings and the applicable standards. Second, the system was examined for weld breaks, punctures, cracks, leaks, corrosion, erosion, scrapes of protective coatings, and other structural damage or inadequate construction. The means of inspection was both visual and by the use of an ultrasonic thickness meter for measurement of the tank wall thickness. The findings are documented in the inspection record, see Appendix B.

1. Installation inspection - [40 CFR 264.192(b)]

The visual inspection revealed only one significant deviation from the design drawings or the applicable codes. The drum washer unit was not listed. Since, the unit is not listed the return/fill shelter must meet the requirements for a use, dispensing and mixing room. To accomplish this a fire extinguishing system needs to be installed in the return/fill shelter.

There are a few minor deviations from the design drawings in Appendix A. They are as follows:

A. Tank Farm Concrete Plan #118308-5000 and Tank Farm #1 Sections and Details #118308-5001: The elevations for the pad and floor indicate a pad height of 8". The section indicates by the dimensions that the pad height is 4". A 4" pad was constructed.

B. Tank Farm Concrete Plan #118308-5000 and Tank Farm #1 Sections and Details #118308-5001: The sump is shown circular with a 2'-0" diameter. A square 2'-0" x 2'-0" sump was installed.

C. Tank Farm Concrete Plan #118308-5001 and Tank Farm #1 Sections and Details #118308-5001: A joint is shown in the wall 8" up from the floor. The wall was poured monolithically.

D. Tank Farm Concrete Plan #118308-5000: Note #4 calls for fibrous reinforced concrete. The concrete was not fibrous reinforced.

E. Tank Farm #1 Sections and Details #118308-5001: The pump pad is shown as concrete. A metal pad with vibration isolating pads was installed.

F. Tank Farm and Return/Fill Piping Equipment Plan #118301-2001: The pipe routing is slightly different than the plan.

G. Waste Solvent Piping Details #118308-2516: The order of the emergency valve and the ball valve is switched so that the emergency valve is closest to the tank.
H. High Level Alarm Drawings 118308-4500, 118308-4502, 118308-4503, 118308-4504, and 200401-4506 are for a Drexel Brook system. A Level Devil system was installed.

I. Drum Washer Schematic and Installation Detail #118308-3508: The recirculation pump is shown above the grating. The pump was installed beneath the grating.

These minor deviations from the design drawings are not considered to have an impact on the tank system.

The tank and piping were visually inspected, air pressure tested by others, and wall thickness of the tank was measured to find weld breaks, punctures, cracks, corrosion, or any other defects in the tank and piping. No defects were found. Results of the air tightness tests, and ultrasonic thickness measurements are in Appendix B. The successful air pressure tightness test indicates the integrity of the tank and piping and lack of weld breaks, punctures, cracks or corrosion. The tank and pipe are new with no visible signs of corrosion. The tank will be painted when weather conditions are more favorable. The wall thickness measurements indicate wall thickness is adequate and that there is no significant wall thinning due to corrosion.

The inspection of the secondary containment structures is dealt with in detail under the 264.193 analysis. In summary, the secondary containment is adequate and without cracks, scrapes, or other defects.

Overall, the construction essentially conforms to the design drawings and the applicable codes, and has been performed in a workmanlike manner. There are no signs of structural damage or inadequate construction or installation.

2. Tightness Testing - [40 CFR 264.192(d)]

The tanks and piping were successfully tightness tested. See test report in Appendix B.

3. Ancillary equipment - [40 CFR 264.192(5)(e)]

The piping is adequately supported ensuring its protection against excessive stress due to settlement, vibration, expansion or contraction. The piping is either located inside the reinforced concrete containment dike, between the dike and the return/fill shelter, or in the return/fill shelter and is thus protected from physical damage.
**DRUM WASHER/DUMPSTER ASSESSMENT**

The return/fill is equipped with a drum washer supported by a dumpster and a dumpster without a drum washer. The drum washer unit has a 162 gallon capacity and the dumpster has a 374 gallon capacity. The drum washer and dumpster are vented to the atmosphere which prevents the units from becoming over pressurized. The liquid level is continuously monitored while the systems are in operation. A float switch engages the pump to empty the drum washer and dumpster. The drum washer and dumpster units are located in a containment area consisting of metal pans.

A visual inspection was performed which verified the correspondence between the drum washer and dumpster design and the actual drum washer and dumpster in service at the site with one exception. The drum washer was not listed. Since the unit was not listed the return/fill shelter must meet the requirements for a use, dispensing and mixing room. To accomplish this a fire extinguishing system needs to be installed in the return/fill shelter. No leaks, cracks, corrosion or any other deficiencies were found in the unit.

**SECONDARY CONTAINMENT ASSESSMENT**

1. **Required date - [40 CFR 264.193(a)(1)]**

   Since the tank system is new, secondary containment that meets the requirement of 40 CFR 264.193 must be provided prior to the tank being put into service.

2. **Compatibility of the construction materials with used mineral spirits - [40 CFR 264.193(c)(1)]**

   The diked secondary containment is lined with Semstone 140 Coating System and stainless steel under the tanks. The edge between the stainless steel and the epoxy liner is caulked with Sikaflex 1a. See Appendix B for Technical Data.

   The containment pans in the Return/Fill Shelter are metal and require no liner.

   The waste mineral spirits solvent consists of mineral spirits solvent and water, solids, oil and grease. The primary hazardous characteristic of the waste is ignitability. Safety-Kleen’s extensive experience storing this material has proven that the materials of construction which consist primarily of carbon steel, concrete, epoxy caulk and coating are compatible with used mineral spirits.
3. **Strength and Foundation** - [40 CFR 264.193(c)(1), (2)]

Per the inspection conducted on January 18, 1993 and the information provided by Kriezenbeck, the general contractor, the floor slab and walls of the tank farm, and the floor and foundation of the return/fill were constructed per the construction drawings. The rebar was inspected by Materials Testing Corporation of Boise. See report in Appendix B. Therefore, the tank farm floor should be capable of supporting the weight of a full tank, the dike walls should be capable of withstanding the hydrostatic pressure from the dike being full of water, and the floor of the return/fill should be capable of supporting the minimal weight of the grating and ancillary equipment.

4. **Leak detection** - [40 CFR 264.193(c)(3)]

The tank system and the secondary containment systems are visually inspected on a daily basis for the presence of any release of hazardous waste or accumulated liquid in the secondary containment.

5. **Liquid removal** - [40 CFR 264.193(c)(4)]

The liquid is removed from the secondary containment with a portable pump or with a vacuum truck.

6. **Requirements for a vault system** - [40 CFR 264.193(c)(3)]

(i) The secondary containment system has sufficient design capacity to contain 100 percent of the capacity of the largest tank and the precipitation from the 25-year, 24-hour rainfall. See Appendix B for field measurements of the secondary containment and containment calculations. The dike walls prevent run-on of precipitation into the secondary containment system.

The drum washer can contain 162 gallons of fluid. The dumpster can contain 374 gallons of fluid. The metal pan containment area under the drum washer and dumpster has a containment capacity well in excess of that combined volume. Precipitation can be excluded since the area is covered.

(ii) There are no joints in the containment structure for the tank.

(iv) The interior of the concrete vault has apparently been lined with Semstone 140, and stainless steel plates have been installed under the tanks. The combination of the epoxy coating and the stainless steel plates serve to prevent migration of the waste into the concrete.

(v) The dike area has short walls which allows for sufficient natural ventilation to protect against the formation of and ignition of vapors within the vault.
(vi) The tank farm is not subject to hydrostatic pressure, therefore it does not need to be provided with an exterior moisture barrier or be otherwise designed or operated to prevent migration of moisture into the tank farm.

7. Ancillary equipment - [40 CFR 264.193(f)]

Most of the piping is within or above the secondary containment structure. The piping outside the secondary containment is welded.

CONCLUSION OF ASSESSMENT

Per the information contained in this report, with one exception, the used mineral spirits and drum washer/dumpster tank system at the Safety-Kleen Branch in Boise, Idaho appears to be installed in accordance with the design drawings and the applicable codes, and to have sufficient structural strength and compatibility with the wastes being stored. The secondary containment appears to be installed to prevent migration of wastes or accumulated liquid out of the system. The return/fill shelter needs to have a fire extinguishing system installed so that it meets the requirements for a use, dispensing and mixing room. Once the system is installed, it appears that the tank system will be in compliance with 40 CFR 264.192, 264.193.
## EXHIBITS

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EXHIBIT 2

NOTE: PART B APPLICATION REFLECTS ONLY LOTS 1 & 2. LOT 3 WAS ADDED TO PROVIDE ADDITIONAL SET BACK & NON-REGULATED ACTIVITIES.

Toothman Orton Engineering will provide correct site plan for submittal.

NEW CONC DRIVE
S 13'-25" 24'-E 305.04'

CONTAINER STORAGE AREA

EXISTING 5000-STEEL BUILDING

REMOVE EXISTING DRIVEWAY ENTRANCE

INSTALL NEW DRIVEWAY ENTRANCE

EAST COWEN ROAD

ASPHALT PAVING

CONC DRIVE

CONC DRIVE

S 36'-33" 36'-W 300.00'

LOT 2 140'-0"-W 284.37'

LOT 2 140'-0"-W 284.37'

CONC DRIVE

S 13'-25" 24'-E 305.04'

20' x 80' TANKER CONTAINMENT PAD

PRESSURE SEWER LINE

S' UTILITY EASEMENT

20' x 30' THREE-BAY RETURN & FILL SHELTER

15' x 20' FLAMMABLE LIQUIDS STORAGE SHELTER

THREE TANK FARM N/ 2 12,000-GAL TANKS FOR CLEAN & USED MINERAL SPIRITS

GENERAL NOTES

THE DRAFTS CONTAIN INFORMATION PROPRIETARY TO SAFETY-KLEEN CORPORATION TO WHICH COMMISSIONER, USE OF THE DRAWINGS IS EXPRESSLY PROHIBITED. DRAWINGS MAY BE OBTAINED BY SAFETY-KLEEN OR AS Set BY SAFETY-KLEEN MAY BE ALTERED OR MODIFIED ONLY WITH EXPRESS WRITTEN CONSENT OF SAFETY-KLEEN.
TANKFARM AND RETURN/FILL PIPING AND EQUIPMENT PLAN

2" UNDERGROUND CONDUIT TO
MAIN WAREHOUSE; CONNECT TO
6" D.I. CONTROL PANEL;
1" SPADE CONDUIT FOR TELEPHONE

TANK PUMP
Supplied by SK

TANK PUMP
Supplied by SK

3'-9" x 3'-9" x 3'
REMOVABLE AND REMOVED FOR CLEAN
DRAINAGE GROUND

3'-9" x 3'-9" x 3'
REMOVABLE AND REMOVED FOR CLEAN
DRAINAGE GROUND

GENERAL NOTES

THE DRAWING CONTAINS INFORMATION PROPRIETARY TO
SAFETY-KLEEN CORPORATION AND IS NOT TO BE REPRODUCED OR
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OF SAFETY-KLEEN OR AS SAFETY-KLEEN MAY AGREE IN WRITING.

PLEASE INQUIRE WITH YOUR CUSTOMER FOR SPECIFIC
NOTES.

TANKFARM AND RETURN/FILL PIPING AND EQUIPMENT PLAN

PRELIMINARY

SAFETY-KLEEN CORP.
USED MINERAL SPIRITS TANK SYSTEM ASSESSMENT
FOR SAFETY-KLEEN SERVICE CENTER AT BOISE, ID.

DRAWN BY: TYJ
DATE: 10-12-92
CHECKED BY: RAB
DATE: 10-12-92

QUESTEC CORPORATION
CONSULTING ENGINEERS
4812 Santana Circle • Columbia • MO 65203 • (314) 675-0260

SYSTEM SCHEMATIC
NO SCALE
APPENDIX A

Design Documentation
APPENDIX A

Design Documentation

The following drawings provided by Safety-Kleen describing the used mineral spirits and drum washer/dumpster storage tank system design, and other design data, were used in the installation assessment.

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NOTE: PART B APPLICATION REFLECTS ONLY LOTS 1 & 2. LOT 3 WAS ADDED TO PROVIDE ADDITIONAL SET BACK & NON-REGULATED ACTIVITIES.

A TOOTHMAN PROTON ENGINEERING WILL PROVIDE CORRECT SITE PLAN FOR SUBMITTAL.

GENERAL NOTES
This drawing contains information proprietary to SAFETY-KLEEN CORPORATION AND REPRODUCTION, DUPLICATION OR USE OF THE DRAWING IS EXPRESSLY PROHIBITED BY LAW.

SITE PLAN
GENERAL NOTES

1. ELEVATIONS SHOWN IN THIS SHEET ARE IRREGULAR ELEVATIONS FOR TANKPARK AND TRUCK STATION ONLY. SEE SHEET 1 FOR MALL ELEVATIONS.
2. ELEVATION OF TRUCK STATION DRAIN PLANE IS EQUAL TO ELEVATION ON THE SITE PLAN.
3. ALL TANKFARM SUBSURFACE FOUNDATION DATA SHOWN ON TANKFARM SHEETS IS FOR ECONOMIC DESIGN. FOR COMPLETION OF THE PROJECT, DETAILS AND FOUNDATION REPORT, CONTRACTOR IS TO DETAIL A COMPLIMENTARY SET OF SHOP DRAWINGS BY COORDINATING WITH ENGINEERING TO STARTING CONSTRUCTION. SEE SPECIFICATIONS.

TANKFARM SUMP SECTION

TYPICAL TANKFARM REINFORCEMENT DETAIL

TANKFARM PUMP BASE SECTION

TANKFARM REINFORCEMENT DETAIL

TANKFARM SUMP DETAIL

DIKE WALL TO FOOTING DETAIL

PRELIMINARY

TANKFARM # 1

SECTIONS & DETAILS

SAFETY-KLEEN CORP.

1. TANKFARM SUMP SECTION
2. TYPICAL TANKFARM REINFORCEMENT DETAIL
3. TANKFARM PUMP BASE SECTION
4. TANKFARM REINFORCEMENT DETAIL
5. TANKFARM SUMP DETAIL
6. DIKE WALL TO FOOTING DETAIL
DRUM WASHER ASSEMBLY DETAIL

FLOAT SWITCH DETAIL

GENERAL NOTES

1. SEE DRAWING 4026 FOR ELECTRICAL AND CONTROL PANELS.
2. ALL INSTALLATION WORK IS TO BE PERFORMED BY QUALIFIED PERSONNEL.
3. RETURN PUMP TO DRAIN PUMP LOCATION.
4. FLOAT INSTALLATION:
   a. TAKE FLOAT SWITCH AS SHOWN DRAWING 4026A, ATTACH TO DRAIN PUMP AS SHOWN.
   b. TAKE FLOAT AND GLUE INTO FLOAT SWITCH AND ENCLOSED HOUSING AS SHOWN.
   c. INSTALL FLOAT INTO DRAIN PUMP AND SEAL ANCHORING STUDS.
   d. INSTALL FLOAT INTO DRAIN PUMP AND SEAL ANCHORING STUDS.

SAFETY-KLEEN CORP.
PIPE SUPPORT DETAIL #2

1. PIPE SUPPORT DETAIL #2

VERTICAL PIPE SUPPORT DETAIL

2. VERTICAL PIPE SUPPORT DETAIL

POST BASE DETAIL

A

GENERAL NOTES

1. CONCRETE PENTRATIONS SHALL NOT BE ALLOWED ON FINISHED SURFACES.

2. ALL PIPES SUPPORTS SHALL SUPPORT PIPING EVERY 4'-0" MIDSPAN.

3. ALL EXHAUST的喜爱 TO BE TAPPED INTO THE EXHAUST SYSTEM AND CONNECTED TO THE EXHAUST SYSTEM. PIPING, AND DRAINAGE ARE TO HAVE SALT IMPERIAL EXHAUST.

SAFETY-KLEEN CORP.
CONTROL PANEL MAKE-UP

GENERAL NOTES

PAGE 19

DRUM WASHER CONTROL PANEL DIAGRAMS

SAFETY-KLEEN CORP.
APPENDIX B

Field Data
# APPENDIX B

Field Data

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TODTMAN GRANITE ENGINEERING WILL PROVIDE CORRECT SITE PLAN FOR SUBMITTAL.

FIELD MEASUREMENTS AS TAKEN BY RICK BARTELT ON 1-18-95

THE DRAWING CONTAINS INFORMATION PREPARED BY SAFFETY KLEEN CORPORATION AND CONSULTING ENGINEERS OF THE FOLLOWING DRAWN BY RICK BARTELT, RICK BARTELT, RICK BARTELT.

REVISIONS

1/20/95

PROJECT NO. 118320-0001 03

SITE PLAN

SAFETY-KLEEN CORP.
For Safety-Kleen Corporation  
Boise, Idaho  
3 Pack Tank Farm, Tank installed - late 1992  
Used Mineral Spirits

By QuesTec Corporation  
Rick A. Bartelt, P.E.  
Gary McLagan  
Project No. 92105.3  
Inspection Date: 1/18/93  
2/13/93

TYPE: Aboveground, Vertical, cylindrical, shallow cone roof, flange & dish bottom - steel  
DIA. 10'-6"  HEIGHT approximately 18'-0" with 24" skirt  
12,000 Gallon Atmospheric

LABEL: UL 142 - Aboveground Tank For Flammable Liquids. Not For Use Underground. #425654

Mfr: C.B. Inc. dba Topaz Tank and Manufacturer, 2269 S. Liberty, Boise, Idaho 83705. Built to weak shell to roof design, this tank is provided with a long bolt manhole test pressure not to exceed 2.5 PSIG.

NFPA Diamond: 0-2-0

Hazardous Waste: Hazardous Waste

Material Stored: Used Solvent

Max. Fill Level: 11,400 Gallons

CONDITION:  
Shell - satisfactory.  
Bottom - satisfactory.  
Roof - satisfactory.  
Welded Joints - satisfactory.  
Nozzles - satisfactory.  
The tank only has a primer coat of paint.

SIGNS OF LEAKAGE: None

SIGNS OF CORROSION:  
Shell - satisfactory.  
Bottom - satisfactory.  
Roof - satisfactory.  
Welded Joints - satisfactory.  
Nozzles - satisfactory.
SUPPORT TYPE: 24" skirt with fireproof coating

NORMAL VENT: Morrison Brothers #548 - 3"

EMERGENCY VENT: Manway with loose cover - nuts are backed off to allow the cover to raise at least 1½" per UL 142, and weak shell-to-roof design. Manway cover labeled, "This Manway is provided with long bolts to permit emergency relief venting. Do not replace with shorter bolts."

TANK CONNECTIONS: All plugged except three each with a ball valve and external emergency valve.

TANK WALL THICKNESS: Satisfactory. See UT test results.

ANCHORS: The tank is anchored in four places.

MINIMUM TANK SPACING SHELL-TO-SHELL: 3'-6"

TANK OPENINGS - UNUSED: Plugged

TANK GAUGE: Varec

TANK HLA: Level Devil
PIPING INSPECTION RECORD
USED MINERAL SPIRITS

For Safety-Kleen Corporation
Boise, Idaho
3 Pack Tank Farm
Piping Installed - Late 1992

By QuesTec Corporation
Rick A. Bartelt, P.E.
Gary McLagan
Project No. 92105.3
Inspection Date: 1/18/93
2/13/93

PIPE WALL THICKNESS: None taken because of insulation.

PIPE MARKINGS: None visible due to insulation. However, the general contractor said
the same material was used for the used mineral spirits pipe and clean
mineral spirits pipe. The clean mineral spirits pipe was marked as
follows: 3 SCH 40 21 ASTM A53 GR A.

PIPE PAINTING: The pipe was covered with insulation, and aluminum jacket which
provides adequate corrosion protection.

FLEXIBLE HOSE: Goodyear Flexwing petroleum hose 150 PSI WP.

SIGNS OF LEAKAGE: None.

SIGNS OF CORROSION: None.

JOINTS: All pipe joints were either threaded, welded or flanged.

FITTINGS: The fittings were not visible, but those used on the clean mineral spirits pipe
were as specified in the design drawings or equal.

VALVES: All valves are as specified in the design drawings or equal.

FLANGES: The flanges were not visible but those used on the clean mineral spirits pipe
were as specified in the design drawings or equal.

PIPE SUPPORTS: Pipe supports are located at a maximum spacing of 8 feet.

PIPE PROTECTION: All piping is inside the tank farm, in return/fill, or between the tank
farm and return/fill and is therefore protected.

CONNECTION
POINT LABELS: Waste Solvent Out

FILLING & EMPTYING CONNECTIONS FOR CLASS I, CLASS II, and CLASS IIIA LIQUIDS:
  a. Located outside of buildings: yes
  b. Minimum of 5 feet from any building opening: yes
  c. Closed liquid tight when not in use: yes
CONTAINMENT INSPECTION RECORD
CONCRETE DIKE

For Safety-Kleen Corporation
Boise, Idaho
3 Pack Tank Farm
Year Built - Late 1992

By QuesTec Corporation
Rick A. Bartelt, P.E.
Gary McLagan
Project No. 92105.3
Inspection Date: 1/18/93
2/13/93

DESCRIPTION: Open concrete vault type with two 12,000 gallon vertical tanks, skirt mounted; one for waste mineral spirits, one for clean mineral spirits.

DIMENSIONS: Inside 48'-6" x 26'-6" with 8" thick walls

WALL HEIGHT: NE 35 1/2" 35 3/4" NW 35" 35" SE 37" 37 1/8" SW 36 1/2" 36 3/4"
Measurements are to the top of the epoxy coating which is approximately 3/4" below the top of the dike wall.

HOUSEKEEPING PAD: 40'-6" x 13'-0" x 4 1/2" to 5 1/2"

CONTAINMENT LINER: The liner was Semstone 140 epoxy paint, Sika 1a caulk, and stainless steel plates on the pads.
Condition: Satisfactory

JOINTS: No joints - walls and floor poured monolithically.

WALL CONDITION: No cracks.

FLOOR CONDITION: No cracks.

FOUNDATION CONDITION: No visible deficiencies.

LIQUID REMOVAL METHOD: Remove liquids that accumulate in sump with a hand pump or vacuum truck.

SIGNS OF LEAKAGE: None

SUMP: size: 2'-0" x 2'-0" x 21" deep
leaks: No visible leaks
blind or capped pipe: blind

COMBUSTIBLE MATERIALS STORED IN TF: None

PIPING OUTSIDE CONTAINMENT: All piping is located inside the tank farm or the return/fill area except for the pipe running between the two which is welded.

SIGNS OF EROSION: None
CONTAINMENT INSPECTION RECORD
RETURN/FILL AREA

For Safety-Kleen Corporation
Boise, Idaho
Return/Fill Area
Date Installed: Late 1992

By QuesTec Corporation
Rick A. Bartelt, P.E.
Gary McLagan
Project No. 92105.3
Inspection Date: 1/18/93
2/13/93

DESCRIPTION: Six metal pans interconnected with pipe allowing for combined containment.

DIMENSIONS: Four pans are 9'-10" x 5'-5" and two are 9'-11" x 5'-5".

PAN CONDITION: Satisfactory

PAN INTERCONNECTING PIPING: All pans are interconnected. The pipes are welded on both sides.

PAN FLASHING: All spaces between pans are covered with metal flashing as are the spaces between the pans and the walls.

LIQUID REMOVAL METHOD: Remove liquids that accumulate with a hand pump.

SIGNS OF LEAKAGE: None.

OTHER OBSERVATIONS: There are 14 square steel posts that are within the containment. The base of the post is welded to the pan, thus maintaining the integrity of the containment. There are several anchor bolts that come through the bottom of the containment pans. They are welded on the top and bottom of the nut, thus maintaining the integrity of the containment.
SITE: SAFETY-KLEEN
BOISE, ID.
DATE: 1-18-93
JOB #: 92105.3
INSPECTOR: RAB

UT TANK WALL THICKNESS TEST

<table>
<thead>
<tr>
<th>POINT #</th>
<th>NORTH</th>
<th>EAST</th>
<th>SOUTH</th>
<th>WEST</th>
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<tr>
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<tr>
<td>8</td>
<td>.236</td>
<td>.268</td>
<td>.261</td>
<td>.260</td>
</tr>
</tbody>
</table>

* TANK SURFACE COVERED WITH INSULATION

USED MINERAL SPIRITS VERTICAL TANK ULTRASONIC THICKNESS TEST

NO SCALE
Tank and Pipe Installation Checklist. Dale's Service Co.

CUSTOMER: Kreizenbach Const. PHONE: 336-9500

LOCATION: Safety Clean site

CUSTOMER'S REP.: Frank Jeff SALESMAN:

FOREMAN: Buck SITE PHONE: 336-3718

PRE-CONSTRUCTION REVIEW: DATE 9-92

SALES MAN | CONST MGR | FOREMAN

SCOPE OF WORK
MATERIALS LIST & P.O.'s
SITE PLAN AND GRADES
SUBCONTRACTS LET & REVIEWED
SCHEDULE SET AND REVIEWED
PERMITS OBTAINED; (BY)

John Hansen (DATE) 12-14-92

SITE LAYOUT/REVIEW:
SITE PHOTOGRAPHED BY: A.P. (DATE) 1-7-93

DIMENSIONS AND GRADES VERIFIED FOR:

TANK EXCAVATION (BY) (DATE) A.P.
CANOPY FOOTINGS (BY) (DATE) A.P.
ISLANDS & SLABS (BY) (DATE) A.P.

UTILITY LOCATN. ORDERED & CHECKED (BY) (DATE) A.P.

EXCAVATED MATERIAL TO:

COMMENTS: 

________________________

________________________
Tank and Pipe Installation Checklist. Dale's Service Co.

ABOVE GROUND TESTING OF TANKS:

PHOTO

TANK TYPE: Steel Above Ground MANUFACTURER: Topaz Tank

UNLOADED BY: Boie Company METHOD USED: Lower

OPENING CONFIGURATION CHECKED AGAINST PLANS BY: Alan P.

<table>
<thead>
<tr>
<th>TANK SIZE:</th>
<th>(DIAM)</th>
<th>(LENGTH)</th>
<th>(CAPCTY)</th>
<th>(VERIFIED BY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANK #1</td>
<td>10 FT</td>
<td>18 FT</td>
<td>12,000</td>
<td>A.P.</td>
</tr>
<tr>
<td>TANK #2</td>
<td>10 FT</td>
<td>18 FT</td>
<td>12,000</td>
<td>A.P.</td>
</tr>
<tr>
<td>TANK #3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TANK #4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TANK #5</td>
<td></td>
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TANK IDENTIFICATION:

<table>
<thead>
<tr>
<th>(U/L #)</th>
<th>(SER #)</th>
<th>(U/L #)</th>
<th>(SER #)</th>
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<tbody>
<tr>
<td>TANK #1</td>
<td>South</td>
<td>Clean Salt</td>
<td>Tank #2</td>
</tr>
<tr>
<td>TANK #3</td>
<td>North</td>
<td>Waste Salt</td>
<td>Tank #4</td>
</tr>
<tr>
<td>TANK #5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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SOAP SUD TEST: ENTIRE SURFACE ( ), FITTINGS & SEALS ONLY ( )

PHOTO ( )

PRESSURE HELD FOR SOAP BY OBSERVED BY

<table>
<thead>
<tr>
<th>TANK #1</th>
<th>2#</th>
<th>1 HR</th>
<th>A.P.</th>
<th>Alan P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANK #2</td>
<td>2#</td>
<td>1 HR</td>
<td>A.P.</td>
<td>Alan P.</td>
</tr>
<tr>
<td>TANK #3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TANK #4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TANK #5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CUSTOMER REPRESENTATIVE: Richard Carpenter INSPECTOR: Alan P. DATE: 12-31-92

COMMENTS:

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________
Tank and Pipe Installation Checklist: Dale's Service Co.

EXCAVATION & SETTING OF TANKS:

TANK HOLE DIMENSIONS: VERIFIED BY __/__/__ DATE __/__/__ (PHOTO)

LENGTH _______ WIDTH _______ DEPTH _______

WHAT IS BENCHMARK? __/__/__ FROM _______

TANKS SET WITH CORRECT ALIGNMENT ( ) BURY ( ) AND SLOPE ( )

AS-BUILT NOTED BY _______ DATE __/__/__ (PHOTO)

PERMANANT BALLAST? YES ( ) NO ( ) IF YES, STATE TYPE:

Anchor Bolts Per Safety Plan Spec. (PHOTO)

IS WRITTEN CHANGE ORDER APPROVED? ( ) BY: _______ DATE _______

IS TEMPORARY BALLAST NEEDED? __/__/__ IF YES, CHECK IF:

WATER ( ), FUEL ( ), PRODUCT AS ASSIGNED (X) BY _______ DATE _______

MONITOR WELLS: NUMBER REQUIRED _______. SIZE: _______ diam.

LOCATIONS ON AS BUILT BY: _______ DATE _______ (PHOTO)

TYPE OF OVERFILL PROTECTION _______ Sound/Zero Sensor _______

BACKFILL:

(type) _______ (size) _______ (PHOTO of backfilled tanks)

MATERIAL _______ _______ BY: _______ DATE _______

SUPPLIER _______ _______ $/yd _______ P.O. # _______

TYPE OF COMPACTION:

______________________________ __________________

BY _______ APPROV. BY _______

MANUFACTURER'S CHKLIST COMPLETE BY: _______ DATE _______

EXCAVATION, BACKFILL, TANK SET AND COMPACTION APPROVED BY:

CUSTOMER: _______ INSPECTOR _______ DATE _______

COMMENTS:
Tank and Pipe Installation Checklist. Dale's Service Co.

PIPING:

* TYPE OF SYSTEM (suction or pressure) _________________________
  * ABOVE GROUND PRESSURE
  * UNDERGROUND PRESSURE

* TYPE OF LIQUID DETECTOR _________________________
  * ABOVE GROUND INSTALLATION
  * UNDERGROUND INSTALLATION

* PRIMARY PIPING MATERIAL _________________________
  * STEEL
  * ALUMINUM
  * COPPER
  * OTHER

* DOUBLE WALL? ______ IF YES, TYPE SYSTEM _________________________

* DESCRIBE TERMINATION OF PRIMARY PIPING:
  At Tanks
    * FIRE VALVE & 1/2 BALL VALVE
  At Dispenser
    * 1/2 B ALL VALVE & NOSE

* HOW ARE METALLIC PORTIONS OF PRODUCT PIPING PROTECTED?
  SACRIFICIAL ANODES ( )
  Coated? ______ How ______
  ISOLATION JACKET AND TYPE ( )
  OTHER ISOLATION FROM SOIL ( ) DESCRIBE _________________________

* DEPTH OF PIPING AT TANKS _______ PLANNED BY _________________________
  ACTUAL DEPTH AT TANKS _______ BY _______ DATE _______ TO
  VENTS PROPERLY SLOPED. BY _______ PHOTO _______
  INSPECTOR _______ CUSTOMER _______ DATE _______
  DEPTH, PIPING AT FURTHEST DISP. _______ PLANNED BY _________________________
  ACTUAL DEPTH AT FURTHEST DISP. _______ BY _______ DATE _______

STAGE I ( ) or II ( ) VAPOR RECOVERY: IF YES, DESCRIBE SYS.:

TYPE OF OVERFILL PROTECTION _________________________
Tank and Pipe Installation Checklist, Dale's Service Co.

PIPING, CONTINUED . . . . . . .

PHOTO OF PIPING LAYOUT BY \( \text{DATE} \) 1-8-93

AS-BUILT NOTED (including all unused tank openings and specific locations) BY \( \text{DATE} \) 1-8-93

PRIMARY PIPE TEST (pressure left on piping until concrete.)

<table>
<thead>
<tr>
<th>FROM TNK #1</th>
<th>PRESSURE</th>
<th>HELD FOR</th>
<th>SOAP BY</th>
<th>OBSERVED BY</th>
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<tbody>
<tr>
<td></td>
<td>60#</td>
<td>1 hr</td>
<td>ALAN</td>
<td></td>
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<table>
<thead>
<tr>
<th>FROM TNK #2</th>
<th>PRESSURE</th>
<th>HELD FOR</th>
<th>SOAP BY</th>
<th>OBSERVED BY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60#</td>
<td>1 hr</td>
<td>ALAN</td>
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<table>
<thead>
<tr>
<th>FROM TNK #3</th>
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<table>
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<tr>
<th>FROM TNK #4</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>FROM TNK #5</th>
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</table>

WITNESS OF PRIMARY PIPING TEST BY:

<table>
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<th>CUSTMR</th>
<th>DATE 1-8-93</th>
<th>INSPECTR</th>
<th>DATE 1-8-92</th>
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COMMENTS

TESTING OF SECONDARY PIPING:

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WITNESS OF SECONDARY PIPING TEST BY:

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<th>CUSTMR</th>
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<th>INSPECTR</th>
<th>DATE</th>
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COMMENTS

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<tbody>
<tr>
<td>----------------</td>
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</table>
Tank and Pipe Installation Checklist, Dale's Service Co.

### MANHOLES AND VAULTS:

- **SPILL PREVENTION**: Model _____ INSPECTION BY _____ DATE _____
- **SUB-PUMP**: Model _____ INSPECTION BY _____ DATE _____
- **VAPOR RECOVERY**: Model _____ INSPECTION BY _____ DATE _____
- **GAGE**: Model [Model #:] INSPECTION BY [Name:], DATE 12-29-92
- **VAPOR/WATER WELL**: Model _____ INSPECTION BY _____ DATE _____
- **SUB-PUMP VAULT ANNULAR?** YES, TYPE OF MONITORING: ___________

### FINAL BACKFILL OVER TANKS AND PIPING:

- **BACKFILL**: (type) [size] (PHOTO of backfilled tank and island area)
- **MATERIAL**: _____ INSPECTION BY _____ DATE _____
- **SUPPLIER**: _____ MATERIAL /yd _____ P.O. #
- **TYPE OF COMPACTION**: __________

### VERIFY FINAL GRADE OVER TANKS AND READY FOR SURFACING:

- **BY**: CUSTOMER _____ DATE _____

### ISLANDS:

<table>
<thead>
<tr>
<th>#1</th>
<th>#2</th>
<th>#3</th>
<th>#4</th>
<th>#5</th>
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<th>#8</th>
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</tbody>
</table>

**COMMENTS**

-----------------------------------------------------------------------
SECONDARY CONTAINMENT CALCULATIONS

**Pack Tank Farm**  **Vertical**  **Tank(s)**

*Note: Sump and sloped concrete slab volume not included (conservative).*

**U.S. Dept. of Comm. Tech. Paper No. 40**

† Assumes Dish Radius = Tank Diameter

Formulas Used:

TANK SEGMENT HT. = \( h = H - h_1 - h_2 \)

SUBMERGED DISH HT. = \( h \) (sub) = \( h_3 + h \)

* DIKE CONTAINMENT VOLUME = \( (L)(W)(H)(7.48 \text{ gal/ft}) \)

PAD DISPLACEMENT VOLUME = \( (l)(w)(h_1)(7.48 \text{ gal/ft})(\text{number of pads}) \)

TANK DISPLACEMENT VOLUME

- vert. tank, dished bottom = \( [\frac{1}{3} (\pi)(h_3^2)(3r - h_3) + \pi R^2 h](7.48 \text{ gal/ft})(\text{number of tanks}) \)
- vert. tank, flat bottom = \( (\pi R^2 h)(7.48 \text{ gal/ft})(\text{number of tanks}) \)
- vert. tank, cone bottom = \( [\frac{1}{3} (\pi)(h)(R_1^2 + R_2^2 + R_1 R_2)] + \pi R^2 h](7.48 \text{ gal/ft})(\text{number of tanks}) \)
- horiz. tank, flat ends = \( [R \cos^2((R - h / R) \text{ rad})] - [(R - h) \sqrt{2(R)(h - h_2)](7.48 \text{ gal/ft})(\text{# of tanks})} \)

MISC. DISPLACEMENT VOLUME (Pumps, Piping, Supports, etc.) = 2% of dike volume

LOCAL RAINFALL ALLOWANCE (25 yr./24 hr.) = \( \frac{(\text{rainfall})}{12}(L)(W)(7.48 \text{ gal/ft}) \)
SECONDARY CONTAINMENT CALCULATIONS

Calculations:

(a) DIKE CONTAINMENT VOLUME = 
\[(48.50)(20.50)(2.92)(1.48)\]  
\[= 21,710 \text{ gal.}\]

(b) VOLUME OF LARGEST TANK WITHIN DIKED AREA =  
\[= 12,000 \text{ gal.}\]

(c) PAD DISPLACEMENT VOLUME =  
\[(40.50)(13.00)(5.5)(1.48)\]  
\[= 1,497 \text{ gal.}\]

(d) TANK DISPLACEMENT VOLUME =  
\[\frac{1}{3} \pi (1.41)^2 (31.5 - 1.41) + \pi (5.25)^2 (5.54) (1.45 \sqrt{2})\]  
\[= 1,037 \text{ gal.}\]

(e) MISC. DISPLACEMENT VOLUME =  
\[0.2 \times 21,710\]  
\[= 434 \text{ gal.}\]

(f) LOCAL RAINFALL ALLOWANCE =  
\[\frac{2}{12} \times (48.50)(20.50)(1.48)\]  
\[= 1,239 \text{ gal.}\]

TOTAL EXCESS CONTAINMENT VOLUME \([\text{sum (a)-(f)}]\)  
\[= 4,909 \text{ gal.}\]
SECONDARY CONTAINMENT CALCULATIONS - RETURN/FILL SHELTER

SECONDARY CONTAINMENT BY METAL PANS

\[
\text{VOLUME} = (0.50)(5.42)(9.83)(4 \text{ PANS}) + (0.50)(5.42)(9.92)(2 \text{ PANS}) = 160.32 \text{ CU.FT.} \\
\text{CONTAINMENT CAPACITY} = 160.32 \text{ CU.FT.} \times (7.48 \text{ GAL/CU.FT.}) = 1,199 \text{ GAL.}
\]

EXCESS CONTAINMENT CAPACITY = CONTAINMENT CAPACITY - VOLUME OF LARGEST CONTAINER

- DUMPSTER VOLUME = 374 GAL
- SWIC DRUM WASHER VOLUME = 162 GAL
- CONTAINMENT CAPACITY = 1,199 GAL.

EXCESS CONTAINMENT CAPACITY = 1,197 GAL. - 374 GAL. = 825 GAL.
# Concrete Compressive Strength Test Report

<table>
<thead>
<tr>
<th>Report Date:</th>
<th>Oct 13, 1992</th>
<th>Project:</th>
<th>SAFETY KLEEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client:</td>
<td>SAFETY KLEEN</td>
<td>Contractor:</td>
<td>KREIZENBECK CONSTRUCTORS</td>
</tr>
<tr>
<td>File #:</td>
<td>B92225-031</td>
<td>Supplier:</td>
<td>TREASURE VALLEY CONCRETE</td>
</tr>
<tr>
<td>Permit #:</td>
<td>Not Reported</td>
<td>Truck #:</td>
<td>220</td>
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<tr>
<td>Mix ID:</td>
<td>400</td>
<td>Ticket #:</td>
<td>882</td>
</tr>
<tr>
<td># Of Yards:</td>
<td>9</td>
<td>Inspector:</td>
<td>Kevin Sagez</td>
</tr>
</tbody>
</table>

**Pour Location:** Monolithic tank farm #1.

- Concrete Cylinders
- Grout Cylinders

## Mix Proportions:

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement</td>
<td>2120 / 2155</td>
</tr>
<tr>
<td>Fly Ash</td>
<td>350 / 375</td>
</tr>
<tr>
<td>Water</td>
<td>190</td>
</tr>
<tr>
<td>Coarse Agg. #1</td>
<td>7140 / 6920</td>
</tr>
<tr>
<td>Coarse Agg. #2</td>
<td></td>
</tr>
<tr>
<td>Fine Agg. #1</td>
<td>6860 / 7500</td>
</tr>
<tr>
<td>Fine Agg. #2</td>
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</tr>
<tr>
<td>Admix #1</td>
<td>AT 370g</td>
</tr>
<tr>
<td>Admix #2</td>
<td>WA 162oz</td>
</tr>
<tr>
<td>Water/Cement Ratio</td>
<td></td>
</tr>
</tbody>
</table>

## Test Properties & Conditions:

- Weather: Cloudy
- Ambient Temperature: 68
- Concrete Temp. (ASTM C 1064): 82
- Time Batched: 8:07
- Time Placed: 8:40
- % Air Content (ASTM C 231): 4.0
- Stump (inches) (ASTM C 144): 1.75
- Unit Weight (ASTM C 138): Not Reported
- Yield (ASTM C 138): Not Reported
- Water Added (gals): 4
- Specified f’c (psi): 4000

## Test Results:

<table>
<thead>
<tr>
<th>Cylinder</th>
<th>Cylinder Diameter</th>
<th>Cylinder Height</th>
<th>Cylinder Area</th>
<th>Test Age</th>
<th>Test Date</th>
<th>Failure Load</th>
<th>Compressive Stress</th>
<th>Fracture Type</th>
</tr>
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<tbody>
<tr>
<td>5715</td>
<td>6</td>
<td>12</td>
<td>28.27</td>
<td>7</td>
<td>Oct 9, 92</td>
<td>10,000</td>
<td>3500</td>
<td>Core</td>
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<tr>
<td>5716</td>
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<td>Core</td>
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<td>28</td>
<td>Oct 30, 92</td>
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<td>3500</td>
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</tbody>
</table>

Remarks: Concrete was placed by mechanical pump and vibrated to consolidation. Sump well and rebar was placed as per required by structural plans.

Respectfully Submitted,

MATERIALS TESTING CORPORATION

David O. Cram
Division Manager

---

4050 Auburn Way North, Suite 5 • Auburn, WA 98002 • (206) 850-7797
230 South Cola Road • Boise, ID 83709 • (208) 376-4748
1132 S.E. Salmon • Portland, OR 97214 • (503) 238-3824
## WELDER AND WELDING OPERATOR QUALIFICATION TEST RECORD

Welder or welding operator's name: Alan Placey
Identification no.: 2
Welding process: SMAW Manual X Semiautomatic Machine
Position: All (Flat, horizontal, overhead or vertical — if vertical, state whether upward or downward)
In accordance with procedure specification no: SMAW 1
Material specification: SA-106-B
Diameter and wall thickness (if pipe) — otherwise, joint thickness: 3" Sch. 40 & 8" Sch. 80
Thickness range this qualifies: 1/8" - Unlimited

### FILLER METAL

Specification no.: AWS 5.1
Classification: E6010 / E7018
Describe filler metal (if not covered by AWS specification):
Is backing strip used?: No
Filler metal diameter and trade name: 1/8" Fleetweld 5P / 1/8" Jetweld LH-70 (Lincoln)
Flux for submerged arc or gas for gas metal arc or flux cored arc welding: N/A

### VISUAL INSPECTION (9.25.1)

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<th>Result</th>
<th>Type</th>
<th>Result</th>
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</table>

Test conducted by: J. Reese Leavitt per AMS D1.1-90 Laboratory test no. 2 Test date 12-31-92

### FILLET TEST RESULTS

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Fracture test root penetration</th>
<th>Macroetch</th>
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Test conducted by: per Laboratory test no. Test date

### RADIOGRAPHIC TEST RESULTS

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<th>Remarks</th>
<th>Film identification</th>
<th>Results</th>
<th>Remarks</th>
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</table>

Test witnessed by: per Test no.

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of section 5, Part C or D of ANSI/AWS D1.1, (1990) Structural Welding Code-Steel.

Manufacturer or contractor: DALE'S SERVICE CO.
Authorized by: ____________
Date: 1-4-93

Form E-4
WELDER AND WELDING OPERATOR QUALIFICATION TEST RECORD

Welder or welding operator's name Bret MacFee Identification no. __

Welding process SMAW Manual X Semiautomatic Machine ___

Position All (Flat, horizontal, overhead or vertical -- if vertical, state whether upward or downward)

In accordance with procedure specification no SMAW_ 

Material specification SA-106-B

Diameter and wall thickness (if pipe) -- otherwise, joint thickness 3" Sch. 40 & 8" Sch. 80

Thickness range this qualifies 1/8" - Unlimited

FILLER METAL

Specification no. AWS 5.1 Classification E6010 / E7018 F no. 3 / 4

Describe filler metal (if not covered by AWS specification) ___

is backing strip used? No

Filler metal diameter and trade name 1/8" Fleetweld SP / 1/8" Jetweld LA-70 (Lincoln) Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut Acceptable Piping porosity None

Guided Bend Test Results

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<th>Result</th>
<th>Type</th>
<th>Result</th>
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Test conducted by J. Reese Leavitt per AWS D1.1-90 Laboratory test no. 1 Test date 12-31-92

Fillet Test Results

Appearance ___ Fillet size ___

Fracture test root penetration Macroetch (Describe the location, nature, and size of any crack or tearing of the specimen.) ___

Test conducted by ___ per Laboratory test no. ___ Test date ___

RADIOGRAPHIC TEST RESULTS

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<th>Remarks</th>
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Test witnessed by ___ per ___ Test no. ___

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of section 5, Part C or D of ANSI/AWS D1.1, (1980) Structural Welding Code-Steel.

Manufacturer or contractor DALE'S SERVICE CO.

Authorized by ___ Date 1-4-83

Form E-4
## Procedure Qualification Record (PQR) # _____________
### Test Results

### TENSILE TEST

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<th>Area</th>
<th>Ultimate tensile load, lb</th>
<th>Ultimate unit stress, psi</th>
<th>Character of failure and location</th>
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### VISUAL INSPECTION

- Appearance
- Undercut
- Piping porosity
- Convexity
- Test date
- Witnessed by

### FILLET WELD TEST RESULTS

- Radiographic-ultrasonic examination
  - RT report no.: ______________ Result: ______________
  - UT report no.: ______________ Result: ______________

### Other Tests

- All-weld-metal tension test
  - Radiographic-ultrasonic examination
  - RT report no.: ______________ Result: ______________
  - UT report no.: ______________ Result: ______________

### Welder's name __________________________ Clock no. ___________ Stamp no. ___________

### Tests conducted by __________________________ Laboratory __________________________

### Signed __________________________

**DALE'S SERVICE COMPANY**

**Title** ________________

**Date** 12-31-92

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 5, Part B of ANSI/AWS D1.1. (1992) Structural Welding Code-Steel.
WELDING PROCEDURE SPECIFICATION (WPS) Yes (X)
PREQUALIFIED x QUALIFIED BY TESTING ______
or PROCEDURE QUALIFICATION RECORD (PQR) Yes ( )

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Company Name: DALE'S SERVICE COMPANY
Welding Process(es): SMAW
Supporting PQR No.: Prequalified Joints

JOINT DESIGN USED
Type: Groove & Fillet
Single ( ) Double Weld ( )
Back (Yes) No ( )
Back Gouging: Yes ( ) No ( )
Root Opening Root Face Dimension
Groove Angle Radius (J-U)

BASE METALS
Material Spec.: Code Section 1.2
Type or Grade
Thickness Groove Unlimited Fillet Unlimited
Diameter (Pipe) All

FILLER METALS
AWS Specification: 5.1
AWS Classification: E6010 / E7018

ELECTRICAL CHARACTERISTICS
Transfer Mode (GMAW)
Short-Circuiting ( )
Globular ( ) Spray ( )
Current: AC ( ) DCEP (X) DCEN ( ) Pulsed ( )

TECHNIQUE
Stringer or Weave Bead
Stringer or Weave
Multi-pass or Single Pass (per side) Single
Number of electrodes One
Electrode Spacing Longitudinal N/A
Lateral
Angle

POSTWELD HEAT TREATMENT
Temp. N/A
Time

PREHEAT
Preheat Temp., Min. 50°F
Interpass Temp., Min. ______ Max. 400°F

WELDING PROCEDURE

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Joint Details
See prequalified joints in code:

- Figure 2.3 - Fillet Welds
- Fig. 2.4 - Complete Joint Penetration Groove Welds
- Fig. 2.5 - Partial Joint Penetration Groove Welds

Form E-1 (Front)
Return Fill Shelter and Tank Farm

Piping from Tank to Return Fill Shelter
Piping from Tank to Access Container
Pipe Connection at Access Container

Freeze Connections
UL 142 Label on Manway with Long Bolts

Normal Vents
Exhibit D2-3

Tank Gauging Chart
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<th>Gauge Reading</th>
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**PROPRIETARY STATEMENT**

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**USED SOLVENT STORAGE TANK GAUGING CHART**

SAFETY-KLEEN SYSTEMS, INC.

2505 W. Broadway • Suite 210
Columbia, MO 65203
Phone: (573) 443-7100
Fax: (573) 443-7181

**SCALE**

- NONE
- CM
- IN
- APPR
- OD
- APPR
- DATE

**SERVICE CENTER LOCATION**

- SC
- DWG NUMBER
- 7114-4100-902
- 0

**REV. NO.**

- 0
Exhibit D2-4

Tank Farm / Return and Fill Piping Plan
Exhibit D2-5

Tank Farm Containment Calculations
Exhibit D2-6

Tank Farm Concrete Details
Exhibit D2-7

Concrete Tank Farm Plan
High Level Alarm Diagram
Exhibit D2-9

Used Solvent Process at Branch
EXAMPLE
Exhibit D2-10

Used Solvent Process at Safety-Kleen Recycle Center
Exhibit D2-11

Return and Fill Layout
Exhibit D2-12

Return and Fill Concrete Slab Detail
Exhibit D2-13

Drum Washer Isometric
Exhibit D2-14

Drum Washer Roll Up Door Detail
Special Note:
Unit includes an explosion proof micro switch which interlocks pump start and door closure. The pump will not start unless the door is fully closed. The pump will shut down when the door is moved from the fully closed position.
Exhibit D2-15

Drum Washer Capacity Calculations
SWIC DRUM WASHER VOLUME CALCULATIONS

SWIC DRUM WASHER VOLUME CALCULATIONS PART 1

TOTAL VOLUME = L x W x H = 4.77' x 2.77' x 1.23' = 16.25 cu.ft.

WEDGE VOLUME = 1/2(ab)W = [(1/2)(0.17')(3.10')(2.77')] = .73 cu.ft.

PART 1 VOLUME = (TOTAL VOLUME)−(WEDGE VOLUME) = 

(16.25)−(.73) = 15.52 cu.ft.

(15.25 cu.ft.)7.48 gal/cf. = 116 gal
SWIC DRUM WASHER VOLUME CALCULATIONS

\[
\begin{align*}
L &= 1.67', \\
W &= 2.77', \\
H &= 1.67', \\
a &= 0.25', \\
b &= 0.75'
\end{align*}
\]

\[L = \frac{1}{3} \cdot 1.67' \cdot 2.77' \cdot 1.67' = 7.73 \text{ cu.ft.}\]

A WEDGE VOLUME = \(\frac{1}{2}aH \cdot W = \frac{(1/2)(.25')(1.67')}{2.77'} = .58 \text{ cu.ft.}\)

B WEDGE VOLUME = \(\frac{1}{2}(bH) \cdot L = \frac{(1/2)(.75')(1.67')}{1.67'} = 1.05 \text{ cu.ft.}\)

C PYRAMID VOLUME = \(\frac{1}{3}(a)(b)H = \frac{(0.25')(0.75')}{3} \cdot 91.67' = 10 \text{ cu. ft.}\)

PART 2 VOLUME = (TOTAL VOLUME) - A - B + C =

\(7.73' - .58' - 1.05' + .10' = 6.20 \text{ cu.ft.}\)

\((6.20 \text{ cu. ft.}) \times (7.48 \text{ gal/cf}) = 46 \text{ gal.}\)

TOTAL DRUM WASHER VOLUME = PART 1 + PART 2 = 116 + 46 = 162 \text{ gal.}\)
Exhibit D2-16

ChemTec Spec Sheet
TECHNICAL DATA

1. PRODUCT NAME

CHEMTEC ONE™

High Performance Water Based Non-Toxic Chemical Treatment that hardens, strengthens, stabilizes, protects, increases the mass & density and extends the useful life of concrete structures.

2. MANUFACTURER

CHEMTEC INTL INC.

7771 Woodstone Drive, Suite 100
Cincinnati Ohio 45244-2855
Phone (513) 474-2090
Fax (513) 474-2054

3. PRODUCT DESCRIPTION

A colorless non-toxic chemical that penetrates the concrete permeable zones producing an insoluble by-product that directly encapsulates the Cement properties of concrete, thereby greatly reducing the porosity, increasing the surface hardness and compression strength. Protecting the concrete from attack by liquids, acids, salts and other contaminants

PROTECTING CONCRETE

This process actually produces a reactive by-product that fills the gel pores, shrinkage cracks and alligator cracks of the concrete. The by-product can in some cases reach depths of over 3 inches into the concrete, making the concrete extremely resistant to water and contaminant penetration. The process allows the concrete to breathe while still giving excellent protection. This process keeps the alkaline content (pH) high, and in cases where deteriorated concrete is being treated, actually raises the pH of the concrete thereby stabilizing and in some cases reversing the deterioration. This process should be used prior to concrete repair, because of its ability to raise the pH of existing deteriorated concrete.

HARDENING

Because CHEMTEC ONE produces a reactive and solid by-product in the concrete, it increases the mass and density thereby making the surface harder and increasing the compression strength. Lab test have shown up to 45% increase in hardness of treated samples with CHEMTEC ONE vs non-treated samples. Reactive products have been used for years as commercial floor protectors / hardeners. We now have the proper formula for deep penetrating protection for all fully cured concrete as well.

USES

CHEMTEC ONE’s primary use is for protecting new and existing dense concrete structures such as Commercial Floors, Parking Facilities, Bridges, Loading Ramps, Driveways, Walkways, Roads, Runways, Taxiways and any concrete structure. CHEMTEC ONE can increase the useful life of normal concrete up to 40%. This process is designed for normal, dense high strength concrete and should not be used on porous concrete blocks or similar type concrete.

DO NOT apply or splash on glass or painted surfaces, protect decorative door fronts as this product may stain them. If you do splash on these surfaces, clean with fresh water immediately. DO NOT store in aluminum, containers or use aluminum spraying equipment. CLEAN UP equipment with soap and water as soon as possible after use. CAUTION, leaving residue in spraying equipment may damage equipment.

COLOR:

CHEMTEC ONE is a clear liquid and comes premixed, DO NOT dilute. A slight brown tint may appear on the surface of the concrete after the final application. This is a sign that iron is present in the concrete. This will wash / wear off in 10 to 15 minutes.

PACKAGING:

55-Gallon drums and 5-Gallon buckets / bulk shipments available.

COVERAGE:

The average coverage for fully cured brushed finished concrete will range between 100 to 125 square feet per gallon per application. Two applications are necessary on these types of concrete surfaces. The coverage for commercial steel troweled concrete floors should be between 175 and 250 square feet per gallon, and generally only one application is necessary.

4. TECHNICAL DATA

TEMPERATURE LIMITS:

CHEMTEC ONE can be applied in temperatures as low as 38° F and as high as 95° F. Do not allow the surface to freeze for at least 12 hours after the final application.

DRYING TIME:

Normal drying time is about 2 to 4 hours depending on the temperature and humidity. The surface must be completely dry prior to applying CHEMTEC ONE, except when it will be used as a floor hardener / sealer on new steel troweled surfaces.

PAINTING / COATINGS:

The surface can be painted on 24 hours after the surface has completely dried. However, it is recommendation that you wash off the surface with fresh water and let thoroughly dry before painting lines or anything else on the surface.

INTERNAL MAKEUP:

A proprietary blend of reactive silicates and surface active agents. Non-Toxic, Non-flammable, Non-Hazardous. NO special handling requirements under environmental regulations.

CAUTIONS:

CHEMTEC ONE is high in alkaline content. Wear protective clothing, gloves, breathing apparatus and safety glasses. Make sure there is adequate ventilation. See MSDS, product label or installation instruction booklet for complete safety details.

ANTICIPATED TREATMENT

RESULTS:

The CHEMTEC ONE treatment can produce the following results.

• Reduce the porosity of existing concrete by up to 90%
• Increase the surface hardness in existing concrete by up to 45% as results of ASTM C-779
• Increase Compression strength in deteriorated concrete.
• Reduce chloride penetration.
• Inhibit chemical attack of treated concrete.
• Form a gelling by-product in the micro-cracks, gel pours and alligator cracks in the concrete to the depth of penetration.
• Retard scaling of high strength concrete.
• Meets ASTM C-672
• Raise the pH of deteriorated concrete
• Reduces water absorption by up to 98% as results of ASTM C-642

5. INSTALLATION

METHOD OF APPLICATION:
Simply pour, pump or spray the formula from the container or pumping system.

TOOLS NEEDED: Low pressure sprayers, brooms, safety equipment and protective gear.

SURFACE PREPARATION: The surface of the concrete must be clean and free of foreign material, such as grease and coatings that would prevent the CHEMTEC formula from penetrating into the concrete. Thoroughly clean dirty areas. Concrete must be completely dry before application of the formula can begin on fully cured surfaces.

IMPLEMENTATION: Pre-determine the amount of formula (gallons) that will be needed to complete the project.

A) Application on steel troweled surfaces. CHEMTEC ONE is applied in ONE application (except where specified differently) at a rate of 175 to 250 square feet per gallon. On new floors the formula can be installed as soon as possible after the finish troweling operation. After the surface is hard enough to walk on without marking, simply saturate the surface with the formula, keeping the entire surface wet. Keep moving the formula around the floor with bristle brooms until the formula starts to react and becomes slippery under foot, approximately 15 to 40 minutes after you apply the formula. If the material stats to gum up prior to removal then re-mist the floor with fresh water, do not flood the surface, just enough to make the formula easy to push around, then squeeze the formula off the surface or use a mechanical vacuum to remove the formula, and allow the floor to dry. DO NOT allow areas to prematurely dry while you are working the formula in. On existing floors, thoroughly clean the floor so they are water permeable. The existing floor must be completely dry before you apply the formula. Use the same application procedure as above. A sheen will normally develop over time. CAUTION, DO NOT allow areas to puddle and dry as they will leave hard white crystals on the surface. Dispose of waste properly, per federal, state or local environmental regulations if required. Please see the 3 page application installation instructions for complete and recommended application procedure for all surfaces.

B) Application on brushed finished fully cured surfaces, such as bridge decks, roads, loading ramps, parking facilities and so on. CHEMTEC ONE is applied in TWO applications at the same rate of 100 to 125 square foot per gallon per application. Simply saturate the surface and let it dry using the following method. Puddling areas should be brushed over to dryer areas. Areas that dry prematurely should have more formula brushed to it or be re-sprayed. Brush the formula around the surface until it is absorbed in, then just let it dry. The goal is to get the proper amount of formula to penetrate an uniformly as possible. The second application is a repeat of the first application. WAIT a minimum of 4 to 6 hours between the first and second applications. CAUTION, there must be a minimum of 12 hours with NO WATER being allowed on the surface after the last application has dried. It is recommended that you flush Bridge Decks and Roadways with fresh water 24 hours after the last application has dried, to prevent any un reacted material that may be on the surface from becoming slick at the first rain.

6) AVAILABILITY:
CHEMTEC ONE is available in 5-gallon (20-liter) buckets and 55-gallon (205-liter) drums. The product is available only through CHEMTEC INT'L.

WARRANTY:
CHEMTEC INT'L warrants that CHEMTEC ONE in its original sealed containers, will be free of defects and when used as instructed will retard deterioration of concrete surfaces.

MAINTENANCE:
Should you want to clean the concrete. Wash with mild detergent and flush with fresh water.
CHEMTec One

Installation instructions for CHEMTec One concrete protector.

CHEMTec One is a proprietary blend of water-diluted and carried reactive silicates and surface active agents. Concrete treatment that penetrates the concrete’s permeable zones producing a solid, insoluble, irreversible reaction products residing in the gel pores, dramatically reducing porosity of the concrete. Increasing adhesion qualities, maintaining the concrete’s ability to breathe, chemically protecting, stabilizing and strengthening concrete. CHEMTec One will protect, harden, densify, strengthen, seal & increase the useful life of your concrete.

"The ultimate concrete protection"
CHEMTec Int’l Inc. (513) 474-2090
7771 Woodstone Drive, Suite 100, Cincinnati, Ohio 45244-2855

WARNING AND STATEMENT OF HAZARD: Irritating to skin, eyes, mucous membranes of the respiratory and digestive tracts.

Moderate health hazard...1.
Minimal reactivity hazard...0.
Minimal fire hazard...0.

Wear personal protection when using CHEMTec One: Protect your eyes and skin by wearing rubber gloves, safety goggles, face shields, sturdy work boots, long sleeve shirts and long pants. If misting or spraying wear mist rated breathing protection.

WARNING AND STATEMENT OF HAZARD CONTINUED:
- Do not ingest but if swallowed do not induce vomiting - seek immediate medical help.
- If skin contact occurs, promptly wash with water. If eye contact occurs, immediately flush with a direct stream of water for 15 minutes.
- If irritation or ill effects develop or persist seek immediate medical help.
- Treat according to the individual’s condition and specifics of the exposure.
- This formula is not subject to restrictive or special handling defined under environmental regulations.
- Keep container closed when not in use. When container is empty, continue to observe all safety precautions.
- Do not reuse container unless commercially cleaned.
- Refer to the MSDS for additional handling and safety information.

WARNING: Wear personal protective clothing that will shield you from contact with this formulation. Avoid contact with skin. Avoid contact with eyes. Do not ingest. Ventilate the work area well. If a runny nose begins and persist go to fresh air until symptoms stop. If asthmatic symptoms begin go to fresh air until they stop. Vapor rated respirators are recommended in closed areas if good ventilation cannot be achieved. There are however no special handling requirements defined in environmental regulations.

Preparation prior to working with CHEMTec One... an alkaline soluble formulation that is likely to irritate on contact with the body. Wear face shields and safety glasses. Wear tough standard work boots. Wear long pants. Wear long sleeve shirts. Wear long gloves. Wear other protective gear that is mandated by the environment.
HOW TO APPLY THE CHEMTEC ONE FORMULATIONS

PREPARATION: Prior to implementing the project. Remove debris from the concrete to be treated. Be sure to clean the concrete to a state which is water permeable and porous. Cover drains to prevent loss and waste of material. Install temporary fan or ventilation in enclosed areas. Bring opened container of the material or pumping system into the area to be treated. Bring tools for all members of the implementation team for the distribution of the material in the project area like squeegees, brooms, sprayers and so on. New floors do not need any preparation.

APPLICATION: Pre-determine the amount of formula (Gallons) that will be needed to complete the project.

A) Application on Steel troweled Surfaces: CHEMTEC ONE is applied in ONE application at a rate of 175 to 250 square feet per gallon. On new floors, you can install the formula as soon as possible after the finish troweling operation. After the surface is hard enough to walk on with out marking. It is recommended that you do not treat an area to large to manage, normally two to three people can control three section wide the length of the slab at a time. Simply saturate the surface with the formula, keeping the entire surface wet. Keep moving the formula around the floor with bristle brooms or mechanical scrubbing machines until the formula starts to react and become slippery under foot, approximately 15 to 40 minutes after you apply the formula. If the material starts to gum up prior to removal then re-mist the floor with fresh water do not flood the surface with water, just enough to make the formula easy to move around. Then squeegee the formula off the surface or use a mechanical floor vacuum to remove the formula, and allow the floor to dry. Do not allow areas to prematurely dry while you are working the formula in. On existing floors, thoroughly clean the floors so that they are water permeable. The existing floor must be completely dry. Use the same application as above. A sheen will normally develop over time. CAUTION: DO NOT allow areas to puddle and dry as they will leave a hard white crystal on the surface. A recommended step for applicators that want to have a slight sheen immediately after the application, is to lightly mist the surface with CHEMTEC ONE formula (do not flood the surface) and work it in with a lambs wool applicator until the floor is about dry and NO puddles are visible.

A.2) Application on Steel troweled Surfaces in Food Preparation, Retail Grocery, Harsh Environments or Dusting Problem Areas AND FOR WAL-MART NEIGHBORHOOD GROCERY ACCOUNT. CHEMTEC ONE is applied in TWO application at a rate of 175 to 250 square feet per gallon. On new floors, you can install the formula as soon as possible after the finish troweling operation. After the surface is hard enough to walk on with out marking. It is recommended that you do not treat an area to large to manage, normally two to three people can control three section wide the length of the slab at a time. Simply saturate the surface with the formula, keeping the entire surface wet. Keep moving the formula around the floor with bristle brooms or a mechanical scrubber until the formula starts to react and become slippery under foot, approximately 15 to 40 minutes after you apply the formula, then squeegee the formula off the surface or use a mechanical floor vacuum to remove the formula, and allow the floor to dry for approximately 30 minutes, then apply the 2nd application the same as the 1st application and allow the floor to dry for 30 minutes. Do not allow areas to prematurely dry while you are working the formula in during the first 2 applications. On existing floors, thoroughly clean the floors so that they are water permeable. The existing floor must be completely dry. Use the same application as above. A sheen will normally develop over time. CAUTION: DO NOT allow areas to puddle and dry as they will leave a hard white crystal on the surface. PLEASE CONSULT THE LATEST WAL-MART SPECIFICATION FOR ALL OTHER INFORMATION REGARDING BURNISHING OPERATION

B) Application on brushed finished fully cured surfaces such as bridge decks, roads, loading ramps, parking facilities, driveways and so on. CHEMTEC ONE is applied in TWO applications at a rate of 100 to 125 square feet per-gallon for each application. Simply saturate the surface and let it dry using the following method. Puddling areas should be pushed over to dryer areas. Areas that dry prematurely should have more formula pushed to it or be re-sprayed. Brush the formula around the surface until it is absorbed in, then just let it dry. The goal is to get the proper amount of formula to penetrate as uniformly as possible. The second application is a repeat of the first application. WAIT a minimum of 4 to 6 hours between applications. (Page 2 of 3)
CAUTION: There must be a minimum of 12 hours with NO water being allowed on the surface after the last application. A quality control step to make sure you have reached proper saturation levels is to, take an eye dropper with muriatic acid with 28% HCL level and randomly test the concrete with a drop of acid immediately after the second application has dried. Put a drop of acid on the treated surface and observe it for a few seconds, then wipe it up. If you get very little to no reaction to the acid you have reached the proper saturation level. If it reacts you need to put more material on those areas until the acid does not react. C) Application on Vertical or underneath bridge decks or parking facility ceiling surfaces.

Because you are working against the force of gravity and using the wicking action of the concrete to draw the formula in on these surfaces, you will need to apply CHEMTEC ONE at a slower rate with a minimum of two to three applications. Use a paint roller or a mist sprayer to apply the formula. The surface must be completely dry before proceeding. On vertical surfaces apply the formula starting at the top of the surface, working you way down. Apply the formula by saturation the surface, but not creating excessive run off. Wait until the surface is dry approximately 2 to 3 hours before applying the second and third applications. Use the same procedure on each application.

When applying the formula on the underneath of bridge decks or parking facilities ceilings, saturate the surface until the formula starts to drip back out. Wait until the surface is dry, approximately 2 to 3 hours and perform the second and third applications the same as the first application. This particular type surface application will take 3 application. Coverage will vary with particular concrete being treated, the temperature and the amount of waste generated by the applicator. Normal coverage rate for this type of application should bee 175 to 200 square feet per gallon for each application.

It is likely that the treated concrete will have a brown tint when the project is complete that will not remain, but it is an indication that iron is present in the concrete. After the last application has dried traffic can return to the area. Roughly three hours after the completion of the project.

CHEMTEC ONE

"THE ULTIMATE CONCRETE PROTECTION"

Manufactured by
CHEMTEC INT'L INC. Cincinnati Ohio

(513) 474-2090 Toll Free 1-888-889-7779 www.concretesealer.net

Please watch the weather reports, it is crucial that the surface of the concrete not get wet for at least 10 to 12 hours after the final application of the product. CAUTION Avoid applying or splashing on glass, painted surfaces, or aluminum. Product may stain these surfaces. Protect decorative fronts from contact. Keep out of traffic pattern when treating roadways or bridges. It is recommended that you flush Bridge Decks and Roadways with fresh water 24 hours after the last application has dried, to prevent any un-reacted material that may be on the surface from becoming slick at the first rain. If you intend to paint lines or install toppings on the surface after treatment, flush surface with fresh water and let dry prior to your installation. Dispose of waste properly per federal, state or local environmental regulations if required. DO NOT STORE IN ALUMINUM OR METAL CONTAINERS.
WHAT THE CHEMTEC ONE PROCESS CAN DO.

1) Reduce the porosity of existing concrete & effectively seal out contaminants.

2) Increase the Surface Hardness and Abrasion Resistance of new and deteriorated concrete.

3) Increase Compression Strength of new and deteriorated concrete.

4) Reduce Chloride Penetration.

5) Inhibit chemical attack of treated concrete.

6) Form a solid by-product in the micro cracks and gel pores.

7) Retard scaling of high strength properly finished concrete

8) Increase the Mass & Density of concrete

9) Produce a sheen on dense steel troweled non-air entrained concrete floors over time.

WHAT THE CHEMTEC ONE PROCESS WILL NOT DO.

1) Make good concrete out of bad concrete.

2) Correct structural deficiencies.

3) Correct substrate or erosion problems.

4) Seal large cracks (Designed to fill alligator, micro and shrinkage cracks)

5) Totally stop scaling of high slump or non air entrained concrete. or stop mortar flaking due to delaminated surfaces caused by poor finishing.

6) Fill large voids in concrete do to high water content prior to curing.

CHEMTEC INT'L INC. (Member CSI).

CHEMTEC High Performance Concrete Protection
CHEMTEC INT'L

MATERIAL SAFETY DATA SHEET

MSDS DATE : 1 January 1997
PRODUCT NAME : CHEMTEC ONE

I. PRODUCT IDENTIFICATION

MANUFACTURER
CHEMTEC INTL. For information call 513-474-2090 Fax 513-474-2054
7771 Woodstone Drive, Suite 100 Toll Free 1-888-889-7779
Cincinnati Ohio 45244-2855

CHEMICAL:
CHEMTEC ONE ... A PROPRIETARY BLEND OF WATER SOLUBLE REACTIVE SILICATES.
DOT proper shipping name: NA DOT Hazard Class: NA
DOT Identification Number: NA DOT Hazardous Substance: NA
H.S. 2839.19.0000

II. HMIS HAZARD RATINGS National painting & Coatings Association
Health Hazard 2 Fire Hazard 0 Reactivity 0

SARA / TITLE III HAZARD CATEGORIES
Immediate (ACUTE) health: yes Reactivity: no Fire: no
Delayed (CHRONIC) health: no Sudden release of pressure: no

II. HEALTH HAZARD INFORMATION

WARNING LABELING

SIGNAL WORD: WARNING
STATEMENT OF HAZARD: Irritating to skin, eyes, mucous membranes of the respiratory and digestive tract.

EMERGENCY AND FIRST AID PROCEDURES

Irritating to skin, eyes, mucous membranes of the respiratory tract, mouth throat esophagus and stomach
- EYES: Immediately flush eyes with a directed stream of water for at least 15 minutes while forcibly holding eye lids apart to ensure complete irrigation of all eye and lid tissue. Get Medical Attention Immediately
- SKIN: Wash and flush skin thoroughly with soap and cool water for at least 15 minutes after contact to avoid irritation. Wash contaminated clothing before reuse. Get Medical Attention If Irritation Develops or Persists.

II. HEALTH HAZARD INFORMATION continued

- INHALATION: If vapors are inhaled remove to fresh air. Breathing oxygen maybe administrated if required. If respiration stop perform CPR. Get Medical Attention Immediately If Symptoms Develop.
- INGESTION: NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON IF SWALLOWED DON'T INDUCE VOMITING. Give large amounts of water, if available give 16 plus ounces of milk. If vomiting occurs spontaneously KEEP AIRWAYS CLEAR. Get Medical Attention Immediately.

ROUTES OF EXPOSURE
INHALATION: Exposure to mist or spray may cause coughing, sneezing or other symptoms of upper respiratory tract irritation. SKIN Can cause irritation of skin. EYES: Causes irritation and pain, redness and tearing.
INGESTION: Can cause irritation to mucous membranes of the digestive tract.
EFFECTS OF OVER EXPOSURE:

ACUTE: Irritating to skin, eyes, mucous membranes of the respiratory and digestive tract.
CHRONIC: No known chronic effects.
TOXICITY: OF CONCENTRATE LD50 2000 TO 3000 mg/kg

PRECAUTIONARY STATEMENTS: This proprietary formulation is not subject to restrictive or special handling
defined under environmental regulations. OSHA regulations are being complied with by these statements.
- When handling material use personal protective equipment such as long pants, long sleeve shirts, chemical
  splash goggles, face shield, rubber gloves and boots...clean immediately with soap and water.
- Avoid getting material in eyes or on skin.
- Use only with adequate ventilation
- Avoid breathing mist or spray asthma symptoms may be aggravated
- Use mist rated respiratory protective equipment when exposed to mist or spray
- Do not ingest
- Avoid contact with acidic material when in the liquid state -- it will gel
- Use no aluminum containers or equipment.
- Do not allow contact with glass, paint or aluminum...wash thoroughly and immediately with soap and water
  after contact to avoid chemical reaction.
- Keep container closed.

III IMPORTANT COMPONENTS

CHEMTEC ONE
- PROPRIETARY BLEND OF A WATER SOLUBLE REACTIVE SILICATES. COMPONENTS ARE NOT A LISTED CARCINOGEN.

IV FIRE AND EXPLOSION DATA

FLASH POINT: NA AUTOIGNITION: NA FLAMMABLE LIMITS IN AIR % BY VOLUME: NA
EXTINGUISHING MEDIA: NA THIS PRODUCT IS NON-COMBUSTIBLE
FIRE FIGHTING PROCEDURE: FIRE FIGHTERS SHOULD USE THE BEST AVAILABLE MEANS TO
PUT OUT THE FIRE. FIRE FIGHTERS SHOULD BE WEARING PROTECTIVE CLOTHING TO
PROTECT FROM EXPOSURE.

V SPECIAL PROTECTION

VENTILATION REQUIREMENTS: WHERE MIST OR SPRAY MAY BE GENERATED USE ADEQUATE
LOCAL EXHAUST VENTILATION.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT
- RESPIRATORY: Use a NIOSH/MSA approved mist rated respirator following manufacturer’s
  recommendations where mist or spray may be generated especially in a confined space.
- EYES: Wear chemical safety goggles, plus full face shield to protect against splashing when appropriate
- GLOVES: Rubber gloves should be worn. Gloves may be cleaned by washing with a mild soap and water.
- OTHER CLOTHING AND EQUIPMENT: Standard skin covering work clothing. Standard work shoes.
  Wash and dry soiled clothing before reuse. Shower and eyewash facilities should be accessible.
VI. PHYSICAL DATA

pH: 11.3 concentrate (ready to use)
BOILING POINT @ 760 mm Hg: 214-216 oF
FREEZING POINT: 30°F
VAPOR PRESSURE: NA
SPECIFIC GRAVITY (H2O=1): 1.41 @ 20°C concentrate (ready to use is less)
SOLUBILITY IN H2O BY WEIGHT: 100%
VAPOR DENSITY (AIR=1): NA
APPEARANCE AND ODOR: Colorless, turbid liquid; none to slightly soapy odor.

VII. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:
Under normal conditions the material is stable.

INCOMPATIBILITY:
This product is alkaline and gels when mixed with acids.

HAZARDOUS DECOMPOSITION PRODUCTS:
None

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATIONS:
None known.

VIII. HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS: Do not store in aluminum containers as flammable hydrogen gas can be generated. Do not use aluminum fittings or transfer lines. Contact with acids will cause gelling of the silicate component and also may produce some heat. CLEAN up equipment with soap and water as soon as possible after use. CAUTION, leaving residue in spraying equipment may damage equipment.

IX. ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: If significant amount of concentrate material is spilled, steps should be taken to contain liquids and prevent discharges to streams or sewer systems. Spills should be reported, if required, to the appropriate local, state and federal regulatory agencies. READY TO USE FORMULATIONS CAN BE DILUTED AND WASHED TO DRAINS WITH PLENTY OF WATER WHEN NOT SIGNIFICANT AMOUNTS. IF OVER 100 GALLONS, RETAIN FOR PROPER DISPOSITION.

WASTE DISPOSITION METHOD: This ready to use formulation is not subject to restrictive or special handling defined under environmental regulations. For concentrate clean-up action should be carefully planned and executed. Shipment, storage, and/or disposal of waste materials may be regulated and action to spilled materials must meet the applicable rules. The appropriate agencies should be assured proper action being taken. If any questions exist … call CHEMTEC INT'L @ 513-474-2090

X. ADDITIONAL INFORMATION

OSHA Standard 29CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to make all information in this Material Safety Data Sheet available to your employees.

FOR INDUSTRIAL USE ONLY The information presented is based on data considered to be accurate at the time of preparation of this MSDS. No warranty or representation expressed or implied is made as to the accuracy or completeness of this information. Additionally, no responsibility will be assumed for any damage or injury resulting from abnormal or misuse, from failure to adhere to recommended practices, or from hazards inherent in the nature of this product.
Exhibit D2-17

Marlow Pump Spec Sheets
MODEL
1½HR49EC & 3CR18EC
SOLIDS HANDLING
SELF-PRIMING CENTRIFUGAL PUMPS
CLOSE-COUPLED

FEATURES
Pump and motor are combined in a single, compact, complete unit. Easy to install and ready to operate.

GENERAL SPECIFICATIONS
Cast iron fitted construction with heavy duty two vane impeller and replaceable volute. (Removable wear plate offered on Model 3CR18EC only as standard equipment.) Preloaded suction check valve. Easy-off suction elbow and cover for quick access to all working parts of pump. Stainless self-lubricating mechanical shaft seal. 1½" NPT wing type fill plug. Units offered with or without baseplate.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sphere Handling Ability</th>
<th>Port Sizes</th>
<th>Shaft Seal Method</th>
<th>Motor</th>
<th>Static Prime Limit*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/2HR49EC</td>
<td>1&quot; Dia. (2.5 cm)</td>
<td>1-1/2&quot; N.P.T. (3.8 cm)</td>
<td>Mech. Seal</td>
<td>1 hp—1-1/2 hp 3450 RPM</td>
<td>25 Ft. 7.6 m</td>
</tr>
<tr>
<td>3CR18EC</td>
<td>1-1/2&quot; Dia. (3.8 cm)</td>
<td>3&quot; N.P.T. (7.6 cm)</td>
<td>Mech. Seal</td>
<td>3 hp—5 hp 1750 RPM</td>
<td>23 Ft. 7.0 m</td>
</tr>
</tbody>
</table>

*Note: Based on nominal pipe sizes with 5 ft. of horizontal length and 0 discharge head.
DIMENSIONS:

THESE DIMENSIONS NOT TO BE USED FOR CONSTRUCTION PURPOSES WITHOUT FORMAL FACTORY APPROVAL.

PUMP UNITS with EXPLOSION PROOF MOTORS
1/2HR49EC

*All dimensions shown in inches
PERFORMANCE CURVES

The performance curves shown in this manual and other published literature were taken from actual tests of standard production pumps, and reflect an average performance of the pumps indicated.

MAXIMUM PRIMING CAPABILITY IS 25° (7.6m), BASED ON MINIMUM LENGTH OF 1-1/2" (3.8cm) SUCTION HOSE, 69°F (20°C) WATER AT SEA LEVEL.

ITT MARLOW

MODEL: 1" HR49EC LIQUID: SP GR 1.0
SIZE: 1" (3.8cm) MOTOR: ELEC 3450 RPM
IMP DIA.: 1-1/2" (3.8cm) DATE: 2.5.74 12/27/74
* DENOTES DYNAMIC SUCTION LIFT BEYOND WHICH CAVITATION BEGINS TO OCCUR.

MAXIMUM PRIMING CAPABILITY IS 23° (7.6m), BASED ON MINIMUM LENGTH OF 3" (7.6cm) SUCTION HOSE, 69°F (20°C) WATER AT SEA LEVEL.

ITT MARLOW

MODEL: 3 CR IB EC LIQUID: SP GR 1.0
SIZE: 3" (7.6cm) MOTOR: ELEC 1750 RPM
IMP DIA.: 3" (7.6cm) DATE: 2.11.64 12/5/64
* DENOTES DYNAMIC SUCTION LIFT BEYOND WHICH CAVITATION BEGINS TO OCCUR.
MODEL
1½HR49EC & 3CR18EC
SOLIDS HANDLING
SELF-PRIMING CENTRIFUGAL PUMPS
CLOSE-COUPLED

FEATURES
Pump and motor are combined in a single,
compact, complete unit. Easy to install and
ready to operate.

GENERAL SPECIFICATIONS
Cast iron fitted construction with heavy duty
two vane impeller and replaceable volute.
(Removable wear plate offered on Model
3CR18EC only as standard equipment.) Pre-
loaded suction check valve. Easy-off suction
elevator and cover for quick access to all
working parts of pump. Stainless self-lubri-
cating mechanical shaft seal. 1½" NPT wing
type fill plug. Units offered with or without
baseplate.

<table>
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<tr>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>1-1/2HR49EC</td>
<td>1&quot; Dia. (2.5 cm)</td>
<td>1-1/2&quot; N.P.T. (3.8 cm)</td>
<td>Mech. Seal</td>
<td>1 hp—1-1/2 hp 3450 RPM</td>
<td>25 Ft. 7.6 m</td>
</tr>
<tr>
<td>3CR18EC</td>
<td>1-1/2&quot; Dia. (3.8 cm)</td>
<td>3&quot; N.P.T. (7.6 cm)</td>
<td>Mech. Seal</td>
<td>3 hp—5 hp 1750 RPM</td>
<td>23 Ft. 7.0 m</td>
</tr>
</tbody>
</table>

*Note: Based on nominal pipe sizes with 5 ft. of horizontal length and 0 discharge head.
 PERFORMANCE CURVES

The performance curves shown in this manual and other published literature were taken from actual tests of standard production pumps, and reflect an average performance of the pumps indicated.

MAXIMUM PRIMING CAPABILITY IS 25' (7.6m), BASED ON MINIMUM LENGTH OF 1-1/2' (4.6cm) SUCTION HOSE, 69°F (20°C) WATER AT SEA LEVEL.

**WMS**

PUMP

**ITT MARLOW**

MODEL: 1/2HR-49EC LIQUID: SP GR 1.0
SIZE: 1-1/2 (3.8cm) MOTOR: ELEC 3450 RPM
IMP. DIA: 1-1/4 (3.2cm) DATE 2-5-64 10" (25.4cm)

* DENOTES DYNAMIC SUCTION LIFT BEYOND WHICH CAVITATION BEGINS TO OCCUR.

MAXIMUM PRIMING CAPABILITY IS 23' (7.0m), BASED ON MINIMUM LENGTH OF 3' (9.1cm) SUCTION HOSE, 69°F (20°C) WATER AT SEA LEVEL.

**ITT MARLOW**

MODEL: 3CR-18EC LIQUID: SP GR 1.0
SIZE: 3' (9.1cm) MOTOR: ELEC 1750 RPM
IMP. DIA: 1-1/2 (3.8cm) DATE 2-11-64 10" (25.4cm)

* DENOTES DYNAMIC SUCTION LIFT BEYOND WHICH CAVITATION BEGINS TO OCCUR.
Exhibit D2-19

Trihydro 2001 Spent Solvent Aboveground Storage Tank System Assessment
March 26, 2001

Mr. Gary Olsen  
Environmental Compliance Manager  
Safety-Kleen Systems, Inc.  
16540 Southeast 130th Street  
Clackamas, Oregon 97015

Re: Spent Solvent Aboveground Storage Tank System Assessment, Safety-Kleen Systems, Inc.  
Service Center, Boise, Idaho (IDD 981770498)

Dear Mr. Olsen:

On March 6, 2001, TriHydro Corporation tested the shell thickness and inspected the spent solvent aboveground storage tank system (AGST) at the Safety-Kleen Systems, Inc. (S-K) Service Center, 6334 Supply Way, Boise, Idaho 83716. The assessment activities were performed by Jeremy Sell, under the direction of Jack Bedessem, P.E. (TriHydro Corporation – Laramie, Wyoming). The purpose of this assessment was to evaluate the condition of the spent solvent AGST system, including a visual inspection of the emissions control devices (as per 40 CFR 264 Subpart CC requirements), pursuant to the facility permit conditions.

This letter documents the results of the March 2001 assessment of the spent solvent AGST system. Per our January 9, 2001 correspondence and recent discussions, the scope of the integrity assessment included ultrasonic thickness measurements of the spent solvent tank, drum washer, and wet dumpster, inspection of the spent solvent tank cover and closure devices, verification of the high level alarm function, and general condition inspection of the spent solvent tank, return/fill station, and associated secondary containment areas.

Summary of Integrity Assessment

In general, the March 6, 2001 assessment consisted of shell thickness testing and visual inspection. Ultrasonic thickness measurements were taken from the accessible walls and bottom of the spent solvent tank, drum washer, and wet dumpster. A cursory visual inspection of the tank drum washer and wet dumpster, piping, and containment areas was also performed during the assessment. This inspection was conducted to assess the condition of the spent solvent tank system and identify potential evidence of leaks. This assessment also included inspection of the tank emissions control devices pursuant to the S-K monitoring plan and applicable sections of 40 CFR 264 Subpart CC.
Description of System

Three vertical, aboveground storage tanks (12,000 gallons each) are located within a reinforced concrete secondary containment area (dike and floor slab). Two tanks are used for storage of clean solvent and one tank is used for storage of spent solvent (petroleum based spent parts washer solvent). The interior of the secondary containment area dike walls and surface of the floor have been coated with gray epoxy-type, chemical resistant sealant.

The spent solvent AGST is constructed of carbon steel. The tank exterior is coated with white paint. According to the S-K branch manager, the tank was most recently painted in 1993. The base of the tank is supported vertically on a steel skirt and bolted to a reinforced concrete platform. A stainless steel plate is mounted between the tank support skirt and concrete platform.

The spent solvent AGST has a maximum capacity of 12,000 gallons, and a reported nominal operating capacity of 10,800 gallons. The tank sidewalls are covered with an insulation jacket and heat tracing from the bottom of the tank to a height of approximately 10 feet. The tank manufacturer's plate was covered by the jacketing, so tank identification information was not visible. According to S-K personnel, the spent solvent tank was installed at the same time as the middle clean solvent tank.

The middle clean solvent tank appears to be similar to the spent solvent tank without the insulation. The manufacturer's plate on the middle clean solvent tank indicates that the tank was constructed to UL 142 standards by Topaz Tank & Mfg. (Boise, ID). According to the branch manager, the spent solvent tank was manufactured and installed in 1993. The tank is vented to the atmosphere, has a liquid level indicator, and a high level alarm to prevent overfilling.

Insulated abovegrade piping connects the spent solvent tank to a wet dumpster and drum washer in the return/fill station shelter. The drum washer, wet dumpster, pump, and filter are located within the steel containment pans of the return/fill station. A site plan of the tank system is presented in Attachment A. Site inspection photographs are included in Attachment B. Field notes documenting the March 6, 2001 inspection are included in Attachment C.

Ultrasonic Thickness Testing

The integrity assessment included measurements of the shell/wall and bottom of the spent solvent tank and accessible walls of the drum washer and wet dumpster using an ultrasonic thickness gauge. Thickness measurements were collected from the exterior surfaces through paint coatings on the spent solvent tank, drum washer, and wet dumpster.

Spent Solvent Tank System

On March 6, 2001, ultrasonic thickness measurements were made using a StressTel T-Mike E and StressTel Probe (0.500", 5.0 MHz). The instrument was calibrated to a test block prior to implementing thickness measurements. Paint thickness measurements were made using a PcsiTest FM measuring device.
Thickness measurements were taken at 24 locations on the tank shell above the jacketing, and at 4 locations on the bottom of the tank. The tank bottom measurements were made through the access holes in the bottom support skirt. All measurements were made through the exterior paint coating. A schematic showing the measurement locations and results is included in Attachment C.

The upper shell thickness (metal plus paint) measurements ranged from 0.191 inches to 0.270 inches. The tank shell bottom readings ranged from 0.264 inches to 0.280 inches.

Due to the continuous paint coating on the tank, there were no places on the tank where a bare metal thickness measurement could be obtained from the tank wall or bottom. Paint thickness measurements were made at two locations on each side of the tank using a PosiTest FM measuring device. The paint thickness measurements on the upper portion of the shell ranged from 4 mils to 6 mils (0.004 to 0.006 inches).

Based on the shell and paint measurements, the bare metal wall thickness in March 2001 ranged from 0.185 to 0.264 inches (measured total thickness minus paint thickness). In addition, the bare metal bottom thickness in March 2001 ranged from 0.258 to 0.274 inches (measured total thickness minus paint thickness). Note, paint thickness measurements could not be obtained from the bottom of the tank; therefore, the largest shell paint thickness was subtracted from the range of total measured thicknesses to estimate a bare metal bottom thickness range.

The average bare metal thicknesses are greater than the UL 142 Standards for new tanks and the API 653 guidelines for tanks in service. UL 142 (Standard for Safety, Steel Aboveground Tanks for Flammable and Combustible Liquids) specifies a minimum shell thickness of 0.167 inches and a minimum bottom thickness of 0.240 inches for a new vertical carbon steel tank with a capacity of more than 1,100 gallons, and a maximum diameter of 144 inches. Note, the API Standard 653 (Tank Inspection, Repair, Alteration, and Reconstruction) specifies that in no case shall the thickness of the tank shell be allowed to fall below 0.1 inches.

**Drum Washer and Wet Dumpster Units**

The ultrasonic thickness measurements were made using a StressTel T-Mike E and StressTel Probe (0.500", 5.0 MHz). The instrument was calibrated to a test block prior to implementing thickness measurements. Paint thickness measurements were taken using a PosiTest FM measuring device. The locations of the thickness measurements are shown on a schematic in the field notes (Attachment C). TriHydro understands the March 2001 drum washer and wet dumpster measurements will be used to establish baseline metal thicknesses for subsequent monitoring and assessment of potential corrosion.

Thickness measurements were taken at 7 sidewall locations and 3 locations on the upper splash plate of the wet dumpster. Thickness measurements were made at 10 sidewall locations and 4 locations on the upper splash plate of the drum washer.

The sidewall thickness (metal plus paint) measurements ranged from 0.082 to 0.092 inches for the wet dumpster and from 0.071 to 0.094 inches for the drum washer. The upper splash plate thickness (metal plus paint) measurements ranged from 0.089 to 0.094 inches for the wet dumpster and from 0.072 to 0.077 inches for the drum washer.
Due to a continuous paint coating on the wet dumpster and drum washer, there were no locations where a bare metal thickness measurement could be obtained from the sidewalls or upper splash plate. The paint thickness measurements ranged from 4 to 6 mils (0.004 to 0.006 inches) for the wet dumpster and from 1.5 to 2 mils (0.0015 to 0.002 inches) for the drum washer.

Based on the sidewall, upper splash plate, and paint measurements, the minimum bare metal thickness measurement on the upper splash plate was 0.083 inches for the wet dumpster and 0.070 inches for the drum washer. The minimum bare metal thickness measured on the sidewalls was 0.076 inches for the wet dumpster and 0.069 inches for the drum washer.

Results of Visual Inspection

A visual inspection was conducted to evaluate if there was any evidence of leaks from the spent solvent tank, drum washer, wet dumpster and associated ancillary equipment (piping, valves, pans and pumps). The inspection was also conducted to document the condition of the coating/sealant on the secondary containment area of the tank farm and the condition of the steel containment pan under the return/fill station.

The spent solvent tank had been cleaned the day before the inspection and was empty at the time of the inspection. The drum washer and wet dumpster were approximately half full during the inspection. The results of the inspections are documented in the field notes in Attachment C. The following observations were noted during the inspection.

Spent Solvent Tank System

The epoxy sealant on the secondary containment appeared to be in good condition. The gray surface coating had been patched at several locations. Several small cracks and chip-outs were observed in the surface coating of the secondary containment area during this inspection. None of the cracks or chip-outs appeared to extend into the underlying sealant or concrete. Overall, the secondary containment area appeared to be in a condition satisfactory to contain leaks or spills.

Minor chip-outs were observed in the tank exterior paint coating and around the top hatch. In general, the exterior paint coating on the tank appeared to be in good condition. Minor surface corrosion was observed at the paint chip-outs. There was no evidence of settlement observed along the tank bottom, support skirt, or concrete slab. During this inspection, there was no evidence of staining observed around the secondary containment area, tank, or piping that may have resulted from leakage. The insulation jacketing on the tank appeared to be in relatively good condition.

Return/Fill Station

There was no visual evidence of leaks from the components (pump, valves, dumpster/container washer unit and containment pans) or piping of the return/fill station. The exterior surfaces and welds of the drum washer and wet dumpster appeared to be in good condition. The exterior paint coating on the drum washer and wet dumpster appeared to be in relatively good condition.
The secondary containment pans of the return/fill station appeared to be in satisfactory condition, including the paint covering the interior containment pans. Evidence of minor incidental drippage from the routine dumping and filling operations was present in the secondary containment pans; however, no free liquids indicating a leak were observed during this inspection. No evidence of free liquids or staining was observed on the concrete around the perimeter of the return/fill station containment pans.

**40 CFR 264 Subpart CC Inspection**

In general, 40 CFR 264.1088 (Subpart CC) requires that the tank cover be visually inspected to confirm that all closure devices are in good condition and are closed with no visible gaps, holes, cracks, or other open spaces into the interior of the tank. The top of the tank, vent, and hatch were visually inspected from a manbasket lifted by a crane. The top of the tank and capped/sealed openings appeared to be in good condition. The surficial weathering was observed around the edges of the gasket beneath the manway cover; but no noticeable odors were observed at the time of the inspection. Therefore, the full thickness of the gasket should be intact.

**Conclusions of Integrity Assessment**

Based on the results of the March 6, 2001 assessment, the spent solvent tank system and ancillary equipment appears intact and of sound integrity. No evidence of leaks from the tank system, wet dumpster and drum washer was observed during the inspection. The secondary containment around the tank and return/fill station appeared to be competent and capable of retaining leaks/spills.

S-K should continue to inspect the surficial coatings/sealants on the secondary containment areas/pans, tanks, dumpster, and drum washer on a regular basis. Observed cracks or chip-outs in the coatings/sealants should be repaired/patched, as necessary. S-K may also consider further inspection of the gasket seal under the manway cover on top of the spent solvent tank during future monitoring. If cracks are observed to extend through the width of the gasket, S-K should replace the gasket.

A summary log of the March 6, 2001 inspection is presented as Table 1. A list of references for the inspection is presented as Table 2. The inspection field notes are presented in Attachment C.

If you have any questions regarding this assessment or the recommendations provided above, please feel free to call us at (307) 745-7474.
Certification

I, Jack Bedessem, have directed the assessment described in this letter report. My duties included scoping the assessment with field personnel, reviewing the results, and overseeing the preparation of this letter report.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Sincerely,
TRIHYDRO CORPORATION

Jack Bedessem, P.E.
Idaho Professional Engineer
Registration No. 7119

363-001

Attachments
Table 1. Spent Solvent Aboveground Storage Tank Inspection Log, Safety-Kleen Systems, Inc. Service Center, Boise, Idaho.

<table>
<thead>
<tr>
<th>Date and time of inspection:</th>
<th>March 6, 2001: 11:00 am to 4:30 pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of inspectors:</td>
<td>Jeremy Sell, TriHydro Corporation (363-001)</td>
</tr>
<tr>
<td>Type of Inspection:</td>
<td>External - spent solvent tank</td>
</tr>
<tr>
<td>Code/Year of construction/Type:</td>
<td>UL 142/1993/Vertical tank on steel skirt bolted to concrete pad</td>
</tr>
<tr>
<td>Maximum/Operating capacity:</td>
<td>12,000 gal max./max. operating cap. 10,800 gal.</td>
</tr>
<tr>
<td>Materials:</td>
<td>Carbon steel shell with paint coating</td>
</tr>
<tr>
<td>Roof conditions:</td>
<td>Appeared satisfactory.</td>
</tr>
<tr>
<td>Shell conditions:</td>
<td>Appeared satisfactory.</td>
</tr>
<tr>
<td>Bottom condition:</td>
<td>Appeared satisfactory.</td>
</tr>
<tr>
<td>Jacket condition:</td>
<td>Appeared satisfactory.</td>
</tr>
<tr>
<td>Foundation type/Condition:</td>
<td>Steel skirt bolted to concrete pad/appeared satisfactory</td>
</tr>
<tr>
<td>Internal structure condition:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Weld/Flange joint condition:</td>
<td>Joints at ports and piping appeared satisfactory.</td>
</tr>
<tr>
<td>Nozzle condition:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Lining/Coating condition:</td>
<td>Appeared satisfactory. Minor surface cracks detected in sealant.</td>
</tr>
<tr>
<td>Insulation condition:</td>
<td>Appeared satisfactory.</td>
</tr>
<tr>
<td>Level indicator:</td>
<td>Appeared functional.</td>
</tr>
<tr>
<td>High level alarm:</td>
<td>Tested. Functioning properly.</td>
</tr>
<tr>
<td>Safety/Pressure valve condition:</td>
<td>Appeared satisfactory</td>
</tr>
<tr>
<td>Signs of cracks:</td>
<td>None observed</td>
</tr>
<tr>
<td>Signs of leakage:</td>
<td>No evidence of leakage from tank or piping</td>
</tr>
<tr>
<td>Signs of corrosion:</td>
<td>Minor surface corrosion in paint chip-outs.</td>
</tr>
<tr>
<td>Signs of erosion:</td>
<td>None observed</td>
</tr>
<tr>
<td>Ultrasonic Tank Thickness Measurements</td>
<td>Refer to Attachment C</td>
</tr>
<tr>
<td>Operating conditions:</td>
<td>Ambient temperature and pressure</td>
</tr>
<tr>
<td>Reference inspection records:</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Table 2. List of References, Spent Solvent Tank Integrity Assessment, Safety-Kleen Systems, Inc. Service Center, Boise, Idaho.


November 1995, API Standard 575, Inspection of Atmospheric and Low-Pressure Storage Tanks.

SITE MAP, S-K SERVICE CENTER
BOISE, ID
Photo 1: Spent solvent tank system and secondary containment area

Photo 2: Influent piping to spent solvent tank from return/fill station
Photo 3: Top hatch (gasket) of spent solvent tank

Photo 4: Crack in the secondary containment coating
0930  PICKED UP EQUIPMENT AND WENT TO SITE

1000  ARRIVED ON SITE - MET WITH DAN FINNEY. JOE HARRELL WAS NOT IN. SHOOK ME SIT AND EXPLAINED THAT THE TANKS WERE ALL INSTALLED WHEN THEY MOVED TO THIS CURRENT LOCATION. EXPLAINED THAT THE COATING ON THE CONTAINMENT AREA WAS ALSO PUT ON (IN FULL) WHEN THE SERVICE CENTER OPENED AND THAT CRACKS HAVE BEEN SERVED WHEN THEY HAVE BEEN FOUND. HE TESTED ALL THREE HIGH LEVEL ALARMS. ALL OPERATED CORRECTLY.

1030  INSPECTION OF TANKS AND PIPING

- NO EVIDENCE OF STAINING AROUND TANKS, VALVES, MANNLAYS, PIPING OR TANKER CONNECTION BOX.
- PAINT ON TANKS IN GOOD CONDITION. -MINOR SCRATChES/CHIPPETS.
- NO EVIDENCE OF SETTLING AT THE BOTTOM OF TANKS.
- TANKS ARE SUPPORTED WITH STEEL SLEEVES. STEEL SLEEVE HAS CONCRETE AROUND .75" AND BOLTED DOORS OVER ACCESS HOCUS.
- THE SECONDARY CONTAINMENT AREA IS COATED WITH BLACK EPOXY TYPE SEALANT - COATING COVERS BOTTOM OF CONTAINMENT AREA AND SIDWALLS. MINOR SURFACE CRACKS WERE DETECTED IN THE SEALANT.

1050  CALIBRATED TANK THICKNESS TESTING EQUIPMENT

STRESSTEC TAKING DIGITAL TEST FOR INSTRUMENT USED FOR PAINT THICKNESS
VERIFIED CALIBRATION WITH 0.270" TEST BLOCK

- WEATHER - CLEAR ~ 60° F

1100  CRANE ARRIVED - CONDUCTED MEASUREMENTS UNTIL ~ 1400

TANK INFORMATION

- TANK 1 = SPENT SOLVENT TANK = 12,000 gal, max 10,800 gal
  INSULATION UP TO ~ 10°
- TANK 2 = CLEAN SILENT = 12,000 gal, max 10,800 gal

TANK 1 & 2 MADE BY: TOPKAN TANK & MFG.
2869 S. LIBERTY
ROSE, ID 83705
TANK 3 - CLEAN SOLVENT = 12,000 gal; max 11,400 gal
TANK 3 MADE BY: ACE TANK & EQUIPMENT
SEATTLE, WA

INSTALL 1998

LIQUID LEVEL AT TIME OF MEASUREMENT

TANK 2 = 99.61''
NOTE: THE TANK WAS CLEANED LAST NIGHT AND THE MANWAY ON THE SIDE
OF THE TANK WAS REMOVED AND
TANK WAS EMPTY. DAN SUGGESTED
THAT POSSIBLY IF FLUID WAS ADDED TO
TANK THAT IT WOULD GO TO 0
AND THEN BACK UP.

TANK 2 = 12.10''
TANK 3 = 12.50''

TOP OF SPENT SOLVENT TANK

- MANWAY HATCH: WAS LONGBOLTS - GASKET APPEARED TO BE
CRACKED IN PLACES. NO NOTicable DRIPS WERE DETECTED
AROUND THE MANWAY. THE VENT APPEARED TO BE IN
WORKING CONDITION.

NOTE: I NOTICED THAT SOME PIECES OF PRODUCT TANK #2 GASKET
FROM TOP MANWAY COVER WERE IN THE SECONDARY CONTAINMENT AREA. DURING
INSTALLATION, I NOTICED THAT LONGBOLTS APPEARED AS IF THE MANWAY HAD LIFTED. WHEN USING CRANE,
S-K PERSONNEL INDICATED THAT WHEN FILLING THE
TANK LAST NIGHT, THE MANWAY HAD LIFTED. I NOTIFIED
DAN FINNEY OF THIS AND HE WAS GOING TO LET JOE
KNOW.

RETURN/ FILL STATION

CHECKED PIPING AND STEEL CONTAINMENT PANS FOR SIGNS OF
LEAKAGE. NO SIGNS OF LEAKAGE DETECTED. SOME PRODUCT NOTICED
IN PAN BUT APPEARED TO BE DUE TO INCIDENTAL SPILLAGE.

THICKNESS MEASUREMENTS WERE MADE ON THE DRUM WASHER
AND WET DUMPSSTER

LEFT SITE AT 1645.
WET DUMPSTER - (BACK OF TANK AND BOTTOM NOT ACCESSIBLE)

DRUM WASHER (BACK, LEFT, AND BOTTOM SIDE OF TANK ARE NOT ACCESSIBLE)
SPENT SOLVENT TANK (TANK A)

**NORTH SIDE**
- 4 mils
- 4 mils
- INSULATION

**SOUTH SIDE**
- 5 mils
- 5 mils
- INSULATION

**EAST SIDE**
- 4 mils
- 4 mils
- INSULATION

**WEST SIDE**
- 6 mils
- 4 mils
- INSULATION

**MEASUREMENTS ON BOTTOM OF TANK WERE MADE THROUGH ACCESS DOORS**

- .271
- .264
- .260
Exhibit D2-20

Questec Design Assessment
DESIGN ASSESSMENT
USED MINERAL SPIRITS AND DRUM WASHER
STORAGE TANK SYSTEM
SAFETY-KLEEN CORPORATION BRANCH
BOISE, IDAHO

Facility No. 1-183-08

Prepared by:
QuesTec Corporation
4812 Santana Circle
Columbia, Missouri 65203
Project No. 92105.2

January 15, 1993
## DESIGN ASSESSMENT

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TANK SYSTEM CERTIFICATION

I have supervised the design assessment dated January 15, 1993 of the used mineral spirits and drumwasher storage tank system at the Safety-Kleen Corporation facility in Boise, Idaho. The EPA ID Number for the facility is IDD981770498.

With regard to this duty, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Rick A. Bartelt
Registered Professional Engineer
Idaho Temporary Registration Number 93-2833

QuesTec Corporation
4812 Santana Circle
Columbia, Missouri 65203
This report documents the design assessment for a used mineral spirits and drumwasher storage tank system at the Safety-Kleen facility in Boise, Idaho. The assessment was conducted to address the requirements of 40 CFR 264.192, 40 CFR 264.193, and the corresponding requirements of the Idaho Rules, Regulations and Standards for Hazardous Waste, Title 1, Chapter 5, 01.05008.

**SYSTEM DESCRIPTION**

Liquid used mineral spirits is picked up from offsite generators in 16 and 30 gallon drums and brought to Safety-Kleen Service Center where it will be transferred into one of two hooded drumwashers. From the drumwashers, it is pumped into a steel aboveground vertical storage tank through a steel piping arrangement. Periodically, the used mineral spirits will be transferred from this storage tank to a large tanker truck by which it is taken to a recycling facility. The sludge, solids and trash that accumulate in the tank are removed through the manway by a vacuum truck and taken offsite for reclamation.

The drumwasher units are manufactured specifically for Safety-Kleen by Southwest Industrial Constructors. The units utilize the used mineral spirits to clean the returned drums. Drawings for the unit are in Appendix A.

The drumwashers are located in the Return/Fill building which has a series of interconnected metal pans for containment.

The storage tank will be a vertical cylinder with a shallow cone roof, and a flange and dish bottom. The tank is supported by a 24 inch high skirt with four portholes which allow for tank bottom leak inspections.

The tank will be located in a steel reinforced concrete diked containment area. The tank is vented to the atmosphere, and it is equipped with a gauge for daily liquid level readings and a liquid level alarm which provides both visual and audio alerts when the liquid level reaches 95% of the permitted capacity.

For purpose of this assessment, the tank system shall be defined as the tank, the piping from the tank to the truck access connection, the piping from the drumwashers in the return/fill dock to the tank, the drumwashers, the dike which serves as secondary containment for the tank, and the metal pans which serve as secondary containment for the Return/Fill Area.

A general location map, a site plan, a tank farm plan, and a system schematic can be found in the exhibit section, exhibits 1, 2, 3 and 4 respectively.
DESIGN ASSESSMENT

1. Design Standards - [40 CFR 264.192(a)(1)]

The design standards according to which the tank and ancillary equipment are to be constructed include the construction drawings provided by Safety-Kleen. See appendix A. The tank system design has been evaluated for compliance with the following codes:

- American Concrete Institute, ACI 318-89, Building Code Requirement for Reinforced Concrete.
- American Society of Civil Engineers ASCE Standard 7-88.
- American Petroleum Institute, API 2000, Venting Atmospheric and Low Pressure Storage Tanks.

Design calculations and a point by point evaluation of the system with respect to the applicable codes are found in Appendix B.

The conclusion of the design review is that the tank system essentially conforms to the requirements of the applicable codes provided the tank system is built according to the drawings and typical Safety-Kleen construction practices. Items not specifically addressed in the drawings, but which are typical Safety-Kleen construction practices include the following. The tank and pipe are to be painted with three coats of paint. The tank is to be UL labelled and built to a weak shell to roof seam design. The drum washer unit is to be listed and approved according to the requirements of UFC 79.803 (c). The fittings and flanges are to meet ANSI B31.3 requirements. The valves are to be either cast steel or ductile iron. The tank is to be labelled identifying the material being stored.

2. Hazardous characteristics of the waste - [40 CFR 264.192(a)(2)]

The clean mineral spirits solvent is labeled under the trade-name of "Safety-Kleen 105 Solvent", so named because the flash point of the solvent is a minimum of 105 F. Chemically, the solvent consists of a petroleum hydrocarbon fraction with boiling points between 310 F and 400 F. Impurities such as light aromatic hydrocarbons (LAHC) and chlorinated hydrocarbons usually constitute less than one percent of the total volume. The used mineral spirits solvent consists of mineral spirits solvent and water, solids, oil and grease.

The waste handling method at the Safety-Kleen Service Centers results in three types of mineral spirits waste, spent mineral solvent, bottom sediment in the tank and dumpster sediment.
The primary hazardous characteristic of the waste is ignitability (D001). Due to the presence of heavy metals picked up in the various cleaning operations, the solvent and sediment may exhibit the characteristic of toxicity using the toxicity characteristic leaching procedure (TCLP) (D004-D011, D018, D019, D021-D030, D032-D043).

3. Corrosion protection - [40 CFR 264.192(a)(3)]

The tank is above ground and does not have any direct contact with soil, therefore, no cathodic protection is required typically. Safety-Kleen design drawings specify that the tank be protected by a paint system which calls for the exterior tank surface to be prepared in accordance with the Steel Structure Painting Code SSPC-SP6 then painted with a primer coat of Sherwin Williams Zinc Clad III, and an intermediate and finish coat of Sherwin Williams DTM acrylic gloss. The design documents do not specify a paint system for the pipe. However, typical Safety-Kleen construction practice is to paint the pipe with a primer, intermediate, and finish coats of paint. The system components do not have any internal corrosion protection. Through research and experience, Safety-Kleen has determined that used mineral spirits is compatible with the typical materials of construction used for the tank systems. Therefore, the used mineral spirits stored in the tank system should not be corrosive to the steel tank and piping.

4. Effects of vehicular traffic - [40 CFR 264.192(a)(4)]

This is an above ground tank system and consequently will not be affected by vehicular traffic.

5. Tank Foundation - [40 CFR 264.192(a)(5)]

The tank foundation is designed to support the gravity load of full tanks plus wind or earthquake loads. See calculations in Appendix B.

The tank is aboveground and is not located in the 100 year flood plain. See telephone log of conversation with the City and the City's FIRM (Flood Insurance Rate Map) Panel 160002 0017C dated April 17, 1984.

According to the City Senior Plans Examiner in Boise, Idaho, the generally accepted depth for frost penetration is 24 inches. However, the City recommends 30" for foundation depth. The tank farm design as shown in Section B, Safety-Kleen Drawing No. 5001, dated August 29, 1991 (see Appendix A) places the foundation (at the edge of the tank farm) 3'-2" below "finished" grade, thereby providing adequate frost penetration depth.

Based on our review of the design document and available information, it appears that the tank foundation is adequately designed to avoid major distress or loss of structural integrity.
6. Ancillary equipment - [40 CFR 264.192(e)]

The piping is to be supported at a minimum of every eight feet ensuring its protection against excessive stress due to settlement, vibration, expansion or contraction. All of the piping is located inside the reinforced concrete containment dike and the Return/Fill shelter, or between the two, and is thus protected from physical damage.

Most of the pipe has short runs with ends that are not fixed which allows for free expansion and contraction. The pipe with a longer run has enough changes of direction to allow for expansion and contraction.

**DRUMWASHER ASSESSMENT**

Each drumwasher unit has a 162 gallon capacity and is supported on a steel rectangular box. The drum washer is vented to the atmosphere which prevents the unit from becoming over pressurized. The liquid level is continuously monitored while the system is in operation. A float switch engages the pump to empty the drumwasher. The drumwasher unit is located in a metal shelter with 6" deep metal pans for containment.

**SECONDARY CONTAINMENT SYSTEM ASSESSMENT**

1. Required date - [40 CFR 264.193(a)(1)]

Since the tank system will be new, secondary containment is required prior to it being put into service.

2. Compatibility of the construction materials with used mineral spirits - [40 CFR 264.193(c)(1)]

The used mineral spirits solvent consists of mineral spirits solvent and water, solids, oil and grease. The primary hazardous characteristic of the waste is ignitability. Safety-Kleen’s extensive experience storing this material has proven that the materials of construction which consist primarily of carbon steel, concrete, and epoxy coating are compatible with used mineral spirits. See Appendix C for additional documentation.

3. Strength and Foundation - [40 CFR 264.193(c)(1), (2)]

The calculations in Appendix B show that the floor slab should have sufficient strength to support the weight of the full tanks.

The calculations in Appendix B show that the dike walls appear to be capable of withstanding the hydrostatic pressure from the dike being full of water.

The secondary containment system is above ground and should not be affected by vehicular traffic.
In the return/fill shelter, the weight from the grating, metal pans and the ancillary equipment exerts a minimal load on the supporting concrete slab. Safety-Kleen’s experience with similar installations verify that the concrete slab and foundation have sufficient strength.

4. Leak detection - [40 CFR 264.193(c)(3)]

The tank system and the secondary containment system are visually inspected on a daily basis for the presence of any release of hazardous waste or accumulated liquid in the secondary containment.

5. Liquid removal - [40 CFR 264.193(c)(4)]

The liquid is removed from the secondary containment with a portable pump or with a vacuum truck.

6. Requirements for a vault system - [40 CFR 264.193(e)(2)]

(i) The secondary containment system has sufficient design capacity to contain 100 percent of the capacity of the largest tank and the precipitation from the 25-year, 24-hour rainfall. See Appendix B. The dike walls prevent run-on of precipitation into the secondary containment system.

(ii) The only joint in the containment structure is in the wall about 8 inches from the bottom of the wall. The joint is to be covered with 1/4" to 1/2" of chemically resistant sealant.

(iii) The interior of the concrete vault is to be lined with an epoxy paint as described in Appendix C to prevent migration of the waste into the concrete.

(iv) The dike area has walls that are only three feet high which allows for sufficient natural ventilation to protect against the formation of and ignition of vapors within the vault.

(v) The tank farm is not subject to hydrostatic pressure, therefore it does not need to be provided with an exterior moisture barrier or be otherwise designed or operated to prevent migration of moisture into the tank farm.

7. Ancillary equipment - [40 CFR 264.193(f)]

Most piping is within or above the secondary containment structure. The piping outside the secondary containment is welded.
CONCLUSION OF ASSESSMENT

There are a few items that were not specifically addressed in the design drawings, but are typical Safety-Kleen construction practices. These items are listed in the Design Standards section of this report. Provided the construction is performed according to standard Safety-Kleen construction practice and the design drawings and other information contained in this report, the used mineral spirits and drumwasher tank system at the Safety-Kleen Branch in Boise, Idaho appears to be adequately designed including structural strength and compatibility with the wastes being stored. The secondary containment appears to be designed to prevent migration of wastes or accumulated liquid out of the system. It appears that the tank system will be in compliance with 40 CFR 264.192, 264.193.
# EXHIBITS

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NOTE: PART B APPLICATION REFLECTS ONLY LOTS 1 & 2. LOT 3 WAS ADDED TO PROVIDE ADDITIONAL SET BACK & NON-REGULATED ACTIVITIES.

TOOTHMAN GROTON ENGINEERING WILL PROVIDE CORRECT SITE PLAN FOR SUBMITAL.
APPENDIX A

Design Documentation
APPENDIX A

Design Documentation

The following drawings provided by Safety-Kleen describing the used mineral spirits and drum washer tank system design, and other design data, were used in the design assessment.

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NOTE: PART B APPLICATION REFLECTS ONLY LOTS 1 & 2. LOT 3 WAS ADDED TO PROVIDE ADDITIONAL SET BACK & NON-REGULATED ACTIVITIES.

TOOTHMAN OROTON ENGINEERING WILL PROVIDE CORRECT SITE PLAN FOR SUBMITTAL.
CONCRETE TANKFARM PLAN
2" FLANGE DETAIL

ANCHOR BOLT INSTALLATION AID USAGE DETAIL

SEISMIC ANCHOR BOLT INSTALLATION AID

GENERAL NOTES

TANK PLAN AND ELEVATION

ANCHOR BOLT CHAIR DETAIL

SAFETY-KEESE CORP.

PRELIMINARY

13,000 GALLON, 15'-5" FLANGED AND DENTED BOTTOM VERTICAL STORAGE TANK WITH FLANGED FITTINGS INSTALLATION DETAILS
PUMPS AND EQUIPMENT DIVISION
ITT CORPORATION
MIDLAND PARK, NEW JERSEY 07432 • (201) 444-6900
LONGVIEW, TEXAS 75601 • (214) 753-7211

MODEL
1½HR49EC & 3CR18EC
SOLIDS HANDLING
SELF-PRIMING CENTRIFUGAL PUMPS
CLOSE-COUPLED

FEATURES
Pump and motor are combined in a single, compact, complete unit. Easy to install and ready to operate.

GENERAL SPECIFICATIONS
Cast iron fitted construction with heavy duty two vane impeller and replaceable volute. (Removable wear plate offered on Model 3CR18EC only as standard equipment.) Pre-loaded suction check valve. Easy-off suction elbow and cover for quick access to all working parts of pump. Stainless self-lubricating mechanical shaft seal. 1½" NPT wing type fill plug. Units offered with or without baseplate.

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<td>1-1/2&quot; N.P.T. (3.8 cm)</td>
<td>Mech. Seal</td>
<td>1 hp–1-1/2 hp 3450 RPM</td>
<td>25 Ft. 7.6 m</td>
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<tr>
<td>3CR18EC</td>
<td>1-1/2&quot; Dia. (3.8 cm)</td>
<td>3&quot; N.P.T. (7.6 cm)</td>
<td>Mech. Seal</td>
<td>3 hp–5 hp 1750 RPM</td>
<td>23 Ft. 7.0 m</td>
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*Note: Based on nominal pipe sizes with 5 ft. of horizontal length and 0 discharge head.
PERFORMANCE CURVES

The performance curves shown in this manual and other published literature were taken from actual tests of standard production pumps, and reflect an average performance of the pumps indicated.

**ITT MARLOW**

**MODEL:** HHR-49EC  **LIQUID:** SP GR 1.0
**SIZE:** 1½ (3.8cm)  **MOTOR:** ELEC 3450 RPM
**IMPDIA.:** 3½ (9.2cm)  **DATE:** 2.5.64

*Denotes dynamic suction lift beyond which cavitation begins to occur.

---

**MAXIMUM PRIMING CAPABILITY IS 25' (7.6m), BASED ON MINIMUM LENGTH OF 1-1/2" (3.8cm) SUCTION HOSE, 60°F (20°C) WATER AT SEA LEVEL.*

---

---

**ITT MARLOW**

**MODEL:** 3CRI-18EC  **LIQUID:** SP GR 1.0
**SIZE:** 3 (7.6cm)  **MOTOR:** ELEC 1750 RPM
**IMPDIA.:** 7¼ (18.4cm)  **DATE:** 2.11.64

*Denotes dynamic suction lift beyond which cavitation begins to occur.

---

---
DIMENSIONS:
THESE DIMENSIONS NOT TO BE USED FOR CONSTRUCTION PURPOSES WITHOUT FORMAL FACTORY APPROVAL.

PUMP UNITS with EXPLOSION PROOF MOTORS
1½HR49EC

*DIMENSIONS MAY VARY DEPENDING ON MFR MFG.

All dimensions shown in inches
TELEPHONE LOG

PROJECT NAME: Boise, ID

PROJECT #: 92105.2

FROM: Ty Johnsen
COMPANY: QuesTec

TO: Bob Garrison
COMPANY: City Of Boise, ID

SR. Plans Examiner

PHONE #: (208)-384-3801

DATE: 1-11-93
TIME: 4:45pm

RE: Design Information for Safety-Kleen Corporation at Boise, ID

DISCUSSION:

Applicable Codes: 1991 UBC, and whichever is the most restrictive between 1991 UFC, ch.79 and NFPA 30

Design Wind Speed: 70 mph

Frost Depth: 24" (But city recommends foundations be built down to 30")

Seismic Zone: 2B

Flood Plain: The S-K site at 6334 Supply Way is located on a 2nd bench, which is 100'-150' above the river bed - well above the 100 yr. flood plain.

Exposure Category: C

Soil Conditions: Mostly sandy gravel with some clay. If soil bearing pressures over 2,000psf are needed then the city requires a soils report

Flood Zone: C
KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
Zone Designations*

100-Year Flood Boundary
500-Year Flood Boundary
Base Flood Elevation Line
With Elevation In Feet**
Base Flood Elevation in Feet
Where Uniform Within Zone**
Elevation Reference Mark
Zone D Boundary
River Mile

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE                   EXPLANATION
A Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; depths are shown, or areas of 100-year alluvial fan flooding, depths and velocities shown, but no flood hazard factors are determined.
AH Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
AT-A30 Areas of 100-year flood; base flood elevations and flood hazard factors determined.
AG Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B Areas between limits of the 100-year flood and 500-
year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C Areas of minimal flooding. (No shading)
D Areas of undetermined, but possible, flood hazards.
V Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30 Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
JUNE 21, 1974
APPENDIX B

Design Review Documents
## APPENDIX B

**Design Review Documents**

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**TANK FARM DATA / GRAVITY LOADS**

- **Volume (Tank Storage Volume)**: 12,000 gal
- **D (Tank Diameter)**: 10.50 ft
- **H1 (Tank Height)**: 15.00 ft
- **H (Dike Wall Height)**: 3.00 ft
- **H2 (Pad Height)**: 0.33 ft
- **H3 (Support Height)**: 2.00 ft
- **t1 (Concrete Slab Thickness)**: 12 in
- **t2 (Agg. Base Thickness)**: 6 in
- **t3 (Tank Shell Thickness)**: 0.25 in
- **G (Specific Gravity of Stored Liquid)**: 0.90

**Vertical Storage Tank**

- **W1 (WT. of Empty Tank)**:
  \[
  W_1 = \left( \frac{\pi D}{8} \right) \left( H_1 + t_2 + \frac{5}{8} \right) (\pi D^2 / 4) \left( H_2 / 12 \right) (490 \text{ lb/ft}^3) (1.1)
  \]
  \[= 9355 \text{ lb} \]

- **W2 (WT. of Stored Liquid)**:
  \[
  W_2 = (G) \left( 62.4 \text{ lb/ft}^3 \right) \left( \frac{\text{Vol}}{7.48 \text{ gal/ft}^3} \right)
  \]
  \[= 98.096 \text{ lb} \]

- **W3 (WT. of Full Tank)**:
  \[W_3 = W_1 + W_2\]
  \[= 99449 \text{ lb} \]

**Notes:**
1. For tank farm info, refer to Safety-Kleen SWG no 5001, 5201, 5312.
2. For analysis of stored liquid see Safety-Kleen TLP (Appendix C).
**Basic Wind Speed (Fig. 23-1, Ref. 1)**

1. Exposure (Section 23.12, Ref. 1)
2. See telephone log or conv. w/ City of Boise, ID. in Appendix A.
3. Ht. Above Ground
4. Importance Factor, Table 23-1, Ref. 1
5. Wind Stagnation Factor, Pressure, Table 23-F, Ref. 1
6. Pressure Coefficient, Table 23-H, Ref. 1

\[ W_1 = \frac{20 \times 30 \, \text{mph}}{2.33} \]

\[ C_c (\text{Combined Ht., Exposure, Cnst. Factor, Table 23-G, Ref. 1}) = 1.13 \]

\[ A_f = C_d (\text{Projected Area Normal to Wind}) = 182 \, \text{sq ft} \]

\[ P = C_c g_s I \text{ (Design Wind Pressure, Sect. 2310, Ref. 1)} = 13.1 \, \text{psf} \]

\[ F = P(A_f) \text{ (Wind Force)} = 2544 \, \text{ft-lb} \]
OVERTURNING

\[ M_0 \text{ (overturning moment)} = (F)(\text{moment arm}) = F\left[\frac{h_1}{2} + (L-h_1)\right] \]

\[ = (2.384)(17.33/2) + (3.00-0.33)\]  

\[ M_R \text{ (resisting moment)} = (W_1)(\text{moment arm}) = W_1(D/2) = (9.353)(10.5/2) = 49.103 \text{ ft}-\text{lb} \]

\[ \frac{M_0}{M_R} \leq 0.67 \text{? (Section 8.3.1, Ref 1)} \]

Wind anchorage required?

SLIDING

\[ f \text{ (coeff. of sliding friction, Ref. 2)} \]

\[ P_1 \text{ (resisting force)} = \frac{9.353}{1.30} \]

\[ W_1 \times f \]

\[ \frac{F}{P_1} \leq 1.0 \text{? (Factor of safety = 1.0)} \]

Wind anchorage required?

Estimated value for sliding surfaces

Steel on concrete

\[ f \text{ (coeff. of sliding friction, Ref. 2)} \]

\[ P_1 \text{ (resisting force)} = \frac{9.353}{1.30} \]

\[ W_1 \times f \]

\[ \frac{F}{P_1} \leq 1.0 \text{? (Factor of safety = 1.0)} \]

Wind anchorage required?
VERTICAL STORAGE TANK
F&D BOTTOM

EARTHQUAKE FORCE

Seismic Zone (Fig. 23-2)

4 SEE TELEPHONE LOG OF CONVERSATION W/ CITY OF BOISE, ID. (APPENDIX A)

\[ k_{3} = k_{dp} \]

\[ k_{dp} = Z I C_p k_{dp} = 0.20(1.5)(0.75)(99,449) = 22,376 \text{ lb} \]

REFERENCES

1. UNIFORM BUILDING CODE, 1991
2. HANNS'S STD. HANDBOOK FOR MECHANICAL ENGINEERS, 8TH ED., PG. 3-24 & 3-26
3. TANK fact DATA/Gravity LOADS (APPENDIX B)
4. SAFETY-KLEEN DWG. No. 0900001, 001, 2512
OVERTURNING

\[ M_o \ (\text{overturning moment}) = (V_i)(\text{moment arm}) = (V_i)(H_1+h_2)/2 \]
\[ = 22,318 \times (13+2)/2 \]
\[ M_r \ (\text{resisting moment}) = (W_3)(\text{moment arm}) = (W_3)(D/2) = (99,449)(10.5/2) = 627,167 \text{ ft-lb} \]

\[ M_o / M_r \ 0.43 \leq 0.67 \ \text{? (factor of safety = 1.5)} \]
\[ \text{YES} \]

SEISMIC ANCHORAGE REQUIRED?

SLIDING

* \( f \) (coeff. of sliding friction, ref. 2)

\[ R_1 \ (\text{resisting force}) = (W_3)(f) = (99,449)(0.30) = 29,835 \text{ lb} \]
\[ V_i / R_1 \ 0.75 \leq 1.0 \ \text{? (factor of safety = 1.0)} \]
\[ \text{YES} \]

SEISMIC ANCHORAGE REQUIRED?

* Estimated value for sliding surfaces (slope on concrete)

FOUNDATION SLAB ANALYSIS

REFERENCES
1. ACI 318-89, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE"
2. PCA REPORT ISD195.01D, "SLAB THICKNESS DESIGN FOR INDUSTRIAL FLOORS ON GRADE," 1976
3. TANK FARM DATA/GRAVITY LOADS AND EARTHQUAKE ANALYSIS, APPENDIX B.
4. SAFETY KLEEN DWG. NO. 200-00-001, 0512

DESIGN CRITERIA/LOADING.

Check loading cases for slab and subgrade induced by gravity only and by gravity + earthquake combination. Neglect weight of conc. slab and aggregate base. Increase allowable stresses by 1/3 for gravity and earthquake load combinations.

CONC. STRENGTH @ 28 DAYS \( f_c = 4,000 \) PS
REBAR GRADE \( f_y = 40 \) (Assumed PS)
SLAB REINFORCEMENT 2-\( \#4\) @ 12" C.C. AROUND PERIM. (1000 lb/sq ft)

\( W_3 \) (WT. OF FULL TANK) = 99,449 L
\( V_1 \) (EARTHQUAKE FORCE) = 22,370 L
\( M_0 \) (MOMENT @ CONC. SLAB LEVEL) = 223,700 FT-PS
\( M_1 \) (MOMENT @ SUBGRADE LEVEL) = 264,708 FT-PS
\( M_2 \) (MOMENT @ DEEPER LEVEL) = 253,570 FT-PS

* Assumed (Conservative for Supporting Soils Under Shallow Foundations)
SOIL BEARING

Assume load uniformly distributed at subgrade level.
Assume load transferred to subsoil at 1:1 slope (45°).
Neglect concrete slab bearing strength and rigidity (CONSERVATIVE).

\[ b_p (\text{WIDTH OF BASE PLATE A} \text{SSUMED}) = 0.25 \text{ F} \]
\[ d_5 (\text{BEARING WIDTH AT SUBGRADE LEVEL}) = 2(1.11t + t_2) + b_p = 2(0.33+0.105)+0.25 = 3.91 \text{ F} \]
\[ D_0 (\text{O.5 DIAMETER}) = 10.5 + 2(0.33+0.105) = 14.16 \text{ F} \]
\[ D_1 (\text{O.5 DIAMETER}) = 10.5 - 2(0.33+0.105)+0.25 = 0.84 \text{ F} \]

\[ A (\text{BEARING AREA}) = \pi (D_0 + D_1/2)(D_5) = \pi (14.16 + 6.08)/2(3.91) = 125.91 \text{ F} \]
\[ S (\text{BEARING SECTION MODULUS}) = \pi (D_0^4 - D_1^4)(32D_0) = \pi (14.16^4 - 6.08^4)/(32(14.16)) = 247.53 \text{ FT} \]
\[ f_1 (\text{SOIL BRR PRSS.}) = P/A = W_3/A = 99,449/125.91 = 790 \text{ PSI} \]
\[ f_1 = 790 \leq 911 \text{ PSI} = 2.000 \text{ ?} \quad \text{YES} \]

\[ f_2 (\text{GRVITY + EQ.}) = P/A + M/s = W_3/A + M/s = \frac{99,449}{125.91} + \frac{247.53}{247.53} = 1,779 \text{ PSI} \]
\[ f_2 = 1,779 \leq (1.35) \text{PSI} \text{allow.} = 2,000 \text{ ?} \quad \text{YES} \]

SOIL BEARING IS OK?

FOUNDATION SLAB BEARING

Assume load uniformly distributed to concrete slab level.
Neglect additional bearing capacity at wider supporting surface.
Max. pressure induced by full gravity and earthquake loading occurs at "extreme forces" of tank. (distance of the average radius of the base plate from the "neutral axis."

\[ D_0 = 10.5 \text{ FT} \quad D_1 = 10.0 \text{ FT} \]
\[ A_1 (\text{BASE PLATE AREA}) = \pi (D_0 + D_1)/2)(b_p) = \pi (10.5+10)/2)(0.25) = 8.65 \text{ FT} \]
\[ S_1 (\text{B/SECT. MOD.}) = \pi (D_0^4 - D_1^4)/(32D_1) = \pi (10.5^4 - 10^4)/[32(10)] = 20.15 \text{ FT} \]
Project No. 92105.2  Date 1/14/93
Project Title BOISE, ID.
Subject USED MINERAL SPIRITS TANK DESIGN ASSESSMENT
Designer SD  Cx By CMA Prelim  Final X

\[ f ( \text{bearing stress}) = \frac{P}{A} \pm \frac{w}{s} = \]
\[ \frac{W_s}{(A_l)(144)} + \frac{(W_d)(12)}{(S_l)(1728)} = \frac{99,444/14,000}{144} + \frac{223,700/12}{1728} = 162.9 \text{ psi} \]

\[ f_{allow (\text{allowable bearing stress})} = 0.3 \frac{f_c}{E} = \frac{(0.3)(4000)}{20} = 1200 \text{ psi} \]

\[ f = 162.9 \leq f_{allow} = 1200 \text{ ?} \]

**Foundation Slab Bearing Is OK ?**

**Foundation Slab Bending**

Assume loading uniformly distributed at aggregate base level.
Assume aggregate base well compacted.
Neglect cane slab bending strength and continuity (conservative).
Assume critical section for bending located at \& Approx. 1/4.

\[ MR (\text{allowable flexural strength}) = q \sqrt{f_c} = 0/(4,000) = 560.9 \text{ psi} \]

per ref. 2 PCL Report Pg. 2.

\[ b_n (\text{bearing width at aggregate base level}) = 2(h_1 + h_2) + b_p = \frac{2(0.33 + 1.0)}{0.32} = 2.91 \text{ ft} \]

\[ D_0 = 13.10 \text{ ft} \]

\[ D_5 = 7.34 \text{ ft} \]

\[ \frac{1}{22} (\text{bearing area}) = \frac{\pi}{2} \left( \frac{D_0 + D_5}{2} \right) = \frac{\pi}{2} (22.7 + 7.34) = 2.34 \text{ ft} \]

\[ S_2 (\text{bearing section mod.}) = \frac{\pi}{2} \left( \frac{D_0^2 - D_5^2}{2} \right) = \frac{\pi}{2} (3.14^2 - 1.17^2) = 20.32 \text{ in.} \]

\[ \beta (\text{bending moment}) = \frac{f_b \ell^2}{2} = \frac{25.3 \times 14^2}{2} = 2,245 \text{ ft-lb} \]

\[ S (\text{section modulus}) = \frac{b d^2}{6} = \frac{12(10^2)}{6} = 200 \text{ in.} \]

\[ f_b (\text{bending stress}) = \frac{12 b h_1}{S_2} = \frac{12(10)}{200} = 6.0 \text{ psi} \]

\[ f_b = 60 \leq MR = 560.9 \text{ ?} \]

**Foundation Slab Bending Is OK ?**

**NOTE:** Foundation slab shear OK by inspection.
DIKE WALL HYDROSTATIC ANALYSIS

DESIGN INFORMATION

HYDROSTATIC LOAD RESISTED BY DIKE WALL ANALYZE 1/2 WIDE CANTILEVER BEAM STA
DESIGN IN ACCORDANCE WITH ACI 318-89
ULTIMATE STRENGTH DESIGN METHOD.
MONOLITHIC CONCRETE WALL AND SLAB
FLUID IS WATER, UNIT WT. = 62.4 PSI
CALCS. TYPICALLY PEER 1/2 WIDTH OF WALL
SAFETY KLEEN REF. DWGS.

ASSUMPTIONS

VERT. WALL REINF.
HORZ. WALL REINF.
REBAR GRADE
CONC. STRENGTH @ 28 DAYS

DATA

\[ f'c = 4,000 \text{ psi} \]
\[ f_y = 40,000 \text{ psi} \]
\[ H = 3.0 \text{ ft} \]
\[ t_w = 8 \text{ in} \]

\[ \text{vert. As} = 0.31 \text{ sqin} \]
\[ \text{horiz. As} = 0.21 \text{ sqin} \]
\[ Ag = 9.0 \text{ sqin} \]

FREE BODY DIAGRAM

DESIGN PROCEDURE

CHECK BENDING AND SHEAR
STRENGTH, CHECK OTHER
ACI CODE REQUIREMENTS
**HYDROSTATIC FORCE**

\[
\text{PRESSURE} = 62.4(\text{H}) = (0.24)(3.9) = 187 \text{ PS}
\]

\[
\text{FORCE} = F_1 = \frac{1}{2} (62.4)(\text{H})^2 = \frac{1}{2}(0.24)(3.9)^2 = 281 \text{ L}
\]

**SERVICE SHEAR AND MOMENT**

\[
V_{\max} = F_1 = \frac{1}{2}(0.24)(3.9)^2 = 281 \text{ L}
\]

\[
M_{\max} = F_1 (H/3) = \frac{1}{2}(0.24)(3.9)^2(3/3) = 281 \text{ FT}
\]

**REQUIRED STRENGTH (LOAD FACTORS)**

**REF. ACI 318, SECTION 9.2**

\[
V_u = 1.7 V_{\max} = (1.7)(281) = 478 \text{ L}
\]

\[
M_u = 1.7 M_{\max} = (1.7)(281) = 478 \text{ FT}
\]

**DESIGN STRENGTH (Φ FACTORS)**

**REF. ACI 318, SECTION 9.3**

NOTE: design strength must be ≥ required strength.

1) **CHECK SHEAR**

\[
\phi V_n = \phi (V_c + V_s), \quad V_s = 0 \quad \text{(negl. steel shear strength)}
\]

\[
\phi V_n = \phi V_c = \phi 2 \sqrt{f'c} \cdot bw d
\]

\[
\phi = 0.85, \quad bw = 12'', \quad d = tw/2 = 3/2
\]

\[
\phi = 0.85\frac{2(3/2)}{12} = 4.11
\]
\[ \phi V_n = (0.85)(2)(\sqrt{4,000})(2)(8/2) = 15,161 \text{ lb} \]
\[ \phi V_n = 5,161 \geq V_n = 478 \text{ ?} \quad \text{YES} \]

Shear is OK?

Yes

2) CHECK BENDING

\[ \phi M_n = \phi A_s f_y (d - a/2), \quad \phi = 0.90 \]
\[ a = A_s f_y / 0.85 f'c b, \quad b = 12" \]
\[ a = (0.31)(40,000)/(0.85)(4,000)(12) = \quad 0.20 \text{ in} \]
\[ \phi M_n = (90)(0.31)(40,000)[4 - (2%)] = 12,900 \text{ in-lb} \]
\[ \phi M_n = 12,900 \leq M_n = 478 \text{ ?} \quad \text{YES} \]

Bending is OK?

Yes

OTHER ACI CODE REQUIREMENTS

1) MINIMUM REINFORCEMENT OF FLEXURAL Members

Ref. ACI 318, Section 10.5

\[ p_{\text{min}} = 200 / f_y = 200 / 40,000 = 0.005 \]
\[ p = A_s / b d = 0.31 / (12)(4) = 0.0068 \]
\[ P = 0.0002 \geq \rho_{\text{min}} = 0.005 \quad \text{? YES} \]

Alternatively, area of steel provided shall be at least \( \frac{1}{3} \) greater than that required by analysis.

\[ \text{As}_{\text{reqd}} = \frac{Mu(12)}{0.9f_y(d-a/2)} \]

\[ = \text{As}_{\text{reqd}}(1.33) = \]

\[ \text{As} = \quad \geq \text{As}_{\text{reqd}}(1.33) = \quad \text{? YES} \]

**MINIMUM REINF. IS OK?**

\[ \text{MINIMUM WALL REINFORCEMENT} \]

REF. ACI 318, SECTION 14.3

**FOR VERTICAL REINFORCEMENT,**

\[ \frac{\text{As}}{A_g} = 0.0032 \geq 0.015 \quad ? \quad \text{YES} \]

MAX. REINF. SPACING \( \leq 18'' \) ? \quad \text{YES}

MIN. VERT. REINF. IS OK ? \quad \text{YES}

**FOR HORIZONTAL REINFORCEMENT,**

\[ \frac{\text{As}}{A_g} = 0.0032 \geq 0.0025 \quad ? \quad \text{YES} \]

MAX. REINF. SPACING \( \leq 18'' \) ? \quad \text{YES}

MIN. HORIZONTAL REINF. IS OK ? \quad \text{YES}
SECONDARY CONTAINMENT CALCULATIONS

Pack Tank Farm    Vertical Tank(s)

![Diagram of Vertical Storage Tank](image)

**Note:** Sump and sloped concrete slab volume not included (conservative).

**U.S. Dept. of Comm. Tech. Paper No. 40**

* Assumes dish radius - tank diameter.

Formulas Used:

1. **TANK SEGMENT HT.** = \( h = H - h_1 \cdot h_2 \)

2. **DIKE CONTAINMENT VOLUME** = \( (L)(W)(H)(7.48 \text{ gal/ft}) \)

3. **PAD DISPLACEMENT VOLUME** = \( (l)(w)(h_1)(7.48 \text{ gal/ft}) \)

4. **TANK DISPLACEMENT VOLUME**
   - **dished bottom** = \( [0.333(\pi)(h^3)(3r - h^3) + \pi R^2 h](7.48 \text{ gal/ft})(\text{number of tanks}) \)
   - **flat bottom** = \( \left( \pi R^2 h \right)(7.48 \text{ gal/ft})(\text{number of tanks}) \)
   - **cone bottom** = \( [0.333(\pi)(h)(R_1^2 + R_2^2 + R_1(R_2)) + \pi R^2 h](7.48 \text{ gal/ft})(\text{number of tanks}) \)

5. **MISC. DISPLACEMENT VOLUME** (Pumps, Piping, Supports, etc.) = 2% of dike volume

6. **LOCAL RAINFALL ALLOWANCE** (25 yr./24 hr.) = \( (\text{rainfall}/12)(L)(W)(7.48 \text{ gal/ft}) \)

---

Data:

- \( L \) [inside wall length]: 45.50 ft.
- \( W \) [inside wall width]: 30.50 ft.
- \( l \) [pad length]: 40.50 ft.
- \( w \) [pad width]: 13.00 ft.
- \( R \) [tank radius]: 6.25 ft.
- \( r \) [dish radius]: 10.50 ft.
- \( H \) [inside wall height]: 2.00 ft.
- \( h_1 \) [pad height]: 2.25 ft.
- \( h_2 \) [support height]: 1.41 ft.
- \( h_3 \) [dish height]: 0.47 ft.
- **rainfall**: 2.0 in.

Tank Sizes:

- \( 12,600 \text{ gal, } 12' \text{ dia. }, F \text{ & } D \text{ Bottom} \)
- \( 12,000 \text{ gal, } 10' \text{ dia. }, F \text{ & } D \text{ Bottom} \)
SECONDARY CONTAINMENT CALCULATIONS

Calculations:

(a) DIKE CONTAINMENT VOLUME =
\[(48.50 \times 20.50 \times 3.0) \times 1.48\] gal. (+) 22,311 gal.

(b) VOLUME OF LARGEST TANK WITHIN DIKED AREA =

(-) 12,000 gal.

(c) PAD DISPLACEMENT VOLUME =
\[(48.50 \times 3.00 \times 0.33) \times 1.48\] gal. (-) 1,200 gal.

(d) TANK DISPLACEMENT VOLUME =
\[\left[\frac{1}{3} \pi (1.41)^2 (51.6 - 1.41) + \pi (6.85)^2 (0.67)\right] (1.48) \times 2\] gal. (-) 1,805 gal.

(e) MISC. DISPLACEMENT VOLUME =
\[6.02 \times 2 \times 2.311\] gal. (-) 44.6 gal.

(f) LOCAL RAINFALL ALLOWANCE =
\[\left(\frac{2}{12}\right) (48.50 \times 20.50 \times 1.48)\] gal. (-) 1,239 gal.

TOTAL EXCESS CONTAINMENT VOLUME [sum (a)-(f)]

(+ 5,521 gal.)
SWIC DRUM WASHER VOLUME CALCULATIONS

L = 4.77'
W = 2.77'
H = 1.23'
a = 0.17'
b = 3.10'

SWIC DRUM WASHER - PART #1

TOTAL VOLUME = L x W x H = 4.77' x 2.77' x 1.23' = 16.25 cu.ft.
WEDGE VOLUME = 1/2(ab)W = [(1/2)(0.17')(3.10')](2.77') = .73 cu.ft.
PART #1 VOLUME = (TOTAL VOLUME) - (WEDGE VOLUME) =
(16.25) - (.73) = 15.52 cu.ft.

(15.52 cu.ft.)(7.48 gal./cu.ft.) = 116 gal.
**SWIC DRUM WASHER VOLUME CALCULATIONS**

L = 1.67'
H = 1.67'
W = 2.77'
a = 0.25'
b = 0.75'

**SWIC DRUM WASHER - PART #2**

TOTAL VOLUME = L x W x H = 1.67' x 2.77' x 1.67' = 7.73 cu.ft.

A WEDGE VOLUME = 1/2(ah)W = \([(1/2)(0.25')(1.67')](2.77') = 0.58 \text{ cu.ft.}

B WEDGE VOLUME = 1/2(bH)L = \([(1/2)(0.75')(1.67')](1.67') = 1.05 \text{ cu.ft.}

C PYRAMID VOLUME = \[\left(\frac{(a)(b)}{3}\right)H = \left(\frac{(0.25')(0.75')}{3}\right)(1.67') = 0.10 \text{ cu.ft.}

PART #2 VOLUME = (TOTAL VOLUME) - (A - B + C) =

\(7.73 - 0.58 - 1.05 + 0.10 = 6.20 \text{ cu.ft.}\)

\(6.20 \text{ cu.ft.} \times 7.48 \text{ gal./cu.ft.} = 46 \text{ gal.}\)

TOTAL DRUM WASHER VOLUME = PART #1 + PART #2 = 116 + 46 = 162 \text{ gal.}
SECONDARY CONTAINMENT CALCULATIONS - RETURN/FILL SHELTER

SECONDARY CONTAINMENT BY METAL PANS

\[ \text{VOLUME} = (0.5)(5.0)(10.0) = 25.00 \text{ CU.FT./PAN} \]

\[ \text{CONTAINMENT CAPACITY} = 25.00 \text{ CU.FT. (6 PANS)(7.48 GAL/CU.FT.)} = 1,122 \text{ GAL.} \]

EXCESS CONTAINMENT CAPACITY = CONTAINMENT CAPACITY - VOLUME OF LARGEST CONTAINER

\[ \text{SWIC DRUM WASHER VOLUME} = 162 \text{ GAL.} \]
\[ \text{CONTAINMENT CAPACITY} = 1,122 \text{ GAL.} \]

EXCESS CONTAINMENT CAPACITY = 1,122 GAL. - 162 GAL. = 960 GAL.
NORMAL VENTING REQUIREMENTS PER NFPA 30

2-3.4.1 Atmospheric storage tanks shall be adequately vented to prevent the development of vacuum or pressure sufficient to distort the roof of a cone roof tank or exceeding the design pressure in the case of other atmospheric tanks, as a result of filling or emptying, and atmospheric temperature changes.

2-3.4.2 Normal vents shall be sized in accordance with either (1) The American Petroleum Institute Standard No. 2000, "Venting Atmospheric and Low-Pressure Storage Tanks", or (2) other accepted standard; or shall be at least as large as the filling or withdrawal connection, whichever is larger, but in no case less than 1 1/4 in. nominal inside diameter.

Response: The normal vent is 3". The largest filling or withdrawal connection is 3". Since the vent is equal in size to the largest filling or withdrawal connection, the vent is adequately sized.

NORMAL VENTING REQUIREMENTS PER UL 142

10 Vent Openings

10.2 The provision for venting shall be a manhole with cover as described in paragraph 10.5 and a vent opening for normal venting complying with the requirements in paragraph 10.8.

Response: The tank has a manhole cover constructed to lift under pressure. See emergency tank vent sizing.

10.8 Each tank provided with a manhole in accordance with paragraph 10.5 shall have a vent opening in the top of the tank for normal venting. The vent opening shall be in addition to the filling and withdrawal openings, and shall not be smaller than specified in Table 10.2.

Per Table 10.2 a tank size 10,001 to 20,000 gallons shall have a minimum vent size of 2 1/2 inches.

Response: The normal vent is 3 inch.
EMERGENCY VENTING REQUIREMENTS PER NFPA 30

2-3.5 Emergency Relief Venting for Fire Exposure for Aboveground Tanks

2-3.5.1 Except as provided in 2-3.5.2, every aboveground storage tank shall have some form of construction or device that will relieve excessive internal pressure caused by exposure fires.

2-3.5.3 In a vertical tank, the construction referred to in 2-3.5.1 may take the form of a floating roof, lifter roof, a weak roof-to-shell seam, or other approved pressure-relieving construction. The weak roof-to-shell seam shall be constructed to fail preferential to any other seam. Design methods that will provide a weak roof-to-shell seam construction are contained in API 650, Welded Steel Tanks for Oil Storage, and UL 142, Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids.

Response: Typically, the tank is built to UL 142 standards and a weak roof-to-shell seam design.

2-3.5.4 Where entire dependence for emergency relief is placed upon pressure relieving devices, the total venting capacity of both normal and emergency vents shall be enough to prevent rupture of the shell or bottom of the tank if vertical, or of the shell or heads if horizontal. The total capacity of both normal and emergency venting devices shall be not less than that derived from Table 2-8.

Response: The manhole cover is to be installed with long bolts that permit the cover to lift under internal pressure, and labeled identifying this function.

EMERGENCY VENTING REQUIREMENTS PER UL 142

10 Vent Openings

10.2 The provision for venting shall be a manhole with cover as described in paragraph 10.5 and a vent opening for normal venting complying with the requirements in paragraph 10.8.

10.5 A manhole in the top of a tank, with a cover constructed so as to lift under internal pressure such that the pressure in the tank cannot exceed 2.5 psi may serve for emergency venting.

Response: The manhole cover is to be installed with long bolts and nuts backed off to allow the cover to lift under pressure, and labeled identifying this function.
NFPA 30 1990 Edition
Tank System Evaluation

Following is a point by point evaluation of the tank system requirements of NFPA 30 Chapter 2 - Tank Storage. The applicable paragraphs are referenced with a brief description of the requirements followed by a response.

2-2.1 Tank designed and built in accordance with recognized good engineering standards.

Response: The tank should bear a UL 142 label indicating that it was built to that standard.

2-2.1 Tank shall be of steel or approved noncombustible material.


2-2.1(a) The material of tank construction shall be compatible with the liquid to be stored.

Response: The tank is to be constructed of carbon steel and the liquid being stored is used mineral spirits. Carbon steel is compatible with used mineral spirits.

2-2.1(e) Specific gravity should be less than that of water. Special engineering considerations may be required if it is not.

Response: The used mineral spirits has a specific gravity of 0.79 to 0.90.

2-2.2.1,2 Tanks must be a shape consistent with sound engineering design, and metal tanks shall be welded, riveted and caulked, or bolted, or constructed by a combination of these methods.

Response: The tank is a vertical cylinder with welded joints and should bear the UL 142 label.

2-2.3.1 Atmospheric tank shall be built to an acceptable standard including UL 142.

Response: The tank is to be built to UL 142.

2-2.3.3 Atmospheric tanks shall not be used for the storage of a liquid at a temperature at or above its boiling point.

Response: The storage temperature of the liquid is ambient which is less than the boiling point of the liquid.
2-3 Installation of Outside Aboveground Tanks

2-3.1 Location with Respect to Property Lines, Public Ways and Important Buildings on the Same Property.

Response: The tank is at a minimum of 140' from the nearest property line and a minimum of 26' from the nearest important building, which satisfies all spacing requirements.

2-3.2 Spacing (Shell-to-Shell) Between Any Two Adjacent Aboveground Tanks.

2-3.2.1 Tanks storing Class I, II or IIIA stable liquids shall be separated in accordance with Table 2-7. Per Table 2-7 for fixed or horizontal tanks not over 150 feet in diameter storing Class I, II, IIIA liquids, the minimum spacing shall be 1/6 the sum of adjacent tank diameters but not less than 3 feet.

Response: The tanks are 10'-6" diameter. Therefore, the minimum spacing between tanks should be 3'-6". The actual distance between the tank shells is 3'-6" which meets the spacing requirements.

2-3.3 Control of Spillage from Aboveground Tanks.

2-3.3.3 Impounding around tanks by diking. Dike shall meet the following requirements:

2-3.3.3(a) Slope of not less than 1% away from the tank to the dike base.

Response: The tank rests on a 4" high concrete housekeeping pad sufficiently elevating it above the dike base.

2-3.3.3(b) The net containment capacity shall be great enough to hold the volume of the largest tank in the diked area.

Response: Containment capacity is sufficient. See Appendix B for calculations.

2-3.3.3(c) The outside base of the dike at ground level shall be no closer than 10 ft. to any property line that is or can be built upon.

Response: Minimum distance is over 130 feet.

2-3.3.3(d) The dike walls shall be designed to be liquidtight and to withstand a full hydrostatic head.

Response: The walls are designed to meet these requirements.
2-3.3.3(e) The walls of the diked area shall be restricted to an average interior height of 6 ft. above interior grade.

Response: Dike wall nominal height is 3'-0".

2-3.3.3(h) Where provision is made for draining water from diked areas, the drains shall be piped with valves located outside the dike.

Response: Sump has a no pipe outlet.

2-3.3.3(i) Storage of combustible materials, empty or full drums, or barrels, shall not be permitted within the diked area.

Response: There will be no combustible materials stored in the tank farm.

2-3.4.2 Tank shall be equipped with a normal vent that has been sized in accordance with API 2000 or UL 142.

Response: The normal vent is 3" diameter which has sufficient venting capacity, see Appendix B.

2-3.5 Tank shall be equipped with emergency venting complying with one of the following:

a) Tank constructed with a weak roof-to-shell seam 2-3.5.3, UL 142, API 2000.)

b) A manhole with bolts extended a minimum of 1 1/2 inches and allowing a maximum pressure of 2.5 psi. (2-3.5.4, UL 142, API 2000.)

c) Emergency vent with adequate capacity. (2-3.5.4, UL 142, API 2000.)

Response: The tank is to be built to a weak shell-to-roof design which satisfies the requirements of (a) and has a manhole which satisfies the requirements of (b).

2-3.7 Tank Openings Other Than Vents:

2-3.7.1 Each connection to an aboveground tank through which liquid can normally flow shall be provided with an internal or an external valve located as close as practical to the shell of the tank.

Response: An external emergency valve is located on all three tank access pipes. A ball valve is located in the normal tank fill line within 2 feet of the tank.
2-3.7.2 Each connection below the liquid level through which liquid does not normally flow shall be provided with a liquidtight closure ie. a valve, plug or blind.

Response: All connections will be plugged.

2-3.7.4 Fill pipes that enter the top of a tank shall terminate within 6 in. of the bottom of the tank. Fill pipes shall be installed or arranged so that vibration is minimized.

Response: The fill pipe terminates near the bottom of the tank and is supported to prevent vibration.

2-3.7.5 Filling and emptying connections for Class I, Class II and Class IIIA liquids that are made and broken shall be:

1) Located outside of buildings at a location free from any source of ignition.

Response: The connection is outside.

2) Not less than 5 ft. away from any building opening.

Response: The connection is more than 5 feet away from any building.

3) Shall be closed and liquidtight when not in use.

Response: The connection has a check valve and a ball valve.

4) Shall be properly identified (3-9)

Response: The connections are to be properly identified.

2-6 Supports, Foundations, Anchorage for All Tank Locations.

2-6.1 Tanks shall rest on the ground or on foundations made of concrete, masonry, piling or steel.

Response: Foundation is concrete.

2-6.1 Tank foundation shall be designed to minimize the possibility of uneven settling of the tank and to minimize corrosion in any part of the tank resting on the foundation.

Response: The tank foundation appears to be adequate. See calculations in Appendix B. The tank rests on a 24" high skirt with four portholes to keep the bottom of the tank from contacting the floor where moisture may be present.
2-6.3 Steel support for tanks storing Class I, Class II, or Class IIIA liquid shall be protected by materials having a fire resistance rating of not less than 2 hours, except that steel tank saddles need not be protected if less than 12 in. high at their lowest point.

Response: The skirt is to be coated with a fire resistant material.

2-6.6 Tanks in Areas Subject to Flooding

Response: The tank is not located in the 100 year flood, therefore these requirements are not applicable.

2-6.7 In areas subject to earthquakes, the tank supports and connections shall be designed to resist damage as a result of such shocks.

Response: Earthquake analysis in Appendix B indicates that the tank requires no additional anchorage.

2-8.1 Tanks shall be tested and labeled with UL 142 listing.

Response: The tank should bear a UL 142 label which requires shop testing.

2-8.3 Tanks and connections shall be tested for tightness at operating pressure with air, inert gas, or water prior to placing the tank in service.

Response: Prior to being placed in service, the tanks are to be tightness tested.

2-9.2 Tanks used to store liquids which have a health or reactivity degree of hazard of 2 or more or a flammability rating of 4 must be labeled in accordance with NFPA 704.

Response: The used mineral spirits does not require an NFPA 704 label.

**NFPA 30 1990 Edition**

**Piping System Evaluation**

Following is a point by point evaluation of the tank system requirements of NFPA 30 Chapter 3 - Piping Systems. The applicable paragraphs are referenced with a brief description of the requirements followed by a response.
3-2.1 The design, fabrication, assembly, test, and inspection of piping systems containing liquids shall be suitable for the expected working pressures and structural stresses. The piping system shall conform to the applicable sections of ANSI B31.

Response: The evaluation that follows should address the requirements of the applicable sections of ANSI B31.

3-2.2 Piping systems shall be maintained liquidtight.

Response: The piping system is designed to be liquid tight.

3-3.1 Pipe, valves, fittings and other pressure containing parts shall meet the material specifications and pressure and temperature limitations of ANSI B31.3 or B31.4.

Response: As follows:

System Design Pressure and Temperature

The used mineral spirits pump is to be a Marlow 1 1/2 HR49EC which can produce a maximum differential pressure of about 22 psig. For design purposes a pressure of 25 psig will be used.

The design temperature is ambient.

Steel Pipe

Paragraph 305.1 of ANSI B31.3 - 1990, approves the use of listed piping components (paragraph 302.2.1) for the pressure-temperature ratings provided in Table 326.1. Piping components not listed in Table 326.1 may be used if qualified for pressure design (paragraph 302.2.3)

The drawings call for the use of schedule 40 black steel pipe.

Joints - Other Components

Section 304.7 of ANSI B31.3 - 1990 addresses pressure design of unlisted components and other piping elements.

Piping joints in the used mineral spirits piping are either flanged, threaded or welded.
Flanges are addressed elsewhere in this section of the report.

Welded joints are to be used.

ANSI B31.3, Section 314, requires that the nominal pipe wall thickness for threaded joints, as defined in ANSI B36.10, for Schedule 40 pipe, be satisfied for pipe sizes 2 inch and larger.

Used mineral spirits pipe is to be SCH 40 standard weight. Therefore, the pipe wall thickness is sufficient to satisfy the requirements of B31.3 for threaded joints.

Pipe Fittings

Section 306 of ANSI B31.3 provides for the use of fittings which are manufactured in accordance with standards listed in Table 326.1, or the use of unlisted fittings which satisfy the requirements of paragraph 304.7.2.

Typical Safety-Kleen construction practice is for pipe fittings on the used mineral spirits to meet the requirements of ANSI B31.3 and NFPA 30.

Valves

Section 307 of ANSI B31.3 provides for the use of valves which are manufactured in accordance with the standards listed in Table 326.1 or the use of unlisted valves which satisfy the requirements of paragraph 304.7.2.

Valves in the used mineral spirits line typically include the following:

- Line Isolation Valve: 3" Flanged ball valve
- Check Valve: 3" Flanged swing check
- Tank Emergency Valve: 3" Flanged external emergency valve
- Truck Connection: 3" Flanged ball valve

The valves typically used by Safety-Kleen have design pressures that exceed the system design pressure of 25 psig. These valves have been used by Safety-Kleen in similar installations throughout the United States, and Safety-Kleen has extensive, successful service experience under comparable operating conditions with similarly proportioned components of like material.

The valves satisfy the requirements of B31.3 for their service.
Flanges

Section 308 of ANSI B31.3 provides for the use of flanges which are manufactured in accordance with standards listed in Table 326.1, or the use of unlisted flanges which satisfy the requirements of paragraph 304.7.2.

Typical Safety-Kleen construction practice requires the use of listed flanges which satisfies the requirements B31.3.

The used mineral spirits piping system therefore should satisfy the requirements of NFPA 30, paragraph 3-3.1.

3-3.3 Valves at storage tanks and their connections to the tank shall be steel or nodular iron, except as provided in paragraph 3-3.3.1, which allows internal emergency tank valves to be other than steel or nodular iron.

In the normal empty line, tank isolation is accomplished by a ball valve and an external emergency valve. In the auxiliary empty lines, tank isolation is accomplished by a ball valve and external emergency valve. Safety-Kleen typical construction practices call for cast steel valves.

3-3.4 If low melting point materials such as aluminum, copper and brass materials that soften on fire exposure such as plastics, or nonductile material such as cast iron are used outdoors in aboveground piping systems handling Class I, Class II, or Class IIIA liquids they shall be either: (a) suitably protected against fire exposure, (b) so located that any leakage resulting from the failure would not unduly expose persons, important buildings, or structures, or (c) located where leakage can readily be controlled by operation of an accessible remotely located valve.

Response: Typical Safety-Kleen construction practice is to equip the tanks with cast steel external emergency valves and cast steel ball valves which meet the requirements of 3-3.3.1 and the tanks are located in secondary containment meeting the requirements of 40 CFR 264.193. These factors satisfy the requirements of either (b) or (c).
3-5  Piping systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion, or contraction.

Response: Pipe supports are located at a maximum spacing of 8 feet which should be more than adequate for support. All of the pipe is inside the tank farm, the return fill shelter or running between the tank farm and the return/fill and is protected from physical damage by the steel reinforced concrete dike walls and the return/fill shelter. There is no pipe in a traffic area. Most of the pipe has short runs with ends that are not fixed which allows for free expansion and contraction. The pipe with a longer run has enough changes of direction to allow for expansion and contraction.

3-7  Piping systems shall contain a sufficient number of valves to operate the system properly and to protect the plant.

Response: The pipe system has sufficient valves for proper system operation and plant protection.

3-8  All piping shall be tested prior to being placed in service.

Response: Typical Safety-Kleen construction practice calls for the pipe to be field tested prior to being placed in service.

3-9  Each loading and unloading riser shall be labeled to identify the product for which the tank is used.

Response: The risers are to be identified with the type of material being stored, and direction of flow.
UFC Article 79, 1991 Edition
Tank System Evaluation

The applicable requirements of UFC Article 79 are essentially the same as the applicable requirements of NFPA 30 except the following:

79.110 Aboveground storage tanks over 100 gallon water capacity permanently installed, mounted or affixed and used for storage of Class I, II or IIIA liquids shall bear a label or placard identifying the material therein in accordance with UFC Standard No. 79-3.

Response: Typical Safety-Kleen construction practice requires the tank to be labeled identifying the liquid being stored as "Used Mineral Spirits".

79.803 Cleaning with Class I and Class II liquids shall be conducted in: 1. A machine listed and approved for the purpose as set forth in Section 79.803(c), or 2. A use, dispensing and mixing room as set forth in Section 79.805.

Response: The drumwasher unit is to be listed.
APPENDIX C

Characteristics of Used Mineral Spirits
# APPENDIX C

Characteristics of Used Mineral Spirits

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<thead>
<tr>
<th>Title</th>
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<td>Concrete Protective Coatings Memorandum</td>
<td>C-3</td>
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<tr>
<td>Product Literature - Semstone 140</td>
<td>C-6</td>
</tr>
</tbody>
</table>
IDENTITY (As Used on Label and List)
Safety-Kleen 105 Solvent-MS  #6617

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I
Manufacturer's Name
Safety-Kleen Corporation
Address (Number, Street, City, State, and ZIP Code)
777 Big Timber Road
Elgin, Illinois 60123

Emergency Telephone Number
312/697-8460

Telephone Number for Information
312/697-8460

Date Prepared 09/12/86
Revised 05/26/87, 09/29/87, 10/06/88, 10/20/88

Signature of Preparer (optional)

Section II—Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>CAS No.</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
<th>Other Limits Recommended</th>
<th>% (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral Spirits</td>
<td>8032-32-4</td>
<td>500 ppm</td>
<td>100 ppm</td>
<td>N/A</td>
<td>99.9+</td>
</tr>
<tr>
<td>Dye</td>
<td>N/A</td>
<td>Unknown</td>
<td>Unknown</td>
<td>unk.</td>
<td>0.003</td>
</tr>
<tr>
<td>Anti-Static Agent</td>
<td>N/A</td>
<td>Unknown</td>
<td>Unknown</td>
<td>100 est.</td>
<td>1 ppm</td>
</tr>
</tbody>
</table>

Section III—Physical/Chemical Characteristics

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point</td>
<td>310-400°F</td>
</tr>
<tr>
<td>Specific Gravity (H₂O = 1)</td>
<td>0.775-0.795</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg) @ 68°F (20°C)</td>
<td>2</td>
</tr>
<tr>
<td>Melting Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Vapor Density (AIR = 1)</td>
<td>4.9</td>
</tr>
<tr>
<td>Evaporation Rate (Toluene = 1)</td>
<td>0.2</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Negligible</td>
</tr>
<tr>
<td>VOC</td>
<td>795g./L</td>
</tr>
</tbody>
</table>

Appearance and Odor
Clear green liquid with characteristic hydrocarbon odor.

Section IV—Fire and Explosion Hazard Data

Extinguishing Media
CO₂, foam, dry chemical, water (mist only)

Special Fire Fighting Procedures
None.

Unusual Fire and Explosion Hazards
None.
Section V—Reactivity Data

<table>
<thead>
<tr>
<th>Stability</th>
<th>Unstable</th>
<th>Stable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditions to Avoid</td>
<td>Heat, sparks, flame and fire.</td>
<td></td>
</tr>
</tbody>
</table>

Incompatibility (Materials to Avoid)

Strong oxidizing agents.

Hazardous Decomposition or Byproducts

Normally none; however, incomplete burning may yield carbon monoxide.

Hazardous Polymerization

May Occur

Conditions to Avoid

N/A

Will Not Occur

X

Section VI—Health Hazard Data

Route(s) of Entry: Inhalation? Yes. Skin? Yes. Ingestion? Yes.

Health Hazards (Acute and Chronic)

Skin: Can cause drying of skin. Eyes: Severe irritant. Inhalation: Excessive inhalation can cause headache, dizziness and nausea. Ingestion: Harmful or fatal if swallowed.


Not a known or suspected carcinogen.

Signs and Symptoms of Exposure

Drying of skin, eye irritation, headache, dizziness, nausea.

Medical Conditions

Generally Aggravated by Exposure Unknown.

Emergency and First Aid Procedures

Skin: Wash with soap and water. Eyes: Irrigate with water. Inhalation: Remove to fresh air source and call a physician. Ingestion: DO NOT induce vomiting. Call a physician.

Section VII—Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled

Catch and collect for recovery as soon as possible. Avoid exposure to sparks, fire, flame, hot surface.

Section VIII—Control Measures

Respiratory Protection (Specify Type)

Self-contained breathing apparatus for concentrations above TLV limits.

Ventilation

Local Exhaust

Normal room ventilation.

Mechanical (General)

None.

Special

None.

Other

None.

Protective Gloves

In case of prolonged contact, wear rubber gloves.

Eye Protection

Yes - Eyeglasses, safety glasses.

Other Protective Clothing or Equipment

N/A

Work/Hygienic Practices

Do not smoke while
MEMORANDUM
August 22, 1991

TO: Draft
FROM: James Gaspar
SUBJECT: Concrete Protective Coatings

The purpose of this report is to provide a basis for selection of concrete protective coatings in Safety-Kleen Corporation. The report is divided into five sections:

1. Definition of the classes of protective coatings that are available for concrete
2. Definition of Safety-Kleen’s needs for coatings
3. Discussion of Safety-Kleen’s experience with coatings
4. Coating recommendations for both Branches and Recycle Centers, and
5. Subjective issues, such as the value that should be placed on aesthetics and cleanability vs. safety and price, the need for coatings in different areas vs. EPA regulations, and durability vs. price.

1.0 Classes of Protective Coatings

Concrete protective coatings generally fall into one of four categories (listed in order of increasing solvent and chemical resistance):

1. Urethanes (not resistant to ketones and chlorinated solvents)
2. Epoxies (not resistant to ketones and chlorinated solvents)
3. Vinyl Esters (excellent acid and base resistance)
4. Novolacs (good for ketones and chlorinated solvents)

There are a few compounds that do not fall into these general categories, namely silanes/siloxanes, baked phenolics and some proprietary modified epoxies. Baked phenolics possess the highest level of solvent and chemical resistance but must be cured at temperatures above 400°F and therefore cannot be used in concrete coatings applications. The other compounds, silanes/siloxanes and specially modified epoxies generally fall in the novolac class of solvent resistance. Some vendors blend resins from different classes (such as novolac-phenolic) in order to increase the range of solvent and pH resistance.
1.1 Urethanes

Of the four classes of concrete coating materials, urethanes exhibit the lowest level of solvent and chemical resistance. These coatings hold up well to aliphatics (such as mineral spirits), aromatics, alcohols, petroleum products (such as motor oils), ethylene glycol, new IC and perchlororethylene. They resist most acids at below 50% concentrations. They do not resist ketones (acetone, MEK, MIBK) or most chlorinated solvents (methylene chloride, TCA, TCE). Urethanes are also abrasion resistant and somewhat elastic (which enables them to bridge hairline, i.e., non-structural, cracks in concrete).

There is some variability in the chemical resistance within the family of urethanes. This is primarily due to the degree of crosslinking that is built into the product. A highly crosslinked, chemical resistant urethane (CRU) is preferable for Safety-Kleen applications.

Urethanes are the least expensive of all of the chemical resistant coatings on the market. Installed costs on new concrete can be under $2.00 per sq. ft. (If cracks or other concrete repairs have to be made, the cost will be higher). These coatings are applied in thin layers, either directly to the concrete or after a primer is applied. Primer coats are on the order of 1 to 3 mils thick and the urethane coat is also on the order of 5 mils in thickness. Multiple layers of urethane are generally not recommended because of bonding problems between layers. Since these coatings are thin, like a layer of paint, they are often applied with a roller. Thicker coating systems can be developed by using composite systems, such as a base coat of an epoxy followed by a topcoat of urethane. Total thickness can be built up to 20 to 30 mils using this kind of system.

Repair procedures are fairly simple, generally requiring abrasive buffing of the area to be repaired followed by application of more urethane with a paint roller.

Concrete preparation procedures are typical of most coatings, either abrasive blasting or acid etching of the concrete to remove laitance, oils, sealants, etc., so that the coating has a solid, clean surface on which to bond. Urethanes typically have to be applied on cured concrete (over 28 days) that is also dry and at a temperature of at least 50F (with the concrete temperature at least 5F above the dew point to prevent condensation on the concrete).

Single coat systems usually dry to the touch and can be walked on after about 4 hours. Second coats must be applied within 24 hours of the first coat. Forklift traffic and normal use can usually occur after 48 - 72 hours depending on curing temperature, which can range from 90 to 50F. Full cure occurs in 7 to 14 days.
1.2 Epoxies

Epoxies generally exhibit a level of solvent resistance that is comparable to urethanes, however, there is substantial variability in the solvent resistance of these products. This variability is primarily due to the type of curing agent that is mixed with the epoxy resin (which is most commonly a bis-phenol A/Epichlorohydrin resin). Curing agents can be polyamides, amine adducts, amines, polyamines or alkalines.

These coatings hold up well to aliphatics (such as mineral spirits), aromatics, alcohols, petroleum products (such as motor oils), ethylene glycol and perchloroethylene. They do not resist ketones or most chlorinated solvents. Some of the epoxies failed in new IC (probably due to the NMP), while others were resistant (probably a function of curing agent). Epoxies exhibit average abrasion resistance, but do not exhibit any elasticity. They will crack if the concrete floor cracks.

Epoxies will "chalk" when exposed to UV light. This is a potential aesthetic drawback to using epoxies for secondary containment in outdoor tank farms.

The strength of epoxies lies in their relatively low cost and their ability to be applied in thick layers (10 mils to 1/4 inch). These qualities make epoxies the material of choice for filling cracks in concrete, repairing old, abraded concrete surfaces and leveling concrete. If increased solvent resistance is required, a top coat of another coating material is usually applied. Installed costs for epoxies generally fall in the range of $3 to $4 per sq. ft., but prices can be variable depending on coating thickness and the extent of crack repair and resurfacing that is required.

(Note: Crack repair procedures are being prepared separately, but it should be noted that most crack repair materials are epoxy compounds and that most coating suppliers/applicators have epoxy based crack repair materials and can repair cracks as well as put down coatings).

Epoxies can be applied in a wide range of thicknesses, from 10 or 20 mils to 1/4 inch. Generally, a primer coat is applied first (5 to 10 mil thickness), followed by the epoxy. The epoxy can be roller, spray or trowel applied depending on thickness. In cases where a thicker coating or improved abrasion resistance is required, silica sand or other aggregate can be broadcast into the epoxy layer.

Concrete preparation procedures follow standard procedures. The concrete must be either abrasive blasted or acid etched to prepare the surface. Epoxies must be applied to dry, cured concrete (over 28 days), at temperatures over 50F (lower temperatures slow the curing reactions).
DESCRIPTION AND USES:

SEMSTONE 140 is Sentry’s primary epoxy topping system for concrete. Self-priming and semi-leveling, it will typically be aggregate filled and spray applied to yield an economical and highly serviceable floor for areas subject to harsh chemical exposure.

SEMSTONE 140 is a two component system that possesses the following characteristics in common with all members of Sentry’s 140 family of products:

- excellent resistance to:
  - chemical attack;
  - thermal shock;
  - wear and impact.
- superior bonding qualities;
- high cohesive strength, coupled with the flexibility necessary to resist cracking;
- low permeability;
- low odor;
- 100% solids.

Example uses include:

Process slabs, tank farm floors, chemical loading and unloading areas, spill containment areas, waste proof coating for secondary containment systems.

PACKAGING/COVERAGE:

SEMSTONE 140 is available in 1 gallon, 5 gallon, and 25 gallon units. Each unit consists of a premeasured Part A component and a premeasured Part B component. A bagged Part C thixotropic agent is available for work on vertical surfaces.

Application thickness may vary from 30 mils to 150 mils, depending on expected service conditions (i.e., chemical exposure, temperature, traffic load and other mechanical abuse, immersion service vs. splash-spill, etc.). Consult Sentry Polymers for specific thickness recommendations.

In addition, coverage rates will be effected by the condition of the surface being coated (degraded vs. smooth, steel vs. concrete, etc.).

To figure THEORETICAL coverage per gallon, divide desired mil thickness into 1,604. (For example, theoretical coverage for a 60 mil thickness is: 1,604 divided by 60 = 26.73 square feet per gallon.)

For practical coverage, make necessary allowances for condition of the substrate, working conditions, waste, spillage, etc.
TYPICAL PROPERTIES - WET

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solids, by Volume</td>
<td>100%</td>
</tr>
<tr>
<td>Weight per Mixed Gallon</td>
<td>9.31 lbs</td>
</tr>
<tr>
<td>Pot Life @ 75°F</td>
<td>45 - 60 minutes</td>
</tr>
<tr>
<td>Cure Time @ 75°F:</td>
<td></td>
</tr>
<tr>
<td>Foot Traffic</td>
<td>12 hrs.</td>
</tr>
<tr>
<td>Light Vehicular Traffic</td>
<td>24 hrs.</td>
</tr>
<tr>
<td>Chemical Service</td>
<td>36 hrs.</td>
</tr>
<tr>
<td>Primer</td>
<td>Not Required</td>
</tr>
<tr>
<td>Nonflammable</td>
<td></td>
</tr>
</tbody>
</table>

TYPICAL PROPERTIES - CURED

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Light Gray (selected other colors available)</td>
</tr>
<tr>
<td>Hardness ASTM D - 2240 Shore D</td>
<td>70 - 75</td>
</tr>
<tr>
<td>Compressive Strength ASTM C - 579</td>
<td>14,000 psi</td>
</tr>
<tr>
<td>Tensile Strength ASTM D - 638</td>
<td>5,000 psi</td>
</tr>
<tr>
<td>Tensile Elongation ASTM D - 638</td>
<td>8%</td>
</tr>
<tr>
<td>Flexural Strength ASTM D - 790</td>
<td>11,000 psi</td>
</tr>
<tr>
<td>Flexural Modulus of Elasticity</td>
<td>Complies with Epoxy Type B</td>
</tr>
<tr>
<td>Abrasion Resistance ASTM D - 1044</td>
<td>56 mg (CS17 wheels)</td>
</tr>
<tr>
<td>Water Vapor Transmission</td>
<td></td>
</tr>
<tr>
<td>WVT</td>
<td>0.0120 grain per hr ft²</td>
</tr>
<tr>
<td>Permeability</td>
<td>0.0042 perm. -in.</td>
</tr>
</tbody>
</table>

RELATED AND ANCILLARY PRODUCTS

- SEMSTONE 110-P/S Epoxy Primer
- SEMSTONE 140-S Epoxy Coating and Lining
- SEMSTONE 140-SL Epoxy Self-Leveling Coating
- SEMSTONE 140-CT Epoxy Coating - Cold Temperature Formulation
- SEMSTONE 300 Epoxy Polymer Concrete
- SEM-CRETE Rapid Hardening Underlayment Mortar
- SEMSTONE Scrim

Refer to separate technical bulletin on each product for uses, application instructions, etc.

STORAGE AND SHELF LIFE

- Keep SEMSTONE 140 components tightly sealed in their original containers until ready for use. Store at 50° - 75°F, out of direct sunlight. Properly stored, SEMSTONE 140 has a minimum shelf life of one year.
- Refer to batch number on label for date of manufacture.

CHEMICAL RESISTANCE

For chemical resistance information, refer to Sentry's Master Chemical Resistance Guide.
APPLICATION GUIDELINES

TEMPERATURE CONSIDERATIONS

1. The temperature of the surface to be coated, and the ambient air temperature should be at least 50°F while applying SEMSTONE 140 and while it cures. If the temperature is expected to drop below 50°F, use SEMSTONE 140-CT.

2. Halt application if the temperature falls within 5°F of the dew point.

3. Bubbles may appear in the SEMSTONE 140 coating if it is applied over concrete in direct sunlight, or when temperatures are rising. This is due to the expansion of air and/or moisture trapped in the concrete. It is especially true of air entrained concrete. For best results, shade the work area and apply SEMSTONE 140 when the temperature of the concrete (or other substrate) is falling. A surface thermometer should be used to frequently monitor the temperature of the substrate.

4. Twenty-four hours before application, all materials (components A and B, aggregate, etc.) should be stored at a 70° - 85°F, to facilitate handling.

SURFACE PREPARATION - GENERAL

Surfaces must be dry and free of dirt, dust, oil, grease, chemicals and other contaminants immediately prior to applying each coat of SEMSTONE 140.

SURFACE PREPARATION OF CONCRETE

1. New concrete generally should be cured a minimum of 28 days.
   NOTE: Check with Sentry Polymers for recommendations regarding concrete cured less than 28 days.

2. Concrete must be structurally sound and must not contain any accelerators or curing compounds.

3. Remove all oil and grease.

4. Remove all surface laitance and expose sound concrete. We recommend abrasive blasting to do this. However, other methods, such as acid etching and neutralizing, may be used.

5. In general, any existing coating should be completely removed. In certain instances this may not be necessary, but consult with Sentry Polymers first.
   Always remove coatings which have failed due to lack of adhesion or thermal shock.

6. Locate all expansion joints, control joints, floor drains, equipment base plates and mid-floor termination points. Handle them according to Sentry's Construction Details.

7. Degraded concrete on horizontal surfaces should be restored using SEMSTONE 300 Epoxy Polymer Concrete or SEM-CRETE.

8. Honeycombs or any form voids in vertical surfaces must be filled. Use a putty made by adding Part C thixotrope and sand to either SEMSTONE 110-P/S Epoxy Primer or SEMSTONE 140. (See supplemental guidelines.)
   Alternately, use SEM-CRETE.

SURFACE PREPARATION OF INCIDENTAL STEEL

Equipment base plates, etc. to be coated along with the concrete should be abrasive blasted to a near white metal finish with a 1 - 2 mil anchor profile. (Ref. SSPC-SP-10)

MASKING

Mask surfaces that are not to be coated. This material is difficult to remove, once applied.

APPLICATION EQUIPMENT

1. SEMSTONE 140 may be applied using a spray rig, notched trowel, brush or roller.

2. Spraying Aggregate Filled Material
   We recommend the use of a Grover Model 973TSD-2-A modified 11:1 pump.
   DO NOT use a plural component or a single component airless rig with aggregate filled material.
Set up the Grover Pump with a 3/4 inch ID, 15 foot long material line and a 3 foot pole spray gun.

Prewet the hoses by pumping a small amount of mixed SEMSTONE 140 (see paragraphs 1 and 2 under MIXING AND APPLICATION) without aggregate through the lines and pole gun; about 1/2 gallon should be sufficient.

3. Spraying Material Without Aggregate

We recommend the use of a plural component or single component airless rig when the material will be sprayed without aggregate.

Plural Component Airless Spray Equipment (Graco King Hydra-Cat or equal):

Set equipment at a 4 to 1 volumetric mix ratio. Use a Graco Silver Gun, or equivalent, equipped with a reversible, self-cleaning tip, orifice size .035 - .041 inch.

Single Component Airless Spray Equipment (Graco King 45 to 1 Hydro Spray Pump, or equal); set up as follows:

No screens, filters or surge tank.

Spray hose should be 3/8" or 1/2" ID, and a maximum of 50 feet in length.

Use Graco 220-961 Flex Gun, or equivalent, equipped with a reversible, self-cleaning tip, orifice size .035 - .041 inch.

Inlet air pressure should be a minimum of 100 psi. Recommended operating pressure is 60 - 100 psi.

4. Always use spray equipment in accordance with manufacturer’s instructions.

5. Care of Spray Rig Hoses

Take care to prevent the mixed material from setting up in your hoses. For best results, keep your hoses as short as possible, purge them immediately if work is interrupted, keep them out of direct sunlight and insulated from hot surfaces.

MIXING AND APPLICATION

1. The components must be individually agitated immediately prior to use.

Part A - Blend each Part A component to a uniform consistency in its individual container, using a Jiffy type mixer.

Part B - Stir each Part B component to a uniform color in its individual container.

2. If using a plural component spray rig, skip this step. Otherwise:

Pour the entire contents of Part B into the container holding Part A, and mix thoroughly for two minutes using a Jiffy type mixer.

The pot life of the mixture will be approximately 45-60 minutes @ 75°F; significantly less time at elevated temperatures.

The longer the material is in the bucket after mixing, the shorter its pot life will be. Use it immediately.

3. SEMSTONE 140 may be extended by adding silica sand. This can provide a more economical floor topping and is also useful when coating rough or mildly eroded concrete.

a. Use only clean, dry, bagged 20/40 mesh round silica sand.

b. Pour half the mixed SEMSTONE 140 into another clean 5 gallon bucket.

c. Slowly add sand to each bucket while blending with a jiffy type mixer. Do both buckets immediately.

d. You may add up to 3 parts, by weight, of sand to 1 part, by weight, of SEMSTONE 140. At a 3 to 1 ratio you get a mixture of grout-like consistency. At a 2 to 1 ratio you will obtain a still fluid mixture and extend coverage by 100%. This is the optimum mixture for spray applications.

e. The mixture may be sprayed or applied by notched trowel.

If spraying, work the pole gun in a circular motion to achieve an even coating thickness.

4. When working a large or congested area, it may be desirable for applicator to wear spiked shoes.
5. To obtain a nonskid surface, broadcast your grit media onto the coated surface before the coating gels.

6. SEMSTONE 140 is semi-leveling. When used on an area that has a pitch or slope, use a 2 to 1 silica sand mixture (see paragraph 3 above) in order to keep the material from sliding.

7. To coat vertical surfaces, use either SEMSTONE 140-S Epoxy Coating and Lining system, or SEMSTONE 140 with Part C added.

   If using SEMSTONE 140 with Part C, refer to Sentry's supplemental guidelines.

8. Prepare surfaces for intercoat adhesion as follows:
   a. Allow SEMSTONE 140 to cure until gelled before recoating.
   b. If the surface cures firm to the touch, but less than 24 hours, it must be washed with soap and water, rinsed and dried before recoating.
   c. Surfaces cured beyond 24 hours must be washed with soap and water, rinsed, dried and lightly sanded or abrasive blasted.

9. If work is interrupted, or at the end of the day, terminate the coating in a straight line.

10. As it cures, SEMSTONE 140 will sometimes develop a thin, oily film on its surface. This film may be easily removed by washing with soap and water.

CLEANUP

Before it gels, SEMSTONE 140 may be cleaned from tools and equipment using hot, soapy water.

After SEMSTONE 140 gels, xylene or MEK will be required. Chlorinated solvents may be used if flammable solvents are not allowed.

SAFETY PRECAUTIONS

FOR INDUSTRIAL USE ONLY.

Avoid contact with eyes and skin; do not ingest or inhale.

When working with SEMSTONE 140, always wear chemical goggles, rubber gloves, and appropriate work clothing.

When spraying in a confined area, also wear a fresh air hood and make provision for forced ventilation.

When spraying in an open area, a NIOSH approved respirator suitable for organic vapors can replace the fresh air hood.

Prolonged or repeated exposure to the unreacted Part A and Part B components of SEMSTONE 140 may cause skin irritation or allergic reactions.

Refer to material safety data sheets regarding individual components.

1 YEAR LIMITED WARRANTY

For one year following sale, SENTRY POLYMERS, INC., Freeport, Texas ("SENTRY") will replace any of its products that do not conform to its manufacturing standards or, at its sole discretion, refund the proportionate sales price applicable to the nonconforming goods. Replacement product will be supplied at no charge, and FOB SENTRY'S facilities.

Information and suggestions supplied by SENTRY, whether in its published literature or otherwise, including samples, are believed to be accurate and reliable and are furnished in good faith. Such information and suggestions are supplied without charge and their use, and the use of SENTRY products is beyond SENTRY’S control. SENTRY’S products, information and suggestions are intended for USERS possessing skill and knowledge in the industry, USERS are responsible, at their sole discretion and risk, to satisfy themselves regarding the suitability of SENTRY’S products, information and suggestions for their particular circumstances.

SENTRY MAKES NO WARRANTIES, EXPRESS OR IMPLIED, CONCERNING ITS PRODUCTS, INFORMATION AND SUGGESTIONS AND DISCLAIMS ALL WARRANTIES INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This limited warranty will be rendered null and void by any one or more of the following: SENTRY is not paid timely and in full at Freeport, Texas, for all goods and services sold by SENTRY for use on the applicable project; USER does not cooperate with SENTRY’S reasonable investigations regarding the alleged nonconforming product; the product has been misused, abused or improperly maintained.

The provisions of this warranty supersede any provisions to the contrary in any of USER’S forms or documents or otherwise unless such contrary provisions are specifically acknowledged and agreed to in writing by SENTRY after receipt by SENTRY. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF PERSONAL INJURY, INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.
Urbana Miscellaneous Unit Leak Testing
March 1, 2010

RCRA Branch, L-8J
Land and Chemicals Division
U.S. EPA Region 5
77 West Jackson Boulevard
Chicago, IL 60604

RE: 0198270009 – Champaign County
Safety-Kleen Systems, Inc.
Champaign (Urbana) Service Center
ILD981088388
Compliance Schedule Submittal - RCRA Part B Permit
RCRA Log No. B-88R

Dear Director:

Safety-Kleen Systems, Inc., with this submittal, is complying with the compliance schedule requirements for project completion of the Final Federal Permit.

Section IV.E.1.c. – Leak Test/ Monitoring Plan Monthly Results

The attached February, 2010 Leak Testing/ Monitoring Plan Report, for the Miscellaneous Unit (Return and Fill Unit/ Drum Washer) was completed on February 16, 2010. Additionally, a cumulative data log is found in Appendix C, to track the entire project sampling results. Continued testing and monitoring will be conducted and submitted, for the designated period of 6 months ending February, 2010. This submittal shall constitute the completion of the “Project” compliance schedule, for testing and monitoring requirements of the Final Federal Permit.

This submittal has been certified by the project PE Certification (attached report) and Facility Certification Statement (below), for this submittal in total dated March 1, 2010. If you have any questions or require additional information, please contact me at 847/468-6701.
The undersigned, being an EHS Manager designated by the sole director of the Corporation (Safety-Kleen Systems, Inc.), the permit applicant, certifies under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons, directly responsible for gathering the information, the information is submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

[Signature]

Matthew C. Sauvageau
EHS Compliance Manager
Safety-Kleen Systems, Inc.
1500 East Villa Street
Elgin, IL 60120

Attachment.

Cc: Champaign (Urbana) EHS 999 File #1010; I(c)
February, 2010
Leak Testing/Monitoring Plan Report

Miscellaneous Units
(Return and Fill Units/ Drum Washers)

Safety-Kleen Systems, Inc.
Champaign (Urbana) Service Center
500 West Anthony Drive
Urbana, IL 61801
0198270009 – Champaign County
USEPA ILD 981088388

Prepared by:

Enviro Solutions, Inc.
10226 Idlewild Lane
Highland, Indiana 46322

February 18, 2010
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Appendix A   Sampling Locations
Appendix B   Sample Results Log
Appendix C   Cumulative Data Log
Monthly
Leak Testing/Monitoring Plan Report
Miscellaneous Units
(Return and Fill Units/ Drum Washers)

Project Description

The Champaign Facility, owned and operated by Safety-Kleen Systems, Inc., has been issued an Illinois EPA (IEPA) RCRA Hazardous Waste Management Part B permit log number 88R and it's corresponding USEPA Federal Permit. As a condition of those permits, one Miscellaneous Unit, commonly referred to as Return and Fill Unit/ Drum Washer is located in 3-Bay Return/ Fill Station.

The unit has been modified with new emission control devices. A final drawing design, of the modified miscellaneous unit, is attached to this plan.

One of the additional conditions of the permit issuance is to conduct an initial monitoring for leaks subsequent to the start up of the modified equipment, followed by additional monthly monitoring for a period of 6 months under the supervision of an Illinois registered Professional Engineer. August E. (Gus) Hawkins, Illinois P.E. Number, 62-041189, has been designated by Safety-Kleen to be that engineer.

The scope of the sampling plan is described below.

Sampling Method

IEPA and US EPA regulations require the monitoring of the unit for emissions of volatile organic compounds (VOCs). Speciation of the individual emitted chemicals is not required. Accordingly, a ToxiRAE Model PGM-30 portable photo-ionization detector (PID has been used to perform the emission checks. Results have been measured and reported as parts per million (ppm) VOCs.

The checks will be performed on a monthly basis. This first series of measurements was collected soon after the units were placed back into operation following the upgrading. Subsequent measurements will be conducted on monthly intervals.

The sampling technique used was to use the PID meter to measure the VOC level at each designated location. The instrument was held as close as practical to the emitting source for those sampling points located at the drum washers themselves. The meter was allowed to stabilize, and the highest reading noted was recorded. For those locations near exit doorways, the meter was held closer to a normal breathing zone height.
The equipment was in operation during the February 16th sampling round. This was the final round of sampling.

Sampling Locations

Sampling locations were chosen based on two criteria: (1) Proximity to the emitting source, and (2) Proximity to potential receptors (exits from the building). The following sample locations have been selected:

<table>
<thead>
<tr>
<th>Sampling Location ID</th>
<th>Descriptive - Location</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Station - East</td>
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<td>2</td>
<td>Station - Center</td>
</tr>
<tr>
<td>3</td>
<td>Station - West</td>
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<tr>
<td>4</td>
<td>Door - Bottom - Left</td>
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<tr>
<td>5</td>
<td>Door - Center - Left</td>
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<tr>
<td>6</td>
<td>Door - Top - Left</td>
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<tr>
<td>7</td>
<td>Door - Bottom - Right</td>
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<tr>
<td>8</td>
<td>Door - Center - Right</td>
</tr>
<tr>
<td>9</td>
<td>Door - Top - Right</td>
</tr>
</tbody>
</table>

These locations are shown on the diagram presented in Appendix B of this document.

Sampling conditions and additional data collected is detailed on the data sheet presented in Appendix B.

Reporting Data

The data collection sheet presented in Appendix B was completed for this sampling round. Each drum washer was in operation at the time the drum washer data value was collected. The unit’s lid was closed at the time these readings were collected. Cumulative data is presented in Appendix C.

Interpretation of Results

IEPA’s and US EPA’s standard for VOC emissions from miscellaneous units is 10,000 ppm. All data values collected during this round met this requirement. No non-compliant data was collected. All data was immediately communicated to Safety-Kleen.

Report Certification

This report is certified by the Illinois Registered PE.
PROFESSIONAL ENGINEER CERTIFICATION

Safety-Kleen Systems, Inc.
Champaign (Urbana) Service Center
500 West Anthony Drive
Urbana, IL 61801
0198270009 – Champaign County
USEPA ILD 981088388

I, August E. Hawkins, hereby certify that I am a registered Professional Engineer in the State of Illinois, and that this document, dated February 18, 2010, has been prepared in accordance with the Rules of Professional Conduct.

August E. Hawkins

P.E. Number: 62-041189

February 18, 2010
Date
Appendix A

Sampling Locations
RETURN AND FILL – SAMPLING LOCATION ID

Diagram showing various locations labeled 1 to 9, including a drum washer, steel dock grating, and mineral spirits tank.
Appendix B

Sample Results Log
Leak Testing and Monitoring - Sample Results  
Date: February 16, 2010

<table>
<thead>
<tr>
<th>Sampling Location ID</th>
<th>Descriptive - Location</th>
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<th>Test Result 2 (ppm)</th>
<th>Average Test Result (ppm)</th>
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<td>1.2</td>
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<td>2.4</td>
<td>1.8</td>
<td>2.1</td>
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</table>

Site Conditions:

1. Warehouse Doors Position: West door was three-quarters closed.
2. Ambient Air Temperature: 20 deg F.
3. Wind Conditions/ Direction: SW, 15 mph

Leak Testing Conducted by: Gus Hawkins  
(Print Name)

\[Signature\]

EHS 999 File #1220.5; VIII(e)
Appendix C

Cumulative Data Log
Leak Testing/Monitoring Plan Report
Miscellaneous Unit
Safety-Kleen Systems, Inc.
Champaign (Urbana) Service Center
500 West Anthony Drive
Urbana, IL 61801
0198270009 – Champaign County
USEPA ILD 981088388

Cummulative Data

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<th>Date Month 2 Oct. 21, 2009</th>
<th>Date Month 3 Nov. 17, 2009</th>
<th>Date Month 4 Dec. 11, 2009</th>
<th>Date Month 5 Jan. 25, 2010</th>
<th>Date Month 6 Feb. 16, 2010</th>
<th>Average of all Readings</th>
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