

Exhibit D1-1

CSA-1 Containment Calculations

Container Storage Area 1**Containment Calculation****Small Trench**

$$11.25''\text{W} \times 12''\text{D} \times 41.75'' \text{L} = 5,636.25 \text{ IN.}^2$$

$$5,636.25 \text{ IN.}^2 / (1728 \text{ IN.}^2/\text{cf}) \times 7.48 \text{ gal./cf} = 24 \text{ gal.}$$

Large Trench

$$1.75'\text{W} \times 3.5'\text{D} \times 11.75'\text{L} \times 7.48 \text{ gal./cf} = 538 \text{ gal.}$$

$$\text{Total CSA 1 Containment Volume} = 562 \text{ gal.}$$

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.

2% Misc. Displacement for Columns/Rails = -22 Gal.

Total CSA 2 Containment Volume = + 1,100 Gal.

Exhibit D1-3

Safety-Kleen Drum Spreadsheet

SAFETY-KLEEN DRUMS

Exhibit D1-3

SK Inventoried Part #	Category	Type	Size (gal)	Nestable	Open-Head	Tight-Head	Drum Only	Lined	Un-lined	Bung Gasket	Gauge	Description	Manufactured Lining	Reconditioned Lining	UN-Rating	Primary Usage
13348	Drum	Steel	16	X	X	X	X				Body 20, bottom 18	Red-O.H.	Rust inhibitor, inside bottom head epoxy-phenolic (L-15X)	Rust inhibitor	1A2/Y1.6/200	Parts Washer
3348	Drum	Steel	16	X	X	X	X				Body 20, bottom 18	Red	Rust inhibitor	Rust inhibitor	UN exempt	Parts Washer
3348	Drum	Steel	16		X	X	X				Body 20, bottom 18	Red	Rust inhibitor	Rust inhibitor	UN exempt	Parts Washer
3398	Drum	Steel	16	X	X	X	X				19	Red	(L-35)		UN exempt	Parts Washer
3264	Drum	Steel	16		X		X			X	Drum, cover, bottom 22 gauge	Red (drum with 3/4" flange in side wall, lid color red with 1 2" and 3 3/4" bungs, bolt ring 14 X 18 gauge)	Pigmented 100% phenolic lining			Solvent (Minimizer)
13393	Drum	Steel	16	X	X	X	X				Body 20, bottom 18	Green	inside bottom head epoxy-	Rust inhibitor	1A2/Y1.6/200	Parts Washer
3250	Drum	Steel	16	X	X	X	X				Body 20, bottom 18	Black	Rust inhibitor lined only	Rust inhibitor	1A2/Y1.6/200	Gas Filter
3324	Drum	Steel	16	X	X		X			X	Body 20, bottom 18	Black (White lid with 2" center bung SK part # 3225, ring is 12 gauge SK part # 3389)	Rust inhibitor lined only	Rust inhibitor	1A2/Y1.6/200	FRS
3387	Drum	Steel	16		X	X		X			Straight 18	Gray (4 brackets spot welded)			1A2/Y1.6/200	Immersion Cleaner
3362	Drum	Steel	16			X	X	X	X		Straight 20	Black with 3/4" and 2" bungs	Purchased as new no lining	100 % phenolic (9967 and 9968)	1A1/Y1.2/100	Paint Refinishing
9967	Drum	Steel	16			X	X		X		Straight 20	Yellow with 3/4" and 2" bungs (Litho-Multi use US)	100 % phenolic	Rust inhibitor	1A1/Y1.8/300	Paint/Thinner (6568)
9968	Drum	Steel	16			X	X		X		Straight 20	Yellow with 3/4" and 2" bungs (Litho-Multi use Can)	100 % phenolic	Rust inhibitor	1A1/Y1.8/300	Paint/Thinner (6568)

SAFETY-KLEEN DRUMS

SK Inventoried Part #	Category	Type	Size (gal)	Nestable	Open-Head	Tight-Head	Drum Only	Lined	Un-lined	Bung Gasket	Gauge	Description	Manufactured Lining	Reconditioned Lining	UN-Rating	Primary Usage
13349	Drum	Steel	30	X	X	X	X				Straight 18	Red	Rust inhibitor, inside bottom head epoxy-phenolic (L-15X)	Rust inhibitor	1A2/Y1.6/100	Parts Washer
3349	Drum	Steel	30	X	X	X	X				Straight 20	Red	Rust inhibitor	Rust inhibitor	UN exempt	Parts Washer
3349	Drum	Steel	30	X	X	X	X				Body 20, bottom 18	Red	Rust inhibitor	Rust inhibitor	UN exempt	Oil Recovery, Parts Washer
3399	Drum	Steel	30	X	X	X	X				Body 20, bottom 18	Red	Epoxy-phenolic (L-35)		UN exempt	Parts Washer
701140	Drum	Stainless Steel	30		X	X					22 gauge	Red Stainless Steel				Solvent (Minimizer)
13395	Drum	Steel	30	X	X	X	X				Straight 18	Green	Rust inhibitor, inside bottom head epoxy-phenolic (L-15X)	Rust inhibitor	1A2/Y1.6/100	Parts Washer
3395	Drum	Steel	30	X		X	X				Straight 20	Green	Rust inhibitor	Rust inhibitor	UN exempt	Parts Washer
3395	Drum	Steel	30	X	X	X	X				Body 20, bottom 18	Green	Rust inhibitor	Rust inhibitor	UN exempt	Oil Recovery, Parts Washer
3391	Drum	Steel	30	X	X		X			X	Straight 18	Yellow w/label (Yellow lid with 2" bung standard location SK part # 3218, ring is 12 gauge SK part # 3342)	Rust inhibitor	Rust inhibitor	1A2/Y1.6/100	Absorbent
3391	Drum	Steel	30	X	X		X			X	Straight 18	Yellow w/label (Yellow lid with 2" bung standard location SK part # 3218, ring is 12 gauge SK part # 3342)	Rust inhibitor	Rust inhibitor	1A2/Y1.6/100	Absorbent
3392	Drum	Steel	30	X	X	X	X				Straight 18	Yellow (no/label)	Rust inhibitor	Rust inhibitor	1A2/Y1.6/100	Absorbent
3252	Drum	Steel	30	X	X	X	X				Straight 18	Black	Rust inhibitor	Rust inhibitor	1A2/Y1.6/100	Gas Filter

SAFETY-KLEEN DRUMS

<i>SK Inventoried Part #</i>	<i>Category</i>	<i>Type</i>	<i>Size (gal)</i>	<i>Nestable</i>	<i>Open-Head</i>	<i>Tight-Head</i>	<i>Drum Only</i>	<i>Lined</i>	<i>Un-lined</i>	<i>Bung Gasket</i>	<i>Gauge</i>	<i>Description</i>	<i>Manufactured Lining</i>	<i>Reconditioned Lining</i>	<i>UN-Rating</i>	<i>Primary Usage</i>
3345	Drum	Steel	30	X	X			X		X	Straight 18	Black (White lid with 2" center bung SK part # 3245, ring 12 gauge sk part # 3342)	Rust inhibitor	Rust inhibitor	1A2/Y1.6/100	FRS
3360	Drum	Steel	30	X	X		X	X			Straight 18	Blue	Rust inhibitor	Rust inhibitor , 100 % phenolic , 70% phenolic 30% epoxy	1A2/Y1.6/100	Aqueous Parts Washer
3303	Drum	Steel	30			X			X	X	Top 18, body 20, bottom 18	Black with 3/4" and 2" bungs			1A1/Y1.2/100	Paint Refinishing
3369	Drum	Steel	55		X				X	X	Top 18, body 20, bottom 18	Black (Black lid with 3/4" bung and 2" bung SK part # 3370, ring is 12 gauge SK part # 3371)			1A2/Y1.8/200, 1A2/Y1.6/150	FRS/Paint Refinishing/Oil Filters
3383	Drum	Steel	55		X				X	X	Top 18, body 20, bottom 18	Green		Rust inhibitor	1A2/Y1.8/200, 1A2/Y1.6/150	Oil Filters
8003369	Drum	Steel	55		X				X	X	Top 18, body 18-20, bottom 18	Black (Black lid with 3/4" bung and 2" bung SK part # 3370, ring is 12 gauge SK part # 3371)		Rust inhibitor	1A2/Y1.2/100 (US and CAN), Non-UN (CAN)	FRS/Paint Refinishing/Oil Filters
Non-part	Drum	Steel	55			X		X		X	bottom 20	Black	100 % Phenolic		1A1/Y1.8/200 (US)	Solvent/Thinner/IC
Non-part	Drum	Steel	55			X			X	X	Top 18, body 20, bottom 20	Black			1A1/Y1.8/300 (US), 1A1/Y1.8/200 (US), 1A1/Y1.2/100 (CAN)	Solvent/Thinner/IC
Non-part	Drum	Steel	55			X					Top 18, body 18-20, bottom 20	Black				
3300	Drum	Steel	85			X		X		X	Straight 16	Yellow (Yellow lid with 3/4" bung standard location SK part # 3220, ring is 12 gauge SK part # 3221)	High baked epoxy-phenolic (L-5X)		1A2/X435/S (US), 1A2/X440/S (CAN)	FRS/Overpack
8003300	Drum	Steel	85						X		Straight 16	Yellow (Yellow lid with 3/4" bung standard location SK part # 3220)			1A2/X400-440/S	FRS/Overpack
5415	Drum	Plastic	15	X	X		X					Yellow			1H2/Y80/S	Imaging
15415	Drum	Plastic	15	X	X		X					Black			1H2/Y80/S	TFS
3270	Drum	Plastic	15	X	X		X					Black	Barzon (3%)		1H2/Y1.2/80	Dry Cleaning
3280	Drum	Plastic	15	X	X		X					Black(Split 30)	Barzon (3%)		1H2/Y1.2/80	Dry Cleaning

SAFETY-KLEEN DRUMS

<i>SK Inventoried Part #</i>	<i>Category</i>	<i>Type</i>	<i>Size (gal)</i>	<i>Nestable</i>	<i>Open-Head</i>	<i>Tight-Head</i>	<i>Drum Only</i>	<i>Lined</i>	<i>Un-lined</i>	<i>Bung Gasket</i>	<i>Gauge</i>	<i>Description</i>	<i>Manufactured Lining</i>	<i>Reconditioned Lining</i>	<i>UN-Rating</i>	<i>Primary Usage</i>
5552	Drum	Plastic	15			X				X		Blue with 3/4" and 2" bungs			1H1/1.8/100	Imaging
5430	Drum	Plastic	30	X	X		X					Yellow			1H2/Y100/S	Imaging
15430	Drum	Plastic	30	X	X		X					Black			1H2/Y100/S	TFS
5553	Drum	Plastic	30			X				X		Blue with two 2" bungs one NPS and one buttress			1H1/1.8/100	Imaging
5455	Drum	Plastic	55	X	X		X					Yellow			1H2/Y140/S	Imaging
15455	Drum	Plastic	55	X	X		X					Black			1H2/Y140/S	TFS
5555	Drum	Plastic	55			X				X		Blue with two 2" bungs one NPS and one buttress			1H1/1.8/100	Imaging
Non-part	Drum	Plastic	55		X							Blue cut out OH			Exempt	RC waste
8500	Drum	Plastic	95	X	X							Yellow--Salvage Drum			1H2/X/340 S	Overpack
8550	Drum	Fiber	5		X							Brown			UN/1G/X30/S	Lab Pack
8510	Drum	Fiber	10		X							Brown			UN/1G/X60/S	Lab Pack
8515	Drum	Fiber	15		X							Brown			UN/1G/X71/S	Lab Pack
8520	Drum	Fiber	20		X							Brown			UN/1G/Y108/S	Lab Pack
8530	Drum	Fiber	30		X							Brown			UN/1G/X75/S	Lab Pack
3388	Lid	Steel	16						X		Straight 18	Epoxy gray (SK drum 3387)				Immersion Cleaner
3213	Lid	Steel	16					X			Straight 18	Red (SK drum 13348 and 3348)	Rust Inhibitor			Parts Washer
103320	Lid	Steel	16					X			Straight 20	Red (SK drums 3398 and 3348)	Rust Inhibitor			Parts Washer, Oil Recovery
3217	Lid	Steel	16					X			Straight 18	Green (SK drum 13393)	Rust Inhibitor			Parts Washer
3225	Lid	Steel	16					X		X	Straight 18	White with 2" center bung (SK drum 3324)	Rust Inhibitor			FRS
3450	Lid	Steel	16					X		X	Straight 18	White with 2" center bung (SK drum 3250)	Rust Inhibitor			Gas Filter
230044	Lid	Steel	16						X	X	18 gauge	Purchased non-painted lightly oil, painted black by SK, 3 2" bungs, (SK drum 3324)				Oil recovery (Oil trap)
3214	Lid	Steel	30					X			Straight 18	Red (SK drums 13349, 3349 and 3360)	Rust Inhibitor			Parts Washer
103334	Lid	Steel	30					X			Straight 20	Red (SK drum 3399)	Rust Inhibitor			Parts Washer, Oil Recovery
3215	Lid	Steel	30					X			Straight 18	Green (SK drum 13395, 3395 and 3360)	Rust Inhibitor			Parts Washer
3218	Lid	Steel	30					X		X	Straight 18	(SK drum 3392)	Rust Inhibitor			Absorbent
3245	Lid	Steel	30					X		X	Straight 18	3345)	Rust Inhibitor			FRS
3452	Lid	Steel	30					X		X	Straight 18	White with 2" center bung (SK drum 3252)	Rust Inhibitor			Gas Filter

SAFETY-KLEEN DRUMS

SK Inventoried Part #	Category	Type	Size (gal)	Nestable	Open-Head	Tight-Head	Drum Only	Lined	Un-lined	Bung Gasket	Gauge	Description	Manufactured Lining	Reconditioned Lining	UN-Rating	Primary Usage
230021	Lid	Steel	30						X	X	18 gauge	Purchased non-painted lightly oil, painted black by SK, 3 2" bungs, (SK drum 3345)				Oil recovery (Oil trap)
3370	Lid	Steel	55						X	X	Straight 16	Black with 3/4" bung and 2" bung (SK drum 3369)				FRS/Paint Refinishing/Oil Filters
230003	Lid	Steel	55						X	X	18 gauge	Purchased non-painted lightly oil, painted black by SK, 3 2" bungs, (SK drum 3369)				Oil recovery (Oil trap)
3220	Lid	Steel	85					X		X	Straight 16	Yellow with 3/4" bung standard location (SK drum 3300)	Epoxy-phenolic			FRS/Overpack
5471	Lid	Plastic	15							X		Yellow with 2 " bung (SK drum 5415)				Imaging
15471	Lid	Plastic	15							X		Black with 2" bung (SK cover for 15415 (black))				Imaging
3272	Lid	Plastic	15					X		X		Black with 2 3/4" vents and combination 2" bung and 3/4" vent (SK drum 3270)	Level 5 Fluorination			Dry Cleaning
5434	Lid	Plastic	30							X		Yellow with 2 " bung (SK drum 5430)				Imaging
15434	Lid	Plastic	30							X		Black with 2" bung (SK drum 15430)				Imaging
3282	Lid	Plastic	30					X				Black (SK drum 3280)	Level 5 Fluorination			Dry Cleaning
5476	Lid	Plastic	55							X		Yellow with 2" bung (SK drum 5455)				Imaging
15476	Lid	Plastic	55							X		Black with 2" bung (SK drum 15455)				Imaging
8501	Lid	Plastic	95					X				Yellow (SK drum 8500)				Overpack
3289	Ring	Steel	16								Straight 12	Lever-lock/bolt(SK part # 3387, 3250, 13348 and 13393)				Parts Washer, Immersion, Gas Filter
3389	Ring	Steel	16								Straight 12	Bolt ring (SK drum 3324)				FRS
3342	Ring	Steel	30								Straight 12	Bolt ring (SK drums 3391, 3392 and 3345)				FRS, Absorbed
3242	Ring	Steel	30								Straight 12	3348, 13395, 3395, 3360 and 3252)				Filter
3371	Ring	Steel	55								Straight 12	Bolt ring (SK drum 3369 and 8003369)				FRS/Paint Refinishing/Oil Filters
3221	Ring	Steel	85								Straight 12	Bolt ring (SK drum 3300 and 8003300)				FRS/Overpack
5472	Ring	Plastic	15								Straight 16	Lever-lock (SK drums 5415/15415)				Imaging
3274	Ring	Plastic	15								Straight 14	Lever-lock (SK drum 3270)				Dry Cleaning
5435	Ring	Plastic	30								Straight 16	Lever lock (SK drums 5430/15430)				Imaging
3284	Ring	Plastic	30								Straight 12	Lever-lock (SK drum 3282)				Dry Cleaning

SAFETY-KLEEN DRUMS

<i>SK Inventoried Part #</i>	<i>Category</i>	<i>Type</i>	<i>Size (gal)</i>	<i>Nestable</i>	<i>Open-Head</i>	<i>Tight-Head</i>	<i>Drum Only</i>	<i>Lined</i>	<i>Un-lined</i>	<i>Bung Gasket</i>	<i>Gauge</i>	<i>Description</i>	<i>Manufactured Lining</i>	<i>Reconditioned Lining</i>	<i>UN-Rating</i>	<i>Primary Usage</i>
5477	Ring	Plastic	55								Straight 16	Lever-lock (SK drum 5455/15455)				Imaging
3211	Gasket	Nitrile	16									Gasket for 16 gal OH steel drum lids				Parts Washer, FRS, Gas Filter
3212	Gasket	Nitrile	30									Gasket for 30 gal OH steel drum lid				Parts Washer, FRS, Immersion Cleaner, Gas Filter
3273	Gasket	Nitrile	15									Gasket for 15 gal OH plastic drum lid				Dry Cleaning
3283	Gasket	Nitrile	30									Gasket for 30 gal OH plastic drum lid				Dry Cleaning
3372	Gasket	EDPM	55									Gasket for 55 gal OH steel drum lid				FRS/Paint Refinishing/Oil Filters
8503	Gasket	Nitrile	95									Gasket for 95 gal OH plastic drum lid				Overpack

Exhibit D1-4

Container Process Flow at Branch

EXAMPLE

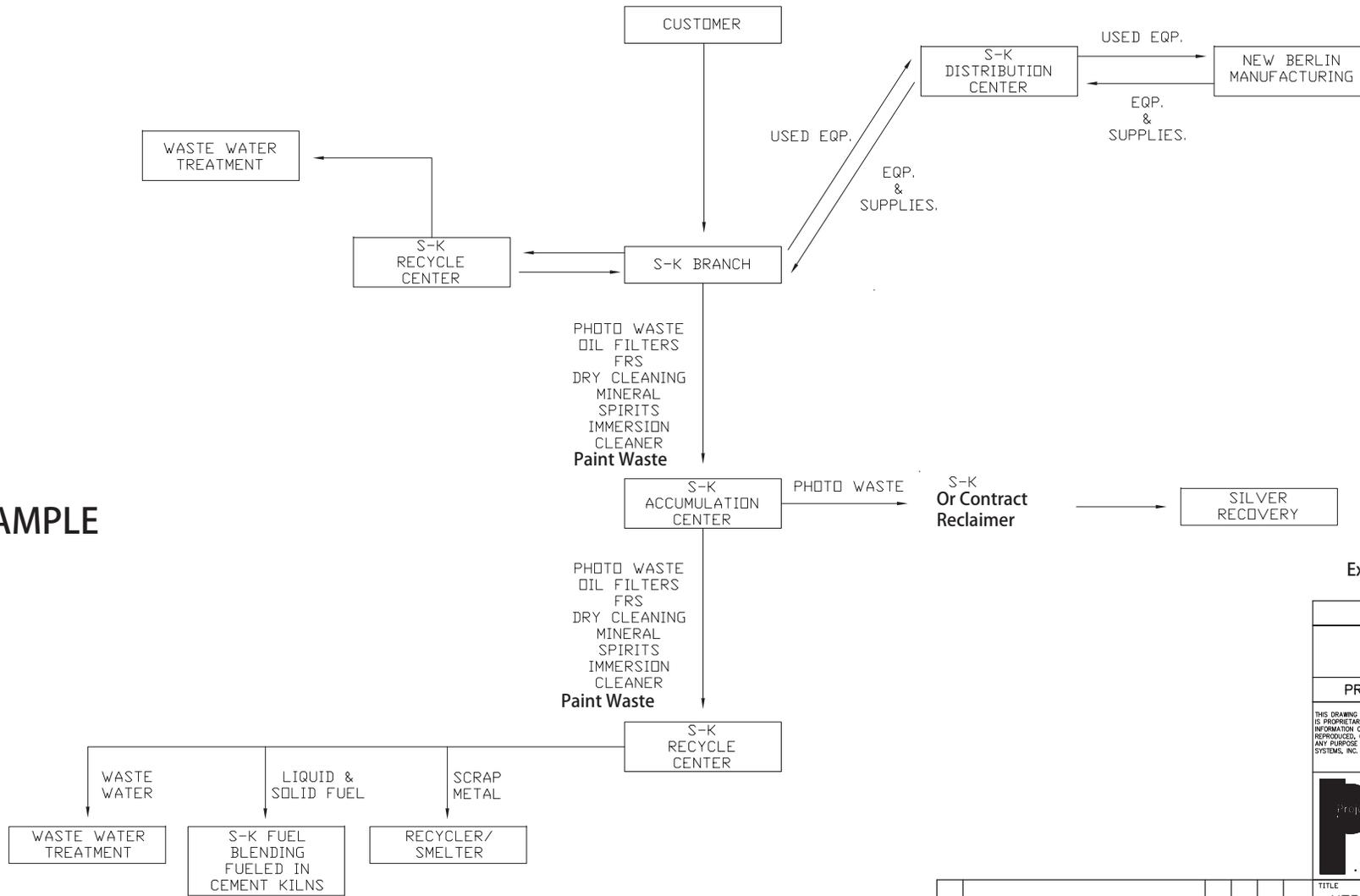


Exhibit D1-4

GENERAL NOTES

PROPRIETARY STATEMENT

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TITLE
NORMAL FLOW DIAGRAM FOR S-K'S CUSTOMER WASTE

SAFETY-KLEEN SYSTEMS, INC.
2600 N. CENT. EXPRESSWAY STE 400 RICHARDSON TX 75080
PHONE 800-669-5740

NO.	DESCRIPTION	BY	CHK	APPR	DATE
X	XX	XXX	XXX	XXX	XXXX
NDL	DESCRIPTION	BY	CHK	APPR	DATE

REVISIONS

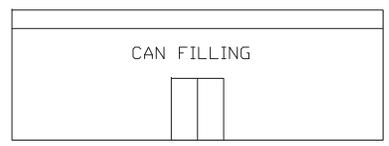
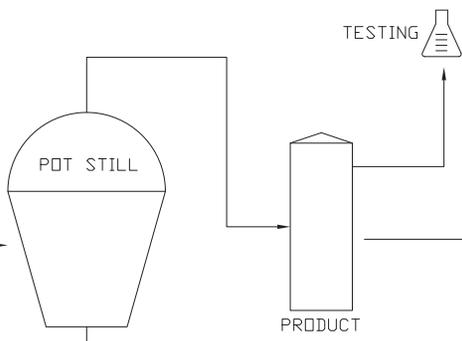
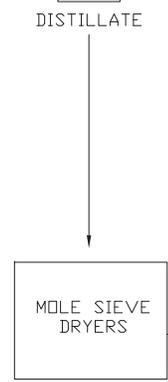
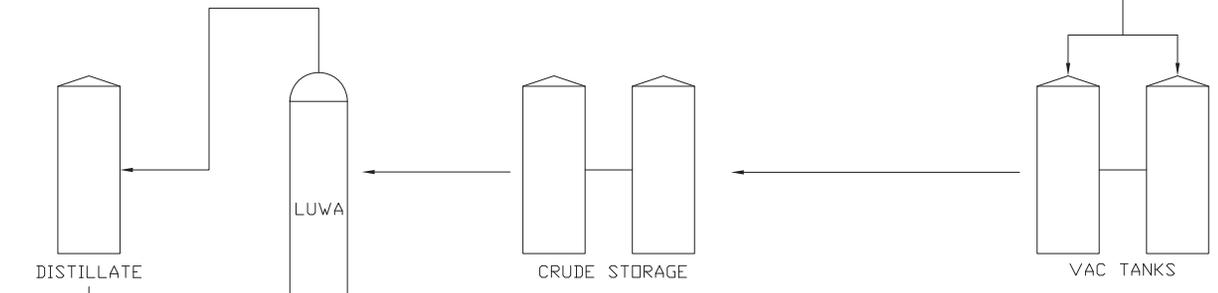
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1/2" = 1'-0"	JEK	GAS	GAS	GAS	2/7/14
BRANCH STANDARD					STD-DWG-REV. NO.

STANDARD

BSD 112

Exhibit D1-5

Paint Waste Process Flow at Recycle Center



TO FUELS
 CEMENT KILN
 CLARKSVILLE, MD.
 HOLLY HILL, S.C.



Exhibit D1-5

~~FIGURE B-12~~

GENERAL NOTES

1. GUN CLEANER WASTE FLUIDS ARE REMOVED FROM 5 AND 16 GALLON CANS BY VACUUM. IT IS THEN STORED UNTIL A FIRST DISTILLATION IS PERFORMED IN A LUWA. FOLLOWING REMOVAL OF WATER IN A MOLE SIEVE DRYER, THE MATERIAL IS DISTILLED A SECOND TIME IN A POT STILL. STILL BOTTOMS FROM DISTILLATION ARE FUEL BLENDED FOR THE CEMENT KILNS.

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TITLE
**PROCESS FLOW DIAGRAM
 GUN CLEANER RECYCLING**

S SAFETY-KLEEN SYSTEMS, INC.
 2600 N. CENT. EXPRESSWAY STE 400 RICHARDSON TX 75080
 PHONE 800-669-5740

NO.	DESCRIPTION	BY	CHK	APPR	DATE
X	XX	XXX	XXX	XXX	XXXX
REVISIONS					

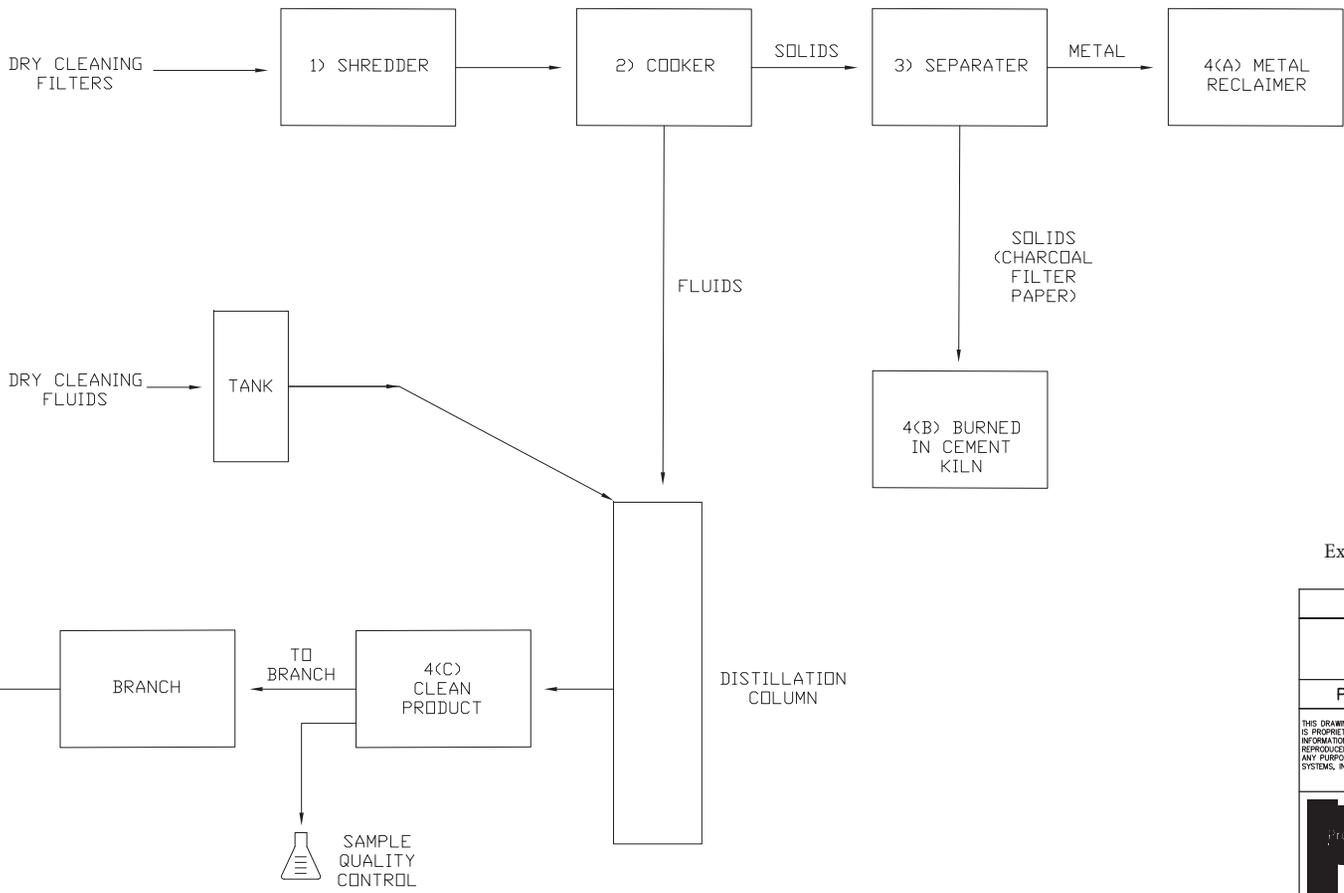
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BRANCH STANDARD					STD-DWG-REV. NO.
STANDARD					BSD 109

Exhibit D1-6

Immersion Cleaner Process Flow at Recycle Center

Exhibit D1-7

Dry Cleaner Process Flow at Recycle Center



EXAMPLE

Exhibit D1-7

GENERAL NOTES																							
PROPRIETARY STATEMENT																							
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<small>2000 West Broadway - Suite 210 - Columbia - MD 21033 Phone: (270) 443-7100 - Fax: (270) 443-7100</small>																							
TITLE PEDCESS FLOW DIAGRAM FOR DRY CLEANING FILTERS																							
 SAFETY-KLEEN SYSTEMS, INC. <small>2600 N. CENT. EXPRESSWAY STE 400 RICHARDSON TX 75080 PHONE 800-669-5740</small>																							
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SCALE	BY	CHKD	P.E. APPR	DP. APPR	DATE																		
X	XX	XXX	XXX	XXXX	2/7/14																		
NL	DESCRIPTION	BY	CHK	APPR	DATE																		
BRANCH STANDARD	STD-DWG-REV. NO.																						
STANDARD	BSD 115																						
REVISIONS																							

Exhibit D1-8

Sherwin Williams Spec Sheet



Protective & Marine Coatings

TILE-CLAD® HIGH SOLIDS

PART A	B62Z	SERIES
PART B	B60VZ70	GLOSS HARDENER
PART B	B60VZ75	EG-SHEL HARDENER
PART B	B60VZX70	MR GLOSS HARDENER

Revised 12/10

PRODUCT INFORMATION

4.30

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 Reduced 10%: <413 g/L; 3.44 lb/gal
Mix Ratio:	1:1 by volume

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	4.0 (100)	7.0 (175)
Dry mils (microns)	2.5 (63)	4.0 (100)
~Coverage sq ft/gal (m²/L)	225 (5.5)	359 (8.8)
Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft	896 (21.9)	

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):

	@ 55°F/13°C	@ 77°F/25°C 50% RH	@ 110°F/43°C
To touch:	3 hours	1 hour	20 minutes
Tack free:	6 hours	2 hours	30 minutes
To recoat:			
minimum:	6 hours	2 hours	30 minutes
maximum:	30 days	30 days	30 days
To stack:	18 hours	16 hours	3 hours
To cure:	21 days	14 days	7 days
<i>If maximum recoat time is exceeded, abrade surface before recoating.</i>			
<i>Drying time is temperature, humidity, and film thickness dependent.</i>			
Pot life:	4 hours	4 hours	2 hours
Sweat-in-time:	1 hour	30 minutes	10 minutes

Shelf Life:	36 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C).
Flash Point:	92°F (33°C), PMCC, mixed
Reducer/Clean Up:	Reducer #54, R7K54-Spray R6K25-Brush & Roll

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
- 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*.
- Lavatories
- Power plants
- Schools
- Marine applications
- Clean rooms
- Nuclear Power Plants
- Nuclear fabrication shops

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

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



Protective & Marine Coatings

TILE-CLAD® HIGH SOLIDS

PART A B62Z
 PART B B60VZ70
 PART B B60VZ75
 PART B B60VZX70

SERIES
 GLOSS HARDENER
 EG-SHEL HARDENER
 MR GLOSS HARDENER

PRODUCT INFORMATION

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RECOMMENDED SYSTEMS

	Dry Film Thickness / ct.	
	Mils	(Microns)
Steel, Epoxy Primer:		
1 ct. Recoatable Epoxy Primer	4.0-6.0	(100-150)
1-2 cts. Tile-Clad High Solids	2.5-4.0	(63-100)
Steel, Universal Primer:		
1 ct. Kem Bond HS	2.0-5.0	(50-125)
1-2 cts. Tile-Clad High Solids	2.5-4.0	(63-100)
Steel, Acrylic Primer:		
1 ct. Pro-Cryl WB Universal Primer	2.0-4.0	(50-100)
1-2 cts. Tile-Clad High Solids	2.5-4.0	(63-100)
Steel, Epoxy Mastic Primer:		
1 ct. Epoxy Mastic Aluminum II	4.0-6.0	(100-150)
1-2 cts. Tile-Clad High Solids	2.5-4.0	(63-100)
Aluminum:		
1 ct. DTM Wash Primer	0.7-1.3	(18-32)
1-2 cts. Tile-Clad High Solids	2.5-4.0	(63-100)
Concrete Block:		
1 ct. Heavy Duty Block Filler	10.0-18.0	(250-400)
1-2 cts. Tile-Clad High Solids	2.5-4.0	(63-100)
Galvanized Metal:		
1-2 cts. Tile-Clad High Solids	2.5-4.0	(63-100)
Poured Concrete/Tilt-Up Concrete Smooth (including floors):		
1-2 cts. Tile-Clad High Solids	2.5-4.0	(63-100)
Wood, including floors:		
1-2 cts. Tile-Clad High Solids	2.5-4.0	(63-100)

The systems listed above are representative of the product's use, other systems may be appropriate.

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

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	C St 2	C St 2	SP 2	-
Pitted & Rusted	D St 2	D St 2	SP 2	-
Rusted	C St 3	C St 3	SP 3	-
Power Tool Cleaning	D St 3	D St 3	SP 3	-
Pitted & Rusted	D St 3	D St 3	SP 3	-

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)
 At least 5°F (2.8°C) above dew point
 Relative humidity: 85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:
 Parts A & B: 1 gallon (3.78L) and 5 gallon (18.9L) containers
 Weight: 10.78 ± 0.2 lb/gal ; 1.3 Kg/L mixed, may vary by color

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.

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.



Protective & Marine Coatings

TILE-CLAD® HIGH SOLIDS

PART A B62Z
 PART B B60VZ70
 PART B B60VZ75
 PART B B60VZX70

SERIES
 GLOSS HARDENER
 EG-SHEL HARDENER
 MR GLOSS HARDENER

Revised 12/10

APPLICATION BULLETIN

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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

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Spa 3	Spa 3	SP 5	1
Near White Metal	Spa 2.5	Spa 2.5	SP 10	2
Commercial Blast	Spa 2	Spa 2	SP 6	3
Brush-Off Blast	Spa 1	Spa 1	SP 7	4
Hand Tool Cleaning	CS St 2	CS St 2	SP 2	-
Pitted & Rusted	DS St 2	DS St 2	SP 2	-
Rusted	CS St 3	CS St 3	SP 3	-
Power Tool Cleaning	DS St 3	DS St 3	SP 3	-

APPLICATION CONDITIONS

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

Relative humidity: 85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Reducer/Clean UpReducer #54, R7K54, R6K25

Airless Spray

Pressure.....2400 psi
 Hose.....3/8" ID
 Tip019"
 Filter60 mesh
 Reduction.....R7K54 as needed up to 10% by volume

Conventional Spray

GunBinks 95
 Fluid Nozzle66
 Air Nozzle.....69 PB
 Atomization Pressure.....60 psi
 Fluid Pressure.....20 psi
 Reduction.....R7K54 as needed up to 10% by volume

Brush

Brush.....Nylon/Polyester or Natural Bristle
 Reduction.....R6K25 as needed up to 10% by volume

Roller

Cover1/4"-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.



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&
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APPLICATION BULLETIN

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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:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	4.0 (100)	7.0 (175)
Dry mils (microns)	2.5 (63)	4.0 (100)
~Coverage sq ft/gal (m ² /L)	225 (5.5)	359 (8.8)
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	896 (21.9)	

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):

	@ 55°F/13°C	@ 77°F/25°C 50% RH	@ 110°F/43°C
To touch:	3 hours	1 hour	20 minutes
Tack free:	6 hours	2 hours	30 minutes
To recoat:			
minimum:	6 hours	2 hours	30 minutes
maximum:	30 days	30 days	30 days
To stack:	18 hours	16 hours	3 hours
To cure:	21 days	14 days	7 days

*If maximum recoat time is exceeded, abrade surface before recoating.
 Drying time is temperature, humidity, and film thickness dependent.*

Pot life:	4 hours	4 hours	2 hours
Sweat-in-time:	1 hour	30 minutes	10 minutes

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

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Reducer #54, R7K54. Clean tools immediately after use with Reducer #54, R7K54. Follow manufacturer's safety recommendations when using any solvent.

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.

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 excessive 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

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.

Exhibit D1-9

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)

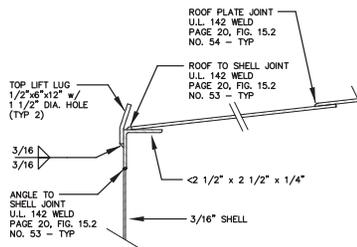
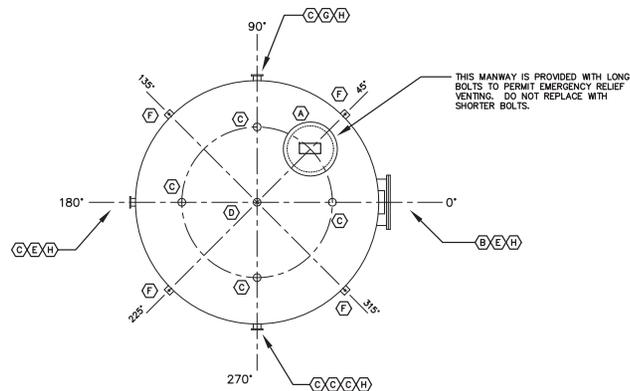
Flexural Strength: 1300 psi (ASTM C-580)

Drum Storage Areas:

Coating must resist the impact and abrasions of wheeled carts, fork trucks, drums and normal operating conditions.

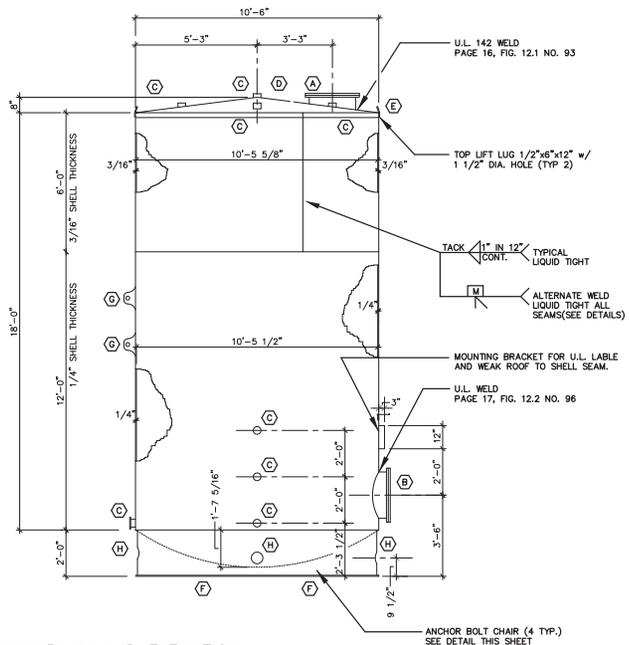
Exhibit D2-1

Tank Fabrication Detail



SHELL TO ROOF DETAIL

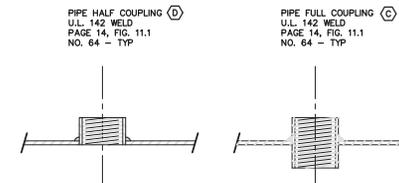
SCALE: 3" = 1'-0"



TANK PLAN AND ELEVATION

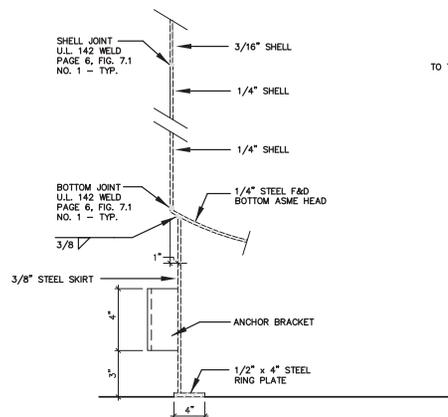
SCALE: 3/8" = 1'-0"

EQUIPMENT SCHEDULE			
MARK	QTY.	SIZE	DESCRIPTION
(A)	1	24"	ROOF MANWAY W/12 - 1/2"x4" L SHOULDER BOLTS
(B)	1	24"	SHELL MANWAY W/24 BOLT PATTERN
(C)	9	4"	FULL COUPLING
(D)	1	3"	HALF COUPLING
(E)	2	-	LIFT LUG
(F)	4	-	<math>< 3-1/2'' \times 3-1/2'' \times 3/8'' \times 4''</math> LONG
(G)	2	-	SIDE LIFT LUG
(H)	4	6"	PORT HOLE AND HINGED COVER



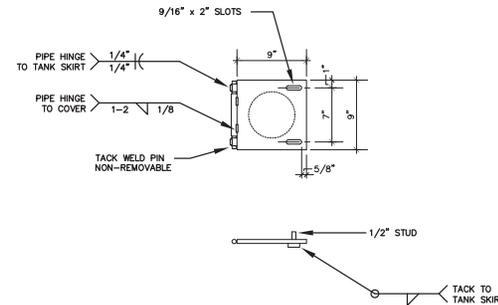
TANK CONNECTIONS

NOT TO SCALE



TANK SKIRT DETAILS

SCALE: 3" = 1'-0"



PORT HOLE HINGED COVER DETAIL

SCALE: 1 1/2" = 1'-0"

Exhibit D2-1

REVISIONS		DATE	BY	CHK	APPR
00	REPLACES DRAWING 9009, ADDED SK CURRENT NOTE SPECIFICATIONS		JHD		
NO.	DESCRIPTION				

SCALE AS SHOWN	BY	CHKD	P.L.E. APPR	OP. APPR	DATE
	JHD		KLS		7-17-91
STANDARD BRANCH LOCATION		STD-DWG NUMBER		REV. NO.	
BOISE, ID.		7114-4100-900		00	

GENERAL NOTES

MANUFACTURER

- 1.) PRESSURE TESTING PROCEDURES SHALL STRICTLY ADHERE TO SAFETY-KLEEN CORP'S SPECIFICATIONS.
- 2.) ALL PERTINENT SAFETY REGULATIONS, "OWNER'S AND OSHA'S", SHALL BE ADHERED TO RIGIDLY. IN ADDITION, ALL SAFETY PRECAUTIONS NOTED ON THE MANUFACTURER'S PRODUCT DATA SHEETS AND LABELS SHALL BE OBSERVED FOR BOTH MATERIAL AND EQUIPMENT.
- 3.) CONSTRUCTION TO MEET UNDERWRITERS LABORATORIES 142' REQUIREMENTS AND BE SO LABELED.
- 4.) THE BOTTOM SHALL BE FLANGED AND DISHD. THE DISH RADIUS SHALL EQUAL THE DIAMETER OF THE TANK AND THE KNUCKLE RADIUS SHALL NOT BE LESS THAN 6X OF THE DIAMETER OF THE TANK.
- 5.) INITIALLY ALL SURFACES TO BE COATED SHALL BE PREPARED IN A WORKMANLIKE MANNER WITH THE OBJECTIVE OF OBTAINING A CLEAN, DRY, AND PROPERLY PREPARED SUBSTRATE.
- 6.) ALL COATINGS SHALL BE APPLIED IN A WORKMANLIKE MANNER TO ACHIEVE THE SPECIFIED DRY MIL FILM BUILD, LEAVING A SMOOTH UNIFORM APPEARING FILM. SPRAY APPLICATION SHALL BE USED WHEREVER POSSIBLE.
- 7.) THE APPLICATION SHALL LEAVE NO SAGS, BRUSH MARKS, OR OTHER DEFECTS.
- 8.) CLEAN AND REMOVE ALL SAND AND DEBRIS FROM THE JOB WHEN COMPLETE.
- 9.) COATING MANUFACTURER'S INSTRUCTIONS MUST BE FOLLOWED WITHOUT EXCEPTION.
- 10.) SURFACE PREPARATION COMMERCIAL BLAST CLEANING (MINIMUM IN ACCORDANCE WITH STEEL STRUCTURES PAINTING COUNCIL SURFACE PREPARATION, SPEC. SSPC-SP6, WITH A PROFILE OF 1.5 - 2.0 MILS. (ALL NON-WETTED PROCESS AREAS)
- 11.) PRIMER COAT FOR TANK - SHALL BE APPLIED SAME DAY AS SAND BLASTING. APPLY ONE COAT SHERMAN WILLIAMS KEM KROKID BROWN WHITE OXIDE PRIMER, 1 MIL DFT, OR APPROVED EQUAL. ALLOW TO DRY 24 HOURS. (ALL NON-WETTED PROCESS AREAS, INCLUDING INSIDE OF SKIRT)(EXCLUDING OUTSIDE OF TANK SKIRT, SEE NOTE 12)
- 12.) FIRE PROOFING PRIMER FOR TANK SKIRT - TANK SUPPORTING SKIRT FIRE PROOFING PRIMER SHALL BE "ALSI #4875", MANUFACTURED BY ALBI WFG, DIVISION OF STAN CHEMICAL INC. OF EAST BERLIN, CT OR APPROVED EQUAL BY OWNER. MATERIAL SHALL BE APPLIED IN A STRICT ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS. (OUTSIDE OF TANK SKIRT ONLY)
- 13.) COATING SYSTEM REQUIRES MINIMUM SURFACE AND MATERIAL TEMPERATURES OF 50 - 55' FAHRENHEIT FOR PROPER CURING/DRYING. DO NOT APPLY OVER MOISTURE OR CONDENSATION.
- 14.) ALL OPENINGS TO THE TANK SHALL BE COVERED PRIOR TO SHIPPING.
- 15.) ROOF MANWAY TO BE SUPPLIED WITH UL APPROVED GASKET, (12) 4" LONG SHOULDER BOLTS AND NUTS, EVERY OTHER BOLT HOLE AND LONG BOLT LABEL ON LD AS INDICATED.
- 16.) TANK SHALL BE TRANSPORTED ON WOOD SURFACES AND PROPER ANCHORING USED TO MINIMIZE TANK DAMAGE DURING SHIPPING.

PROPRIETARY STATEMENT

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SAFETY-KLEEN SYSTEMS, INC.
2600 N. CENT. EXPRESSWAY STE. 400 RICHARDSON, TX 75080
800-669-5740

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 PSIG

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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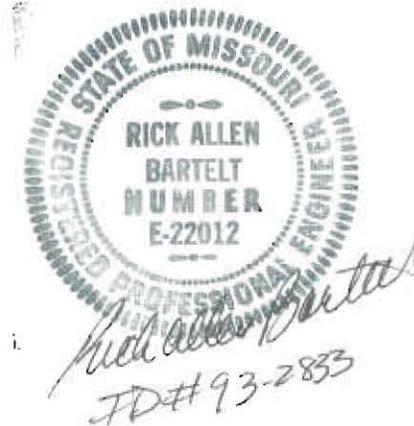
TANK SYSTEM CERTIFICATION

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 tankfarm 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
- (ii) 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.

- (iii) 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)]

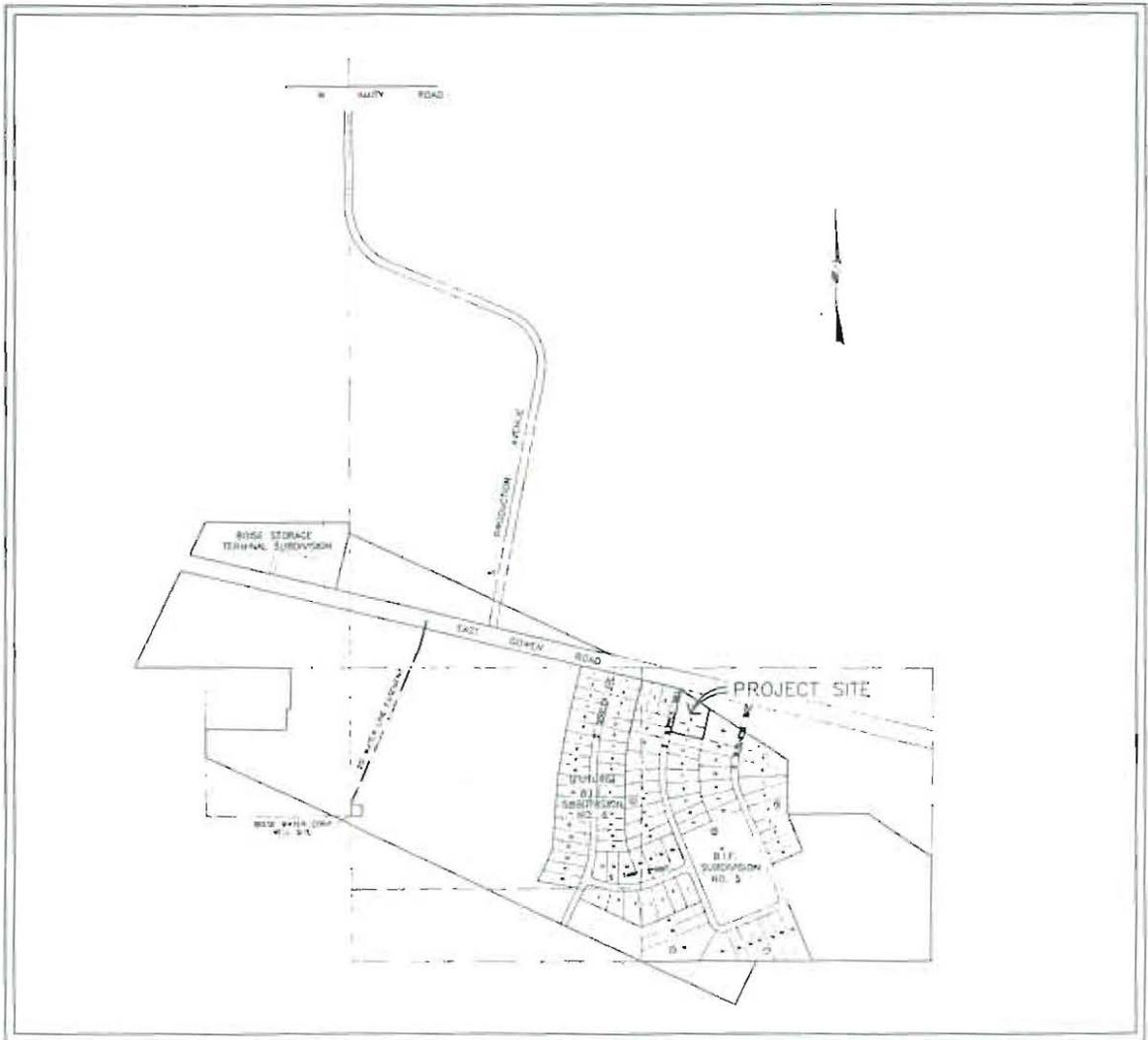
Most of the piping is within or above the secondary containment structure. The piping outside the secondary containment is welded.

CONCLUSION OF ASSESSMENT

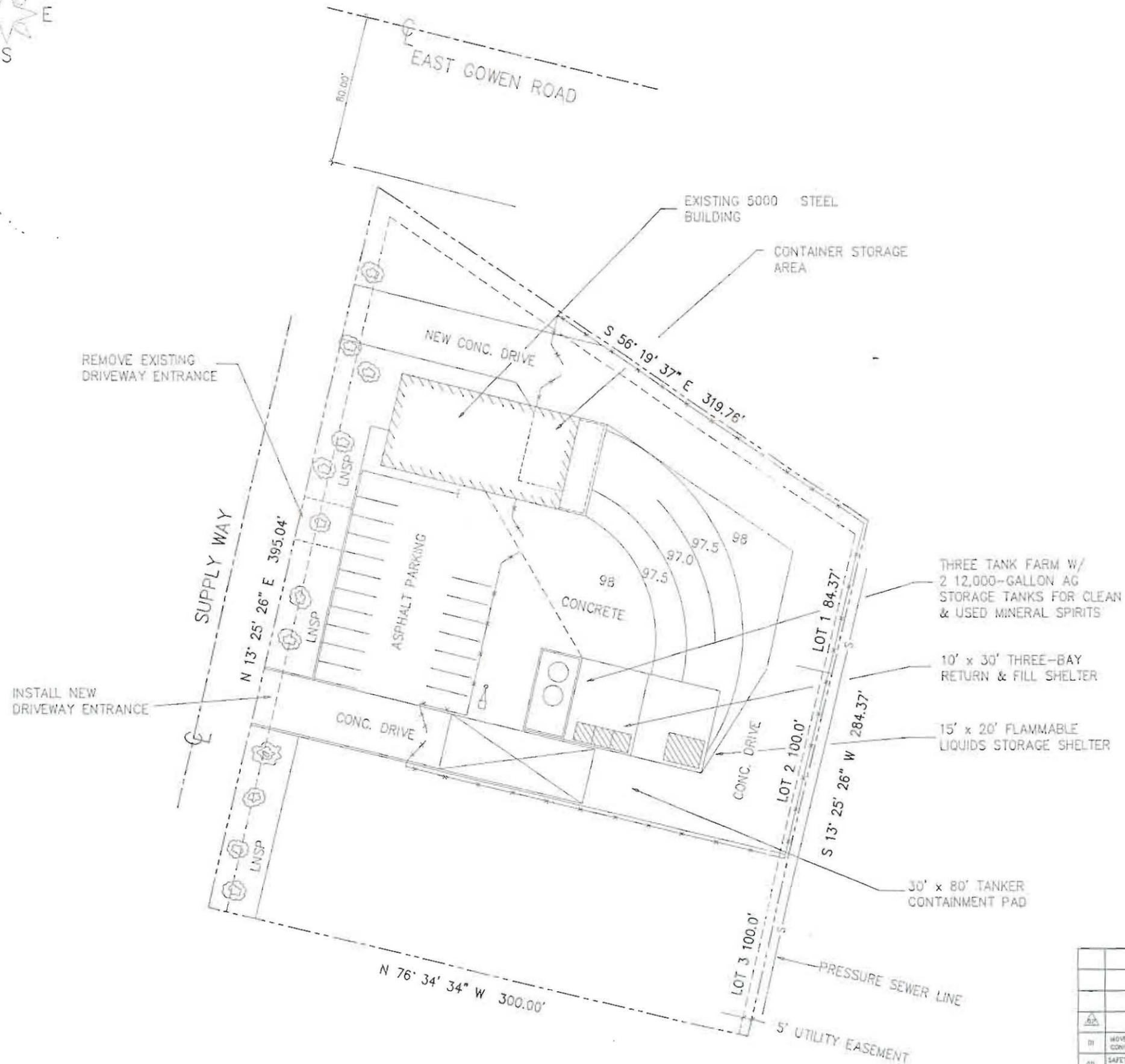
Per the information contained in this report, with one exception, the used mineral spirits and drum washer/dumpster tank system at the Safety-Kleen Branch in Boise, Idaho appears to be installed in accordance with the design drawings and the applicable codes, and to have sufficient structural strength 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

<u>Title</u>	<u>Exhibit No.</u>
Vicinity Plan	1
Site Plan	2
Tank Farm Piping Plan	3
System Schematic	4



VICINITY MAP
NOT TO SCALE



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

PRELIMINARY

2

GENERAL NOTES

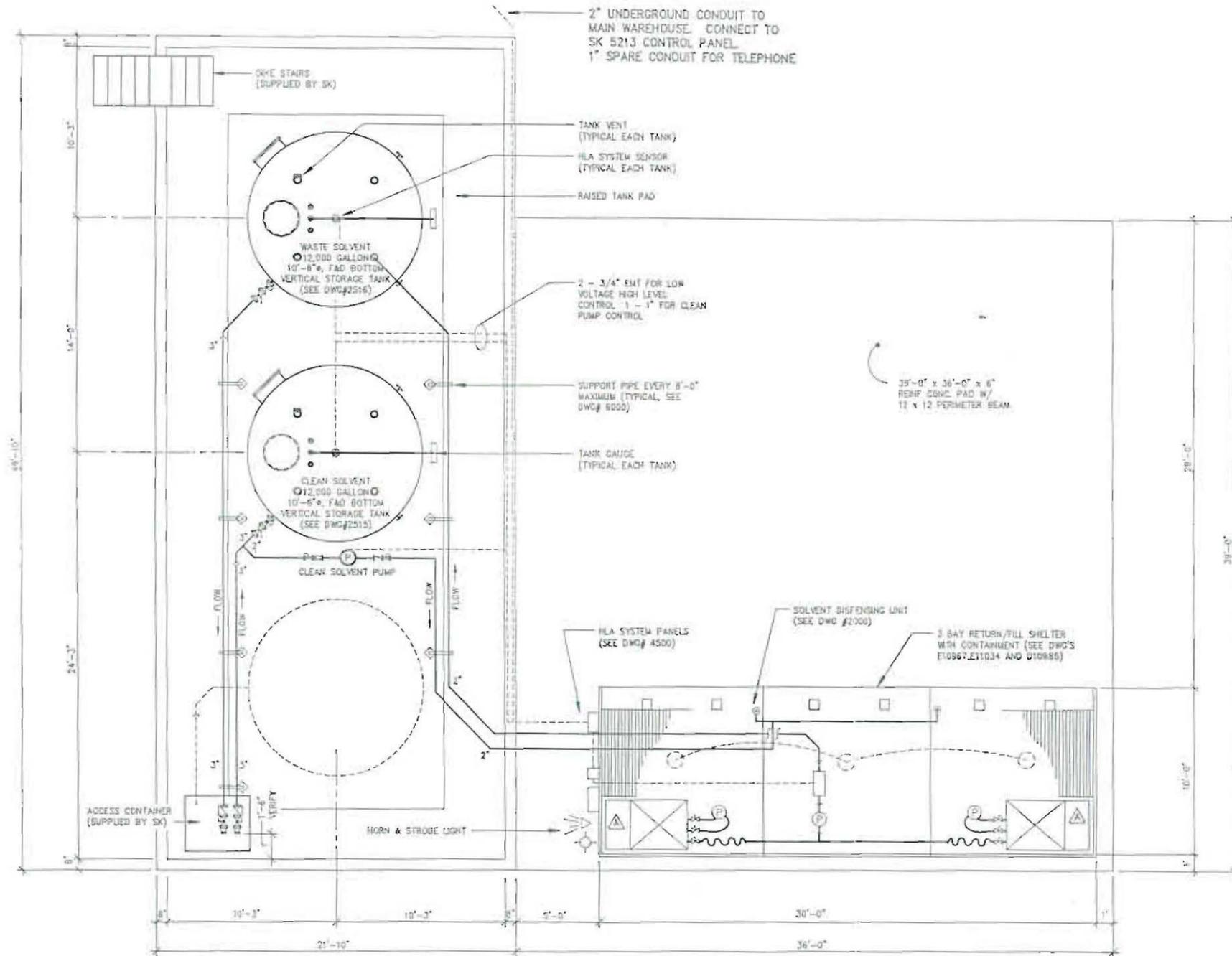
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SITE PLAN

NO.	DESCRIPTION	BY	CHK	APPR	DATE	SERVICE CENTER LOCATION	SC-OWG NUMBER	REV. NO.
01	MOVED NOTE	MJP	-	-	9/20/90			
02	MOVE FENCE OUT 25'. CHANGE ASPHALT YARD TO CONCRETE. RELOCATE LIGHT POLE.	WEY			9-18-91			
03	SAFETY-KLEEN DRAWING CONVERTED TO CAD AS CALLED. REPLACES SAFETY-KLEEN DRAWING D11519.	JYG			5-1-91			
REVISIONS						BOISE, ID	118308-0001	01

SAFETY-KLEEN CORP.
777 W. TUBER ROAD, LOGAN, UTAH 84301, PHONE 708-897-1462

SCALE: 1" = 30'-0"



TANKFARM AND RETURN/FILL PIPING AND EQUIPMENT PLAN

SCALE: 1/4" = 1'-0"

PRELIMINARY

10

GENERAL NOTES

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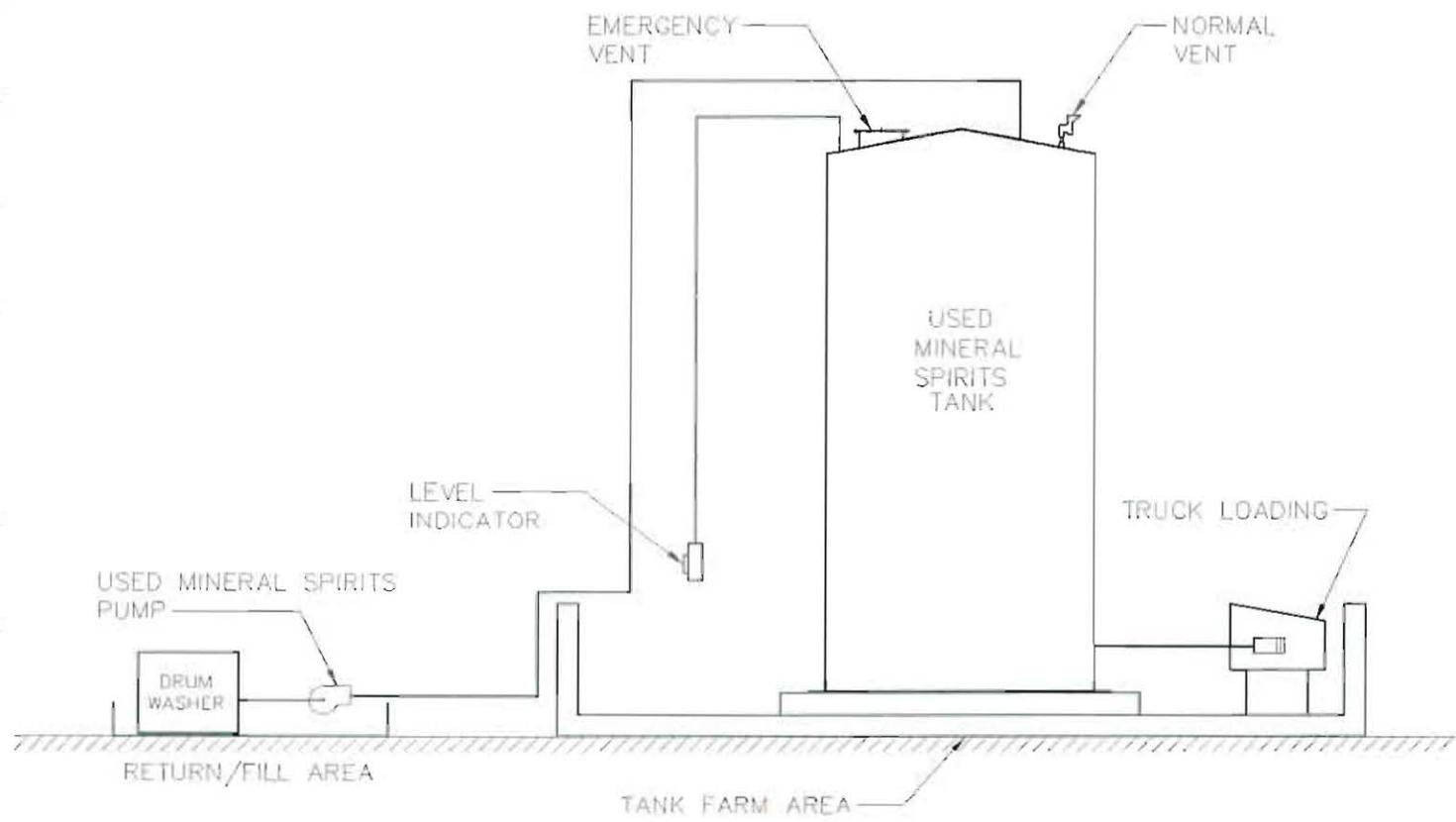
- A) WASTE SOLVENT COLLECTION HOPPER WITH ISOLATION BALL VALVE AND FLEXIBLE HOSE.
- B) CONCRETE PENETRATIONS SHALL NOT BE ALLOWED ON TANKFARM FLOOR.
- C) IF CONSTRUCTION REQUIRES CONCRETE PENETRATIONS AFTER EPOXY COATING IS APPLIED, CONTRACTOR SHALL PATCH AND REPAIR EPOXY COATING PER MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS.

TITLE
TANKFARM AND RETURN/FILL PIPING AND EQUIPMENT PLAN

SAFETY-KLEEN CORP.

777 BO TOWER ROAD ELLEN S. LINDE 4103 PHONE 708-637-8440

NO.	DESCRIPTION	BY	CHK	APPR	DATE	SCALE	BY MEY	CHKD	P.E. APPR	DP. APPR	DATE
01	REVISE TO CURRENT STD'S, CHS PIPING	JND	-	-	082991	1/4" = 1'-0"					8-24-81
02	S-K DRAWING CONVERTED TO CAD	JDC	-	-	082491						
NO.	DESCRIPTION	BY	CHK	APPR	DATE	SERVICE CENTER LOCATION	SC-DWG NUMBER	REV. NO.			
	REVISIONS					BOISE, ID	118308-2001	01			



SYSTEM SCHEMATIC
NO SCALE

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

EXHIBIT
4

APPENDIX A

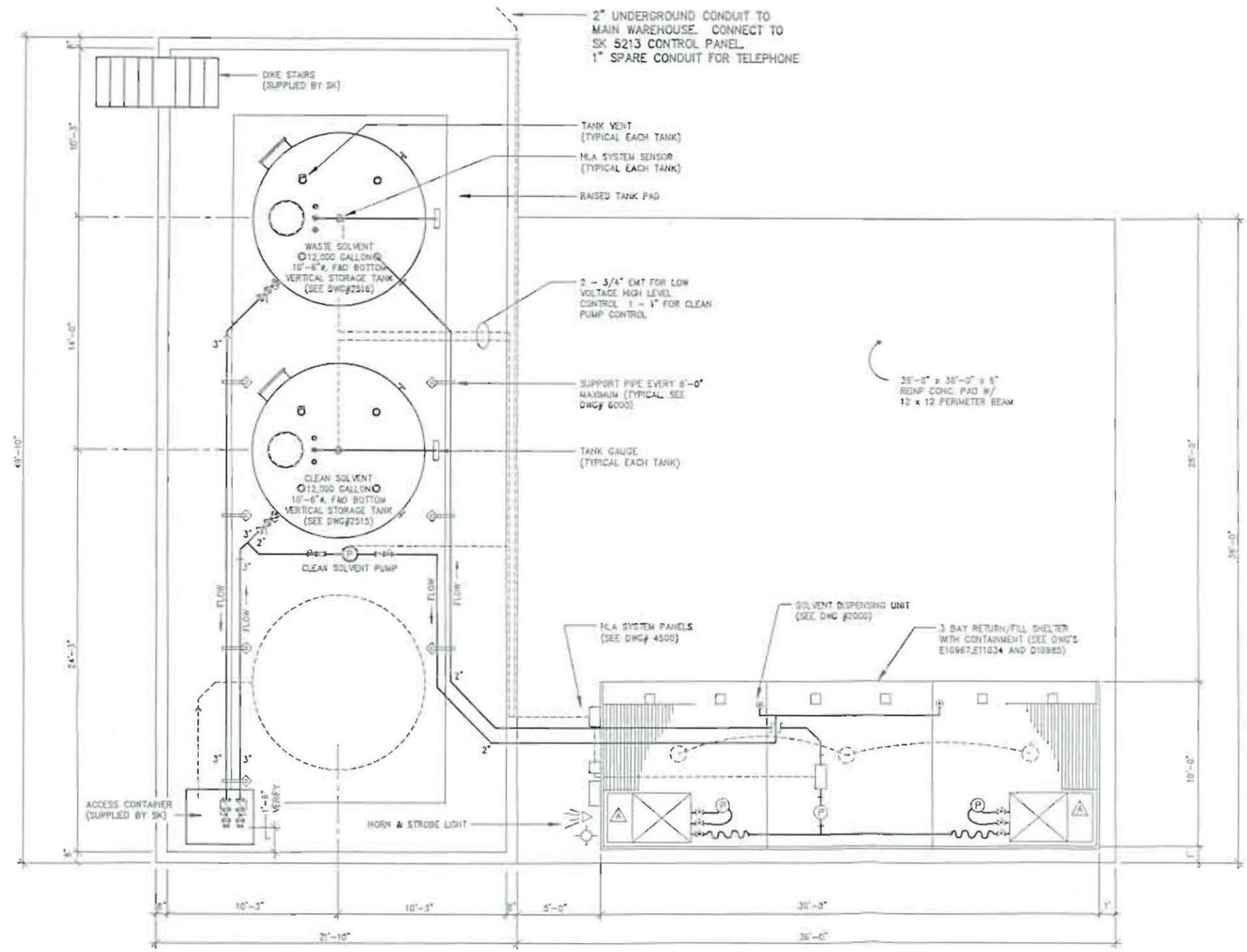
Design Documentation

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.

<u>Title</u>	<u>Page No.</u>
Site Plan, 0001	A-1
Tank Farm Concrete Plan, 5000	A-2
Tank Farm #1 Sections and Details	A-3
Tank Farm and Return/Fill Piping and Equipment Plan, 2001	A-4
Assembly Details for Modular Bay Return/Fill Shelter, E10967	A-5
Drum washer Schematic and Installation Details, 3508	A-6
12,000 Gallon, 10'-6" DIA. Flanged and Dished Bottom Vertical Storage Tank with Flanged Fittings Installation Details, 2512	A-7
Waste Solvent Flanged Vertical Storage Tank Piping Detail	A-8
Storage Tank Access Container Details, 2513	A-9
Pipe and Equipment Support Details, 6000	A-10
Varec Tank Gauge Installation Details, 3500	A-11
Drum Washer Control Panel Diagrams, 4010	A-12
Solvent Tank HLA System Diagram, 4500	A-13
HLA Sensor to Remote Transmitter Installation Details, 4502	A-14
L.C.T. Electronic Control Cabinet Details, 4503	A-15
L.C.T. High Level Alarm Receiver System Details, 4504	A-16
Solvent Wiring Details for Control Panel #1 (SK #5346), 4506	A-17
Control Panel (SK #5213), 4508	A-18
Control Panel (SK #5213) Wiring Diagram, 4509	A-19
SWIC Drum Washer Screen and Filter Details, 1001	A-20



TANKFARM AND RETURN/FILL PIPING AND EQUIPMENT PLAN

SCALE: 1/4" = 1'-0"

PRELIMINARY

10

- GENERAL NOTES**
- A) THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SAFETY-KLEEN CORPORATION. ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT BY SAFETY-KLEEN OR AS SAFETY-KLEEN MAY AGREE IN WRITING.
 - B) WASTE SOLVENT COLLECTION HOPPER WITH ISOLATION BALL VALVE AND FLEXIBLE HOSE.
 - C) CONCRETE PENETRATIONS SHALL NOT BE ALLOWED ON TANKFARM FLOOR.
 - D) IF CONSTRUCTION REQUIRES CONCRETE PENETRATIONS AFTER EPOXY COATING IS APPLIED, CONTRACTOR SHALL PATCH AND REPAIR EPOXY COATING PER MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS.

REVISIONS		DATE		BY		CHK		APPR	
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02	S-K DRAWING CONVERTED TO CAD	JDD	-	-	08/24/01				
NO.	DESCRIPTION	BY	CHK	APPR	DATE				

TITLE		SCALE		BY		CHK		P.E. APPR		OP. APPR		DATE	
TANKFARM AND RETURN/FILL PIPING AND EQUIPMENT PLAN		1/4" = 1'-0"		JHD		JDD						8-24-01	
SERVICE CENTER LOCATION		SC-DWG NUMBER		REV. NO.									
BOISE, ID		118308-2001		01									

SAFETY-KLEEN CORP.
 777 216 TOWER ROAD BOISE BUSINESS CENTER PHONE 708-677-9448

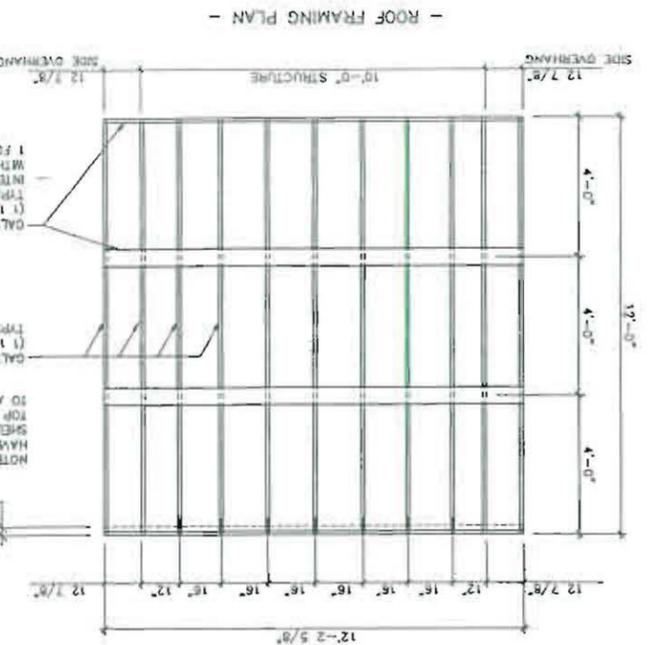
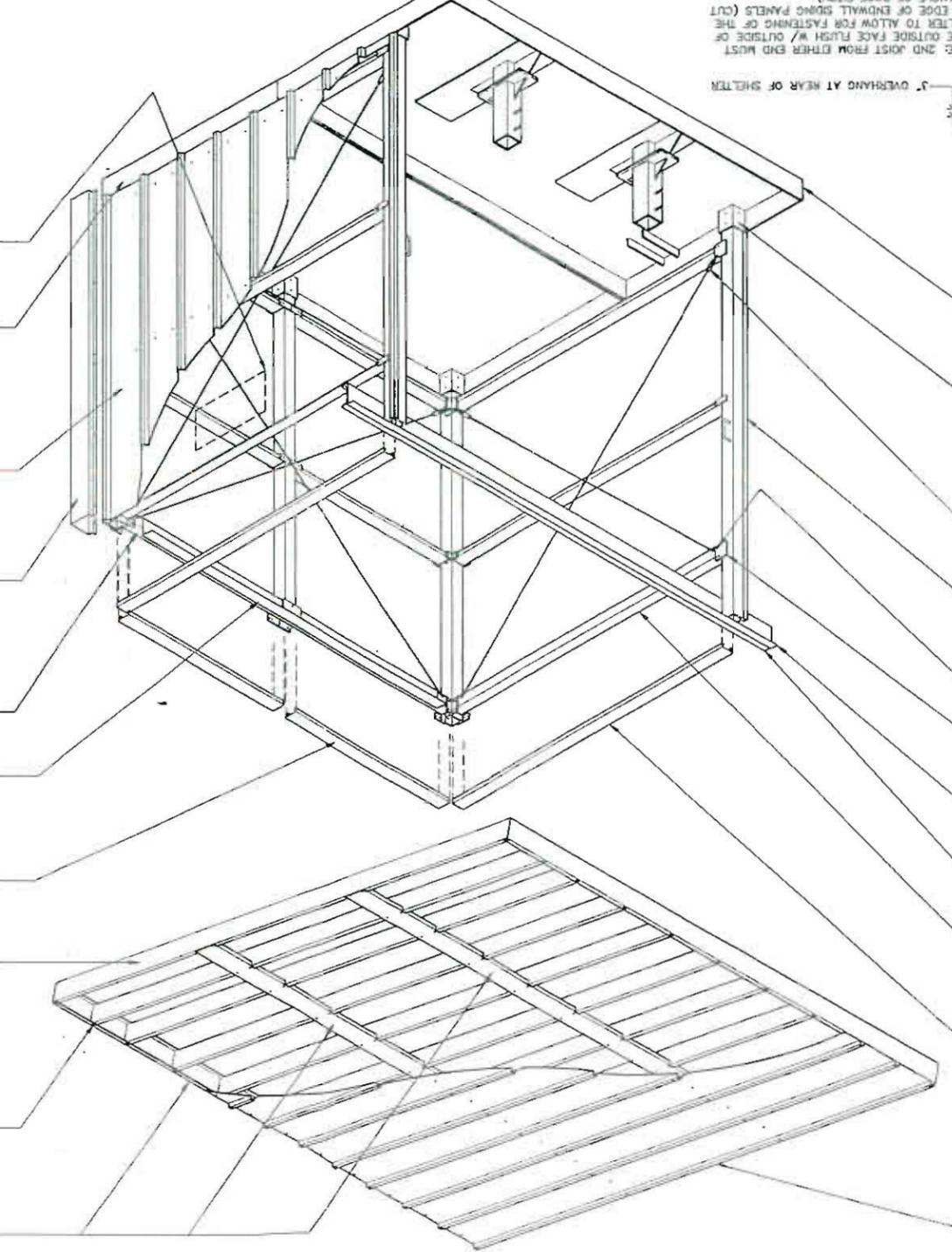
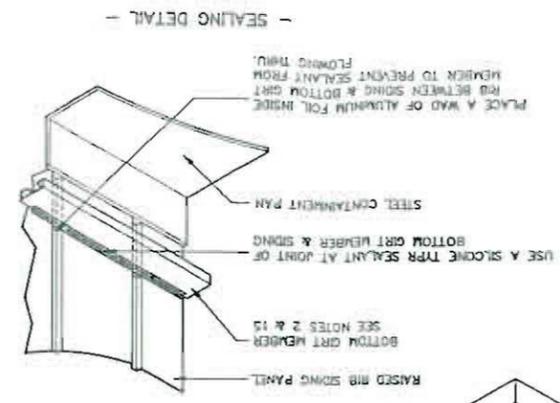
REV. NO.		DATE		BY		CHK		APPR		DATE	
00											
SAFETY-KLEEN CORP. 177 RD THORNTON ROAD ELK RIVER MINN 55125-4442											
ASSY. DETAILS FOR MODULAR BAY RETURN/FILL SHELTER											
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SAFETY-KLEEN CORPORATION. ANY REPRODUCTION, DISCLOSEURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT BY SAFETY-KLEEN OR AS SAFETY-KLEEN MAY AGREE IN WRITING.											
GENERAL NOTES											

NO.	DESCRIPTION	BY	CHK	APPR	DATE
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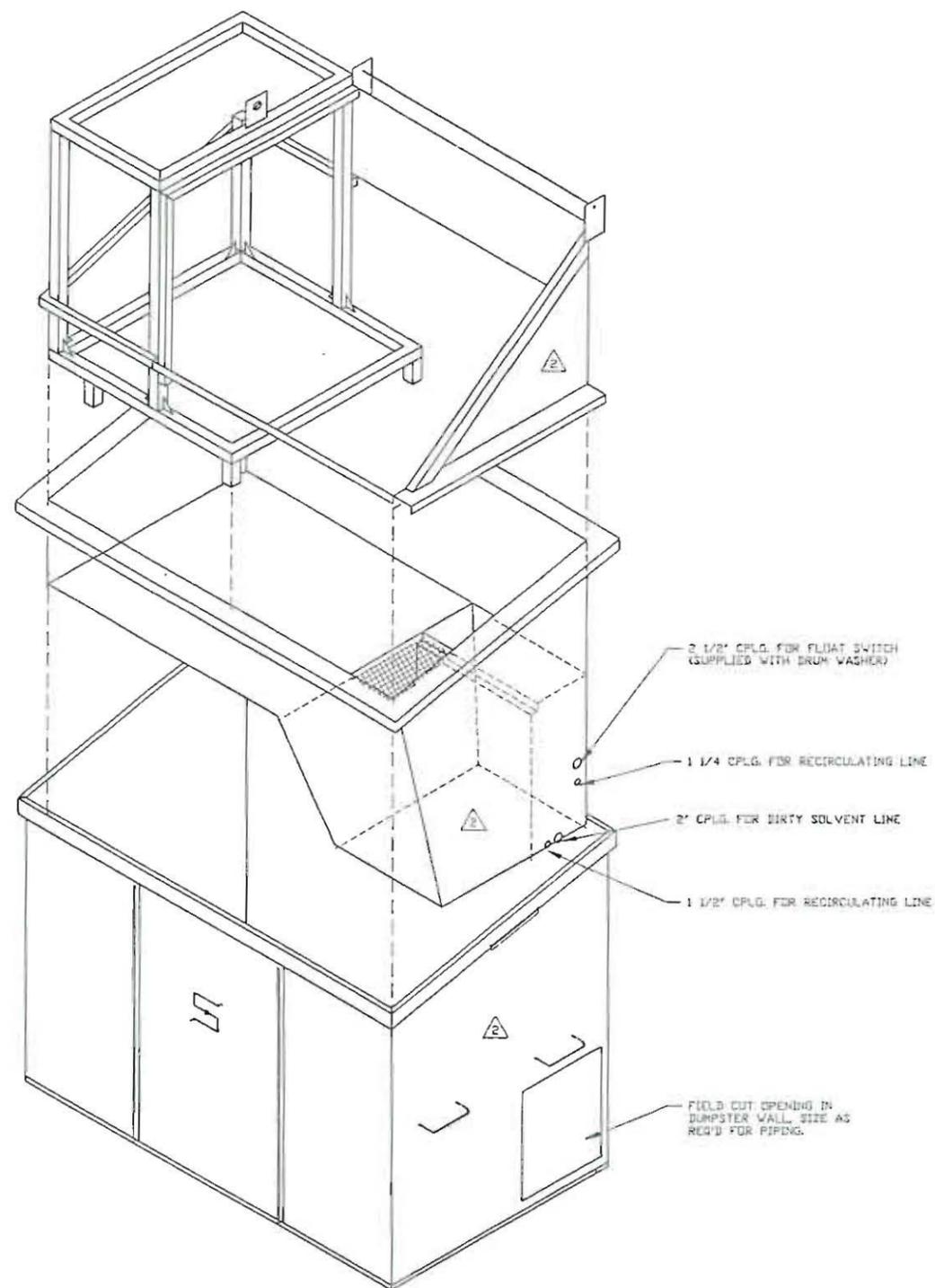
TYPE	A	B	C	D
FASTENERS				

TYPE	A	B	C	D
FASTENERS				

- 12 GALVANIZED STEEL RUNNER TRACK - 16 GA. (1/4" X 6" X 12'-1 3/4" LONG) * REQUIRED TOTAL (2 FRONT & REAR TO ENDS OF JOIST & 2 CROSSMEMBERS) USE 2 TYPE 'A' FASTENERS TO FASTEN CROSSMEMBERS AT EACH JOIST. SEE LOCATIONS & FASTENER TYPE 'B' PLAYS BETWEEN RISER PANELS TO BE SEAMLESS TO AVOID RUST SPOTTING.
- 13 LOCATE & MARK JOIST LOCATIONS PER ROOF FRAMING PLAN AT LEFT & CENTER PUNCH FOR TWO FASTENERS. TYPICAL EACH JOIST LOCATION (FRONT & REAR, TOP & BOTTOM). USE FASTENER TYPE 'A' FOR THIS OPERATION.
- 14 GALVANIZED STEEL 'C' SHAPE JOIST - 16 GA. (1/4" X 6" X 12'-0" LONG) 11 REQUIRED (SEE ROOF FRAMING PLAN FOR DETAILS)
- 15 GALVANIZED STEEL 'C' SHAPE GIRT MEMBER - 20 GA. (1/4" X 3 5/8" X 6'-8 1/2" LONG) USE 3 ON EITHER SIDE OF REAR CENTER POST (6 TOTAL). FASTEN SINGING TO THESE MEMBERS FROM OUTSIDE USING FASTENER TYPE 'A' (SEE NOTES 6 & 19)
- 16 ROOF STRUCTURE ATTACHMENT ANGLE (SEE NOTE 17)
- 17 REAR STRUTTER ANGLE BOLT TO BRACKETS USING 1/2-13 X 1 1/2" LONG MACHINE BOLTS (SEE SAFETY-KLEEN DWG. D1098 FOR ANGLE DETAILS AND NOTE 7). (SUPPLIED BY SAFETY-KLEEN). USE FASTENER TYPE 'A' TO FASTEN ROOF STRUCTURE TO ANGLE ATTACHED TO REAR ANGLE STRUTTER MEMBER. ATTACHMENT ANGLE TO BE DRILLED (3/16 DRILL) AT EVERY ROOF JOIST LOCATION WHICH PASSES ACROSS ANGLE FOR TWO FASTENERS TYPICAL.
- 18 CORNER TRIM FINISH SECTIONS X 8'-0" LONG (2 REQUIRED). FASTEN TO SINGING @ 3", 24", 45", 46", 69" & 90" DOWN FROM TOP EDGE WHICH FLUSH WITH TOP OF SINGING. USE TYPE 'A' FASTENER FOR THIS OPERATION. FASTEN AT LOCATIONS GIVEN ABOVE ON SIDES & REAR. CORNER TRIM SECTIONS TO HAVE GOLD/TAPE EXTERIOR AND WHITE INTERIOR BAKED ON FINISH AS SIDING PANELS.
- 19 HIGH RISER 8'-12" O.C. SIDING PANELS HAVE A GOLD/TAPE EXTERIOR & WHITE INTERIOR BAKED ON FINISH TYPICAL. USE TYPE 'A' FASTENERS IN EACH VALLEY AND CENTERED ON 1 1/4" GIRTS. ASSEMBLY NOTES: SIDING SHOULD BE MARKED & CENTER PUNCHED AT ALL FASTENER LOCATIONS PRIOR TO PLACING UP ON SHELTER. THIS WILL AID IN HOLDING FASTENERS IN PLACE WHILE PRACTICE AT ANY OTHER FASTENING LOCATIONS. THIS IS ALSO A GOOD WORKING THIS DRAWING WITH SAFETY-KLEEN DRAWINGS D1098S & E11034 FOR ADDITIONAL INFORMATION REGARDING ASSEMBLY OF RELATED COMPONENTS FOR MULTIPLE BAY SYSTEMS.
- 20 DWG. D1098, S-K PART NUMBER 5298. SEE DETAILS ON SAFETY-KLEEN REAR PLAN OF TWO STEEL CONTAINMENT PANS. SEE DETAILS ON SAFETY-KLEEN COMPOSITE - KEEP FINE AWAY - SINK (SUPPLIED BY SAFETY-KLEEN), S-K PART NUMBER B1207. (TYPICAL 3 SIDES & EACH OVERHEAD DOOR IF DOORS ARE USED). LOCATE APPROX. 7'-0" ABOVE GRADE.

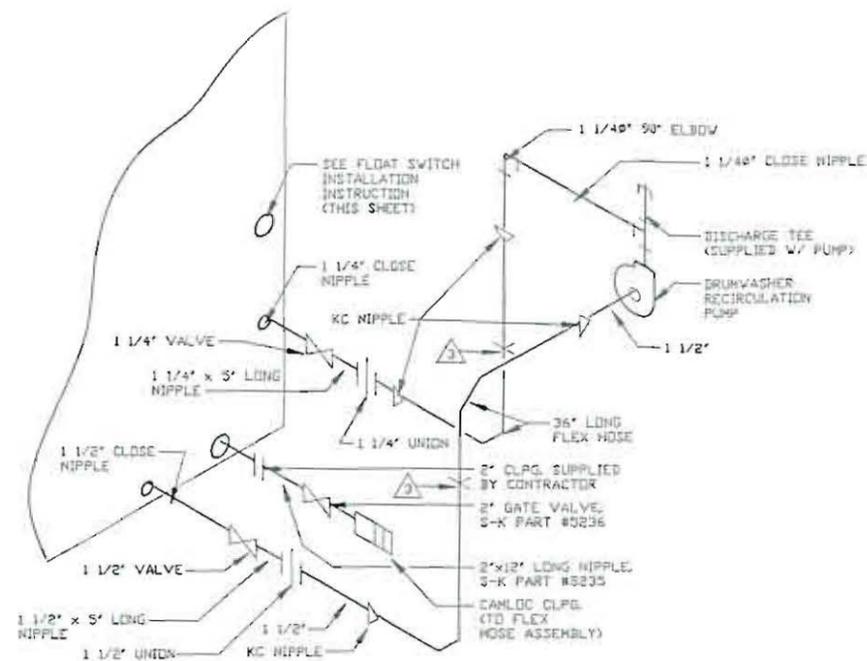


- 1 RAISED RIB SIDING PANEL (25 GA. STEEL - 37 3/4" WIDE X 12'-0" LONG) W/ 3/4" HIGH RISER 8'-12" INCHES ON CENTER TYPICAL. ALL SEAMS TO BE SEAMLESS TO AVOID RUST SPOTTING. FASTENERS WILL BE PLACED ON BAKED ON EXTERIOR & INTERIOR FINISH. ROOF PANELS TO HAVE A WHITE (12) & 4 1/2" ALONG BOTH SIDE EDGES. FASTENERS (SEE NOTE 1) FASTEN ONCE AT EVERY FLAT ON INTERMEDIATE CROSSMEMBERS (SEE NOTE LOCATIONS & FASTENER TYPE 'B' PLAYS BETWEEN RISER PANELS TO BE SEAMLESS TO AVOID RUST SPOTTING. USE FASTENER TYPE 'A' TO BE SEAMLESS TO AVOID RUST SPOTTING. USE FASTENER TYPE 'A' TO BE SEAMLESS TO AVOID RUST SPOTTING.
- 2 'C' SHAPE 20 GA. GALVANIZED STEEL STUD MEMBER (1 1/4" X 3 5/8" X 7'-9 1/2" LONG) 3 PER SIDE (6 TOTAL). FASTEN SINGING TO THESE MEMBERS FROM OUTSIDE (SEE NOTES 6 & 19). USE FASTENER TYPE 'A'. NOTE: FOR LOCATIONS REQUIRING 40 PSF WIND LOAD DESIGN, MIDDLE SIDE WALL GIRT WILL BE A DOUBLE MEMBER. 4 PER SIDE (8 TOTAL).
- 3 SIDE STRUTTER ANGLE - BOLT TO BRACKETS USING 1/2-13 X 1 1/2" LONG MACHINE BOLTS. SEE NOTE 7 & SAFETY-KLEEN DWG. E1098 FOR DETAILS OR ANGLES (SUPPLIED BY S-K).
- 4 CHANNEL BEAM - (6S X 10S) BOLT TO STUDS PROVIDED ON FRONT POSTS. SEE SAFETY-KLEEN DWG. D1098 (SUPPLIED BY SAFETY-KLEEN).
- 5 USE FASTENER TYPE 'A' TO SECURE ROOF STRUCTURE TO ANGLE ATTACHED TO CHANNEL BEAM. ANGLE TO BE DRILLED (3/16 DRILL) AT EVERY ROOF JOIST LOCATION FOR TWO FASTENERS TYPICAL.
- 6 USE FASTENER TYPE 'A' TO FASTEN 20 GAUGE GIRT SECTIONS BRACKETS & FASTENERS TYPICAL AT ENDS OF ALL GIRTS.
- 7 STRUTTER ANGLE AROUND TOP OF STRUCTURE. USE FLAT WASHERS BOTH & LOCKWASHER ON NUT SIDE (TYPICAL 7 PLACES) NOTE: PLACE NUT ON OUTSIDE OF ANGLE - FINGER TIGHT ONLY. THIS TIME (SEE NOTE 9).
- 8 SAFETY-KLEEN DWG. D1098 FOR DETAILS (SUPPLIED BY SAFETY-KLEEN).
- 9 TURNBUCKLE, HOOK & 3/8" AIRCRAFT CABLE ASSEMBLY (SUPPLIED BY SAFETY-KLEEN). USE TO PUMP OR SQUARE STRUCTURE. ALL CABLES MUST BE TIGHT AFTER ADJUSTING STRUCTURE. ONCE STRUCTURE IS SQUARE, TIGHTEN NUTS ALL SEVEN BOLT & NUT ASSEMBLY USED ON STRUTTER ANGLE (SEE NOTE 7) & TWO NUTS HOLDING CHANNEL BEAM TO FRONT POSTS. NOTE: FOR LOCATIONS REQUIRING 40 PSF WIND LOAD DESIGN, 4 SIDE WALL CABLES TO BE 1/4" DIA. FOR 2 & 3 BAY SHELTERS SIDE WALL CABLES TO BE 5/16" DIA.
- 10 ALL POST ANCHORING BOXES HAVE A DUAL SET OF 3/8" DIA HOLES ON EACH INTERNAL EXPOSED SIDE. FOLLOWING COMPLETION OF ROOF & USE FASTENER TYPE 'C' TO DRILL THRU 3/16" HOLE AND USE ALL HOLES AVAILABLE.
- 11 FRONT PAN OF TWO STEEL CONTAINMENT PANS. SEE SAFETY-KLEEN DWG. D1098 (S-K PART NUMBER 5297).



DRUM WASHER ASSEMBLY DETAIL

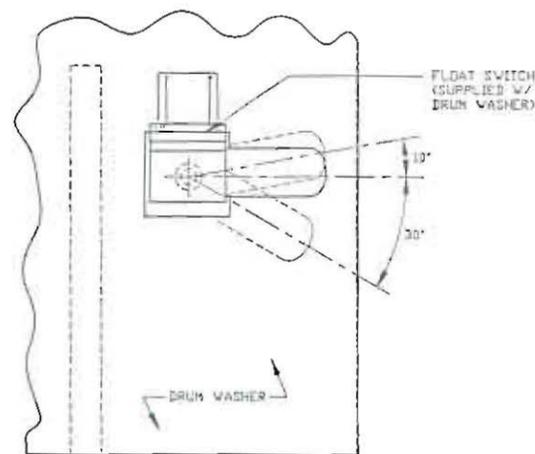
SCALE: NONE



* ALL PIPING & EQUIPMENT SUPPLIED BY S-K & INSTALLED BY CONTRACTOR UNLESS OTHERWISE NOTED.

DRUM WASHER PIPING SCHEMATIC

SCALE: NONE



FLOAT SWITCH DETAIL

SCALE: NONE

GENERAL NOTES

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1. SEE SHEET 4010 FOR ELECTRICAL AND CONTROL PANEL.

△ SUPPLIED BY S-K AND INSTALLED BY CONTRACTOR.

△ RETURN/FILL STEEL DOCK PENETRATION.

FLOAT INSTALL. INSTRUCTIONS

1. TAKE FLOAT SWITCH AND WRAP CLOCKWISE WITH 2 WINDS OF TEFLON TAPE AND INSTALL INTO 2 1/2" COUPLING ON OUTSIDE OF DRUMWASHER.
2. TAKE FLOAT AND THREAD INTO THE FLOAT SWITCH SHAFT FROM THE INSIDE OF THE DUMPSTER AND TIGHTEN SECURELY.
3. RELEASE SHIPPING BRACKET BY REMOVING SCREW AND DISCARDING BRACKET.
4. FLOAT TRAVEL SETTING ADJUSTMENTS CAN BE ACCOMPLISHED BY LOOSENING ADJUSTMENT SCREWS. THE FLOAT TRAVEL ARC SHOULD BE SET AT 10" TRAVEL UP AND 30" TRAVEL DOWN. (SEE CALIBRATION ON DIAL.) SEE FLOAT SWITCH DETAIL.
5. FLOAT SWITCH TO BE INSTALLED ON SAME SIDE OF DUMPSTER AS DRAIN LINE. SEE RETURN/FILL AREA SOLVENT PIPING PLAN - DWG. 3205. FLOAT SWITCH IS SQUARE D CLASS 9037 HR - 3 (RIGHT HAND) OF HR - 4 (LEFT HAND).
6. RE-ADJUST FLOAT STOPS TO THOSE SHOWN ON FLOAT SWITCH DETAIL.

PRELIMINARY

11

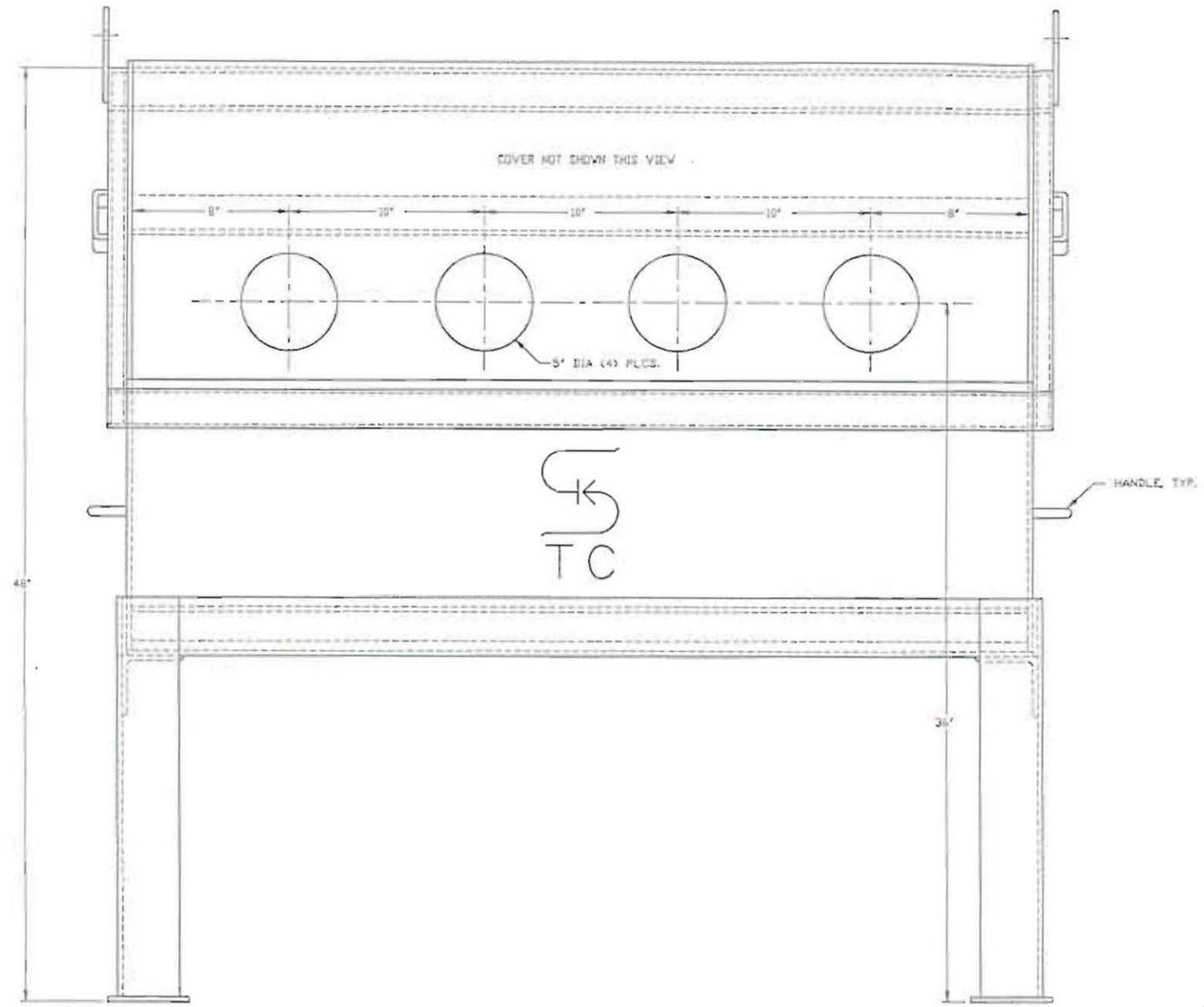
NO.	DESCRIPTION	BY	CHK	APPR	DATE

TITLE
DRUM WASHER SCHEMATIC AND INSTALLATION DETAILS

SAFETY-KLEEN CORP.

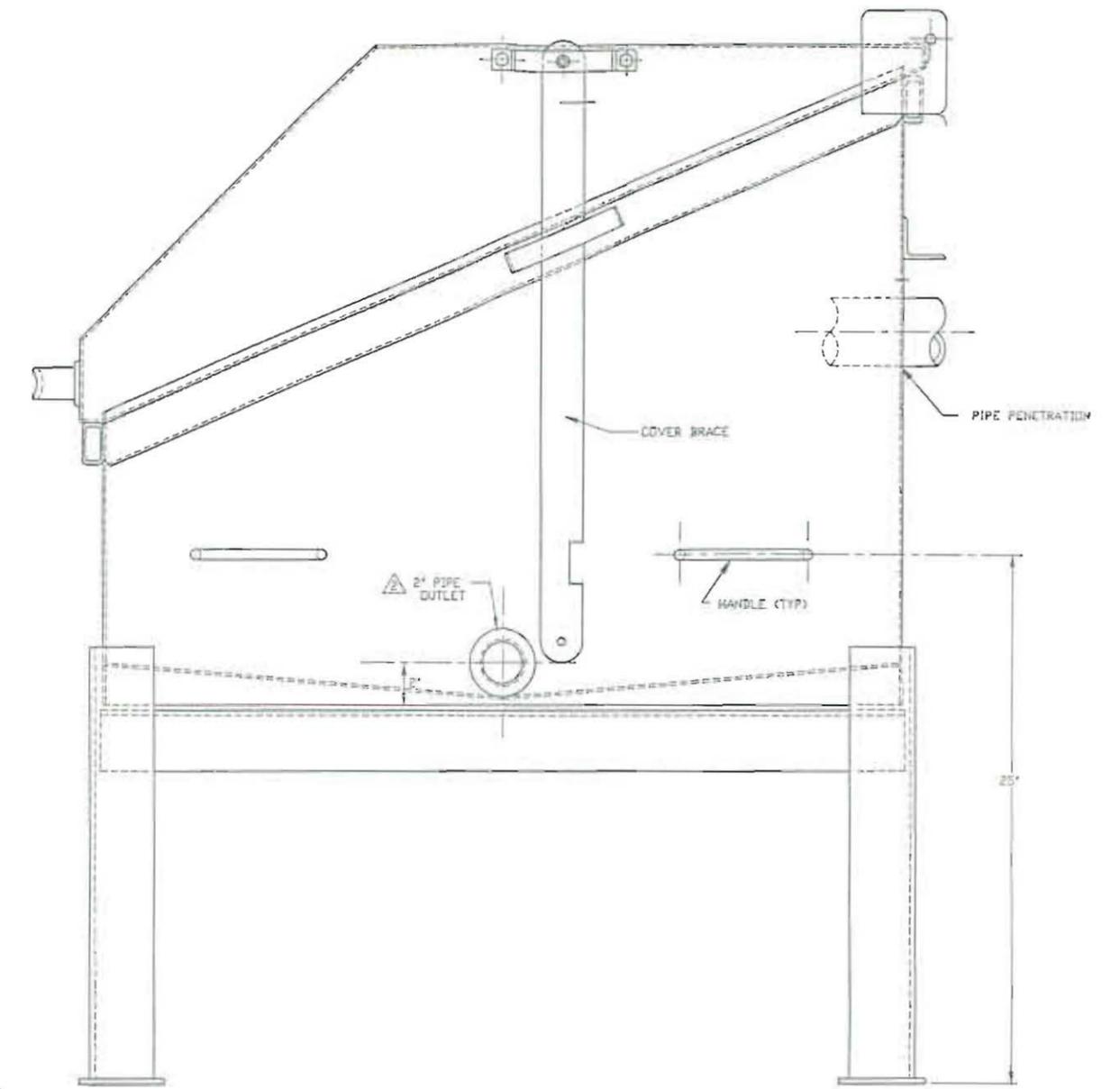
277 215 TOWER ROAD ELGIN, ILLINOIS 60120 PHONE 708-497-6448

SCALE	BY	CHKD	P.E. APPR	OP. APPR	DATE



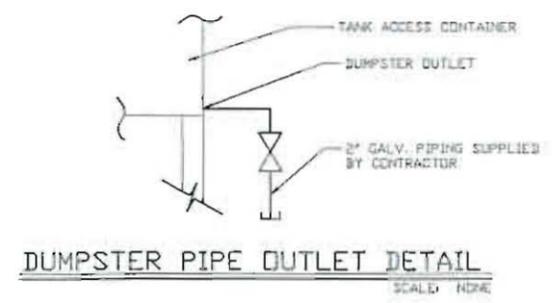
TANK ACCESS CONTAINER - FRONT VIEW

SCALE: 1/4"=1'



TANK ACCESS CONTAINER - SIDE VIEW

SCALE: 1/4"=1'



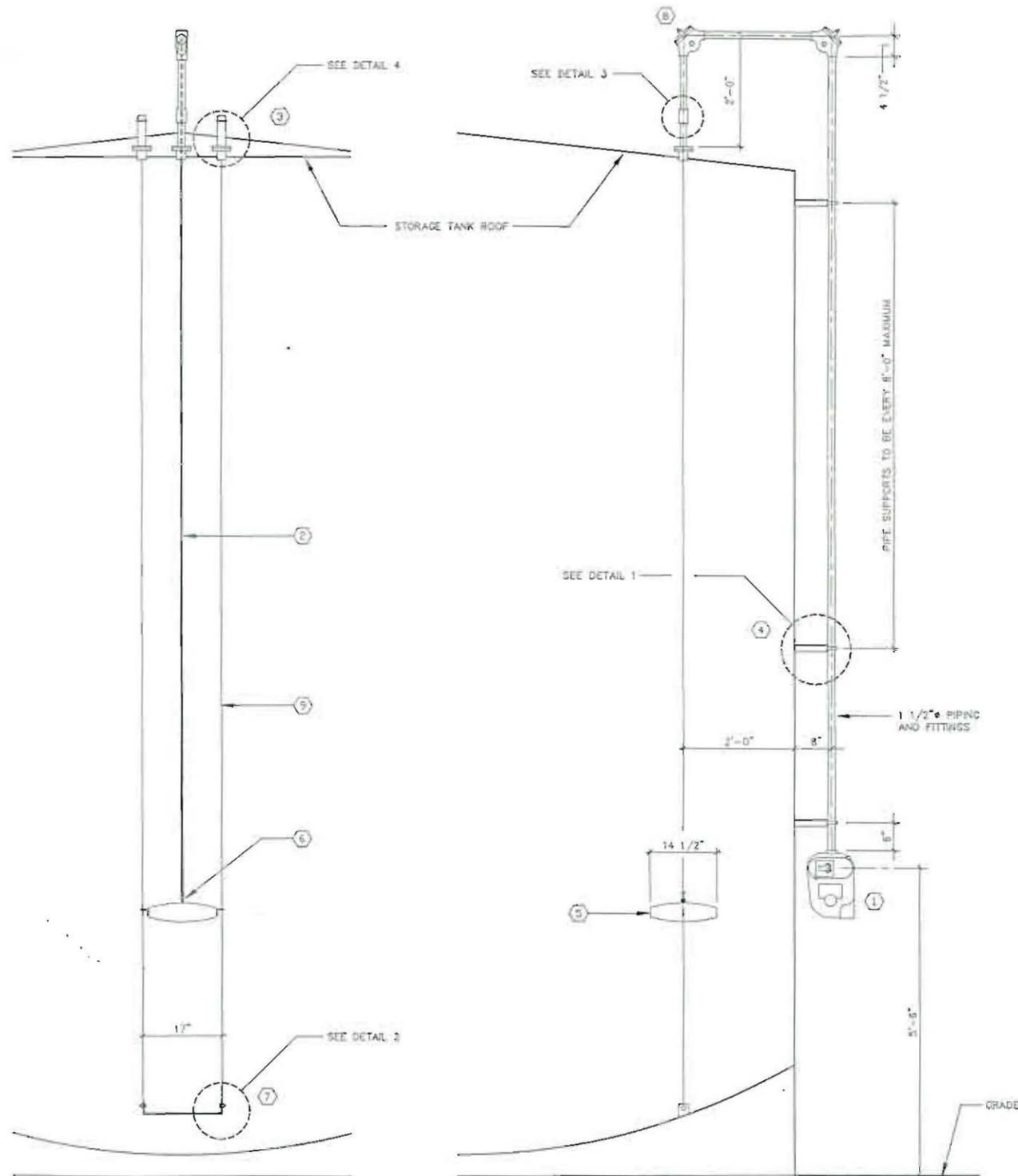
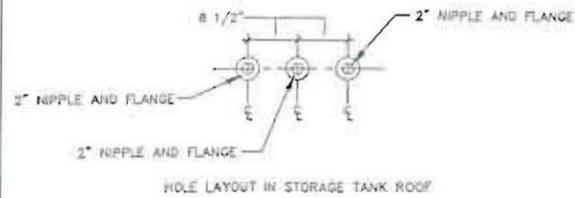
DUMPSTER PIPE OUTLET DETAIL

SCALE: NHP

PRELIMINARY

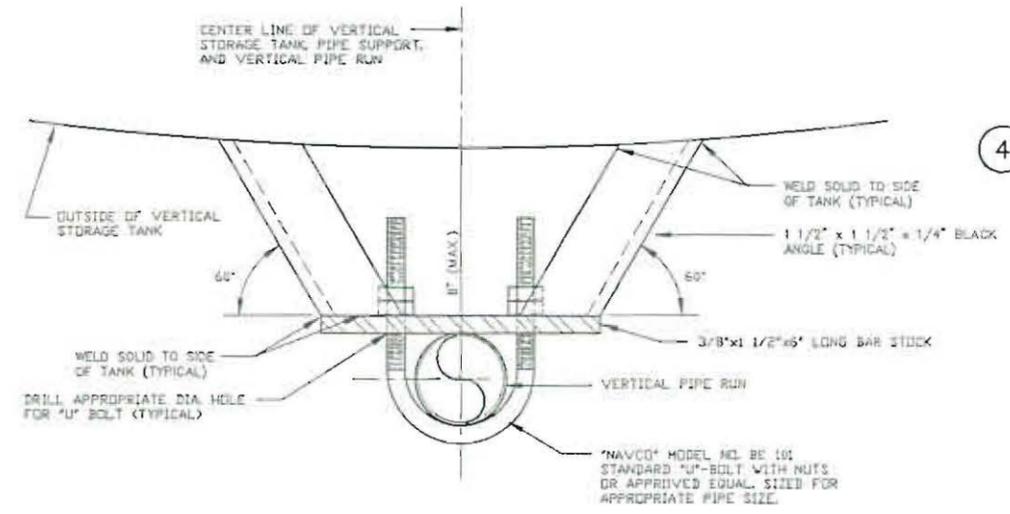
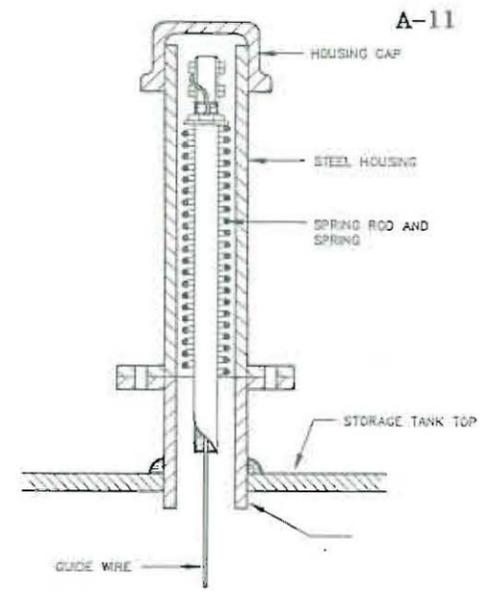
16

GENERAL NOTES						TITLE			
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						SAFETY-KLEEN CORP. 777 810 TORRIS ROAD ELGIN, ILLINOIS 60120 PHONE 708-697-0411			
NO. DESCRIPTION BY CHK APPR DATE						SCALE AS SHOWN BY JHD QWJ P.E. APPR WEY DP. APPR - DAT			
REVISIONS						SERVICE CENTER LOCATION BOISE, ID DC-DWG NUMBER 118308-2513			

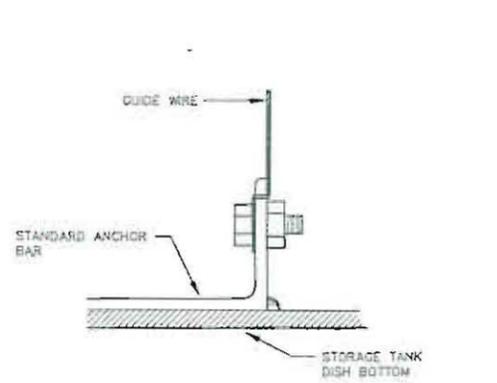


EQUIPMENT SCHEDULE			
MARK	PART DESCRIPTION	SK PART	REMARKS
①	GAUGE HEAD, IRON HOUSING AND SHEAVES, 304 S.S. TRIM	-	
②	GAUGE TAPE, 316 STAINLESS STEEL	-	
③	TOP GUIDE WIRE ANCHOR, STEEL HOUSING & SPRING ROD, CAD PLATE STEEL SPRING	-	SEE DETAIL 4
④	PIPE SUPPORT BRACKET, STEEL	-	SEE DETAIL 1
⑤	GAUGE FLOAT, 316 S.S. HOLLOW SHELL WELDED	-	
⑥	TAPE FASTENER, 316 STAINLESS STEEL	-	
⑦	BOTTOM GUIDE WIRE ANCHOR, STEEL	-	SEE DETAIL 2
⑧	SHEAVE ELBOW, IRON HOUSING, 316 S.S. TRIM, TEFLON BEARING	-	
⑨	GUIDE WIRE, 316 STAINLESS STEEL	-	

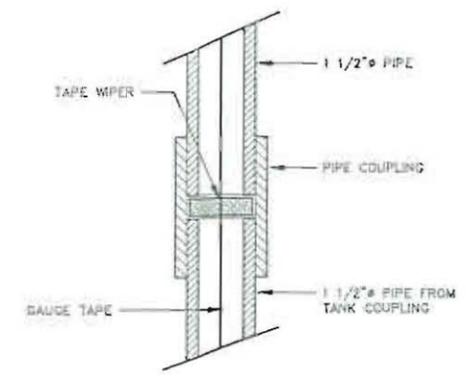
NOTE: THE ABOVE ITEMS TO BE SUPPLIED BY SAFETY-KLEEN CORP. EXCEPT ITEM #4



① VERTICAL PIPE SUPPORT DETAIL
NOTE: SIMILAR DETAIL TO BE USED FOR SUPPORTING PIPE RUNS ACROSS TANK TOPS.
NOTE: PAINT "U"-BOLT & NUTS, BARSTOCK, & ANGLES PER TANK PAINTING SPECS.



② BOTTOM GUIDE WIRE ANCHOR DETAIL



③ TAPE WIPER DETAIL

PRELIMINARY

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GENERAL NOTES

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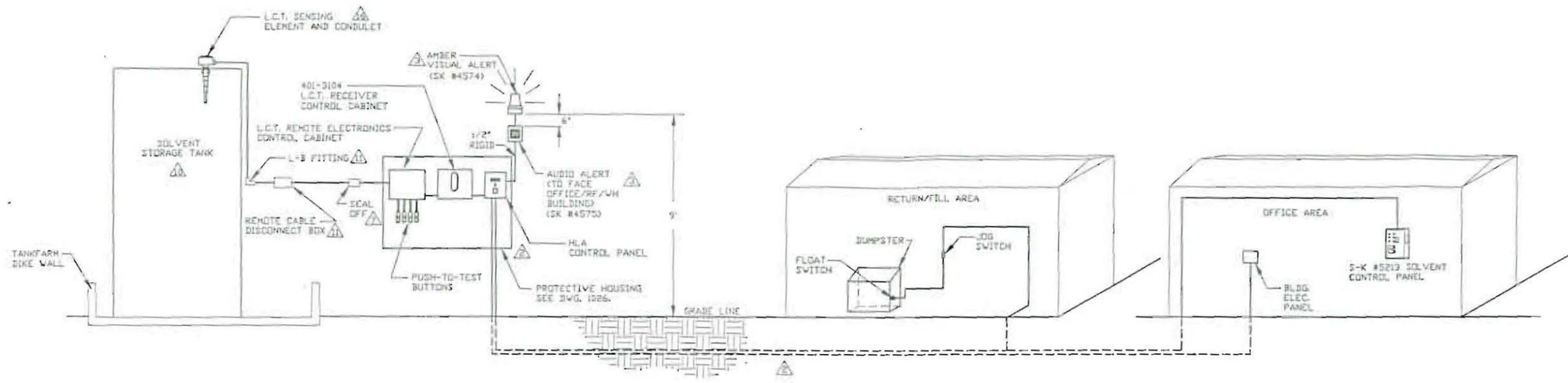
- SEE TANKFARM PIPING PLAN FOR ACTUAL TANK GAUGE LOCATION.
- TANK GAUGE TO BE INSTALLED PER VAREC 2500 SERIES LOW PRESSURE AUTOMATIC TANK GAUGE INSTRUCTION MANUAL.
- PIPING FOR VAREC TANK GAUGE TO BE SCHEDULE 40 GALVANIZED, SUPPORTED EVERY 8'-0" MAXIMUM AND ALL EXPOSED NON-PROTECTED STEEL IS TO BE PAINTED PER SK SPECS.

TITLE
VAREC TANK GAUGE INSTALLATION DETAILS

SAFETY-KLEEN CORP.
777 305 TROCK ROAD ELGIN ILLINOIS 60120 PHONE 708-697-8400

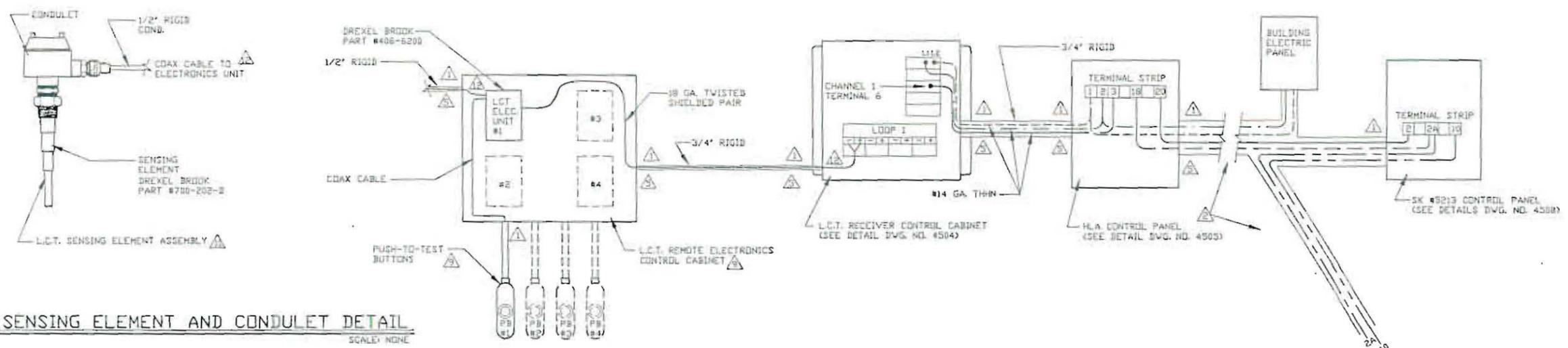
NO.	DESCRIPTION	BY	CHK	APPR	DATE

SCALE AS SHOWN BY JED - P.E. APPR WEY - DATE 8-23
SERVICE CENTER LOCATION BOISE, ID SO-DWG NUMBER 118308-3500 REV. 1



HIGH LEVEL ALARM SYSTEM DIAGRAM

SCALE: NONE

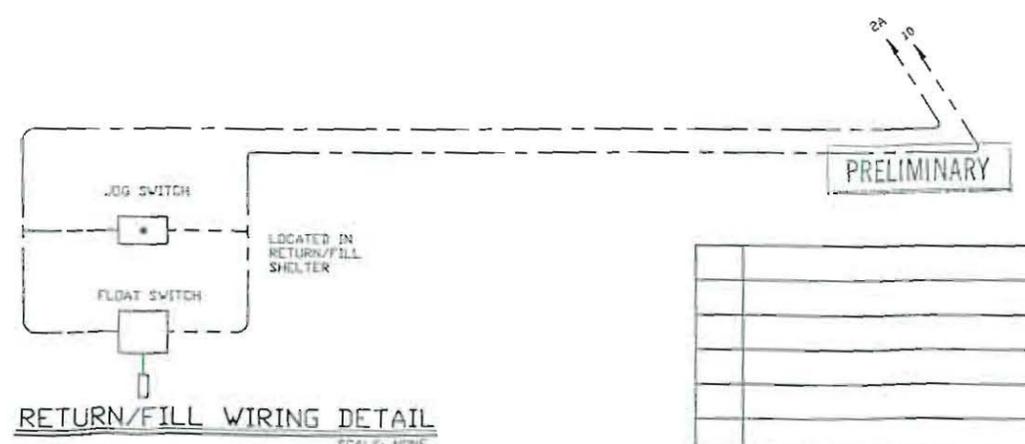


L.C.T. SENSING ELEMENT AND CONDULET DETAIL

SCALE: NONE

TYPICAL TANK HLA SYSTEM CONTROL WIRING LAYOUT

SCALE: NONE



RETURN/FILL WIRING DETAIL

SCALE: NONE

GENERAL NOTES

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- 1. USE MEYER'S HUB'S AT ALL CONDUIT ENTRIES INTO ELECTRICAL BOXES.
- 2. SEE TANKFARM PIPING AND EQUIPMENT PLAN FOR SPECIFIC EQUIPMENT MOUNTING.
- 3. SUPPLIED BY S-K.
- 4. L.C.T. = LEVEL CONTROL TRANSMITTER.
- 5. CONDUIT PENETRATION TO BE IN SIDE OF ENCL. APPROX. WHERE SHOWN.
- 6. ELECTRIC CONTRACTOR SHALL INSTALL CONDUIT IN CONTROL PANELS IN A NEAT & ORDERLY FASHION. THIS INCLUDES USING TIE WRAPS & TAGGING CONDUCTORS.
- 7. INSTALL SEALING FITTING 12" FROM L.C.T. REMOTE ELECTRONICS CONTROL CABINET.
- 8. CONTRACTOR IS NOT TO USE WIRE PULLING STRIPS FROM L.C.T. REMOTE ELECTRONICS CONTROL CABINET TO L.C.T. SENSING ELEMENT AND CONDULET.
- 9. SEE DETAIL DWG. 4503.
- 10. FOR GLYCOL OR WASTE OIL TANK SEE 'GLYCOL AND WASTE OIL HLA SYSTEM DIAGRAM', DWG. NO. 4504.
- 11. SEE DWG. 4502 FOR INSTALLATION PROCEDURE.
- 12. HLA LOW VOLTAGE OPERATING REQUIREMENTS:
 - A. POWER REQUIREMENT 13 TO 28 VDC.
 - B. OUTPUT 4 - 10 mA (ALARM STATE) 15 - 25 mA (NORMAL STATE)
 - C. OPERATING TEMP. -40°F TO +140°F
 - D. SHIELD-TO-GROUND LOADING 25 ohm MIN. RESISTANCE
 - E. RFI EFFECT: LESS THAN 2" OF SHIFT IN OPERATING POINT FOR UNIT IN EXPLOSION PROOF HOUSING FROM 5 V FIELD @ 27, OR 450 MHz AT A DISTANCE OF 5 FT. (1" EXPOSED CABLE OF SIGNAL WIRE)
 - F. FAIL-SAFE: SWITCHABLE FROM EITHER LOW-LEVEL FAIL-SAFE (L.L.F.S.) OR HIGH-LEVEL FAIL-SAFE (H.L.F.S.)
- 13. IF INDIVIDUAL SERVICE CENTER CONDITIONS ARE NOT COVERED BY DETAILS SHOWN HERE CONTACT ENGINEER OR S-K TECHNICAL SERVICES.
- 14. WRAP ALL RIGID CONDUIT THREADS WITH TEFT TAPE.
- 15. ALL ELECTRICAL WITHIN 10 FT. OF TANK TO BE CLASS 1 DIV. 2 PER LOCAL CODE.
- 16. DO NOT INSTALL L.C.T. SENSING ELEMENT IN COUPLING IN CENTER OF TANK.

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SOLVENT TANK HLA SYSTEM DIAGRAM

SAFETY-KLEEN CORP.
777 80 THUNDER ROAD ELLENZ 221023 PHONE 706-

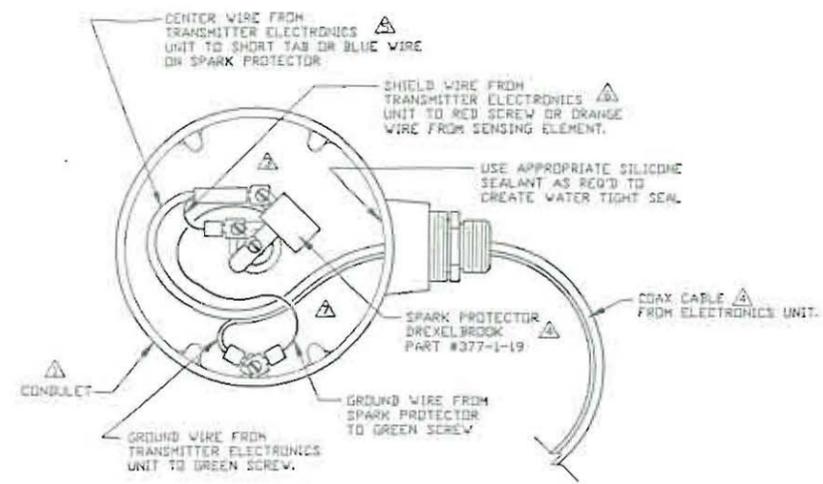
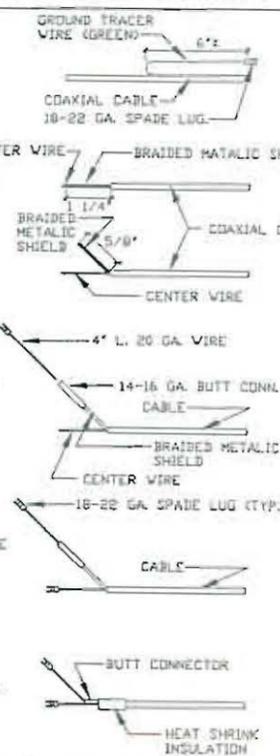
NO.	DESCRIPTION	BY	CHK	APPR	DATE

REVISIONS

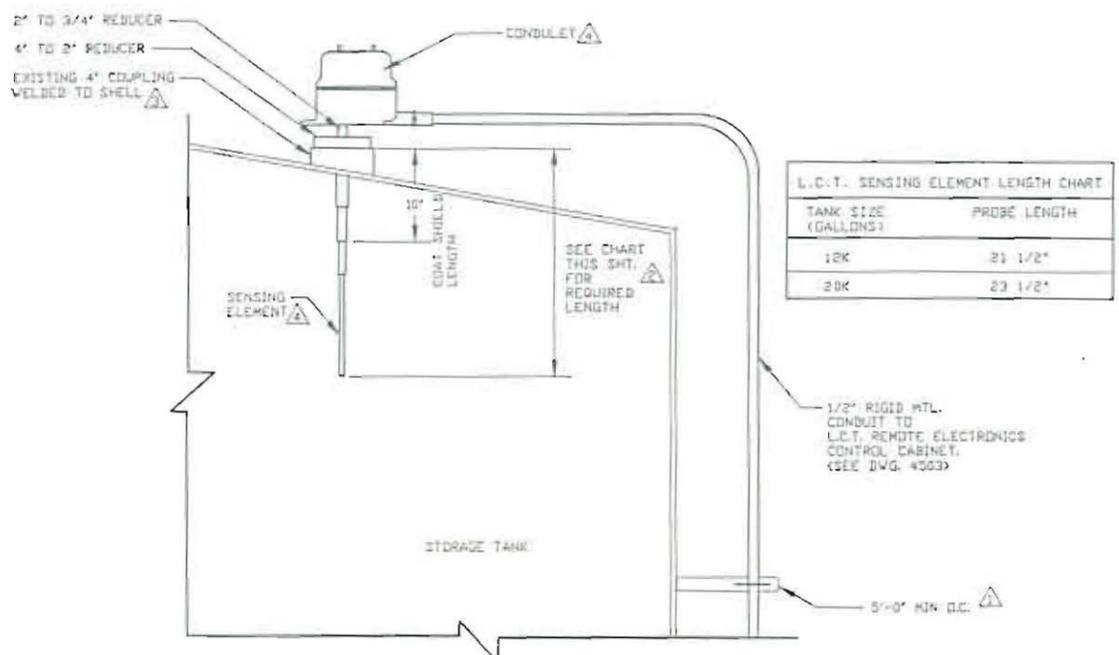
SCALE: NONE BY: SJD CHK: DP. APPR: SERVICE CENTER LOCATION: BOISE, ID SC-UWG NUMBER: 118308-4500

TERMINATIONS OF COAXIAL CABLE

- CUT CABLE TO REQUIRED LENGTH PLUS 5" STRIP THE GROUND TRACER WIRE AWAY FROM THE COAX TO A LENGTH OF ABOUT 6" STRIP ABOUT 1/4" OF INSULATION FROM THE END OF THE WIRE, CRIMP AN 18-22 GA SPADE TERMINAL LUG ONTO THE GROUND WIRE.
- TRIM OUTER INSULATION BACK 1/4", CUTTING DOWN TO BUT NOT INCLUDING BRAIDED METALLIC SHIELD.
- UNRAVEL THE METALLIC BRAID FROM THE CENTER WIRE INSULATION, TWIST THE BRAID TIGHTLY TOGETHER, CUT THE TWISTED BRAID TO A LENGTH OF ABOUT 5/8".
- USING A 14-16 GA CRIMP-ON BUTT CONNECTOR, ATTACH A 4" PIECE OF 20 GA STRANDED INSULATED WIRE TO THE TWISTED BRAID IN ORDER TO MAKE A STRONG CONNECTION WITH THE LARGER GAUGE OF THE BUTT CONNECTOR, A 3/8" STRIPPED LENGTH OF THE 20 GA WIRE SHOULD BE TWISTED AND THEN FOLDED BACK UPON ITSELF BEFORE INSERTION INTO THE BUTT CONNECTOR, CRIMP AN 18-22 GA SPADE TERMINAL LUG ONTO THE OTHER END OF THE 4" WIRE.
- TRIM ABOUT 1/4" OF THE INNER PLASTIC INSULATION TO EXPOSE THE CENTER WIRE, SLIP AN 18-22 GA SPADE TERMINAL LUG OVER THE BARE CENTER WIRE SO THAT THE INSULATION OF THE SPADE LUG BOTTOMS OUT ON THE INNER INSULATION AND THE TIP OF THE WIRE SHOWS AT THE LUG END, CRIMP THE LUG AND TRIM ANY EXCESS CENTER WIRE.
- SLIP 1" OF 1/2" DIAMETER HEATSHRINK INSULATION OVER CABLE END SO THAT ALL METALLIC BRAID IS WELL COVERED, HEAT THE INSULATION UNTIL IT SHRINKS AND TIGHTLY GRIPS THE CABLE, (DRY HEAT SOURCE OF 200-250 DEGREES NEEDED, A PROPANE TORCH WITH A LOW LEVEL FLAME IS RECOMMENDED)



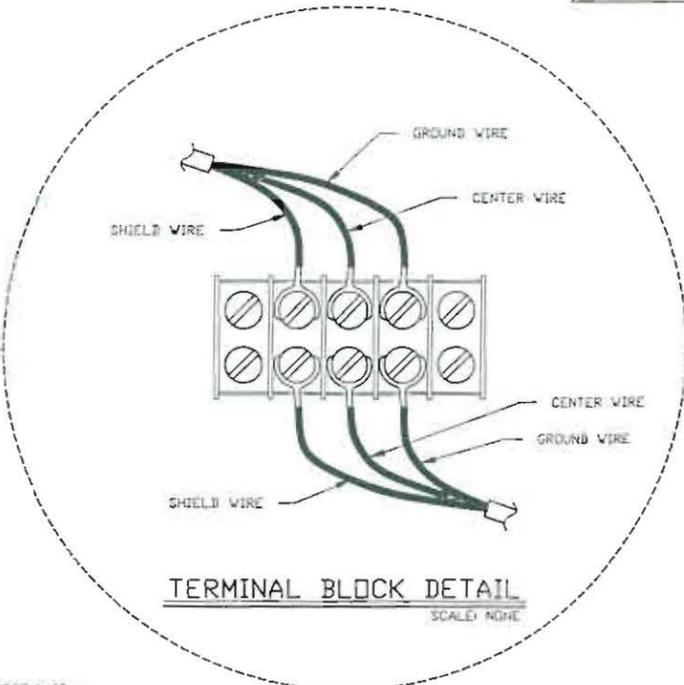
L.C.T. SENSING ELEMENT AND CONDULET DETAILS SCALE: NONE



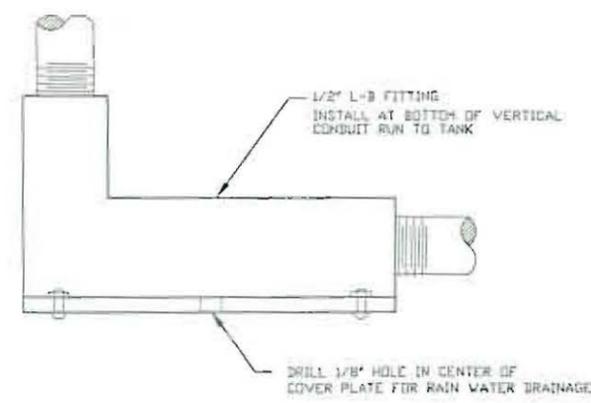
ABOVEGROUND VERTICAL TANK INSTALLATION DETAIL SCALE: NONE

L.C.T. SENSING ELEMENT LENGTH CHART

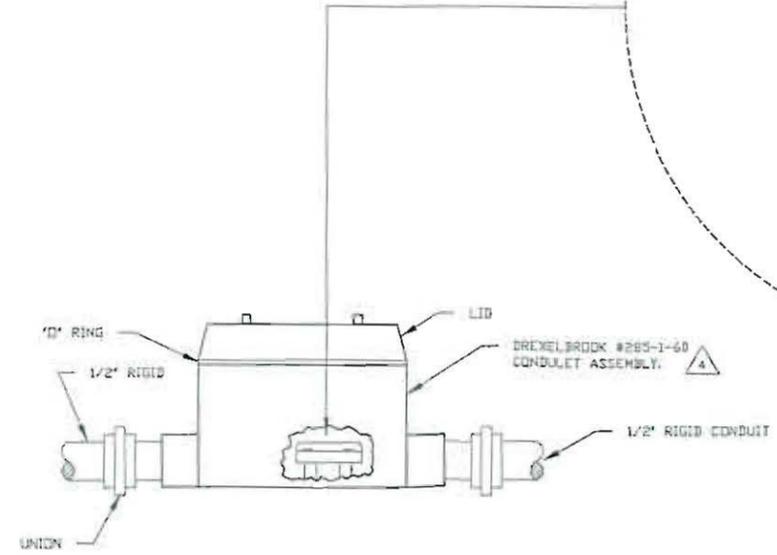
TANK SIZE (GALLONS)	PROBE LENGTH
12K	21 1/2"
20K	23 1/2"



TERMINAL BLOCK DETAIL SCALE: NONE



L-B FITTING INSTALLATION DETAIL SCALE: NONE



REMOTE CABLE DISCONNECT BOX DETAIL SCALE: NONE

GENERAL NOTES

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- CONTRACTOR TO SUPPLY & INSTALL CONDUIT SUPPORTS & BRACKETS AS REQUIRED.
 - CALCULATIONS FOR LENGTH OF PROBE INSIDE OF TANK ARE SET TO ACTIVATE THE ALARM AT THE 95% VOLUME LEVEL.
 - DO NOT INSTALL L.C.T. SENSING ELEMENT IN TANK COUPLING IN CENTER OF TANK.
 - SUPPLIED BY S-K.
 - BLUE WIRE REPLACES SHORT TAB ON OLDER TYP SPARK PROTECTORS, WHICH MAY BE FOUND IN THE FIELD.
 - ORANGE WIRE REPLACES RED SCREW ON OLDER TYP SENSING ELEMENTS, WHICH MAY BE FOUND IN THE FIELD.

PRELIMINARY

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TITLE
HLA SENSOR TO REMOTE TRANSMITTER INSTALLATION DETAILS

SAFETY-KLEEN CORP.
777 205 TIMBER ROAD ELKTON, ILLINOIS 62428 PHONE 708-497-1148

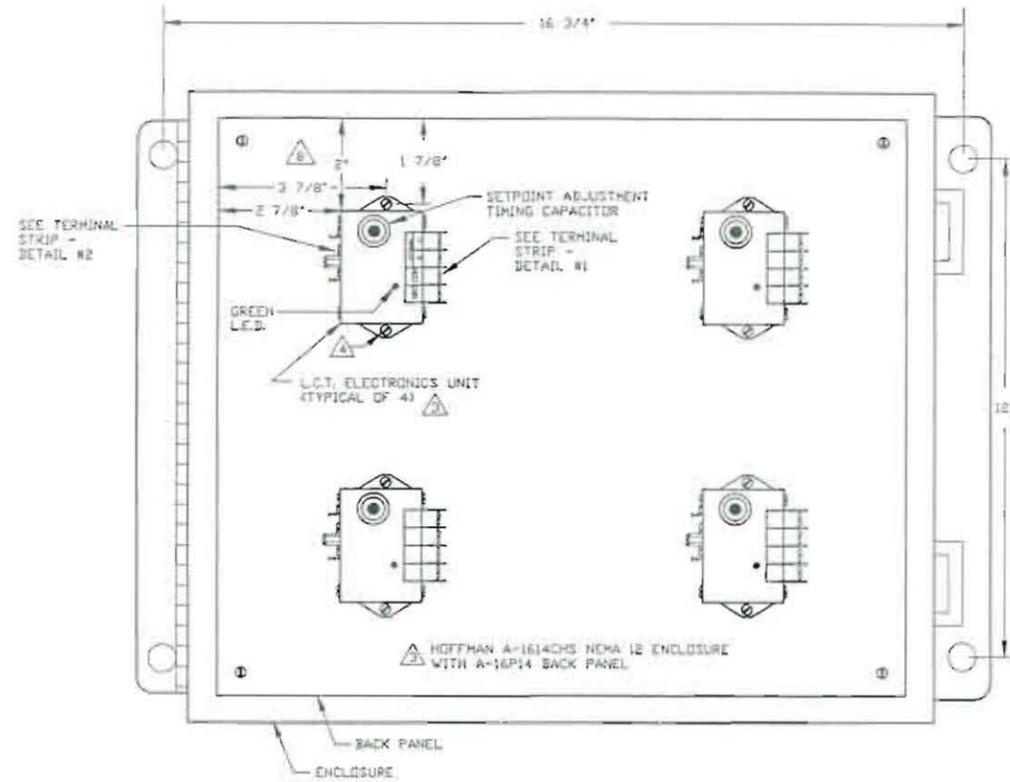
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SCALE	BY	CHKD	P.E. APPR	OP. APPR	DATE
NONE	JHD	-	WEY	-	-

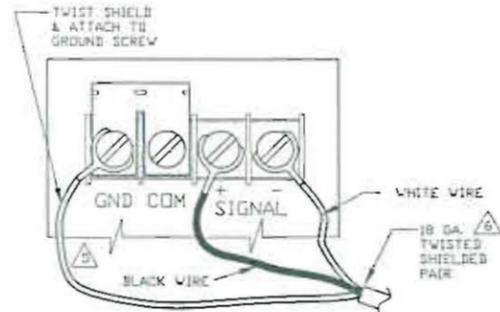
BOISE, ID 118306-4502

CALIBRATION PROCEDURE FOR ELECTRONICS UNIT

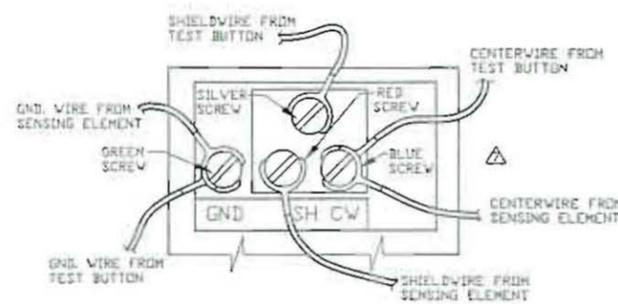
1. VERIFY THAT THE LIQUID IS NOT COVERING THE PROBE. THIS CAN BE DONE BY CHECKING THE READING ON THE TANK'S TAPE GAUGE. IF THE TANK IS LESS THAN FULL THE PROBE WILL NOT BE IMMERSED IN LIQUID.
2. THE CALIBRATION SHOULD BE PERFORMED WITH ALL SYSTEM ELECTRICAL CONNECTIONS COMPLETE. ANY CHANGE IN ELECTRICAL CONNECTIONS AFTER CALIBRATION INVALIDATES THE CALIBRATION. NEATLY DRESS ALL WIRING. ALL SLACK IN THE WIRES SHOULD BE PUSHED DOWN INSIDE THE CONDULET, WITHOUT STRAINING THE WIRES. THIS PROTECTS THE WIRES FROM DAMAGE WHEN THE CAP OF THE CONDULET IS SCREWED ON. ALSO, IF THE WIRES ARE LYING TOO HIGH IN THE CONDULET, STRAY CAPACITANCE FROM THE METAL CAP CAN ALTER THE OPERATING POINT OF THE ELECTRONICS UNIT.
3. USING THE PLASTIC TUNING WRENCH SUPPLIED WITH THE ELECTRONICS UNIT, TURN THE TUNING CAPACITOR TO THE FULLY COUNTERCLOCKWISE POSITION, THEN SLOWLY TURN THE TUNING WRENCH CLOCKWISE UNTIL THE GREEN LIGHT ILLUMINATES. THIS IS THE OPERATING POINT OF THE SENSOR. IDENTIFY EXACTLY THIS OPERATING POINT.
4. TO CHECK HYSTERESIS OF THE ELECTRONICS UNIT, TURN THE TUNING CAPACITOR COUNTER CLOCKWISE UNTIL THE GREEN LIGHT TURNS OFF. COUNTERCLOCKWISE TRAVEL SHOULD BE NO MORE THAN 1/8 TURN. IF HYSTERESIS IS GREATER THAN THIS, CONTACT ENGINEER.
5. RETURN THE TUNING CAPACITOR TO EXACTLY THE POSITION OF THE OPERATING POINT AND THEN TURN THE TUNING WRENCH CLOCKWISE EXACTLY ONE-HALF ADDITIONAL TURN (90 DEGREES). THE GREEN LIGHT SHOULD REMAIN ILLUMINATED. REMOVE THE TUNING WRENCH. CAREFULLY SCREW THE CAP ON THE CONDULET.
6. PROVIDE ENGINEER WITH WRITTEN VERIFICATION THAT CALIBRATION PROCEDURE WAS FOLLOWED. IDENTIFY THE TANK, DOCUMENT HYSTERESIS, NAME OF COMPANY AND INDIVIDUAL THAT PERFORMED PROCEDURE, AND DATE OF CALIBRATION.



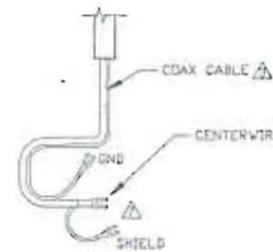
L.C.T. REMOTE ELECTRONICS CONTROL CABINET
SCALE: NONE



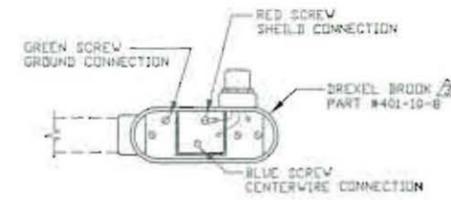
TERMINAL STRIP DETAIL #1
SCALE: NONE



TERMINAL STRIP DETAIL #2
SCALE: NONE



PUSH-TO-TEST BUTTON WIRING DETAIL
PRELIMINARY



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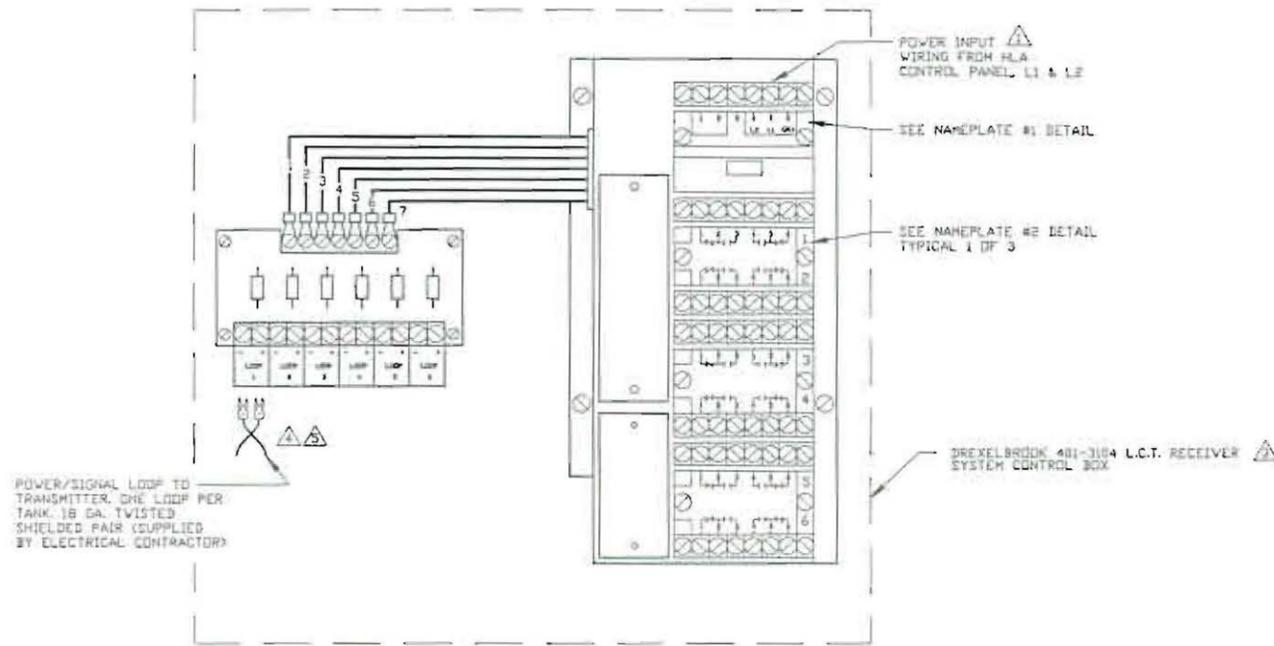
1. USE PROPER INSULATED SPACE TERMINAL LUG TO MATCH CONDUCTOR SIZE & TERMINAL SCREW SIZE. F & I BY CONTRACTOR.
 2. INSTALL STAR WASHERS ON EVERY TERMINAL SCREW AT LCT SENSING ELEMENT, LCT ELECTRONIC UNITS, AND PUSH-TO-TEST SWITCH. F & I BY CONTRACTOR.
- △ SUPPLIED BY SAFETY-KLEEN.
- △ LOCATE ELECTRONIC UNITS AS SHOWN AND MARK LOCATION OF CONNECTING LUGS ON BACK PANEL. DRILL HOLES THROUGH PANEL FOR 10/32 IN. BOLTS. INSTALL EACH ELECTRONIC UNIT W/ 2 - 10/32 x 1/2 BOLTS THROUGH BACK SIDE OF PANEL. ADD NUTS AND TIGHTEN.
- △ UNRAVEL METALIC BRAID FROM THE 2 INSULATED W/ & SEPARATE TO A LENGTH OF ABOUT 3". TWIST BR & CRIMP ON AN 18-22 GA. TERMINAL SPACE LUG. TAPE BARE BRAID WITH ELECTRICAL TAPE TO PREV SHORTING SIGNAL LOOP WIRES. USE 3/4" OR EQUAL.
- △ STRIP ABOUT 5/16 - 3/8" INSULATION OFF EACH W/ & CRIMP AN 18-22 GA. TERMINAL SPACE LUG ON EACH.
- △ SEE DWG. NO. 4502 FOR CABLE TERMINATION PROCEDURE.
- △ LOCATION DIMENSIONS ARE TYPICAL FOR L.C.T. ELECTRONICS UNITS.

TITLE
L.C.T. ELECTRONIC CONTROL CABINET DETAILS

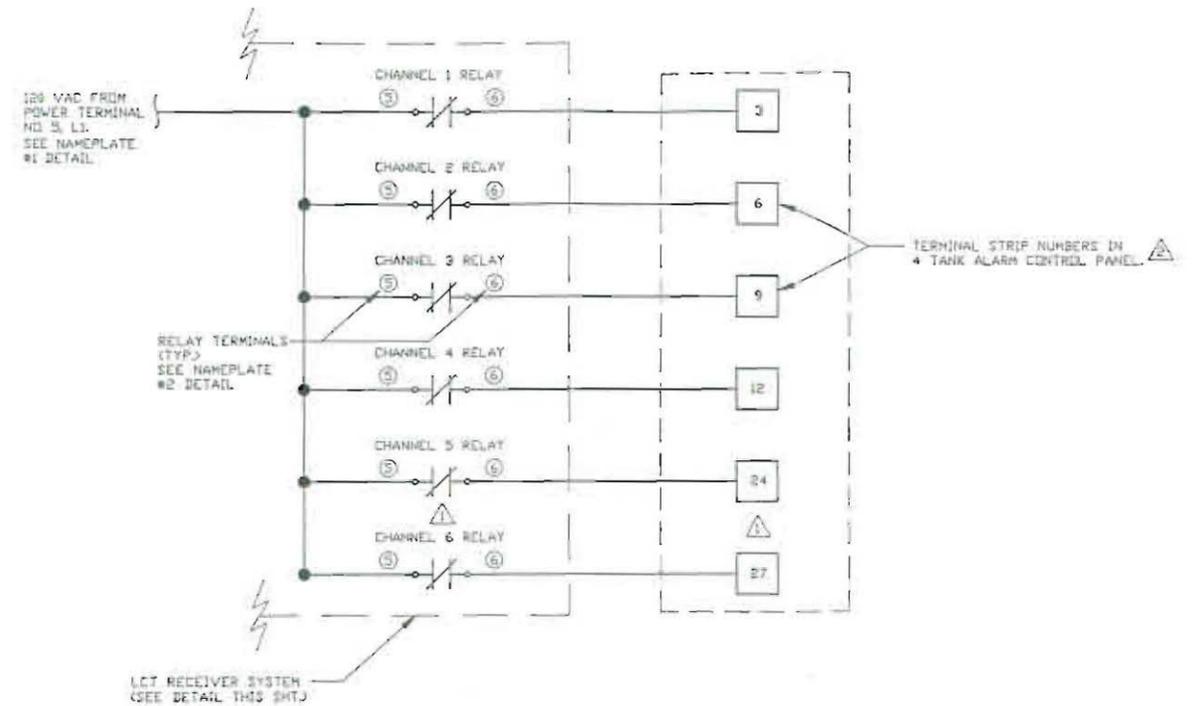
SAFETY-KLEEN CORP.
777 815 PARK ROAD ELSON, ILLINOIS 60120 PHONE 708-697-0460

NO.	DESCRIPTION	BY	CHK	APPR	DATE
REVISIONS					

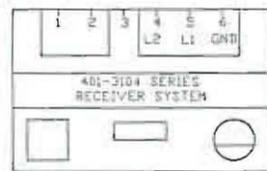
SCALE	BY	CHK	P.E. APPR	DATE	
NONE	JND	-	WY	8-22	
NO.	DESCRIPTION	BY	CHK	APPR	DATE
SERVICE CENTER LOCATION		SC-DWG NUMBER		REV. 1	
BOISE, ID		118308-4503		DC	



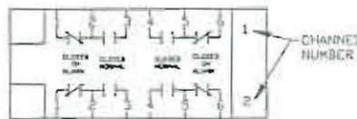
LCT RECEIVER SYSTEM COMPONENT LAYOUT DETAIL
SCALE: NONE



WIRING DETAILS TO ALARM CONTROL PANEL
SCALE: NONE



NAMEPLATE #1 DETAIL
SCALE: NONE



NAMEPLATE #2 DETAIL, TYP.
SCALE: NONE

GENERAL NOTES

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SAFETY-KLEEN CORPORATION. ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS SAFETY-KLEEN OR AS SAFETY-KLEEN MAY AGREE IN WRITING.

- ⚠ DO NOT USE CHANNELS 5 AND 6 FOR 4 PACK TANKFARM.
- ⚠ SEE DWG. NO. 4506 & 4507.
- ⚠ SUPPLIED BY S-K.
- ⚠ UNRAVEL METALLIC BRAID FROM THE 8 INSULATED WIRES & SEPARATE TO A LENGTH OF ABOUT 3". TWIST BRAID & CRIMP ON AN 18-22 GA. TERMINAL SPADE LUG. TAPE BARE BRAID WITH ELECTRICAL TAPE TO PREVENT SHORTING SIGNAL LOOP WIRES (USE 3% 33+ OR EQUAL).
- ⚠ STRIP ABOUT 5/16" - 3/8" INSULATION OFF EACH WIRE. CRIMP AN 18-22 GA. TERMINAL SPADE LUG ON EACH.

PRELIMINARY

24

NO.	DESCRIPTION	BY	CHK	APPR	DATE

WILE

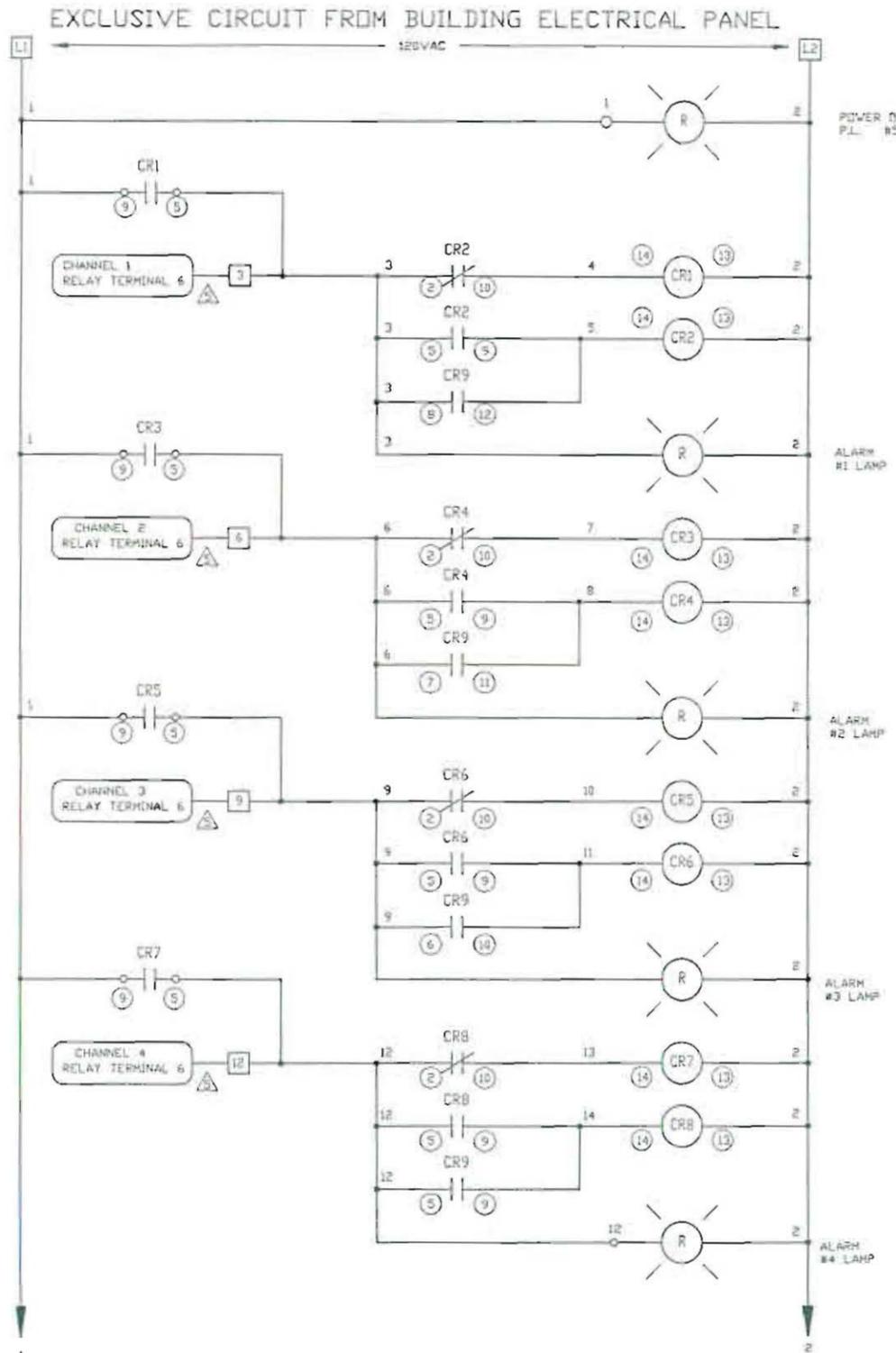
L.C.T. HIGH LEVEL ALARM RECIVER SYSTEM DETAILS

SAFETY-KLEEN CORP.
777 210 TANK ROAD ELLEN, ILLINOIS 62421 PHONE 708-697-8946

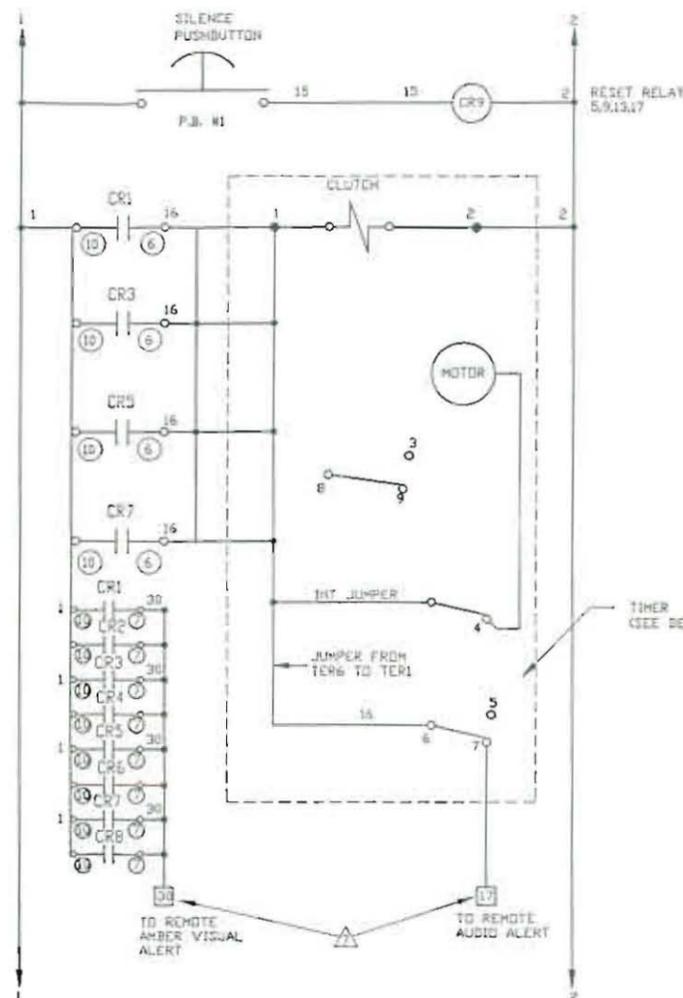
SCALE: NONE	BY: JMD	CHK: -	P.E. APPR: WEY	OP. APPR: -	DATE: 8-2

NO. DESCRIPTION BY CHK APPR DATE SERVICE CENTER LOCATION DC-DWG NUMBER REV.

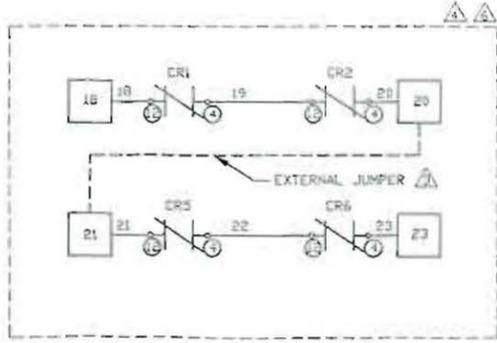
BOISE, ID 118308-4504 C



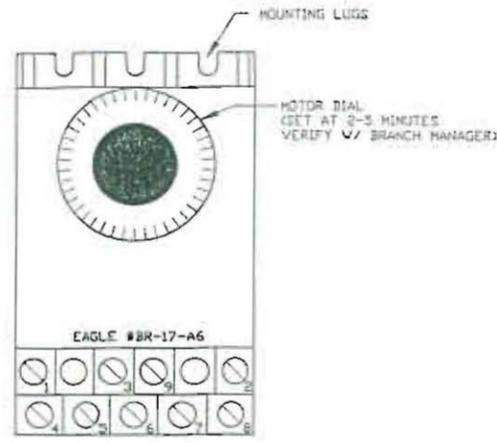
ALARM LAMP WIRING DETAILS SCALE: NONE



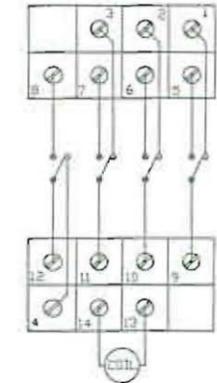
ALARM CUTOFF WIRING DETAILS SCALE: NONE



DIRTY PUMP DISABLE CIRCUIT DETAIL SCALE: NONE



TIMER DETAIL SCALE: NONE



TYPICAL OMRON RELAY TERMINAL WIRING DETAIL SCALE: NONE

- GENERAL NOTES**
- 1 NUMBERS IN CIRCLES ARE RELAY SOCKET TERMINAL
 - 2 NUMBERS IN SQUARE BOXES ARE TERMINAL BLOCK WIRE NUMBERS.
 - ⚠ EXTERNAL JUMPER TO BE INSTALLED WHEN 2 DIRTY SOLVENT TANKS ARE BEING MONITORED AND ONLY DIRTY SOLVENT PUMP IS USED. TERMINAL BLOCKS 21 & 23 ARE NOT USED WHEN ONLY ONE TANK IS BEING MONITORED.
 - ⚠ CONTACT ENGINEER IF TERMINAL STRIP NUMBERS DIFFER FROM THOSE SHOWN IN DETAILS.
 - ⚠ SEE DWG. NO. 4504, NAMEPLATE #2 AND WIRING DETAIL.
 - ⚠ SEE DWG. NO. 4509, DIRTY PUMP DISABLE CIRCUIT.
 - ⚠ SEE DWG. NO. 4500.
- TITLE
- SOLVENT WIRING
DETAILS FOR CONTROL
PANEL #1 (SK #5346)

PRELIMINARY

25

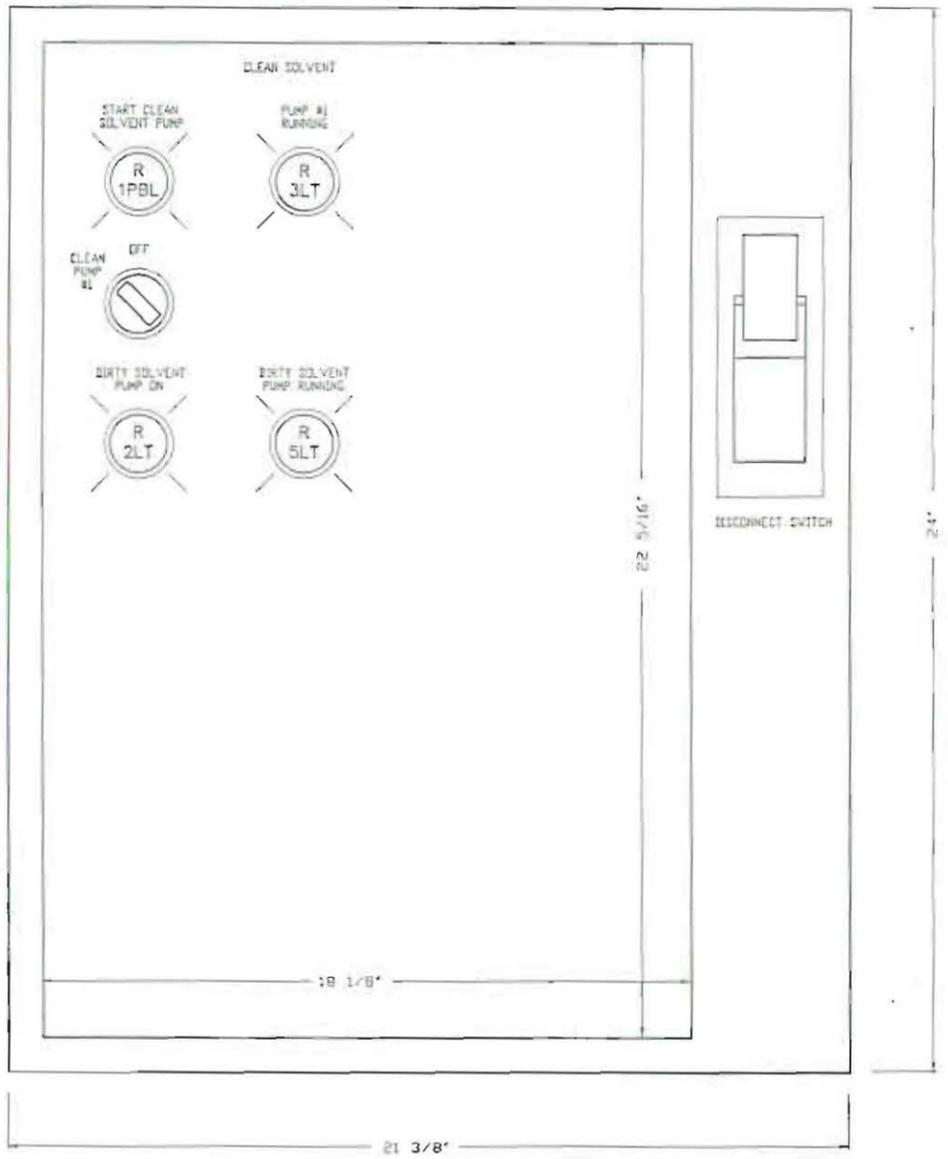
NO.	DESCRIPTION	BY	CHK	APPR	DATE

SAFETY-KLEEN CORP.
777 W. TOWER ROAD CLON, ID 83402-6123 PHONE 784-877-8444

SCALE: NONE	BY: JMD	CHK: -	P.L. APPR: WEY	OP. APPR: -	DATE: 8-2
SERVICE CENTER LOCATION: BOISE, ID		SC-DWG NUMBER: 200401-4506		REV: 0	

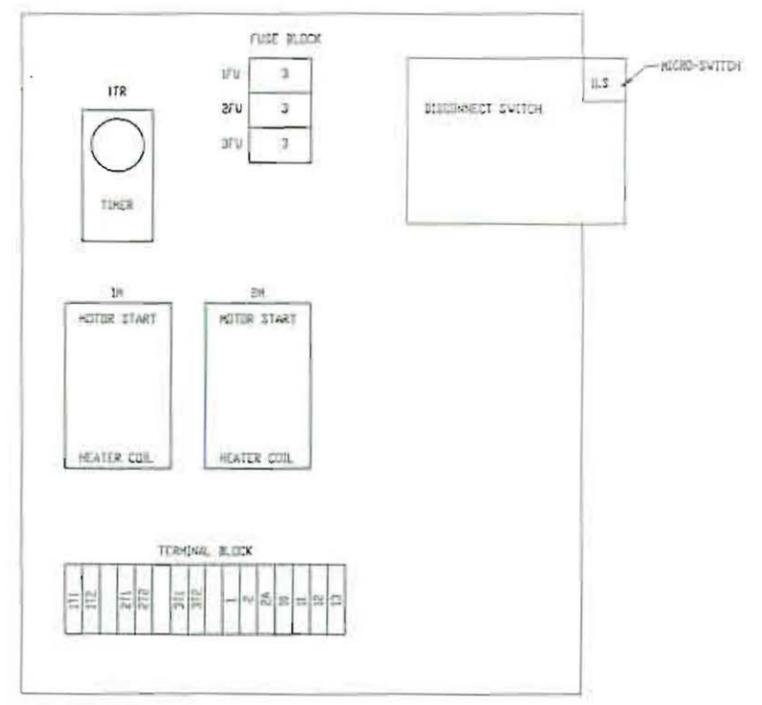
S-K #5213 PARTS LIST

QTY.	DESCRIPTION	MANUFACTURER	PART NUMBER
1	ENCLOSURE, NEMA 12	HOFFMAN	A-245A2208LP
1	SUB-PANEL	"	A24P05
1	OPERATING HANDLE	A-B	1494 VH-1
1	DISCONNECT SWITCH	"	1494 V-0540
1	ROB	"	1494 V-RA1
2	STARTER	"	509-AD03
2	HEATER	"	V54
1	ILLUMINATED PUSHBUTTON	"	9007-PE16R
1	CONTACT BLOCK	"	9007-RA2
1	PILOT LIGHT, 120V	"	9007-PI6R
2	PILOT LIGHT, 240V	"	9007-PI6R
4	LENS CAP	"	9007-ND6R
5	LEGONS PLATE	"	9007-K700
2	FUSE, 5A	FUSETRON	FR05
2	FUSE, 30A	"	FR30
1	TIMER	EAGLE	BR114401
2	TOGGLE SWITCH	LEVITON	5226-1
2	COVER PLATE	APPLETON	2510
8	TERMINAL BLOCK	CURTIS	"
1	FUSE BLOCK-3 POLE	"	F30A3B
1	MICRO-SWITCH	"	32-28013-A2
1	SEL. SWITCH, 3 POS., 4-POLE	A-B	8007-J2B
2	CONTACT BLOCK	"	9007-XA



S-K #5213 CONTROL PANEL COVER

SCALE: NONE



PANEL INTERNAL COMPONENT LAYOUT DETAIL

SCALE: PRELIMINARY

GENERAL NOTES

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1. S-K #5213 CONTROL PANEL COMES COMPLETELY ASSEMBLED. PARTS LIST IS FOR MAINTENANCE PURPOSES ONLY.

2. SEE DWG. NO. 4509 FOR WIRING DETAILS.

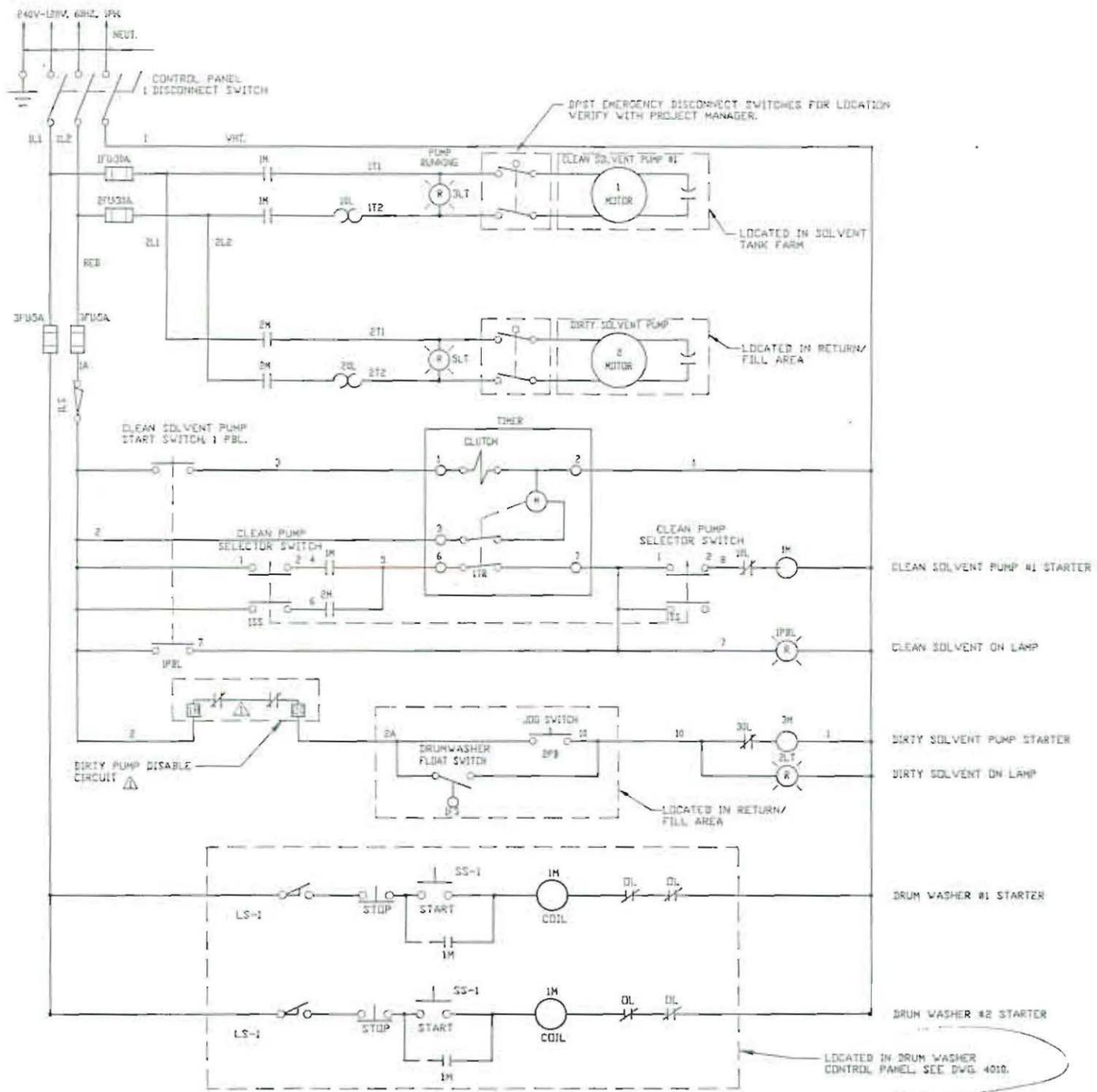
NO.	DESCRIPTION	BY	CHK	APPR	DATE
REVISIONS					

TITLE

CONTROL PANEL (SK #5213)

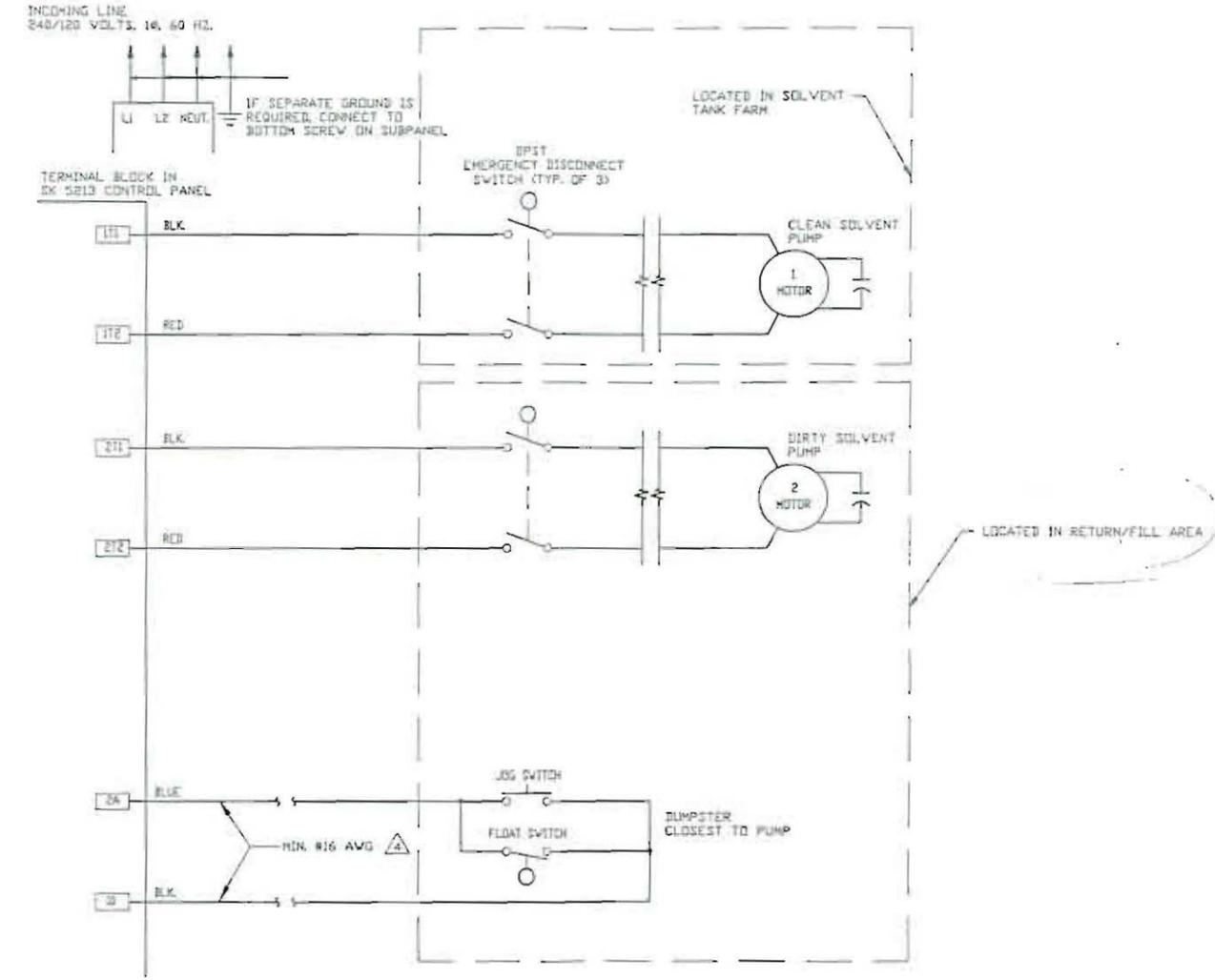
SAFETY-KLEEN CORP.
 777 880 TOWER ROAD ELGIN ILLINOIS 60120 PHONE 708-697-4

SCALE: NONE	BY: JHD	CHKD: -	P.E. APPR: MEY	OP. APPR: -	DA: B-
SERVICE CENTER LOCATION: BOISE, ID			SQ-DWG NUMBER: 118308-4508		



SK #5213 CONTROLS WIRING DIAGRAM

SCALE: NONE



SOLVENT PUMPS & PARTIAL RETURN/FILL AREA ELECTRICAL WIRING DIAGRAM

SCALE: NONE

GENERAL NOTES

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- 1. SEE DWG. NO. 4506, DIRTY PUMP DISABLE CIRCUITS.
- 2. CONTRACTOR TO PROVIDE ENGINEER WITH A WRITTEN VERIFICATION OF SYSTEM OPERATION PER "DIRTY SOLVENT PUMP CUTOFF TEST" AS FOLLOWS:

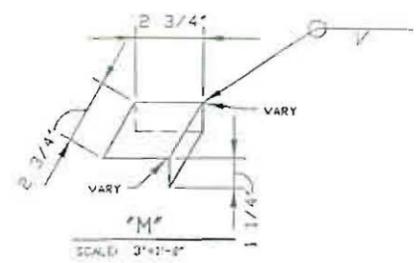
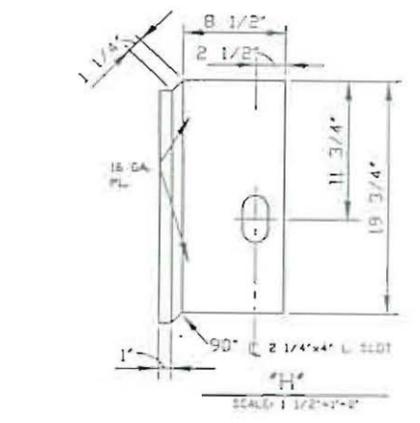
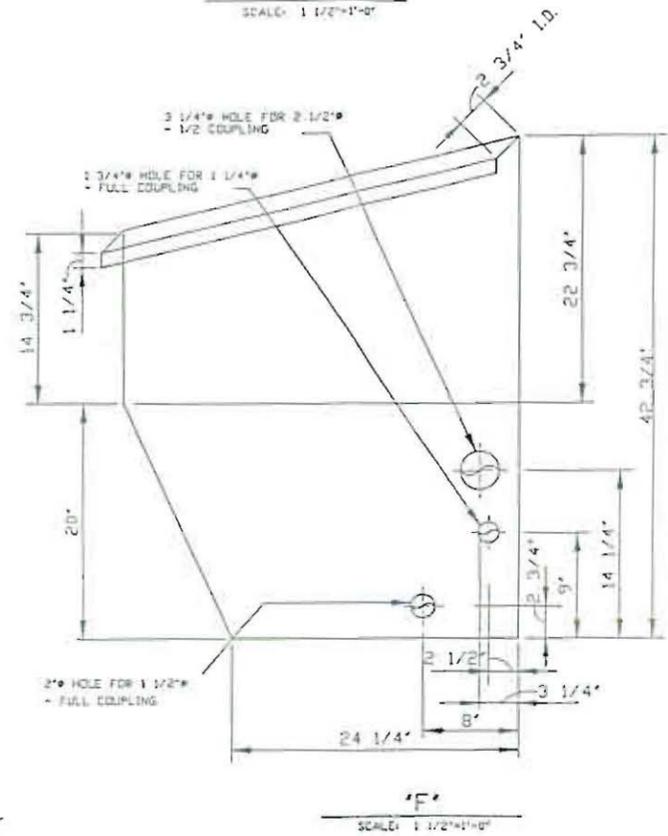
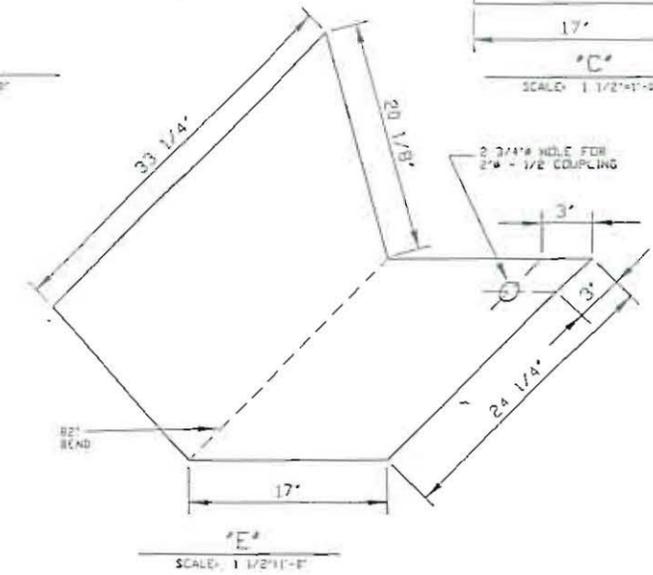
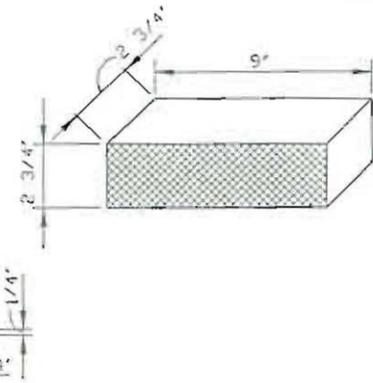
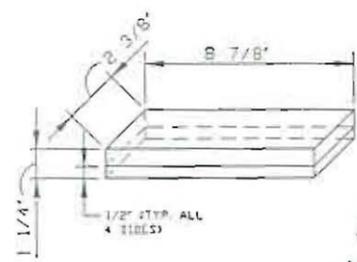
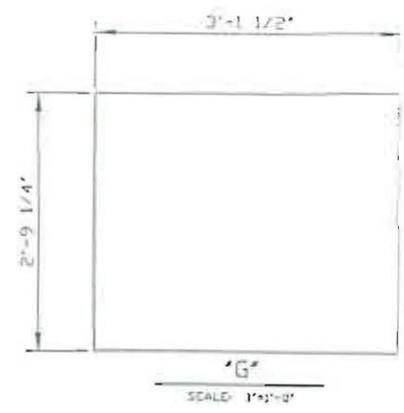
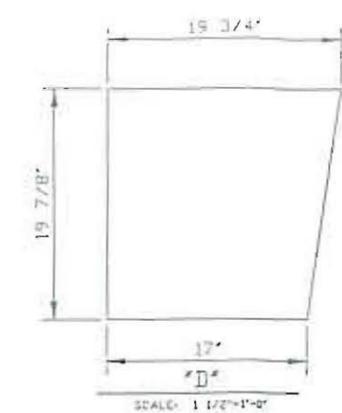
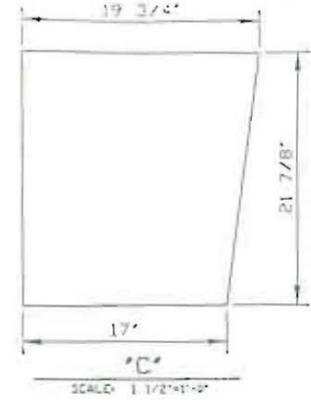
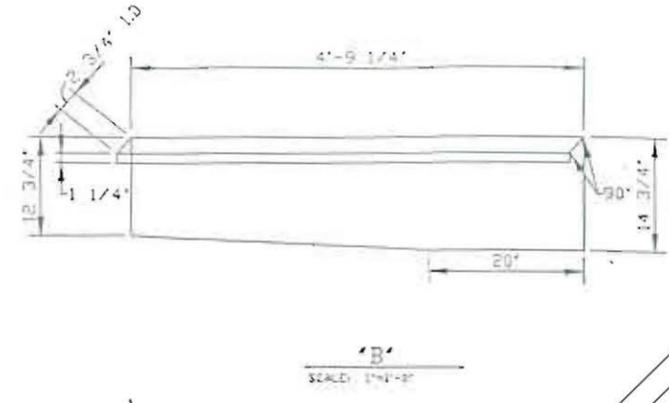
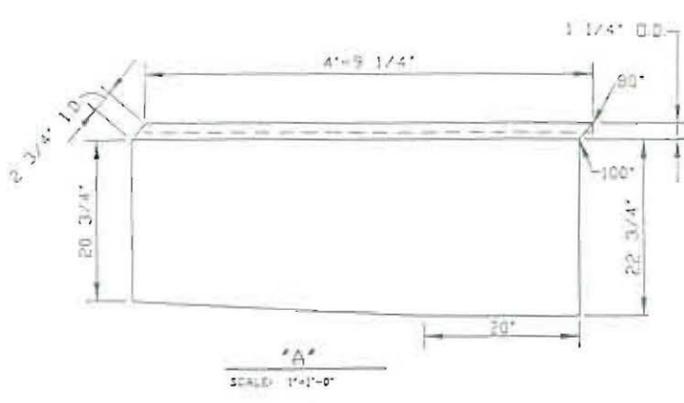
- A. FILL DRUM WASHER TO ACTIVATE FLOAT SWITCH
- B. VERIFY THAT DIRTY SOLVENT PUMP IS NOW RUNNING.
- C. PUSH DIRTY SOLVENT TANK "PUSH-TO-TEST" BUTTON TO SIMULATE ALARM CONDITION OF 95% FULL TANK.
- D. VERIFY THAT DIRTY SOLVENT PUMP IS NOW OFF.
- E. PUSH JOG SWITCH.
- F. VERIFY THAT DIRTY SOLVENT PUMP DOES NOT RUN.
- G. DOCUMENT DATE & SEND REPORT TO ENGINEER WITH NAME OF COMPANY AND INDIVIDUAL THAT PERFORMED TEST.

NO.		DESCRIPTION	BY	CHK	APPR	DATE
REVISIONS						

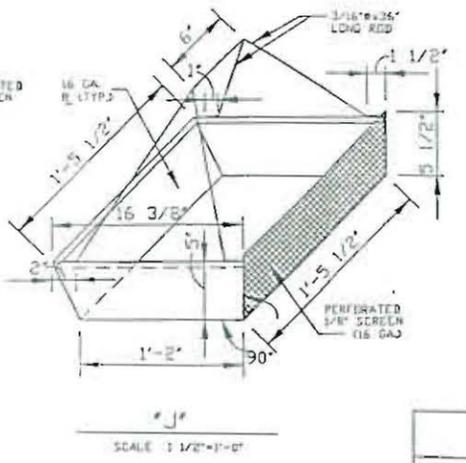
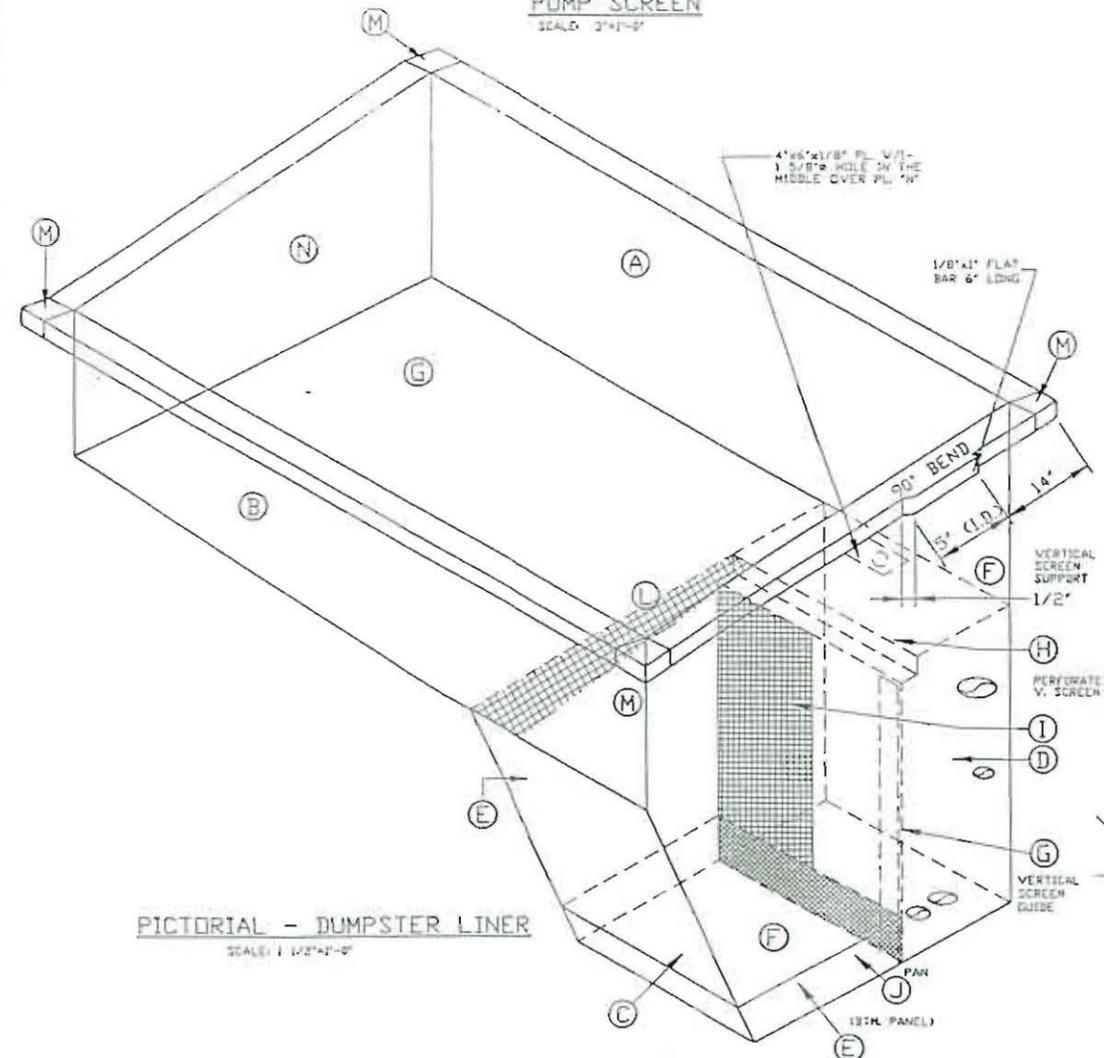
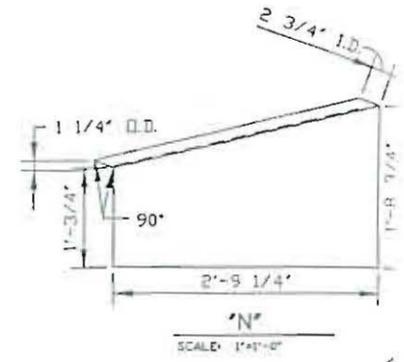
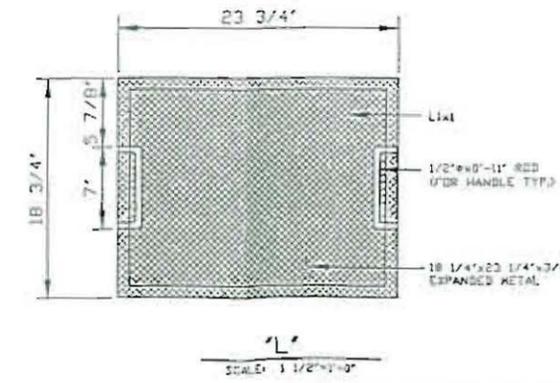
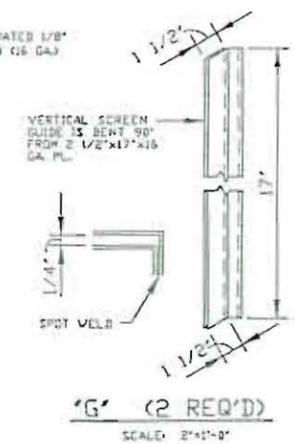
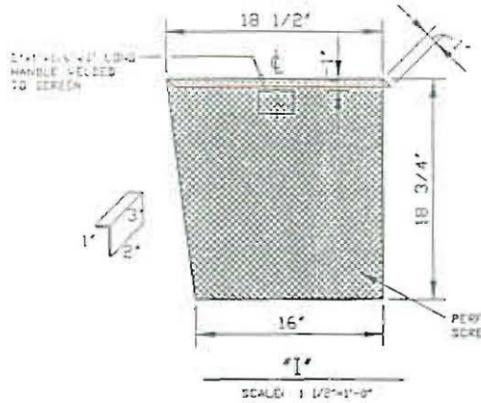
CONTROL PANEL (SK #5213) WIRING DIAGRAM

SAFETY-KLEEN CORP.
777 N.W. TOWER ROAD, ELLIOTT, ILLINOIS 60123 PHONE 708-597-8000

SCALE: NONE	BY: JGD	CHK: -	P.E. APPR: MEY	OP. APPR: -	DATE: -
SERVICE CENTER LOCATION: BOISE, ID			SC-DWG NUMBER: 118308-4509		



PUMP SCREEN
SCALE: 3/4"=1'-0"



NOTE: ALL MATERIALS ARE 1/8" THK. A/R STEEL PLATE

GENERAL NOTES

REVISIONS				TITLE			
NO.	DESCRIPTION	BY	CHK	APPR	DATE	SWIC DRUM WASHER SCREEN & FILTER DETAIL	
						SAFETY-KLEEN CORP.	
						777 810 THREE ROAD ELGIN ILLINOIS 60120 PHONE 700-197	
						SCALE AS NOTED	BY JCK/RD
						DESIGNED	P.E. APPR
						CHECKED	DR. APPR
						SERVICE CENTER STANDARDS	STD-DWG NUMBER
						FABRICATION	STD-1001

APPENDIX B

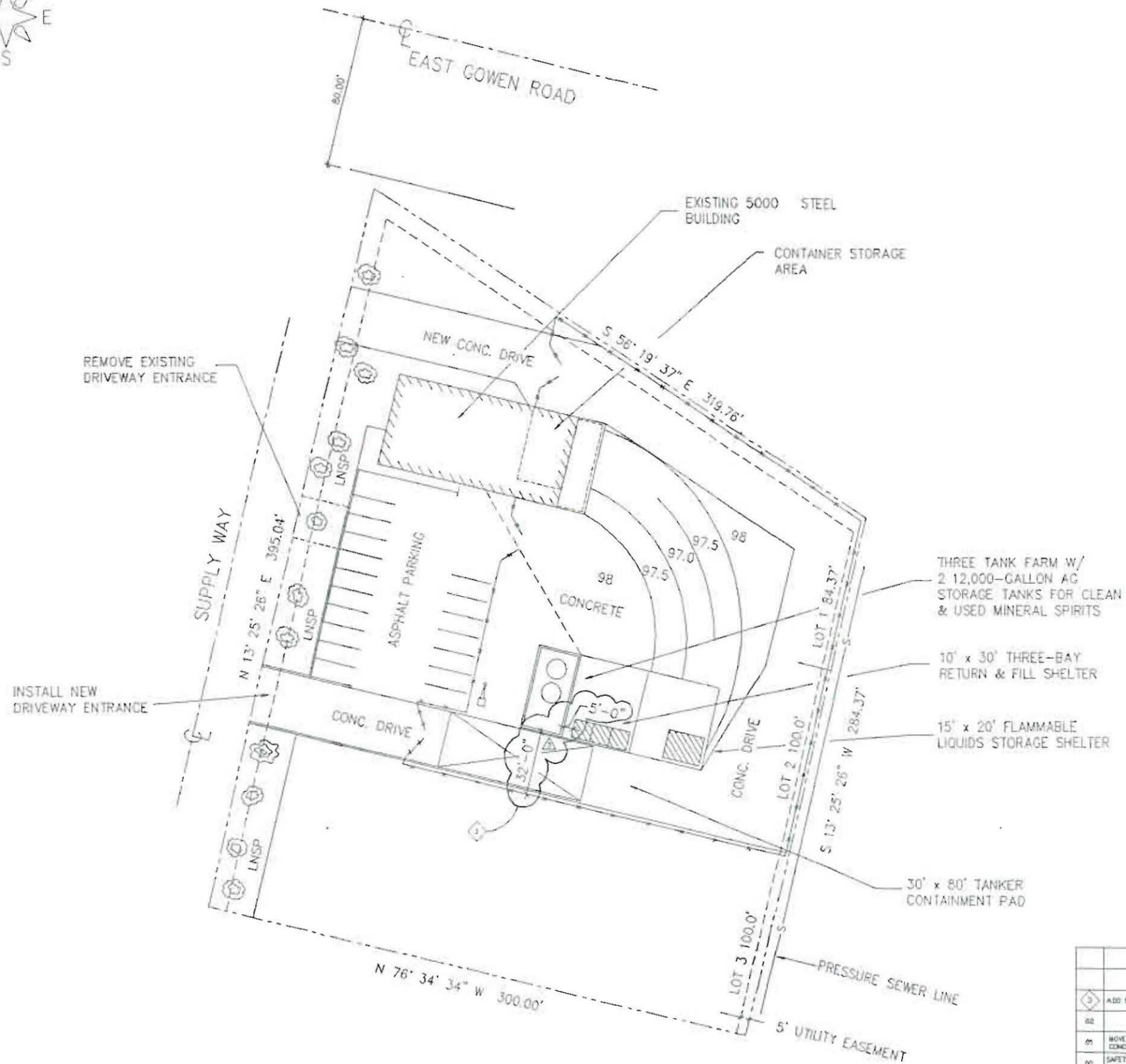
Field Data

APPENDIX B

Field Data

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<u>Title</u>	<u>Page No.</u>
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Tank Farm Field Data	B-2
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Containment Inspection Record - Concrete Dike	B-6
Containment Inspection Record - Return/Fill	B-7
Tank Wall Thickness Test Results	B-8
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Tank Farm Secondary Containment Calculations	B-15
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Materials Testing Corporation Report	B-18
Welders Qualifications	B-19
Photographs	B-23



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

2 TOOTHMAN GROTON ENGINEERING WILL PROVIDE CORRECT SITE PLAN FOR SUBMITTAL

3 FIELD MEASUREMENTS AS TAKEN BY RICK BARTELT ON 1-18-93



GENERAL NOTES

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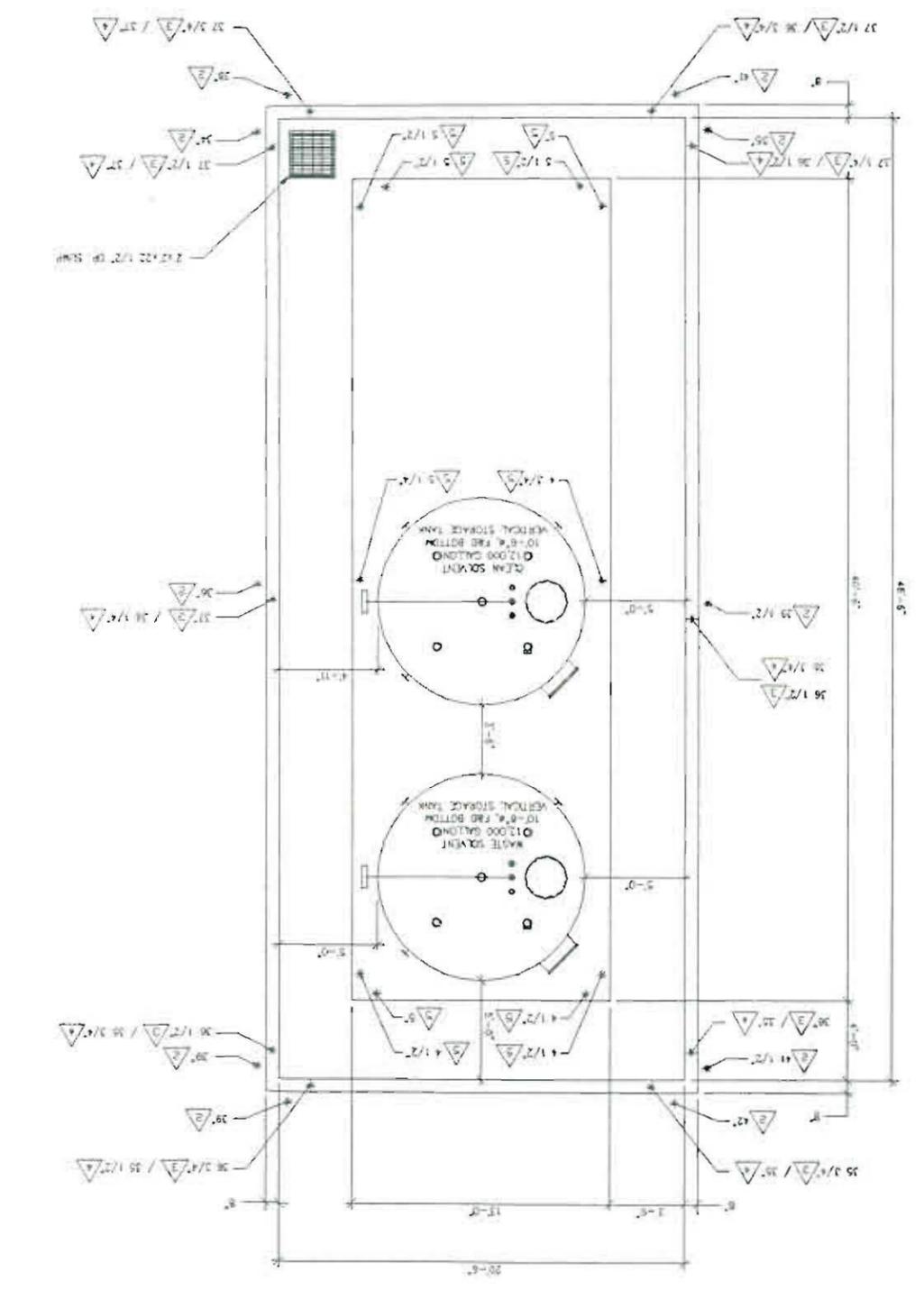
SITE PLAN

SAFETY-KLEEN CORP.
777 2ND TANKER ROAD, BOISE, IDAHO 83721, PHONE 708-487-8400

NO.	DESCRIPTION	BY	DATE	APP'D	DATE
01	ADD FIELD MEASUREMENTS AND RISE REVISIONS	BJJ	8/3		03/29/93
02	ADDIES NOTE	RJP			08/09/93
03	MOVE FENCE OUT 25'. CHANGE ASPHALT YARD TO CONCRETE. RELOCATE LIGHT POLE.	WEV			8-18-93
04	SAFETY-KLEEN DRAWING CONVERTED TO CAD AS DATED. REPLACES SAFETY-KLEEN DRAWING 012279	DO			5-1-93

SCALE	BY	DATE	P.L. APPR.	OP. APPR.	DATE
1" = 30'-0"	WEV				1-5-93
PROJECT CENTER LOCATION		DC-DWG NUMBER		REV. NO.	
BOISE, ID		118308-0001		03	

TANKFARM PLAN WITH FIELD MEASUREMENTS



SCALE: 1/4" = 1'-0"



NO.		DESCRIPTION		BY	CHK	APPV	DATE

GENERAL NOTES

1. ALL DIMENSIONS ON THIS DWG ARE FIELD MEASUREMENTS TAKEN BY BOB BARRETT ON 1-18-05.
2. OUTSIDE ONE WALL HEIGHT.
3. INSIDE ONE WALL HEIGHT.
4. INSIDE ONE WALL CORNER HEIGHT.
5. TANK PAD THICKNESS.

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SAFETY-KLEEN CORPORATION. ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT BY SAFETY-KLEEN OR AS SAFETY-KLEEN MAY AGREE IN WRITING.

TANKFARM PLAN WITH FIELD MEASUREMENTS

SAFETY-KLEEN CORP.

777 20 THREE ONE ELEM STREET WALKER TANK 796-6776

SCALE: 1/4" = 1'-0"

DATE: 5-2-05

REV. NO.: 0

BOISE, ID

SERVICE CENTER LOCATION

SC-DWG NUMBER

**TANK INSPECTION RECORD
USED MINERAL SPIRITS**

B-3

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**

B-6

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 20'-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.

B-8

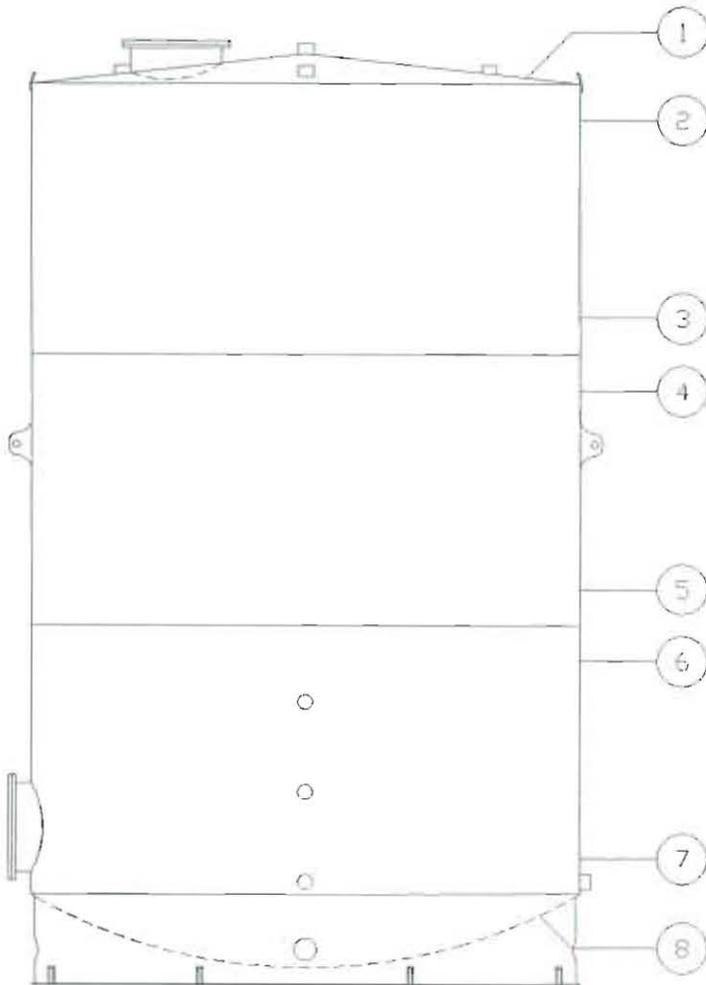
SITE: SAFETY-KLEEN

BOISE, ID.

DATE: 1-18-93

JOB #: 92105.3

INSPECTOR: RAB



UT TANK WALL THICKNESS TEST				
POINT #	NORTH	EAST	SOUTH	WEST
1	.179	.189	.193	.185
2	.190	.191	.192	.185
3	.197	.190	.200	.185
4	.250	.250	.250	.251
5	*	*	*	*
6	*	*	*	*
7	*	*	*	*
8	.236	.268	.261	.260

* 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.: Buck JEFF SALESMAN: _____

FOREMAN: Buck SITE PHONE: 336-3778

PRE-CONSTRUCTION REVIEW: DATE 9-92

	SALESMAN	CONST MGR	FOREMAN
SCOPE OF WORK	<i>[Signature]</i>	<i>[Signature]</i>	A.P.
MATERIALS LIST & P.O.'s	<i>[Signature]</i>	<i>[Signature]</i>	A.P.
SITE PLAN AND GRADES	<i>[Signature]</i>	<i>[Signature]</i>	N/A
SUBCONTRACTS LET & REVIEWED	<i>[Signature]</i>	<i>[Signature]</i>	A.P.
SCHEDULE SET AND REVIEWED	<i>[Signature]</i>	<i>[Signature]</i>	A.P.
PERMITS OBTAINED: ----- (BY)	<u>John Harmon</u>		(DATE) <u>12-14-92</u>

SITE LAYOUT/REVIEW:

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

DIMENSIONS AND GRADES VERIFIED FOR:

TANK EXCAVATION (BY) _____ (DATE) N/A

CANOPY FOOTINGS (BY) _____ (DATE) N/A

ISLANDS & SLABS (BY) _____ (DATE) N/A

UTILITY LOCATN. ORDERED & CHECKED (BY) _____ (DATE) N/A

EXCAVATED MATERIAL TO: _____ (BY) _____

COMMENTS: _____

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

ABOVE GROUND TESTING OF TANKS:

PHOTO

TANK TYPE Steel Above Ground MANUFACTURER TOPAC TANK

UNLOADED BY Boise Crane METHOD USED Crane

OPENING CONFIGURATION CHECKED AGAINST PLANS BY Alan P.

TANK SIZE:	(DIAM)	(LENGTH)	(CAPCTY)	(VERIFIED BY)
TANK #1	<u>10 FT</u>	<u>18 FT</u>	<u>12,000</u>	<u>A.P.</u>
TANK #2	<u>10 FT</u>	<u>18 FT</u>	<u>12,000</u>	<u>A.P.</u>
TANK #3				
TANK #4				
TANK #5				

TANK IDENTIFICATION:

(U/L #)	(SER #)	(U/L #)	(SER #)
TANK #1 <u>South</u>	<u>Clean Solvent</u>	TANK #2	
TANK #3 <u>North</u>	<u>Waste Solvent</u>	TANK #4	
TANK #5			

SOAP SUDS TEST: ENTIRE SURFACE (), FITINGS & SEAMS ONLY ()
PHOTO ()

	PRESSURE	HELD FOR	SOAP BY	OBSERVED BY
TANK #1	<u>2 #</u>	<u>1 hr</u>	<u>A.P.</u>	<u>High suds</u>
TANK #2	<u>2 #</u>	<u>1 hr</u>	<u>A.P.</u>	<u>High suds</u>
TANK #3				
TANK #4				
TANK #5				

CUSTOMER REP Bud Cooper K&L INSPECTOR [Signature] DATE 12-28-92

COMMENTS: _____

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

EXCAVATION & SETTING OF TANKS:

TANK HOLE DIMENSIONS: VERIFIED BY n/a DATE n/a (PHOTO)
LENGTH _____ WIDTH _____ DEPTH _____

WHAT IS BENCHMARK? n/a FROM _____

TANKS SET WITH CORRECT ALIGNMENT (BURY) AND SLOPE

AS-BUILT NOTED BY Alan DATE 1-8-93 (PHOTO)

PERMANANT BALLAST? YES NO . . . IF YES, STATE TYPE:
Anchor Bolts Per S&B Klean Spec. (PHOTO)

IS WRITTEN CHANGE ORDER APPROVED? BY: _____ DATE _____

IS TEMPORARY BALLAST NEEDED? n/a IF YES, CHECK IF:

WATER , FUEL PRODUCT AS ASSGND BY _____ DATE _____

MONITOR WELLS: NUMBER REQUIRED _____ SIZE: _____ diam.

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

TYPE OF OVERFILL PROTECTION Soundwave Sensor

BACKFILL: (type) | (size) (PHOTO of backfilled tanks)

MATERIAL _____ BY: _____ DATE _____

SUPPLIER _____ \$ /yd _____ P.O. # _____

TYPE OF COMPACTION: _____

_____ BY _____ APPR. BY _____

MANUFACTURER'S CHKLST COMPLETE BY: _____ DATE _____

EXCAVATION, BACKFILL, TANK SET AND COMPACTION APPROVED BY:

CUSTOMER: _____ INSPECTOR ^x n/a DATE _____

COMMENTS: _____

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

PIPING:

* TYPE OF SYSTEM (suction or pressure) Above Ground Pressure

* TYPE OF LEAK DETECTOR Other Installed by _____ DATE _____

* PRIMARY PIPING MATRL: Sch 40 Black Steel SIZE _____

* DOUBLE WALL? _____ IF YES, TYPE SYSTEM _____

* DESCRIBE TERMINATION OF PRIMARY PIPING:

At Tanks Fire Valve & 1/2 Ball Valve

At Dispenser 1/2 Ball Valve & Nozzle

* HOW ARE METALLIC PORTIONS OF PRODUCT PIPING PROTECTED?

SACRIFICIAL ANODES () Coated? _____ How N/A

N/A ISOLATION JACKET AND TYPE () _____

N/A OTHER ISOLATION FROM SOIL () DESCRIBE _____

* DEPTH OF PIPING AT TANKS _____ PLANNED BY _____

ACTUAL DEPTH AT TANKS _____ BY _____ DATE _____

N/A VENTS PROPERLY SLOPED. BY N/A 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 1-8-93 Alan DATE _____

AS-BUILT NOTED (including all unused tank openings and
specific locations) BY ALAN DATE 1-8-93

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

	PRESSURE	HELD FOR	SOAP BY	OBSERVED BY
FROM TNK #1	<u>60#</u>	<u>1 hr</u>	<u>ALAN</u>	<u>[Signature]</u>
FROM TNK #2	<u>60#</u>	<u>1 hr</u>	<u>ALAN</u>	<u>[Signature]</u>
FROM TNK #3				
FROM TNK #4				
FROM TNK #5				

WITNESS OF PRIMARY PIPING TEST BY:

CUSTMR R 1-8-93 DATE 1-8-92 INSPECTR [Signature] DATE 1-8-92

COMMENTS _____

TESTING OF SECONDARY PIPING:

	PRESSURE	HELD FOR	SOAP BY	OBSERVED BY
FROM TNK #1				
FROM TNK #2				
FROM TNK #3				
FROM TNK #4				
FROM TNK #5				

WITNESS OF SECONDARY PIPING TEST BY:

CUSTMR _____ DATE _____ INSPECTR _____ DATE _____

COMMENTS _____

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

MANHOLES AND VAULTS: (PHOTO)

* SPILL PREVENTION, MODEL _____ INSP BY _____ DATE _____

* SUB-PUMP MODEL _____ INSP BY _____ DATE _____

* VAPOR RECOVERY MODEL _____ INSP BY _____ DATE _____

* GAGE MODEL Varec INSP BY Alan DATE 12-29-92

* VAPOR/WATER WELL MODEL _____ INSP BY _____ DATE _____

* SUB-PUMP VAULT ANNULAR? _____ IF YES, TYPE OF MONITORING _____

* MODEL _____ INSP BY _____ DATE _____

FINAL BACKFILL OVER TANKS AND PIPING:

BACKFILL: (type) | (size) (PHOTO of backfilled tank and island area)

MATERIAL _____ BY: _____ DATE _____

* SUPPLIER _____ \$ /yd _____ P.O. # _____

TYPE OF COMPACTION: _____

_____ BY _____ APPR. BY _____

VERIFY FINAL GRADE OVER TANKS AND READY FOR SURFACING:

BY _____ CUSTOMER _____ DATE _____

ISLANDS:

	LENGTH	WIDTH	GRADE	PLAN BY	DATE	VERIFY BY	DATE
* #1	_____	_____	_____	_____	_____	_____	_____
* #2	_____	_____	_____	_____	_____	_____	_____
* #3	_____	_____	_____	_____	_____	_____	_____
* #4	_____	_____	_____	_____	_____	_____	_____
* #5	_____	_____	_____	_____	_____	_____	_____
* #6	_____	_____	_____	_____	_____	_____	_____
* #7	_____	_____	_____	_____	_____	_____	_____
* #8	_____	_____	_____	_____	_____	_____	_____

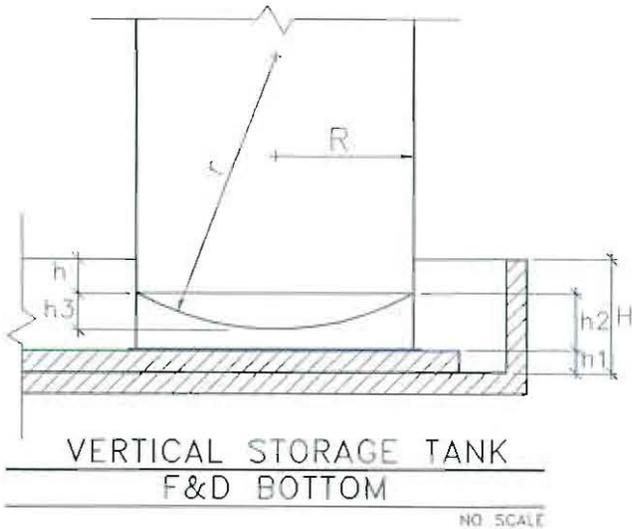
COMMENTS _____

SECONDARY CONTAINMENT CALCULATIONS

3 Pack Tank Farm Z-VERTICAL Tank(s)

REFERENCES

FIELD DATA



Data :

L1 [tank length]	<u>N/A</u>	ft.
L [inside wall length]	<u>48.50</u>	ft.
W [inside wall width]	<u>20.50</u>	ft.
l [pad length]	<u>40.50</u>	ft.
w [pad width]	<u>13.00</u>	ft.
R [tank radius]	<u>5.25</u>	ft.
† r [dish radius]	<u>10.50</u>	ft.
H [inside wall height]	<u>2.92</u>	ft.
h1 [pad height]	<u>0.38</u>	ft.
h2 [support height]	<u>2.00</u>	ft.
h3 [dish height]	<u>1.41</u>	ft.
h [tank segment height]	<u>0.54</u>	ft.
** rainfall	<u>2.0</u>	in.

* 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 :

$$\text{TANK SEGMENT HT.} = h = H - h1 - h2$$

$$\text{SUBMERGED DISH HT.} = h(\text{sub}) = h3 + h$$

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

$$\text{PAD DISPLACEMENT VOLUME} = (l)(w)(h1)(7.48 \text{ gal/cf})(\text{number of pads})$$

TANK DISPLACEMENT VOLUME

$$\text{vert. tank, dished bottom} = [1/3 (\pi) (h3)^2 (3r - h3) + \pi R^2 h](7.48 \text{ gal/cf})(\text{number of tanks})$$

$$\text{vert. tank, flat bottom} = (\pi R^2 h)(7.48 \text{ gal/cf})(\text{number of tanks})$$

$$\text{vert. tank, cone bottom} = [1/3 (\pi) (h)(R1^2 + R2^2 + R1(R2)) + \pi R^2 h](7.48 \text{ gal/cf})(\text{number of tanks})$$

$$\text{horiz. tank, flat ends} = [R \cos^{-1} ((R - h) / R) \text{ rad}] - [(R - h) \sqrt{2(R)(h) - h^2}] (L1)(7.48 \text{ gal/cf})(\# \text{ of tanks})$$

$$\text{MISC. DISPLACEMENT VOLUME (Pumps, Piping, Supports, etc.)} = 2\% \text{ of dike volume}$$

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

Tank Sizes:

200. 12,000 GAL., 10'-6" Ø F&D BOT.

1 (FUTURE) 12,000 GAL., 10'-6" Ø, F&D BOT.



CONSULTING ENGINEERS
Mechanical • Electrical • Civil • Environmental

4812 SANTANA CIRCLE, COLUMBIA, MO. 65203

Client SAFETY KLEEN CORP. Pg. **B-16**
 Project No. 92105.3 Date 2-24-93
 Project Title BOISE, ID.
 Subject USED MINERAL SPIRITS INSTALLATION ASSESSMENT
 Designer TYJ Cx By RAB Prelim Final X

SECONDARY CONTAINMENT CALCULATIONS

Calculations :

(a) DIKE CONTAINMENT VOLUME =

$$(48.50)(20.50)(2.92)(7.48) \quad (+) \underline{21,716} \text{ gal.}$$

(b) VOLUME OF LARGEST TANK WITHIN DIKED AREA =

$$(-) \underline{12,000} \text{ gal.}$$

(c) PAD DISPLACEMENT VOLUME =

$$(40.50)(13.00)(.38)(7.48) \quad (-) \underline{1,497} \text{ gal.}$$

(d) TANK DISPLACEMENT VOLUME =

$$\left[\frac{1}{3} \pi (1.41)^2 (31.5 - 1.41) + \pi (5.25)^2 (.54) \right] (7.48) (2) \quad (-) \underline{1,637} \text{ gal.}$$

(e) MISC. DISPLACEMENT VOLUME =

$$(.02)(21,716) \quad (-) \underline{434} \text{ gal.}$$

(f) LOCAL RAINFALL ALLOWANCE =

$$\left(\frac{2}{12} \right) (48.50)(20.50)(7.48) \quad (-) \underline{1,239} \text{ gal.}$$

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

$$(+)\underline{4,909} \text{ gal.}$$



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4812 SAVTANA CIRCLE, COLUMBIA, MD. 21043

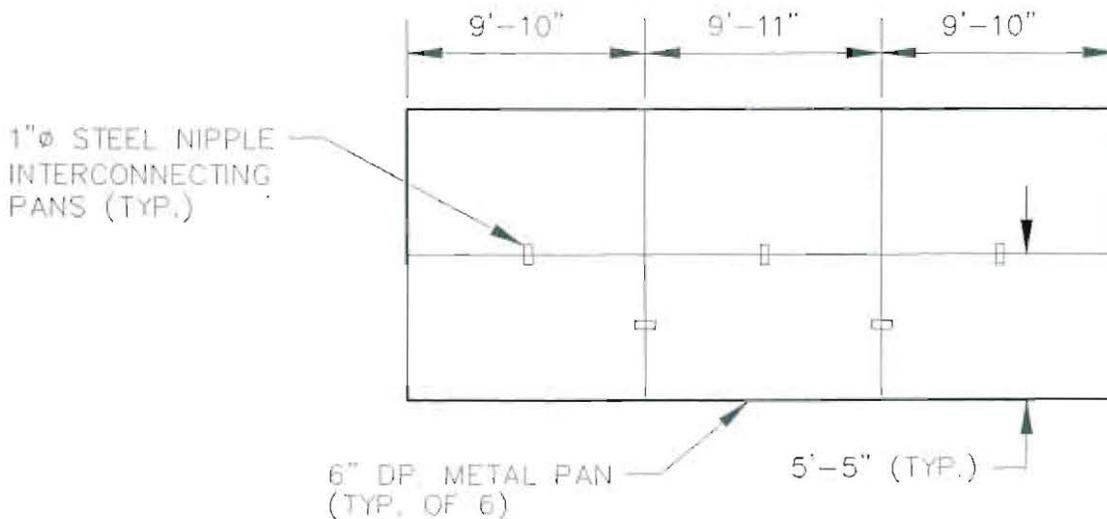
Client SAFETY KLEEN CORP. Pg. B-17
 Project No. 92105.2 Date 2-24-93
 Project Title BOISE, ID.
 Subject USED MINERAL SPIRITS TANK DESIGN ASSESSMENT
 Designer TYJ Cx By RAB Prelim. Final X

SECONDARY CONTAINMENT CALCULATIONS – RETURN/FILL SHELTER

SECONDARY CONTAINMENT BY METAL PANS

$$\text{VOLUME} = (.50)(5.42)(9.83)(4 \text{ PANS}) + (.50)(5.42)(9.92)(2 \text{ PANS}) = 160.32 \text{ CU.FT.}$$

$$\text{CONTAINMENT CAPACITY} = 160.32 \text{ CU.FT.} (7.48 \text{ GAL/CU.FT.}) = 1,199 \text{ GAL.}$$



PLAN VIEW

$$\text{EXCESS CONTAINMENT CAPACITY} = \text{CONTAINMENT CAPACITY} - \text{VOLUME OF LARGEST CONTAINER}$$

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

$$\text{EXCESS CONTAINMENT CAPACITY} = 1,197 \text{ GAL.} - 374 \text{ GAL.} = \underline{\underline{825 \text{ GAL.}}}$$

**CONCRETE
COMPRESSIVE STRENGTH
TEST REPORT**

REPORT DATE:	OCT 13, 1992	PROJECT:	SAFETY KLEEN
CLIENT:	SAFETY KLEEN	CONTRACTOR:	KREIZENBECK CONSTRUCTORS
FILE #:	B92225-031	SUPPLIER:	TREASURE VALLEY CONCRETE
Permit #:	Not Reported	Truck #:	220
Mix ID:	400	Ticket #:	882
# Of Yards:	9	Inspector:	Kevin Sagez

Pour Location: Monolithic tank farm #1.

Concrete Cylinders Grout Cylinders

MIX PROPORTIONS:	TEST PROPERTIES & CONDITIONS:
Cement : 2120 / 2155 Fly Ash: 390 / 375 Water: 190 Coarse Agg. #1: 7140 / 6920 Coarse Agg. #2: Fine Agg. #1: 6860 / 7500 Fine Agg. #2: Admix #1: AT 37oz Adm: #2: WA 162oz Admix #3: Water/Cement Ratio:	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 Slump (inches) (ASTM C 143): 1.75 Unit Weight (ASTM C 138): Not Reported Yield (ASTM C 138): Not Reported Water Added (gals): 4 Specified f _c (psi): 4000

Cast Date:		Oct 2, 92						
# of Cylinders:		3						
Cylinder ID	Cylinder Diameter	Cylinder Height	Cylinder Area	Test Age	Test Date	Failure Load	Compressive Strength	Fracture Type
5715	6	12	2827	7	Oct 9, 92	100,700	3560	Cone
5716	6	12	2827	28	Oct 30, 92			
5717	6	12	2827	28	Oct 30, 92			

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
DAVID O. CRAM
DIVISION MANAGER

WELDER AND WELDING OPERATOR QUALIFICATION TEST RECORD

Welder or welding operator's name Alan Placey Identification no. 2
 Welding process SMAW Manual 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 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 Flux for submerged arc or gas for gas metal arc or flux
5P / 1/8" Jetweld LH-70 (Lincoln) cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut Acceptable Piping porosity None

Guided Bend Test Results

Type	Result	Type	Result
Face Bend	Satisfactory - No Defects	Side Bend	Satisfactory - No Defects
Face Bend	Satisfactory - No Defects	Side Bend	Satisfactory - No Defects
Root Bend	Satisfactory - No Defects	Side Bend	Satisfactory - No Defects
Root Bend	Satisfactory - No Defects	Side Bend	Satisfactory - No Defects

CWI #81050643

Test conducted by J. Reese Leavitt Laboratory test no. 2
 per AWS D1.1-90 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 _____ Laboratory test no. _____
 per _____ Test date _____

RADIOGRAPHIC TEST RESULTS

Film identification	Results	Remarks	Film identification	Results	Remarks

Test witnessed by _____ Test no. _____
 per _____

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 [Signature]

Date 1-4-93

WELDER AND WELDING OPERATOR QUALIFICATION TEST RECORD

Welder or welding operator's name Bret MacFee Identification no. 1
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 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 Flux for submerged arc or gas for gas metal arc or flux
5P / 1/8" Jetweld LH-70 (Lincoln) cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut Acceptable Piping porosity None

Guided Bend Test Results

Table with 4 columns: Type, Result, Type, Result. Rows include Face Bend, Side Bend, and Root Bend, all with 'Satisfactory - No Defects' results.

CWI #81050643

Test conducted by J. Reese Leavitt Laboratory test no. 1
per AWS D1.1-90 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 Laboratory test no.
per Test date

RADIOGRAPHIC TEST RESULTS

Table with 6 columns: Film identification, Results, Remarks, Film identification, Results, Remarks.

Test witnessed by Test no.
per

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

Procedure Qualification Record (PQR) # _____
Test Results

TENSILE TEST

Specimen no.	Width	Thickness	Area	Ultimate tensile load, lb	Ultimate unit stress, psi	Character of failure and location

GUIDED BEND TEST

Specimen No.	Type of bend	Result	Remarks

VISUAL INSPECTION

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

Radiographic-ultrasonic examination
 RT report no: _____ Result _____
 UT report no: _____ Result _____

FILLET WELD TEST RESULTS

Minimum size multiple pass Maximum size single pass
 Macroetch Macroetch
 1. _____ 3. _____ 1. _____ 3. _____
 2. _____ 2. _____

Other Tests

All-weld-metal tension test
 Tensile strength, psi _____
 Yield point/strength, psi _____
 Elongation in 2 in., % _____
 Laboratory test no. _____

Welder's name _____ Clock no. _____ Stamp no. _____

Tests conducted by _____ Laboratory

Test number _____

Per _____

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.
year

Signed DALE'S SERVICE COMPANY
Manufacturer or Contractor

By Walter C. Dohm

Title Vice President - Construction

Date 12-31-92

WELDING PROCEDURE SPECIFICATION (WPS) Yes (X)
PREQUALIFIED X QUALIFIED BY TESTING _____
or PROCEDURE QUALIFICATION RECORD (PQR) Yes ()

Company Name DALE'S SERVICE COMPANY Identification # SMAW 1
 Revision 0 Date 12-31-92 By J R Leavitt
 Welding Process(es) SMAW Authorized by Norm Hobson Date 12-31- 92
 Supporting PQR No.(s) Prequalified Joints Type - Manual (X) Semi-Automatic ()
 Machine () Automatic ()

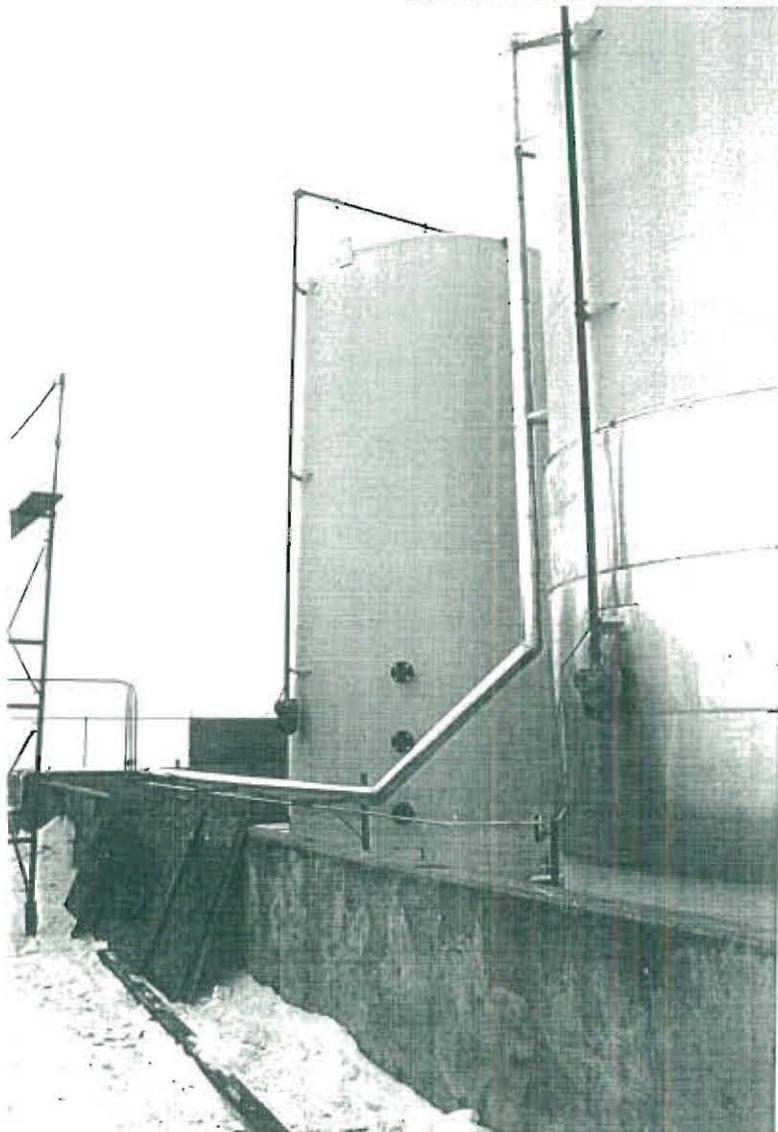
JOINT DESIGN USED Type <u>Groove & Fillet</u> Single () Double Weld () Backing Yes () No () Backing Material _____ Root Opening _____ Root Face Dimension _____ Groove Angle _____ Radius (J-U) _____ Back Gouging: Yes () No () Method _____	POSITION Position of Groove <u>All</u> Fillet <u>All</u> Vertical Progression: Up (X) Down ()
BASE METALS Material Spec. <u>Code Section 1.2</u> Type or Grade _____ Thickness Groove <u>Unlimited</u> Fillet <u>Unlimited</u> Diameter (Pipe) <u>All</u>	ELECTRICAL CHARACTERISTICS Transfer Mode (GMAW) Short-Circuiting () Globular () Spray () Current: AC () DCEP (X) DCEN () Pulsed () Other _____
FILLER METALS AWS Specification <u>5.1</u> AWS Classification <u>E6010 / E7018</u>	TECHNIQUE Stringer or Weave Bead <u>Stringer or Weave</u> Multi-pass or Single Pass (per side) <u>Single</u> Number of electrodes <u>One</u> Electrode Spacing Longitudinal <u>N/A</u> Lateral _____ Angle _____
SHIELDING Flux <u>N/A</u> Gas <u>N/A</u> Composition _____ Electrode-Flux (Class) _____ Flow Rate _____ Gas Cup Size _____	Contact Tube to Work Distance <u>N/A</u> Peening <u>None</u> Interpass Cleaning: _____
PREHEAT Preheat Temp., Min. <u>50°F</u> Interpass Temp., Min. <u>--</u> Max. <u>400°F</u>	POSTWELD HEAT TREATMENT Temp. <u>N/A</u> Time _____

WELDING PROCEDURE

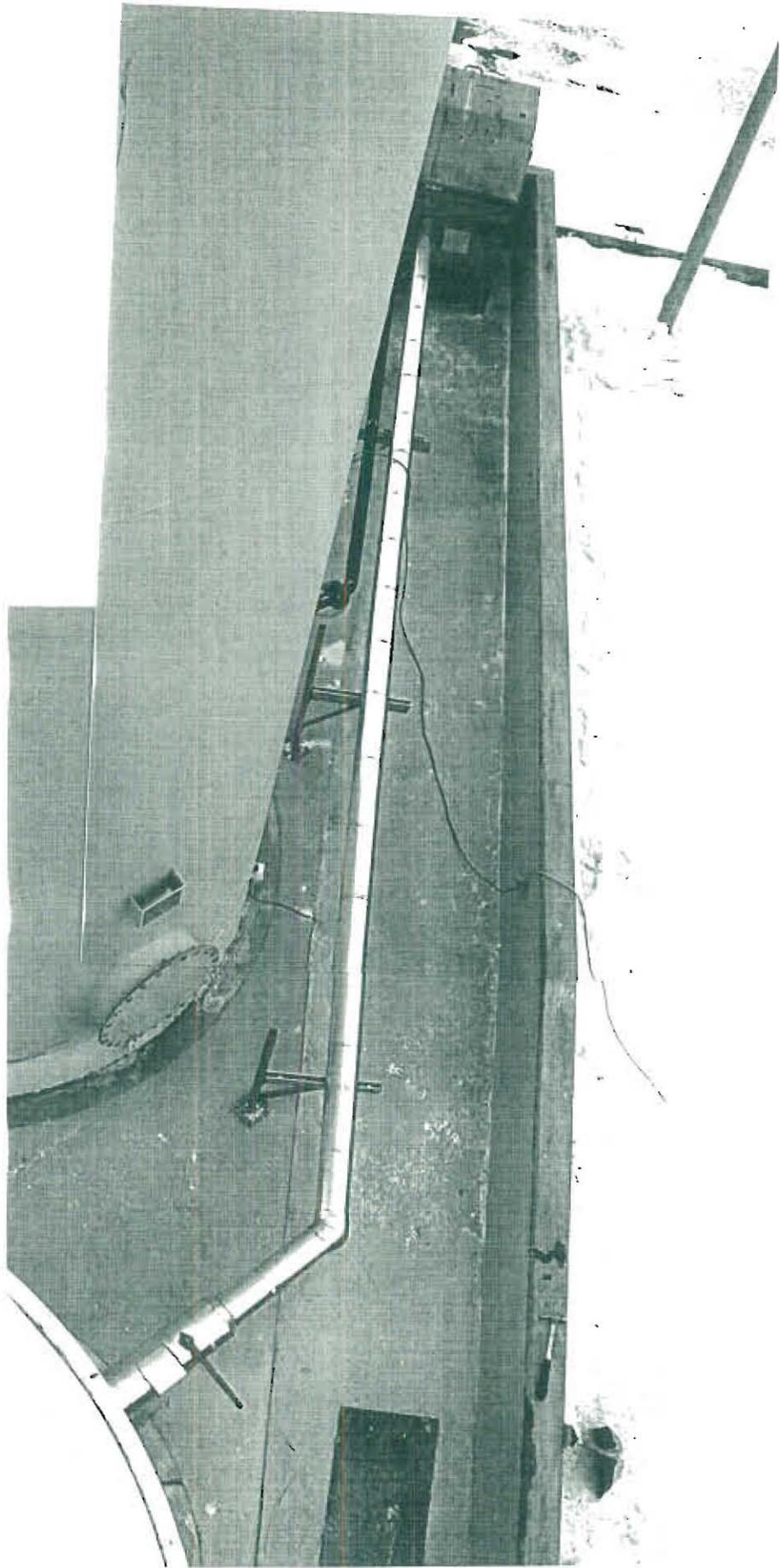
Pass or Weld Layer(s)	Process	Filler Metals		Current			Travel Speed	Joint Details
		Class	Diam.	Type & Polarity	Amps or Wire Feed Speed	Volts		
Root	SMAW	E6010	3/32"	D.C.E.P.	40-75	20-27	4-12"/Min.	See prequalified joints in code: Figure 2.3 - Fillet Welds Fig. 2-4 - Complete Joint Penetration Groove Welds Fig. 2.5 - Partial Joint Penetration Groove Welds
			1/8"	D.C.E.P.	75-130	20-27	4-12"/Min.	
			5/32"	D.C.E.P.	90-175	20-27	4-12"/Min.	
Filler	SMAW	E7018	3/32"	D.C.E.P.	70-110	20-27	4-12"/Min.	
			1/8"	D.C.E.P.	90-160	20-27	4-12"/Min.	
			5/32"	D.C.E.P.	120-200	20-27	4-12"/Min.	
			3/16"	D.C.E.P.	170-270	20-27	4-12"/Min.	



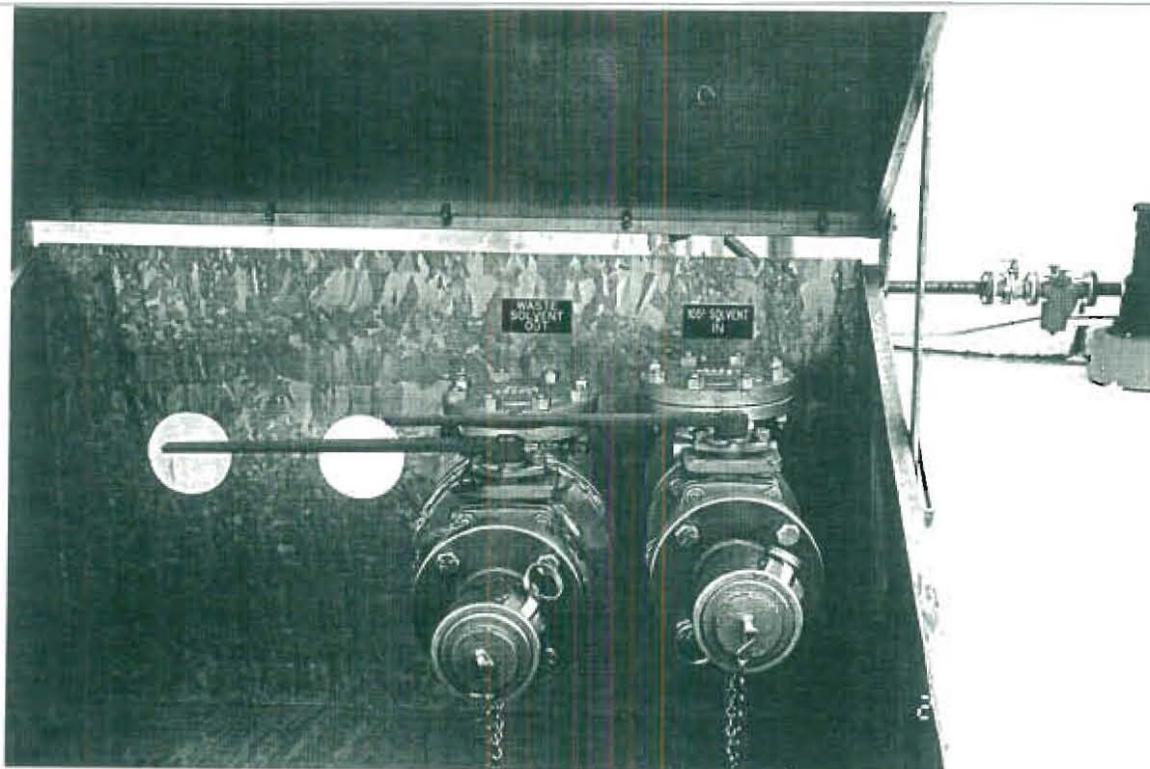
Return Fill Shelter and Tank Farm



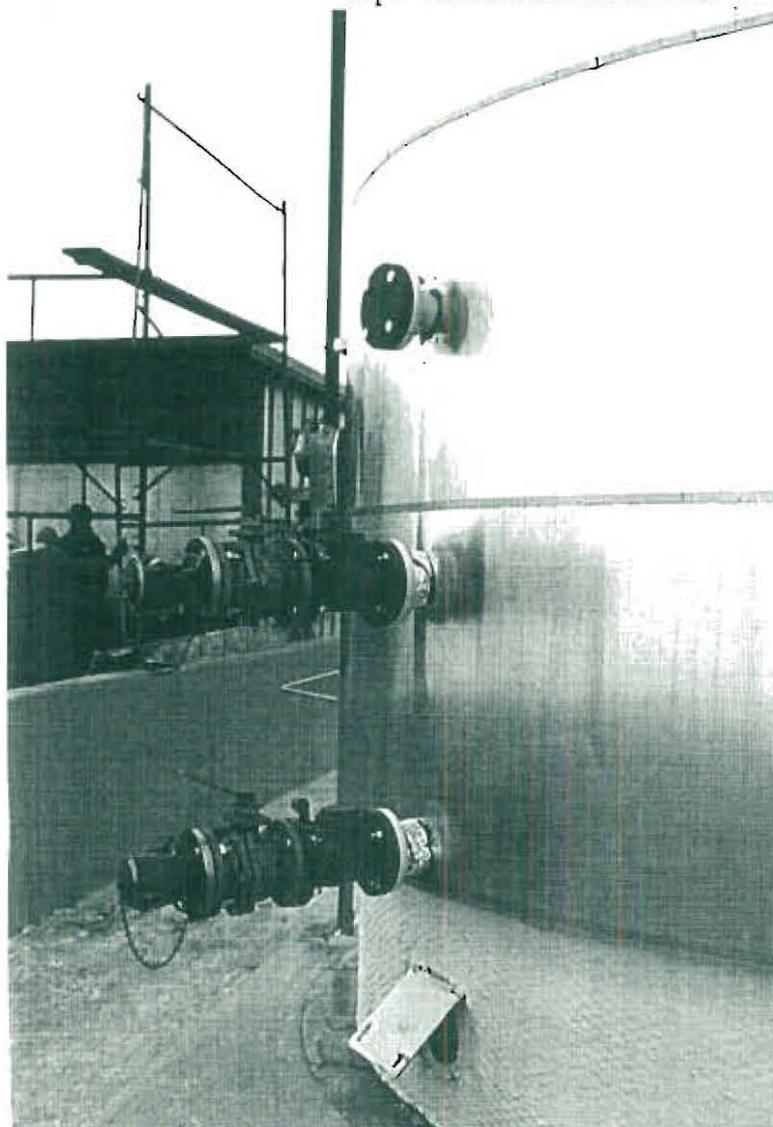
Piping from Tank to Return Fill Shelter



Piping from Tank to Access Container



Pipe Connection at Access Container



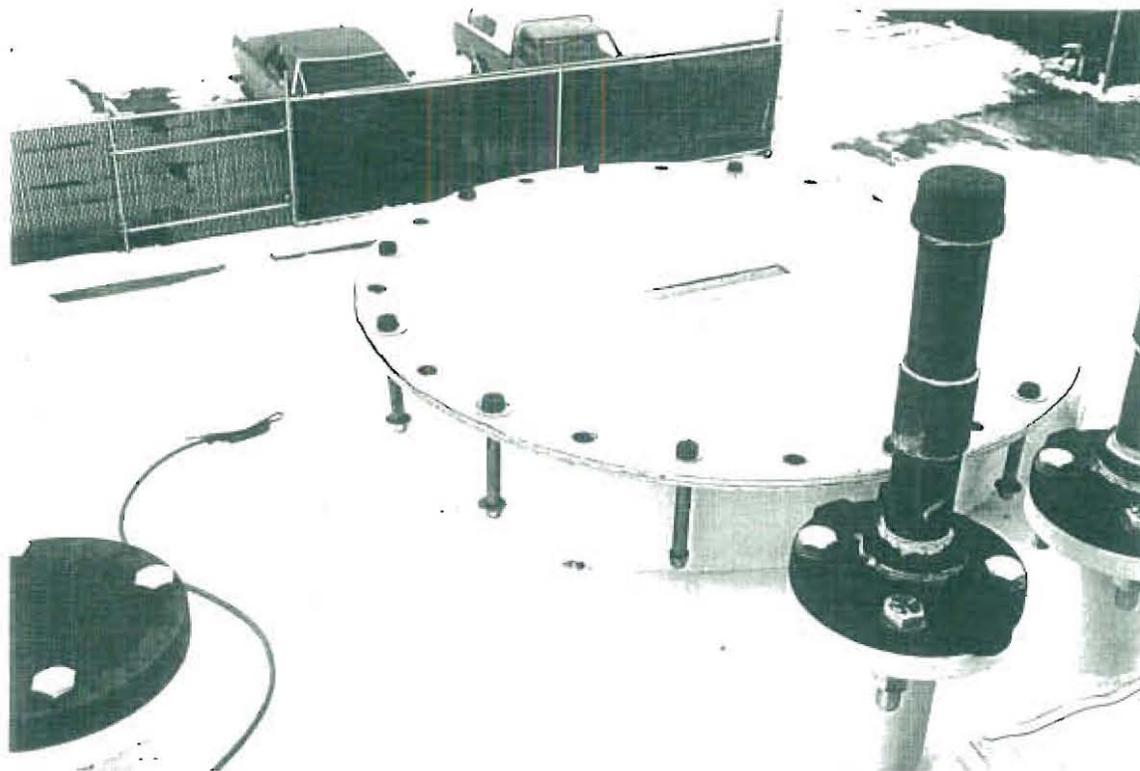
Freeze Connections



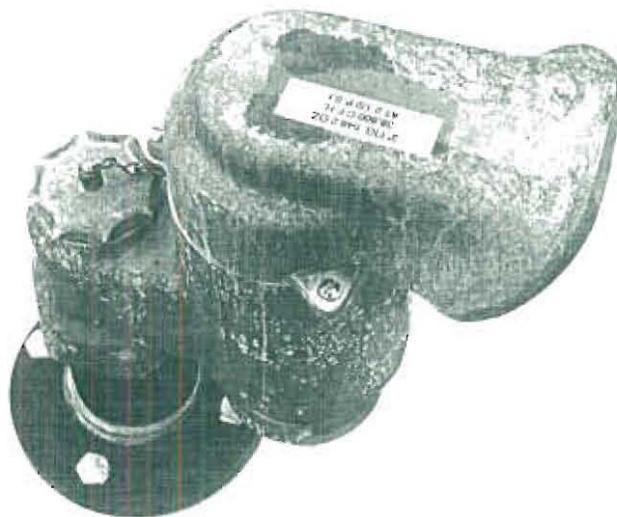
Tank Manufacturer's Label



Tank Labels



UL 142 Label on Manway with Long Bolts



Normal Vents

Exhibit D2-3

Tank Gauging Chart

SAFETY-KLEEN SYSTEMS, INC.
BOISE, ID.
USED SOLVENT STORAGE TANK
TANK VOLUME VS. DEPTH

DIAMETER = 10'-6"
HEIGHT = 18'-6"
NOMINAL CAPACITY = 12,000 GALLONS
VERTICAL TANK, DISH BOTTOM

Gauge Reading	Volume						
Ft.-In.	Gallons	Ft.-In.	Gallons	Ft.-In.	Gallons	Ft.-In.	Gallons
-1 -7	14	3 -5	2964	8 -5	6202	13 -5	9441
-1 -6	26	3 -6	3018	8 -6	6256	13 -6	9495
-1 -5	43	3 -7	3072	8 -7	6310	13 -7	9549
-1 -4	64	3 -8	3126	8 -8	6364	13 -8	9603
-1 -3	89	3 -9	3180	8 -9	6418	13 -9	9657
-1 -2	116	3 -10	3234	8 -10	6472	13 -10	9711
-1 -1	146	3 -11	3288	8 -11	6526	13 -11	9765
-1 -0	179	4 -0	3342	9 -0	6580	14 -0	9819
-0 -11	215	4 -1	3396	9 -1	6634	14 -1	9873
-0 -10	253	4 -2	3450	9 -2	6688	14 -2	9927
-0 -9	293	4 -3	3504	9 -3	6742	14 -3	9981
-0 -8	336	4 -4	3558	9 -4	6796	14 -4	10035
-0 -7	381	4 -5	3612	9 -5	6850	14 -5	10089
-0 -6	429	4 -6	3666	9 -6	6904	14 -6	10143
-0 -5	479	4 -7	3720	9 -7	6958	14 -7	10197
-0 -4	530	4 -8	3774	9 -8	7012	14 -8	10251
-0 -3	584	4 -9	3828	9 -9	7066	14 -9	10305
-0 -2	639	4 -10	3882	9 -10	7120	14 -10	10359
-0 -1	695	4 -11	3936	9 -11	7174	14 -11	10413
0 -0	751	5 -0	3990	10 -0	7228	15 -0	10467
0 -1	805	5 -1	4043	10 -1	7282	15 -1	10520
0 -2	859	5 -2	4097	10 -2	7336	15 -2	10574
0 -3	913	5 -3	4151	10 -3	7390	15 -3	10628
0 -4	967	5 -4	4205	10 -4	7444	15 -4	10682
0 -5	1021	5 -5	4259	10 -5	7498	15 -5	10736
0 -6	1075	5 -6	4313	10 -6	7552	15 -6	10790
0 -7	1129	5 -7	4367	10 -7	7606	15 -7	10844
0 -8	1183	5 -8	4421	10 -8	7660	15 -8	10898
0 -9	1237	5 -9	4475	10 -9	7714	15 -9	10952
0 -10	1291	5 -10	4529	10 -10	7768	15 -10	11006
0 -11	1345	5 -11	4583	10 -11	7822	15 -11	11060
1 -0	1399	6 -0	4637	11 -0	7876	16 -0	11114
1 -1	1453	6 -1	4691	11 -1	7930	16 -1	11168
1 -2	1507	6 -2	4745	11 -2	7984	16 -2	11222
1 -3	1561	6 -3	4799	11 -3	8038	16 -3	11276
1 -4	1615	6 -4	4853	11 -4	8092	16 -4	11330
1 -5	1669	6 -5	4907	11 -5	8146	16 -5	11384
1 -6	1723	6 -6	4961	11 -6	8200	16 -6	11438
1 -7	1777	6 -7	5015	11 -7	8254	16 -7	11492
1 -8	1831	6 -8	5069	11 -8	8308	16 -8	11546
1 -9	1884	6 -9	5123	11 -9	8361	16 -9	11600
1 -10	1938	6 -10	5177	11 -10	8415	16 -10	11654
1 -11	1992	6 -11	5231	11 -11	8469	16 -11	11708
2 -0	2046	7 -0	5285	12 -0	8523	17 -0	11762
2 -1	2100	7 -1	5339	12 -1	8577	17 -1	11816
2 -2	2154	7 -2	5393	12 -2	8631	17 -2	11870
2 -3	2208	7 -3	5447	12 -3	8685	17 -3	11924
2 -4	2262	7 -4	5501	12 -4	8739	17 -4	11978
2 -5	2316	7 -5	5555	12 -5	8793	17 -5	12032
2 -6	2370	7 -6	5609	12 -6	8847	17 -6	12086
2 -7	2424	7 -7	5663	12 -7	8901	17 -7	12140
2 -8	2478	7 -8	5717	12 -8	8955	17 -8	12194
2 -9	2532	7 -9	5771	12 -9	9009	17 -9	12248
2 -10	2586	7 -10	5825	12 -10	9063	17 -10	12302
2 -11	2640	7 -11	5879	12 -11	9117	17 -11	12356
3 -0	2694	8 -0	5933	13 -0	9171	18 -0	12410
3 -1	2748	8 -1	5987	13 -1	9225		
3 -2	2802	8 -2	6041	13 -2	9279		
3 -3	2856	8 -3	6095	13 -3	9333		
3 -4	2910	8 -4	6149	13 -4	9387		

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USED SOLVENT STORAGE TANK GAUGING CHART

SAFETY-KLEEN SYSTEMS, INC.
5360 LEGACY DR., BLDG. 2 SUITE 100 PLANO, TX. 75024 800-669-5740

SCALE NONE	BY JEK	CHKD KDT	APPR KDT	OP. APPR KDT	DATE 6/2/14
SERVICE CENTER LOCATION BOISE, ID.			SC-DWG NUMBER 7114-4100-902		REV. NO. 0

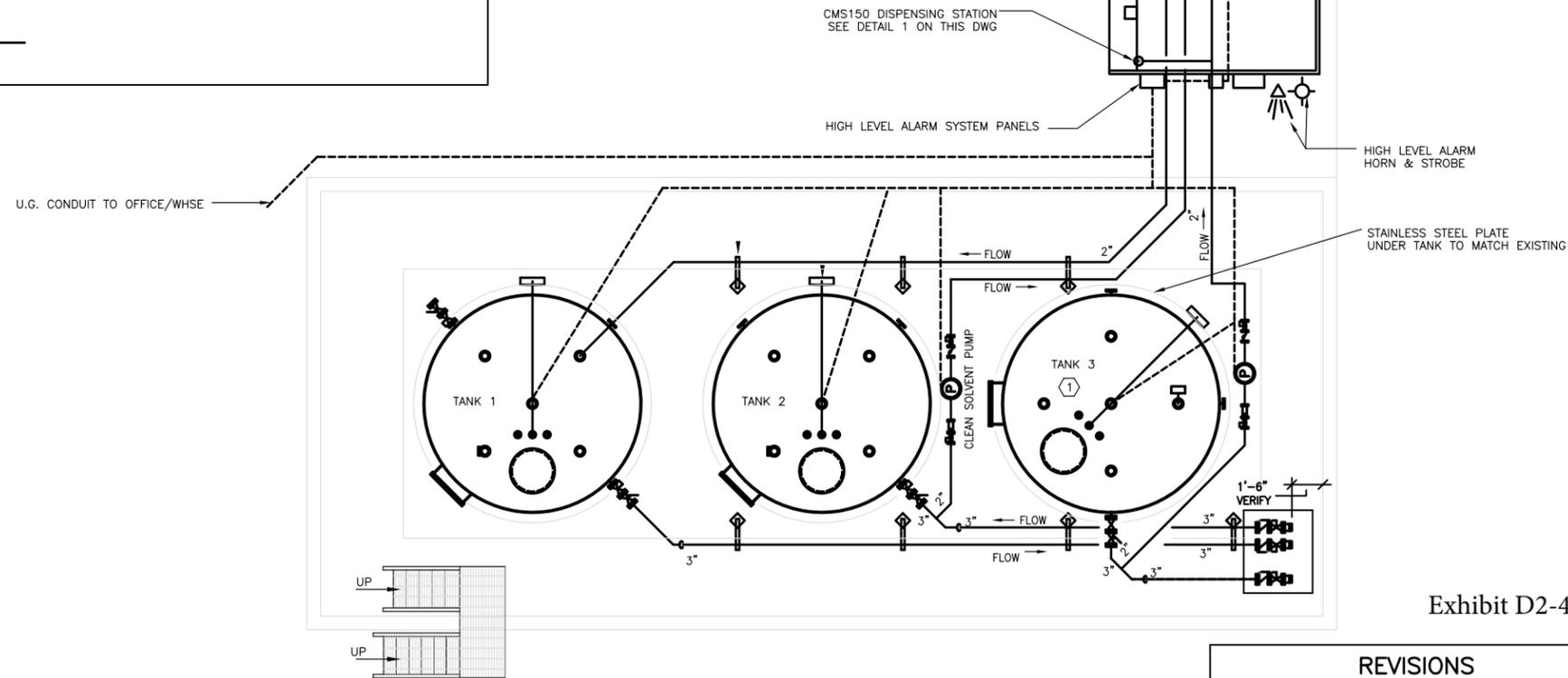
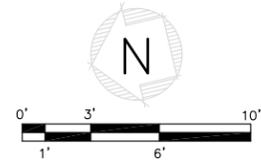
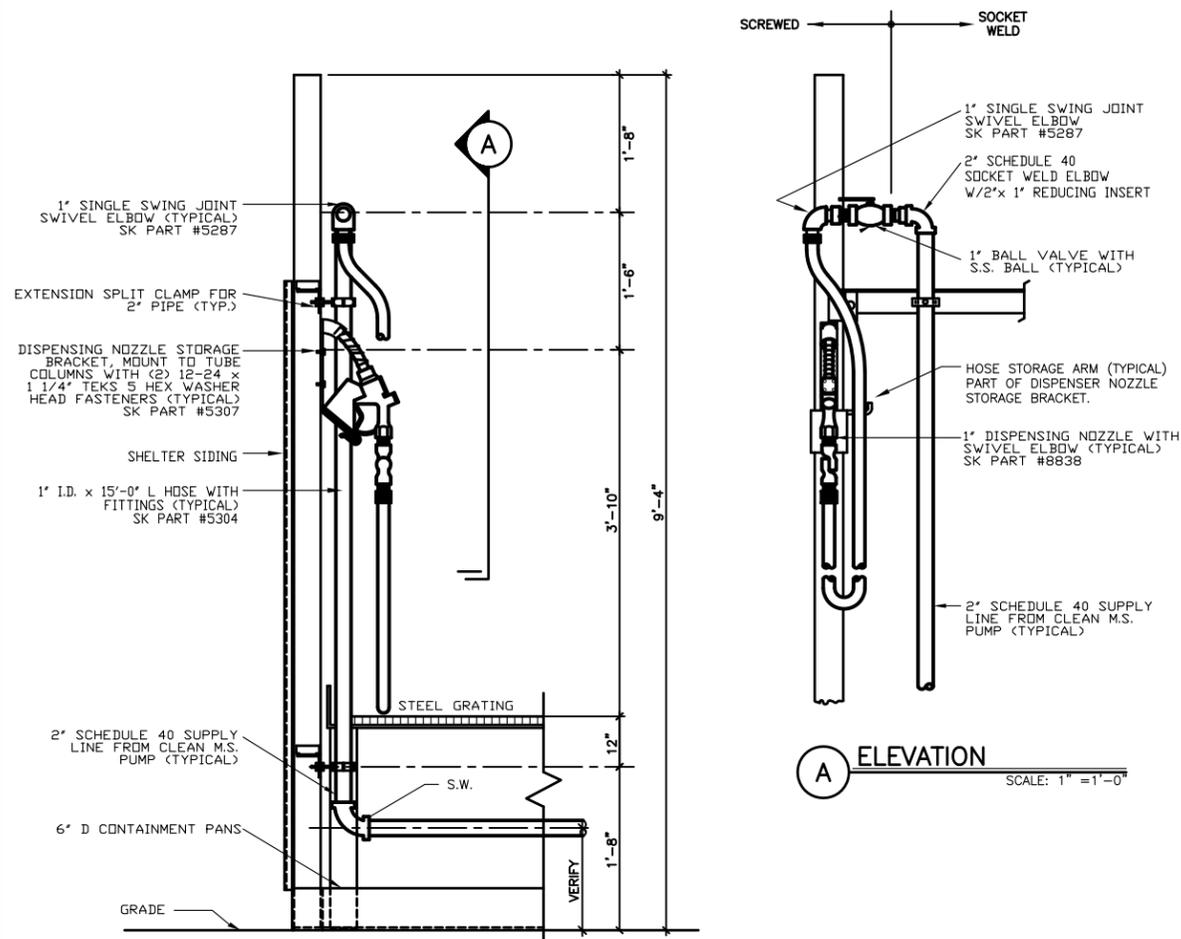


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Exhibit D2-4

Tank Farm / Return and Fill Piping Plan

DISPENSING STATION DETAIL 1



GENERAL NOTES

- 1.) RUN PROCESS PIPE LEVEL FROM TANK. CHANGE ELEVATION ONLY AS REQUIRED.
- 2.)
- 3.) PAINT ALL PIPE AND TANKS PER SK SPECS.
- 4.) ALL PIPING TO BE SUPPORTED EVERY 8'-0" MAXIMUM. CONTRACTOR TO SUPPLY ALL BRACKETS, CLAMPS, ECT. AS REQUIRED FOR SUPPORTING PIPE.
- 5.) PIPING TO BE PRESSURE TESTED PER SAFETY-KLEEN SPECIFICATIONS.
- 6.) ALL ITEMS SUPPLIED BY S-K TO BE INSTALLED BY CONTRACTOR.
- 7.) REFERENCE SITE PLAN DWG TD06001 FOR EQUIPMENT LOCATIONS
- 8.) ELECTRICALLY GROUND TANK AS REQ'D.

EQUIPMENT SCHEDULE

MARK	DESCRIPTION	QTY.	REMARKS
1	12K TANK	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
2	3" CAM LOCK	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
3	3" LOCKING BALL VALVE	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
4	3" CHECK VALVE	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
5	3" EXTERNAL EMERGENCY VALVE	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
6	3" GATE VALVE	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
7	2" BALL VALVE	2	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
8	2" "Y" STRAINER	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
9	CMS PUMP	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
10	BACK PRESSURE VALVE	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
11	ACCESS CONTAINER	1	EXISTING
12	3" PRESSURE VACUUM BREAKER	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
14	HLA SENSING ELEMENT	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR
15	TANK LEVEL GAUGE	1	SUPPLIED BY S-K INSTALLED BY CONTRACTOR

TANK LEGEND

TANK NO.	TANK VOLUME	TANK CONTENTS	REMARKS
1	12,000 USG	USED MINERAL SPIRITS	10'-6" F&D BOTTOM TANK
2	12,000 USG	CLEAN 105' MINERAL SPIRITS	10'-6" F&D BOTTOM TANK
3	12,000 USG	CLEAN 150' MINERAL SPIRITS	PROPOSED TANK

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Exhibit D2-4

REVISIONS

NO.	DESCRIPTION	BY	CHK	APPR	DATE
A	RELEASED TO WEY FOR REVIEW	MBH	KJM	WEY	05/31/96
B	FOR PERMIT	JKM	GO	-	03/13/01
C	REMOVE DUMPSTER AND FITTINGS	JEK	GO	-	11/02/05
D	REMOVE C/U VAT AND FITTINGS REVISED FOR PERMIT	JEK	NC	NC	01/09/13

TANK FARM AND RETURN/FILL PIPING PLAN

SAFETY-KLEEN SYSTEMS, INC. 2600 N. CENT EXPRESSWAY STE 400 RICHARDSON, TX. 75080 PHONE 800-669-5740		SCALE 1/4" = 1'-0"	BY MBH	CHKD CHKD	APPROVED	OPERATIONS	DATE 05-31-96
SERVICE CENTER LOCATION BOISE, ID		SC-DWG NUMBER 7114-4100-301		REV. NO. D			

Exhibit D2-5

Tank Farm Containment Calculations

TANK FARM CONTAINMENT CALCULATIONS

FORMULAS USED

$L \times W \times H \times 7.48 \text{ GAL/CF}$

$\pi \times R^2 \times D \times 7.48 \text{ GAL/CF}$

VOLUME OF TANKFARM

$48.5' \times 20.5' \times 3' \times 7.48 \text{ GAL/CF} = +23,311 \text{ GAL.}$

VOLUME OF SUMP

$\pi \times 1'^2 \times 2'-0" \times 7.48 \text{ GAL/CF} = +46 \text{ GAL.}$

DISPLACEMENT OF TANK PAD

$40.66' \times 13' \times .416' \times 7.48 = -1,645 \text{ GAL.}$

VOLUME OF LARGEST TANK

$(2.5"/12) \times 48.5' \times 20.5' \times 7.48 \text{ GAL/CF} = -1,549 \text{ GAL.}$

1% MISC. DISPLACEMENT OF EQPT.

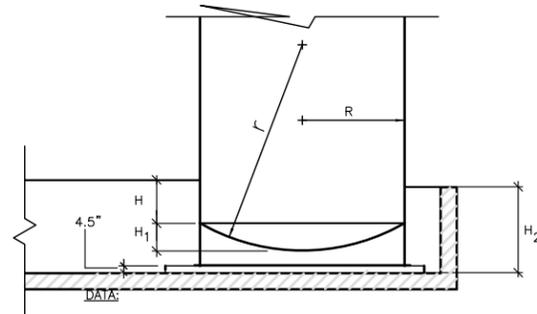
$(\text{PUMPS, PIPING, SUPPORTS}) = -233 \text{ GAL}$

TANK DISPLACEMENT VOLUME (12K DISH BOTTOM TANK)

FORMULA USED $[(1/3)(\pi)(H_1)^2(3r-H_1) + (\pi R^2 H)] \times 7.48 \text{ GAL/CF} \times \# \text{ OF TANKS}$

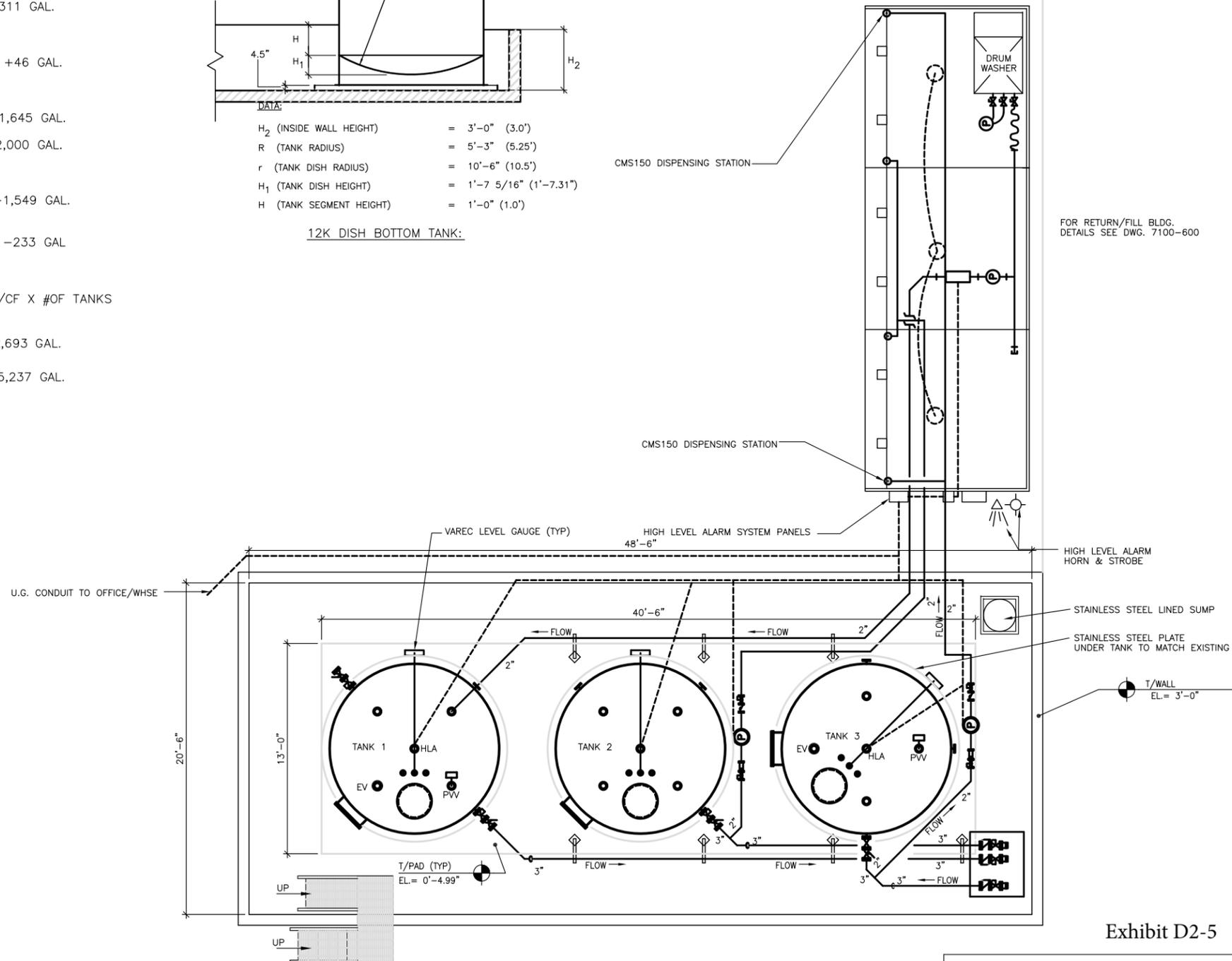
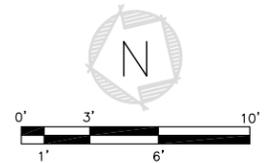
$[(1/3 \times \pi \times (1.731')^2 \times (3(10.5') - 1.731')) + (\pi \times (5.25')^2 \times (1.0'))] \times 7.48 \text{ GAL/CF} \times 2 \text{ TANKS} = -2,693 \text{ GAL.}$

TOTAL EXCESS CONTAINMENT = +5,237 GAL.



- H₂ (INSIDE WALL HEIGHT) = 3'-0" (3.0')
- R (TANK RADIUS) = 5'-3" (5.25')
- r (TANK DISH RADIUS) = 10'-6" (10.5')
- H₁ (TANK DISH HEIGHT) = 1'-7 5/16" (1'-7.31")
- H (TANK SEGMENT HEIGHT) = 1'-0" (1.0')

12K DISH BOTTOM TANK:



FOR RETURN/FILL BLDG. DETAILS SEE DWG. 7100-600

LEGEND

- HLA - HIGH LEVEL ALARM
- PVV - PRESSURE/VACUUM VENT
- EV - EMERGENCY VENT

TANK LEGEND

TANK NO.	TANK VOLUME	TANK CONTENTS	REMARKS
1	12,000 USG	USED MINERAL SPIRITS	10'-6" F&D BOTTOM TANK
2	12,000 USG	OUT OF SERVICE	10'-6" F&D BOTTOM TANK
3	12,000 USG	CLEAN 150' MINERAL SPIRITS	10'-6" F&D BOTTOM TANK

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Exhibit D2-5

REVISIONS

NO.	DESCRIPTION	BY	CHK	APPR	DATE
A	RELEASED TO WEY FOR REVIEW	MBH	KJM	WEY	053196
B	FOR PERMIT	JKM	GO	-	031301
C	REMOVE DUMPSTER AND FITTINGS	JEK	GO	-	110205
D	REMOVE C/U VAT AND FITTINGS REVISED FOR PERMIT	JEK	NC	NC	010913
E	REVISED FOR PERMIT	JEK	NC	NC	030414

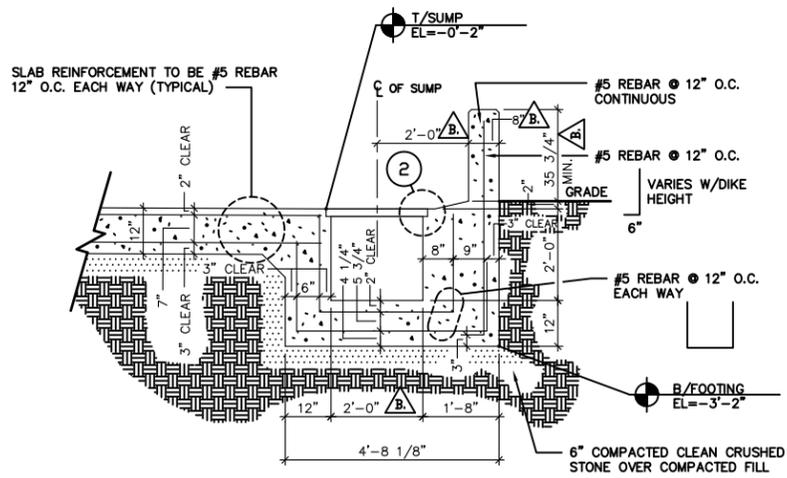
TITLE
TANK FARM AND RETURN/FILL PIPING PLAN

SAFETY-KLEEN SYSTEMS, INC.
2600 N. CENT EXPRESSWAY STE 400 RICHARDSON, TX. 75080
PHONE 800-669-5740

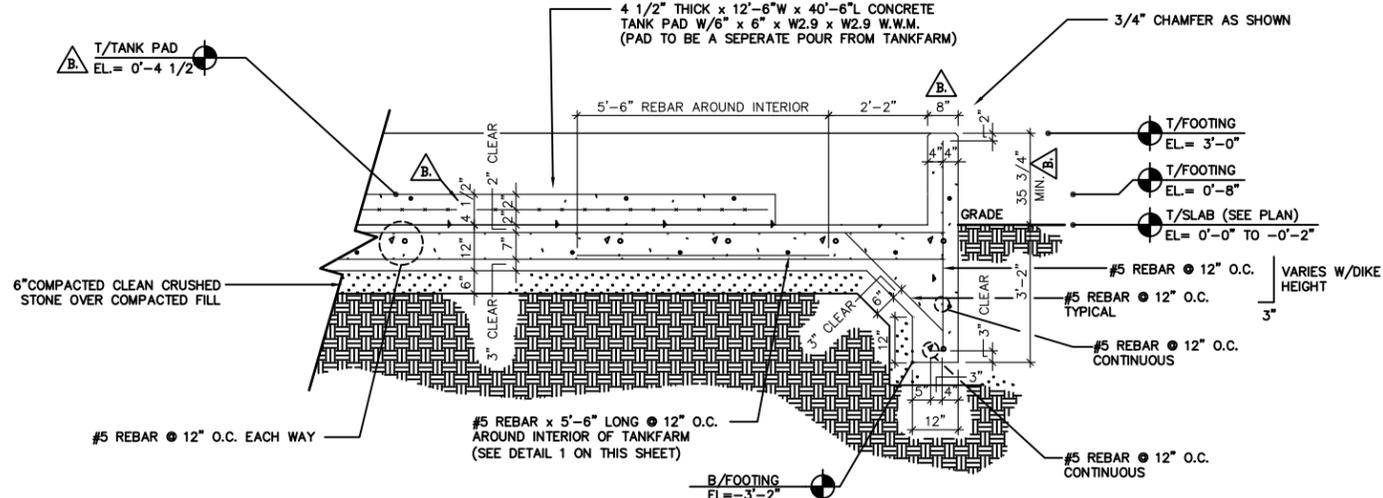
SCALE	BY	CHKD	APPROVED	OPERATIONS	DATE
1/4"=1'-0"	MBH				05-31-96
SERVICE CENTER LOCATION	SC-DWG NUMBER	REV. NO.			
BOISE, ID	7114-4100-301	E			

Exhibit D2-6

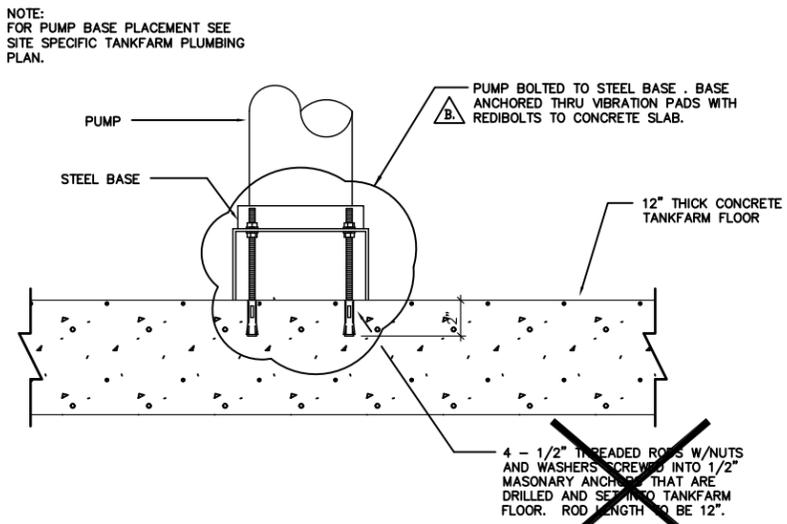
Tank Farm Concrete Details



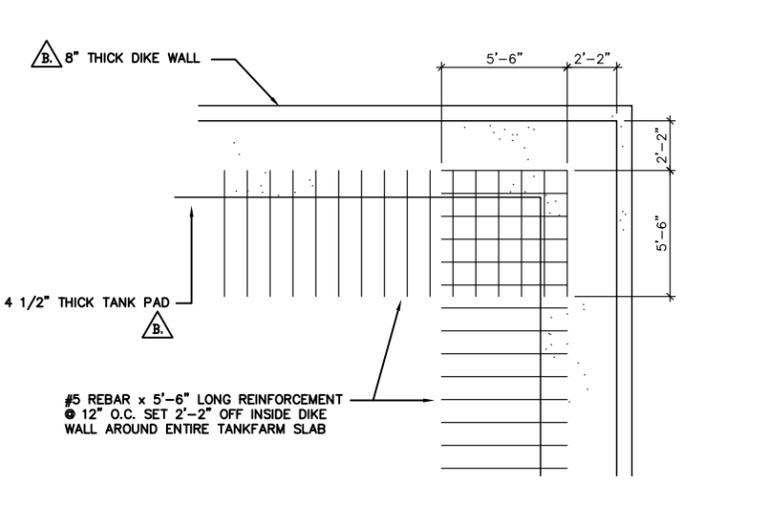
A TANKFARM SUMP SECTION
TYPICAL CONSTRUCTION
SCALE: 1/2" = 1'-0"



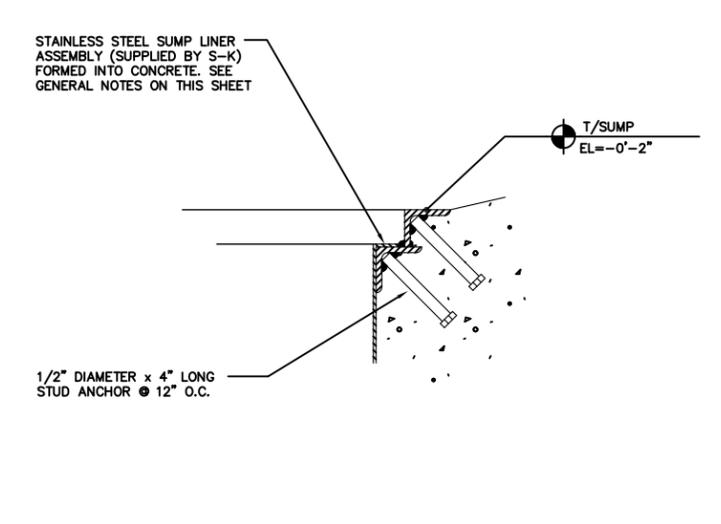
B TYPICAL TANKFARM REINFORCEMENT DETAIL
TYPICAL CONSTRUCTION
SCALE: 1/2" = 1'-0"



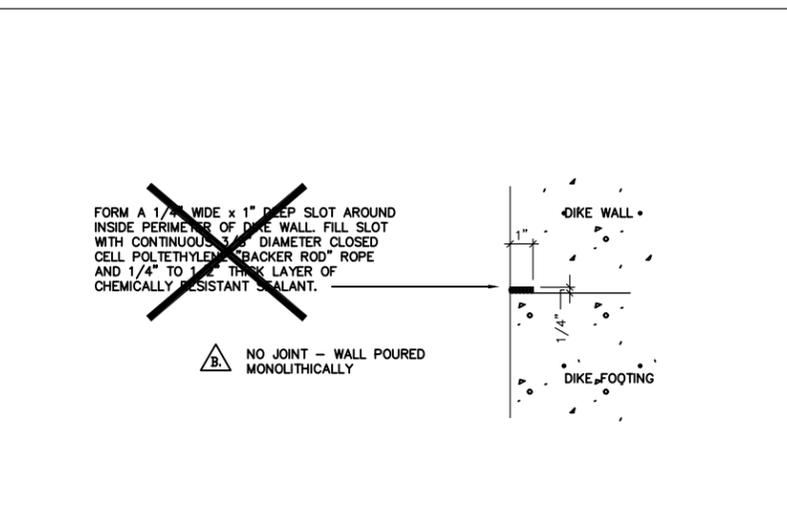
C TANKFARM PUMP BASE SECTION
TYPICAL CONSTRUCTION



1 TANKFARM REINFORCEMENT DETAIL
TYPICAL CONSTRUCTION
SCALE: 1/4" = 1'-0"



2 TANKFARM SUMP DETAIL
TYPICAL CONSTRUCTION
SCALE: 3" = 1'-0"



3 DIKE WALL TO FOOTING DETAIL
TYPICAL CONSTRUCTION
SCALE: 3" = 1'-0"

ASBUILT NOTES

- A. ASBUILT INFORMATION HAS BEEN ADDED TO CONSTRUCTION DRAWINGS AS PROVIDED BY SAFETY-KLEEN. DRAWING REVISIONS HAVE BEEN MADE ONLY TO REFLECT ASBUILT CONDITIONS. NO OTHER REPRESENTATIONS ARE MADE.
- B. INDICATES ASBUILT MEASUREMENT OR FIELD VERIFICATION OF EXISTING CONDITION ON 2/11/93.
- C. DETAILS INDICATED AS TYPICAL CONSTRUCTION IDENTIFY TYPICAL SAFETY-KLEEN CONSTRUCTION PRACTICES WHICH WERE NOT FIELD VERIFIED UNLESS SPECIFICALLY INDICATED.

GENERAL NOTES

- 1.) ALL CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF ACI 301, 315 AND 318 LATEST EDITIONS. FOLLOW ACI RECOMMENDATIONS FOR COLD AND HOT WEATHER CONDITIONS.
- 2.) ALL CONCRETE SLABS SHALL BE COVERED WITH BURLAP AND KEPT CONTINUOUSLY MOIST FOR A MINIMUM PERIOD OF FIVE DAYS.
- 3.) ALL WALLS SHALL BE CAST MONOLITHICALLY WITH SLAB.
- 4.) MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE 3" FOR CONCRETE CAST AGAINST SOIL AND 2" FOR CONCRETE EXPOSED TO WEATHER.
- 5.) ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS WITH MAX. SIZE AGGREGATE OF 1 1/2" AND ENTRAINED AIR OF 4% - 6% IN ADDITION FOR TRUCK STATION MIN. MODULUS OF RUPTURE OF 600 PSI AT 28 DAYS WITH MAX. W/C RATIO OF .50 AND MIN. CEMENT FACTOR OF 560 LB/CY.
- 6.) ALL REBAR SHALL BE GRADE 50 BILLET STEEL CONFORMING TO ASTM A-615.
- 7.) TANK FARM ELEVATIONS ARE RELATIVE AND SHALL BE BASED ON THE ASSIGNED REFERENCE ELEVATION OF 0'-0" FOR EXISTING GRADE LEVEL.
- 8.) TANK FARM REQUIRED PREPARATION: REMOVE SURFACE AND UNDERCUT SOIL TO THE PROPER SUB GRADE ELEVATION. SCARIFY AND RECOMPACT THE TOP 8" OF EXISTING SUB GRADE SOIL. BACK FILL AND COMPACT WITH AN 8" LAYER OF STRUCTURAL FILL (3" MINUS WELL GRADED CRUSHED STONE) AND 6" LAYER OF GRANULAR FILL (1" MINUS WELL GRADED CRUSHED STONE). SUBGRADE MATERIAL SHALL BE COMPACTED TO 95% STRUCTURAL FILL AND GRANULAR FILL MATERIALS SHALL BE COMPACTED TO 100% OF THE STANDARD PROCTOR MAX. DRY DENSITY AND UNIFORM OVER THE ENTIRE AREA. ACTUAL GRADE PREPARATION MAY VARY DUE TO EXISTING SOIL CONDITIONS.
- 9.) EXISTING GRADE AT PROPOSED TANK FARM LOCATION VARIES. CONTRACTOR TO VERIFY IN FIELD SLOPE DIRECTIONS AND ELEVATION. CONTRACTOR TO STEP GRADE BEAM AS REQ'D. CONTRACTOR TO MEET CONC. APRONS W/ ASPHALT RAMPS AT EITHER SIDE AND BLEND W/ EXISTING ASPHALT SURFACE AS REQ'D. (1"/PER FOOT MAX. SLOPE)
- 10.) ELEVATIONS SHOWN ON THIS SHEET ARE REFERENCE ELEVATIONS FOR TANKFARM AND TRUCK STATION ONLY. SEE SITE PLAN FOR ACTUAL ELEVATIONS.
- 11.) ELEVATION 0'-0" ON TANKFARM AND TRUCK STATION CONCRETE PLANS IS EQUAL TO ELEVATION ON THE SITE PLAN.
- 12.) ALL TANKFARM SUBSURFACE FOUNDATION DATA SHOWN ON TANKFARM AND TRUCK STATION CONCRETE DRAWING AND DETAILS IS SUBJECT TO CHANGE PER SITE SOILS AND FOUNDATION REPORT. CONTRACTOR IS TO OBTAIN A COPY OF THIS REPORT FROM EITHER SK OR THE ENGINEER PRIOR TO STARTING CONSTRUCTION. SEE SPECIFICATIONS.

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Project Solutions
Companies

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Exhibit D2-6

TITLE										
TANKFARM # 1 SECTIONS & DETAILS										
SAFETY-KLEEN SYSTEMS, INC. 2600 N. CENT. EXPRESSWAY, STE. 400 RICHARDSON TX. 75080 800-669-5740										
1	ASBUILT	HB	LOL	3/3/93	SCALE AS SHOWN	BY JHD	CHKD -	P.E. APPR WEY	OP. APPR -	DATE 8-29-91
NO.	DESCRIPTION	BY	CHK	APPR	DATE	SERVICE CENTER LOCATION	SC-DWG NUMBER	BOISE, ID	7114-4100-501	REV. NO. 01
REVISIONS										

Exhibit D2-7

Concrete Tank Farm Plan

GENERAL NOTES

- 1.) ALL CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF ACI 301, 315 AND 318 LATEST EDITIONS. FOLLOW ACI RECOMMENDATIONS FOR COLD AND HOT WEATHER CONDITIONS.
- 2.) ALL CONCRETE SLABS SHALL BE COVERED WITH BURLAP AND KEPT CONTINUOUSLY MOIST FOR A MINIMUM PERIOD OF FIVE DAYS.
- 3.) ALL WALLS SHALL BE CAST MONOLITHICALLY WITH SLAB.
- 4.) MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE 3" FOR CONCRETE CAST AGAINST SOIL AND 2" FOR CONCRETE EXPOSED TO WEATHER.
- 5.) ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS WITH MAX. SIZE AGGREGATE OF 1 1/2" AND ENTRAINED AIR OF 4% - 6% IN ADDITION FOR TRUCK STATION MIN. MODULUS OF RUPTURE OF 600 PSI AT 28 DAYS WITH MAX. W/C RATIO OF .50 AND MIN. CEMENT FACTOR OF 560 LB/CY.
- 6.) ALL REBAR SHALL BE GRADE 50 BILLET STEEL CONFORMING TO ASTM A-615.
- 7.) TANK FARM ELEVATIONS ARE RELATIVE AND SHALL BE BASED ON THE ASSIGNED REFERENCE ELEVATION OF 0'-0" FOR EXISTING GRADE LEVEL.
- 8.) TANK FARM REQUIRED PREPARATION: REMOVE SURFACE AND UNDERCUT SOIL TO THE PROPER SUB GRADE ELEVATION. SCARIFY AND RECOMPACT THE TOP 8" OF EXISTING SUB GRADE SOIL. BACK FILL AND COMPACT WITH AN 8" LAYER OF STRUCTURAL FILL (3" MINUS WELL GRADED CRUSHED STONE) AND 6" LAYER OF GRANULAR FILL (1" MINUS WELL GRADED CRUSHED STONE). SUBGRADE MATERIAL SHALL BE COMPACTED TO 95% STRUCTURAL FILL AND GRANULAR FILL MATERIALS SHALL BE COMPACTED TO 100% OF THE STANDARD PROCTOR MAX. DRY DENSITY AND UNIFORM OVER THE ENTIRE AREA. ACTUAL GRADE PREPARATION MAY VARY DUE TO EXISTING SOIL CONDITIONS.
- 9.) EXISTING GRADE AT PROPOSED TANK FARM LOCATION VARIES. CONTRACTOR TO VERIFY IN FIELD SLOPE DIRECTIONS AND ELEVATION. CONTRACTOR TO STEP GRADE BEAM AS REQ'D. CONTRACTOR TO MEET CONC. APRONS W/ ASPHALT RAMPS AT EITHER SIDE AND BLEND W/ EXISTING ASPHALT SURFACE AS REQ'D. (1"/PER FOOT MAX. SLOPE)
- 10.) ELEVATIONS SHOWN ON THIS SHEET ARE REFERENCE ELEVATIONS FOR TANKFARM AND TRUCK STATION ONLY. SEE SITE PLAN FOR ACTUAL ELEVATIONS.
- 11.) ELEVATION 0'-0" ON TANKFARM AND TRUCK STATION CONCRETE PLANS IS EQUAL TO ELEVATION ON THE SITE PLAN.
- 12.) ALL TANKFARM SUBSURFACE FOUNDATION DATA SHOWN ON TANKFARM AND TRUCK STATION CONCRETE DRAWING AND DETAILS IS SUBJECT TO CHANGE PER SITE SOILS AND FOUNDATION REPORT. CONTRACTOR IS TO OBTAIN A COPY OF THIS REPORT FROM EITHER SK OR THE ENGINEER PRIOR TO STARTING CONSTRUCTION. SEE SPECIFICATIONS.
- 13.) CONCRETE PENETRATIONS SHALL NOT BE ALLOWED ON TANKFARM FLOOR.
- 14.) TANKFARM FLOOR AND DIKE WALL SURFACES TO BE EPOXY COATED PER SK SPECIFICATIONS.
- 15.) IF CONSTRUCTION REQUIRES CONCRETE PENETRATIONS AFTER EPOXY COATING IS APPLIED, CONTRACTOR SHALL PATCH AND REPAIR EPOXY COATING PER MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS.



PROPRIETARY STATEMENT

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Exhibit D2-7

ASBUILT NOTES

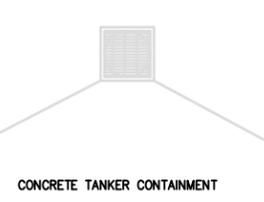
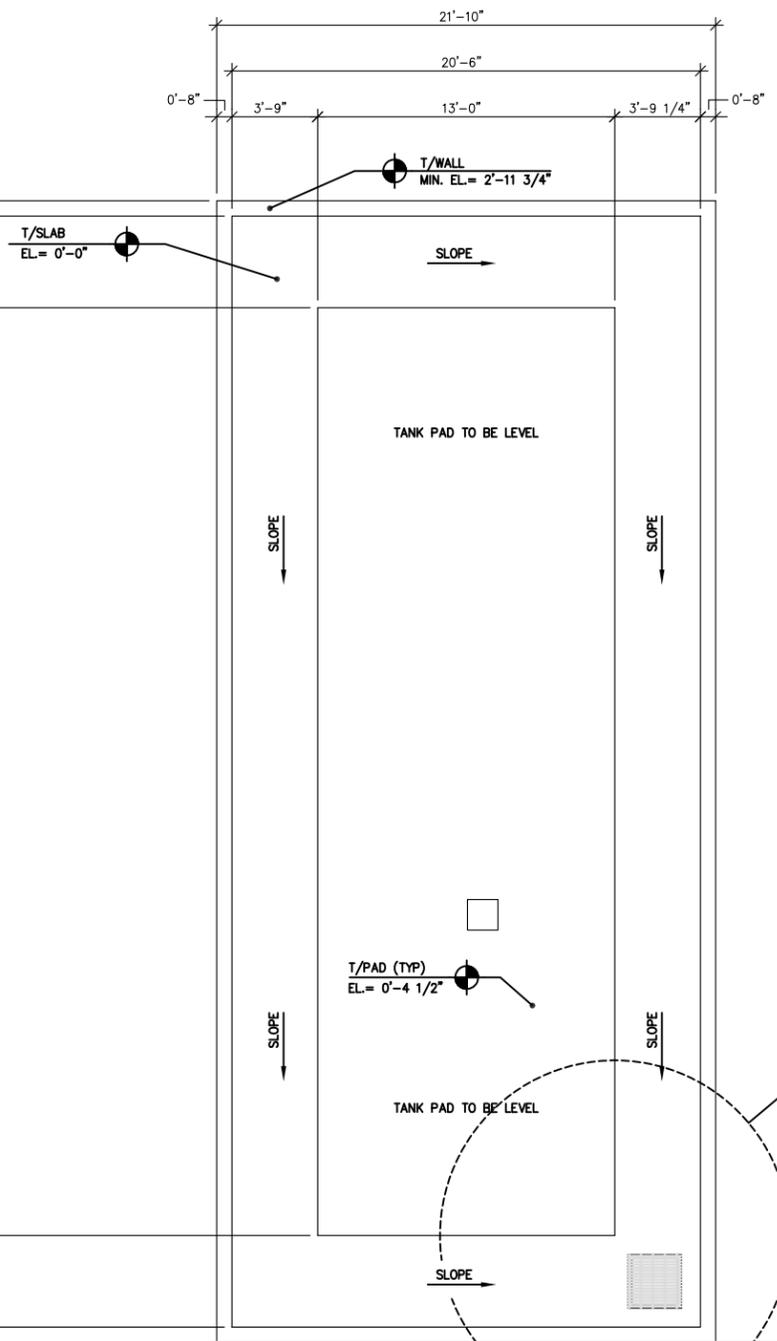
- A. ASBUILT INFORMATION HAS BEEN ADDED TO CONSTRUCTION DRAWINGS AS PROVIDED BY SAFETY-KLEEN. DRAWING REVISIONS HAVE BEEN MADE ONLY TO REFLECT ASBUILT CONDITIONS. NO OTHER REPRESENTATIONS ARE MADE.
- B. INDICATES ASBUILT MEASUREMENT OR FIELD VERIFICATION OF EXISTING CONDITION ON 2/11/93.

TITLE
TANKFARM CONCRETE PLAN

SAFETY-KLEEN SYSTEMS, INC.
2600 N. CENT. EXPRESSWAY, STE. 400 RICHARDSON TX. 75080 800-669-5740

SCALE	BY	CHKD	P.E. APPR	OP. APPR	DATE
1/4" = 1'-0"	JHD	-	-	-	9-24-91
NO.	DESCRIPTION	BY	CHK	APPR	DATE
REVISIONS		SERVICE CENTER LOCATION		SC-DWG NUMBER	REV. NO.
		BOISE, ID		7114-4100-500	02

2	ASBUILT	HB	LOL	3/3/93
01	MOVED TANKER PAD, SUMP	HJP	-	020892

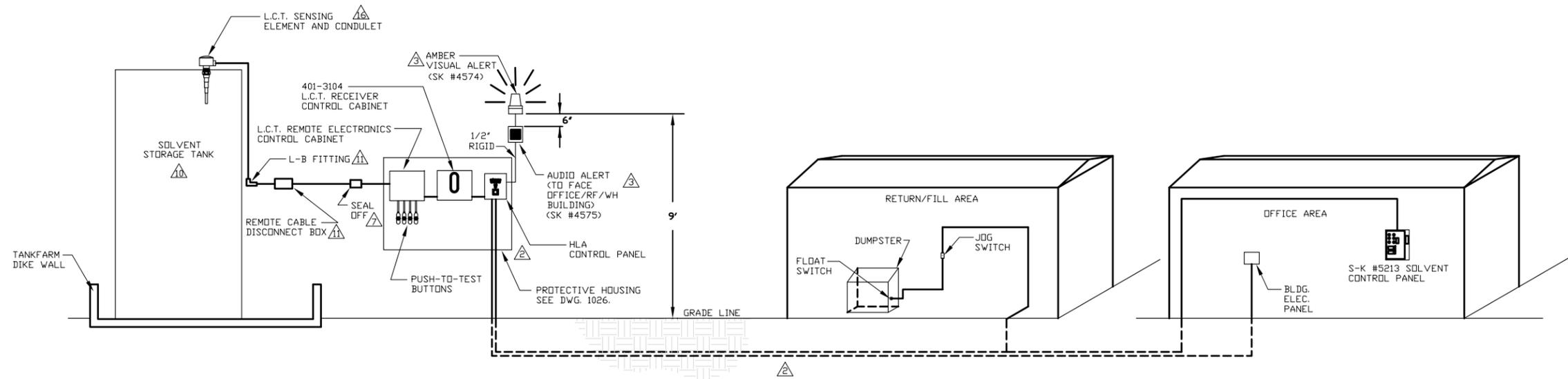


CONCRETE TANKFARM PLAN

SCALE: 1/4" = 1'-0"

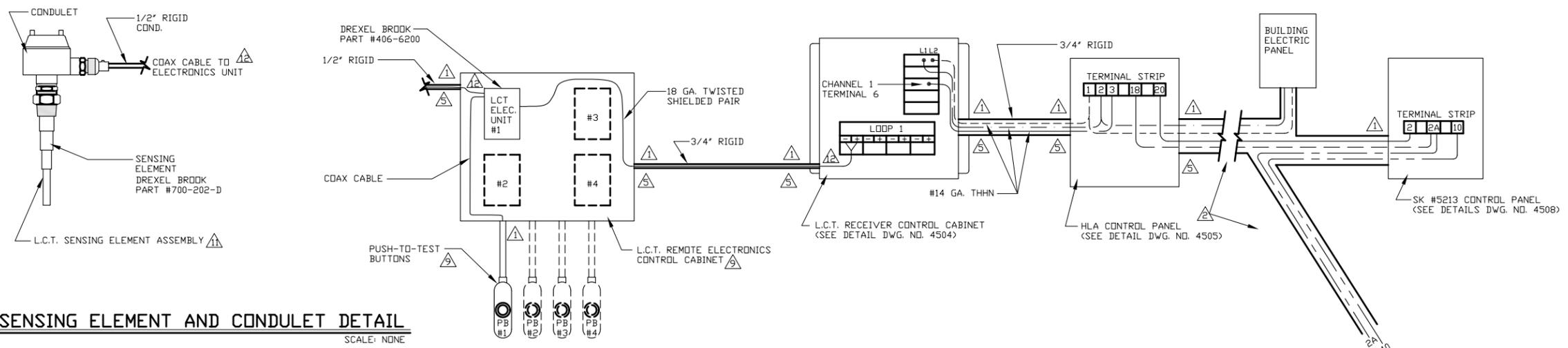
Exhibit D2-8

High Level Alarm Diagram



HIGH LEVEL ALARM SYSTEM DIAGRAM

SCALE: NONE

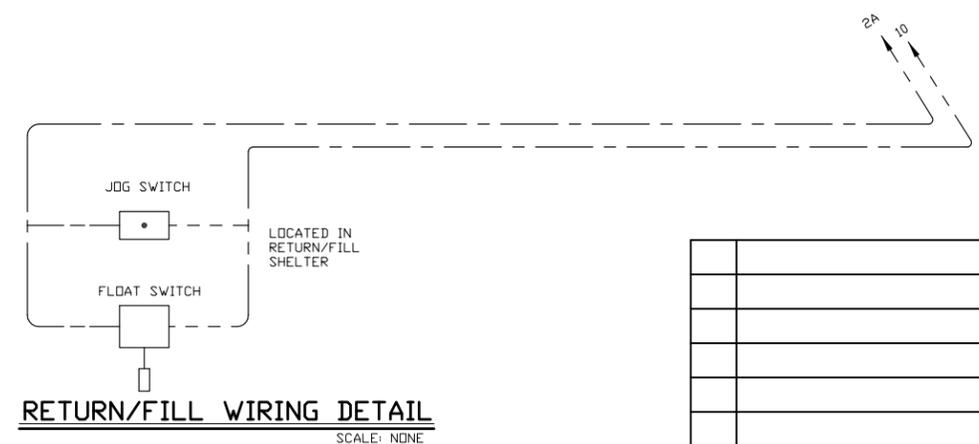


L.C.T. SENSING ELEMENT AND CONDULET DETAIL

SCALE: NONE

TYPICAL TANK HLA SYSTEM CONTROL WIRING LAYOUT

SCALE: NONE



RETURN/FILL WIRING DETAIL

SCALE: NONE

GENERAL NOTES

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SAFETY-KLEEN CORPORATION. ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT BY SAFETY-KLEEN OR AS SAFETY-KLEEN MAY AGREE IN WRITING.

1. USE MEYER'S HUB'S AT ALL CONDUIT ENTRIES INTO ELECTRICAL BOXES.
2. SEE TANKFARM PIPING AND EQUIPMENT PLAN FOR SPECIFIC EQUIPMENT MOUNTING.
3. SUPPLIED BY S-K.
4. L.C.T. = LEVEL CONTROL TRANSMITTER
5. CONDUIT PENETRATION TO BE IN SIDE OF ENCLOSURE APPROX. WHERE SHOWN.
6. ELECTRIC CONTRACTOR SHALL INSTALL CONDUCTORS IN CONTROL PANELS IN A NEAT & ORDERLY FASHION. THIS INCLUDES USING TIE WRAPS & TAGGING CONDUCTORS.
7. INSTALL SEALING FITTING 12" FROM L.C.T. REMOTE ELECTRONICS CONTROL CABINET.
8. CONTRACTOR IS NOT TO USE WIRE PULLING SOAP FROM L.C.T. REMOTE ELECTRONICS CONTROL CABINET TO L.C.T. SENSING ELEMENT AND CONDULET.
9. SEE DETAIL DWG. 4503.
10. FOR GLYCOL OR WASTE OIL TANK SEE 'GLYCOL AND WASTE OIL HLA SYSTEM DIAGRAM', DWG. NO. 4501.
11. SEE DWG. 4502 FOR INSTALLATION PROCEDURE.
12. HLA LOW VOLTAGE OPERATING REQUIREMENTS:
 - A. POWER REQUIREMENT 13 TO 28 VDC.
 - B. OUTPUT 4 - 10 mA (ALARM STATE) 15 - 25 mA (NORMAL STATE)
 - C. OPERATING TEMP. -40°F TO +140°F
 - D. SHIELD-TO-GROUND LOADING: 25 ohm MIN. RESISTANCE
 - E. RFI EFFECT: LESS THAN 2 pF SHIFT IN OPERATING POINT FOR UNIT IN EXPLOSION-PROOF HOUSING FROM 5' W FIELD @ 27, 150, OR 450 MHz AT A DISTANCE OF 5 FT. FROM EXPOSED CABLE OF SIGNAL WIRE.
 - F. FAIL-SAFE: SWITCHABLE FROM EITHER LOW-LEVEL FAIL-SAFE (LLFS) OR HIGH-LEVEL FAIL-SAFE (HLFS).
13. IF INDIVIDUAL SERVICE CENTER CONDITIONS ARE NOT COVERED BY DETAILS SHOWN HERE CONTACT ENGINEER OR S-K TECHNICAL SERVICES.
14. WRAP ALL RIGID CONDUIT THREADS WITH TEFLON TAPE.
15. ALL ELECTRICAL WITHIN 10 FT. OF TANK TO BE CLASS 1, DIV. 2, PER LOCAL CODE.
16. DO NOT INSTALL L.C.T. SENSING ELEMENT IN COUPLING IN CENTER OF TANK.

Exhibit D2-8

NO.	DESCRIPTION	BY	CHK	APPR	DATE
REVISIONS					

TITLE					
SOLVENT TANK HLA SYSTEM DIAGRAM					
SAFETY-KLEEN SYSTEMS, INC.					
2600 N. CENT. EXPRESSWAY STE 400 RICHARDSON, TX 75080 PHONE 800-669-5740					
SCALE	BY	CHKD	P.E. APPR	OP. APPR	DATE
NONE	JHD	-	WEY	-	8-22-91
SERVICE CENTER LOCATION			SC-DWG NUMBER		
BOISE, ID			7114-4100-450		
					REV. NO.
					00

Exhibit D2-9

Used Solvent Process at Branch

USED SOLVENT FROM CUSTOMER IN DRUMS

S-K WET DUMPSTER/ DRUMWASHER

SLUDGE DUMPSTER MUD PLACED IN DRUMS

STORAGE IN DRUM STORAGE AREA

DRUMS TO RECYCLE CENTER FOR RECLAMATION

SLUDGE TO RECYCLE CENTER FOR RECLAMATION

BULK RECOVERED SOLVENT TO RECYCLE CENTER FOR RECYCLING

RECOVERED SOLVENT ACCUMULATED IN BULK STORAGE TANK

EXAMPLE

Exhibit D2-9

PROPRIETARY STATEMENT

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TITLE

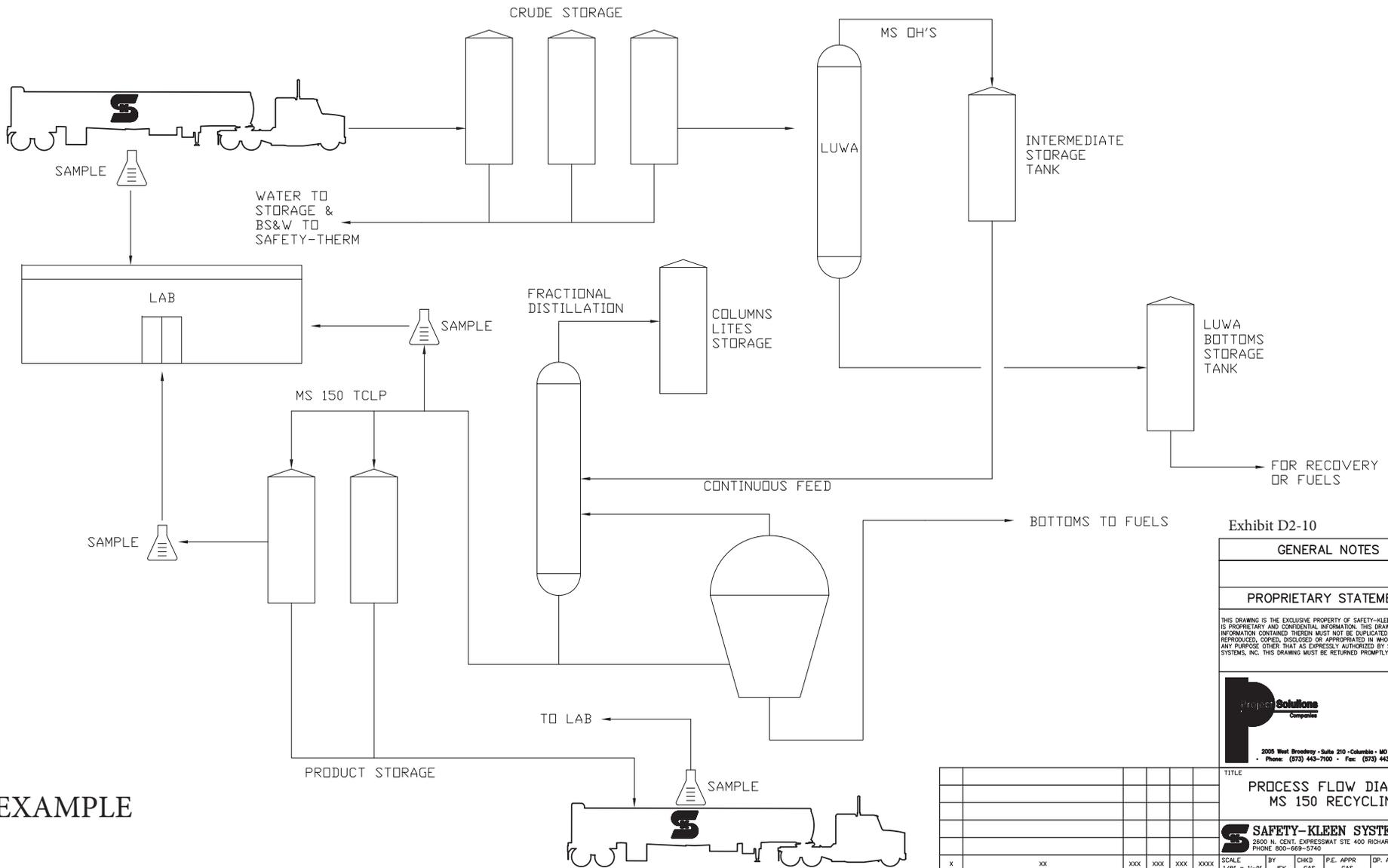
HANDLING PROCESS FOR SPENT MINERAL SPIRITS

S SAFETY-KLEEN CORP.
777 855 TIMBER ROAD ELGIN, ILLINOIS 60123 PHONE 708-697-8468

SCALE	BY	CHKD	P.E. APPR	OP. APPR	DATE
NONE	PROJ/SOL				2-5-03
SERVICE CENTER LOCATION			SC-DWG-REV NO.		SHEET NO.
STANDARD			BSD 940		

Exhibit D2-10

Used Solvent Process at Safety-Kleen
Recycle Center



EXAMPLE

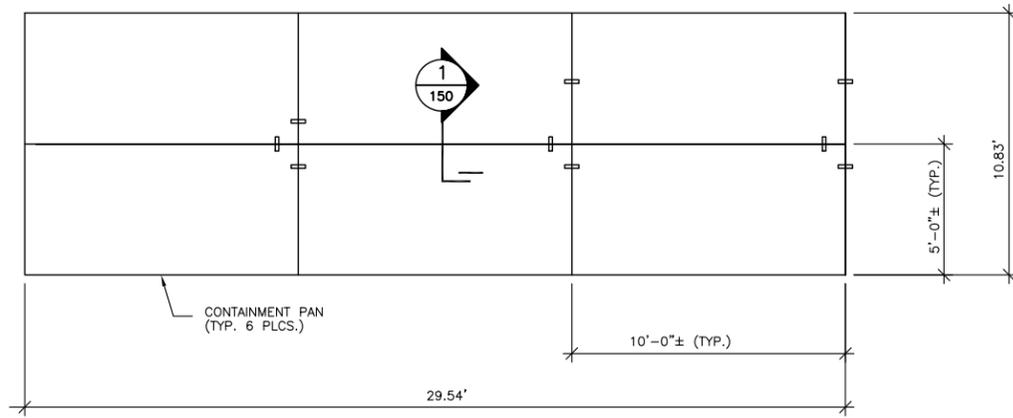
Exhibit D2-10

GENERAL NOTES	
PROPRIETARY STATEMENT	
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<small>2000 West Broadway - Suite 210 - Columbia - MD 21033 Phone: (410) 443-7100 - Fax: (410) 443-7100</small>	
TITLE	
PROCESS FLOW DIAGRAM MS 150 RECYCLING	
 SAFETY-KLEEN SYSTEMS, INC. <small>2600 N. CENT. EXPRESSWAY STE 400 RICHARDSON TX 75080 PHONE 800-669-5740</small>	
SCALE	BY
1/2" = 1'-0"	JCK
CHKD	P.E. APPR
GAS	GAS
DR. APPR	DATE
	2/7/14
BRANCH STANDARD	STD-DWG-REV. NO.
STANDARD	BSD 116

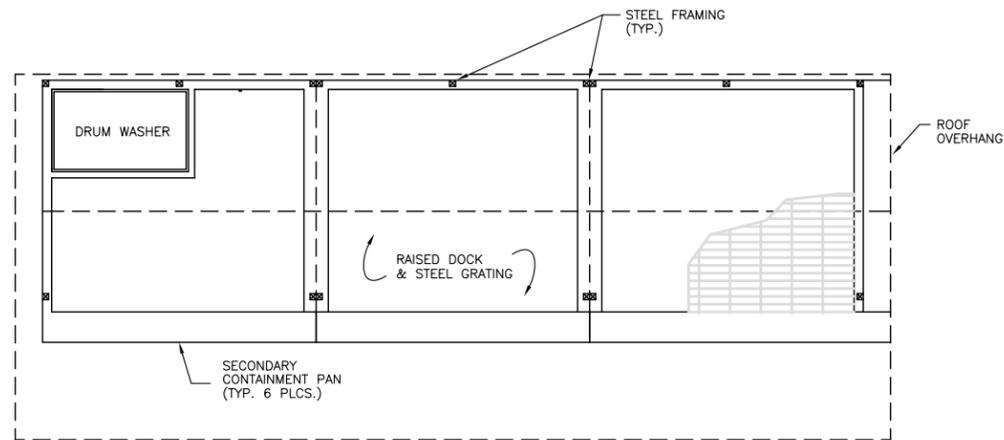
NO.	DESCRIPTION	BY	CHK	APPR	DATE
X	XX	XXX	XXX	XXX	XXXX
REVISIONS					

Exhibit D2-11

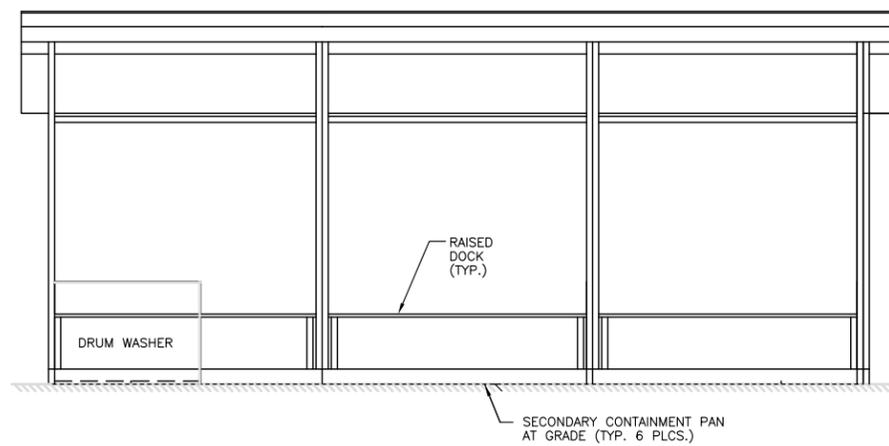
Return and Fill Layout



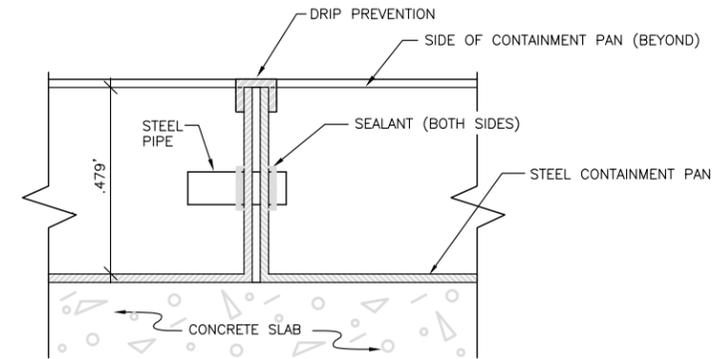
SECONDARY CONTAINMENT PAN LAYOUT
TYPICAL CONSTRUCTION NO SCALE



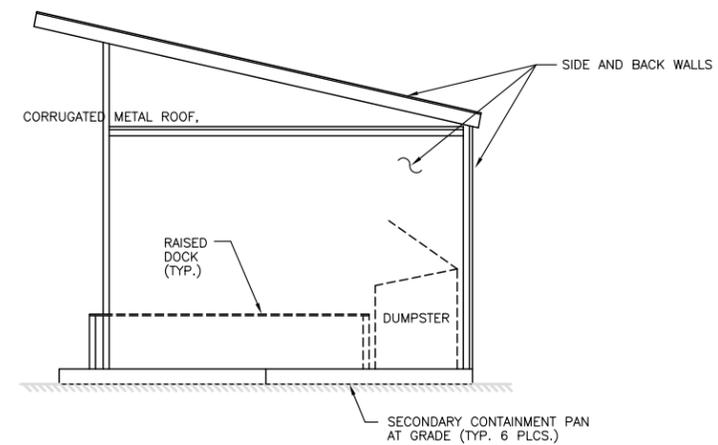
FLOOR PLAN
TYPICAL CONSTRUCTION NO SCALE



FRONT ELEVATION
TYPICAL CONSTRUCTION NO SCALE



CONTAINMENT PAN SECTION
TYPICAL CONSTRUCTION NO SCALE



SIDE ELEVATION
TYPICAL CONSTRUCTION NO SCALE

CONTAINMENT CALC

29.54' x 10.83' x .479' x 7.48 CF/GAL. = +1,146 GAL.
 VOLUME OF DRUM WASHER = -162 GAL.
 1% MISC DISPL. FOR COLUMNS/RAILS = -11 GAL.
 TOTAL CONTAINMENT = +973 GAL.

Exhibit D2-11

GENERAL NOTES

1. DETAILS INDICATED AS TYPICAL CONSTRUCTION IDENTIFY TYPICAL SAFETY-KLEEN CONSTRUCTION PRACTICES WHICH WERE NOT FIELD VERIFIED UNLESS SPECIFICALLY INDICATED.

PROPRIETARY STATEMENT

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TITLE
**3-BAY RETURN/FILL SHELTER
 PLAN AND DETAILS**

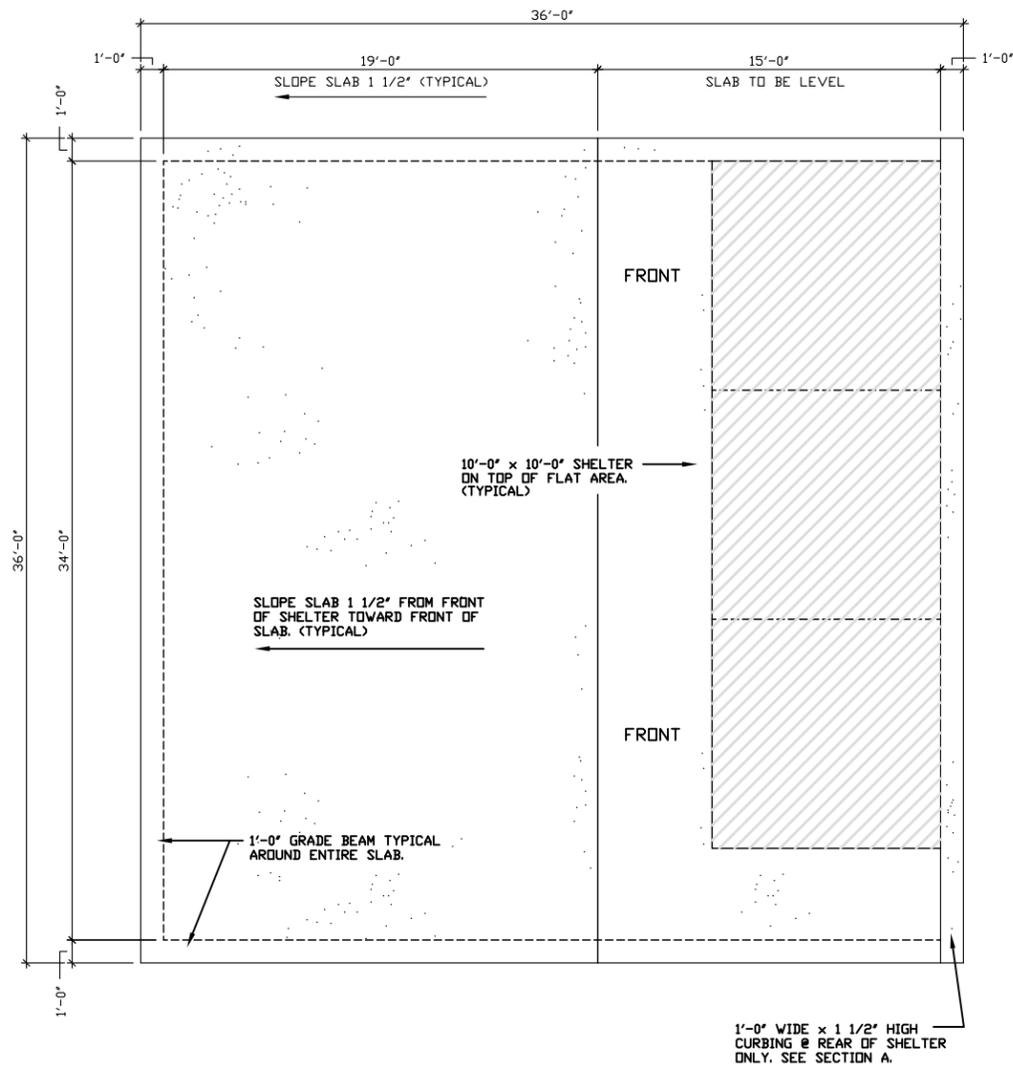
SAFETY-KLEEN SYSTEMS, INC.
 2600 N. CENT. EXPRESSWAY STE. 400 RICHARDSON, TX. 75080
 PHONE 800-669-5740

SCALE AS SHOWN	BY JEK	CHKD GAS	APPROVED	OPERATIONS	DATE 7-23-01
SERVICE CENTER LOCATION BOISE, ID.			SC-DWG. NO. 7114-7100-600	REV. NO. 0	

NO.	DESCRIPTION	BY	CHK	APPR	DATE
REVISIONS					

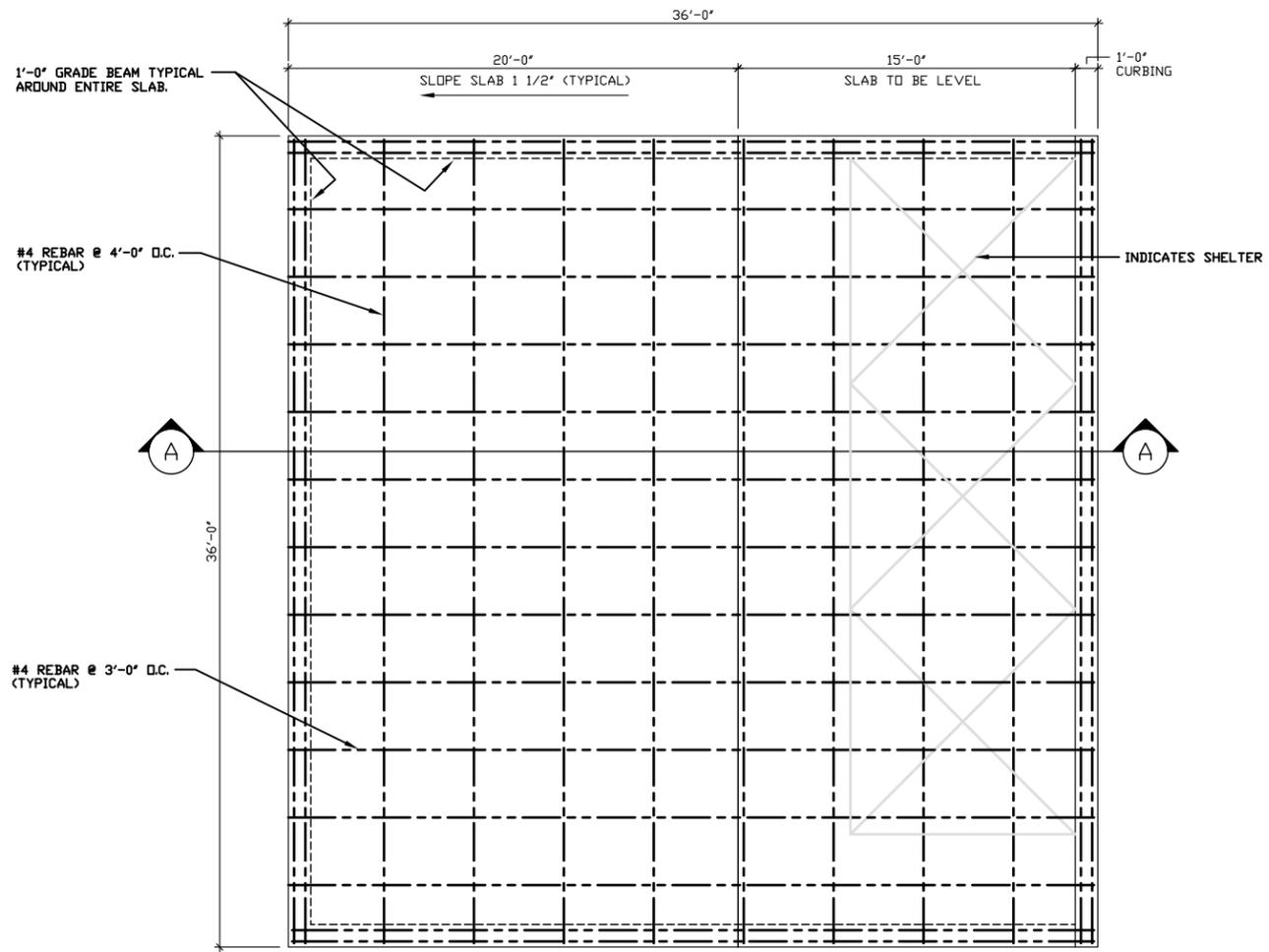
Exhibit D2-12

Return and Fill Concrete Slab Detail



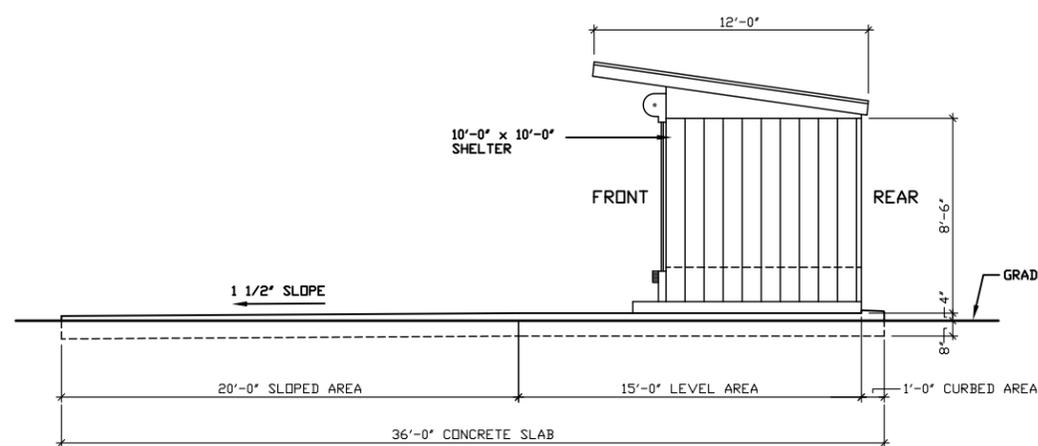
PLAN - CONCRETE SLAB W/SHELTERS

SCALE: 1/4" = 1'-0"



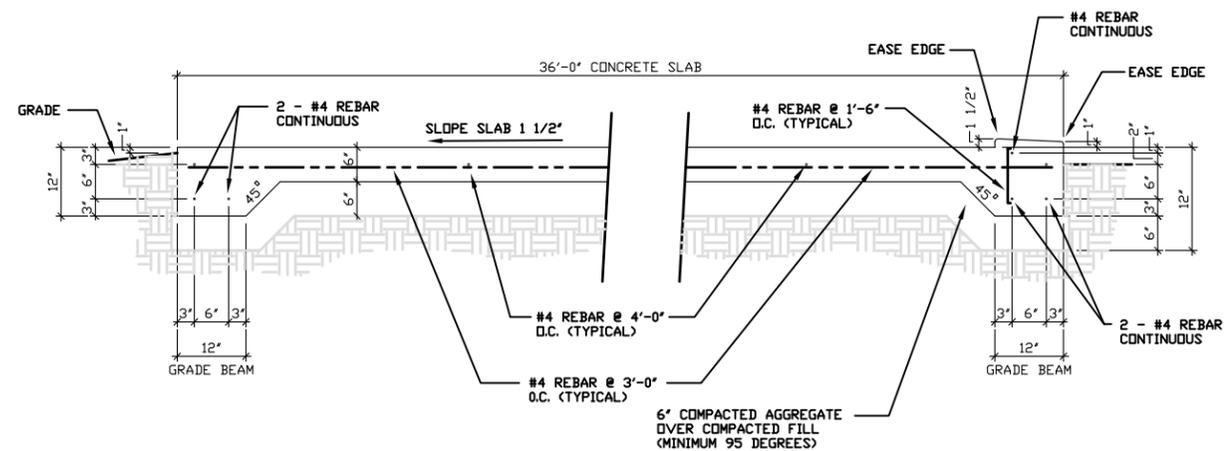
PLAN - CONCRETE SLAB REINFORCING

SCALE: 1/4" = 1'-0"



ELEVATION - CONCRETE SLAB W/SHELTERS

SCALE: 1/4" = 1'-0"



SECTION AA SEE GENERAL NOTES

SCALE: 3/4" = 1'-0"

GENERAL NOTES

- 1.) ALL CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF ACI 301, 315 AND 318 LATEST EDITIONS. FOLLOW ACI RECOMMENDATIONS FOR COLD AND HOT WEATHER CONDITIONS.
- 2.) ALL CONCRETE SLABS SHALL BE COVERED WITH BURLAP AND KEPT CONTINUOUSLY MOIST FOR A MINIMUM PERIOD OF FIVE DAYS.
- 3.) ALL CURBS SHALL BE CAST MONOLITHICALLY WITH SLAB.
- 4.) SLOPE CONCRETE SLAB AS SHOWN ON PLAN.
- 5.) MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE 3" FOR CONCRETE CAST AGAINST SOIL AND 2" FOR CONCRETE EXPOSED TO WEATHER.
- 6.) ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS WITH MAX. SIZE AGGREGATE OF 1 1/2" AND ENTRAINED AIR OF 4% - 6% IN ADDITION FOR TRUCK STATION MIN. MODULUS OF RUPTURE OF 600 PSI AT 28 DAYS WITH MAX. W/C RATIO OF .50 AND MIN. CEMENT FACTOR OF 560 LB/CY.
- 7.) ALL REBAR SHALL BE GRADE 50 BILLET STEEL CONFORMING TO ASTM A-615.
- 8.) SHELTER REQUIRED PREPARATION: REMOVE SURFACE AND UNDERCUT SOIL TO THE PROPER SUB GRADE ELEVATION. SCARIFY AND RECOMPACT THE TOP 8" OF EXISTING SUB GRADE SOIL. INSTALL MIRAFI 500X GEOFABRIC OR APPROVED EQUAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. BACK FILL AND COMPACT WITH AN 8" LAYER OF STRUCTURAL FILL (3" MINUS WELL GRADED CRUSHED STONE) AND 6" LAYER OF GRANULAR FILL (1" MINUS WELL GRADED CRUSHED STONE). SUBGRADE MATERIAL SHALL BE COMPACTED TO 95%. STRUCTURAL FILL AND GRANULAR FILL MATERIALS SHALL BE COMPACTED TO 100% OF THE STANDARD PROCTOR MAX. DRY DENSITY AND UNIFORM OVER THE ENTIRE AREA. ACTUAL GRADE PREPARATION MAY VARY DUE TO EXISTING SOIL CONDITIONS.
- 9.) SWALE EXISTING GRADE AWAY FROM SHELTER AS REQUIRED SO AS TO PREVENT SURFACE RUN-OFF FROM SETTLING IN THE PAD AREA.

PROPRIETARY STATEMENT

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TITLE
3 BAY RETURN/FILL SHELTER
CONCRETE SLAB DETAILS

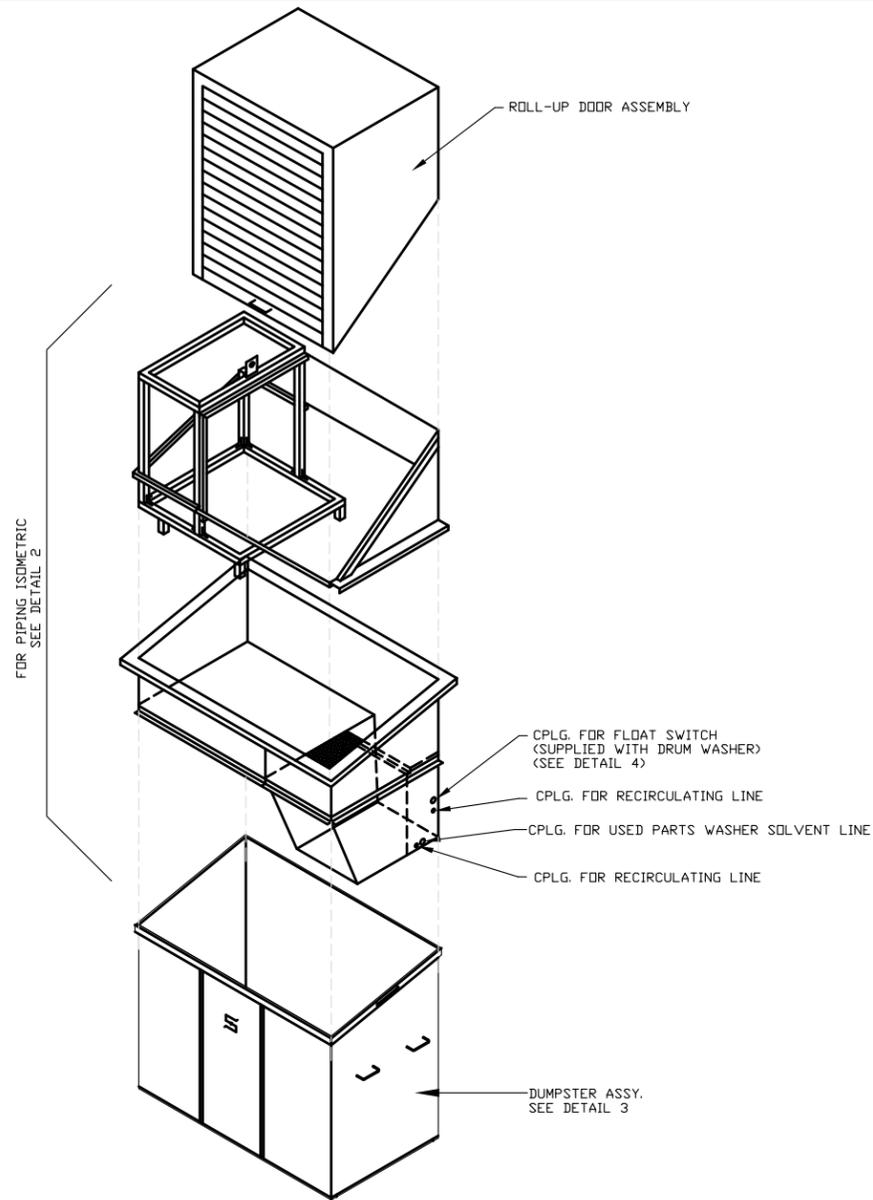
SAFETY-KLEEN SYSTEMS, INC.
2600 N. CENT. EXPRESSWAY STE 400 RICHARDSON, TX. 75080
PHONE 800-689-5740

NO.	DESCRIPTION	BY	CHK	APPR	DATE	SCALE AS NOTED	BY	CHK	APPROVED	OPERATIONS	DATE	
0	MADE FROM DRAWING 5000-00.	RD	KJM		102693		JD	KJM			9/28/91	
REVISIONS						SERVICE CENTER STANDARDS	CONCRETE		STD-DWG NUMBER	BSD-505	REV. NO.	0

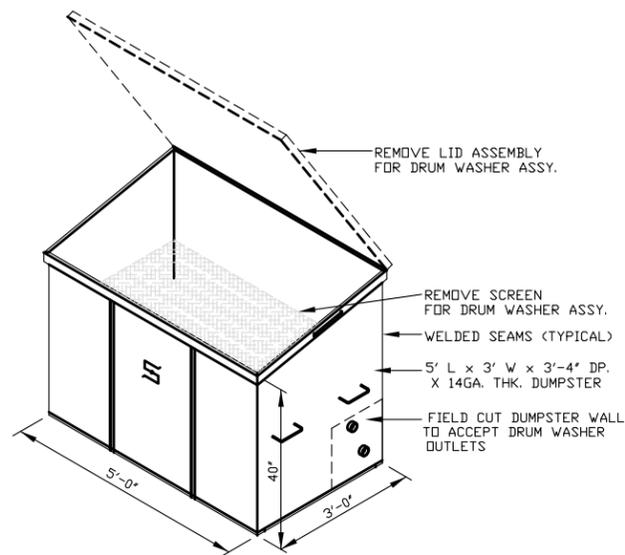
Exhibit D2-13

Drum Washer Isometric

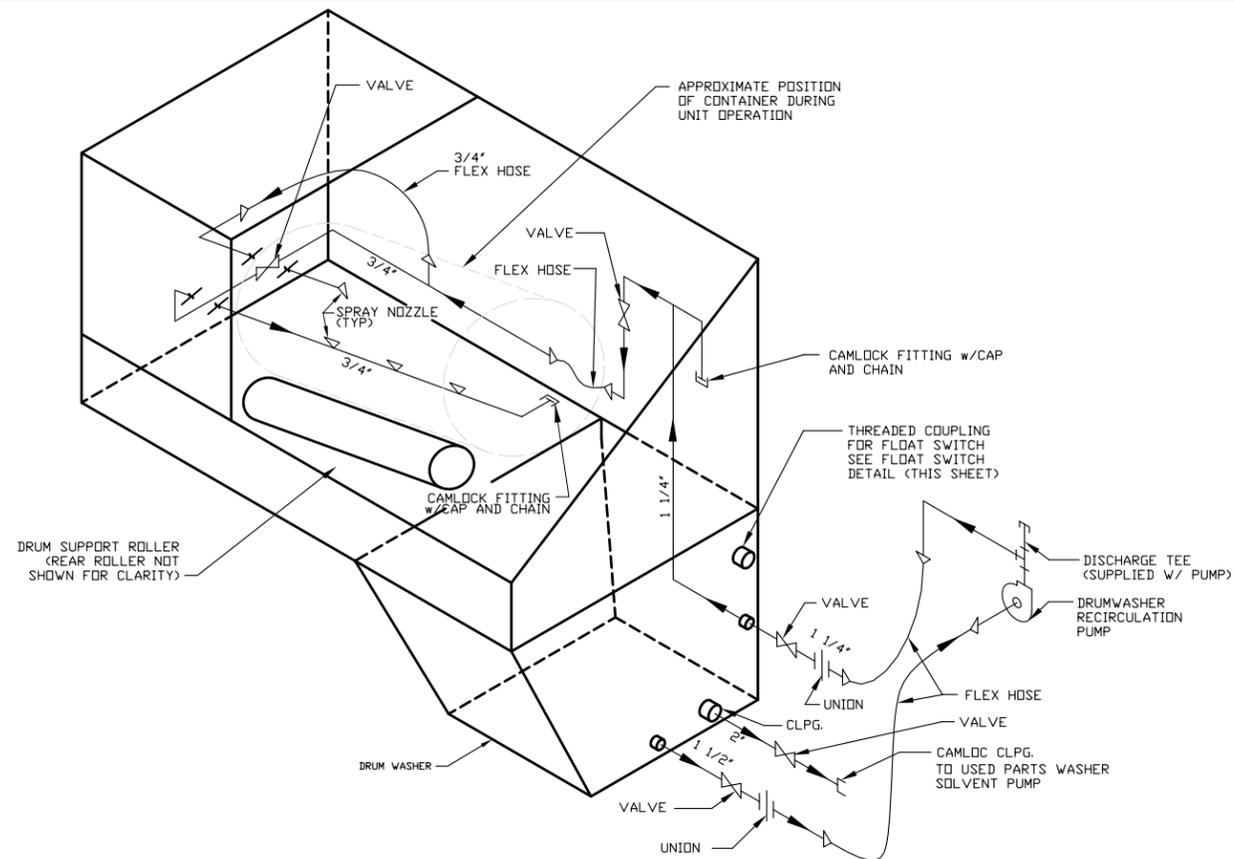
DUMPSTER/BARREL WASHER ASSY – DETAIL 1



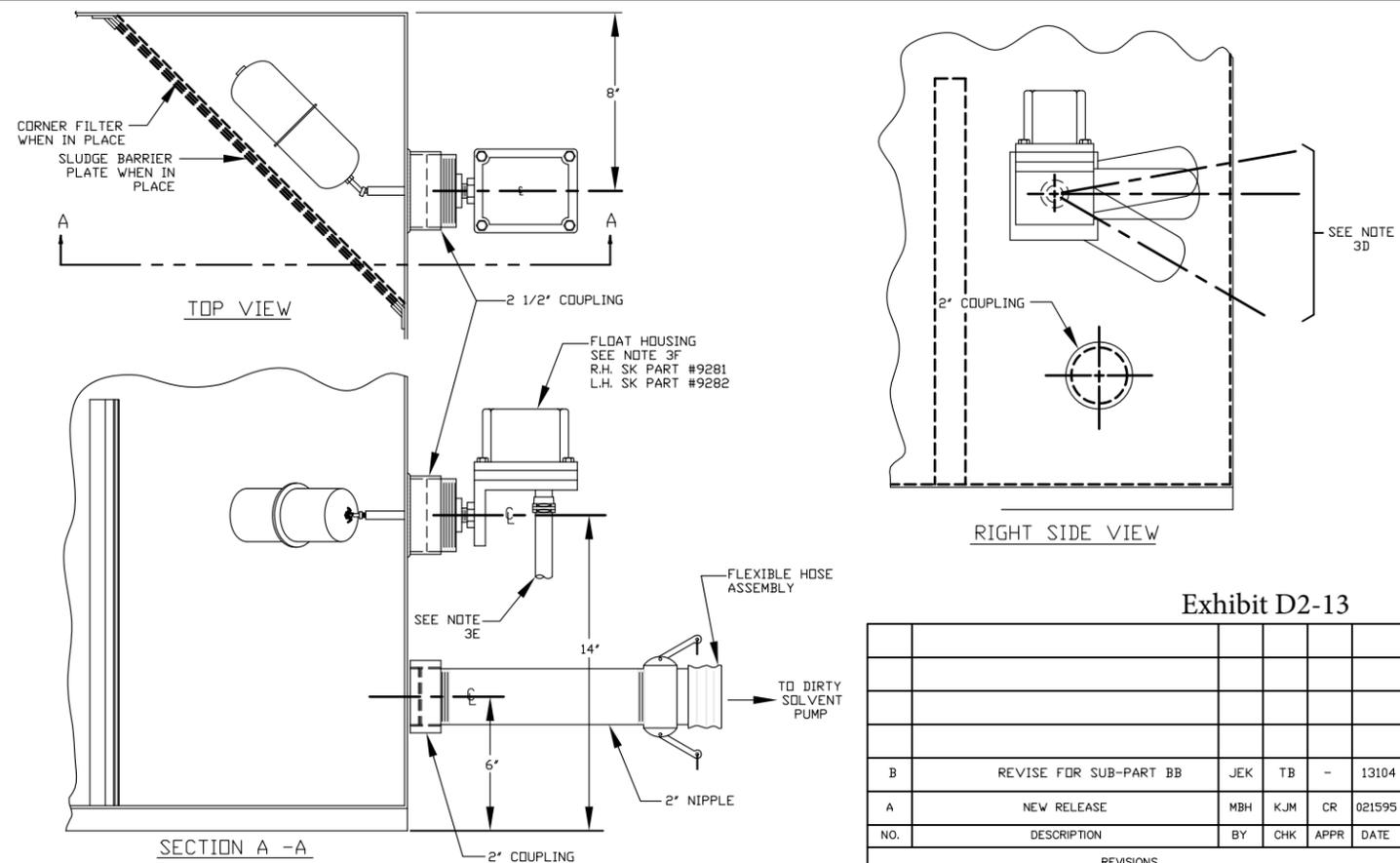
DUMPSTER ASSY. – DETAIL 3



BARREL WASHER PIPING ISOMETRIC – DETAIL 2



FLOAT SWITCH INSTALLATION – DETAIL 4



GENERAL NOTES

1. THE BARREL WASHER UNIT AND DUMPSTER ARE SUPPLIED BY SAFETY-KLEEN CORP. AND COMBINED BY CONTRACTOR. RECIRCULATING PUMP, AND VALVES FOR DRUM WASHER ARE SUPPLIED BY SAFETY-KLEEN CORP. AND INSTALLED WITH CONTRACTOR SUPPLIED PIPE UNIONS AND HOSES.
2. ALL ITEMS WITH SAFETY-KLEEN PART NO. REFERENCES WILL BE SUPPLIED TO CONTRACTOR.
3. FLOAT SWITCH INSTALLATION INSTRUCTIONS
 - A. TAKE FLOAT SWITCH AND WRAP CLOCKWISE WITH 2 TEFLON WINDS OF TAPE, AND INSTALL INTO 2 1/2\"/>
 - B. TAKE FLOAT AND THREAD IT INTO THE FLOAT SWITCH FROM THE INSIDE SHAFT OF THE DUMPSTER AND TIGHTEN SECURELY.
 - C. RELEASE SHIPPING BRACKET BY REMOVING SCREW AND DISCARDING BRACKET.
 - D. FLOAT TRAVEL SETTING ADJUSTMENTS CAN BE ACCOMPLISHED BY LOOSENING ADJUSTMENT SCREWS. THE FLOAT TRAVEL ARC SHOULD BE SET AT 10\"/>
 - E. FLOAT SWITCH SHOULD BE WIRED UP ACCORDING TO MFGRS. SPECS AND IN COMPLIANCE WITH ANY LOCAL CODES. (USE RIGID CONDUIT THROUGHOUT).
 - F. FLOAT SWITCH TO BE INSTALLED ON SAME SIDE OF DUMPSTER AS DRAIN LINE. INSTALLATION SHOWN IS FOR RIGHT HAND SIDE OF DUMPSTER. FLOAT SWITCH IS SQUARE D CLASS 9037 HR - 3 (RIGHT HAND) OR HR - 4 (LEFT HAND).
 - G. RE-ADJUST FLOAT STOPS TO THOSE SHOWN ON RIGHT SIDE VIEW.
 - H. WHEN DUMPSTER DOES NOT HAVE A 2 1/2\"/>

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Project Solutions
Companies

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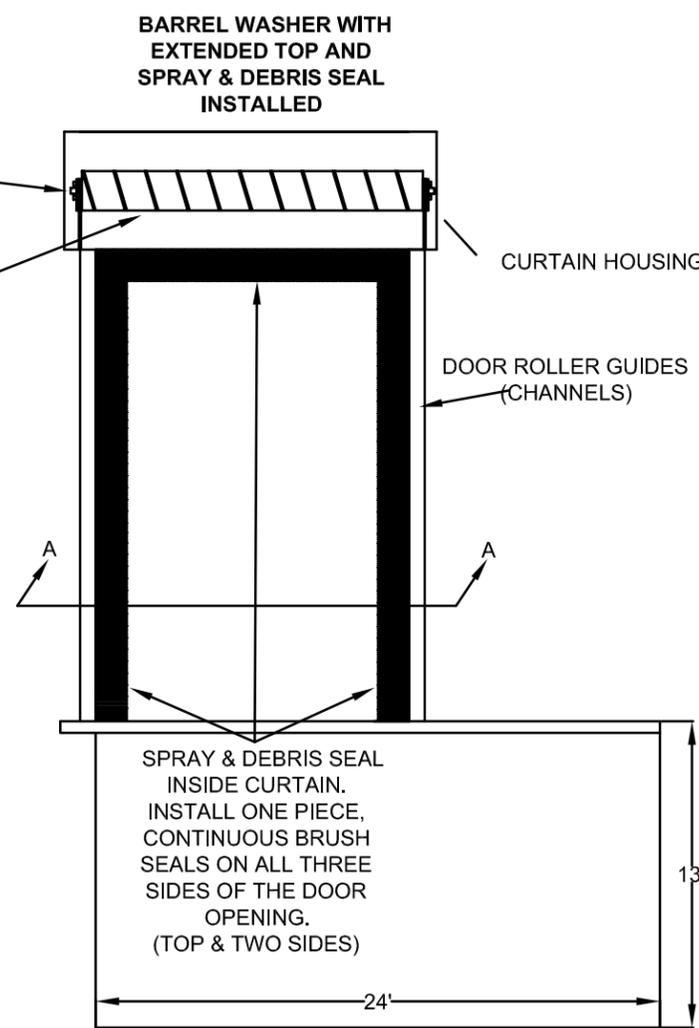
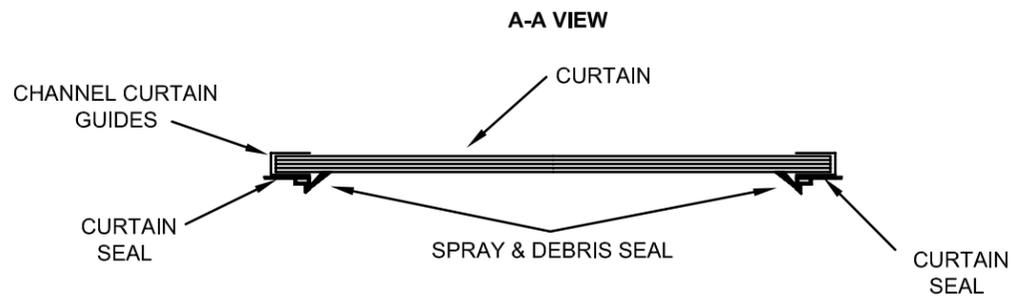
Exhibit D2-13

TITLE		DRUM WASHER/DUMPSTER ISOMETRIC	
SCALE		NONE	
BY	MBH	CHKD	KJM
APPROVED	CR	OPERATIONS	DATE
02-08-95			
SERVICE CENTER LOCATION		SC-DWG NUMBER	
BOISE, ID.		7114-5600-301	
REV. NO.		B	

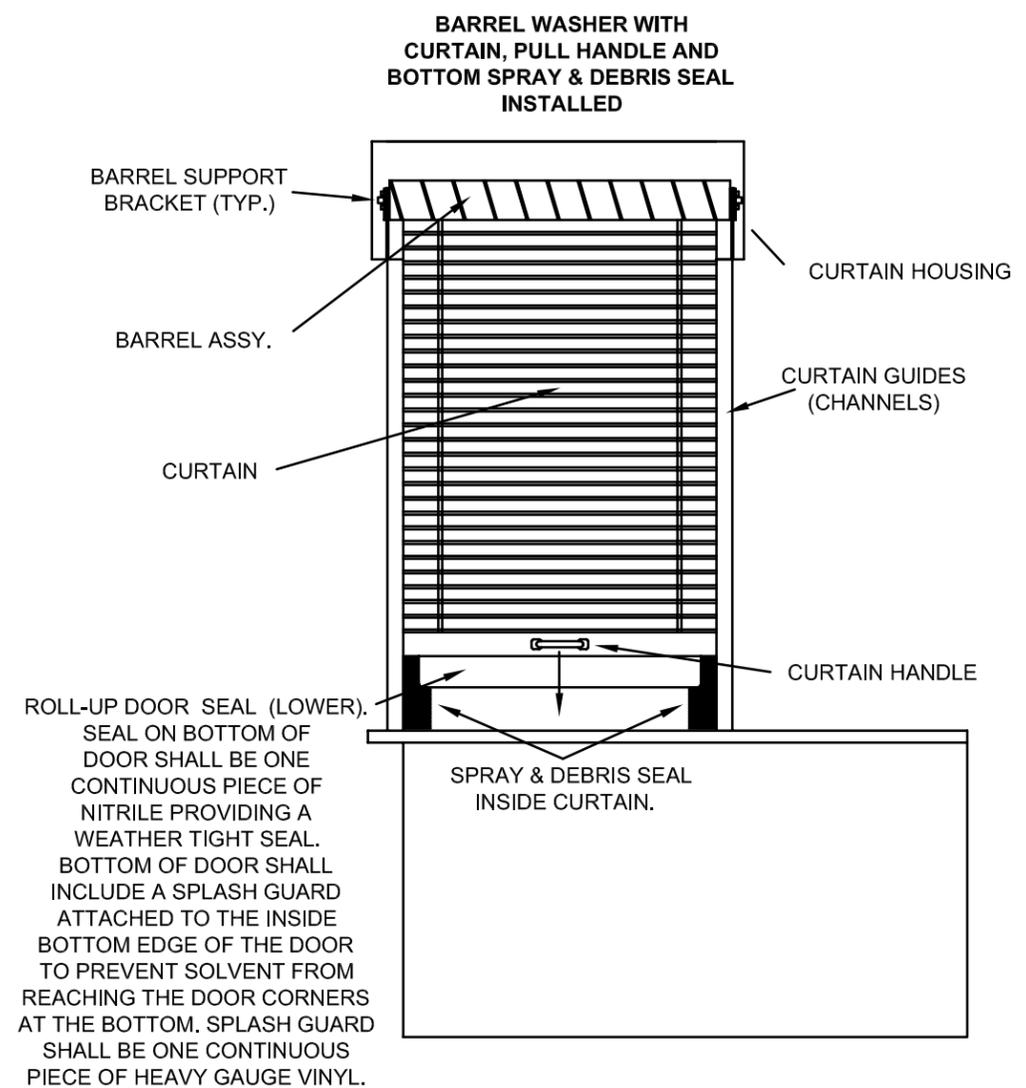
B	REVISE FOR SUB-PART BB	JEK	TB	-	13104
A	NEW RELEASE	MBH	KJM	CR	021595
NO.	DESCRIPTION	BY	CHK	APPR	DATE
REVISIONS					

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



BARREL WASHER ENCLOSURE MODIFICATION

COMPANY:
MILLER STEEL
121 EXPOSITION STREET, DENTON, TEXAS 76201

SCALE	DRAWN BY	GRAPH BY	CHECK BY	DATE	SHEET NO.
	twl		twl	15 JAN 04	1

"BARREL WASHER AND BARREL WASHER ENCLOSURE MODIFICATION" IS THE PROPRIETARY CONCEPT, DESIGN AND SOLE PROPERTY OF MILLER STEEL

- NOTES:
1. SPRAY & DEBRIS SEAL: 4.5", .350 NYLON, BRUSH MOUNTED TO SIDES AND TOP OF BARREL WASHER OPENING
 2. EXTERIOR IS PROTECTED FROM SPRAY AND DEBRIS
 3. BRUSH SEAL WILL WITHSTAND 20 MPH WIND MELTING TEMPERATURE: 410° OPERATING TEMPERATURE: 200-230°
 4. ROLL-UP DOOR: CURTAIN MATERIAL: GALVANIZED 80 GRADE STEEL
 5. FINISH: SILICONE POLYESTER PRE-PAINT
 6. LOCK: SINGLE MINI SLIDE LATCH BOLTED TO CURTAIN & SUITABLE FOR DOUBLE PADLOCKS
 7. MANUAL OPERATION
 8. SEE DRAWING BSD 952 FOR DETAILS.
 9. DRAWINGS ARE PROVIDED TO ILLUSTRATE THE CONCEPT OF A ROLL-UP DOOR ADDED TO A SAFETY-KLEEN STANDARD BARREL WASHER ONLY.
 10. FEATURES ILLUSTRATED ON THESE DRAWINGS MAY BE ALTERED TO FACILITATE FABRICATION.
 11. DRAWINGS ARE PROVIDED FOR THE PURPOSE OF INFORMATION TO REGULATORY AGENCIES ONLY.
 12. CONCEPTS ARE CONFIDENTIAL AND MAY NOT BE REPRODUCED WITHOUT PERMISSION OF SAFETY-KLEEN SYSTEMS, INC. ENGINEERING DEPARTMENT OR MILLER STEEL.

Exhibit D2-14

PROPRIETARY STATEMENT

THIS DRAWING IS THE EXCLUSIVE PROPERTY OF SAFETY-KLEEN CORP. AND IS PROPRIETARY AND CONFIDENTIAL INFORMATION. THIS DRAWING AND THE INFORMATION CONTAINED THEREIN MUST NOT BE DUPLICATED, USED, DIVULGED, REPRODUCED, COPIED, DISCLOSED OR APPROPRIATED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN AS EXPRESSLY AUTHORIZED BY SAFETY-KLEEN CORP. THIS DRAWING MUST BE RETURNED PROMPTLY UPON REQUEST.

Project Solutions
Companies

1390 Boone Industrial Drive • Suite 200 • Columbia • MO 65202
• Phone: (573) 443-7100 • Fax: (573) 443-7181 •

REVISIONS						FABRICATION					
NO.	DESCRIPTION	BY	CHK	APPR	DATE	SCALE	BY	CHKD	APPROVED	OPERATIONS	DATE
1	REVISE NOTES ON SEAL, SPLASH GUARD, BOTTOM SEAL	JEK	DDP	DDP	100305	N.T.S.	JEK	-	BC	-	2-8-04
						SERVICE CENTER STANDARDS SC-DWG NUMBER BSD 951 REV. NO. 0					

TITLE
BARREL WASHER ROLL-UP DOOR ASSEMBLY

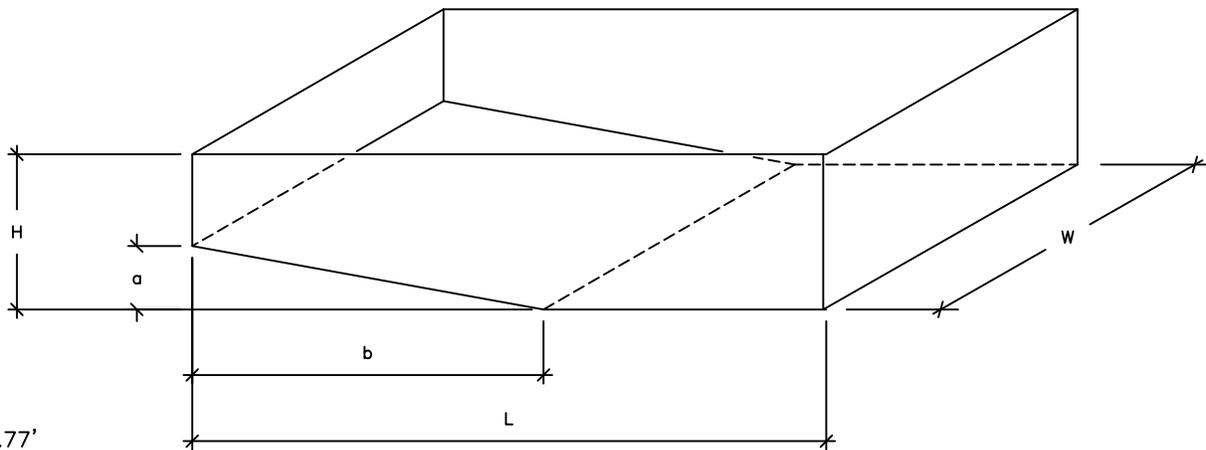
SAFETY-KLEEN SYSTEMS, INC.
5400 LEGACY DR. CLUSTER III BLDG. 3, PLANO, TX. 75024 800-669-5740

Exhibit D2-15

Drum Washer Capacity Calculations

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SWIC DRUM WASHER VOLUME CALCULATIONS



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

SWIC DRUM WASHER VOLUME CALCULATIONS PART 1

TOTAL VOLUME = $L \times W \times H = 4.77' \times 2.77' \times 1.23' = 16.25 \text{ cu.ft.}$

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

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

$(16.25) - (.73) = 15.52 \text{ cu.ft.}$

$(15.52 \text{ cu.ft.})(7.48 \text{ gal/cf.}) = \boxed{116 \text{ gal.}}$

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Client SAFETY-KLEEN CORP. Pg. 2 of 2

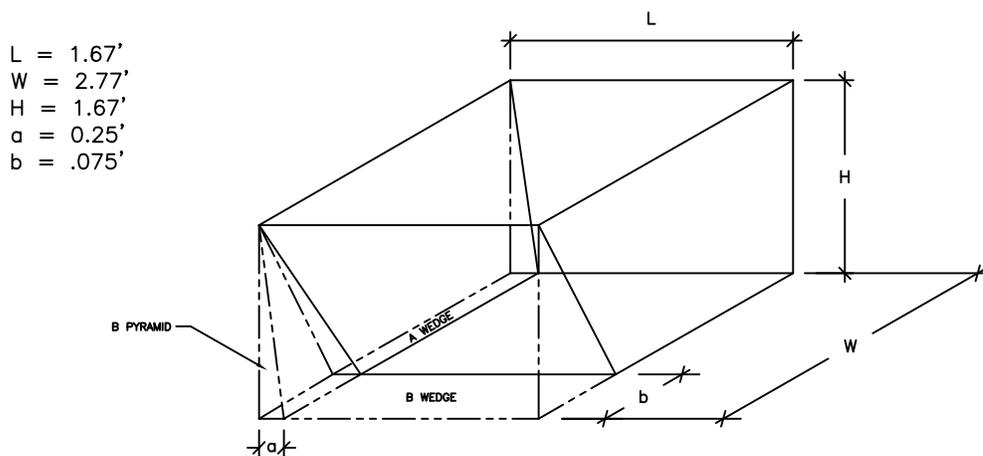
Project No. _____ Date _____

Project Title _____

Subject DRUM WASHER VOLUME

Designer JEK Cx By JEK Prelim _____ Final GPM

SWIC DRUM WASHER VOLUME CALCULATIONS



SWIC DRUM WASHER VOLUME CALCULATIONS PART 2

$$\text{TOTAL VOLUME} = L \times W \times H = 1.67' \times 2.77' \times 1.67' = 7.73 \text{ cu.ft.}$$

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

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

$$\text{C PYRAMID VOLUME} = \frac{[(a)(b)]H}{3} = \frac{[(.25')(.75')](1.67')}{3} = .10 \text{ cu. ft.}$$

$$\text{PART 2 VOLUME} = (\text{TOTAL VOLUME}) - A - B + C =$$

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

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

$$\text{TOTAL DRUM WASHER VOLUME} = \text{PART 1} + \text{PART 2} = 116 + 46 = \boxed{162 \text{ gal.}}$$

Exhibit D2-16

ChemTec Spec Sheet



TECHNICAL DATA

CHEMTEC INT'L

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 INT'L 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 Cementos 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 pours, 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.

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 as on. Make sure there is adequate ventilation. See MSDS, product label or installation instruction booklet for complete safety details.

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 pre mixed. **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 of time.

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.

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 to a solid 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 starts 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 squeegee 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 feet 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 as 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 unreacted 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

TECHNICAL SERVICES:

Technical information and assistance may be obtained from CHEMTEC INT'L INC., Cincinnati Ohio 45244 (513) 474-2090 Toll Free 1-888-889-7779



CHEMTEC ONE

Installation instruction 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 MINUETS.
- ☛ 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 COMMERCIALY 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 symptom begin go to fresh air until they stop. Vapor rated respirators are recommended in closed areas if good ventilation can not 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 acting 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 be 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.**

ctii 205



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).

MATERIAL SAFETY DATA SHEET

MSDS DATE : 1 January 1997
PRODUCT NAME : CHEMTEC ONE

I. PRODUCT IDENTIFICATION**MANUFACTURER**

CHEMTEC INT'L. 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

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 administered 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.

CHEMTEC INT'L

EFFECTS OF OVER EXPOSURE:

ACUTE: Irritating to skin, eyes, mucous membranes of the respiratory and digestive tract,
CHRONIC: No known chronic effects.
TOXICOLOGY: 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.
-

CHEMTEC INT'L

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 109 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

SK5330

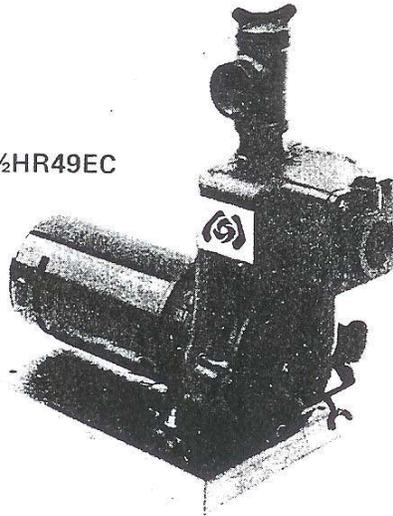


PUMPS AND EQUIPMENT DIVISION
ITT CORPORATION
MIDLAND PARK, NEW JERSEY 07432 • (201) 444-6900
LONGVIEW, TEXAS 75601 • (214) 753-7211

MODEL 1½HR49EC & 3CR18EC

SOLIDS HANDLING
SELF-PRIMING CENTRIFUGAL PUMPS
CLOSE-COUPLED

1½HR49EC



WMS
PUMP

3CR18EC



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.

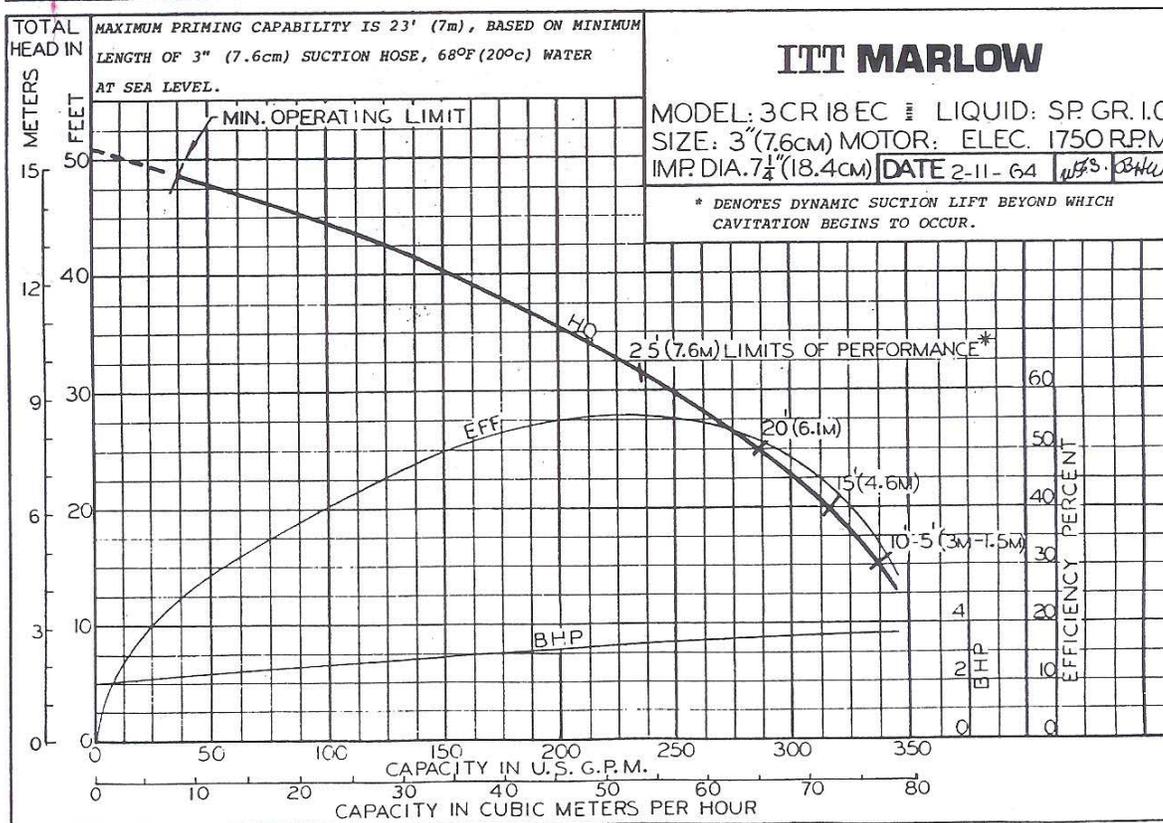
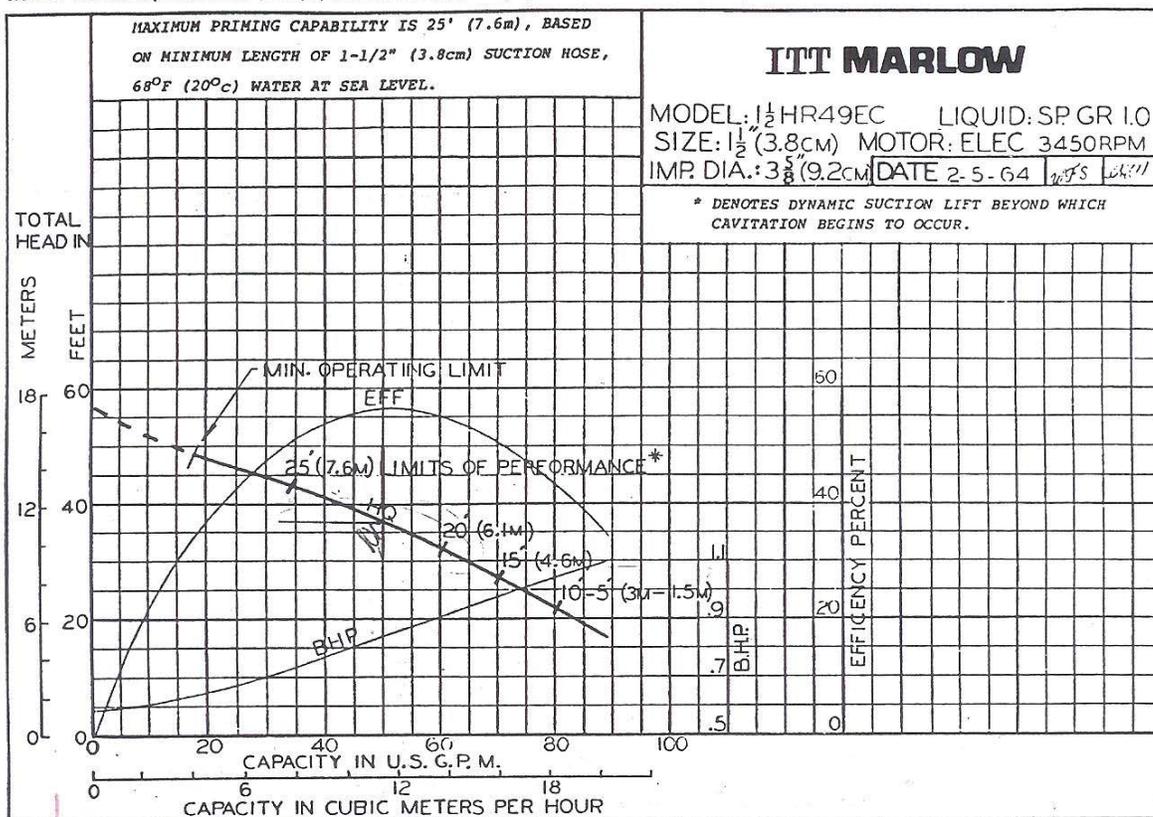
Model	Sphere Handling Ability	Port Sizes	Shaft Seal Method	Motor	Static Prime Limit*
1-1/2HR49EC	1" Dia. (2.5 cm)	1-1/2" N.P.T. (3.8 cm)	Mech. Seal	1 hp-1-1/2 hp 3450 RPM	25 Ft. 7.6 m
3CR18EC	1-1/2" Dia. (3.8 cm)	3" N.P.T. (7.6 cm)	Mech. Seal	3 hp-5 hp 1750 RPM	23 Ft. 7.0 m

WMS
PUMP

*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.



SK5330

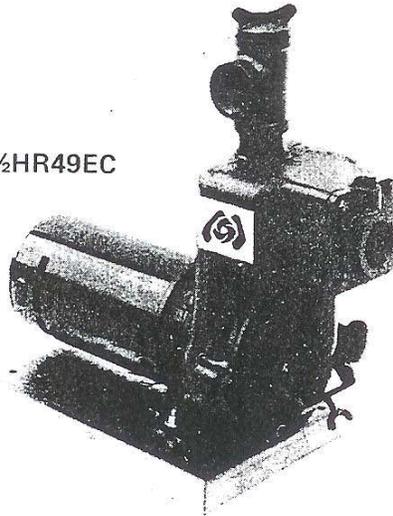


PUMPS AND EQUIPMENT DIVISION
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MODEL 1½HR49EC & 3CR18EC

SOLIDS HANDLING
SELF-PRIMING CENTRIFUGAL PUMPS
CLOSE-COUPLED

1½HR49EC



WMS
PUMP

3CR18EC



FEATURES

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

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WMS
PUMP

*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.

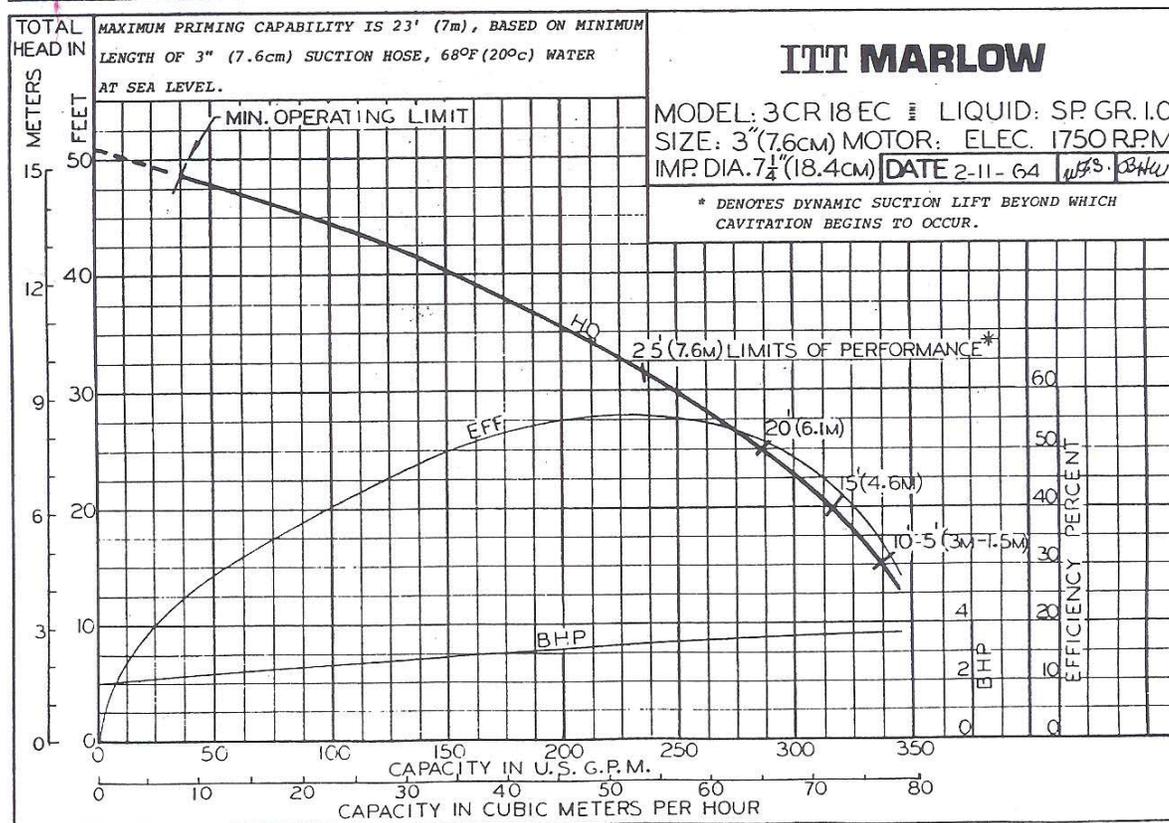
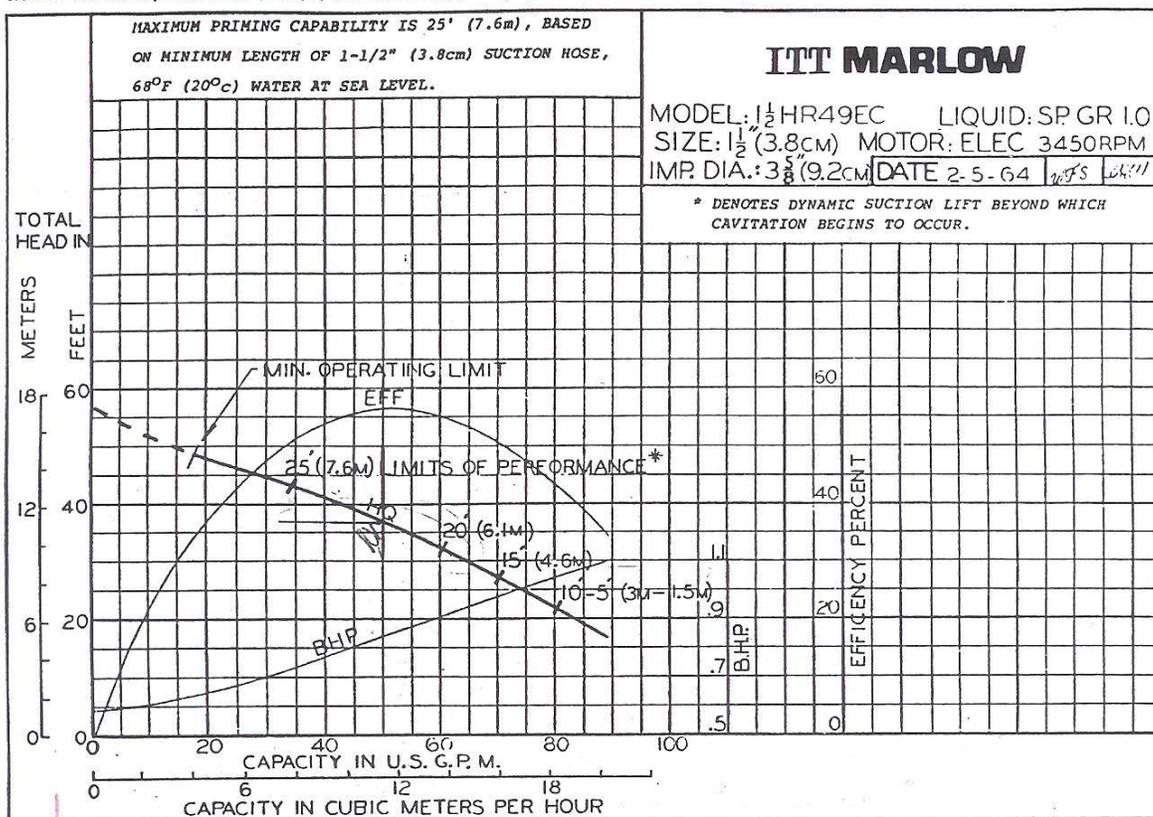
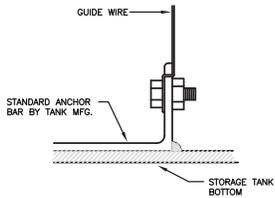
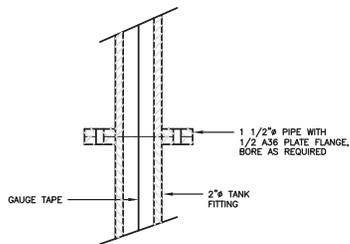


Exhibit D2-18

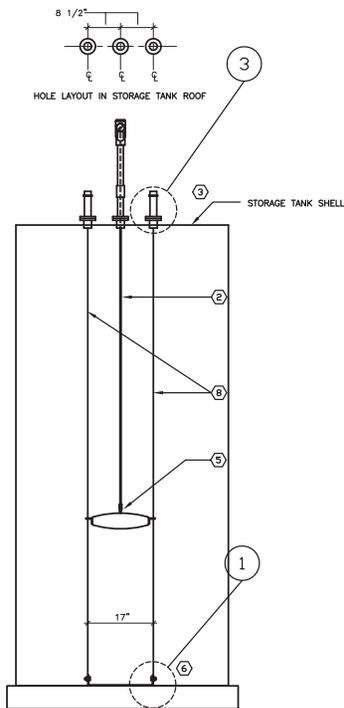
Varec Tank Gauge Detail



1 BOTTOM GUIDE WIRE ANCHOR DETAIL
SCALE: NONE



2 TAPE WIPER DETAIL
SCALE: NONE



3 TOP GUIDE WIRE ANCHOR DETAIL
SCALE: NONE

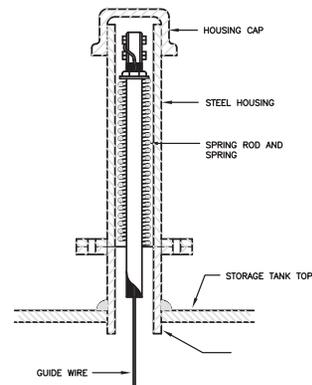
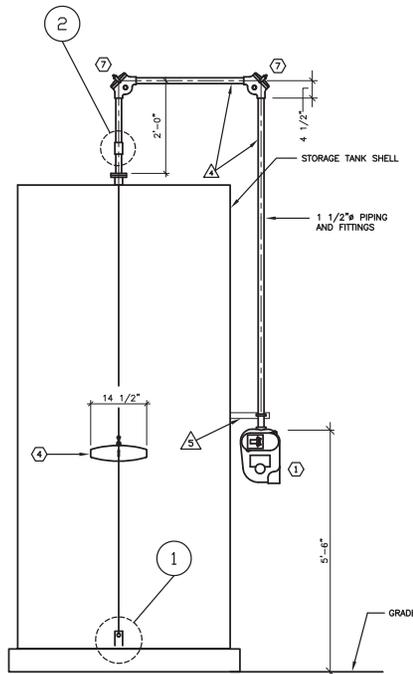


Exhibit D2-18

EQUIPMENT SCHEDULE		
VAREC AUTOMATIC TANK GAUGE 2500 SERIES		
MARK	PART DESCRIPTION	REMARKS
①	GAUGE HEAD, IRON HOUSING AND SHEAVES, 304 S.S. TRIM	
②	GAUGE TAPE, 316 STAINLESS STEEL	
③	TOP GUIDE WIRE ANCHOR, STEEL HOUSING & SPRING ROD, CAD PLATE STEEL SPRING	SEE DETAIL 3
④	GAUGE FLOAT, 316 S.S. HOLLOW SHELL WELDED	
⑤	TAPE FASTENER, 316 STAINLESS STEEL	
⑥	BOTTOM GUIDE WIRE ANCHOR, STEEL	SEE DETAIL 1
⑦	SHEAVE ELBOW, IRON HOUSING, 316 S.S. TRIM, TEFLON BEARING	
⑧	GUIDE WIRE, 316 STAINLESS STEEL	

GENERAL NOTES

- 1.) INSTALL LEVEL GAUGE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

PROPRIETARY STATEMENT

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2005 West Broadway • Suite 210 • Columbia • MO 65203
• Phone: (573) 443-7100 • Fax: (573) 443-7181 •

TITLE
VERTICAL TANK
LEVEL GAUGE DETAILS

S SAFETY-KLEEN SYSTEMS, INC.
2600 N. CENT. EXPRESSWAY STE 400 RICHARDSON, TX 75080
PHONE 800-669-5740

NO.	DESCRIPTION	BY	CHK	APPR	DATE	SCALE	BY	CHKD	APPROVED	OPERATIONS	DATE	
A	ISSUED FOR REVIEW				082193	AS SHOWN					6-21-93	
REVISIONS										MECHANICAL	BSD-307	A

VERTICAL STORAGE TANK GAUGE INSTALLATION DETAILS

SCALE: NONE

Exhibit D2-19

Trihydro 2001 Spent Solvent Aboveground Storage Tank System Assessment



TriHydro Corporation

920 Sheridan Street
Laramie, Wyoming 82070

(307) 745-7474
FAX: (307) 745-7729

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 include 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 PosiTest 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.



Mr. Gary Olsen
March 26, 2001
Page 6

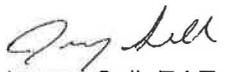
Certification

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,
TRIHYRO CORPORATION


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


Jeremy Sell, E.I.T.
Project Engineer

363-001

Attachments



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

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

Table 2. List of References, Spent Solvent Tank Integrity Assessment, Safety-Kleen Systems, Inc. Service Center, Boise, Idaho.

December 1995, API Standard 653, Tank Inspection Repair, Alteration and Reconstruction.

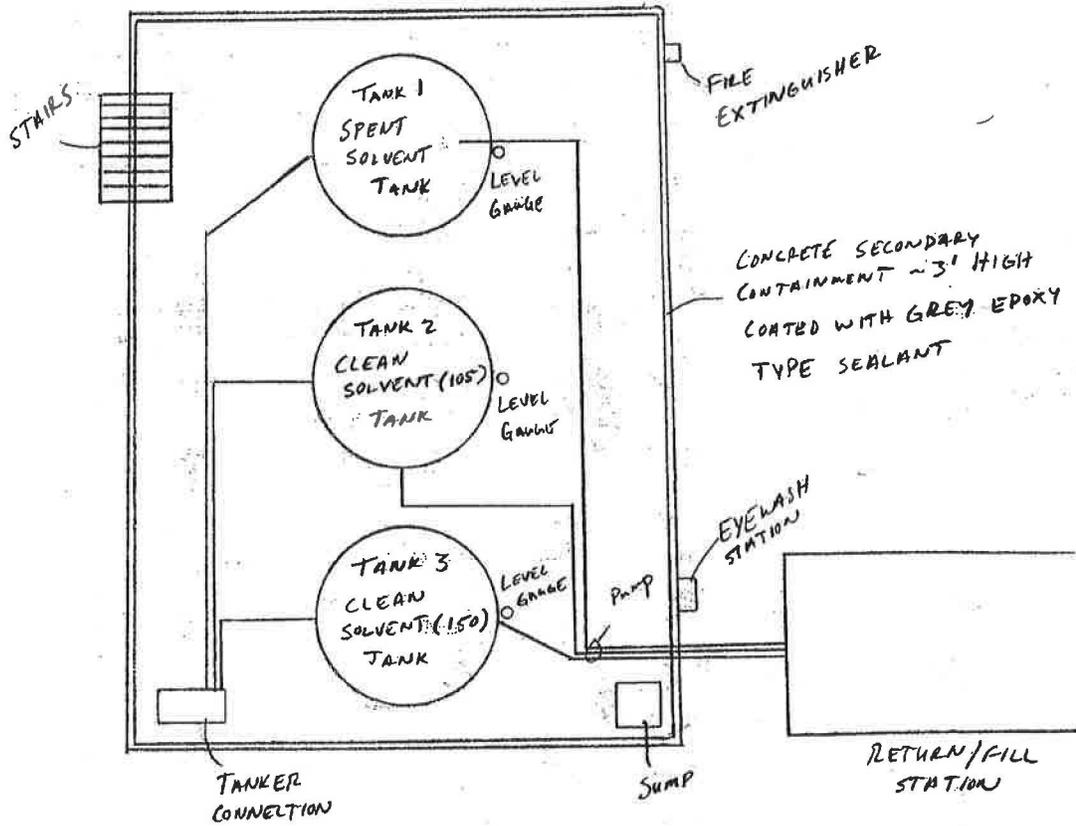
November 1995, API Standard 575, Inspection of Atmospheric and Low-Pressure Storage Tanks.

April 1993, UL Standard 142, Standard for Safety, Steel Aboveground Tanks for Flammable and Combustible Liquids.

363-001

S-K BOISE
SITE MAP

3/6/01 JS



SITE MAP, S-K SERVICE CENTER
BOISE, ID

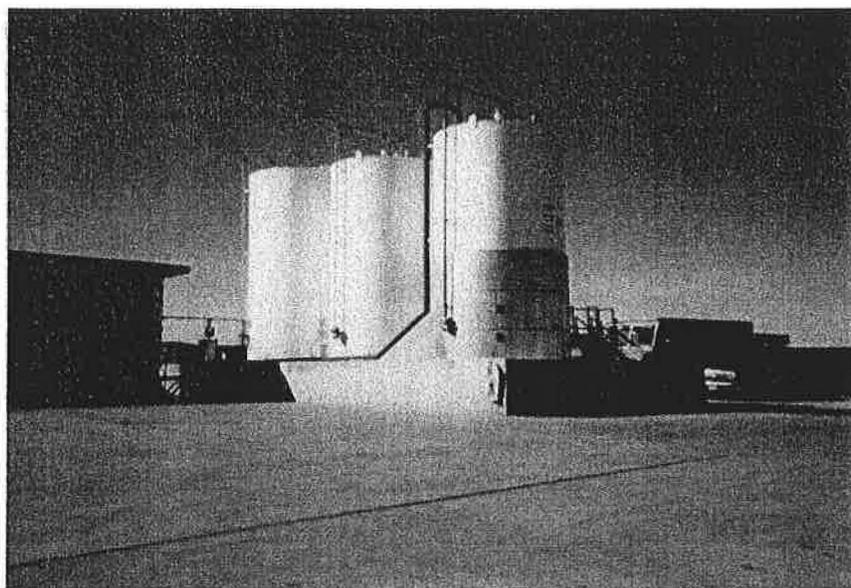


Photo 1: Spent solvent tank system and secondary containment area

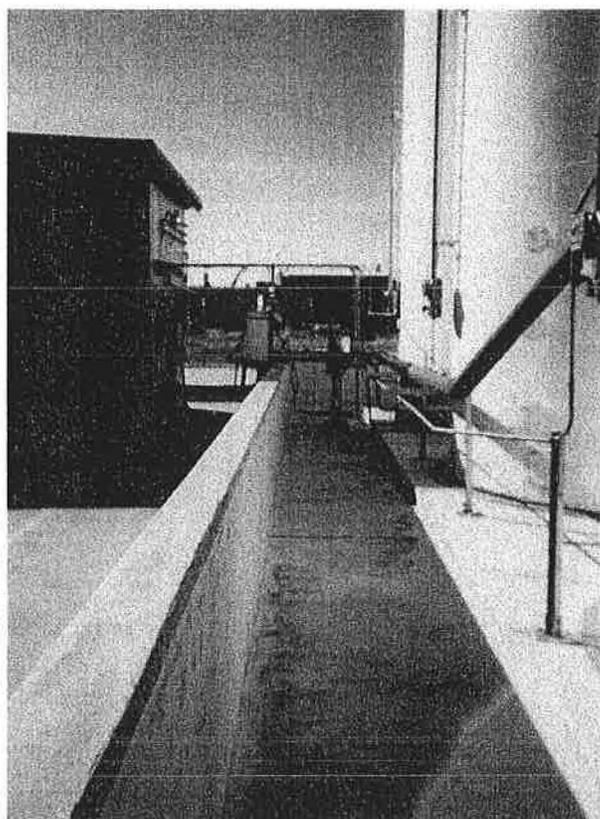


Photo 2: Influent piping to spent solvent tank from return/fill station

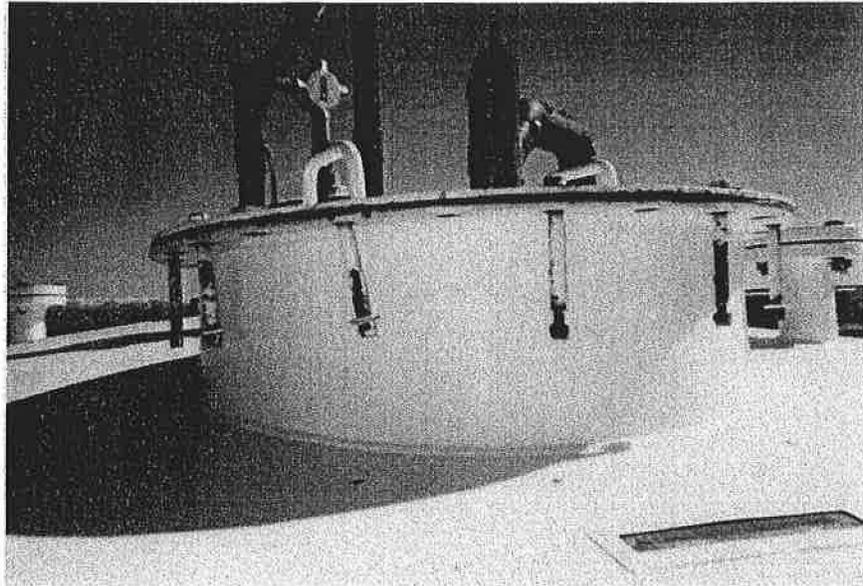


Photo 3: Top hatch (gasket) of spent solvent tank

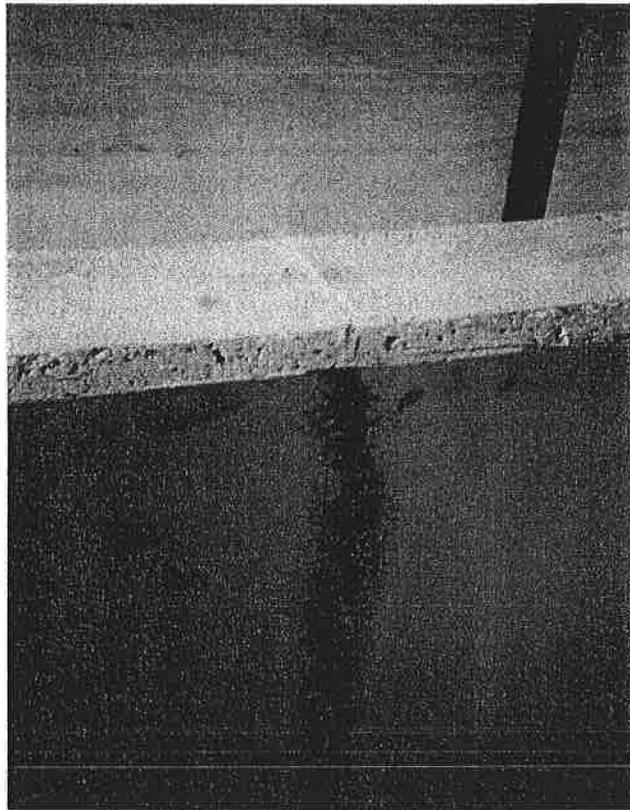


Photo 4: Crack in the secondary containment coating

0930

PICKED UP EQUIPMENT AND WENT TO SITE

1000

ARRIVED ON SITE - MET WITH DAN FINNEY. JOE HARRICK WAS NOT IN. SHOWED ME SITE 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 SEALED 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, MANWAYS, PIPING OR TANKER CONNECTION BOX.
- PAINT ON TANKS IN GOOD CONDITION - MINOR SCRATCHES/CHIPPOINTS.
- NO EVIDENCE OF SETTLING AT THE BOTTOM OF TANKS. TANKS ARE SUPPORTED WITH STEEL SKIRT. STEEL SKIRT HAS CONCRETE AROUND IT AND BOLTED DOORS OVER ACCESS HOLES
- THE SECONDARY CONTAINMENT AREA IS COATED WITH GREY EPOXY TYPE SEALANT - COATING COVERS BOTTOM OF CONTAINMENT AREA AND SIDEWALLS. MINOR SURFACE CRACKS WERE DETECTED IN THE SEALANT.

1058

CALIBRATED TANK THICKNESS TESTING EQUIPMENT
STRESSTEL T MIKEE
DORITEST FM 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

Both tanks installed when Branch opened 1993

TANK 1 = SPENT SOLVENT TANK = 12,000 gallon, max fill 10,800 gal
INSULATION UP TO ~ 10'

TANK 2 = CLEAN SOLVENT = 12,000 gallon, max fill 10,800 gal

TANK 1, 2 MADE BY: TOPAZ TANK & MFG.
2869 S. LIBERTY
BOISE, ID 83705

TANK 3 = CLEAN SOLVENT = 12,000 gal, max fill 11,400 gal

TANK 3 MADE BY: ACE TANK & EQUIPMENT
SEATTLE, WA

Installed in 1998

LIQUID LEVELS AT TIME OF MEASUREMENT

TANK 1 = 99.66"

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 HAS LONG BOLTS. GASKET APPEARED TO BE CRACKED IN PLACES. NO NOTICABLE ODORS 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 INSPECTION FROM CRANE, I NOTICED THAT LONG-BOLTS APPEARED AS IF THE MANWAY HAD LIFTED. WHEN DONE WITH 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.

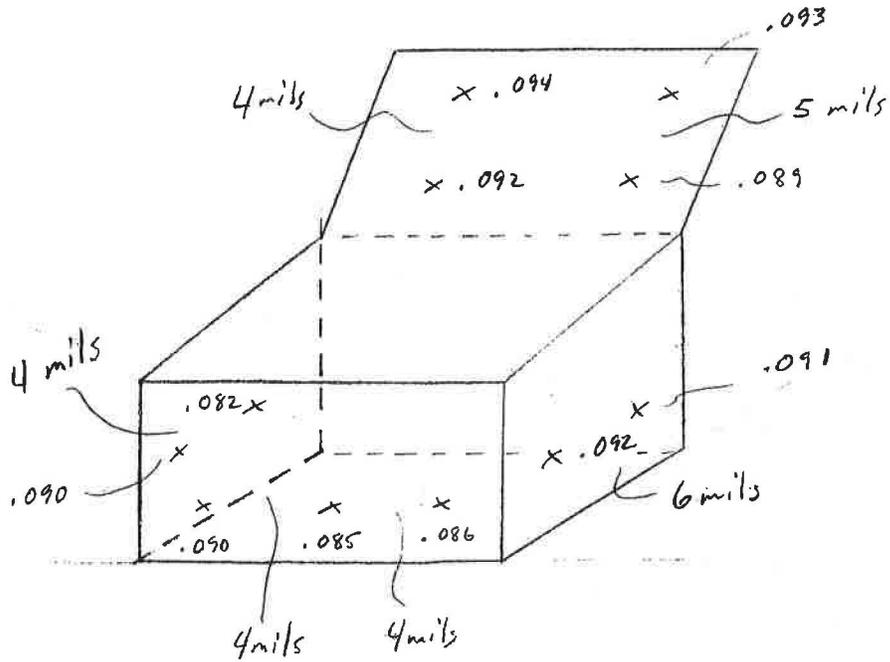
RETURN / FILL STATION

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

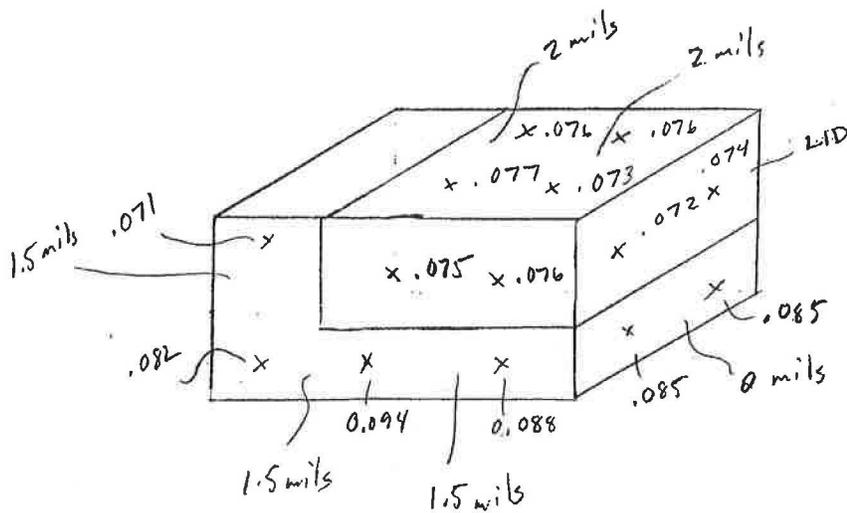
THICKNESS MEASUREMENTS WERE MADE ON THE DRAIN WASHER AND WET DUMPSTER

LEFT SITE AT 1645.

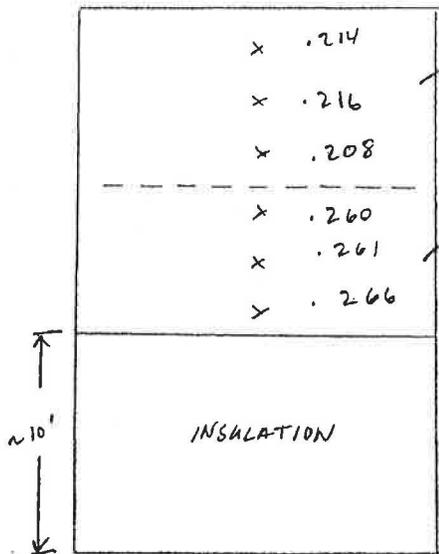
WET DUMPSTER - (BACK OF TANK AND BOTTOM NOT ACCESSIBLE)



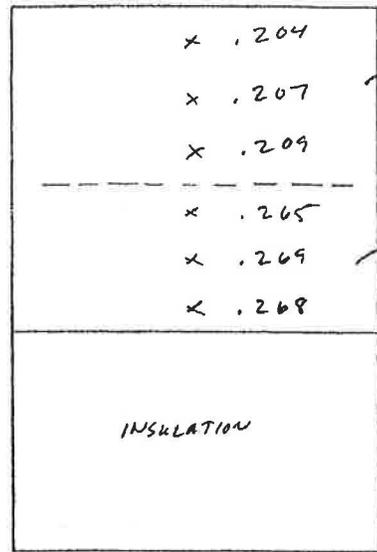
DRUM WASHER (BACK, LEFT, AND BOTTOM SIDE OF TANK ARE NOT ACCESSIBLE)



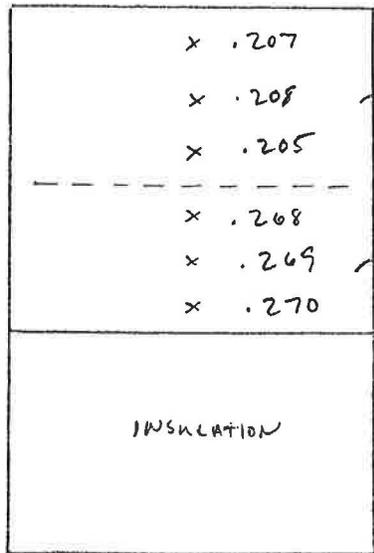
SPENT SOLVENT TANK (TANK 1)



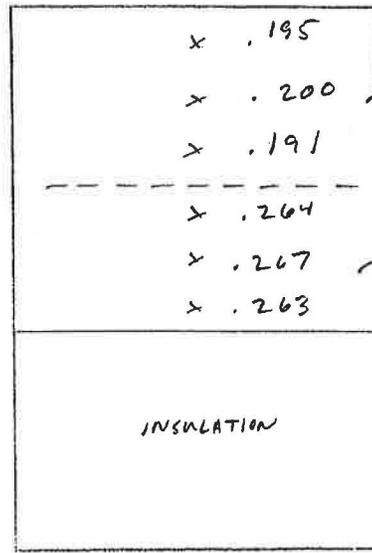
NORTH SIDE



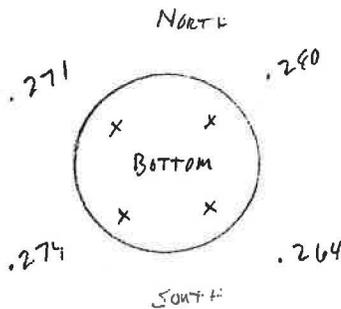
SOUTH SIDE



EAST SIDE



WEST SIDE



MEASUREMENTS ON BOTTOM OF TANK WERE MADE THRU ACCESS DOORS

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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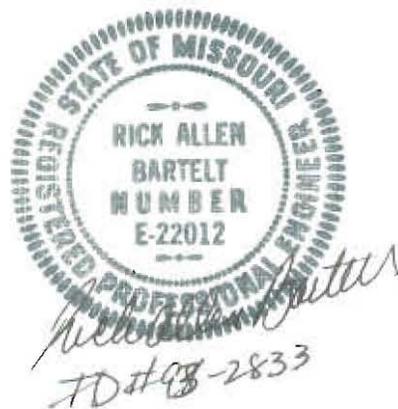
TANK SYSTEM CERTIFICATION

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 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 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:

- Underwriters' Laboratory, UL 142, Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids, 6th Edition.
- National Fire Protection Association, NFPA 30, Flammable and Combustible Liquids Code Handbook, 1990 Edition.
- American Concrete Institute, ACI 318-89, Building Code Requirement for Reinforced Concrete.
- American Society of Civil Engineers ASCE Standard 7-88.
- American National Standards Institute, ANSI B31.3, Petroleum Refinery Piping.
- American Petroleum Institute, API 2000, Venting Atmospheric and Low Pressure Storage Tanks.
- Uniform Building Code, 1991 Edition.
- Uniform Fire Code, 1991 Edition.

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 - [40CFR 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
- (ii) 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.

The drum washers can each contain 162 gallons of fluid. The 6" deep metal pans under the return/fill shelter have a total containment capacity well in excess of that combined volume. Precipitation can be excluded since the area is covered. See Appendix B.

- (iii) 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.
- (iv) 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.
- (v) 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.
- (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)]

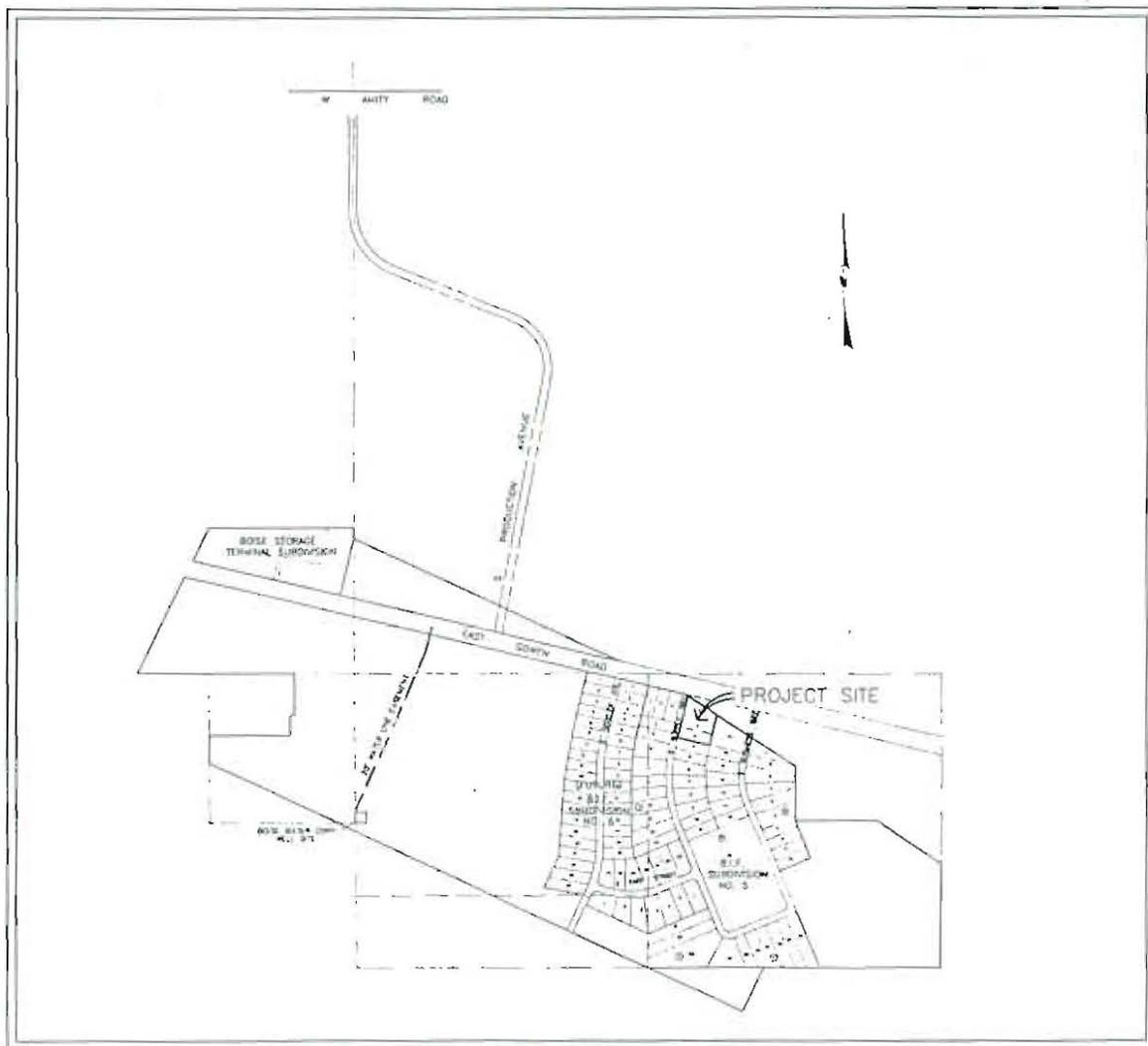
Most piping is within or above the secondary containment structure. The piping outside the secondary containment is welded.

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.

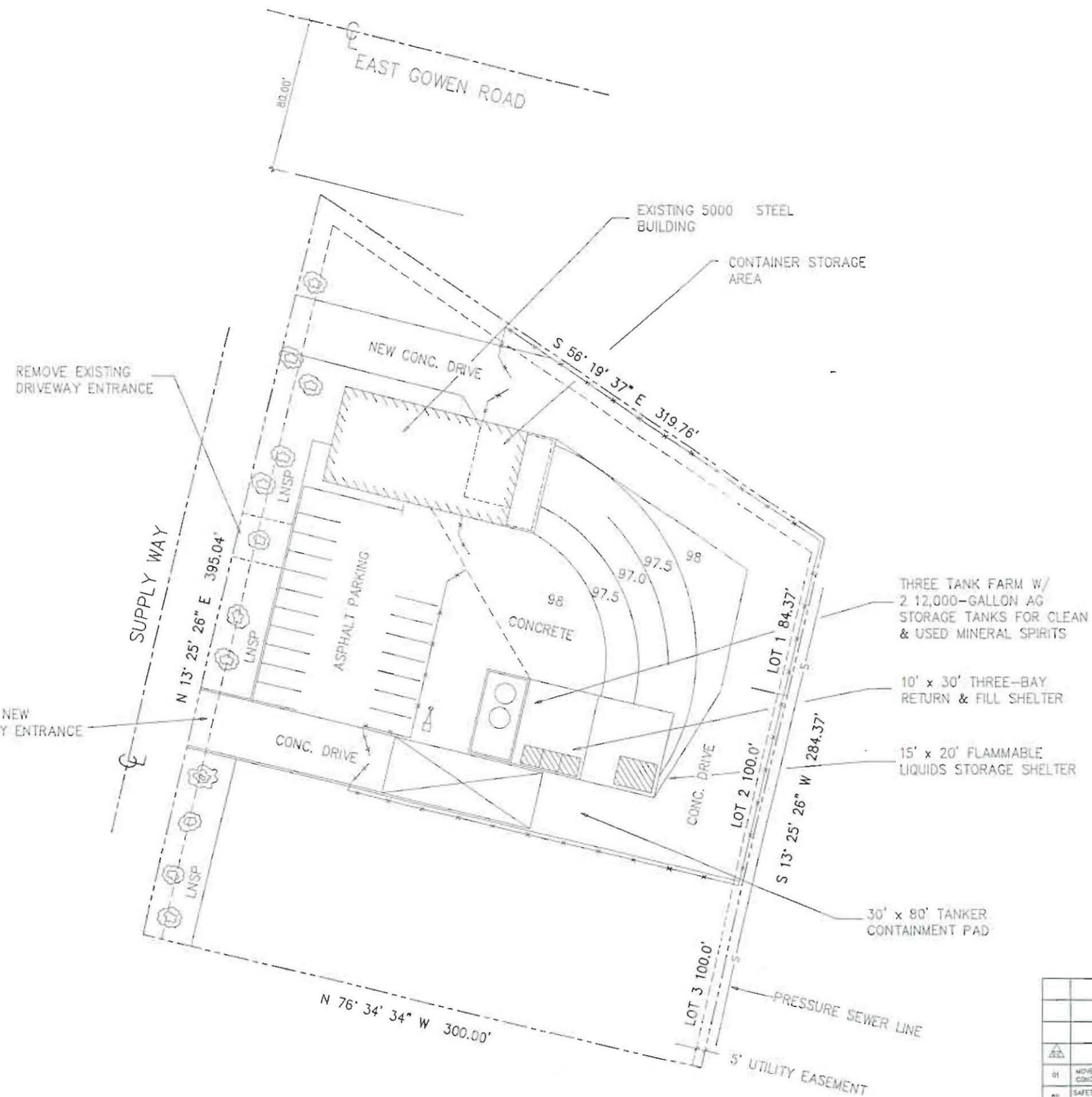
EXHIBITS

<u>Title</u>	<u>Exhibit No.</u>
Vincinity Map	1
Site Plan	2
Tank Farm Plan	3
System Schematic	4



VICINITY MAP

NOT TO SCALE



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

PRELIMINARY

2

GENERAL NOTES

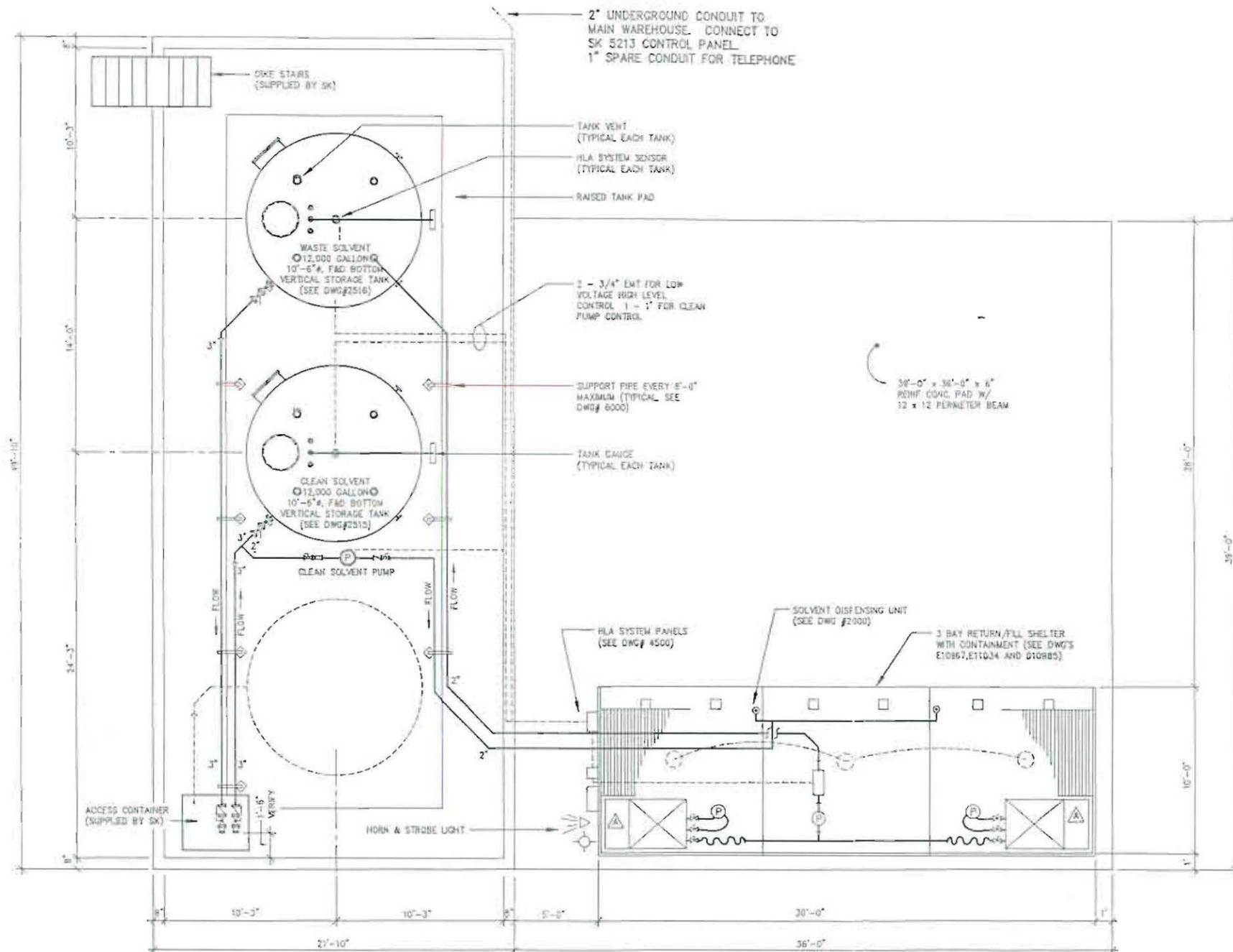
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TITLE
SITE PLAN

NO.	DESCRIPTION	BY	CHK	APPR	DATE

SAFETY-KLEEN CORP.
777 8th Street Road, Elgin, Illinois 60120, Phone 708-887-8440

SCALE 1" = 30'-0"	BY WEY	CHKD -	P.E. APPR -	OP. APPR -	DATE 1-5-98
SERVICE CENTER LOCATION BOISE, ID	SC-ORG NUMBER 115308-0001	REV. NO 01			



TANKFARM AND RETURN/FILL PIPING AND EQUIPMENT PLAN

SCALE: 1/4" = 1'-0"

PRELIMINARY

10

GENERAL NOTES

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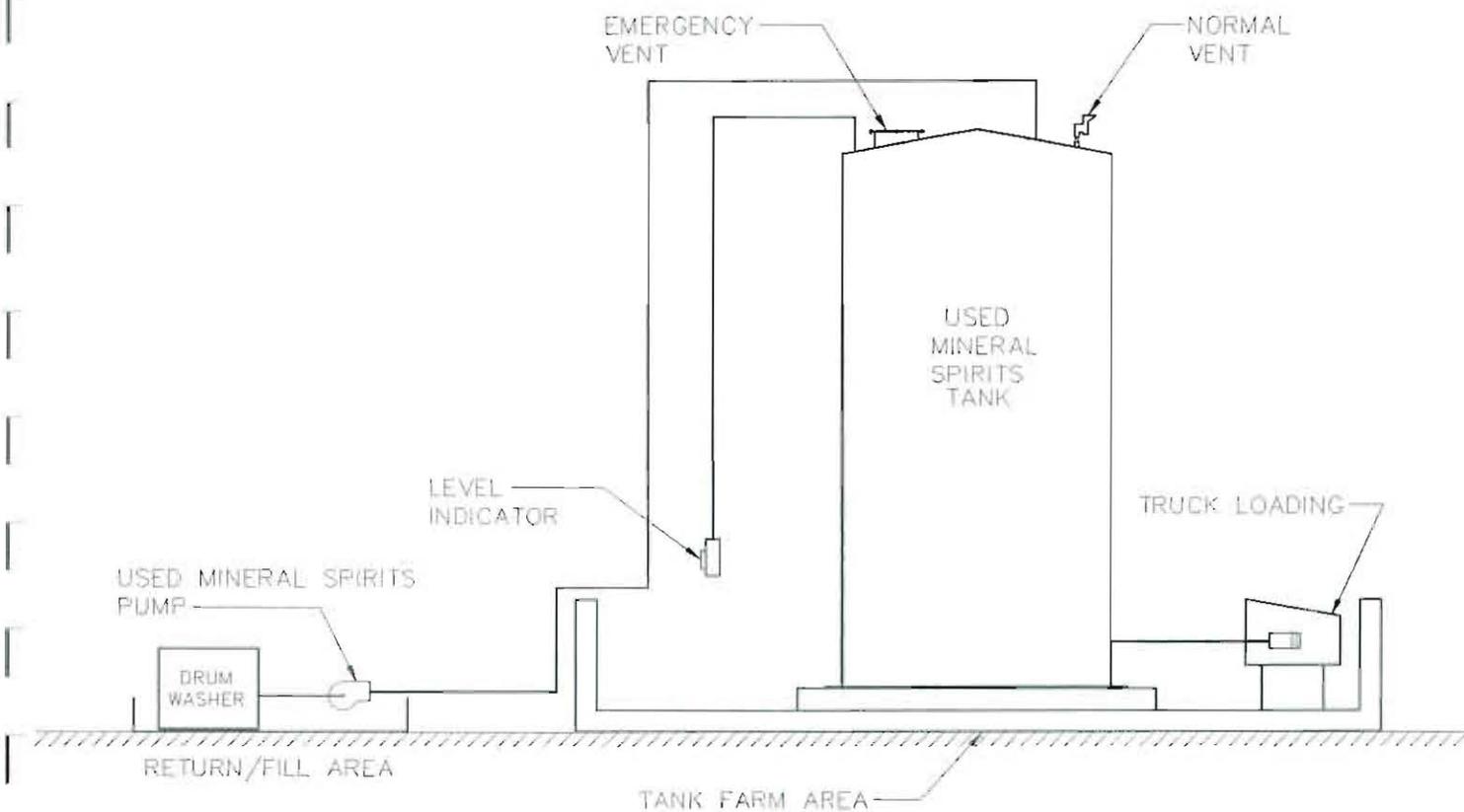
- A) WASTE SOLVENT COLLECTION HOPPER WITH ISOLATION BALL VALVE AND FLEXIBLE HOSE.
- B) CONCRETE PENETRATIONS SHALL NOT BE ALLOWED ON TANKFARM FLOOR.
- C) IF CONSTRUCTION REQUIRES CONCRETE PENETRATIONS AFTER EPOXY COATING IS APPLIED, CONTRACTOR SHALL PATCH AND REPAIR EPOXY COATING PER MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS.

TITLE
TANKFARM AND RETURN/FILL
PIPING AND EQUIPMENT PLAN

S SAFETY-KLEEN CORP.
777 300 TRIMMER ROAD (L&S) ILLINOIS 60121 PHONE 708-497-8462

NO.	DESCRIPTION	BY	CHK	APPR	DATE	SERVICE CENTER LOCATION	SC-DWG NUMBER	REV. NO.	
01	REVISE TO CURRENT STEP'S CHS PIPING	JHG	-	-	08/29/99				
00	5-H DRAWING CONVERTED TO CAD	JOG	-	-	08/24/99				
REVISIONS							BOISE, ID	118308-2001	01

8-24-01



SYSTEM SCHEMATIC

NO SCALE

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



CONSULTING ENGINEERS
4812 Santana Circle • Columbia • MO 65203 • (314) 875-0260

EXHIBIT
4

APPENDIX A

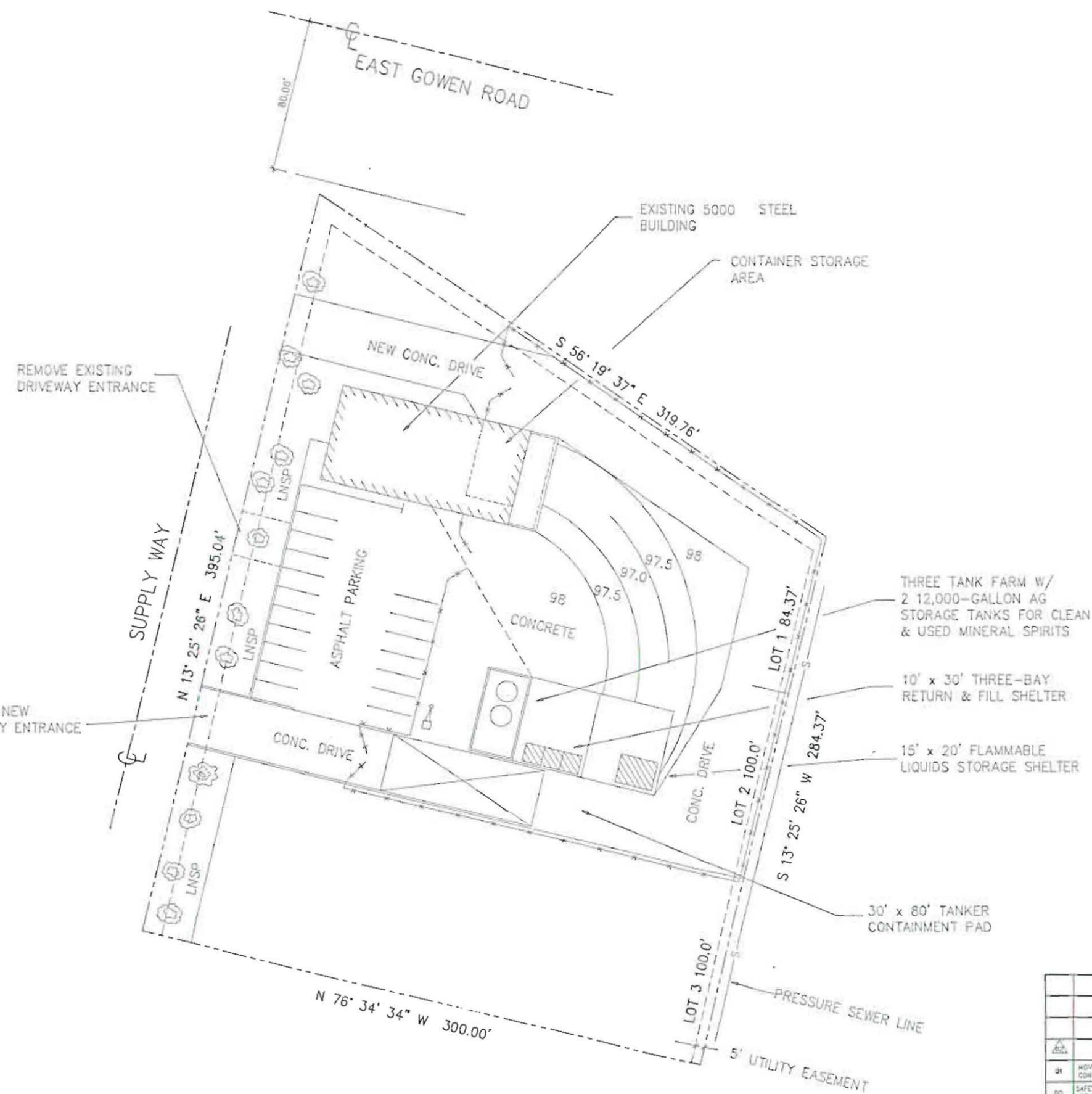
Design Documentation

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.

<u>Title</u>	<u>Page No.</u>
Site Plan, 0001	A-1
Tank Farm Concrete Plan, 5000	A-2
Tank Farm #1 Sections and Details	A-3
Tank Farm and Return/Fill Piping and Equipment Plan, 2001	A-4
Assembly Details for Modular Bay Return/Fill Shelter, E10967	A-5
Drumwasher Schematic and Installation Details, 3508	A-6
12,000 Gallon, 10'-6" DIA. Flanged and Dished Bottom Vertical Storage Tank with Flanged Fittings Installation Details, 2512	A-7
Waste Solvent Flanged Vertical Storage Tank Piping Detail	A-8
Storage Tank Access Container Details, 2513	A-9
Pipe and Equipment Support Details, 6000	A-10
Varec Tank Gauge Installation Details, 3500	A-11
Drum Washer Control Panel Diagrams, 4010	A-12
Solvent Tank HLA System Diagram, 4500	A-13
HLA Sensor to Remote Transmitter Installation Details, 4502	A-14
L.C.T. Electronic Control Cabinet Details, 4503	A-15
L.C.T. High Level Alarm Receiver System Details, 4504	A-16
Solvent Wiring Details for Control Panel #1 (SK #5346), 4506	A-17
Control Panel (SK #5213), 4508	A-18
Control Panel (SK #5213) Wiring Diagram, 4509	A-19
SWIC Drum Washer Screen and Filter Details, 1001	A-20
Used Mineral Spirits Pump Technical Data	A-21
Telephone Log with City of Boise, Idaho	A-24
Flood Boundary Information	A-25



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

2 TOOTHMAN OROTON-ENGINEERING WILL PROVIDE CORRECT SITE PLAN FOR SUBMITTAL

PRELIMINARY

2

GENERAL NOTES

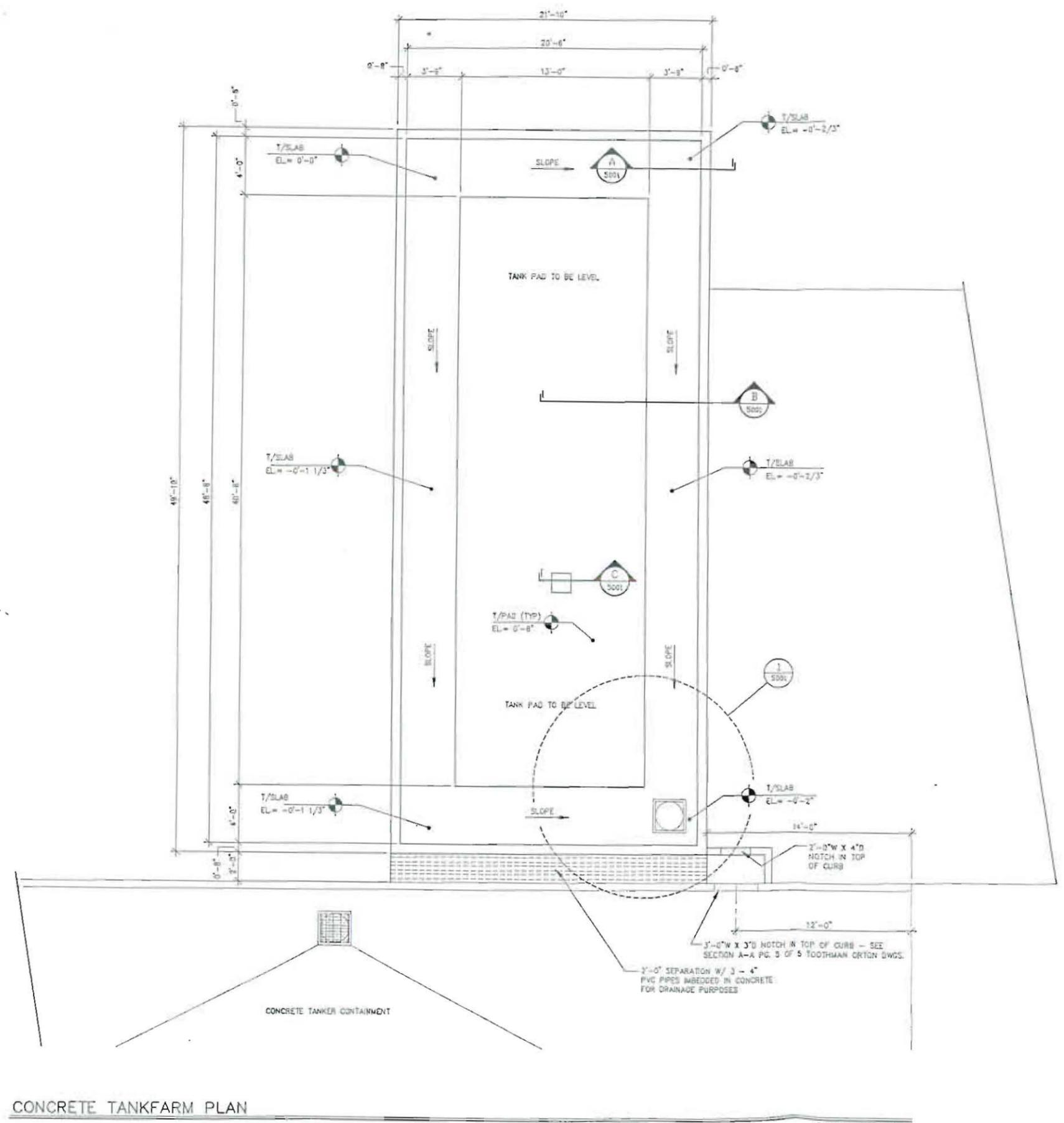
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SITE PLAN

SAFETY-KLEEN CORP.
 777 8th TOWER ROAD ELGIN, ILLINOIS 60123 PHONE 708-697-6400

SCALE: 1" = 30'-0"
 SERVICE CENTER LOCATION: BOISE, ID
 SC-DWG NUMBER: 118308-0001
 DATE: 1-5-90
 REV. NO.: 01

NO.	DESCRIPTION	BY	CHK	APPR	DATE
01	ADDED NOTE	KJP	-	-	8-18-81
01	MOVE FENCE OUT 25', CHANGE ASPHALT YARD TO CONCRETE, RELOCATE LIGHT POLE.	WE'Y	-	-	8-18-81
00	SAFETY-KLEEN DRAWING CONVERTED TO CAD AS DATED REPLACES SAFETY-KLEEN DRAWING D13579	JDG	-	-	5-1-91



CONCRETE TANKFARM PLAN

SCALE: 1/4" = 1'-0"

PRELIMINARY

4

GENERAL NOTES

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- ELEVATIONS SHOWN ON THIS SHEET ARE REFERENCE ELEVATIONS FOR TANKFARM AND TRUCK STATION ONLY. SEE SITE PLAN FOR ACTUAL ELEVATIONS.
 - ELEVATION 0'-0" IN TANKFARM AND TRUCK STATION CONCRETE PLANS IS EQUAL TO ELEVATION IN THE SITE PLAN.
 - ALL CONCRETE WORK SHALL BE FIBROUS REINFORCED AND SHALL HAVE 4,000 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS AND 3% TO 5% AIR ENTRAINING ADMIXTURE - SEE SK SPECIFICATIONS.
 - CONCRETE PENETRATIONS SHALL NOT BE ALLOWED ON TANKFARM FLOOR.
 - TANKFARM FLOOR AND DIKE WALL SURFACES TO BE EPOXY COATED PER SK SPECIFICATIONS.
 - IF CONSTRUCTION REQUIRES CONCRETE PENETRATIONS AFTER EPOXY COATING IS APPLIED, CONTRACTOR SHALL PATCH AND REPAIR EPOXY COATING PER MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS.

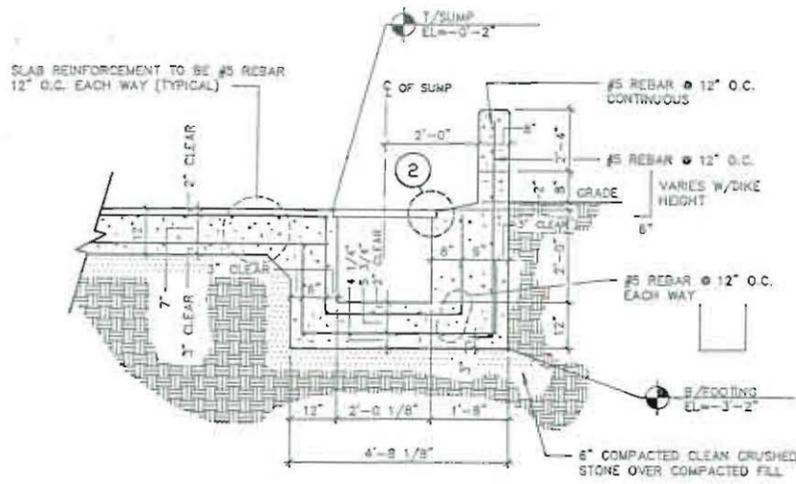
TITLE
TANKFARM CONCRETE PLAN

SAFETY-KLEEN CORP.
777 251 TOWER ROAD ELSON, ILLINOIS 64033 PHONE 708-497-8448

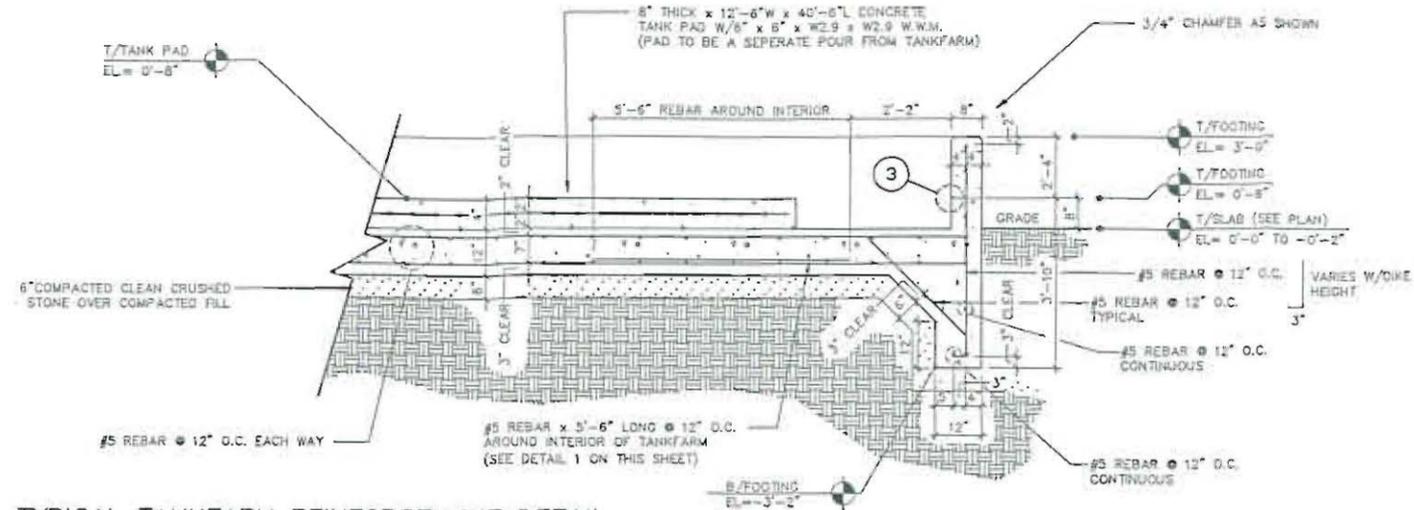
NO.	DESCRIPTION	BY	CHK	APPR	DATE	SERVICE CENTER LOCATION	CC-DWG NUMBER	REV. NO.
01	MOVED TANKER PAD, DUMP	HJP	-	-	08/09/08	BOISE, ID	118308-5000	01
REVISIONS								

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- ELEVATIONS SHOWN ON THIS SHEET ARE REFERENCE ELEVATIONS FOR TANKFARM AND TRUCK STATION ONLY. SEE SITE PLAN FOR ACTUAL ELEVATIONS.
- ELEVATION 0'-0" ON TANKFARM AND TRUCK STATION CONCRETE PLANS IS EQUAL TO ELEVATION ON THE SITE PLAN.
- ALL TANKFARM SUBSURFACE FOUNDATION DATA SHOWN ON TANKFARM AND TRUCK STATION CONCRETE DRAWING AND DETAILS IS SUBJECT TO CHANGE PER SITE SOILS AND FOUNDATION REPORT. CONTRACTOR IS TO OBTAIN A COPY OF THIS REPORT FROM EITHER SK OR THE ENGINEER PRIOR TO STARTING CONSTRUCTION. SEE SPECIFICATIONS.

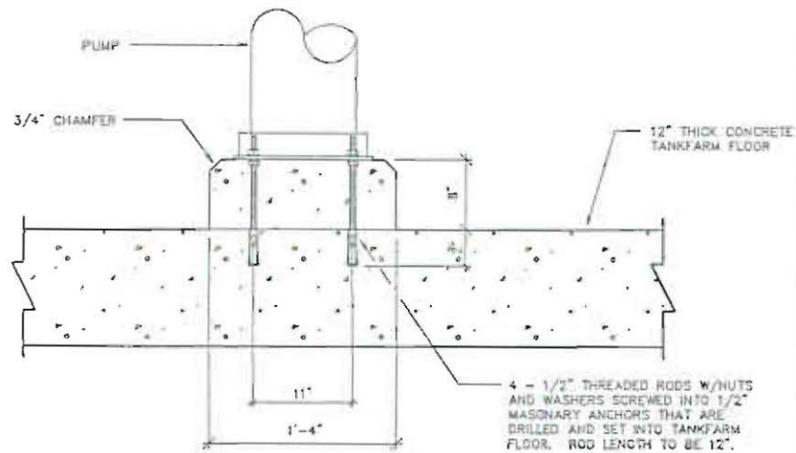


A TANKFARM SUMP SECTION
SCALE: 1/2" = 1'-0"

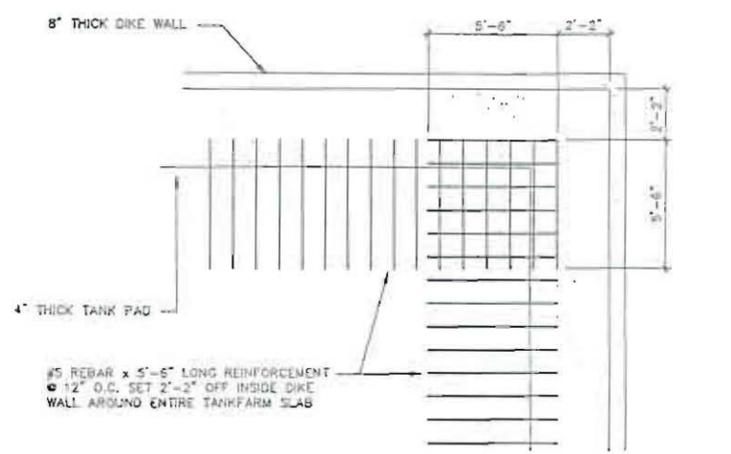


B TYPICAL TANKFARM REINFORCEMENT DETAIL
SCALE: 1/2" = 1'-0"

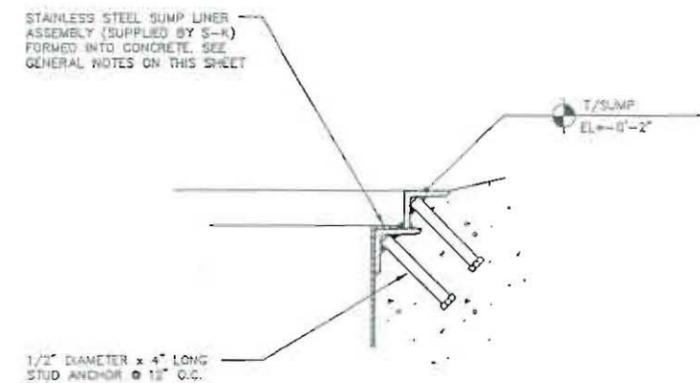
NOTE:
FOR PUMP BASE PLACEMENT SEE
SITE SPECIFIC TANKFARM PLUMBING
PLAN.



C TANKFARM PUMP BASE SECTION



1 TANKFARM REINFORCEMENT DETAIL
SCALE: 1/4" = 1'-0"



2 TANKFARM SUMP DETAIL
SCALE: 3" = 1'-0"

FORM A 1/4" WIDE x 1" DEEP SLOT AROUND INSIDE PERIMETER OF DIKE WALL. FILL SLOT WITH CONTINUOUS 3/8" DIAMETER CLOSED CELL POLYETHYLENE "BACKER ROD" ROPE AND 1/4" TO 1/2" THICK LAYER OF CHEMICALLY RESISTANT SEALANT.



3 DIKE WALL TO FOOTING DETAIL
SCALE: 3" = 1'-0"

5

PRELIMINARY

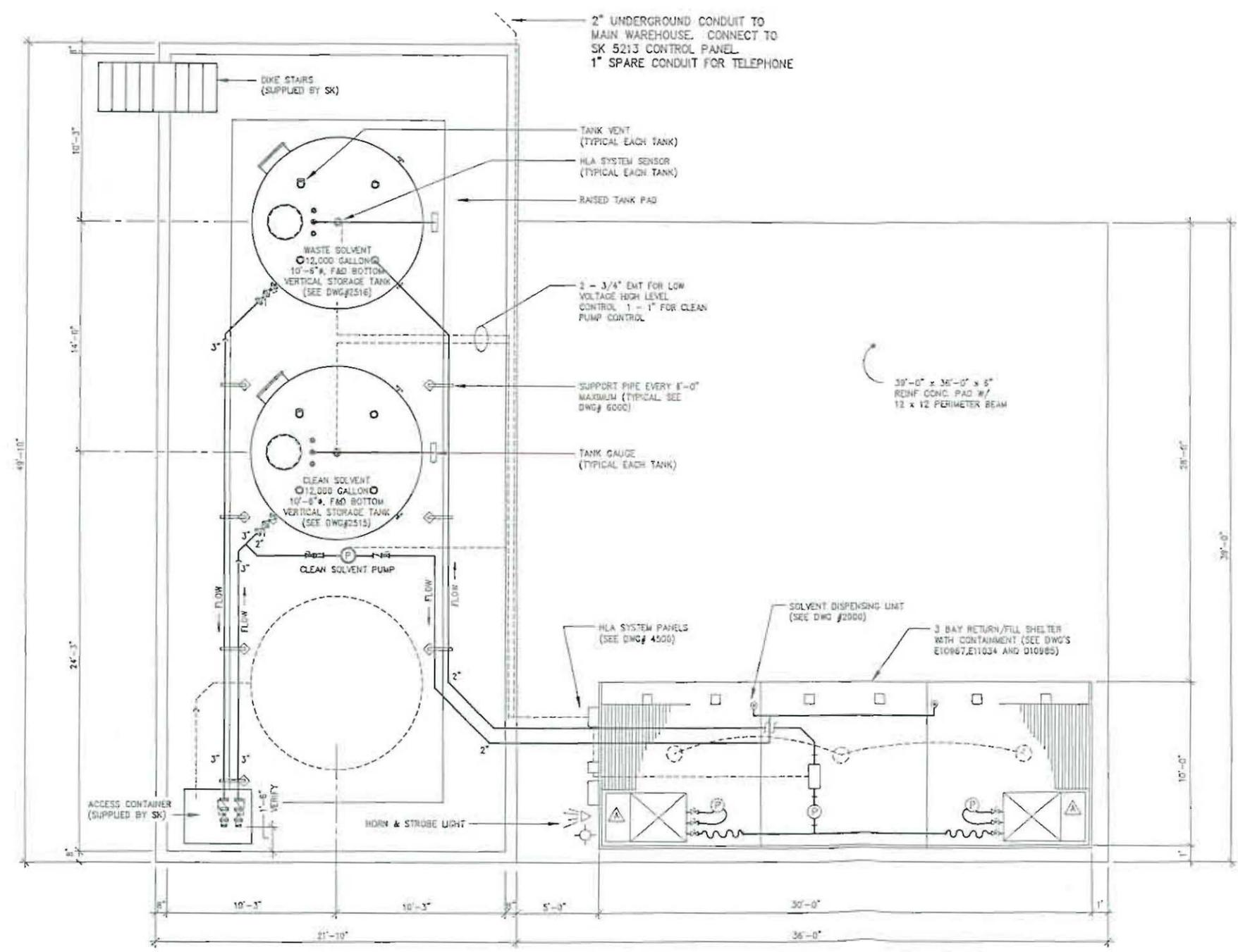
TANKFARM # 1
SECTIONS & DETAILS

S SAFETY-KLEEN CORP.
777 8th TOWER ROAD, ELGIN, ILLINOIS 60120 PHONE 708-477-8442

NO.	DESCRIPTION	BY	CHK	APPR	DATE

SCALE	BY	CHK	P.E. APPR	OP. APPR	DATE
AS SHOWN	JHD	-	WET	-	8-23-91
SERVICE CENTER LOCATION					REV. NO.
BOISE, ID					00

3-24-91



TANKFARM AND RETURN/FILL PIPING AND EQUIPMENT PLAN

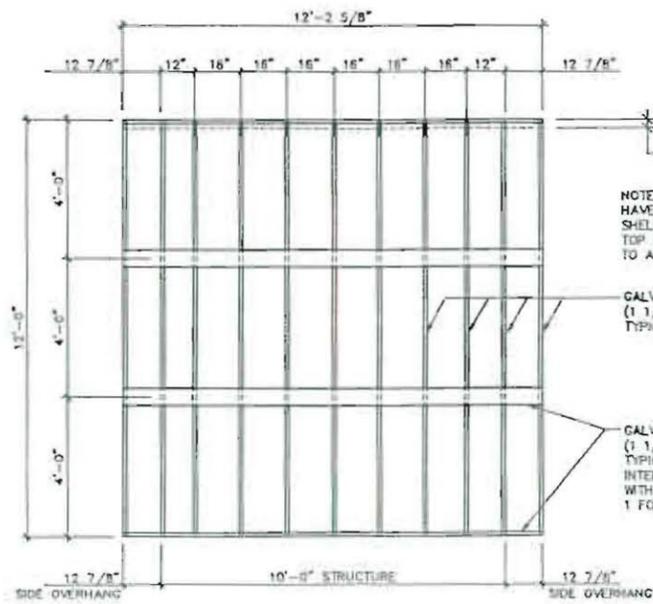
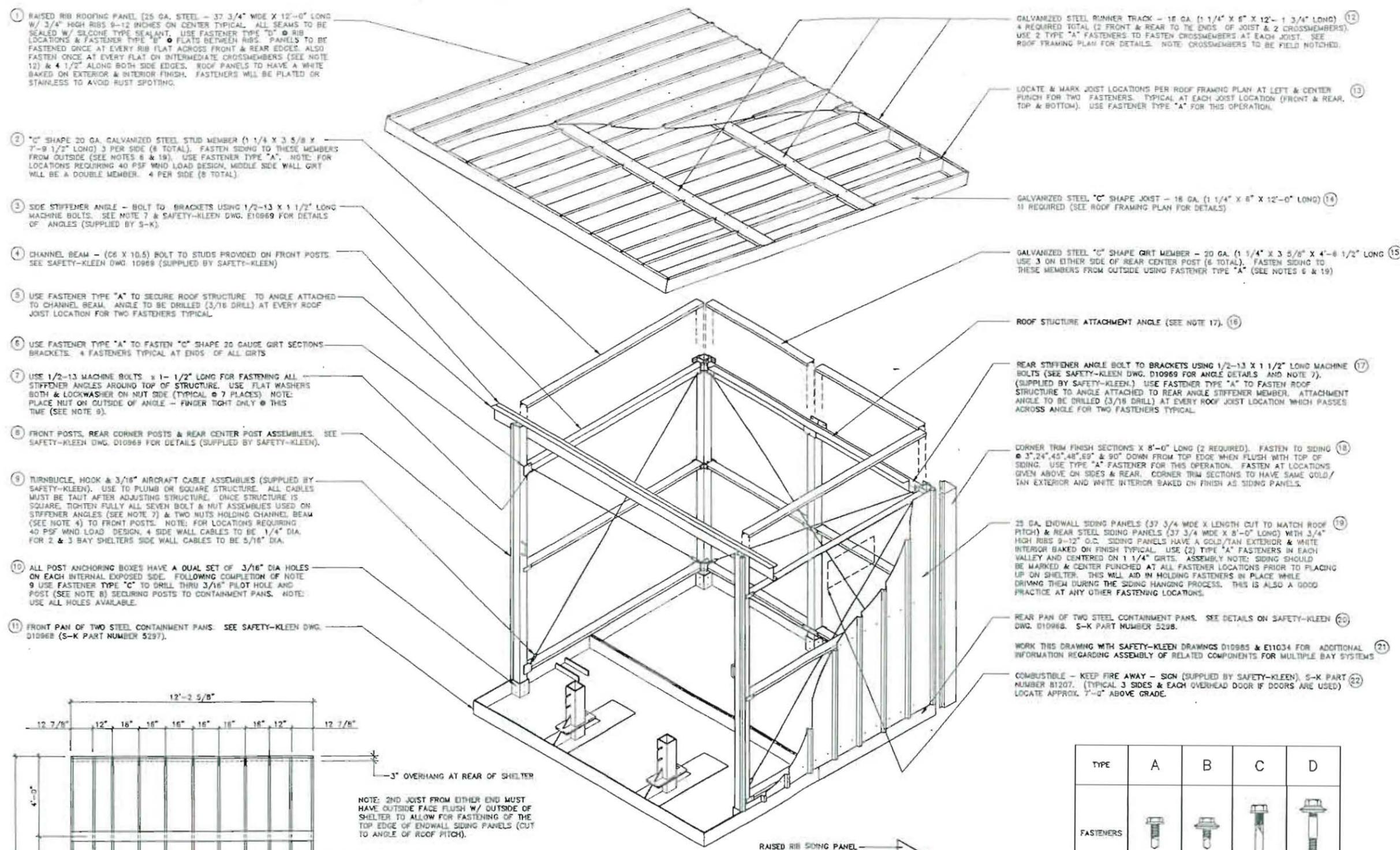
SCALE: 1/4" = 1'-0"

PRELIMINARY

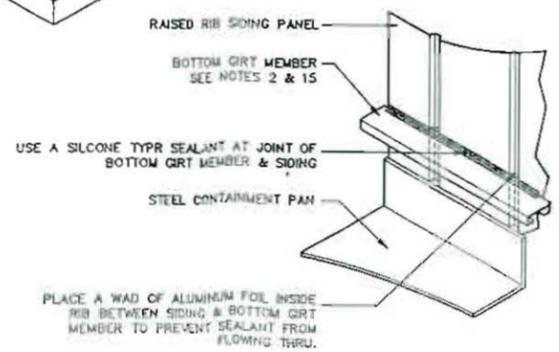
10

- GENERAL NOTES**
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- A) WASTE SOLVENT COLLECTION HOPPER WITH ISOLATION BALL VALVE AND FLEXIBLE HOSE.
 - B) CONCRETE PENETRATIONS SHALL NOT BE ALLOWED ON TANKFARM FLOOR.
 - C) IF CONSTRUCTION REQUIRES CONCRETE PENETRATIONS AFTER EPOXY COATING IS APPLIED, CONTRACTOR SHALL PATCH AND REPAIR EPOXY COATING PER MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS.

REVISIONS				TITLE	
01	REVISE TO CURRENT STD'S. CHG PIPING	JHG	-	-	TANKFARM AND RETURN/FILL PIPING AND EQUIPMENT PLAN
00	S-K DRAWING CONVERTED TO CAD	JDG	-	-	
NO.	DESCRIPTION	BY	CHK	APPR	DATE
SAFETY-KLEEN CORP.					
777 W. TIMBER ROAD, ELGIN, ILLINOIS 60120 PHONE 708-437-0460					
SCALE: 1/4" = 1'-0"		BY	CHK	P.E. APPR	DATE
SERVICE CENTER LOCATION		SC-DWG NUMBER		REV. NO.	
BOISE, ID		116308-2001		01	



- ROOF FRAMING PLAN -



- SEALING DETAIL -

TYPE	A	B	C	D
FASTENERS				

GENERAL NOTES

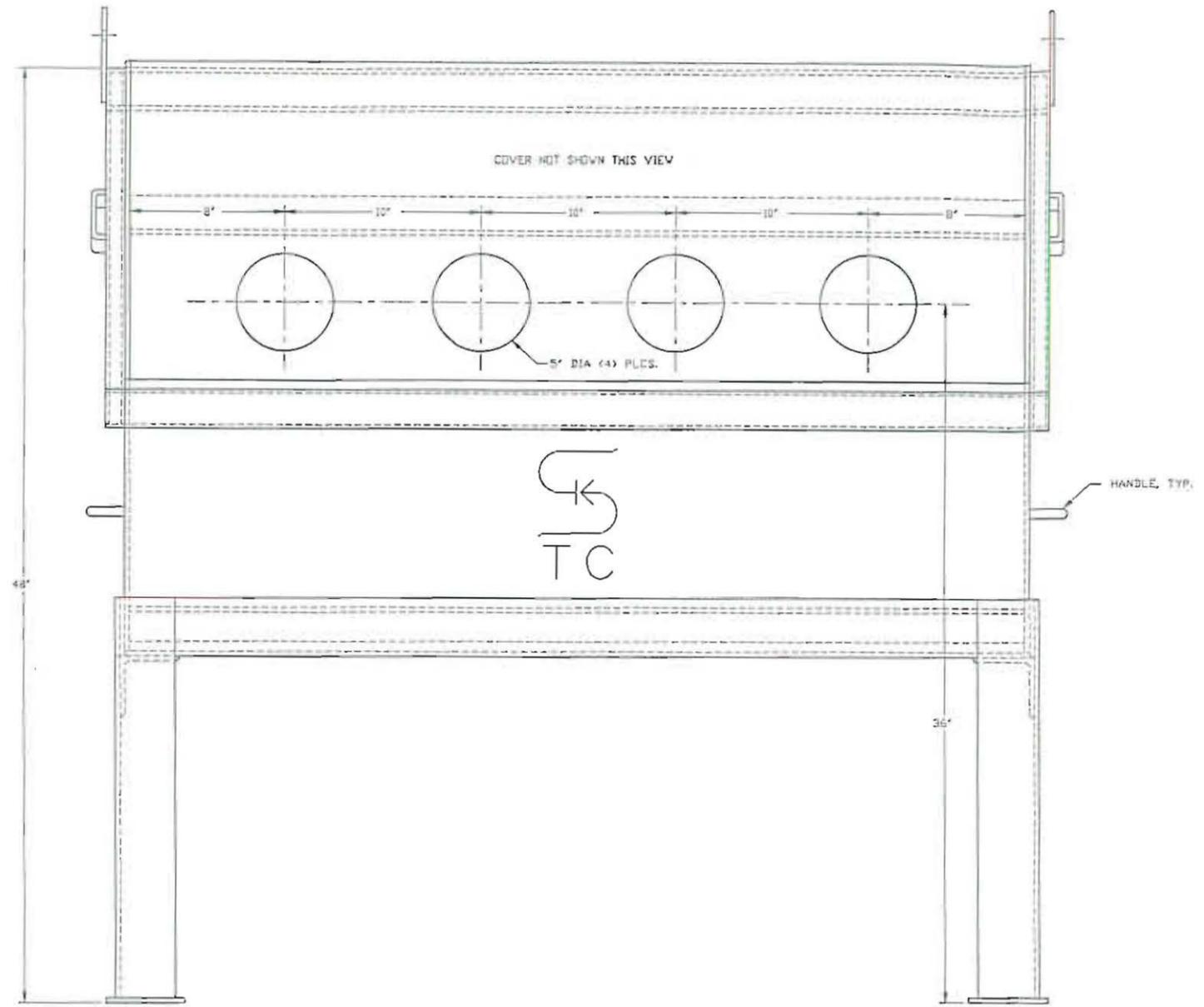
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SAFETY-KLEEN CORPORATION. ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT BY SAFETY-KLEEN OR AS SAFETY-KLEEN MAY AGREE IN WRITING.

TITLE
ASSY. DETAILS FOR MODULAR BAY RETURN/FILL SHELTER

S SAFETY-KLEEN CORP.
777 805 TOWER ROAD ELKHART, INDIANA 46512 PHONE 765-491-8446

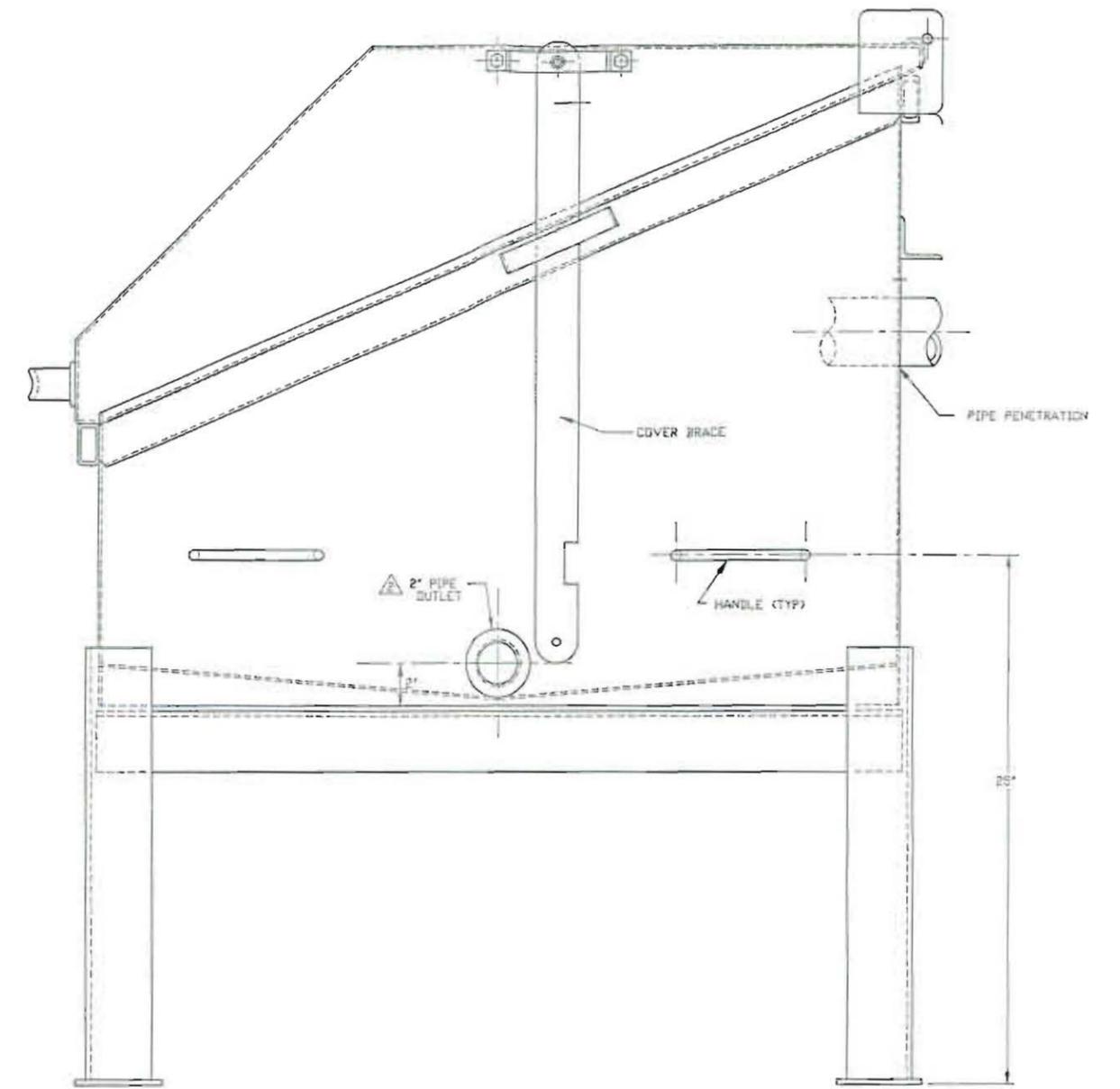
NO.	DESCRIPTION	BY	CHK	APPR	DATE	SCALE	BY	CHK	P.E. APPR	SP. APPR	DATE
	REBORN ON CAD	MH	-	-	010962	1/2" = 1'-0"	MH	-	-	-	010962
	DESCRIPTION	BY	CHK	APPR	DATE	SERVICE CENTER STANDARDS			STD-DWG NUMBER		REV. N/L
						FABRICATION			E10967		00

REVISIONS



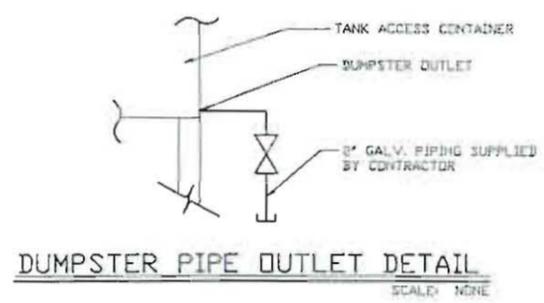
TANK ACCESS CONTAINER - FRONT VIEW

SCALE: 1/4"=1'



TANK ACCESS CONTAINER - SIDE VIEW

SCALE: 1/4"=1'

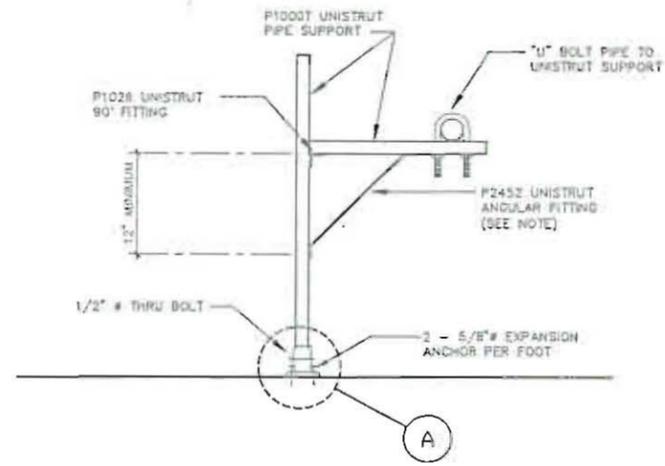


DUMPSTER PIPE OUTLET DETAIL
SCALE: NONE

PRELIMINARY

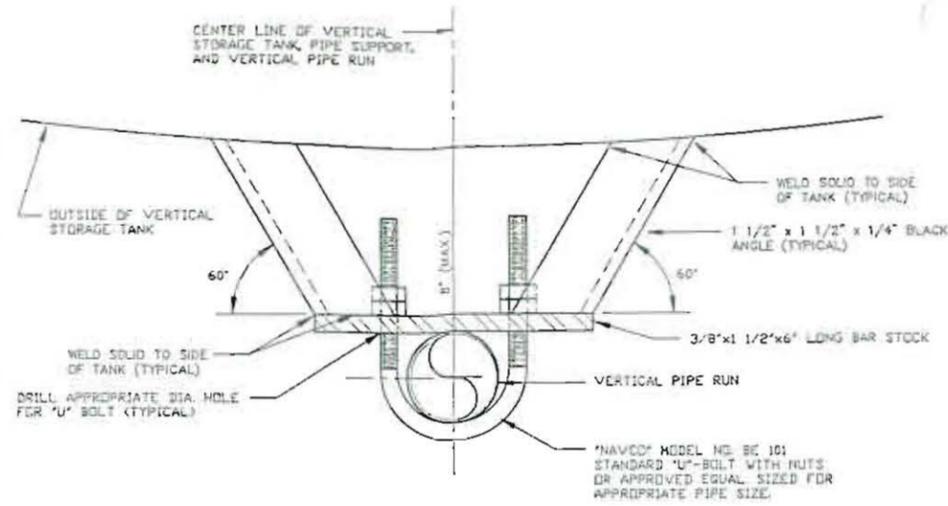
16

GENERAL NOTES						TITLE					
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1. TANK ACCESS CONTAINER IS PROVIDED FULLY FABRICATED - MINUS PIPING.						SAFETY-KLEEN CORP. 777 BIG TENDER ROAD ELGIN ILLINOIS 60120 PHONE 708-497-84					
2. CONTR TO PROVIDE 3-NOZZLES, 1-90° ELL, (150# MALLEABLE), 1-CAP, & 1-2" BALL VALVE, IN EACH DUMPSTER PIPE OUTLET, SEE DETAIL THIS SHEET.						SCALE	BY	CHK	P.E. APPR	OP. APPR	DATE
						AS SHOWN	JHO		REV		
						NO.	DESCRIPTION	BY	CHK	APPR	DATE
						REVISIONS		SERVICE CENTER LOCATION		SC-DWG NUMBER	
								BOISE, ID		118308-2513	



1 PIPE SUPPORT DETAIL #2

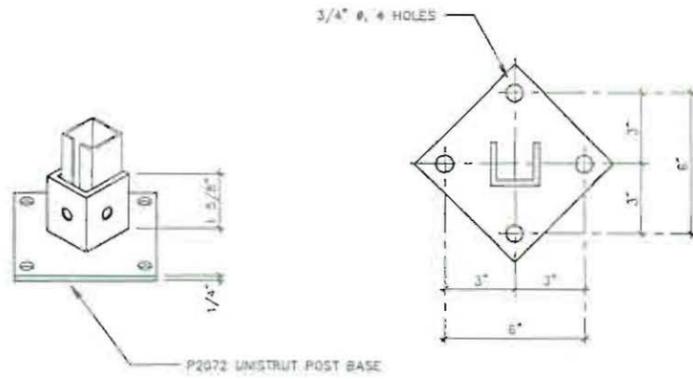
SCALE: 1" = 1'-0"



2 VERTICAL PIPE SUPPORT DETAIL

SCALE: NONE

*NOTE: SIMILAR DETAIL TO BE USED FOR SUPPORTING PIPE RUNS ACROSS TANK TOPS.
*NOTE: PAINT *U*-BOLT & NUTS, BARSTOCK, & ANGLES PER TANK PAINTING SPECS.



A POST BASE DETAIL

SCALE: 3\"/>

GENERAL NOTES

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- 1.) CONCRETE PENETRATIONS SHALL NOT BE ALLOWED ON TANKFARM FLOOR.
- 2.) IF CONSTRUCTION REQUIRES CONCRETE PENETRATIONS AN EPOXY COATING IS APPLIED, CONTRACTOR SHALL REPAIR EPOXY COATING AS PER MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS.
- 3.) ALL PIPE SUPPORTS SHALL SUPPORT PIPING EVERY 6'-0" MAXIMUM.
- 4.) HLA AND EYEWASH UNITS TO BE SECURED TO TANKER PL WITH APPROPRIATE EXPANSION TYPE ANCHORS, AND SHALL AS REQUIRED TO MAKE LEVEL BY E.C.

PRELIMINARY

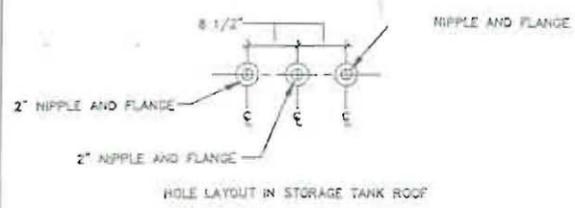
17

PIPE AND EQUIPMENT SUPPORT DETAILS

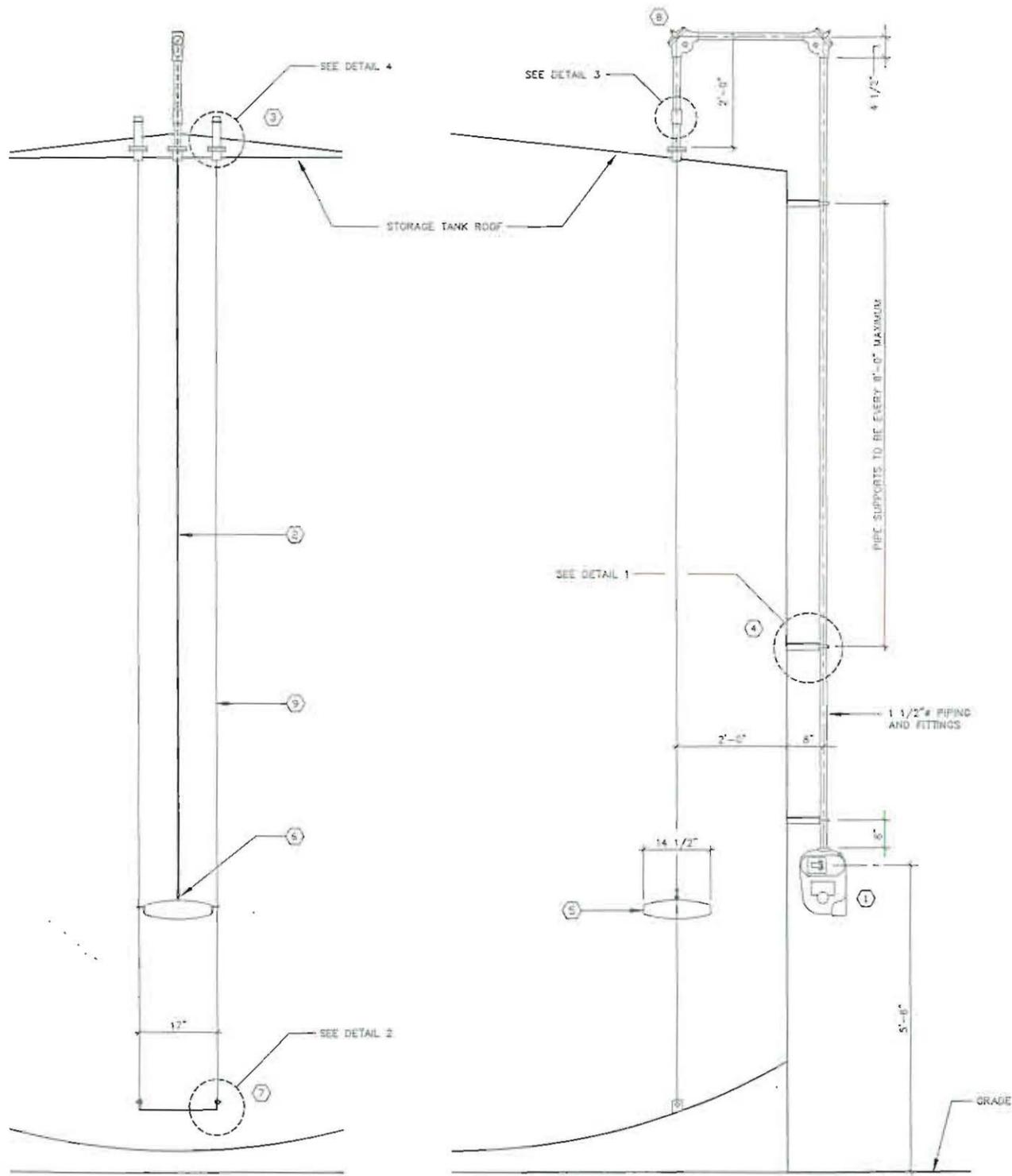
S SAFETY-KLEEN CORP.
277 BIG DAWG ROAD, CLARK, ILLINOIS 60123 PHONE 708-487-84

NO.	DESCRIPTION	BY	CHKD	APPR	DATE

SCALE AS SHOWN	BY JHD	CHKD -	P.E. APPR -	OP. APPR -	DATE 8-20
SERVICE CENTER LOCATION	BOISE, ID	SC-DWG NUMBER	118308-6000	REV. 00	



HOLE LAYOUT IN STORAGE TANK ROOF

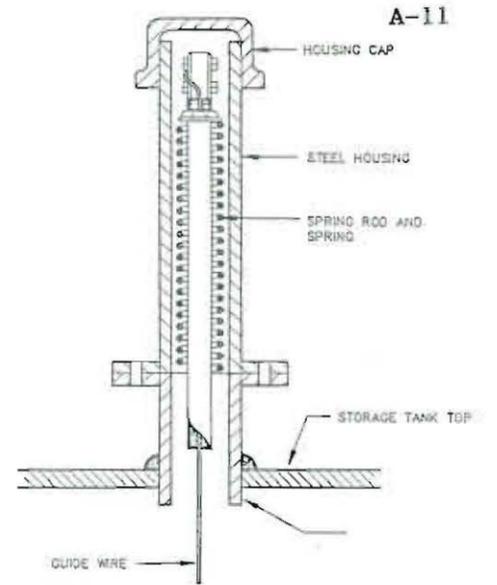


VERTICAL STORAGE TANK GAUGE INSTALLATION DETAILS

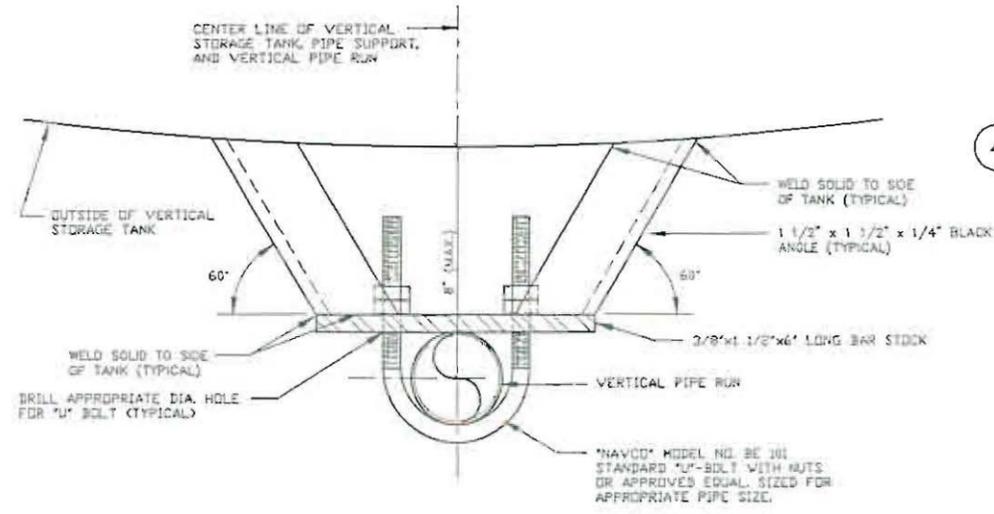
SCALE: NONE

EQUIPMENT SCHEDULE			
MARK	PART DESCRIPTION	SK PART	REMARKS
①	GAUGE HEAD, IRON HOUSING AND SHEAVES, 304 S.S. TRIM	-	
②	GAUGE TAPE, 316 STAINLESS STEEL	-	
③	TOP GUIDE WIRE ANCHOR, STEEL HOUSING & SPRING ROD, CAD PLATE STEEL SPRING	-	SEE DETAIL 4
④	PIPE SUPPORT BRACKET, STEEL	-	SEE DETAIL 1
⑤	GAUGE FLOAT, 316 S.S. HOLLOW SHELL WELDED	-	
⑥	TAPE FASTENER, 316 STAINLESS STEEL	-	
⑦	BOTTOM GUIDE WIRE ANCHOR, STEEL	-	SEE DETAIL 2
⑧	SHEAVE ELBOW, IRON HOUSING, 316 S.S. TRIM, TEFLON BEARING	-	
⑨	GUIDE WIRE, 316 STAINLESS STEEL	-	

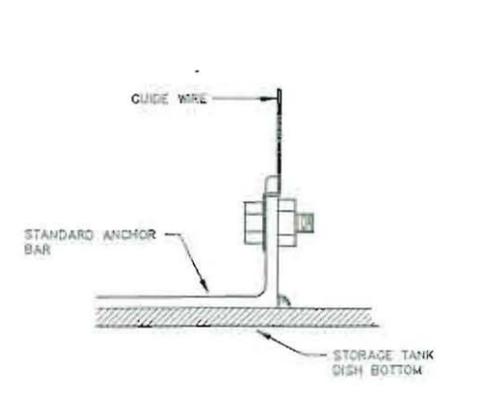
NOTE: THE ABOVE ITEMS TO BE SUPPLIED BY SAFETY-KLEEN CORP. EXCEPT ITEM #4



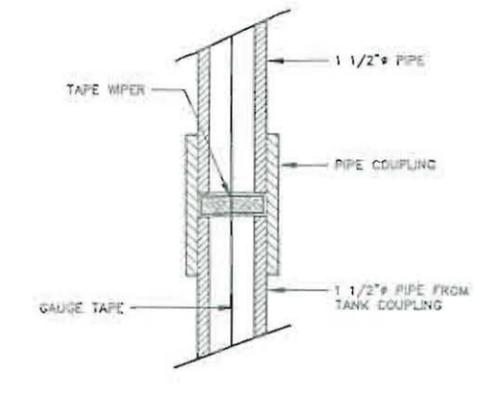
④ TOP GUIDE WIRE ANCHOR DETAIL
SCALE: NONE



① VERTICAL PIPE SUPPORT DETAIL
NOTE: SIMILAR DETAIL TO BE USED FOR SUPPORTING PIPE RUNS ACROSS TANK TOPS.
NOTE: PAINT "U"-BOLT & NUTS, BARSTOCK, & ANGLES PER TANK PAINTING SPECS.
SCALE: NONE



② BOTTOM GUIDE WIRE ANCHOR DETAIL
SCALE: NONE



③ TAPE WIPER DETAIL
SCALE: NONE

PRELIMINARY

18

GENERAL NOTES
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- SEE TANKFARM PIPING PLAN FOR ACTUAL TANK GAUGE LOCATION.
- TANK GAUGE TO BE INSTALLED PER VAREC 2500 SERIES LOW PRESSURE AUTOMATIC TANK GAUGE INSTRUCTION MANUAL.
- PIPING FOR VAREC TANK GAUGE TO BE SCHEDULE 40 GALVANIZED, SUPPORTED EVERY 8'-0" MAXIMUM AND ALL EXPOSED NON-PROTECTED STEEL IS TO BE PAINTED PER SK SPECS.

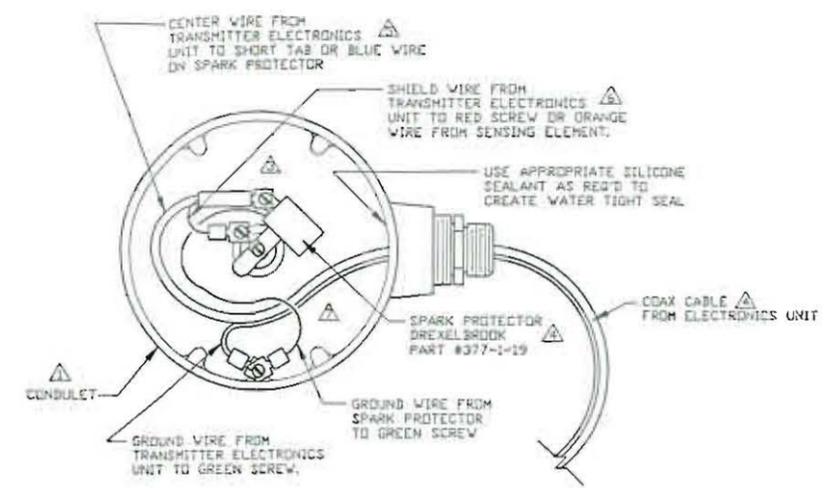
TITLE
VAREC TANK GAUGE INSTALLATION DETAILS

SAFETY-KLEEN CORP.
777 200 TOWER ROAD ELGIN, ILLINOIS 60120 PHONE 708-697-8441

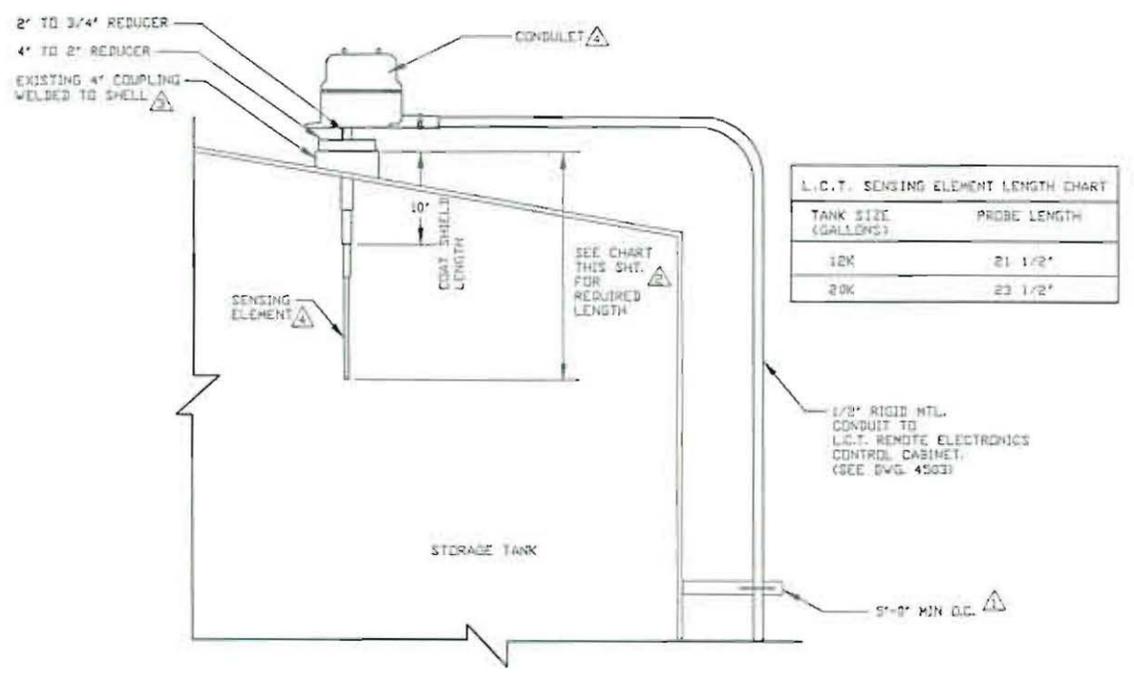
NO.	DESCRIPTION	BY	CHK	APPR	DATE	SCALE AS SHOWN	BY JHD	CHK -	P.E. APPR WEY	OP. APPR -	DATE 8-2	REV. 0
REVISIONS												
						SCALE AS SHOWN	BY JHD	CHK -	P.E. APPR WEY	OP. APPR -	DATE 8-2	REV. 0
						SERVICE CENTER LOCATION	SC-DWG NUMBER			REV.		
						BOISE, ID	118308-3500			C		

TERMINATIONS OF COAXIAL CABLE

- CUT CABLE TO REQUIRED LENGTH PLUS 5'. STRIP THE GROUND TRACER WIRE AWAY FROM THE COAX TO A LENGTH OF ABOUT 6". STRIP ABOUT 1/4" OF INSULATION FROM THE END OF THE WIRE, CRIMP AN 18-22 GA. SPADE TERMINAL LUG ONTO THE GROUND WIRE.
- TRIM OUTER INSULATION BACK 1 1/4", CUTTING DOWN TO BUT NOT INCLUDING BRAIDED METALLIC SHIELD.
- UNRAVEL THE METALLIC BRAID FROM THE CENTER WIRE INSULATION. TWIST THE BRAID TIGHTLY TOGETHER. CUT THE TWISTED BRAID TO A LENGTH OF ABOUT 3/8".
- USING A 14-16 GA. CRIMP-ON BUTT CONNECTOR, ATTACH A 4" PIECE OF 20 GA. STRANDED INSULATED WIRE TO THE TWISTED BRAID IN ORDER TO MAKE A STRONG CONNECTION WITH THE LARGER GAUGE OF THE BUTT CONNECTOR. A 3/8" STRIPPED LENGTH OF THE 20 GA. WIRE SHOULD BE TWISTED AND THEN FOLDED BACK UPON ITSELF BEFORE INSERTION INTO THE BUTT CONNECTOR. CRIMP AN 18-22 GA. SPADE TERMINAL LUG ONTO THE OTHER END OF THE 4" WIRE.
- TRIM ABOUT 1/4" OF THE INNER PLASTIC INSULATION TO EXPOSE THE CENTER WIRE. SLIP AN 18-22 GA. SPADE TERMINAL LUG OVER THE BARE CENTER WIRE SO THAT THE INSULATION OF THE SPADE LUG BOTTOMS OUT ON THE INNER INSULATION AND THE TIP OF THE WIRE SHOWS AT THE LUG END. CRIMP THE LUG AND TRIM ANY EXCESS CENTER WIRE.
- SLIP 1" OF 1/2" DIAMETER HEATSHRINK INSULATION OVER CABLE END SO THAT ALL METALLIC BRAID IS WELL COVERED. HEAT THE INSULATION UNTIL IT SHRINKS AND TIGHTLY GRIPS THE CABLE. (DRY HEAT SOURCE OF 200-250 DEGREES NEEDED. A PROPANE TORCH WITH A LOW FLAME IS RECOMMENDED.)

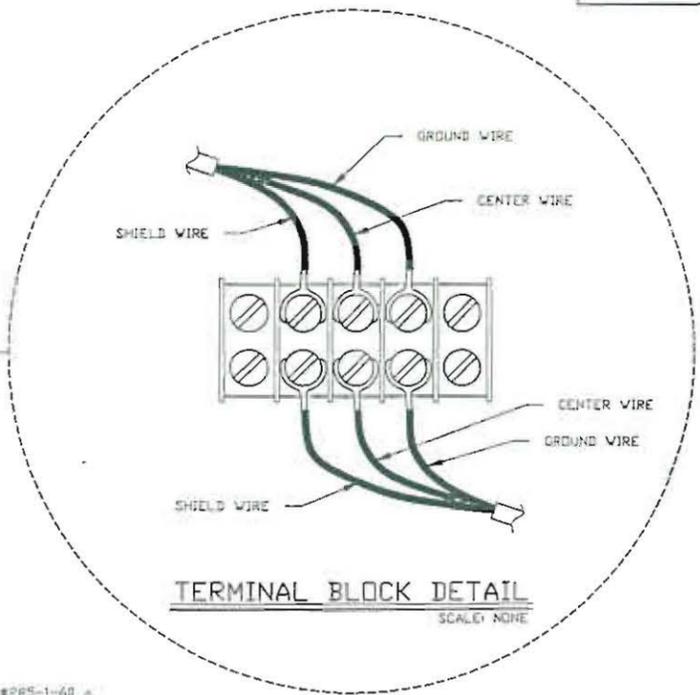


L.C.T. SENSING ELEMENT AND CONDULET DETAILS SCALE: NONE

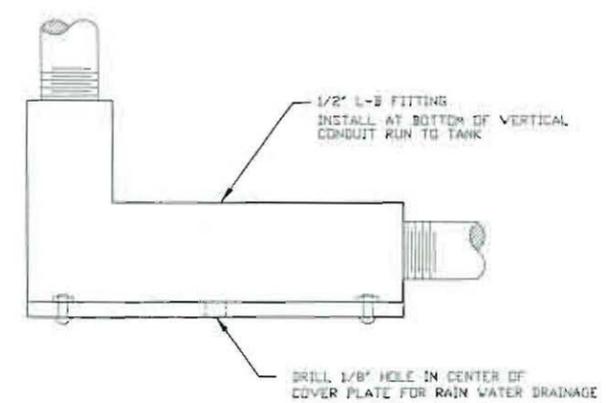


ABOVEGROUND VERTICAL TANK INSTALLATION DETAIL SCALE: NONE

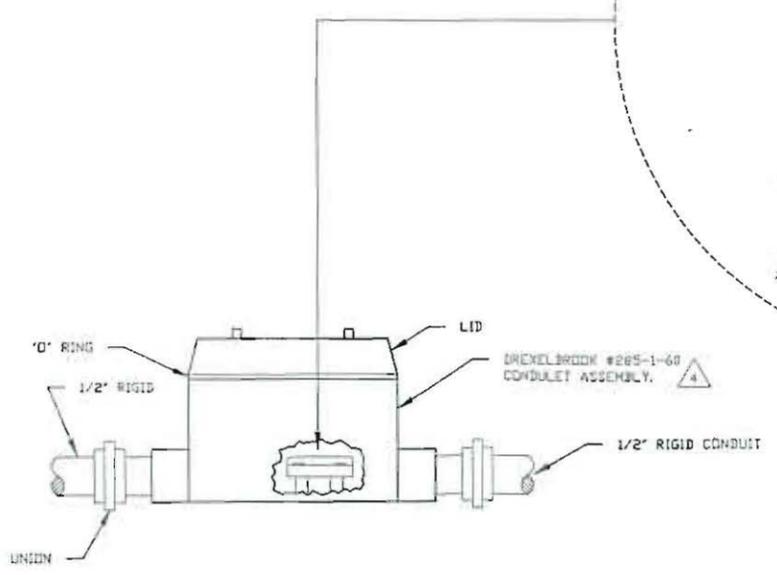
TANK SIZE (GALLONS)	PROBE LENGTH
12K	21 1/2'
20K	23 1/2'



TERMINAL BLOCK DETAIL SCALE: NONE



L-B FITTING INSTALLATION DETAIL SCALE: NONE



REMOTE CABLE DISCONNECT BOX DETAIL SCALE: NONE

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- CONTRACTOR TO SUPPLY & INSTALL CONDUIT SUPPORTS & BRACKETS AS REQUIRED.
 - CALCULATIONS FOR LENGTH OF PROBE INSIDE OF TANK ARE SET TO ACTIVATE THE ALARM AT THE 95% VOLUME LEVEL.
 - DO NOT INSTALL L.C.T. SENSING ELEMENT IN TANK COUPLING IN CENTER OF TANK.
 - SUPPLIED BY S-K.
 - BLUE WIRE REPLACES SHORT TAB ON OLDER TYPE SPARK PROTECTORS, WHICH MAY BE FOUND IN THE FIELD.
 - ORANGE WIRE REPLACES RED SCREW ON OLDER TYPE SENSING ELEMENTS, WHICH MAY BE FOUND IN THE FIELD.

PRELIMINARY

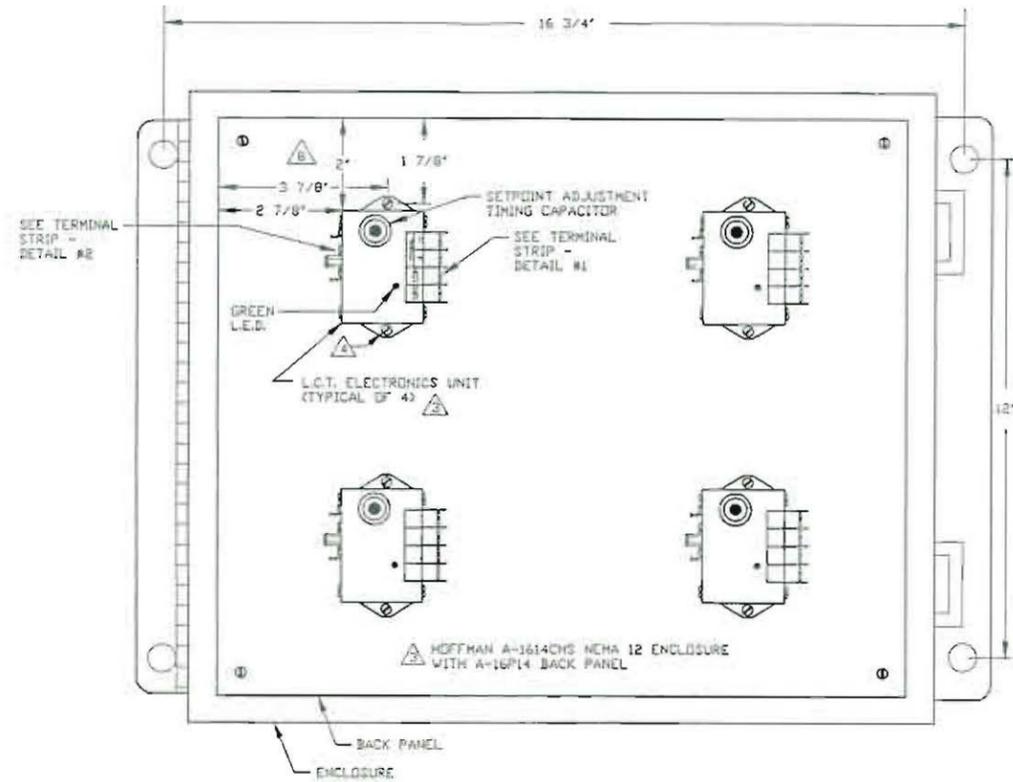
22

TITLE		HIA SENSOR TO REMOTE TRANSMITTER INSTALLATION DETAILS	
SCALE		NONE	
BY		JHD	
CHK		-	
APP'D		-	
DATE		-	
SERVICE CENTER LOCATION		BOISE, ID	
SC-DWG NUMBER		118308-4502	
NO.	DESCRIPTION	BY	CHK
REVISIONS			

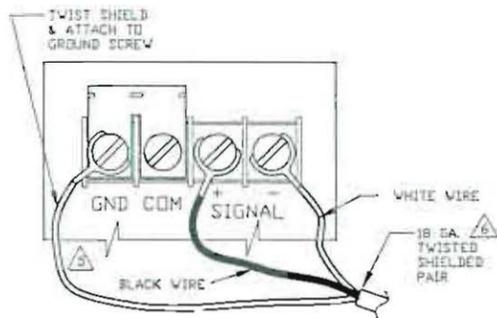
S SAFETY-KLEEN CORP.
777 BIG TIMBER ROAD ELGIN, ILLINOIS 60120 PHONE 708-687-8411

CALIBRATION PROCEDURE FOR ELECTRONICS UNIT

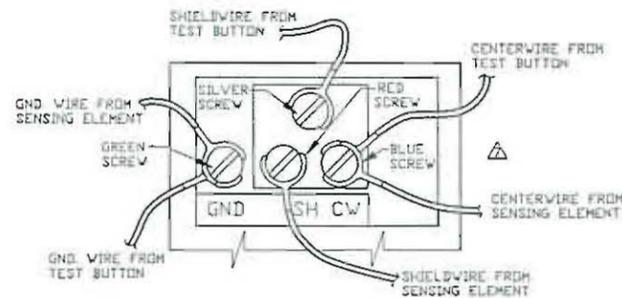
1. VERIFY THAT THE LIQUID IS NOT COVERING THE PROBE. THIS CAN BE DONE BY CHECKING THE READING ON THE TANK'S TAPE GAUGE. IF THE TANK IS LESS THAN FULL, THE PROBE WILL NOT BE IMMERSIED IN LIQUID.
2. THE CALIBRATION SHOULD BE PERFORMED WITH ALL SYSTEM ELECTRICAL CONNECTIONS COMPLETE. ANY CHANGE IN ELECTRICAL CONNECTIONS AFTER CALIBRATION INVALIDATES THE CALIBRATION. NEATLY DRESS ALL WIRING. ALL SLACK IN THE WIRES SHOULD BE PUSHED DOWN INSIDE THE CONDULET, WITHOUT STRAINING THE WIRES. THIS PROTECTS THE WIRES FROM DAMAGE WHEN THE CAP OF THE CONDULET IS SCREWED ON. ALSO, IF THE WIRES ARE LYING TOO HIGH IN THE CONDULET, STRAY CAPACITANCE FROM THE METAL CAP CAN ALTER THE OPERATING POINT OF THE ELECTRONICS UNIT.
3. USING THE PLASTIC TUNING WRENCH SUPPLIED WITH THE ELECTRONICS UNIT, TURN THE TUNING CAPACITOR TO THE FULLY COUNTERCLOCKWISE POSITION. THEN SLOWLY TURN THE TUNING WRENCH CLOCKWISE UNTIL THE GREEN LIGHT ILLUMINATES. THIS IS THE OPERATING POINT OF THE SENSOR. IDENTIFY EXACTLY THIS OPERATING POINT.
4. TO CHECK HYSTERESIS OF THE ELECTRONICS UNIT, TURN THE TUNING CAPACITOR COUNTER CLOCKWISE UNTIL THE GREEN LIGHT TURNS OFF. COUNTERCLOCKWISE TRAVEL SHOULD BE NO MORE THAN 1/8 TURN. IF HYSTERESIS IS GREATER THAN THIS, CONTACT ENGINEER.
5. RETURN THE TUNING CAPACITOR TO EXACTLY THE POSITION OF THE OPERATING POINT AND THEN TURN THE TUNING WRENCH CLOCKWISE EXACTLY ONE-HALF ADDITIONAL TURN (90 DEGREES). THE GREEN LIGHT SHOULD REMAIN ILLUMINATED. REMOVE THE TUNING WRENCH. CAREFULLY SCREW THE CAP ON THE CONDULET.
6. PROVIDE ENGINEER WITH WRITTEN VERIFICATION THAT CALIBRATION PROCEDURE WAS FOLLOWED. IDENTIFY THE TANK, DOCUMENT HYSTERESIS, NAME OF COMPANY AND INDIVIDUAL THAT PERFORMED PROCEDURE, AND DATE OF CALIBRATION.



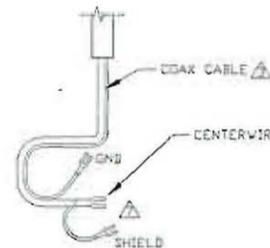
L.C.T. REMOTE ELECTRONICS CONTROL CABINET
SCALE: NONE



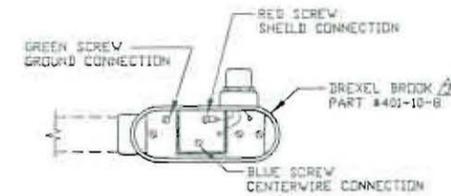
TERMINAL STRIP DETAIL #1
SCALE: NONE



TERMINAL STRIP DETAIL #2
SCALE: NONE



PUSH-TO-TEST BUTTON WIRING DETAIL
PRELIMINARY



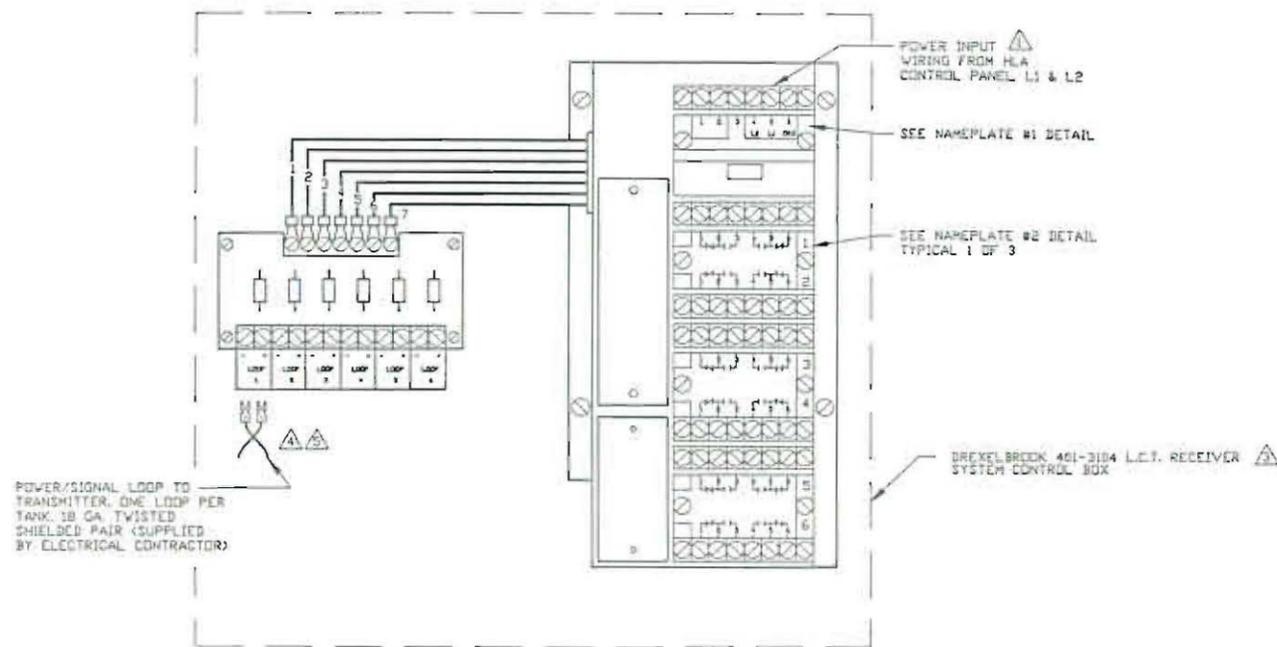
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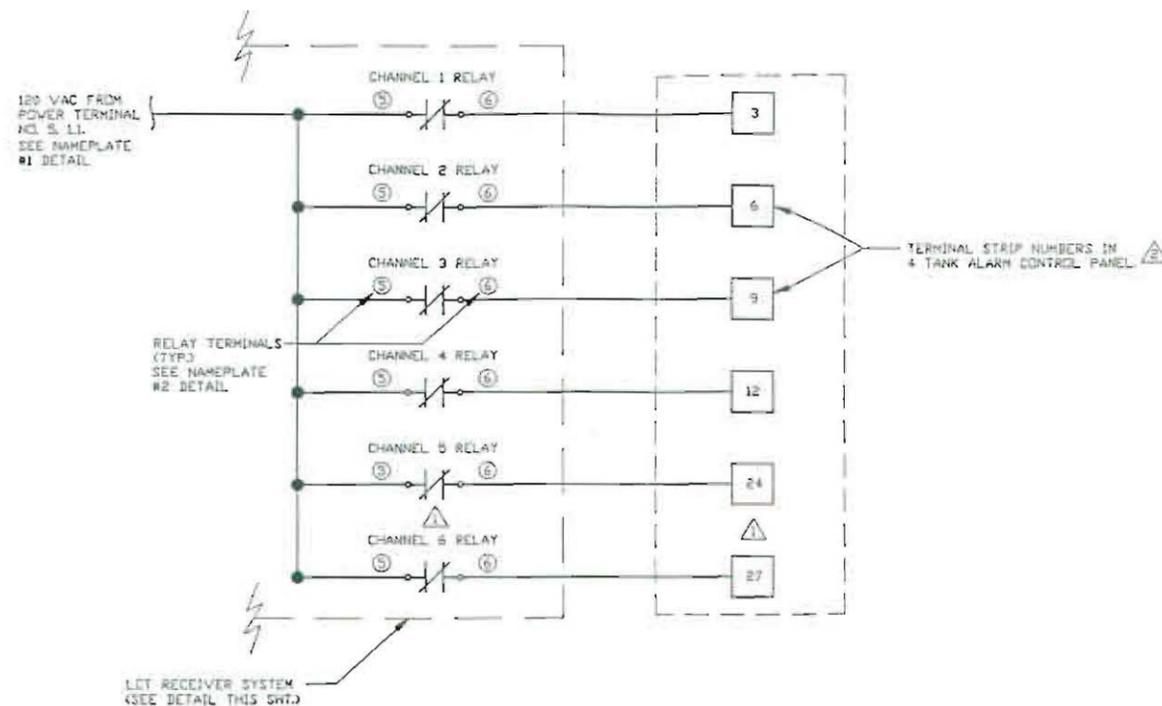
1. USE PROPER INSULATED SPADE TERMINAL LUG TO MATCH CONDUCTOR SIZE & TERMINAL SCREW SIZE. F & I BY CONTRACTOR.
 2. INSTALL STAR WASHERS ON EVERY TERMINAL SCREW AT LET SENSING ELEMENT, LET ELECTRONIC UNITS, AND PUSH-TO-TEST SWITCH F & I BY CONTRACTOR.
- ⚠ SUPPLIED BY SAFETY-KLEEN.
 - ⚠ LOCATE ELECTRONIC UNITS AS SHOWN AND MARK LOCATION OF CONNECTING LUGS ON BACK PANEL. DRILL HOLES THROUGH PANEL FOR 10/32 IN. BOLTS. INSTALL EACH ELECTRONIC UNIT 1/2" ± 10/32" ± 4" BOLTS THROUGH BACK SIDE OF PANEL. ADD NUTS AND TIGHTEN.
 - ⚠ UNRAVEL METALIC BRAID FROM THE 2 INSULATED W/ & SEPARATE TO A LENGTH OF ABOUT 3". TWIST BR & CRIMP ON AN 18-22 GA. TERMINAL SPADE LUG. TAPE BARE BRAID WITH ELECTRICAL TAPE TO PREV SHORTING SIGNAL LUGS WIRES. USE 3M 33+ OR EQUAL.
 - ⚠ STRIP ABOUT 5/16 - 3/8" INSULATION OFF EACH W/ CRIMP AN 18-22 GA. TERMINAL SPADE LUG ON EACH.
 - ⚠ SEE DWG. NO. 4502 FOR CABLE TERMINATION PROCEDURE.
 - ⚠ LOCATION DIMENSIONS ARE TYPICAL FOR L.C.T. ELECTRONICS UNITS.

23

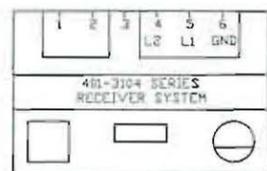
TITLE		L.C.T. ELECTRONIC CONTROL CABINET DETAILS	
DRAWN		SAFETY-KLEEN CORP.	
777 305 TOWER ROAD ELGIN ILLINOIS 60120 PHONE 708-637-8466			
SCALE	BY	CHKD	P.E. APPR
NONE	JJD	-	MEY
DATE	OP	APP	-
B-22	-	-	-
NO.	DESCRIPTION	BY	CHK APPR DATE
	REVISIONS		
SERVICE CENTER LOCATION		SC-DWG NUMBER	
BOISE, ID		118308-4503	
REV.		REV.	
		06	



LCT RECEIVER SYSTEM COMPONENT LAYOUT DETAIL
SCALE: NONE



WIRING DETAILS TO ALARM CONTROL PANEL
SCALE: NONE



NAMEPLATE #1 DETAIL
SCALE: NONE



NAMEPLATE #2 DETAIL, TYP.
SCALE: NONE

GENERAL NOTES

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- ⚠ DO NOT USE CHANNELS 5 AND 6 FOR 4 PACK TANKFARM.
- ⚠ SEE DWG. NO. 4506 & 4507.
- ⚠ SUPPLIED BY S-K.
- ⚠ UNRAVEL METALIC BRAID FROM THE 8 INSULATED WIRES & SEPARATE TO A LENGTH OF ABOUT 3". TWIST BRAID & CRIMP ON AN 18-22 GA. TERMINAL SPADE LUG TAPE BARE BRAID WITH ELECTRICAL TAPE TO PREVENT SHORTING SIGNAL LOOP WIRES. (USE 3M 33+ OR EQUAL.)
- ⚠ STRIP ABOUT 5/16" - 3/8" INSULATION OFF EACH WIRE CRIMP AN 18-22 GA. TERMINAL SPADE LUG ON EACH.

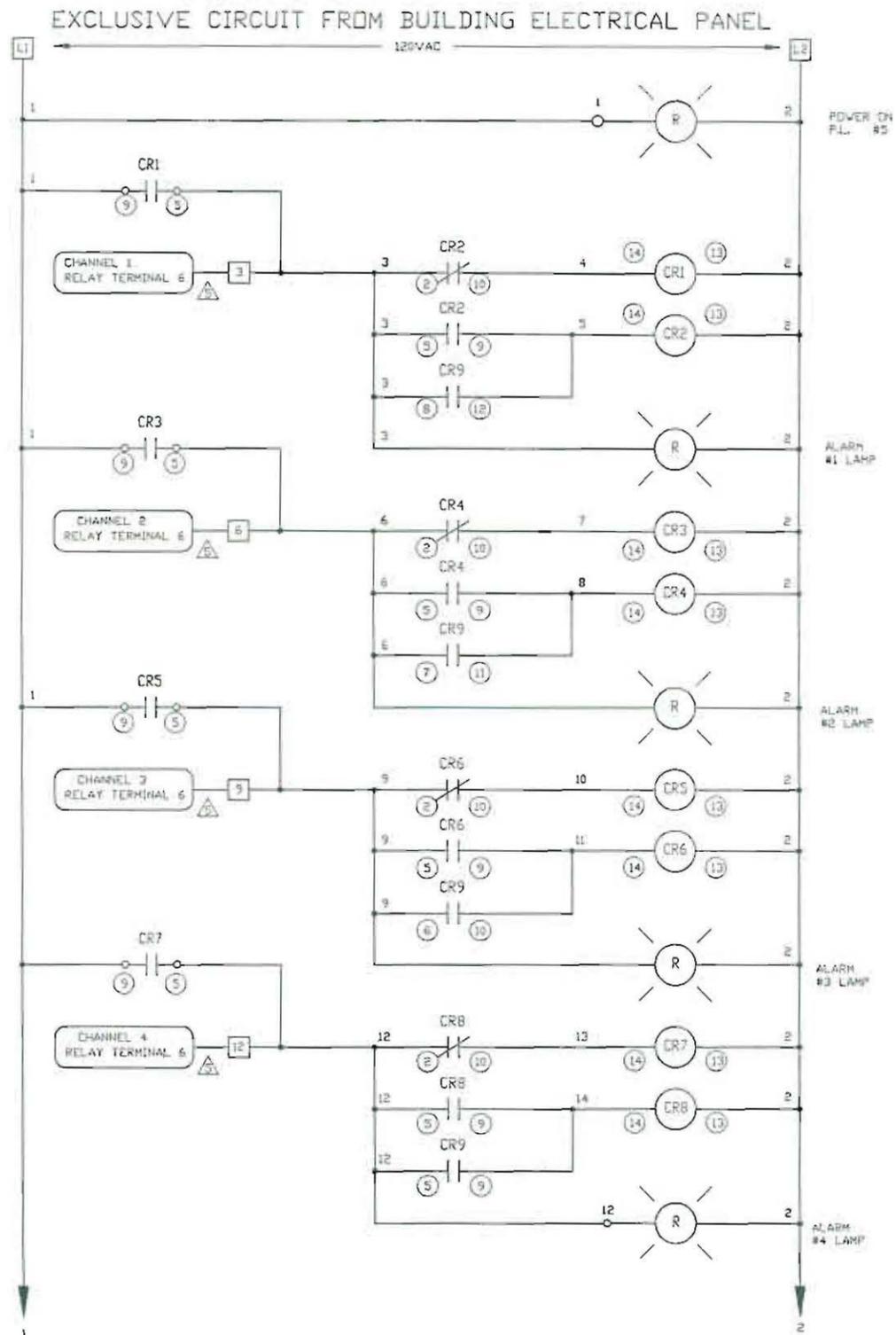
PRELIMINARY

24

L.C.T. HIGH LEVEL ALARM RECIVER SYSTEM DETAILS

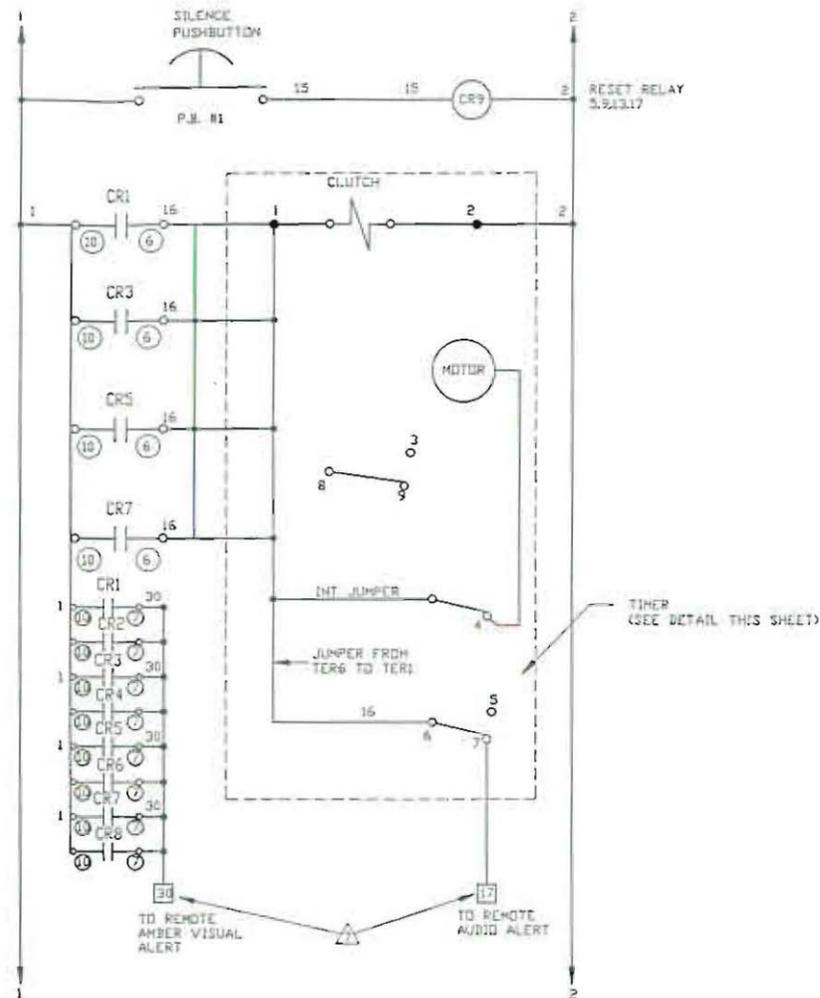
S SAFETY-KLEEN CORP.
777 NIS TOWER ROAD ELSON, ILLINOIS 62523 PHONE 708-697-844

NO.	DESCRIPTION	BY	CHK	APPR	DATE	SCALE	BY	CHK	APPR	DATE	SERVICE CENTER LOCATION	SC-DWG NUMBER	REV.
						NONE	JHD		WEY	8-2	BOISE, ID	118308-4504	C



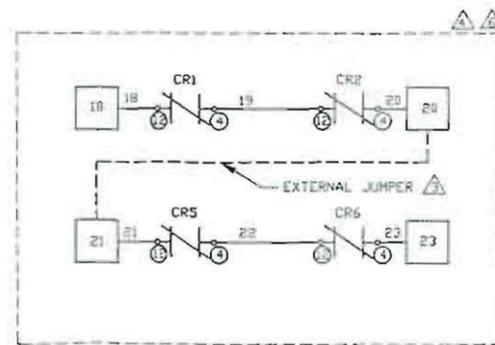
ALARM LAMP WIRING DETAILS

SCALE: NONE



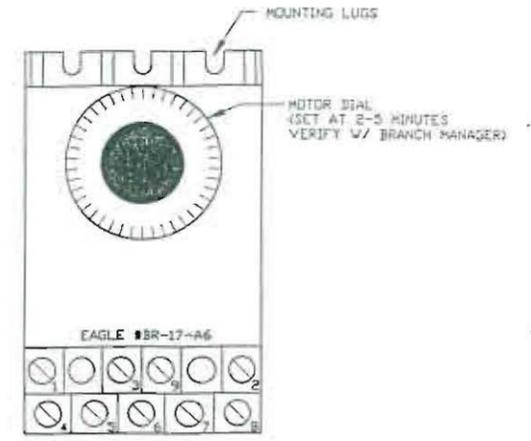
ALARM CUTOFF WIRING DETAILS

SCALE: NONE



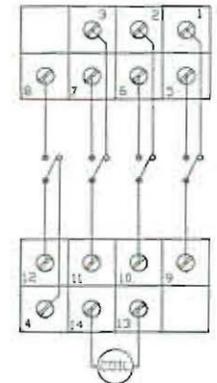
DIRTY PUMP DISABLE CIRCUIT DETAIL

SCALE: NONE



TIMER DETAIL

SCALE: NONE



TYPICAL OMRON RELAY TERMINAL WIRING DETAIL

SCALE: NONE

PRELIMINARY

25

GENERAL NOTES

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- 1. NUMBERS IN CIRCLES ARE RELAY SOCKET TERMINAL
- 2. NUMBERS IN SQUARE BOXES ARE TERMINAL BLOCK WIRE NUMBERS.
- ⚠ EXTERNAL JUMPER TO BE INSTALLED WHEN 2 DIRTY SOLVENT TANKS ARE BEING MONITORED AND ONLY DIRTY SOLVENT PUMP IS USED. TERMINAL BLOCKS 21 & 23 ARE NOT USED WHEN ONLY ONE TANK IS BEING MONITORED.
- ⚠ CONTACT ENGINEER IF TERMINAL STRIP NUMBERS DIFFER FROM THOSE SHOWN IN DETAILS.
- ⚠ SEE DWG. NO. 4504, NAMEPLATE #2 AND WIRING DETAIL.
- ⚠ SEE DWG. NO. 4509, DIRTY PUMP DISABLE CIRCUIT.
- ⚠ SEE DWG. NO. 4300.

TITLE
SOLVENT WIRING
DETAILS FOR CONTROL
PANEL #1 (SK #5346)

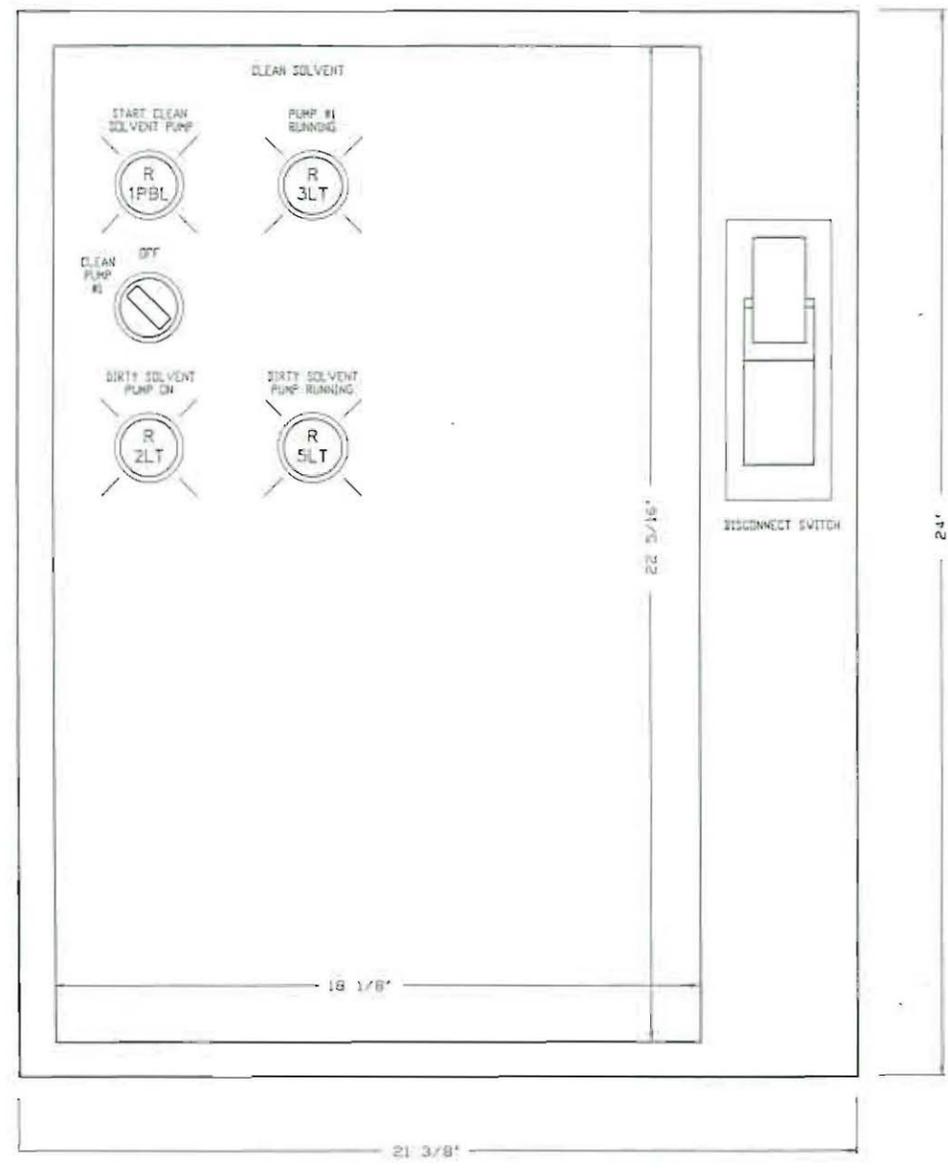
SAFETY-KLEEN CORP.
777 800 TIMBER ROAD ELGIN, ILLINOIS 60120 PHONE 708-491-0411

NO.	DESCRIPTION	BY	CHK	APPR	DATE

SCALE	BY	CHK	P.E. APPR	OP. APPR	DATE
NONE	JHO	-	WEY	-	8-2
SERVICE CENTER LOCATION		30-DWG NUMBER		REV.	
BOISE, ID		200401-4506		C	

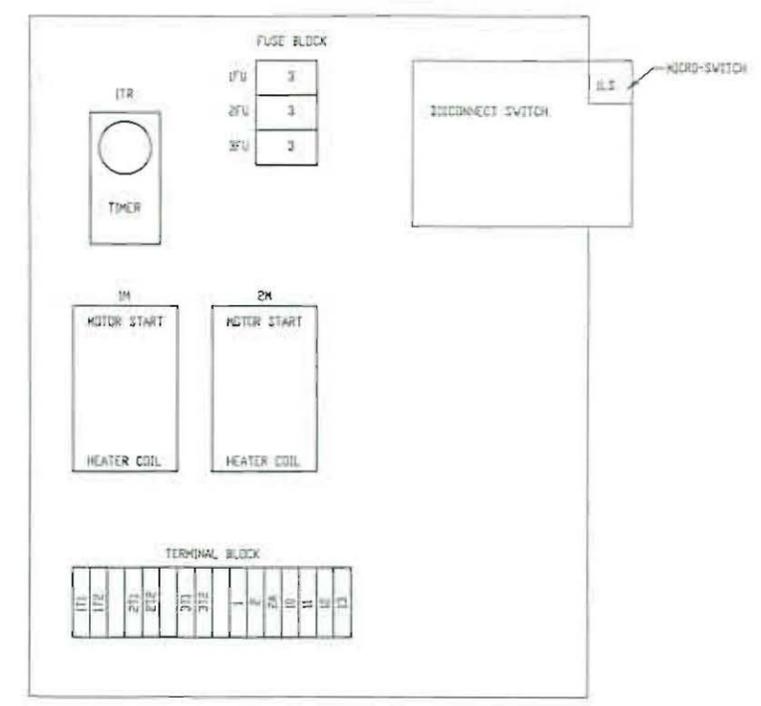
S-K #5213 PARTS LIST

QTY.	DESCRIPTION	MANUFACTURER	PART NUMBER
1	ENCLOSURE, NEMA 12	HOFFMAN	A-24A220BLP
1	SUB-PANEL	"	A24P20
1	OPERATING HANDLE	A-B	1494 V-1
1	DISCONNECT SWITCH	"	1494 V-2568
1	ROD	"	1494 V-RA1
2	STARTER	"	509-AC13
2	HEATER	"	VS4
1	ILLUMINATED PUSHBUTTON	"	800T-PB16R
1	CONTACT BLOCK	"	800T-XA2
1	PILDT LIGHT, 120V	"	800T-P16R
2	PILDT LIGHT, 240V	"	800T-P26R
4	LENS CAP	"	800T-N26R
5	LEGEND PLATE	"	800T-X700
2	FUSE, 5A	FUSETRON	FRNS
2	FUSE, 30A	"	FRN30
1	TIMER	EAGLE	8R11A601
2	TOGGLE SWITCH	LEVITON	5226-1
2	COVER PLATE	APPLETON	2510
8	TERMINAL BLOCK	CURTIS	"
1	FUSE BLOCK-3 POLE	"	F30A22
1	MICRO-SWITCH	"	82-2R013-A2
1	SEL. SWITCH 3 POS. 4-POLE	A-B	800T-J2B
2	CONTACT BLOCK	"	800T-XA



S-K #5213 CONTROL PANEL COVER

SCALE: NONE



PANEL INTERNAL COMPONENT LAYOUT DETAIL

SCALE: PRELIMINARY

GENERAL NOTES

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SAFETY-KLEEN CORPORATION. ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS AUTHORIZED BY SAFETY-KLEEN OR AS SAFETY-KLEEN MAY AGREE IN WRITING.

- 1. S-K #5213 CONTROL PANEL COMES COMPLETELY ASSEMBLED. PARTS LIST IS FOR MAINTENANCE PURPOSES ONLY.
- 2. SEE DWG. NO. 4509 FOR WIRING DETAILS.

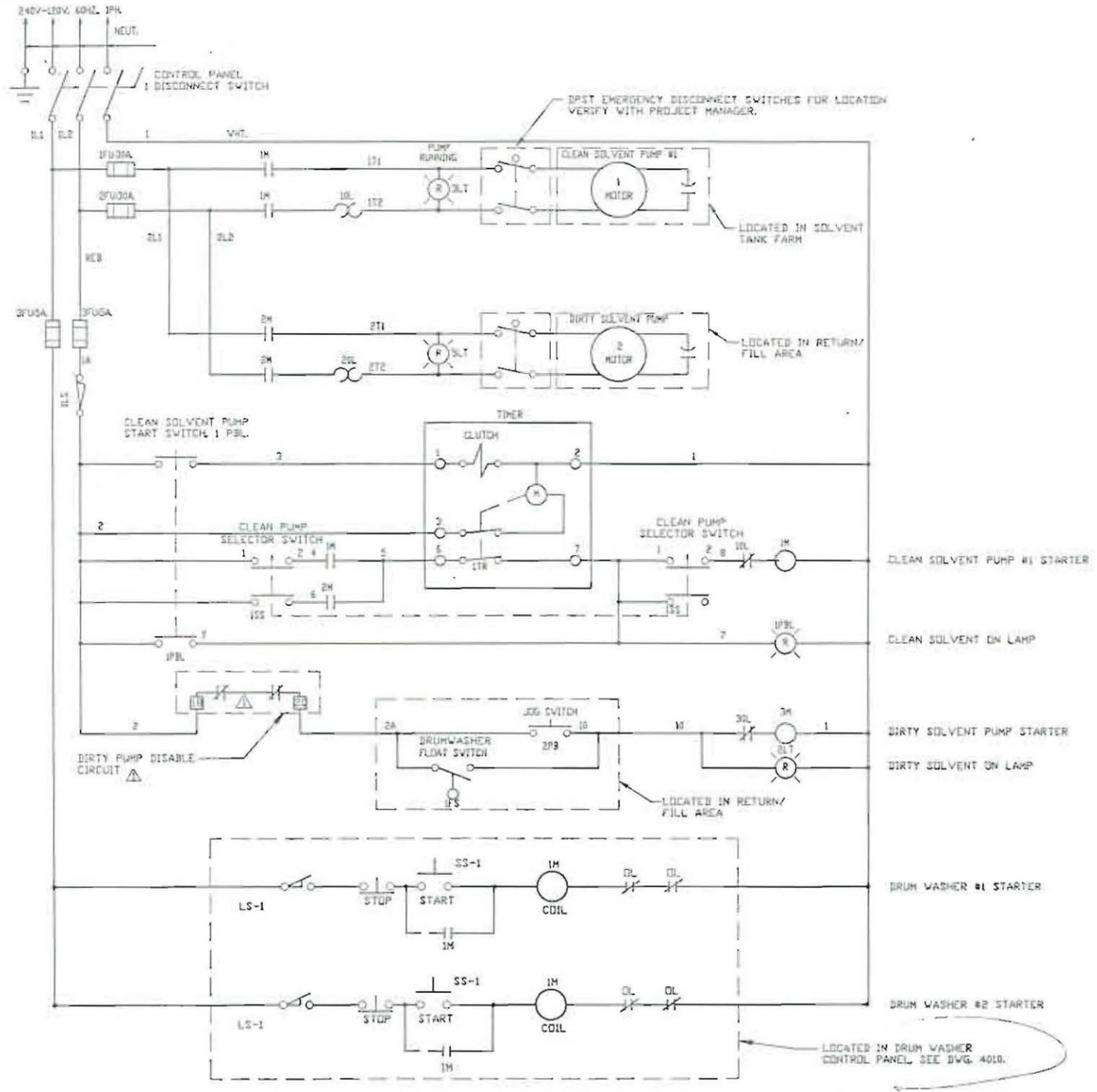
26

CONTROL PANEL (SK #5213)

SAFETY-KLEEN CORP.
777 800 TOWER ROAD ELGIN, ILLINOIS 60120 PHONE 708-693-8400

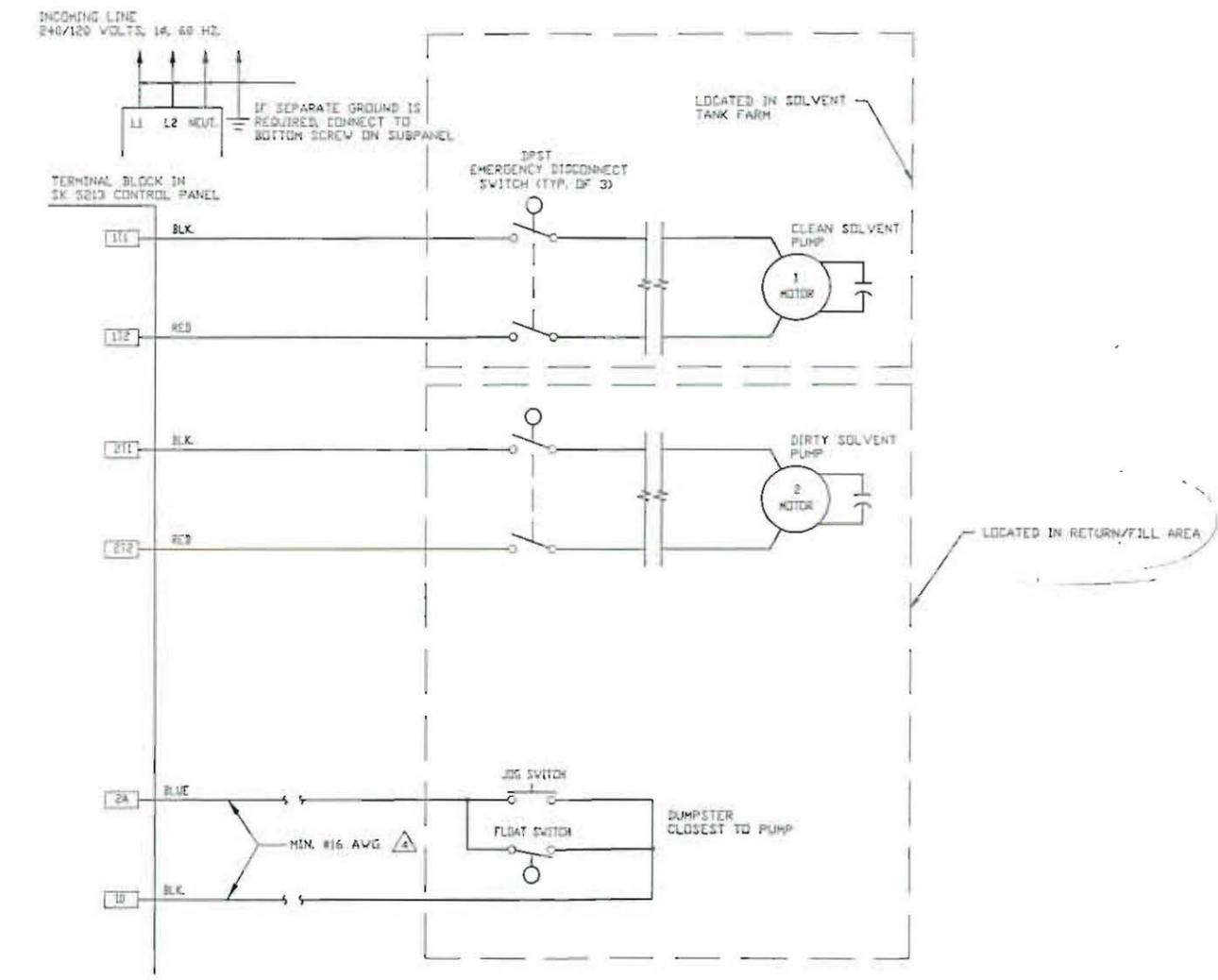
NO.	DESCRIPTION	BY	CHK	APPR	DATE

SCALE	BY	CHKD	P.E. APPR	DR. APPR	DATE
NONE	JHD	-	WEY	-	8-2
SERVICE CENTER LOCATION		SQ-DWG NUMBER		REV.	
BOISE, ID		118308-4508		0	



SK #5213 CONTROLS WIRING DIAGRAM

SCALE: NONE



SOLVENT PUMPS & PARTIAL RETURN/FILL AREA ELECTRICAL WIRING DIAGRAM

SCALE: NONE

GENERAL NOTES

- 1. THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SAFETY-KLEEN CORPORATION. ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT BY SAFETY-KLEEN OR AS SAFETY-KLEEN MAY AGREE IN WRITING.
- 2. SEE DVG NO. 4506, DIRTY PUMP DISABLE CIRCUITS.
- 3. CONTRACTOR TO PROVIDE ENGINEER WITH A WRITTEN VERIFICATION OF SYSTEM OPERATION PER 'DIRTY SOLVENT PUMP CUTOFF TEST' AS FOLLOWS:

- A. FILL DRUM WASHER TO ACTIVATE FLOAT SWITCH
- B. VERIFY THAT DIRTY SOLVENT PUMP IS NOW RUNNING
- C. PUSH DIRTY SOLVENT TANK 'PUSH-TO-TEST' BUTTON TO SIMULATE ALARM CONDITION OF 95% FULL TANK
- D. VERIFY THAT DIRTY SOLVENT PUMP IS NOW OFF
- E. PUSH JOG SWITCH
- F. VERIFY THAT DIRTY SOLVENT PUMP DOES NOT RUN
- G. DOCUMENT DATE & SEND REPORT TO ENGINEER WITH NAME OF COMPANY AND INDIVIDUAL THAT PERFORMED TEST.

NO.	DESCRIPTION	BY	CHK	APPR	DATE

TITLE
CONTROL PANEL (SK #5213)
WIRING DIAGRAM

SAFETY-KLEEN CORP.
777 8th TOWER ROAD CLARK BLDG 60123 PHOENIX 708-697-8844

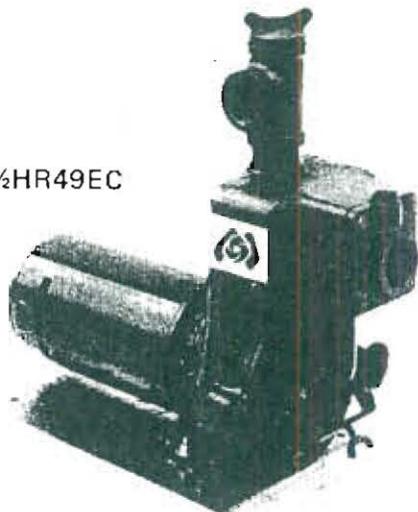
SCALE: NONE	BY: JHD	CHKD: -	P.E. APPR: MEY	OP. APPR: -	DATE: 8-2
SERVICE CENTER LOCATION: BOISE, ID	SC-DWG NUMBER: 118308-4509	REV: -			



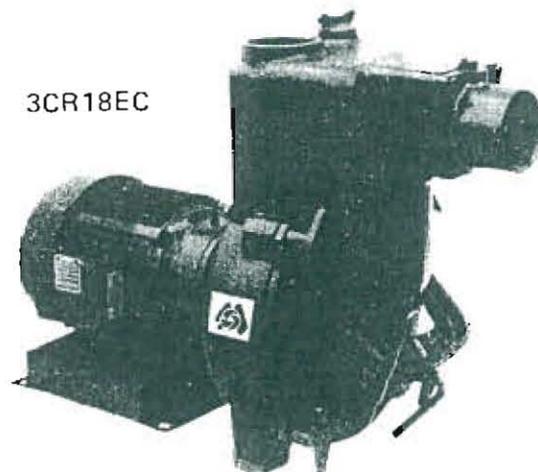
MODEL 1½HR49EC & 3CR18EC

SOLIDS HANDLING
SELF-PRIMING CENTRIFUGAL PUMPS
CLOSE-COUPLED

1½HR49EC



3CR18EC



FEATURES

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

GENERAL SPECIFICATIONS

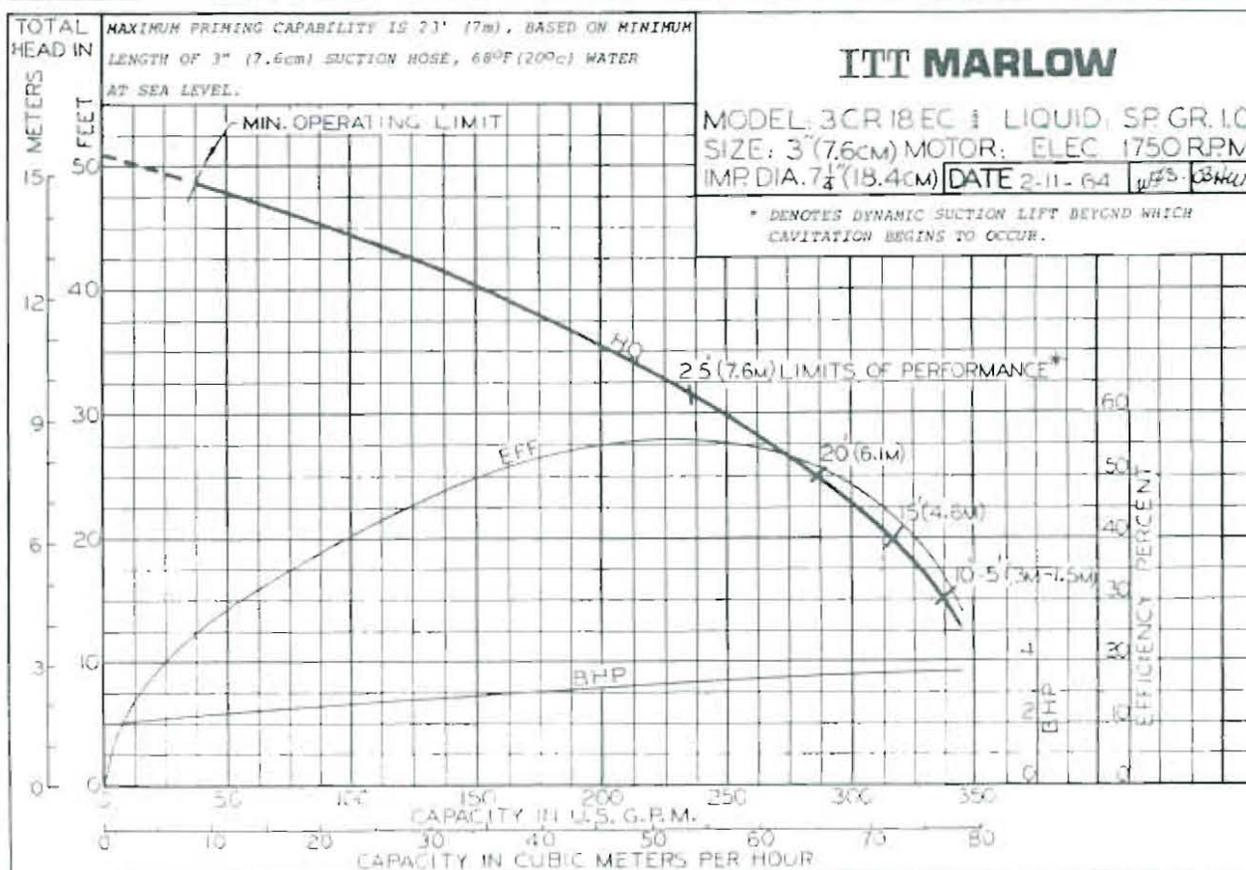
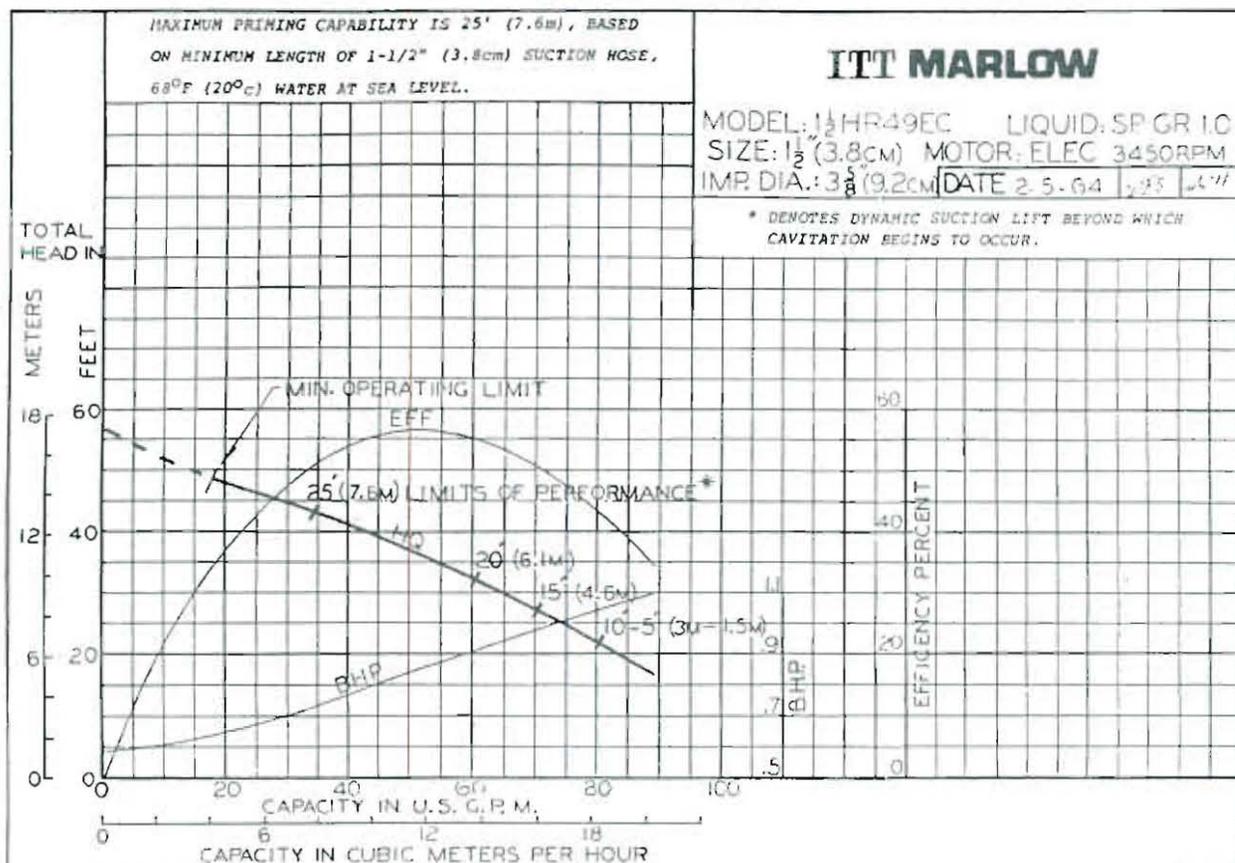
Cast iron fitted construction with heavy duty two vane impeller and replaceable volute. (Removable wear plate offered on Model 3CR18EC only as standard equipment.) Pre-loaded suction check valve. Easy-off suction elbow and cover for quick access to all working parts of pump. Stainless self-lubricating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

Model	Sphere Handling Ability	Port Sizes	Shaft Seal Method	Motor	Static Prime Limit*
1-1/2HR49EC	1" Dia. (2.5 cm)	1-1/2" N.P.T. (3.8 cm)	Mech. Seal	1 hp-1-1/2 hp 3450 RPM	25 Ft. 7.6 m
3CR18EC	1-1/2" Dia. (3.8 cm)	3" N.P.T. (7.6 cm)	Mech. Seal	3 hp-5 hp 1750 RPM	23 Ft. 7.0 m

*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.



TELEPHONE LOG

PROJECT NAME: Boise, IDPROJECT #: 92105.2FROM: Ty Johnsen COMPANY: QuesTecTO: Bob Garrison COMPANY: City Of Boise, IDSR. Plans ExaminerPHONE #: (208)-384-3801DATE: 1-11-93 TIME: 4:45pmRE: Design Information for Safety-Kleen Corporation at Boise, IDDISCUSSION: Applicable Codes: 1991 UBC, and whichever is the most restrictivebetween 1991 UFC, ch.79 and NFPA 30Design Wind Speed: 70 mphFrost Depth: 24" (But city recommends foundations be built down
to 30")Seismic Zone: 2BFlood 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: CSoil Conditions: Mostly sandy gravel with some clay. If soil
bearing pressures over 2,000psf are needed then
the city requires a soils reportFlood Zone: C

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
BOISE,
IDAHO
ADA COUNTY

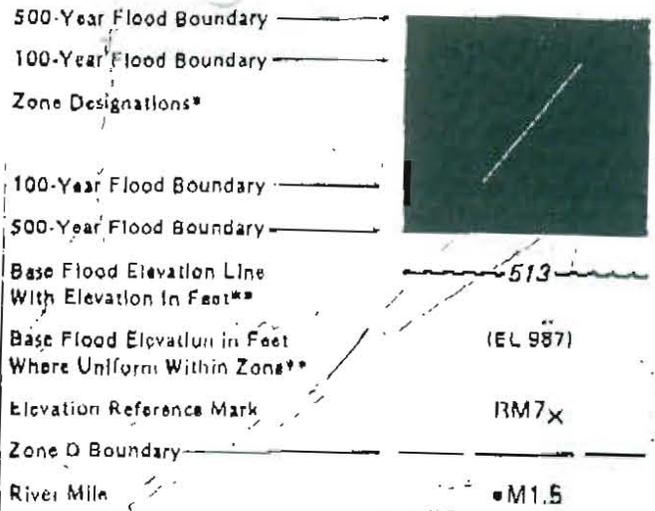
PANEL 17 OF 17
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
160002 0017 C

EFFECTIVE DATE:
APRIL 17, 1984



Federal Emergency Management Agency



**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

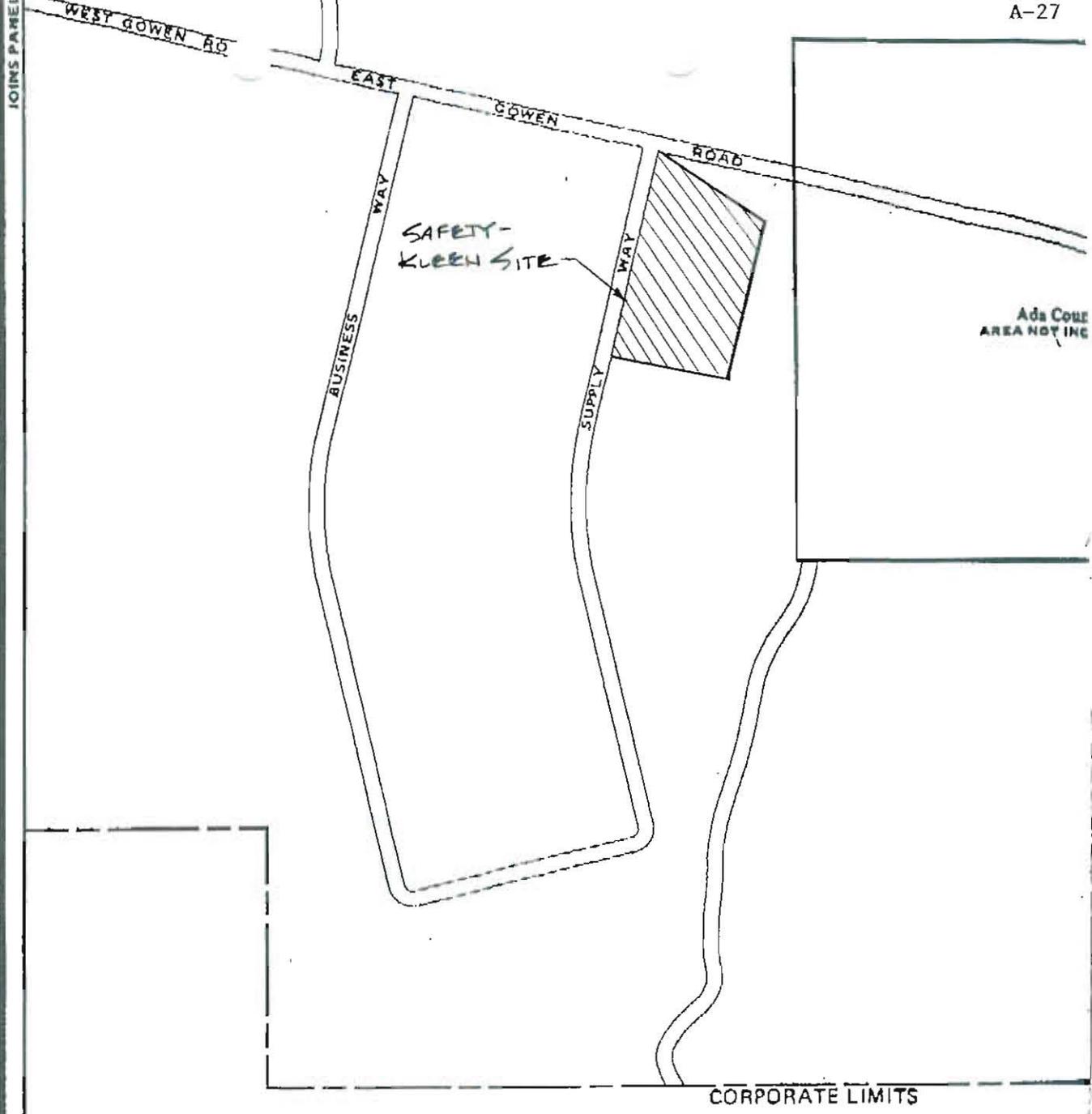
ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; depths are shown, or areas of 100-year alluvial fan flooding, depths and 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.
A99	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.



Ads CODE
AREA NOT IN

CORPORATE LIMITS

APPENDIX B

Design Review Documents

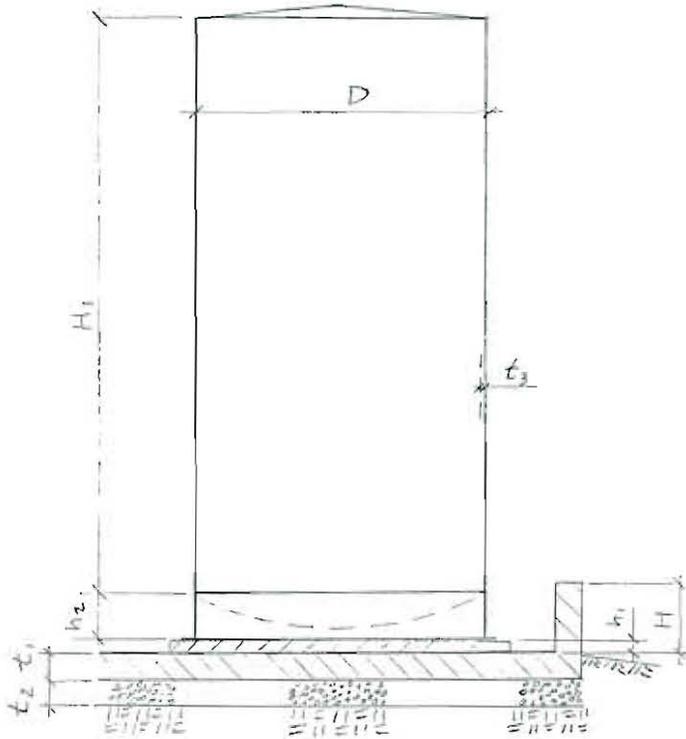
APPENDIX B

Design Review Documents

TABLE OF CONTENTS

<u>Title</u>	<u>Page No.</u>
Tank Farm Data/Gravity Loads	B-1
Wind Analysis	B-2
Earthquake Analysis	B-4
Foundation Slab Analysis	B-6
Dike Wall Hydrostatic Analysis	B-9
Tank Farm Secondary Containment Calculations	B-13
SWIC Drum Washer Volume Calculations	B-15
Return/Fill Secondary Containment Calculations	B-17
Tank Venting Evaluation	B-18
NFPA 30 Tank System Evaluation	B-20
NFPA 30 Pipe System Evaluation	B-24
UFC Article 79 Evaluation	B-29

TANK FARM DATA / GRAVITY LOADS



VOL (TANK STORAGE VOLUME)	<u>12,000 G/L</u>
D (TANK DIAMETER)	<u>10.50 F'</u>
H ₁ (TANK HEIGHT)	<u>18.00 F'</u>
H (DIKE WALL HEIGHT)	<u>3.00 F'</u>
h ₁ (PAD HEIGHT)	<u>0.33 F'</u>
h ₂ (SUPPORT HEIGHT)	<u>2.00 F'</u>
t ₁ (CONC. SLAB THICKNESS)	<u>12 "</u>
t ₂ (AGGR. BASE THICKNESS)	<u>6 "</u>
t ₃ (TANK SHELL THICKNESS)	<u>0.25 "</u>
G (SPECIFIC GRAVITY OF STORED LIQUID)	<u>0.90</u>

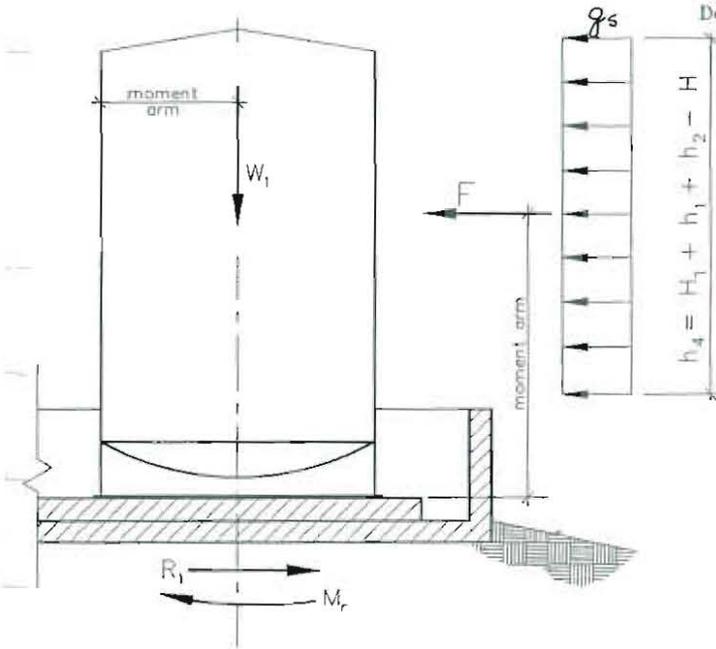
VERTICAL STORAGE TANK
F & D BOTTOM
NO SCALE

W₁ (WT. OF EMPTY TANK) = $[(\pi)(D)(H_1+h_2) + (2)(\pi)(D^2/4)](t_3/12)(490 \text{ LB/CF})(1.1)$ 9,353 L

W₂ (WT. OF STORED LIQUID) = $(G)(62.4 \text{ LB/CF})(\text{VOL}/7.48 \text{ GAL/CF})$ 90,096 L

W₃ (WT. OF FULL TANK) = $W_1 + W_2$ 99,449 L

NOTES: ∴ FOR TANK FARM INFO, REFER TO SAFETY-KLEEN DWG NO. 5000, 5001, 2001, 2512
 2, FOR ANALYSIS OF STORED LIQUID SEE SAFETY-KLEEN TCLP (APPENDIX C)



REFERENCES

1. UNIFORM BUILDING CODE, 1991
2. MARKS STD. HANDBOOK FOR MECHANICAL ENGINEERS, 8TH ED., 1978, pg. 3-24-3-28.
3. TANK FATH DATA/GRAVITY LOADS (APPENDIX B)
4. SAFETY KLEEN DWG. NO. 5000, 5001, 2001, 2512

VERTICAL STORAGE TANK
F&D BOTTOM

NO SCALE

WIND FORCE

BASIC WIND SPEED (FIG. 23-1, REF. 1)

70 MPH

* EXPOSURE (SECTION 23.12, REF. 1)

C

+ SEE TELEPHONE LOG OF CONV. W/ CITY OF BOISE, ID. IN APPENDIX A.

Ht. ABOVE GROUND

20.33 FT.

I (IMPORTANCE FACTOR, TABLE 23-L, REF. 1)

1.15

qs (WIND STAGNATION, PRESSURE, TABLE 23-F, REF. 1)

12.6 PSF

Cg (PRESSURE COEFF., TABLE 23-H, REF. 1)

0.8

h4 17.33

Ce (COMBINED HT, EXPOSURE, GUST FACTOR, TABLE 23-G, REF. 1)

1.13

Af = (h4)(D)(PROJECTED AREA NORMAL TO WIND)

182 SF

P = Ce Cg qs I (DESIGN WIND PRESSURE, SECT. 2310, REF. 1)

13.1 PSF

F = P(Af) (WIND FORCE)

2,384 LF

OVERTURNING

$$M_o \text{ (OVERTURNING MOMENT) } = (F)(\text{MOMENT ARM}) = (F) \left[(h_t/2) + (H-h_t) \right] \quad \underline{27,023 \text{ FT-L}}$$

$$= (7,384) \left[(17.33/2) + (3.00 - .33) \right] =$$

$$M_R \text{ (RESISTING MOMENT) } = (W_1)(\text{MOMENT ARM}) = (W_1)(D/2) = (9,353)(10.5/2) = \underline{49,103 \text{ FT-L}}$$

$$M_o/M_R \quad \underline{0.55} \leq 0.67 ? \text{ (SECTION 2317, REF 1)} \quad \underline{YES}$$

WIND ANCHORAGE REQUIRED ? NO

SLIDING

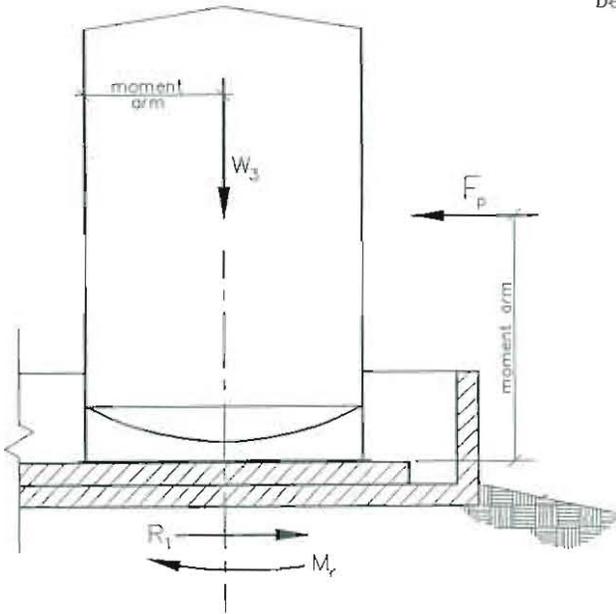
$$* f \text{ (COEFF. OF SLIDING FRICTION, REF. 2)} \quad \underline{0.30}$$

$$R_1 \text{ (RESISTING FORCE) } = (W_1)(f) = (9,353)(.30) \quad \underline{2,806 \text{ L}}$$

$$F/R_1 \quad \underline{0.85} \leq 1.0 ? \text{ Factor of Safety } \geq 1.0 \quad \underline{YES}$$

WIND ANCHORAGE REQUIRED ? NO

* ESTIMATED VALUE FOR SLIDING SURFACES
 (STEEL ON CONCRETE)



VERTICAL STORAGE TANK
F&D BOTTOM

NO SCALE

EARTHQUAKE FORCE

Project No. 92105.2 Date 1/14/93
Project Title BOISE, ID.
Subject USED MINERAL SPIRITS TANK DESIGN ASSESSMENT
Designer SD Cx By TYJ Prelim Final X

REFERENCES

1. UNIFORM BUILDING CODE, 1991
2. MARKS STD. HANDBOOK FOR MECHANICAL ENGINEERS, 8TH ED., 1978, PG. 3-24, 3-25
3. TANK FACT DATA/GRAVITY LOADS (APPENDIX B)
4. SAFETY-KLEEN DWG. NO. 5000, 5001, 2001, 2512

SEISMIC ZONE (FIG. 23-2)

* ZB

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

$W_3 = W_p$

99,449 LB

Z (SEISMIC ZONE FACTOR, TABLE 23-I, REF. 1)

0.20

I (IMPORTANCE FACTOR, TABLE 23-L AND SEC. 23-30(b))

1.5

Cp (HORIZ. FORCE FACTOR, TABLE 23-P, REF. 1)

0.75

$V_1 = F_p = Z I C_p W_p = 0.20(1.5)(0.75)(99,449) =$

22,376 LB

Project No. 92105.2 Date 1/14/93

Project Title BOISE, ID.

Subject USED MINERAL SPIRITS TANK DESIGN ASSESSMENT

Designer SD Cx By TYJ Prelim Final X

OVERTURNING

$$M_o \text{ (OVERTURNING MOMENT)} = (V_1)(\text{MOMENT ARM}) = (V_1)(H+h_2)/2 = 22,316(18+2)/2 = 223,760 \text{ FT-LB}$$

$$M_R \text{ (RESISTING MOMENT)} = (W_3)(\text{MOMENT ARM}) = (W_3)(D/2) = (99,449)(10.5/2) = 522,107 \text{ FT-LB}$$

M_o/M_R 0.43 ≤ 0.67 ? (FACTOR OF SAFETY=1.5) YES

SEISMIC ANCHORAGE REQUIRED ? NO

SLIDING

* f (COEFF. OF SLIDING FRICTION, REF. 2) 0.30

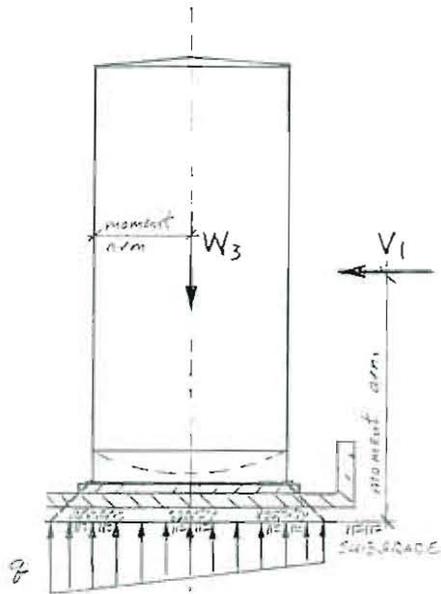
$$R_1 \text{ (RESISTING FORCE)} = (99,449)(0.30) = 29,835 \text{ LB}$$

V_1/R_1 0.75 ≤ 1.0 ? (FACTOR OF SAFETY = 1.0) YES

SEISMIC ANCHORAGE REQUIRED ? NO

* ESTIMATED VALUE FOR SLIDING SURFACES
(STEEL 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. ~~5000, 5001, 2001, 2512~~

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 $f'_c = \underline{4,000 \text{ PSI}}$
 REBAR GRADE $f_y = \underline{40 \text{ ASSUMED PSI}}$

SLAB REINFORCEMENT 2-LAYERS #5 @ 12" O.C. IN WAY, #5 x 5'-6" L. @ 12" O.C. AROUND PERIM., #4 x 6" x 12.9" x 12.9" W/RT @ PAD

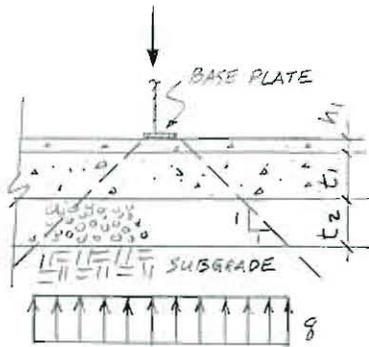
W_3 (WT. OF FULL TANK) = 99,449 LB
 V_1 (EARTHQUAKE FORCE) = 22,376 LB
 M_0 (MOMENT @ CONC. SLAB LEVEL) = 223,7600 FT-LB
 M_1 (MOMENT @ SUBGRADE LEVEL) = 264,708 FT-LB
 M_2 (MOMENT @ ASSR. SLAB LEVEL) = 253,570 FT-LB

MOMENT ARM = 10.0'
 MOMENT ARM = 11.83'
 MOMENT ARM = 11.33'

* q_{allow} . (use allowable soil bearing capacity) = 2,000 PSI

* ~~ASSUMED (CONSERVATIVE FOR SUPPORTING SOILS UNDER SHALLOW FOUNDATIONS)~~

SOIL BEARING



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

b_p (WIDTH OF BASE PLATE ASSUMED) = 0.25 F

b_s (BEARING WIDTH @ SUBGRADE LEVEL) =

$2(L_1 + t_1) + b_p = 2(.33 + 1.0) + .25 = 3.91 F$

D_o (O.S. DIAMETER) = $10.5 + 2(.33 + 1.0) = 14.16 F$

D_i (I.S. DIAMETER) = $10.5 - 2(.33 + 1.0) = 6.34 F$

A (BEARING AREA) =

$(\pi(D_o + D_i)/2)(b_s) = \pi(14.16 + 6.34/2)(3.91) = 125.91 FT$

S (BEARING SECTION MODULUS) =

$\pi(D_o^4 - D_i^4)/(32D_o) = \pi(14.16^4 - 6.34^4)/(32(14.16)) = 267.53 FT$

q_1 (SOIL BRG. PRESS. GRAVITY ONLY) = $P/A = W_3/A = 99,449/125.91 = 790 PSF$

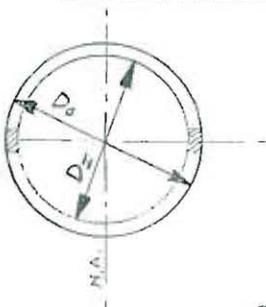
$q_1 = 790 \leq q_{allow.} = 2,000 ?$ YES

q_2 (SOIL BRG. PRESS. GRAVITY + EQ.) = $P/A \pm M/S = W_3/A \pm M_1/S = \frac{99,449}{125.91} \pm \frac{264,708}{267.53} = 1,779 PSF$

$q_2 = 1,779 \leq (1.33)q_{allow.} = 2,660 ?$ YES

SOIL BEARING IS OK ? YES

FOUNDATION SLAB BEARING



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

$D_o = 10.5 FT$ $D_i = 10.0 FT$

A_1 (BASE PLATE AREA) = $(\pi(D_o + D_i)/2)(b_p) = [\pi(10.5 + 10)/2](.25) = 8.05 FT$

S_1 (B/TG SECT. MOD.) = $\pi(D_o^4 - D_i^4)/(32D_o) = \pi(10.5^4 - 10.0^4)/(32(10.5)) = 20.15 FT$

$$f \text{ (BEARING STRESS)} = P/A \pm M/S =$$

$$W_3/(A_1)(144) \pm (M_0)(12)/(S_1)(1728) = 99,449/(18.05)(144) \pm 223,700(12)/(20.19)(1728) = \underline{162.9 \text{ PSI}}$$

$$f_{allow} \text{ (ALLOWABLE BEARING STRESS)} = 0.3 f'_c = (0.3)(4000) = \underline{1,200 \text{ PSI}}$$

per ref. 1 ACI 318-89 A.3.1(c)

$$f = \underline{162.9} \leq f_{allow} = \underline{1,200} \quad ? \quad \underline{YES}$$

FOUNDATION SLAB BEARING IS OK ? YES

FOUNDATION SLAB BENDING

Assume loading uniformly distributed at aggregate base level.
Assume aggregate base well compacted.
Neglect conc. slab bending strength and continuity (conservative).
Assume critical section for bending located at $\frac{1}{2}$ base plate.

$$MR \text{ (ALLOWABLE FLEXURAL STRENGTH)} = 9 \sqrt{f'_c} = 9 \sqrt{4,000} = \underline{569 \text{ PSI}}$$

per ref. 2 PCA Report pg. 2

$$b_a \text{ (BEARING WIDTH @ AGGR. BASE LEVEL)} = 2(h_1 + t_1) + b_p = 2(13.14 + 1.0) + 2.5 = \underline{2.91 \text{ FT}}$$

$$D_o = \underline{13.14 \text{ FT}} \quad D_i = \underline{7.34 \text{ FT}}$$

$$A_2 \text{ (BEARING AREA)} = (\pi (D_o + D_i) / 2) (b_a) = [\pi (13.14 + 7.34) / 2] (2.91) = \underline{93.71 \text{ FT}^2}$$

$$S_2 \text{ (BEARING SECT. MOD.)} = \pi (D_o^4 - D_i^4) / (32 D_o) = \pi (13.14^4 - 7.34^4) / [32 (13.14)] = \underline{202.10 \text{ FT}^3}$$

$$q \text{ (SOIL BEARING PRESSURE)} = P/A \pm M/S =$$

$$W_3/A_2 \pm M_2/S_2 = 99,449/93.71 \pm 253,520/202.10 = \underline{2,316 \text{ PSI}}$$

$$* M \text{ (BENDING MOMENT)} = \frac{q l^2}{2} = \frac{(2316)(1.0 + 1.34)^2}{2} = \underline{2,452 \text{ FT-L}}$$

$$S \text{ (SECTION MODULUS)} = \frac{b d^2}{6} = \frac{(12)(16)^2}{6} = \underline{512 \text{ IN}^3}$$

$$f_b \text{ (BENDING STRESS)} = 12 M / S = \frac{(12)(2452)}{512} = \underline{57 \text{ PSI}}$$

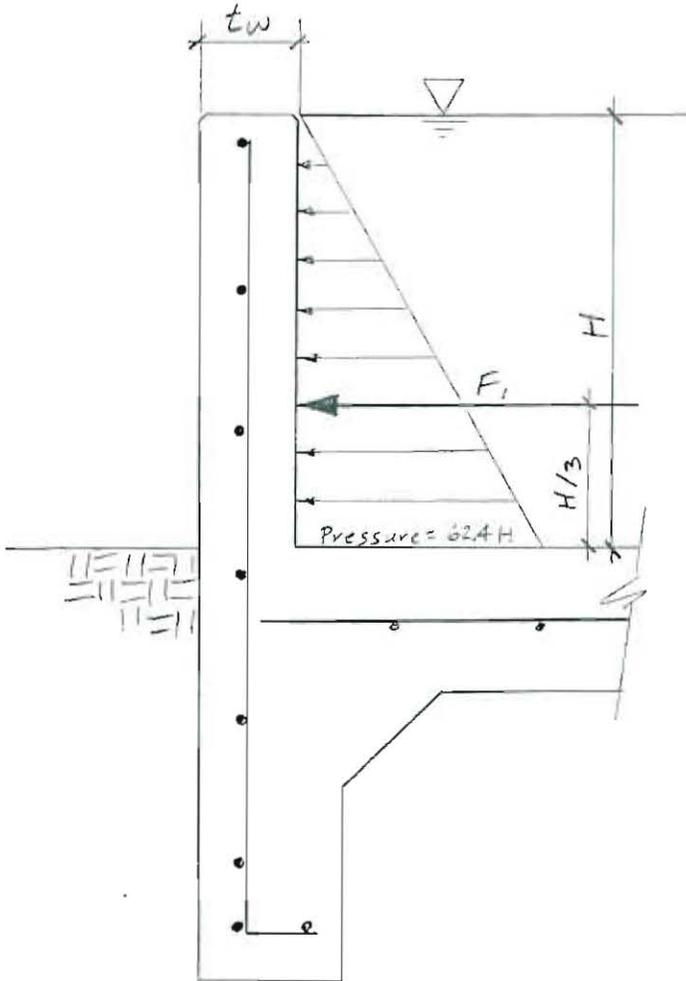
* for one foot wide strip

$$f_b = \underline{57} \leq MR = \underline{569} \quad ? \quad \underline{YES}$$

FOUNDATION SLAB BENDING IS OK ? YES

NOTE: FOUNDATION SLAB SHEAR OK BY INSPECTION

DIKE WALL HYDROSTATIC ANALYSIS



TYPICAL DIKE WALL SECTION
NO SCALE

DESIGN INFORMATION

HYDROSTATIC LOAD RESISTED BY DIKE WALL ANALYZE 1'-0 WIDE CANTILEVER BEAM STR DESIGN IN ACCORDANCE WITH ACI 318-89 ULTIMATE STRENGTH DESIGN METHOD. MONOLITHIC CONCRETE WALL AND SLAB FLUID IS WATER, UNIT WT. = 62.4 PCF CALCS. TYPICALLY PER 1'-0 WIDTH OF WALL. SAFETY KLEEN REF. DWGS. 5000, 5001, 2001, 251

ASSUMPTIONS

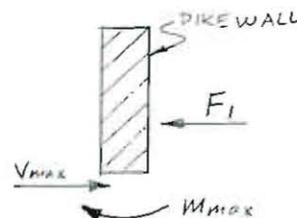
VERT. WALL REINF.	<u>#5 @ 12" O.C.</u>
HORIE. WALL REINF.	<u>#5 @ 12" O.C.</u>
REBAR GRADE	<u>40 ASSUMED</u>
CONC. STRENGTH @ 28 DAYS	<u>4,000</u>
VERT. REBAR CENTERED IN WALL	

DATA

f'_c	=	<u>4,000 PS</u>
f_y	=	<u>40,000 PS</u>
H	=	<u>3.0 F</u>
tw	=	<u>8 IN</u>
vert. A_s	=	<u>0.31 SQ. FT.</u>
horiz. A_s	=	<u>0.31 SQ. FT.</u>
A_g	=	<u>96 SQ. FT.</u>

DESIGN PROCEDURE

CHECK BENDING AND SHEAR STRENGTH, CHECK OTHER ACI CODE REQUIREMENTS



FREE BODY DIAGRAM

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4812 SANTANA CIRCLE, COLUMBIA, MD. 65203

 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
HYDROSTATIC FORCE

$$PRESSURE = 62.4(H) = (62.4)(3.0) = \underline{187} \text{ PS}$$

$$FORCE = F_1 = \frac{1}{2}(62.4)(H)^2 = \frac{1}{2}(62.4)(3)^2 = \underline{281} \text{ LB}$$

SERVICE SHEAR AND MOMENT

$$V_{max} = F_1 = \frac{1}{2}(62.4)(3)^2 = \underline{281} \text{ L}$$

$$M_{max} = F_1(H/3) = \frac{1}{2}(62.4)(3)^2(3/3) = \underline{281} \text{ FT-L}$$

REQUIRED STRENGTH (LOAD FACTORS)

REF. ACI 318, SECTION 9.2

$$V_u = 1.7 V_{max} = (1.7)(281) = \underline{478} \text{ LB}$$

$$M_u = 1.7 M_{max} = (1.7)(281) = \underline{478} \text{ FT-L}$$

DESIGN STRENGTH (ϕ FACTORS)

REF. ACI 318, SECTION 9.3

 NOTE: design strength must be \geq required strength

 1) CHECK SHEAR

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

$$\phi V_n = \phi V_c = \phi 2\sqrt{f'_c} b_w d$$

$$\phi = 0.85, \quad b_w = 12", \quad d = t_w/2 = 8/2 = \underline{4} \text{ ''}$$

$$\phi V_n = (0.85)(2)(\sqrt{4,000})(12)(8/2) = \underline{5,161} \text{ LBS}$$

$$\phi V_n = \underline{5,161} \geq V_u = \underline{478} ? \quad \underline{YES}$$

SHEAR IS OK ? YES

2) CHECK BENDING

$$\phi M_n = \phi A_s f_y (d - a/2), \quad \phi = 0.90$$

$$a = A_s f_y / 0.85 f'_c b, \quad b = 12"$$

$$a = (0.31)(40,000) / (0.85)(4,000)(12) = \underline{0.30} \text{ IN}$$

$$\phi M_n = (0.90)(0.31)(40,000)[4 - (0.30/2)] = \underline{42,966} \text{ IN-LBS}$$

$$\phi M_n = 42,966 / 12 = \underline{3,581} \text{ FT-LBS}$$

$$\phi M_n = \underline{3,581} \geq M_u = \underline{478} ? \quad \underline{YES}$$

BENDING IS OK ? YES

OTHER ACI CODE REQUIREMENTS

1) MINIMUM REINFORCEMENT OF FLEXURAL MEMBERS

REF. ACI 318, SECTION 10.5

$$p_{min.} = 200 / f_y = 200 / 40,000 = \underline{0.005}$$

$$p = A_s / bd = 0.31 / (12)(4) = \underline{0.0065}$$

$P = 0.0005 \geq p_{min} = 0.005$? YES

alternately, area of steel provided shall be at least 1/3 greater than that required by analysis

$A_s REQD = M_u(12) / 0.9 f_y (d - a/2)$
 $=$ $=$ N/A SQ
 $A_s REQD(1.33) =$ $=$ N/A SQ

$A_s =$ $\geq A_s REQD(1.33) =$? N/A

MINIMUM REINF. IS OK ? N/A

2.) MINIMUM WALL REINFORCEMENT

REF. ACI 318, SECTION 14.3

FOR VERTICAL REINFORCEMENT,

$A_s / A_g = 0.0032 \geq 0.0015$? YES

MAX. REINF. SPACING $\leq 18"$? YES

MIN. VERT. REINF. IS OK ? YES

FOR HORIZONTAL REINFORCEMENT,

$A_s / A_g = 0.0032 \geq 0.0025$? YES

MAX. REINF. SPACING $\leq 18"$? YES

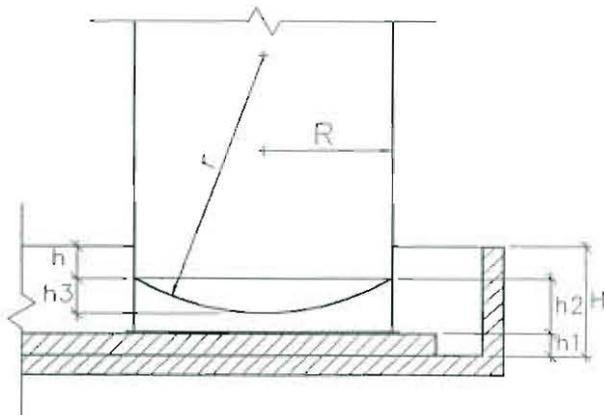
MIN. HORIE. REINF. IS OK ? YES

SECONDARY CONTAINMENT CALCULATIONS

 Pack Tank Farm Vertical Tank(s)

SAFETY KLEEN REF. DWGS. 500, 501, 2001,
2512

Data :



VERTICAL STORAGE TANK
F&D BOTTOM

NO SCALE

L [inside wall length]	<u>48.50</u>	ft.
W [inside wall width]	<u>20.50</u>	ft.
l [pad length]	<u>40.50</u>	ft.
w [pad width]	<u>13.00</u>	ft.
R [tank radius]	<u>5.25</u>	ft.
r [dish radius]	<u>10.50 †</u>	ft.
H [inside wall height]	<u>3.00</u>	ft.
h1 [pad height]	<u>0.23</u>	ft.
h2 [support height]	<u>2.00</u>	ft.
h3 [dish height]	<u>1.41</u>	ft.
h [tank segment height]	<u>0.67</u>	ft.
** rainfall	<u>2.0</u>	in.

- * Note: Sump and sloped concrete slab volume not included (conservative).
- ** U.S. Dept. of Comm. Tech. Paper No. 40
- † ASSUMES DISH RADIUS = TANK DIAMETER

Tank Sizes:

Zea. 12,000 GAL, 10'-6" φ, F&D BOTTOM
 (FUTURE) 12,000 GAL, 10'-6" φ, F&D BOTTOM

Formulas Used :

$$\text{TANK SEGMENT HT.} = h = H - h1 - h2$$

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

$$\text{PAD DISPLACEMENT VOLUME} = (l)(w)(h1)(7.48 \text{ gal/cf})$$

TANK DISPLACEMENT VOLUME

$$\text{dished bottom} = [0.333(\pi)(h3)^2(3r - h3) + \pi R^2 h](7.48 \text{ gal/cf})(\text{number of tanks})$$

$$\text{flat bottom} = (\pi R^2 h)(7.48 \text{ gal/cf})(\text{number of tanks})$$

$$\text{cone bottom} = [0.333(\pi)(h)(R1^2 + R2^2 + R1(R2)) + \pi R^2 h](7.48 \text{ gal/cf})(\text{number of tanks})$$

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

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



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Client SAFETY KLEEN CORP. Pg. B-14
 Project No. 92105.2 Date 1/14/93
 Project Title BOISE, ID.
 Subject USED MINERAL SPIRITS TANK DESIGN ASSESSMENT
 Designer TYJ Cx By SD Prelim Final X

SECONDARY CONTAINMENT CALCULATIONS

Calculations :

(a) DIKE CONTAINMENT VOLUME =

$$(48.50)(20.50)(3.0)(7.48) \quad (+) \underline{22,311} \text{ gal.}$$

(b) VOLUME OF LARGEST TANK WITHIN DIKED AREA =

$$(-) \underline{12,000} \text{ gal.}$$

(c) PAD DISPLACEMENT VOLUME =

$$(40.50)(13.00)(0.33)(7.48) \quad (-) \underline{1,300} \text{ gal.}$$

(d) TANK DISPLACEMENT VOLUME =

$$\left[\frac{1}{3} \pi (1.41)^2 (31.5 - 1.41) + \pi (5.25)^2 (0.67) \right] (7.48) (2) \quad (-) \underline{1,805} \text{ gal.}$$

(e) MISC. DISPLACEMENT VOLUME =

$$(0.02)(22,311) \quad (-) \underline{446} \text{ gal.}$$

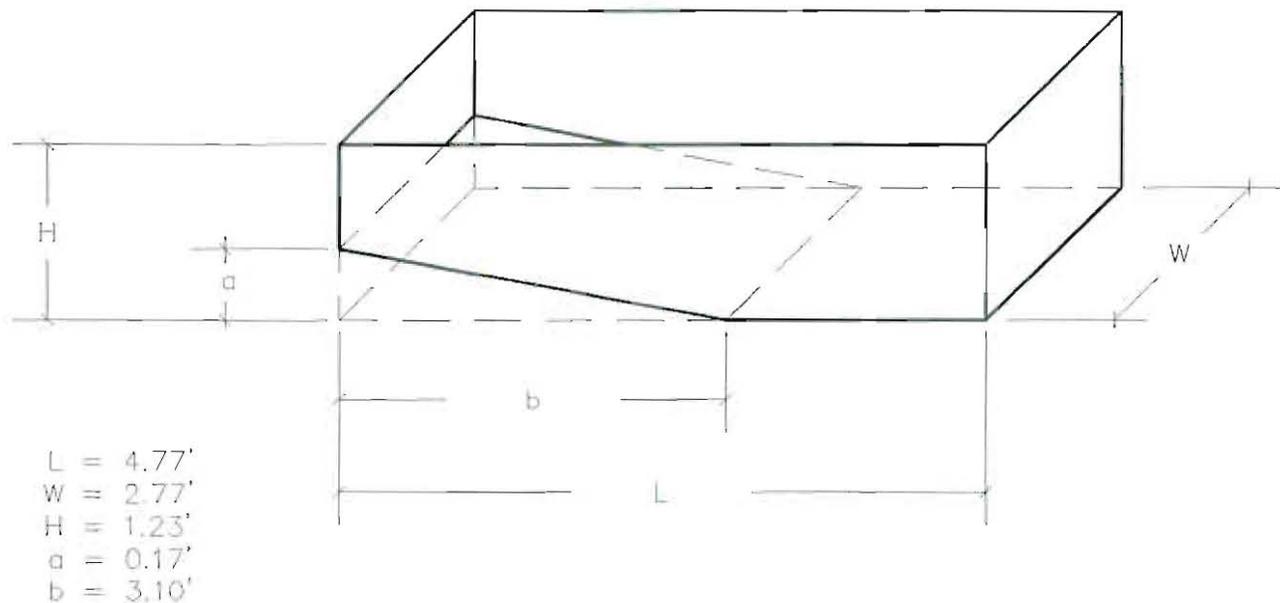
(f) LOCAL RAINFALL ALLOWANCE =

$$\left(\frac{2}{12} \right) (48.50)(20.50)(7.48) \quad (-) \underline{1,239} \text{ gal.}$$

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

$$(+) \underline{5,521} \text{ gal.}$$

SWIC DRUM WASHER VOLUME CALCULATIONS



SWIC DRUM WASHER – PART #1

$$\text{TOTAL VOLUME} = L \times W \times H = 4.77' \times 2.77' \times 1.23' = \underline{16.25 \text{ cu.ft.}}$$

$$\text{WEDGE VOLUME} = 1/2(ab)W = [(1/2)(0.17')(3.10')](2.77') = \underline{.73 \text{ cu.ft.}}$$

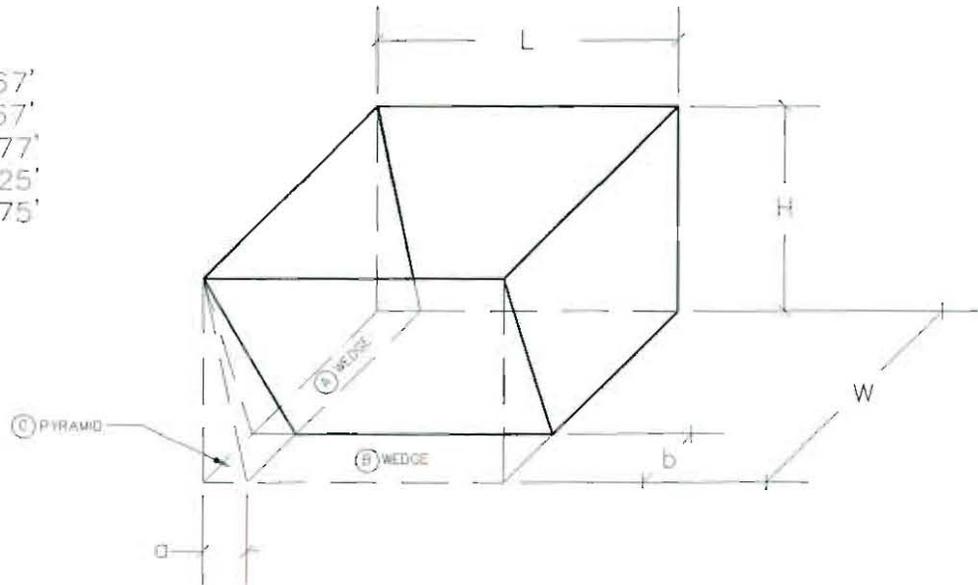
$$\text{PART \#1 VOLUME} = (\text{TOTAL VOLUME}) - (\text{WEDGE VOLUME}) =$$

$$(16.25) - (.73) = \underline{15.52 \text{ cu.ft.}}$$

$$(15.52 \text{ cu.ft.})(7.48 \text{ gal./cu.ft.}) = \underline{116 \text{ gal.}}$$

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 = $L \times W \times H = 1.67' \times 2.77' \times 1.67' = \underline{7.73 \text{ cu.ft.}}$

(A) WEDGE VOLUME = $1/2(aH)W = [(1/2)(.25')(1.67')](2.77') = \underline{.58 \text{ cu.ft.}}$

(B) WEDGE VOLUME = $1/2(bH)L = [(1/2)(.75')(1.67')](1.67') = \underline{1.05 \text{ cu.ft.}}$

(C) PYRAMID VOLUME = $\frac{[(a)(b)]H}{3} = \frac{[(.25')(1.67')](1.67')}{3} = \underline{.10 \text{ cu.ft.}}$

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

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

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

TOTAL DRUM WASHER VOLUME = PART #1 + PART #2 = 116 + 46 = 162 gal.



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Project Title BOISE, ID.

Subject USED MINERAL SPIRITS TANK DESIGN ASSESSMENT

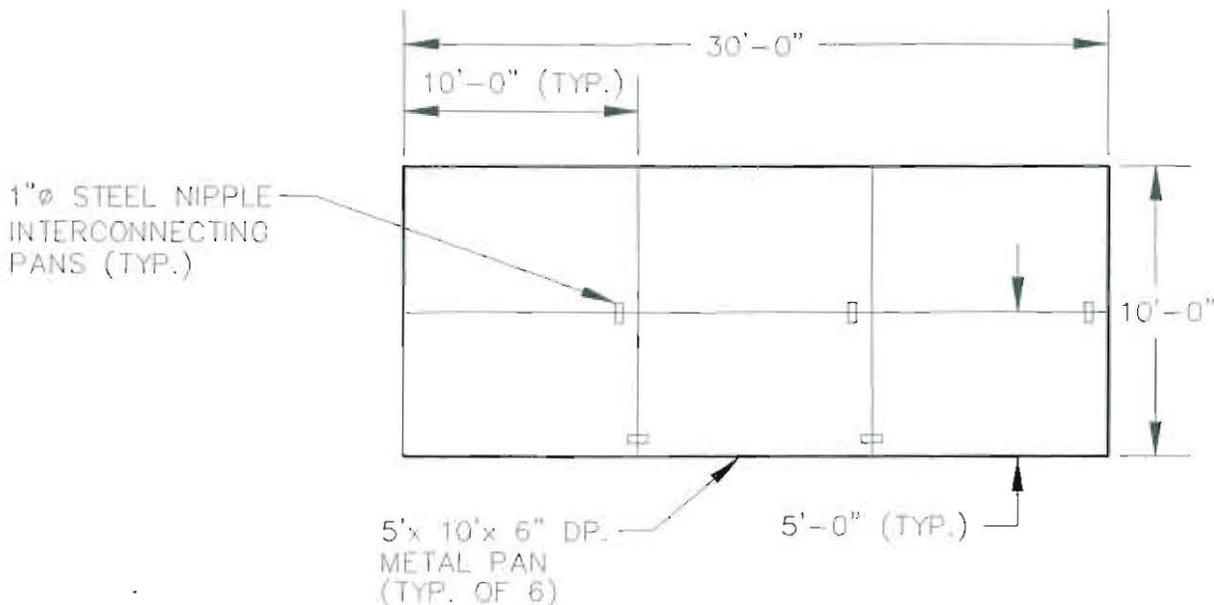
Designer TYJ Cx By _____ Prelim X Final _____

SECONDARY CONTAINMENT CALCULATIONS – RETURN/FILL SHELTER

SECONDARY CONTAINMENT BY METAL PANS

$$\text{VOLUME} = (.50)(5.0)(10.0) = 25.00 \text{ CU.FT./PAN}$$

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



PLAN VIEW

EXCESS CONTAINMENT CAPACITY = CONTAINMENT CAPACITY – VOLUME OF LARGEST CONTAINER

$$\text{SWIC DRUM WASHER VOLUME} = 162 \text{ GAL.}$$

$$\text{CONTAINMENT CAPACITY} = 1,122 \text{ GAL.}$$

$$\text{EXCESS CONTAINMENT CAPACITY} = 1,122 \text{ GAL.} - 162 \text{ GAL.} = \underline{\underline{960 \text{ GAL.}}}$$

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.

Response: Material - carbon steel.

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 house keeping 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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MATERIAL SAFETY DATA SHEET
SAFETY-KLEEN CORP.
 777 Big Timber Rd.
 Elgin, IL 60123



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	Emergency Telephone Number 312/697-8460
Address (Number, Street, City, State, and ZIP Code) 777 Big Timber Road	Telephone Number for Information 312/697-8460
Elgin, Illinois 60123	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))	CAS No.	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Mineral Spirits	8032-32-4	500 ppm	100 ppm	N/A	99.9+
Dye	N/A	Unknown	Unknown	unk.	0.003
Anti-Static Agent	N/A	Unknown	Unknown	100 est.	1 ppm

Section III—Physical/Chemical Characteristics

Boiling Point (°F)	310-400	Specific Gravity (H ₂ O = 1)	0.775- 0.795
Vapor Pressure (mm Hg.) @ 68°F (20°C)	2	Melting Point	N/A
Vapor Density (AIR = 1)	4.9	Evaporation Rate (Toluene = 1)	0.2
Solubility in Water Negligible.		VOC	795g./L

Appearance and Odor

Clear green liquid with characteristic hydrocarbon odor.

Section IV—Fire and Explosion Hazard Data

Flash Point (Method Used) 105 °F TCC	Flammable Limits	LEL 0.7	UEL 6.0
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Extinguishing Media

CO₂, foam, dry chemical, water (mist only)

Special Fire Fighting Procedures

None.

Unusual Fire and Explosion Hazards

None.

Section V—Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	Heat, sparks, flame and fire.

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
	Will Not Occur	X	N/A

Section VI—Health Hazard Data

Route(s) of Entry:	Inhalation? Yes.	Skin? Yes.	Ingestion? Yes.
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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.

Carcinogenicity:	NTP? Not listed.	IARC Monographs? Not listed.	OSHA Regulated? No.
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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.

Waste Disposal Method

Dispose of in accordance with company, local, state and federal regulations.

Precautions to Be Taken in Handling and Storing

Combustible. Keep away from heat, sparks, flame. Use with adequate ventilation. Avoid long and repeated contact with skin. If clothes are inadvertently saturated with solvent - DO NOT SMOKE. Remove the solvent saturated clothes immediately to avoid skin rash. Keep away from ignition sources. Keep out of reach of children.

Section VIII—Control Measures

Respiratory Protection (Specify Type)

Self-contained breathing apparatus for concentrations above TLV limits.

Ventilation	Local Exhaust Normal room ventilation.	Special None.
	Mechanical (General) None.	Other None.

Protective Gloves In case of prolonged contact, wear rubber gloves.	Eye Protection Yes - Eyeglasses, safety glasses.
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Other Protective Clothing or Equipment

N/A

Work/Hygiene Practices

Do not smoke while

MEMORANDUM

August 22, 1991

TO: Draft cc: Glenn Casbourne Uly Marini
Dan Dowling Frank Osmanski
FROM: James Gaspar Bill Jacoby Clark Rose
Bernie Landsbaum Bill Teberg
SUBJECT: Concrete Protective Marshall Levy
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 chlorinateds)
2. Epoxies (not resistant to ketones and chlorinateds)
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 400F 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 perchloroethylene. 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).

TECHNICAL BULLETIN

August 1992

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.

SEMSTONE® 140

Sprayable Epoxy Topping



P. O. Box 2076
5500 E. HWY 332 409-233-0312
FREEPORT, TX 77541 800-221-2544

TYPICAL PROPERTIES – WET

Solids, by Volume _____	100%
Weight per Mixed Gallon _____	9.3 lbs
Pot Life @ 75°F _____	45 - 60 minutes
	(significantly less at elevated temperatures)
Cure Time @ 75°F:	
Foot Traffic _____	12 hrs.
Light Vehicular Traffic _____	24 hrs.
Chemical Service _____	36 hrs.
Primer _____	Not Required
	(SEMSTONE 110-P/S Primer Optional)
Nonflammable _____	

TYPICAL PROPERTIES – CURED

Color _____	Light Gray (selected other colors available)
Hardness _____	ASTM D - 2240 Shore D _____ 70 - 75
Compressive Strength _____	ASTM C - 579 _____ 14,000 psi
Tensile Strength _____	ASTM D - 638 _____ 5,000 psi
Tensile Elongation _____	ASTM D - 638 _____ 8%
Flexural Strength _____	ASTM D - 790 _____ 11,000 psi
Flexural Modulus of Elasticity _____	ASTM C - 722 _____ Complies with Epoxy Type B
Abrasion Resistance _____	ASTM D - 1044 _____ 56 mg (CS17 wheels)
Water Vapor Transmission _____	ASTM E - 96
	WVT _____ 0.0120 grain per hr ft ²
	Permeability _____ 0.0042 perm. -in.

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 know-how 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.

Exhibit D2-21

Urbana Miscellaneous Unit Leak Testing



March 1, 2010

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

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,



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 its 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:

Sampling Location ID	Descriptive – Location
1	Station - East
2	Station - Center
3	Station - West
4	Door – Bottom - Left
5	Door – Center - Left
6	Door – Top - Left
7	Door – Bottom - Right
8	Door – Center - Right
9	Door - -Top - Right

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



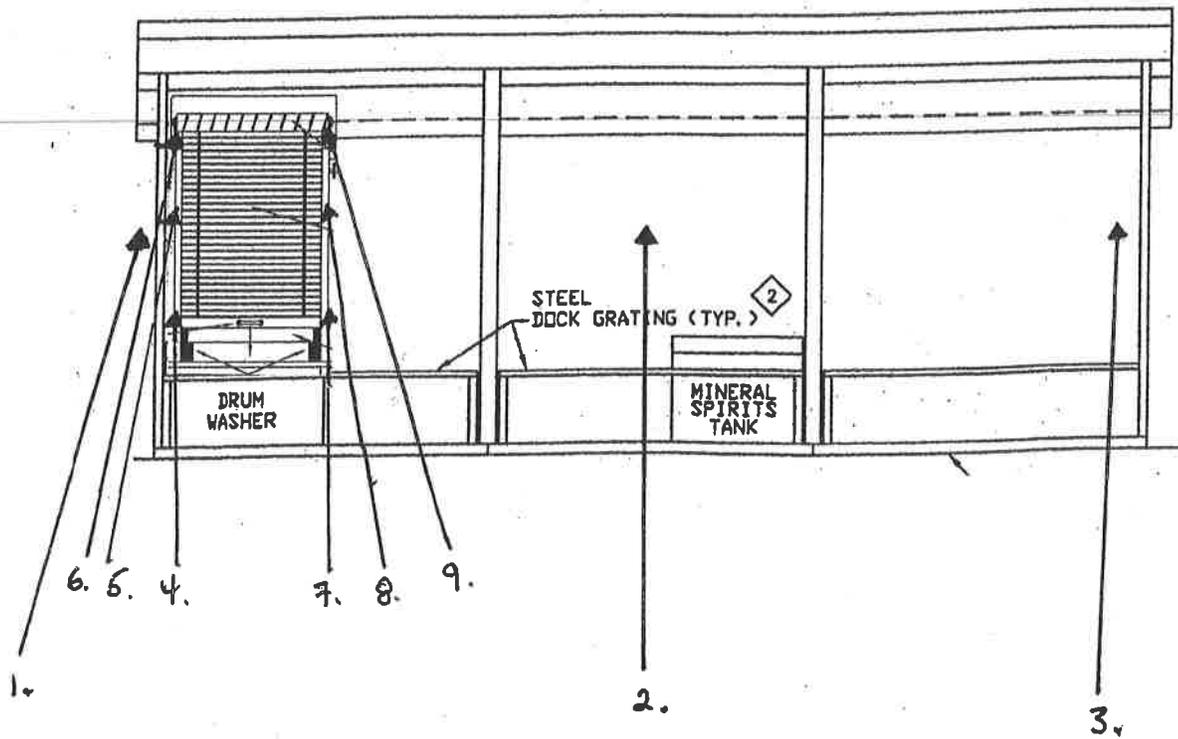
February 18, 2010
Date

P.E. Number: 62-041189

Appendix A

Sampling Locations

RETURN AND FILL - SAMPLING LOCATION ID



Appendix B

Sample Results Log

Leak Testing and Monitoring - Sample Results
Date: February 16, 2010

Sampling Location ID	Descriptive - Location	Test Result 1 (ppm)	Test Result 2 (ppm)	Average Test Result (ppm)
1	Station - East	1.3	.2	0.8
2	Station - Center	1.1	.2	0.7
3	Station - West	1.8	.9	1.4
4	Door - Bottom Left	5.4	2.3	3.9
5	Door - Center Left	4.4	1.2	2.8
6	Door - Top Left	3.1	.7	1.9
7	Door - Bottom - Right	2.3	1.0	1.7
8	Door - Center - Right	2.4	1.1	1.8
9	Door - Top - Right	2.4	1.8	2.1

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(c)

Appendix C

Cumulative Data Log

**Safety-Kleen Systems, Inc.
Champaign (Urbana) Service Center**

Miscellaneous Unit Project-to-Date Summary - Leak Testing Monitoring Results (ppm)

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

Sampling Location ID	Description Location	Initial Test Aug. 25, 2009	Date Month 1 Sep. 25, 2009	Date Month 2 Oct. 21, 2009	Date Month 3 Nov. 17, 2009	Date Month 4 Dec. 11, 2009	Date Month 5 Jan. 25, 2010	Date Month 6 Feb. 16, 2010	Average of all Readings
1	Station – East	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1
2	Station – Center	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.1
3	Station – West	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.2
4	Door – Bottom Left	0.0	0.8	5.5	10.5	1.0	0.0	3.9	3.1
5	Door – Center Left	0.9	3.6	0.2	2.6	0.6	0.0	2.8	1.5
6	Door – Top Left	1.2	3.2	0.0	1.0	0.5	0.2	1.9	1.1
7	Door – Bottom – Right	0.0	7.2	0.0	0.7	0.0	0.0	1.7	1.4
8	Door – Center – Right	0.0	0.8	0.0	1.0	0.3	0.0	1.8	0.6
9	Door – Top – Right	3.1	0.0	1.3	0.5	0.6	0.0	2.1	1.1

