APPENDIX 2

SEISMIC AND STRUCTURAL INTEGRITY ASSESSMENT

California Tank Assessment
Of
KW Plastics Recovery Process

Prepared for

KW Plastics of California
1861 Sunnyside Crt.
Bakersfield, CA 93308

August 1, 2007

Prepared by

Jim Hansen
Creative Products
1604 Banbridge Crt.
Bakersfield, CA 93311

ASSESSMENT SUMMARY

The tank assessment of the KW Plastics facility was performed according to the CalARP Guidance Program and California regulations CCR66270.16 and CCR 66262.192. The evaluation centered on the recovery process equipment used to separate the plastic from lead and water. This is a new process line which will be installed in the third quarter of 2007.

The evaluation determined structural integrity is sufficient to sustain the loads of a seismic event. The tanks have sufficient strength and compatibility with the hazardous waste to be transferred, to ensure they will not collapse, rupture,or fail.

The secondary containment has sufficient volume and strength and compatibility with the hazardous materials accumulated to prevent any migration out of the system to the soil, ground, or surface water.

KW Plastics of California
CalARP Seismic Assessment
California Tank Assessment
Regulation CCR 66264 (New Tanks) & CCR 66270
1861 Sunnyside Ct.
Bakersfield, CA 93308

The evaluation will follow the CalARP Guidance Program (Appendix C) and comply with the 1997 Uniform building Code.

Evaluation Scope:

1) Covered processes as defined by CalARP Program regulations
2) Adjacent facility structural failure is not a factor
3) Utility systems such as fire and water are not required to mitigate RS release.

Performance Criteria:

- ✓ Maintain Structural Integrity
- ✓ Maintain Position
- ✓ Maintain Containment of Material

Seismic Evaluation:

A seismic assessment under the Risk Management and Prevention Program was performed in August 2003.

Geotechnical Engineering Study

Golden Valley Testing performed a study in 1986 when the facility was started.

Seismic Hazards:

1) Ground Shaking - Fault	Site is located >15 km from the White Wolf
2) Liquefaction	Not a factor
3) Fault Rupture	Remote
4) Seismic Settlement	Potential of 0.5" in 150 feet
5) Landslide	Non existent
6) Seiches/Tsunamis	Not pertinent

Walkthrough Evaluation:

To be performed

Analytical Evaluation:

The seismic load calculations were performed per UBC 97 and AISC 9^{th} edition.

Assessment of Equipment:

All equipment was classified under one system.

Evaluation of Tanks at Grade:

Tanks 1 through 8 are elevated and positioned horizontally. The tanks are open top with any overfill and leak detection performed visually by the operators. Tanks 9 and 10 are vertical, closed top, and are positioned directly on the floor.

Evaluations of above ground piping systems:

Wastewater Exemption for Piping

The piping used to convey wastewater from Tanks 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are exempt from permitting under the recyclable material exemptions under California Health and Safety Code 25143.2(c)(2).

Hazardous characteristics of the wastes:

1) Lead and acid contaminated water
2) Lead and acid contaminated polypropylene

Float Separator Tank (Tank 1)

This tank primarily contains water to separate the plastic chips from the waste and debris. The tank has an operational capacity of 5,500 gallons and a maximum capacity of 6,697 gallons. The tank is constructed with a width of 8 feet, a length of 20 feet, and a maximum depth of 7.4 feet. The tank walls and bottom are constructed of 1/4-inch, 316 stainless steel plate. The tank has the following specifications:

- Design Specifications: Reference Appendix 2
- Pressure Rating: Open top (atmospheric)
- Structural Supports: Reference Appendix 2
- Age of Tank: < 1 year
- Operating Temperature: Ambient 50 to 100 degrees Fahrenheit
- Location: Reference Figure 4: Process Plan
- Construction Materials: Reference Appendix 2
- Corrosion Resistance: Corrosion resistant stainless steel used on wetted surfaces
- Foundation Specifications: Reference Appendix 2
- Date in Service: 2007
- Expected Life: 25 years
- Cathodic Protection: Not required (aboveground)
- Previous Use: None
- National Fire Prevention
- Association (NFPA) Protective
- Distances: Not Applicable
- Certified Tank Drawings: Reference Appendix 2
- Vapor Pressure of Stored Waste: 14.7 pounds per square inch (psi) at 213 degrees Fahrenheit

Wash Tank (Tank 3)

This tank primarily contains water to separate the plastic chips from the waste and debris. The tank has an operational capacity of 5,500 gallons and a maximum capacity of 6,697 gallons. The tank is constructed with a width of 8 feet, a length of 20 feet, and a maximum depth of 7.4 feet. The tank walls and bottom are constructed of 1/4-inch, 316 stainless steel plate. The tank has the following specifications:

- Design Specifications: Reference Appendix 2
- Pressure Rating: Open top (atmospheric)
- Structural Supports: Reference Appendix 2
- Age of Tank: < 1 year
- Operating Temperature: Ambient 50 to 100 degrees Fahrenheit
- Location: Reference Figure 4: Process Plan
- Construction Materials: Reference Appendix 2
- Corrosion Resistance: Corrosion resistant stainless steel used on wetted surfaces
- Foundation Specifications: Reference Appendix 2
- Date in Service: 2007
- Expected Life: 25 years
- Cathodic Protection: Not required (aboveground)
- Previous Use: None
- National Fire Prevention
- Association (NFPA) Protective
- Distances: Not Applicable
- Certified Tank Drawings: Reference Appendix 2
- Vapor Pressure of Stored Waste: 14.7 pounds per square inch (psi) at 213 degrees Fahrenheit

Wash Tank (Tank 5)

This tank primarily contains water to wash the plastic chips by agitation to remove any paper or debris attached to the chips. The tank has an operational capacity of 4,309 gallons and a maximum capacity of 5,386 gallons. The tank is constructed with a width of 12 feet, a length of 12 feet, and a maximum depth of 5 feet. The tank walls and top are constructed of 1/2-inch, A36 carbon steel plate. The tank bottom is constructed of 3/8-inch, A36 carbon steel plate. The tank has the following specifications:

- Design Specifications: Reference Appendix 2
- Pressure Rating: Open top (atmospheric)
- Structural Supports: Reference Appendix 2
- Age of Tank: < 1 year
- Operating Temperature: Ambient 50 to 100 degrees Fahrenheit
- Location: Reference Figure 4: Process Plan
- Construction Materials: Reference Appendix 2
- Corrosion Resistance: Carbon steel is acceptable for a water pH at 8 or above
- Foundation Specifications: Reference Appendix 2
- Date in Service: 2007
- Expected Life: 25 years
- Cathodic Protection: Not required (aboveground)
- Previous Use: None
- NFPA Protective Distances: Not Applicable
- Certified Tank Drawings: Reference Appendix 2
- Vapor Pressure of Stored Waste: 14.7 pounds per square inch (psi) at 213 degrees Fahrenheit

Rinse Tank (Tank 7)

This tank primarily contains water to rinse the plastic chips to remove any fine particles remaining on the chips. The tank has an operational capacity of 5,500 gallons and a maximum capacity of 6,697 gallons. The tank is 8 feet wide, length 20 feet, and a maximum depth of 7.4 feet. The tank walls and bottom are constructed of 1/4-inch, A36 steel plate. The tank has the following specifications:

- Design Specifications: Reference Appendix 2
- Pressure Rating: Open top (atmospheric)
- Structural Supports: Reference Appendix 2
- Age of Tank: < 1 year
- Operating Temperature: Ambient 50 to 100 degrees Fahrenheit
- Location: Reference Figure 4: Process Plan
- Construction Materials: Reference Appendix 2
- Corrosion Resistance: Corrosion resistant stainless steel used on wetted surfaces
- Foundation Specifications: Reference Appendix 2
- Date in Service: 2007
- Expected Life: 25 years
- Cathodic Protection: Not required (aboveground)
- Previous Use: None
- National Fire Prevention
- Association (NFPA) Protective
- Distances: Not Applicable
- Certified Tank Drawings: Reference Appendix 2
- Vapor Pressure of Stored Waste: 14.7 pounds per square inch (psi) at 213 degrees Fahrenheit

Recycling Tanks (Tanks 2, 4, 6, and 8)

These tanks are used to contain the wastewater removed from the chips prior to entering the next process tank. Tank 2 is 4-feet wide, 4-feet long, and 2.3-feet deep with an operational capacity of 159 gallons and a maximum capacity of 280 gallons. Tank 4 is 4-feet wide, 5.9-feet long, and 2.0-feet deep with an operational capacity of 177 gallons and a maximum capacity of 360 gallons. Tank 6 is 4-feet wide, 5.9-feet long, and 3-feet deep with an operational capacity of 353 gallons and a maximum capacity of 540 gallons. Tank 8 is 4-feet wide, 5.9-feet long, and 2.0-feet deep with an operational capacity of 177 gallons and a maximum capacity of 360 gallons. The tank walls and bottom for each tank are constructed of 1/4-inch, A36 steel plate. The four tanks have the following specifications:

- Design Specifications: Reference Appendix 2
- Pressure Rating: Open top (atmospheric)
- Structural Supports: Reference Appendix 2
- Age of Tank: < 1 year
- Operating Temperature: Ambient 50 to 100 degrees Fahrenheit
- Location: Reference Figure 4: Process Plan
- Construction Materials: Reference Appendix 2
- Corrosion Resistance: Carbon steel is acceptable for a water pH at 8 or above
- Foundation Specifications: Reference Appendix 2
- Date in Service: 2007
- Expected Life: 25 years
- Cathodic Protection: Not required (aboveground)
- Previous Use: None
- NFPA Protective Distances: Not Applicable
- Certified Tank Drawings: Reference Appendix 2
- Vapor Pressure of Stored Waste: 14.7 pounds per square inch (psi) at 213 degrees Fahrenheit

Water Recovery Tank (Tank 9)
This tank contains primarily water, has a capacity of 7,800 gallons, in a 10 feet diameter by 14.7 feet high polyethylene structure. The wastewater is held in this tank prior to discharge to the plate filter press. The tank has the following specifications:

• Design Specifications:	Reference Appendix 2
• Pressure Rating:	Open top (atmospheric)
• Structural Supports:	Reference Appendix 2
• Age of Tank:	New
• Operating Temperature:	Ambient 50 to 100 degrees Fahrenheit
• Location:	Reference Figure 4: Process Plan
• Construction Materials:	Reference Appendix 2
• Corrosion Resistance:	Corrosion resistant polyethylene
• Foundation Specifications:	Reference Appendix 2
• Date in Service:	2007
• Expected Life:	25 years
• Cathodic Protection:	Not required (aboveground)
• Previous Use:	None
• NFPA Protective Distances:	Not Applicable
• Certified Tank Drawings:	Reference Appendix 2
• Vapor Pressure of Stored Waste:	14.7 pounds per square inch (psi) at 213 degrees Fahrenheit

Holding Tank (Tank 10)
This tank is a 10 feet diameter by 14.7 feet high polyethylene structure and has a capacity of 7,800 gallons. Water from the filter press is held in this tank pending analytical results prior to discharge to either the Water Recovery Tank (Tank 9) or the Water Storage Pond. The tank has the following specifications:

- Design Specifications: Reference Appendix 2
- Pressure Rating: Open top (atmospheric)
- Structural Supports: Reference Appendix 2
- Age of Tank: New
- Operating Temperature: Ambient 50 to 100 degrees Fahrenheit
- Location: Reference Figure 4: Process Plan
- Construction Materials: Reference Appendix 2
- Corrosion Resistance: Corrosion resistant polyethylene
- Foundation Specifications: Reference Appendix 2
- Date in Service: 2007
- Expected Life: 25 years
- Cathodic Protection: Not required (aboveground)
- Previous Use: None
- NFPA Protective Distances: Not Applicable
- Certified Tank Drawings: Reference Appendix 2
- Vapor Pressure of Stored Waste: 14.7 pounds per square inch (psi) at 213 degrees Fahrenheit

Tank Assessment
A structural integrity assessment was performed on the existing and new treatment system tanks by Creative Products, located in Bakersfield, California. The tank assessment determined that the tanks will be structurally stable and constructed of materials compatible with materials contained. A copy of the structural integrity assessment is provided in Appendix 2. The assessment is valid for five years and expires on **August 1, 2012**, at which time a new structural integrity assessment will be performed.

Secondary Containment
The secondary containment consists of a concrete floor and a concrete curb that encloses all tanks according to Figure 4 Process Plan. This secondary containment system is impermeable and compatible with the lead waste. The entire secondary containment area is enclosed within a building to prevent the collection of precipitation in the containment area. The containment curb has a minimum width of eight inches and a minimum height of eight inches above the finished floor. The containment curb is constructed with expansion joints at the curb corners and at 20-foot intervals between corners. The expansion joints are ½" wide and are made of pre-molded non-bituminous joint filler.

The secondary containment curb has a capacity of 9,447 gallons and exceeds the largest tank capacity of 7,800 gallons and 10% of the total capacity of all tanks (4,243 gallons). Any waste material spilled and collected in the secondary containment will be pumped to the recovery tank and any solids will be collected and temporarily stored in drums. The concrete curb prevents run-on and run-off from the containment area. The secondary and tank systems are inspected daily for cracks, leaks, damage, or deterioration in accordance with the inspection schedule in Appendix 9.

CERTIFICATION

" I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information submitted. Base 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 the there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signed: ______________________ Date: 3/1/07

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Creative Products
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Bakersfield, CA 93311

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CUSTOMER KW PLASTICS
JOB TREATMENT ROOM EXPANSION

CALCULATED BY: Jim Hansen DATE: 1/2/01

SCOPE ASSESSMENT OF NEW PROCESS FOR CALARP COMPLIANCE FOR K.W. PLASTICS OF CALIFORNIA AT 1861 SUNNYSIDE CT., BAKERSFIELD, CA 93308 PARCELS 3 & 4 OF MAP 7105 KERN CNTY, CA.

FAULT PROXIMITY: >15 KM FROM WHITE WOLF FAULT

UBC FACTORS: Z=0.4, SD, B (FAULT), Na=1.0
Nv=1.0

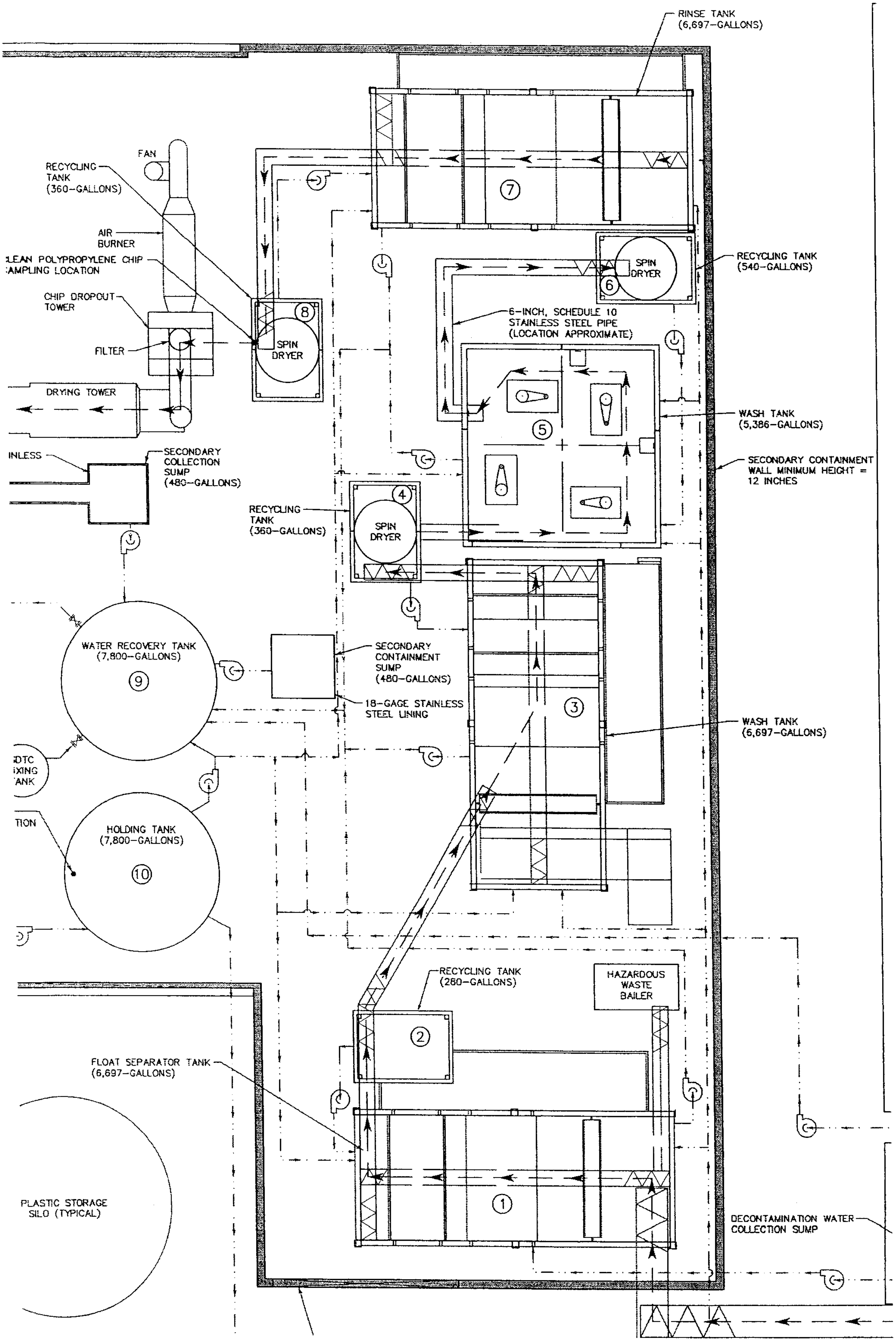
SOILS REPORT: GOLDEN VALLEY TESTING, INC
1999 EDISON HWY ST 20
BAKERSFIELD, CA. 93305
327-8267

ALLOWABLE SOIL BEARING = 1200#/ft² UP TO 1700#/ft² MAX

EQUIPMENT:
TANKS CONTAINING HAZARDOUS LIQUID

TANK #1, 3, 7
5500 GAL FLOAT SEPERATOR DWG SH 3 OF 8
PROJ 96-SAN01-05 (KW PLASTICS)
MAX CAP = 6,697 GAL 1197/7.48 = 160 ft³
3/16" 316 SST WALL h = 160/160 = 1 ft
LIQ WT = 5500 GAL (8.34 #/GAL) = 45,882#

1 ft FREEBOARD


RINSE TANK
(6,697-GALLONS)
FAN
RECYCLING TANK
(360-GALLONS)
AIR BURNER
CLEAN POLYPROPYLENE CHIP SAMPLING LOCATION
CHIP DROPOUT TOWER
FILTER
DRYING TOWER
SPIN DRYER
RECYCLING TANK
(540-GALLONS)
6-INCH, SCHEDULE 10
STAINLESS STEEL PIPE
(LOCATION APPROXIMATE)
WASH TANK
(5,386-GALLONS)
SECONDARY COLLECTION SUMP
(480-GALLONS)
SECONDARY CONTAINMENT WALL MINIMUM HEIGHT = 12 INCHES
RECYCLING TANK
(360-GALLONS)
WATER RECOVERY TANK
(7,800-GALLONS)
SECONDARY CONTAINMENT SUMP
(480-GALLONS)
18-GAGE STAINLESS STEEL LINING
WASH TANK
(6,697-GALLONS)
HOLDING TANK
(7,800-GALLONS)
RECYCLING TANK
(280-GALLONS)
HAZARDOUS WASTE BAILER
FLOAT SEPARATOR TANK
(6,697-GALLONS)
PLASTIC STORAGE SILO (TYPICAL)
DECONTAMINATION WATER COLLECTION SUMP
1
2
3
4
5
6
7
8
9
10

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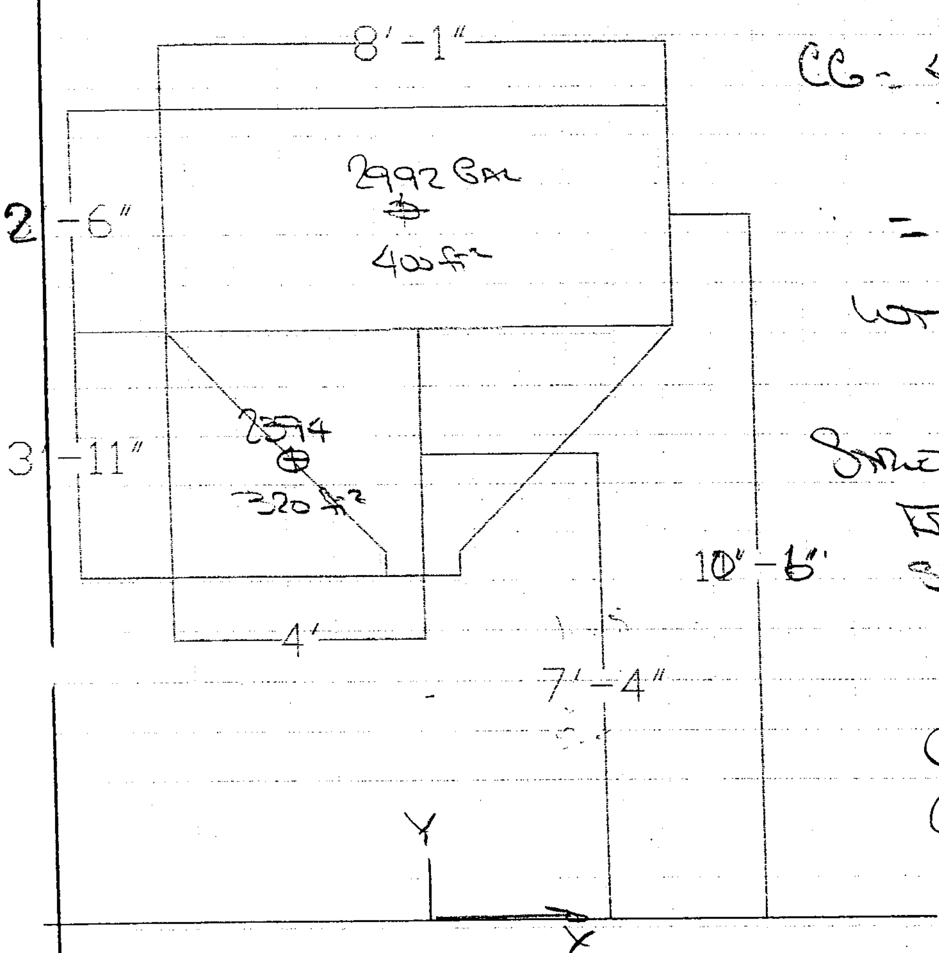
CUSTOMER
JOB
SHEET NO. 3 OF
CALCULATED BY: Jim Hansen DATE:

TANK #1, 3, 7



TOTAL GAL = 5386 GAL

CG = [400 (10.5) + 320 (7.33)] / 720

= 9.09 ft

WT = 5386 (8.34) = 44,919#

STRUCTURE WT.
FRAME. 1600# @ 9'-0
SHELL 3/16
88 ft² + 280 ft² = 368 ft²
2900# @ 9'-0"
CATWALK 2000# @ 9'-0"
CONVEYORS 1800# @ 9'-0"

TOTAL 8300# @ 9'-0"

TOTAL GROSS
= 53,219 @ 9'-0"

BASE SHEAR:
LC #1 HORIZ ACC X-X

$V = \frac{2.5 (Ca) I (W)}{R (1.4) \text{ ASD}}$ $Ca = 0.44 (1) = 0.44$

$I = 1.25$ $R = 4.5$

$= 0.22 W$

$\therefore V = 0.22 (53.2^k) = 11.7^k$ (AISC ALLOWS 1.4 ASD)

VERT LOAD:
$E_v = 1D + 0.5 (.44) 1 (1) D = 1.22 D$

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CUSTOMER ____________
JOB ____________
SHEET NO. 4 OF ____
CALCULATED BY: Jim Hansen DATE: ______

LATERAL SHEAR:

SHEAR @ ENDS = 11.7/4 = 2.92ᵏ/END

SHEAR @ MID SECTION = 5.85ᵏ

SUPPORT REACTIONS:

$P_y = 5.85(9)/8.3 + 53.2^k/4$ — MAX LOAD!

$= 6.34 + 13.3 = 19.64^k$/LEG @ CENTER.

MIN = 13.3 − 6.34 = 6.96ᵏ (NO UPLIFT)

LEG STRESS

@ MID SECT

TS 5×5×1/4 — $f_a = 19.64/4.6 = 4.27$ KSI

A = 4.6 r = 1.92

S = 6.78 — $f_b = 5.85(62)/2(6.78) = 26.7$ KSI

Fy = 46 (ASTM 500 GR B)

@ END

UNBRACED @ 6'-7"

$f_b = 2.92(79)/6.78 = 34$ KSI

$f_a = 19.64/2(4.6) = 2.13$ KSI

ALLOWABLE

$KL/r = 72(2)/1.92 = 75$

$F_a = 19.5$

$F_b = 0.66F_y$

(H1-3) $\frac{2.13}{(1.3)19.5} + \frac{34}{30.36(1.3)} =$

$0.08 + 0.86 = 0.94$ OK

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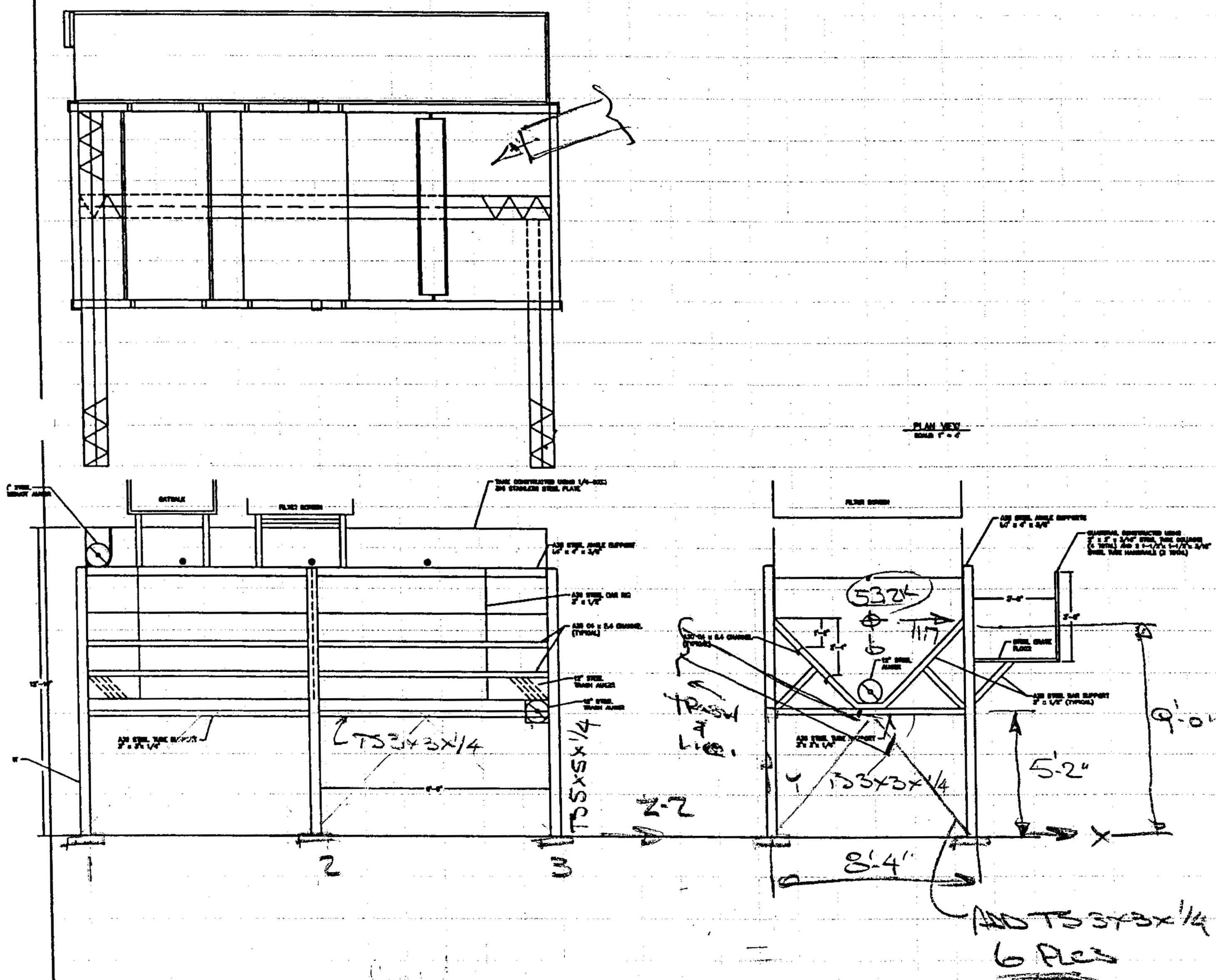
CUSTOMER__________

JOB__________

SHEET NO. 5 OF ______

CALCULATED BY: Jim Hansen DATE: ______

TANK #137

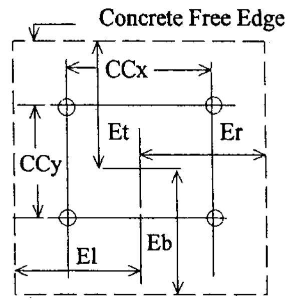


6

ARCHON WinBase

INPUT DATA

Anchor Size = 5/8
Anchors are embeded studs
Stud Tension Area = 0.226(in^2)
Stud Shear Area = 0.307(in^2)
Stud head dia. = 0.625(in)
Embedment = 5(in)
Stud Yield Strength = 50(ksi)
Stud Tensil Strength = 100(ksi)
Concrete Compressive Strength = 3300(psi)



Center to Center Spacing:
CCX = 12(in)
CCY = 12(in)

Concrete Free Edge Distance
Note, if 0 then there is no free edge distance

ET = 24(in)EB = 24(in)EL = 24(in)ER = 24(in)

BOLT TYPE IS EMBEDED ANCHOR
INPUT SAFETY FACTOR = 2.000

THE FOLLOWING IS BASED ON WORST
CASE SHEAR IN ALL DIRECTIONS.

YOUR WORST CASE ALLOWABLE LOADS:
Your lowest allowable tension load is 5085 lbs
Your lowest allowable shear load is 5756 lbs

ALLOWABLE INDIVIDUAL BOLT TENSION
BOLT(1) 5085 lbs
BOLT(2) 5085 lbs
BOLT(3) 5085 lbs
BOLT(4) 5085 lbs

ALLOWABLE INDIVIDUAL BOLT SHEAR
BOLT(1) 5756 lbs
BOLT(2) 5756 lbs
BOLT(3) 5756 lbs
BOLT(4) 5756 lbs

MAX TOTAL LOAD ALLOWED ON BOLT GROUP
MAX GROUP SHEAR LOAD = 2.30E+04 lbs
MAX GROUP TENSION LOAD = 2.03E+04 lbs

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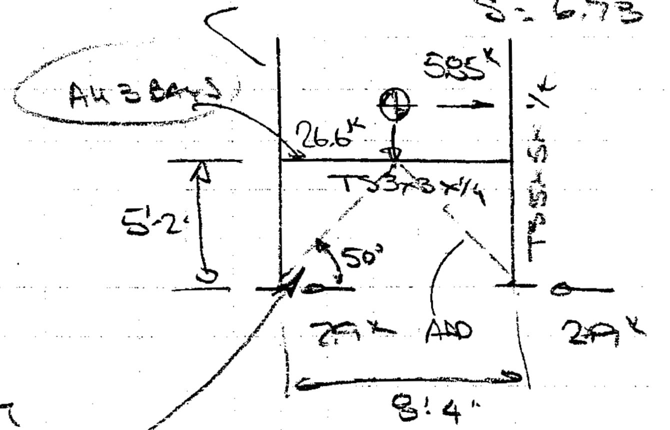
CUSTOMER ____________
JOB ____________
SHEET NO. 8 OF ______
CALCULATED BY: Jim Hansen DATE: ______

TANK # 1,3,7

LOADS @ MID SECTION (#2)

LC#2 ACC Y-Y

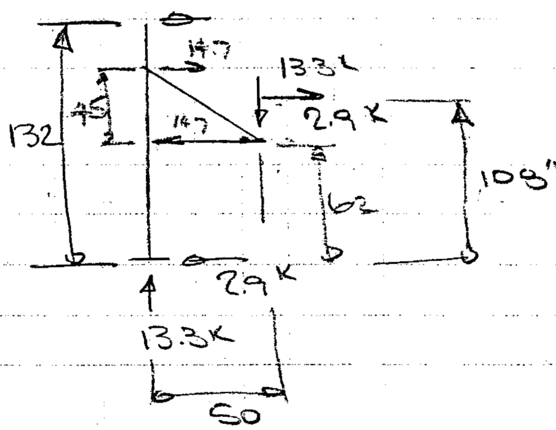
TS 5x5x1/4 I = 16.9
S = 6.78



TS 3x3x1/4 A = 2.59
S = 2.10

$f_b = 310{,}704/6.78(1000)$
$= 45.8\ KSI > 0.6(1.3)\ F_y$

ADD DIAGONALS @ 3 BAYS



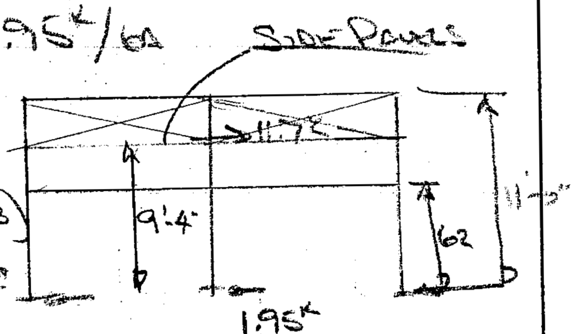
AXIAL LOAD
$P_a = 13.3/\sin 50$
$= 17.4\ K$ L = 146

USE TS 3x3x1/4
$f_a = 17.4/2.59 = 6.7\ KSI$ OK $< 0.6F_y$

LC#3 SEISMIC ACC Z-Z

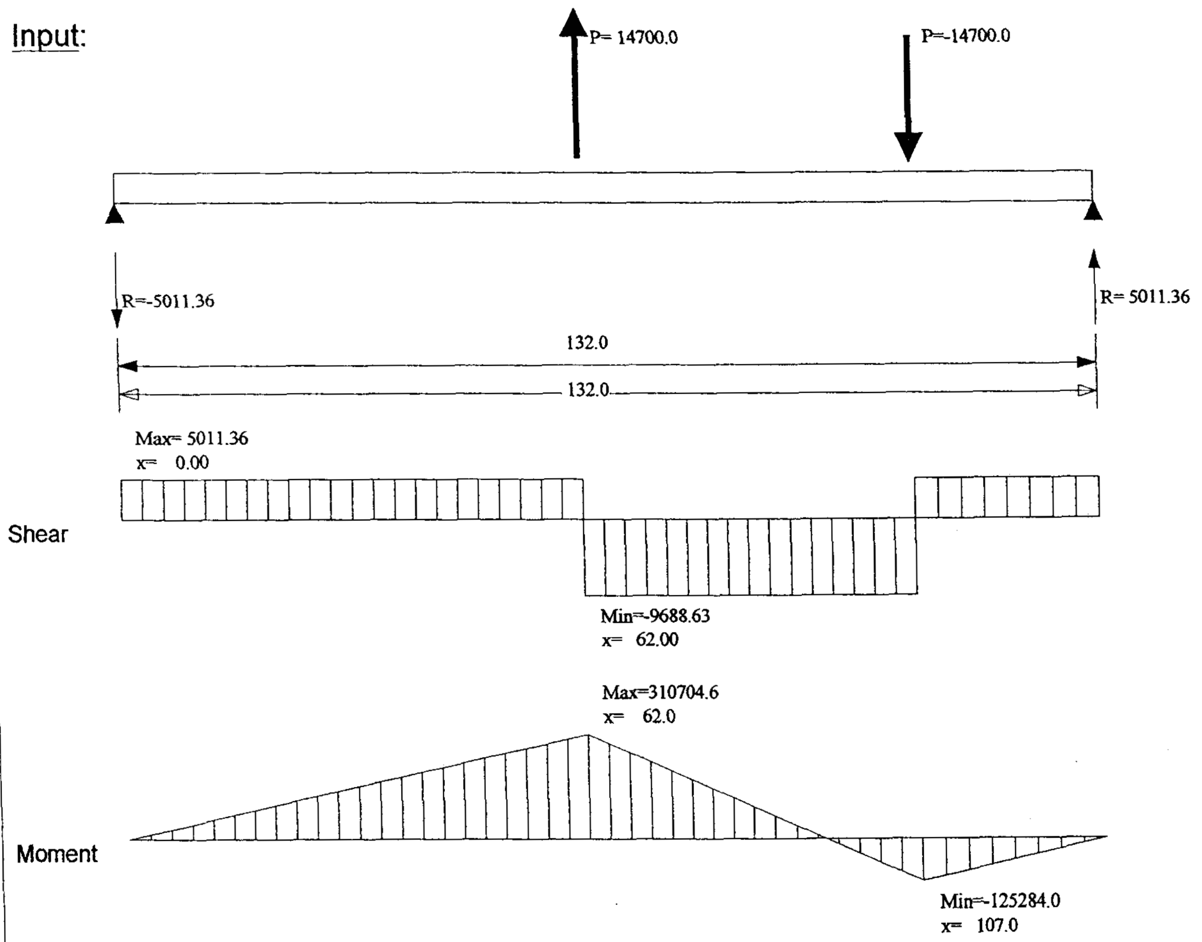
$V_z = 11.7^K$ $V_{z\,EACH} = 11.7/6 = 1.95^K/EA$

$f_b = 1.95(112)/6.78 = 32.2\ KSI$ OK
$< 0.6F_y(1.3)$
35.9 KSI



PCE	KW Plastics CalARP on Expansion	Date:	09Sep2005
		Engineer:	Your Name
	Tank #1	Project:	CalARP

Input:



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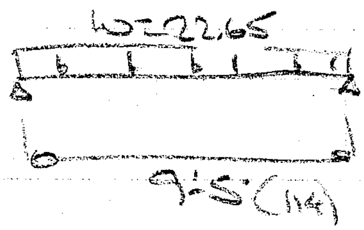
CUSTOMER__________
JOB__________
SHEET NO. 10 OF ______
CALCULATED BY: Jim Hansen DATE: ______

TANK 1,3,7

TANK SUPPORT:

HEAD = 4ft = 1.75PSI   AREA ON CHNL SUPPORT



A = 1.5 (9.5') = 14.25 ft²

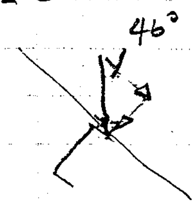
P_V = 3590# (VERT)

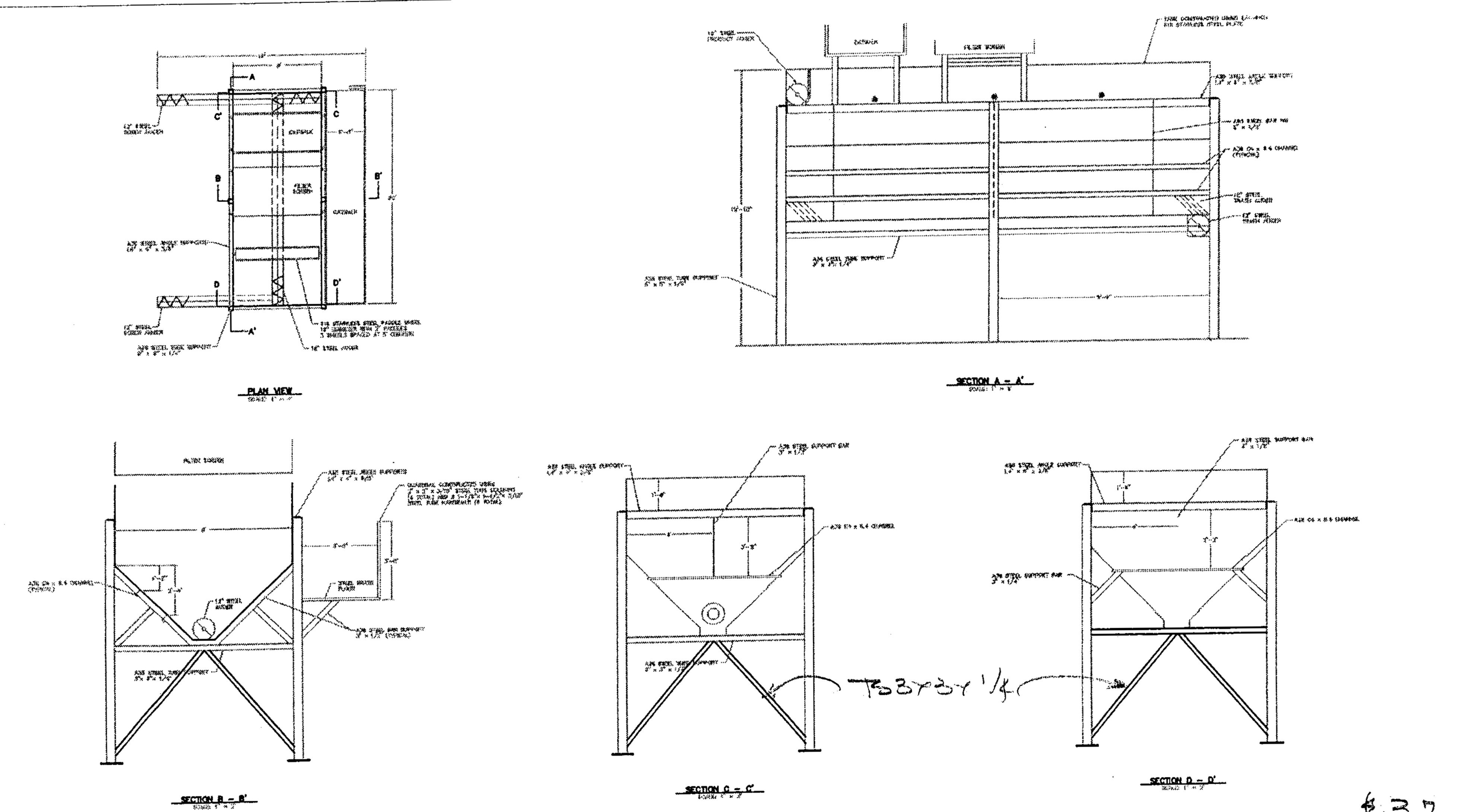
M = 22.65 (114)² / 8 (1000)
= 51.17

P_H = 3590 Sin 46°
= 2582

USE
C4x5.4
S = 1.93

f_b = 36.8 / 1.93 = 19.1 KSI OK
< 0.6Fy





£3,7

TANK NO. 1 – FLOAT SEPARATOR			
SCALE: AS SHOWN	ALW		
KW PLASTICS OF CALIFORNIA 1861 SUNNYSIDE COURT BAKERSFIELD, CALIFORNIA 93308 (805) 392-0800 fax (805) 392-0643			
PROJ: 96-EANG1-08	DATE: 06/06/05	SHEET 3 OF 6	

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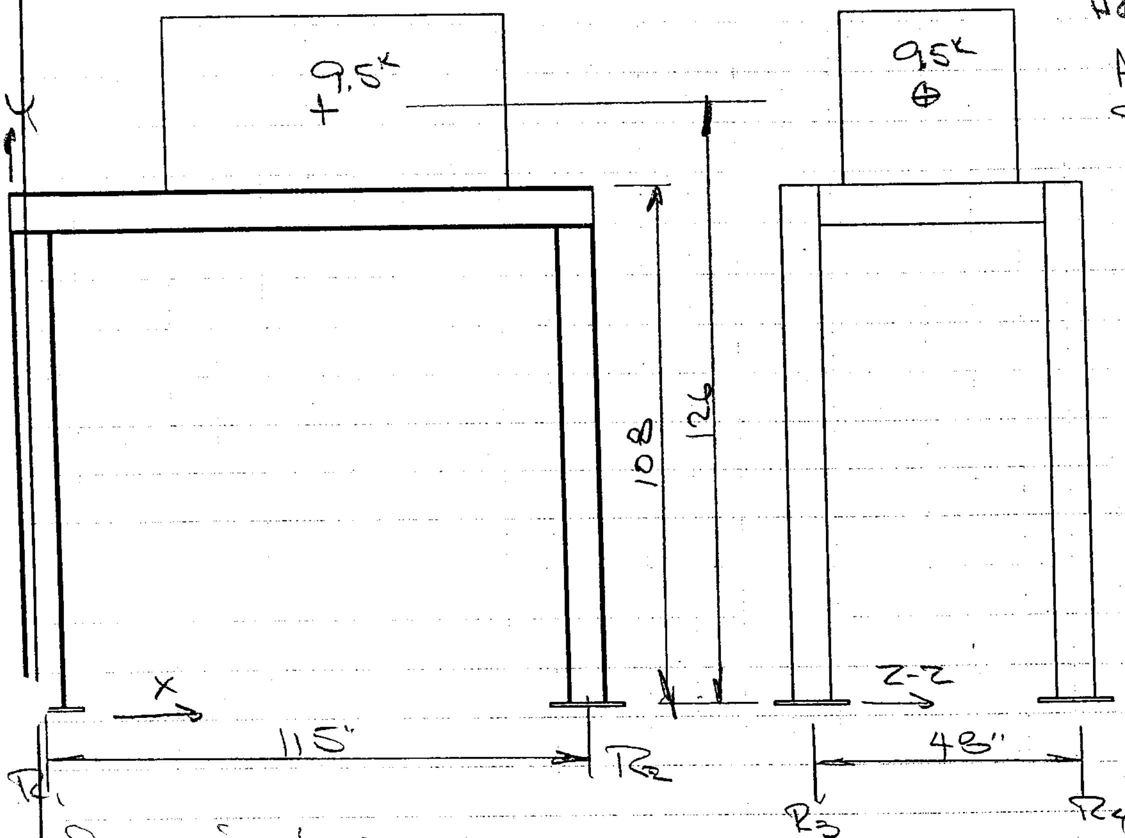
CUSTOMER ____________

JOB ____________

SHEET NO. 12 OF ____________

CALCULATED BY: Jim Hansen DATE: ____________

Grinder Structure over Tank #3



Frame W8x35

A = 10.3

S = 31.2

Seismic Load.

$$V = \frac{2.5(Ca)\,I\,(W)}{R(1.4)\ ASD} = \frac{2.5(1)1W}{4.5(1.4)} = \underline{0.18W}$$

$Ca = 0.44(1) = 0.44$

$I = 1.0 \quad R = 4.5$

LC#1 Acc in X-X

$$R_2 = 9.5/4 + 9.5(0.18)(126)/115$$

$$= 2.38 + 1.87 = \underline{4.25^k} / \text{Support Leg}$$

$$M_1 = 2.38 - 1.87 = \underline{0.51^k}$$

Bending

$$f_b = 9.5(0.18)(126)/4(31.2) = \underline{1.73\,ksi}$$

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CUSTOMER

JOB

SHEET NO. 13 OF

CALCULATED BY: Jim Hansen DATE:

Axial

$f_a = 4.25/10.3 = \underline{0.42}$ ksi

LC#2 ACC'N 2-2

$R_4 = 9.5(0.18)(128)/48 + 2.38$

$= 4.5 + 2.38 = \underline{6.9}^k$

$R_3 = -\underline{2.12}^k$ uplift

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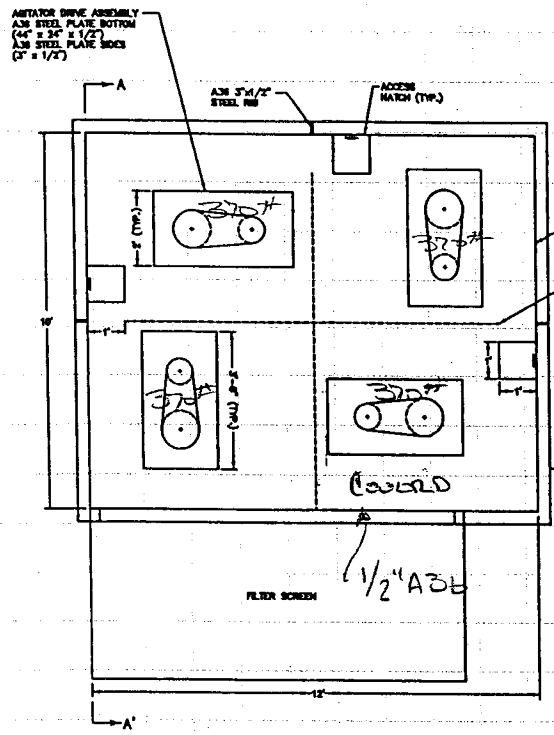
SHEET NO. 14 OF ______
CALCULATED BY: Jim Hansen DATE: ______

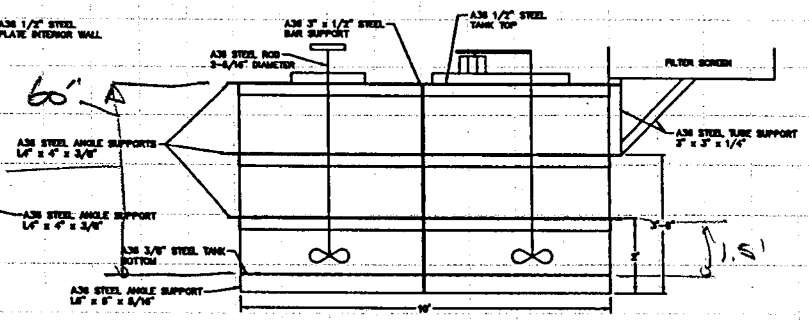
TANK # 5



PLAN VIEW
SCALE: 1" = 2'

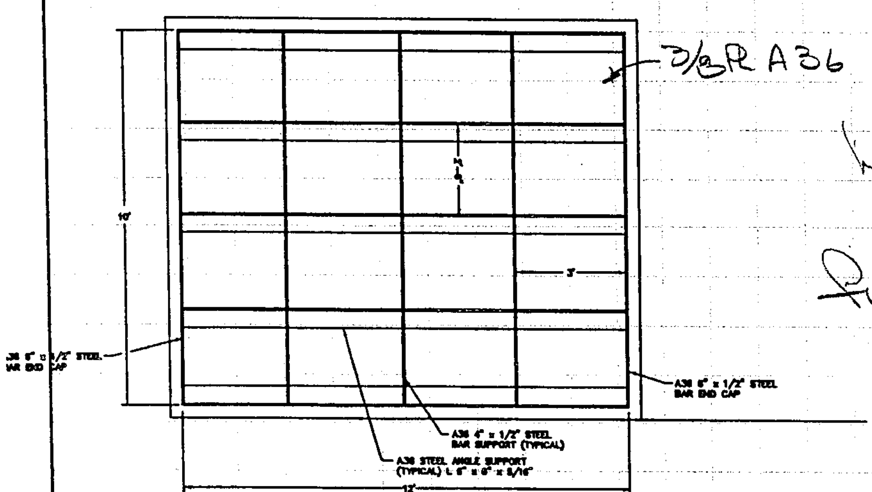
LIQUID LOAD = 3600 GAL
3600(8.34) = 30,024#

HEIGHT = 481/120 = 4 FT



SECTION A – A'
SCALE: 1" = 2'

TANK BTM: 3/8 PL w/ L6x6x5/16 @ 30" C-C
OK IF SUPPORTED BY FLOOR



3/8 PL A36 IF SUPPORT AT 4 CORNERS

LOAD/BAY = 2.5(4)(62.4) = 624#/FT
(52)

$f_b = 52(144)^2 / 8(13.3)$
= 10,134 PSI < 0.6 Fy OK

TANK WALL 1/2" A36 w L4x4x3/8

PRESSURE AT LOWER SUPPORT H = 4 − 1.5 = 2.5 FT
= 1.25 PSI

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PCE	KW PLASTICS CalARP New Expansion	Date:	10Sep2005
		Engineer:	Jim Hansen
	Tank # 5 Bottom	Project:	KW

Composite Section Summary:

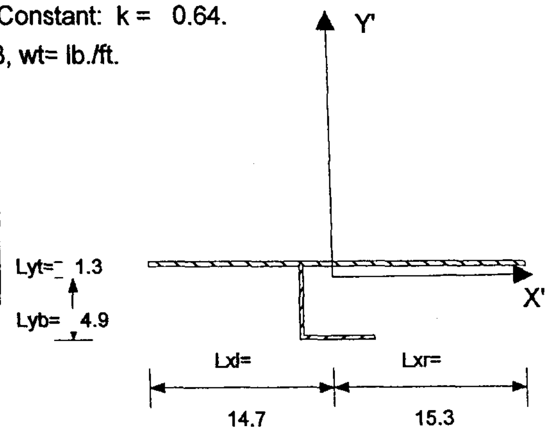
Area	Wt	Ix	Iy	Ixy	Sx	Sy	Rx	Ry	Xna	Yna	Sxb	Sxt	Syl	Syr
14.9	50.6	65.8	861.9	8.9	13.3	56.2	2.10	7.61	-0.34	-1.07	13.3	52.4	58.8	56.2
Principal Axis		65.7	862.0	0.0	13.3	56.2	2.10	7.61	-0.33	-1.07	13.3	52.0	58.7	56.2

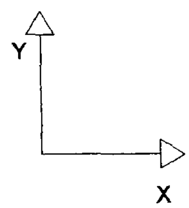
Principal Axis Angle: θ= 0.64°, Approximate Torsional Constant: k = 0.64.

Mat. Density = 490.00 lbs./ft^3, Units: A= in², I= in^4, S=in^3, wt= lb./ft.

Object Geometries:

		Dimensions				Position		
No.	ID	1(d)	2(b)	3(t)	4(tw)	X0	Y0	Ang°
1	PL 30.0x 0.4	0.375	30.00					
2	L 6x6x0.310	6.000	6.000	0.310	0.310		-3.0	





PCE	KW PLASTICS CalARP	Date:	10Sep2005
		Engineer:	Jim Hansen
	Tank #5 Side Wall	Project:	KW

Composite Section Summary:

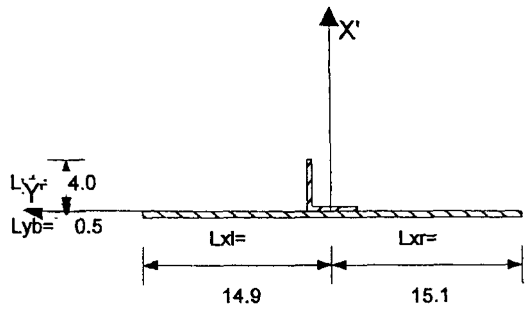
Area	Wt	Ix	Iy	Ixy	Sx	Sy	Rx	Ry	Xna	Yna	Sxb	Sxt	Syl	Syr
17.9	60.9	9.4	1131.2	-5.5	2.3	74.7	0.73	7.95	-0.14	0.22	19.8	2.3	76.1	74.7
Principal Axis		1131.2	9.4	-0.0	260.5	0.6	7.95	0.72	-0.23	-0.14	2168.0	260.5	0.6	0.6

Principal Axis Angle: θ= 89.72°, Approximate Torsional Constant: k = 1.37.

Mat. Density = 490.00 lbs./ft^3, Units: A= in², I= in^4, S=in^3, wt= lb./ft.

Object Geometries:

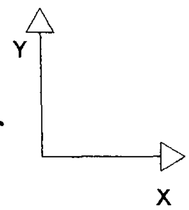
No.	ID	Dimensions 1(d)	2(b)	3(t)	4(tw)	Position X0	Y0	Ang°
1	PL 30.0x 0.5	0.500	30.00					
2	L 4x4x0.380	4.000	4.000	0.380	0.380		2.3	



SPAN 72" TO 1/2 x 4 BAR

$M = 1.25(36)(72)^2 / 8(2.3)(1000)$

$= \underline{12.7\ KSI} < 0.6F_y$ OK



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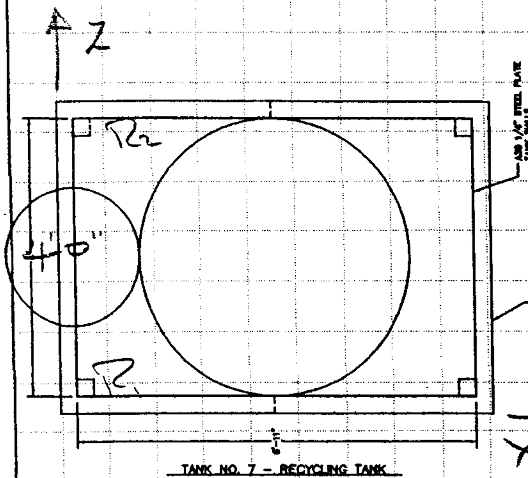
SHEET NO. 17 OF ______
CALCULATED BY: Jim Hansen DATE: ______



TANK #4

LOADS:

DL TANK WT – 750#
SPIN DRYER 3816 (DL+LL)

LL 177 GAL × 8.4 = 1487#
6053

BASE SHEAR:

CG = 6 ft

X → CH 1 Horiz Acc Z-Z

$V = 0.22W$
$= 0.22(6053) = 1332^{\#}$ on 4 legs

SUPPORT REACTIONS

$R_2 = \frac{6{,}053}{4} + 1332\frac{(6)}{4(2)}$
$= 1513 + 999 = 2512^{\#}$

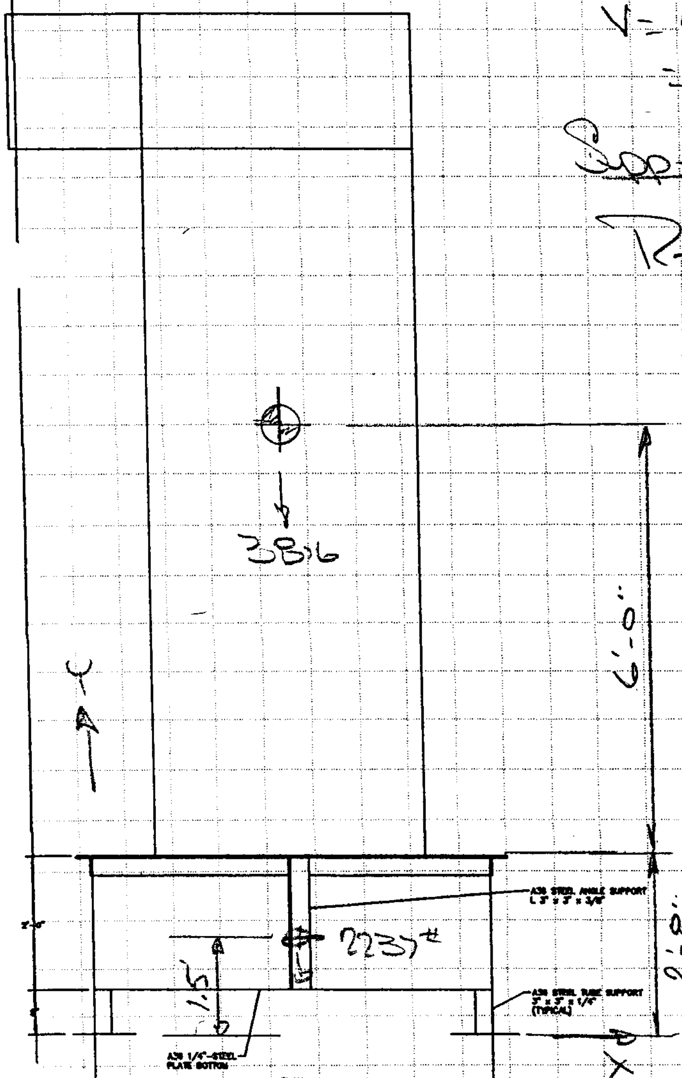
No uplift

SUPPORT STRESS

TS 3×3×1/4 EVAL LIKE L3×3×1/4
A = 1.5
S = 0.78

$f_a = 2.5^k/1.5 = 1.67$ ksi < 0.6 Fy ok

$f_b = 1.33^k(8)/4(.78) = 3.4$ ksi ok



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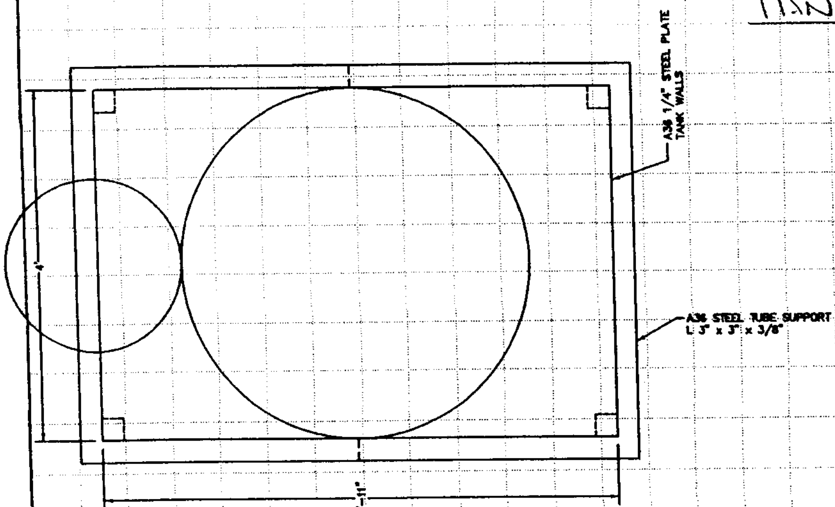
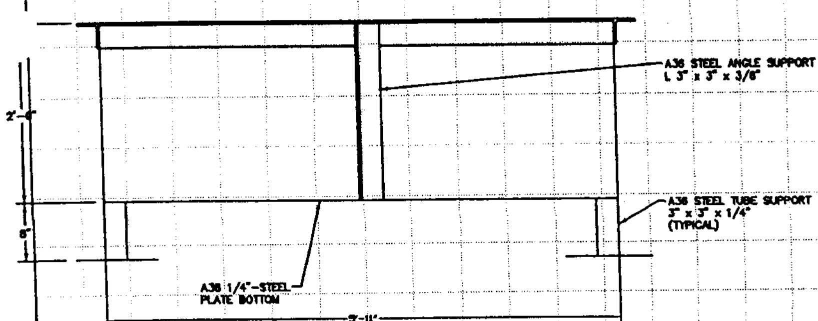
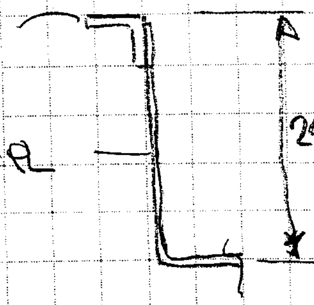


TANK NO. 7 – RECYCLING TANK



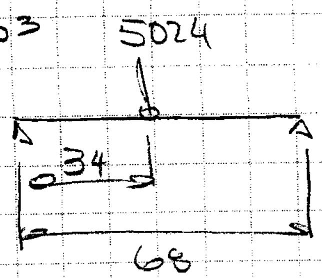
TANK SHELL STRESS



SECTION PROP

$A = 6 \text{ in}^2$

$S_x = 40 \text{ in}^3$



$f_b = 5(68)/4\,(40) = 2.13$ ksi

BASE PLATE

USE 1/2 x 8 x 8
2 – 5/8 ANCHORS W/
5" EMBEDMENT

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CUSTOMER ______

JOB ______

SHEET NO. 19 OF ______

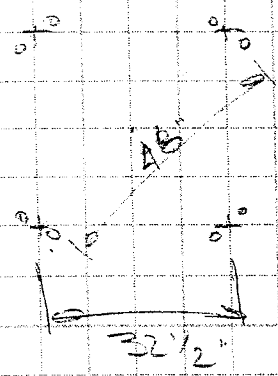
CALCULATED BY: Jim Hansen DATE: ______

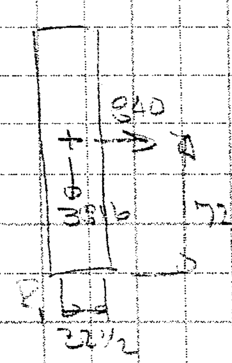
SPICE DRYER MOUNT: (TANKS 7, 8 & 9)

SHEAR

DL + LL = 3816# $V = 0.22W = 0.22(3816) = 840\#$

BOLT IN 4 QUADRANTS OF 4 ft DIA BASE





$UPLIFT\ R = (0.9)\frac{3816}{2} - 840(72)/32\frac{1}{2}$

$= 1717 - 1861$

$= 144\#$ ON 2 BOLTS

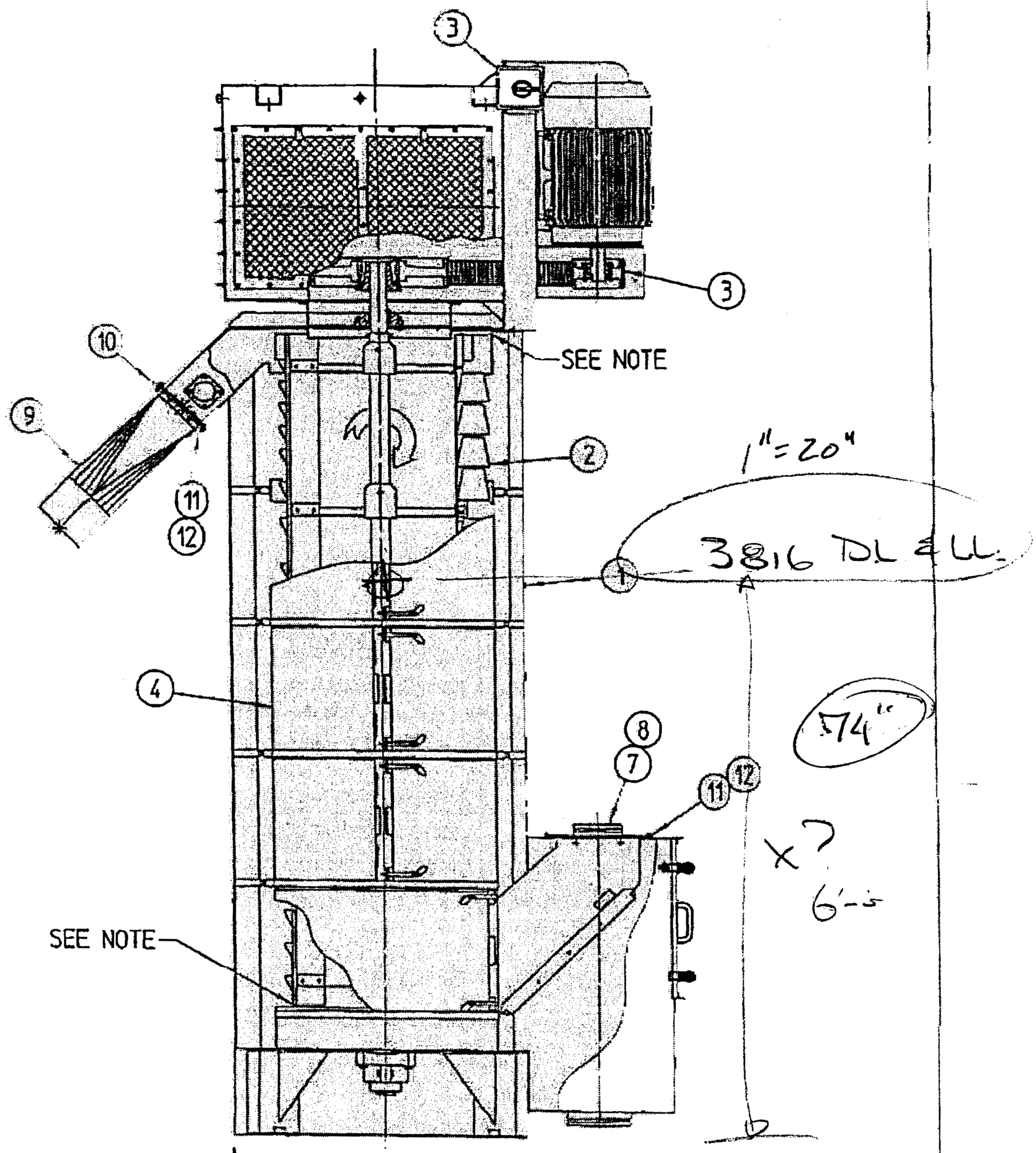
USE 5/8 × 8" PLATE IN 4 LOCATIONS (SEE SKETCH)

ADD L3×3×3/8 L TO MID MOUNTS

(MOUNT SAME ON TANKS 7, 8 & 9)

201

REVISIONS			
NO.	DATE	BY	CK
1			



Model No. 5032BF

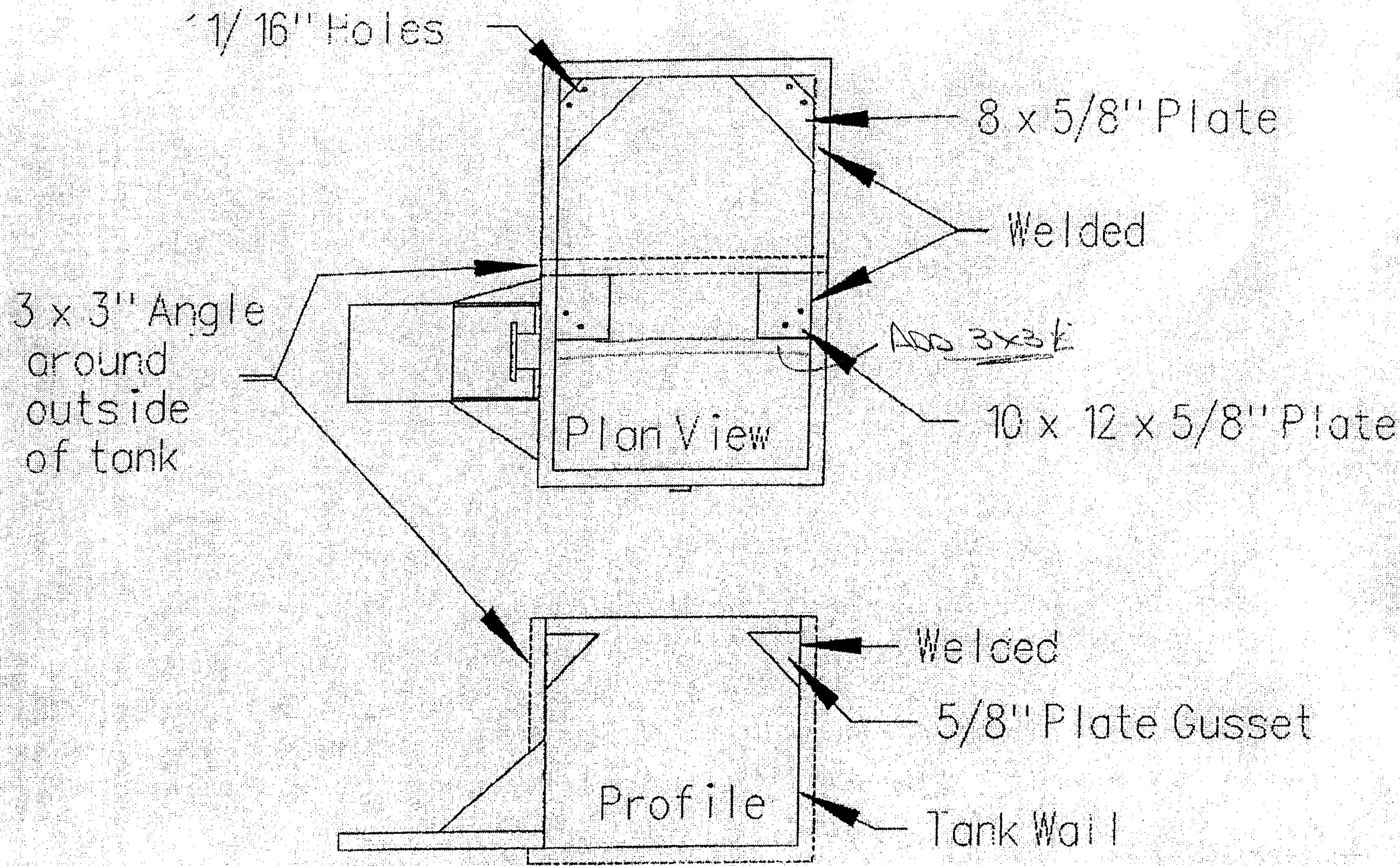
4 ft Dia

Gala Job# 20000600126

SPIN DRYERS

,o: Jared Lynn 6.5-889-4004

From: Pat Borom



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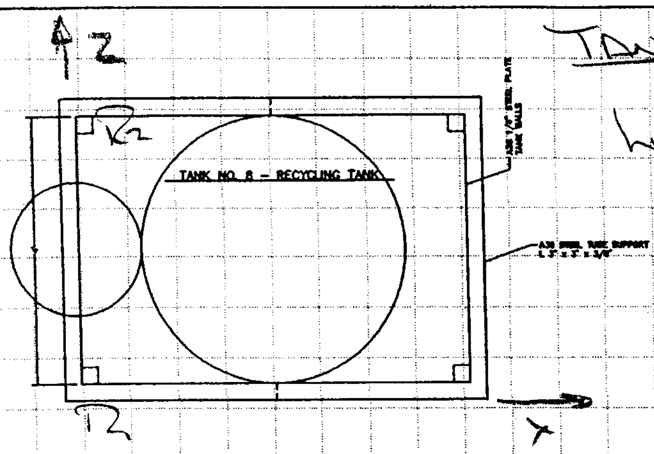


TANK #8

LOADS:

DL TANK WT

1/4 PL 650#

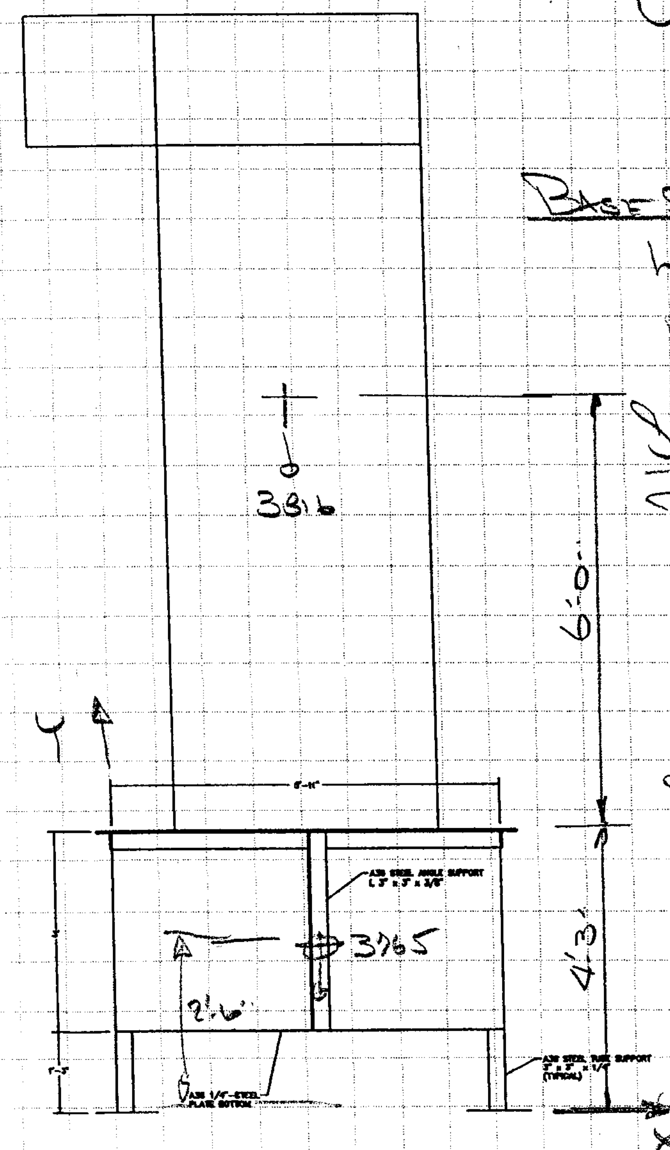
L3x3x1/4 150#

SPIN DRYER 3816 DL+LL

L.L. 353 GAL (8.4) = 2965

7581

$CG = \frac{2.5(3765) + 8.5(3816)}{7581} = 5.52 \text{ ft}$



BASE SHEAR

LC#1 Horiz Acc 22

$V = 0.22W = 0.22(7581) = 1668$

SUPPORT REACTIONS

$R_2 = \frac{7581}{4} \pm \frac{1668(5.52)}{3.75(2)}$

$= 1895 \pm 1228$

$= 3123$ (No uplift)

SUPPORT STRESS

TS 3x3x1/4 EVAL LIKE L3x3x1/4

A = 1.5

S = 0.78

$f_b = \frac{1668(1.5)}{4(0.78)}$

$= 8019$ PSI $< 0.6F_y$ OK

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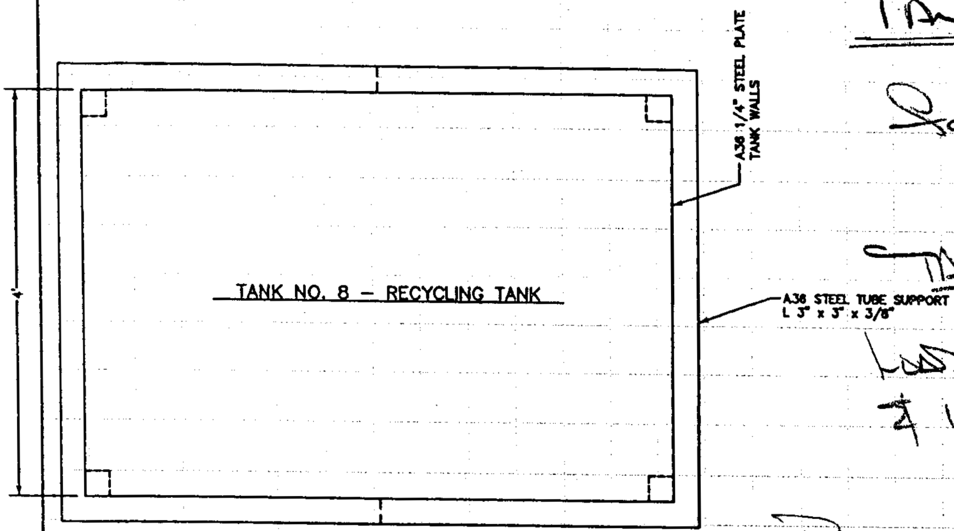

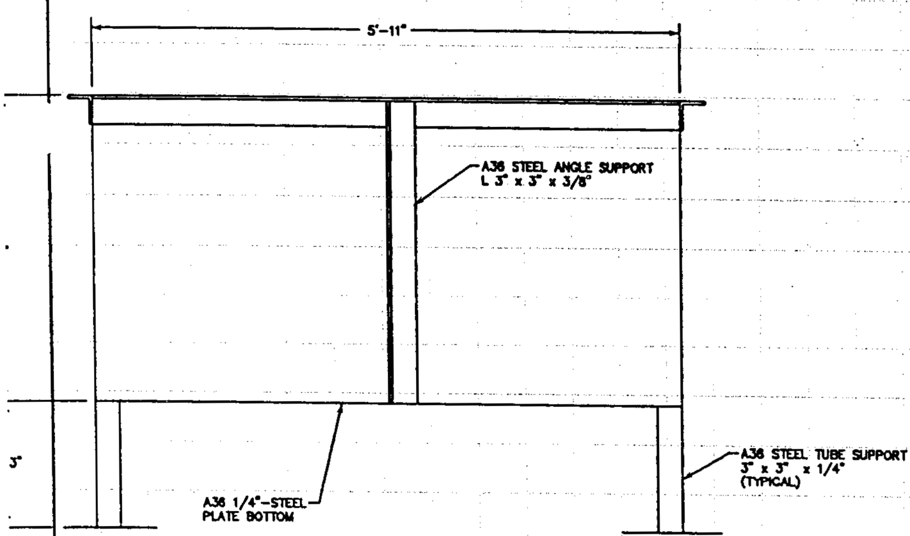

TANK #8

fa = 758#/4 (1.5) = 1263 psi < 20,1.. ok

TANK STEEL STRESS

LOAD SAME TANK #7
& 12' DEEPER BOTH OK

BASE PLT

USE 1/2×6×6
& 2 – 5/8 ANCHORS
W– 5" EMBEDMENT

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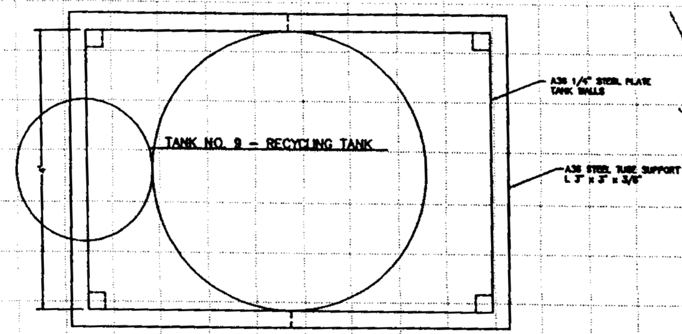
TANK #6

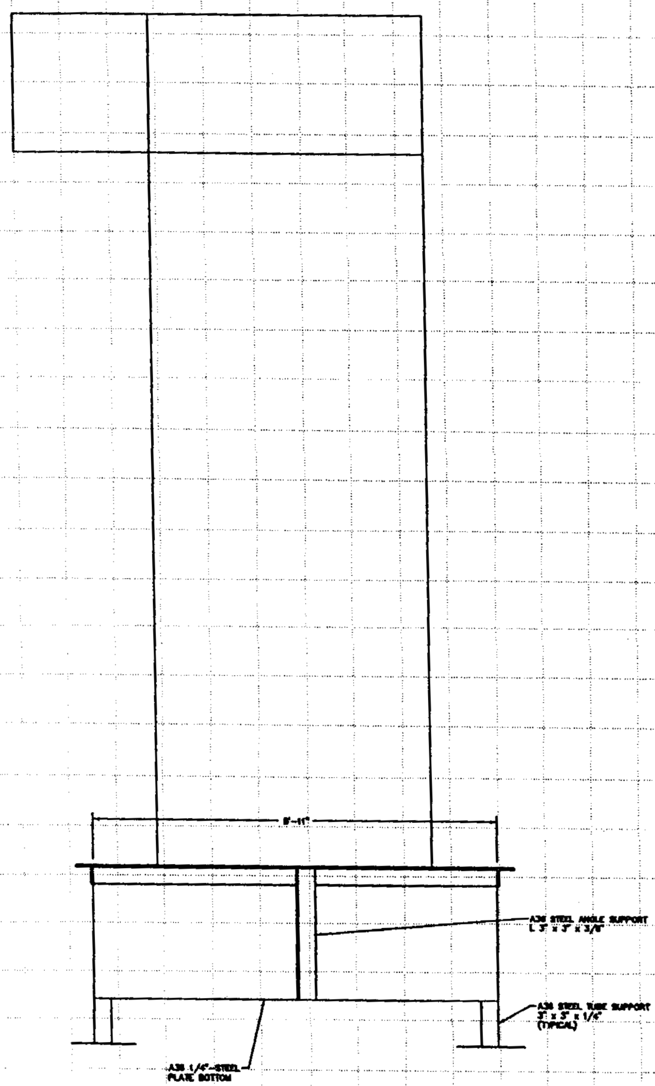


LOADS: SAME AS TANK #4 & 8

TANK IS SAME

∴ TANK DESIGN WITHIN ALLOWABLES.

SAME BASE PLATES



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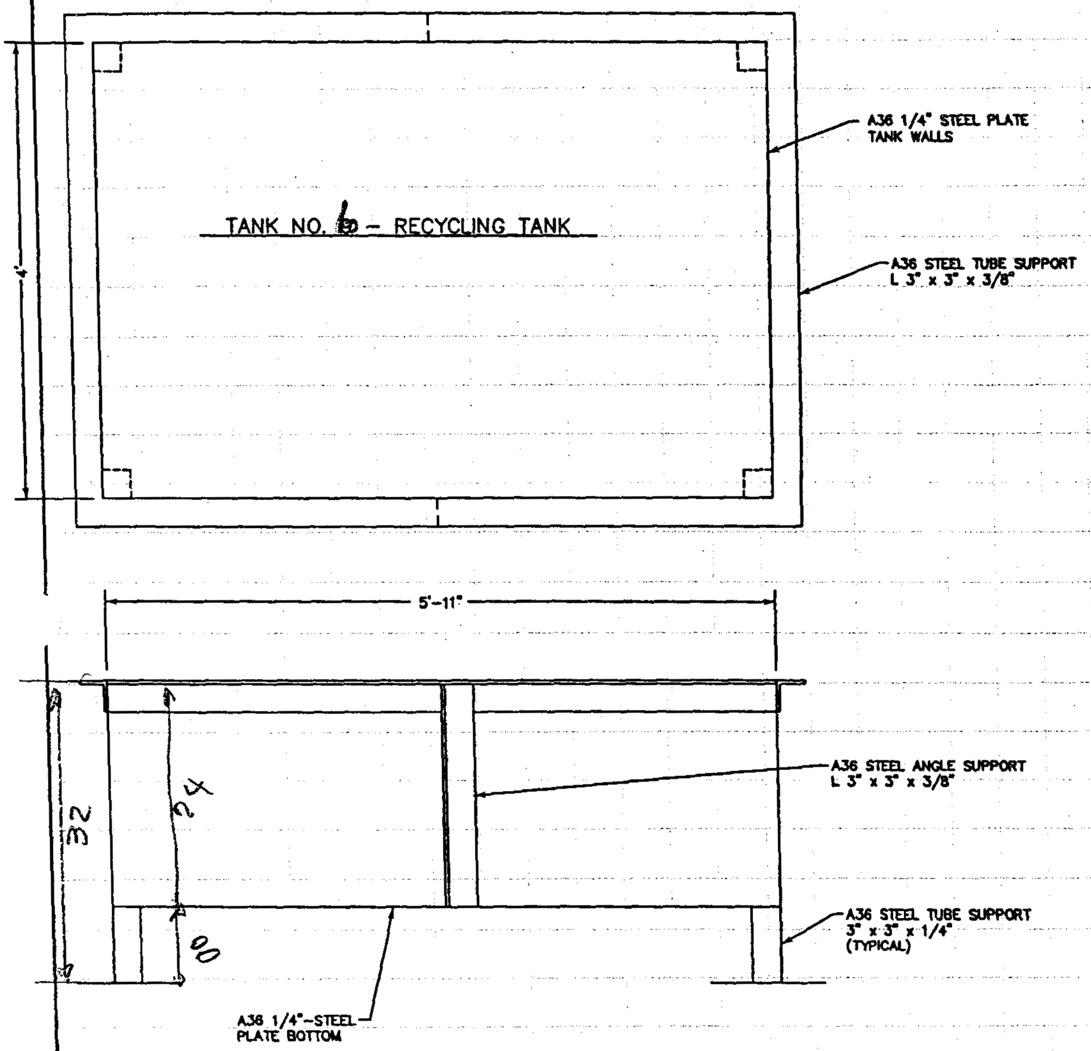


3/13/07 KW Plastics Cal Secondary Containment/28

BASE VOLUME:

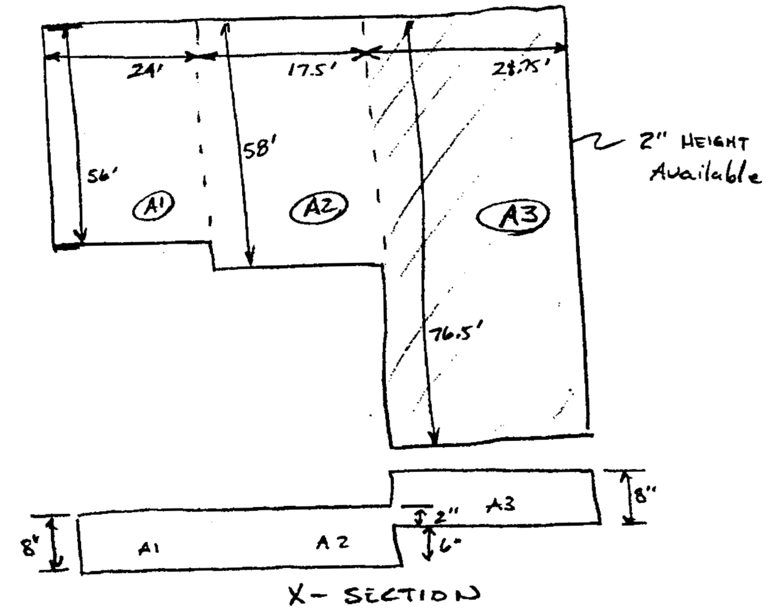
$V_B = V_{A1} + V_{A2} + V_{A3}$

$V_B = (56' \times 24' \times \frac{8}{12})$

$+ (58' \times 17.5' \times \frac{8}{12})$

$+ (76.5 \times 28.75 \times \frac{2}{12})$

$V_B = 1,939\ ft^3$



VOL OF SUMPS + TRENCH

$V_{S1} = 4' \times 4' \times 4' = 64\ ft^3$

$V_{S2} = 4' \times 4' \times 4' = 64\ ft^3$

$V_T = 1' \times 1' \times 31.5' = 31.5\ ft^3$

$\Sigma V_{SUMPS/TRENCH} = 159.5\ ft^3$

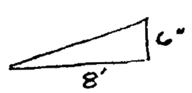
VOL OF OBSTRUCTIONS

$V_{TANKS\ 9+10}$ $V = 2 \times \pi r^2 h = 2\pi (5')^2 \frac{8}{12} = 104.7\ ft^3$

$V_{OTHER\ EQUIP}$ (5% OF FLOOR SPACE) $V = 0.05[(56' \times 24') + (58' \times 17.5') + (76.5' \times 28.75')]\frac{8}{12}$

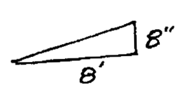
$= 151.9\ ft^3$

$V_{RAMP\ B/T\ A2 + A3}$ $V = \frac{1}{2} b h L$



$= \frac{1}{2}(8')(0.5')58'$ $= 116.0\ ft^3$

$V_{RAMP\ INTO\ A1}$ $V = \frac{1}{2} b h L$



$= \frac{1}{2}(8')(\frac{8}{12})12'$ $= 32.0\ ft^3$

$\Sigma V_{OBSTRUCTIONS} = 404.6\ ft^3$

VOLUME AVAILABLE

$V_A = V_{BASE} + V_{SUMPS} - V_{OB}$

$V_{AVAILABLE} = 1,939\ ft^3 + 159.5\ ft^3 - 404.6\ ft^3$

$V_{AVAILABLE} = 1,693.9\ ft^3 = 12,670$ gallons

REQUIRED SECONDARY CONTAINMENT VOLUME

PRECIPITATION FROM 24hr/25YR EVENT PLUS
LARGEST (1) 10% FROM ALL TANKS
(2) 100% FROM LARGEST TANK

TANK	VOLUME
1	6,697
2	280
3	6,697
4	360
5	5,386
6	540
7	6,697
8	360
9	7,800
10	7,800
	42,617 gallons

$V_{PRECIPITATION} = 0$ (UNDER ROOF)

10% of all tanks = 4,262 gallons

100% of largest tank = 7,800 gallon

REQUIRED SECONDARY CONTAINMENT VOLUME = 7,800 gallons

VOL IN EXISTING TREATMENT ROOM (A1 + A2)

$$V_{A1+A2} = V_{AVAILABLE} - V_{A3} - V_{S2}$$

$$= 1{,}693.9 \text{ ft}^3 - (76.5' \times 28.75' \times \tfrac{2}{12}) - 64 \text{ ft}^3$$

$$= 1{,}263 \text{ ft}^3 = 9{,}447 \text{ gallons}$$

2213.8 or 2214.6, or concrete-braced frame designed in accordance with Section 1921.

ORDINARY MOMENT-RESISTING FRAME (OMRF) is a moment-resisting frame not meeting special detailing requirements for ductile behavior.

ORTHOGONAL EFFECTS are the earthquake load effects on structural elements common to the lateral-force-resisting systems along two orthogonal axes.

OVERSTRENGTH is a characteristic of structures where the actual strength is larger than the design strength. The degree of overstrength is material- and system-dependent.

$P\Delta$ EFFECT is the secondary effect on shears, axial forces and moments of frame members induced by the vertical loads acting on the laterally displaced building system.

SHEAR WALL is a wall designed to resist lateral forces parallel to the plane of the wall (sometimes referred to as vertical diaphragm or structural wall).

SHEAR WALL-FRAME INTERACTIVE SYSTEM uses combinations of shear walls and frames designed to resist lateral forces in proportion to their relative rigidities, considering interaction between shear walls and frames on all levels.

SOFT STORY is one in which the lateral stiffness is less than 70 percent of the stiffness of the story above. See Table 16-L.

SPACE FRAME is a three-dimensional structural system, without bearing walls, composed of members interconnected so as to function as a complete self-contained unit with or without the aid of horizontal diaphragms or floor-bracing systems.

SPECIAL CONCENTRICALLY BRACED FRAME (SCBF) is a steel-braced frame designed in conformance with the provisions of Section 2213.9.

SPECIAL MOMENT-RESISTING FRAME (SMRF) is a moment-resisting frame specially detailed to provide ductile behavior and comply with the requirements given in Chapter 19 or 22.

SPECIAL TRUSS MOMENT FRAME (STMF) is a moment-resisting frame specially detailed to provide ductile behavior and comply with the provisions of Section 2213.11.

STORY is the space between levels. Story x is the story below Level x.

STORY DRIFT is the lateral displacement of one level relative to the level above or below.

STORY DRIFT RATIO is the story drift divided by the story height.

STORY SHEAR, V_x, is the summation of design lateral forces above the story under consideration.

STRENGTH is the capacity of an element or a member to resist factored load as specified in Chapters 16, 18, 19, 21 and 22.

STRUCTURE is an assemblage of framing members designed to support gravity loads and resist lateral forces. Structures may be categorized as building structures or nonbuilding structures.

SUBDIAPHRAGM is a portion of a larger wood diaphragm designed to anchor and transfer local forces to primary diaphragm struts and the main diaphragm.

VERTICAL LOAD-CARRYING FRAME is a space frame designed to carry vertical gravity loads.

WALL ANCHORAGE SYSTEM is the system of elements anchoring the wall to the diaphragm and those elements within the diaphragm required to develop the anchorage forces, including subdiaphragms and continuous ties, as specified in Sections 1633.2.8 and 1633.2.9.

WEAK STORY is one in which the story strength is less than 80 percent of the story above. See Table 16-L.

SECTION 1628 — SYMBOLS AND NOTATIONS

The following symbols and notations apply to the provisions of this division:

A_B = ground floor area of structure in square feet (m^2) to include area covered by all overhangs and projections.

A_c = the combined effective area, in square feet (m^2), of the shear walls in the first story of the structure.

A_e = the minimum cross-sectional area in any horizontal plane in the first story, in square feet (m^2) of a shear wall.

A_x = the torsional amplification factor at Level x.

a_p = numerical coefficient specified in Section 1632 and set forth in Table 16-O.

C_a = seismic coefficient, as set forth in Table 16-Q.

C_t = numerical coefficient given in Section 1630.2.2.

C_v = seismic coefficient, as set forth in Table 16-R.

D = dead load on a structural element.

D_e = the length, in feet (m), of a shear wall in the first story in the direction parallel to the applied forces.

E, E_h, E_m, E_v = earthquake loads set forth in Section 1630.1.

F_i, F_n, F_x = Design Seismic Force applied to Level i, n or x, respectively.

F_p = Design Seismic Forces on a part of the structure.

F_{px} = Design Seismic Force on a diaphragm.

F_t = that portion of the base shear, V, considered concentrated at the top of the structure in addition to F_n.

f_i = lateral force at Level i for use in Formula (30-10).

g = acceleration due to gravity.

h_i, h_n, h_x = height in feet (m) above the base to Level i, n or x, respectively.

I = importance factor given in Table 16-K.

I_p = importance factor specified in Table 16-K.

L = live load on a structural element.

Level i = level of the structure referred to by the subscript i. "i = 1" designates the first level above the base.

Level n = that level that is uppermost in the main portion of the structure.

Level x = that level that is under design consideration. "x = 1" designates the first level above the base.

M = maximum moment magnitude.

N_a = near-source factor used in the determination of C_a in Seismic Zone 4 related to both the proximity of the building or structure to known faults with magnitudes and slip rates as set forth in Tables 16-S and 16-U.

N_v = near-source factor used in the determination of C_v in Seismic Zone 4 related to both the proximity of the building or structure to known faults with magnitudes and slip rates as set forth in Tables 16-T and 16-U.

PI = plasticity index of soil determined in accordance with approved national standards.

R = numerical coefficient representative of the inherent overstrength and global ductility capacity of lateral-force-resisting systems, as set forth in Table 16-N or 16-P.

r = a ratio used in determining ρ. See Section 1630.1.

S_A, S_B, S_C, S_D, S_E, S_F = soil profile types as set forth in Table 16-J.

T = elastic fundamental period of vibration, in seconds, of the structure in the direction under consideration.

V = the total design lateral force or shear at the base given by Formula (30-5), (30-6), (30-7) or (30-11).

V_x = the design story shear in Story x.

W = the total seismic dead load defined in Section 1630.1.1.

w_i, w_x = that portion of W located at or assigned to Level i or x, respectively.

W_p = the weight of an element or component.

w_{px} = the weight of the diaphragm and the element tributary thereto at Level x, including applicable portions of other loads defined in Section 1630.1.1.

Z = seismic zone factor as given in Table 16-I.

[illegible] = Maximum Inelastic Response Displacement, which is the total drift or total story drift that occurs when the structure is subjected to the Design Basis Ground Motion, including estimated elastic and inelastic contributions to the total deformation defined in Section 1630.9.

[illegible] = Design Level Response Displacement, which is the total drift or total story drift that occurs when the structure is subjected to the design seismic forces.

[illegible] = horizontal displacement at Level i relative to the base due to applied lateral forces, f, for use in Formula (30-10).

[illegible] = Redundancy/Reliability Factor given by Formula (30-3).

[illegible] = Seismic Force Amplification Factor, which is required to account for structural overstrength and set forth in Table 16-N.

[illegible] 1629 — CRITERIA SELECTION

[illegible] for Design. The procedures and the limitations for [illegible] structures shall be determined considering seismic [illegible] characteristics, occupancy, configuration, structural [illegible] in accordance with this section. Structures shall [illegible] with adequate strength to withstand the lateral dis[illegible] induced by the Design Basis Ground Motion, consid[illegible] response of the structure and the inherent [illegible] strength and ductility of the lateral-force-[illegible] minimum design strength shall be based on [illegible] forces determined in accordance with the [illegible] of Section 1630, except as modified [illegible]. Where strength design is used, the load com[illegible] Section 1612.2 shall apply. Where Allowable Stress [illegible] load combinations of Section 1612.3 shall [illegible] may be used to evaluate sliding or [illegible] interface regardless of the design [illegible] of the structure, provided load combinations of Section 1612.3 are utilized. One- and two-family dwellings in Seismic Zone 1 need not conform to the provisions of this section.

1629.2 Occupancy Categories. For purposes of earthquake-resistant design, each structure shall be placed in one of the occupancy categories listed in Table 16-K. Table 16-K assigns importance factors, I and I_p, and structural observation requirements for each category.

1629.3 Site Geology and Soil Characteristics. Each site shall be assigned a soil profile type based on properly substantiated geotechnical data using the site categorization procedure set forth in Division V, Section 1636 and Table 16-J.

> **EXCEPTION:** When the soil properties are not known in sufficient detail to determine the soil profile type, Type S_D shall be used. Soil Profile Type S_E or S_F need not be assumed unless the building official determines that Type S_E or S_F may be present at the site or in the event that Type S_E or S_F is established by geotechnical data.

1629.3.1 Soil profile type. Soil Profile Types S_A, S_B, S_C, S_D and S_E are defined in Table 16-J and Soil Profile Type S_F is defined as soils requiring site-specific evaluation as follows:

1. Soils vulnerable to potential failure or collapse under seismic loading, such as liquefiable soils, quick and highly sensitive clays, and collapsible weakly cemented soils.

2. Peats and/or highly organic clays, where the thickness of peat or highly organic clay exceeds 10 feet (3048 mm).

3. Very high plasticity clays with a plasticity index, $PI > 75$, where the depth of clay exceeds 25 feet (7620 mm).

4. Very thick soft/medium stiff clays, where the depth of clay exceeds 120 feet (36 576 mm).

1629.4 Site Seismic Hazard Characteristics. Seismic hazard characteristics for the site shall be established based on the seismic zone and proximity of the site to active seismic sources, site soil profile characteristics and the structure's importance factor.

1629.4.1 Seismic zone. Each site shall be assigned a seismic zone in accordance with Figure 16-2. Each structure shall be assigned a seismic zone factor Z, in accordance with Table 16-I.

1629.4.2 Seismic Zone 4 near-source factor. In Seismic Zone 4, each site shall be assigned a near-source factor in accordance with Table 16-S and the Seismic Source Type set forth in Table 16-U. The value of N_a used to determine C_a need not exceed 1.1 for structures complying with all the following conditions:

1. The soil profile type is S_A, S_B, S_C or S_D.

2. $\rho = 1.0$.

3. Except in single-story structures, Group R, Division 3 and Group U, Division 1 Occupancies, moment frame systems designated as part of the lateral-force-resisting system shall be special moment-resisting frames.

4. The exceptions to Section 2213.7.5 shall not apply, except for columns in one-story buildings or columns at the top story of multistory buildings.

5. None of the following structural irregularities is present: Type 1, 4 or 5 of Table 16-L, and Type 1 or 4 of Table 16-M.

1629.4.3 Seismic response coefficients. Each structure shall be assigned a seismic coefficient, C_a, in accordance with Table 16-Q and a seismic coefficient, C_v, in accordance with Table 16-R.

1629.5 Configuration Requirements.

1629.5.1 General. Each structure shall be designated as being structurally regular or irregular in accordance with Sections 1629.5.2 and 1629.5.3.