

Clean Harbors Environmental Services, LLC
Lone Mountain Facility
Waynoka, Oklahoma

RCRA/HSWA Permit Renewal Application

Volume 6

October 1, 2020

VOLUME 6

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SECTION CT1

MYERS Engineering CORPORATION

ENGINEERING FOR TODAY'S CHANGING WORLD

RECEIVED
MAY 23 1994
LARRY J. ODEN

November 6, 1993

Mr. Don Dillie
USPCI, Inc.
Rt. 2 Box 170
Waynoka, Oklahoma 73860

Dear Mr. Dillie:

At the time of our inspection of Caustic Storage Tanks 1-4 located at the pretreatment area were inspected and there were no visual apparent weld breaks, punctures, scrapes of protective coatings, cracks, corrosion or damage due to construction or installation. This is to certify that Caustic Storage Tanks 1-4 were installed in such a manner which did not produce any structurally adverse conditions in accordance with 40 CFR 264.192(b).

This is to certify that at the time of our inspection, the Caustic Storage Tanks 1-4 located at the pretreatment area of the Lone Mountain Facility, (Waynoka, Oklahoma), were filled with water and allowed to stand at static equilibrium for a period of several hours. During this time all welds and tank walls were monitored for leaks. There were no apparent leaks found therefore the tank appears to be capable of handling hazardous wastes without release for the intended life and use of the tank.

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

Sincerely,

MYERS ENGINEERING CORPORATION

E. E. Myers

By E. E. Myers

EEM:ls

cc: Mr. Gene Walker
Environmental Engineer
Lone Mountain Facility

FILE INSTRUCTIONS	
Unit Pre-Treatment	
Project Caustic Tank Assessment	
Section Tank Certification	
Rcvd. by: L. J. ODEN	
ROUTE	COPY
F.B	D. Dodd
	B. Correa

LEAK TEST

11102 NORTH STRATFORD DRIVE · SUITE 8400 · OKLAHOMA CITY · OKLAHOMA · 73120 · 405/755-5325 · FAX 405/755-5373

SECTION 106

ASSESSMENT OF CAUSTIC TANK #1 (CT1)
LONE MOUNTAIN HAZARDOUS WASTE FACILITY
U.S.P.C.I.
WAYNOKA, OKLAHOMA

A. TANK VESSEL DESCRIPTION

Caustic Tank #1 is a large steel aboveground vertical tank located in the pretreatment area of the Lone Mountain Hazardous Waste Facility. Caustic Tank #1, Caustic Tank #2, Caustic Tank #3, Caustic Tank #4, Sludge Storage Tank #1 and, Caustic Overflow Tank, Cyanide Overflow tank, Cyanide Reactor, Cyanide Measure Tank and a portion of their ancillary equipment will be located together in a concrete containment area.

B. PRIMARY TANK VESSEL

1. General Description

Caustic Tank #1 is being assessed to determine if the unit is adequately designed with sufficient structural strength, and compatibility with the waste to be stored or treated. Caustic Storage Tank #1 is an aboveground tank that will be used for the storage of caustic liquids. The tank is vertical in position and cylindrical in shape. The tank and contents are supported by a skirted base. There is a cone on the bottom of the tank inside the skirt. There is a platform connected to all four caustic storage tanks (CT1, CT2, CT3, CT4). There are two ladders for access to the tank top and platform. This tank is equipped with a 3" overflow line. There is a level gauge installed through an 18" nozzle, in addition to the level gauge there is a high level alarm installed through a nozzle on the top of the tank. This tank was manufactured by Scott Manufacturing, Inc from Lubbock, Texas. The temperature of the tank varies with the ambient temperature.

Influent piping is located from the pretreatment building to the caustic tank and to other tanks in the containment area.

2. Design Standards.

The tank is designed and constructed to those sections that are applicable in the American Petroleum Institute Standard 650 - 1988 edition (API-650) and the American Institute of Steel Construction (AISC) Manual of Steel Construction (8th Edition). The Mill Test reports and radiographic testing reports can be found in Appendix F of this assessment.

3. Hazardous Characteristics of Wastes Stored

The wastes to be stored in this tank have the following characteristics (Provided by USPCI):

Untreated wastes pH (7 - 13)
N > 1
Temperature = Ambient

The hazardous characteristics of the waste to be stored in this tank were examined. It was determined that the pH and normality levels of the waste are the primary areas of concern. This is to determine the applicability of a corrosion allowance for the tank material type and thickness.

4. Existing Corrosion Protection

The interior of the tank is be coated with Gliden "Glid-Guard Epoxy Chemical Resistant Finish 5240 Series." This coating will withstand the chemical characteristics of the waste to be stored.

5. Documented Age of Tank

This is a new tank, it was constructed and installed in October of 1992.

6. Result of Leak Tests

A leak test was performed. In this test the tank was filled to maximum operating capacity with water. The tank was allowed to sit full for a minimum of 6 hours. After remaining full for this time there was no evidence of the tank leaking. In the inspection all welds, flanges, manways, nozzles, and sidewalls were checked for leaks.

7. Existing Data Obtained

Diameter of Tank	12'-8-5/8" Inside Dia.
Height	40'
Material	A36 steel See Appendix F for Mill Test reports
Wall and top thickness	0.25"
Bottom cone thickness	0.3125"
Maximum Volume	4426.27 cf. or 33,108 Gal.
Maximum Operating Volume	4299.22 cf. or 32,156 Gal.
Specific gravity of waste	1.5 (Provided by USPCI)
Temperature	Ambient
Seismic Zone	1

8. Calculation of Existing Foundation Loading

Total Weight of Tank and Contents = 216.54 tons

Detailed calculations reflecting the volume and weight of the tank are found in appendix A. The required foundation thickness and steel reinforcement are included in appendix E of this assessment.

9. Required Structural Calculation

The calculated required wall thickness for this tank is 0.2195 inches. This thickness includes 0.125 inches added for corrosion allowance. This corrosion allowance is based on a best engineering estimate taking into account the materials being treated and a 20 year design life. (See appendix B and C of this assessment for detailed calculations or required wall thickness and structural analysis of the tank support system.)

10. Comparison of Actual Structure to Theoretical Values

Wall Thickness Comparison

Calculated Required Wall Thickness	0.2195"
Minimum Required Wall Thickness By API-650-88	0.1875"
Measured Wall Thickness	0.25"

C. SECONDARY CONTAINMENT SYSTEM

1. General Description of Secondary Containment

The secondary containment system is designed and will be operated to prevent any migration of wastes or liquids out of the system. Cyanide Reactor Tank, Cyanide Measure Tank, Caustic Tanks #1-4, Sludge Storage Tank, Caustic Overflow Tank, Cyanide Overflow Tank will be located on a reinforced concrete base floor area with vertical concrete sidewalls. All associated piping is aboveground. The area is inspected on a daily basis. The containment system is walled off and receives no direct vehicular traffic. The foundation walls and base are mass poured in place. No cracks from compression or uplift are visually apparent. There are three low areas with a slight depression that are used to collect any waste spills and rainwater. Any released tank contents or surface runoff will drain on top of the sloped concrete to the sump areas. The accumulated liquids are then removed and pumped out in accordance with the permit condition. The slab floor also serves as a foundation support for the tanks in this area.

The concrete floor was removed and replaced in October of 1992. The floor was replaced in order to strengthen the foundation for the tank support.

2. Design Standards.

Design drawings for the walls were obtained and used as a reference. It should be noted that these are design drawings and not as built drawings. The structural capacity of the foundation and walls were compared to those sections that are applicable in the API-650-88 and the American Concrete Institute (ACI 318-89/318r-89) and these calculations were used as a guide in verifying the ability of the system to contain hazardous waste. The concrete floor and foundation are built in close adherence to the above mentioned codes. The floor as previously mentioned was removed and replaced.

3. Hazardous Characteristics of Wastes Stored

The wastes which are treated in the primary tank have the following characteristics:

Untreated waste pH (7 - 13)
N > 1
Temperature = Ambient

The hazardous characteristics of the waste treated in the primary tank were examined. It was determined that the pH and normality levels of the waste are the primary areas of concern. This is to determine the applicability of a corrosion allowance for the containment system material type and thickness.

4. Existing Corrosion Protection

The concrete containment is coated with Concrete Protection System, Inc "OVERKOTE" industrial flooring. For more information on this coating see Appendix H of this report.

5. Documented Age of The Containment Area

The secondary containment system was originally constructed and installed in 1987 however the floor was replaced in October 1992.

6. Result of Leak Tests

A visual inspection of the containment area was performed and from this inspection it was determined there are no cracks or breaks in the impermeable coating. The area will be inspected on a daily basis checking for leaks from the primary tank.

7. Data Obtained

Area	2509.85 s.f.
Wall Height	2.62 ft. (Min.)
Material	Concrete
Gross Volume	6575.81 c.f.
Thickness	30"

See Appendix G of this assessment for a detailed layout and cross sections of the secondary containment. Also included in Appendix D of this assessment are detailed calculations of the gross volumes of each containment area.

8. Calculation of Existing Capacity

Containment Capacity Available (CCA)

CCA = Gross Volume - Volume of items in the containment - Volume of rainfall.

See the appendix of this report for detailed calculations of the available containment volume. The containment capacity available = 4960.54 c.f.

9. Required Volume

Containment Capacity Required (CCR)

CCR = Volume of Largest Tank in the secondary containment

Volume of Largest Tank =	4426.27 c.f.(CT1) or 33,108 Gal.

10. Comparison of Available Volume to Required Volume

Containment Capacity Comparison

Containment Capacity Required =	4,426.27 c.f.
Secondary Containment Volume Available =	4,960.54 c.f.
Excess Containment Volume =	534.27 c.f.

CCA > CCR Adequate Capacity (under normal operating conditions) is available.

D. CONCLUSIONS

1. Primary Tank Vessel

The primary tank vessel at the time of inspection was fit for use with the proposed waste stream at the given densities, chemical and physical characteristics as verified by USPCI. The useful life of the steel tank would be estimated at 20 years if the proposed waste stream is maintained. This useful life was determined by using a design life of 20 years less the period that the tank has been in use at the USPCI Lone Mountain Facility.

2. Secondary Containment System

The secondary containment area is fit for use, with the proposed waste stream at the given densities and chemical and physical characteristics as verified by USPCI were released from the primary tank. The useful life of the concrete containment area is estimated at 20 years. This useful life is determined by using a design life of 20 years less the period that the system has been in use at the USPCI Lone Mountain Facility.

E. RECOMMENDATIONS

The following repairs or modifications should be made:

1. Primary Tank

   The tank should be internally inspected periodically to insure no corrosion is occurring. The tank should be checked with ultrasonic testing procedures to establish a verified limit of corrosion. USPCI should continually insure compatibility with the waste and densities stored. Daily inspections should conducted to detect any visual corrosion or defects.

2. Secondary Containment

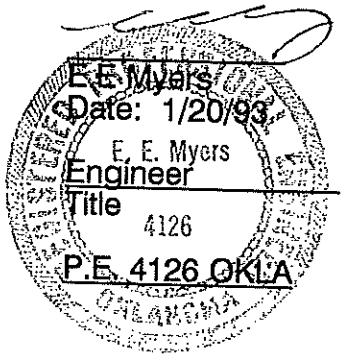
   The secondary containment should be checked periodically for any deterioration and structural integrity.

3. Routine Inspections

   When routine and preventative measures are to be completed, the tank should be cleaned and internally inspected to determine any interior defects or corrosion. Routine painting and coating of tanks on the interior and exterior, and routine inspection is recommended.

F. CERTIFICATION

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.



APPENDIX A

Primary Tank Volume Calculations

SECTION 106 - APPENDIX A

CT1, Caustic Storage Tank No.1

PRIMARY TANK VOLUME CALCULATIONS

DIMENSIONS:				
Geometry:	CYLINDRICAL			
Diameter:		12.72	FEET	
Max Height:		34.00	FEET	
Normal Operating Height:		33.00	FEET	
Cone Height:		2.42	FEET	
Bottom Cone Diameter		0.50	FEET	
Cone Length		6.80	FEET	
Cone Volume:		106.53	C.F. or	796.83 Gal.
VOLUME CALCULATIONS				
Max. Volume :		4426.27	C.F. or	33108.49 Gal.
Normal Operating Volume		4299.22	C.F. or	32158.15 Gal.

MAXIMUM OPERATING TANK VOLUME =		4426.27	C.F.
	OR	33,108.49	GAL

WEIGHT ON FOUNDATION

CONTENTS S.G.:	1.50	
DENSITY:	93.60	LB/C.F.

SURFACE AREA CALCULATION		
Tank Top =	127.05	S.F.
Tank Bottom Cone =	257.87	S.F.
Tank Wall= Cir*h	1358.54	S.F.
TOTAL SURFACE AREA WALL AND TOP	1743.47	S.F.
Steel Thickness=		
Sidewalls and Top	0.25	INCHES
Cone	0.31	INCHES
Volume of Steel =		
Sidewalls	28.30	C.F.
Top and bottom	10.02	C.F.
Density of Steel =	490.00	LB/C.F.
Weight of Steel =	9.39	TONS
WEIGHT OF TANK CONTENTS =	207.15	TONS

TOTAL WEIGHT OF TANK AND CONTENTS =	216.54 TONS

APPENDIX B

Primary Tank Wall Thickness Calculations

SECTION 106 - APPENDIX B

CT1, Caustic Storage Tank No.1

PRIMARY TANK WALL THICKNESS

DIMENSIONS:			
Geometry:	CYLINDRICAL		
Diameter:		12.72	FEET
Height :		34.00	FEET
Specific Gravity:		1.50	
Normal Operating Temperature =		ambient	

STEEL THICKNESS CALCULATIONS @ BOTTOM RING

Thickness (t) = (2.6 * H * D * S.G.) / (s * E) + CA

s = Allowable Design Stress =	21000.00	PSI ***
E = Joint Efficiency =	85.00%	
Thickness (t) =	0.0945	INCHES
Corrosion Allowance =	0.1250	INCHES
Calculated Req'd Wall thk. =	0.2195	INCHES

*** THIS DESIGN STRESS IS OBTAINED FROM API-650-88 WITH THE USE OF APPENDIX A.

CONE WALL THICKNESS CALCULATION

Cosine Alpha = cos(67.6594)	0.3801	
P1= Internal Pressure= =Density*s.g.*(x+D/6*cot(alpha)	3263.83	psi
P2= H*density*s.g.=33*62.4*1.5 =	3182.40	psi
Tc= top cone radius =	6.36	inches
Fb = Allowable stress	23200	psi

The required wall thickness of the cone will be the greater of the following Formulas.

1. Ts=P1*Tc/2*cos(alpha)*fb =	0.098	+1/8"C.A.=	0.223	in.
2. Ts=P2*D/cos(alpha)*Fb =	0.191	+1/8"C.A.=	0.316	in.

APPENDIX C

Structural Support Calculations

SECTION 106 - APPENDIX C

CT1, Caustic Storage Tank No.1

STRUCTURAL SUPPORT CALCULATIONS

GIVEN:		
Tank Diameter =	12.72	feet
Total Height =	40.00	feet
Weight of Tank =	18780.00	lbs
Weight of Max. Contents =	414300.00	lbs
Tank Nominal Thickness =	0.25	in

-----SEISMIC DESIGN CHECK-----

ZONE COEFFICIENT (Z):	0.1875	
ESSENTIAL FACILITIES FACTOR (I):	1.000	
LATERAL EARTHQUAKE FORCE COEFF. (C1):	0.240	
D/H:	0.267	
k factor:	0.590	
SITE AMPLIFICATION FACTOR (S):	1.500	
NATURAL PERIOD OF FIRST SLOSHING (T):	2.104	
LATERAL EARTHQUAKE FORCE COEFF. (C2):	0.214	
WEIGHT OF TANK SHELL (Ws):	18780.000	LBS
TOTAL WEIGHT OF TANK CONTENTS (Wt):	414300.000	LBS
W1/Wt:	0.950	
W2/Wt:	0.050	
WEIGHT OF EFFECTIVE MASS OF CONTENTS THAT MOVES IN UNISON WITH THE TANK SHELL (W1):	393585.000	LBS
WEIGHT OF EFFECTIVE MASS IN FIRST SLOSHING (W2):	20715.000	LBS
HT FROM BTM OF SHELL TO CENT. OF SHELL (Xs):	20.000	FEET
X1/H:	0.500	
HT FROM BTM TO CENT. OF LAT. SEISMIC FORCE (X1):	20.000	FEET
X2/H:	0.900	
HT FROM BTM TO CENT. OF LAT. SEISMIC FORCE (X2):	36.000	FEET

OVERTURNING MOMENT (M) = Z*I*(C1*Ws*Xs + C1*W1*X1 + C2*W2*X2)

OVERTURNING MOMENT (M):	401030.873	FT-LBS

Note: All of the above calculations are based on API-650-88 Seismic Design Procedure (Appendix E).

CHECK STRESS IN TANK SHELL FROM SEISMIC FORCES:

Wl = MAXIMUM WEIGHT OF TANK CONTENTS THAT MAY BE USED TO RESIST THE SHELL OVERTURNING MOMENT

Wl = 7.9*tb*(Fby*G*H) ^ .5

tb = THK. OF BTM. PLATE UNDER SHELL:	0.250	IN
Fby = MINIMUM YIELD STRENGTH OF BOTTOM PLATE:	9000.000	PSI
G = DESIGN SPECIFIC GRAV. OF LIQUID:	1.50	
Wl =	1451.32	LBS/FT OF SHELL CIRCUMFRENCE
DENSITY OF TANK SHELL MATERIAL:	490.00	LBS/CF
WT = WEIGHT OF TANK SHELL AND THE PORTION OF FIXED ROOF SUPPORTED BY TANK SHELL:	408.33	LBS/FT OF SHELL CIRCUMFRENCE
M/[D^2(WT+Wl)]:	1.3328	

b = MAXIMUM LONGITUDINAL COMPRESSIVE FORCE AT THE BTM. OF TANK SHELL

b = WT + 1.273*M/D^2

b:	3563.57	LBS/FT OF SHELL
G*H*D^2/t^2:	155326.46	
Fa = MINIMUM OF 10^6*t/D or Fty/2:	4500.00	PSI
Fty = MINIMUM YIELD STRENGTH OF BTM. PLATE:	9000.00	PSI
MAX. LONGITUDINAL COMPRESSIVE STRESS IN THE TANK SHELL = b/12t =	1187.86	PSI

CHECK OVERTURNING MOMENT FROM WIND PRESSURE

M must be Less Than or Equal To .66*(WD)/2
If M Is Greater Than .66*(WD)/2 Anchor Bolts
Would Be Required

Where:

W = Shell Weight Available To Resist Uplift (lbs)

D = Tank Diameter (feet)

M = Overturning Moment

M = Pw*Projected Area*H1

H1 = Height from ground to centroid of tank shell

Pw = Wind Pressure (18 psf for 100 MPH Wind on cylinders)

.66*(WD)/2:	78830.93	FT-LBS
M:	183168.00	FT-LBS

M > .66*(WD)/2 therefore anchor bolts are required

Number of Anchors:	12.00	
Anchor Diameter:	1.25	inches
Dia. of Anchor Circle:	13.05	feet

tB = design tension load per anchor

tB:	3113.62	pounds
Allowable Load/ Anchor:	24543.69	pounds

APPENDIX D

Containment Area Volume Calculations

SECTION 106 - APPENDIX D

CT1, Caustic Storage Tank No.1

CONTAINMENT AREA No.8A VOLUME CALCULATIONS (CAUSTIC AREA)

Length =	70.70	feet
Width =	35.50	feet
Height =	2.62	feet
Surface Area =	2509.85	S.F.

Gross Volume =	Area * Heigth =	6575.81	C.F.

Volumes of Items of Displacement **

1. Steel skirting =	9.17	C.F.
Total volume to deduct for items in containment area =	9.17	C.F.

Subtraction for volume of rainfall

Volume of rain = Area x depth of rainfall

Depth of rainfall =	6.15	In.
Area =	2509.85	S.F.
Volume =	1286.30	C.F.

TOTAL AVAILABLE VOLUME = Gross Volume - Subtractions =	6575.81	C.F.
Items of diplacement	-9.17	C.F
Volume of rainfall	-1286.30	C.F
TOTAL AVAILABLE VOLUME Area 8A	5280.34	C.F.

CONTAINMENT AREA No.8c VOLUME CALCULATIONS (TRUCK PAD)

This area will collect rain and deposit it into the caustic containment area (8a) when the valve is opened. This area does not contribute any volume for containment.

Length =	52.00	feet
Width =	12.00	feet
Surface Area =	624.00	S.F.

Subtraction for volume of rainfall

Volume of rain = Area x depth of rainfall

Depth of rainfall =	6.15	In.
Area =	624.00	S.F.
Volume =	319.80	C.F.

SUMMARY OF SECONDARY CONTAINMENT DATA

Surface Areas :

Caustic Area 8A =	2509.85	S.F.
Truck Unloading Pad 8C =	624.00	S.F.

Gross Volumes :

Caustic Area 8A =	6575.81	C.F.
Truck Unloading Pad 8C =	0.00	C.F.

Volume of displacements

Caustic Area 8A =	9.17	C.F.
Truck Unloading Pad 8C =	0.00	C.F.

Volume for 24hr rain:

Caustic Area 8A =	1286.30	C.F.
Truck Unloading Pad 8C =	319.80	C.F.

Total Gross Volume 8A =	6575.81	C.F.
Total Displacement Volumes =	9.17	C.F.
Total volume of Rain	1606.10	C.F.

Containment Capacity Available (CCA) =	4960.54	C.F.
	or	
	37104.83	GAL.

APPENDIX E

Foundation Design Analysis

SECTION 106 - APPENDIX E

CT1, Caustic Storage Tank No.1

FOUNDATION DESIGN ANALYSIS

ASSUMPTIONS:

f'c =		4.00	KSI
fy =		60.00	KSI
Allowable Soil Press. =		2.20	KSI
Structural Steel =	A36		

GIVEN:

Tank Diameter =	12.72	feet
Sidewall Height =	40.00	feet
Weight of Tank (Shell)	18780.00	lbs
Weight of Max. Contents =	414300.00	lbs

Tank is Resting on a concrete foundation.

CHECK CONCRETE FOUNDATION DESIGN:

Assume Footing Depth =	30.00	inches
Assume Footing Width =	30.00	inches
Assumed Effective Soil Press. =	1925.00	psf

psf

Look at what is resisiting overturning moment from seismic load:

b =	3563.57	lb/ft of circ.

Where b is the maximum shell compression at the bottom of the shell.

If the footing is	30.00	inches wide
then the actual applied pressure to the subgrade is	1425.43	lb/sf

This is less than the effective soil pressure.

APPENDIX F

MANUFACTURERS DATA, MILL TEST REPORTS, RADIOGRAPHIC REPORTS

CERTIFICATION TO OWNER OF COMPLIANCE WITH API 650-88

To: USPCI LONE MOUNTAIN FACILITY

WAYNOKA, OKLAHOMA

To Whom It May Concern:

Scott Manufacturing, Inc. hereby certifies that the tank(s) constructed for you at SCOTT MANUFACTURING, INC. WOLFFORTH, TEXAS and described as follows: (4) 12/75' diameter by 40' shell height Caustic Storage Tanks, Serial Numbers 451-1, 2, 3, &4 has/have been designed, fabricated, erected, and inspected in accordance with all of the requirements of the American Petroleum Institute Standard 650-88 entitled, "Welded Steel Tanks for Oil Storage" and that the results of all such inspections, radiographs, and other tests indicate that the tanks(s) fully complies/comply with all of the requirements. We further certify that all materials meet specifications.

SCOTT MANUFACTURING, INC.

By William A. Bassom

MANAGER/HEAVY CONSTRUCTION
Title

23 OCTOBER 1992
Date

CITY OF LUBBOCK

STATE OF TEXAS

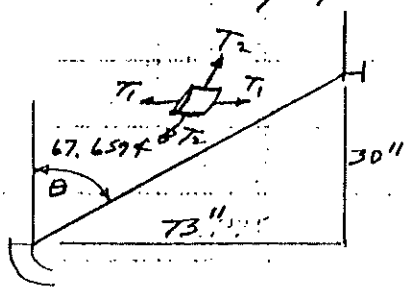
Acknowledged and sworn to before me this 23rd day of October, 1992.

Royce Eledell
Notary Public

USPCI, WAYNOKA, OK

10/20/92

12.72'ϕ x 40' (OVERALL)



CONE

$$T_2 = \frac{\gamma}{2\cos\theta}\left(\frac{D}{2}\right)\left(X + \frac{D}{6}\cot\theta\right)$$

$$= \frac{62.4(1.5)}{2\cos 67.659°}\left(\frac{12.72}{2}\right)\left(33' + \frac{12.72}{6}\cot 67.659°\right)$$

$$= 123.1217\,(6.36)\,(33.8712)$$

$$= 26{,}523 \text{ lbs/ft} \div 12$$

$$= 2210.25 \text{ lbs/in} \div 23{,}200 \text{ lbs/in}^2$$

$$= 0.09527" + 0.125"$$

$$= 0.2203" \quad \text{use } \tfrac{1}{4}" \text{ PL}$$

$$T_1 = \frac{\gamma D X}{2\cos\theta}$$

$$= \frac{62.4(1.5)(12.72)33}{2\cos 67.659°}$$

$$= 51{,}682 \text{ lbs/ft} \div 12$$

$$= 4{,}306.80 \text{ lbs/inch} \div 23{,}200 \text{ lbs/in}^2$$

$$= 0.1856" + 0.125"$$

$$= 0.3106" \quad \underline{\text{use } \tfrac{5}{16}" \text{ PL}}$$

GIRDER RING

$$C = \frac{\gamma}{B}\left(X + \frac{D}{6}\cot\theta\right) D^2 \tan\theta$$

$$= \frac{62.4(1.5)}{8}\left(33' + \frac{12.72}{6}\cot 67.659°\right) 12.72^2 \tan 67.659°$$

$$= 11.70\,(33.8712)\,393.710°$$

$$= 156{,}025 \text{ lbs} \div 23{,}200 \text{ lbs/in}^2$$

$$= 6.72522 \text{ in}^2$$

$$A_{eff} = 0.78\left(t_c\sqrt{R_c t_c} + t_1\sqrt{R_1 t_1} + t_s\sqrt{R_s t_s}\right)$$

$$= 0.78\left(.25\sqrt{6.375(.25)} + .3125\sqrt{17.31(.3125)} + .25\sqrt{6.375(.25)}\right)$$

$$= 1.05927 \text{ in}^2 \quad (0.8131 \text{ in}^2)$$

$$A_{eff(MAX)} = 16\left(t_c^2 + t_1^2 + t_s\right)$$

$$= 16\left(.25^2 + .3125^2 + .25^2\right)$$

$$= 3.56250\ in^2 > 1.05927\ in^2 \text{ use smaller}$$

(2.5625) (0.8131)

$\therefore$ use $1.05927\ in^2$

$6.72522 - 1.05927 = 5.666\ in^2$

$(6.7252 - 0.8131 = 5.9121\ in^2)$

USPCI, WAYNOKA, OK 10/14/92

12.75'ø X 40' (OVERALL) CONTENTS - CAUSTIC LIQUID - SP. GR. - 1.5 API-650

CORROSION ALLOWANCE - 1/8" THICKNESS BY 1 FOOT METHOD

$$\frac{2.6(12.75)(40-1)1.5}{23,200} + .125 = .2086" \text{ use } 1/4" \text{ PL}$$

Louis D. Wood, Jr.

STATE OF TEXAS
LOUIS D. WOOD, JR.
60815
REGISTERED
PROFESSIONAL ENGINEER

10/14/92

PLATE

SUNBELT TRADING COMPANY, Inc.

TO: Scott Mfg.

Attn: Wayne

REF:

CUSTOMER'S P.O. NO. 27158

S.T.C.'s RELEASE NO. 2994

S.T.C.'s INVOICE NO. 010435

ATTACHED PLEASE FIND MILL TEST CERTIFICATES FOR YOUR ABOVE REFERENCED PURCHASE ORDER FOR THE FOLLOWING MATERIAL.

See Below

THANKS AND REGARDS,

Stacey

STACEY GESSERT

enclosure

20 pcs. 1/4 x 96 x 480 A-36 Plate

4 pcs 1/4 x 96 x 240 A-36 Plate

6 pcs 5/16 x 96 x 240 A-36 Plate

4 pcs 1/4 x 96 x 240 Floor Plate

NEW ADDRESS
1990 POST OAK BLVD., SUITE 1550
HOUSTON, TX 77056-3813

2000 Post Oak Blvd. Suite 1867 Houston, Texas 77056
Tel. (713) 840-0550 TLX - 790313 - FAX (713) 840-8727

CERTIFICAT D'ANALYSE DIN 50049/2.2

N°29070 — PAGE N° 1 / BLATT NR / PAGE No

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE)

PLAQUES-BLECHE-PLATES

SIGLE PRODUCTEUR / HERSTELLERZEICHEN / TRADE MARK

C.D.C. : Conforme au Cahier des Charges – Gemäss den Vorschriften – According specifications (1)
BL : Brut de laminage – Walzgewaltz unbehandelt – As rolled
N : Normalisé – Normalgeglüht – Normalized
R : Revenu – Vergütet – Tempered
D : Détensionné – Spannungsfreigeglüht – Stress relieved
LC : Laminage contrôlé – Gleichmässige Temperaturführung – Controlled rolling

Organisme et/ou service de contrôle / Überwachungs-organisation / Inspection: Z02

CLIENT / DESTINATAIRE – BESTELLER / EMPFÄNGER – PURCHASER / CONSIGNEE: SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD. # 1550
US - HOUSTON - TEXAS 77056-3813 — A06

N° COMMANDE COURTIER/CLIENT – MAKLER/KUNDEBESTELL NUMMER – BROKER/PURCHASER'S ORDER NUMBER: STC 11.695 — A07

N° commande usine / Werksbestell Nr. / Works order No.: 15042 — A08

NUANCE ET SPECIFICATIONS TECHNIQUES – STAHLSORTEN UND PRÜFBEDINGUNGEN – QUALITY AND SPECIFICATIONS: GRADE C / ASTM A 283/88 — B02

ETAT DE LIVRAISON / LIEFERZUSTAND / AS DELIVERED — B04

TRAITEMENT DE REFERENCE / PROBESTREIFENDE HANDLUNG / TREATMENT OF TEST SAMPLES (1) — B05

IDENTIFICATION DU PRODUIT – ERZEUGNIS BENENNUNG – PRODUCT IDENTIFICATION			N° POSTE / POS NR / ITEM NR	Nbre DE PLAQUES / STÜCKZAHL / NUMBER OF PLATES	DIMENSIONS – ABMESSUNGEN – DIMENSIONS			MASSE THEORIQUE / THEORETISCHES GEWICHT / THEORETICAL WEIGHT	EMPLACEMENT (2)	TRACTION – ZUGVERSUCH – TENSILE TEST						RESILIENCE – KERBSCHLAGZÄHIGKEIT – NOTCH TOUGHNESS					
N° REFERENCE / REFERENZ. NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	BRAME / BRAMME / SLAB			EPAISSEUR / DICKE / THICKNESS	LARGEUR / BREITE / WIDTH	LONGUEUR / LÄNGE / LENGTH			SENS (3)	(4)	Re	Rm	A %			TYPE / FORM / TYPE	SENS (3)	TEMP °C	PEAU / COEUR (4)	VALEURS INDIVIDUELLES / EINZELWERTE / INDIVIDUAL VALUES			MOYENNE / MITTELWERTE / AVERAGE
B07	B08		B09	B10	B11	B12	B13	B14	C01	C02	C04	C11	C12	C13	C14	C15	C40	C44	C45	C46	C42	C42	C42	C43	C08
								(kg)				(N/mm2)													
	289299	*	1	26	0"1/4	96"	240"			T															
	289300	*	1	36	0"1/4	96"	240"			T															
	289301	*	1	53	0"1/4	96"	240"			T															
	289304	*	1	67	0"1/4	96"	240"			T															

leared plates

+ (1) Lo = 5,65 √S mm – (2) Lo = 50 mm – (3) Lc = 200 mm

(5)	N° DE REFERENCE / REFERENZ. NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	ANALYSE SUR PRODUIT – STÜCKANALYSE – CHECK ANALYSIS																
			Mn %	P %	S %	C %	Si %	Al %	Nb %										
C70	B07	B08	C69	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84		
O/Y	289299			0.475	0.033	0.009	0.159	0.163	0.015	0.001									
	289300			0.463	0.019	0.017	0.172	0.201	0.031	0.001									
CC	289301			0.460	0.023	0.009	0.179	0.174	0.015	0.001									
	289304			0.446	0.015	0.017	0.176	0.219	0.004	0.001									

SERVICE METALLURGIQUE — A05

D02/Z03

Controle de marquage d'aspect et de dimensions : Satisfaisants / Bezeichnung, besichtigung und ausmessung : Ohne beanstandung / Marking, inspection and measurement : Without objection

CLABECQ, le 27/04/92

(2) Prélèvement-Location / Probelage-Location: 1:Tête-Kopf-Top; 2:Pied-Fuss-Bottom — C05

(3) Direction / Richtung / Direction: L:Long-Länge-Longitudinal; T:Travers-Quer-Transverse — C06

(4) C:Coeur-Kernprobe-Core sample; P:Peau-Walzfläche-Rolled surface — C07

C50

(5) O/Y : Oxygène pur – Sauerstoff – Oxygen
CC : Coulée continue – Kontinuierliches giessen – Continuous casting — C93

Nous certifions que les produits enumérés ci-dessus sont conformes aux prescriptions de la commande / Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen / We certify hereby that the above mentioned products are consistent with the order prescriptions — Z04

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe / Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben / The results of the special tests are indicated on the complementary documents in appendix — C60

CERTIFICAT D'USINE DIN 50049/2.2

N°29774 PAGE N° 9
BLATT NR
PAGE No

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE)

PLAQUES-BLECHE-PLATES

SIGLE PRODUCTEUR / HERSTELLERKENNZEICHEN / TRADE MARK

C.D.C. : Conforme au Cahier des Charges – Gemäss den Vorschriften – According specifications (1)
BL : Brut de laminage – Walzgeglüht – As rolled
N : Normalisé – Normalgeglüht – Normalized
R : Revenu – Vergütet – Tempered
D : Détensionné – Spannungsfreigeglüht – Stress relieved
LC : Laminage contrôlé – Einsatzwertige Temperaturführung – Controlled rolling

CLIENT / DESTINATAIRE – BESTELLER / EMPFÄNGER – PURCHASER / CONSIGNEE
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

N° COMMANDE COURTIER/CLIENT – MAKLER/KUNDENBESTELL NUMMER – BROKER/PURCHASER'S ORDER NUMBER: 11654B

N° commande usine / Werksauftrag Nr. / Works order No.: 15527

NUANCE ET SPECIFICATIONS TECHNIQUES – STAHLSORTEN UND PRÜFBEDINGUNGEN – QUALITY AND SPECIFICATIONS: A36 - SA36 / ASTM A36/91-ASME SA36/

LIVRAISON / LIEFERUNG / AS DELIVERED:

TRAITEMENT DE REFERENCE / PROBESTREIFENDE WARMUNG / TREATMENT OF TEST SAMPLES (1):

Organisme et/ou service de contrôle / Überwachungs-organisation / Inspection:

IDENTIFICATION DU PRODUIT – ERZEUGNIS BENENNUNG – PRODUCT IDENTIFICATION				DIMENSIONS – ABMESSUNGEN – DIMENSIONS			MASSE THEORIQUE – THEORETISCHES GEWICHT – THEORETICAL WEIGHT	DUPLICATA	TRACTION – ZUGVERSUCH – TENSILE TEST					RESILIENCE – KERBSCHLAGZÄHIGKEIT – NOTCH TOUGHNESS							
N° REFERENCE / REFERENCE NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	BRAME / BRAMME / SLAB	N° POSTE / ITEM NR / POST No	NOMBRE DE PLAQUES / NUMBER OF PLATES	EPAISSEUR / DICKE / THICKNESS	LARGEUR / BREITE / WIDTH	LONGUEUR / LÄNGE / LENGTH	(kg)	(2)	SENS (3)	(4)	Re	Rm	A 2 e (3)	TYPE / FORM / TYPE	SENS (3)	TEMP °C	PEAU COEUR (4)	VALEURS INDIVIDUELLES – EINZELWERTE – INDIVIDUAL VALUES			MOYENNE – MITTELWERTE – AVERAGE
B07	B08		B09	B10	B11	B12	B13	B14	C01	C02	C04	C11 (N/mm2)	C12	C13	C14	C15	C40	C44	C45	C46	C42	C42	C42	C43	C08
	292080		34		0"5/16	96"	240"			T		308	410	27.0										
	292085		35	24	0"3/8	96"	240"			T		284	436	27.0										
	292086		35		0"3/8	96"	240"			T		310	415	31.0										
	292083		36	21	0"3/8	96"	480" H			T		298	413	30.0										
	292085		36		0"3/8	96"	480"			T		303	418	31.0										
										T		287	414	30.0										
										T		307	430	32.0										

* (2) Lo = 5,65 √S mm – (2) Lo = 50 mm – (3) Lc = 200 mm

ANALYSE SUR PRODUIT – STÜCKANALYSE – CHECK ANALYSIS

(5)	N° DE REFERENCE / REFERENCE NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	Mn %	P %	S %	C %	Si %	Al %	Nb %								
C70	B07	B08	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	
O/Y		292080	0.826	0.032	0.015	0.096	0.285	0.013	0.001								
		292085	0.810	0.016	0.010	0.092	0.289	0.021	0.001								
CC		292086	0.808	0.020	0.012	0.075	0.259	0.011	0.001								
		292083	0.816	0.018	0.014	0.088	0.324	0.002	0.001								

A05

SERVICE METALLURGIQUE

D01/Z03

Controle de marquage d'aspect et de dimensions : Satisfaisants – Bezeichnung, beschichtigung und masseassung : Ohne beanstandung – Marking, inspection and measurements : Without objection

CLABECQ, le 10/07/92

(2) Prélèvement-Location / Probelage-Location: 1:Tête-Kopf-Top; 2:Pied-Fuss-Bottom C05

(3) Sens / Richtung-Direction: L:Long-Längs-Longitudinal; T:Travers-Quer-Transverse C06

(4) C:Coeur-Kernprobe-Core sample; P:Peau-Walzfläche-Rolled surface C07

C50

(1) O/Y : Oxygène pur – Oxygen
CC : Coulée continue – Kontinuierliches giessen – Continuous casting C93

Nous certifions que les produits enumérés ci-dessus sont conformes aux prescriptions de la commande – Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen – We certify hereby that the above mentioned products are conformant with the order prescriptions Z04

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe – Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben – The results of the special tests are indicated on the complementary documents in appendix C60

Z01

CERTIFICAT D'USINE DIN 50049/2.2

N°29786 — PAGE N°. 4 / BLATT NR / PAGE No

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE)

PLAQUES-BLECHE-PLATES

SIGLE PROJECTEUR / MARQUE DE FABRIQUE / TRADE MARK

C.E.C. : Conforme au Cahier des Charges – Gemäss den Vorschriften – According specifications
EL : Etat de livraison – Werkstoffzustand – As rolled
N : Normalisé – Normalgeglüht – Normalized
R : Revenu – Vergütet – Tempered
D : Détensionné – Spannungsfreigeglüht – Stress relieved
TC : Traitement contrôlé – Gütebehandlung / Temperaturführung – Controlled rolling

Organisme et/ou service de contrôle / Überwachungs-organisation / Inspection	CLIENT / DESTINATAIRE – BESTELLER / EMPFÄNGER – PURCHASER / CONSIGNEE	N° COMMANDE COURTIER/CLIENT – MAKLER/EMPFÄNGERS NUMMER – BROKER/PURCHASER'S ORDER NUMBER	N° commande usine / Werksauftrag Nr. / Works order No.	NUANCE ET SPECIFICATIONS TECHNIQUES – STAHLSORTEN UND PRÜFBEDINGUNGEN – QUALITY AND SPECIFICATIONS	LIEU DE LIVRAISON – LIEFERORT – AS DELIVERED	TRAITEMENT DE REFERENCE – PROBESTREIFENBEHANDLUNG – TREATMENT OF TEST SAMPLES (1)
Z02	SUNBELT TRADING COMPANY INC. 1990 POST OAK BLVD., #1550 US-HOUSTON-TEXAS 77056-3813 (USA) A06	11654B A07	15527 A08	A36 - SA36 ASTM A36/91-ASME SA36/ B02	B04	B05

IDENTIFICATION DU PRODUIT – ERZEUGNIS KENNZEICHNUNG – PRODUCT IDENTIFICATION			N° POSITION – POS. NR. – ITEM No	MARQUE DE CONTROLE – PRÜFZEICHEN – INSPECTION STAMP	DIMENSIONS – ABMESSUNGEN – DIMENSIONS			MASSE THEORIQUE – THEORETISCHES GEWICHT – THEORETICAL WEIGHT	DIAGRAMME	TRACTION – ZUGVERSUCH – TENSILE TEST						RESILIENCE – KERBSCHLAGZÄHIGKEIT – NOTCH TOUGHNESS							
N° REFERENCE / REFERENCE NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	MARQUE / MARKE / SLAB			D'ASSISE / DICKE / THICKNESS	LARGEUR / BREITE / WIDTH	LONGUEUR / LÄNGE / LENGTH			ESSAI (3)	(4)	Re	Rm	A % (3)			TYPE / FORM / TYPE	ESSAI (3)	TEMP °C	PLAN COEUR (4)	VALEURS INDIVIDUELLES – EINZELWERTE – INDIVIDUAL VALUES			MOYENNE – MITTELWERTE – AVERAGE	
B07	B08		B09	B10	B11	B12	B13	B14	C01	C02	C03	C11	C12	C13	C14	C15	C40	C44	C45	C46	C42	C43	C42	C43	C08
	292097		32		0"1/4	96"	240"	(kg)		T		(N/mm2)	410	27.0											
	292098		32		0"1/4	96"	240"			T		293	413	28.0											
	292099		32		0"1/4	96"	240"			T		295	416	26.0											
	292100		32		0"1/4	96"	240"			T		301	416	23.0											
										T		287	407	26.0											
										T		294	415	24.5											
										T		298	410	27.0											
										T		295	411	24.0											
										T		294													

(3) Le = 5,65 √S mm – (2) Lo = 50 mm – (3) Lo = 200 mm

(5)	N° DE REPERE / REFERENCE NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	ANALYSE SUR PRODUIT – STÜCKANALYSE – CHECK ANALYSIS																						
			Mn %	P %	S %	C %	Si %	Al %	Nb %																
C70	B07	B08	C04	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84								
D/Y		292097		0.789	0.022	0.014	0.073	0.259	0.007	0.001															
		292098		0.808	0.023	0.023	0.081	0.281	0.013	0.001															
CC		292099		0.736	0.019	0.015	0.066	0.274	0.013	0.001															
		292100		0.798	0.029	0.022	0.066	0.272	0.011	0.001															

B05

SERVICE METALLURGIQUE

D01/D03

Contrôle de marquage d'aspect et de dimensions : Satisfaisants
Bezeichnung, Beschaffenheit und Ausmessung : Ohne Beanstandung
Marking, inspection and measurements : Without objection

CLABECQ, le 13/07/92

(2) Prélèvement – Location – Lage
1/Tête – Kopf – Top
2/Pied – Fuss – Bottom C05

(3) Direction – Richtung – Direction
L/Long – Längs – Longitudinal
T/Travers – Quer – Transverse C06

(4) Carotte – Entnahmestelle – Core sample
P/Peau – Walzfläche – Rolled surface
C07

C00

(5) D/Y : Oxygène pur – Sauerstoff – Oxygen
CC : Coulée continue – Kontinuierliches giessen – Continuous casting
C93

Nous certifions que les produits susvisés ci-dessus sont conformes aux prescriptions de la commande
Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen
We certify hereby that the above mentioned products are conformant with the order prescriptions
Z04

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe
Die ergebnisse der besonderen prüfungen sind in de beigefügten zusatzlichen unterlagen angegeben
The results of the special tests are indicated on the complementary documents in appendix
E60

Z01

CERTIFICAT D'USINE DIN 50049/2.2

N°2942 PAGE N° 3 / BLATT NR / PAGE No A03

A02

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE) A01

PLAQUES-BLECHE-PLATES B01

SIGLE PRODUCTEUR / HERSTELLERZEICHEN / TRADE MARK A04

C.D.C. : Conforme au Cahier des Charges – Gemäss den Vorschriften – According specifications (1)
BL : Brut de laminage – Walzgewalzt unbehandelt – As rolled
N : Normalisé – Normalgeglüht – Normalized
R : Revenu – Vergütet – Tempered
D : Détensionné – Spannungsfreigeglüht – Stress relieved
LC : Laminage contrôlé – Gleichmässige Temperaturführung – Controlled rolling
B03

A15

Organisme et/ou service de contrôle / Überwachungs-organisation / Inspection Z02

CLIENT / DESTINATAIRE – BESTELLER / EMPFÄNGER – PURCHASER / CONSIGNEE A06
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

N° COMMANDE COURTIER/CLIENT – MAKLER/KUNDEBESTELL NUMMER / BROKER/PURCHASER'S ORDER NUMBER A07
11.653

N° commande usine / Werksbestell Nr. / Works order No. A08
15520

NUANCE ET SPECIFICATIONS TECHNIQUES / STAHLSORTEN UND PRÜFBEDINGUNGEN / QUALITY AND SPECIFICATIONS B02
A36 - SA36
ASTM A36/89-ASME SA36/89

ETAT DE LIVRAISON / LIEFERZUSTAND / AS DELIVERED B04

TRAITEMENT DE REFERENCE / PROBESTREIFENDE HANDLUNG / TREATMENT OF TEST SAMPLES (1) B05

IDENTIFICATION DU PRODUIT / ERZEUGNIS BENENNUNG / PRODUCT IDENTIFICATION			N° POSTE / POSITION NR	MARQUE DES PLAQUES / STOCK MARK	DIMENSIONS – ABMESSUNGEN – DIMENSIONS			MASSE THEORIQUE / THEORETISCHES GEWICHT / THEORETICAL WEIGHT	DEGRADE (2)	TRACTION – ZUGVERSUCH – TENSILE TEST						RESILIENCE – KERBSCHLAGZÄHIGKEIT – NOTCH TOUGHNESS						(2) *
N° REFERENCE / REFERENZ. NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	BRAME / BRAMME / SLAB			EPAISSEUR / DICKE / THICKNESS	LARGEUR / BREITE / WIDTH	LONGUEUR / LÄNGE / LENGTH			SENS (3)	(a)	Re	Rm	A % (2) * (3) *			TYPE / FORM / TYPE	SENS (3)	TEMP °C	PEAU / COEUR (a)	VALEURS INDIVIDUELLES / EINZELWERTE / INDIVIDUAL VALUES			MOYENNE / MITTELWERTE / AVERAGE	
B07	B08		B09	B10	B11	B12	B13	B14 (kg)	C01	C02	C04	C11 (N/mm2)	C12	C13	C14	C15		C40	C44	C45	C46	C42	C42	C42	C43	C08
290634		2		0"1/4	96"	480"				T		294	410	29.0												
290635		2		0"1/4	96"	480"				T		284	404	31.0												
290638		2		0"1/4	96"	480"				T		271	404	31.0												
289231		3	2	2"	96"	480"				T		283	405	29.0												
										T		293	407	30.0												
										T		300	482	34.0												
										T		280	473	34.0												

* (2) Lo = 5,65 √S mm – (3) Lo = 50 mm – (5) Lo = 200 mm

(5)	N° DE REFERENCE / REFERENZ NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	ANALYSE SUR PRODUIT – STÜCKANALYSE – CHECK ANALYSIS														
			Mn %	P %	S %	C %	Si %	Al %	Nb %								
C70	B07	B08	C94	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84
O/Y	290634			0.859	0.025	0.016	0.073	0.182	0.011	0.001							
	290635			0.845	0.020	0.017	0.075	0.159	0.010	0.001							
CC	290638			0.822	0.018	0.018	0.077	0.204	0.012	0.001							
	289231			0.938	0.020	0.009	0.190	0.198	0.032	0.001							

A05

SERVICE METALLURGIQUE

D02/203

Controle de marquage d'aspect et de dimensions : Satisfaisants / Bezeichnung, besichtigung und ausmessung : Ohne beanstandung / Marking, inspection and measurements : Without objection

CLABECQ, le 29/05/92

(2) Probelage-Location / 1:Tête-Kopf-Top / 2:Pied-Fuss-Bottom C05

(3) Richtung-Direction / L:Long-Langs-Longitudinal / T:Travers-Quer-Transverse C06

(4) C:Coeur-Kernprobe-Core sample / P:Peau-Walzfläche-Rolled surface C07

C50

(5) O/Y : Oxygène pur – Oxygen
CC : Coulée continue – Kontinuierliches giessen / Continuous casting C93

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande / Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen / We certify hereby that the above mentioned products are consistent with the order prescriptions Z04

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe / Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben / The results of the special tests are indicated on the complementary documents in appendix C60

Z01

STRUCTURAL

CHAPARRAL STEEL

MIDLOTHIAN 300 WARD RD.
TEXAS 76065
(214) 775-8241

CERTIFIED MATERIAL TEST REPORT

SOLD TO
O'NEAL STEEL, INC.
P.O. BOC 98
BIRMINGHAM AL. 35201

SHIP TO
O NEAL STEEL INC
2834 CLOVIS RD
LUBBOCK TX
3035*

TOMER PURCHASE ORDER NUMBER	DATE	QUANTITY	DESCRIPTION	LENG
-04616	10-JUN-92	4.68	W 4 X 13#	0.01

STED ACCORDING TO	SIZE	GRADE	PRODUCT	HEAT
STM A6-90A 36-90 572-88C	W 4 X 13#	A36/A57250	WF BEAMS	9-9769

CHEMICAL ANALYSIS

	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	
.12	0.87	0.014	0.050	0.26	0.57	0.14	0.06	0.028	0.000	0.009	

PHYSICAL PROPERTIES

YIELD STRENGTH ~~K.S.I.~~	TENSILE STRENGTH ~~K.S.I.~~	SPECIMEN AREA ~~SQ. IN.~~	ELONGATION %	ELONGATION GAUGE LENGTH	BEND TEST DIA	BEND TEST RESULT	GRAIN SIZE	REDUC OF ARE
7.5	77.7	3.727	43.5	2"	0.5D	PASS		
60.4	80.0	3.727	39.0	2"	0.5D	PASS		

hereby certify that the contents of this report are correct and accurate. All test results and operations performed by this mate manufacturer are in compliance with the requirements of the material specification, and when designated by the purchaser meet t pecific applicable material requirements of section III of the A.S.M.E. Boiler and Pressure Vessel Code".

gned Tom L Harrington

Tom L. Harrington • Quality Assurance Manager
worn and Subscribed to before me, in and for Ellis County on

is 10th day JUNE, 1992

(NOTARY PUBLIC)

y Commission Expires

ANIFEST 499603 (NOTARIZED ON REQUEST ONLY)

REMARKS

PO# 27230
WO# JT 41210

O NEAL STEEL INC.

P O BOX 5495

LUBBOCK TX 79417

LL MANUFACTURING PROCESSES OF THE STEEL MATERIALS IN THIS PRODUCT, NCLUDING SMELTING, HAVE OCCURRED WITHIN THE UNITED STATES IN COMPLIANCE ITH THE "BUY AMERICA" PROVISION OF THE SURFACE TRANSPORTATION SSISTANCE ACT OF 1982.

Atlantic Steel Company

A MEMBER OF THE INACO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

TEST CERTIFICATE

DATE 08/[illegible]/92

3/8 x 2

SEND TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

INVOICE NUMBER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH (KSI)	TENSILE STRENGTH (KSI)	ELONG. 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - %										
								C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
5605 01	Z-1725 S	FLATS, 0.3750"X 2.0000" A36-90 20'00", 5000# BUNDLE	49690	52.0	73.3	30.0		.16	.72	.015	.016	.16	.27					

SWORN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

_____ 19 _____

I CERTIFY THE ABOVE RESULTS OF TESTS AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

DOD

FLORIDA STEEL CORPORATION

CHEMICAL AND PHYSICAL TEST REPORT

MADE IN U.S.A.

D'NEAL STEEL, INC.
2834 CLOVIS ROAD
BOX 5495
LUBBOCK TX 79415

INVOICE TO

D'NEAL STEEL, INC.
P. O. BOX 2623
BIRMINGHAM AL 35202-26

SHIP DATE	SHIPPERS NUMBER
07-20-92	8582-116256
CUST. ACCOUNT NO	
36791606	

SIZE	GRADE	SPECIFICATION	S.O. NO.	CUST. P.O. NUMBER

HEAT LD NO	C	MN	P	S	V	SI	CR	CU	NI	SN	AL	MO	YIELD PT LBS/SQ IN	TENSILE LBS/SQ IN	% ELONG E IN	BEND	DIF.	% LIGHT HEAVY
4 X 5.4#					A36		ASTM A36-91				ASME-SA36			2013173	7-17424			
2-1989	.15	.69	.01	.03									48270	72169	32.0 DK			
4 X 5.4#					A36		ASTM A36-91				ASME-SA36			2013173	7-17424			
2-1989	.15	.69	.01	.03									48742	72327	31.4 DK			
3 X 3 X 1/4					A36		ASTM A36-91				ASME-SA36			2013173	7-17424			
2-2486	.15	.73	.01	.04									52586	71724	29.0 DK			
3 X 3 X 1/4					A36		ASTM A36-91				ASME-SA36			2013173	7-17424			
2-2486	.15	.73	.01	.04									52777	72222	29.4 DK			
1 1/2 X 1 1/2 X 3/16					A36		ASTM A36-91				ASME-SA36			2011544	7-13452			
2-2827	.14	.61	.01	.04									49056	68396	26.0 DK			
1 1/2 X 1 1/2 X 3/16					A36		ASTM A36-91				ASME-SA36			2011544	7-13452			
2-2827	.14	.61	.01	.04									48113	66981	27.5 DK			
2 X 2 X 3/8					A36		ASTM A36-91				ASME-SA36			2009381	7-08587			
2-2736	.15	.69	.01	.05									46828	70522	32.0 DK			
2 X 2 X 3/8					A36		ASTM A36-91				ASME-SA36			2009381	7-08587			
2-2736	.15	.69	.01	.05									47201	71455	31.5 DK			
3 X 3 X 3/16					A36		ASTM A36-91				ASME-SA36			2013396	7-57936			
2-2530	.14	.66	.01	.03									48394	68119	32.0 DK			
3 X 3 X 3/16					A36		ASTM A36-91				ASME-SA36			2013396	7-57936			
2-2530	.14	.66	.01	.03									47706	67660	34.0 DK			

HIS MATERIAL, INCLUDING THE BILLETS,
AS PRODUCED AND MANUFACTURED IN THE
NITED STATES OF AMERICA.

A. J. TURNER
QUALITY ASSURANCE MGR.
MILL GROUP

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY

2 x 2 x 3/8 Angle

FLORIDA STEEL CORPORATION

"Steel when you want it"

CHEMICAL AND PHYSICAL TEST REPORT

MADE IN U.S.A.

wright TX

SHIP TO	INVOICE TO	SHIP DATE	SHIPPERS NUMBER
O'NEAL STEEL, INC. 3854 CLOVIS ROAD BOX 5495 LUBBOCK TX 79415	O'NEAL STEEL, INC. P. O. BOX 2623 BIRMINGHAM AL 35202-26	09-17-92	8582-1-9177
		CUST. ACCOUNT NO. 36791606	

SIZE					GRADE		SPECIFICATION						S.O. NO.		CUST. P.O. NUMBER			
HEAT LD NO.	C	MN	P	S	V	SI	CR	CU	NI	SN	AL	MO	YIELD PT LBS./SQ IN.	TENSILE LBS./SQ IN	% ELONG @ IN	BEND	DEF.	% LIGHT HEAVY
1 1/2 X 1 1/2 X 1/8					A36		ASTM A36-91					ASME-SA36						
V2-2784	.15	.70	.01	.04									56428	75714	25.0	OK		
1 1/2 X 1 1/2 X 1/8					A36		ASTM A36-91					ASME-SA36						
V2-2784	.15	.70	.01	.04									55000	74285	25.6	OK		
7 X 7 X 7/16					A36		ASTM A36-91					ASME-SA36						
V2-2520	.12	.69	.02	.04									46336	65732	38.6	OK		
7 X 7 X 7/16					A36		ASTM A36-91					ASME-SA36						
V2-2520	.12	.69	.02	.04									45474	64878	38.5	OK		
6 X 8 2*					A36		ASTM A36-91					ASME-SA36						
V2-3508	.15	.81	.01	.03									55425	73025	29.5	OK		
7 X 7 X 1/4					A36		ASTM A36-91					ASME-SA36						
V2-2498	.13	.69	.02	.04									48611	67881	35.0	OK		
7 X 7 X 1/4					A36		ASTM A36-91					ASME-SA36						
V2-2488	.13	.69	.02	.04									49300	68831	33.8	OK		

JAN 94

Resid Hrn 9-21-92

THIS MATERIAL, INCLUDING THE BILLETS, WAS PRODUCED AND MANUFACTURED IN THE UNITED STATES OF AMERICA.

A. J. TURNER
QUALITY ASSURANCE MGR.
MILL GROUP

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY

8000 71 030R 8/88

Z-57945 L 6X1 5X16

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

WE HEREBY CERTIFY THAT THE FOLLOWING DATA IS A TRUE COPY FROM TESTS PERFORMED IN OUR LABORATORY.

The following tests conform to the requirements of the specifications listed.

DAN SCHACHT 8/ 7/92

QUALITY CONTROL MANAGER

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
01391	AU 2.5X2X1/4	ASTM A36-89	.15	0.87	.024	.036	.16	.43	0.24	0.17	.039	.000	.0040	.003
37196	CH 6X10.5	ASTM A36-89	.17	0.68	.009	.031	.26	.37	0.23	0.23	.049	.004	.0020	.001
39624	SQ 3/4	ASTM A36-89	.16	0.82	.009	.033	.17	.50	0.11	0.23	.053	.000	.0020	
39625	SQ 3/4	ASTM A36-89	.15	0.76	.006	.028	.19	.46	0.10	0.22	.054	.000	.0020	
37196	CH 6X10.5	ASTM A36-89	.17	0.68	.009	.031	.26	.37	0.23	0.23	.049	.004	.0020	.001
01476	#8 REBAR	ASTM A615-89 GRADE 60 AASHTO M31	.42	0.97	.008	.032	.23	.42	0.08	0.17	.041	.013	.0020	.002

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
01391	1	52100	74800	30.0		3.570	06/25/92
37196	1	51800	74400	39.0		10.400	08/28/91
39624	1	51500	73500	22.0		1.900	01/10/92
39625	1	51500	73500	22.0		1.900	01/10/92
37196	1	51800	74400	39.0		10.400	08/28/91
01476	1	69000	106300	12.0	BK	2.600	06/26/92

REMARKS: P.O. Z-16717; Z-19477; Z-19076 ; Z-57945 & BZ-42393
THIS STEEL IS MELTED & MANUFACTURED IN THE USA

Atlantic Steel COMPANY

A MEMBER OF THE IVACO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

TEST CERTIFICATE

PAGE

DATE 05/21/92

SEND TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

INVOICE NUMBER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	ELONG 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - %									
								C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
036447 -001	Z-07998 S	FLATS, 0.2500" X 4.0000" 55 KSI 20'00", 5000# STACKED BUNDLE	48832	65.6	87.6	28.0		.20	.88	.017	.022	.21	.37				.023

MATERIAL MELTED AND MANUFACTURED IN THE USA

Z-07998

SWORN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

_____ 19 _____

I CERTIFY THE ABOVE RESULTS OF TEST AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

CERTIFIED MILL TE REPORT

SOLD TO
O'NEAL STEEL *BIRMINGHAM
PO BOX 96
BIRMINGHAM AL 35201

SHIP TO
O'NEAL STEEL *BIRMINGHAM
10848 LUNA ROAD
DALLAS TX

JACKSON, MS STEEL DIV
FOURTH STREET OFF FLOWOOD DR.
JACKSON MS 36613

DATE: 08/18/92
B.L. NO.: 84- 69867
LOAD NO.: 84- 18261

PO# X-16006 X-17704 2-20833

HEAT NO.*	DESCRIPTION	PHYSICAL TESTS					CHEMICAL TESTS						
		YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WT% DEF	C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu	C.E
559213668	1/4x3" F1 20' (A36) ASTM A36	50,500	71,500	25.0	OK	-4.9%	.15 NA	.700 NA	.014 NA	.035 NA	.16 NA	NA	
559213692	1/4x4" F1 20' (A36) ASTM A36	45,800	65,900	28.0	OK	-4.3%	.15 NA	.600 NA	.010 NA	.038 NA	.19 NA	NA	
559310572	1/2x3" F1 20' (A36) ASTM A36-91	46,700	68,700	31.0	OK	-2.9%	.14 NA	.650 NA	.021 NA	.038 NA	.11 NA	NA	
559310573	1/2x3" F1 20' (A36) ASTM A36-91	46,300	67,600	33.0	OK	-2.8%	.15 NA	.720 NA	.018 NA	.036 NA	.15 NA	NA	

REC'D O'NEAL STEEL DALLAS
AUG 19 1992
ORIGINAL

E REVERSE FOR PLANT OF ORIGIN

Y CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE CORPORATION.

JOHN STAUBITZ

CERTIFIED MILL TEST REPORT

SOLD TO
D'NEAL STEEL *BIRMINGHAM
PO BOX 98
BIRMINGHAM AL 35201

SHIP TO
D'NEAL STEEL *BIRMINGHAM
2834 CLOVIS ROAD
LUBBOCK TX

JACKSON, MS STEEL DIV
FOURTH STREET OFF FLOWOOD DR.
JACKSON MS 36613

DATE: 08/14/92
B.L.NO.: B4- 69790
LOAD NO.: B4- 18214

PO# Z-17620
Z-59009 F 1/4X2

HEAT NO.	DESCRIPTION	PHYSICAL TESTS YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WT% DEF	CHEMICAL TESTS C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu	C.E.
49215924	1/4x2" Fl 20' (A36) ASTM A36-90	44,400	65,400	28.0	OK		.16 NA	.580 NA	.005 NA	.022 NA	.18 NA	NA	
49310382	3/4" Rd 20' (A36) ASTM A36-90	56,689	74,830	20.0	OK		.18 NA	.670 NA	.016 NA	.029 NA	.20 NA	NA	

REVERSE FOR PLANT OF ORIGIN

I CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THIS CORPORATION

JOHN STAUBITZ

GE 1

Atlantic Steel Company

A MEMBER OF THE IVACO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

TEST CERTIFICATE

DATE 06/10/92

SEND TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

DICE BER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	% ELONG. 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
0167 01	Z-0270 1	FLATS, 0.7500"X 4.0000" 55 KSI 20'00", 9000# STACKED BUND	48782	60.0	82.7	31.0		.20	.94	.007	.028	.19	.22				.032	

B3K 16

MATERIAL MELTED AND MANUFACTURED IN THE USA

3/4 x 4 Flat

RN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

_____ 19 _____

I CERTIFY THE ABOVE RESULTS OF TESTS AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

SIGNED: A K Davis

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

The following tests conform to the requirements of the specifications listed.

WE HEREBY CERTIFY THAT THE FOLLOWING DATA IS A TRUE COPY FROM TESTS PERFORMED IN OUR LABORATORY.

DAN SCHACHT — 12/19/91

QUALITY CONTROL MANAGER

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
780	AE 2.5X1/4	ASTM A36-89	.15	0.78	.008	.034	.24	.46	0.12	0.17	.037	.000	.0020	
202	AE 2X3/8	ASTM A36-89	.15	0.85	.008	.029	.25	.38	0.19	0.17	.052	.000	.0010	
243	FL 3/4X6	A36 MODIFIED	.21	0.83	.009	.042	.23	.41	0.11	0.18	.035	.004	.0020	.001
094	FL 3/4X6	A36 MODIFIED	.21	0.80	.009	.034	.22	.43	0.16	0.17	.037	.001	.0010	.001
175	AE 2X1/4	ASTM A36-89	.13	0.87	.012	.029	.26	.60	0.18	0.21	.051	.000	.0020	
176	AE 2X1/4	ASTM A36-89	.14	0.80	.009	.029	.26	.47	0.12	0.17	.046	.000	.0010	
105	FL 3/4X5	A36 MODIFIED	.22	0.80	.007	.030	.23	.47	0.13	0.17	.041	.004	.0010	.001

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
780	1	52900	73100	31.0		4.045	11/16/91
202	1	51400	75000	30.0		4.560	10/19/91
243	1	52200	79400	25.0		15.150	04/27/91
094	1	51200	80000	25.0		15.200	08/18/91
175	1	45800	72900	32.0		3.150	10/20/91
176	1	51200	72700	30.0		3.140	10/20/91
105	1	54400	81300	26.0		12.590	08/20/91

3/4X5 A36 mod flat

MARKS: THIS STEEL IS MELTED & MANUFACTURED IN THE USA

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

WE HEREBY CERTIFY THAT THE F[illegible]OWING DATA IS A TRUE COPY FROM TESTS PE[illegible]MED IN OUR LABORATORY.

DAN SCHACHT 4/29/92

QUALITY CONTROL MANAGER

The following tests conform to the requirements of the specifications listed.

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
89511	AU 2X1.5X3/16	ASTM A36-89	.15	0.79	.011	.033	.18	.38	0.11	0.15	.036	.000	.0020	
K1017	AE 2X1/8	ASTM A36-89	.16	0.69	.020	.036	.22	.33	0.13	0.09	.010	.004	.0020	.002
K1056	AE 2X1/8	ASTM A36-89	.15	0.66	.019	.037	.24	.36	0.12	0.11	.020	.003	.0020	.003
88202	AE 2X3/8	ASTM A36-89	.15	0.85	.008	.029	.25	.38	0.19	0.17	.052	.000	.0010	
00195	AE 2.5X3/8	ASTM A36-89	.18	0.74	.008	.033	.21	.51	0.06	0.14	.032	.000	.0020	
00222	AE 2.5X1/4	ASTM A36-89	.19	0.73	.007	.028	.23	.52	0.12	0.14	.046	.001	.0020	.001

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
89511	1	49800	71200	29.0		2.060	01/02/92
K1017	1	55300	73800	29.5		1.600	01/26/92
K1056	1	53900	71900	24.0		1.640	01/25/92
88202	1	51400	75000	30.0		4.560	10/19/91
00195	1	54200	75200	30.0		5.830	04/21/92
00222	1	54000	77300	32.0		4.050	04/21/92

RECEIVED
MAY - 7 1992

REMARKS: THIS STEEL IS MELTED & MANUFACTURED IN THE USA

PO# 27310
WO# JT4210

FIFE

middle east tube co.ltd.
IMPORT / EXPORT DEPT.
P.O.B 62 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 8-268382 - 4 FAX: 8-221186

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 89/J/1-189 PAGE 1

P H Y S I C A L P R O P E R T I E S

TUBE DIMENSION	YIELD POINT	U.T.S.	ENLONGATION	HEAT NO.
18" X 0.375	52017	68334	40	2483
10" X 0.375	57736	72991	32	2485
10" X 0.375	59167	74195	33	2486
10" X 0.375	56364	70712	37	2488
10" X 0.375	57206	72827	33	2489
10" X 0.375	53200	64462	34	2490
10" X 0.375	56742	75653	31	2491
10" X 0.375	55391	65465	33	2492
10" X 0.375	62406	76499	30	2493
10" X 0.375	50029	73780	35	2494

RAMLA, 23/04/89

middle east tube co.ltd.

IMPORT / EXPORT DEPT.

P.O.B 82 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 8-258382 - 4 FAX: 8-221199

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 89/J/1-183 PAGE 1.

C H E M I C A L A N A L Y S I S

BE DIMENSIONS	% C	% MN.	% SI.	% P	% S	AL%	HEAT NO.
8" X 0.375	0.160	0.710	0.160	0.014	0.012	0.004	2483
8" X 0.375	0.160	0.760	0.270	0.014	0.013	0.006	2485
8" X 0.375	0.160	0.780	0.250	0.013	0.015	0.006	2486
8" X 0.375	0.140	0.640	0.200	0.008	0.021	0.005	2488
8" X 0.375	0.160	0.690	0.270	0.008	0.025	0.005	2489
8" X 0.375	0.160	0.700	0.240	0.013	0.017	0.004	2490
8" X 0.375	0.150	0.750	0.300	0.006	0.027	0.005	2491
8" X 0.375	0.160	0.690	0.220	0.009	0.022	0.004	2492
8" X 0.375	0.160	0.740	0.200	0.006	0.021	0.005	2493
8" X 0.375	0.160	0.770	0.240	0.015	0.016	0.012	2494

RAMLA, 23/04/89

middle east tube co.ltd.

IMPORT / EXPORT DEPT.

P.O.B 62 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 08-268392 - 4 FAX: 08221199

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 1837/00

ER NO. : 09/J/1-183 TEST PSI : 1490

ER.	WALL THICK.	KG/ MTR	LENGTH MTR	LENGTH FT	TOTAL M.TON	NO. OF PIECES	REMARKS
	.375	105.100	3150.36	10336.33	325.742	246	RED+RED
	.375	105.100	269.24	883.30	27.948	23	GREEN+GREEN

02/04/09

L-80000

Tubos de aço
PERSKO
PIZZAMIGLIO

Rod. Pres. Dutra, Km 218 - Tel.: (011) 917-4711/3222 - Telex 1155121 - CEP 07180
Guarulhos - SP - BRASIL - C.G.C. 61.091.013/0003-30 - I.E. 336.040.605.118
Fax (011) 912-0434 - Endereço Telegráfico: IRONTUBES

CERTIFICADO DE ENSAIOS E ANÁLISES
MILL TEST CERTIFICATE

CEA/MTC Nº 9561
ORIGINAL

FOLHA/SHEET 1

DESCRIÇÃO/DESCRIPTION: ERW LINE PIPE / BPE - GR A - SCH 40.

NOTA FISCAL Nº/EXPORT Nº: 6211

LOTE Nº/LOT Nº: 753602

PACOTES/BUNDLES: 22

Nº DE PEÇAS/Nº PIECES: 154

PESO APROXIMADO/APPROXIMATE WEIGHT (LBS): 52844

COMPRIMENTO TOTAL/TOTAL LENGHT: 6160 FEET

DIMENSÕES/DIMENSIONS: *X0.280X18.97LBS/FTX40FT

ESPECIFICAÇÕES/SPECIFICATIONS: PI 5L GRADE A

Nº DE COMPRA Nº/PURCHASE ORDER Nº:

CARTA DE CRÉDITO/LETTER OF CREDIT: 920121IM295

Nº DE PRODUÇÃO Nº/WORKING ORDER Nº: 168201

DRL

6 Sch 40 453A Welded

TRATAMENTO TÉRMICO/HEAT TREATMENT	BOBINA Nº COIL NUMBER	PROPRIEDADES FÍSICAS/PHYSICAL PROPERTIES				ANÁLISE QUÍMICA/CHEMICAL ANALYSIS (%)											
		LIMITE ESCOAMENTO YP	LIMITE RESISTÊNCIA TS	ALONGAMENTO ELONGATION	DUREZA HARDNESS	x 100							x 1000				
		PSI	PSI			C	Mn	Si	Ni	Cr	Mo	CU	P	S	Al	Nb	
1 REGIÃO DA SOLDA/WELD AREA: N	501557	46490	51760	41,2	-	3	38	-	-	-	-	-	13	3	-	-	
RESULTADO DOS TESTES/TEST RESULTS	501560	39816	50054	43,4	-	5	32	-	-	-	-	-	13	15	-	-	
ENSAIOS MECÂNICOS/MECHANICAL	501573	55742	66591	33,2	-	19	87	-	-	-	-	-	15	9	-	-	
ACHATAMENTO/FLATTENING: N	501574	52045	61714	35,0	-	4	30	-	-	-	-	-	12	15	-	-	
REVERSO/REVERSE FLATTENING: Y	501575	38394	48285	45,8	-	4	31	-	-	-	-	-	12	19	-	-	
ALARGAMENTO/EXPANDING: N	501577	42375	49527	42,2	-	5	30	-	-	-	-	-	10	17	-	-	
ALARGAMENTO REVERSO/REVERSE BEND: -	501581	61714	74228	33,0	-	14	64	22	-	-	-	-	15	12	-	-	
ACHATAMENTO/FLANGE: -	501587	50054	51760	37,6	-	3	37	-	-	-	-	-	15	13	-	-	
DOBRA/BEND: -																	
ENSAIO DE MANCHONAMENTO/COUPLING TEST: -																	
ENSAIO HIDROSTÁTICO/HYDROSTATIC: 1820 PSI																	
ENSAIOS NÃO DESTRUTIVOS/NON DESTRUCTIVE: Y																	
MAGNÉTICO ELETROMAGNÉTICO/MAGNETIC ELECTROMAGNETIC: -																	
MAGNÉTICO PARTÍCULA MAGNÉTICA/MAGNETIC PARTICLE: -																	
GALVANIZAÇÃO/GALVANIZING: -																	
PESO DE ZINCO/ZINC GRADE (%): -																	
CAMADA DE ZINCO/ZINC WEIGHT (g/m²): -																	
REVESTIMENTO/COATING THICKNESS: -																	
ENSAIO DE IMERSÃO/IMMERSION TEST: -																	
IMERSÃO/IMMERSION: -																	
ADERÊNCIA/ADHERENCE: -																	
UNIFORMIDADE/UNIFORMITY: -																	
ESPESSURA/THICKNESS: -																	

OBSERVAÇÕES/REMARKS: DUCTILITY

CERTIFICAMOS PELO PRESENTE QUE O MATERIAL FOI TESTADO EM NOSSO LABORATÓRIO, DE ACORDO COM AS ESPECIFICAÇÕES TÉCNICAS, RESULTANDO NOS VALORES ACIMA REFERIDOS.
WE HEREBY CERTIFY THAT THE DESCRIBED MATERIAL WAS TESTED IN OUR LABORATORY ACCORDING TO THE TECHNICAL STANDARDS AND YIELDED THE RESULTS ABOVE MENTIONED

CUMPLIDO,
APRIL 13 1992
SALVATORE DI MINO
GERENTE CONTROLE QUALIDADE/QUALITY CONTROL MANAGER

OCT 15 '92 09:51 O'NEAL STEEL LUBBOCK P.3

Z-52890

BUYER ACEROTEX INTERNATIONAL

ORDER Nº ATI-914017

SPECIFICATION ASTM-A-53-A

KIND OF ARTICLE CARBON STEEL (STEEL 3" NOM SCH-40)

TUNA

91 772

Villacero

TUBERIA NACIONAL, S. A.

N E/L

INSPECTION CERTIFICATE

HEAT Nº	DIMENSION			HYDROSTATIC	WEIGHT	CHEMICAL COMPOSITION %								TENSION TEST		
	NOM. (INCHES)	THICKNESS (INCHES)	LENGTH FT (MTS)	TESTED PSI (KG/CM.²)	LBS. (KGS)	C x 1/100	Mn x 1/100	P x 1/1000	S x 1/1000	Si x 1/100				Y.P. PSI / KG/CM²	T.S. PSI / KG/CM²	E.L. %
1104271	3	0.216	21	2200		13	44	11	21	0				38755	48536	29
				155										2724	3412	
			MPA	15.17												
												MPA		267	334	

3 sch 40 453 welded

OCT 15 '92 09:52 O'NEAL STEEL LUBBOCK P.4

P.O. BOX 10232
LUBBOCK, TEXAS 79408

FOR: SHIELDED METAL ARC WELDING, CARBON STEEL (P-Number 1)

SCOPE

1. This welding procedure specification covers the welding of carbon steel (P-1) in the fabrication of API 650 storage tanks.

PROCESS: Shielded metal arc.

BASE METAL:

The steel base metal shall comply with one of the ASTM specifications and grades listed in the ASME Code under (P-1).

FILLER METAL:

The filler metal shall comply with ASME Material Specification Part C E6010 (F3).

PREPARATION OF BASE METAL AND ALIGNMENT OF EDGES:

1. The edges to be joined shall be perpared in accordance with a single or double "V" Groove. Gas cutting may be used.

2. Edges to joined and all surfaces within 1/2" of the welding edge shall be thoroughly cleaned immediately prior to welding.

3. Abutting edges of plates at longitudinal joints shall not, after welding, have an offset at any point in excess of one-quarter of the plate thickness with a maximum permissible offset of 1/8", except that plates less than 1/4" in thickness, the offset may be as much as 1/16".

4. Abutting edges circumferential joints shall be aligned with the following tolerances;

For plates up to 1/4"	1/16"
For plates over 1/4" to 3/4"	25% of plate thickness
For plates over 3/4" to 1½"	3/16"
For plates over 1½"	12 1/2% of plate thickness, but not over 1/4"

ELECTRIC CURRENT:

Direct current shall be used with electrode positive and the base metal negative. (Reverse Polarity).

WELDING TECHNIQUE:

1. The welding technique shall be substantially as shown on the attached sketches.

2. (a) When making double-welded joints the reverse (root) side must be gouged,chipped,or ground out to sound metal before the finishing bead is deposited.

WPS No. SMI 1-1 Rev. 0

POSITIONS (QW-405)
Position(s) of Groove 6G
Welding Progression: Up E7018 Down E6010
Position(s) of Fillet ALL

POSTWELD HEAT TREATMENT (QW-407)
Temperature Range NA
Time Range

PREHEAT (QW-406)
Preheat Temp. Min. 70°F
Interpass Temp. Max. 500°F
Preheat Maintenance As Required
(Continuous or special heating where applicable should be recorded)

GAS (QW-408)
Shielding Gas(es)
Percent Composition (mixtures)
Flow Rate
Gas Backing
Trailing Shielding Gas Composition

ELECTRICAL CHARACTERISTICS (QW-409)
Current AC or DC DC Polarity Reverse
Amps (Range) 120-190 Volts (Range) 19-26
(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type NA
(Pure Tungsten, 2% Thoriated, etc.)
Mode of Metal Transfer for GMAW NA
(Spray arc, short circuiting arc, etc.)
Electrode Wire feed speed range NA

TECHNIQUE (QW-410)
String or Weave Bead String & Weave
Orifice or Gas Cup Size NA
Initial and Interpass Cleaning (Brushing, Grinding, etc.) Grinding & Brush
Method of Back Gouging Air Arc and Grinding
Oscillation No pass greater than ½"
Contact Tube to Work Distance NA
Multiple or Single Pass (per side) Multipass
Multiple or Single Electrodes Single
Travel Speed (Range) 8 to 10 Inches Per Minute
Peening Not Allowed
Other

Weld Layer(s)	Process	Filler Metal Class	Filler Metal Dia.	Current Type Polar.	Current Amp. Range	Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
1	SMAW	E6010	1/8"	Rev.	120-190	19-26	8-10 IPM	
2	SMAW	E7018	1/8	Rev.	120-190	19-26	6-8 IPM	
3-4-5	SMAW	E7018	5/32"	Rev.	120-190	19-26	8-10 IPM	
CAP	SMAW	E7018	1/8"	Rev.	120-190	19-26	6-8 IPM	

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)

(See QW-201.1, Section IX, ASME Boiler and Pressure Vessel Code)

GC 1

Company Name SCOTT MFG. INC. By: James H. Tipton

Welding Procedure Specification No. SMI 1-1 Date 8-18-90 Supporting PQR No.(s) SMI 1-1A

Revision No. 0 Date 8-18-90

Welding Process(es) SMAW Type(s) Manual

(Automatic, Manual, Machine, or Semi-Auto.)

JOINTS (QW-402)

Joint Design GROOVE

Backing (Yes) _____ (No) N

Backing Material (Type) _____

(Refer to both backing and retainers.)

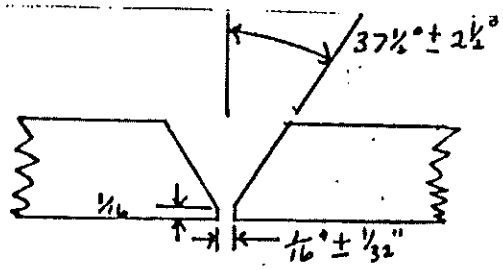
☐ Metal ☐ Nonfusing Metal

☐ Nonmetallic ☐ Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

Details



*BASE METALS (QW-403)

P-No. 1 Group No. 1 to P-No. 1 Group No. 1

OR

Specification type and grade A106 Gr B

to Specification type and grade A106 Gr B

OR

Chem. Analysis and Mech. Prop. _____

to Chem. Analysis and Mech. Prop. _____

Thickness Range:

Base Metal: Groove .1876 to .864" Fillet Unlimited

Pipe Dia. Range: Groove 6 5/8" Fillet Unlimited

Other _____

*FILLER METALS (QW-404)		
Spec. No. (SFA)	5.1	5.1-5.5
AWS No. (Class)	E6010	E7018
F-No.	3	4
A-No.	1	1
Size of Filler Metals	1/8"	1/8"--5/32"
Deposited Weld Metal	.125"	.307"
Thickness Range:	.0625" to .250"	.0625- .614"
Groove	ALL	ALL
Fillet	ALL	Unlimited
Electrode-Flux (Class)	Iron Oxide	Low Hydrogen
Flux Trade Name		
Consumable Insert		
Other		

*Each base metal-filler metal combination should be recorded individually.

This form (E00006) may be obtained from the Order Dept., ASME, 345 E. 47 St., N.Y., N.Y. 10017

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)
(See QW-201.2, Section IX, ASME Boiler and Pressure Vessel Code)
Record Actual Conditions Used to Weld Test Coupon.

Company Name SCOTT MANUFACTURING, INC.
Procedure Qualification Record No. SA-1A Date 9-5-90
WPS No. SA-1
Welding Process(es) SMAW
Types (Manual, Automatic, Semi-Auto.) Manual

JOINTS (QW-402)

Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec. SA 516
Type or Grade 70
P-No. 1 to P-No. 1
Thickness of Test Coupon .375"
Diameter of Test Coupon NA
Other

POSTWELD HEAT TREATMENT (QW-407)
Temperature NA
Time
Other

GAS (QW-408)
Type of Gas or Gases
Composition of Gas Mixture
Other

FILLER METALS (QW-404)

SFA Specification	5.1
AWS Classification	E6010
Filler Metal F-No.	3
Weld Metal Analysis A-No.	1
Size of Filler Metal	1/8"--5/32"
Other	
Deposited Weld Metal	.500"

ELECTRICAL CHARACTERISTICS (QW-409)
Current DC
Polarity Reverse
Amps. 90-140 Volts 22-26
Tungsten Electrode Size
Other

POSITION (QW-405)
Position of Groove 1G
Weld Progression (Uphill, Downhill)
Other

TECHNIQUE (QW-410)
Travel Speed 8-10-IPM
String or Weave Bead String & Weave
Oscillation
Multipass or Single Pass (per side) Multipass
Single or Multiple Electrodes Single
Other No pass greater than 1/2"

PREHEAT (QW-406)
Preheat Temp. None
Interpass Temp. 450°F
Other

(6/85) This form (E00007) may be obtained from the Order Dept., ASME, 345 E. 47th St., New York, N.Y. 10017

QW-483 (Back)

PQR No. SA-1A

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load lb	Ultimate Unit Stress psi	Type of Failure & Location
T-1	1.043	.374	.390	27,500	70,513	Base Metal
T-2	1.035	.373	.386	27,250	70,596	Base Metal

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
QW-463.1(d) Root 1	Accepted
QW-463.1(d) Root 2	Accepted
QW-463.1(d) Face 1	Accepted
QW-463.1(d) Face 2	Accepted

Toughness Tests (QW-170)

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Values	Lateral Exp.		Drop Weight	
					% Shear	Mils	Break	No Break

Fillet-Weld Test (QW-180)

Result — Satisfactory: Yes _____ No _____ Penetration Into Parent Metal: Yes _____ No _____

Macro—Results _____

Other Tests

Type of Test _____

Deposit Analysis _____

Other _____

Welder's Name Tim Kirksey Clock No. 423-76-1547 Stamp No. _____

Tests conducted by: Longview Inspection, Inc. Laboratory Test No. 260-90

We 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 IX of the ASME Code.

AWS AC 1 JAMES H. TIPTON 89120151 CWI

Manufacturer SCOTT MANUFACTURING, INC.

9-5-90

By William A. Basom

(Each of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

PERMIAN NON-DESTRUCTIVE TESTING

QUALIFICATION

ST METHOD		RT		UT		MT		PT		HT	
NAME: Miller, Morris J.		I	II	I	II	I	II	I	II	I	II
EXAMS	GENERAL/30%	/ 26.70		/		/ 25.50		/ 29.25		/	
	SPECIFIC/30%	/ 24.00		/		/ 22.50		/ 30.00		/	
	PRACTICAL/40%	/ 36.00		/		/ 34.80		/ 38.00		/	
	COMPOSITE	/ 86.70		/		/ 82.80		/ 97.25		/	
CERTIFIED BY / LEVEL		DFM III				DFM III		DFM III			
CERTIFICATION DATE		10-17-90				10-17-90		10-17-90			
RECERTIFICATION DUE		10-17-91				10-17-91		10-17-91			
DOCUMENTED EXPERIENCE		On File				On File		On File			
PRIOR CERTIFICATION LEVEL		II				II		II			
APPOINTMENT BY LETTER, III											

GER J-2 AND J-1 TEST	ACCEPT: X CONDITIONS: None DATE: 10-17-90
COLOR PERCEPTION TEST	ACCEPT: X CONDITIONS: None DATE: 10-17-90

DATE EMPLOYED: 1-25-88 ASSIGNMENT TO NDT: 1-25-88

EDUCATION LEVEL: High Scholl/Tech EXPERIENCE TIME: 9.5 Years

LIMITATIONS: Recertified RT, MT, PT only

THIS INDIVIDUAL HAS SUCCESSFULLY COMPLETED THE ABOVE EXAMINATIONS AND HAS QUALIFIED FOR THE LEVEL IN THE NONDESTRUCTIVE TEST METHOD INDICATED ABOVE AS PER PERMIAN NON-DESTRUCTIVE TESTING'S WRITTEN PRACTICE. DOCUMENTATION SHALL BE ON FILE FOR REVIEW UPON REASONABLE REQUEST.

AUTHORIZED EXAMINER / DATE

Dean Dingley 10-17-90

PERMIAN NON-DESTRUCTIVE TESTING

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

P.O. Box 176
La Grange, Texas 78945
(409) 242-3117

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

Pg. 1 of 1

No. 10269

Customer SME Date 10-14-92 Technician MM Level II Asme N/A Api N/A
Work Order Serial No. Code API 650 % Rig R-4 White Rapture

RADIOGRAPHIC	ULTRASONIC	MAGNETIC PARTICLE	DYE PENETRANT
Curies Screens	Equipment	Equipment Magnaflux Yr 4-6	Type Cleaner
Exposure Arrangement	Transducer Type	Material Type C.S. Thickness 1/4"	Type Penet
Material Thickness	Size Freq.	Amp 6 AMP	Type Devel
Penetrameter S. F.	Calibration	Prodspacing 2 1/2" - 4"	Surface Prep
Film Type:	Material Ampl.	AC/DC AC	Dwell Time
Film Qty:	Hole Size Dist.	Surface Prep as welded	Material Type Thickness
Film Qty:		Type Used WHITE & GRAY	
Film Qty:		Particle Used (lbs.) 10 LBS	

	Weld No.	By No.	Location	Pipe Size	PNDT Within Code Yes	PNDT Within Code No	CUST Within Code Yes	CUST Within Code No	Defects & Location	REMARKS
1	W-1			6"	✓					
2	W-2			3"						
3	W-3			3"						
4	W-4			6"						
5	W-5			6"						
6	W-6			3"						
7	W-7			5"						
8	W-8			6"						
9	W-9			36"						
10	W-10			30"						
11	W-11			36"						
12	W-12			30"						
13	W-13			30"						
14	W-14			30"						
15	W-15			6"						
16	W-16			3"						
17	W-17			5"						
18	W-18			6"						
19	W-19			3"						
20	W-20			5"						
21	W-21			6"						
22	W-22			6"						
23	W-23			30"						
24	W-24			30"						
25	W-25			30"						
26	W-26			30"						
27	W-27			18"						
28	W-28			18"						
29	W-29			24"						
30	W-30			6"						
31	W-31			5"						
32	W-32			3"						
33	W-33			3"						
34	W-34			6"						
35	W-35			24"						
36	W-36			18"						
37	W-37			18"						
38	W-38			18"						
39	W-39			18"						W-41 6" ✓
40	W-40			24"	✓					W-42 3" ✓

Test(s) Interpreted By: M. Mills Level: II P.O. #:

Number of Testing Personnel: 1 Misc. Info.: # Welds: 42 Per Diem N/A Miles 250 RT

Hours Worked: 5 (AM) to 4:30 (PM) Hours: RT 8 Hours: OT 3 Total Hrs 11 Job Location Wolfforth, TX

NOTICE: THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PNDT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT. TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PNDT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS. PNDT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMERS REPRESENTATIVE'S SIGNATURE VERIFIES TIME AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION UNLESS OTHERWISE SPECIFICALLY NOTED.

UNDER NO CIRCUMSTANCES DOES PNDT GUARANTEE THE QUALITY OR USABILITY OF ANY ITEM, MATERIAL, OR PRODUCT INSPECTED OR TESTED. NO WARRANTIES ARE EXPRESSED OR IMPLIED, AND IN NO EVENT SHALL THE LIABILITY OF PNDT WITH RESPECT TO ITEMS INSPECTED (INCLUDING ANY LIABILITY PERTAINING TO SELECTION AND/OR RESULTS OF THESE SAME TESTS) EXCEED THE CHARGE OF PNDT FOR THE INSPECTION OF SUCH ITEMS.

Agreed and Accepted: William A. Bisson Date: 10-14-92

TERMS AND ABBREVIATIONS

I.P.	INADEQUATE PENETRATION	S.P.	SPHERICAL POROSITY
I.P.D.	INADEQUATE PENETRATION DUE TO HIGH-LOW	C.P.	CLUSTER POROSITY
I.C.	INTERNAL CONCAVITY	P.P.	PIPING POROSITY
I.F.	INCOMPLETE FUSION	H.B.	HOLLOW BEAD
I.F.C.U.	INCOMPLETE FUSION DUE TO COLD LAP	C.R.	CRACKS
B.T.	BURN THROUGH	A.D.	ACCUMULATION OF DISCONTINUITIES
E.S.I.	ELONGATED SLAG INCLUSIONS	A.D.	
I.S.I.	ISOLATED SLAG INCLUSIONS	I.U.	INTERNAL UNDERCUT
		O.U.	OUTSIDE UNDERCUT

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

P.O. Box 176
La Grange, Texas 78945
(409) 242-3117

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

Pg. 1 of 4

No. 10271

Customer: SMI Date: 10-16-92 Technician: M.M. Level: II Assis. BG Level: I
Work Order: CTI - [redacted]2 Serial No.: 451-1 1 [redacted] Code: API 650 % Rig #: 4567

RADIOGRAPHIC	ULTRASONIC	MAGNETIC PARTICLE	DYE PENETRANT
Curies: 50 Screens: C10	Equipment:	Equipment:	Type Cleaner:
Exposure Arrangement: B	Transducer Type:	Material Type: Thickness:	Type Penet:
Material Thickness: 1/4" - 5/16"	Size: Freq.	Amp:	Type Devel:
Penetrameter: 12 S. X F.	Calibration	Prodspacing:	Surface Prep:
Film Type: D-4	Material: Ampl.	AC/DC:	Dwell Time:
Film Qty: 10-3½"X10"	Hole Size: Dist.	Surface Prep:	Material Type: Thickness:
Film Qty:		Type Used:	
Film Qty:		Particle Used (lbs.):	

	Weld No.	By No.	Location	Pipe Size	PNDT Within Code Yes	PNDT Within Code No	CUST Within Code Yes	CUST Within Code No	Defects & Location	REMARKS
1	V-1		0-1		✓					
2										
3	T-1		0-1		✓					
4										
5	H-1		0-1		✓					
6										
7	C-1		0-1			X			IP	
8										
9	C-2		0-1			X			IP	
10										
11	C-3		0-1			X			IP	
12										
13	J-2		0-1		✓					
14										
15	C-1R		0-1			X			Slag	
16										
17	C-2R		0-1			X			IP	
18										
19	C-3R		0-1			X			IP	
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

Test(s) Interpreted By: M. Miller Level: II P.O. #:

Number of Testing Personnel: 2 Misc. Info.: # Welds: 30 Per Diem: N/A Miles: 230 RT

Hours Worked: 900 AM/PM to 100 AM/PM Hours: RT 8 Hours: OT 8 Total Hrs. 16 Job Location: Wolfforth, Texas

NOTICE: THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PNDT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PNDT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS. PNDT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMERS REPRESENTATIVE'S SIGNATURE VERIFIES TIME AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION, UNLESS OTHERWISE SPECIFICALLY NOTED.

UNDER NO CIRCUMSTANCES DOES PNDT GUARANTEE THE QUALITY OR USABILITY OF ANY ITEM, MATERIAL, OR PRODUCT, INSPECTED OR TESTED. NO WARRANTIES ARE EXPRESSED OR IMPLIED, AND IN NO EVENT SHALL THE LIABILITY OF PNDT WITH RESPECT TO ITEMS INSPECTED INCLUDING ANY LIABILITY PERTAINING TO SELECTION AND/OR RESULTS OF THESE SAME TESTS EXCEED THE CHARGE OF PNDT FOR THE INSPECTION OF SUCH ITEMS.

Agreed and Accepted: William A. Bacon Date: 10/17/92

TERMS AND ABBREVIATIONS

I.P.	INADEQUATE PENETRATION	S.P.	SPHERICAL POROSITY
I.P.D.	INADEQUATE PENETRATION DUE TO HIGH-LOW	C.P.	CLUSTER POROSITY
		P.P.	PIPING POROSITY
I.C.	INTERNAL CONCAVITY	H.B.	HOLLOW BEAD
I.F.	INCOMPLETE FUSION	C.R.	CRACKS
I.F.C.L.	INCOMPLETE FUSION DUE TO COLD LAP	A.D.	ACCUMULATION OF DISCONTINUITIES
B.T.	BURN THROUGH	I.U.	INTERNAL UNDERCUT
E.S.I.	ELONGATED SLAG INCLUSIONS	O.U.	OUTSIDE UNDERCUT
I.S.I.	ISOLATED SLAG INCLUSIONS		

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

P.O. Box 176
La Grange, Texas 78945
(409) 242-3117

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

Pg. 1 of 2

No. 10276

Customer: SMF Date: 10-12-92 Technician: MM Level: II Asst.: BG Level: I
Work Order: CT-1 Serial No.: 451-1 Code: API 650 % Rig #: 4567

RADIOGRAPHIC	ULTRASONIC	MAGNETIC PARTICLE	DYE PENETRANT
Curies: 50 Beams: 010	Equipment:	Equipment:	Type Cleaner:
Exposure Arrangement: P	Transducer Type:	Material Type: Thickness:	Type Penet:
Material Thickness: 5/16"	Size: Freq.	Amp:	Type Devel:
Penetrameter: 12 S. X F.	Calibration	Prodspacing:	Surface Prep:
Film Type: D-4	Material: Ampl.:	AC/DC:	Dwell Time:
Film Qty: 1-3½" X 10"	Hole Size: Dist.:	Surface Prep:	Material Type: Thickness:
Film Qty:		Type Used:	
Film Qty:		Particle Used (lbs.):	

	Weld No.	By No.	Location	Pipe Size	PNDT Within Code Yes	PNDT Within Code No	CUST Within Code Yes	CUST Within Code No	Defects & Location		REMARKS
1	C-1		0-1		✓						
2											
3											
4											
5											
6											
7											
8											
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11											
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38											
39											
40											

Test(s) Interpreted By: M. Miller Level: II P.O. #:

Number of Testing Personnel: 2 Misc. Info.: # Welds: 2 Per Diem: N/A Miles: 250 RT

Hours Worked: 8 (AM/PM) to 7 (AM/PM) Hours: RT 8 Hours: OT 3 Total Hrs. 11 Job Location: WOLFFORTH, TEXAS

NOTICE: THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PNDT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PNDT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS. PNDT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMERS REPRESENTATIVE'S SIGNATURE VERIFIES TIME AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION UNLESS OTHERWISE SPECIFICALLY NOTED.

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Agreed and Accepted: William A. Brown Date: 10/12/92

TERMS AND ABBREVIATIONS

I.P.	INADEQUATE PENETRATION	S.P.	SPHERICAL POROSITY
I.P.D.	INADEQUATE PENETRATION DUE TO HIGH-LOW	C.P.	CLUSTER POROSITY
		P.P.	PIPING POROSITY
I.C.	INTERNAL CONCAVITY	H.B.	HOLLOW BEAD
I.F.	INCOMPLETE FUSION	C.R.	CRACKS
I.F.C.L.	INCOMPLETE FUSION DUE TO COLD LAP	A.D.	ACCUMULATION OF DISCONTINUITIES
B.T.	BURN THROUGH	I.U.	INTERNAL UNDERCUT
E.S.I.	ELONGATED SLAG INCLUSIONS	O.U.	OUTSIDE UNDERCUT
I.S.I.	ISOLATED SLAG INCLUSIONS		

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

WISCO WELDING INSPECTION SERVICE COMPANY
11811 NORTH FRWY., SUITE 670
HOUSTON, TEXAS 77060

REPORT DATES 10/16/92 10/17/92
CUSTOMER: USPCI ATTN: MR. SAMAR HAMWI
ORDER NO: PO 19350 DATED: REV: DATED:
MAT'L DESTINATION: LONE MOUNTAIN
REQUIRED DATE: 11/1/92 SHIPMENT DATE IS NOW: SAME
AS OF CHANGED FROM:
INSPECTOR ESTIMATED SHIPMENT DATE: SAME
ORDER IS 65% PERCENT COMPLETED:
VENDOR: SCOTT MFG. CO. ORDER NO: 451
MANUFACTURER: SAME
PHONE: 806-866-9591 SHOP LOCATION: WOFORD, TX.
SHOP ORDER NO: 451
INSPECTOR'S CONTACT: BILL BASON POSITION: FIELD MANAGER
REPORT IS: INTERIM
REGARDING: INSPECTION
INSPECTOR: VICTOR HAGMAN

MATERIAL DESCRIPTION: (4) 12.75' DIAMETER BY 40' HEIGHT CAUSTIC STORAGE TANKS.

STATUS OF ORDER: TWO TANKS TO SHIP 10/19/92

INSPECTION: WITNESS RADIOGRAPHS BE TAKEN OF WELDS AND REVIEW OF SAME.

1. PICKED SPOTS FOR RADIOGRAPHS ON TWO TANKS. SHOTS WERE TAKEN OF VERTICAL SEAMS GIRTH WELDS IN TANKS. ONE SPOT WAS TAKEN ON THE BUTT WELDS ON THE CONE BOTTOM. THE CONE BOTTOM HAS THREE BUTT WELDS.

2. REVIEW OF SPOT WELDS FOUND THE FOLLOWING. THE WELDS IN THE CONE BOTTOM WERE BAD. PENALTY SHOTS WERE TAKEN AS PER API 650, AND ASME SEC. VIII UW 51, AND UW52. FOUND THAT A BAD PROCEDURE WAS USED IN WELDING THE BUTT WELDS ON THE BOTTOM OF ALL FOUR TANKS. THERE WAS NO PENETRATION ON ANY OF THE WELDS. SO SCOTT MFG MADE REPAIRS ON THE TWO TANKS TO SHIP ON 10/19/92. REPAIR SHOTS WERE MADE, FOUND THAT THE WELDS WERE STILL BAD, THE COMPLETE BUTT WELDS ON THE BOTTOM OF ALL FOUR TANKS WAS REMOVED COMPLETELY.
10/17/92.
1. PICKED RADIOGRAPHS FOR BOTTOM BUTT WELDS. AFTER REVIEWING FILM FOUND THAT ALL OF THE BOTTOM BUTT WELDS WERE NOW ACCEPTABLE. THE REASON FOR THE PROBLEM TO START WITH WAS THAT NO ROOT OPENING WAS LEFT FOR PENETRATION. THESE WELDS WERE DONE BY THE SHOP PERSONAL, NOT THE CREW THAT IS BUILDING THESE TANKS.
2. WITNESS FITTING THE TOP RING ON TANK NUMBER TWO, AND WATCHED AS THE WELDERS MADE THE ROOT PASS. ALL WELDING WAS PER SPECIFICATIONS AND WAS OF GOOD QUALITY.
WILL RETURN 10/19/92 FOR FINAL ON FIRST TWO TANKS AND WITNESS

WISCO WELDING INSPECTION SERVICE COMPANY
11811 NORTH FRWY., SUITE 670
HOUSTON TEXAS 77060

REPORT DATES 10/14/92 10/15/92
CUSTOMER: USPCI ATTN: MR SAMAR HAMWI
ORDER NO: DATED: REV: DATED:
MAT'L DESTINATION: LONE MOUNTAIN
REQUIRED DATE: SHIPMENT DATE IS NOW:
AS OF CHANGED FROM:
INSPECTOR ESTIMATED SHIPMENT DATE:
ORDER IS PERCENT COMPLETED:
VENDOR: SCOTT MFG. ORDER NO: 451
MANUFACTURER: SAME
PHONE: 806-866-9591 SHOP LOCATION: WOLFORD, TX
SHOP ORDER NO: 451
INSPECTOR'S CONTACT: BILL BASON POSITION: ENG.
REPORT IS: INTERIM
REGARDING: INSPECTION
INSPECTOR: VICTOR HAGMAN

MATERIAL DESCRIPTION: (4) 12.75' DIAMETER BY 40 HEIGHT CAUSTIC TANKS.

STATUS OF ORDER: COMPLETION IS ABOUT 50% TWO TANKS TO SHIP MON 10/19/92

INSPECTION: MEETING WITH MR BASON AND FIELD FOREMAN,

WENT OVER SPECIFICATIONS FROM USPCI. AND REVIEWED WHAT DRAWINGS WERE ON HAND. NO PROBLEMS WERE FOUND WITH SCOTT MFG. MEETING SPECIFICATIONS.

INSPECTION OF TANKS BEING WELDED.
1. WITNESS WELDING OF GIRTH WELDS ON TANKS, FOUND THAT THE ROOT OPENING WAS ACCEPTABLE FOR FULL PENETRATION WELDS.
2. WITNESS AIR TESTING OF REPADS ON TANK SHELLS. ALL NOZZLES ARE WELDED IN SHELLS BEFORE TANK SHELLS ARE FIT TOGETHER. THIS IS GOOD AS THAT ALL OF THE REPADS CAN BE AIR TESTED ON THE GROUND. NO DANGER OF FALLING AR OF PADS NOT BEING TESTED. SHOP AIR WAS USED FOR TESTING. WITH 18-20 POUNDS OF AIR APPLIED TO PADS, A SOAP AND WATER MIXTURE WAS USED TO CHECK FOR LEAKS BOTH ON THE INTERNAL AND THE EXTERNAL. REPAD TEST WAS ACCEPTABLE AS NO LEAKS WERE FOUND.
3. VISUAL INSPECTION OF WELDING BOTH INTERNAL AND EXTERNAL, NO DEFECTS WERE FOUND. VISUAL INSPECTION WAS TO FIND UNDERCUTTING, PIN HOLES, COLD LAP, LOW FILLET WELDS EXSSIVE WELD BUILD UP ON GIRTH WELDS ETC. ALL THAT WAS FOUND WAS SOME SMALL PINHOLES, THESE WERE REPAIRED.
VISUAL INSPECTION OF THE ROLLED RINGS. FOUND THAT ONE OF THE BRACES ON THE PAINTERS RING WAS WELDED TO THE VERTICAL WELD SEAM. AS API 650 STATES THAT ALL ATTACHMENTS MUST MISS VERTICAL SEAMS BY AT LEST 6 INCHES , THESE WERE MOVED AND REWELDED.

10/15/92.

MET WITH MR HAMWI THIS A.M. FOR INSPECTION OF TANKS. TALKED WITH MR. BASON ABOUT DELIVERY OF TANKS. THE FIRST TWO TANKS WILL BE ON TRUCKS TO JOB SITE BY 10/19/92 A.M.

REVIEW OF DRAWINGS ON TANKS AND WALK WAYS. NO PROBLEMS WERE FOUND.

FIELD INSPECTION OF TANKS BEING WELDED, AND A TOUR OF SHOP WAS TAKEN. SCOTT MFG. HAS A WIDE RANGE OF SERVICES THAT WERE SHOWN TO MR HAMWI AND THIS WRITER.

A VISUAL INSPECTION OF TANKS WAS DONE AND NO PROBLEMS WERE FOUND.

PHOTOS OF TANKS, ERECTION. AND WELDING WAS TAKEN. THESE WILL SENT WITH DATA PACKAGES.

REVIEW OF MATERIAL TEST REPORTS FOR THE SHELL MATERIAL AND FOR THE STRUCTURAL MATERIAL. THE MTR'S FOR THE PIPING HAS NOT ARRIVED FROM THE SUPPLIER. AS SOON AS THESE OR IN THEY WILL BE CHECKED.

REVIEWED ALL WELDER QUALIFICATIONS. AND ALL WELD PROCEDURES. ALL WELDING OF TANKS WERE TO THESE PROCEDURES. ALL WELDER WORKING ON TANKS WERE QUALIFIED PER A 6G WELD TEST AND ALL PAPER WORK WAS IN ORDER.

ALL RADIOGRAPHS WILL BE SHOT 10/16/92 ON THE TWO TANKS TO SHIP ON 10/19/92. ALL OTHER NDE WORK HAS BEEN COMPLETED. ALL THAT WAS REQUIRES WAS A MAG PARTICLE OF NOZZLE WELDS, THIS HAS BE DONE AND PROPER PAPER WORK IS IN THE JOB FILE.

AT THIS TIME ALL API-650 AND USPCI SPECIFICATIONS ARE BEING FOLLOWED. ALL WORK SEEN ON THIS VISIT WAS OF GOOD QUALITY AND WAS ACCEPTABLE TO ALL SPECIFICATIONS.

WELDING INSPECTION SERVICE COMPANY

WIS/QA-06

QUALITY ASSURANCE INSPECTION RELEASE

PAGE 1 OF 1
DATE: 10-19-92
REP. NO.:

CUSTOMER: US PCI
P.O. NO.: 19350
LOCATION: LUBBOCK TX

VENDOR: Scott MFG
PROJECT: LONE MOUNTAIN

[X] Satisfactorily completed Quality Assurance Inspection on: 10-19-92 (Date)

P.O. ITEM	QUANTITY	MATERIAL DESCRIPTION/TAG NO.
	1	12.75' X 40' height CAUSTIC TANK SER. NO. 451-1
	1	12.75' X 40' height CAUSTIC TANK SER NO. 451-2

Shipping Information: By truck to LUA-NOKA OKLA.
Date Released for Shipment: 10-19-92

[X] Without exception to the Purchase Order Documents.
[ ] With the following Exception from the Purchase Order, only with follow up in writing with a copy of telex or letter attached. (State specifics and name of Responsible Engineer)

Approval or release for shipment of any work by a representative of the purchaser, or purchaser's Client, shall in no way relieve the vendor or sub-vendor of any responsibility for meeting the requirements of the purchase order and/or specifications.

Signing of the form acknowledges the items have been inspected in accordance with the above purchase order.

10-19-92
Date

V. P. Wagman Jr.
Agency Inspector's Signature

11811 North Frwy, Suite 670 · Houston, Texas 77060 (713) 820-8066

WELDING INSPECTION SERVICE COMPANY

WIS/QA-06

QUALITY ASSURANCE INSPECTION RELEASE

PAGE____ OF____
DATE: 10-24-92
REP. NO.:

CUSTOMER: USPCI
P.O. NO.: 19350
LOCATION: LUBBOCK TX

VENDOR: Scott Mfg INC
PROJECT: LONE MOUNTAIN

[ ] Satisfactorily completed Quality Assurance Inspection on: 10-24-92 (Date)

P.O. ITEM	QUANTITY	MATERIAL DESCRIPTION/TAG NO.
	1	12.75'X 40' height CAUSTIC TANK SER. NO. 451-3
	1	12.75' x40' height CAUSTIC TANK SER NO., 451-4

Shipping Information: By TRUCK to WAYNOKA OKLA.
Date Released for Shipment: 10-24-92

[ ] Without exception to the Purchase Order Documents.
[ ] With the following Exception from the Purchase Order, only with follow up in writing with a copy of telex or letter attached. (State specifics and name of Responsible Engineer)

Approval or release for shipment of any work by a representative of the purchaser, or purchaser's Client, shall in no way relieve the vendor or sub-vendor of any responsibility for meeting the requirements of the purchase order and/or specifications.

Signing of the form acknowledges the items have been inspected in accordance with the above purchase order.

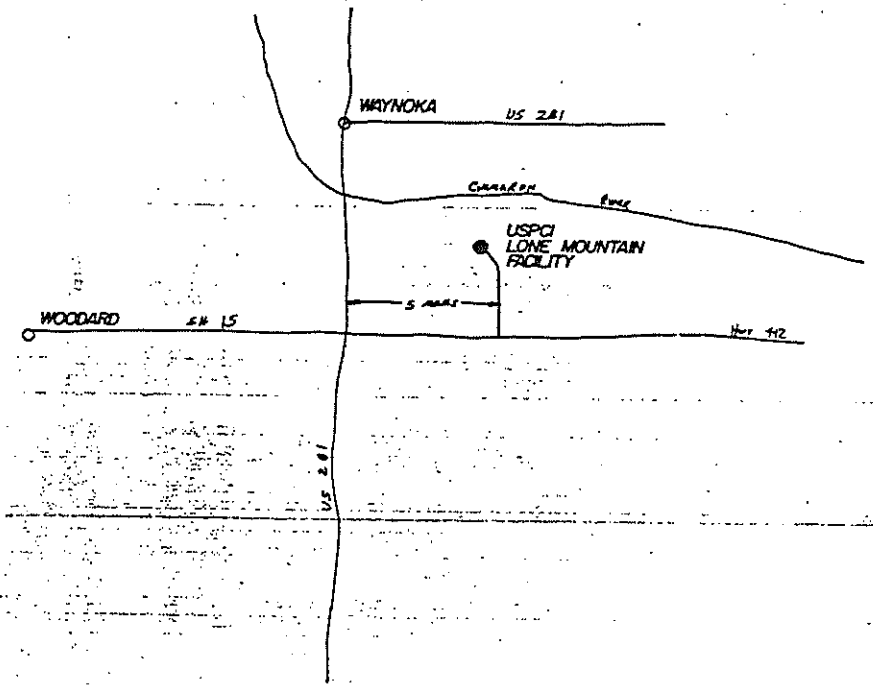
10-24-92
Date

U.L. Wagman Jr.
Agency Inspector's Signature

APPENDIX G

Drawings

USPCI
CAUSTIC STORAGE TANKS
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA



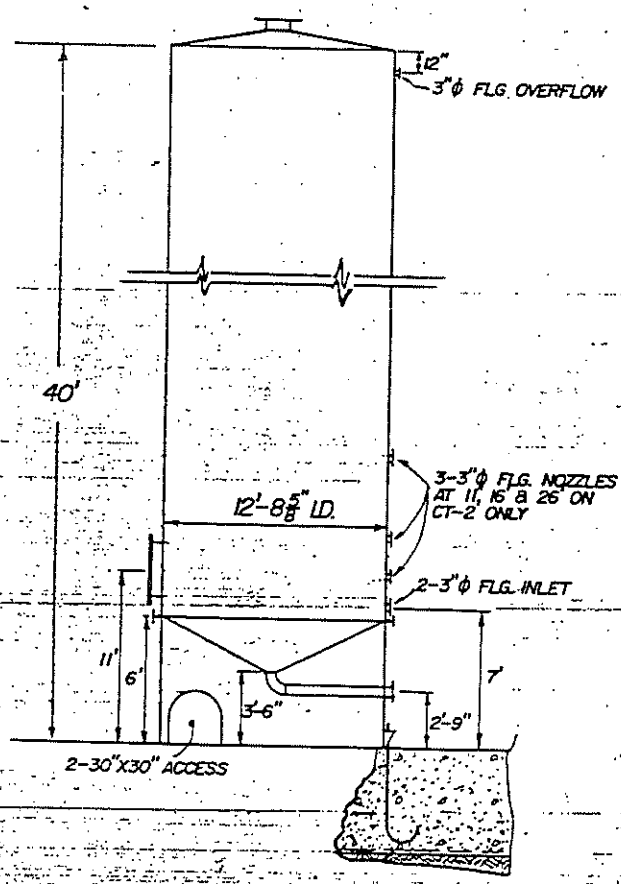
PROJECT ENGINEER: MYERS ENGINEERING CORP.
11102 N. STRATFORD DRIVE
SUITE B400
OKC, OK 73120
(405) 755-5325

SMI
SCOTT MANUFACTURING, INC.
LUBBOCK, TX.

'AS BUILT'

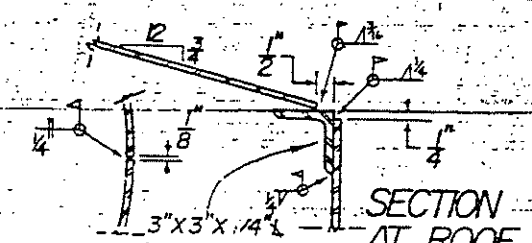
PER TANK

QTY.	ITEM	DWG. NO.
12	ANCHOR BOLTS 1¼" ϕ & CHAIRS	2
3	3"ϕ SHELL NOZZLE FLG. W/B.F.	3
1	3"ϕ ROOF NOZZLE FLG. W/B.F.	3
1	GIRDER RING	3
1	OUTLET 6"ϕ W/6"ϕ 90° ELL	3
1	LADDER PLATFORM	10
2	LADDER TOWERS	5 & 11
5	SHELL RE.	1
7	NOZZLE RE-RE. (10 FOR CT-2 ONLY)	4
1	6"ϕ ROOF NOZZLE FLG. W/B.F.	3
1 EA.	SHELL / ROOF MANHOLE 30"/24"ϕ	6 & 7
2	18"ϕ ROOF NOZZLE FLG. W/B.F.	3
1 EA.	¼" ROOF RE. ¼" FLOOR RE.	8
1	ROOF ANGLE RING 3"X3"X¼"	1
2	PAINTERS RING	5
1	OVERFLOW, LEVEL IND, UTIL. BRACKETS	3
4	LIFTING LUGS	10
1	HANDRAIL	10
1	CONE RE. 5/16"	3
8	RAFTERS C4X7.25 & CLIPS	3
1	COMPRESSION RING	3

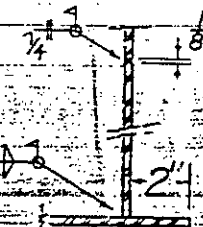


ELEVATION VIEW
FOUR TANKS
CT-1, 2, 3, 4

PLAN ORIENTATION



SECTION AT ROOF



SHELL RE. SCHEDULE

RING NO.	THICK	HEIGHT	NO. OF SHEETS @ LENGTH
1-5	¼"	96"	1 @ 480"

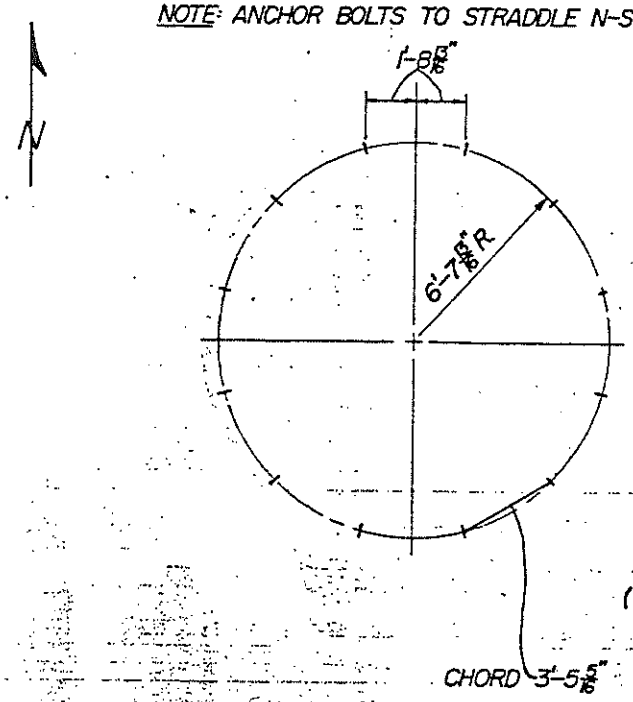
REVISIONS			
NO.	DATE	BY	
1			
2			
3			
4			
5			

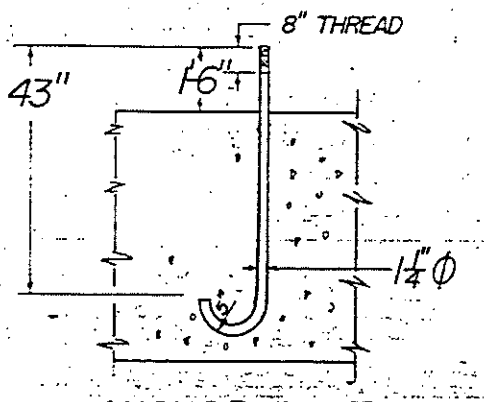
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

30,500 GALLON STANDPIPE FOR
USPCI, WAYNOKA, OK

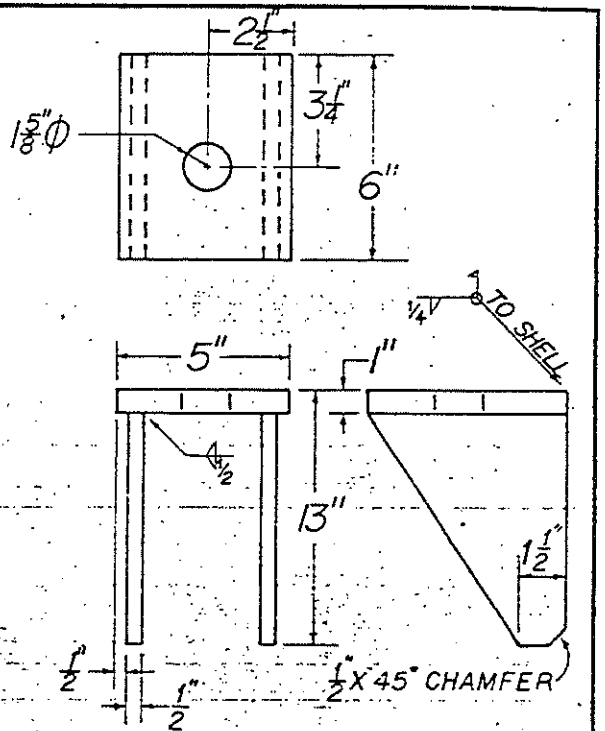
DRAWN BY LDW	SCALE NONE	MATERIAL	
CHK'D	DATE 10/6/92	DRAWING NO. 451-1	
TRACED	APP'D		

NOTE: ANCHOR BOLTS TO STRADDLE N-S ℄



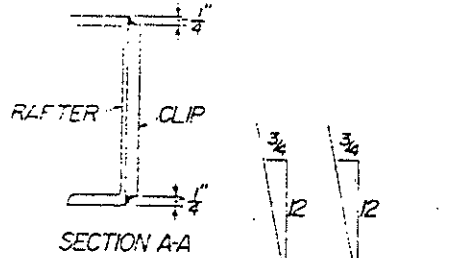


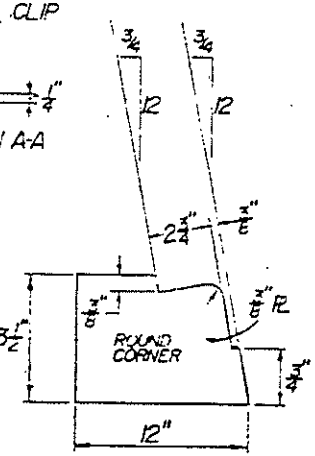
ANCHOR BOLT
12 REQUIRED
NTS
DOUBLE NUT ANCHOR BOLTS
GALVANIZED



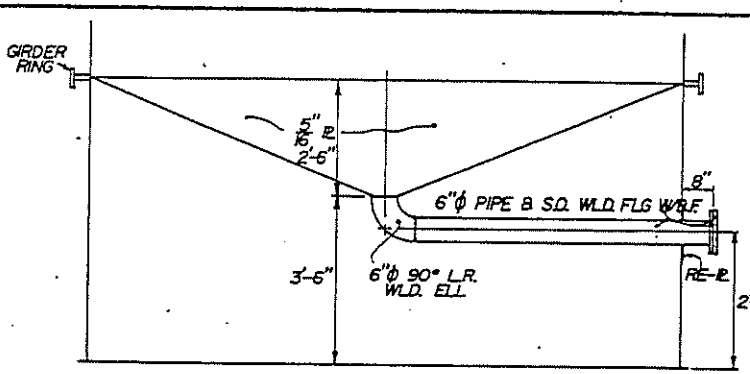
ANCHOR BOLT CHAIR
12 REQUIRED
3"=1'
DOUBLE NUT ANCHOR BOLTS

REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408		
NO.	DATE	BY	FOUNDATION FOR: USPCI, WAYNOKA, OK		
1			DRAWN BY LDW	SCALE noted	MATERIAL
2			CHK'D	DATE 10/8/92	DRAWING NO. 451-2
3			FINISH	APP'D	
4					
5					

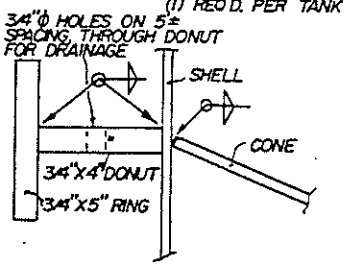




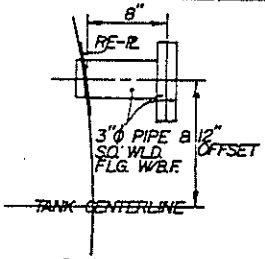
CLIP
8 REQ'D PER TANK



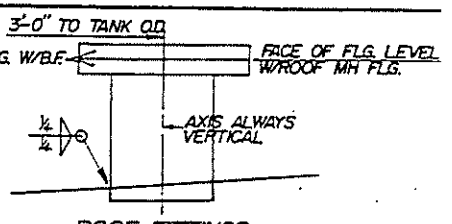
CONE & OUTLET
(1) REQ'D. PER TANK



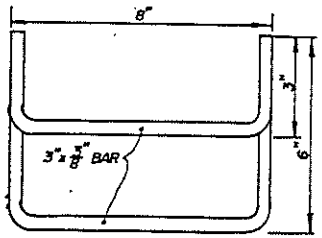
GIRDER RING



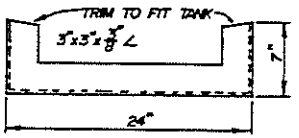
OVERFLOW
(1) REQ'D. PER TANK
12" FROM TOP OF SHELL



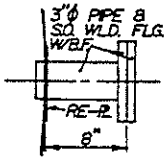
ROOF FITTINGS
(4) REQ'D. PER TANK
(1)-3", (1)-6", (2)-18"



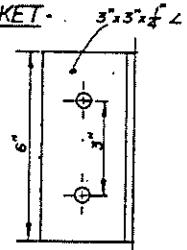
LEVEL INDICATOR BRACKET
(4) REQ'D. PER TANK
10' SPACING DOWN TANK



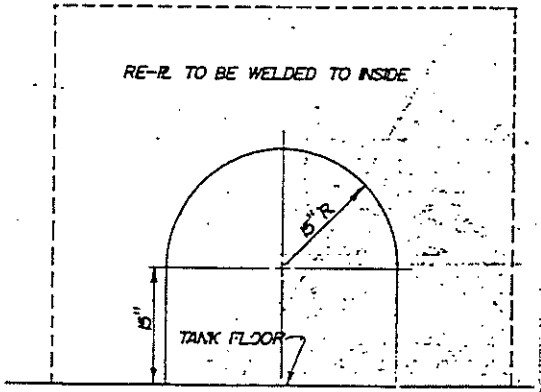
UTILITIES SUPPORT BRACKET
(4) REQ'D.
8' SPACING DOWN TANK



FILL
(2) REQ'D. PER TANK
(5) REQ'D. CT-2 ONLY

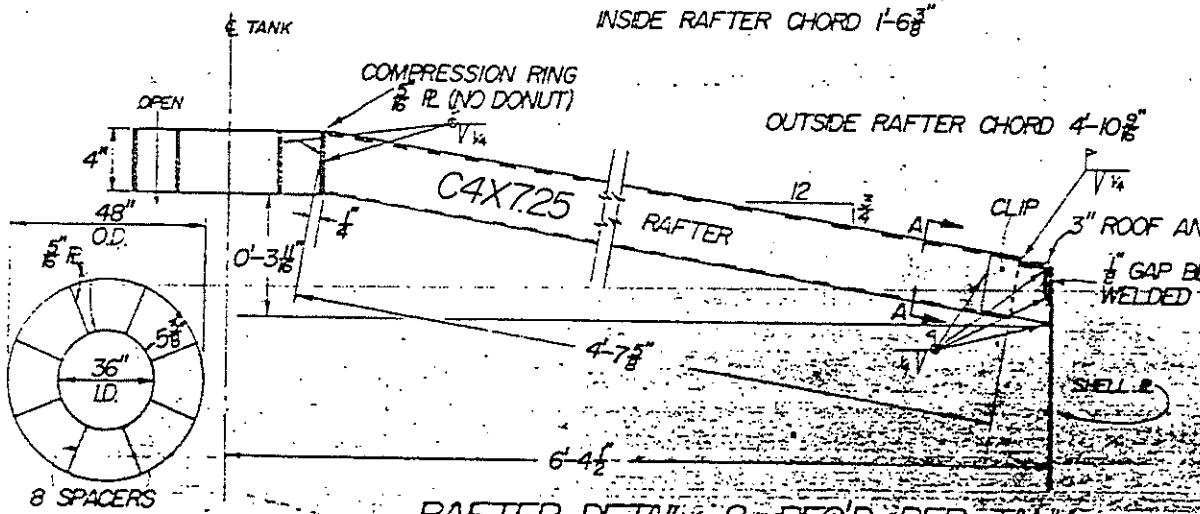


OVERFLOW SUPPORT
(3) REQ'D. PER TANK
10' SPACING DOWN TANK



30" X 30" SHELL ACCESS
(2) REQ'D. PER TANK—DUE EAST & WEST

INSIDE RAFTER CHORD 1'-6 3/8"



RAFTER DETAIL 8 REQ'D PER TANK

REVISIONS		
NO.	DATE	BY
1		
2		
3		
4		
5		

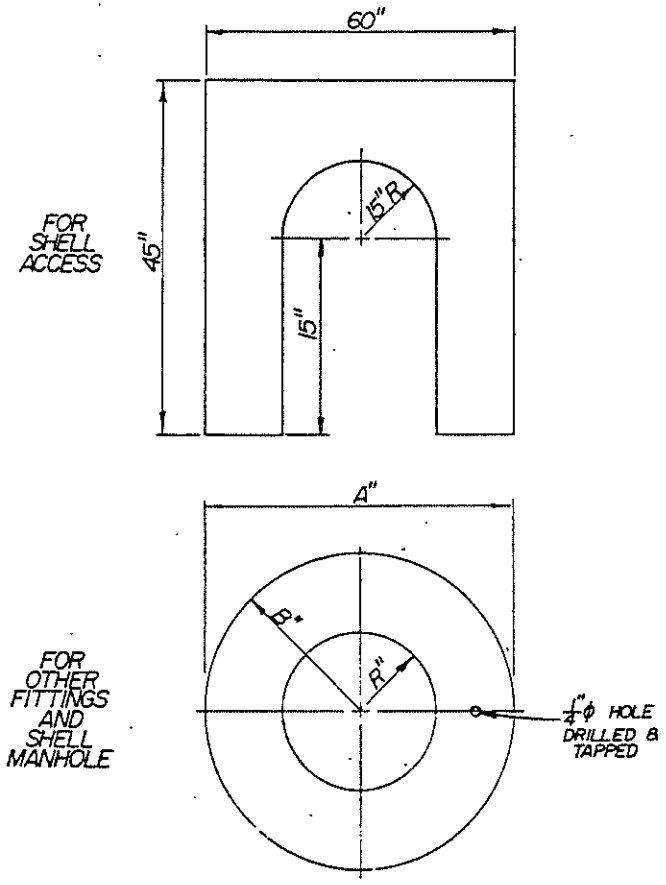
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

USPCI, WAYNOKA, OK

DRAWN BY LDW | SCALE AS NOTED | MATERIAL

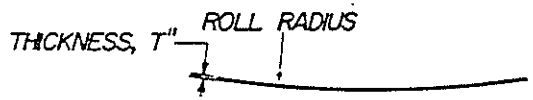
CHECKED | DATE 10/12/92 | 451-3

TRACED



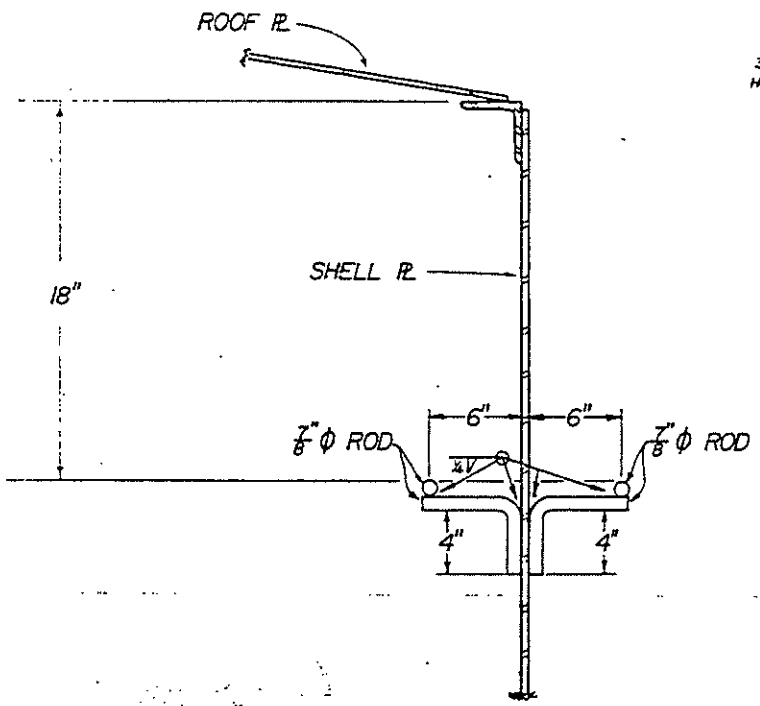
USE	NOMINAL DIA. D"	T"	ROLL RADIUS	A"	B"	R"	PER TANK QT'Y
SHELL MANHOLE	30	1/4	TANK RADIUS	60	30	15 3/16	1
OUTLET	6	1/4	"	13 1/4	6 5/8	3 7/16	1
INLET	3	1/4	"	7	3 1/2	1 7/8	2
OVERFLOW	3	1/4	"	"	"	"	1
SHELL ACCESS	—	—	"	SEE DETAIL AT LEFT			2

5 ON CT-2 ONL



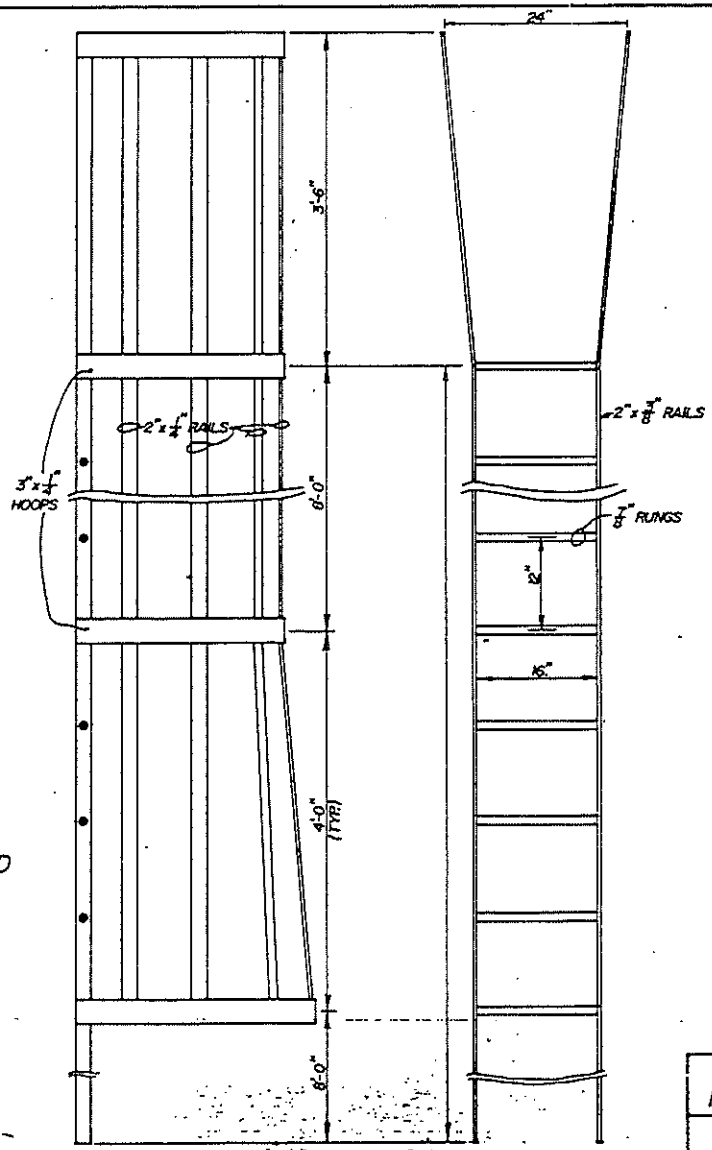
EDGE VIEW, ROLLED

REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408		
NO	DATE	BY	REINFORCING PLATE DETAIL USPCI, WAYNOKA, OK		
1					
2					
3			DRAWN BY LDW	SCALE none	MATERIAL
4			CHK'D	DATE 10/8/92	DRAWING NO 451-4
5			TRACED	APP'D	

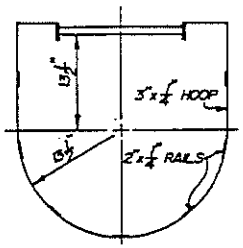


PAINTERS RING

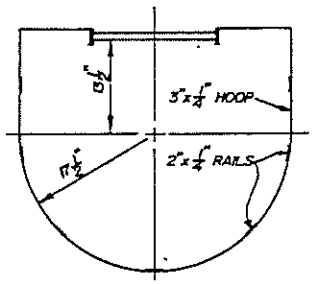
(2) REQ'D. PER TANK-IN & OUT



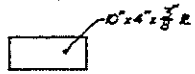
CAGE (2) REQ'D PER TOWER LADDER



STANDARD HOOP

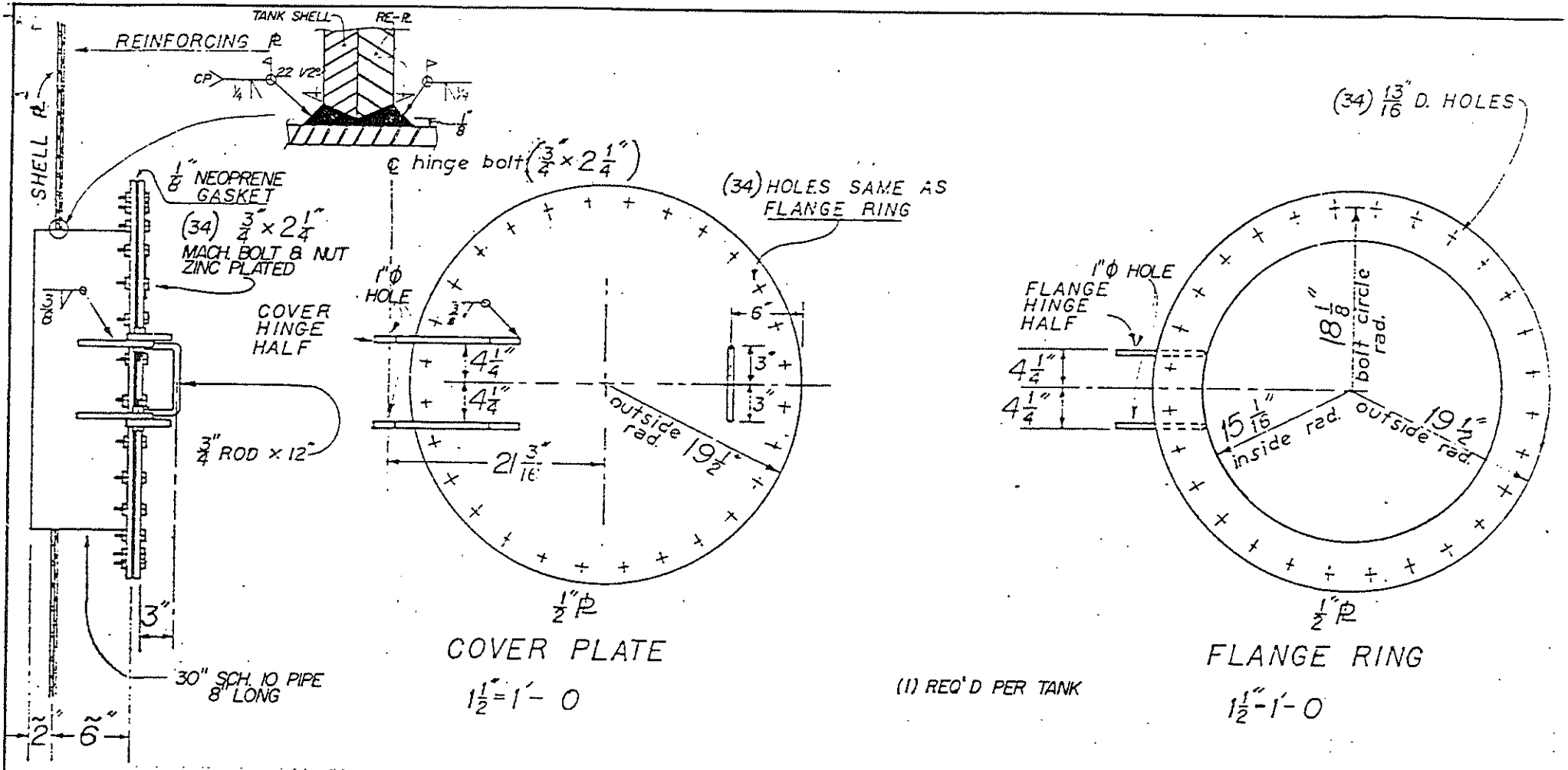


BOTTOM HOOP



LADDER STANDOFF
(16) REQ'D. PER SECTION

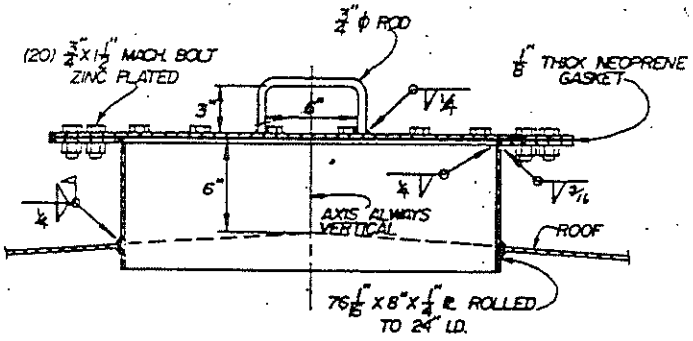
SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408	
USPCI, WAYNOKA, OK	
drawn: LDW	no. 451-5
scale:	
date: 10/14/92	



(1) REQ'D PER TANK

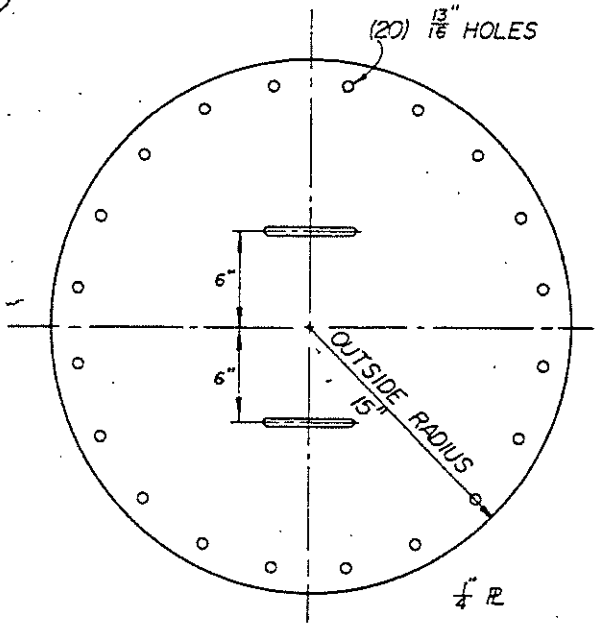
NOTE: 30" TYPE

SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408	
STANDARD SHELL MANHOLE USPCI, WAYNOKA, OK.	
drawn: LDW	no. 451-6
scale: NOTED	
date: 10/9/92	

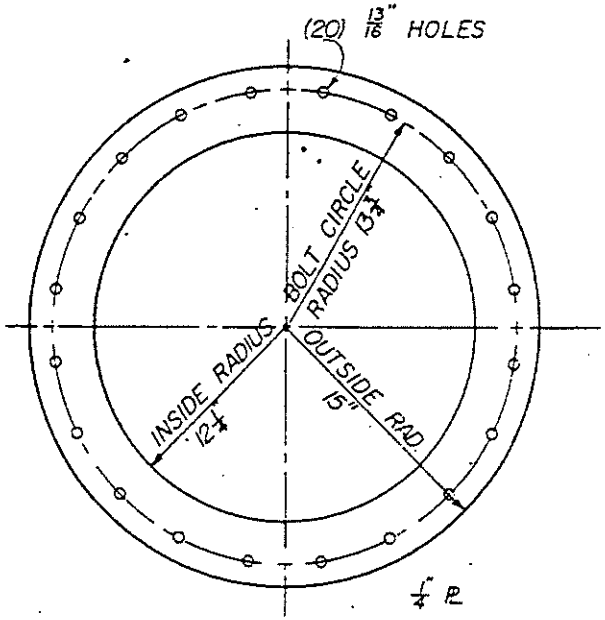


SECTION

BOLTHOLES SHALL STRADDLE THE CENTERLINES



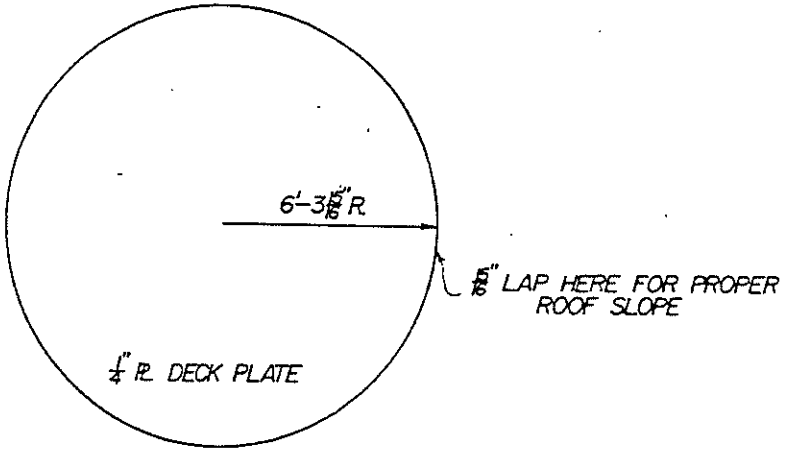
COVER



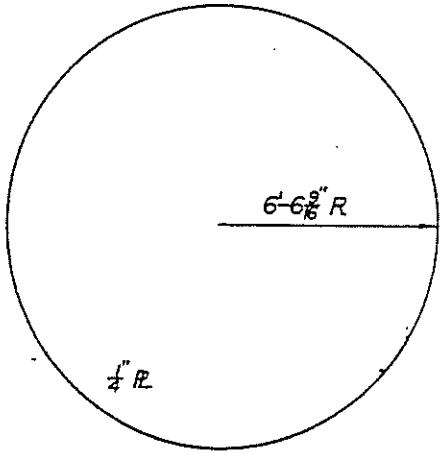
FLANGE RING

SCALE: 1 1/2" = 1'-0"
(1) REQ'D. PER TANK

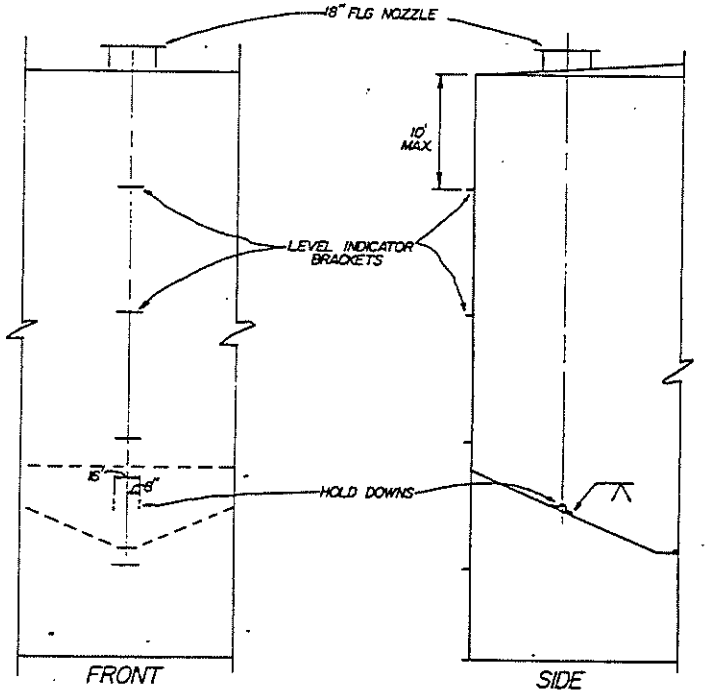
REVISIONS			SCOTT MANUFACTURING, INC. PO BOX 10232 LUBBOCK, TEXAS 79408
NO	DATE	BY	
1			API ROOF MANHOLE USPCI, WAYNOKA, OK.
2			
3			DRAWN BY LDW — SCALE AS SHOWN — MATERIAL
4			CHK'D — DATE 10/9/92 — DRAWING NO 451-7
5			TRACED — APP'D



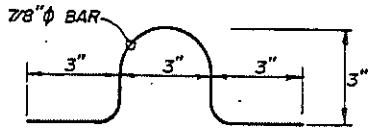
ROOF



FLOOR

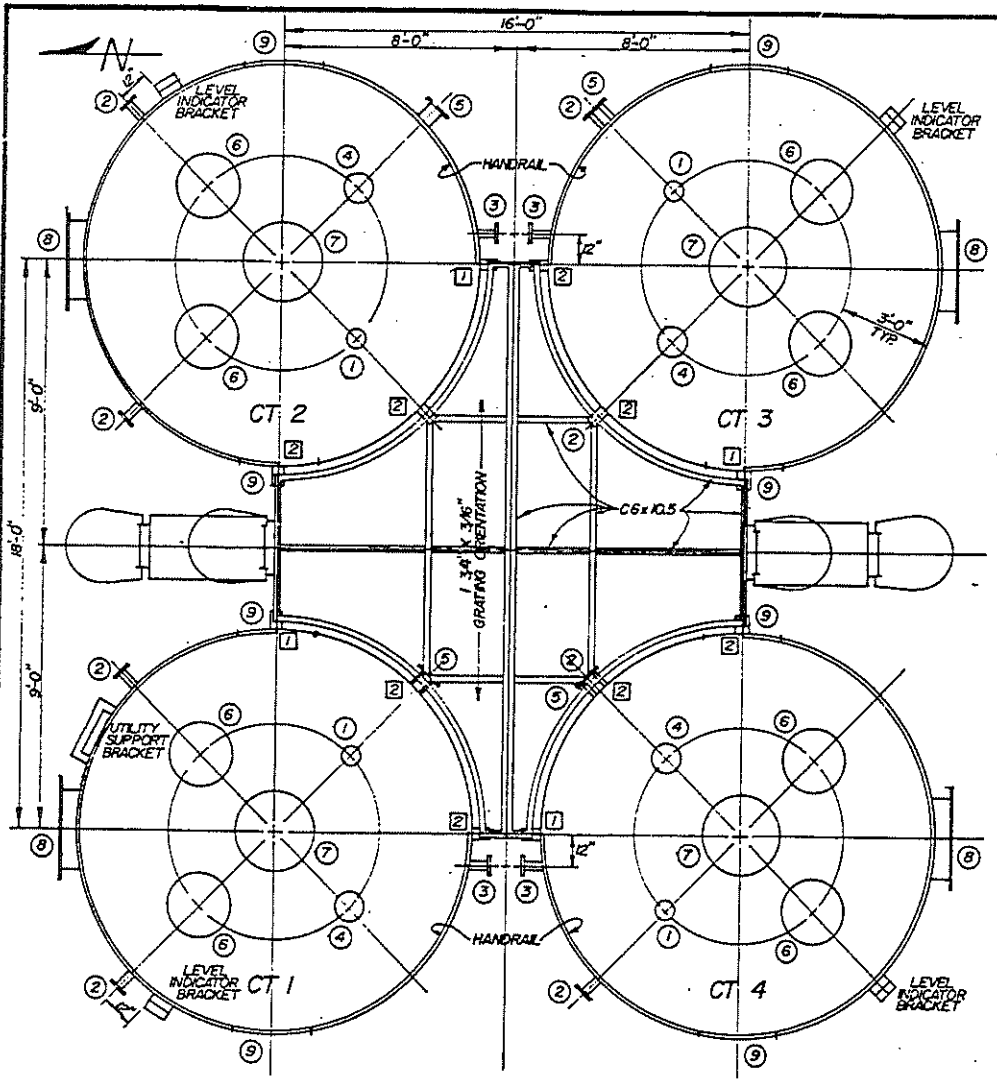


LEVEL INDICATOR DETAILS



INDICATOR HOLD-DOWN
(2) REQ'D. PER TANK

REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408		
NO	DATE	BY			
1			USPCI, WAYNOKA, OK		
2					
3			DRAWN BY LDW	SCALE	MATERIAL
4			CHK'D	DATE 10/14/92	DRAWING NO 451-8
5			TRACED	APP'D	



NO.	SIZE	LOCATION	QUAN.	NOTES
1	3"	ROOF	1	
2	3"	SHELL (RADIAL)	2	(3 EXTRA-CT 2 ONLY)
3	3"	SHELL (OFFSET)	1	
4	6"	ROOF	1	
5	6"	SHELL	1	
6	18"	ROOF	2	

NO.	SIZE	LOCATION	QUAN.
7	24"	ROOF/NAME PL	1
8	30"	SHELL	1
9	30"	SHELL (ACCESS)	2
		PLATFORM SUPPORTS	
1		BOLTED PLATFORM SUPPORTS	
2		SLIDING PLATFORM SUPPORTS	

TANK BATTERY PLAN
QUANS. SHOWN ARE PER TANK

NOTE: TANKS TO BE PLUMBED PRIOR TO PLATFORM PLACEMENT. PLATFORM FRAME TO BE MITERED & COPED AND WELDED ALL AROUND.

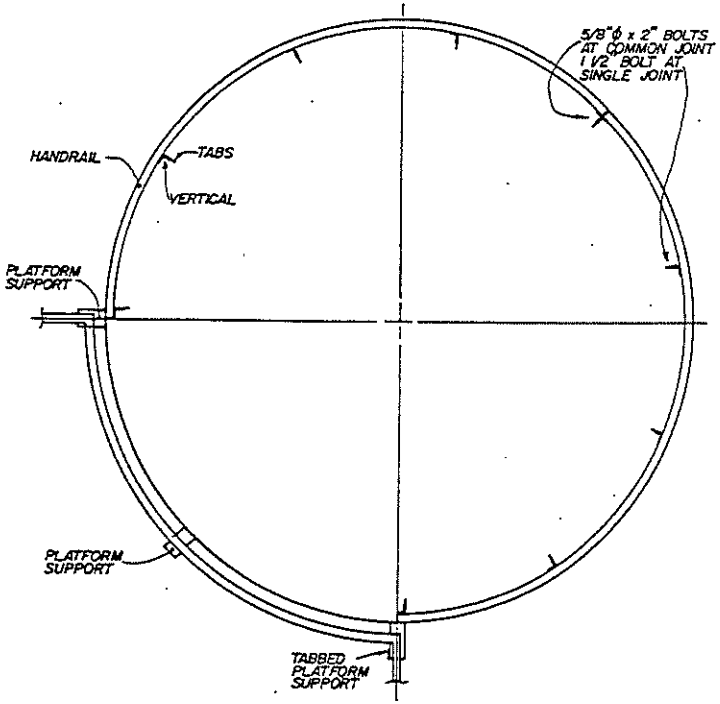
REVISIONS		
NO.	DATE	BY
1		
2		
3		
4		
5		

SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

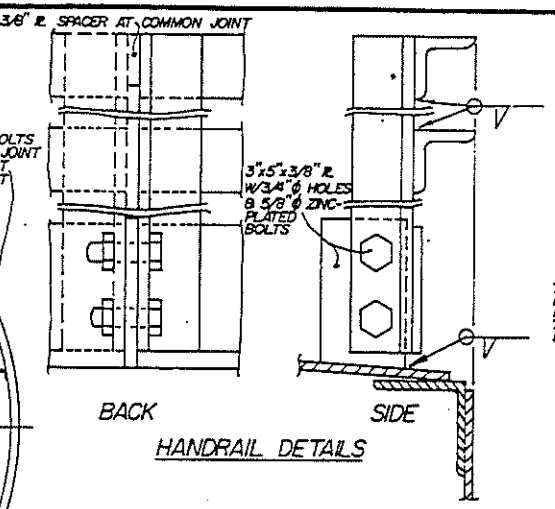
USPCI, WAYNOKA, OK.

DRAWN BY LDW	SCALE	MATERIAL
CHK'D	DATE 10/12/92	DRAWING NO 451-9
TRACED	APP'D	

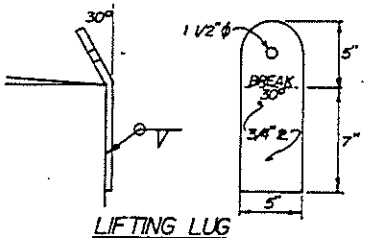
NOTE: *EACH TANK'S HANDRAIL IS MADE IN 2 HALVES AND ARE MIRROR IMAGES. *NOTE THE VERTICAL'S ORIENTATION. THE RAILS ARE LEG OUT & LEG DOWN. *ALL WELDS ARE ALL-AROUND. LEG OUT OF RAILS ARE ROLLED TO TANK O.D.



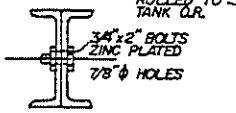
HANDRAIL ON TANK-TYPICAL



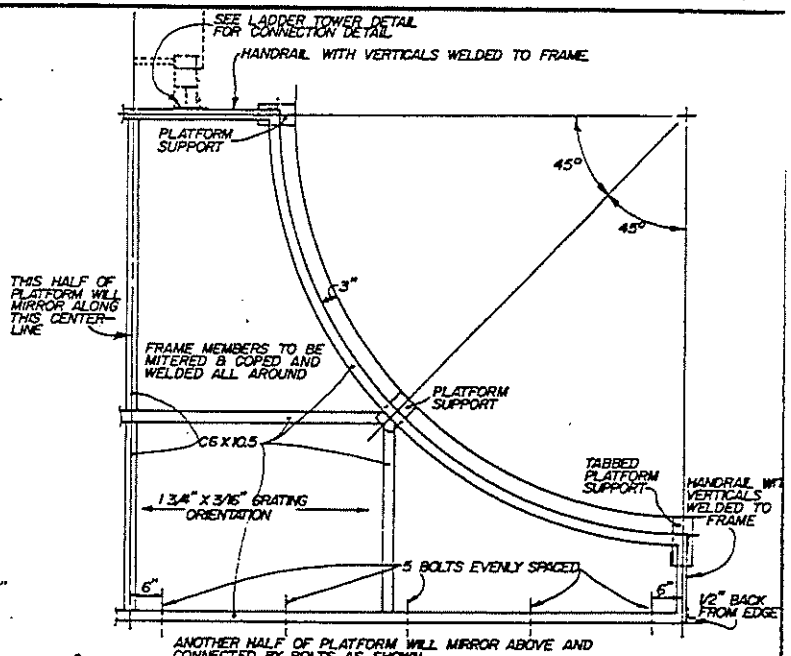
HANDRAIL DETAILS



LIFTING LUG
(4) REQ'D. PER TANK

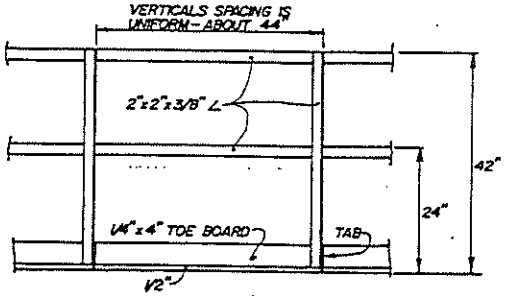


PLATFORM-HALF CONNECTION



TYPICAL PLATFORM QUADRANT

PLATFORM SUPPORT
(2) REQ'D. PER TANK
(1) TABBED PER TANK



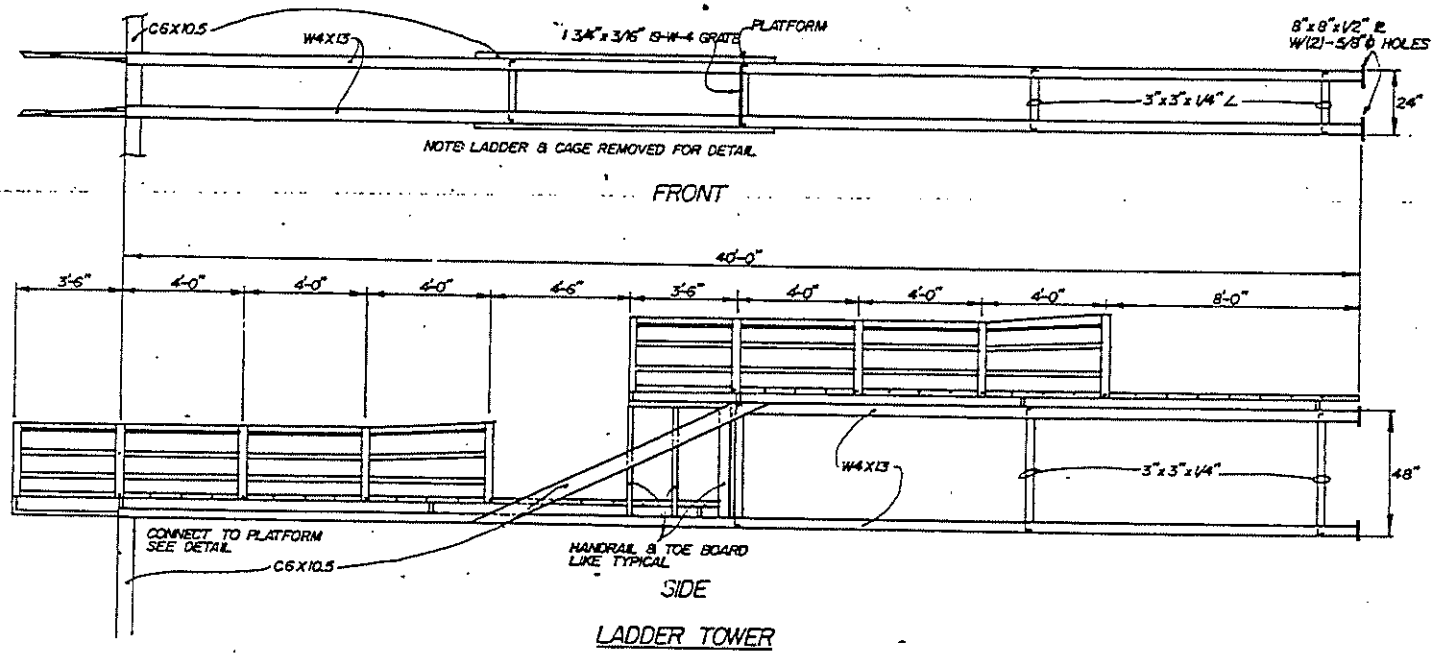
HANDRAIL TYPICAL

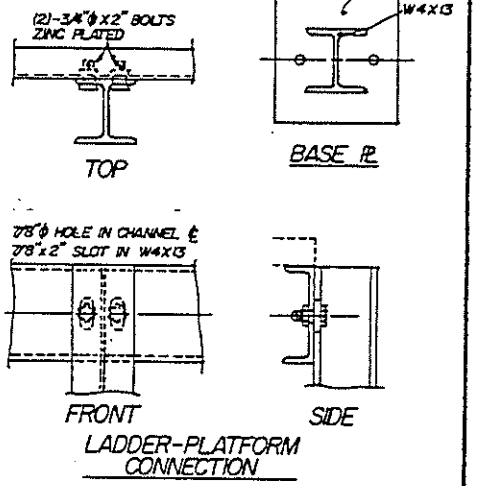
REVISIONS		
NO	DATE	BY
1		
2		
3		
4		
5		

SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

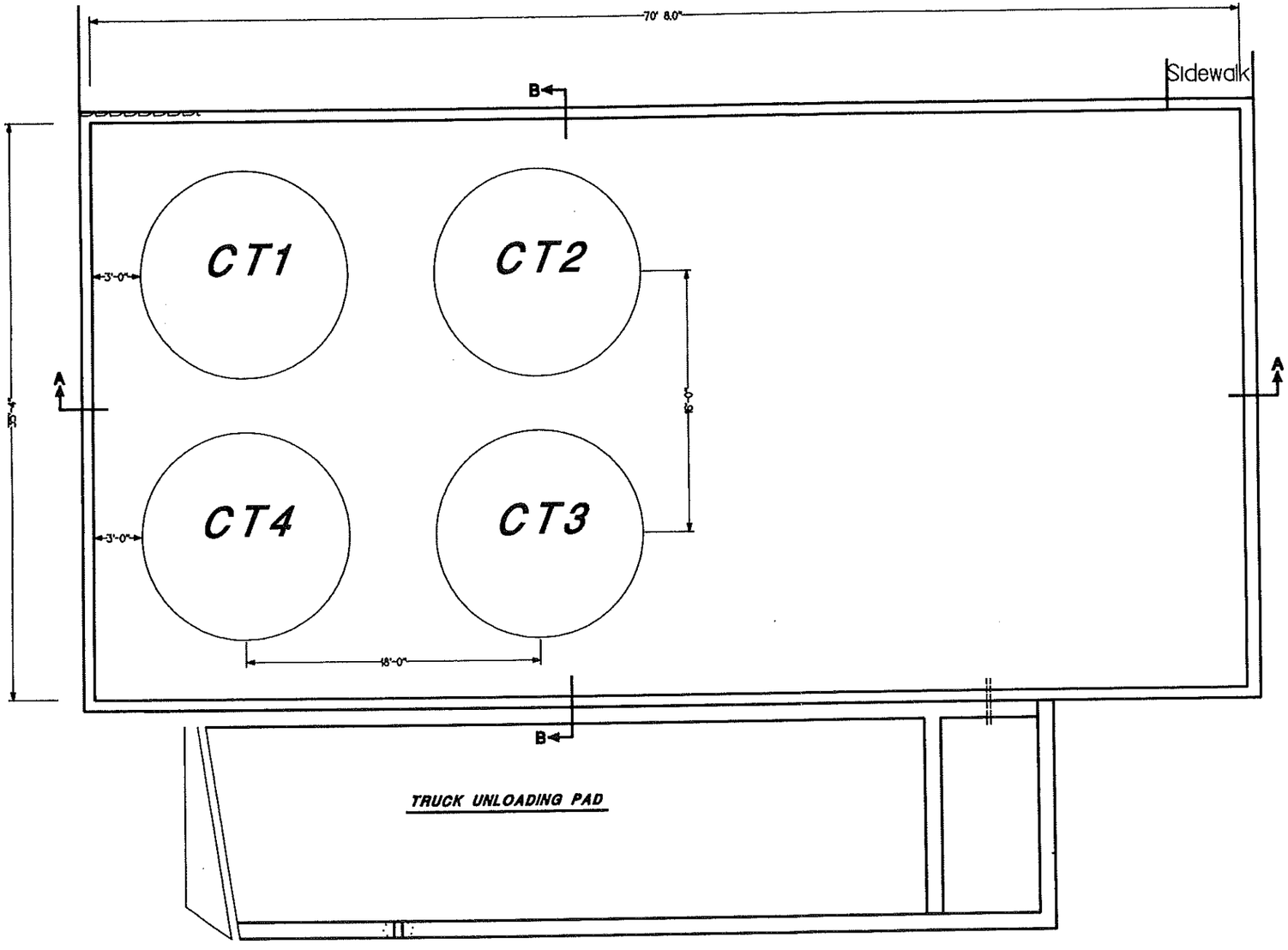
USPCI, WAYNOKA, OK.

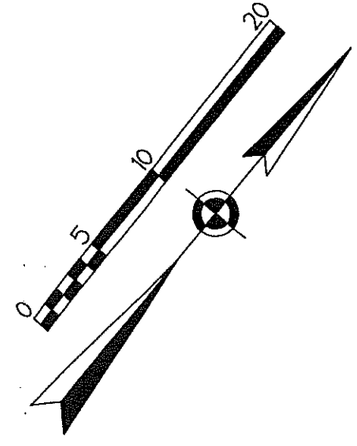
DRAWN BY	SCALE	MATERIAL
LDW		
CHK'D	DATE 10/20/92	DRAWING NO
TRACED	APP'D	451-10





REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408		
NO	DATE	BY			
1			USPCI, WAYNOKA, OK		
2					
3			DRAWN BY LDW	SCALE	MATERIAL
4			CHK'D	DATE 10/23/92	DRAWING NO 451-11
5			TRACED	APP'D	





RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

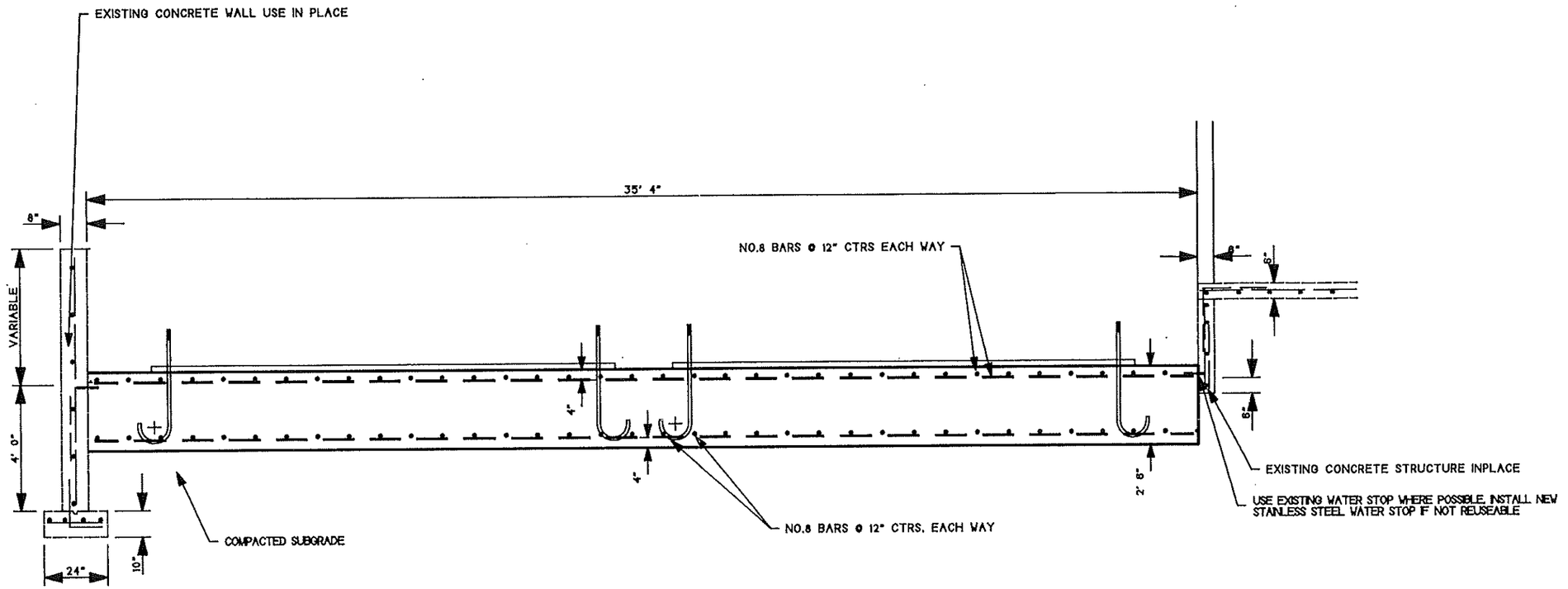
USPCI
A Subsidiary of Union Pacific Corporation

USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-5925

CAUSTIC TANKS 1-4 REPACEMENT PLANS
LAYOUT OF AREA

JOB NO. 5137
SCALE
DRAWN mtc
DATE 10/28/92
SHEET OF



SECTION

RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

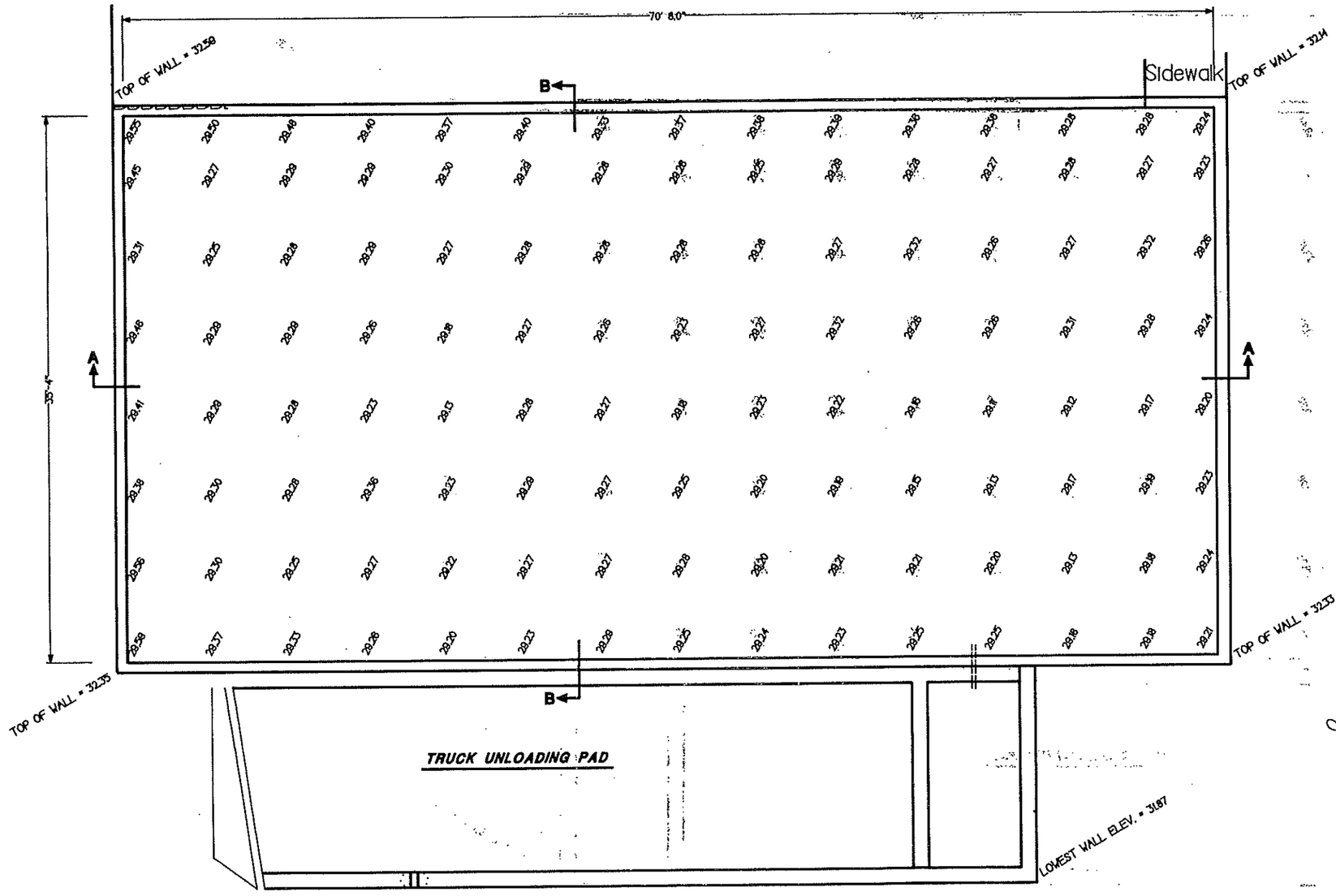
USPCI
A Subsidiary of Union Pacific Corporation

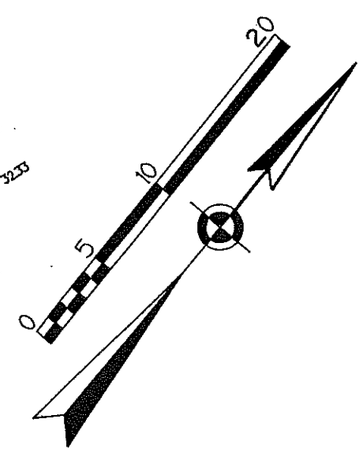
USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-6326

CAUSTIC STORAGE TANK 1-4
CONCRETE REPLACEMENT
SECTION "B" - "B"

JOB NO. 5137
SCALE
DRAWN GRS & RF
DATE 10-5-92
SHEET OF





NOTE:
ADD 1400.00 TO ALL ELEVATIONS

RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

USPCI
A Subsidiary of Union Pacific Corporation

USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-5325

CAUSTIC TANKS 1-4 REPACEMENT PLANS
LAYOUT OF AREA

JOB NO. 5137
SCALE
DRAWN mtc
DATE 10/28/92
SHEET OF

SECTION CT2

MYERS Engineering CORPORATION

ENGINEERING FOR TODAY'S CHANGING WORLD

RECEIVED
MAY 23 1994
LARRY J. ODEN

November 6, 1993

Mr. Don Dillie
USPCI, Inc.
Rt. 2 Box 170
Waynoka, Oklahoma 73860

Dear Mr. Dillie:

At the time of our inspection of Caustic Storage Tanks 1-4 located at the pretreatment area were inspected and there were no visual apparent weld breaks, punctures, scrapes of protective coatings, cracks, corrosion or damage due to construction or installation. This is to certify that Caustic Storage Tanks 1-4 were installed in such a manner which did not produce any structurally adverse conditions in accordance with 40 CFR 264.192(b).

This is to certify that at the time of our inspection, the Caustic Storage Tanks 1-4 located at the pretreatment area of the Lone Mountain Facility, (Waynoka, Oklahoma), were filled with water and allowed to stand at static equilibrium for a period of several hours. During this time all welds and tank walls were monitored for leaks. There were no apparent leaks found therefore the tank appears to be capable of handling hazardous wastes without release for the intended life and use of the tank.

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

Sincerely,

MYERS ENGINEERING CORPORATION

By E. E. Myers
E. E. Myers

EEM:ls

cc: Mr. Gene Walker
Environmental Engineer
Lone Mountain Facility

FILE INSTRUCTIONS	
Unit Pre-Treatment	
Project Caustic Tank Assessment	
Section Tank Certification	
Rcvd. by: L. J. ODEN	
ROUTE	COPY
F.LB	D. Dodd
	B. Correa

LEAK TEST

11002 NORTH STRATFORD DRIVE • SUITE 2400 • OKLAHOMA CITY • OKLAHOMA • 73120 • 405/755-5525 • FAX 405/755-557

SECTION 202

ASSESSMENT OF CAUSTIC TANK #3 (CT3)
LONE MOUNTAIN HAZARDOUS WASTE FACILITY
U.S.P.C.I.
WAYNOKA, OKLAHOMA

A. TANK VESSEL DESCRIPTION

Caustic Tank #3 is a large steel aboveground vertical tank located in the pretreatment area of the Lone Mountain Hazardous Waste Facility. Caustic Tank #1, Caustic Tank #2, Caustic Tank #3, Caustic Tank #4, Sludge Storage Tank #1 and, Caustic Overflow Tank, Cyanide Overflow tank, Cyanide Reactor, Cyanide Measure Tank and a portion of their ancillary equipment will be located together in a concrete containment area.

B. PRIMARY TANK VESSEL

1. General Description

Caustic Tank #3 is being assessed to determine if the unit is adequately designed with sufficient structural strength, and compatibility with the waste to be stored or treated. Caustic Storage Tank #3 is an aboveground tank that will be used for the storage of caustic liquids. The tank is vertical in position and cylindrical in shape. The tank and contents are supported by a skirted base. There is a cone on the bottom of the tank inside the skirt. There is a platform connected to all four caustic storage tanks (CT1, CT2, CT3, CT4). There are two ladders for access to the tank top and platform. This tank is equipped with a 3" overflow line. There is a level gauge installed through an 18" nozzle, in addition to the level gauge there is a high level alarm installed through a nozzle on the top of the tank. This tank was manufactured by Scott Manufacturing, Inc from Lubbock, Texas. The temperature of the tank varies with the ambient temperature.

Influent piping is located from the pretreatment building to the caustic tank and to other tanks in the containment area.

2. Design Standards.

The tank is designed and constructed to those sections that are applicable in the American Petroleum Institute Standard 650 - 1988 edition (API-650) and the American Institute of Steel Construction (AISC) Manual of Steel Construction (8th Edition). The Mill Test reports and radiographic testing reports can be found in Appendix F of this assessment.

3. Hazardous Characteristics of Wastes Stored

The wastes to be stored in this tank have the following characteristics (Provided by USPCI):

Untreated wastes pH (7 - 13)
N > 1
Temperature = Ambient

The hazardous characteristics of the waste to be stored in this tank were examined. It was determined that the pH and normality levels of the waste are the primary areas of concern. This is to determine the applicability of a corrosion allowance for the tank material type and thickness.

4. Existing Corrosion Protection

The interior of the tank is coated with Gliden "Glid-Guard Epoxy Chemical Resistant Finish 5240 Series." This coating will withstand the chemical characteristics of the waste to be stored.

5. Documented Age of Tank

This is a new tank, it was constructed and installed in October of 1992.

6. Result of Leak Tests

A leak test was performed. In this test the tank was filled to maximum operating capacity with water. The tank was allowed to sit full for a minimum of 6 hours. After remaining full for this time there was no evidence of the tank leaking. In the inspection all welds, flanges, manways, nozzles, and sidewalls were checked for leaks.

7. Existing Data Obtained

Diameter of Tank	12'-8-5/8" Inside Dia.
Height	40'
Material	A36 steel See Appendix F for Mill Test reports
Wall and top thickness	0.25"
Bottom cone thickness	0.3125"
Maximum Volume	4426.27 cf. or 33,108 Gal.
Maximum Operating Volume	4299.22 cf. or 32,156 Gal.
Specific gravity of waste	1.5 (Provided by USPCI)
Temperature	Ambient
Seismic Zone	1

8. Calculation of Existing Foundation Loading

Total Weight of Tank and Contents = 216.54 tons

Detailed calculations reflecting the volume and weight of the tank are found in appendix A. The required foundation thickness and steel reinforcement are included in appendix E of this assessment.

9. Required Structural Calculation

The calculated required wall thickness for this tank is 0.2195 inches. This thickness includes 0.125 inches added for corrosion allowance. This corrosion allowance is based on a best engineering estimate taking into account the materials being treated and a 20 year design life. (See appendix B and C of this assessment for detailed calculations or required wall thickness and structural analysis of the tank support system.)

10. Comparison of Actual Structure to Theoretical Values

Wall Thickness Comparison

Calculated Required Wall Thickness	0.2195"
Minimum Required Wall Thickness By API-650-88	0.1875"
Measured Wall Thickness	0.25"

C. SECONDARY CONTAINMENT SYSTEM

1. General Description of Secondary Containment

The secondary containment system is designed and will be operated to prevent any migration of wastes or liquids out of the system. Cyanide Reactor Tank, Cyanide Measure Tank, Caustic Tanks #1-4, Sludge Storage Tank, Caustic Overflow Tank, Cyanide Overflow Tank will be located on a reinforced concrete base floor area with vertical concrete sidewalls. All associated piping is aboveground. The area will be inspected on a daily basis. The containment system is walled off and receives no direct vehicular traffic. The foundation walls and base were mass poured in place. No cracks from compression or uplift were visually apparent. There are three low areas with a slight depression that are used to collect any waste spills and rainwater. Any released tank contents or surface runoff will drain on top of the sloped concrete to the sump areas. The accumulated liquids are then removed and pumped out in accordance with the permit condition. The slab floor also serves as a foundation support for the tanks in this area.

The concrete floor was removed and replaced in October of 1992. The floor was replaced in order to strengthen the foundation for the tank support.

2. Design Standards.

Design drawings for the walls were obtained and used as a reference. It should be noted that these are design drawings and not as built drawings. The structural capacity of the foundation and walls were compared to those sections that are applicable in the API-650-88 and the American Concrete Institute (ACI 318-89/318r-89) and these calculations were used as a guide in verifying the ability of the system to contain hazardous waste. The concrete floor and foundation were built in close adherence to the above mentioned codes. The floor as previously mentioned was removed and replaced.

3. Hazardous Characteristics of Wastes Stored

The wastes which are treated in the primary tank have the following characteristics:

Untreated waste pH (7 - 13)
N > 1
Temperature = Ambient

The hazardous characteristics of the waste treated in the primary tank were examined. It was determined that the pH and normality levels of the waste are the primary areas of concern. This is to determine the applicability of a corrosion allowance for the containment system material type and thickness.

4. Existing Corrosion Protection

The concrete containment is coated with Concrete Protection System, Inc "OVERKOTE" industrial flooring. For more information on this coating see Appendix H of this report.

5. Documented Age of The Containment Area

The secondary containment system was originally constructed and installed in 1987 however the floor was replaced in October 1992.

6. Result of Leak Tests

A visual inspection of the containment area was performed and from this inspection it was determined that there are no cracks or breaks in the impermeable coating. The area will be inspected on a daily basis checking for leaks from the primary tank.

7. Data Obtained

Area	2509.85 s.f.
Wall Height	2.62 ft. (Min.)
Material	Concrete
Gross Volume	6575.81 c.f.
Thickness	30"

See Appendix G of this assessment for a detailed layout and cross sections of the secondary containment. Also included in Appendix D of this assessment are detailed calculations of the gross volumes of each containment area.

8. Calculation of Existing Capacity

Containment Capacity Available (CCA)

CCA = Gross Volume - Volume of items in the containment - Volume of rainfall.

See the appendix of this report for detailed calculations of the available containment volume. The containment capacity available = 4960.54 c.f.

9. Required Volume

Containment Capacity Required (CCR)

CCR = Volume of Largest Tank in the secondary containment

Volume of Largest Tank =	4426.27 c.f.(CT1) or 33,108 Gal.

10. Comparison of Available Volume to Required Volume

Containment Capacity Comparison

Containment Capacity Required =	4,426.27 c.f.
Secondary Containment Volume Available =	4,960.54 c.f.
Excess Containment Volume =	534.27 c.f.

CCA > CCR Adequate Capacity (under normal operating conditions) is available.

D. CONCLUSIONS

1. Primary Tank Vessel

The primary tank vessel at the of inspection was fit for use with the proposed waste stream at the given densities, chemical and physical characteristics as verified by USPCI. The useful life of the steel tank would be estimated at 20 years if the proposed waste stream is maintained. This useful life was determined by using a design life of 20 years less the period that the tank has been in use at the USPCI Lone Mountain Facility.

2. Secondary Containment System

The secondary containment area is fit for use, with the proposed waste stream at given densities and chemical and physical characteristics as verified by USPCI were released from the primary tank. The useful life of the concrete containment area is estimated at 20 years. This useful life was determined by using a design life of 20 years less the period that the system has been in use at the USPCI Lone Mountain Facility.

E. RECOMMENDATIONS

The following repairs or modifications should be made:

1. Primary Tank

   The tank should be internally inspected periodically to insure no corrosion is occurring. The tank should be checked yearly with ultrasonic testing procedures to establish a verified limit of corrosion. USPCI should continually insure compatibility with the waste and densities stored. Daily inspections should conducted to detect any visual corrosion or defects.

2. Secondary Containment

   The secondary containment should be checked periodically for any deterioration and structural integrity.

3. Routine Inspections

   When routine and preventative measures are to be completed, the tank should be cleaned and internally inspected to determine any interior defects or corrosion. Routine painting and coating of tanks on the interior and exterior, and routine inspection is recommended.

F. CERTIFICATION

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.

E.E Myers
Date: 1/20/93

Engineer
Title

P.E. 4126/OKLA

REGISTERED PROFESSIONAL ENGINEER
E. E. Myers
4126
OKLAHOMA

APPENDIX A

Primary Tank Volume Calculations

SECTION 202 - APPENDIX A

CT3, Caustic Storage Tank No. 3

PRIMARY TANK VOLUME CALCULATIONS

DIMENSIONS:				
Geometry:	CYLINDRICAL			
Diameter:		12.72	FEET	
Max Height:		34.00	FEET	
Normal Operating Height:		33.00	FEET	
Cone Height:		2.42	FEET	
Bottom Cone Diameter		0.50	FEET	
Cone Length		6.80	FEET	
Cone Volume:		106.53	C.F. or	796.83 Gal.
VOLUME CALCULATIONS				
Max. Volume :		4426.27	C.F. or	33108.49 Gal.
Normal Operating Volume		4299.22	C.F. or	32158.15 Gal.

MAXIMUM OPERATING TANK VOLUME =		4426.27	C.F.
	OR	33,108.49	GAL

WEIGHT ON FOUNDATION

CONTENTS S.G.:	1.50	
DENSITY:	93.60	LB/C.F.

SURFACE AREA CALCULATION		
Tank Top =	127.05	S.F.
Tank Bottom Cone =	257.87	S.F.
Tank Wall= Cir*h	1358.54	S.F.
TOTAL SURFACE AREA WALL AND TOP	1743.47	S.F.
Steel Thickness=		
Sidewalls and Top	0.25	INCHES
Cone	0.31	INCHES
Volume of Steel =		
Sidewalls	28.30	C.F.
Top and bottom	10.02	C.F.
Density of Steel =	490.00	LB/C.F.
Weight of Steel =	9.39	TONS
WEIGHT OF TANK CONTENTS =	207.15	TONS

TOTAL WEIGHT OF TANK AND CONTENTS =	216.54 TONS

APPENDIX B

Primary Tank Wall Thickness Calculations

SECTION 202 - APPENDIX B

CT3, Caustic Storage Tank No. 3

PRIMARY TANK WALL THICKNESS

DIMENSIONS:			
Geometry:	CYLINDRICAL		
Diameter:		12.72	FEET
Height :		34.00	FEET
Specific Gravity:		1.50	
Normal Operating Temperature =		ambient	

STEEL THICKNESS CALCULATIONS @ BOTTOM RING

Thickness (t) = (2.6 * H * D * S.G.) / (s * E) + CA

s = Allowable Design Stress =	21000.00	PSI ***
E = Joint Efficiency =	85.00%	
Thickness (t) =	0.0945	INCHES
Corrosion Allowance =	0.1250	INCHES
Calculated Req'd Wall thk. =	0.2195	INCHES

*** THIS DESIGN STRESS IS OBTAINED FROM API-650-88 WITH THE USE OF APPENDIX A.

CONE WALL THICKNESS CALCULATION

Cosine Alpha = cos(67.6594)	0.3801	
P1= Internal Pressure=		
=Density*s.g.*(x+D/6*cot(alpha)	3263.83	psi
P2= H*density*s.g.=33*62.4*1.5 =	3182.40	psi
Tc= top cone radius =	6.36	inches
Fb = Allowable stress	23200	psi

The required wall thickness of the cone will be the greater of the following Formulas.

1. Ts=P1*Tc/2*cos(alpha)*fb =	0.098	+1/8"C.A.=	0.223	in.
2. Ts=P2*D/cos(alpha)*Fb =	0.191	+1/8"C.A.=	0.316	in.

APPENDIX C

Structural Support Calculations

SECTION 202 - APPENDIX C

CT3, Caustic Storage Tank No.3

STRUCTURAL SUPPORT CALCULATIONS

GIVEN:		
Tank Diameter =	12.72	feet
Total Height =	40.00	feet
Weight of Tank =	18780.00	lbs
Weight of Max. Contents =	414300.00	lbs
Tank Nominal Thickness =	0.25	in

-----SEISMIC DESIGN CHECK-----

ZONE COEFFICIENT (Z):	0.1875	
ESSENTIAL FACILITIES FACTOR (I):	1.000	
LATERAL EARTHQUAKE FORCE COEFF. (C1):	0.240	
D/H:	0.267	
k factor:	0.590	
SITE AMPLIFICATION FACTOR (S):	1.500	
NATURAL PERIOD OF FIRST SLOSHING (T):	2.104	
LATERAL EARTHQUAKE FORCE COEFF. (C2):	0.214	
WEIGHT OF TANK SHELL (Ws):	18780.000	LBS
TOTAL WEIGHT OF TANK CONTENTS (Wt):	414300.000	LBS
W1/Wt:	0.950	
W2/Wt:	0.050	
WEIGHT OF EFFECTIVE MASS OF CONTENTS THAT MOVES IN UNISON WITH THE TANK SHELL (W1):	393585.000	LBS
WEIGHT OF EFFECTIVE MASS IN FIRST SLOSHING (W2):	20715.000	LBS
HT FROM BTM OF SHELL TO CENT. OF SHELL (Xs):	20.000	FEET
X1/H:	0.500	
HT FROM BTM TO CENT. OF LAT. SEISMIC FORCE (X1):	20.000	FEET
X2/H:	0.900	
HT FROM BTM TO CENT. OF LAT. SEISMIC FORCE (X2):	36.000	FEET

Note: All of the above calculations are based on API-650-88 Seismic Design Procedure (Appendix E).

CHECK STRESS IN TANK SHELL FROM SEISMIC FORCES:

Wl = MAXIMUM WEIGHT OF TANK CONTENTS THAT MAY BE USED TO RESIST THE SHELL OVERTURNING MOMENT

Wl = 7.9*tb*(Fby*G*H) ^ .5

tb = THK. OF BTM. PLATE UNDER SHELL:	0.250	IN
Fby = MINIMUM YIELD STRENGTH OF BOTTOM PLATE:	9000.000	PSI
G = DESIGN SPECIFIC GRAV. OF LIQUID:	1.50	
Wl =	1451.32	LBS/FT OF SHELL CIRCUMFRENCE
DENSITY OF TANK SHELL MATERIAL:	490.00	LBS/CF
WT = WEIGHT OF TANK SHELL AND THE PORTION OF FIXED ROOF SUPPORTED BY TANK SHELL:	408.33	LBS/FT OF SHELL CIRCUMFRENCE
M/[D ^ 2(WT+Wl)]:	1.3328	

b = MAXIMUM LONGITUDINAL COMPRESSIVE FORCE AT THE BTM. OF TANK SHELL

b = WT + 1.273*M/D ^ 2

b:	3563.57	LBS/FT OF SHELL
G*H*D ^ 2/t ^ 2:	155326.46	
Fa = MINIMUM OF 10 ^ 6*t/D or Fty/2:	4500.00	PSI
Fty = MINIMUM YIELD STRENGTH OF BTM. PLATE:	9000.00	PSI
MAX. LONGITUDINAL COMPRESSIVE STRESS IN THE TANK SHELL = b/12t =	1187.86	PSI

CHECK OVERTURNING MOMENT FROM WIND PRESSURE

M must be Less Than or Equal To .66*(WD)/2
If M is Greater Than .66*(WD)/2 Anchor Bolts
Would Be Required

Where:

W = Shell Weight Available To Resist Uplift (lbs)

D = Tank Diameter (feet)

M = Overturning Moment

M = Pw*Projected Area*H1

H1 = Height from ground to centroid of tank shell

Pw = Wind Pressure (18 psf for 100 MPH Wind on cylinders)

.66*(WD)/2:	78830.93	FT-LBS
M:	183168.00	FT-LBS

M > .66*(WD)/2 therefore anchor bolts are required

Number of Anchors:	12.00	
Anchor Diameter:	1.25	inches
Dia. of Anchor Circle:	13.05	feet

tB = design tension load per anchor

tB:	3113.62	pounds
Allowable Load/ Anchor:	24543.69	pounds

APPENDIX D

Containment Area Volume Calculations

SECTION 202 - APPENDIX D

CT3, Caustic Storage Tank No.3

CONTAINMENT AREA No.8A VOLUME CALCULATIONS (CAUSTIC AREA)

Length =	70.70	feet
Width =	35.50	feet
Height =	2.62	feet
Surface Area =	2509.85	S.F.

Gross Volume =	Area * Heigth =	6575.81 C.F.

Volumes of Items of Displacement **

1. Steel skirting =		9.17 C.F.
Total volume to deduct for items in containment area =		9.17 C.F.

Subtraction for volume of rainfall

Volume of rain = Area x depth of rainfall

Depth of rainfall =	6.15 In.
Area =	2509.85 S.F.
Volume =	1286.30 C.F.

TOTAL AVAILABLE VOLUME = Gross Volume - Subtractions =	6575.81 C.F.
Items of diplacement	-9.17 C.F
Volume of rainfall	-1286.30 C.F
TOTAL AVAILABLE VOLUME Area 8A	5280.34 C.F.

CONTAINMENT AREA No.8c VOLUME CALCULATIONS (TRUCK PAD)

This area will collect rain and deposit it into the caustic containment area (8a) when the valve is opened. This area does not contribute any volume for containment.

Length =	52.00	feet
Width =	12.00	feet
Surface Area =	624.00	S.F.

Subtraction for volume of rainfall

Volume of rain = Area x depth of rainfall

Depth of rainfall =	6.15 In.
Area =	624.00 S.F.
Volume =	319.80 C.F.

SUMMARY OF SECONDARY CONTAINMENT DATA

Surface Areas :

Caustic Area 8A =	2509.85	S.F.
Truck Unloading Pad 8C =	624.00	S.F.

Gross Volumes :

Caustic Area 8A =	6575.81	C.F.
Truck Unloading Pad 8C =	0.00	C.F.

Volume of displacements

Caustic Area 8A =	9.17	C.F.
Truck Unloading Pad 8C =	0.00	C.F.

Volume for 24hr rain:

Caustic Area 8A =	1286.30	C.F.
Truck Unloading Pad 8C =	319.80	C.F.

Total Gross Volume 8A =	6575.81	C.F.
Total Displacement Volumes =	9.17	C.F.
Total volume of Rain	1606.10	C.F.

Containment Capacity Available (CCA) =	4960.54	C.F.
	or	
	37104.83	GAL.

APPENDIX E

Foundation Design Analysis

SECTION 202 - APPENDIX E

CT3, Caustic Storage Tank No.3

FOUNDATION DESIGN ANALYSIS

ASSUMPTIONS:

f'c =		4.00	KSI
fy =		60.00	KSI
Allowable Soil Press. =		2.20	KSI
Structural Steel =	A36		

GIVEN:

Tank Diameter =	12.72	feet
Sidewall Height =	40.00	feet
Weight of Tank (Shell)	18780.00	lbs
Weight of Max. Contents =	414300.00	lbs

Tank is Resting on a concrete foundation.

CHECK CONCRETE FOUNDATION DESIGN:

Assume Footing Depth =	30.00	inches
Assume Footing Width =	30.00	inches
Assumed Effective Soil Press. =	1925.00	psf

psf

Look at what is resisiting overturning moment from seismic load:

b = 3563.57 lb/ft of circ.

Where b is the maximum shell compression at the bottom of the shell.

If the footing is 30.00 inches wide
then the actual applied pressure to the subgrade is 1425.43 lb/sf

This is less than the effective soil pressure.

APPENDIX F

MANUFACTURERS DATA, MILL TEST REPORTS, RADIOGRAPHIC REPORTS

CERTIFICATION TO OWNER OF COMPLIANCE WITH API 650-88

To: USPCI LONE MOUNTAIN FACILITY

WAYNOKA, OKLAHOMA

To Whom It May Concern:

Scott Manufacturing, Inc. hereby certifies that the tank(s) constructed for you at SCOTT MANUFACTURING, INC. WOLFFORTH, TEXAS and described as follows: (4) 12/75' diameter by 40' shell height Caustic Storage Tanks, Serial Numbers 451-1, 2, 3, &4 has/have been designed, fabricated, erected, and inspected in accordance with all of the requirements of the American Petroleum Institute Standard 650-88 entitled, "Welded Steel Tanks for Oil Storage" and that the results of all such inspections, radiographs, and other tests indicate that the tanks(s) fully complies/comply with all of the requirements. We further certify that all materials meet specifications.

SCOTT MANUFACTURING, INC.

By William A. Bassom

MANAGER/HEAVY CONSTRUCTION
Title

23 OCTOBER 1992
Date

CITY OF LUBBOCK

STATE OF TEXAS

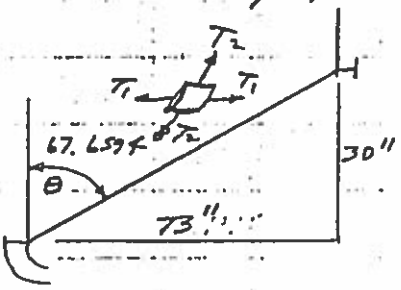
Acknowledged and sworn to before me this 23rd day of October, 1992.

Royce Eledell
Notary Public

USPCI, WAYNOKA, OK

10/20/92

12.72'ϕ x 40' (OVERALL)



CONC

$$T_2 = \frac{\gamma}{2\cos\theta}\left(\frac{D}{2}\right)\left(X + \frac{D}{6}\cot\theta\right)$$

$$= \frac{62.4(1.5)}{2\cos 67.659°}\left(\frac{12.72}{2}\right)\left(33' + \frac{12.72}{6}\cot 67.659°\right)$$

$$= 123.1217\ (636)\ (33.8712)$$

$$= 26{,}523\ \text{lbs/ft} \quad \div 12$$

$$= 2210.25\ \text{lbs/in} \quad \div 23{,}200\ \text{lbs/in}^2$$

$$= 0.09527" + 0.125"$$

$$= 0.2203" \quad \text{use } \tfrac{1}{4}" \text{ PL}$$

$$T_1 = \frac{\gamma D X}{2\cos\theta}$$

$$= \frac{62.4(1.5)(12.72)33}{2\cos 67.659°}$$

$$= 51{,}682\ \text{lbs/ft} \quad \div 12$$

$$= 4{,}306.80\ \text{lbs/inch} \quad \div 23{,}200\ \text{lbs/in}^2$$

$$= 0.1856" + 0.125"$$

$$= 0.3106" \quad \underline{\text{use } \tfrac{5}{16}" \text{ PL}}$$

GIRDER RING

$$C = \frac{\gamma}{B}\left(X + \frac{D}{6}\cot\theta\right) D^2 \tan\theta$$

$$= \frac{62.4(1.5)}{B}\left(33 + \frac{12.72}{6}\cot 67.659°\right) 12.72^2 \tan 67.659°$$

$$= 11.70\ (33.8712)\ 393.710$$

$$= 156{,}025\ \text{lbs} \quad \div 23{,}200\ \text{lbs/in}^2$$

$$= 6.72522\ \text{in}^2$$

( )

$$A_{eff} = 0.78\left(t_c\sqrt{R_c t_c} + t_1\sqrt{R_1 t_1} + t_s\sqrt{R_s t_s}\right)$$

$$= 0.78\left(.25\sqrt{6.375(.25)} + .375\sqrt{17.31(3.125)} + .25\sqrt{6.375(.25)}\right)$$

$$= 1.05927\ \text{in}^2 \quad (0.8131\ \text{in}^2)$$

$$A_{eff(MAX)} = 16\left(t_c^2 + t_1^2 + t_s\right)$$

$$= 16\left(.25^2 + .3125^2 + .25^2\right)$$

$$= 3.56250\ in^2 > 1.05927\ in^2 \text{ use smaller}$$
$$(2.5625)$$

$$\therefore \text{use } 1.05927\ in^2$$
$$(0.8131)$$

$$6.72522 - 1.05927 = 5.666\ in^2$$
$$(6.7252 - 0.8131 = 5.9121\ in^2)$$

USPCI, WAYNOKA, OK 10/14/92

12.75'ϕ X 40' (OVERALL) CONTENTS - CAUSTIC LIQUID - SP. GR. - 1.5 API-650

CORROSION ALLOWANCE - 1/8" THICKNESS BY 1 FOOT METHOD

$$\frac{2.6\,(12.75)(40-1)\,1.5}{23{,}200} + .125 = 0.2086" \text{ use } 1/4" \text{ R}$$

Louis D. Wood, Jr.

STATE OF TEXAS
LOUIS D. WOOD, JR.
60815
REGISTERED PROFESSIONAL ENGINEER

10/14/92

PLATE

SUNBELT TRADING COMPANY, Inc.

TO: Scott Mfg.
Attn: Wayne

REF:

CUSTOMER'S P.O. NO. 27158
S.T.C.'s RELEASE NO. 2994
S.T.C.'s INVOICE NO. 010435

ATTACHED PLEASE FIND MILL TEST CERTIFICATES FOR YOUR ABOVE REFERENCED PURCHASE ORDER FOR THE FOLLOWING MATERIAL.

See Below

THANKS AND REGARDS,

Stacey

STACEY GESSERT

enclosure

20 pcs. 1/4 x 96 x 480 A-36 Plate
4 pcs 1/4 x 96 x 240 A-36 Plate
6 pcs 5/16 x 96 x 240 A-36 Plate
4 pcs 1/4 x 96 x 240 Floor Plate

NEW ADDRESS
1990 POST OAK BLVD., SUITE 1550
HOUSTON, TX 77056-3813

2000 Post Oak Blvd. Suite 1867 Houston, Texas 77056
Tel. (713) 840-0550 TLX - 790313 - FAX (713) 840-8727

CERTIFICAT D'ANALYSE DIN 50049/2.2

N°29070 SEITE N° 1
BLATT NR
PAGE No

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE)

PLAQUES-BLECHE-PLATES

C.D.C. : Conforme au Cahier des Charges - Gemäss den Vorschriften - According specifications (1)
BL : Brut de laminage - Walzgeglüht unbearbeitet - As rolled
N : Normalisé - Normalisiert - Normalized
R : Revenu - Vergütet - Tempered
D : Détensionné - Spannungsfreiglüht - Stress relieved
LC : Laminage contrôlé - Gleichmässige Temperaturführung - Controlled rolling

Organisme et/ou service de contrôle
Überwachungs-organisation
Inspection

CLIENT / DESTINATAIRE - BESTELLER / EMPFÄNGER - PURCHASER / CONSIGNEE
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD. # 1550
US - HOUSTON - TEXAS 77056-3813

N° COMMANDE COURTIER/CLIENT - MAKLER/KUNDENBESTELL NUMMER
BROKER/PURCHASER'S ORDER NUMBER
STC 11.695

N° commande usine
Werksauftrags Nr.
Works order No.
15042

NUANCE ET SPECIFICATIONS TECHNIQUES
STAHLSORTEN UND PRÜFBEDINGUNGEN
QUALITY AND SPECIFICATIONS
GRADE C
ASTM A 283/88

LIEU DE LIVRAISON
LIEFERORT
AS DELIVERED

TRAITEMENT DE REFERENCE
PROBESTABZIEHOE NACHLUNG
TREATMENT OF TEST SAMPLES (1)

IDENTIFICATION DU PRODUIT / PRODUCT IDENTIFICATION					DIMENSIONS - ABMESSUNGEN - DIMENSIONS						TRACTION - ZUGVERSUCH - TENSILE TEST							RESILIENCE - KERBSCHLAGZÄHIGKEIT - NOTCH TOUGHNESS							
N° REFERENCE REFERENCE No	N° COULEE SCHMELZ NR HEAT No	MARQUE BRAMME SLAB	NOMBRE DE PIECES NUMBER OF PIECES	POIDS PAR PIECE WEIGHT PER PIECE	EPAISSEUR DICKE THICKNESS	LARGEUR BREITE WIDTH	LONGUEUR LÄNGE LENGTH	MASSE THEORIQUE THEORETICAL WEIGHT	ORIENTATION (1)	SENS (2)	(3)	Re	Rm	A %			TYPE FORM TYPE	SENS (3)	TEMP °C	PEAU COEUR (4)	VALEURS INDIVIDUELLES EINZELWERTE INDIVIDUAL VALUES			MOYENNE MITTELWERTE AVERAGE	
B01	B08	B09	B10	B11	B12	B13	B14	C01	C02	C04	C11	C12	C13	C14	C15		CA0	C44	C45	C46	CA1	CA1	CA2	CA3	CD0
	289299 *	1	26	0"1/4	96"	240"	(kg)		T		(N/mm2)													
	289300 *	1	36	0"1/4	96"	240"			T															
	289301 *	1	53	0"1/4	96"	240"			T															
	289304 *	1	67	0"1/4	96"	240"			T															

* leared plates

* (1) le = 3,65 15 mm - (2) Le = 50 mm - (3) Le = 200 mm

AC5

(3)	N° DE REPERENCE REFERENCE No	N° COULEE SCHMELZ NR HEAT No	ANALYSE SUR PRODUIT - STÜCKANALYSE - CHECK ANALYSIS														
			Mn %	P %	S %	C %	Si %	Al %	Nb %								
C30	B01	B08	C34	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84
O/Y		289299		0.475	0.033	0.009	0.159	0.163	0.015	0.001							
		289300		0.463	0.019	0.017	0.172	0.201	0.031	0.001							
CC		289301		0.460	0.023	0.009	0.179	0.174	0.015	0.001							
		289304		0.446	0.015	0.017	0.176	0.219	0.004	0.001							

SERVICE METALLURGIQUE

D02/D03

Controle de marquage d'aspect et de dimensions : Satisfaisants
Bezeichnung, Beschaffenheit und Ausmessung : Ohne Beanstandung
Marking, inspection and measurement : Without objection

CLABECQ, le 27/04/92

(2) Prélèvement-Location
1:Tête-Kopf-Top
2:Pied-Fuss-Bottom C05

(3) Direction-Richtung
L:Long-Länge-Longitudinal
T:Travers-Quer-Transverse C06

(4) C:Coeur-Kernprobe-Core sample
P:Peau-Oberfläche-Rolled surface C07

C00

(1) O/Y : Oxygène pur - Sauerstoff - Oxygen
CC : Coulée continue - Kontinuierliches giessen - Continuous casting C17

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande
Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen
We certify hereby that the above mentioned products are consistent with the order prescriptions D04

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe
Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben
The results of the special tests are indicated on the complementary documents in appendix C40

FORGES DE CLABECQ
rue de la Déportation 210
1480 TUBIZE
(BELGIQUE) A01

PLAQUES-BLECHE-PLATES B01

CERTIFICAT D'USINE DIN 50049/2.2

A02

N°29774 PAGE N° 9
BLATT NR
PAGE No A03

SIGLE PRODUCTEUR / HERSTELLERKENNZEICHEN / TRADE MARK A04

B15

C.D.C. : Conforme au Cahier des Charges - Conform with Specifications - According specifications (1)
R. : Brut de laminage - Hergestellt unterwärmt - As rolled
N : Normalisé - Normalgeglüht - Normalized
T : Revenu - Vergütet - Tempered
D : Détensionné - Spannungsfreigeglüht - Stress relieved
LC : Laminage contrôlé - Clairwerkige Temperaturführung - Controlled rolling B07

Expédié à/au service de contrôle / Überwachungs-organisation / Inspection: A01

CLIENT / DESTINATAIRE - BESTELLER / EMPFÄNGER - PURCHASER / CONSIGNEE A06
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

N° COMMANDE COURTIER/CLIENT - MAKLER/KUNDENSTELL NUMMER - BROKER/PURCHASER'S ORDER NUMBER: 11654B A07

Référence cahier des charges n° / Vorschrift Nr. / Specification No.: 15527 A08

NUANCE ET SPECIFICATIONS TECHNIQUES - STAHLSORTEN UND PRÜFBEDINGUNGEN - QUALITY AND SPECIFICATIONS: A36 - SA36 ASTM A36/91-ASME SA36/ B01

CONDITION DE LIVRAISON - LIEFERZUSTAND - AS DELIVERED: B04

TRAITEMENT DE RÉFÉRENCE - PROBESTAB(TYP)OK HANDLING - TREATMENT OF TEST SAMPLES (1): B05

IDENTIFICATION DU PRODUIT - ERZEUGNIS BENENNUNG - PRODUCT IDENTIFICATION					DIMENSIONS - ABMESSUNGEN - DIMENSIONS						TRACTION - ZUGVERSUCH - TENSILE TEST							RESILIENCE - KERBSCHLAGZÄHIGKEIT - NOTCH TOUGHNESS								
N° REFERENCE / REFERENCE NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	MARQUE / STAMPE / BRAND / SLAB	N° POSTE / POSTEN NR / PIECE No	NOMBRE DE PLAQUES / STÜCKZAHL / NUMBER OF PLATES	EPAISSEUR / DICKE / THICKNESS	LARGEUR / BREITE / WIDTH	LONGUEUR / LÄNGE / LENGTH	MASSE THEORIQUE / THEORETISCHES GEWICHT / THEORETICAL WEIGHT	OBSERVATIONS (2)	SENS (3)	(4)	Re	Rm	A x e (3)			TYPE / FORM / TYPE	SENS (3)	TEMP °C	PEAU / COEUR (4)	VALEURS INDIVIDUELLES / EINZELWERTE / INDIVIDUAL VALUES				MOYENNE / MITTELWERTE / AVERAGE
B02	B06		B09	B10	B11	B12	B13	B14	C01	C02	C04	C11	C12	C13	C14	C15	C40	C44	C45	C46	C42	C42	C42	C43	C08
								(kg)				(N/mm2)													
	292080		34		0"5/16	96"	240"			T		308	410	27.0											
										T		284	436	27.0											
	292085		35	24	0"3/8	96"	240"			T															
	292086		35		0"3/8	96"	240"			T		310	415	31.0											
										T		298	413	30.0											
	292083		36	21	0"3/8	96"	480"			T		303	418	31.0											
										T		287	414	30.0											
	292085		36		0"3/8	96"	480"			T		307	430	32.0											

(1) Lo = 5,65 √S mm - (2) Lo = 50 mm - (3) Lo = 200 mm

A05

(5)	N° DE REFERENCE / REFERENCE NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	ANALYSE SUR PRODUIT - STÜCKANALYSE - CHECK ANALYSIS															
			Mn %	P %	S %	C %	Si %	Al %	Nb %									
C10	B07	B08	C72	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84		
O/Y		292080	0.826	0.032	0.015	0.096	0.285	0.013	0.001									
		292085	0.810	0.016	0.010	0.092	0.289	0.021	0.001									
CC		292086	0.808	0.020	0.012	0.075	0.259	0.011	0.001									
		292083	0.816	0.018	0.014	0.088	0.324	0.002	0.001									

SERVICE METALLURGIQUE

D02/703

Contrôle de marquage d'aspect et de dimensions : Satisfaisants - Bezeichnung, Beschaffung und Ausmessung : Ohne Beanstandung - Marking, inspection and measurements : Without objection

CLABECQ, le 10/07/92

(1) Prélèvement - Location - Entnahmestelle: 1:Bout-Kopf-Top 2:Pied-Fuss-Bottom C02
(2) Sens - Richtung - Direction: L:Long-Längs-Longitudinal T:Travers-Quer-Transverse C04
(3) Surface - Oberfläche - Face sample: C:Coeur-Kernzone-Core sample P:Peau-Walzfläche-Rolled surface C05
C30

(4) O/Y : Oxygène pur - Oxygen
CC : Coulée continue - Kontinuierliches giessen - Continuous casting C93

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande. Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen. We certify hereby that the above mentioned products are conformist with the order prescriptions Z04

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe. Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen eingetragen. The results of the special tests are indicated on the complementary documents in annexe C40

F01

CERTIFICAT D'USINE DIN 50049/2.2

N°29786 — PAGE N°. A / TT NR / PAGE No

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE)

PLAQUES-BLECHE-PLATES

SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

11654B

15527

A36 - SA36
ASTH A36/91-ASME SA36/

Identification du produit / Produktkennzeichnung / Product identification				Dimensions			Masse théorique / Theoretisches Gewicht / Theoretical weight	Traction / Zugversuch / Tensile test							Résilience / Kerbschlagzähigkeit / Notch toughness						
N° référence / Referenz-Nr. / Reference No.	N° coulée / Schmelz-Nr. / Heat No.	Numéro de plaque / Blech-Nr. / Plate No.	Epaisseur / Dicke / Thickness	Largeur / Breite / Width	Longueur / Länge / Length		Sens (3)	(4)	Re	Rm	A 5 (3)			Type / Form / Type	Sens (3)	T° °C	Pliage à froid (4)	Valeurs individuelles / Einzelwerte / Individual values			Moyenne / Mittelwerte / Average
						(kg)			(N/mm2)												
	292097	32	0"1/4	96"	240"		T		293	410	27.0										
	292098	32	0"1/4	96"	240"		T		295	413	28.0										
	292099	32	0"1/4	96"	240"		T		301	416	26.0										
	292100	32	0"1/4	96"	240"		T		287	416	23.0										
							T		294	407	26.0										
							T		298	415	24.5										
							T		295	410	27.0										
							T		294	411	24.0										

(3) Le = 5,65 √S mm — (4) Le = 50 mm — (5) Le = 200 mm

(5)	N° de référence / Referenz-Nr. / Reference No.	N° coulée / Schmelz-Nr. / Heat No.	Analyse sur produit / Stückanalyse / Check analysis																		
			% C	% P	% S	% Cr	% Ni	% Cu	% Nb												
O/Y		292097	0.789	0.022	0.014	0.073	0.259	0.007	0.001												
		292098	0.808	0.023	0.023	0.081	0.281	0.013	0.001												
CC		292099	0.736	0.019	0.015	0.066	0.274	0.013	0.001												
		292100	0.798	0.029	0.022	0.066	0.272	0.011	0.001												

SERVICE METALLURGIQUE

CLABECQ, le 13/07/92

(1) Prélèvement-Location: 1=Tête-Kopf-Top 2=Pied-Fuss-Bottom
(2) Direction: 1=Long-Längs-Longitudinal 2=Travers-Quer-Transverse
(4) Eprouvette-Entaille: P=Pliage-Faltbiegung-Bend test
(5) O/T = Oxygène pur - Sauerstoff; CC = Coulée continue - Stranggießen - Continuous casting

Nous certifions que les produits énumérés ci-dessus sont conformes aux prescriptions de la commande. Wir bestätigen hiermit, dass die vorgenannten Erzeugnisse den bestellung vorschriften entsprechen. We certify hereby that the above mentioned products are conformed with the order prescriptions.

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe. Die ergebnisse der besonderen prüfungen sind in en beigefügten ergänzenden unterlagen angegeben. The results of the special tests are indicated on the complementary documents in appendix.

Contrôle de marquage d'aspect et de dimensions : Satisfaisants. Bezeichnung, beschaffenheit und abmessung : Ohne beanstandung. Marking, inspection and measurement : Without objection.

CERTIFICAT D'USINE DIN 50049/2.2

A02

N°2942 — PAGE N° 3 / ATT NR / PAGE No — A03

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE)
A01

PLAQUES-BLECHE-PLATES
B01

SIGLE PRODUCTEUR / HERSTELLERZEICHEN / TRADE MARK — A04

B15

C.D.C. : Conforme au Cahier des Charges – Conform den Vorschriften – According specifications (1)
BL : Brut de laminage – Walzgeglüht unbearbeitet – As rolled
N : Normalisé – Normalisiert – Normalized
R : Revenu – Vergütet – Tempered
D : Détensionné – Spannungsfreiglüht – Stress relieved
LC : Laminage contrôlé – Gleichmässige Temperaturführung – Controlled rolling
B07

Organisme et/ou service de contrôle / Überwachungs-organisation / Inspection — 202

CLIENT / DESTINATAIRE – BESTELLER / EMPFÄNGER – PURCHASER / CONSIGNEE
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)
A06

N° COMMANDE COURTIER/CLIENT – MAKLER/KUNDENBESTELL NUMMER / BROKER/PURCHASER'S ORDER NUMBER
11.653
A07

N° commande Usine / Werks-auftrags Nr. / Works order No.
15520
A08

NUANCE ET SPECIFICATIONS TECHNIQUES / STAHLSORTEN UND PRUFBEDINGUNGEN / QUALITY AND SPECIFICATIONS
A36 - SA36
ASTM A36/89-ASME SA36/89
B02

ETAT DE LIVRAISON / LIEFERZUSTAND / AS DELIVERED — B04

TRAITEMENT DE REFERENCE / PROBESTREIFENDE HANDLUNG / TREATMENT OF TEST SAMPLES (1) — B03

IDENTIFICATION DU PRODUIT / ERZEUGNIS BENENNUNG / PRODUCT IDENTIFICATION			N° POSTE / POSTEN NR / ITEM NR	NOMBRE DE PLAQUES / STÜCKZAHL / NUMBER OF PLATES	DIMENSIONS – ABMESSUNGEN – DIMENSIONS			MASSE THEORIQUE / THEORETISCHES GEWICHT / THEORETICAL WEIGHT	EPROUVETTE (2)	TRACTION – ZUGVERSUCH – TENSILE TEST							RESILIENCE – KERBSCHLAGZÄHIGKEIT – NOTCH TOUGHNESS							
N° REFERENCE / REFERENZ NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	MARQUE / BRAMME / SLAB			EPAISSEUR / DICKE / THICKNESS	LARGEUR / BREITE / WIDTH	LONGUEUR / LÄNGE / LENGTH			SENS (3)	(4)	Re	Rm	A % (2) (3)			TYPE / FORM / TYPE	SENS (3)	TEMP °C	PEAU COULEE (4)	VALEURS INDIVIDUELLES / EINZELWERTE / INDIVIDUAL VALUES			MOYENNE / MITTELWERTE / AVERAGE	(2) *
B07	B08		B09	B10	B11	B12	B13	B14 (kg)	C01	C02	C04	C11 (N/mm2)	C12	C13	C14	C15	C40	C44	C45	C46	C41	C42	C43	C42	C08
290634			2		0"1/4	96"	480"			T		294	410	29.0											
290635			2		0"1/4	96"	480"			T		284	404	31.0											
										T		271	404	31.0											
										T		283	405	29.0											
290638			2		0"1/4	96"	480"			T		293	407	30.0											*
289231			3	2	2"	96"	480"			T		300	482	34.0											*
										T		280	473	34.0											

a (2) Lo = 5,65 √S mm – (2) Lo = 50 mm – (2) Lo = 200 mm

A05

(5)	N° DE REFERENCE / REFERENZ NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	ANALYSE SUR PRODUIT – STÜCKANALYSE – CHECK ANALYSIS														
				Mn %	P %	S %	C %	Si %	Al %	Nb %							
C10	B07	B08	C94	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84
D/Y	290634			0.859	0.025	0.016	0.073	0.182	0.011	0.001							
	290635			0.845	0.020	0.017	0.075	0.159	0.010	0.001							
CC	290638			0.822	0.018	0.018	0.077	0.204	0.012	0.001							
	289231			0.938	0.020	0.009	0.190	0.198	0.032	0.001							

SERVICE METALLURGIQUE

D02/203

Contrôle de marquage d'aspect et de dimensions : Satisfaisants / Bezeichnung, Besichtigung und Ausmessung : Ohne Beanstandung / Marking, inspection and measurement : Without objection

C30

CLABECQ, le 29/05/92

201

(2) Prélèvement-Location / Probelage-Lacation: 1:Tête-Kopf-Top; 2:Pied-Fuss-Bottom — C05

(3) Sens / Richtung / Direction: L:Long-Langs-Longitudinal; T:Travers-Quer-Transverse — C06

(4) C:Coeur-Kernprobe-Core sample; P:Peau-Walzfläche-Rolled surface — C07

(5) O/Y : Oxygène pur – Sauerstoff – Oxygen
CC : Coulée continue – Kontinuierliches giessen – Continuous casting
C93

Nous certifions que les produits mentionnés ci-dessus sont conformes aux prescriptions de la commande / Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen / We certify hereby that the above mentioned products are consistent with the order prescriptions
204

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe / Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben / The results of the special tests are indicated on the complementary documents in appendix
C60

STRUCTURAL

CHAPARRAL STEEL

MIDLOTHIAN 300 WARD RD.
TEXAS 76065
(214) 775-8241

CERTIFIED MATERIAL TEST REPORT

D
O

O'NEAL STEEL, INC.
P.O. BOC 98

BIRMINGHAM AL. 35201

SHIP TO

O NEAL STEEL INC
2834 CLOVIS RD

LUDBOCK TX
3035*

OMER PURCHASE ORDER NUMBER	DATE	QUANTITY	DESCRIPTION	LEN
·04616	10-JUN-92	4.68	W 4 X 13#	40.0

TED ACCORDING TO	SIZE	GRADE	PRODUCT	HEAT
STM A6-90A A6-90 A72-88C	W 4 X 13#	A36/A57250	WF BEAMS	9-9769

CHEMICAL ANALYSIS

	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	
.12	0.87	0.014	0.050	0.26	0.57	0.14	0.06	0.028	0.000	0.009	

PHYSICAL PROPERTIES

YIELD STRENGTH ~~ksi~~	TENSILE STRENGTH ~~ksi~~	SPECIMEN AREA ~~sq. in.~~	ELONGATION %	GAUGE LENGTH	BEND TEST DIA	BEND TEST RESULT	GRAIN SIZE	REDUC O AR
.5	77.7	3.727	43.5	2"	0.5D	PASS		
60.4	80.0	3.727	39.0	2"	0.5D	PASS		

hereby certify that the contents of this report are correct and accurate. All test results and operations performed by this mat anufacturer are in compliance with the requirements of the material specification, and when designated by the purchaser meet ecific applicable material requirements of section III of the A.S.M.E. Boiler and Pressure Vessel Code".

gned Tom L Harrington

Tom L. Harrington • Quality Assurance Manager
orn and Subscribed to before me, in and for Ellis County on

is ~~10th~~ day ~~JUNE,~~ ~~1992~~

(NOTARY PUBLIC)

y Commission Expires

ANIFEST 499603

(NOTARIZED ON REQUEST ONLY)

REMARKS

PO# 27230
WO# JT 41210

O NEAL STEEL INC.

P O BOX 5495

LUDBOCK TX 79417

LL MANUFACTURING PROCESSES OF THE STEEL MATERIALS IN THIS PRODUCT, NCLUDING SMELTING, HAVE OCCURRED WITHIN THE UNITED STATES IN COMPLIANCE ITH THE "BUY AMERICA" PROVISION OF THE SURFACE TRANSPORTATION SSISTANCE ACT OF 1982.

GE 1

Atlantic Steel Company

A MEMBER OF THE INCO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

TEST CERTIFICATE

DATE 08/ 92

3/8 X 2

SOLD TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

ICE BER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	% ELONG IN GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
5605 01	Z-1725 S	FLATS, 0.3750"X 2.0000" A36-90 20'00", 5000# BUNDLE	49690	52.0	73.3	30.0		.16	.72	.015	.016	.16	.27					

ORN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

I CERTIFY THE ABOVE RESULTS OF TESTS AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

FLORIDA STEEL CORPORATION

"Steel when you want it"

CHEMICAL AND PHYSICAL TEST REPORT

MADE IN U.S.A.

SHIP TO	INVOICE TO	SHIP DATE	SHIPPERS NUMBER
O'NEAL STEEL, INC. 2834 CLOVIS ROAD BOX 5495 LUBBOCK TX 79415	O'NEAL STEEL, INC. P. O. BOX 2623 BIRMINGHAM AL 35202-26	07-20-92	8582-116256
		CUST. ACCOUNT NO 36791606	

SIZE					GRADE		SPECIFICATION							S.O. NO.		CUST. P.O. NUMBER			
HEAT LD NO	C	MN	P	S	V	SI	CR	CU	NI	SN	AL	MO		YIELD PT LBS/SQ IN	TENSILE LBS/SQ IN	% ELONG 8 IN	BEND	DEF	% LIGHT HEAVY
C 4 X 5.4#					A36		ASTM A36-91					ASME-SA36		2013173		7-17424			
V2-1989	.15	.69	.01	.03										48270	72169	32.0	OK		
C 4 X 5.4#					A36		ASTM A36-91					ASME-SA36		2013173		7-17424			
V2-1989	.15	.69	.01	.03										48742	72327	31.4	OK		
A 3 X 3 X 1/4					A36		ASTM A36-91					ASME-SA36		2013173		7-17424			
V2-2486	.15	.73	.01	.04										52586	71724	29.0	OK		
A 3 X 3 X 1/4					A36		ASTM A36-91					ASME-SA36		2013173		7-17424			
V2-2486	.15	.73	.01	.04										52777	72222	29.4	OK		
A 1 1/2 X 1 1/2 X 3/16					A36		ASTM A36-91					ASME-SA36		2011544		7-13452			
V2-2827	.14	.61	.01	.04										49056	68396	26.0	OK		
A 1 1/2 X 1 1/2 X 3/16					A36		ASTM A36-91					ASME-SA36		2011544		7-13452			
V2-2827	.14	.61	.01	.04										48113	66981	27.5	OK		
A 2 X 2 X 3/8					A36		ASTM A36-91					ASME-SA36		2009381		7-08587			
V2-2736	.15	.69	.01	.05										46828	70522	32.0	OK		
A 2 X 2 X 3/8					A36		ASTM A36-91					ASME-SA36		2009381		7-08587			
V2-2736	.15	.69	.01	.05										47201	71455	31.5	OK		
A 3 X 3 X 3/16					A36		ASTM A36-91					ASME-SA36		2013396		7-57936			
V2-2530	.14	.66	.01	.03										48394	68119	32.0	OK		
A 3 X 3 X 3/16					A36		ASTM A36-91					ASME-SA36		2013396		7-57936			
V2-2530	.14	.66	.01	.03										47706	67660	34.0	OK		

THIS MATERIAL, INCLUDING THE BILLETS, WAS PRODUCED AND MANUFACTURED IN THE UNITED STATES OF AMERICA.

A. J. TURNER
QUALITY ASSURANCE MGR.
MILL GROUP

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY

2 X 2 X 3/8 Angle

FLORIDA STEEL CORPORATION

"Steel when you want it"

CHEMICAL AND PHYSICAL TEST REPORT

MADE IN U.S.A.

SHIP TO	INVOICE TO	SHIP DATE	SHIPPERS NUMBER
O'NEAL STEEL, INC. 2834 CLOVIS ROAD BOX 5495 LUBBOCK TX 79415	O'NEAL STEEL, INC. P. O. BOX 2623 BIRMINGHAM AL 35202-26	09-17-92	8582-119173
		CUST. ACCOUNT NO. 36791606	

SIZE					GRADE		SPECIFICATION							S.O. NO.		CUST. P.O. NUMBER			
HEAT LD NO.	C	MN	P	S	V	SI	CR	CU	NI	SN	AL	MO		YIELD PT LBS/SQ IN	TENSILE LBS/SQ IN	ELONG % IN	BEND	DEF.	% LIGHT HEAVY
A 1 1/2 X 1 1/2 X 1/8					A36		ASTM A36-91				ASME-SA36			2014989		Z12601			
V2-2784	.15	.70	.01	.04										56428	75714	25.0	OK		
A 1 1/2 X 1 1/2 X 1/8					A36		ASTM A36-91				ASME-SA36			2014989		Z12601			
V2-2784	.15	.70	.01	.04										55000	74285	25.6	OK		
A 7 X 7 X 7/16					A36		ASTM A36-91				ASME-SA36			2018465		Z23484			
V2-2520	.12	.69	.02	.04										46736	65732	38.0	OK		
A 7 X 7 X 7/16					A36		ASTM A36-91				ASME-SA36			2018465		Z23484			
V2-2520	.12	.69	.02	.04										45474	64870	38.5	OK		
C 6 X 8.2#					A36		ASTM A36-91				ASME-SA36			2018465		Z21624			
V2-3508	.15	.81	.01	.03										55125	73012	29.5	OK		
A 7 X 7 X 1/4					A36		ASTM A36-91				ASME-SA36			2018465		Z57950			
V2-2488	.13	.69	.02	.04										48611	67881	35.0	OK		
A 7 X 7 X 1/4					A36		ASTM A36-91				ASME-SA36			2018465		Z57950			
V2-2488	.13	.69	.02	.04										49300	68831	33.8	OK		

JAN 91

Issued: Rev: 9-21-92

THIS MATERIAL, INCLUDING THE BILLETS, WAS PRODUCED AND MANUFACTURED IN THE UNITED STATES OF AMERICA.

A. J. TURNER
QUALITY ASSURANCE MGR.
MILL GROUP

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY

· Z-57945 C 6X1[illegible]

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

WE HEREBY CERTIFY THAT THE FOLLOWING DATA IS A TRUE COPY FROM TESTS PERFORMED IN OUR LABORATORY.

The following tests conform to the requirements of the specifications listed.

DAN SCHACHT 8/ 7/92

QUALITY CONTROLMANAGER

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
01391	AU 2.5X2X1/4	ASTM A36-89	.15	0.87	.024	.036	.16	.43	0.24	0.17	.039	.000	.0040	.003
87196	CH 6X10.5	ASTM A36-89	.17	0.68	.009	.031	.26	.37	0.23	0.23	.049	.004	.0020	.001
89624	SQ 3/4	ASTM A36-89	.16	0.82	.009	.033	.17	.50	0.11	0.23	.053	.000	.0020	
89625	SQ 3/4	ASTM A36-89	.15	0.76	.006	.028	.19	.46	0.10	0.22	.054	.000	.0020	
87196	CH 6X10.5	ASTM A36-89	.17	0.68	.009	.031	.26	.37	0.23	0.23	.049	.004	.0020	.001
01476	#8 REBAR	ASTM A615-89 GRADE 60 AASHTO M31	.42	0.97	.008	.032	.23	.42	0.08	0.17	.041	.013	.0020	.002

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
01391	1	52100	74800	30.0		3.570	06/25/92
87196	1	51800	74400	39.0		10.400	08/28/91
89624	1	51500	73500	22.0		1.900	01/10/92
89625	1	51500	73500	22.0		1.900	01/10/92
87196	1	51800	74400	39.0		10.400	08/28/91
01476	1	69000	106300	12.0	OK	2.600	06/26/92

REMARKS: P.O. Z-16717; Z-19477; Z-19076 ; Z-57945 & BZ-42393
THIS STEEL IS MELTED & MANUFACTURED IN THE USA

Atlantic Steel COMPANY

A MEMBER OF THE IVACO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

TEST CERTIFICATE

DATE 05/23/92

SOLD TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

INVOICE NUMBER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	ELONG 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
036447 -001	Z-0799 S	FLATS, 0.2500" X 4.0000" 55 KSI 20'00", 5000# STACKED BUNDLE	48832	65.6	87.6	28.0		.20	.88	.017	.022	.21	.37				.023	

MATERIAL MELTED AND MANUFACTURED IN THE USA

Z-0799B

SWORN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

19

I CERTIFY THE ABOVE RESULTS OF TEST AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

CERTIFIED MILL TE[illegible] REPORT

SOLD TO
O'NEAL STEEL *BIRMINGHAM
PO BOX 96
BIRMINGHAM AL 35201

SHIP TO
O'NEAL STEEL *BIRMINGHAM
10848 LUNA ROAD
DALLAS TX

JACKSON, MS STEEL DIV
FOURTH STREET OFF FLOWOOD DR.
JACKSON MS 36613

DATE: 08/18/92
B.L. NO.: B4- 69867
LOAD NO.: B4- 18261

PO# X-16006 X-17704 2-20833

HEAT NO.*	DESCRIPTION	PHYSICAL TESTS					CHEMICAL TESTS							
		YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WT% DEF	C / Ni	Mn / Cr	P / Mo	S / V	Si / B	Cu	C.E
559213668	1/4x3" F1 20' (A36) ASTM A36	50,500	71,500	25.0	OK	-4.9%	.15 NA	.700 NA	.014 NA	.035 NA	.16 NA		
559213692	1/4x4" F1 20' (A36) ASTM A36	45,800	65,900	28.0	OK	-4.3%	.15 NA	.600 NA	.010 NA	.038 NA	.19 NA		
559310572	1/2x3" F1 20' (A36) ASTM A36-91	46,700	68,700	31.0	OK	-2.9%	.14 NA	.650 NA	.021 NA	.038 NA	.11 NA		
559310573	1/2x3" F1 20' (A36) ASTM A36-91	46,300	67,600	33.0	OK	-2.8%	.15 NA	.720 NA	.018 NA	.038 NA	.15 NA		

REC'D O'NEAL STEEL DALLAS
AUG 19 1992
ORIGINAL

CERTIFIED MILL TEST REPORT

SOLD TO
D'NEAL STEEL *BIRMINGHAM
PO BOX 98
BIRMINGHAM AL 35201

SHIP TO
D'NEAL STEEL *BIRMINGHAM
2834 CLOVIS ROAD
LUBBOCK TX

JACKSON, MS STEEL DIV
FOURTH STREET OFF FLOWOOD DR.
JACKSON MS 36613

DATE: 08/14/92
B.L.NO.: B4- 69790
LOAD NO.: B4- 18214

P.O. # Z-17620
Z-59009 F 1/4X2

HEAT NO.	DESCRIPTION	PHYSICAL TESTS YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WT% / DEF	CHEMICAL TESTS C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu	C.E.
B49215924	1/4x2" F1 20' (A36) ASTM A36-90	44,400	65,400	28.0	OK		.16 / NA	.500 / NA	.005 / NA	.022 / NA	.18 / NA	NA	
B49310382	3/4" Rd 20' (A36) ASTM A36-90	56,689	74,830	20.0	OK		.18 / NA	.670 / NA	.016 / NA	.029 / NA	.20 / NA	NA	

REVERSE FOR PLANT OF ORIGIN

Atlantic Steel Company

A MEMBER OF THE IVACO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

TEST CERTIFICATE

DATE 06 /92

SEND TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

VOICE NUMBER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	% ELONG. 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
30167	Z-0270	FLATS, 0.7500"X 4.0000" 55 KSI																
001	1	20'00", 9000# STACKED BUND	48782	60.0	82.7	31.0		.20	.94	.007	.028	.19	.22				.032	

33 16

MATERIAL MELTED AND MANUFACTURED IN THE USA

3/4 x 4 Flat

WORN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

_____ 19 _____

I CERTIFY THE ABOVE RESULTS OF TESTS AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

SIGNED: [signature]

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

The following tests conform to the requirements of the specifications listed.

WE HEREBY CERTIFY THAT THE FO[illegible]ING DATA IS A TRUE COPY FROM TESTS PERFO[illegible]ED IN OUR LABORATORY.

DAN SCHACHT — 12/19/91
QUALITY CONTROL MANAGER

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
8780	AE 2.5X1/4	ASTM A36-89	.15	0.78	.008	.034	.24	.46	0.12	0.17	.037	.000	.0020	
8202	AE 2X3/8	ASTM A36-89	.15	0.85	.008	.029	.25	.38	0.19	0.17	.052	.000	.0010	
5243	FL 3/4X6	A36 MODIFIED	.21	0.83	.009	.042	.23	.41	0.11	0.18	.035	.004	.0020	.001
7094	FL 3/4X6	A36 MODIFIED	.21	0.80	.009	.034	.22	.43	0.16	0.17	.037	.001	.0010	.001
8175	AE 2X1/4	ASTM A36-89	.13	0.87	.012	.029	.26	.60	0.18	0.21	.051	.000	.0020	
8176	AE 2X1/4	ASTM A36-89	.14	0.80	.009	.029	.26	.47	0.12	0.17	.046	.000	.0010	
7105	FL 3/4X5	A36 MODIFIED	.22	0.80	.007	.030	.23	.47	0.13	0.17	.041	.004	.0010	.001

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
8780	1	52900	73100	31.0		4.045	11/16/91
8202	1	51400	75000	30.0		4.560	10/19/91
5243	1	52200	79400	25.0		15.150	04/27/91
7094	1	51200	80000	25.0		15.200	08/18/91
8175	1	45800	72900	32.0		3.150	10/20/91
8176	1	51200	72700	30.0		3.140	10/20/91
7105	1	54400	81300	26.0		12.590	08/20/91

3/4X5 A36 mod flat

REMARKS: THIS STEEL IS MELTED & MANUFACTURED IN THE USA

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

WE HEREBY CERTIFY THAT THE [illegible] IS A TRUE COPY FROM TESTS PERFORMED IN OUR LABORATORY.

The following tests conform to the requirements of the specifications listed.

DAN SCHACHT
QUALITY CONTROL MANAGER

4/29/92

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
89511	AU 2X1.5X3/16	ASTM A36-89	.15	0.79	.011	.033	.18	.38	0.11	0.15	.036	.000	.0020	
K1017	AE 2X1/8	ASTM A36-89	.16	0.69	.020	.036	.22	.33	0.13	0.09	.010	.004	.0020	.002
K1056	AE 2X1/8	ASTM A36-89	.15	0.66	.017	.037	.24	.36	0.12	0.11	.020	.003	.0020	.003
88202	AE 2X3/8	ASTM A36-89	.15	0.85	.008	.029	.25	.38	0.19	0.17	.052	.000	.0010	
00195	AE 2.5X3/8	ASTM A36-89	.18	0.74	.008	.033	.21	.51	0.06	0.14	.032	.000	.0020	
00222	AE 2.5X1/4	ASTM A36-89	.19	0.73	.007	.028	.23	.52	0.12	0.14	.046	.001	.0020	.001

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
89511	1	49800	71200	29.0		2.060	01/02/92
K1017	1	55300	73800	29.5		1.600	01/26/92
K1056	1	53900	71900	24.0		1.640	01/25/92
88202	1	51400	75000	30.0		4.560	10/19/91
00195	1	54200	75200	30.0		5.830	04/21/92
00222	1	54000	77300	32.0		4.050	04/21/92

MAY - 7 1992

REMARKS: THIS STEEL IS MELTED & MANUFACTURED IN THE USA

PO# 27310
WO# IT41210

middle east tube co.ltd.

IMPORT / EXPORT DEPT.
P.O.B 82 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 8-268382 - 4 FAX: 8-221186

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 89/J/1-183 PAGE 1

P H Y S I C A L P R O P E R T I E S

TUBE DIMENSION	YIELD POINT	U.T.S.	ENLONGATION	HEAT NO.
18" X 0.375	52017	68334	40	2483
18" X 0.375	57736	72931	32	2485
18" X 0.375	59167	74195	33	2486
18" X 0.375	56364	70712	37	2488
18" X 0.375	57206	72827	33	2489
18" X 0.375	53208	64462	34	2490
18" X 0.375	56742	76653	31	2491
18" X 0.375	55391	65465	33	2492
18" X 0.375	62406	76499	30	2493
18" X 0.375	58829	73783	35	2494

RAMLA, 23/04/89

middle east tube co.ltd.

IMPORT / EXPORT DEPT.
P.O.B 62 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 8-258382 - 4 FAX: 8-221199

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 89/J/1-183 PAGE 1.

C H E M I C A L A N A L Y S I S

SE DIMENSIONS	% C	% MN.	% SI.	% P	% S	AL%	HEAT NO.
3" X 0.375	0.160	0.710	0.160	0.014	0.012	0.004	2483
3" X 0.375	0.160	0.760	0.270	0.014	0.013	0.006	2485
3" X 0.375	0.160	0.780	0.250	0.013	0.015	0.006	2486
" X 0.375	0.140	0.640	0.200	0.008	0.021	0.005	2488
3" X 0.375	0.160	0.690	0.270	0.008	0.025	0.005	2489
3" X 0.375	0.160	0.700	0.240	0.013	0.017	0.004	2490
3" X 0.375	0.150	0.750	0.300	0.006	0.027	0.005	2491
3" X 0.375	0.160	0.690	0.220	0.009	0.022	0.004	2492
3" X 0.375	0.160	0.740	0.200	0.005	0.021	0.005	2493
0.375	0.160	0.770	0.240	0.015	0.016	0.012	2494

RAMLA, 23/04/89

middle east tube co.ltd.

IMPORT / EXPORT DEPT.

P.O.B 62 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 8-268392 - 4 FAX: 8-221199

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 1837/00

ER NO. : 89/J/1-183 TEST PSI : 1490

ER.	WALL THICK.	KG/ MTR	LENGTH MTR	LENGTH FT	TOTAL M.TON	NO. OF PIECES	REMARKS
	.375	105.100	3150.36	10336.33	325.742	246	RED+RED
	.375	105.100	269.24	883.38	27.948	23	GREEN+GREEN

02/04/89

2 - 8200

Sobre de aço
PERSICO PIZZAMIGLIO

Rod. Pres. Dutra, Km 218 - Tel: (011) 913-4711/3223 - Telex 1165123 - CEP 07136
Guarulhos - SP - BRASIL - C.G.C. 61.081.613/0001-10 - I.E. 336.043.605.116
Fax (011) 913-9484 - Endereço Telegráfico: MONTUBOS

CERTIFICADO DE ENSAIOS E ANÁLISES
MILL TEST CERTIFICATE

CEA/MTC Nº 9561
ORIGINAL

FOLHA/SHEET 1

DESCRIÇÃO/DESCRIPTION
ERW LINE PIPE / BPE - GR A - SCH 40.

NOTA FISCAL Nº/EXPORT Nº 6211

LOTE Nº/LOT Nº 753602

PACOTES/BUNDLES 22

Nº DE PEÇAS/Nº PIECES 154

PESO APROXIMADO/APPROXIMATE WEIGHT (KG) 52844

COMPRIMENTO TOTAL/TOTAL LENGHT 6160 FEET

DIMENSÕES/DIMENSIONS
6"X0.280X18.97LBS/FTX40FT

ESPECIFICAÇÕES/SPECIFICATIONS
API 5L GRADE A

ORDEM DE COMPRA Nº/PURCHASE ORDER Nº

CARTA DE CRÉDITO/LETTER OF CREDIT
920121IM295

ORDEM DE PRODUÇÃO Nº/WORKING ORDER Nº 168207 1

DRL
6 Sch 40 4534 Welded

TRATAMENTO TÉRMICO/HEAT TREATMENT
TEMPERATURA/TEMPERATURE
LINHA DE SOLDA/WELD LINE
N

RESULTADO DOS TESTES/TEST RESULTS

BOBINA Nº COIL NUMBER	PROPRIEDADES FÍSICAS/PHYSICAL PROPERTIES				ANÁLISE QUÍMICA/CHEMICAL ANALYSIS (%)										
	LIMITE ESCOAMENTO YP PSI	LIMITE RESISTÊNCIA TS PSI	ALONGAMENTO ELONGATION	DUREZA HARDNESS	x 100 C	Mn	Si	Ni	Cr	Mo	CEV	x 1000 P	S	Al	Nb
501557	46490	51760	41,2	-	13	38	-	-	-	-	-	13	3	-	-
501560	39816	50054	43,4	-	5	32	-	-	-	-	-	13	15	-	-
501573	55742	66591	33,2	-	19	67	-	-	-	-	-	15	9	-	-
501574	52045	61714	35,0	-	4	30	-	-	-	-	-	12	15	-	-
501575	38394	48265	45,8	-	4	31	-	-	-	-	-	12	19	-	-
501577	42375	49527	42,2	-	5	30	-	-	-	-	-	10	17	-	-
501581	61714	74228	33,0	-	14	64	22	-	-	-	-	15	12	-	-
501587	50054	57760	37,6	-	3	32	-	-	-	-	-	15	13	-	-

ENSAIO HIDROSTÁTICO/HYDROSTATIC
1820 PSI
ENSAIO DESTRUTIVO/DESTRUCTIVE
ENSAIO MAGNÉTICO/ELECTROMAGNETIC Y
ENSAIO MAGNÉTICAS/MAGNETIC PARTICLE
CARACTERIZAÇÃO DA SOLDA/WELD
ANÁLISE DE PRODUTO/PRODUCT ANALYSIS
ENSAIO DE DUREZA/HARDNESS
ENSAIO DE IMERSÃO/IMMERSION TEST
ENSAIO DE IMPACTO/IMPACT
ENSAIO DE TRAÇÃO/TENSILE
ENSAIO DE DOBRAMENTO/BENDING

OBSERVAÇÕES/REMARKS
DUCTILITY

CERTIFICAMOS PELO PRESENTE QUE O MATERIAL FOI TESTADO EM NOSSO LABORATÓRIO, DE ACORDO COM AS ESPECIFICAÇÕES TÉCNICAS, RESULTANDO NOS VALORES ACIMA REFERIDOS.
WE HEREBY CERTIFY THAT THE DESCRIBED MATERIAL WAS TESTED IN OUR LABORATORY ACCORDING TO THE TECHNICAL STANDARDS AND YIELDED THE RESULTS ABOVE MENTIONED

GUARULHOS, APRIL 13 1992

SALVATORE DI MINO
GERENTE CONTROLE QUALIDADE/QUALITY CONTROL MANAGER

OCT 15 '92 09:51 O'NEAL STEEL LUBBOCK P.3

Z-52890

ACEROTEX INTERNATIONAL

ORDER Nº ATI-914017

SPECIFICATION ASTM-A-53-A

KIND OF ARTICLE CARBON STEEL (STEEL 3" NOM SCH-40)

N E/L

TUNA

91 772

Villacero

TUBERIA NACIONAL, S. A.

INSPECTION CERTIFICATE

HEAT Nº	DIMENSION			HYDROSTATIC	WEIGHT	CHEMICAL COMPOSITION %								TENSION TEST		
	NOM. (INCHES)	THICKNESS (INCHES)	LENGTH FT (MTS)	TESTED PSI (KG/CM.²)	LBS. (KGS)	C x 1/100	Mn x 1/100	P x 1/1000	S x 1/1000	SI x 1/100				Y.P. PSI KG/CM²	T.S. PSI KG/CM²	E.L. %
1104271	3	0.216	21	2200		13	44	11	21	0				38755	48536	29
				155										2724	3412	
			MPA	15.17								MPA		267	334	

3 sch 40. 453 welded

OCT 15 '92 09:52 O'NEAL STEEL LUBBOCK P.4

P.O. BOX 10232
LUBBOCK, TEXAS 79408

FOR: SHIELDED METAL ARC WELDING, CARBON STEEL (P-Number 1)

SCOPE

1. This welding procedure specification covers the welding of carbon steel (P-1) in the fabrication of API 650 storage tanks.

PROCESS: Shielded metal arc.

BASE METAL:

The steel base metal shall comply with one of the ASTM specifications and grades listed in the ASME Code under (P-1).

FILLER METAL:

The filler metal shall comply with ASME Material Specification Part C E6010 (F3).

PREPARATION OF BASE METAL AND ALIGNMENT OF EDGES:

1. The edges to be joined shall be perpared in accordance with a single or double "V" Groove. Gas cutting may be used.

2. Edges to joined and all surfaces within 1/2" of the welding edge shall be thoroughly cleaned immediately prior to welding.

3. Abutting edges of plates at longitudinal joints shall not, after welding, have an offset at any point in excess of one-quarter of the plate thickness with a maximum permissible offset of 1/8", except that plates less than 1/4" in thickness, the offset may be as much as 1/16".

4. Abutting edges circumferential joints shall be aligned with the following tolerances;

For plates up to 1/4"	1/16"
For plates over 1/4" to 3/4"	25% of plate thickness
For plates over 3/4" to 1½"	3/16"
For plates over 1½"	12 1/2% of plate thickness, but not over 1/4"

ELECTRIC CURRENT:

Direct current shall be used with electrode positive and the base metal negative. (Reverse Polarity).

WELDING TECHNIQUE:

1. The welding technique shall be substantially as shown on the attached sketches.

2. (a) When making double-welded joints the reverse (root) side must be gouged,chipped,or ground out to sound metal before the finishing bead is deposited.

QW-482 (Back)

WPS No. SMI 1-1 Rev. 0

POSITIONS (QW-405)
Position(s) of Groove 6G
Welding Progression: Up E7018 Down E6010
Position(s) of Fillet ALL

POSTWELD HEAT TREATMENT (QW-407)
Temperature Range NA
Time Range

PREHEAT (QW-406)
Preheat Temp. Min. 70°F
Interpass Temp. Max. 500°F
Preheat Maintenance As Required
(Continuous or special heating where applicable should be recorded)

GAS (QW-408)
Shielding Gas(es)
Percent Composition (mixtures)
Flow Rate
Gas Backing
Trailing Shielding Gas Composition

ELECTRICAL CHARACTERISTICS (QW-409)
Current AC or DC DC Polarity Reverse
Amps (Range) 120-190 Volts (Range) 19-26
(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type NA
(Pure Tungsten, 2% Thoriated, etc.)

Mode of Metal Transfer for GMAW NA
(Spray arc, short circuiting arc, etc.)

Electrode Wire feed speed range NA

TECHNIQUE (QW-410)
String or Weave Bead String & Weave
Orifice or Gas Cup Size NA
Initial and Interpass Cleaning (Brushing, Grinding, etc.) Grinding & Brush
Method of Back Gouging Air Arc and Grinding
Oscillation No pass greater than ½"
Contact Tube to Work Distance NA
Multiple or Single Pass (per side) Multipass
Multiple or Single Electrodes Single
Travel Speed (Range) 8 to 10 Inches Per Minute
Peening Not Allowed
Other

Weld Layer(s)	Process	Filler Metal Class	Filler Metal Dia.	Current Type Polar.	Current Amp. Range	Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
1	SMAW	E6010	1/8"	Rev.	120-190	19-26	8-10 IPM	
2	SMAW	E7018	1/8	Rev.	120-190	19-26	6-8 IPM	
3-4-5	SMAW	E7018	5/32"	Rev.	120-190	19-26	8-10 IPM	
CAP	SMAW	E7018	1/8"	Rev.	120-190	19-26	6-8 IPM	

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)

(See QW-201.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name SCOTT MFG. INC. By: James H. Tipton

Welding Procedure Specification No. SMI 1-1 Date 8-18-90 Supporting PQR No.(s) SMI 1-1A

Revision No. 0 Date 8-18-90

Welding Process(es) SMAW Type(s) Manual

(Automatic, Manual, Machine, or Semi-Auto.)

JOINTS (QW-402)

Joint Design GROOVE

Backing (Yes) ____ (No) N

Backing Material (Type) ____

(Refer to both backing and retainers.)

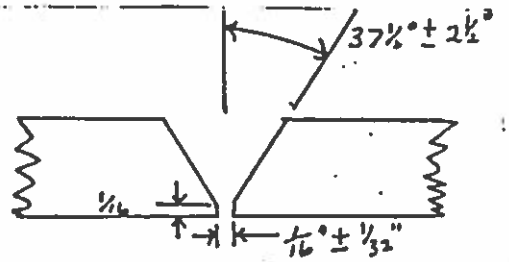
☐ Metal ☐ Nonfusing Metal

☐ Nonmetallic ☐ Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

Details



*BASE METALS (QW-403)

P-No. 1 Group No. 1 to P-No. 1 Group No. 1

OR

Specification type and grade A106 Gr B

to Specification type and grade A106 Gr B

OR

Chem. Analysis and Mech. Prop. ____

to Chem. Analysis and Mech. Prop. ____

Thickness Range:

Base Metal: Groove .1876 to .864" Fillet Unlimited

Pipe Dia. Range: Groove 6 5/8" Fillet Unlimited

Other ____

*FILLER METALS (QW-404)		
Spec. No. (SFA)	5.1	5.1-5.5
AWS No. (Class)	E6010	E7018
F-No.	3	4
A-No.	1	1
Size of Filler Metals	1/8"	1/8"--5/32"
Deposited Weld Metal	.125"	.307"
Thickness Range:	.0625" to .250"	.0625- .614"
Groove	ALL	ALL
Fillet	ALL	Unlimited
Electrode-Flux (Class)	Iron Oxide	Low Hydrogen
Flux Trade Name		
Consumable Insert		
Other		

*Each base metal-filler metal combination should be recorded individually.

This form (E00006) may be obtained from the Order Dept., ASME, 345 E. 47 St., N.Y., N.Y. 10017

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)
(See QW-201.2, Section IX, ASME Boiler and Pressure Vessel Code)
Record Actual Conditions Used to Weld Test Coupon.

Company Name SCOTT MANUFACTURING, INC.
Procedure Qualification Record No. SA-1A Date 9-5-90
WPS No. SA-1
Welding Process(es) SMAW
Types (Manual, Automatic, Semi-Auto.) Manual

JOINTS (QW-402)

Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec. SA 516
Type or Grade 70
P-No. 1 to P-No. 1
Thickness of Test Coupon .375"
Diameter of Test Coupon NA
Other

POSTWELD HEAT TREATMENT (QW-407)
Temperature NA
Time
Other

GAS (QW-408)
Type of Gas or Gases
Composition of Gas Mixture
Other

FILLER METALS (QW-404)	
SFA Specification	5.1
AWS Classification	E6010
Filler Metal F-No.	3
Weld Metal Analysis A-No.	1
Size of Filler Metal	1/8"--5/32"
Other	
Deposited Weld Metal	.500"

ELECTRICAL CHARACTERISTICS (QW-409)
Current DC
Polarity Reverse
Amps. 90-140 Volts 22-26
Tungsten Electrode Size
Other

POSITION (QW-405)
Position of Groove 1G
Weld Progression (Uphill, Downhill)
Other

TECHNIQUE (QW-410)
Travel Speed 8-10-IPM
String or Weave Bead String & Weave
Oscillation
Multipass or Single Pass (per side) Multipass
Single or Multiple Electrodes Single
Other No pass greater than 1/2"

PREHEAT (QW 406)
Preheat Temp. None
Interpass Temp. 450°F
Other

This form (E00007) may be obtained from the Order Dept., ASME, 345 E. 47th St., New York, N.Y. 10017

QW-483 (Back)

PQR No. SA-1A

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load lb	Ultimate Unit Stress psi	Type of Failure & Location
T-1	1.043	.374	.390	27,500	70,513	Base Metal
T-2	1.035	.373	.386	27,250	70,596	Base Metal

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
QW-463.1(d) Root 1	Accepted
QW-463.1(d) Root 2	Accepted
QW-463.1(d) Face 1	Accepted
QW-463.1(d) Face 2	Accepted

Toughness Tests (QW-170)

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Values	Lateral Exp. % Shear	Lateral Exp. Mils	Drop Weight Break	Drop Weight No Break

Fillet-Weld Test (QW-180)

Result — Satisfactory: Yes _____ No _____ Penetration into Parent Metal: Yes _____ No _____

Macro—Results _____

Other Tests

Type of Test _____

Deposit Analysis _____

Other _____

Welder's Name Tim Kirksey Clock No. 423-76-1547 Stamp No. _____

Tests conducted by: Longview Inspection, Inc. Laboratory Test No. 260-90

We 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 IX of the ASME Code.

AWS QC 1 JAMES H. TIPTON 89120151 CWI

Manufacturer SCOTT MANUFACTURING, INC.

9-5-90

By William A. Basom

(Form of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

PERMIAN NON-DESTRUCTIVE TESTING

QUALIFICATION

TEST METHOD		RT		UT		MT		PT		HT	
NAME: Miller, Morris J.		I	II	I	II	I	II	I	II	I	II
EXAMS	GENERAL/30%	/ 26.70		/		/ 25.50		/ 29.25		/	
	SPECIFIC/30%	/ 26.00		/		/ 22.50		/ 30.00		/	
	PRACTICAL/40%	/ 36.00		/		/ 34.80		/ 38.00		/	
	COMPOSITE	/ 86.70		/		/ 82.80		/ 97.25		/	
CERTIFIED BY / LEVEL		DFM III				DFM III		DFM III			
CERTIFICATION DATE		10-17-90				10-17-90		10-17-90			
RECERTIFICATION DUE		10-17-91				10-17-91		10-17-91			
DOCUMENTED EXPERIENCE		On File				On File		On File			
PRIOR CERTIFICATION LEVEL		II				II		II			
APPOINTMENT BY LETTER, III											

SNELLEN J-2 AND J-1 TEST	ACCEPT: X CONDITIONS: None DATE: 10-17-90
COLOR PERCEPTION TEST	ACCEPT: X CONDITIONS: None DATE: 10-17-90

DATE EMPLOYED: 1-25-88 ASSIGNMENT TO NDT: 1-25-88

EDUCATION LEVEL: High Scholl/Tech EXPERIENCE TIME: 9.5 Years

LIMITATIONS: Recertified RT, MT, PT only

THIS INDIVIDUAL HAS SUCCESSFULLY COMPLETED THE ABOVE EXAMINATIONS AND HAS QUALIFIED FOR THE LEVEL IN THE NONDESTRUCTIVE TEST METHOD INDICATED ABOVE AS PER PERMIAN NON-DESTRUCTIVE TESTING'S WRITTEN PRACTICE. DOCUMENTATION SHALL BE ON FILE FOR REVIEW UPON REASONABLE REQUEST.

AUTHORIZED EXAMINER / DATE

Jean Dunagin 10-17-90

PERMIAN NON-DESTRUCTIVE TESTING

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

P.O. Box 176
La Grange, Texas 78945
(409) 242-3117

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

No. 10269

Pg. 1 of 1

Customer: SMI Date: 10-14-92 Technician: M M Level: II Assoc. N/A Level: N/A

Work Order: Serial No: Code: API 650 % No.: E-1 White Report

RADIOGRAPHIC
Curies: Screens:
Exposure Arrangement:
Material Thickness:
Penetrameter: S. F.
Film Type:
Film Qty:
Film Qty:
Film Qty:

ULTRASONIC
Equipment:
Transducer Type:
Size: Freq.
Calibration
Material: Ampl.
Hole Size: Dist.

MAGNETIC PARTICLE
Equipment: Manual Yoke Y-6
Material Type: C/S Thickness:
Amp: 6 N/A
Predescing: 2 1/2" - 7"
AC/DC: AC
Surface Prep: As welded
Type Used: Wet Fluorescent
Particle Used (lbs.): 10 Lbs

DYE PENETRANT
Type Cleaner:
Type Penet:
Type Devel:
Surface Prep:
Dwell Time:
Material Type: Thickness:

	Weld No.	By No.	Location	Pipe Size	IND Within Code Yes	IND Within Code No	CUST Within Code Yes	CUST Within Code No	Defects & Location		REMARKS
1	W-1			6"	✓						
2	W-2			3"							
3	W-3			3"							
4	W-4			6"							
5	W-5			6"							
6	W-6			3"							
7	W-7			3"							
8	W-8			6"							
9	W-9			36"							
10	W-10			30"							
11	W-11			36"							
12	W-12			30"							
13	W-13			36"							
14	W-14			30"							
15	W-15			6"							
16	W-16			3"							
17	W-17			3"							
18	W-18			6"							
19	W-19			3"							
20	W-20			3"							
21	W-21			6"							
22	W-22			6"							
23	W-23			30"							
24	W-24			30"							
25	W-25			30"							
26	W-26			30"							
27	W-27			15"							
28	W-28			15"							
29	W-29			24"							
30	W-30			6"							
31	W-31			3"							
32	W-32			3"							
33	W-33			3"							
34	W-34			6"							
35	W-35			24"							
36	W-36			18"							
37	W-37			15"							
38	W-38			18"							
39	W-39			15"							W-41 6" ✓
40	W-40			24"	✓						W-42 3" ✓

Test(s) Interpreted By: M. Mills Level: II P.O. #:

Number of Testing Personnel: 1 Misc. Info.: # Welds: 42 Per Diem N/A Miles 250 RT

Hours Worked: 5 PM to 4 AM Hours: RT 8 Hours: OT 3 Total Hrs 11 Job Location Wolfforth, Texas

NOTICE: THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PNDT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PNDT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS. PNDT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMERS REPRESENTATIVE'S SIGNATURE VERIFIES TIME AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION UNLESS OTHERWISE SPECIFICALLY NOTED.

UNDER NO CIRCUMSTANCES DOES PNDT GUARANTEE THE QUALITY OR USABILITY OF ANY ITEM, MATERIAL, OR PRODUCT INSPECTED OR TESTED. NO WARRANTIES ARE EXPRESSED OR IMPLIED, AND IN NO EVENT SHALL THE LIABILITY OF PNDT WITH RESPECT TO ITEMS INSPECTED INCLUDING ANY LIABILITY PERTAINING TO SELECTION AND/OR RESULTS OF THESE SAME TESTS EXCEED THE CHARGE OF PNDT FOR THE INSPECTION OF SUCH ITEMS.

Agreed and Accepted: William A. Brown Date: 10-14-92

TERMS AND ABBREVIATIONS

I.P.	INADEQUATE PENETRATION	S.P.	SPHERICAL POROSITY
I.P.D.	INADEQUATE PENETRATION DUE TO HIGH-LOW	C.P.	CLUSTER POROSITY
		P.P.	PIPING POROSITY
I.C.	INTERNAL CONCAVITY	H.B.	HOLLOW BEAD
I.F.	INCOMPLETE FUSION	C.R.	CRACKS
I.F.C.L.	INCOMPLETE FUSION DUE TO COLD LAP	A.D.	ACCUMULATION OF DISCONTINUITIES
B.T.	BURN THROUGH	I.U.	INTERNAL UNDERCUT
E.S.I.	ELONGATED SLAG INCLUSIONS	O.U.	OUTSIDE UNDERCUT
I.S.I.	ISOLATED SLAG INCLUSIONS		

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

P.O. Box 176
La Grange, Texas 78945
(409) 242-3117

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

No. 10274

Pg. 3 of 4

Customer: SMI Date: 10-16-92 Technician: MM Level: II Asme: BC Level: II
Work Order: CT-3 Serial No: 451-3 Code: API 650 % Rig #: 4562

RADIOGRAPHIC
Curies: 50 Screens: .010
Exposure Arrangement: B
Material Thickness: 11 - 3/16"
Penetrameter: 12 S. X F.
Film Type: D-7
Film Qty: 1 - 3½" X 10"
Film Qty:
Film Qty:

ULTRASONIC
Equipment:
Transducer Type:
Size: Freq.:
Calibration:
Material: Ampl.:
Hole Size: Dist.:

MAGNETIC PARTICLE
Equipment:
Material Type: Thickness:
Amp:
Prodspacing:
AC/DC:
Surface Prep:
Type Used:
Particle Used (lbs.):

DYE PENETRANT
Type Cleaner:
Type Penet:
Type Devel:
Surface Prep:
Dwell Time:
Material Type: Thickness:

	Weld No.	By No.	Location	Pipe Size	NDT Within Code Yes	NDT Within Code No	CUST Within Code Yes	CUST Within Code No	Defects & Location	REMARKS
1	C-1		C-1			X			IP	
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
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36										
37										
38										
39										
40										

Test(s) Interpreted By: M. Miller Level: II P.O. #:

Number of Testing Personnel: Misc. Info.: # Welds: Per Diem: Miles:

Hours Worked: AM/PM to Hours: RT: Hours: OT: Total Hrs. Job Location

NOTICE: THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PNDT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PNDT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS. PNDT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMERS REPRESENTATIVE'S SIGNATURE VERIFIES TIME AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION UNLESS OTHERWISE SPECIFICALLY NOTED.
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Agreed and Accepted: William A. Brown Date: 10/17/92

TERMS AND ABBREVIATIONS

LP	INADEQUATE PENETRATION	SP	SPHERICAL POROSITY
LP.D.	INADEQUATE PENETRATION DUE TO HIGH-LOW	CP	CLUSTER POROSITY
I.C.	INTERNAL CONCAVITY	PP	PIPING POROSITY
LF	INCOMPLETE FUSION	HB	HOLLOW BEAD
LF.C.L.	INCOMPLETE FUSION DUE TO COLD LAP	CR	CRACKS
B.T.	BURN THROUGH	A.D.	ACCUMULATION OF DISCONTINUITIES
E.S.I.	ELONGATED SLAG INCLUSIONS	I.U.	INTERNAL UNDERCUT
I.S.I.	ISOLATED SLAG INCLUSIONS	O.U.	OUTSIDE UNDERCUT

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

WISCO WELDING INSPECTION SERVICE COMPANY
11811 NORTH FRWY., SUITE 670
HOUSTON, TEXAS 77060

REPORT DATES 10/16/92 10/17/92
CUSTOMER: USPCI ATTN: MR. SAMAR HAMWI
ORDER NO: PO 19350 DATED: REV: DATED:
MAT'L DESTINATION: LONE MOUNTAIN
REQUIRED DATE: 11/1/92 SHIPMENT DATE IS NOW: SAME
AS OF CHANGED FROM:
INSPECTOR ESTIMATED SHIPMENT DATE: SAME
ORDER IS 65% PERCENT COMPLETED:
VENDOR: SCOTT MFG. CO. ORDER NO: 451
MANUFACTURER: SAME
PHONE: 806-866-9591 SHOP LOCATION: WOFORD, TX.
SHOP ORDER NO: 451
INSPECTOR'S CONTACT: BILL BASON POSITION: FIELD MANAGER
REPORT IS: INTERIM
REGARDING: INSPECTION
INSPECTOR: VICTOR HAGMAN

MATERIAL DESCRIPTION: (4) 12.75' DIAMETER BY 40' HEIGHT CAUSTIC STORAGE TANKS.

STATUS OF ORDER: TWO TANKS TO SHIP 10/19/92

INSPECTION: WITNESS RADIOGRAPHS BE TAKEN OF WELDS AND REVIEW OF SAME.

1. PICKED SPOTS FOR RADIOGRAPHS ON TWO TANKS. SHOTS WERE TAKEN OF VERTICAL SEAMS GIRTH WELDS IN TANKS. ONE SPOT WAS TAKEN ON THE BUTT WELDS ON THE CONE BOTTOM. THE CONE BOTTOM HAS THREE BUTT WELDS.

2. REVIEW OF SPOT WELDS FOUND THE FOLLOWING. THE WELDS IN THE CONE BOTTOM WERE BAD. PENALTY SHOTS WERE TAKEN AS PER API 650, AND ASME SEC. VIII UW 51, AND UW52. FOUND THAT A BAD PROCEDURE WAS USED IN WELDING THE BUTT WELDS ON THE BOTTOM OF ALL FOUR TANKS. THERE WAS NO PENETRATION ON ANY OF THE WELDS. SO SCOTT MFG MADE REPAIRS ON THE TWO TANKS TO SHIP ON 10/19/92. REPAIR SHOTS WERE MADE. FOUND THAT THE WELDS WERE STILL BAD. THE COMPLETE BUTT WELDS ON THE BOTTOM OF ALL FOUR TANKS WAS REMOVED COMPLETELY.

10/17/92.

1. PICKED RADIOGRAPHS FOR BOTTOM BUTT WELDS. AFTER REVIEWING FILM FOUND THAT ALL OF THE BOTTOM BUTT WELDS WERE NOW ACCEPTABLE. THE REASON FOR THE PROBLEM TO START WITH WAS THAT NO ROOT OPENING WAS LEFT FOR PENETRATION. THESE WELDS WERE DONE BY THE SHOP PERSONAL. NOT THE CREW THAT IS BUILDING THESE TANKS.
2. WITNESS FITTING THE TOP RING ON TANK NUMBER TWO. AND WATCHED AS THE WELDERS MADE THE ROOT PASS. ALL WELDING WAS PER SPECIFICATIONS AND WAS OF GOOD QUALITY.

WILL RETURN 10/19/92 FOR FINAL ON FIRST TWO TANKS AND WITNESS LOADING OF SAME.

WISCO WELDING INSPECTION SERVICE COMPANY
11811 NORTH FRWY., SUITE 670
HOUSTON TEXAS 77060

REPORT DATES 10/14/92 10/15/92
CUSTOMER: USPCI ATTN: MR SAMAR HAMWI
ORDER NO: DATED: REV: DATED:
MAT'L DESTINATION: LONE MOUNTAIN
REQUIRED DATE: SHIPMENT DATE IS NOW:
AS OF CHANGED FROM:
INSPECTOR ESTIMATED SHIPMENT DATE:
ORDER IS PERCENT COMPLETED:
VENDOR: SCOTT MFG. ORDER NO: 451
MANUFACTURER: SAME
PHONE: 806-866-9591 SHOP LOCATION: WOLFORD, TX
SHOP ORDER NO: 451
INSPECTOR'S CONTACT: BILL BASON POSITION: ENG.
REPORT IS: INTERIM
REGARDING: INSPECTION
INSPECTOR: VICTOR HAGMAN

MATERIAL DESCRIPTION: (4) 12.75' DIAMETER BY 40 HEIGHT CAUSTIC TANKS.

STATUS OF ORDER: COMPLETION IS ABOUT 50% TWO TANKS TO SHIP MON 10/19/92

INSPECTION: MEETING WITH MR BASON AND FIELD FOREMAN.

WENT OVER SPECIFICATIONS FROM USPCI. AND REVIEWED WHAT DRAWINGS WERE ON HAND. NO PROBLEMS WERE FOUND WITH SCOTT MFG. MEETING SPECIFICATIONS.

INSPECTION OF TANKS BEING WELDED.
1. WITNESS WELDING OF GIRTH WELDS ON TANKS. FOUND THAT THE ROOT OPENING WAS ACCEPTABLE FOR FULL PENETRATION WELDS.
2. WITNESS AIR TESTING OF REPADS ON TANK SHELLS. ALL NOZZLES ARE WELDED IN SHELLS BEFORE TANK SHELLS ARE FIT TOGETHER. THIS IS GOOD AS THAT ALL OF THE REPADS CAN BE AIR TESTED ON THE GROUND. NO DANGER OF FALLING AR OF PADS NOT BEING TESTED. SHOP AIR WAS USED FOR TESTING. WITH 18-20 POUNDS OF AIR APPLIED TO PADS. A SOAP AND WATER MIXTURE WAS USED TO CHECK FOR LEAKS BOTH ON THE INTERNAL AND THE EXTERNAL. REPAD TEST WAS ACCEPTABLE AS NO LEAKS WERE FOUND.
3. VISUAL INSPECTION OF WELDING BOTH INTERNAL AND EXTERNAL. NO DEFECTS WERE FOUND. VISUAL INSPECTION WAS TO FIND UNDERCUTTING, PIN HOLES, COLD LAP, LOW FILLET WELDS EXSSIVE WELD BUILD UP ON GIRTH WELDS ETC. ALL THAT WAS FOUND WAS SOME SMALL PINHOLES. THESE WERE REPAIRED.
VISUAL INSPECTION OF THE ROLLED RINGS. FOUND THAT ONE OF THE BRACES ON THE PAINTERS RING WAS WELDED TO THE VERTICAL WELD SEAM. AS API 650 STATES THAT ALL ATTACHMENTS MUST MISS VERTICAL SEAMS BY AT LEST 6 INCHES . THESE WERE MOVED AND REWELDED.

10/15/92.

MET WITH MR HAMWI THIS A.M. FOR INSPECTION OF TANKS. TALKED WITH MR. BASON ABOUT DELIVERY OF TANKS. THE FIRST TWO TANKS WILL BE ON TRUCKS TO JOB SITE BY 10/19/92 A.M.

REVIEW OF DRAWINGS ON TANKS AND WALK WAYS. NO PROBLEMS WERE FOUND.

FIELD INSPECTION OF TANKS BEING WELDED, AND A TOUR OF SHOP WAS TAKEN. SCOTT MFG. HAS A WIDE RANGE OF SERVICES THAT WERE SHOWN TO MR HAMWI AND THIS WRITER.

A VISUAL INSPECTION OF TANKS WAS DONE AND NO PROBLEMS WERE FOUND.

PHOTOS OF TANKS, ERECTION, AND WELDING WAS TAKEN. THESE WILL SENT WITH DATA PACKAGES.

REVIEW OF MATERIAL TEST REPORTS FOR THE SHELL MATERIAL AND FOR THE STRUCTURAL MATERIAL. THE MTR'S FOR THE PIPING HAS NOT ARRIVED FROM THE SUPPLIER. AS SOON AS THESE OR IN THEY WILL BE CHECKED.

REVIEWED ALL WELDER QUALIFICATIONS, AND ALL WELD PROCEDURES. ALL WELDING OF TANKS WERE TO THESE PROCEDURES. ALL WELDER WORKING ON TANKS WERE QUALIFIED PER A 6G WELD TEST AND ALL PAPER WORK WAS IN ORDER.

ALL RADIOGRAPHS WILL BE SHOT 10/16/92 ON THE TWO TANKS TO SHIP ON 10/19/92. ALL OTHER NDE WORK HAS BEEN COMPLETED. ALL THAT WAS REQUIRES WAS A MAG PARTICLE OF NOZZLE WELDS, THIS HAS BE DONE AND PROPER PAPER WORK IS IN THE JOB FILE.

AT THIS TIME ALL API-650 AND USPCI SPECIFICATIONS ARE BEING FOLLOWED. ALL WORK SEEN ON THIS VISIT WAS OF GOOD QUALITY AND WAS ACCEPTABLE TO ALL SPECIFICATIONS.

WIS/QA-06

WELDING INSPECTION SERVICE COMPANY

QUALITY ASSURANCE INSPECTION RELEASE

PAGE 1 OF 1
DATE: 10-19-92
REP. NO.:

CUSTOMER: US PCI
P.O. NO.: 19350
LOCATION: LUBBOCK TX

VENDOR: Scott Mfg
PROJECT: Lone Mountain

[X] Satisfactorily completed Quality Assurance Inspection on: 10-19-92
(Date)

P.O. ITEM	QUANTITY	MATERIAL DESCRIPTION/TAG NO.
	1	12.75' X 40' height Caustic tank Ser. No. 451-1
	1	12.75' X 40' height Caustic tank Ser No. 451-2

Shipping Information: By truck to Wayneka Okla.
Date Released for Shipment: 10-19-92

[X] Without exception to the Purchase Order Documents.
[ ] With the following Exception from the Purchase Order, only with follow up in writing with a copy of telex or letter attached. (State specifics and name of Responsible Engineer)

Approval or release for shipment of any work by a representative of the purchaser, or purchaser's Client, shall in no way relieve the vendor or sub-vendor of any responsibility for meeting the requirements of the purchase order and/or specifications.

Signing of the form acknowledges the items have been inspected in accordance with the above purchase order.

10-19-92
Date

U. S. Nagman Jr.
Agency Inspector's Signature

11811 North Frwy, Suite 670 · Houston, Texas 77060 (713) 820-8066

WELDING INSPECTION SERVICE COMPANY

WIS/QA-06

QUALITY ASSURANCE INSPECTION RELEASE

PAGE _____ OF _____
DATE: 10-24-92
REP. NO.: _____

CUSTOMER: USPCI
P.O. NO.: 19350
LOCATION: LUBBOCK TX

VENDOR: Scott Mfg INC
PROJECT: LONE MOUNTAIN

[ ] Satisfactorily completed Quality Assurance Inspection on: 10-24-92 (Date)

P.O. ITEM	QUANTITY	MATERIAL DESCRIPTION/TAG NO.
	1	12.75'X 40' height CAUSTIC TANK SER. NO. 451-3
	1	12.75' x40' height CAUSTIC TANK SER NO., 451-4

Shipping Information: By TRUCK to WAYNOKA OKLA.
Date Released for Shipment: 10-24-92

[ ] Without exception to the Purchase Order Documents.
[ ] With the following Exception from the Purchase Order, only with follow up in writing with a copy of telex or letter attached. (State specifics and name of Responsible Engineer)

Approval or release for shipment of any work by a representative of the purchaser, or purchaser's Client, shall in no way relieve the vendor or sub-vendor of any responsibility for meeting the requirements of the purchase order and/or specifications.

Signing of the form acknowledges the items have been inspected in accordance with the above purchase order.

10-24-92
Date

U.L. Nugman Jr.
Agency Inspector's Signature

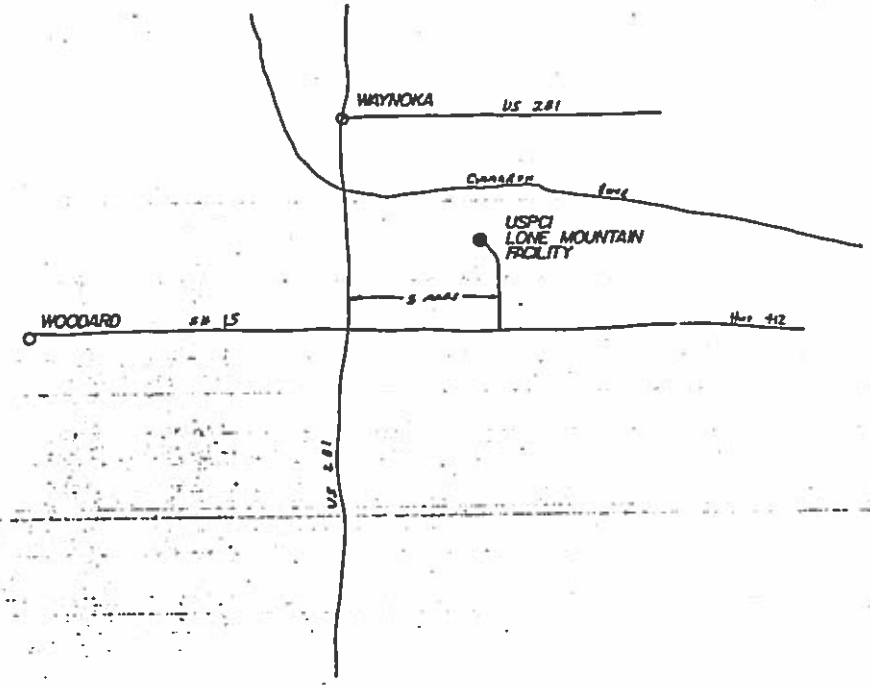
11811 North Frwy, Suite 670- Houston, Texas 77060 (713) 820-8066

APPENDIX G

Drawings

USPCI
CAUSTIC STORAGE TANKS
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

PROJECT ENGINEER: MYERS ENGINEERING CORP.
1102 N. STRATFORD DRIVE
SUITE B400
OKC, OK 73120
(405) 755-5325

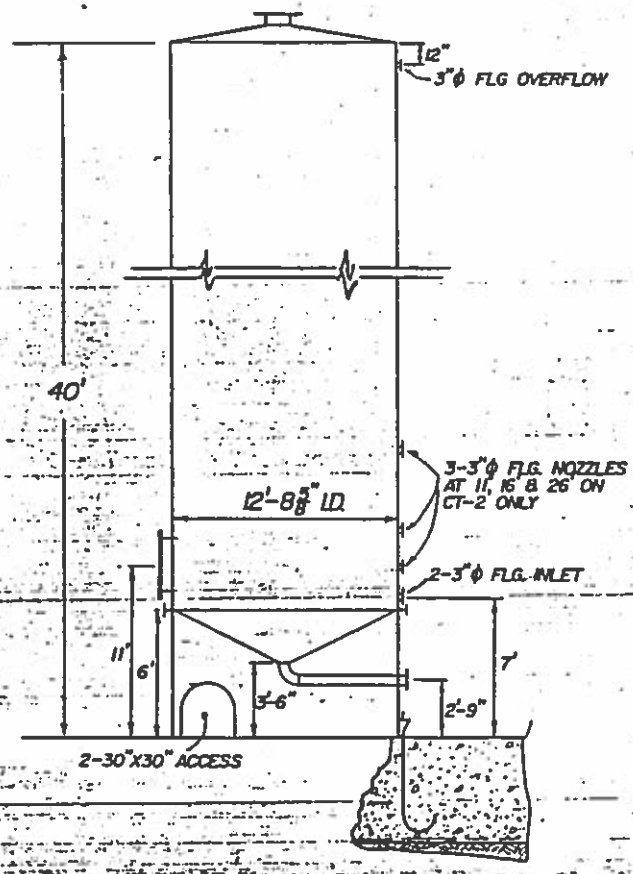


SMI
SCOTT MANUFACTURING, INC.
LUBBOCK, TX.

'AS-BUILT'

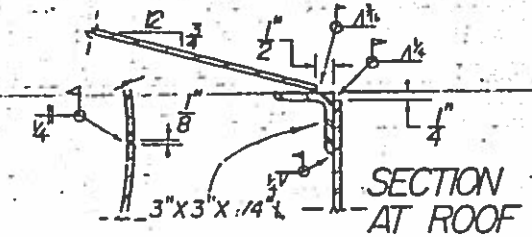
PER TANK

QTY.	ITEM	DWG. NO.
12	ANCHOR BOLTS 1¼ ϕ & CHAIRS	2
3	3"ϕ SHELL NOZZLE FLG. W/B.F.	3
1	3"ϕ ROOF NOZZLE FLG. W/B.F.	3
1	GIRDER RING	3
1	OUTLET 6"ϕ W/6"ϕ 90° ELL	3
1	LADDER PLATFORM	10
2	LADDER TOWERS	5 & 11
5	SHELL PL.	1
7	NOZZLE RE-PL. (10 FOR CT-2 ONLY)	4
1	6"ϕ ROOF NOZZLE FLG. W/B.F.	3
1 EA.	SHELL / ROOF MANHOLE 30"/24"ϕ	6 & 7
2	18"ϕ ROOF NOZZLE FLG. W/B.F.	3
1 EA.	¼ ROOF PL. ¼ FLOOR PL.	8
1	ROOF ANGLE RING 3"X3"X¼	1
2	PAINTERS RING	5
1	OVERFLOW, LEVEL IND., UTIL. BRACKETS	3
4	LIFTING LUGS	10
1	HANDRAIL	10
1	CONE PL. 3/16	3
8	RAFTERS C4X7.25 & CLIPS	3
1	COMPRESSION RING	3

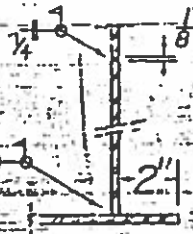


ELEVATION VIEW
FOUR TANKS
CT-1, 2, 3, 4

PLAN ORIENTATION



SECTION AT ROOF



VERTICAL SEAM

HORIZONTAL

SHELL PL. SCHEDULE

RING NO.	THICK	HEIGHT	NO. OF SHEETS @ LENGTH
1-5	¼"	96"	1 @ 480"

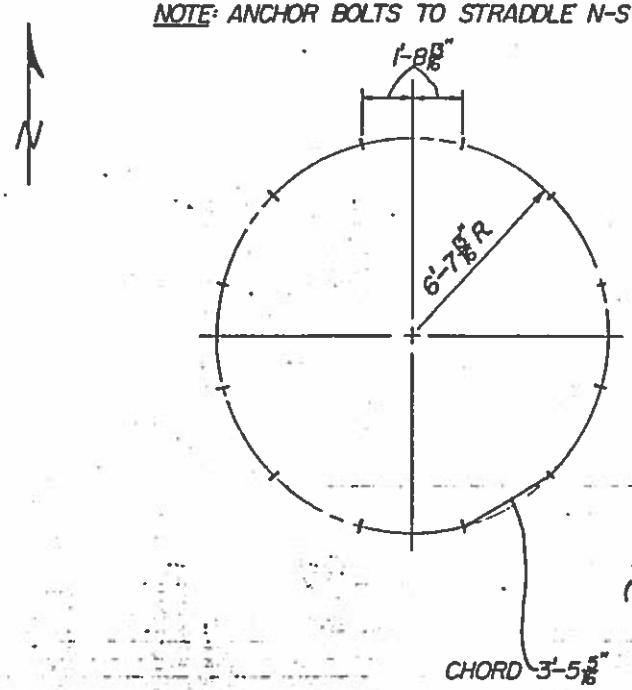
REVISIONS			
NO	DATE	BY	
1			
2			
3			
4			
5			

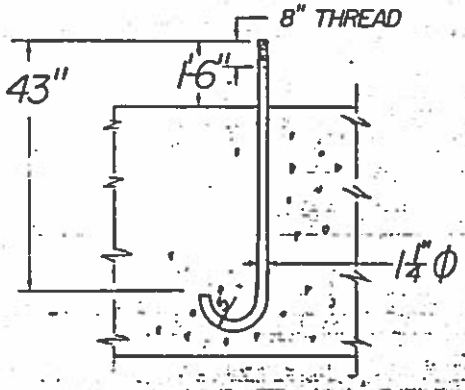
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

30,500 GALLON STANDPIPE FOR:
USPCI, WAYNOKA, OK

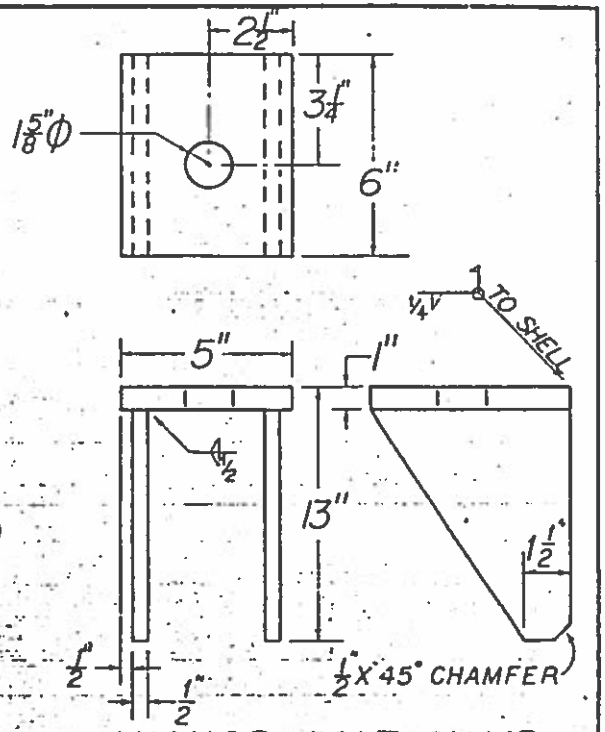
DRAWN BY LDW	SCALE NONE	MATERIAL
CHK'D	DATE 10/6/92	DRAWING NO. 451-1
TRACED	APP'D	

NOTE: ANCHOR BOLTS TO STRADDLE N-S ℄



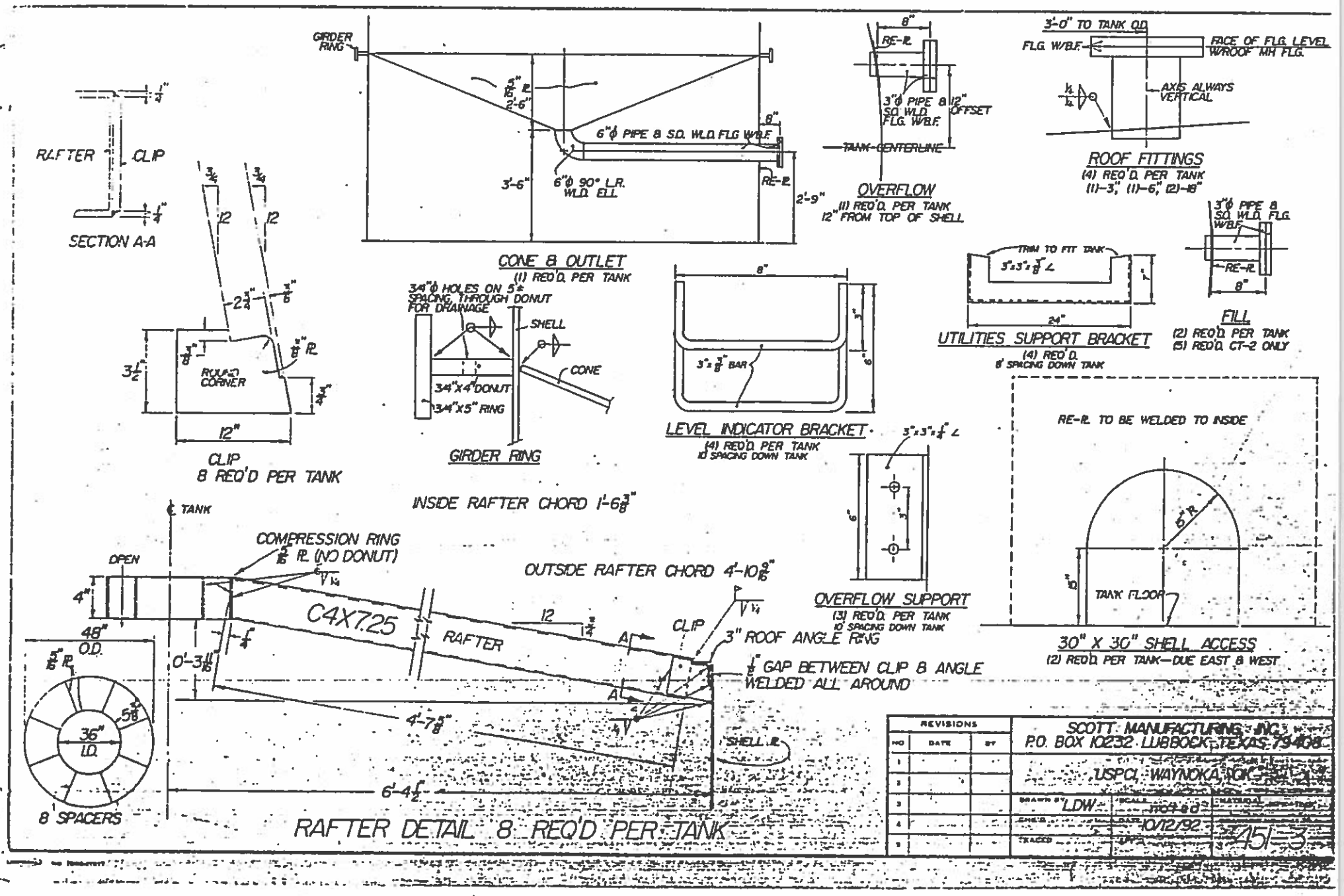


ANCHOR BOLT
12 REQUIRED
NTS
DOUBLE NUT ANCHOR BOLTS
GALVANIZED

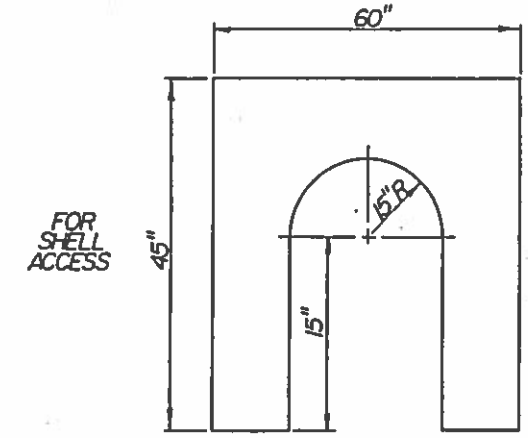


ANCHOR BOLT CHAIR
12 REQUIRED
3"=1'
DOUBLE NUT ANCHOR BOLTS

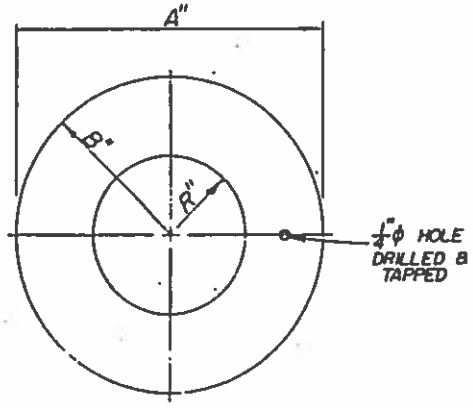
REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408		
NO.	DATE	BY	FOUNDATION FOR: ID. USPCI, WAYNOKA, OK		
			DRAWN BY LDW	SCALE noted	MATERIAL
			CHK'D	DATE 10/8/92	DRAWING NO 451-2
			TRACED	APP'D	



RAFTER
CLIP
SECTION A-A
GIRDER RING
6"ϕ PIPE & S.O. WLD. FLG W/B.F.
6"ϕ 90° L.R. WLD. ELL
3'-6"
2'-9"
CONE & OUTLET
(1) REQ'D. PER TANK
3"ϕ PIPE & S.O. WLD. FLG. W/B.F.
12" OFFSET
TANK CENTERLINE
OVERFLOW
(1) REQ'D. PER TANK
12" FROM TOP OF SHELL
3'-0" TO TANK O.D.
FLG. W/B.F.
FACE OF FLG. LEVEL W/ROOF MH FLG.
AXIS ALWAYS VERTICAL
ROOF FITTINGS
(4) REQ'D. PER TANK
(1)-3", (1)-6", (2)-18"
3"ϕ PIPE & S.O. WLD. FLG. W/B.F.
FILL
(2) REQ'D. PER TANK
(5) REQ'D. CT-2 ONLY
TRIM TO FIT TANK
UTILITIES SUPPORT BRACKET
(4) REQ'D.
8' SPACING DOWN TANK
ROUND CORNER
CLIP
8 REQ'D PER TANK
3/4"ϕ HOLES ON 5" SPACING, THROUGH DONUT FOR DRAINAGE
SHELL
CONE
3/4"X4" DONUT
3/4"X5" RING
GIRDER RING
LEVEL INDICATOR BRACKET
(4) REQ'D. PER TANK
10' SPACING DOWN TANK
INSIDE RAFTER CHORD 1'-6 3/8"
OVERFLOW SUPPORT
(3) REQ'D. PER TANK
10' SPACING DOWN TANK
RE-PL TO BE WELDED TO INSIDE
TANK FLOOR
30" X 30" SHELL ACCESS
(2) REQ'D. PER TANK—DUE EAST & WEST
℄ TANK
OPEN
COMPRESSION RING
OUTSIDE RAFTER CHORD 4'-10 9/16"
C4X7.25
RAFTER
CLIP
3" ROOF ANGLE RING
1/8" GAP BETWEEN CLIP & ANGLE WELDED ALL AROUND
48" O.D.
36" I.D.
8 SPACERS
4'-7 5/8"
6'-4 1/2"
SHELL PL
RAFTER DETAIL 8 REQ'D PER TANK
REVISIONS
NO
DATE
BY
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408
USPCI, WAYNOKA, OK
DRAWN BY LDW
SCALE
DATE 10/12/92
451-3



FOR SHELL ACCESS

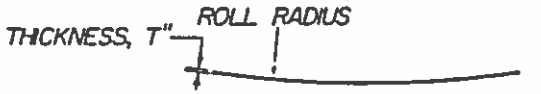


FOR OTHER FITTINGS AND SHELL MANHOLE

FRONT VIEW

USE	NOMINAL DIA. D"	T"	ROLL RADIUS	A"	B"	R"	PER TANK QT'Y
SHELL MANHOLE	30	¼	TANK RADIUS	60	30	$15\frac{3}{16}$	1
OUTLET	6	¼	"	$13\frac{1}{4}$	$6\frac{5}{8}$	$3\frac{7}{16}$	1
INLET	3	¼	"	7	$3\frac{1}{2}$	$1\frac{7}{8}$	2
OVERFLOW	3	¼	"	"	"	"	1
SHELL ACCESS	—	—	"	SEE DETAIL AT LEFT			2

5 ON CT-2 ON



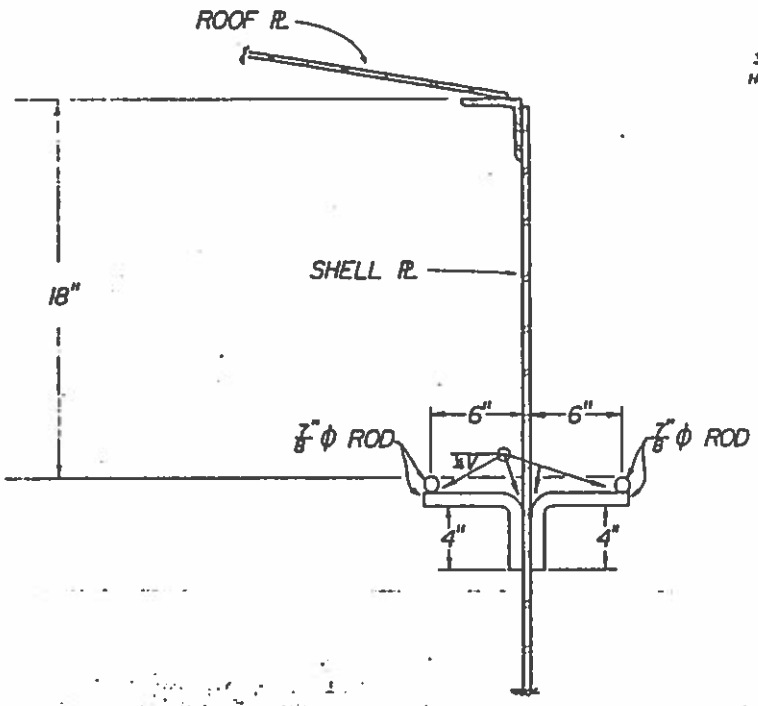
EDGE VIEW, ROLLED

REVISIONS		
NO	DATE	BY
1		
2		
3		
4		
5		

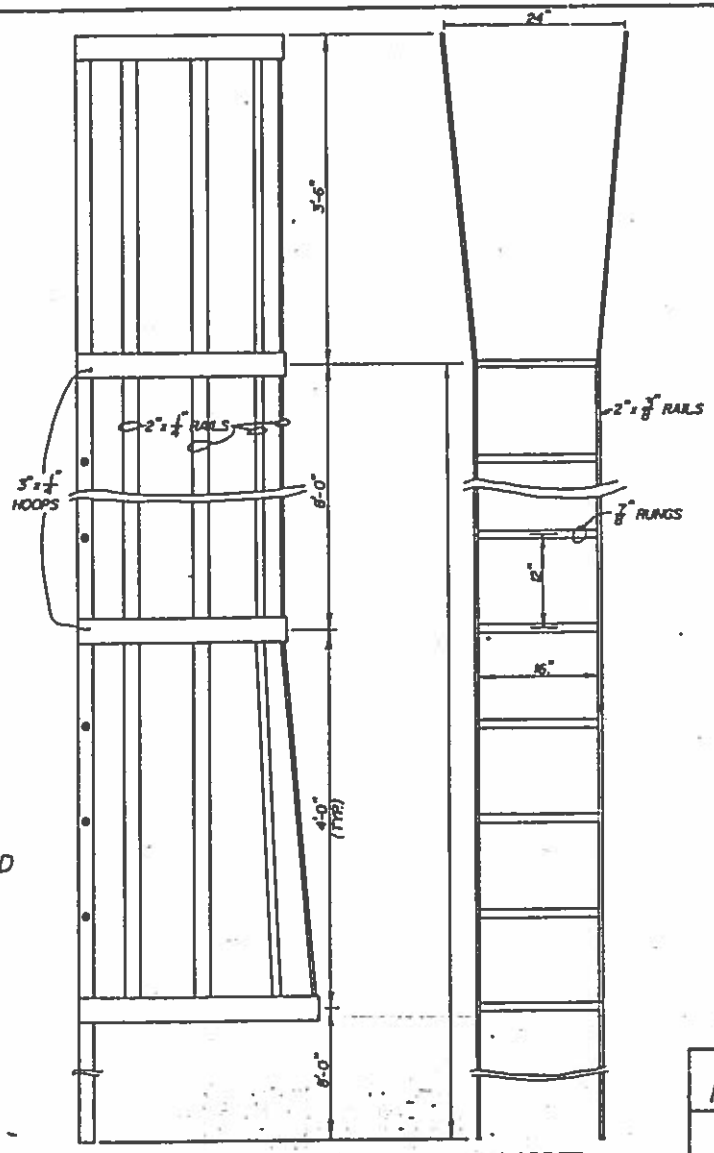
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

REINFORCING PLATE DETAIL
USPCI, WAYNOKA, OK

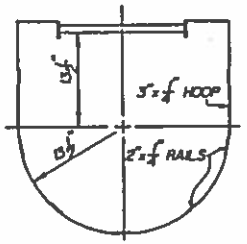
DRAWN BY LDW	SCALE none	MATERIAL
CHK'D	DATE 10/8/92	DRAWING NO 451-4
TRACED	APP'D	



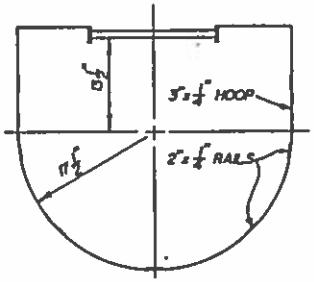
PAINTERS RING
(2) REQ'D. PER TANK-IN & OUT



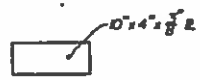
CAGE (2) REQ'D PER TOWER LADDER



STANDARD HOOP

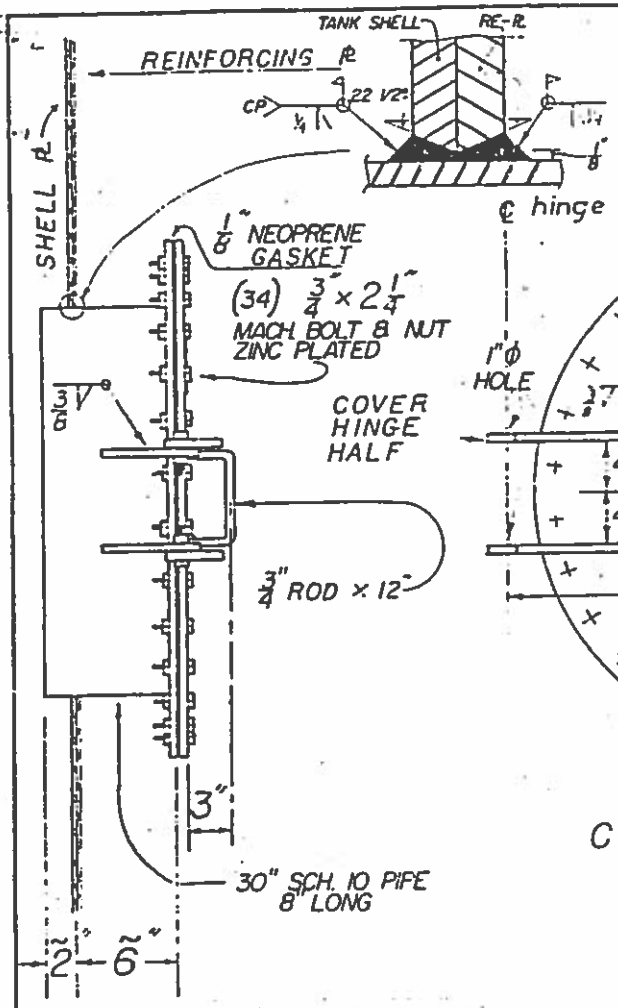


BOTTOM HOOP

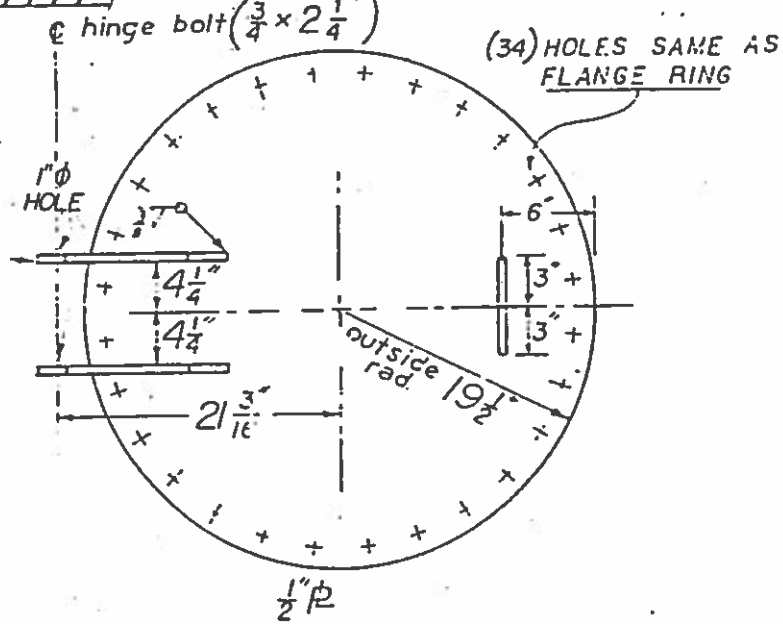


LADDER STANDOFF
(6) REQ'D. PER SECTION

SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408	
USPCI, WAYNOKA, OK	
drawn: LDW	no. 451-5
scale:	
date: 10/14/92	



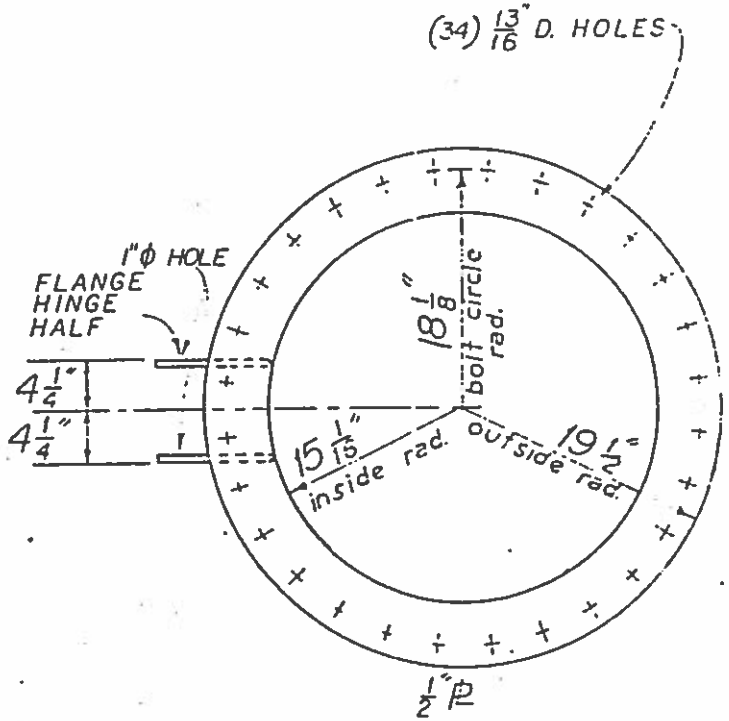
SIDE VIEW
INSTALLED



1/2" PL

COVER PLATE
1 1/2" = 1'-0

(1) REQ'D PER TANK

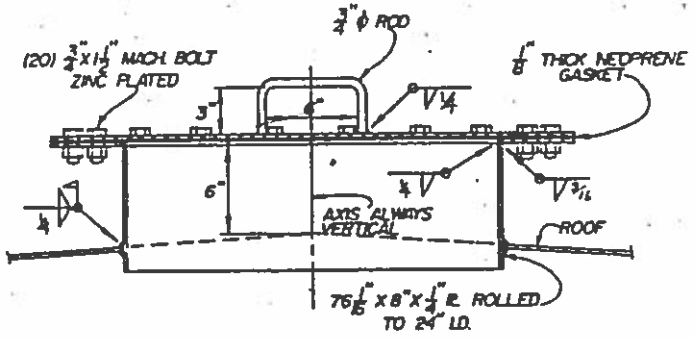


1/2" PL

FLANGE RING
1 1/2" = 1'-0

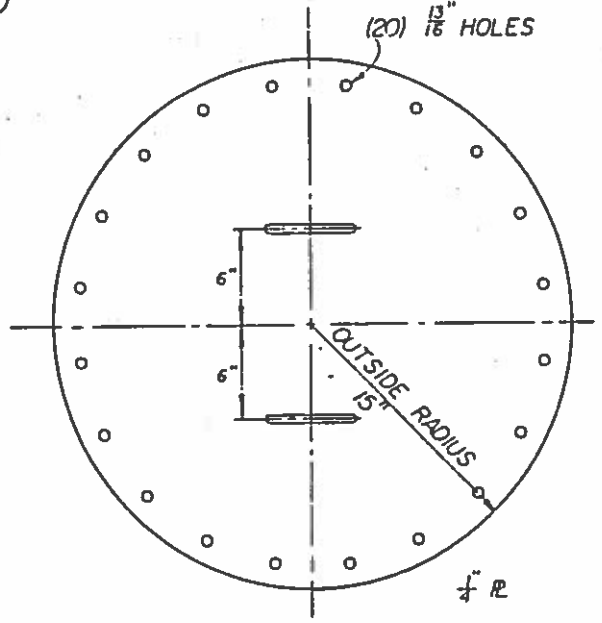
NOTE: 30" TYPE

SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408	
STANDARD SHELL MANHOLE USPCI, WAYNOKA, OK.	
drawn: LDW	no. 451-6
scale: NOTED	
date: 10/9/92	

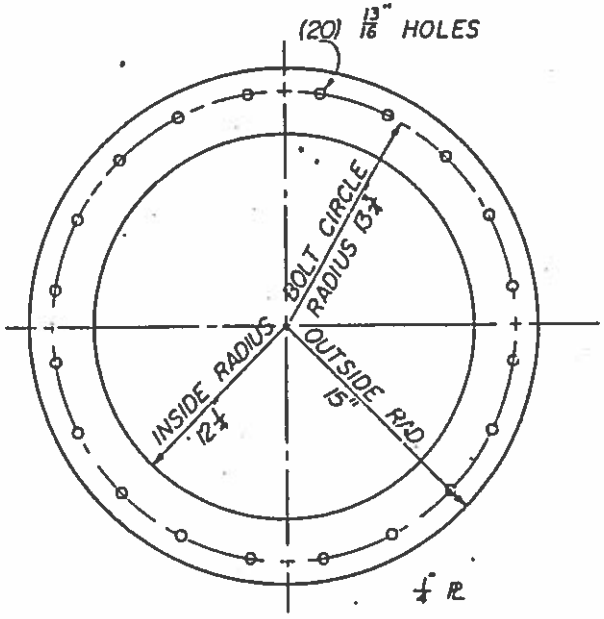


SECTION

BOLTHOLES SHALL STRADDLE THE CENTERLINES



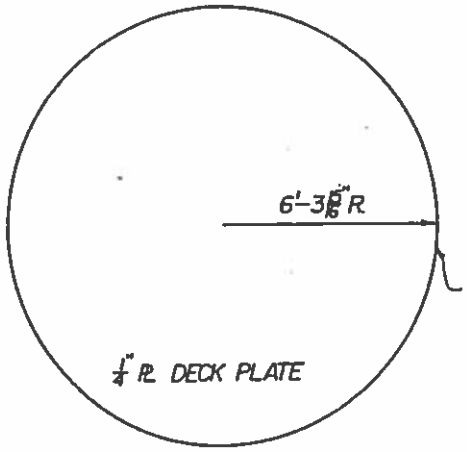
COVER



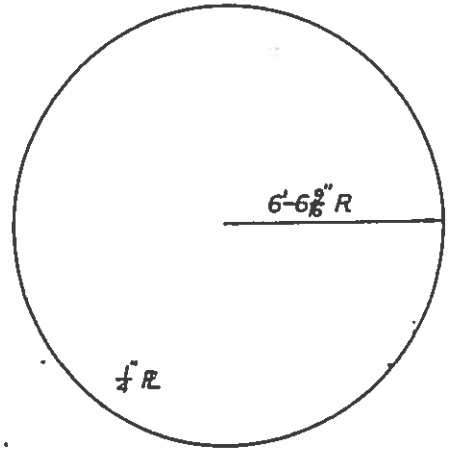
FLANGE RING

SCALE: 1 1/2" = 1'-0"
(1) REQ'D. PER TANK

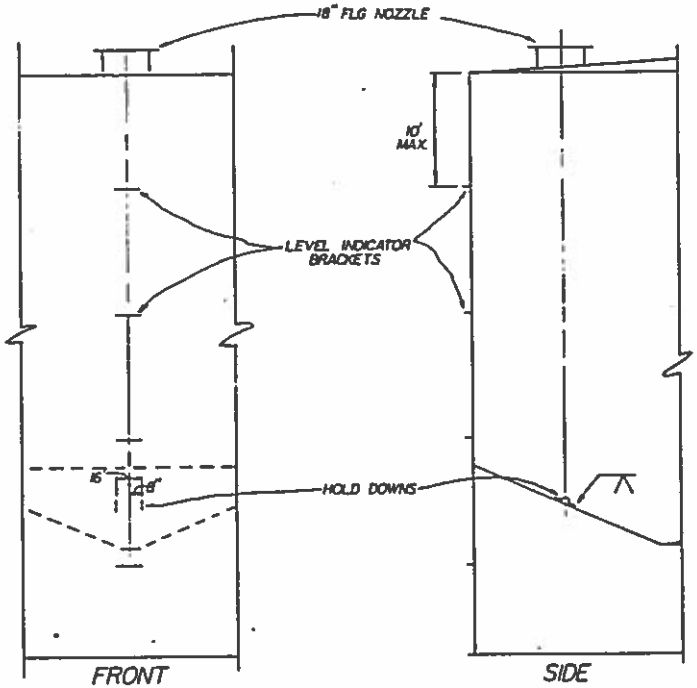
REVISIONS			SCOTT MANUFACTURING, INC. PO BOX 10232 LUBBOCK, TEXAS 79408
NO	DATE	BY	
1			API ROOF MANHOLE USPCI, WAYNOKA, OK.
2			DRAWN BY LDW — SCALE AS SHOWN — MATERIAL
3			CHK'D — DATE 10/9/92 — DRAWING NO 451-7
4			
5			TRACED — APP'D



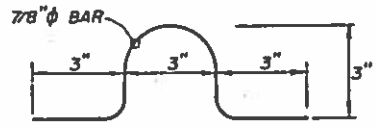
ROOF



FLOOR

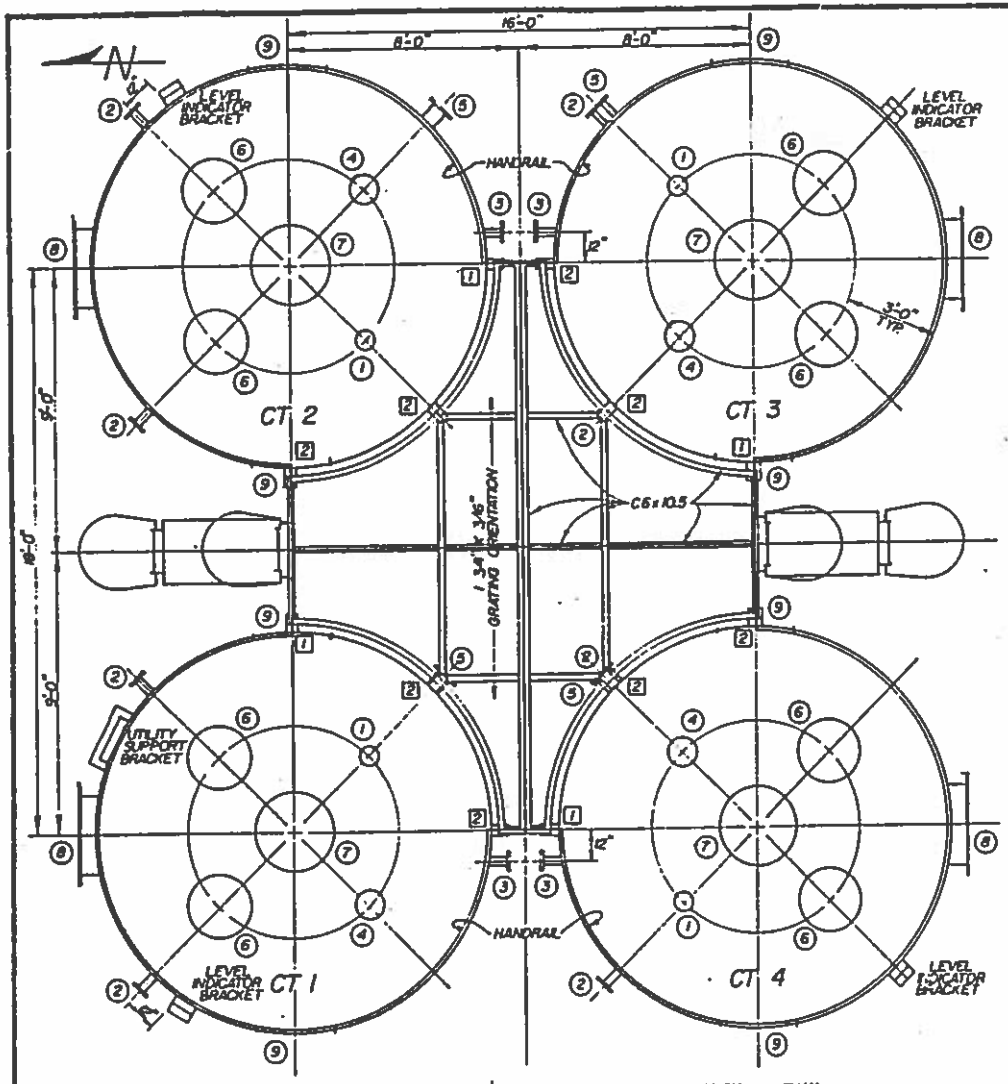


LEVEL INDICATOR DETAILS



INDICATOR HOLD-DOWN
(2) REQ'D. PER TANK

REVISIONS			SCOTT MANUFACTURING, INC. PO BOX 10232 LUBBOCK, TEXAS 79408		
NO	DATE	BY			
1			USPCI, WAYNOKA, OK		
2					
3			DRAWN BY LDW	SCALE	MATERIAL
4			CHK'D	DATE 10/14/92	DRAWING NO 451-8
5			TRACED	APP'D	



NO.	SIZE	LOCATION	QUAN.	NOTES
(1)	3"	ROOF	1	
(2)	3"	SHELL (RADIAL)	2	(3 EXTRA-CT 2 ONLY)
(3)	3"	SHELL (OFFSET)	1	
(4)	6"	ROOF	1	
(5)	6"	SHELL	1	
(6)	18"	ROOF	2	

NO.	SIZE	LOCATION	QUAN.
(7)	24"	ROOF/NAME P.	1
(8)	30"	SHELL	1
(9)	30"	SHELL (ACCESS.)	2
PLATFORM SUPPORTS			
[1]	BOLTED PLATFORM SUPPORTS		
[2]	SLIDING PLATFORM SUPPORTS		

TANK BATTERY PLAN
QUANS. SHOWN ARE PER TANK

NOTE: TANKS TO BE PLUMBED PRIOR TO PLATFORM PLACEMENT. PLATFORM FRAME TO BE MITERED & COPED AND WELDED ALL AROUND.

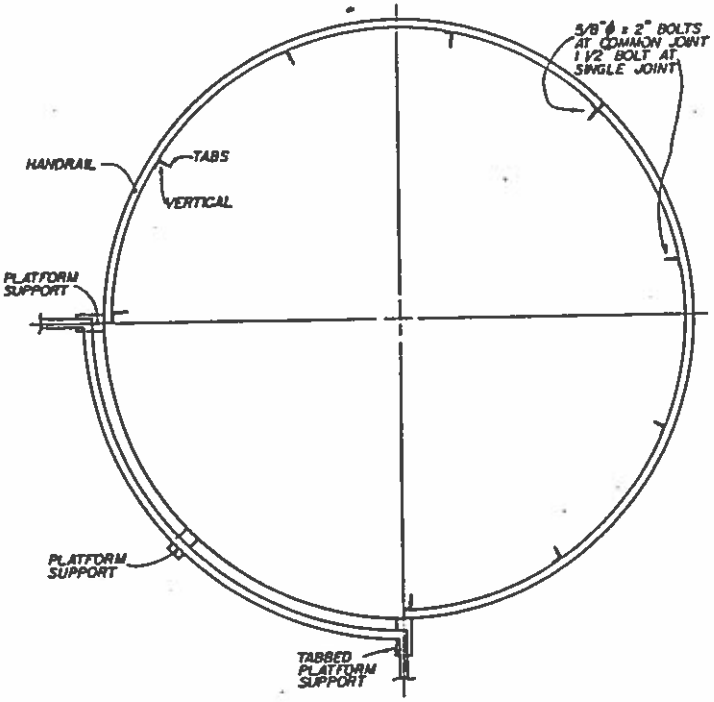
REVISIONS		
NO	DATE	BY
1		
2		
3		
4		
5		

SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

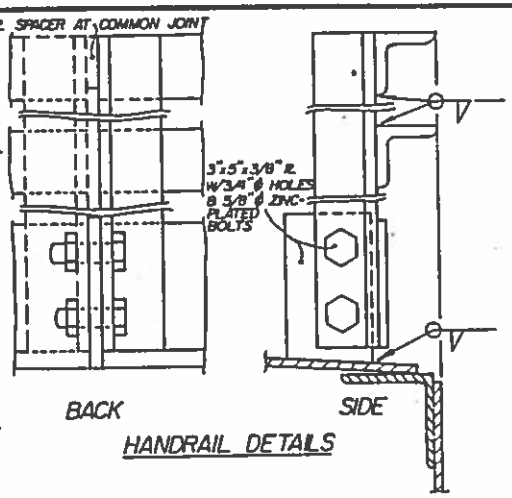
USPCI, WAYNOKA, OK.

DRAWN BY	SCALE	MATERIAL
LDW		
CHK'D	DATE 10/12/92	DRAWING NO 451-9
TRACED	APP'D	

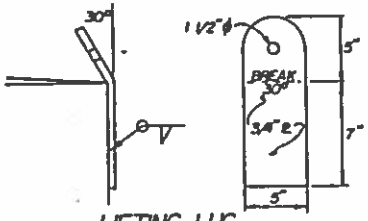
NOTE: EACH TANK'S HANDRAIL IS MADE IN 2 HALVES AND ARE MIRROR IMAGES.
*NOTE THE VERTICAL'S ORIENTATION. THE RAILS ARE LEG OUT & LEG DOWN.
*ALL WELDS ARE ALL-AROUND. LEG OUT OF RAILS ARE ROLLED TO TANK O.D.



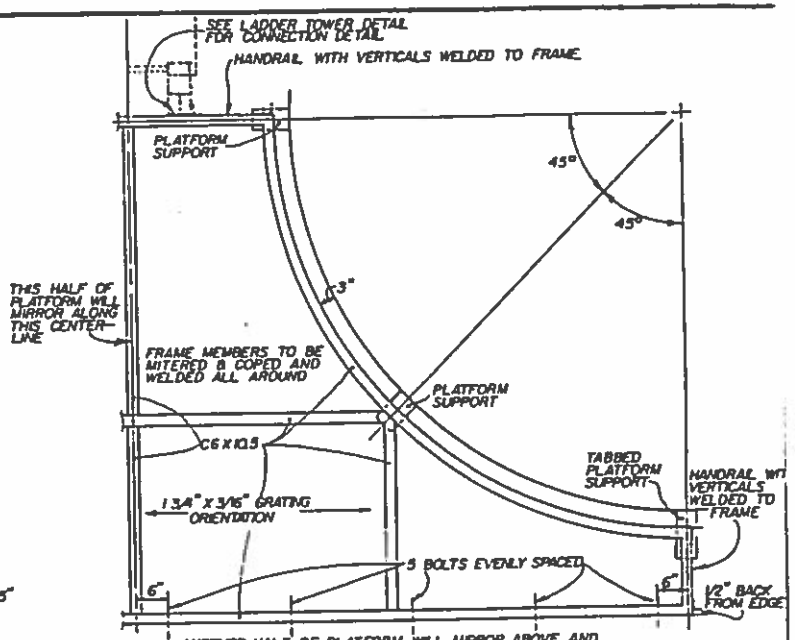
HANDRAIL ON TANK-TYPICAL



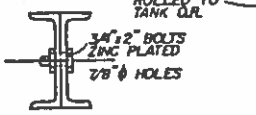
HANDRAIL DETAILS



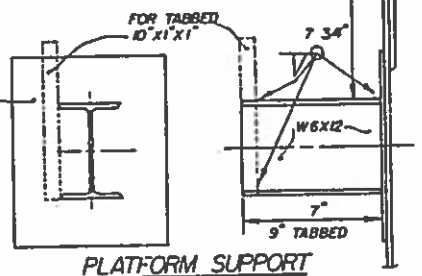
LIFTING LUG
(4) REQ'D. PER TANK



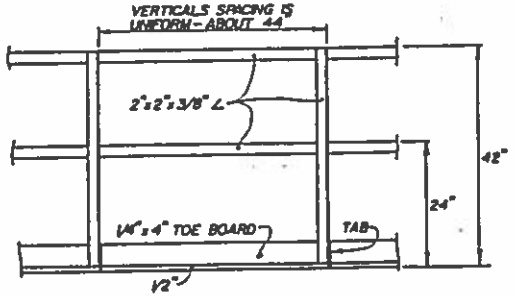
TYPICAL PLATFORM QUADRANT



PLATFORM-HALF CONNECTION

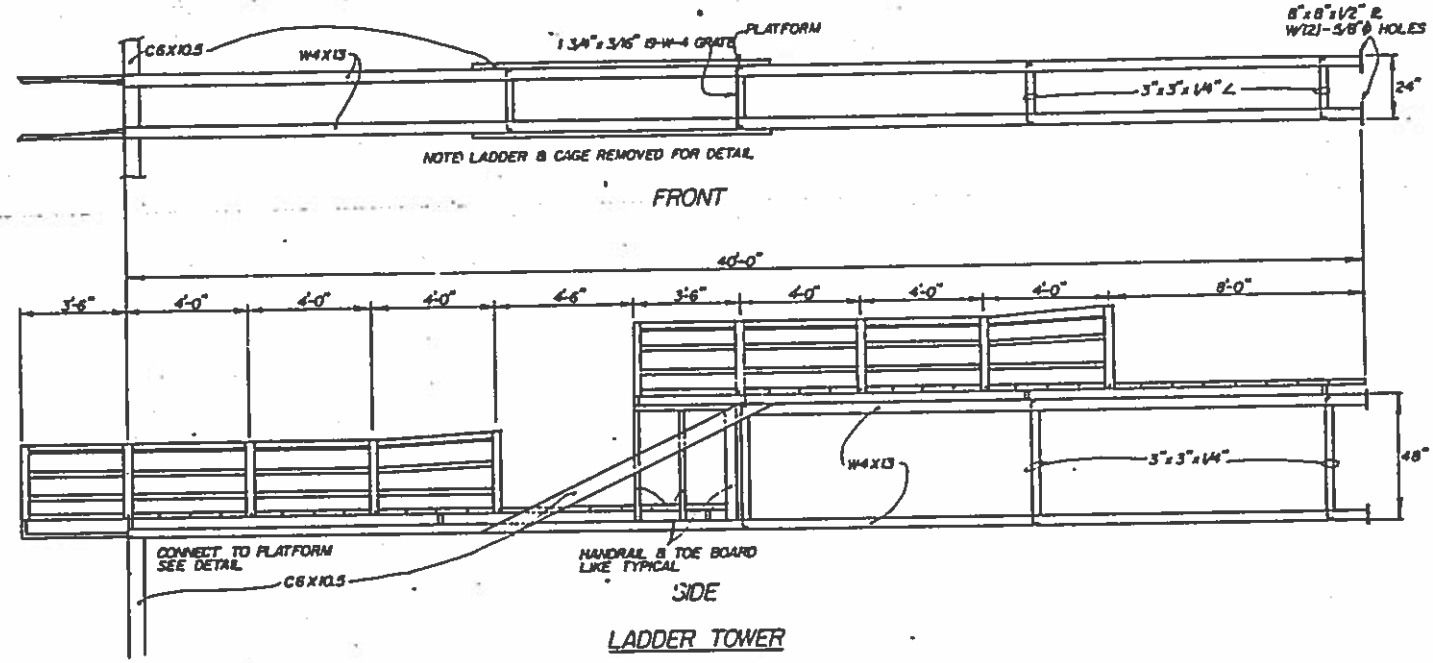


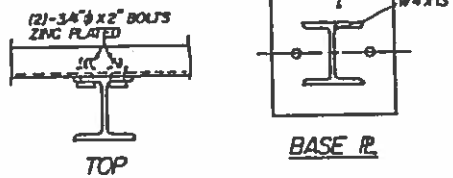
PLATFORM SUPPORT
(2) REQ'D. PER TANK
(1) TABBED PER TANK

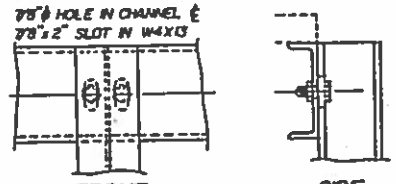


HANDRAIL TYPICAL

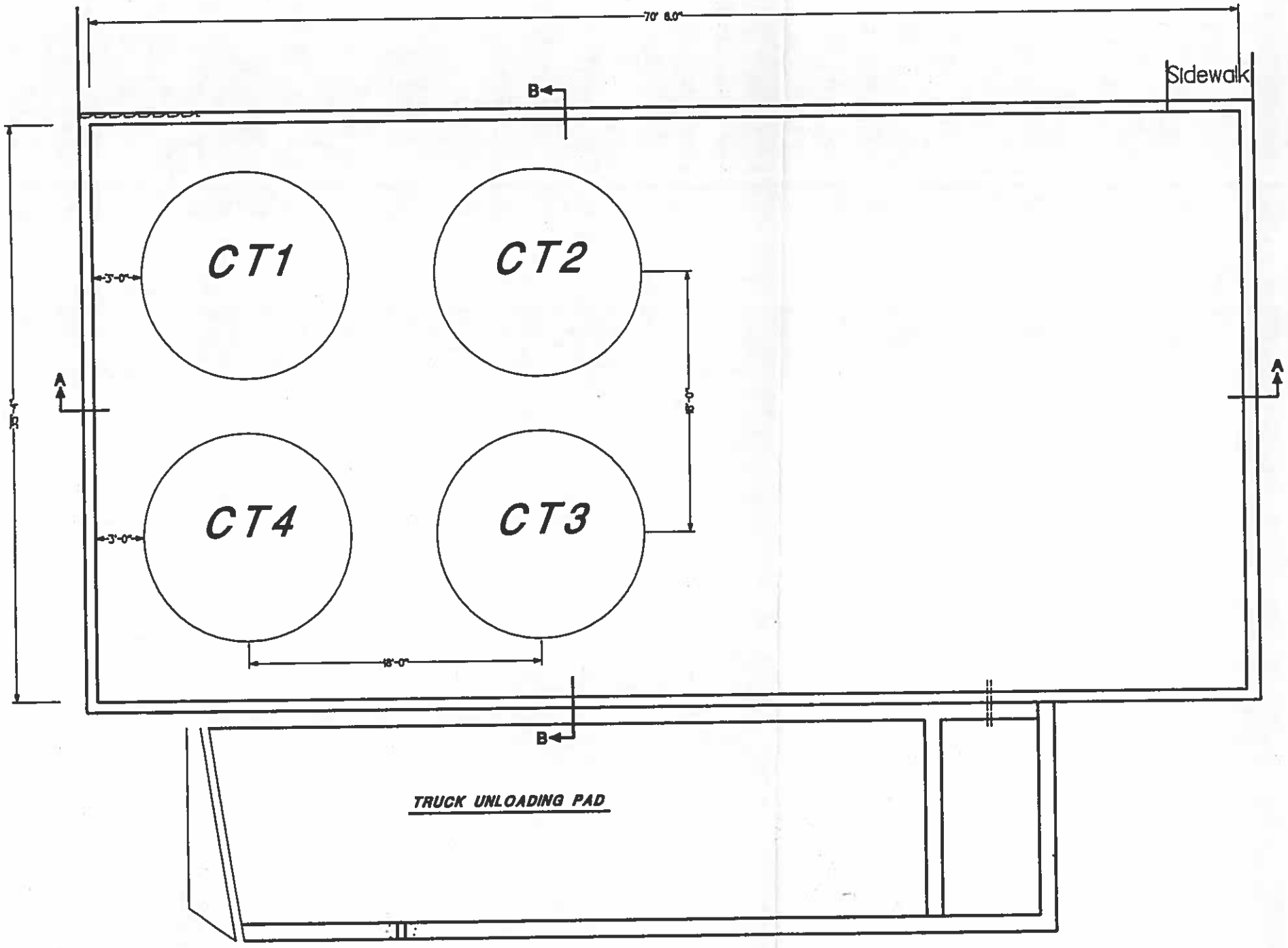
REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408		
NO	DATE	BY	USPCI, WAYNOKA, OK		
1			DRAWN BY LDW	SCALE	MATERIAL
2			CHK'D	DATE 10/20/92	DRAWING NO 451-10
3			TRACED	APP'D	
4					
5					

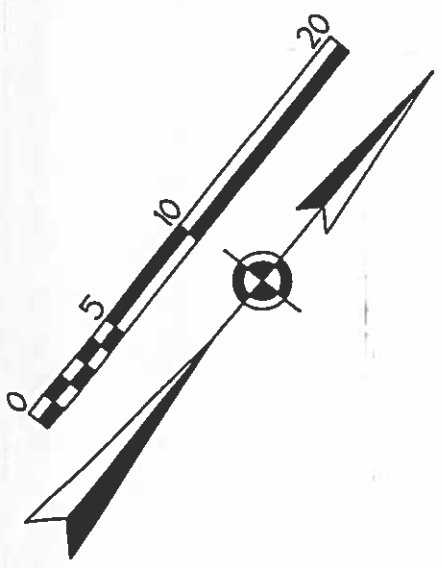






REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408
NO	DATE	BY	
1			USPCI, WAYNOKA, OK
2			
3			DRAWN BY LDW — SCALE — MATERIAL
4			CHK'D — DATE 10/23/92 — DRAWING NO 451-11
5			TRACED — APP'D





RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

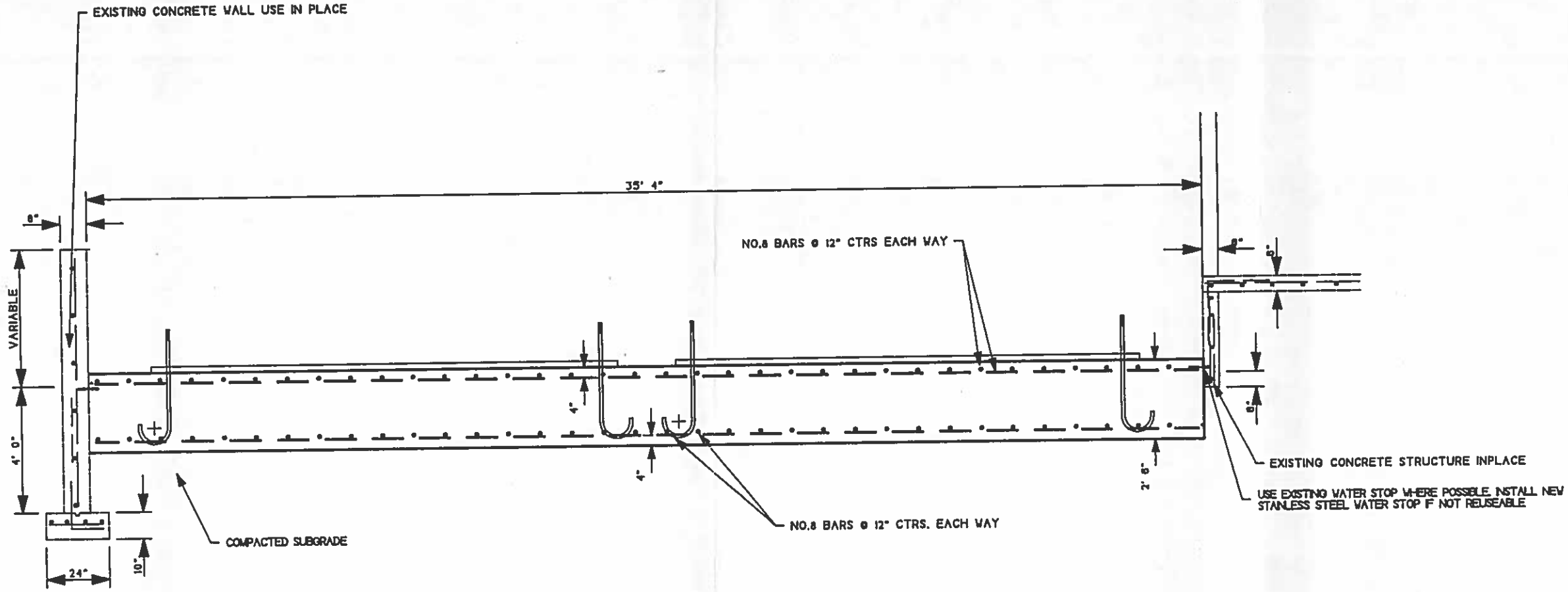
USPCI
A Subsidiary of Union Pacific Corporation

USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-5325

CAUSTIC TANKS 1-4 REPACEMENT PLANS
LAYOUT OF AREA

JOB NO. 5137
SCALE
DRAWN nic
DATE 10/28/92
SHEET OF



SECTION

RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

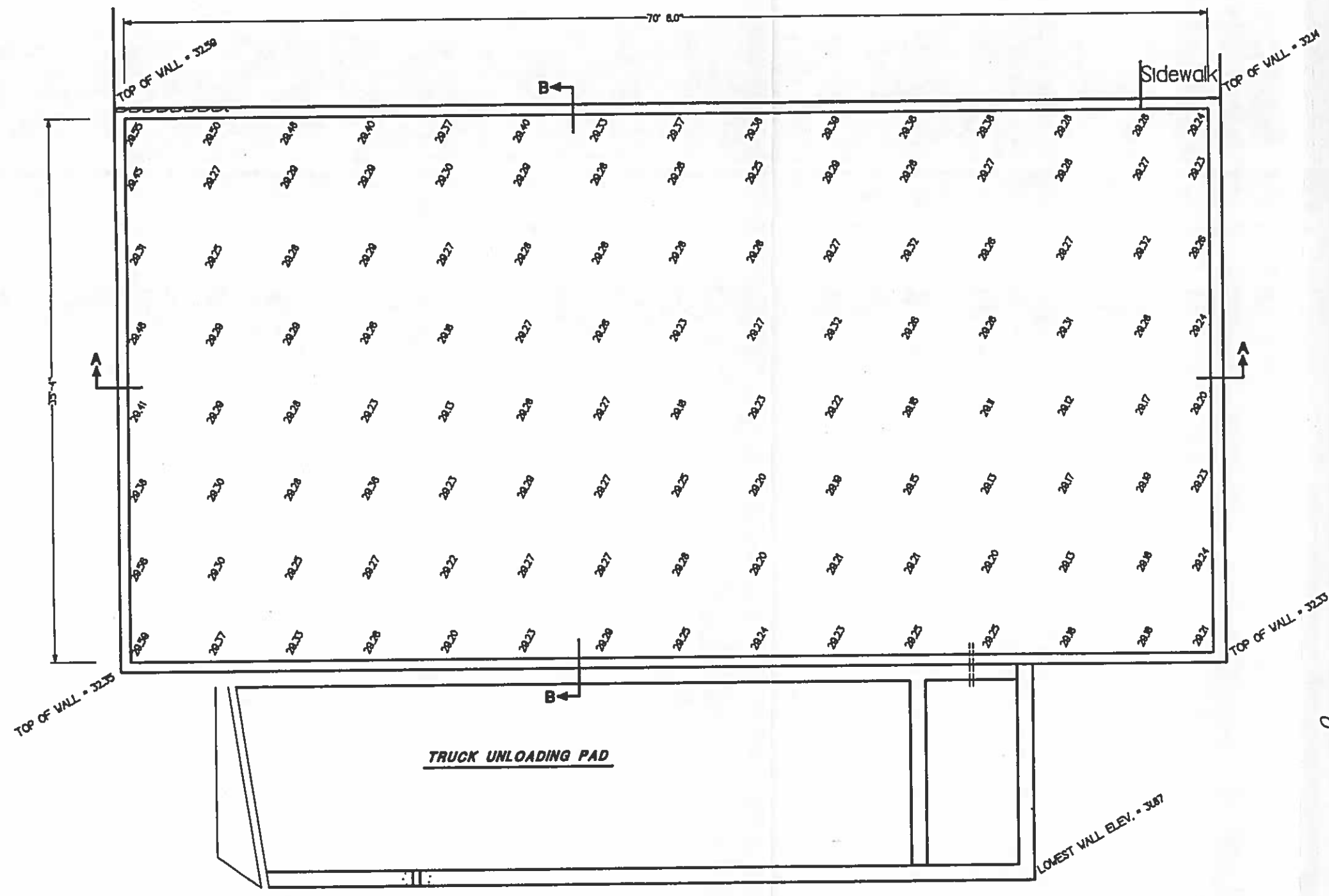
USPCI
A Subsidiary of Union Pacific Corporation

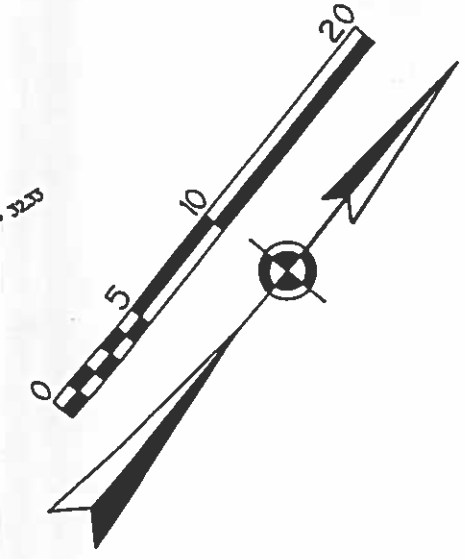
USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-6325

CAUSTIC STORAGE TANK 1-4
CONCRETE REPLACEMENT
SECTION "B" - "B"

JOB NO. 5137
SCALE
DRAWN GRS & JF
DATE 10-5-92
SHEET OF





NOTE:
ADD 1400.00 TO ALL ELEVATIONS

RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

USPCI
A Subsidiary of Union Pacific Corporation

USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11108 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-5325

CAUSTIC TANKS 1-4 REPACEMENT PLANS
LAYOUT OF AREA

JOB NO. 5137
SCALE nic
DRAWN
DATE 10/28/92
SHEET OF

SECTION CT3

MYERS Engineering CORPORATION

ENGINEERING FOR TODAY'S CHANGING WORLD



November 6, 1993

Mr. Don Dillie
USPCI, Inc.
Rt. 2 Box 170
Waynoka, Oklahoma 73860

Dear Mr. Dillie:

At the time of our inspection of Caustic Storage Tanks 1-4 located at the pretreatment area were inspected and there were no visual apparent weld breaks, punctures, scrapes of protective coatings, cracks, corrosion or damage due to construction or installation. This is to certify that Caustic Storage Tanks 1-4 were installed in such a manner which did not produce any structurally adverse conditions in accordance with 40 CFR 264.192(b).

This is to certify that at the time of our inspection, the Caustic Storage Tanks 1-4 located at the pretreatment area of the Lone Mountain Facility, (Waynoka, Oklahoma), were filled with water and allowed to stand at static equilibrium for a period of several hours. During this time all welds and tank walls were monitored for leaks. There were no apparent leaks found therefore the tank appears to be capable of handling hazardous wastes without release for the intended life and use of the tank.

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

Sincerely,

MYERS ENGINEERING CORPORATION

By: E. E. Myers
E. E. Myers

EEM:ls

cc: Mr. Gene Walker
Environmental Engineer
Lone Mountain Facility

FILE INSTRUCTIONS	
Unit: Pre-Treatment	
Project: Caustic Tank Assessment	
Section: Tank Certification	
Rcvd. by: L. J. ODEN	
ROUTE	COPY
F.E.	D. Dodd
	B. Correa

LEAK TEST

1602 NORTH STRATFORD DRIVE • SUITE 2400 • OKLAHOMA CITY • OKLAHOMA • 73120 • 405/755-5525 • FAX 405/755-551

SECTION 202

ASSESSMENT OF CAUSTIC TANK #3 (CT3)
LONE MOUNTAIN HAZARDOUS WASTE FACILITY
U.S.P.C.I.
WAYNOKA, OKLAHOMA

A. TANK VESSEL DESCRIPTION

Caustic Tank #3 is a large steel aboveground vertical tank located in the pretreatment area of the Lone Mountain Hazardous Waste Facility. Caustic Tank #1, Caustic Tank #2, Caustic Tank #3, Caustic Tank #4, Sludge Storage Tank #1 and, Caustic Overflow Tank, Cyanide Overflow tank, Cyanide Reactor, Cyanide Measure Tank and a portion of their ancillary equipment will be located together in a concrete containment area.

B. PRIMARY TANK VESSEL

1. General Description

Caustic Tank #3 is being assessed to determine if the unit is adequately designed with sufficient structural strength, and compatibility with the waste to be stored or treated. Caustic Storage Tank #3 is an aboveground tank that will be used for the storage of caustic liquids. The tank is vertical in position and cylindrical in shape. The tank and contents are supported by a skirted base. There is a cone on the bottom of the tank inside the skirt. There is a platform connected to all four caustic storage tanks (CT1, CT2, CT3, CT4). There are two ladders for access to the tank top and platform. This tank is equipped with a 3" overflow line. There is a level gauge installed through an 18" nozzle, in addition to the level gauge there is a high level alarm installed through a nozzle on the top of the tank. This tank was manufactured by Scott Manufacturing, Inc from Lubbock, Texas. The temperature of the tank varies with the ambient temperature.

Influent piping is located from the pretreatment building to the caustic tank and to other tanks in the containment area.

2. Design Standards.

The tank is designed and constructed to those sections that are applicable in the American Petroleum Institute Standard 650 - 1988 edition (API-650) and the American Institute of Steel Construction (AISC) Manual of Steel Construction (8th Edition). The Mill Test reports and radiographic testing reports can be found in Appendix F of this assessment.

3. Hazardous Characteristics of Wastes Stored

The wastes to be stored in this tank have the following characteristics (Provided by USPCI):

Untreated wastes pH (7 - 13)
N > 1
Temperature = Ambient

The hazardous characteristics of the waste to be stored in this tank were examined. It was determined that the pH and normality levels of the waste are the primary areas of concern. This is to determine the applicability of a corrosion allowance for the tank material type and thickness.

4. Existing Corrosion Protection

The interior of the tank is coated with Gliden "Glid-Guard Epoxy Chemical Resistant Finish 5240 Series." This coating will withstand the chemical characteristics of the waste to be stored.

5. Documented Age of Tank

This is a new tank, it was constructed and installed in October of 1992.

6. Result of Leak Tests

A leak test was performed. In this test the tank was filled to maximum operating capacity with water. The tank was allowed to sit full for a minimum of 6 hours. After remaining full for this time there was no evidence of the tank leaking. In the inspection all welds, flanges, manways, nozzles, and sidewalls were checked for leaks.

7. Existing Data Obtained

Diameter of Tank	12'-8-5/8" Inside Dia.
Height	40'
Material	A36 steel See Appendix F for Mill Test reports.
Wall and top thickness	0.25"
Bottom cone thickness	0.3125"
Maximum Volume	4426.27 cf. or 33,108 Gal.
Maximum Operating Volume	4299.22 cf. or 32,156 Gal.
Specific gravity of waste	1.5 (Provided by USPCI)
Temperature	Ambient
Seismic Zone	1

8. Calculation of Existing Foundation Loading

Total Weight of Tank and Contents = 216.54 tons

Detailed calculations reflecting the volume and weight of the tank are found in appendix A. The required foundation thickness and steel reinforcement are included in appendix E of this assessment.

9. Required Structural Calculation

The calculated required wall thickness for this tank is 0.2195 inches. This thickness includes 0.125 inches added for corrosion allowance. This corrosion allowance is based on a best engineering estimate taking into account the materials being treated and a 20 year design life. (See appendix B and C of this assessment for detailed calculations or required wall thickness and structural analysis of the tank support system.)

10. Comparison of Actual Structure to Theoretical Values

Wall Thickness Comparison

Calculated Required Wall Thickness	0.2195"
Minimum Required Wall Thickness By API-650-88	0.1875"
Measured Wall Thickness	0.25"

C. SECONDARY CONTAINMENT SYSTEM

1. General Description of Secondary Containment

The secondary containment system is designed and will be operated to prevent any migration of wastes or liquids out of the system. Cyanide Reactor Tank, Cyanide Measure Tank, Caustic Tanks #1-4, Sludge Storage Tank, Caustic Overflow Tank, Cyanide Overflow Tank will be located on a reinforced concrete base floor area with vertical concrete sidewalls. All associated piping is aboveground. The area will be inspected on a daily basis. The containment system is walled off and receives no direct vehicular traffic. The foundation walls and base were mass poured in place. No cracks from compression or uplift were visually apparent. There are three low areas with a slight depression that are used to collect any waste spills and rainwater. Any released tank contents or surface runoff will drain on top of the sloped concrete to the sump areas. The accumulated liquids are then removed and pumped out in accordance with the permit condition. The slab floor also serves as a foundation support for the tanks in this area.

The concrete floor was removed and replaced in October of 1992. The floor was replaced in order to strengthen the foundation for the tank support.

2. Design Standards.

Design drawings for the walls were obtained and used as a reference. It should be noted that these are design drawings and not as built drawings. The structural capacity of the foundation and walls were compared to those sections that are applicable in the API-650-88 and the American Concrete Institute (ACI 318-89/318r-89) and these calculations were used as a guide in verifying the ability of the system to contain hazardous waste. The concrete floor and foundation were built in close adherence to the above mentioned codes. The floor as previously mentioned was removed and replaced.

3. Hazardous Characteristics of Wastes Stored

The wastes which are treated in the primary tank have the following characteristics:

Untreated waste pH (7 - 13)
N > 1
Temperature = Ambient

The hazardous characteristics of the waste treated in the primary tank were examined. It was determined that the pH and normality levels of the waste are the primary areas of concern. This is to determine the applicability of a corrosion allowance for the containment system material type and thickness.

4. Existing Corrosion Protection

The concrete containment is coated with Concrete Protection System, Inc "OVERKOTE" industrial flooring. For more information on this coating see Appendix H of this report.

5. Documented Age of The Containment Area

The secondary containment system was originally constructed and installed in 1987 however the floor was replaced in October 1992.

6. Result of Leak Tests

A visual inspection of the containment area was performed and from this inspection it was determined that there are no cracks or breaks in the impermeable coating. The area will be inspected on a daily basis checking for leaks from the primary tank.

7. Data Obtained

Area	2509.85 s.f.
Wall Height	2.62 ft. (Min.)
Material	Concrete
Gross Volume	6575.81 c.f.
Thickness	30"

See Appendix G of this assessment for a detailed layout and cross sections of the secondary containment. Also included in Appendix D of this assessment are detailed calculations of the gross volumes of each containment area.

8. Calculation of Existing Capacity

Containment Capacity Available (CCA)

CCA = Gross Volume - Volume of items in the containment - Volume of rainfall.

See the appendix of this report for detailed calculations of the available containment volume. The containment capacity available = 4960.54 c.f.

9. Required Volume

Containment Capacity Required (CCR)

CCR = Volume of Largest Tank in the secondary containment

Volume of Largest Tank =	4426.27 c.f.(CT1) or 33,108 Gal.

10. Comparison of Available Volume to Required Volume

Containment Capacity Comparison

Containment Capacity Required =	4,426.27 c.f.
Secondary Containment Volume Available =	4,960.54 c.f.
Excess Containment Volume =	534.27 c.f.

CCA > CCR Adequate Capacity (under normal operating conditions) is available.

D. CONCLUSIONS

1. Primary Tank Vessel

The primary tank vessel at the of inspection was fit for use with the proposed waste stream at the given densities, chemical and physical characteristics as verified by USPCI. The useful life of the steel tank would be estimated at 20 years if the proposed waste stream is maintained. This useful life was determined by using a design life of 20 years less the period that the tank has been in use at the USPCI Lone Mountain Facility.

2. Secondary Containment System

The secondary containment area is fit for use, with the proposed waste stream at given densities and chemical and physical characteristics as verified by USPCI were released from the primary tank. The useful life of the concrete containment area is estimated at 20 years. This useful life was determined by using a design life of 20 years less the period that the system has been in use at the USPCI Lone Mountain Facility.

E. RECOMMENDATIONS

The following repairs or modifications should be made:

1. Primary Tank

   The tank should be internally inspected periodically to insure no corrosion is occurring. The tank should be checked yearly with ultrasonic testing procedures to establish a verified limit of corrosion. USPCI should continually insure compatibility with the waste and densities stored. Daily inspections should conducted to detect any visual corrosion or defects.

2. Secondary Containment

   The secondary containment should be checked periodically for any deterioration and structural integrity.

3. Routine Inspections

   When routine and preventative measures are to be completed, the tank should be cleaned and internally inspected to determine any interior defects or corrosion. Routine painting and coating of tanks on the interior and exterior, and routine inspection is recommended.

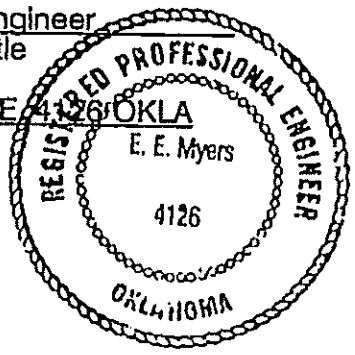
F. CERTIFICATION

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.

E.E Myers
Date: 1/20/93

Engineer
Title

P.E. 4126/OKLA



APPENDIX A

Primary Tank Volume Calculations

SECTION 202 - APPENDIX A

CT3, Caustic Storage Tank No. 3

PRIMARY TANK VOLUME CALCULATIONS

DIMENSIONS:				
Geometry:	CYLINDRICAL			
Diameter:		12.72	FEET	
Max Height:		34.00	FEET	
Normal Operating Height:		33.00	FEET	
Cone Height:		2.42	FEET	
Bottom Cone Diameter		0.50	FEET	
Cone Length		6.80	FEET	
Cone Volume:		106.53	C.F. or	796.83 Gal.
VOLUME CALCULATIONS				
Max. Volume :		4426.27	C.F. or	33108.49 Gal.
Normal Operating Volume		4299.22	C.F. or	32158.15 Gal.
MAXIMUM OPERATING TANK VOLUME =			4426.27	C.F.
		OR	33,108.49	GAL
WEIGHT ON FOUNDATION				
CONTENTS S.G.:		1.50		
DENSITY:		93.60	LB/C.F.	
SURFACE AREA CALCULATION				
Tank Top =		127.05	S.F.	
Tank Bottom Cone =		257.87	S.F.	
Tank Wall= Cir*h		1358.54	S.F.	
TOTAL SURFACE AREA WALL AND TOP		1743.47	S.F.	
Steel Thickness=				
Sidewalls and Top		0.25	INCHES	
Cone		0.31	INCHES	
Volume of Steel =				
Sidewalls		28.30	C.F.	
Top and bottom		10.02	C.F.	
Density of Steel =		490.00	LB/C.F.	
Weight of Steel =		9.39	TONS	
WEIGHT OF TANK CONTENTS =		207.15	TONS	
TOTAL WEIGHT OF TANK AND CONTENTS =			216.54	TONS

APPENDIX B

Primary Tank Wall Thickness Calculations

SECTION 202 - APPENDIX B

CT3, Caustic Storage Tank No. 3

PRIMARY TANK WALL THICKNESS

DIMENSIONS:			
Geometry:	CYLINDRICAL		
Diameter:		12.72	FEET
Height :		34.00	FEET
Specific Gravity:		1.50	
Normal Operating Temperature =		ambient	

STEEL THICKNESS CALCULATIONS @ BOTTOM RING

Thickness (t) = (2.6 * H * D * S.G.) / (s * E) + CA

s = Allowable Design Stress =	21000.00	PSI ***
E = Joint Efficiency =	85.00%	
Thickness (t) =	0.0945	INCHES
Corrosion Allowance =	0.1250	INCHES
Calculated Req'd Wall thk. =	0.2195	INCHES

*** THIS DESIGN STRESS IS OBTAINED FROM API-650-88 WITH THE USE OF APPENDIX A.

CONE WALL THICKNESS CALCULATION

Cosine Alpha = cos(67.6594)	0.3801	
P1= Internal Pressure=		
=Density*s.g.*(x+D/6*cot(alpha)	3263.83	psi
P2= H*density*s.g.=33*62.4*1.5 =	3182.40	psi
Tc= top cone radius =	6.36	inches
Fb = Allowable stress	23200	psi

The required wall thickness of the cone will be the greater of the following Formulas.

1. Ts=P1*Tc/2*cos(alpha)*fb =	0.098	+1/8"C.A.=	0.223 in.
2. Ts=P2*D/cos(alpha)*Fb =	0.191	+1/8"C.A.=	0.316 in.

APPENDIX C

Structural Support Calculations

SECTION 202 - APPENDIX C

CT3, Caustic Storage Tank No.3

STRUCTURAL SUPPORT CALCULATIONS

GIVEN:		
Tank Diameter =	12.72	feet
Total Height =	40.00	feet
Weight of Tank =	18780.00	lbs
Weight of Max. Contents =	414300.00	lbs
Tank Nominal Thickness =	0.25	in

-----SEISMIC DESIGN CHECK-----

ZONE COEFFICIENT (Z):	0.1875	
ESSENTIAL FACILITIES FACTOR (I):	1.000	
LATERAL EARTHQUAKE FORCE COEFF. (C1):	0.240	
D/H:	0.267	
k factor:	0.590	
SITE AMPLIFICATION FACTOR (S):	1.500	
NATURAL PERIOD OF FIRST SLOSHING (T):	2.104	
LATERAL EARTHQUAKE FORCE COEFF. (C2):	0.214	
WEIGHT OF TANK SHELL (We):	18780.000	LBS
TOTAL WEIGHT OF TANK CONTENTS (Wt):	414300.000	LBS
W1/Wt:	0.950	
W2/Wt:	0.050	
WEIGHT OF EFFECTIVE MASS OF CONTENTS THAT MOVES IN UNISON WITH THE TANK SHELL (W1):	393585.000	LBS
WEIGHT OF EFFECTIVE MASS IN FIRST SLOSHING (W2):	20715.000	LBS
HT FROM BTM OF SHELL TO CENT. OF SHELL (Xe):	20.000	FEET
X1/H:	0.500	
HT FROM BTM TO CENT. OF LAT. SEISMIC FORCE (X1):	20.000	FEET
X2/H:	0.900	
HT FROM BTM TO CENT. OF LAT. SEISMIC FORCE (X2):	36.000	FEET

Note: All of the above calculations are based on API-650-88 Seismic Design Procedure (Appendix E).

CHECK STRESS IN TANK SHELL FROM SEISMIC FORCES:

Wi = MAXIMUM WEIGHT OF TANK CONTENTS THAT MAY BE USED TO RESIST THE SHELL OVERTURNING MOMENT		
Wi = 7.9*tb*(Fby*G*H)^.5		
tb = THK. OF BTM. PLATE UNDER SHELL:	0.250	IN
Fby = MINIMUM YIELD STRENGTH OF BOTTOM PLATE:	9000.000	PSI
G = DESIGN SPECIFIC GRAV. OF LIQUID:	1.50	
Wi =	1451.32	LBS/FT OF SHELL CIRCUMFRENCE
DENSITY OF TANK SHELL MATERIAL:	490.00	LBS/CF
WT = WEIGHT OF TANK SHELL AND THE PORTION OF FIXED ROOF SUPPORTED BY TANK SHELL:	408.33	LBS/FT OF SHELL CIRCUMFRENCE
M/[D^2(WT+Wi)]:	1.3328	
b = MAXIMUM LONGITUDINAL COMPRESSIVE FORCE AT THE BTM. OF TANK SHELL		
b = WT + 1.273*M/D^2		
b:	3563.57	LBS/FT OF SHELL
G*H*D^2/t^2:	155326.46	
Fa = MINIMUM OF 10^6*t/D or Fty/2:	4500.00	PSI
Fty = MINIMUM YIELD STRENGTH OF BTM. PLATE:	9000.00	PSI
MAX. LONGITUDINAL COMPRESSIVE STRESS IN THE TANK SHELL = b/12t =	1187.86	PSI

CHECK OVERTURNING MOMENT FROM WIND PRESSURE

M must be Less Than or Equal To .66*(WD)/2
If M is Greater Than .66*(WD)/2 Anchor Bolts
Would Be Required

Where:

W = Shell Weight Available To Resist Uplift (lbs)

D = Tank Diameter (feet)

M = Overturning Moment

M = Pw*Projected Area*H1

H1 = Height from ground to centroid of tank shell

Pw = Wind Pressure (18 psf for 100 MPH Wind on cylinders)

.66*(WD)/2:	78830.93	FT-LBS
M:	183168.00	FT-LBS

M > .66*(WD)/2 therefore anchor bolts are required

Number of Anchors:	12.00	
Anchor Diameter:	1.25	inches
Dia. of Anchor Circle:	13.05	feet

tB = design tension load per anchor

tB:	3113.62	pounds
Allowable Load/ Anchor:	24543.69	pounds

APPENDIX D

Containment Area Volume Calculations

SECTION 202 - APPENDIX D

CT3, Caustic Storage Tank No.3

CONTAINMENT AREA No.8A VOLUME CALCULATIONS (CAUSTIC AREA)

Length =	70.70	feet
Width =	35.50	feet
Height =	2.62	feet
Surface Area =	2509.85	S.F.

Gross Volume = Area * Heigth = 6575.81 C.F.

Volumes of Items of Displacement **

1. Steel skirting = 9.17 C.F.

Total volume to deduct for items in containment area = 9.17 C.F.

Subtraction for volume of rainfall

Volume of rain = Area x depth of rainfall

Depth of rainfall =	6.15	In.
Area =	2509.85	S.F.
Volume =	1286.30	C.F.

TOTAL AVAILABLE VOLUME = Gross Volume - Subtractions =	6575.81 C.F.
Items of diplacement	-9.17 C.F
Volume of rainfall	-1286.30 C.F
TOTAL AVAILABLE VOLUME Area 8A	5280.34 C.F.

CONTAINMENT AREA No.8c VOLUME CALCULATIONS (TRUCK PAD)

This area will collect rain and deposit it into the caustic containment area (8a) when the valve is opened. This area does not contribute any volume for containment.

Length =	52.00	feet
Width =	12.00	feet
Surface Area =	624.00	S.F.

Subtraction for volume of rainfall

Volume of rain = Area x depth of rainfall

Depth of rainfall =	6.15	In.
Area =	624.00	S.F.
Volume =	319.80	C.F.

SUMMARY OF SECONDARY CONTAINMENT DATA

Surface Areas :

Caustic Area 8A =	2509.85	S.F.
Truck Unloading Pad 8C =	624.00	S.F.

Gross Volumes :

Caustic Area 8A =	6575.81	C.F.
Truck Unloading Pad 8C =	0.00	C.F.

Volume of displacements

Caustic Area 8A =	9.17	C.F.
Truck Unloading Pad 8C =	0.00	C.F.

Volume for 24hr rain:

Caustic Area 8A =	1286.30	C.F.
Truck Unloading Pad 8C =	319.80	C.F.

Total Gross Volume 8A =	6575.81	C.F.
Total Displacement Volumes =	9.17	C.F.
Total volume of Rain	1606.10	C.F.

Containment Capacity Available (CCA) =	4960.54	C.F.
	or	
	37104.83	GAL.

APPENDIX E

Foundation Design Analysis

SECTION 202 - APPENDIX E

CT3, Caustic Storage Tank No.3

FOUNDATION DESIGN ANALYSIS

ASSUMPTIONS:

f'c =		4.00	KSI
fy =		60.00	KSI
Allowable Soil Press. =		2.20	KSI
Structural Steel =	A36		

GIVEN:

Tank Diameter =	12.72	feet
Sidewall Height =	40.00	feet
Weight of Tank (Shell)	18780.00	lbs
Weight of Max. Contents =	414300.00	lbs

Tank is Resting on a concrete foundation.

CHECK CONCRETE FOUNDATION DESIGN:

Assume Footing Depth =	30.00	inches
Assume Footing Width =	30.00	inches
Assumed Effective Soil Press. =	1925.00	psf

psf

Look at what is resisting overturning moment from seismic load:

b = 3563.57 lb/ft of circ.

Where b is the maximum shell compression at the bottom of the shell.

If the footing is 30.00 inches wide
then the actual applied pressure to the subgrade is 1425.43 lb/sf

This is less than the effective soil pressure.

APPENDIX F

MANUFACTURERS DATA, MILL TEST REPORTS, RADIOGRAPHIC REPORTS

CERTIFICATION TO OWNER OF COMPLIANCE WITH API 650-88

To: USPCI LONE MOUNTAIN FACILITY

WAYNOKA, OKLAHOMA

To Whom It May Concern:

Scott Manufacturing, Inc. hereby certifies that the tank(s) constructed for you at SCOTT MANUFACTURING, INC. WOLFFORTH, TEXAS and described as follows: (4) 12/75' diameter by 40' shell height Caustic Storage Tanks, Serial Numbers 451-1, 2, 3, &4 has/have been designed, fabricated, erected, and inspected in accordance with all of the requirements of the American Petroleum Institute Standard 650-88 entitled, "Welded Steel Tanks for Oil Storage" and that the results of all such inspections, radiographs, and other tests indicate that the tanks(s) fully complies/comply with all of the requirements. We further certify that all materials meet specifications.

SCOTT MANUFACTURING, INC.

William A. Bacon
By

MANAGER/HEAVY CONSTRUCTION
Title

23 OCTOBER 1992
Date

CITY OF LUBBOCK

STATE OF TEXAS

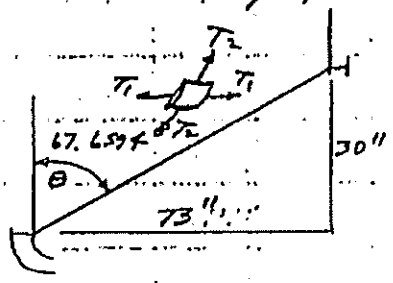
Acknowledged and sworn to before me this 23rd day of October, 1992.

Royce Eledell
Notary Public

USPCI, WAYNOKA, OK

10/20/92

12.72'ϕ x 40' (OVERALL)



CONE

$$T_2 = \frac{\gamma}{2\cos\theta}\left(\frac{D}{2}\right)\left(X + \frac{D}{6}\cot\theta\right)$$

$$= \frac{62.4(1.5)}{2\cos 67.659°}\left(\frac{12.72}{2}\right)\left(33' + \frac{12.72}{6}\cot 67.659°\right)$$

$$= 123.1217\ (6.36)\ (33.8712)$$

$$= 24,523\ \text{lbs/ft} \div 12$$

$$= 2210.25\ \text{lbs/in} \div 23,200\ \text{lbs/in}^2$$

$$= 0.09527" + 0.125"$$

$$= 0.2203"$$ use 1/4" PL

$$T_1 = \frac{\gamma D X}{2\cos\theta}$$

$$= \frac{62.4(1.5)(12.72)33}{2\cos 67.659°}$$

$$= 51,682\ \text{lbs/ft} \div 12$$

$$= 4,306.80\ \text{lbs/inch} \div 23,200\ \text{lbs/in}^2$$

$$= 0.1856" + 0.125"$$

$$= 0.3106"$$ use 5/16" PL

GIRDER RING

$$C = \frac{\gamma}{B}\left(X + \frac{D}{6}\cot\theta\right) D^2 \tan\theta$$

$$= \frac{62.4(1.5)}{B}\left(33 + \frac{12.72}{6}\cot 67.659°\right) 12.72^2 \tan 67.659°$$

$$= 11.70\ (33.8712)\ 393.710$$

$$= 156,025\ \text{lbs} \div 23,200\ \text{lbs/in}^2$$

$$= 6.72522\ \text{in}^2$$

( )

$$A_{eff} = 0.78\left(t_c\sqrt{R_c t_c} + t_1\sqrt{R_1 t_1} + t_s\sqrt{R_s t_s}\right)$$

$$= 0.78\left(.25\sqrt{4.375(.25)} + .3125\sqrt{17.31(.3125)} + .25\sqrt{4.375(.25)}\right)$$

$$= 1.05927\ \text{in}^2 \quad (0.8131\ \text{in}^2)$$

$$A_{eff(MAX)} = 16\,(t_c^2 + t_1^2 + t_s)$$

$$= 16\,(.25^2 + .3125^2 + .25^2)$$

$$= 3.56250\ in^2 > 1.05927\ in^2 \text{ use smaller}$$
(2.5625) (0.8131)

$\therefore$ use $1.05927\ in^2$

$$6.72522 - 1.05927 = 5.666\ in^2$$
$$(6.7252 - 0.8131 = 5.9121\ in^2)$$

USPCI, WAYNOKA, OK 10/14/92

12.75'ϕ X 40' (overall) Contents - Caustic Liquid - Sp. Gr. - 1.5 API-650

Corrosion Allowance - 1/8" Thickness By 1 Foot Method

$$\frac{2.6\,(12.75)(40-1)\,1.5}{23,200} + .125 = 0.2086" \text{ use } 1/4" \text{ Pl}$$

Louis D. Wood, Jr.

STATE OF TEXAS
LOUIS D. WOOD, JR.
60815
REGISTERED
PROFESSIONAL ENGINEER

10/14/92

PLATE

SUNBELT TRADING COMPANY, Inc.

JC Scott Mfg.
Attn: Wayne

REF:

CUSTOMER'S P.O. NO. 27158
S.T.C.'s RELEASE NO. 2994
S.T.C.'s INVOICE NO. 010435

ATTACHED PLEASE FIND MILL TEST CERTIFICATES FOR YOUR ABOVE REFERENCED PURCHASE ORDER FOR THE FOLLOWING MATERIAL.

See Below

THANKS AND REGARDS,

Stacey

STACEY GESSERT

enclosure

20 pcs. 1/4 x 96 x 480 A-36 Plate
4 pcs 1/4 x 96 x 240 A-36 Plate
6 pcs 5/16 x 96 x 240 A-36 Plate
4 pcs 1/4 x 96 x 240 Floor Plate

NEW ADDRESS
1990 POST OAK BLVD., SUITE 1550
HOUSTON, TX 77056-3813

2000 Post Oak Blvd. Suite 1867 Houston, Texas 77056

CERTIFICAT D'ANALYSE DIN 50049/2.2

N°29070 — PAGE N° 1 / ARTT NR / PAGE No

FORGES DE CLABECQ
Rue de la Déportation 218
1480 TUBIZE
(BELGIQUE)

C.E.C. : Conforme au Cahier des Charges – Conform den Vorschriften – According specifications
BL : Brut de laminage – Walzhaut unbearbeitet – As rolled
N : Normalisé – Normalgeglüht – Normalized
Z : Recuit – Verglüht – Tempered
D : Détensionné – Spannungsfreiglüht – Stress relieved
LC : Laminage contrôlé – Gleichmässige Temperaturführung – Controlled rolling

TOLES-BLECHE-PLATES

CLIENT / DESTINATAIRE – BESTELLER / EMPFÄNGER – PURCHASER / CONSIGNEE: SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD. # 1550
US - HOUSTON - TEXAS 77056-3813

N° COMMANDE COURTIER/CLIENT – MAKLER/KUNDENBESTELL NUMMER – BROKER/PURCHASER'S ORDER NUMBER: STC 11.695

N° commande usine – Werksauftrag Nr. – Works order No.: 15042

NUANCE ET SPECIFICATIONS TECHNIQUES – STAHLSORTEN UND PRÜFBEDINGUNGEN – QUALITY AND SPECIFICATIONS: GRADE C / ASTH A 283/88

IDENTIFICATION DU PRODUIT – ERZEUGNIS BEZEICHNUNG – PRODUCT IDENTIFICATION				DIMENSIONS – ABMESSUNGEN – DIMENSIONS			MASSE THEORIQUE THEORETISCHES GEWICHT THEORETICAL WEIGHT	TRACTION – ZUGVERSUCH – TENSILE TEST						RESILIENCE – KERBSCHLAGZÄHIGKEIT – NOTCH TOUGHNESS						
N° REFERENCE – REFERENCE No	N° COULEE – SCHMELZ NR – HEAT No	MARQUE – SIGLE – STAMP	NOMBRE DE PIECES – ANZAHL DER STÜCKE – No OF PIECES	EPAISSEUR – DICKE – THICKNESS	LARGEUR – BREITE – WIDTH	LONGUEUR – LÄNGE – LENGTH		CONTROLE	SENS	(2)	Re	Rm	A %		TYPE – ART – TYPE	SENS	TEMP °C	PEAU – OBERFLÄCHE – SURFACE	VALEURS INDIVIDUELLES – EINZELWERTE – INDIVIDUAL VALUES				MOYENNE – MITTELWERT – AVERAGE
							(kg)		T T T		(N/mm2)											
	289299		1	26	0"1/4	96"	240"												
	289300		1	36	0"1/4	96"	240"												
	289301		1	53	0"1/4	96"	240"												
	289304		1	67	0"1/4	96"	240"												

Sheared plates

(1) Is = 3,43 mm – (2) Ls = 20 mm – (3) L = 200 mm

ANALYSE SUR PRODUIT – STÜCKANALYSE – CHECK ANALYSIS

(5)	N° DE REFERENCE – REFERENCE NR – REFERENCE No	N° COULEE – SCHMELZ NR – HEAT No		Mn %	P %	S %	C %	Si %	Al %	Nb %							
O/Y		289299		0.475	0.033	0.009	0.159	0.163	0.015	0.001							
		289300		0.463	0.019	0.017	0.172	0.201	0.031	0.001							
CC		289301		0.460	0.023	0.009	0.179	0.174	0.015	0.001							
		289304		0.446	0.015	0.017	0.176	0.219	0.004	0.001							

SERVICE METALLURGIQUE

Controle de marquage d'aspect et de dimensions : Satisfaisants
Bezeichnung, Beschaffenheit und Ausmessung : Ohne Beanstandung
Marking, inspection and measurement : Without objection

CLABECQ, le 27/04/92

(1) Prélèvement-Location – Entnahme-Lage – Sampling-Location: 1:Tête-Kopf-Top 2:Pied-Fuss-Bottom
(2) Sens-Richtung-Direction: L:Long-Lange-Longitudinal – T:Travers-Quer-Transverse
(3) C:Cœur-Kernprobe-Core sample; F:Peau-Oberfläche-Rolled surface
(4) O/Y : Oxygène pur – Sauerstoff – Oxygen; CC : Coulée continue – Kontinuierliches giessen – Continuous casting

Nous certifions que les produits exposés ci-dessus sont conformes aux prescriptions de la commande
Wir bestätigen hiermit dass die obenerwähnten erzeugnisse den bestellung vorgeschrift entsprechen
We certify hereby that the above mentioned products are conformed with the order prescriptions

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe
Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben
The results of the special tests are indicated on the complementary documents in appendix

CERTIFICAT D'USINE DIN 50049/2.2

N°29774 PAGE N° 9
BLATT NR
PAGE No

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE)

PLAQUES-BLECHE-PLATES

SIGLE PRODUCTION MOYEN/LIEU/PAYS
TRADE MARK

C.E.E. : Conforme au Cahier des Charges - Conform with specifications (1)
BL : Brut de laminage - Hot/as rolled - Warmgewalzt - As rolled
N : Normalisé - Normalized - Normalisiert
R : Recuit - Annealed - Getempert
D : Détensionné - Stress relieved - Spannungsfreiglühen - Stress relieved
TC : Laminage contrôlé - Controlled rolling - Kontrolliertes Walzen - Controlled rolling

CLIENT / DESTINATAIRE - BESTELLER / EMPFÄNGER - PURCHASER / CONSIGNEE
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

N° COMMANDE ACHETEUR/CLIENT - KÄUFER/KUNDENSEITIG NUMMER - BUYER/PURCHASER'S ORDER NUMBER
11654B

N° commande usine - Werksauftrag Nr. - Works order No.
15527

NUANCE ET SPECIFICATIONS TECHNIQUES - STAHLSORTE UND PRÜFBEDINGUNGEN - QUALITY AND SPECIFICATIONS
A36 - SA36
ASTM A36/91-ASME SA36/

CONDITIONS DE LIVRAISON - LIEFERZUSTAND - AS DELIVERED

TRAITEMENT DE REFERENCE PROBESTÜCKZUSTAND - HEAT TREATMENT OF TEST SAMPLES (1)

IDENTIFICATION DU PRODUIT - ERZEUGNIS KENNZEICHEN - PRODUCT IDENTIFICATION				DIMENSIONS - ABMESSUNGEN - DIMENSIONS			MASSE THEORIQUE - THEORETISCHES GEWICHT - THEORETICAL WEIGHT	REMARQUES	TRACTION - ZUGVERSUCH - TENSILE TEST							RESILIENCE - KERBSCHLAGZÄHIGKEIT - NOTCH TOUGHNESS							
N° REFERENCE - REFERENCE NR - REFERENCE No	N° COULEE - SCHMELZ NR - HEAT No	NBRE DE PIECES - STÜCKZAHL - No OF PIECES	NBRE DE LAMES - No OF SLABS	EPAISSEUR - DICKE - THICKNESS	LARGEUR - BREITE - WIDTH	LONGUEUR - LÄNGE - LENGTH	(kg)	(2)	SENS (3)	(4)	Re	Rm	A % (3)			TYPE - FORM - TYPE	SENS (3)	TEMP °C	PEAU ECOUR (4)	VALEURS INDIVIDUELLES - EINZELWERTE - INDIVIDUAL VALUES			VOLEURS MOYENNE - MITTELWERTE - AVERAGE
B07	B08	B09	B10	B11	B12	B13	B16	C01	C02	C04	C11 (N/mm2)	C12	C13	C14	C15	C40	C44	C45	C46	C42	C42	C42	C43	C08
	292080	34		0"5/16	96"	240"			T		308	410	27.0											
									T		284	436	27.0											
	292085	35	24	0"3/8	96"	240"			T															
	292086	35		0"3/8	96"	240"			T		310	415	31.0											
									T		298	413	30.0											
	292083	36	21	0"3/8	96"	480"			T		303	418	31.0											
									T		287	414	30.0											
	292085	36		0"3/8	96"	480"			T		307	430	32.0											

(1) Le = 5,65 √S mm - (2) Le = 50 mm - (3) Le = 200 mm

A05

ANALYSE SUR PRODUIT - STÜCKANALYSE - CHECK ANALYSIS

(5)	N° DE REFERENCE - REFERENCE NR - REFERENCE No	N° COULEE - SCHMELZ NR - HEAT No	Mn %	P %	S %	C %	Si %	Al %	Nb %								
C10	B07	B08	C72	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	
D/Y		292080	0.826	0.032	0.015	0.096	0.285	0.013	0.001								
		292085	0.810	0.016	0.010	0.092	0.289	0.021	0.001								
CC		292086	0.808	0.020	0.012	0.075	0.259	0.011	0.001								
		292083	0.816	0.018	0.014	0.088	0.324	0.002	0.001								

SERVICE METALLURGIQUE

D01/203

Contrôle de marquage d'aspect et de dimensions : Satisfaisants - Bezeichnung, Beschaffenheit und Ausmessung : Ohne Beanstandung - Marking, inspection and measurements : Without objection

CLABECQ, le 10/07/92

(2) Prélèvement - Location - Lage: 1:Bobine-Tête-Top / 2:Plat-Face-Bottom C02

(3) Sens - Richtung - Direction: L:Long-Longitudinal / T:Travers-Quer-Transverse C04

(4) Eprouvette - Kerbschlagprobe - Test sample: P:Peau-Walzfläche-Rolled surface C07

C08

(5) D/Y : Oxygène pur - Oxygen / CC : Coulée continue - Stranggießen - Continuous casting C93

Nous certifions que les produits mentionnés ci-dessus sont conformes aux prescriptions de la commande - We certify hereby that the above mentioned products are conform with the order prescriptions Z04

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe - Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben - The results of the special tests are indicated on the complementary documents in annexe C40

Z01

FORGES DE CLABECQ
rue de la Déportation 216
1400 TUBIZE
(BELGIQUE)

PLAQUES-BLECHE-PLATES

CERTIFICAT D'USINE DIN 50049/2.2

N°29786 — PAGE No. 1

CLIENT / DESTINATAIRE : SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

N° COMMANDE CLIENT / ACHETEUR : 11654B

N° COMMANDE USINE : 15527

NORME ET SPECIFICATIONS TECHNIQUES : A36 - SA36
ASTM A36/91-ASME SA36/

N° REFERENCE REPERAGE	N° COULEE SCHMELZ-NR. HEAT No	MARQUE DE LAMINAGE WALZMARKE MILL MARK	EPAISSEUR DICKE THICKNESS	LARGEUR BREITE WIDTH	LONGUEUR LAENGE LENGTH	MASSE THEORIQUE THEORETISCHES GEWICHT THEORETICAL WEIGHT	QUALITE	Re (N/mm2)	Rm	A 2" %	ETAT TEMPE TEMPER	TDP °C	PCAU COEUR (1)	VALEURS INDIVIDUELLES EINZELWERTE INDIVIDUAL VALUES	MOYENNE DURCHSCHNITT AVERAGE
	292097	32	0"1/4	96"	240"	(kg)	T	293	410	27.0					
							T	295	413	28.0					
	292098	32	0"1/4	96"	240"		T	301	416	26.0					
							T	287	416	23.0					
	292099	32	0"1/4	96"	240"		T	294	407	26.0					
							T	298	415	24.5					
	292100	32	0"1/4	96"	240"		T	295	410	27.0					
							T	294	411	24.0					

(1) Le = 5,65 √So mm — (2) Le = 50 mm — (3) Le = 200 mm

ANALYSE SUR PRODUIT - SPECIMEN/ITE - CHECK ANALYSIS

	N° DE REPERAGE REFERENCE No	N° COULEE SCHMELZ-NR. HEAT No	%C	%Si	%Mn	%P	%S	%Cu	%Nb+V
O/Y		292097	0.789	0.022	0.014	0.073	0.259	0.007	0.001
		292098	0.808	0.023	0.023	0.081	0.281	0.013	0.001
CC		292099	0.736	0.019	0.015	0.066	0.274	0.013	0.001
		292100	0.798	0.029	0.022	0.066	0.272	0.011	0.001

SERVICE METALLURGIQUE

Contrôle de marque d'accord et de dimensions : Satisfaisants
Kontrolle, Bestätigung und Abmessung : Ohne Beanstandung
Marking, inspection and measurement : Without objection

CLABECQ, le 15/07/92

(1) Prélèvement-Lecture
Entnahme-Lage
Sampling-Location

(2) Sens-Direction
Längs-Quer
Longitudinal-Transverse

(3) E/T : Oxygène pur - Oxygen
CC : Coulée continue - Continuous casting

(4) Eprouvette-Corps d'épreuve
Prüfstück-Prüfstab
Test piece-Test bar

CERTIFICAT D'USINE DIN 50049/2.2

N°2942 PAGE N° 3 / ZEUGNIS NR / CERTIFICATE NR / ATTESTATO NR / ATT NR / PAGE No

FORGES DE CLABECQ
Rue de la Déportation 238
1480 TUBIZE
(BELGIQUE)

TÔLES-BLECHE-PLATES

C.E.C. : Conforme au Cahier des Charges – Gemäss den Vorschriften – According specifications (1)
BL : Brut de laminage – Walzgeglüht unbearbeitet – As rolled
N : Normalisé – Normalgeglüht – Normalized
R : Revenu – Vergütet – Tempered
D : Détensionné – Spannungsfreigeglüht – Stress relieved
LC : Laminage contrôlé – Gleichmässige Temperaturführung – Controlled rolling

SIGLE PRODUCTEUR / HERSTELLERKENNZEICHEN / TRADE MARK

CLIENT / DESTINATAIRE – BESTELLER / EMPFÄNGER – PURCHASER / CONSIGNEE
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

N° COMMANDE COURTIER/CLIENT – MAKLER/KUNDENBESTELL NUMMER – BROKER/PURCHASER'S ORDER NUMBER: 11.653

N° commande usine – Werks-Auftrag-Nr. – Works order No.: 15520

NUANCE ET SPECIFICATIONS TECHNIQUES – STAHLSORTEN UND PRÜFBEDINGUNGEN – QUALITY AND SPECIFICATIONS: A36 - SA36 / ASTM A36/89-ASME SA36/89

ETAT DE LIVRAISON – LIEFERZUSTAND – AS DELIVERED

TRAITEMENT DE REFERENCE – PROBESTREIFENDE HANDLUNG – TREATMENT OF TEST SAMPLES (1)

IDENTIFICATION DU PRODUIT – ERZEUGNIS BENENNUNG – PRODUCT IDENTIFICATION				DIMENSIONS – ABMESSUNGEN – DIMENSIONS					TRACTION – ZUGVERSUCH – TENSILE TEST							RESILIENCE – KERBSCHLAGZÄHIGKEIT – NOTCH TOUGHNESS							
N° REFERENCE – REFERENCE NR – REFERENCE No	N° COULEE – SCHMELZ NR – HEAT No	MARQUE – BRANDZ – STAMP	N° PIECE – STÜCK NR – PIECE No	REPERE DE PIECE – STÜCK-ZAHL – PIECE No	EPAISSEUR – DICKE – THICKNESS	LARGEUR – BREITE – WIDTH	LONGUEUR – LÄNGE – LENGTH	MASSE THEORIQUE – THEORETISCHES GEWICHT – THEORETICAL WEIGHT	UNITE – EINHEIT	SENS (3)	(4)	Re	Rm	A % (2) (3)			TYPE – FORM – TYPE	SENS (3)	TEMP °C	PEAU – ZUNDER (4)	VALEURS INDIVIDUELLES – EINZELWERTE – INDIVIDUAL VALUES			MOYENNE – MITTELWERTE – AVERAGE	(2) *
								(kg)				(N/mm2)												
290634		2		0"1/4	96"	480"		T		294	410	29.0				T								
290635		2		0"1/4	96"	480"		T		284	404	31.0				T								
290638		2		0"1/4	96"	480"		T		271	404	31.0				T								
289231		3	2	2"	96"	480"		T		283	405	29.0				T								
								T		293	407	30.0				T								
								T		300	482	34.0				T								
								T		280	473	34.0				T								

* (2) La = 5,65 √S₀ – (3) Lo = 50 mm – (3) Lo = 200 mm

ANALYSE SUR PRODUIT – STÜCKANALYSE – CHECK ANALYSIS

(5)	N° DE REPERE – REFERENCE NR – REFERENCE No	N° COULEE – SCHMELZ NR – HEAT No	Mn %	P %	S %	C %	Si %	Al %	Nb %							
D/Y		290634	0.859	0.025	0.016	0.073	0.182	0.011	0.001							
		290635	0.845	0.020	0.017	0.075	0.159	0.010	0.001							
CC		290638	0.822	0.018	0.018	0.077	0.204	0.012	0.001							
		289231	0.938	0.020	0.009	0.190	0.198	0.032	0.001							

SERVICE METALLURGIQUE

Contrôle de marquage d'aspect et de dimensions : Satisfaisants – Bezeichnung, Beschaffenheit und Ausmessung : Ohne Beanstandung – Marking, inspection and measurement : Without objection

CLABECQ, le 29/05/92

(1) Prüflage-Location: 1: Tête-Kopf-Top; 2: Pied-Fuss-Bottom
(3) Richtung-Direction: L: Long-Längs-Longitudinal; T: Travers-Quer-Transverse
(4) E: Coeur-Kernprobe-Core sample; P: Peau-Haltfläche-Rolled surface
(5) O/Y : Oxygène pur – Sauerstoff – Oxygen
CC : Coulée continue – Kontinuierliches giessen – Continuous casting

Nous certifions que les produits mentionnés ci-dessus sont conformes aux prescriptions de la commande – Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellbog vorschriften entsprechen – We certify hereby that the above mentioned products are consistent with the order prescriptions

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe – Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben – The results of the special tests are indicated on the complementary documents in appendix

STRUCTURAL

CHAPARRAL STEEL

MIDLOTHIAN 300 WARD RD.
TEXAS 76065
(214) 775-8241

CERTIFIED MATERIAL TEST REPORT

SOLD TO
O'NEAL STEEL, INC.
P.O. BOC 98
BIRMINGHAM AL 35201

SHIP TO
O NEAL STEEL INC
2834 CLOVIS RD
LUBBOCK TX
3035*

OMER PURCHASE ORDER NUMBER	DATE	QUANTITY	DESCRIPTION	LENG
·04616	10-JUN-92	4.68	W 4 X 13#	40.0

TED ACCORDING TO	SIZE	GRADE	PRODUCT	HEAT
STM A6-90A 6-90 72-88C	W 4 X 13#	A36/A57250	WF BEAMS	9-9769

CHEMICAL ANALYSIS

	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	
.12	0.87	0.014	0.050	0.26	0.57	0.14	0.06	0.028	0.000	0.009	

PHYSICAL PROPERTIES

ELD ENGTH	TENSILE STRENGTH	SPECIMEN AREA	ELONGATION	GAUGE LENGTH	BEND TEST DIA	BEND TEST RESULT	GRAIN SIZE	REDUC O AR
.5	77.7	3.727	43.5	2"	0.5D	PASS		
60.4	80.0	3.727	39.0	2"	0.5D	PASS		

I hereby certify that the contents of this report are correct and accurate. All test results and operations performed by this manufacturer are in compliance with the requirements of the material specification, and when designated by the purchaser meet specific applicable material requirements of section III of the A.S.M.E. Boiler and Pressure Vessel Code".

Signed Tom L Harrington

Tom L. Harrington • Quality Assurance Manager
Sworn and Subscribed to before me, in and for Ellis County on

this 10th day JUNE, 1992

(NOTARY PUBLIC)

My Commission Expires

ANTEST 499603 (NOTARIZED ON REQUEST ONLY)

REMARKS

PO# 27230
WO# JT 41210

O NEAL STEEL INC.
P O BOX 5495
LUBBOCK TX 79417

ALL MANUFACTURING PROCESSES OF THE STEEL MATERIALS IN THIS PRODUCT, INCLUDING SMELTING, HAVE OCCURRED WITHIN THE UNITED STATES IN COMPLIANCE WITH THE "BUY AMERICA" PROVISION OF THE SURFACE TRANSPORTATION

1

Atlantic Steel Company

A MEMBER OF THE MACO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

TEST CERTIFICATE

DATE 08/[illegible]/92

3/8 x 2

SEND TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	% ELONG 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
05	Z-1725 S	FLATS, 0.3750"X 2.0000" A36-90 20'00", 5000# BUNDLE	49690	52.0	73.3	30.0		.16	.72	.015	.016	.16	.27					

TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

I CERTIFY THE ABOVE RESULTS OF TESTS AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

ORIDA STEEL
RPORATION

CHEMICAL AND PHYSICAL TEST REPORT

MADE IN U.S.A.

O'NEAL STEEL, INC.
2834 CLOVIS ROAD
BOX 5495
LUBBOCK TX 79415

INVOICE TO: O'NEAL STEEL, INC.
P. O. BOX 2623
BIRMINGHAM AL 35202-26

SHIP DATE: 07-20-92
SHIPPERS NUMBER: 8582-116256
CUST. ACCOUNT NO: 36791606

SIZE					GRADE		SPECIFICATION							S.O. NO.		CUST. P.O. NUMBER			
HEAT LD NO	C	MN	P	S	V	SI	CR	CU	NI	SN	AL	MO		YIELD PT LBS/SQ IN	TENSILE LBS/SQ IN	% ELONG 8 IN	BEND	DEF.	% LIGHT HEAVY
4 X 5.4#					A36		ASTM A36-91						ASME-SA36	2013173		7-17424			
-1989	.15	.69	.01	.03										48270	72169	32.0	OK		
4 X 5.4#					A36		ASTM A36-91						ASME-SA36	2013173		7-17424			
-1989	.15	.69	.01	.03										48742	72327	31.4	OK		
3 X 3 X 1/4					A36		ASTM A36-91						ASME-SA36	2013173		7-17424			
-2486	.15	.73	.01	.04										52586	71724	29.0	OK		
3 X 3 X 1/4					A36		ASTM A36-91						ASME-SA36	2013173		7-17424			
-2486	.15	.73	.01	.04										52777	72222	29.4	OK		
1 1/2 X 1 1/2 X 3/16					A36		ASTM A36-91						ASME-SA36	2011544		7-13452			
-2827	.14	.61	.01	.04										49056	68396	26.0	OK		
1 1/2 X 1 1/2 X 3/16					A36		ASTM A36-91						ASME-SA36	2011544		7-13452			
-2827	.14	.61	.01	.04										48113	66981	27.5	OK		
2 X 2 X 3/8					A36		ASTM A36-91						ASME-SA36	2009381		7-08587			
-2736	.15	.69	.01	.05										46828	70522	32.0	OK		
2 X 2 X 3/8					A36		ASTM A36-91						ASME-SA36	2009381		7-08587			
-2736	.15	.69	.01	.05										47201	71455	31.5	OK		
3 X 3 X 3/16					A36		ASTM A36-91						ASME-SA36	2013396		7-57936			
-2530	.14	.66	.01	.03										48394	68119	32.0	OK		
3 X 3 X 3/16					A36		ASTM A36-91						ASME-SA36	2013396		7-57936			
-2530	.14	.66	.01	.03										47706	67660	34.0	OK		

IS MATERIAL, INCLUDING THE BILLETS,
S PRODUCED AND MANUFACTURED IN THE
ITED STATES OF AMERICA.
A. J. TURNER
QUALITY ASSURANCE MGR.
MILL GROUP

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY

2 X 2 X 3/8 Angle

.ORIDA STE
ORPORATION

CHEMICAL AND [illegible]SICAL TEST REPORT

MADE IN U.S.A.

O'NEAL STEEL, INC.
[illegible]834 CLOVIS ROAD
BOX 5495
LUBBOCK TX 79415

INVOICE TO: O'NEAL STEEL, INC.
P. O. BOX 2623
BIRMINGHAM AL 35202-26

SHIP DATE: 09-17-92
SHIPPERS NUMBER: 8582-[illegible]
CUST. ACCOUNT NO.: 36791606

SIZE					GRADE		SPECIFICATION							S.O. NO.		CUST. P.O. NUMBER			
HEAT LD NO.	C	MN	P	S	V	SI	CR	CU	NI	SN	AL	MO		YIELD PT LBS/SQ IN	TENSILE LBS/SQ IN	% ELONG ZE IN	BEND	DEF.	% LIGHT HEAVY
1 1/2 X 1 1/2 X 1/8					A36		ASTM A36-91				ASME-SA36				2014889	[illegible]			
2-2784	.15	.70	.01	.04										56428	75714	25.0	OK		
1 1/2 X 1 1/2 X 1/8					A36		ASTM A36-91				ASME-SA36				2014889	[illegible]			
2-2784	.15	.70	.01	.04										55000	74285	25.6	OK		
7 X 7 X 7/16					A36		ASTM A36-91				ASME-SA36				[illegible]	[illegible]			
2-2520	.12	.69	.02	.04										46736	65732	38.0	OK		
7 X 7 X 7/16					A36		ASTM A36-91				ASME-SA36				[illegible]	[illegible]			
2-2520	.12	.69	.02	.04										45474	64870	38.5	OK		
6 X 2 2*					A36		ASTM A36-91				ASME-SA36				[illegible]	[illegible]			
2-3508	.15	.81	.01	.03										55125	[illegible]	29.5	OK		
7 X 7 X 1/4					A36		ASTM A36-91				ASME-SA36				[illegible]	[illegible]			
2-2488	.13	.69	.02	.04										48611	67881	35.0	OK		
7 X 7 X 1/4					A36		ASTM A36-91				ASME-SA36				2018465	[illegible]			
2-2488	.13	.69	.02	.04										49300	68831	33.8	OK		

JAN [illegible]

Issue: Rev: 9-21-92

HIS MATERIAL, INCLUDING THE BILLETS,
AS PRODUCED AND MANUFACTURED IN THE
NITED STATES OF AMERICA.
A. J. TURNER
QUALITY ASSURANCE MGR.
MILL GROUP

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY

· Z-5 1445 C 6X1 [illegible]

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

WE HEREBY CERTIFY THAT THE FOLLOWING DATA IS A TRUE COPY FROM TESTS PERFORMED IN OUR LABORATORY.

The following tests conform to the requirements of the specifications listed.

DAN SCHACHT 8/ 7/92

QUALITY CONTROL MANAGER

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
.391	AU 2.5X2X1/4	ASTM A36-89	.15	0.87	.024	.036	.16	.43	0.24	0.17	.039	.000	.0040	.003
7196	CH 6X10.5	ASTM A36-89	.17	0.68	.009	.031	.26	.37	0.23	0.23	.049	.004	.0020	.001
9624	SQ 3/4	ASTM A36-89	.16	0.82	.009	.033	.17	.50	0.11	0.23	.053	.000	.0020	
9625	SQ 3/4	ASTM A36-89	.15	0.76	.006	.028	.19	.46	0.10	0.22	.054	.000	.0020	
7196	CH 6X10.5	ASTM A36-89	.17	0.68	.009	.031	.26	.37	0.23	0.23	.049	.004	.0020	.001
1476	#8 REBAR	ASTM A615-89 GRADE 60 AASHTO M31	.42	0.97	.008	.032	.23	.42	0.08	0.17	.041	.013	.0020	.002

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	% ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
1391	1	52100	74800	30.0		3.570	06/25/92
7196	1	51800	74400	39.0		10.400	08/28/91
9624	1	51500	73500	22.0		1.900	01/10/92
9625	1	51500	73500	22.0		1.900	01/10/92
7196	1	51800	74400	39.0		10.400	08/28/91
1476	1	69000	106300	12.0	OK	2.600	06/26/92

REMARKS: P.O. Z-16717; Z-19477; Z-19076 ; Z-57945 & BZ-42393
THIS STEEL IS MELTED & MANUFACTURED IN THE USA

Atlantic Steel COMPANY

A MEMBER OF THE IVACO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

TEST CERTIFICATE

DATE 05/21/92

SEND TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

VOICE NUMBER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	ELONG 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
36447 001	Z-0799 S	FLATS, 0.2500"X 4.0000" 55 KSI 20'00", 5000# STACKED BUNDLE	48832	65.6	87.6	28.0		.20	.88	.017	.022	.21	.37				.025	

MATERIAL MELTED AND MANUFACTURED IN THE USA

Z-07998

ORN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

I CERTIFY THE ABOVE RESULTS OF TEST AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

19

CERTIFIED MILL TE REPO

SOLD TO
O'NEAL STEEL *BIRMINGHAM
PO BOX 96
BIRMINGHAM AL 35201

SHIP TO
O'NEAL STEEL *BIRMINGHAM
10848 LUNA ROAD
DALLAS TX

JACKSON, MS STEEL DIV
FOURTH STREET OFF FLOWOOD DR.
JACKSON MS 36613

DATE: 08/18/92

B.L. NO.: B4- 69867

LOAD NO.: B4- 18261

PO# X-16006 X-17704 2-20833

HEAT NO.*	DESCRIPTION	PHYSICAL TESTS					CHEMICAL TESTS						
		YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WT% / DEF	C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu / -	C.E
559213668	1/4x3" F1 20' (A36) ASTM A36	50,500	71,500	25.0	OK	-4.9%	.15 NA	.700 NA	.014 NA	.035 NA	.16 NA	NA	
559213692	1/4x4" F1 20' (A36) ASTM A36	45,800	65,900	28.0	OK	-4.3%	.15 NA	.600 NA	.010 NA	.038 NA	.19 NA	NA	
559310572	1/2x3" F1 20' (A36) ASTM A36-91	45,700	68,700	31.0	OK	-2.9%	.14 NA	.650 NA	.021 NA	.038 NA	.11 NA	NA	
559310573	1/2x3" F1 20' (A36) ASTM A36-91	46,300	67,600	33.0	OK	-2.8%	.15 NA	.720 NA	.018 NA	.038 NA	.15 NA	NA	

REC'D O'NEAL STEEL DALLAS
AUG 19 1992
ORIGINAL

CERTIFIED MILL TEST REPORT

SOLD TO: D'NEAL STEEL *BIRMINGHAM
PO BOX 98
BIRMINGHAM AL 35201

SHIP TO: D'NEAL STEEL *BIRMINGHAM
2834 CLOVIS ROAD
LUBBOCK TX

JACKSON, MS STEEL DIV
FOURTH STREET OFF FLOWOOD DR.
JACKSON MS 36613

DATE: 08/14/92
B.L.NO.: B4- 69790
LOAD NO.: B4- 18214

PO# Z-17620
Z-59009 F 1/4X2

HEAT NO.	DESCRIPTION	PHYSICAL TESTS: YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WTS / DEF	CHEMICAL TESTS: C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu	C.E.
9215924	1/4x2" Fl 20' (A36) ASTM A36-90	44,400	65,400	29.0	OK		.16 NA	.500 NA	.005 NA	.022 NA	.18 NA	NA	
9310382	3/4" Rd 20' (A36) ASTM A36-90	56,689	74,830	20.0	OK		.18 NA	.670 NA	.016 NA	.029 NA	.20 NA	NA	

REVERSE FOR PARTS ORIGIN

Atlantic Steel Company

A MEMBER OF THE IVACO GROUP

P.O. BOX 1714 — ATLANTA, GEORGIA 30301

DATE 06/ /92

TEST CERTIFICATE

SEND TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	% ELONG IN 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
167 Z-0270	FLATS, 0.7500"X 4.0000" 55 KSI																
1 1	20'00", 9000# STACKED BUND	487S2	60.0	82.7	31.0		.20	.94	.007	.028	.19	.22				.032	

23' 16

MATERIAL MELTED AND MANUFACTURED IN THE USA

3/4 x 4 Flat

N TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

_____ 19 _____

I CERTIFY THE ABOVE RESULTS OF TESTS AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

SIGNED

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

The following tests conform to the requirements of the specifications listed.

WE HEREBY CERTIFY THAT THE FO[illegible]ING DATA IS A TRUE COPY FROM TESTS PERF[illegible]ED IN OUR LABORATORY.

DAN SCHACHT — 12/19/91

QUALITY CONTROL MANAGER

AT O.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
B0	AE 2.5X1/4	ASTM A36-89	.15	0.78	.008	.034	.24	.46	0.12	0.17	.037	.000	.0020	
02	AE 2X3/8	ASTM A36-89	.15	0.85	.008	.029	.25	.38	0.19	0.17	.052	.000	.0010	
43	FL 3/4X6	A36 MODIFIED	.21	0.83	.009	.042	.23	.41	0.11	0.18	.035	.004	.0020	.001
94	FL 3/4X6	A36 MODIFIED	.21	0.80	.009	.034	.22	.43	0.16	0.17	.037	.001	.0010	.001
75	AE 2X1/4	ASTM A36-89	.13	0.87	.012	.029	.26	.60	0.18	0.21	.051	.000	.0020	
76	AE 2X1/4	ASTM A36-89	.14	0.80	.009	.029	.26	.47	0.12	0.17	.046	.000	.0010	
05	FL 3/4X5	A36 MODIFIED	.22	0.80	.007	.030	.23	.47	0.13	0.17	.041	.004	.0010	.001

AT O.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
80	1	52900	73100	31.0		4.045	11/16/91
02	1	51400	75000	30.0		4.560	10/19/91
43	1	52200	79400	25.0		15.150	04/27/91
94	1	51200	80000	25.0		15.200	08/18/91
75	1	45800	72900	32.0		3.150	10/20/91
76	1	51200	72700	30.0		3.140	10/20/91
05	1	54400	81300	26.0		12.590	08/20/91

3/4X5 A36 mod. flat

MARKS: THIS STEEL IS MELTED & MANUFACTURED IN THE USA

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

WE HEREBY CERTIFY THAT THE ... IS A TRUE COPY FROM TESTS PERFORMED IN ... LABORATORY.

DAN SCHACHT
QUALITY CONTROL MANAGER

4/29/92

The following tests conform to the requirements of the specifications listed.

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
89511	AU 2X1.5X3/16	ASTM A36-89	.15	0.79	.011	.033	.13	.38	0.11	0.15	.036	.000	.0020	
K1017	AE 2X1/8	ASTM A36-89	.16	0.69	.020	.036	.22	.33	0.13	0.09	.010	.004	.0020	.002
K1056	AE 2X1/8	ASTM A36-89	.15	0.66	.017	.037	.24	.36	0.12	0.11	.020	.003	.0020	.003
88202	AE 2X3/8	ASTM A36-89	.15	0.85	.008	.029	.25	.38	0.19	0.17	.052	.000	.0010	
00195	AE 2.5X3/8	ASTM A36-89	.18	0.74	.008	.033	.21	.51	0.06	0.14	.032	.000	.0020	
00222	AE 2.5X1/4	ASTM A36-89	.19	0.73	.007	.028	.23	.52	0.12	0.14	.046	.001	.0020	.001

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
89511	1	49800	71200	29.0		2.060	01/02/92
K1017	1	55300	73800	29.5		1.600	01/26/92
K1056	1	53900	71900	24.0		1.640	01/25/92
88202	1	51400	75000	30.0		4.560	10/19/91
00195	1	54200	75200	30.0		5.830	04/21/92
00222	1	54000	77300	32.0		4.050	04/21/92

RECEIVED
MAY - 7 1992

REMARKS: THIS STEEL MELTED & MANUFACTURED IN THE USA

PO# 27310
WO# JT41210

middle east tube co.ltd.
IMPORT / EXPORT DEPT.
P.O.B 82 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 8-266382 - 4 FAX: 8-221186

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 89/J/1-183 PAGE 1.

P H Y S I C A L P R O P E R T I E S

TUBE DIMENSION	YIELD POINT	U.T.S.	ENLONGATION	HEAT NO.
18" X 0.375	52017	68834	40	2483
10" X 0.375	57736	72931	32	2485
18" X 0.375	59167	74195	33	2486
18" X 0.375	56364	70717	37	2488
18" X 0.375	57206	72927	03	2489
18" X 0.375	53208	64461	34	2490
18" X 0.375	56742	70953	31	2491
18" X 0.375	55991	65466	03	2492
18" X 0.375	62406	76499	30	2493
18" X 0.375	58829	73783	35	2494

RAMLA, 23/04/89

middle east tube co.ltd.

IMPORT./ EXPORT DEPT.

P.O.B 62 RAMLA 72100 ISRAEL TELEX: 381603 PIPE IL

TELEPHONE: 8-258382 - 4 FAX: 8-221198

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 89/J/1-183 PAGE 1.

C H E M I C A L A N A L Y S I S

SE DIMENSIONS	% C	% MN.	% SI.	% P	% S	AL%	HEAT NO.
3" X 0.375	0.160	0.710	0.160	0.014	0.012	0.004	2483
3" X 0.375	0.160	0.760	0.270	0.014	0.013	0.006	2485
3" X 0.375	0.160	0.780	0.250	0.013	0.015	0.006	2486
3" X 0.375	0.140	0.640	0.200	0.008	0.021	0.005	2488
3" X 0.375	0.160	0.690	0.270	0.008	0.025	0.005	2489
3" X 0.375	0.160	0.700	0.240	0.013	0.017	0.004	2490
X 0.375	0.150	0.750	0.300	0.006	0.027	0.005	2491
X 0.375	0.160	0.690	0.220	0.009	0.022	0.004	2492
3" X 0.375	0.160	0.740	0.200	0.006	0.021	0.006	2493
0.375	0.160	0.770	0.240	0.015	0.016	0.012	2494

RAMLA, 23/04/89

middle east tube co.ltd.

IMPORT / EXPORT DEPT.

P.O.B 82 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 08-268392 - 4 FAX: 08-221199

MTC

1.

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 1837/00

ER NO. : 89/J/1-183 TEST PSI : 1490

ER.	WALL THICK.	KG/ MTR	LENGTH MTR	LENGTH FT	TOTAL M.TON	NO. OF PIECES	REMARKS
	.375	105.100	3150.36	10336.33	325.742	246	RED+RED
	.375	105.100	269.24	883.38	27.948	23	GREEN+GREEN

02/04/89

OCT 15 '92 16:04 O'NEAL STEEL LUBBOCK

Lubbock

CERTIFICADO DE ENSAIOS E ANÁLISES
MILL TEST CERTIFICATE

CEA/MTC Nº 9561 ORIGINAL

FOLHA/SHEET 1

...de aço
...RSICO
...ZAMIGLIO

Rua Pres. Dutra, 6/n 218 - Tel: (011) 312-4711/3222 - Telex 1181121 - CEP 07150
Guarulhos - SP - BRASIL - C.G.C. 61.801.013/0003-10 - I.E. 335.343.605.118
Fax (011) 312-3684 - Endereço Telegráfico: MONTUBEL

DESCRIÇÃO/DESCRIPTION: ERW LINE PIPE / 8PE - GR A - SCH 40.

NOTA FISCAL Nº/EXPORT Nº: 6211

LOTE Nº/LOT Nº: 753602

PACOTES/BUNDLES: 22

Nº DE PEÇAS/Nº PIECES: 154

PESO APROXIMADO/APPROXIMATE WEIGHT (KG): 52844

COMPRIMENTO TOTAL/TOTAL LENGHT: 6160 FEET

...SIONS: ...0.210X18.97LBS/FTX40FT

...ÇÕES/SPECIFICATIONS: ...SL GRADE A

...COMPRA Nº/PURCHASE ORDER Nº:

CARTA DE CRÉDITO/LETTER OF CREDIT: 920121IM295

...PRODUÇÃO Nº/WORKING ORDER Nº: 76820/ 1

DRL

6 Sch 40 A53A Welded

...NTO TÉRMICO/HEAT TREATMENT	DOBRA Nº COIL NUMBER	PROPRIEDADES FÍSICAS/PHYSICAL PROPERTIES: LIMITE ESCOAMENTO Y.P. PSI	LIMITE RESISTÊNCIA T.S. PSI	ALONGAMENTO ELONGATION	DUREZA HARDNESS	ANÁLISE QUÍMICA/CHEMICAL ANALYSIS (%): x 100 C	Mn	Si	Ni	Cr	Mo	Cu	x 1000 P	S	Al	Nb
...ESULTADO DOS TESTES/TEST RESULTS	501557	46490	51760	41,2	-	3	38	-	-	-	-	-	13	3	-	-
...DIS/MECHANICAL	501560	39816	50054	43,4	-	5	32	-	-	-	-	-	13	15	-	-
...ENTO/FLATTENING N	501573	55742	66591	33,2	-	19	67	-	-	-	-	-	15	9	-	-
...ENTO/FLATTENING Y	501574	52045	61714	35,0	-	4	30	-	-	-	-	-	12	15	-	-
...ENTO/REVERSO/REVERSE FLATTENING N	501575	38394	48285	45,8	-	4	31	-	-	-	-	-	12	19	-	-
...ENTO/BEND -	501577	42375	49527	42,2	-	5	30	-	-	-	-	-	10	17	-	-
...ENTO/REVERSO/REVERSE BEND -	501981	61714	74228	33,0	-	14	64	22	-	-	-	-	15	12	-	-
...ENTO/FLANGE -	501987	50054	51760	37,6	-	3	32	-	-	-	-	-	15	13	-	-
...PLEY -																
...E MAIOR/LIGHT TEST -																
...ÁTICO/HYDROSTATIC																
1820 PSI																
...TRUTIVO/NON DESTRUCTIVE																
...MAGNÉTICO/ELECTROMAGNETIC Y																
...MAGNÉTICA/MAGNETIC PARTICLE -																
...ZAÇÃO/GALVANIZING																
...E ZINCO/ZINC GRADE HI -																
...A CAMADA/COATING WEIGHT (g/ft) -																
...REVESTIMENTO/COATING THICKNESS -																
...E IMERSÃO/DIP TEST -																
...MERSÕES/DIPPES -																
...CHAMBERENCE -																
...MENTO/BEND -																
...MENTO/FLATTENING -																

...VAÇÕES/REMARKS

...DUCTILITY

CERTIFICAMOS PELO PRESENTE QUE O MATERIAL FOI TESTADO EM NOSSO LABORATÓRIO, DE ACORDO COM AS ESPECIFICAÇÕES TÉCNICAS, RESULTANDO NOS VALORES ACIMA REFERIDOS. WE HEREBY CERTIFY THAT THE DESCRIBED MATERIAL WAS TESTED IN OUR LABORATORY ACCORDING TO THE TECHNICAL STANDARDS AND YIELDED THE RESULTS ABOVE MENTIONED

CUMULHOS, APRIL 13 1992

SALVATORE DI MINO
PERSICO PIZZAMIGLIO S.A.
GERENTE CONTROLE QUALIDADE/QUALITY CONTROL MANAGER

Z-52890

MASER ACEROTEX INTERNATIONAL

ORDER Nº ATI-914017

SPECIFICATION ASTM-A-53-A

KIND OF ARTICLE CARBON STEEL (STEEL 3" NOM SCH-40)

N E/L

TURA

91 772

Villacero

TUBERIA NACIONAL, S. A.

INSPECTION CERTIFICATE

HEAT Nº	DIMENSION			HYDROSTATIC	WEIGHT	CHEMICAL COMPOSITION %								TENSION TEST		
	NOM. (INCHES)	THICKNESS (INCHES)	LENGTH FT (MTS)	TESTED PSI (KG/CM.²)	LBS. (KGS)	C x 1/100	Mn x 1/100	P x 1/1000	S x 1/1000	Si x 1/100				Y.P. PSI / KG/CM²	T.S. PSI / KG/CM²	E.L. %
1104271	3	0.216	21	2200		13	44	11	21	0				38755	48536	29
				155										2724	3412	
			MPA	15.17								MPA		267	334	

3 sch 40. 453 welded

OCT 15 '92 09:52 O'NEAL STEEL LUBBOCK P.4

P.O. BOX 10232
LUBBOCK, TEXAS 79408

FOR: SHIELDED METAL ARC WELDING, CARBON STEEL (P-Number 1)

SCOPE

1. This welding procedure specification covers the welding of carbon steel (P-1) in the fabrication of API 650 storage tanks.

PROCESS: Shielded metal arc.

BASE METAL:

The steel base metal shall comply with one of the ASTM specifications and grades listed in the ASME Code under (P-1).

FILLER METAL:

The filler metal shall comply with ASME Material Specification Part C E6010 (F3).

PREPARATION OF BASE METAL AND ALIGNMENT OF EDGES:

1. The edges to be joined shall be perpared in accordance with a single or double "V" Groove. Gas cutting may be used.

2. Edges to joined and all surfaces within 1/2" of the welding edge shall be thoroughly cleaned immediately prior to welding.

3. Abutting edges of plates at longitudinal joints shall not, after welding, have an offset at any point in excess of one-quarter of the plate thickness with a maximum permissible offset of 1/8", except that plates less than 1/4" in thickness, the offset may be as much as 1/16".

4. Abutting edges circumferential joints shall be aligned with the following tolerances;

For plates up to 1/4"	1/16"
For plates over 1/4" to 3/4"	25% of plate thickness
For plates over 3/4" to 1½"	3/16"
For plates over 1½"	12 1/2% of plate thickness, but not over 1/4"

ELECTRIC CURRENT:

Direct current shall be used with electrode positive and the base metal negative. (Reverse Polarity).

WELDING TECHNIQUE:

1. The welding technique shall be substantially as shown on the attached sketches.

2. (a) When making double-welded joints the reverse (root) side must be gouged,chipped,or ground out to sound metal before the finishing bead is deposited.

QW-482 (Back)

WPS No. SMI 1-1 Rev. 0

POSITIONS (QW-405)
Position(s) of Groove: 6G
Welding Progression: Up E7018 Down E6010
Position(s) of Fillet: ALL

POSTWELD HEAT TREATMENT (QW-407)
Temperature Range: NA
Time Range:

PREHEAT (QW-406)
Preheat Temp. Min.: 70°F
Interpass Temp. Max.: 500°F
Preheat Maintenance: As Required
(Continuous or special heating where applicable should be recorded)

GAS (QW-408)
Shielding Gas(es):
Percent Composition (mixtures):
Flow Rate:
Gas Backing:
Trailing Shielding Gas Composition:

ELECTRICAL CHARACTERISTICS (QW-409)
Current AC or DC: DC Polarity: Reverse
Amps (Range): 120-190 Volts (Range): 19-26
(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type: NA (Pure Tungsten, 2% Thoriated, etc.)
Mode of Metal Transfer for GMAW: NA (Spray arc, short circuiting arc, etc.)
Electrode Wire feed speed range: NA

TECHNIQUE (QW-410)
String or Weave Bead: String & Weave
Orifice or Gas Cup Size: NA
Initial and Interpass Cleaning (Brushing, Grinding, etc.): Grinding & Brush
Method of Back Gouging: Air Arc and Grinding
Oscillation: No pass greater than ½"
Contact Tube to Work Distance: NA
Multiple or Single Pass (per side): Multipass
Multiple or Single Electrodes: Single
Travel Speed (Range): 8 to 10 Inches Per Minute
Peening: Not Allowed
Other:

Weld Layer(s)	Process	Filler Metal Class	Filler Metal Dia.	Current Type Polar.	Current Amp. Range	Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
1	SMAW	E6010	1/8"	Rev.	120-190	19-26	8-10 IPM	
2	SMAW	E7018	1/8	Rev.	120-190	19-26	6-8 IPM	
3-4-5	SMAW	E7018	5/32"	Rev.	120-190	19-26	8-10 IPM	
CAP	SMAW	E7018	1/8"	Rev.	120-190	19-26	6-8 IPM	

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)

(See QW-201.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name SCOTT MFG. INC. By: James H. Tipton

Welding Procedure Specification No. SMI 1-1 Date 8-18-90 Supporting PQR No.(s) SMI 1-1A

Revision No. 0 Date 8-18-90

Welding Process(es) SMAW Type(s) Manual

(Automatic, Manual, Machine, or Semi-Auto.)

JOINTS (QW-402)

Joint Design GROOVE

Backing (Yes) ____ (No) N

Backing Material (Type) ____

(Refer to both backing and retainers.)

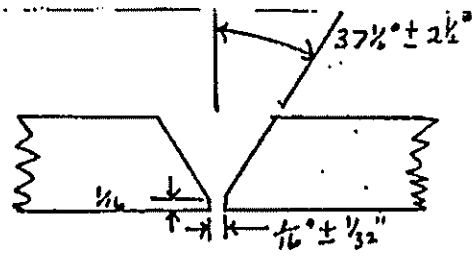
☐ Metal ☐ Nonfusing Metal

☐ Nonmetallic ☐ Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

Details



BASE METALS (QW-403)

P-No. 1 Group No. 1 to P-No. 1 Group No. 1

OR

Specification type and grade A106 Gr B

to Specification type and grade A106 Gr B

OR

Chem. Analysis and Mech. Prop. ____

to Chem. Analysis and Mech. Prop. ____

Thickness Range:

Base Metal: Groove .1876 to .864" Fillet Unlimited

Pipe Dia. Range: Groove 6 5/8" Fillet Unlimited

Other ____

*FILLER METALS (QW-404)		
Spec. No. (SFA)	5.1	5.1-5.5
AWS No. (Class)	E6010	E7018
F-No.	3	4
A-No.	1	1
Size of Filler Metals	1/8"	1/8"--5/32"
Deposited Weld Metal	.125"	.307"
Thickness Range:	.0625" to .250"	.0625- .614"
Groove	ALL	ALL
Fillet	ALL	Unlimited
Electrode-Flux (Class)	Iron Oxide	Low Hydrogen
Flux Trade Name		
Consumable Insert		
Other		

*Each base metal-filler metal combination should be recorded individually.

This form (E00006) may be obtained from the Order Dept., ASME, 345 E. 47 St., N.Y., N.Y. 10017

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)
(See QW-201.2, Section IX, ASME Boiler and Pressure Vessel Code)
Record Actual Conditions Used to Weld Test Coupon.

Company Name: SCOTT MANUFACTURING, INC.
Procedure Qualification Record No.: SA-1A Date: 9-5-90
WPS No.: SA-1
Welding Process(es): SMAW
Types (Manual, Automatic, Semi-Auto.): Manual

JOINTS (QW-402)

Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec.: SA 516
Type or Grade: 70
P-No.: 1 to P-No.: 1
Thickness of Test Coupon: .375"
Diameter of Test Coupon: NA
Other:

POSTWELD HEAT TREATMENT (QW-407)
Temperature: NA
Time:
Other:

GAS (QW-408)
Type of Gas or Gases:
Composition of Gas Mixture:
Other:

FILLER METALS (QW-404)

SFA Specification	5.1
AWS Classification	E6010
Filler Metal F-No.	3
Weld Metal Analysis A-No.	1
Size of Filler Metal	1/8"--5/32"
Other	
Deposited Weld Metal	.500"

ELECTRICAL CHARACTERISTICS (QW-409)
Current: DC
Polarity: Reverse
Amps.: 90-140 Volts: 22-26
Tungsten Electrode Size:
Other:

POSITION (QW-405)
Position of Groove: 1G
Weld Progression (Uphill, Downhill):
Other:

TECHNIQUE (QW-410)
Travel Speed: 8-10-IPM
String or Weave Bead: String & Weave
Oscillation:
Multipass or Single Pass (per side): Multipass
Single or Multiple Electrodes: Single
Other: No pass greater than 1/2"

PREHEAT (QW 406)
Preheat Temp.: None
Interpass Temp.: 450°F
Other:

This form (E00007) may be obtained from the Order Dept., ASME, 345 E. 47th St., New York, N.Y. 10017

QW-483 (Back)

POR No. SA-1A

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load lb	Ultimate Unit Stress psi	Type of Failure & Location
T-1	1.043	.374	.390	27,500	70,513	Base Metal
T-2	1.035	.373	.386	27,250	70,596	Base Metal

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
QW-463.1(d) Root 1	Accepted
QW-463.1(d) Root 2	Accepted
QW-463.1(d) Face 1	Accepted
QW-463.1(d) Face 2	Accepted

Toughness Tests (QW-170)

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Values	Lateral Exp. % Shear	Lateral Exp. Mils	Drop Weight Break	Drop Weight No Break

Fillet-Weld Test (QW-180)

Result — Satisfactory: Yes _____ No _____ Penetration into Parent Metal: Yes _____ No _____

Macro—Results _____

Other Tests

Type of Test _____

Deposit Analysis _____

Other _____

Welder's Name Tim Kirksey Clock No. 423-76-1547 Stamp No. _____

Tests conducted by: Longview Inspection, Inc. Laboratory Test No. 260-90

We 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 IX of the ASME Code.

AWS QC1 JAMES H. TIPTON 89120151 CWI

Manufacturer SCOTT MANUFACTURING, INC.

9-5-90

By William A. Basom

(Form of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

PERMIAN NON-DESTRUCTIVE TESTING

QUALIFICATION

TEST METHOD		RT		UT		MT		PT		HT	
NAME: Miller, Morris J.		I	II	I	II	I	II	I	II	I	II
SCORES	GENERAL/30%	1/26.70		1/		1/25.50		1/29.25		1/	
	SPECIFIC/30%	1/26.10		1/		1/22.50		1/30.00		1/	
	PRACTICAL/40%	1/36.00		1/		1/34.80		1/38.00		1/	
	COMPOSITE	1/86.70		1/		1/82.80		1/97.25		1/	
CERTIFIED BY / LEVEL		DFM III				DFM III		DFM III			
CERTIFICATION DATE		10-17-90				10-17-90		10-17-90			
RECERTIFICATION DUE		10-17-91				10-17-91		10-17-91			
DOCUMENTED EXPERIENCE		On File				On File		On File			
PRIOR CERTIFICATION LEVEL		II				II		II			
APPOINTMENT BY LETTER, III											

SNELLEN J-2 AND J-1 TEST	ACCEPT: X CONDITIONS: None DATE: 10-17-90
COLOR PERCEPTION TEST	ACCEPT: X CONDITIONS: None DATE: 10-17-90

DATE EMPLOYED: 1-25-88 ASSIGNMENT TO NDT: 1-25-88

EDUCATION LEVEL: High Scholl/Tech EXPERIENCE TIME: 9.5 Years

LIMITATIONS: Recertified RT, MT, PT only

THIS INDIVIDUAL HAS SUCCESSFULLY COMPLETED THE ABOVE EXAMINATIONS AND HAS QUALIFIED FOR THE LEVEL IN THE NONDESTRUCTIVE TEST METHOD INDICATED ABOVE AS PER PERMIAN NON-DESTRUCTIVE TESTING'S WRITTEN PRACTICE. DOCUMENTATION SHALL BE ON FILE FOR REVIEW UPON REASONABLE REQUEST.

AUTHORIZED EXAMINER / DATE

Joan Dinsmore 10-17-90

PERMIAN NON-DESTRUCTIVE TESTING

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

P.O. Box 176
La Grange, Texas 78945
(409) 242-3117

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

Pg. 1 of 1

No. 10269

Customer: SMS Date: 10-14-92 Technician: M M Level: II Appr: N/A Level: N/A
Work Order: Serial No: Code: API 650 % Proc #: 6-1 Rev 1 & Rev 2

RADIOGRAPHIC
Curies: Screens:
Exposure Arrangement:
Material Thickness:
Penetrameter: S: F:
Film Type:
Film Qty:
Film Size:
Film Qty:

ULTRASONIC
Equipment:
Transducer Type:
Size: Freq.
Calibration
Material: Angle:
Hole Size: Dist.

MAGNETIC PARTICLE
Equipment: Magnaflux Y-6
Material Type: C.S. Thickness: 1/4"
Amp: 6 N/A
Prodpacking: 2 L" - 1
AC/DC: AC
Surface Prep: NS welded
Type Used: MR 71 Gary
Particle Used On: 10 Y 65

DYE PENETRANT
Type Cleaner:
Type Penet:
Type Devel:
Surface Prep:
Dwell Time:
Material Type: Thickness:

	Weld No.	By No.	Location	Pipe Size	NOT Within Code Yes	NOT Within Code No	CUT Within Code Yes	CUT Within Code No	Defects & Location	REMARKS
1	W-1			6"	✓					
2	W-2			3"						
3	W-3			3"						
4	W-4			6"						
5	W-5			6"						
6	W-6			3"						
7	W-7			3"						
8	W-8			6"						
9	W-9			36"						
10	W-10			30"						
11	W-11			36"						
12	W-12			30"						
13	W-13			36"						
14	W-14			30"						
15	W-15			6"						
16	W-16			3"						
17	W-17			3"						
18	W-18			6"						
19	W-19			3"						
20	W-20			3"						
21	W-21			6"						
22	W-22			6"						
23	W-23			30"						
24	W-24			30"						
25	W-25			30"						
26	W-26			30"						
27	W-27			18"						
28	W-28			18"						
29	W-29			24"						
30	W-30			6"						
31	W-31			3"						
32	W-32			3"						
33	W-33			3"						
34	W-34			6"						
35	W-35			24"						
36	W-36			18"						
37	W-37			18"						
38	W-38			18"						
39	W-39			18"						W-41 6" ✓
40	W-40			24"	✓					W-42 3" ✓

Test(s) Interpreted By: M. Miller Level: II P.O. #:

Number of Testing Personnel: 1 Misc. Info.: # Welds: 42 Per Diem N/A Miles 250 RT

Hours Worked: 5 AM to 4:45 PM Hours: RT 8 Hours: OT 3 Total Hrs 11 Job Location Midland, Texas

NOTICE: THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PNDT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PNDT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS. PNDT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMER'S REPRESENTATIVE'S SIGNATURE VERIFIES TIME AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION UNLESS OTHERWISE SPECIFICALLY NOTED.

UNDER NO CIRCUMSTANCES DOES PNDT GUARANTEE THE QUALITY OR USABILITY OF ANY ITEM, MATERIAL, OR PRODUCT INSPECTED OR TESTED. NO WARRANTIES ARE EXPRESSED OR IMPLIED, AND IN NO EVENT SHALL THE LIABILITY OF PNDT WITH RESPECT TO ITEMS INSPECTED (INCLUDING ANY LIABILITY PERTAINING TO SELECTION AND/OR RESULTS OF THESE SAME TESTS) EXCEED THE CHARGE OF PNDT FOR THE INSPECTION OF SUCH ITEMS.

Agreed and Accepted: William A. Brown Date: 10-14-92

TERMS AND ABBREVIATIONS

I.P.	INADEQUATE PENETRATION	S.P.	SPHERICAL POROSITY
I.P.D.	INADEQUATE PENETRATION DUE TO MISH-LOW	C.P.	CLUSTER POROSITY
I.C.	INTERNAL CONCAVITY	P.P.	PIPING POROSITY
I.F.	INCOMPLETE FUSION	H.B.	HOLLOW BEAD
I.F.D.	INCOMPLETE FUSION DUE TO COLD LAP	C.R.	CRACKS
B.T.	BURN THROUGH	A.D.	ACCUMULATION OF DISCONTINUITIES
E.S.I.	ELONGATED SLAG INCLUSIONS	I.U.	INTERNAL UNDERCUT
I.S.I.	ISOLATED SLAG INCLUSIONS	O.U.	OUTSIDE UNDERCUT

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

P.O. Box 176
La Grange, Texas 78945
(409) 242-3117

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

No. 10274

Pg. 3 of 4

Customer: SMI Date: 10-16-92 Technician: MM Level: II Asme: AG Level: I
Work Order: CT-3 Serial No: 151-3 Code: API 650 % Pg #: 4562

RADIOGRAPHIC
Curies: 50 Source: 010
Exposure Arrangement: B
Material Thickness: 1/4" - 3/8"
Penetrameter: 12 S. X F.
Film Type: D-7
Film Qty: 1-3½"X10"
Film Qty:
Film Qty:

ULTRASONIC
Equipment:
Transducer Type:
Size: Freq.:
Calibration
Material: Angle:
Hole Size: Dist.:

MAGNETIC PARTICLE
Equipment:
Material Type: Thickness:
Amp:
Prodspacing:
AC/DC:
Surface Prep:
Type Used:
Particle Used (Wet):

DYE PENETRANT
Type Cleaner:
Type Penet:
Type Devel:
Surface Prep:
Dwell Time:
Material Type: Thickness:

	Weld No.	By No.	Location	Pipe Size	NOT Within Code Yes	NOT Within Code No	CUT Within Code Yes	CUT Within Code No	Defects & Location	REMARKS
1	C-1		0-1			X			I.P.	
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
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38										
39										
40										

Test(s) Interpreted By: M. Miller Level: II P.O. #:

Number of Testing Personnel: Misc. Info.: # Welds: Per Diem: Miles:

Hours Worked: AM/PM to Hours: RT: Hours: OT: Total Hrs: Job Location:

NOTICE THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER'S REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PHOT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PHOT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS, PHOT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMER'S REPRESENTATIVE'S SIGNATURE VERIFIES THAT AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION, UNLESS OTHERWISE SPECIFICALLY NOTED.

UNDER NO CIRCUMSTANCES DOES PHOT GUARANTEE THE QUALITY OR USABILITY OF ANY ITEM, MATERIAL OR PRODUCT INSPECTED OR TESTED. NO WARRANTIES ARE EXPRESSED OR IMPLIED, AND IN NO EVENT SHALL THE LIABILITY OF PHOT WITH RESPECT TO ITEMS INSPECTED INCLUDING ANY LIABILITY PERTAINING TO SELECTION AND/OR RESULTS OF THESE SAME TESTS EXCEED THE CHARGE OF PHOT FOR THE INSPECTION OF SUCH ITEMS.

Agreed and Accepted: William A Brown Date: 10/17/92

TERMS AND ABBREVIATIONS

I.P.	INADEQUATE PENETRATION	S.P.	SPHERICAL POROSITY
I.P.D.	INADEQUATE PENETRATION DUE TO HIGH-LOW	C.P.	CLUSTER POROSITY
I.C.	INTERNAL CONCAVITY	P.P.	PIPING POROSITY
I.F.	INCOMPLETE FUSION	H.B.	HOLLOW BEAD
I.F.D.L.	INCOMPLETE FUSION DUE TO COLD LAP	C.R.	CRACKS
B.T.	BURN THROUGH	A.D.	ACCUMULATION OF DISCONTINUITIES
E.S.I.	ELONGATED SLAG INCLUSIONS	I.U.	INTERNAL UNDERCUT
I.S.I.	ISOLATED SLAG INCLUSIONS	O.U.	OUTSIDE UNDERCUT

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

WISCO WELDING INSPECTION SERVICE COMPANY
11811 NORTH FRWY., SUITE 670
HOUSTON, TEXAS 77060

REPORT DATES 10/16/92 10/17/92
CUSTOMER: USPCI ATTN: MR. SAMAR HAMWI
ORDER NO: PO 19350 DATED: REV: DATED:
MAT'L DESTINATION: LONE MOUNTAIN
REQUIRED DATE: 11/1/92 SHIPMENT DATE IS NOW: SAME
AS OF CHANGED FROM:
INSPECTOR ESTIMATED SHIPMENT DATE: SAME
ORDER IS 65% PERCENT COMPLETED:
VENDOR: SCOTT MFG. CO. ORDER NO: 451
MANUFACTURER: SAME
PHONE: 806-866-9591 SHOP LOCATION: WOFORD, TX.
SHOP ORDER NO: 451
INSPECTOR'S CONTACT: BILL BASON POSITION: FIELD MANAGER
REPORT IS: INTERIM
REGARDING: INSPECTION
INSPECTOR: VICTOR HAGMAN

MATERIAL DESCRIPTION: (4) 12.75' DIAMETER BY 40' HEIGHT CAUSTIC STORAGE TANKS.

STATUS OF ORDER: TWO TANKS TO SHIP 10/19/92

INSPECTION: WITNESS RADIOGRAPHS BE TAKEN OF WELDS AND REVIEW OF SAME.

1. PICKED SPOTS FOR RADIOGRAPHS ON TWO TANKS. SHOTS WERE TAKEN OF VERTICAL SEAMS GIRTH WELDS IN TANKS. ONE SPOT WAS TAKEN ON THE BUTT WELDS ON THE CONE BOTTOM. THE CONE BOTTOM HAS THREE BUTT WELDS.

2. REVIEW OF SPOT WELDS FOUND THE FOLLOWING. THE WELDS IN THE CONE BOTTOM WERE BAD. PENALTY SHOTS WERE TAKEN AS PER API 650, AND ASME SEC. VIII UW 51, AND UW52. FOUND THAT A BAD PROCEDURE WAS USED IN WELDING THE BUTT WELDS ON THE BOTTOM OF ALL FOUR TANKS. THERE WAS NO PENETRATION ON ANY OF THE WELDS. SO SCOTT MFG MADE REPAIRS ON THE TWO TANKS TO SHIP ON 10/19/92. REPAIR SHOTS WERE MADE. FOUND THAT THE WELDS WERE STILL BAD. THE COMPLETE BUTT WELDS ON THE BOTTOM OF ALL FOUR TANKS WAS REMOVED COMPLETELY.

10/17/92.

1. PICKED RADIOGRAPHS FOR BOTTOM BUTT WELDS. AFTER REVIEWING FILM FOUND THAT ALL OF THE BOTTOM BUTT WELDS WERE NOW ACCEPTABLE. THE REASON FOR THE PROBLEM TO START WITH WAS THAT NO ROOT OPENING WAS LEFT FOR PENETRATION. THESE WELDS WERE DONE BY THE SHOP PERSONAL. NOT THE CREW THAT IS BUILDING THESE TANKS.

2. WITNESS FITTING THE TOP RING ON TANK NUMBER TWO. AND WATCHED AS THE WELDERS MADE THE ROOT PASS. ALL WELDING WAS PER SPECIFICATIONS AND WAS OF GOOD QUALITY.

WILL RETURN 10/18/92 FOR FINAL ON FIRST TWO TANKS AND WITNESS

WISCO WELDING INSPECTION SERVICE COMPANY
11811 NORTH FRWY., SUITE 670
HOUSTON TEXAS 77060

REPORT DATES 10/14/92 10/15/92
CUSTOMER: USPCI ATTN: MR SAMAR HAMWI
ORDER NO: DATED: REV: DATED:
MATL DESTINATION: LONE MOUNTAIN
REQUIRED DATE: SHIPMENT DATE IS NOW:
AS OF CHANGED FROM:
INSPECTOR ESTIMATED SHIPMENT DATE:
ORDER IS PERCENT COMPLETED:
VENDOR: SCOTT MFG. ORDER NO: 451
MANUFACTURER: SAME
PHONE: 806-866-9591 SHOP LOCATION: WOLFORD, TX
SHOP ORDER NO: 451
INSPECTOR'S CONTACT: BILL BASON POSITION: ENG.
REPORT IS: INTERIM
REGARDING: INSPECTION
INSPECTOR: VICTOR HAGMAN

MATERIAL DESCRIPTION: (4) 12.75' DIAMETER BY 40 HEIGHT CAUSTIC TANKS.

STATUS OF ORDER: COMPLETION IS ABOUT 50% TWO TANKS TO SHIP MON 10/19/92

INSPECTION: MEETING WITH MR BASON AND FIELD FOREMAN.

WENT OVER SPECIFICATIONS FROM USPCI. AND REVIEWED WHAT DRAWINGS WERE ON HAND. NO PROBLEMS WERE FOUND WITH SCOTT MFG. MEETING SPECIFICATIONS.

INSPECTION OF TANKS BEING WELDED.
1 WITNESS WELDING OF GIRTH WELDS ON TANKS. FOUND THAT THE ROOT OPENING WAS ACCEPTABLE FOR FULL PENETRATION WELDS.
2. WITNESS AIR TESTING OF REPADS ON TANK SHELLS. ALL NOZZLES ARE WELDED IN SHELLS BEFORE TANK SHELLS ARE FIT TOGETHER. THIS IS GOOD AS THAT ALL OF THE REPADS CAN BE AIR TESTED ON THE GROUND. NO DANGER OF FALLING AR OF PADS NOT BEING TESTED. SHOP AIR WAS USED FOR TESTING. WITH 18-20 POUNDS OF AIR APPLIED TO PADS. A SOAP AND WATER MIXTURE WAS USED TO CHECK FOR LEAKS BOTH ON THE INTERNAL AND THE EXTERNAL. REPAD TEST WAS ACCEPTABLE AS NO LEAKS WERE FOUND.
3. VISUAL INSPECTION OF WELDING BOTH INTERNAL AND EXTERNAL, NO DEFECTS WERE FOUND. VISUAL INSPECTION WAS TO FIND UNDERCUTTING, PIN HOLES, COLD LAP, LOW FILLET WELDS EXSSIVE WELD BUILD UP ON GIRTH WELDS ETC. ALL THAT WAS FOUND WAS SOME SMALL PINHOLES, THESE WERE REPAIRED.
VISUAL INSPECTION OF THE ROLLED RINGS. FOUND THAT ONE OF THE BRACES ON THE PAINTERS RING WAS WELDED TO THE VERTICAL WELD SEAM. AS API 650 STATES THAT ALL ATTACHMENTS MUST MISS VERTICAL SEAMS BY AT LEST 6 INCHES . THESE WERE MOVED AND REWELDED.

10/15/92.

MET WITH MR HAMWI THIS A.M. FOR INSPECTION OF TANKS. TALKED WITH MR. BASON ABOUT DELIVERY OF TANKS. THE FIRST TWO TANKS WILL BE ON TRUCKS TO JOB SITE BY 10/19/92 A.M.

REVIEW OF DRAWINGS ON TANKS AND WALK WAYS. NO PROBLEMS WERE FOUND.

FIELD INSPECTION OF TANKS BEING WELDED, AND A TOUR OF SHOP WAS TAKEN. SCOTT MFG. HAS A WIDE RANGE OF SERVICES THAT WERE SHOWN TO MR HAMWI AND THIS WRITER.

A VISUAL INSPECTION OF TANKS WAS DONE AND NO PROBLEMS WERE FOUND.

PHOTOS OF TANKS, ERECTION, AND WELDING WAS TAKEN. THESE WILL SENT WITH DATA PACKAGES.

REVIEW OF MATERIAL TEST REPORTS FOR THE SHELL MATERIAL AND FOR THE STRUCTURAL MATERIAL. THE MTR'S FOR THE PIPING HAS NOT ARRIVED FROM THE SUPPLIER. AS SOON AS THESE OR IN THEY WILL BE CHECKED.

REVIEWED ALL WELDER QUALIFICATIONS, AND ALL WELD PROCEDURES. ALL WELDING OF TANKS WERE TO THESE PROCEDURES. ALL WELDER WORKING ON TANKS WERE QUALIFIED PER A 6G WELD TEST AND ALL PAPER WORK WAS IN ORDER.

ALL RADIOGRAPHS WILL BE SHOT 10/16/92 ON THE TWO TANKS TO SHIP ON 10/19/92. ALL OTHER NDE WORK HAS BEEN COMPLETED. ALL THAT WAS REQUIRES WAS A MAG PARTICLE OF NOZZLE WELDS, THIS HAS BE DONE AND PROPER PAPER WORK IS IN THE JOB FILE.

AT THIS TIME ALL API-650 AND USPCI SPECIFICATIONS ARE BEING FOLLOWED. ALL WORK SEEN ON THIS VISIT WAS OF GOOD QUALITY AND WAS ACCEPTABLE TO ALL SPECIFICATIONS.

WIS/QA-06

WELDING INSPECTION SERVICE COMPANY

QUALITY ASSURANCE INSPECTION RELEASE

PAGE 1 OF 1
DATE: 10-19-92
REP. NO.:

CUSTOMER: U S PCI
P.O. NO.: 19350
LOCATION: LUBBOCK TX

VENDOR: Scott MFG
PROJECT: LONE MOUNTAIN

[X] Satisfactorily completed Quality Assurance Inspection on: 10-19-92 (Date)

P.O. ITEM	QUANTITY	MATERIAL DESCRIPTION/TAG NO.
	1	12.75' X 40' height CAUSTIC TANK SER. NO. 451-1
	1	12.75' X 40' height CAUSTIC TANK SER NO. 451-2

Shipping Information: By truck to LUA-/NOKA OKLA.
Date Released for Shipment: 10-19-92

[X] Without exception to the Purchase Order Documents.
[ ] With the following Exception from the Purchase Order, only with follow up in writing with a copy of telex or letter attached. (State specifics and name of Responsible Engineer)

Approval or release for shipment of any work by a representative of the purchaser, or purchaser's Client, shall in no way relieve the vendor or sub-vendor of any responsibility for meeting the requirements of the purchase order and/or specifications.

Signing of the form acknowledges the items have been inspected in accordance with the above purchase order.

10-19-92
Date

U. S. Nugman Jr.
Agency Inspector's Signature

11811 North Frwy, Suite 670 · Houston, Texas 77060 (713) 820-8066

WELDING INSPECTION SERVICE COMPANY

WIS/QA-06

QUALITY ASSURANCE INSPECTION RELEASE

PAGE____ OF____
DATE: 10-24-92
REP. NO.:____

CUSTOMER: USPCI
P.O. NO.: 19350
LOCATION: LUBBOCK TX

VENDOR: Scott Mfg INC
PROJECT: Lone Mountain

[ ] Satisfactorily completed Quality Assurance Inspection on: 10-24-92 (Date)

P.O. ITEM	QUANTITY	MATERIAL DESCRIPTION/TAG NO.
	1	12.75'X 40' height CAUSTIC TANK SER. NO. 451-3
	1	12.75' X40' height CAUSTIC TANK SERE NO., 451-4

Shipping Information: By Truck to WAYNOKA OKLA.
Date Released for Shipment: 10-24-92

[ ] Without exception to the Purchase Order Documents.
[ ] With the following Exception from the Purchase Order, only with follow up in writing with a copy of telex or letter attached. (State specifics and name of Responsible Engineer)

Approval or release for shipment of any work by a representative of the purchaser, or purchaser's Client, shall in no way relieve the vendor or sub-vendor of any responsibility for meeting the requirements of the purchase order and/or specifications.

Signing of the form acknowledges the items have been inspected in accordance with the above purchase order.

10-24-92
Date

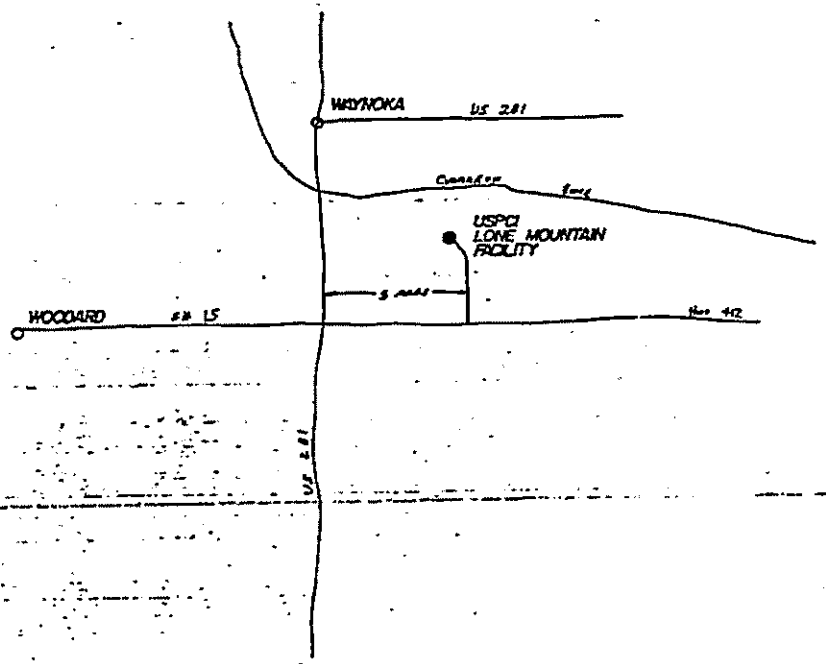
U.L. Wagmans Jr.
Agency Inspector's Signature

11811 North Frwy, Suite 670 · Houston, Texas 77060 (713) 820-8066

APPENDIX G

Drawings

USPCI
CAUSTIC STORAGE TANKS
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA



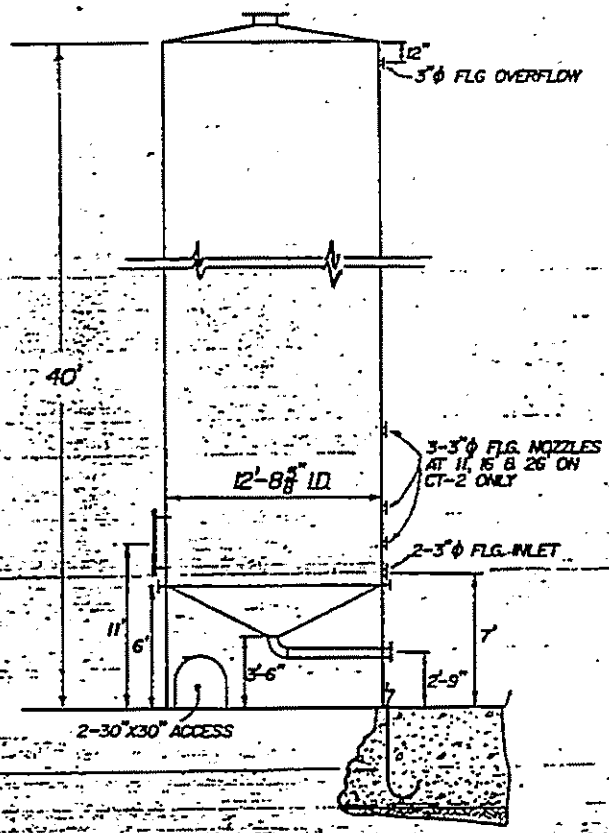
PROJECT ENGINEER: MYERS ENGINEERING CORP.
11102 N. STRATFORD DRIVE
SUITE B400
OKC, OK 73120
(405) 755-5325

SMI
SCOTT MANUFACTURING, INC.
LUBBOCK, TX.

'AS-BUILT'

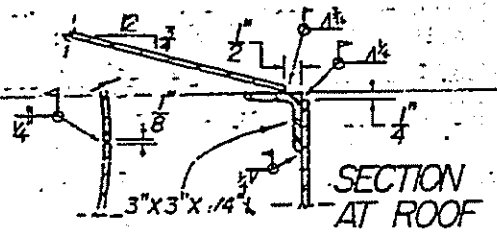
PER TANK

QTY	ITEM	DWG. NO.
12	ANCHOR BOLTS 1¼ ϕ & CHAIRS	2
3	3"ϕ SHELL NOZZLE FLG. W/B.F.	3
1	3"ϕ ROOF NOZZLE FLG. W/B.F.	3
1	GIRDER RING	3
1	OUTLET 6"ϕ W/6"ϕ 90° ELL	3
1	LADDER PLATFORM	10
2	LADDER TOWERS	5 & 11
5	SHELL PL.	1
7	NOZZLE RE-PL. (10 FOR CT-2 ONLY)	4
1	6"ϕ ROOF NOZZLE FLG. W/B.F.	3
1 EA.	SHELL / ROOF MANHOLE 30"/24"ϕ	6 & 7
2	18"ϕ ROOF NOZZLE FLG. W/B.F.	3
1 EA.	¼ ROOF PL. ¼ FLOOR PL.	8
1	ROOF ANGLE RING 3"X3"X¼	1
2	PAINTERS RING	5
1	OVERFLOW, LEVEL IND., UTIL. BRACKETS	3
4	LIFTING LUGS	10
1	HANDRAIL	10
1	CONE PL. 7/16	3
8	RAFTERS C4X7.25 & CLIPS	3
1	COMPRESSION RING	3

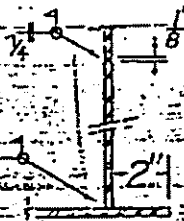


ELEVATION VIEW
FOUR TANKS
CT-1, 2, 3, 4

PLAN ORIENTATION



SECTION AT ROOF



VERTICAL SEAM

HORIZONTAL

SHELL PL. SCHEDULE

RING NO.	THICK	HEIGHT	NO. OF SHEETS @ LENGTH
1-5	¼"	96"	1 @ 480"

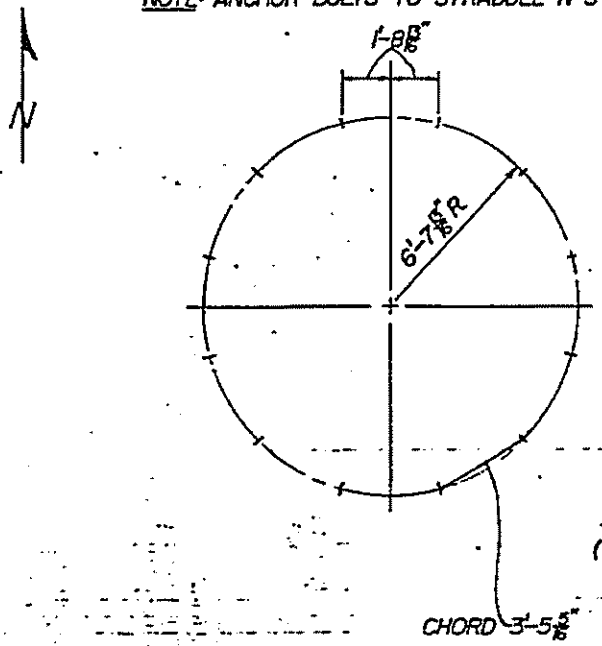
REVISIONS			
NO.	DATE	BY	
1			
2			
3			
4			
5			

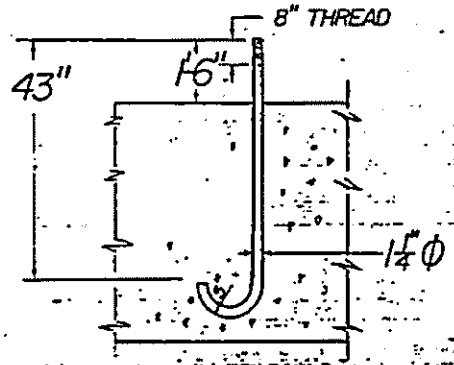
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

30,500 GALLON STANDPIPE FOR
USPCI, WAYNOKA, OK

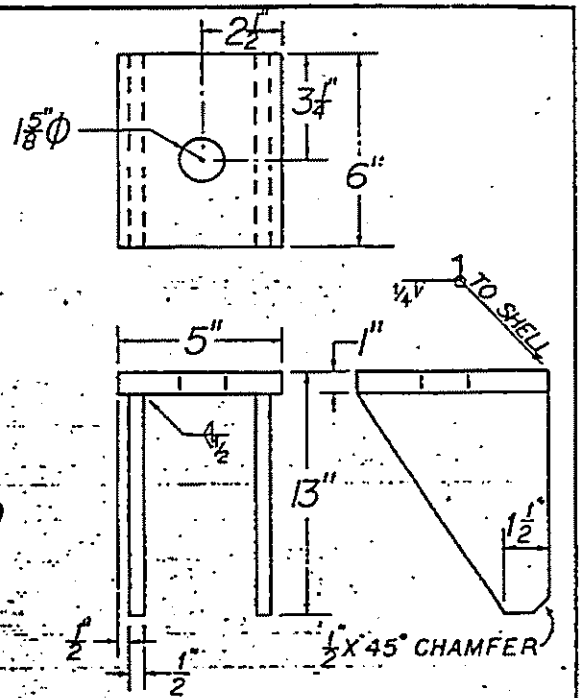
DRAWN BY LDW	SCALE NONE	MATERIAL	
CHK'D	DATE 10/6/92	DRAWING NO.	451-1
TRACED			

NOTE: ANCHOR BOLTS TO STRADDLE N-S ℄



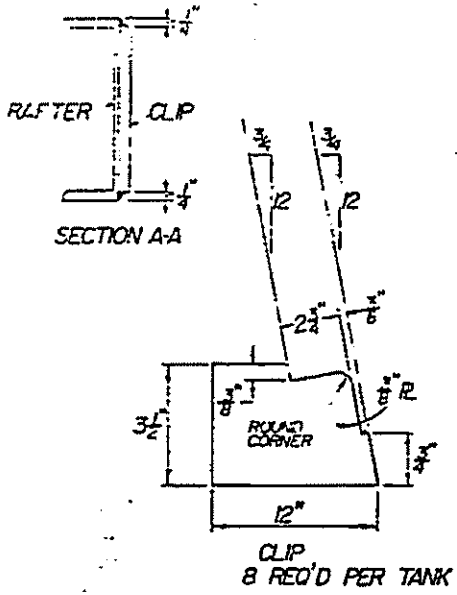


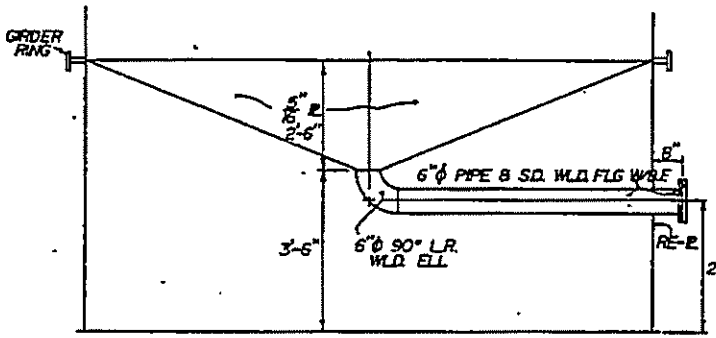
ANCHOR BOLT
12 REQUIRED
NTS
DOUBLE NUT ANCHOR BOLTS
GALVANIZED



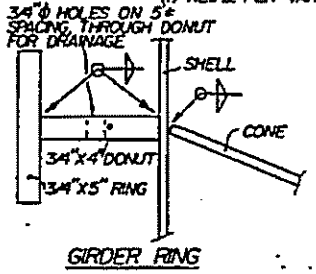
ANCHOR BOLT CHAIR
12 REQUIRED
3"=1'
DOUBLE NUT ANCHOR BOLTS

REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408		
NO.	DATE	BY	FOUNDATION FOR: USPCI, WAYNOKA, OK		
			DRAWN BY LDW	SCALE noted	MATERIAL
			CHECK	DATE 10/8/92	DRAWING NO 451-2
			TRACED		



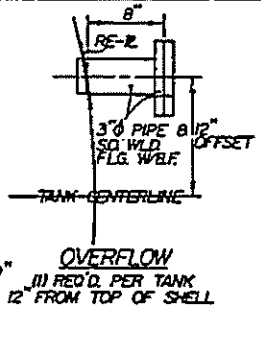


CONE & OUTLET
(1) REQ'D. PER TANK

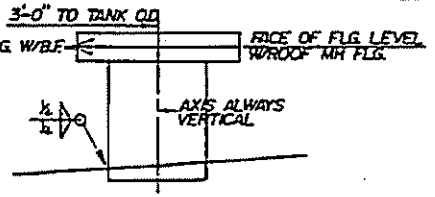


GIRDER RING

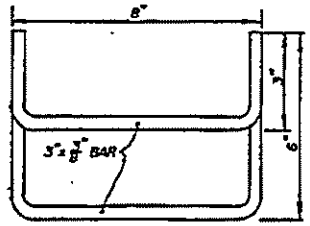
INSIDE RAFTER CHORD 1'-6 3/8"



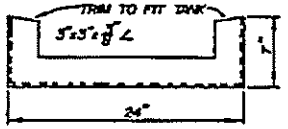
OVERFLOW
(1) REQ'D. PER TANK
12" FROM TOP OF SHELL



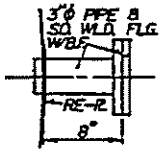
ROOF FITTINGS
(4) REQ'D. PER TANK
(1)-3", (1)-6", (2)-18"



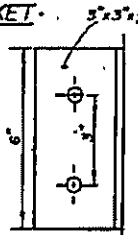
LEVEL INDICATOR BRACKET
(4) REQ'D. PER TANK
10' SPACING DOWN TANK



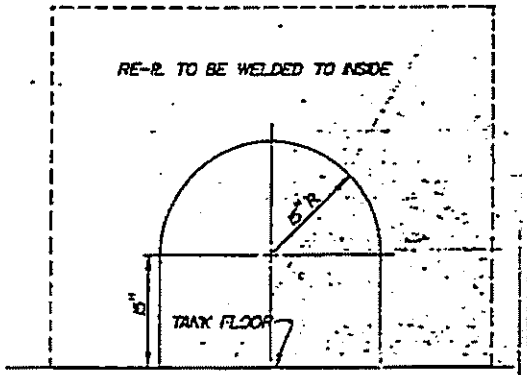
UTILITIES SUPPORT BRACKET
(4) REQ'D.
8' SPACING DOWN TANK



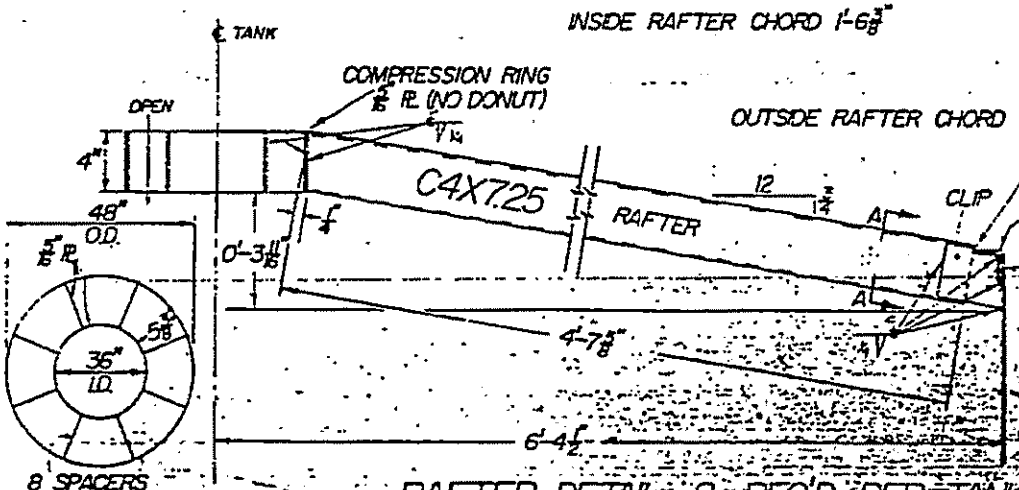
FILL
(2) REQ'D. PER TANK
(5) REQ'D. CT-2 ONLY



OVERFLOW SUPPORT
(3) REQ'D. PER TANK
10' SPACING DOWN TANK



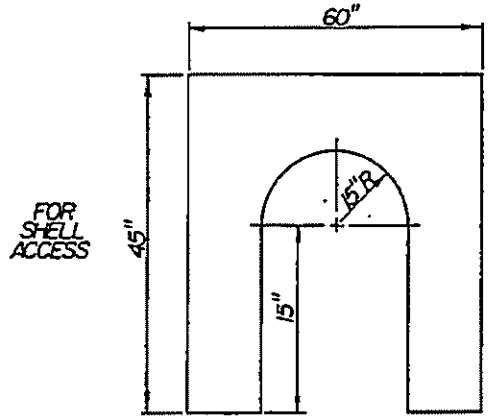
30" X 30" SHELL ACCESS
(2) REQ'D. PER TANK—DUE EAST & WEST



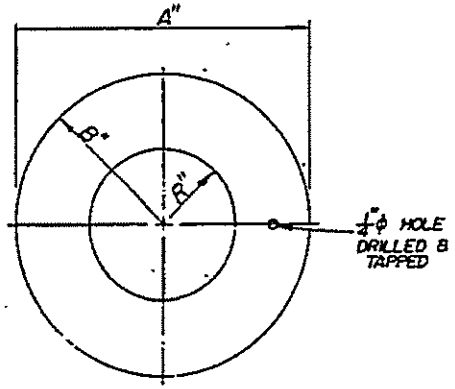
RAFTER DETAIL 8 REQ'D PER TANK

REVISIONS			SCOTT MANUFACTURING, INC.
NO	DATE	BY	P.O. BOX 10232 LUBBOCK, TEXAS 79408
1			USPCI WAYNOKA, OK
2			DRAWN BY LDW SCALE NOT TO SCALE
3			CHKD DATE 10/12/92
4			TRACED APP'D
5			

45-3



FOR SHELL ACCESS

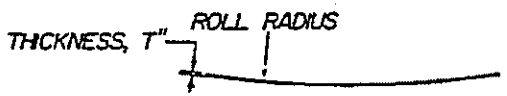


FOR OTHER FITTINGS AND SHELL MANHOLE

FRONT VIEW

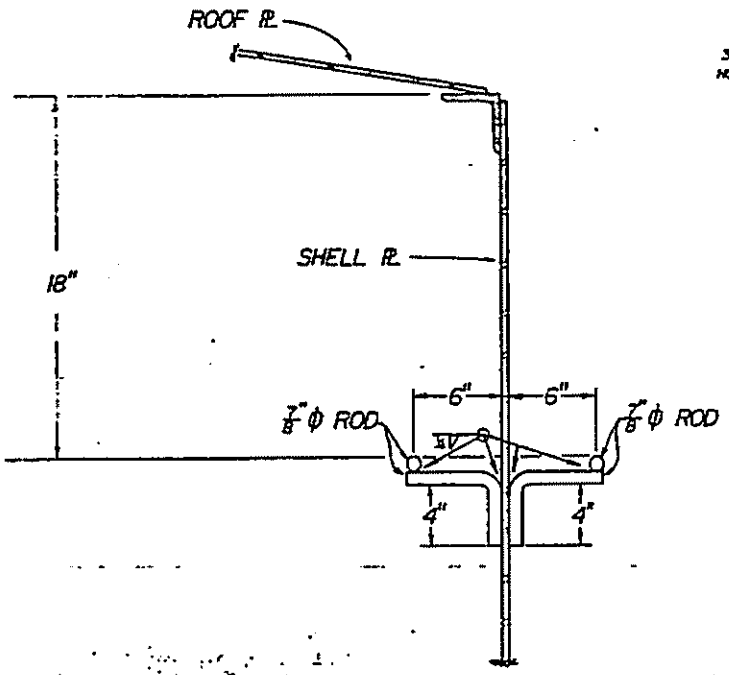
USE	NOMINAL DIA. D"	T"	ROLL RADIUS	A"	B"	R"	PER TANK QT'Y
SHELL MANHOLE	30	1/4	TANK RADIUS	60	30	15 3/16	1
OUTLET	6	1/4	"	13 1/4	6 5/8	3 7/16	1
INLET	3	1/4	"	7	3 1/2	1 7/8	2
OVERFLOW	3	1/4	"	"	"	"	1
SHELL ACCESS	—	—	"	SEE DETAIL AT	LEFT		2

5 ON CT-2 ON

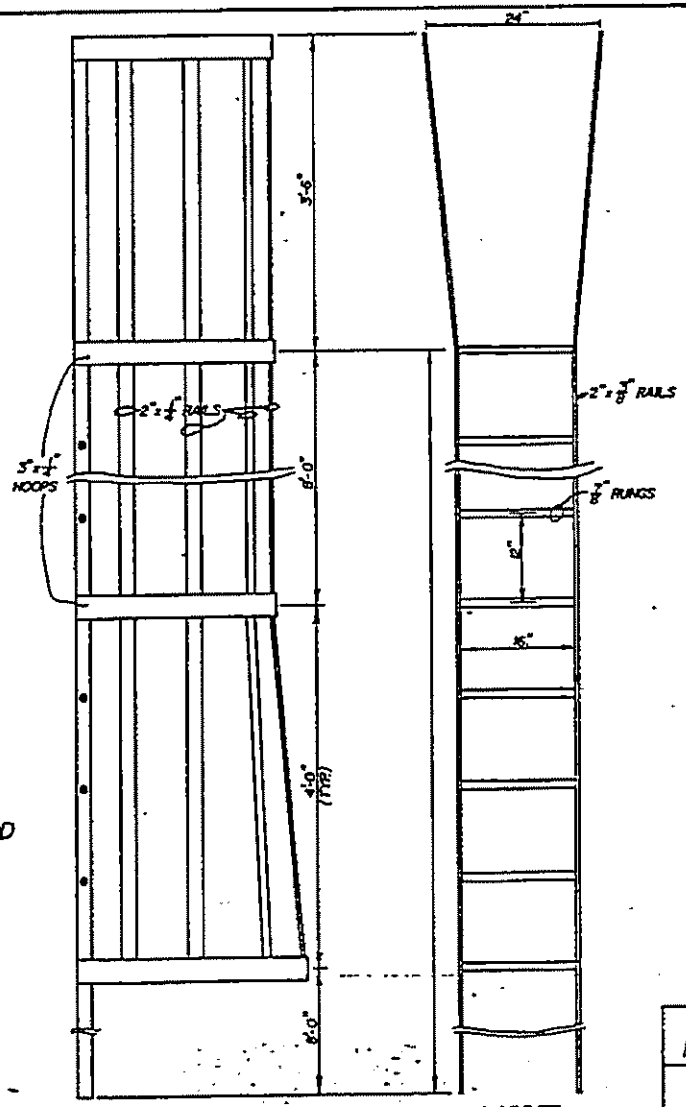


EDGE VIEW, ROLLED

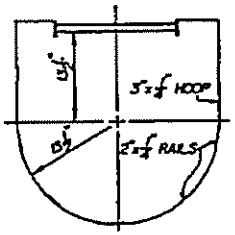
REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408		
NO	DATE	BY	REINFORCING PLATE DETAIL USPCI, WAYNOKA, OK		
1					
2					
3			DRAWN BY LDW	SCALE None	MATERIAL
4			CHK'D -	DATE 10/8/92	DRAWING NO. 451-4
5			TRACED	APP'D	



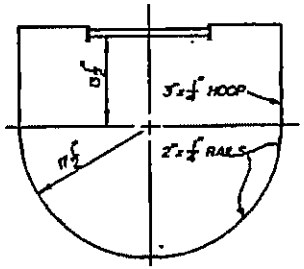
PAINTERS RING
(2) REQ'D. PER TANK-IN & OUT



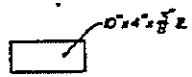
CAGE (2) REQ'D PER TOWER LADDER



STANDARD HOOP

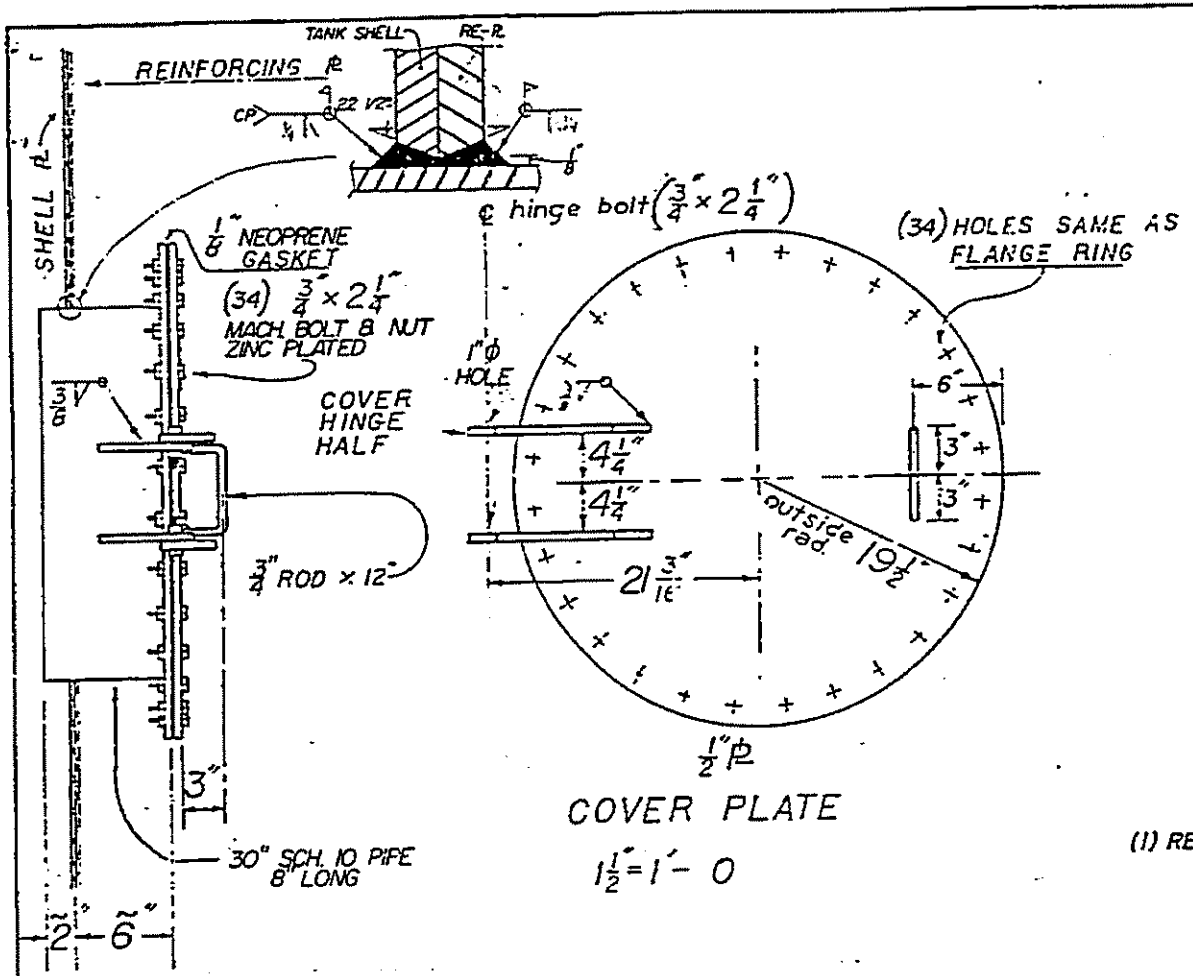


BOTTOM HOOP



LADDER STANDOFF
(6) REQ'D. PER SECTION

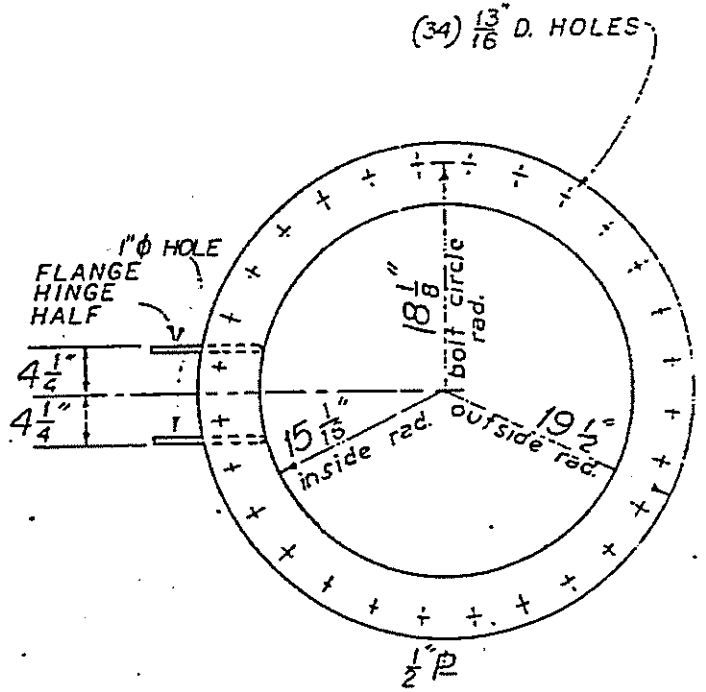
SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408	
USPCI, WAYNOKA, OK	
drawn: LDW	no. 451-5
scale:	
date: 10/14/92	



SIDE VIEW
INSTALLED

COVER PLATE
1 1/2" = 1'-0"

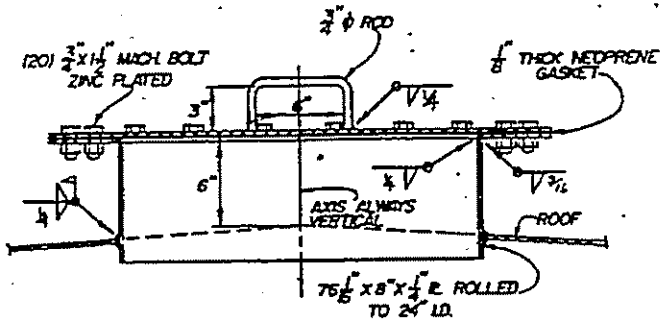
(1) REQ'D PER TANK



FLANGE RING
1 1/2" = 1'-0"

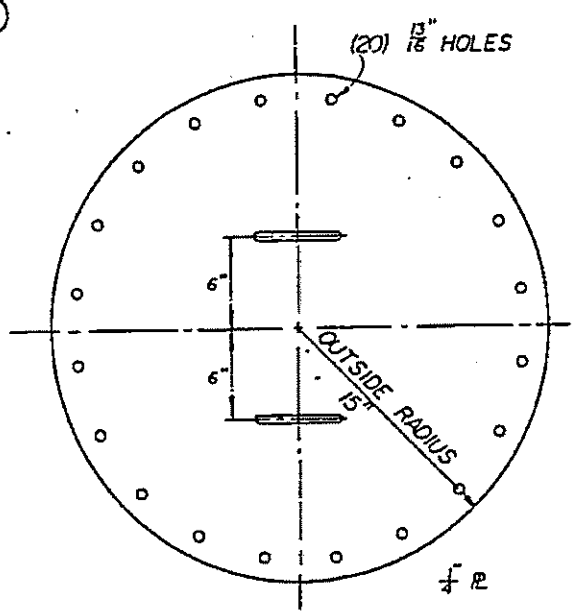
NOTE: 30" TYPE

SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408	
STANDARD SHELL MANHOLE USPCI, WAYNOKA, OK.	
drawn: LDW	no. 451-6
scale: NOTED	
date: 10/9/92	

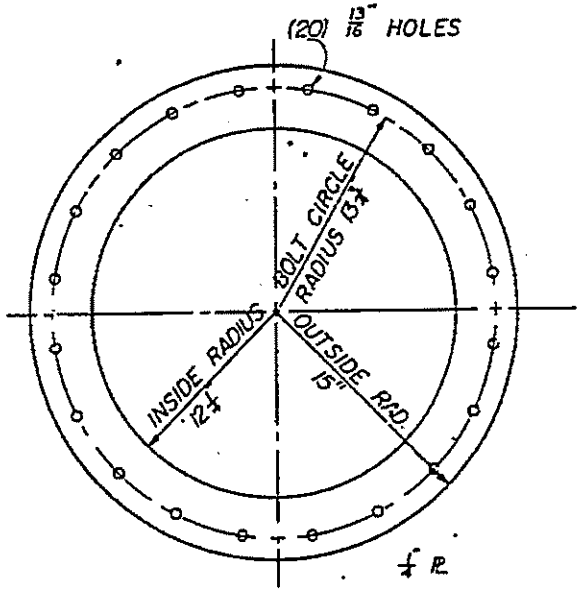


SECTION

BOLTHOLES SHALL STRADDLE THE CENTERLINES



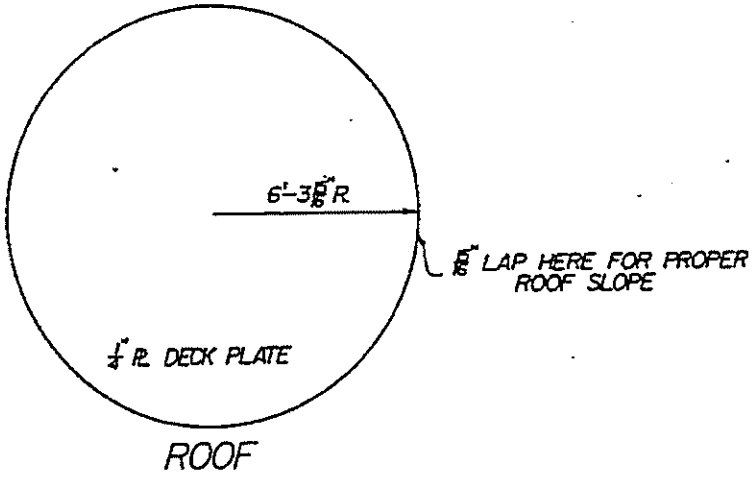
COVER



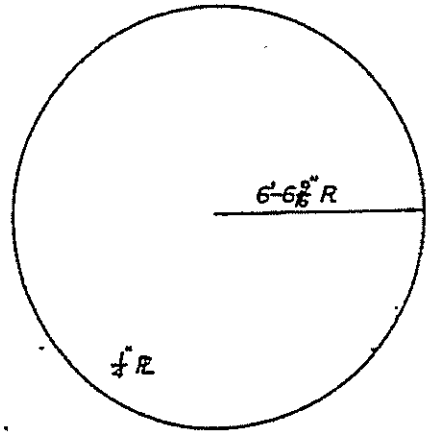
FLANGE RING

SCALE: 1 1/2" = 1'-0"
(1) REQ'D PER TANK

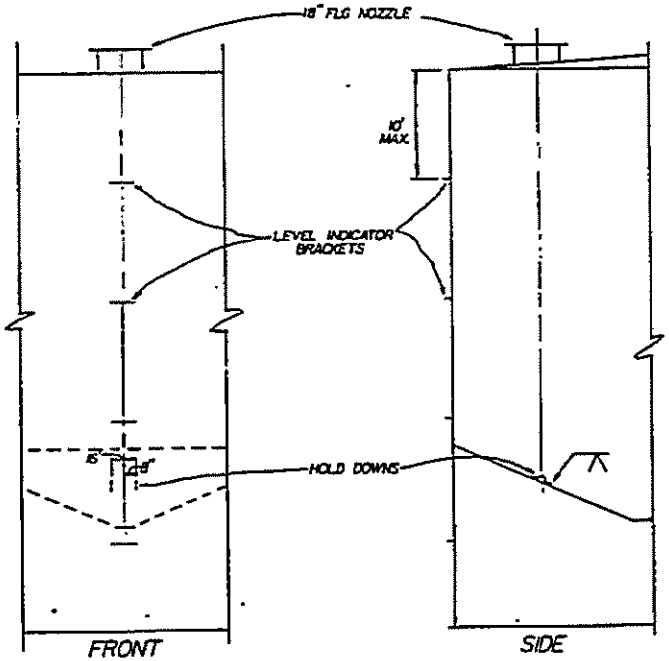
REVISIONS			SCOTT MANUFACTURING, INC. PO BOX 10232 LUBBOCK, TEXAS 79408
NO	DATE	BY	
1			API ROOF MANHOLE USPCI, WAYNOKA, OK.
2			DRAWN BY LDW · SCALE AS SHOWN · MATERIAL
3			CHK'D · DATE 10/9/92 · DRAWING NO 451-7
4			TRACED · APP'D
5			



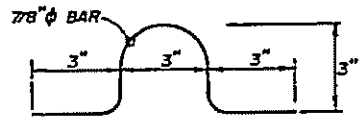
ROOF



FLOOR

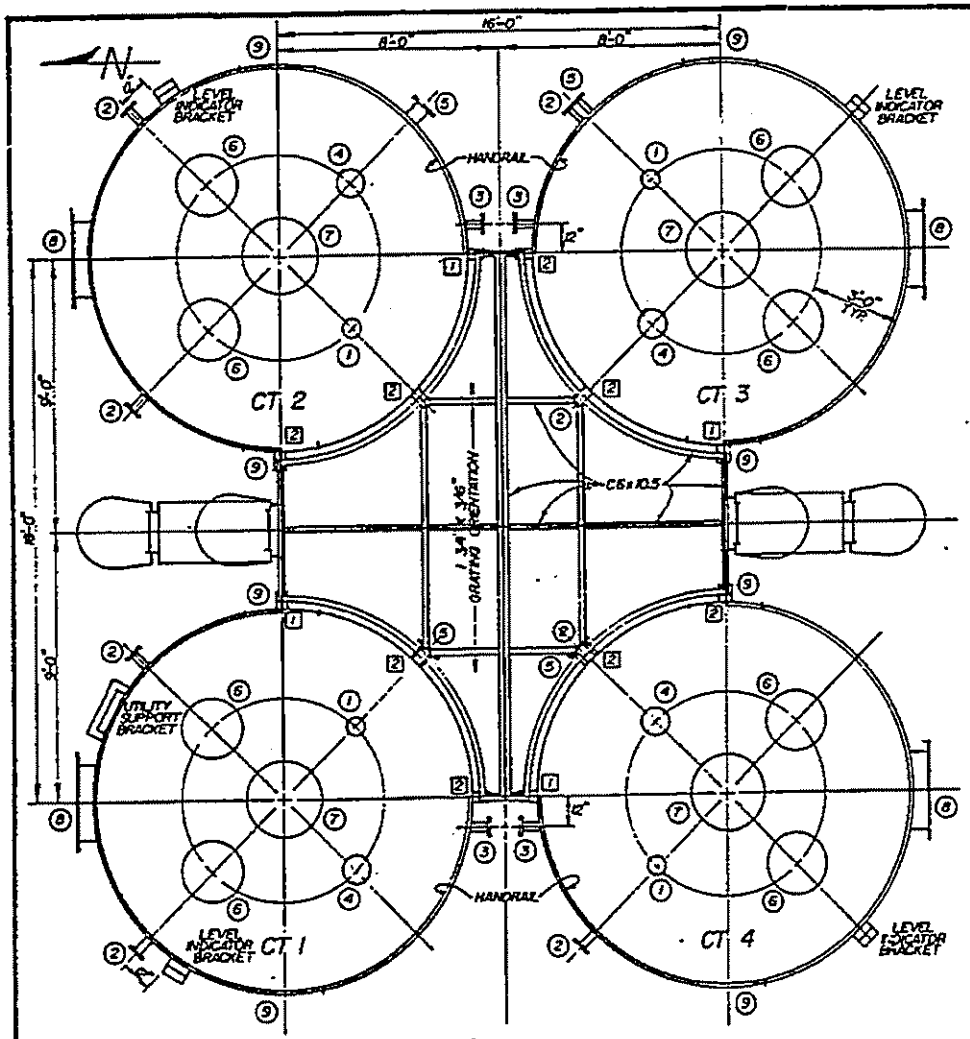


LEVEL INDICATOR DETAILS



INDICATOR HOLD-DOWN
(2) REQ'D PER TANK

REVISIONS			SCOTT MANUFACTURING, INC. PO BOX 10232 LUBBOCK, TEXAS 79408		
NO.	DATE	BY			
1			USPCI, WAYNOKA, OK		
2					
3			DRAWN BY LDW	SCALE	MATERIAL
4			CHK'D	DATE 10/14/92	DRAWING NO. 451-8
5			TRACED	APP'D	



NO.	SIZE	LOCATION	QUAN.	NOTES
(1)	3"	ROOF	1	
(2)	3"	SHELL (RADIAL)	2	(3 EXTRA-CT 2 ONLY)
(3)	3"	SHELL (OFFSET)	1	
(4)	6"	ROOF	1	
(5)	6"	SHELL	1	
(6)	8"	ROOF	2	

NO.	SIZE	LOCATION	QUAN.
(7)	24"	ROOF/NAME 2.	1
(8)	30"	SHELL	1
(9)	30"	SHELL (ACCESS)	2
PLATFORM SUPPORTS			
[1]	BOLTED PLATFORM SUPPORTS		
[2]	SLIDING PLATFORM SUPPORTS		

TANK BATTERY PLAN
QUANS. SHOWN ARE PER TANK

NOTE: TANKS TO BE PLUMBED PRIOR TO PLATFORM PLACEMENT. PLATFORM FRAME TO BE MITERED & COPED AND WELDED ALL AROUND.

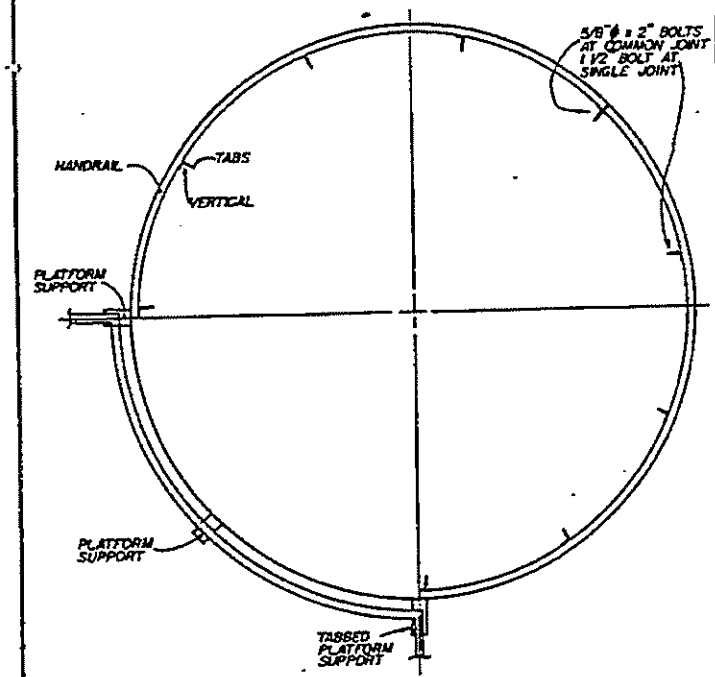
REVISIONS		
NO.	DATE	BY
1		
2		
3		
4		
5		

SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

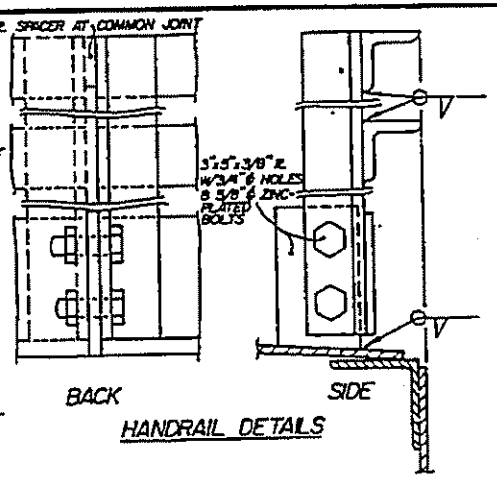
USPCI, WAYNOKA, OK.

DRAWN BY	SCALE	MATERIAL
LDW		
CHK'D	DATE 10/12/92	DRAWING NO. 451-9
TRACED	APP'D	

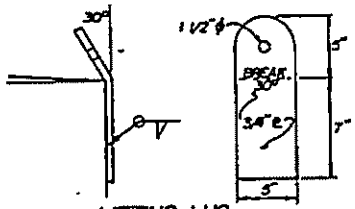
NOTE: EACH TANK'S HANDRAIL IS MADE IN 2 HALVES AND ARE MIRROR IMAGES.
NOTE THE VERTICAL'S ORIENTATION. THE RAILS ARE LEG OUT & LEG DOWN.
ALL WELDS ARE ALL-AROUND. LEG OUT OF RAILS ARE ROLLED TO TANK O.D.



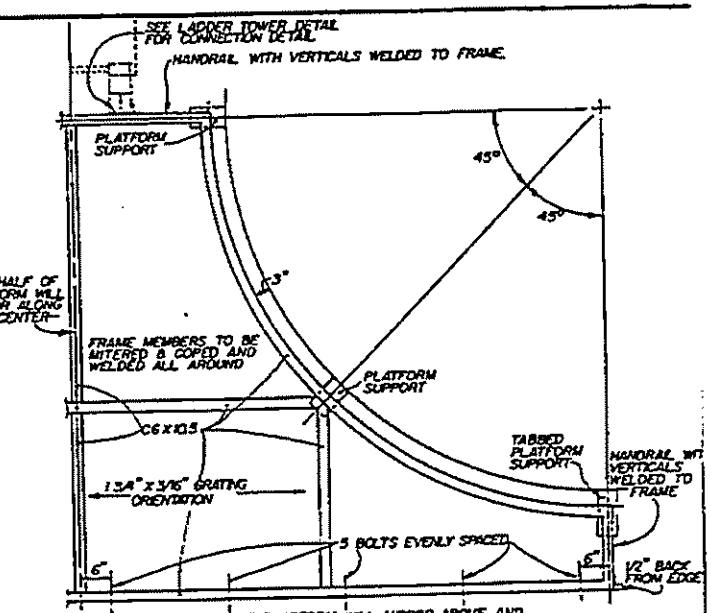
HANDRAIL ON TANK-TYPICAL



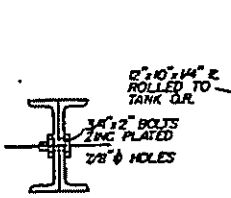
HANDRAIL DETAILS



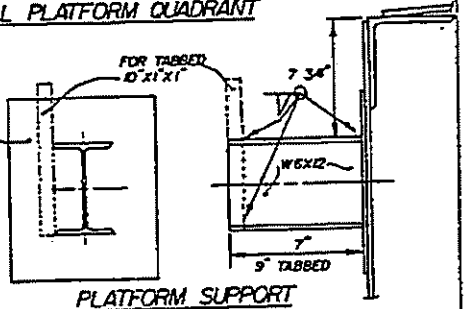
LIFTING LUG
(4) REQ'D. PER TANK



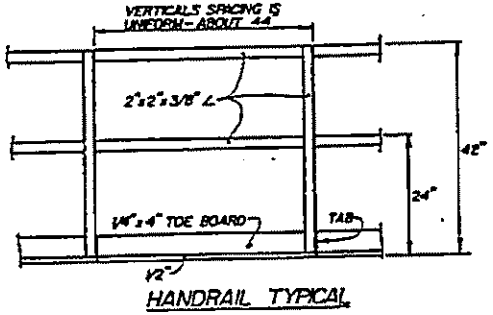
TYPICAL PLATFORM QUADRANT



PLATFORM-HALF CONNECTION



PLATFORM SUPPORT
(2) REQ'D. PER TANK
(1) TABBED PER TANK



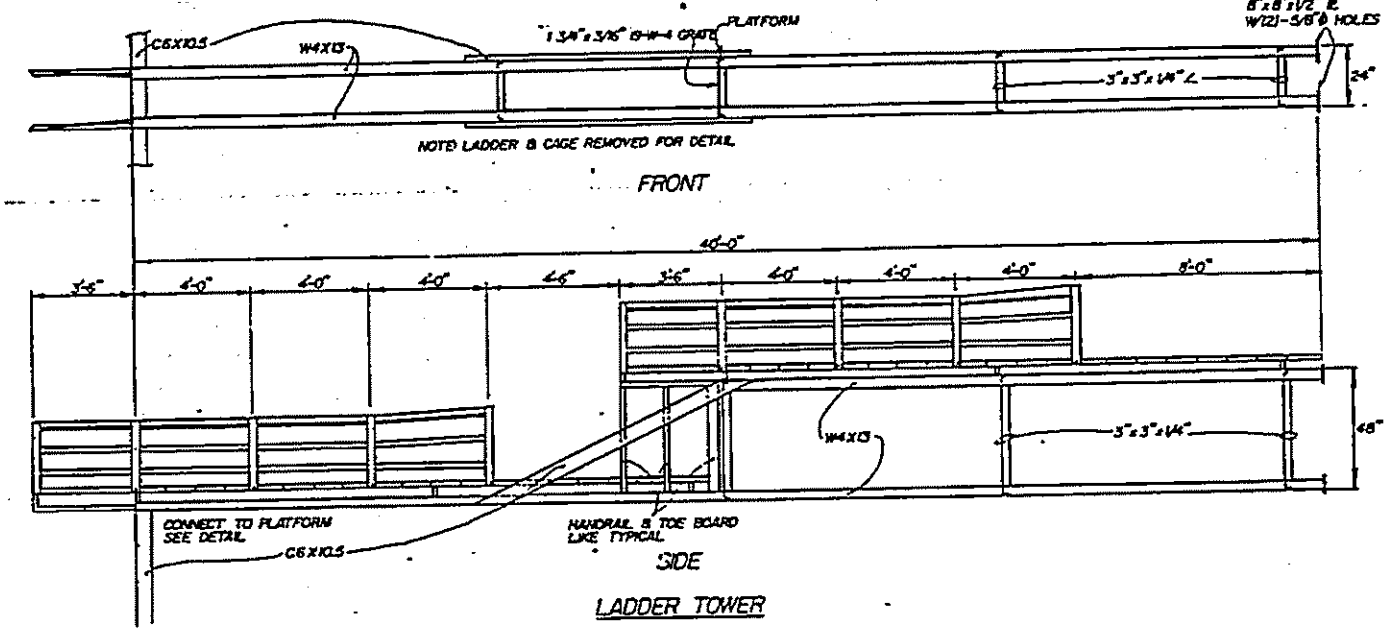
HANDRAIL TYPICAL

REVISIONS		
NO	DATE	BY
1		
2		
3		
4		
5		

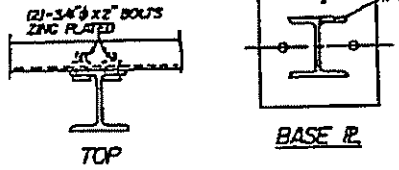
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

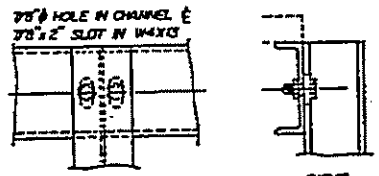
USPCI, WAYNOKA, OK

DRAWN BY LDW	SCALE	MATERIAL
CHK'D	DATE 10/20/92	DRAWING NO 451-10
TRACED	APP'D	



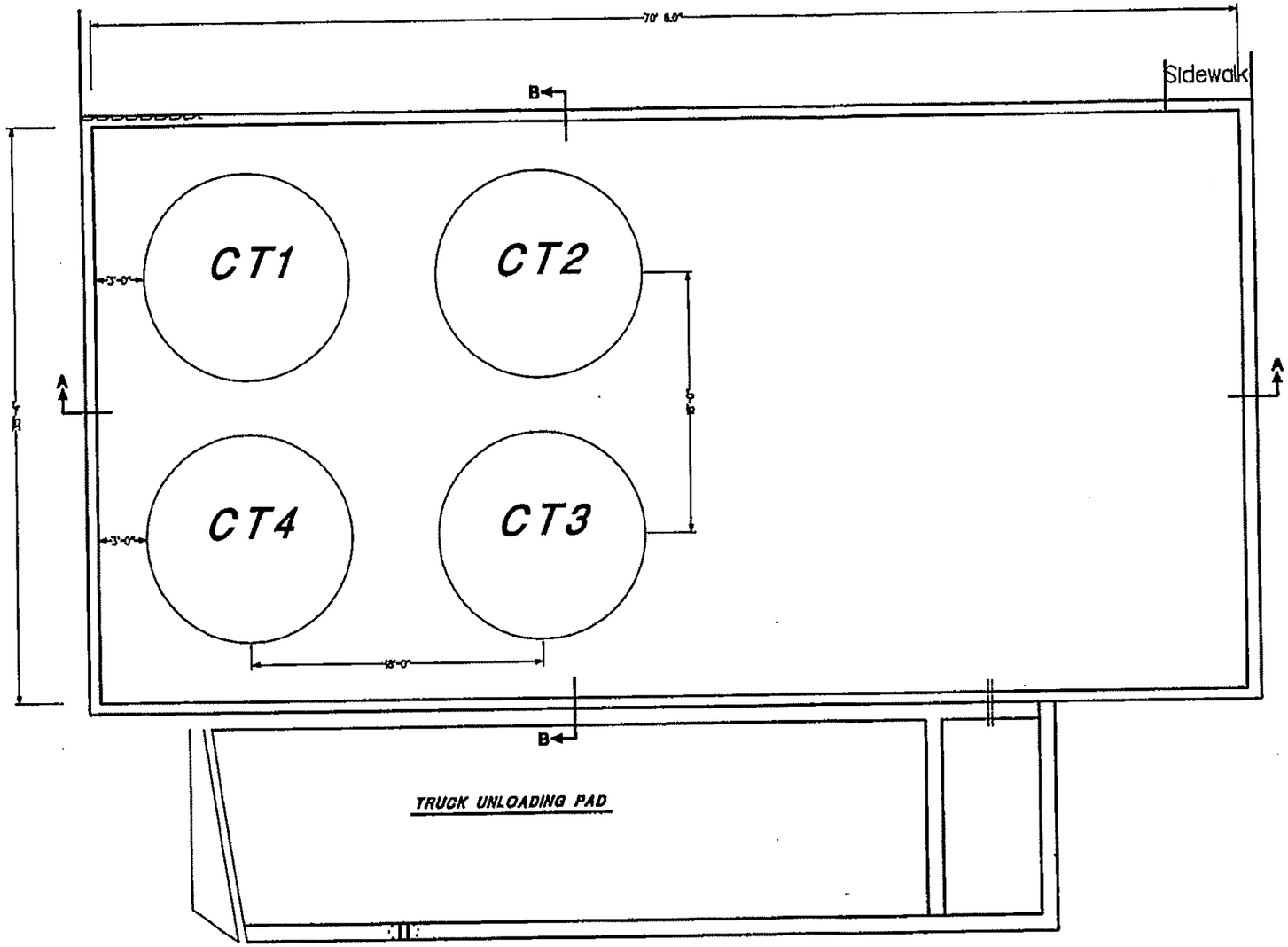
LADDER TOWER

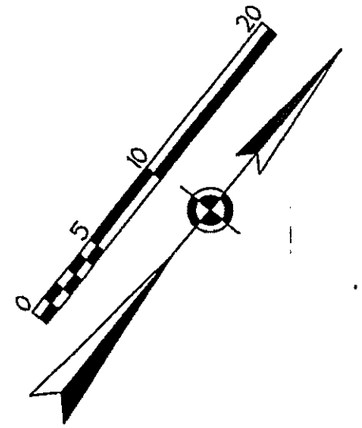




LADDER-PLATFORM CONNECTION

REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408
NO	DATE	BY	
1			USPCI, WAYNOKA, OK
2			DRAWN BY LDW — SCALE — MATERIAL
3			CHK'D — DATE 10/23/92 — DRAWING NO 451-11
4			TRACED — APP'D
5			





RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

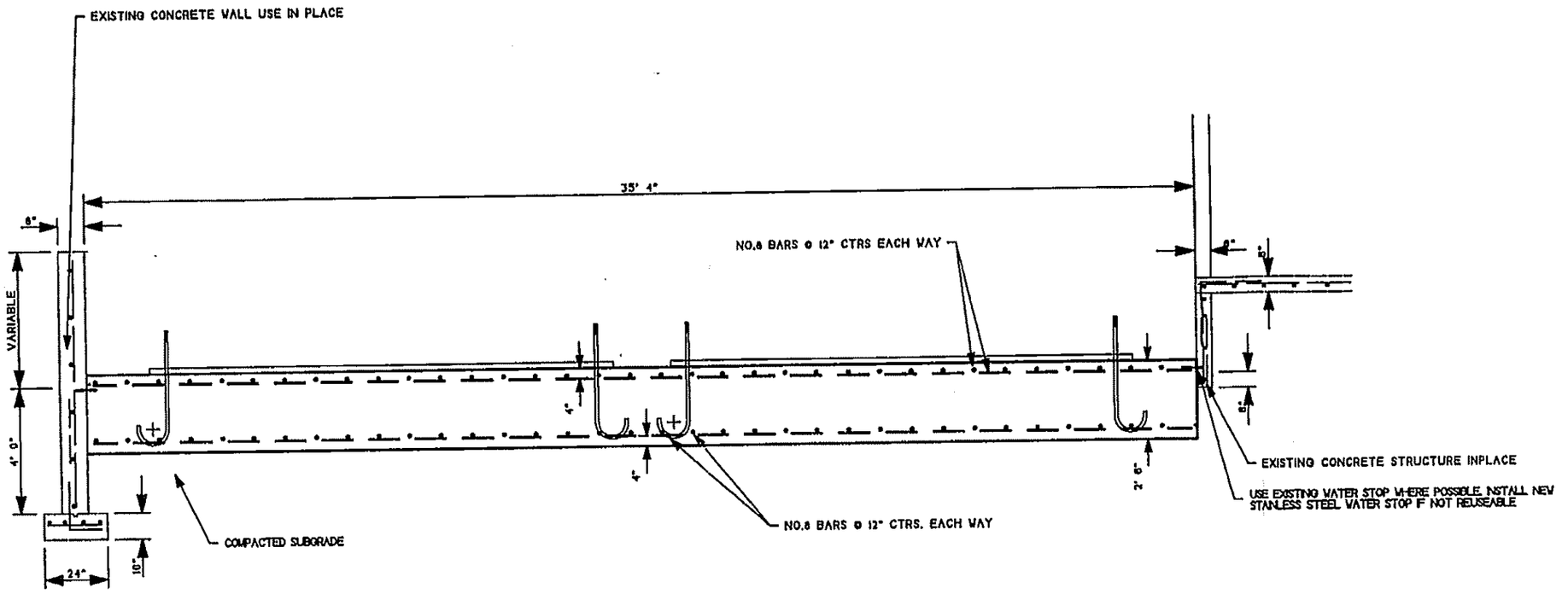
USPCI
A Subsidiary of Union Pacific Corporation

USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-5926

CAUSTIC TANKS 1-4 REPACEMENT PLANS
LAYOUT OF AREA

JOB NO. 5137
SCALE nic
DRAWN
DATE 10/28/92
SHEET OF



SECTION

RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

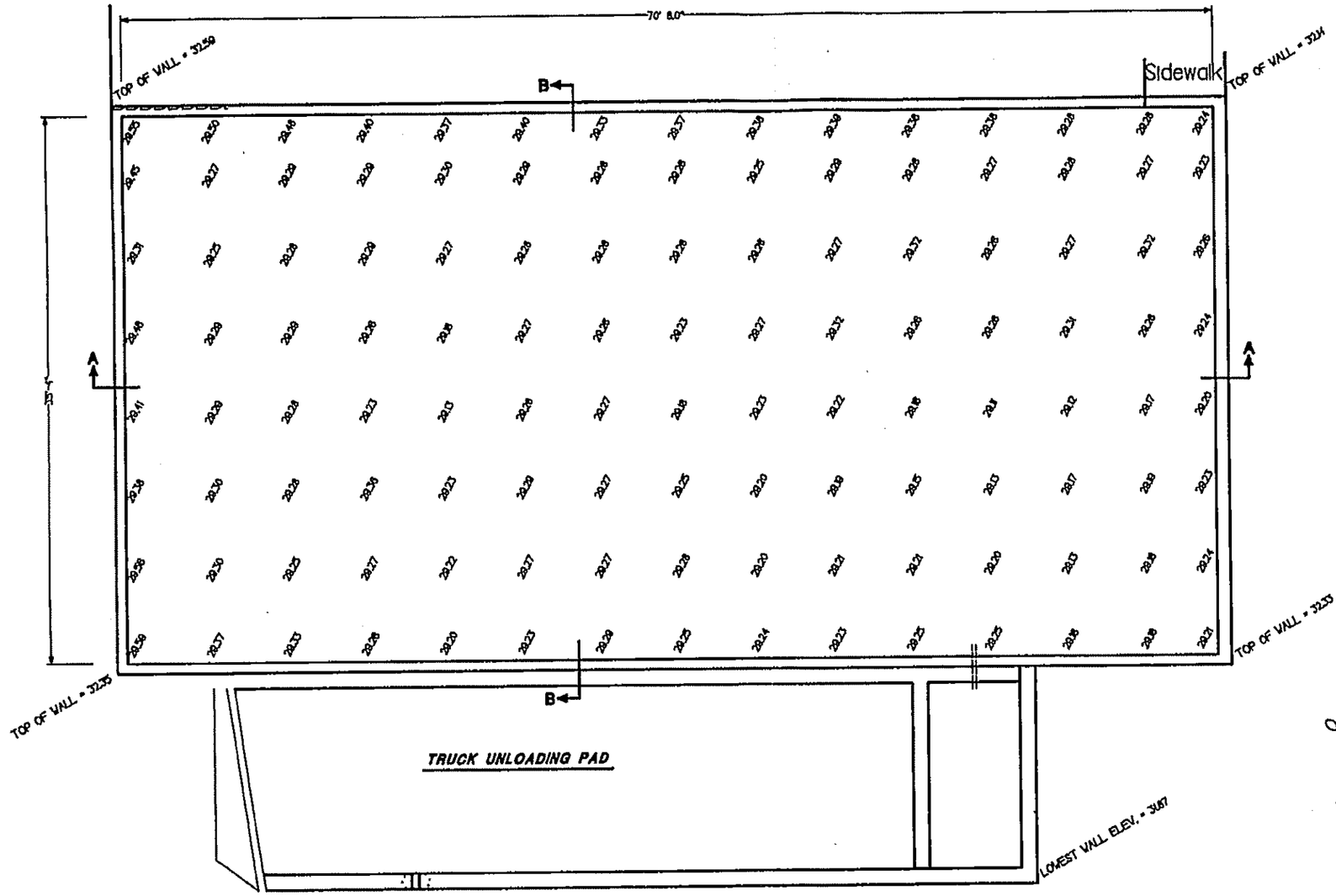
USPCI
A Subsidiary of Union Pacific Corporation

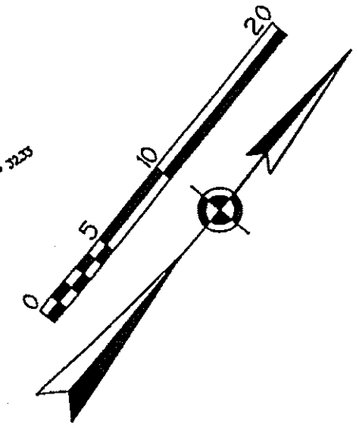
USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-5525

CAUSTIC STORAGE TANK 1-4
CONCRETE REPLACEMENT
SECTION "B" - "B"

JOB NO. 5137
SCALE
DRAWN GRS & JF
DATE 10-5-92
SHEET OF





NOTE:
ADD 1400.00 TO ALL ELEVATIONS

RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

USPCI
A Subsidiary of Union Pacific Corporation

USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-5325

CAUSTIC TANKS 1-4 REPACEMENT PLANS
LAYOUT OF AREA

JOB NO. 5137
SCALE
DRAWN nlc
DATE 10/28/92
SHEET OF

SECTION CT4

MYERS Engineering CORPORATION

ENGINEERING FOR TODAY'S CHANGING WORLD

RECEIVED
MAY 23 1994
LARRY J. ODEN

November 6, 1993

Mr. Don Dillie
USPCI, Inc.
Rt. 2 Box 170
Waynoka, Oklahoma 73860

Dear Mr. Dillie:

At the time of our inspection of Caustic Storage Tanks 1-4 located at the pretreatment area were inspected and there were no visual apparent weld breaks, punctures, scrapes of protective coatings, cracks, corrosion or damage due to construction or installation. This is to certify that Caustic Storage Tanks 1-4 were installed in such a manner which did not produce any structurally adverse conditions in accordance with 40 CFR 264.192(b).

This is to certify that at the time of our inspection, the Caustic Storage Tanks 1-4 located at the pretreatment area of the Lone Mountain Facility, (Waynoka, Oklahoma), were filled with water and allowed to stand at static equilibrium for a period of several hours. During this time all welds and tank walls were monitored for leaks. There were no apparent leaks found therefore the tank appears to be capable of handling hazardous wastes without release for the intended life and use of the tank.

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

Sincerely,

MYERS ENGINEERING CORPORATION

By E. E. Myers
E. E. Myers

EEM:ls

cc: Mr. Gene Walker
Environmental Engineer
Lone Mountain Facility

FILE INSTRUCTIONS	
Unit Pre-Treatment	
Project Caustic Tank Assesment	
Section Tank Certification	
Rcvd. by: L. J. ODEN	
ROUTE	COPY
F.LB	D. Dodd
	B. Correa

LEAK TEST

11102 NORTH STRATFORD DRIVE • SUITE 8400 • OKLAHOMA CITY • OKLAHOMA • 73120 • 405/755-5525 • FAX 405/755-557

SECTION 205

ASSESSMENT OF CAUSTIC TANK #4 (CT4)
LONE MOUNTAIN HAZARDOUS WASTE FACILITY
U.S.P.C.I.
WAYNOKA, OKLAHOMA

A. TANK VESSEL DESCRIPTION

Caustic Tank #4 is a large steel aboveground vertical tank located in the pretreatment area of the Lone Mountain Hazardous Waste Facility. Caustic Tank #1, Caustic Tank #2, Caustic Tank #3, Caustic Tank #4, Sludge Storage Tank #1 and, Caustic Overflow Tank, Cyanide Overflow tank, Cyanide Reactor, Cyanide Measure Tank and a portion of their ancillary equipment will be located together in a concrete containment area.

B. PRIMARY TANK VESSEL

1. General Description

Caustic Tank #4 is being assessed to determine if the unit is adequately designed with sufficient structural strength, and compatibility with the waste to be stored or treated. Caustic Storage Tank #4 is an aboveground tank that will be used for the storage of caustic liquids. The tank is vertical in position and cylindrical in shape. The tank and contents are supported by a skirted base. There is a cone on the bottom of the tank inside the skirt. There is a platform connected to all four caustic storage tanks (CT1, CT2, CT3, CT4). There are two ladders for access to the tank top and platform. This tank is equipped with a 3" overflow line. There is a level gauge installed through an 18" nozzle, in addition to the level gauge there is a high level alarm installed through a nozzle on the top of the tank. This tank was manufactured by Scott Manufacturing, Inc from Lubbock, Texas. The temperature of the tank varies with the ambient temperature.

Influent piping is located from the pretreatment building to the caustic tank and to other tanks in the containment area.

2. Design Standards.

The tank is designed and constructed to those sections that are applicable in the American Petroleum Institute Standard 650 - 1988 edition (API-650) and the American Institute of Steel Construction (AISC) Manual of Steel Construction (8th Edition). The Mill Test reports and radiographic testing reports can be found in Appendix F of this assessment.

3. Hazardous Characteristics of Wastes Stored

The wastes to be stored in this tank have the following characteristics (Provided by USPCI):

Untreated wastes pH (7 - 13)
N > 1
Temperature = Ambient

The hazardous characteristics of the waste to be stored in this tank were examined. It was determined that the pH and normality levels of the waste are the primary areas of concern. This is to determine the applicability of a corrosion allowance for the tank material type and thickness.

4. Existing Corrosion Protection

The interior of the tank is coated with Gliden "Glid-Guard Epoxy Chemical Resistant Finish 5240 Series." This coating will withstand the chemical characteristics of the waste to be stored.

5. Documented Age of Tank

This is a new tank, it was constructed and installed in October of 1992.

6. Result of Leak Tests

A leak test was performed. In this test the tank was filled to maximum operating capacity with water. The tank was allowed to sit full for a minimum of 6 hours. After remaining full for this time there was no evidence of the tank leaking. In the inspection all welds, flanges, manways, nozzles, and sidewalls were checked for leaks.

7. Existing Data Obtained

Diameter of Tank	12'-8-5/8" Inside Dia.
Height	40'
Material	A36 steel See Appendix F for Mill Test reports
Wall and top thickness	0.25"
Bottom cone thickness	0.3125"
Maximum Volume	4426.27 cf. or 33,108 Gal.
Maximum Operating Volume	4299.22 cf. or 32,156 Gal.
Specific gravity of waste	1.5 (Provided by USPCI)
Temperature	Ambient
Seismic Zone	1

8. Calculation of Existing Foundation Loading

Total Weight of Tank and Contents = 216.54 tons

Detailed calculations reflecting the volume and weight of the tank are found in appendix A. The required foundation thickness and steel reinforcement are included in appendix E of this assessment.

9. Required Structural Calculation

The calculated required wall thickness for this tank is 0.2195 inches. This thickness includes 0.125 inches added for corrosion allowance. This corrosion allowance is based on a best engineering estimate taking into account the materials being treated and a 20 year design life. (See appendix B and C of this assessment for detailed calculations or required wall thickness and structural analysis of the tank support system.)

10. Comparison of Actual Structure to Theoretical Values

Wall Thickness Comparison

Calculated Required Wall Thickness	0.2195"
Minimum Required Wall Thickness By API-650-88	0.1875"
Measured Wall Thickness	0.25"

C. SECONDARY CONTAINMENT SYSTEM

1. General Description of Secondary Containment

The secondary containment system is designed and will be operated to prevent any migration of wastes or liquids out of the system. Cyanide Reactor Tank, Cyanide Measure Tank, Caustic Tanks #1-4, Sludge Storage Tank, Caustic Overflow Tank, Cyanide Overflow Tank will be located on a reinforced concrete base floor area with vertical concrete sidewalls. All associated piping is aboveground. The area will be inspected on a daily basis. The containment system is walled off and receives no direct vehicular traffic. The foundation walls and base were mass poured in place. No cracks from compression or uplift were visually apparent. There are three low areas with a slight depression that are used to collect any waste spills and rainwater. Any released tank contents or surface runoff will drain on top of the sloped concrete to the sump areas. The accumulated liquids are then removed and pumped out in accordance with the permit condition. The slab floor also serves as a foundation support for the tanks in this area.

The concrete floor was removed and replaced in October of 1992. The floor was replaced in order to strengthen the foundation for the tank support.

2. Design Standards.

Design drawings for the walls were obtained and used as a reference. It should be noted that these are design drawings and not as built drawings. The structural capacity of the foundation and walls were compared to those sections that are applicable in the API-650-88 and the American Concrete Institute (ACI 318-89/318r-89) and these calculations were used as a guide in verifying the ability of the system to contain hazardous waste. The concrete floor and foundation were built in close adherence to the above mentioned codes. The floor as previously mentioned was removed and replaced.

3. Hazardous Characteristics of Wastes Stored

The wastes which are treated in the primary tank have the following characteristics:

Untreated waste pH (7 - 13)
N > 1
Temperature = Ambient

The hazardous characteristics of the waste treated in the primary tank were examined. It was determined that the pH and normality levels of the waste are the primary areas of concern. This is to determine the applicability of a corrosion allowance for the containment system material type and thickness.

4. Existing Corrosion Protection

The concrete containment will be coated with Concrete Protection System, Inc "OVERKOTE" industrial flooring. For more information on this coating see Appendix H of this report.

5. Documented Age of The Containment Area

The secondary containment system was originally constructed and installed in 1987 however the floor was replaced in October 1992.

6. Result of Leak Tests

A visual inspection of the containment area was performed and from this inspection it was determined that there are no cracks or breaks in the impermeable coating. The area will be inspected on a daily basis checking for leaks from the primary tank.

7. Data Obtained

Area	2509.85 s.f.
Wall Height	2.62 ft. (Min.)
Material	Concrete
Gross Volume	6575.81 c.f.
Thickness	30"

See Appendix G of this assessment for a detailed layout and cross sections of the secondary containment. Also included in Appendix D of this assessment are detailed calculations of the gross volumes of each containment area.

8. Calculation of Existing Capacity

Containment Capacity Available (CCA)

CCA = Gross Volume - Volume of items in the containment - Volume of rainfall.

See the appendix of this report for detailed calculations of the available containment volume. The containment capacity available = 4960.54 c.f.

9. Required Volume

Containment Capacity Required (CCR)

CCR = Volume of Largest Tank in the secondary containment

Volume of Largest Tank =	4426.27 c.f.(CT1) or 33,108 Gal.

10. Comparison of Available Volume to Required Volume

Containment Capacity Comparison

Containment Capacity Required =	4,426.27 c.f.
Secondary Containment Volume Available =	4,960.54 c.f.
Excess Containment Volume =	534.27 c.f.

CCA > CCR Adequate Capacity (under normal operating conditions) is available.

D. CONCLUSIONS

1. Primary Tank Vessel

The primary tank vessel at the of inspection was fit for use with the proposed waste stream at the given densities, chemical and physical characteristics as verified by USPCI. The useful life of the steel tank would be estimated at 20 years if the proposed waste stream is maintained. This useful life was determined by using a design life of 20 years less the period that the tank has been in use at the USPCI Lone Mountain Facility.

2. Secondary Containment System

The secondary containment area is fit for use, with the proposed waste stream at given densities and chemical and physical characteristics as verified by USPCI were released from the primary tank. The useful life of the concrete containment area is estimated at 20 years. This useful life was determined by using a design life of 20 years less the period that the system has been in use at the USPCI Lone Mountain Facility.

E. RECOMMENDATIONS

The following repairs or modifications should be made:

1. Primary Tank

   The tank should be internally inspected periodically to insure no corrosion is occurring. The tank should be checked yearly with ultrasonic testing procedures to establish a verified limit of corrosion. USPCI should continually insure compatibility with the waste and densities stored. Daily inspections should conducted to detect any visual corrosion or defects.

2. Secondary Containment

   The secondary containment should be checked periodically for any deterioration and structural integrity.

3. Routine Inspections

   When routine and preventative measures are to be completed, the tank should be cleaned and internally inspected to determine any interior defects or corrosion. Routine painting and coating of tanks on the interior and exterior, and routine inspection is recommended.

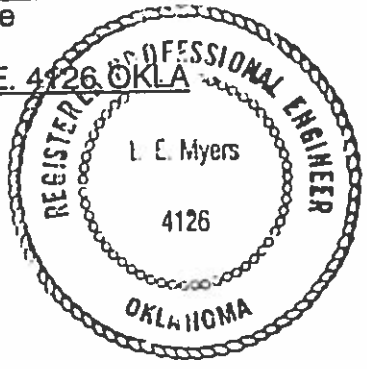
F. CERTIFICATION

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.

E.E Myers
Date: 1/20/93

Engineer
Title

P.E. 4126 OKLA



APPENDIX A

Primary Tank Volume Calculations

SECTION 205 - APPENDIX A

CT4, Caustic Storage Tank No. 4

PRIMARY TANK VOLUME CALCULATIONS

DIMENSIONS:			
Geometry:	CYLINDRICAL		
Diameter:	12.72	FEET	
Max Height:	34.00	FEET	
Normal Operating Height:	33.00	FEET	
Cone Height:	2.42	FEET	
Bottom Cone Diameter	0.50	FEET	
Cone Length	6.80	FEET	
Cone Volume:	106.53	C.F. or	796.83 Gal.

VOLUME CALCULATIONS

Max. Volume :	4426.27	C.F. or	33108.49 Gal.
Normal Operating Volume	4299.22	C.F. or	32158.15 Gal.

MAXIMUM OPERATING TANK VOLUME =	4426.27	C.F.
OR	33,108.49	GAL

WEIGHT ON FOUNDATION

CONTENTS S.G.:	1.50	
DENSITY:	93.60	LB/C.F.

SURFACE AREA CALCULATION

Tank Top =	127.05	S.F.
Tank Bottom Cone =	257.87	S.F.
Tank Wall= Cir*h	1358.54	S.F.
TOTAL SURFACE AREA WALL AND TOP	1743.47	S.F.

Steel Thickness=		
Sidewalls and Top	0.25	INCHES
Cone	0.31	INCHES
Volume of Steel =		
Sidewalls	28.30	C.F.
Top and bottom	10.02	C.F.
Density of Steel =	490.00	LB/C.F.
Weight of Steel =	9.39	TONS
WEIGHT OF TANK CONTENTS =	207.15	TONS

TOTAL WEIGHT OF TANK AND CONTENTS =	216.54 TONS

APPENDIX B

Primary Tank Wall Thickness Calculations

SECTION 205 - APPENDIX B

CT4, Caustic Storage Tank No. 4

PRIMARY TANK WALL THICKNESS

DIMENSIONS:		
Geometry:	CYLINDRICAL	
Diameter:	12.72	FEET
Height :	34.00	FEET
Specific Gravity:	1.50	
Normal Operating Temperature =	ambient	

STEEL THICKNESS CALCULATIONS @ BOTTOM RING

Thickness (t) = (2.6 * H * D * S.G.) / (s * E) + CA

s = Allowable Design Stress =	21000.00	PSI ***
E = Joint Efficiency =	85.00%	
Thickness (t) =	0.0945	INCHES
Corrosion Allowance =	0.1250	INCHES
Calculated Req'd Wall thk. =	0.2195	INCHES

*** THIS DESIGN STRESS IS OBTAINED FROM API-650-88 WITH THE USE OF APPENDIX A.

CONE WALL THICKNESS CALCULATION

Cosine Alpha = cos(67.6594)	0.3801	
P1= Internal Pressure= =Density*s.g.*(x+D/6*cot(alpha)	3263.83	psi
P2= H*density*s.g.=33*62.4*1.5 =	3182.40	psi
Tc= top cone radius =	6.36	inches
Fb = Allowable stress	23200	psi

The required wall thickness of the cone will be the greater of the following Formulas.

1. Ts=P1*Tc/2*cos(alpha)*fb =	0.098	+1/8"C.A.=	0.223 in.
2. Ts=P2*D/cos(alpha)*Fb =	0.191	+1/8"C.A.=	0.316 in.

APPENDIX C

Structural Support Calculations

SECTION 205 - APPENDIX C

CT4, Caustic Storage Tank No.4

STRUCTURAL SUPPORT CALCULATIONS

GIVEN:		
Tank Diameter =	12.72	feet
Total Height =	40.00	feet
Weight of Tank =	18780.00	lbs
Weight of Max. Contents =	414300.00	lbs
Tank Nominal Thickness =	0.25	in

----SEISMIC DESIGN CHECK----

ZONE COEFFICIENT (Z):	0.1875	
ESSENTIAL FACILITIES FACTOR (I):	1.000	
LATERAL EARTHQUAKE FORCE COEFF. (C1):	0.240	
D/H:	0.267	
k factor:	0.590	
SITE AMPLIFICATION FACTOR (S):	1.500	
NATURAL PERIOD OF FIRST SLOSHING (T):	2.104	
LATERAL EARTHQUAKE FORCE COEFF. (C2):	0.214	
WEIGHT OF TANK SHELL (Ws):	18780.000	LBS
TOTAL WEIGHT OF TANK CONTENTS (Wt):	414300.000	LBS
W1/Wt:	0.950	
W2/Wt:	0.050	
WEIGHT OF EFFECTIVE MASS OF CONTENTS THAT MOVES IN UNISON WITH THE TANK SHELL (W1):	393585.000	LBS
WEIGHT OF EFFECTIVE MASS IN FIRST SLOSHING (W2):	20715.000	LBS
HT FROM BTM OF SHELL TO CENT. OF SHELL (Xs):	20.000	FEET
X1/H:	0.500	
HT FROM BTM TO CENT. OF LAT. SEISMIC FORCE (X1):	20.000	FEET
X2/H:	0.900	
HT FROM BTM TO CENT. OF LAT. SEISMIC FORCE (X2):	36.000	FEET

Note: All of the above calculations are based on API-650-88 Seismic Design Procedure (Appendix E).

CHECK STRESS IN TANK SHELL FROM SEISMIC FORCES:

Wl = MAXIMUM WEIGHT OF TANK CONTENTS THAT MAY BE USED TO RESIST THE SHELL OVERTURNING MOMENT

Wl = 7.9*tb*(Fby*G*H) ^ .5

tb = THK. OF BTM. PLATE UNDER SHELL:	0.250	IN
Fby = MINIMUM YIELD STRENGTH OF BOTTOM PLATE:	9000.000	PSI
G = DESIGN SPECIFIC GRAV. OF LIQUID:	1.50	
Wl =	1451.32	LBS/FT OF SHELL CIRCUMFRENCE
DENSITY OF TANK SHELL MATERIAL:	490.00	LBS/CF
WT = WEIGHT OF TANK SHELL AND THE PORTION OF FIXED ROOF SUPPORTED BY TANK SHELL:	408.33	LBS/FT OF SHELL CIRCUMFRENCE
M/[D^2(WT+Wl)]:	1.3328	

b = MAXIMUM LONGITUDINAL COMPRESSIVE FORCE AT THE BTM. OF TANK SHELL

b = WT + 1.273*M/D^2

b:	3563.57	LBS/FT OF SHELL
G*H*D^2/t^2:	155326.46	
Fa = MINIMUM OF 10^6*t/D or Fty/2:	4500.00	PSI
Fty = MINIMUM YIELD STRENGTH OF BTM. PLATE:	9000.00	PSI
MAX. LONGITUDINAL COMPRESSIVE STRESS IN THE TANK SHELL = b/12t =	1187.86	PSI

CHECK OVERTURNING MOMENT FROM WIND PRESSURE

M must be Less Than or Equal To .66*(WD)/2
If M is Greater Than .66*(WD)/2 Anchor Bolts
Would Be Required

Where:

W = Shell Weight Available To Resist Uplift (lbs)

D = Tank Diameter (feet)

M = Overturning Moment

M = Pw*Projected Area*H1

H1 = Height from ground to centroid of tank shell

Pw = Wind Pressure (18 psf for 100 MPH Wind on cylinders)

.66*(WD)/2:	78830.93	FT-LBS
M:	183168.00	FT-LBS

M > .66*(WD)/2 therefore anchor bolts are required

Number of Anchors:	12.00	
Anchor Diameter:	1.25	inches
Dia. of Anchor Circle:	13.05	feet

tB = design tension load per anchor

tB:	3113.62	pounds
Allowable Load/ Anchor:	24543.69	pounds

APPENDIX D

Containment Area Volume Calculations

SECTION 205 - APPENDIX D

CT4, Caustic Storage Tank No.4

CONTAINMENT AREA No.8A VOLUME CALCULATIONS (CAUSTIC AREA)

Length =	70.70	feet
Width =	35.50	feet
Height =	2.62	feet
Surface Area =	2509.85	S.F.

Gross Volume = Area * Heigth = 6575.81 C.F.

Volumes of Items of Displacement **

1. Steel skirting = 9.17 C.F.

Total volume to deduct for items in containment area = 9.17 C.F.

Subtraction for volume of rainfall

Volume of rain = Area x depth of rainfall

Depth of rainfall =	6.15	In.
Area =	2509.85	S.F.
Volume =	1286.30	C.F.

TOTAL AVAILABLE VOLUME = Gross Volume - Subtractions =	6575.81	C.F.
Items of diplacement	-9.17	C.F
Volume of rainfall	-1286.30	C.F
TOTAL AVAILABLE VOLUME Area 8A	5280.34	C.F.

CONTAINMENT AREA No.8c VOLUME CALCULATIONS (TRUCK PAD)

This area will collect rain and deposit it into the caustic containment area (8a) when the valve is opened. This area does not contribute any volume for containment.

Length =	52.00	feet
Width =	12.00	feet
Surface Area =	624.00	S.F.

Subtraction for volume of rainfall

Volume of rain = Area x depth of rainfall

Depth of rainfall =	6.15	In.
Area =	624.00	S.F.
Volume =	319.80	C.F.

SUMMARY OF SECONDARY CONTAINMENT DATA

Surface Areas :

Caustic Area 8A =	2509.85 S.F.
Truck Unloading Pad 8C =	624.00 S.F.

Gross Volumes :

Caustic Area 8A =	6575.81 C.F.
Truck Unloading Pad 8C =	0.00 C.F.

Volume of displacements

Caustic Area 8A =	9.17 C.F.
Truck Unloading Pad 8C =	0.00 C.F.

Volume for 24hr rain:

Caustic Area 8A =	1286.30 C.F.
Truck Unloading Pad 8C =	319.80 C.F.

Total Gross Volume 8A =	6575.81 C.F.
Total Displacement Volumes =	9.17 C.F.
Total volume of Rain	1606.10 C.F.

Containment Capacity Available (CCA) =	4960.54 C.F. or 37104.83 GAL.

APPENDIX E

Foundation Design Analysis

SECTION 205 - APPENDIX E

CT4, Caustic Storage Tank No.4

FOUNDATION DESIGN ANALYSIS

ASSUMPTIONS:

f'c =	4.00	KSI	
fy =	60.00	KSI	
Allowable Soil Press. =	2.20	KSI	
Structural Steel =	A36		

GIVEN:

Tank Diameter =	12.72	feet
Sidewall Height =	40.00	feet
Weight of Tank (Shell)	18780.00	lbs
Weight of Max. Contents =	414300.00	lbs

Tank is Resting on a concrete foundation.

CHECK CONCRETE FOUNDATION DESIGN:

Assume Footing Depth =	30.00	inches	
Assume Footing Width =	30.00	inches	
Assumed Effective Soil Press. =	1925.00	psf	
			psf

Look at what is resisting overturning moment from seismic load:

b =	3563.57	lb/ft of circ.

Where b is the maximum shell compression at the bottom of the shell.

If the footing is	30.00	inches wide
then the actual applied pressure to the subgrade is	1425.43	lb/sf

This is less than the effective soil pressure.

APPENDIX F

MANUFACTURERS DATA, MILL TEST REPORTS, RADIOGRAPHIC REPORTS

CERTIFICATION TO OWNER OF COMPLIANCE WITH API 650-88

To: USPCI LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

To Whom It May Concern:

Scott Manufacturing, Inc. hereby certifies that the tank(s) constructed for you at SCOTT MANUFACTURING, INC. WOLFFORTH, TEXAS and described as follows: (4) 12/75' diameter by 40' shell height Caustic Storage Tanks, Serial Numbers 451-1, 2, 3, &4 has/have been designed, fabricated, erected, and inspected in accordance with all of the requirements of the American Petroleum Institute Standard 650-88 entitled, "Welded Steel Tanks for Oil Storage" and that the results of all such inspections, radiographs, and other tests indicate that the tanks(s) fully complies/comply with all of the requirements. We further certify that all materials meet specifications.

SCOTT MANUFACTURING, INC.

William A. Bacon
By

MANAGER/HEAVY CONSTRUCTION
Title

23 OCTOBER 1992
Date

CITY OF LUBBOCK

STATE OF TEXAS

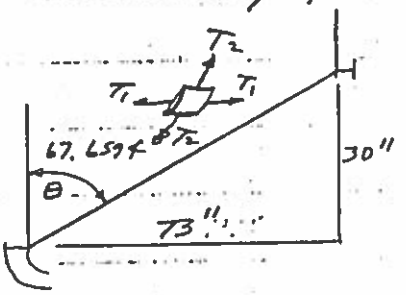
Acknowledged and sworn to before me this 23rd day of October, 1992.

Royce Eledell
Notary Public

10/20/92

USPCI, WAYNOKA, OK

12.72'ϕ x 40' (OVERALL)



CONE

$$T_2 = \frac{\gamma}{2\cos\theta}\left(\frac{D}{2}\right)\left(X + \frac{D}{6}\cot\theta\right)$$

$$= \frac{62.4(1.5)}{2\cos 67.659°}\left(\frac{12.72}{2}\right)\left(33' + \frac{12.72}{6}\cot 67.659°\right)$$

$$= 123.1217\ (636)\ (33.8712)$$

$$= 26,523\ \text{lbs/ft} \quad \div 12$$

$$= 2210.25\ \text{lbs/in} \quad \div 23,200\ \text{lbs/in}^2$$

$$= 0.09527" + 0.125"$$

$$= 0.2203" \quad \text{use } \tfrac{1}{4}" \text{ PL}$$

$$T_1 = \frac{\gamma D X}{2\cos\theta}$$

$$= \frac{62.4(1.5)(12.72)33}{2\cos 67.659°}$$

$$= 51,682\ \text{lbs/ft} \quad \div 12$$

$$= 4,306.80\ \text{lbs/inch} \quad \div 23,200\ \text{lbs/in}^2$$

$$= 0.1856" + 0.125"$$

$$= 0.3106" \quad \underline{\text{use } \tfrac{5}{16}" \text{ PL}}$$

GIRDER RING

$$C = \frac{\gamma}{8}\left(X + \frac{D}{6}\cot\theta\right) D^2 \tan\theta$$

$$= \frac{62.4(1.5)}{8}\left(33 + \frac{12.72}{6}\cot 67.659°\right) 12.72^2 \tan 67.659°$$

$$= 11.70\ (33.8712)\ 393.710$$

$$= 156,025\ \text{lbs} \quad \div 23,200\ \text{lbs/in}^2$$

$$= 6.72522\ \text{in}^2$$

( )

$$A_{eff} = 0.78\left(t_c\sqrt{R_c t_c} + t_1\sqrt{R_1 t_1} + t_s\sqrt{R_s t_s}\right)$$

$$= 0.78\left(.25\sqrt{6.375(.25)} + .3125\sqrt{17.31(.3125)} + .25\sqrt{6.375(.25)}\right)$$

$$= 1.05927\ \text{in}^2 \quad (0.8131\ \text{in}^2)$$

$$A_{eff(MAX)} = 16\left(t_c^2 + t_i^2 + t_s\right)$$

$$= 16\left(.25^2 + .3125^2 + .25^2\right)$$

$$= 3.56250\ in^2 > 1.05927\ in^2 \text{ use smaller}$$

(2.5625) (0.8131)

$\therefore$ use $1.05927\ in^2$

$6.72522 - 1.05927 = 5.666\ in^2$

$(6.7252 - 0.8131 = 5.9121\ in^2)$

USPCI, WAYNOKA, OK 10/14/92

12.75'ϕ X 40' (overall) Contents - Caustic Liquid - Sp. Gr. - 1.5 API-650

Corrosion Allowance - 1/8" Thickness By 1 Foot Method

$$\frac{2.6\,(12.75)(40-1)\,1.5}{23{,}200} + .125 = .2086" \text{ use } 1/4" \text{ R}$$

Louis D. Wood, Jr.

STATE OF TEXAS
LOUIS D. WOOD, JR.
60815
REGISTERED PROFESSIONAL ENGINEER

10/14/92

PLATE

SUNBELT TRADING COMPANY, Inc.

TO: Scott Mfg.

Attn: Wayne

REF: CUSTOMER'S P.O. NO. 27158

S.T.C.'s RELEASE NO. 2994

S.T.C.'s INVOICE NO. 010435

ATTACHED PLEASE FIND MILL TEST CERTIFICATES FOR YOUR ABOVE REFERENCED PURCHASE ORDER FOR THE FOLLOWING MATERIAL.

See Below

THANKS AND REGARDS,

Stacey

STACEY GESSERT

enclosure

20 pcs. 1/4 x 96 x 480 A-36 Plate

4 pcs 1/4 x 96 x 240 A-36 Plate

6 pcs 5/16 x 96 x 240 A-36 Plate

4 pcs 1/4 x 96 x 240 Floor Plate

NEW ADDRESS
1990 POST OAK BLVD., SUITE 1550
HOUSTON, TX 77056-3813

2000 Post Oak Blvd. Suite 1867 Houston, Texas 77056
Tel. (713) 840-0550 TLX - 790313 - FAX (713) 840-8727

FORGES DE CLABECQ
rue de la Déportation 210
1480 TUBIZE
(BELGIQUE) A01

PLAQUES-BLECHE-PLATES B01

CERTIFICAT D'ANALYSE DIN 50049/2.2

A02

N°29070 SEITE N° 1
BLATT NR
PAGE No A03

STOLE PRODUCTEUR / HERSTELLERZEICHEN / TRADE MARK A04

C.D.C. : Conforme au Cahier des Charges - Gemäss den Vorschriften - According specifications (1)
BL : Brut de laminage - Walzgeglüht - As rolled
N : Normalisé - Normalgeglüht - Normalized
R : Revenu - Vergütet - Tempered
D : Détensionné - Spannungsfreigeglüht - Stress relieved
LC : Laminage contrôlé - Gleichmässige Temperaturführung - Controlled rolling
B03

D35

Contrôle et/ou service de contrôle / Überwachungs-organisation / Inspection B02

CLIENT / DESTINATAIRE - BESTELLER / EMPFÄNGER - PURCHASER / CONSIGNEE A06

SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD. # 1550
US - HOUSTON - TEXAS 77056-3813

N° COMMANDE COURTIER/CLIENT - MAKLER/KUNDEBESTELL NUMMER / BROKER/PURCHASER'S ORDER NUMBER A07

STC 11.695

N° commande usine / Werks order No. A08

15042

NUANCE ET SPECIFICATIONS TECHNIQUES / STAHLSORTEN UND PRÜFBEDINGUNGEN / QUALITY AND SPECIFICATIONS B02

GRADE C
ASTM A 283/88

DATE DE LIVRAISON / LIEFERDATUM / AS DELIVERED B04

TRAITEMENT DE REFERENCE / PROBESTREIFENWÄRMEBEHANDLUNG / TREATMENT OF TEST SAMPLES (1) B05

IDENTIFICATION DU PRODUIT / ERZEUGNIS BENENNUNG / PRODUCT IDENTIFICATION			N° POSTE / POSITION NO	NOMBRE DE PIÈCES / NUMBER OF PIECES	DIMENSIONS - ABMESSUNGEN - DIMENSIONS			MASSE THÉORIQUE / THEORETISCHES GEWICHT / THEORETICAL WEIGHT	QUALIFICATION (2)	TRACTION - ZUGVERSUCH - TENSILE TEST						RESILIENCE - KERBSCHLAGZÄHIGKEIT - NOTCH TOUGHNESS						
N° RÉFÉRENCE, N° REFERENCE No	N° COULÉE / SCHMELZ NR / HEAT No	NUANCE / STAHLSORTE / STEEL GRADE			ÉPAISSEUR / DICKE / THICKNESS	LARGEUR / BREITE / WIDTH	LONGUEUR / LÄNGE / LENGTH			SENS (3)	(4)	Re (N/mm2)	Rm	A %			TYPE / FORM / TYPE	SENS (3)	TEMP °C	PEAU / ECKIGE (4)	VALEURS INDIVIDUELLES / EINZELWERTE / INDIVIDUAL VALUES			MOYENNE / MITTELWERTE / AVERAGE
B07	B08		B09	B10	B11	B12	B13	B14	C01	C02	C04	C13	C12	C13	C14	C15	C40	C44	C45	C46	C42	C43	C42	C41	C08
289299		*	1	26	0"1/4	96"	240"	(kg)		T														
289300		*	1	36	0"1/4	96"	240"			T														
289301		*	1	53	0"1/4	96"	240"			T														
289304		*	1	67	0"1/4	96"	240"			T														

* Cleared plates

(1) Le = 5,65 √S mm - (2) Le = 50 mm - (3) Le = 200 mm

A05

(3)	N° DE RÉFÉRENCE / REFERENCE NR / REFERENCE No	N° COULÉE / SCHMELZ NR / HEAT No	ANALYSE SUR PRODUIT - STÜCKANALYSE - CHECK ANALYSIS							Nb %								
			Mn %	P %	S %	C %	Si %	Al %										
C70	B03	B04	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84		
O/Y		289299	0.475	0.033	0.009	0.159	0.163	0.015	0.001									
		289300	0.463	0.019	0.017	0.172	0.201	0.031	0.001									
CC		289301	0.460	0.023	0.009	0.179	0.174	0.015	0.001									
		289304	0.446	0.015	0.017	0.176	0.219	0.004	0.001									

SERVICE METALLURGIQUE

D02/D03

Controle de marquage d'aspect et de dimensions : Satisfaisants / Bezeichnung, besichtigung und ausmessung : Ohne beanstandung / Marking, inspection and measurement : Without objection

CLABECQ, le 27/04/92

(2) Prélèvage-Location / Lage-Lage-Location: 1/4 t-Cœur-Tête / 1/4 t-Mitte-Kopf / 1/4 t-Centre-Top; 1/4 t-Pied-Fuss-Bottom C05

(3) Direction / Richtung-Direction: L/Long-Längs-Longitudinal; T/Travers-Quer-Transverse C06

(4) C/Cœur-Kernprobe-Core sample; P/Peau-Randprobe-Rolled surface D07

D00

(1) O/Y : Oxygène pur - Oxygen; CC : Coulée continue - Kontinuierliches giessen / Continuous casting C03

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande / Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen / We certify hereby that the above mentioned products are consistent with the order prescriptions D04

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe / Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben / The results of the special tests are indicated on the complementary documents in appendix C60

CERTIFICAT D'USINE DIN 50049/2.2

N°29774 PAGE N° 9
BLATT NR
PAGE No

FORGES DE CLABECQ
rue de la Déportation 238
1480 TUBIZE
(BELGIQUE)

PLAQUES-BLECHE-PLATES

C.E.D.C. : Conforme au Cahier des Charges - Gemäss den Vorschriften - According specifications (1)
BL : Brut de laminage - Herausgewalzt unterwärmt - As rolled
N : Normalisé - Normalgeglüht - Normalized
R : Revenu - Vergütet - Tempered
D : Détensionné - Spannungsfreigeglüht - Stress relieved
LC : Laminage contrôlé - Kontrolliertes Walzen - Controlled rolling

CLIENT / DESTINATAIRE - BESTELLER / EMPFÄNGER - PURCHASER / CONSIGNEE
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

N° COMMANDE ACHETEUR/CLIENT - KAUFER/KUNDEBESTELL NUMMER - BUYER/PURCHASER'S ORDER NUMBER: 11654B

Nos renvois votre marchandise No. Ware unser No.: 15527

NUANCE ET SPECIFICATIONS TECHNIQUES - STAHLSORTEN UND PRÜFBEDINGUNGEN - QUALITY AND SPECIFICATIONS: A36 - SA36 / ASTM A36/91-ASME SA36/

ETAT DE LIVRAISON - LIEFERZUSTAND - AS DELIVERED

TRAITEMENT DE REFERENCE - PROBESTABFEUCHT HANDLUNG - TREATMENT OF TEST SAMPLES (1)

IDENTIFICATION DU PRODUIT - KENNZEICHNUNG DES ERZEUGNISSES - PRODUCT IDENTIFICATION				DIMENSIONS - ABMESSUNGEN - DIMENSIONS			MASSE THEORIQUE - THEORETISCHES GEWICHT - THEORETICAL WEIGHT		TRACTION - ZUGVERSUCH - TENSILE TEST						RESILIENCE - KERBSCHLAGZÄHIGKEIT - NOTCH TOUGHNESS						
N° REFERENCE - REFERENZ NR - REFERENCE No	N° COULEE - SCHMELZ NR - HEAT No	BRAME - BRAMME - SLAB	N° POSTE - POSTEN NR - ITEM No	NOMBRE DE PIECES - STÜCKZAHL - NUMBER OF PIECES	EPAISSEUR - DICKE - THICKNESS	LARGEUR - BREITE - WIDTH	LONGUEUR - LÄNGE - LENGTH			SENS (3)	(4)	Re	Rm	A 5 (3)			TYPE - FORM - TYPE	SENS (3)	TEMP °C	PLIAGE (4)
	292080	34			0"5/16	96"	240"			T		(N/mm2) 308	410	27.0						
										T		284	436	27.0						
	292085	35	24		0"3/8	96"	240"			T										
	292086	35			0"3/8	96"	240"			T		310	415	31.0						
										T		298	413	30.0						
	292083	36	21		0"3/8	96"	480"			T		303	418	31.0						
										T		287	414	30.0						
	292085	36			0"3/8	96"	480"			T		307	430	32.0						

(1) Lo = 5,65 √S mm - (2) Lo = 50 mm - (2) Lo = 200 mm

(1)	N° DE REFERENCE - REFERENZ NR - REFERENCE No	N° COULEE - SCHMELZ NR - HEAT No	ANALYSE SUR PRODUIT - STÜCKANALYSE - CHECK ANALYSIS													SERVICE METALLURGIQUE
			Mn %	P %	S %	C %	Si %	Al %	Nb %							
O/Y	292080		0.826	0.032	0.015	0.096	0.285	0.013	0.001							
	292085		0.810	0.016	0.010	0.092	0.289	0.021	0.001							
CC	292086		0.808	0.020	0.012	0.075	0.259	0.011	0.001							
	292083		0.816	0.018	0.014	0.088	0.324	0.002	0.001							

Contrôle de marquage d'aspect et de dimensions : Satisfaisants
Bezeichnung, Beschaffenheit und Abmessung : Ohne Beanstandung
Marking, inspection and measurement : Without objection

CLABECQ, le 10/07/92

(2) Prélèvement-Location - Probenlage - Location of sample: 1:Tête-Kopf-Top; 2:Pied-Fuss-Bottom
(3) Direction - Richtung - Direction: L:Long-Längs-Longitudinal; T:Travers-Quer-Transverse
(4) Coin-Kerbprobe-Cut sample; P:Peau-Walzfläche-Rolled surface
(5) O/Y : Oxygène pur - Sauerstoff - Oxygen; CC : Coulée continue - Kontinuierliches giessen - Continuous casting

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande
Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen
We certify hereby that the above mentioned products are consistent with the order prescriptions

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe
Die ergebnisse der besonderen prüfungen sind in den beigefügten ergänzenden unterlagen angegeben
The results of the special tests are indicated on the complementary documents in appendix

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE)

PLAQUES-BLECHE-PLATES

CERTIFICAT D'USINE DIN 50049/2.2

N°2978[illegible] GE N°. 4
[illegible]ATT NR
PAGE No

SIGLE PRODUCTEUR / HERSTELLERZEICHEN / TRADE MARK

C.D.C. : Conforme au Cahier des Charges - Gemäss den Vorschriften - According specifications (1)
BL : Brut de laminage - Warmgewalzt unbehandelt - As rolled
N : Normalisé - Normalgeglüht - Normalized
R : Revenu - Vergütet - Tempered
D : Détensionné - Spannungsfreigeglüht - Stress relieved
LC : Laminage contrôlé - Gleichwertige Temperaturführung - Controlled rolling

Organisme et/ou service de contrôle / Überwachungs-organisation / Inspection

CLIENT / DESTINATAIRE - BESTELLER / EMPFÄNGER - PURCHASER / CONSIGNEE
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

N° COMMANDE COURTIER/CLIENT - MAKLER/KUNDERBESTELL NUMMER / BROKER/PURCHASER'S ORDER NUMBER: 11654B

N° commande usine / Werkstatt Nr. / Works order No.: 15527

NUANCE ET SPECIFICATIONS TECHNIQUES / STAHLSORTE UND PRÜFBEDINGUNGEN / QUALITY AND SPECIFICATIONS: A36 - SA36 / ASTM A36/91-ASME SA36/

CONDITION DE LIVRAISON / LIEFERUNG / AS DELIVERED

TRAITEMENT DE REFERENCE / PROBESTREIFENDE HANDLUNG / TREATMENT OF TEST SAMPLES (1)

IDENTIFICATION DU PRODUIT / EXIGENCES BENENNUNG / PRODUCT IDENTIFICATION: N° REFERENCE / REFERENCE No	N° COULEE / SCHMELZ No / HEAT No	BAHNE / BRAMME / SLAB	N° POSTE / POST No / ITEM No	Mode de plaques / Stück-Zahl / Number of Plates	DIMENSIONS - ABMESSUNGEN - DIMENSIONS: EPAISSEUR / DICKE / THICKNESS	LARGEUR / BREITE / WIDTH	LONGUEUR / LÄNGE / LENGTH	MASSE THEORIQUE / THEORISCHES GEWICHT / THEORETICAL WEIGHT	EMPLACEMENT (2)	TRACTION - ZUGVERSUCH - TENSILE TEST: SENS (3)	(4)	Re	Rm	A % (3)			RESILIENCE - KERBSCHLAGZÄHIGKEIT - NOTCH TOUGHNESS: TYPE / FORM / TYPE	SENS (3)	TEMP °C	PEAU / COEUR (4)	VALEURS INDIVIDUELLES / EINZELWERTE / INDIVIDUAL VALUES			MOYENNE / MITTELWERTE / AVERAGE	
								(kg)				(N/mm2)													
	292097		32		0"1/4	96"	240"			T		293	410	27.0											
										T		295	413	28.0											
	292098		32		0"1/4	96"	240"			T		301	416	26.0											
										T		287	416	23.0											
	292099		32		0"1/4	96"	240"			T		294	407	26.0											
										T		298	415	24.5											
	292100		32		0"1/4	96"	240"			T		295	410	27.0											
										T		294	411	24.0											

(1) ls = 5,65 VS mm - (2) lo = 50 mm - (3) ls = 200 mm

(5)	N° DE REFERENCE / REFERENCE No	N° COULEE / SCHMELZ No / HEAT No	ANALYSE SUR PRODUIT - STÜCKANALYSE - CHECK ANALYSIS: Mn %	P %	S %	C %	Si %	Al %	Nb%
O/Y		292097	0.789	0.022	0.014	0.073	0.259	0.007	0.001
		292098	0.808	0.023	0.023	0.081	0.281	0.013	0.001
CC		292099	0.736	0.019	0.015	0.066	0.274	0.013	0.001
		292100	0.798	0.029	0.022	0.066	0.272	0.011	0.001

SERVICE METALLURGIQUE

Contrôle de marquage d'aspect et de dimensions : Satisfaisants / Bezeichnung, Besichtigung und Ausmessung : Ohne Beanstandung / Marking, inspection and measurement : Without objection

CLABECQ, le 13/07/92

(2) Prélèvement-Location: 1:Tête-Kopf-Top / 2:Pied-Fuss-Bottom
(3) Richtung-Direction: L:Long-Lange-Longitudinal / T:Travers-Quer-Transverse
(4) C:Coeur-Kernprobe-Core sample / P:Peau-Vorlaufbleche-Rolled surface

(5) O/Y : Oxygene pur - Oxygen
CC : Coulée continue - Kontinuierliches giessen / Continuous casting

Nous certifions que les produits énoncés ci-dessus sont conformes aux prescriptions de la commande / Wir bestätigen hiermit dass die obengenannten Erzeugnisse den Bestellung vorschriften entsprechen / We certify hereby that the above mentioned products are consistent with the order prescriptions

Les résultats des essais particuliers figurent sur les documents complémentaires joints en annexe / Die ergebnisse der besonderen prüfungen sind in den beigefügten ergänzenden unterlagen angegeben / The results of the special tests are indicated on the complementary documents in appendix

FORGES DE CLABECQ
rue de la Déportation 218
1480 TUBIZE
(BELGIQUE) A01

PLAQUES-BLECHE-PLATES B01

CERTIFICAT D'USINE DIN 50049/2.2

A02

N°29425 PAGE N° 3
BLATT NR
PAGE No A03

SIGLE PRODUCTEUR / HERSTELLERZEICHEN / TRADE MARK A04

C.D.C. : Conforme au Cahier des Charges - Gemäss den Vorschriften - According specifications (1)
BL : Brut de laminage - Herausgewalzt unbearbeitet - As rolled
N : Normalisé - Normalgeglüht - Normalized
R : Revenu - Vergütet - Tempered
D : Détensionné - Spannungsfreigeglüht - Stress relieved
LC : Laminage contrôlé - Gleichmässige Temperaturführung - Controlled rolling
B13 B03

Organisme d/ou service de contrôle / Überwachungs-organisation / Inspection A02

CLIENT / DESTINATAIRE - BESTELLER / EMPFÄNGER - PURCHASER / CONSIGNEE A06
SUNBELT TRADING COMPANY INC.
1990 POST OAK BLVD., #1550
US-HOUSTON-TEXAS 77056-3813 (USA)

N° COMMDE COURTIER/CLIENT - MAKLER/KUNDENBESTELL NUMMER - BROKER/PURCHASER'S ORDER NUMBER A07
11.653

N° commande usine / Herstellauftr. Nr. / Works order No. A08
15520

NUANCE ET SPECIFICATIONS TECHNIQUES / STAHLSORTEN UND PRÜFBEDINGUNGEN / QUALITY AND SPECIFICATIONS B02
A36 - SA36
ASTM A36/89-ASME SA36/89

ETAT DE LIVRAISON / LIEFERZUSTAND / AS DELIVERED B04

TRAITEMENT DE REFERENCE / PROBESTREIFENDE HANDLUNG / TREATMENT OF TEST SAMPLES (1) B05

IDENTIFICATION DU PRODUIT / ERZEUGNIS BENENNUNG / PRODUCT IDENTIFICATION			N° POSTE / POS. NR / PIECE No	NOMBRE DE PIECES / STÜCKZAHL / No OF PIECES	DIMENSIONS - ABMESSUNGEN - DIMENSIONS			MASSE THEORIQUE / THEORETISCHES GEWICHT / THEORETICAL WEIGHT	LOT / CHARGE	TRACTION - ZUGVERSUCH - TENSILE TEST							RESILIENCE - KERBSCHLAGZÄHIGKEIT - NOTCH TOUGHNESS								
N° REFERENCE / REFERENZ. NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	BRAME / BRAMME / SLAB			EPAISSEUR / DICKE / THICKNESS	LARGEUR / BREITE / WIDTH	LONGUEUR / LÄNGE / LENGTH			SENS (3)	(4)	Re	Rm	A % (2)* (3)*			TYPE / FORM / TYPE	SENS (3)	TEMP °C	PEAU / COEUR (4)	VALEURS INDIVIDUELLES / EINZELWERTE / INDIVIDUAL VALUES				MOYENNE / MITTELWERTE / AVERAGE	(2)*
B07	B08		B09	B10	B11	B12	B13	B14 (kg)	C01	C07	C04	C11 (N/mm2)	C12	C13	C14	C15	C40	C44	C45	C46	C47	C48	C49	C42	C09
	290634		2		0"1/4	96"	480"			T		294	410	29.0											
										T		284	404	31.0											
	290635		2		0"1/4	96"	480"			T		271	404	31.0											
										T		283	405	29.0											
	290638		2		0"1/4	96"	480"			T		293	407	30.0											*
	289231		3	2	2"	96"	480"			T		300	482	34.0											*
										T		280	473	34.0											

a (1) Lo = 5,65 √S mm - (2) Lo = 50 mm - (3) Lt = 200 mm A05

(3)	N° DE REFERENCE / REFERENZ NR / REFERENCE No	N° COULEE / SCHMELZ NR / HEAT No	ANALYSE SUR PRODUIT - STÜCKANALYSE - CHECK ANALYSIS														
			Mn %	P %	S %	C %	Si %	Al %	Nb %								
C70	B07	B08	C94	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84
O/Y	290634			0.859	0.025	0.016	0.073	0.182	0.011	0.001							
	290635			0.845	0.020	0.017	0.075	0.159	0.010	0.001							
CC	290638			0.822	0.018	0.018	0.077	0.204	0.012	0.001							
	289231			0.938	0.020	0.009	0.190	0.198	0.032	0.001							

SERVICE METALLURGIQUE

D01/203

Controle de marquage d'aspect et de dimensions : Satisfaisants / Bezeichnung, Besichtigung und ausmessung : Ohne beanstandung / Marking, inspection and measurements : Without objection

CLABECQ, le 29/05/92

(2) Prebelage-Location / 1:Tete-Kopf-Top / 2:Pied-Fuss-Bottom C05

(3) Richtung-Direction / Long-Langs-Longitudinal / T:Travers-Quer-Transverse C06

(4) C:Coeur-Kernprobe-Core sample / P:Peau-Veltfläche-Rolled surface C07

C50

(1) O/Y : Oxygene pur - Oxygen / CC : Coulee continue - Kontinuierliches giessen / Continuous casting C93

Nous certifions que les produits ci-dessus sont conformes aux prescriptions de la commande / Wir bestätigen hiermit dass die obengenannten erzeugnisse den bestellung vorschriften entsprechen / We certify hereby that the above mentioned products are consistent with the order prescriptions J04

Les résultats des essais particuliers figurent sur les documents complementaires joints en annexe / Die ergebnisse der besonderen prüfungen sind in de beigefügten ergänzenden unterlagen angegeben / The results of the special tests are indicated on the complementary documents in appendix C40

201

STRUCTURAL

CHAPARRAL STEEL

MIDLOTHIAN 300 WARD RD.
TEXAS 76065
(214) 775-8241

CERTIFIED MATERIAL TEST REPORT

SOLD TO
O'NEAL STEEL, INC.
P.O. BOC 98

BIRMINGHAM AL. 35201

SHIP TO
O NEAL STEEL INC
2834 CLOVIS RD

LUBBOCK TX
3035*

OMER PURCHASE ORDER NUMBER	DATE	QUANTITY	DESCRIPTION	LEN
-04616	10-JUN-92	4.68	W 4 X 13#	40.0

TED ACCORDING TO	SIZE	GRADE	PRODUCT	HEAT
STM A6-90A 36-90 572-88C	W 4 X 13#	A36/A57250	WF BEAMS	9-9769

CHEMICAL ANALYSIS

	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	
.12	0.87	0.014	0.050	0.26	0.57	0.14	0.06	0.028	0.000	0.009	

PHYSICAL PROPERTIES

YIELD TRENGTH ~~ksi~~	TENSILE STRENGTH ~~ksi~~	SPECIMEN AREA ~~SQ. IN.~~	ELONGATION %	ELONGATION GAUGE LENGTH	BEND TEST DIA	BEND TEST RESULT	GRAIN SIZE	REDU D AR
.5	77.7	3.727	43.5	2"	0.5D	PASS		
60.4	80.0	3.727	39.0	2"	0.5D	PASS		

hereby certify that the contents of this report are correct and accurate. All test results and operations performed by this mat anufacturer are in compliance with the requirements of the material specification, and when designated by the purchaser meet ecific applicable material requirements of section III of the A.S.M.E. Boiler and Pressure Vessel Code".

gned Tom L Harrington

Tom L. Harrington • Quality Assurance Manager
orn and Subscribed to before me, in and for Ellis County on

s 10th day JUNE, 1992

(NOTARY PUBLIC)

y Commission Expires

ANIFEST 499603 (NOTARIZED ON REQUEST ONLY)

REMARKS

PO# 27230
WO# JT 41210

O NEAL STEEL INC.

P O BOX 5495

LUBBOCK TX 79417

LL MANUFACTURING PROCESSES OF THE STEEL MATERIALS IN THIS PRODUCT, NCLUDING SMELTING, HAVE OCCURRED WITHIN THE UNITED STATES IN COMPLIANCE ITH THE "BUY AMERICA" PROVISION OF THE SURFACE TRANSPORTATION SSISTANCE ACT OF 1982.

Atlantic Steel Company

A MEMBER OF THE INCO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

DATE(08) 2/92

TEST CERTIFICATE

3/8 X 2

SOLD TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

INVOICE NUMBER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	% ELONG. 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
045605 -001	Z-1725 S	FLATS, 0.3750"X 2.0000" A36-90 20'00", 5000# BUNDLE	49690	52.0	73.3	30.0		.16	.72	.015	.016	.16	.27					

SWORN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

I CERTIFY THE ABOVE RESULTS OF TESTS AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

FLORIDA STEEL CORPORATION

CHEMICAL AND PHYSICAL TEST REPORT

MADE IN U.S.A.

SHIP TO	INVOICE TO	SHIP DATE	SHIPPERS NUMBER
O'NEAL STEEL, INC. 2834 CLOVIS ROAD BOX 5495 LUBBOCK TX 79415	O'NEAL STEEL, INC. P. O. BOX 2623 BIRMINGHAM AL 35202-26	07-20-92	8562-116256
		CUST. ACCOUNT NO 36791606	

SIZE	GRADE	SPECIFICATION	S.O. NO.	CUST. P.O. NUMBER

HEAT LD NO	C	MN	P	S	V	SI	CR	CU	NI	SN	AL	MO		YIELD PT LBS/SQ IN	TENSILE LBS/SQ IN	% ELONG IN	BEND	DF	% LIGHT HEAVY
C 4 X 5.4#					A36		ASTM A36-91						ASME-SA36		2013173	7-17424			
V2-1989	.15	.69	.01	.03										48270	72169	32.0	DK		
C 4 X 5.4#					A36		ASTM A36-91						ASME-SA36		2013173	7-17424			
V2-1989	.15	.69	.01	.03										48742	72327	31.4	DK		
A 3 X 3 X 1/4					A36		ASTM A36-91						ASME-SA36		2013173	7-17424			
V2-2486	.15	.73	.01	.04										52586	71724	29.0	DK		
A 3 X 3 X 1/4					A36		ASTM A36-91						ASME-SA36		2013173	7-17424			
V2-2486	.15	.73	.01	.04										52777	72222	29.4	DK		
A 1 1/2 X 1 1/2 X 3/16					A36		ASTM A36-91						ASME-SA36		2011544	7-13452			
V2-2827	.14	.61	.01	.04										49056	68396	26.0	DK		
A 1 1/2 X 1 1/2 X 3/16					A36		ASTM A36-91						ASME-SA36		2011544	7-13452			
V2-2827	.14	.61	.01	.04										48113	66981	27.5	DK		
A 2 X 2 X 3/8					A36		ASTM A36-91						ASME-SA36		2009381	7-08587			
V2-2736	.15	.69	.01	.05										46828	70522	32.0	DK		
A 2 X 2 X 3/8					A36		ASTM A36-91						ASME-SA36		2009381	7-08587			
V2-2736	.15	.69	.01	.05										47201	71455	31.5	DK		
A 3 X 3 X 3/16					A36		ASTM A36-91						ASME-SA36		2013396	7-57936			
V2-2530	.14	.66	.01	.03										48394	68119	32.0	DK		
A 3 X 3 X 3/16					A36		ASTM A36-91						ASME-SA36		2013396	7-57936			
V2-2530	.14	.66	.01	.03										47706	67660	34.0	DK		

THIS MATERIAL, INCLUDING THE BILLETS, WAS PRODUCED AND MANUFACTURED IN THE UNITED STATES OF AMERICA.

A. J. TURNER
QUALITY ASSURANCE MGR.
MILL GROUP

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY

2 x 2 x 3/8 Angle

FLORIDA S[illegible] CORPORATION

"Steel when you want it"

CHEMICAL AN[illegible]YSICAL TEST REPORT

MADE IN U.S.A.

SHIP TO	INVOICE TO	SHIP DATE	SHIPPERS NUMBER
O'NEAL STEEL, INC. 2834 CLOVIS ROAD BOX 5495 LUBBOCK TX 79415	O'NEAL STEEL, INC. P. O. BOX 2623 BIRMINGHAM AL 35202-26	09-17-92 CUST. ACCOUNT NO. 36791606	8582-119173

SIZE					GRADE		SPECIFICATION							S.O. NO.		CUST. P.O. NUMBER			
HEAT LD NO	C	MN	P	S	V	SI	CR	CU	NI	SN	AL	MO		YIELD PT LBS/SQ IN	TENSILE LBS/SQ IN	ELONG % IN	BEND	DEF.	% LIGHT HEAVY
A 1 1/2 X 1 1/2 X 1/8					A36		ASTM A36-91				ASME-SA36				2014889	Z[illegible]			
V2-2784	.15	.70	.01	.04										56428	75714	25.0	OK		
A 1 1/2 X 1 1/2 X 1/8					A36		ASTM A36-91				ASME-SA36				2014888	Z[illegible]			
V2-2784	.15	.70	.01	.04										55000	74285	25.6	OK		
A 7 X 7 X 7/16					A36		ASTM A36-91				ASME-SA36				2018[illegible]	Z[illegible]			
V2-2520	.12	.69	.02	.04										46336	65732	38.0	OK		
A 7 X 7 X 7/16					A36		ASTM A36-91				ASME-SA36				2018[illegible]	Z[illegible]			
V2-2520	.12	.69	.02	.04										45474	64870	38.5	OK		
C 6 X 8 2*					A36		ASTM A36-91				ASME-SA36				2018[illegible]	Z[illegible]			
V2-3508	.15	.81	.01	.03										55125	[illegible]	29.5	OK		
A 7 X 7 X 1/4					A36		ASTM A36-91				ASME-SA36				2018[illegible]	Z57950			
V2-2488	.13	.69	.02	.04										48611	67881	35.0	OK		
A 7 X 7 X 1/4					A36		ASTM A36-91				ASME-SA36				2018465	Z57950			
V2-2488	.13	.69	.02	.04										49300	68831	33.8	OK		

JAN [illegible]

Jesse Flor: 9-21-92

THIS MATERIAL, INCLUDING THE BILLETS, WAS PRODUCED AND MANUFACTURED IN THE UNITED STATES OF AMERICA.

A. J. TURNER
QUALITY ASSURANCE MGR.
MILL GROUP

WE HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY

Z-57945 C 6X10.5X4C

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

WE HEREBY CERTIFY THAT THE FOLLOWING DATA IS A TRUE COPY FROM TESTS PERFORMED IN OUR LABORATORY.

The following tests conform to the requirements of the specifications listed.

DAN SCHACHT 8/ 7/92

QUALITY CONTROL MANAGER

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
01391	AU 2.5X2X1/4	ASTM A36-89	.15	0.87	.024	.036	.16	.43	0.24	0.17	.039	.000	.0040	.003
87196	CH 6X10.5	ASTM A36-89	.17	0.68	.009	.031	.26	.37	0.23	0.23	.049	.004	.0020	.001
89624	SQ 3/4	ASTM A36-89	.16	0.82	.009	.033	.17	.50	0.11	0.23	.053	.000	.0020	
89625	SQ 3/4	ASTM A36-89	.15	0.76	.006	.028	.19	.46	0.10	0.22	.054	.000	.0020	
87196	CH 6X10.5	ASTM A36-89	.17	0.68	.009	.031	.26	.37	0.23	0.23	.049	.004	.0020	.001
01476	#8 REBAR	ASTM A615-89 GRADE 60 AASHTO M31	.42	0.97	.008	.032	.23	.42	0.08	0.17	.041	.013	.0020	.002

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
01391	1	52100	74800	30.0		3.570	06/25/92
87196	1	51800	74400	39.0		10.400	08/28/91
89624	1	51500	73500	22.0		1.900	01/10/92
89625	1	51500	73500	22.0		1.900	01/10/92
87196	1	51800	74400	39.0		10.400	08/28/91
01476	1	69000	106300	12.0	OK	2.600	06/26/92

REMARKS: P.O. Z-16717; Z-19477; Z-19076 ; Z-57945 & BZ-42393
THIS STEEL IS MELTED & MANUFACTURED IN THE USA

Atlantic Steel COMPANY

A MEMBER OF THE IVACO GROUP

P.O. BOX 1714 ATLANTA, GEORGIA 30301

TEST CERTIFICATE

DATE 05/23/92

SEND TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

INVOICE NUMBER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	ELONG 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
036447 -001	Z-0799 S	FLATS, 0.2500" X 4.0000" 55 KSI 20'00", 5000# STACKED BUNDLE	48832	65.6	87.6	28.0		.20	.88	.017	.022	.21	.37				.023	

MATERIAL MELTED AND MANUFACTURED IN THE USA

Z-0799B

SWORN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY

I CERTIFY THE ABOVE RESULTS OF TEST AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

CERTIFIED MILL TEST REPORT

SOLD TO
O'NEAL STEEL *BIRMINGHAM
PO BOX 96
BIRMINGHAM AL 35201

SHIP TO
O'NEAL STEEL *BIRMINGHAM
10848 LUNA ROAD
DALLAS TX

JACKSON, MS STEEL DIV
FOURTH STREET OFF FLOWOOD DR.
JACKSON MS 36613

DATE: 08/18/92

B.L. NO.: B4- 69867

LOAD NO.: B4- 18261

PO# X-16006 X-17704 2-20833

HEAT NO.*	DESCRIPTION	PHYSICAL TESTS YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WT% / DEF	CHEMICAL TESTS C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu /	C.E
5592I3668	1/4x3" F1 20' (A36) ASTM A36	50,500	71,500	25.0	OK	-4.9%	.15 NA	.700 NA	.014 NA	.035 NA	.16 NA	NA	
5592I3692	1/4x4" F1 20' (A36) ASTM A36	45,800	65,900	28.0	OK	-4.3%	.15 NA	.600 NA	.010 NA	.038 NA	.19 NA	NA	
5593I0572	1/2x3" F1 20' (A36) ASTM A36-91	46,700	68,700	31.0	OK	-2.9%	.14 NA	.650 NA	.031 NA	.038 NA	.11 NA	NA	
5593I0573	1/2x3" F1 20' (A36) ASTM A36-91	46,300	67,600	33.0	OK	-2.8%	.15 NA	.720 NA	.018 NA	.038 NA	.15 NA	NA	

REC'D O'NEAL STEEL DALLAS
AUG 19 1992
ORIGINAL

CERTIFIED MILL TEST REPORT

SOLD TO
D'NEAL STEEL *BIRMINGHAM
PO BOX 98
BIRMINGHAM AL 35201

SHIP TO
D'NEAL STEEL *BIRMINGHAM
2834 CLOVIS ROAD
LUBBOCK TX

JACKSON, MS STEEL DIV
FOURTH STREET OFF FLOWOOD DR.
JACKSON MS 36613

DATE: 08/14/92
B.L.NO.: B4- 69790
LOAD NO.: B4- 18214

P.O. # Z-17620
Z-59009 F 1/4X2

HEAT NO.	DESCRIPTION	PHYSICAL TESTS YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WT% DEF	CHEMICAL TESTS C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu	C.E.
B49215924	1/4x2" F1 20' (A36) ASTM A36-90	44,400	65,400	28.0	OK		.16 NA	.580 NA	.005 NA	.022 NA	.16 NA	NA	
B49310382	3/4" Rd 20' (A36) ASTM A36-90	56,689	74,830	20.0	OK		.18 NA	.670 NA	.016 NA	.029 NA	.20 NA	NA	

Atlantic Steel Company

A MEMBER OF THE IVACO GROUP

P.O. BOX 1714 — ATLANTA, GEORGIA 30301

AGE 1

DATE 06 /92

TEST CERTIFICATE

SEND TO
O'NEAL STEEL, INC.
TEST REPORTS
P. O. BOX 5906
LUBBOCK, TX 79417

SHIPPED TO
2834 CLOVIS ROAD
LUBBOCK, TX

VOICE NBER	CUSTOMER ORDER NO.	DESCRIPTION	HEAT NUMBER	YIELD STRENGTH KSI	TENSILE STRENGTH KSI	% ELONG. 8" GAGE	BEND TEST	CHEMICAL ANALYSIS - % C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb
30167 001	Z-0270 1	FLATS, 0.7500"X 4.0000" 55 KSI 20'00", 9000# STACKED BUND	48782	60.0	62.7	31.0		.20	.94	.007	.028	.19	.22				.032	

33' 16

MATERIAL MELTED AND MANUFACTURED IN THE USA

3/4 x 4 Flat

SWORN TO AND SUBSCRIBED TO BEFORE ME THIS _____ DAY OF _____ 19 _____

I CERTIFY THE ABOVE RESULTS OF TESTS AND/OR ANALYSES TO BE CORRECT AS CONTAINED IN THE RECORDS OF ATLANTIC STEEL COMPANY.

AUTHORIZED SIGNATURE

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

The following tests conform to the requirements of the specifications listed.

WE HEREBY CERTIFY THAT THE FOLLOWING DATA IS A TRUE COPY FROM TESTS PERFORMED IN OUR LABORATORY.

DAN SCHACHT — 12/19/91
QUALITY CONTROL MANAGER

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
780	AE 2.5X1/4	ASTM A36-89	.15	0.78	.008	.034	.24	.46	0.12	0.17	.037	.000	.0020	
202	AE 2X3/8	ASTM A36-89	.15	0.85	.008	.029	.25	.38	0.19	0.17	.052	.000	.0010	
243	FL 3/4X6	A36 MODIFIED	.21	0.83	.009	.042	.23	.41	0.11	0.18	.035	.004	.0020	.001
094	FL 3/4X6	A36 MODIFIED	.21	0.80	.009	.034	.22	.43	0.16	0.17	.037	.001	.0010	.001
175	AE 2X1/4	ASTM A36-89	.13	0.87	.012	.029	.26	.60	0.18	0.21	.051	.000	.0020	
176	AE 2X1/4	ASTM A36-89	.14	0.80	.009	.029	.26	.47	0.12	0.17	.046	.000	.0010	
105	FL 3/4X5	A36 MODIFIED	.22	0.80	.007	.030	.23	.47	0.13	0.17	.041	.004	.0010	.001

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
8780	1	52900	73100	31.0		4.045	11/16/91
8202	1	51400	75000	30.0		4.560	10/19/91
5243	1	52200	79400	25.0		15.150	04/27/91
7094	1	51200	80000	25.0		15.200	08/18/91
8175	1	45800	72900	32.0		3.150	10/20/91
8176	1	51200	72700	30.0		3.140	10/20/91
7105	1	54400	81300	26.0		12.590	08/20/91

3/4X5 A36 mod flat

REMARKS: THIS STEEL IS MELTED & MANUFACTURED IN THE USA

STRUCTURAL METALS, INC.
BOX 911, SEGUIN, TEXAS 78156-0911
512-372-8200

CERTIFIED TEST REPORT

WE HEREBY CERTIFY THAT THE FOLLOWING DATA IS A TRUE COPY FROM TESTS PERFORMED IN OUR LABORATORY.

DAN SCHACHT
QUALITY CONTROL MANAGER

4/29/92

The following tests conform to the requirements of the specifications listed.

HEAT NO.	SECTION	SPECIFICATION	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Cb	V	Al
B7511	AU 2X1.5X3/16	ASTM A36-87	.15	0.77	.011	.033	.18	.33	0.11	0.15	.036	.000	.0020	
K1017	AE 2X1/8	ASTM A36-87	.16	0.69	.020	.036	.22	.33	0.13	0.09	.010	.004	.0020	.002
K1056	AE 2X1/8	ASTM A36-87	.15	0.66	.017	.037	.24	.36	0.12	0.11	.020	.003	.0020	.003
88202	AE 2X3/8	ASTM A36-87	.15	0.85	.008	.029	.25	.38	0.19	0.17	.052	.000	.0010	
00195	AE 2.5X3/8	ASTM A36-87	.18	0.74	.008	.033	.21	.51	0.06	0.14	.032	.000	.0020	
00222	AE 2.5X1/4	ASTM A36-87	.19	0.73	.007	.028	.23	.52	0.12	0.14	.046	.001	.0020	.001

HEAT NO.	Test No.	YIELD PSI	TENSILE PSI	%ELONG IN 8"	BEND	LB/FT	DATE ROLLED MM-DD-YY
B7511	1	49800	71200	29.0		2.060	01/02/92
K1017	1	55300	73800	29.5		1.600	01/26/92
K1056	1	53900	71900	24.0		1.640	01/25/92
88202	1	51400	75000	30.0		4.560	10/19/91
00195	1	54200	75200	30.0		5.830	04/21/92
00222	1	54000	77300	32.0		4.050	04/21/92

MAY - 7 1992

REMARKS: THIS STEEL IS MELTED & MANUFACTURED IN THE USA

PO#27310
WO#IT41210

middle east tube co.ltd.
IMPORT / EXPORT DEPT.
P.O.B 62 RAMLA 72100 ISRAEL TELEX: 381603 PIPE IL
TELEPHONE: 8-268382 - 4 FAX: 8-221186

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 89/J/1-183 PAGE 1.

P H Y S I C A L P R O P E R T I E S

UBE DIMENSION	YIELD POINT	U.T.S.	ENLONGATION	HEAT NO.
18" X 0.375	52017	68834	40	2483
10" X 0.375	57736	72931	32	2485
18" X 0.375	59167	74195	33	2486
18" X 0.375	56364	70711	37	2488
18" X 0.375	57206	72527	33	2489
18" X 0.375	53208	64462	34	2490
18" X 0.375	56742	76653	31	2491
10" X 0.375	55391	65465	33	2492
10" X 0.375	62406	76499	30	2493
18" X 0.375	58029	73783	33	2494

RAMLA, 23/04/89

middle east tube co.ltd.

IMPORT / EXPORT DEPT.
P.O.B 82 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 8-258382 - 4 FAX: 8-221198

M I D D L E E A S T T U B E C O. L. T D.

MILL CERTIFICATE NO. 89/J/1-183 PAGE 1.

C H E M I C A L A N A L Y S I S

IBE DIMENSIONS	% C	% MN.	% SI.	% P	% S	AL%	HEAT NO.
8" X 0.375	0.160	0.710	0.160	0.014	0.012	0.004	2483
8" X 0.375	0.160	0.760	0.270	0.014	0.013	0.006	2485
8" X 0.375	0.160	0.780	0.250	0.013	0.015	0.006	2486
8" X 0.375	0.140	0.640	0.200	0.008	0.021	0.005	2488
8" X 0.375	0.160	0.690	0.270	0.008	0.025	0.005	2489
8" X 0.375	0.160	0.700	0.240	0.013	0.017	0.004	2490
8" X 0.375	0.150	0.750	0.300	0.006	0.027	0.005	2491
8" X 0.375	0.160	0.690	0.220	0.009	0.022	0.004	2492
8" X 0.375	0.160	0.740	0.200	0.005	0.021	0.005	2493
[illegible] X 0.375	0.160	0.770	0.240	0.015	0.016	0.012	2494

RAMLA, 23/04/89

middle east tube co.ltd.
IMPORT / EXPORT DEPT.
P.O.B 62 RAMLA 72100 ISRAEL TELEX: 381503 PIPE IL
TELEPHONE: 8-268392 - 4 FAX: 8-221199

MTR

M I D D L E E A S T T U B E C O. L T D.

MILL CERTIFICATE NO. 1837/00

ER NO. : 89/J/1-183 TEST PSI : 1490

ER.	WALL THICK.	KG/ MTR	LENGTH MTR	LENGTH FT	TOTAL M.TON	NO. OF PIECES	REMARKS
	.375	105.100	3150.36	10336.33	325.742	246	RED+RED
	.375	105.100	269.24	883.38	27.948	23	GREEN+GREEN

02/04/89

MEMBER OF KOOR STEEL
HEAD OFFICE : P.O.B. 785 HAIFA 31007 ISRAEL. TELEPHONE: 04-910467-8-0, CABLES: METCO, HAIFA. TELEX: 471786 METCO-IL FAX: 04-912745

2-8000

tubos de aço
PERSICO
PIZZAMIGLIO

Rod. Pres. Dutra, Km 210 - Tel: (011) 912-4711/3222 - Telex 1162121 - CEP 07180
Guarulhos - SP - BRASIL - C.G.C. 01.001.013/0003-10 - I.E. 331.040.606.118
Fax (011) 912-6684 - Endereço Telegráfico: IRONTUBES

CERTIFICADO DE ENSAIOS E ANÁLISES
MILL TEST CERTIFICATE

CEA/MTC Nº 9561 ORIGINAL

FOLHA/SHEET 1

DESCRIÇÃO/DESCRIPTION: ERW LINE PIPE / BPE - GR A - SCH 40.

NOTA FISCAL Nº/EXPORT Nº: 6211

LOTE Nº/LOT Nº: 753602

PACOTES/BUNDLES: 22

Nº DE PEÇAS/Nº PIECES: 154

PESO APROXIMADO/APPROXIMATE WEIGHT (KG): 52844

COMPRIMENTO TOTAL/TOTAL LENGHT: 6160 FEET

DRL

6 Sch 40 A53A Weldeel

DIMENSÕES/DIMENSIONS: 6"X0.280X18.97LBS/FTX40FT

ESPECIFICAÇÕES/SPECIFICATIONS: API 5L GRADE A

PEDIDO DE COMPRA Nº/PURCHASE ORDER Nº:

CARTA DE CREDITO/LETTER OF CREDIT: 920121IM295

ORDEM DE PRODUÇÃO Nº/WORKING ORDER Nº: 76820/ 1

TRATAMENTO TÉRMICO/HEAT TREATMENT		BOBINA Nº COIL NUMBER	PROPRIEDADES FÍSICAS/PHYSICAL PROPERTIES: LIMITE ESCOAMENTO YP PSI	LIMITE RESISTÊNCIA TS PSI	ALONGAMENTO ELONGATION (IN 2"/%)	DUREZA HARDNESS	ANÁLISE QUÍMICA / CHEMICAL ANALYSIS (%) x 100: C	Mn	Si	Ni	Cr	Mo	CU	x 1000: P	S	Al	Nb	
TEMPERATURA / TEMPERATURE																		
TEMPO NA REGIÃO DA SOLDA (S/N) / SEAM DUCT (Y/N)	N																	
RESULTADO DOS TESTES/TEST RESULTS																		
CÂNICOS/MECHANICAL		501557	48490	51760	41,2	-	3	38	-	-	-	-	-	13	3	-	-	
EXPANSÃO/FLARING	N	501560	39816	50054	43,4	-	5	32	-	-	-	-	-	13	15	-	-	
ACHATAMENTO/FLATTENING	Y																	
ACHAT. REVERSO/REVERSE FLATTENING	N	501573	55742	66591	33,2	-	19	87	-	-	-	-	-	15	9	-	-	
DOBRAMENTO/BEND	-																	
DOBRAMENTO REVERSO/REVERSE BEND	-	501574	52045	61714	35,0	-	4	30	-	-	-	-	-	12	15	-	-	
ALONGAMENTO/FLANGE	-																	
ESTOURO/BURST	-	501575	38394	48205	45,8	-	4	31	-	-	-	-	-	12	19	-	-	
TESTE DE MANDRIL/DRIFT TEST	-																	
HIDROSTÁTICO/HYDROSTATIC		501577	42375	49527	42,2	-	5	30	-	-	-	-	-	10	17	-	-	
1820 PSI																		
NÃO-DESTRUTIVO/NONDESTRUCTIVE		501981	61714	74228	33,0	-	14	64	22	-	-	-	-	15	12	-	-	
ELETROMAGNÉTICO/ELECTROMAGNETIC	Y																	
PART. MAGNÉTICAS/MAGNETIC PARTICLE	-	501587	50054	51760	37,6	-	3	32	-	-	-	-	-	15	13	-	-	
GALVANIZAÇÃO/GALVANIZING																		
GRAU DE ZINCO/ZINC GRADE (%)	-																	
PESO DA CAMADA/COATING WEIGHT (g/m²)	-																	
ESPES. REVESTIMENTO/COATING THICKNESS	-																	
TESTE DE IMERSÃO/DIP TEST	-																	
TESTE DE IMERSÕES/TIMES	-																	
ADERÊNCIA/ADHERENCE	-																	
DOBRAMENTO/BEND	-																	
ACHATAMENTO/FLATTENING	-																	

OBSERVAÇÕES/REMARKS: DUCTILITY

CERTIFICAMOS PELO PRESENTE QUE O MATERIAL FOI TESTADO EM NOSSO LABORATÓRIO, DE ACORDO COM AS ESPECIFICAÇÕES TÉCNICAS, RESULTANDO NOS VALORES ACIMA REFERIDOS. WE HEREBY CERTIFY THAT THE DESCRIBED MATERIAL WAS TESTED IN OUR LABORATORY ACCORDING TO THE TECHNICAL STANDARDS AND YIELDED THE RESULTS ABOVE MENTIONED

GUARULHOS, APRIL 13 1992

SALVATORE DI MINO
PERSICO PIZZAMIGLIO S.A.
GERENTE CONTROLE QUALIDADE/QUALITY CONTROL MANAGER

OCT 15 '92 09:51 O'NEAL STEEL LUBBOCK P.3

BUYER ACEROTEX INTERNATIONAL

ORDER Nº ATI-914017

SPECIFICATION ASTM-A-53-A

KIND OF ARTICLE CARBON STEEL (STEEL 3" NOM SCH-40)

N E/L

Z-52890

TURR 91 772

Villacero

TUBERIA NACIONAL, S. A.

INSPECTION CERTIFICATE

HEAT Nº	DIMENSION			HYDROSTATIC	WEIGHT	CHEMICAL COMPOSITION %								TENSION TEST		
	NOM. (INCHES)	THICKNESS (INCHES)	LENGTH FT (MTS)	TESTED PSI (KG/CM.²)	LBS. (KGS)	C x 1/100	Mn x 1/100	P x 1/1000	S x 1/1000	SI x 1/100				Y.P. PSI / KG/CM	T.S. PSI / KG/CM	E.L. %
1104271	3	0.216	21	2200		13	44	11	21	0				38755	48536	29
				155										2724	3412	
			MPA	15.17								MPA		267	334	

2 sch 40. A53 welded

OCT 15 '92 09:52 O'NEAL STEEL LUBBOCK P.4

P.O. BOX 10232
LUBBOCK, TEXAS 79408

FOR: SHIELDED METAL ARC WELDING, CARBON STEEL (P-Number 1)

SCOPE

1. This welding procedure specification covers the welding of carbon steel (P-1) in the fabrication of API 650 storage tanks.

PROCESS: Shielded metal arc.

BASE METAL:

The steel base metal shall comply with one of the ASTM specifications and grades listed in the ASME Code under (P-1).

FILLER METAL:

The filler metal shall comply with ASME Material Specification Part C E6010 (F3).

PREPARATION OF BASE METAL AND ALIGNMENT OF EDGES:

1. The edges to be joined shall be perpared in accordance with a single or double "V" Groove. Gas cutting may be used.

2. Edges to joined and all surfaces within 1/2" of the welding edge shall be thoroughly cleaned immediately prior to welding.

3. Abutting edges of plates at longitudinal joints shall not, after welding, have an offset at any point in excess of one-quarter of the plate thickness with a maximum permissible offset of 1/8", except that plates less than 1/4" in thickness, the offset may be as much as 1/16".

4. Abutting edges circumferential joints shall be aligned with the following tolerances;

For plates up to 1/4"	1/16"
For plates over 1/4" to 3/4"	25% of plate thickness
For plates over 3/4" to 1½"	3/16"
For plates over 1½"	12 1/2% of plate thickness, but not over 1/4"

ELECTRIC CURRENT:

Direct current shall be used with electrode positive and the base metal negative. (Reverse Polarity).

WELDING TECHNIQUE:

1. The welding technique shall be substantially as shown on the attached sketches.

2. (a) When making double-welded joints the reverse (root) side must be gouged,chipped,or ground out to sound metal before the finishing bead is deposited.

QW-482 (Back)

WPS No. SMI 1-1 Rev. 0

POSITIONS (QW-405)

Position(s) of Groove: 6G

Welding Progression: Up E7018 Down E6010

Position(s) of Fillet: ALL

POSTWELD HEAT TREATMENT (QW-407)

Temperature Range: NA

Time Range:

PREHEAT (QW-406)

Preheat Temp. Min.: 70°F

Interpass Temp. Max.: 500°F

Preheat Maintenance: As Required

(Continuous or special heating where applicable should be recorded)

GAS (QW-408)

Shielding Gas(es):

Percent Composition (mixtures):

Flow Rate:

Gas Backing:

Trailing Shielding Gas Composition:

ELECTRICAL CHARACTERISTICS (QW-409)

Current AC or DC: DC Polarity: Reverse

Amps (Range): 120-190 Volts (Range): 19-26

(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type: NA (Pure Tungsten, 2% Thoriated, etc.)

Mode of Metal Transfer for GMAW: NA (Spray arc, short circuiting arc, etc.)

Electrode Wire feed speed range: NA

TECHNIQUE (QW-410)

String or Weave Bead: String & Weave

Orifice or Gas Cup Size: NA

Initial and Interpass Cleaning (Brushing, Grinding, etc.): Grinding & Brush

Method of Back Gouging: Air Arc and Grinding

Oscillation: No pass greater than ½"

Contact Tube to Work Distance: NA

Multiple or Single Pass (per side): Multipass

Multiple or Single Electrodes: Single

Travel Speed (Range): 8 to 10 Inches Per Minute

Peening: Not Allowed

Other:

Weld Layer(s)	Process	Filler Metal Class	Filler Metal Dia.	Current Type Polar.	Current Amp. Range	Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
1	SMAW	E6010	1/8"	Rev.	120-190	19-26	8-10 IPM	
2	SMAW	E7018	1/8	Rev.	120-190	19-26	6-8 IPM	
3-4-5	SMAW	E7018	5/32"	Rev.	120-190	19-26	8-10 IPM	
CAP	SMAW	E7018	1/8"	Rev.	120-190	19-26	6-8 IPM	

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)

(See QW-201.1, Section IX, ASME Boiler and Pressure Vessel Code)

WPS CC 1

Company Name SCOTT MFG. INC. By: James H. Tipton

Welding Procedure Specification No. SMI 1-1 Date 8-18-90 Supporting PQR No.(s) SMI 1-1A

Revision No. 0 Date 8-18-90

Welding Process(es) SMAW Type(s) Manual

(Automatic, Manual, Machine, or Semi-Auto.)

JOINTS (QW-402)

Joint Design GROOVE

Backing (Yes) (No) N

Backing Material (Type)

(Refer to both backing and retainers.)

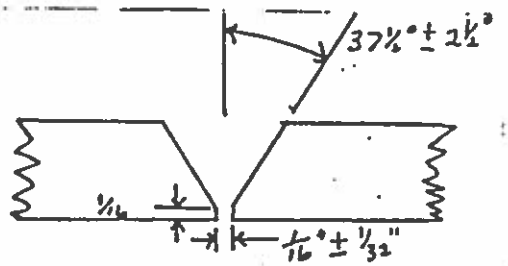
☐ Metal ☐ Nonfusing Metal

☐ Nonmetallic ☐ Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

Details



*BASE METALS (QW-403)

P-No. 1 Group No. 1 to P-No. 1 Group No. 1

OR

Specification type and grade A106 Gr B

to Specification type and grade A106 Gr B

OR

Chem. Analysis and Mech. Prop.

to Chem. Analysis and Mech. Prop.

Thickness Range:

Base Metal: Groove .1876 to .864" Fillet Unlimited

Pipe Dia. Range: Groove 6 5/8" Fillet Unlimited

Other

*FILLER METALS (QW-404)		
Spec. No. (SFA)	5.1	5.1-5.5
AWS No. (Class)	E6010	E7018
F-No.	3	4
A-No.	1	1
Size of Filler Metals	1/8"	1/8"--5/32"
Deposited Weld Metal	.125"	.307"
Thickness Range:	.0625" to .250"	.0625- .614"
Groove	ALL	ALL
Fillet	ALL	Unlimited
Electrode-Flux (Class)	Iron Oxide	Low Hydrogen
Flux Trade Name		
Consumable Insert		
Other		

*Each base metal-filler metal combination should be recorded individually.

This form (E00006) may be obtained from the Order Dept., ASME, 345 E. 47 St., N.Y., N.Y. 10017

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)
(See QW-201.2, Section IX, ASME Boiler and Pressure Vessel Code)
Record Actual Conditions Used to Weld Test Coupon.

Company Name SCOTT MANUFACTURING, INC.
Procedure Qualification Record No. SA-1A Date 9-5-90
WPS No. SA-1
Welding Process(es) SMAW
Types (Manual, Automatic, Semi-Auto.) Manual

JOINTS (QW-402)

Groove Design of Test Coupon

(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec. SA 516
Type or Grade 70
P-No. 1 to P-No. 1
Thickness of Test Coupon .375"
Diameter of Test Coupon NA
Other

POSTWELD HEAT TREATMENT (QW-407)
Temperature NA
Time
Other

GAS (QW-408)
Type of Gas or Gases
Composition of Gas Mixture
Other

FILLER METALS (QW-404)	
SFA Specification	5.1
AWS Classification	E6010
Filler Metal F-No.	3
Weld Metal Analysis A-No.	1
Size of Filler Metal	1/8"--5/32"
Other	
Deposited Weld Metal	.500"

ELECTRICAL CHARACTERISTICS (QW-409)
Current DC
Polarity Reverse
Amps. 90-140 Volts 22-26
Tungsten Electrode Size
Other

POSITION (QW-405)
Position of Groove 1G
Weld Progression (Uphill, Downhill)
Other

TECHNIQUE (QW-410)
Travel Speed 8-10-IPM
String or Weave Bead String & Weave
Oscillation
Multipass or Single Pass (per side) Multipass
Single or Multiple Electrodes Single
Other No pass greater than 1/2"

PREHEAT (QW-406)
Preheat Temp. None
Interpass Temp. 450°F
Other

(6/85) This form (E00007) may be obtained from the Order Dept., ASME, 345 E. 47th St., New York, N.Y. 1001

QW-483 (Back)

PQR No. SA-1A

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load lb	Ultimate Unit Stress psi	Type of Failure & Location
T-1	1.043	.374	.390	27,500	70,513	Base Metal
T-2	1.035	.373	.386	27,250	70,596	Base Metal

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
QW-463.1(d) Root 1	Accepted
QW-463.1(d) Root 2	Accepted
QW-463.1(d) Face 1	Accepted
QW-463.1(d) Face 2	Accepted

Toughness Tests (QW-170)

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Values	Lateral Exp. % Shear	Lateral Exp. Mils	Drop Weight Break	Drop Weight No Break

Fillet-Weld Test (QW-180)

Result — Satisfactory: Yes _____ No _____ Penetration into Parent Metal: Yes _____ No _____

Macro—Results _____

Other Tests

Type of Test _____

Deposit Analysis _____

Other _____

Welder's Name Tim Kirksey Clock No. 423-76-1547 Stamp No. _____

Tests conducted by: Longview Inspection, Inc. Laboratory Test No. 260-90

We 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 IX of the ASME Code.

AWS QC1 JAMES H. TIPTON 89120151

Manufacturer SCOTT MANUFACTURING, INC.

9-5-90 By William A. Basom

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

PERMIAN NON-DESTRUCTIVE TESTING

QUALIFICATION

METHOD	RT		UT		MT		PT		HT	
NAME: Miller, Morris J.	I	II	I	II	I	II	I	II	I	II
EXAMS: GENERAL/30%	/ 26.70		/		/ 25.50		/ 29.25		/	
EXAMS: SPECIFIC/30%	/ 24.00		/		/ 22.50		/ 30.00		/	
EXAMS: PRACTICAL/40%	/ 36.00		/		/ 34.80		/ 38.00		/	
EXAMS: COMPOSITE	/ 86.70		/		/ 82.80		/ 97.25		/	
CERTIFIED BY / LEVEL	DFM III				DFM III		DFM III			
CERTIFICATION DATE	10-17-90				10-17-90		10-17-90			
RECERTIFICATION DUE	10-17-91				10-17-91		10-17-91			
DOCUMENTED EXPERIENCE	On File				On File		On File			
PRIOR CERTIFICATION LEVEL	II				II		II			
APPOINTMENT BY LETTER, III										

JAEGER J-2 AND J-1 TEST	ACCEPT: X	CONDITIONS: None	DATE: 10-17-90
COLOR PERCEPTION TEST	ACCEPT: X	CONDITIONS: None	DATE: 10-17-90

DATE EMPLOYED: 1-25-88 ASSIGNMENT TO NDT: 1-25-88

EDUCATION LEVEL: High Scholl/Tech EXPERIENCE TIME: 9.5 Years

LIMITATIONS: Recertified RT, MT, PT only

THIS INDIVIDUAL HAS SUCCESSFULLY COMPLETED THE ABOVE EXAMINATIONS AND HAS QUALIFIED FOR THE LEVEL IN THE NONDESTRUCTIVE TEST METHOD INDICATED ABOVE AS PER PERMIAN NON-DESTRUCTIVE TESTING'S WRITTEN PRACTICE. DOCUMENTATION SHALL BE ON FILE FOR REVIEW UPON REASONABLE REQUEST.

AUTHORIZED EXAMINER / DATE

Joan Dingley 10-17-90

PERMIAN NON-DESTRUCTIVE TESTING

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

P.O. Box 176
La Grange, Texas 78945
(409) 242-3117

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

No. 102691

Pg. 1 of 1

Customer SMI Date 10-14-92 Technician M M Level II Asme N/A Level N/A

Work Order ____ Serial No ____ Code API 650 % ____ Rig # R-1 N/A Tank

RADIOGRAPHIC
Curie ____ Screens ____
Exposure Arrangement ____
Material Thickness ____
Penetrometer ____ S ____ F ____
Film Type ____
Film Qty: ____
Film Qty: ____
Film Qty: ____

ULTRASONIC
Equipment ____
Transducer Type ____
Size ____ Freq ____
Calibration
Material ____ Ampl. ____
Hole Size ____ Dist. ____

MAGNETIC PARTICLE
Equipment Magnaflux Y-6
Material Type C/S Thickness 1/4"
Amp 6 N/A
Prodspacing 2 1/2" - 7"
AC/DC AC
Surface Prep As welded
Type Used Mid 9 Grey
Particle Used (No.) 10 V65

DYE PENETRANT
Type Cleaner ____
Type Penet ____
Type Devel ____
Surface Prep ____
Dwell Time ____
Material Type ____ Thickness ____

	Weld No.	By No.	Location	Pipe Size	PNOT Within Code Yes	PNOT Within Code No	CUST Within Code Yes	CUST Within Code No	Defects & Location	REMARKS
1	W-1			6"	✓					
2	W-2			3"						
3	W-3			3"						
4	W-4			6"						
5	W-5			6"						
6	W-6			3"						
7	W-7			3"						
8	W-8			6"						
9	W-9			36"						
10	W-10			36"						
11	W-11			36"						
12	W-12			30"						
13	W-13			30"						
14	W-14			30"						
15	W-15			6"						
16	W-16			3"						
17	W-17			3"						
18	W-18			6"						
19	W-19			3"						
20	W-20			3"						
21	W-21			6"						
22	W-22			6"						
23	W-23			30"						
24	W-24			30"						
25	W-25			30"						
26	W-26			30"						
27	W-27			18"						
28	W-28			18"						
29	W-29			24"						
30	W-30			6"						
31	W-31			3"						
32	W-32			3"						
33	W-33			3"						
34	W-34			6"						
35	W-35			24"						
36	W-36			18"						
37	W-37			18"						
38	W-38			18"						
39	W-39			18"						
40	W-40			24"	✓					W-41 6" ✓ W-42 3" ✓

Test(s) Interpreted By: M. Miller Level: II P.O. #: ____

Number of Testing Personnel: 1 Misc. Info.: ____ # Welds: 42 Per Diem N/A Miles 250 RT

Hours Worked: 5 PM to 4 AM Hours: RT 8 Hours: OT 3 Total Hrs 11 Job Location Wolfforth, Texas

NOTICE: THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PHOT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PHOT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS. PHOT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMERS REPRESENTATIVE'S SIGNATURE VERIFIES TIME AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION UNLESS OTHERWISE SPECIFICALLY NOTED.

UNDER NO CIRCUMSTANCES DOES PHOT GUARANTEE THE QUALITY OR USABILITY OF ANY ITEM, MATERIAL, OR PRODUCT, INSPECTED OR TESTED. NO WARRANTIES ARE EXPRESSED OR IMPLIED, AND IN NO EVENT SHALL THE LIABILITY OF PHOT WITH RESPECT TO ITEMS INSPECTED INCLUDING ANY LIABILITY PERTAINING TO SELECTION AND/OR RESULTS OF THESE SAME TESTS EXCEED THE CHARGE OF PHOT FOR THE INSPECTION OF SUCH ITEMS.

Agreed and Accepted: William A. Brown Date: 10-14-92

TERMS AND ABBREVIATIONS

LP	INADEQUATE PENETRATION	S.P.	SPHERICAL POROSITY
LP.D.	INADEQUATE PENETRATION DUE TO HIGH-LOW	C.P.	CLUSTER POROSITY
I.C.	INTERNAL CONCAVITY	P.P.	PIPING POROSITY
I.F.	INCOMPLETE FUSION	H.B.	HOLLOW BEAD
I.F.C.L.	INCOMPLETE FUSION DUE TO COLD LAP	C.R.	CRACKS
B.T.	BURN THROUGH	A.D.	ACCUMULATION OF DISCONTINUITIES
E.S.I.	ELONGATED SLAG INCLUSIONS	I.U.	INTERNAL UNDERCUT
I.S.I.	ISOLATED SLAG INCLUSIONS	O.U.	OUTSIDE UNDERCUT

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

P.O. Box 176
La Grange, Texas 78945
(409) 242-3117

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

Pg. 4 of 4

No. 10275

Customer: SMI Date: 10-16-92 Technician: MM Level: II Asme: B G Level: I
Work Order: CT-4 Serial No.: 451-4 Code: DPT 650 % Rig #: 4567

RADIOGRAPHIC
Curies: 50 Screens: .010
Exposure Arrangement: F
Material Thickness: 5/16"
Penetrameter: 12 S. X I.
Fam Type: D-4
Fam Qty: 1-3½" X 10"
Fam Qty:
Fam Qty:

ULTRASONIC
Equipment:
Transducer Type:
Size: Freq:
Calibration
Material: Ampl:
Hole Size: Dist.:

MAGNETIC PARTICLE
Equipment: Magnaflux Y-6
Material Type: FS Thickness: ½"
Amp: 600 AMP
Prodspacing: 3"-4"
AC/DC: AC
Surface Prep: As Welded
Type Used: MAG GACY
Particle Used Hrs: 3 1/2 5

DYE PENETRANT
Type Cleaner:
Type Penet:
Type Devel:
Surface Prep:
Dwell Time:
Material Type: Thickness:

	Weld No.	By No.	Location	Pipe Size	NOT Within Code Yes	NOT Within Code No	CUST Within Code Yes	CUST Within Code No	Defects & Location	REMARKS
1	C-1		C-1			X			I.P.	
2										
3										
4										
5										
6										
7										
8										
9										
10	V-1			24"	✓					
11	V-2			18"	✓					
12	V-3			18"	✓					
13	V-4			6"	✓					
14	V-5			3"	✓					
15										
16										
17										
18										
19										
20										
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35										
36										
37										
38										
39										
40										

(MAG.)

Test(s) Interpreted By: M. Miller Level: II P.O. #:

Number of Testing Personnel: Miss. Info.: # Welds: Per Diem: Miles:

Hours Worked: AM/PM to PM Hours: RT Hours: OT Total Hrs Job Location

NOTICE: THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PNDT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PNDT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS. PNDT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMER'S REPRESENTATIVE'S SIGNATURE VERIFIES TIME AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION UNLESS OTHERWISE SPECIFICALLY NOTED.
UNDER NO CIRCUMSTANCES DOES PNDT GUARANTEE THE QUALITY OR USABILITY OF ANY ITEM, MATERIAL OR PRODUCT, INSPECTED OR TESTED. NO WARRANTIES ARE EXPRESSED OR IMPLIED, AND IN NO EVENT SHALL THE LIABILITY OF PNDT WITH RESPECT TO ITEMS INSPECTED (INCLUDING ANY LIABILITY PERTAINING TO SELECTION AND/OR RESULTS OF THESE SAME TESTS) EXCEED THE CHARGE OF PNDT FOR THE INSPECTION OF SUCH ITEMS.

Agreed and Accepted: William A. Cason Date: 10/17/92

TERMS AND ABBREVIATIONS

I.P.	INADEQUATE PENETRATION	S.P.	SPHERICAL POROSITY
I.P.D.	INADEQUATE PENETRATION DUE TO HIGH-LOW	C.P.	CLUSTER POROSITY
I.C.	INTERNAL CONCAVITY	P.P.	PIPING POROSITY
I.F.	INCOMPLETE FUSION	H.B.	HOLLOW BEAD
I.F.C.L.	INCOMPLETE FUSION DUE TO COLD LAP	C.R.	CRACKS
B.T.	BURN THROUGH	A.D.	ACCUMULATION OF DISCONTINUITIES
E.S.I.	ELONGATED SLAG INCLUSIONS	I.U.	INTERNAL UNDERCUT
I.S.I.	ISOLATED SLAG INCLUSIONS	O.U.	OUTSIDE UNDERCUT

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

WISCO WELDING INSPECTION SERVICE COMPANY
11811 NORTH FRWY., SUITE 670
HOUSTON, TEXAS 77060

REPORT DATES 10/16/92 10/17/92
CUSTOMER: USPCI ATTN: MR. SAMAR HAMWI
ORDER NO: PO 19350 DATED: REV: DATED:
MAT'L DESTINATION: LONE MOUNTAIN
REQUIRED DATE: 11/1/92 SHIPMENT DATE IS NOW: SAME
AS OF CHANGED FROM:
INSPECTOR ESTIMATED SHIPMENT DATE: SAME
ORDER IS 65% PERCENT COMPLETED:
VENDOR: SCOTT MFG. CO. ORDER NO: 451
MANUFACTURER: SAME
PHONE: 806-866-9591 SHOP LOCATION: WOFORD, TX.
SHOP ORDER NO: 451
INSPECTOR'S CONTACT: BILL BASON POSITION: FIELD MANAGER
REPORT IS: INTERIM
REGARDING: INSPECTION
INSPECTOR: VICTOR HAGMAN

MATERIAL DESCRIPTION: (4) 12.75' DIAMETER BY 40' HEIGHT CAUSTIC STORAGE TANKS.

STATUS OF ORDER: TWO TANKS TO SHIP 10/19/92

INSPECTION: WITNESS RADIOGRAPHS BE TAKEN OF WELDS AND REVIEW OF SAME.

1. PICKED SPOTS FOR RADIOGRAPHS ON TWO TANKS. SHOTS WERE TAKEN OF VERTICAL SEAMS GIRTH WELDS IN TANKS. ONE SPOT WAS TAKEN ON THE BUTT WELDS ON THE CONE BOTTOM. THE CONE BOTTOM HAS THREE BUTT WELDS.

2. REVIEW OF SPOT WELDS FOUND THE FOLLOWING. THE WELDS IN THE CONE BOTTOM WERE BAD. PENALTY SHOTS WERE TAKEN AS PER API 650, AND ASME SEC. VIII UW 51, AND UW52. FOUND THAT A BAD PROCEDURE WAS USED IN WELDING THE BUTT WELDS ON THE BOTTOM OF ALL FOUR TANKS. THERE WAS NO PENETRATION ON ANY OF THE WELDS. SO SCOTT MFG MADE REPAIRS ON THE TWO TANKS TO SHIP ON 10/19/92. REPAIR SHOTS WERE MADE. FOUND THAT THE WELDS WERE STILL BAD. THE COMPLETE BUTT WELDS ON THE BOTTOM OF ALL FOUR TANKS WAS REMOVED COMPLETELY.

10/17/92.

1. PICKED RADIOGRAPHS FOR BOTTOM BUTT WELDS. AFTER REVIEWING FILM FOUND THAT ALL OF THE BOTTOM BUTT WELDS WERE NOW ACCEPTABLE. THE REASON FOR THE PROBLEM TO START WITH WAS THAT NO ROOT OPENING WAS LEFT FOR PENETRATION. THESE WELDS WERE DONE BY THE SHOP PERSONAL. NOT THE CREW THAT IS BUILDING THESE TANKS.
2. WITNESS FITTING THE TOP RING ON TANK NUMBER TWO. AND WATCHED AS THE WELDERS MADE THE ROOT PASS. ALL WELDING WAS PER SPECIFICATIONS AND WAS OF GOOD QUALITY.

WILL RETURN 10/19/92 FOR FINAL ON FIRST TWO TANKS AND WITNESS LOADING OF SAME.

WISCO WELDING INSPECTION SERVICE COMPANY
11811 NORTH FRWY., SUITE 670
HOUSTON TEXAS 77060

REPORT DATES 10/14/92 10/15/92
CUSTOMER: USPCI ATTN: MR SAMAR HAMWI
ORDER NO: DATED: REV: DATED:
MATL DESTINATION: LONE MOUNTAIN
REQUIRED DATE: SHIPMENT DATE IS NOW:
AS OF CHANGED FROM:
INSPECTOR ESTIMATED SHIPMENT DATE:
ORDER IS PERCENT COMPLETED:
VENDOR: SCOTT MFG. ORDER NO: 451
MANUFACTURER: SAME
PHONE: 806-866-9591 SHOP LOCATION: WOLFORD, TX
SHOP ORDER NO: 451
INSPECTOR'S CONTACT: BILL BASON POSITION: ENG.
REPORT IS: INTERIM
REGARDING: INSPECTION
INSPECTOR: VICTOR HAGMAN

MATERIAL DESCRIPTION: (4) 12.75' DIAMETER BY 40 HEIGHT CAUSTIC TANKS.

STATUS OF ORDER: COMPLETION IS ABOUT 50% TWO TANKS TO SHIP MON 10/19/92

INSPECTION: MEETING WITH MR BASON AND FIELD FOREMAN.

WENT OVER SPECIFICATIONS FROM USPCI. AND REVIEWED WHAT DRAWINGS WERE ON HAND. NO PROBLEMS WERE FOUND WITH SCOTT MFG. MEETING SPECIFICATIONS.

INSPECTION OF TANKS BEING WELDED.
1. WITNESS WELDING OF GIRTH WELDS ON TANKS. FOUND THAT THE ROOT OPENING WAS ACCEPTABLE FOR FULL PENETRATION WELDS.
2. WITNESS AIR TESTING OF REPADS ON TANK SHELLS. ALL NOZZLES ARE WELDED IN SHELLS BEFORE TANK SHELLS ARE FIT TOGETHER. THIS IS GOOD AS THAT ALL OF THE REPADS CAN BE AIR TESTED ON THE GROUND. NO DANGER OF FALLING AR OF PADS NOT BEING TESTED. SHOP AIR WAS USED FOR TESTING. WITH 18-20 POUNDS OF AIR APPLIED TO PADS. A SOAP AND WATER MIXTURE WAS USED TO CHECK FOR LEAKS BOTH ON THE INTERNAL AND THE EXTERNAL. REPAD TEST WAS ACCEPTABLE AS NO LEAKS WERE FOUND.
3. VISUAL INSPECTION OF WELDING BOTH INTERNAL AND EXTERNAL. NO DEFECTS WERE FOUND. VISUAL INSPECTION WAS TO FIND UNDERCUTTING, PIN HOLES, COLD LAP, LOW FILLET WELDS EXSSIVE WELD BUILD UP ON GIRTH WELDS ETC. ALL THAT WAS FOUND WAS SOME SMALL PINHOLES. THESE WERE REPAIRED.
VISUAL INSPECTION OF THE ROLLED RINGS. FOUND THAT ONE OF THE BRACES ON THE PAINTERS RING WAS WELDED TO THE VERTICAL WELD SEAM. AS API 650 STATES THAT ALL ATTACHMENTS MUST MISS VERTICAL SEAMS BY AT LEST 6 INCHES . THESE WERE MOVED AND REWELDED.

10/15/92.

MET WITH MR HAMWI THIS A.M. FOR INSPECTION OF TANKS. TALKED WITH MR. BASON ABOUT DELIVERY OF TANKS. THE FIRST TWO TANKS WILL BE ON TRUCKS TO JOB SITE BY 10/19/92 A.M.

REVIEW OF DRAWINGS ON TANKS AND WALK WAYS. NO PROBLEMS WERE FOUND.

FIELD INSPECTION OF TANKS BEING WELDED, AND A TOUR OF SHOP WAS TAKEN. SCOTT MFG. HAS A WIDE RANGE OF SERVICES THAT WERE SHOWN TO MR HAMWI AND THIS WRITER.

A VISUAL INSPECTION OF TANKS WAS DONE AND NO PROBLEMS WERE FOUND.

PHOTOS OF TANKS, ERECTION. AND WELDING WAS TAKEN. THESE WILL SENT WITH DATA PACKAGES.

REVIEW OF MATERIAL TEST REPORTS FOR THE SHELL MATERIAL AND FOR THE STRUCTURAL MATERIAL. THE MTR'S FOR THE PIPING HAS NOT ARRIVED FROM THE SUPPLIER. AS SOON AS THESE OR IN THEY WILL BE CHECKED.

REVIEWED ALL WELDER QUALIFICATIONS. AND ALL WELD PROCEDURES. ALL WELDING OF TANKS WERE TO THESE PROCEDURES. ALL WELDER WORKING ON TANKS WERE QUALIFIED PER A 6G WELD TEST AND ALL PAPER WORK WAS IN ORDER.

ALL RADIOGRAPHS WILL BE SHOT 10/16/92 ON THE TWO TANKS TO SHIP ON 10/19/92. ALL OTHER NDE WORK HAS BEEN COMPLETED. ALL THAT WAS REQUIRES WAS A MAG PARTICLE OF NOZZLE WELDS. THIS HAS BE DONE AND PROPER PAPER WORK IS IN THE JOB FILE.

AT THIS TIME ALL API-650 AND USPCI SPECIFICATIONS ARE BEING FOLLOWED. ALL WORK SEEN ON THIS VISIT WAS OF GOOD QUALITY AND WAS ACCEPTABLE TO ALL SPECIFICATIONS.

WIS/QA-06

WELDING INSPECTION SERVICE COMPANY

QUALITY ASSURANCE INSPECTION RELEASE

PAGE 1 OF 1
DATE: 10-19-92
REP. NO.:

CUSTOMER: U S PCI
P.O. NO.: 19350
LOCATION: LUBBOCK TX

VENDOR: Scott Mfg
PROJECT: Lone Mountain

[X] Satisfactorily completed Quality Assurance Inspection on: 10-19-92 (Date)

P.O. ITEM	QUANTITY	MATERIAL DESCRIPTION/TAG NO.
	1	12.75' X 40' height CAUSTIC TANK SER. NO. 451-1
	1	12.75' X 40' height CAUSTIC TANK SER NO. 451-2

Shipping Information: By truck to LUA-/NOKA OKLA.
Date Released for Shipment: 10-19-92

[X] Without exception to the Purchase Order Documents.
[ ] With the following Exception from the Purchase Order, only with follow up in writing with a copy of telex or letter attached. (State specifics and name of Responsible Engineer)

Approval or release for shipment of any work by a representative of the purchaser, or purchaser's Client, shall in no way relieve the vendor or sub-vendor of any responsibility for meeting the requirements of the purchase order and/or specifications.

Signing of the form acknowledges the items have been inspected in accordance with the above purchase order.

10-19-92
Date

U. L. Wagman Jr.
Agency Inspector's Signature

11811 North Frwy, Suite 670 · Houston, Texas 77060 (713) 820-8066

14206 West Hwy. 80 East
Odessa, Texas 79765
(915) 561-5000

ASME
API
ANSI
AWS
FAA

PERMIAN NON-DESTRUCTIVE TESTING
a DPM Subsidiary

Radiography
Ultrasonics
Eddy Current
Dye Penetrant
Magnetic Particle
Heat Treat

Pg. 2 of 2

No. 09250

Customer: TMF Date: 10-23-92 Technician: M M Level: II Asst. W. M Level: I
Work Order: CT-4 Serial No.: 451-4 Code: API 6.50 % Rig #: 4567

RADIOGRAPHIC	ULTRASONIC	MAGNETIC PARTICLE	DYE PENETRANT
Curies: 22 Screens: .010	Equipment:	Equipment:	Type Cleaner:
Exposure Arrangement: D	Transducer Type:	Material Type: Thickness:	Type Penet:
Material Thickness: 7/11	Size: Freq.	Amp:	Type Devel:
Penetrameter: 12 S. Y F. D-7	Calibration	Prodspacing:	Surface Prep:
Film Type:	Material: Ampl.	AC/DC:	Dwell Time:
Film Qty: 5-2½"x10"	Hole Size: Dist.	Surface Prep:	Material Type: Thickness:
Film Qty:		Type Used:	
Film Qty:		Particle Used (lbs.):	

	Weld No.	By No.	Location	Pipe Size	PHOT Within Code Yes	PHOT Within Code No	CUST Within Code Yes	CUST Within Code No	Defects & Location	REMARKS
1	J-1		C-1		✓					
2										
3	J-2		C-1		✓					
4										
5	L-1		C-1		✓					
6										
7	V-1		C-1		✓					
8										
9	C-1		C-1		✓					
10										
11										
12										
13										
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38										
39										
40										

Test(s) Interpreted By: M. M Level: II P.O. #:

Number of Testing Personnel: Misc. Info.: / # Welds: Per Diem Miles

Hours Worked: AM/PM to AM/PM Hours: RT Hours: OT Total Hrs. Job Location

NOTICE: THE ABOVE REPORT AND ANY CONSULTATION WITH THE CUSTOMER REPRESENTATIVE OR CUSTOMER'S CONTRACTOR REGARDING THE RESULTS OF THE INSPECTION REPRESENTS THE GOOD FAITH OPINION OF THE PHOT TECHNICIAN ASSIGNED TO THE PROJECT UNLESS SPECIFICALLY WRITTEN ON THIS REPORT TO THE CONTRARY THE CUSTOMER REPRESENTATIVE ACCEPTING THE RADIOGRAPHS AND/OR REPORT IS IN AGREEMENT WITH THE RESULTS AND CONFIRMS THAT THE PERSONNEL OF PHOT ABOVE HAVE PERFORMED THEIR SERVICES IN ACCORDANCE WITH THE CUSTOMER'S SPECIFICATIONS. PHOT SHALL ASSUME NO FURTHER RESPONSIBILITY FOR THE RADIOGRAPHS AND/OR REPORTS FOLLOWING ACCEPTANCE BY THE CUSTOMER REPRESENTATIVE. THE CUSTOMERS REPRESENTATIVE'S SIGNATURE VERIFIES TIME AND MATERIALS IN WHOLE, AND THE PROJECT LOCATION WAS NOT DAMAGED BY PERSONNEL OR EQUIPMENT AND WAS LEFT IN SATISFACTORY CONDITION UNLESS OTHERWISE SPECIFICALLY NOTED.
UNDER NO CIRCUMSTANCES DOES PHOT GUARANTEE THE QUALITY OR USABILITY OF ANY ITEM, MATERIAL, OR PRODUCT, INSPECTED OR TESTED. NO WARRANTIES ARE EXPRESSED OR IMPLIED, AND IN NO EVENT SHALL THE LIABILITY OF PHOT WITH RESPECT TO ITEMS INSPECTED (INCLUDING ANY LIABILITY PERTAINING TO SELECTION AND/OR RESULTS OF THESE SAME TEST) EXCEED THE CHARGE OF PHOT FOR THE INSPECTION OF SUCH ITEMS.

Agreed and Accepted: William A. Brown Date: 10/27/92

TERMS AND ABBREVIATIONS

I.P.	INADEQUATE PENETRATION	S.P.	SPHERICAL POROSITY
I.P.D.	INADEQUATE PENETRATION DUE TO HIGH-LOW	C.P.	CLUSTER POROSITY
I.C.	INTERNAL CONCAVITY	P.P.	PIPING POROSITY
I.F.	INCOMPLETE FUSION	H.B.	HOLLOW BEAD
I.F.C.L.	INCOMPLETE FUSION DUE TO COLD LAP	C.R.	CRACKS
B.T.	BURN THROUGH	A.D.	ACCUMULATION OF DISCONTINUITIES
E.S.I.	ELONGATED SLAG INCLUSIONS	I.U.	INTERNAL UNDERCUT
I.S.I.	ISOLATED SLAG INCLUSIONS	O.U.	OUTSIDE UNDERCUT

LOCATIONS

R.S.	RIGHT OF WAY SIDE	B.	BOTTOM
D.S.	DITCH SIDE	T.Q.	TOP QUARTER
T.	TOP	B.Q.	BOTTOM QUARTER

WIS/QA-06

WELDING INSPECTION SERVICE COMPANY

QUALITY ASSURANCE INSPECTION RELEASE

PAGE _____ OF _____
DATE: 10-24-92
REP. NO.: _____

CUSTOMER: USPCI
P.O. NO.: 19350
LOCATION: LUBBOCK TX

VENDOR: Scott Mfg INC
PROJECT: LONE MOUNTAIN

[ ] Satisfactorily completed Quality Assurance Inspection on: 10-24-92 (Date)

P.O. ITEM	QUANTITY	MATERIAL DESCRIPTION/TAG NO.
	1	12.75'X 40' height CAUSTIC TANK SER. NO. 451-3
	1	12.75' x40' height CAUSTIC TANK SER NO., 451-4

Shipping Information: By TRUCK to WAYNOKA OKLA.
Date Released for Shipment: 10-24-92

[ ] Without exception to the Purchase Order Documents.
[ ] With the following Exception from the Purchase Order, only with follow up in writing with a copy of telex or letter attached. (State specifics and name of Responsible Engineer)

Approval or release for shipment of any work by a representative of the purchaser, or purchaser's Client, shall in no way relieve the vendor or sub-vendor of any responsibility for meeting the requirements of the purchase order and/or specifications.

Signing of the form acknowledges the items have been inspected in accordance with the above purchase order.

10-24-92
Date

U.L. Wagman Jr.
Agency Inspector's Signature

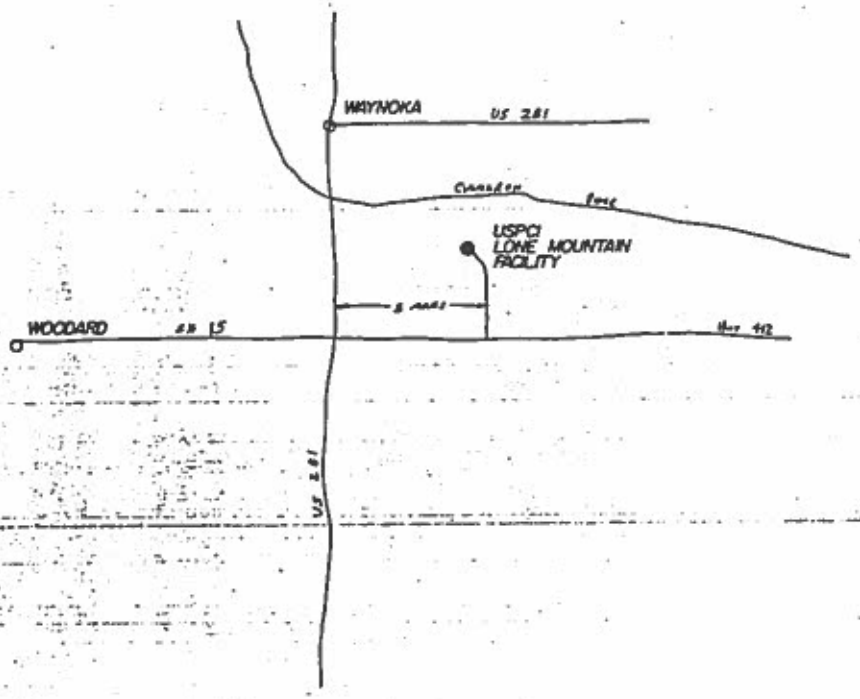
11811 North Frwy, Suite 670- Houston, Texas 77060 (713) 820-8066

APPENDIX G

Drawings

USPCI
CAUSTIC STORAGE TANKS
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

PROJECT ENGINEER: MYERS ENGINEERING CORP.
11102 N. STRATFORD DRIVE
SUITE B400
OKC, OK 73120
(405) 755-5325

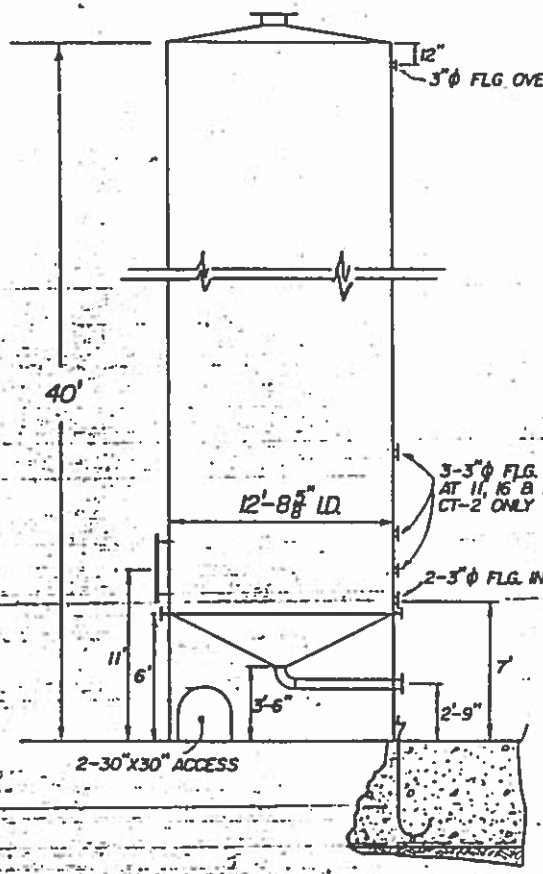


SCOTT MANUFACTURING, INC.
LUBBOCK, TX.

'AS-BUILT'

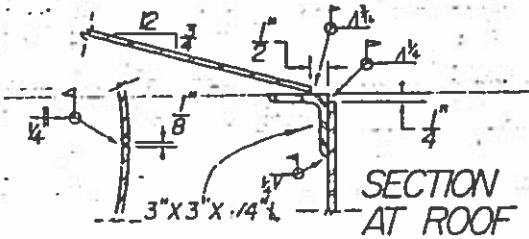
PER TANK

QTY	ITEM	DWG. NO.
12	ANCHOR BOLTS 1¼" ϕ & CHAIRS	2
3	3"ϕ SHELL NOZZLE FLG. W/B.F.	3
1	3"ϕ ROOF NOZZLE FLG. W/B.F.	3
1	GIRDER RING	3
1	OUTLET 6"ϕ W/6"ϕ 90° ELL	3
1	LADDER PLATFORM	10
2	LADDER TOWERS	5 & 11
5	SHELL PL.	1
7	NOZZLE RE-PL. (10 FOR CT-2 ONLY)	4
1	6"ϕ ROOF NOZZLE FLG. W/B.F.	3
1 EA.	SHELL / ROOF MANHOLE 30"/24"ϕ	6 & 7
2	18"ϕ ROOF NOZZLE FLG. W/B.F.	3
1 EA.	¼" ROOF PL. ¼" FLOOR PL.	8
1	ROOF ANGLE RING 3"X3"X¼"	1
2	PAINTERS RING	5
1	OVERFLOW, LEVEL IND., UTIL. BRACKETS	3
4	LIFTING LUGS	10
1	HANDRAIL	10
1	CONE PL. 5/16"	3
8	RAFTERS C4X7.25 & CLIPS	3
1	COMPRESSION RING	3



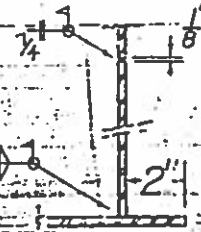
ELEVATION VIEW
FOUR TANKS
CT-1, 2, 3, 4

PLAN ORIENTATION.



SECTION AT ROOF

VERTICAL SEAM



HORIZONTAL

SHELL PL. SCHEDULE

RING NO.	THICK	HEIGHT	NO. OF SHEETS @ LENGTH
1-5	¼"	96"	1 @ 480"

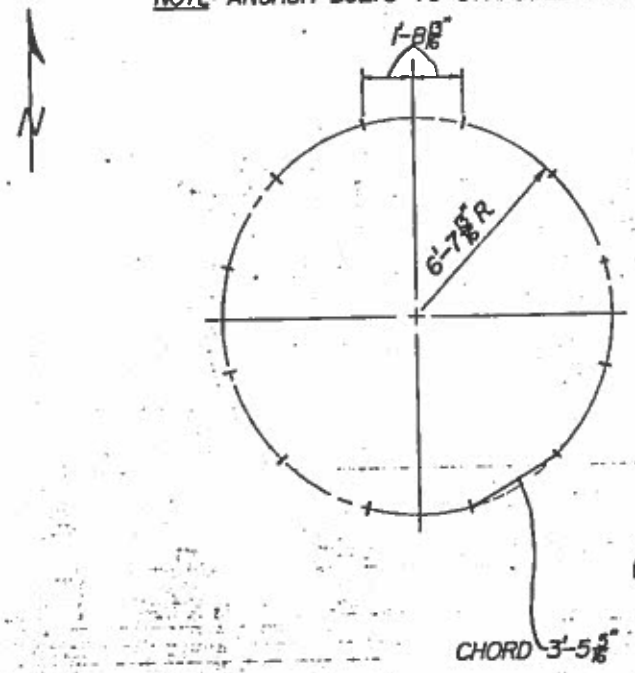
REVISIONS			
NO	DATE	BY	
1			
2			
3			
4			
5			

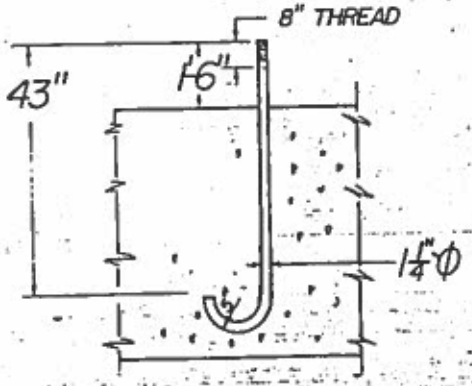
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

30,500 GALLON STANDPIPE FOR
USPCI, WAYNOKA, OK

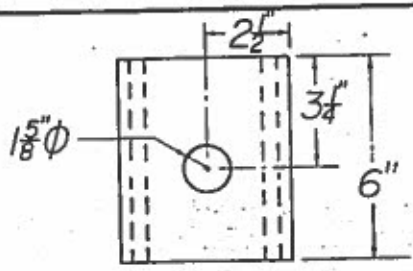
DRAWN BY LDW	SCALE NONE	MATERIAL	
CHK'D	DATE 10/6/92	DRAWING NO.	451-1
TRACED	APP'D		

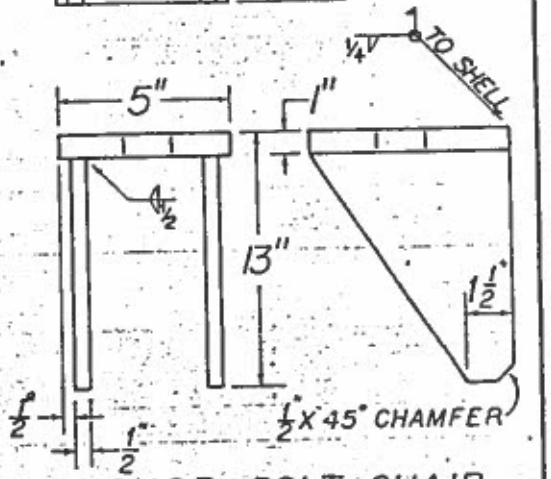
NOTE: ANCHOR BOLTS TO STRADDLE N-S ℄





ANCHOR BOLT
12 REQUIRED
NTS
DOUBLE NUT ANCHOR BOLTS
GALVANIZED





ANCHOR BOLT CHAIR
12 REQUIRED
3"=1'
DOUBLE NUT ANCHOR BOLTS

REVISIONS			
NO.	DATE	BY	
1			
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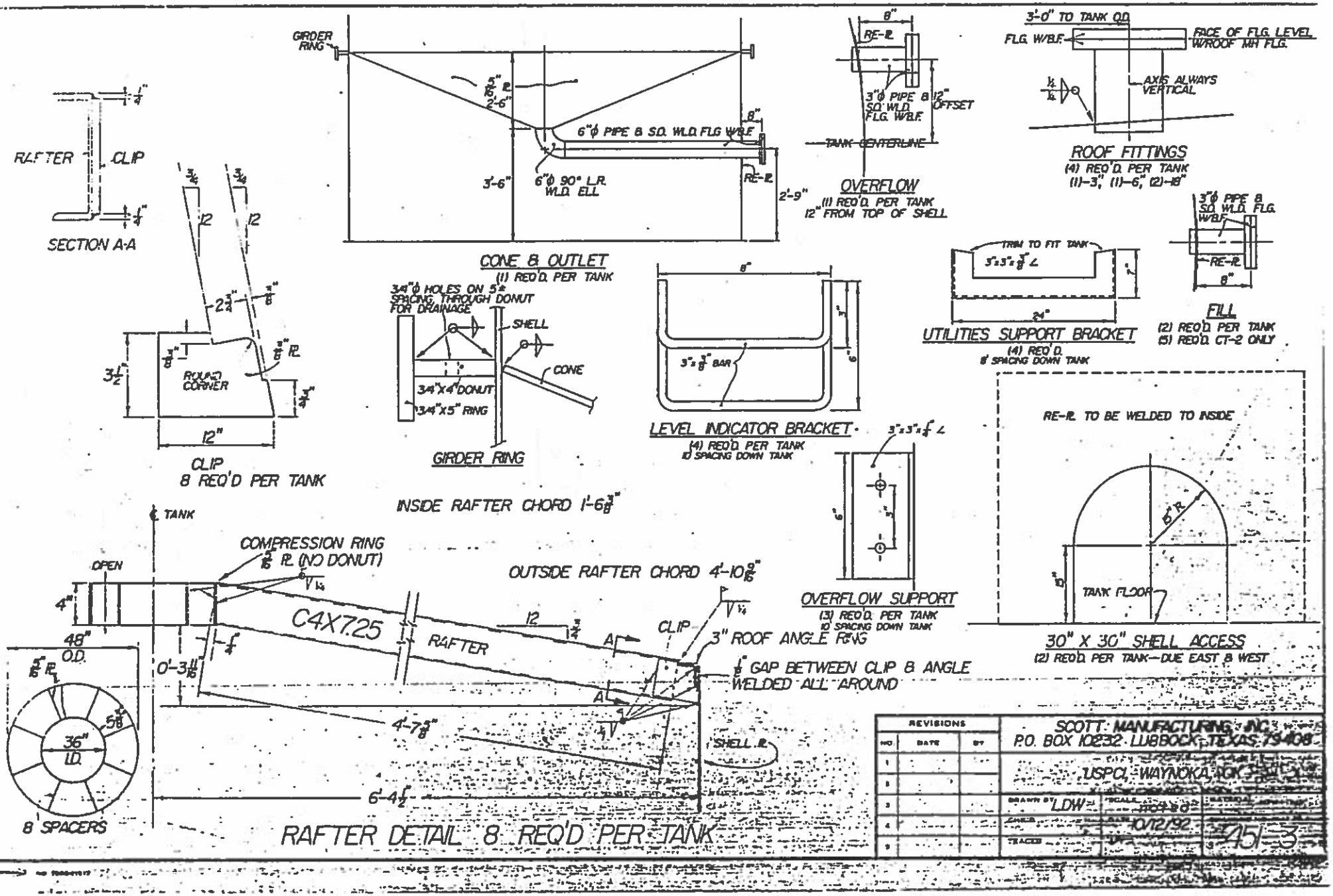
6			

SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

FOUNDATION FOR: [illegible] USPCI, WAYNOKA, OK

DRAWN BY	SCALE	MATERIAL
LDW	Noted	
CHK'D	DATE 10/8/92	DRAWING NO. 451-2
TRACED		



REVISIONS		
NO.	DATE	BY
1		
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3		
4		
5		

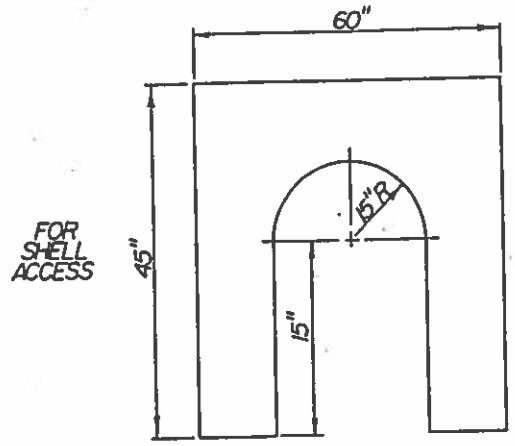
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

USPCI - WAYNOKA, OK

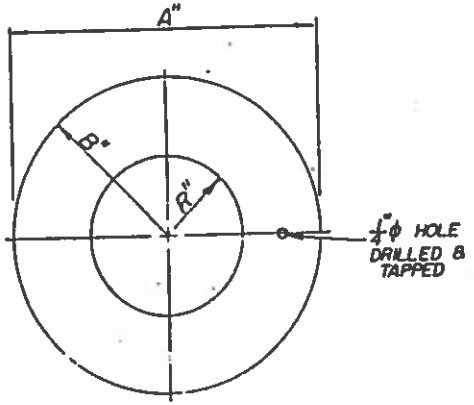
DRAWN BY LDW | SCALE NOT TO SCALE | MATERIAL

DATE 10/12/92

TRACED | DWG. NO. 451-3



FOR SHELL ACCESS

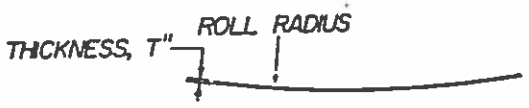


FOR OTHER FITTINGS AND SHELL MANHOLE

FRONT VIEW

USE	NOMINAL DIA. D"	T"	ROLL RADIUS	A"	B"	R"	PER TANK QT'Y
SHELL MANHOLE	30	¼	TANK RADIUS	60	30	$15\frac{3}{16}$	1
OUTLET	6	¼	"	$13\frac{1}{4}$	$6\frac{5}{8}$	$3\frac{7}{16}$	1
INLET	3	¼	"	7	$3\frac{1}{2}$	$1\frac{7}{8}$	2
OVERFLOW	3	¼	"	"	"	"	1
SHELL ACCESS	—	—	"	SEE DETAIL AT LEFT			2

5 ON CT-2 ONL



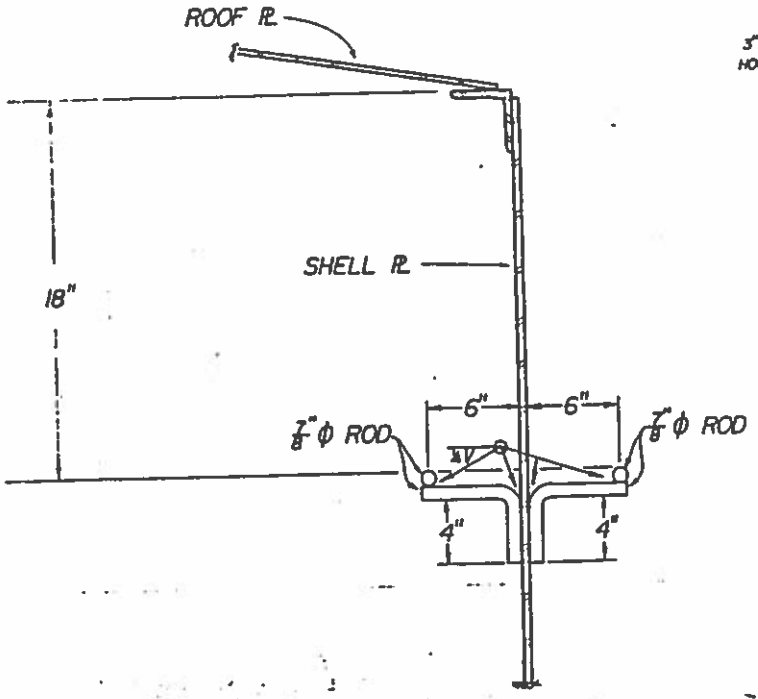
EDGE VIEW, ROLLED

REVISIONS		
NO	DATE	BY
1		
2		
3		
4		
5		

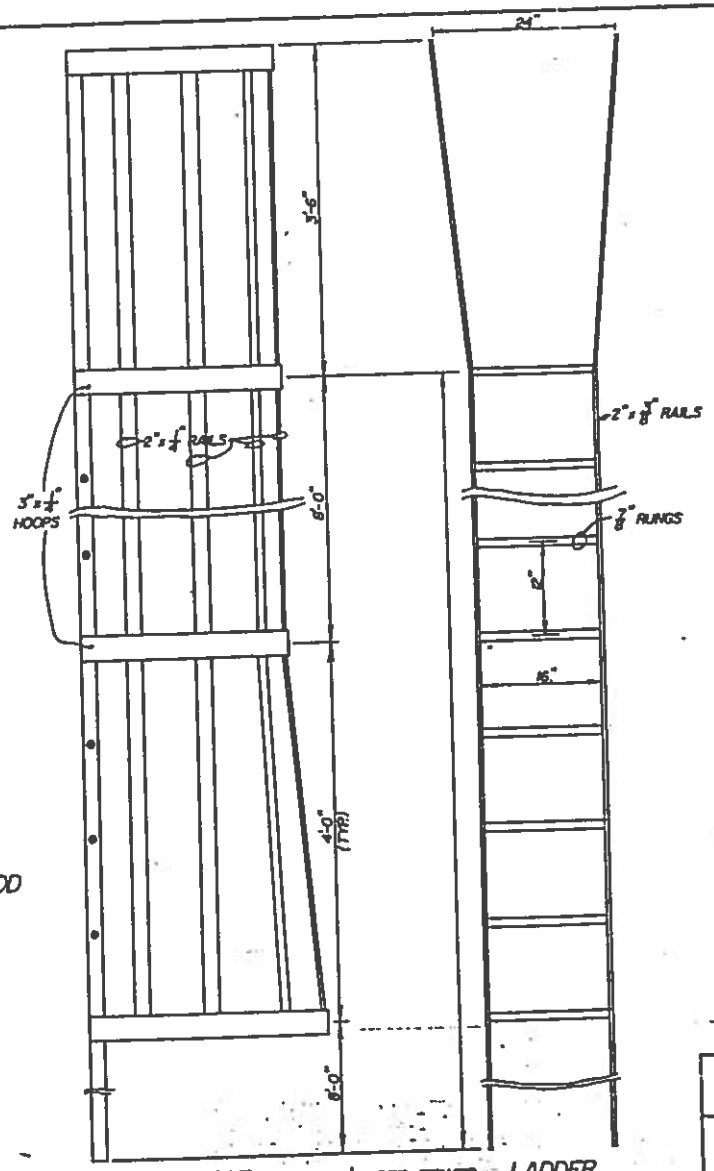
SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

REINFORCING PLATE DETAIL
USPCI, WAYNOKA, OK

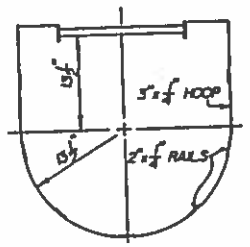
DRAWN BY LDW	SCALE None	MATERIAL
CHK'D	DATE 10/8/92	DRAWING NO 451-4
TRACED	APP'D	



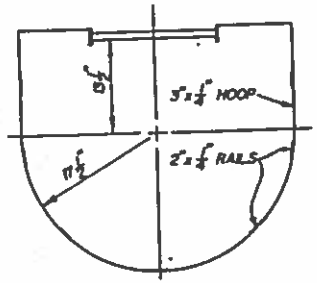
PAINTERS RING
(2) REQ'D. PER TANK-IN & OUT



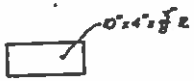
CAGE (2) REQ'D PER TOWER LADDER



STANDARD HOOP

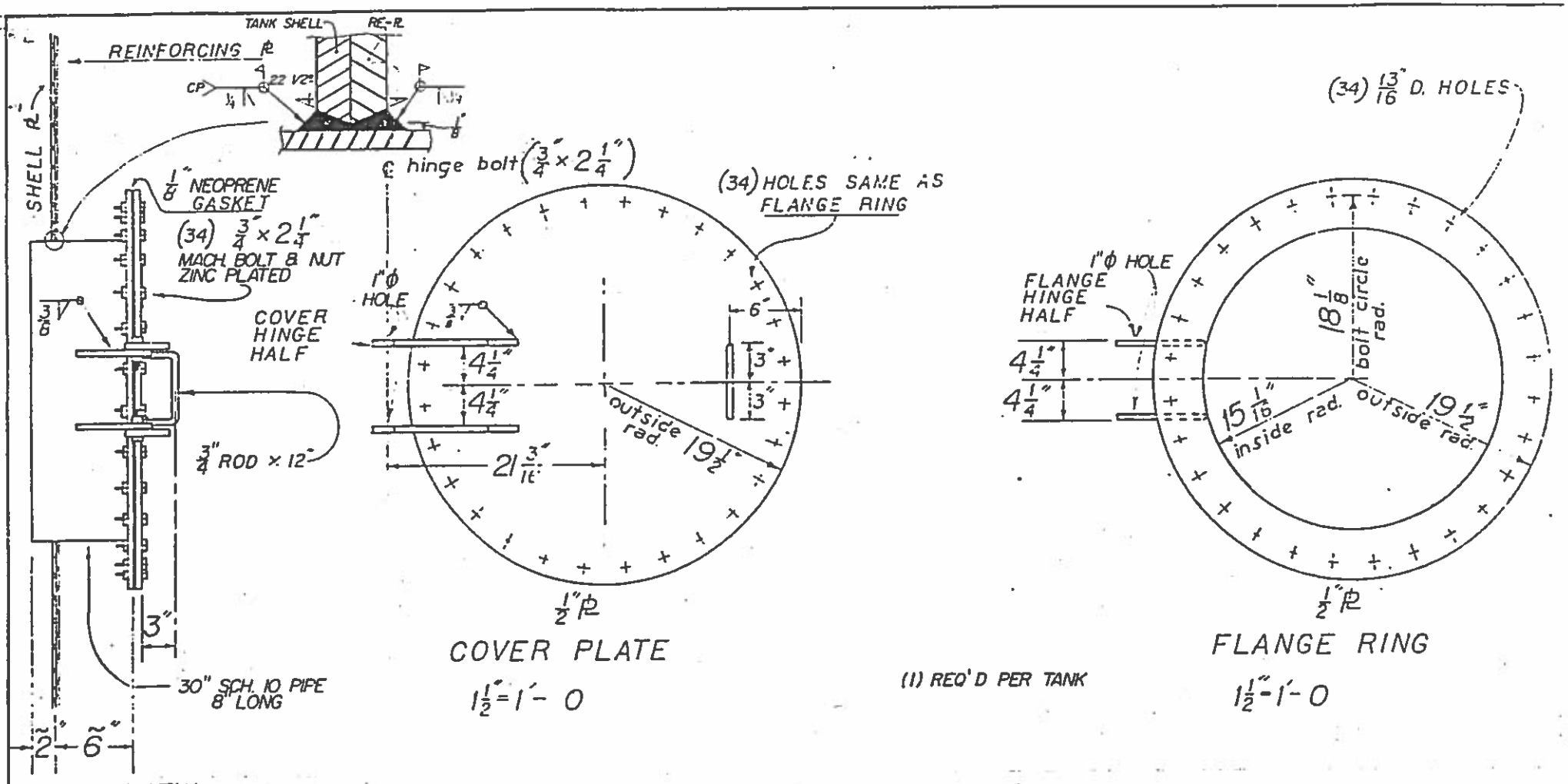


BOTTOM HOOP



LADDER STANDOFF
(6) REQ'D. PER SECTION

SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408	
USPCI, WAYNOKA, OK	
drawn: LDW	no. 451-5
scale:	
date: 10/14/92	



NOTE: 30" TYPE

(1) REQ'D PER TANK

SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408	
STANDARD SHELL MANHOLE USPCI, WAYNOKA, OK.	
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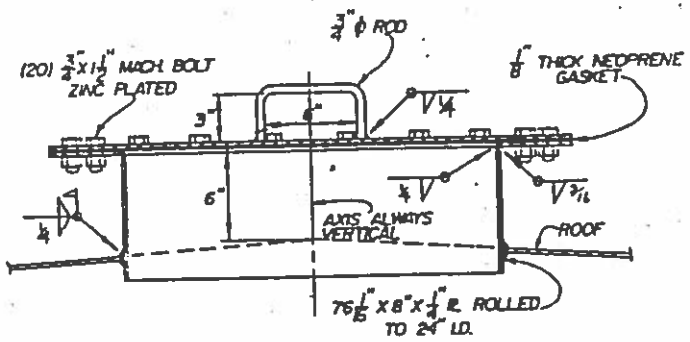
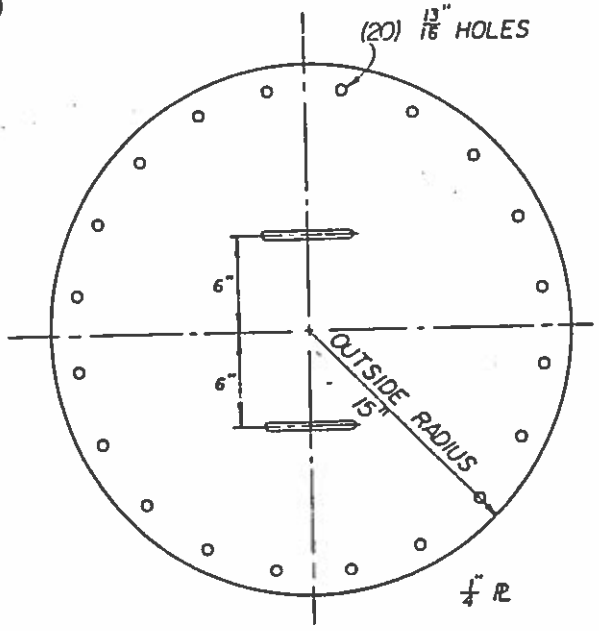
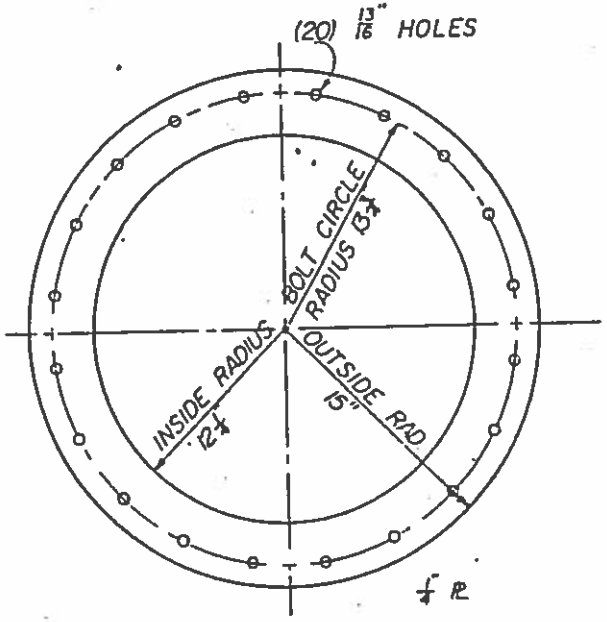


SECTION

BOLTHOLES SHALL STRADDLE THE CENTERLINES



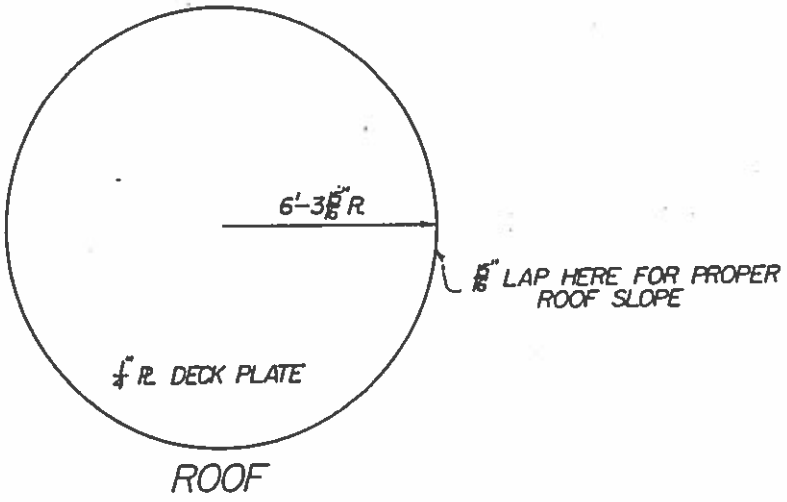
COVER



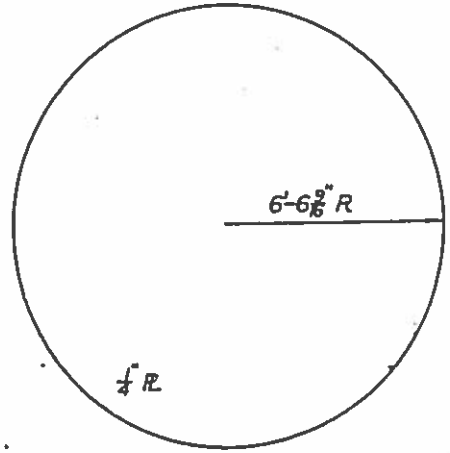
FLANGE RING

SCALE: 1 1/2" = 1'-0"
(1) REQ'D. PER TANK

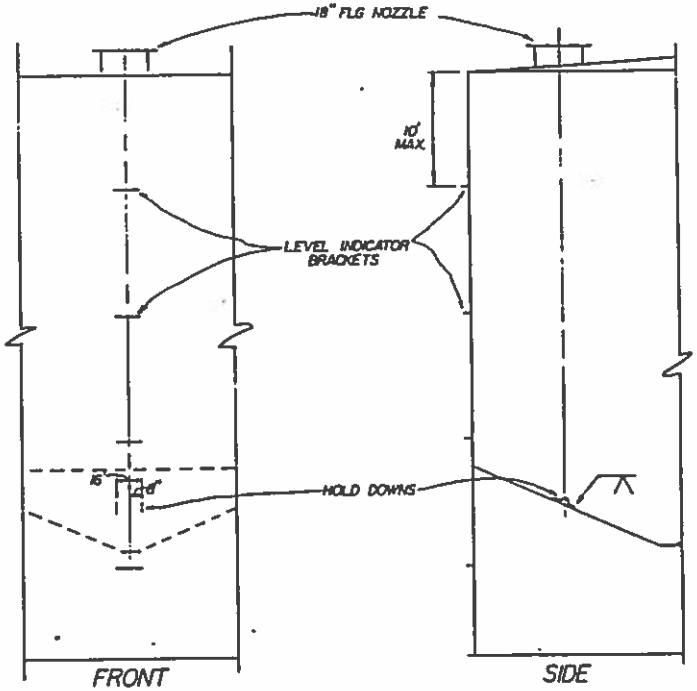
REVISIONS			SCOTT MANUFACTURING, INC. PO BOX 10232 LUBBOCK, TEXAS 79408
NO	DATE	BY	
1			API ROOF MANHOLE USPCI, WAYNOKA, OK.
2			
3			DRAWN BY LDW — SCALE AS SHOWN — MATERIAL
4			CHK'D — DATE 10/9/92 — DRAWING NO 451-7
5			TRACED — APP'D



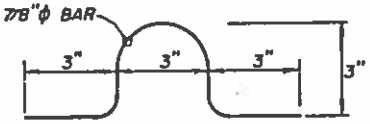
ROOF



FLOOR

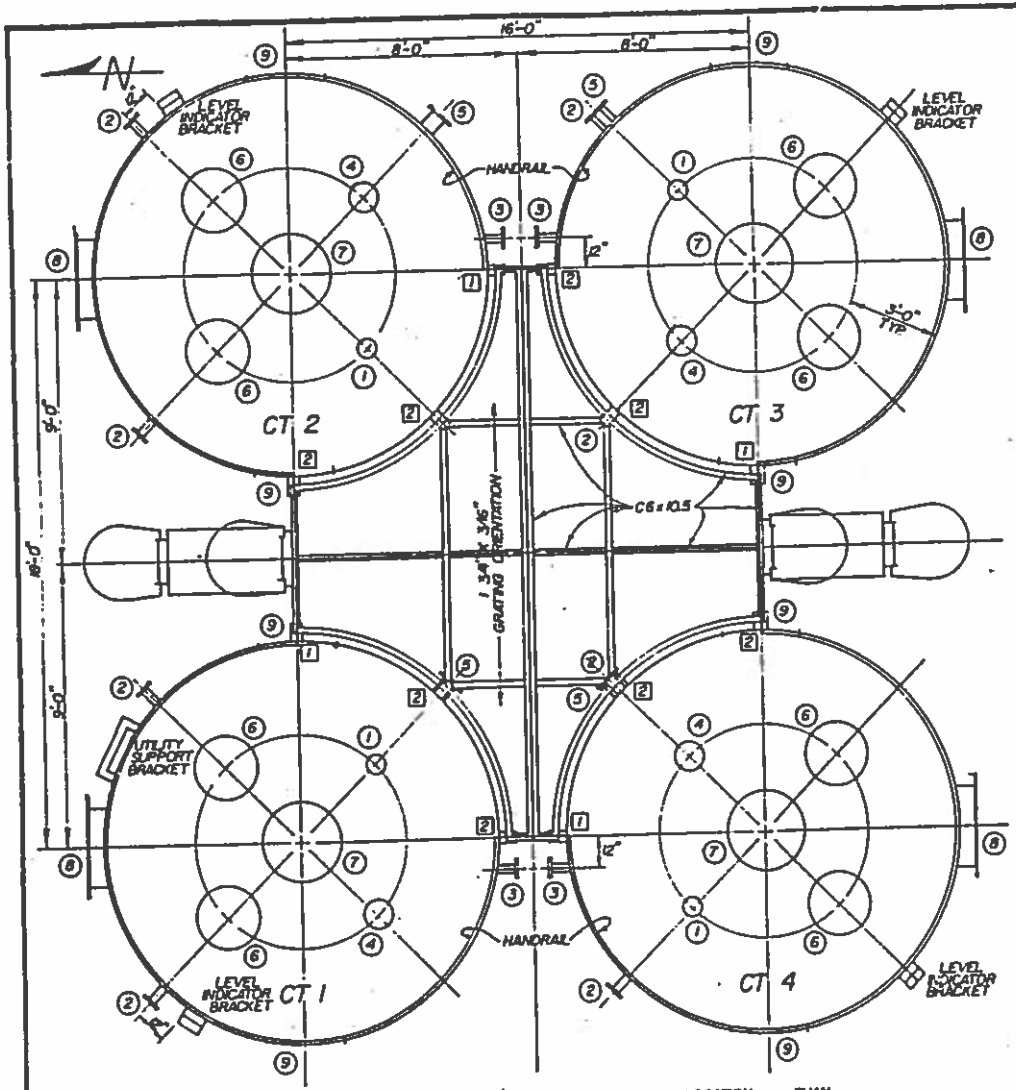


LEVEL INDICATOR DETAILS



INDICATOR HOLD-DOWN
(2) REQ'D PER TANK

REVISIONS			SCOTT MANUFACTURING, INC. PO BOX 10232 LUBBOCK, TEXAS 79408		
NO	DATE	BY	USPCI, WAYNOKA, OK		
1					
2					
3			DRAWN BY LDW	SCALE	MATERIAL
4			CHK'D	DATE 10/14/92	DRAWING NO 451-8
5			TRACED	APP'D	



NO.	SIZE	LOCATION	QUAN.	NOTES
(1)	3"	ROOF	1	
(2)	3"	SHELL (RADIAL)	2	(3 EXTRA-CT 2 ONLY)
(3)	3"	SHELL (OFFSET)	1	
(4)	6"	ROOF	1	
(5)	6"	SHELL	1	
(6)	18"	ROOF	2	

NO.	SIZE	LOCATION	QUAN.
(7)	24"	ROOF/NAME R.	1
(8)	30"	SHELL	1
(9)	30"	SHELL (ACCESS)	2
PLATFORM SUPPORTS			
[1]		BOLTED PLATFORM SUPPORTS	
[2]		SLIDING PLATFORM SUPPORTS	

TANK BATTERY PLAN
QUANS. SHOWN ARE PER TANK

NOTE: TANKS TO BE PLUMBED PRIOR TO PLATFORM PLACEMENT. PLATFORM FRAME TO BE MITERED & COPED AND WELDED ALL AROUND.

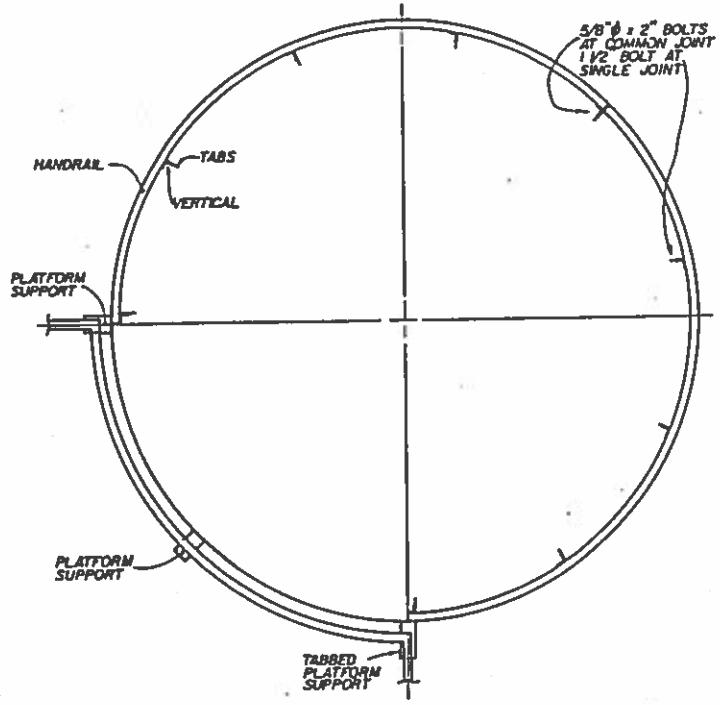
REVISIONS		
NO	DATE	BY
1		
2		
3		
4		
5		

SCOTT MANUFACTURING, INC.
P.O. BOX 10232 LUBBOCK, TEXAS 79408

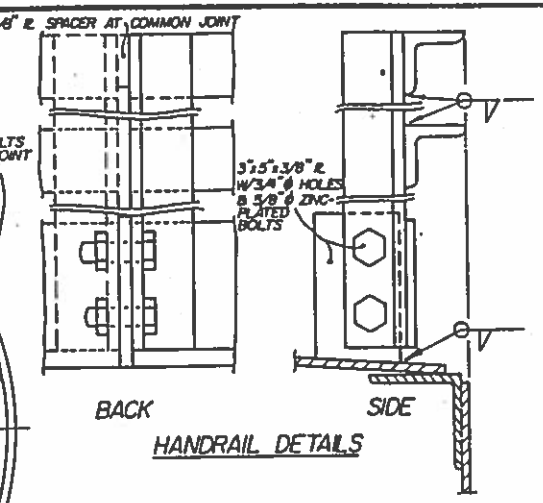
USPCI, WAYNOKA, OK.

DRAWN BY LDW	SCALE	MATERIAL
CHK'D	DATE 10/12/92	DRAWING NO 451-9
TRACED	APP'D	

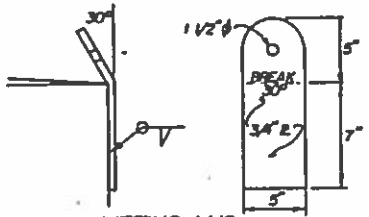
NOTE: EACH TANK'S HANDRAIL IS MADE IN 2 HALVES AND ARE MIRROR IMAGES.
NOTE THE VERTICAL'S ORIENTATION. THE RAILS ARE LEG OUT & LEG DOWN.
ALL WELDS ARE ALL-AROUND. LEG OUT OF RAILS ARE ROLLED TO TANK O.D.



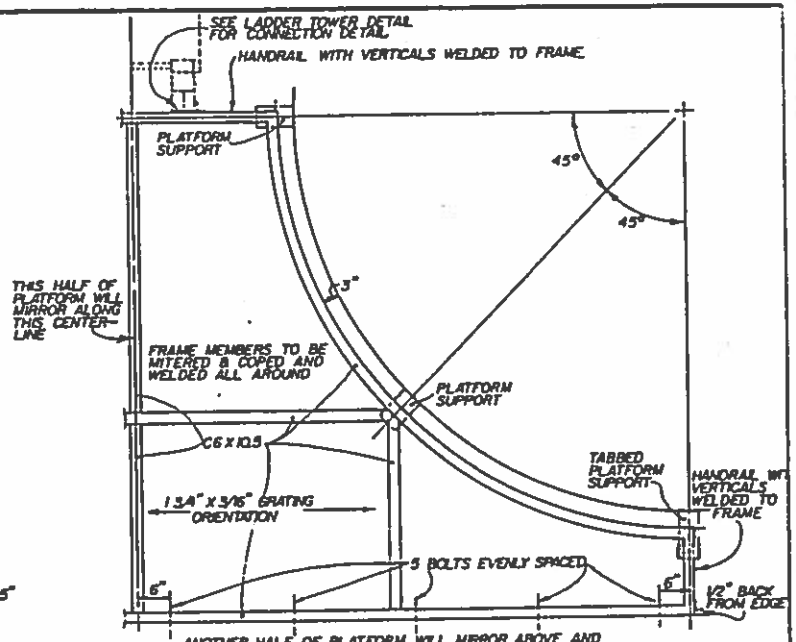
HANDRAIL ON TANK-TYPICAL



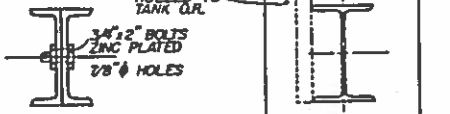
HANDRAIL DETAILS



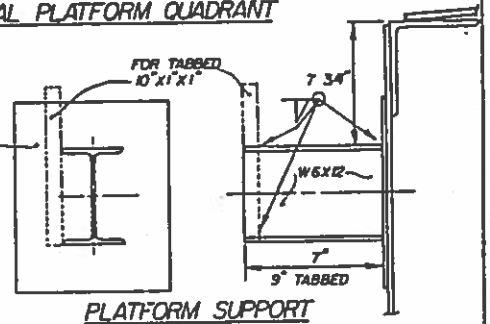
LIFTING LUG
(4) REQ'D. PER TANK



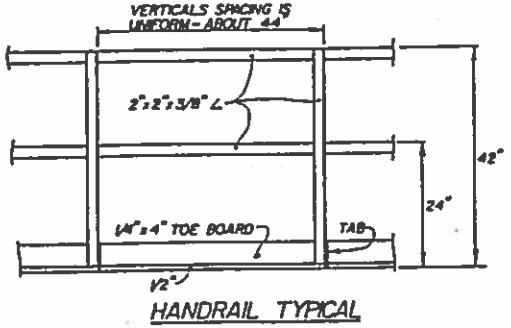
TYPICAL PLATFORM QUADRANT



PLATFORM-HALF CONNECTION

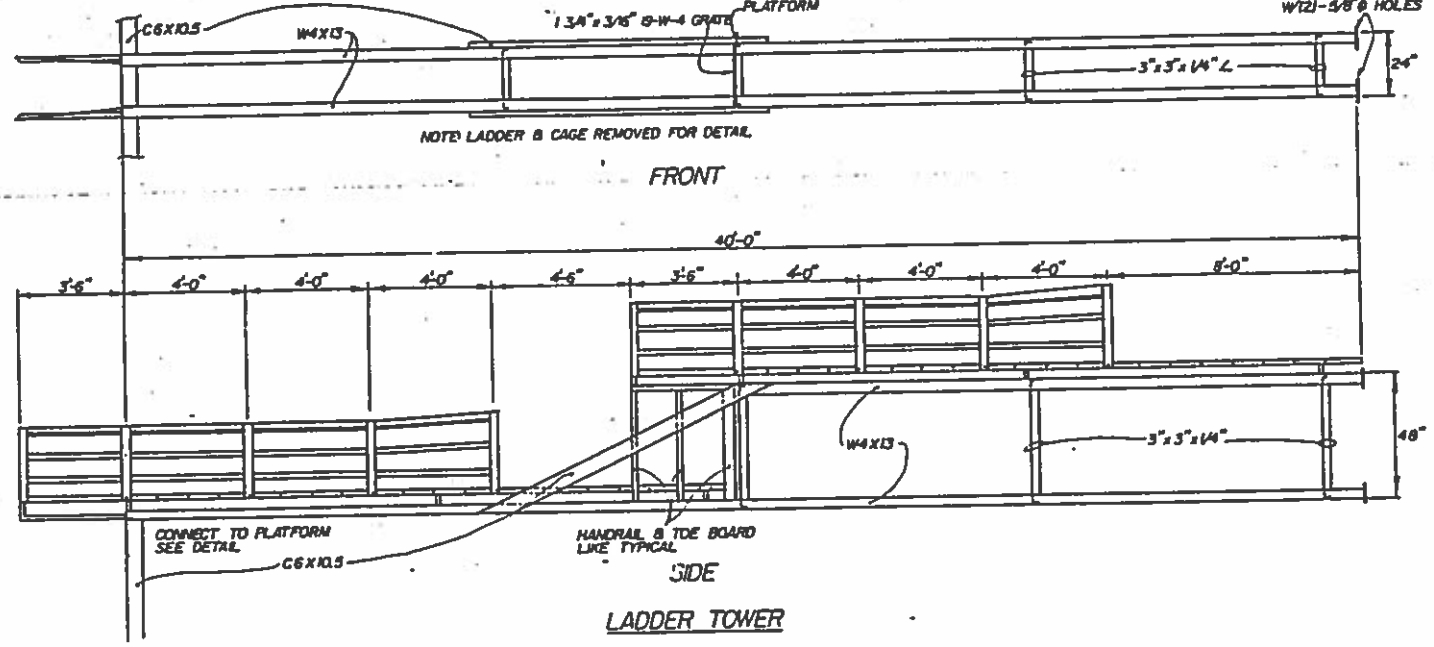


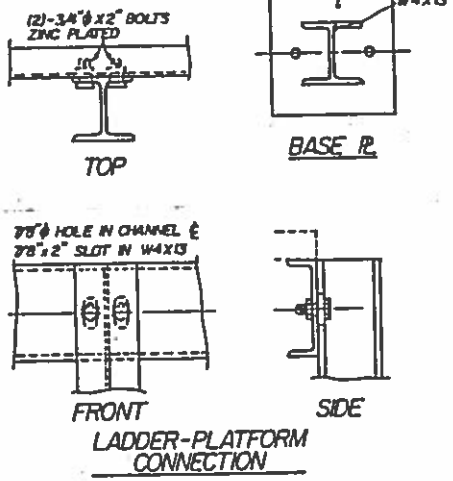
PLATFORM SUPPORT
(2) REQ'D. PER TANK
(1) TABBED PER TANK



HANDRAIL TYPICAL

REVISIONS			SCOTT MANUFACTURING, INC. P.O. BOX 10232 LUBBOCK, TEXAS 79408		
NO	DATE	BY	USPCI, WAYNOKA, OK		
1					
2					
3			DRAWN BY LDW	SCALE	MATERIAL
4			CHK'D	DATE 10/20/92	DRAWING NO 451-10
5			TRACED	APP'D	





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NO	DATE	BY			
1			USPCI, WAYNOKA, OK		
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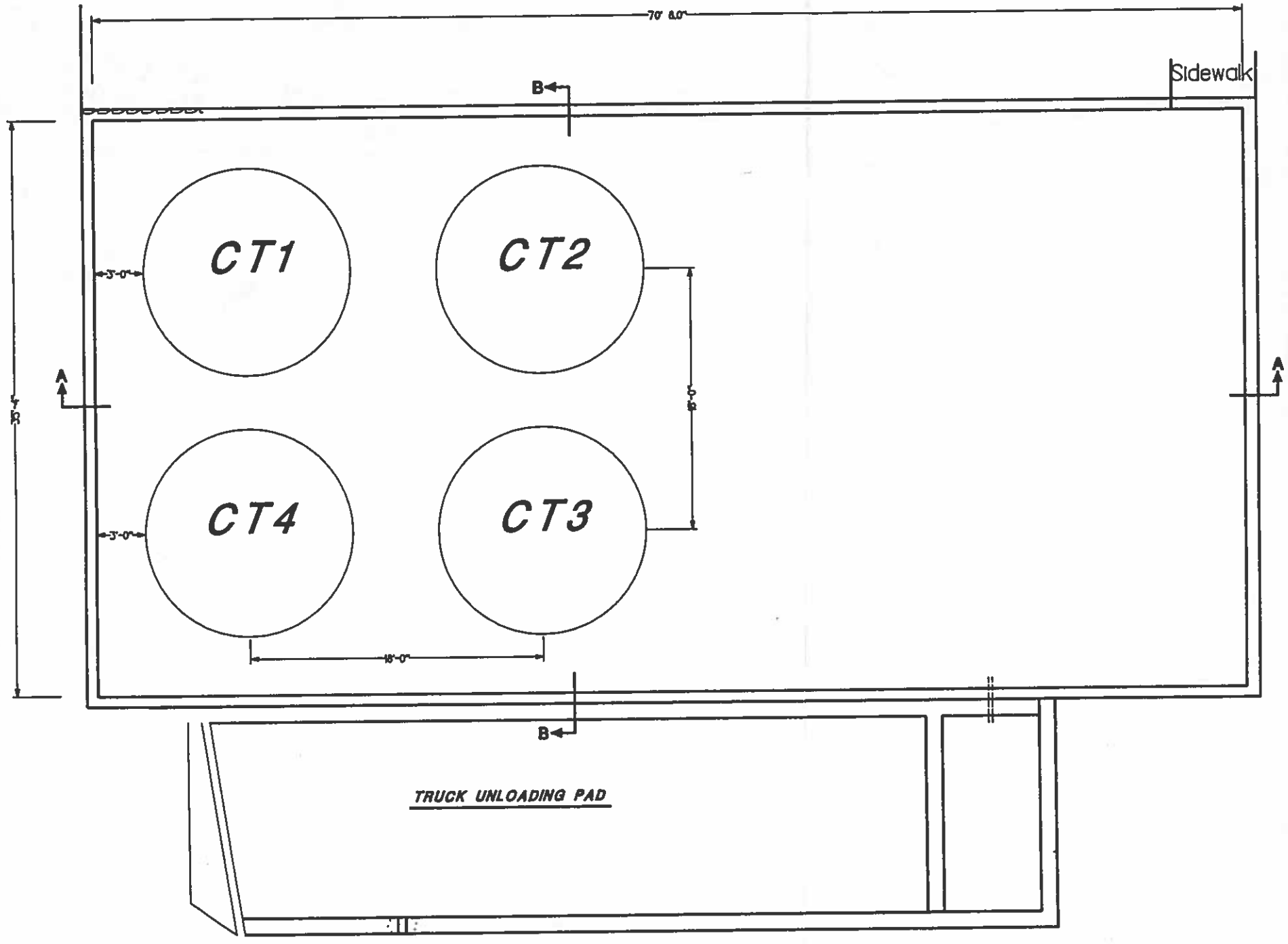
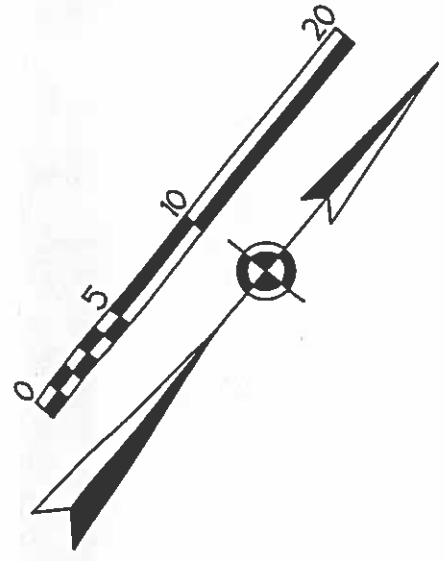
5			TRACED	APP'D	





RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

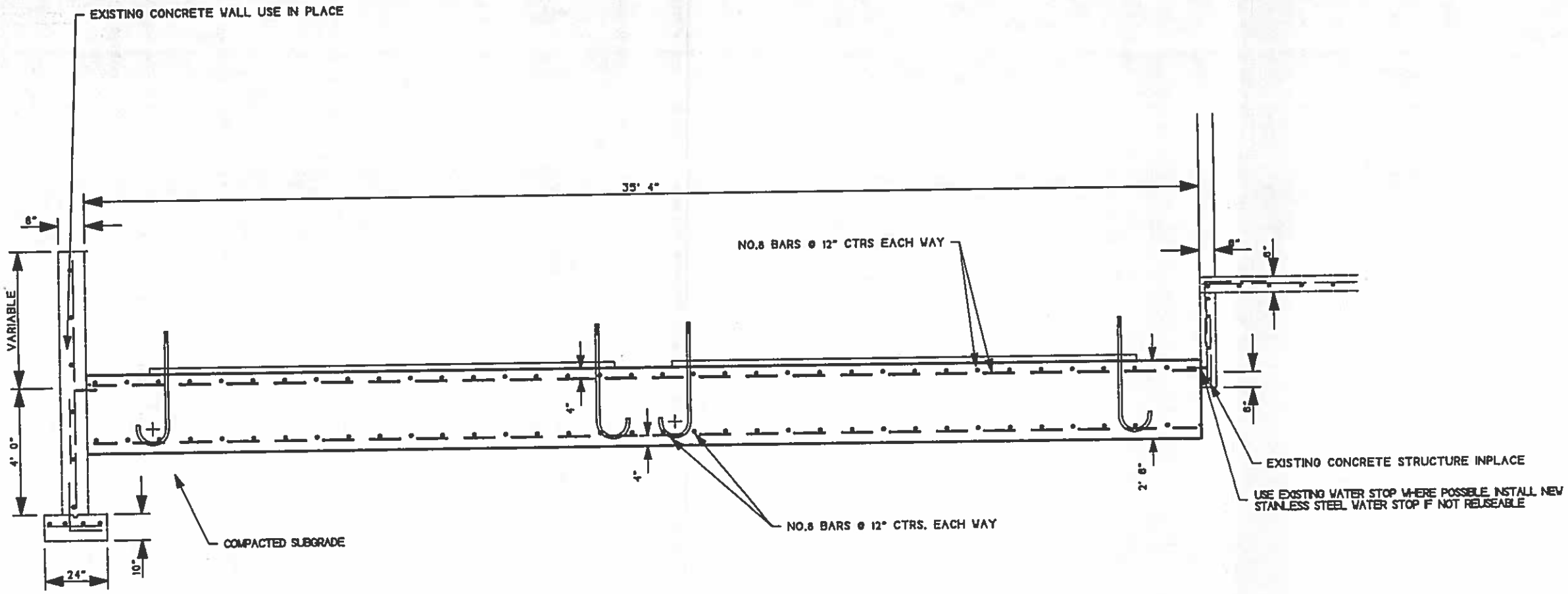
USPCI
A Subsidiary of Union Pacific Corporation

USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-5325

CAUSTIC TANKS 1-4 REPACEMENT PLANS
LAYOUT OF AREA

JOB NO. 5137
SCALE
DRAWN mtc
DATE 10/28/92
SHEET OF



SECTION

RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

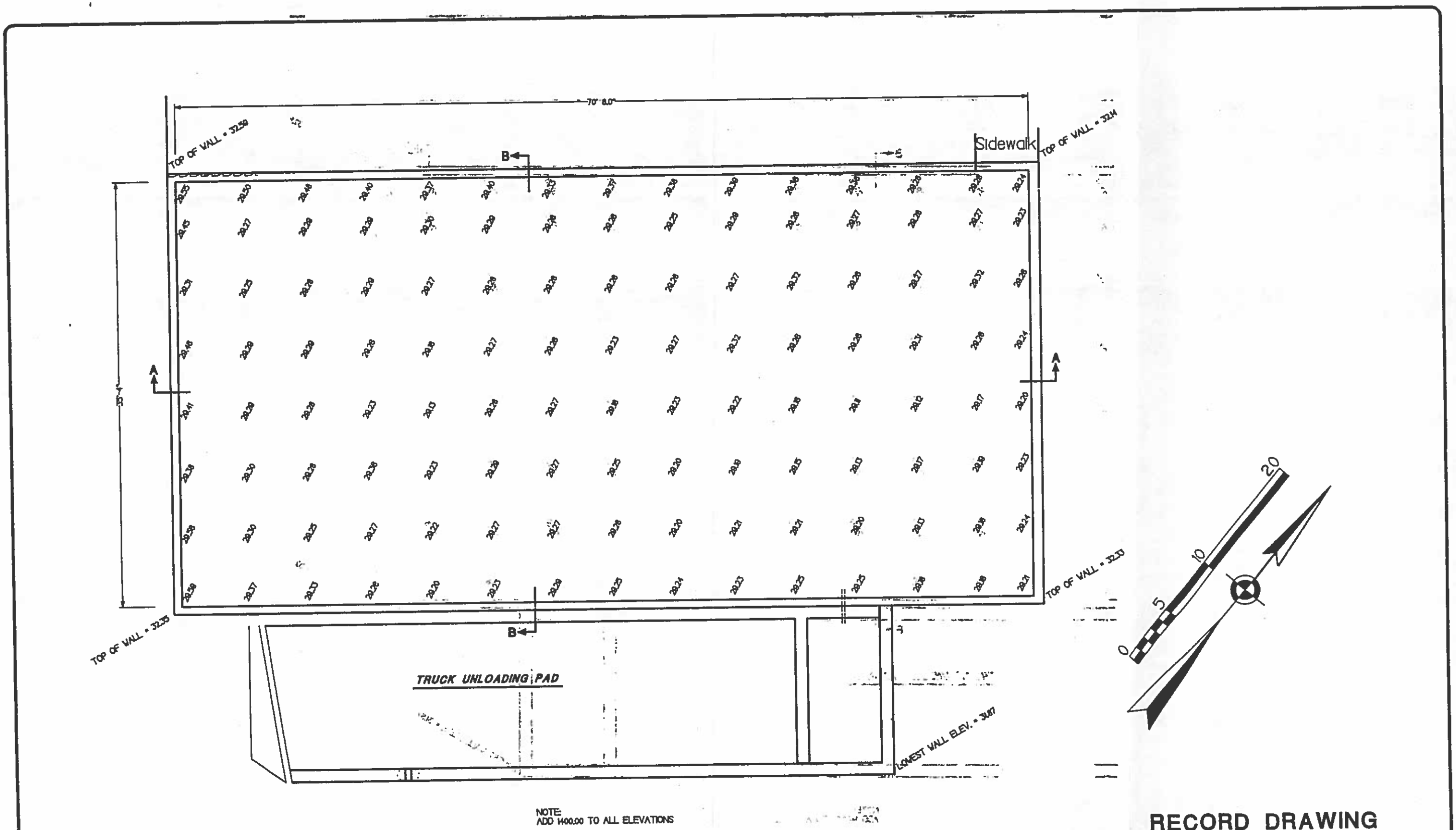
USPCI
A Subsidiary of Union Pacific Corporation

USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-5325

CAUSTIC STORAGE TANK 1-4
CONCRETE REPLACEMENT
SECTION "B" - "B"

JOB NO. 5137
SCALE
DRAWN GRS & JF
DATE 10-5-92
SHEET OF



NOTE:
ADD 1400.00 TO ALL ELEVATIONS

RECORD DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

USPCI
A Subsidiary of Union Pacific Corporation

USPCI
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
11102 N. Stratford Dr. Suite B400
Oklahoma City, Oklahoma 73120
(405) 755-8326

CAUSTIC TANKS 1-4 REPACEMENT PLANS
LAYOUT OF AREA

JOB NO. 5137
SCALE
DRAWN nlc
DATE 10/28/92
SHEET OF

SECTION EB2

ASSESSMENT OF EVAPORATOR BLOWDOWN TANK NO. 2 (EB2)
LONE MOUNTAIN HAZARDOUS WASTE FACILITY
U.S.P.C.I./LAIDLAW
WAYNOKA, OKLAHOMA

A TANK SYSTEM DESCRIPTION

Evaporator Blowdown Tank No. 2 (EB2) is a new welded above-ground wastewater storage and treatment tank to be installed as a part of the final wastewater treatment plant at the Lone Mountain Facility. Evaporator Blowdown Tank #2 (EB2) is located within the Wastewater Final Treatment building on the ground floor level of the building. The tank system consists of Evaporator Blowdown Tank #2 (EB2), Circulating Pump (P82), Circulating Pump (P84), and associated piping and instruments.

B PRIMARY TANK VESSEL

1. General Description

Evaporator Blowdown Tank No. 2 (EB2) is a circular steel tank with an outside diameter of 5'0" and a height of 12'0". The tank proper has a skirt that is anchored to the concrete floor. The top of the tank is flat with a vent to the atmosphere. The bottom of the tank is cone shaped. Evaporator Blowdown Tank No. 2 is being assessed to determine if the unit is adequately designed with sufficient structural strength and compatibility with the waste to be stored.

2. Design Standards

The tank is designed and constructed to those sections that are applicable in the American Petroleum Institute Standard 650-1993 edition (API-650).

3. Hazardous Characteristics of Wastes Stored

The wastes which are stored in this tank are treated and untreated brine solutions. Representative samples of both the treated and the untreated wastes were sent for analysis. The results of those analyses are included in Appendix G of this assessment. In addition, the following characteristics of the wastes were verified:

Ignitability - Flash Point > 240° F

Corrosiveness

$7 < pH < 12$

$2 < N < 7$

Reactivity - None
Temp < 300° F

From the examination of the hazardous characteristics of the waste to be stored in this tank, it was determined that the pH and normality levels (Corrosiveness) of the waste are the primary areas of concern. This is to determine the applicability of a corrosion allowance for the tank material type and thickness.

4. Corrosion Protection

The interior of the tank is coated with two layers of Sherwin Williams Hi-Mil Sher-Tar Epoxy. Each layer is applied at a dry film thickness of not less than 7.0 mils. The exterior coating consists of one layer of Glid-Guard Corrosion Resistant HS Epoxy No. 5466 series, at a dry film thickness of not less then 3.0 mils. Appendix F contains manufacturer's information on both the interior and the exterior corrosion protection systems.

5. Documented Age of Tank

This tank was manufactured by Lide Tank Company of Mexia, Texas, in November 1993 and installed in February of 1995.

6. Result of Leak Tests

The manufacturer conducted a hydrostatic leak test of the tank before shipping. A description of that test is included in Appendix D of this assessment. In addition, a visual inspection was performed of the interior and exterior of the tank after installation. This inspection was conducted specifically to detect the presence of any of the following items:

a) Weld break
b) Punctures
c) Scrapes of protective coatings
d) Cracks
e) Corrosion
f) Other structural damage or inadequacies of construction and/or installation

The tank hydrostatic test after installation is included in Appendix D of this Assessment. A description of that procedure will also be included in Appendix D of this assessment. From these tests, a determination will be made as to the primary tank's integrity.

7. Existing Data Obtained

a. Diameter of Tank	5'0"
b. Nominal Height of Tank	12'0"
c. Maximum Capacity	1017 gal.
d. Overflow Liquid level	11'0"
e. Overflow Volume	881.5 gal.
f. Design Specific Gravity	1.5
g. Maximum Bottom Pressure	5.9 psi
h. Maximum Operating Temperature	250° F
i. Material of Construction	
i) Shell, Root & Bottom	ASTM A36
ii) Reinforcing Pads	ASTM A36
iii) Structural Supports	ASTM A36
iv) Steel Pipe	ASTM SA106, Grade B
v) Bolts	ASTM SA193, B7
vi) Flanges, Blinds, Couplings & Plugs	ASTM SA105
j. Wall Thickness	0.375"
k. Operating Pressure	Atmospheric
l. Seismic Zone	1

8. Calculation of Existing Foundation Loading

Total Weight of Tank and Contents 17,112 lbs.

Detailed calculations reflecting the volume and weight of the tank are included in Appendix A of this assessment.

9. Required Structural Calculation

Calculations for the required wall thickness for this tank are shown in Appendix B. Metallurgical information on the materials used is included in Appendix E of this assessment. The minimum required thickness in accordance with API 650, is 0.148 inches. A corrosion allowance of 0.125 is provided for. The measured wall thickness is 0.375 inches.

Design calculations for the support structure are included in Appendix C of this assessment. These calculations were done in accordance with BOCA National Building Code 1990 Edition.

Structural analysis of the foundation is included in Appendix C of this assessment.

10. Comparison of Actual to Theoretical Structural Values

Wall Thickness Comparison

Calculated Required Wall Thickness	0.1875"
Minimum Required Wall Thickness By API 650	0.148"
Measured Wall Thickness	0.375"

Bottom Thickness Comparison

Calculated Required Bottom Thickness	0.150"
Minimum required Bottom Thickness by API 650	0.250"
Measured Bottom Thickness	0.375"

C ANCILLARY EQUIPMENT

1. General Description

The ancillary equipment for the Evaporator Blowdown Tank No. 2 (EB2) system includes the following:

a) Circulating Pump (P82) - a centrifugal pump designed to pump 80 GPM at 50 feet of discharge head with a suction head of 5 feet.

b) Circulation Pump (P84) -- a centrifugal pump designed to pump 80 gpm at 50 ft. discharge head with a suction head of 5 ft.

c) Associated piping, valves and instruments - all piping is Schedule 40 carbon steel fitted with 150 psi flanges. All piping with an inside diameter of 2" or smaller is socket-welded using, at a minimum, 3000# connections. All piping with an inside diameter greater than 2" is butt-welded. All valves, fittings & instruments are rated for 150 psi or higher.

2. Design Standards

All piping is to be installed according to ASME/ANSI Code section B31.3. Metallurgical information on the materials used is included in Appendix E of this assessment.

3. Corrosion Protection

The exterior of all waste piping will be coated with two layers of Kem-Kromik Universal Metal Primer - B50Z Series. Each layer is applied at a dry film thickness of not less than 5 mils. Detailed information on the coating is

included in Appendix F of this assessment.

4. Documented Age of Piping System

The piping and other ancillary equipment was purchased during a period of time between December 1994 and January 1995. It will be installed in April 1995.

5. Result of Leak Tests

A Hydrostatic leak test will be performed in accordance with ASME/ANSI. B31.3 Chapter VI paragraph 345.5 using paragraph 345.4.2 to determine the pressure requirements of the test. A description of this testing procedure, along with the results of that test, are inserted in Appendix D of this assessment.

6. Data Obtained

Included in Appendix H of this assessment is a Piping and Flow Diagram of the treatment process. This Piping and Flow Diagram reflects data such as valves, blowoffs, vents, level controls and the overall flow pattern of the treatment process.

7. Piping Support System

A visual inspection of the pipe support system will be conducted. This inspection will include a look at such things as materials of construction, welds, and construction methods. From this inspection a determination will be made as to the adequacy of the piping support system.

D SECONDARY CONTAINMENT SYSTEM

1. General Description of Secondary Containment

The secondary containment system was originally designed and operated to prevent any migration of wastes or liquids out of the system. Evaporator Flash Tank No. 1, Evaporator Flash Tank No. 2, Evaporator Flash Tank No. 3, Evaporator Blowdown Tank No. 2 and Evaporator Feed Tank No. 4 are located on a reinforced concrete base floor area with vertical concrete sidewalls. All associated piping is above ground and located within the secondary containment system. The area is inspected daily on a routine basis.

At the time of inspection the concrete area was withstanding daily operations, and routine climatic conditions. No cracks from compression or uplift were visually apparent.

Any released tank contents are removed and pumped to an appropriate storage area within the maximum time allowed as a permit condition.

2. Design Standards

Corings of the concrete in the existing containment area were taken and tested for comprehensive strength. A copy of the report generated from those tests is included in Appendix C of this assessment. The structural capacity of the foundation was compared to those sections that are applicable in the API-650 and the ACI-318, and these calculations were used as a guide in verifying the ability of the system to contain hazardous waste.

3. Corrosion Protection

There is an impermeable coating applied to the entire concrete floor and curbs. Appendix F of this assessment contains detailed information on the coating(s) employed.

4. Documented Age of the Containment Area

The secondary containment system was constructed and installed in 1987.

5. Result of Leak Tests

A visual inspection of the containment area was performed and from this inspection there were no cracks or breaks in the impermeable coating, therefore it appears to be adequate to contain any leaks or spills.

6. Calculation of Capacity Available (CCA)

Area	2738 s.f.
Curb Height	0.25 ft.
Material	Concrete
Gross Volume	685 c.f.

See Appendix H for detailed drawings of this containment area. Appendix A of this assessment contains detailed calculations of the available containment volume. The containment capacity available = 685 c.f.

7. Required Volume

<u>Containment Capacity Required (CCR)</u>

CCR=Volume of Largest Tank in the secondary containment
Volume of Largest Tank = (FT1)= 401 c.f.

8. Comparison of Available Volume to Required Volume

Containment Capacity

Containment Capacity Required =	401 c.f.
Secondary Containment Volume Available =	685 c.f
Excess Containment Volume =	284 c.f.

CCA>CCR Adequate Capacity (under normal operating conditions is available)

E CONCLUSIONS

1. The foundation, structural support beams, connections, and controls for the Evaporator Blowdown Tank No. 2 (EB2) System have been adequately designed.

2. The Evaporator Blowdown Tank No. 2 (EB2) system has sufficient structural strength, is compatible with the wastes to be stored and treated, and has adequate corrosion protection to ensure that it will not collapse, rupture or fail.

3. The Evaporator Blowdown Tank No. 2 (EB2) system was inspected on 3/1/95 for weld breaks, punctures scrapes of protective coating, cracks, leaks, corrosion, and other structural damage or inadequacies of construction/installation.

4. The Evaporator Blowdown Tank No. 2 (EB2) was tightness tested after installation is complete.

5. The Secondary Containment for the Evaporator Blowdown Tank No. 2 (EB2) system is of sufficient structural strength and of sufficient volume to meet the requirements set forth in 40 CFR 264.193.

6. All ancillary equipment associated with the Evaporator Blowdown Tank No. 2 (EB2) system is properly supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.

7. The Evaporator Blowdown Tank No. 2 (EB2) system associated ancillary equipment was tightness tested after equipment installation in accordance with ASME/ANSI B31.

F CERTIFICATION

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.

REGISTERED PROFESSIONAL ENGINEER
JAMES CLARK REICHENBACH
14326
OKLAHOMA

James C. Reichenbach, P.E.

Date 9/22/96

Primary Tank Volume Calculations

EB2 Volume Calculations

Shell Volume $= \pi r^2 H$

$= 3.14 \times 2.5 \times 2.5 \times 6$

$\cong 118\ ft^3$

Cone Volume $= \frac{1}{3} \pi r^2 H$

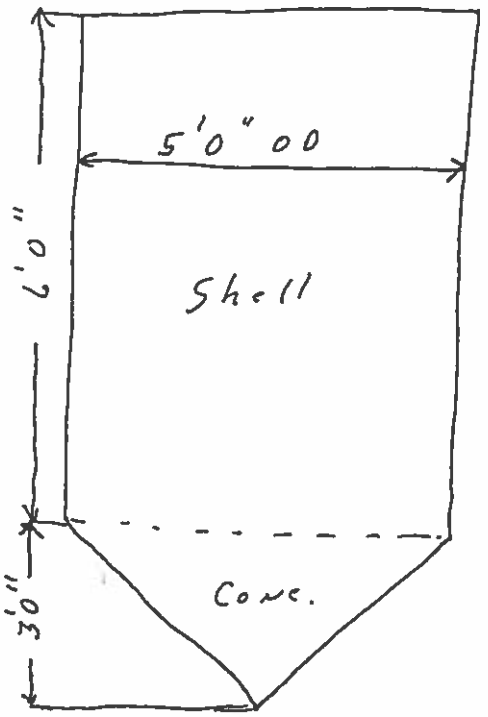
$= 0.33 \times 3.14 \times 2.5 \times 2.5 \times 3$

$\cong 19.5\ ft^3$

Total Volume = Shell Volume + Cone Volume

$= 118 + 19.5$

$= 137.5\ ft^3$



Weight of contents = Volume(ft^3) × 62.4 lb/ft^3 × 1.5 sp. gr.

$= 137.5\ (ft^3) \times 62.4\ lb/ft^3 \times 1.5$

$= 12,870\ lb.$

weight of tank $\cong$ 5700 lb.

Manufacturers Design Information

Primary Tank

USPCL
item # EB2
EF4

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)

(See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name LIDE VESSELS INC. By: EVAN LEMON

Welding Procedure Specification No. BB01 Date 6-1-82 Supporting PQR No.(s) BB01

Revision No. 1 Date 5-1-90

Welding Process(es) SMAW Type(s) MANUAL

(Automatic, Manual, Machine, or Semi-Auto.)

JOINTS (QW-402) Details

Joint Design SEE PRODUCTION DRAWINGS

Backing (Yes) F4 (No) F3

Backing Material (Type) WELD METAL OR BASE METAL

(Refer to both backing and retainers.)

☐ Metal ☐ Nonfusing Metal RETAINERS NOT USED

☐ Nonmetallic ☐ Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

*BASE METALS (QW-403)

P-No. 1 Group No. 1&2 to P-No. 1 Group No. 1&2

OR

Specification type and grade --

to Specification type and grade --

OR

Chem. Analysis and Mech. Prop. --

to Chem. Analysis and Mech. Prop. --

Thickness Range:

Base Metal: Groove .1875 - 1.500 * Fillet ALL

Pipe Dia. Range: Groove ALL Fillet ALL

Other * PROCEDURE LIMITED TO 1.500 DUE TO NO PWHT

*FILLER METALS (QW-404)			
Spec. No. (SFA)	5.1	5.1	
AWS No. (Class)	E6010	E7018	
F-No.	3	4	
A-No.	1	1	
Size of Filler Metals	1/8" - 5/32"	1/8" - 5/32"	
Deposited Weld Metal	.250	.614	
Thickness Range:	--	--	
Groove	.500	1.228	
Fillet	ALL	ALL	
Electrode-Flux (Class)	--	--	
Flux Trade Name	--	--	
Consumable Insert	--	--	
Other	--	--	

*Each base metal-filler metal combination should be recorded individually.

QW-482 (Back)

WPS No. BB01 Rev. 1

POSITIONS (QW-405)
Position(s) of Groove: ALL
Welding Progression: Up F4 Down F3
Position(s) of Fillet: ALL

POSTWELD HEAT TREATMENT (QW-407)
Temperature Range: NA
Time Range: --

PREHEAT (QW-406)
Preheat Temp. Min.: 50°F **
Interpass Temp. Max.: 600°F
Preheat Maintenance: NA
(Continuous or special heating where applicable should be recorded)

GAS (QW-408)

	Gas(es)	Percent Composition (Mixture)	Flow Rate
Shielding	--	--	--
Trailing	--	--	--
Backing	--	--	--

ELECTRICAL CHARACTERISTICS (QW-409)
Current AC or DC: DC Polarity: REV
Amps (Range): SEE BELOW Volts (Range): SEE BELOW
(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type: -- (Pure Tungsten, 2% Thoriated, etc.)
Mode of Metal Transfer for GMAW: -- (Spray arc, short circuiting arc, etc.)
Electrode Wire feed speed range: --

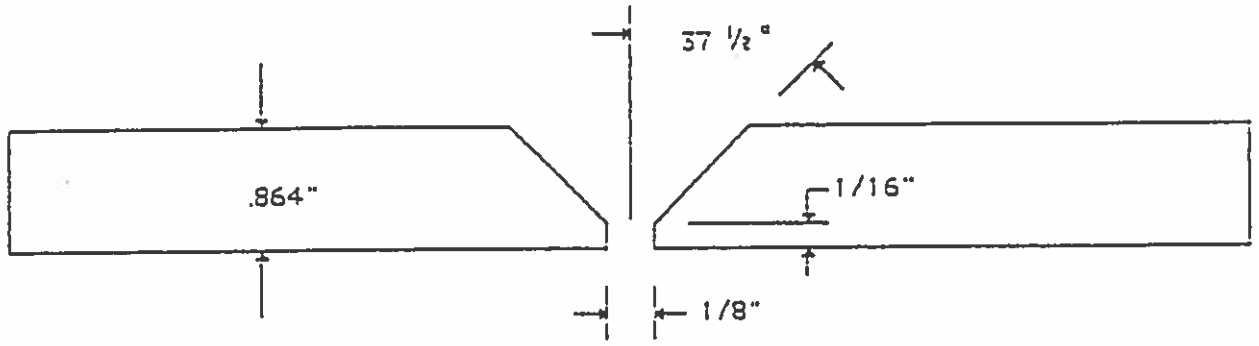
TECHNIQUE (QW-410)
String or Weave Bead: STRING
Orifice or Gas Cup Size: --
Initial and Interpass Cleaning (Brushing, Grinding, etc.): BRUSH, GRIND, OR CHIP AS NEEDED
Method of Back Gouging: AIR ARC OR GRIND AS NEEDED
Oscillation: --
Contact Tube to Work Distance: --
Multiple or Single Pass (per side): MULTIPLE
Multiple or Single Electrodes: SINGLE
Travel Speed (Range): --
Peening: NONE
Other: NO SINGLE PASS TO EXCEED 1/2" IN THICKNESS
** 200°F MINIMUM PREHEAT FOR THICKNESSES OVER 1.25" AND THROUGH 1.5"

Weld Layer(s)	Process	Filler Metal Class	Filler Metal Dia.	Current Type Polar.	Current Amp. Range	Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
1&2	SMAW	E6010	1/8"	REV	75-125	18-24	NA	
"	"	"	5/32"	"	110-170	20-26	"	
REM	SMAW	E7018	1/8"	"	115-165	20-26	"	
"	"	"	5/32"	"	150-220	21-27	"	

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)
(See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)
Record Actual Conditions Used to Weld Test Coupon.

Company Name LIDE VESSELS INC.
Procedure Qualification Record No. BB01 Date 5-26-82
WPS No. BB01
Welding Process(es) SMAW
Types (Manual, Automatic, Semi-Auto.) MANUAL

JOINTS (QW-402)



Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec. SA-106
Type or Grade B
P-No. 1 to P-No. 1
Thickness of Test Coupon .864
Diameter of Test Coupon 6-5/8" OD
Other --

POSTWELD HEAT TREATMENT (QW-407)
Temperature NA
Time --
Other --

GAS (QW-408)

	Percent Composition Gas(es)	(Mixture)	Flow Rate
Shielding	--	--	--
Trailing	--	--	--
Backing	--	--	--

FILLER METALS (QW-404)

SFA Specification	5.1	5.1
AWS Classification	E6010	E7018
Filler Metal F-No.	3	4
Weld Metal Analysis A-No.	1	1
Size of Filler Metal	1/8"	1/8"
Other	--	
Deposited Weld Metal	.250	.614

ELECTRICAL CHARACTERISTICS (QW-409)
Current DC
Polarity REV
Amps. F3-120, F4-120 Volts F3-20, F4-24
Tungsten Electrode Size NA
Other --

POSITION (QW-405)
Position of Groove 6G
Weld Progression (Uphill, Downhill) F3-DOWN, F4-UP
Other --

TECHNIQUE (QW-410)
Travel Speed NOT RECORDED
String or Weave Bead STRING
Oscillation NONE
Multipass or Single Pass (per side) MULTIPLE
Single or Multiple Electrodes SINGLE
Other --

PREHEAT (QW-406)
Preheat Temp. 70°F
Interpass Temp. 500°F
Other --

QW-483 (Back)

PQR No. 9801

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load lb	Ultimate Unit Stress psi	Type of Failure & Location
1	.506	DIA	.201	15800	78600	BM DUCT
2	.506	DIA	.201	15600	77600	BM DUCT

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
SIDE BEND QW-462.2	ACCEPTABLE
SIDE BEND QW-462.2	ACCEPTABLE
SIDE BEND QW-462.2	ACCEPTABLE
SIDE BEND QW-462.2	ACCEPTABLE

Toughness Tests (QW-170)

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Values	Lateral Exp. % Shear	Lateral Exp. Mils	Drop Weight Break	Drop Weight No Break

Fillet-Weld Test (QW-180)

Result — Satisfactory: Yes _____ No _____ Penetration into Parent Metal: Yes _____ No _____

Macro—Results _____

Other Tests

Type of Test BNH F3 WELD-174 HAZ-179, F4 WELD-179 HAZ-182 & 185

Deposit Analysis _____

Other _____

Welder's Name JOHN MCKINNEY Clock No. 114 Stamp No. M

Tests conducted by: SOUTHWESTERN LAB Laboratory Test No. D9-8220-2

We 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 IX of the ASME Code.

Manufacturer LIDE VESSELS INC.

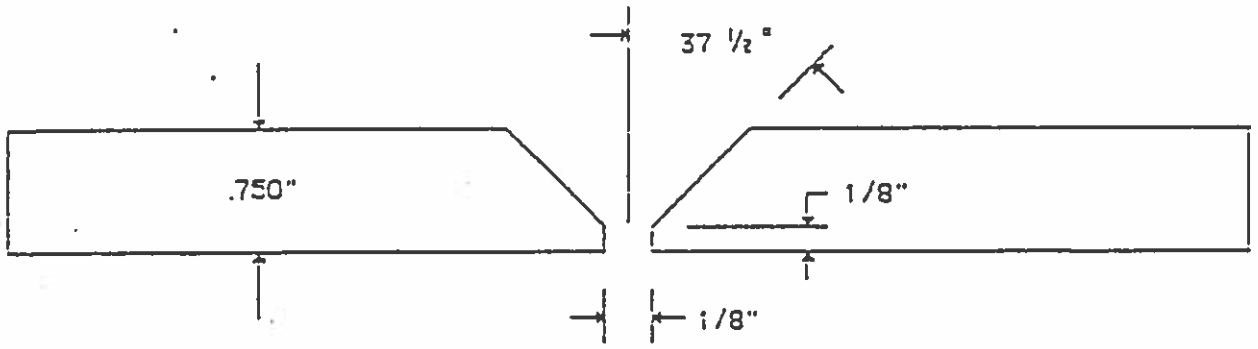
Date 6-2-82 By _____

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)
(See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)
Record Actual Conditions Used to Weld Test Coupon.

Company Name LIDE VESSELS INC.
Procedure Qualification Record No. 8802 Date 5-26-82
WPS No. 8802
Welding Process(es) SMAW
Types (Manual, Automatic, Semi-Auto.) MANUAL

JOINTS (QW-402)



Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)
Material Spec. SA-36
Type or Grade --
P-No. 1 to P-No. 1
Thickness of Test Coupon .750
Diameter of Test Coupon --
Other PLATE

POSTWELD HEAT TREATMENT (QW-407)
Temperature NA
Time --
Other --

GAS (QW-408)

	Gas(es)	Percent Composition (Mixture)	Flow Rate
Shielding	--	--	--
Trailing	--	--	--
Backing	--	--	--

FILLER METALS (QW-404)

SFA Specification	5.1	5.1
AWS Classification	E6010	E7024
Filler Metal F-No.	3	1
Weld Metal Analysis A-No.	1	1
Size of Filler Metal	1/8"	3/16"
Other	--	
Deposited Weld Metal	.250"	.500"

ELECTRICAL CHARACTERISTICS (QW-409)
Current DC
Polarity REV
Amps. F3-110, F1-250 Volts F3-20, F1-22
Tungsten Electrode Size --
Other --

POSITION (QW-405)
Position of Groove 1G
Weld Progression (Uphill, Downhill) FLAT
Other --

TECHNIQUE (QW-410)
Travel Speed NOT RECORDED
String or Weave Bead STRING
Oscillation --
Multipass or Single Pass (per side) MULTIPLE
Single or Multiple Electrodes SINGLE
Other --

PREHEAT (QW-406)
Preheat Temp. 70°F
Interpass Temp. 500°F
Other --

QW-483 (Back)

PQR No. 9802

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load lb	Ultimate Unit Stress psi	Type of Failure & Location
1	.505	DIA.	.200	14120	70600	WLD DUCT
2	.506	DIA.	.201	13740	68400	BM DUCT

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
SIDE BEND QW-462.2	ACCEPTABLE
SIDE BEND QW-462.2	ACCEPTABLE
SIDE BEND QW-462.2	ACCEPTABLE
SIDE BEND QW-462.2	ACCEPTABLE

Toughness Tests (QW-170)

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Values	Lateral Exp. % Shear	Lateral Exp. Mils	Drop Weight Break	Drop Weight No Break

Fillet-Weld Test (QW-180)

Result — Satisfactory: Yes -- No -- Penetration into Parent Metal: Yes -- No --

Macro—Results --

Other Tests

Type of Test --

Deposit Analysis --

Other --

Welder's Name BILLY LIDE Clock No. _____ Stamp No. L

Tests conducted by: SOUTHWESTERN LABORATORIES Laboratory Test No. D9-8220-1

We 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 IX of the ASME Code.

Manufacturer LIDE VESSELS INC.

Date 9-11-90 By Brian Lide

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)
(See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name LIDE VESSELS INC. By: EVAN LEMON

Welding Procedure Specification No. 8802 Date 5-28-82 Supporting PQR No.(s) 8802

Revision No. 1 Date 3-7-89

Welding Process(es) SMAW Type(s) MANUAL
(Automatic, Manual, Machine, or Semi-Auto.)

JOINTS (QW-402) Details

Joint Design SEE PRODUCTION DRAWINGS

Backing (Yes) ____ (No) XX

Backing Material (Type) WELD METAL OR BASE METAL
(Refer to both backing and retainers.)

☐ Metal ☐ Nonfusing Metal NO RETAINERS USED

☐ Nonmetallic ☐ Other

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

BASE METALS (QW-403)

P-No. 1 Group No. 1&2 to P-No. 1 Group No. 1&2

OR

Specification type and grade --

to Specification type and grade --

OR

Chem. Analysis and Mech. Prop. --

to Chem. Analysis and Mech. Prop. --

Thickness Range:

Base Metal: Groove .1875" - 1.5" Fillet ALL

Pipe Dia. Range: Groove ALL Fillet ALL

Other --

*FILLER METALS (QW-404)			
Spec. No. (SFA)	5.1	5.1	
AWS No. (Class)	E6010	E7024	
F-No.	3	1	
A-No.	1	1	
Size of Filler Metals	1/8", 5/32"	1/8", 5/32", 3/16"	
Deposited Weld Metal	.250	.500	
Thickness Range:	--	--	
Groove	.500	1.00	
Fillet	ALL	ALL	
Electrode-Flux (Class)	--	--	
Flux Trade Name	--	--	
Consumable Insert	--	--	
Other	--	--	

*Each base metal-filler metal combination should be recorded individually.

(This form (S00006) may be obtained from the Order Dept., ASME, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300.

QW-482 (Back)

WPS No. BB02 Rev. 1

POSITIONS (QW-405)
Position(s) of Groove: F3-ALL, F1-FLAT
Welding Progression: Up F3 Down ---
Position(s) of Fillet: ALL

POSTWELD HEAT TREATMENT (QW-407)
Temperature Range: NA
Time Range: ---

PREHEAT (QW-406)
Preheat Temp. Min.: 50°F *
Interpass Temp. Max.: 600°F
Preheat Maintenance: NONE
(Continuous or special heating where applicable should be recorded)

GAS (QW-408)

	Gas(es)	Percent Composition (Mixture)	Flow Rate
Shielding	---	---	---
Trailing	---	---	---
Backing	---	---	---

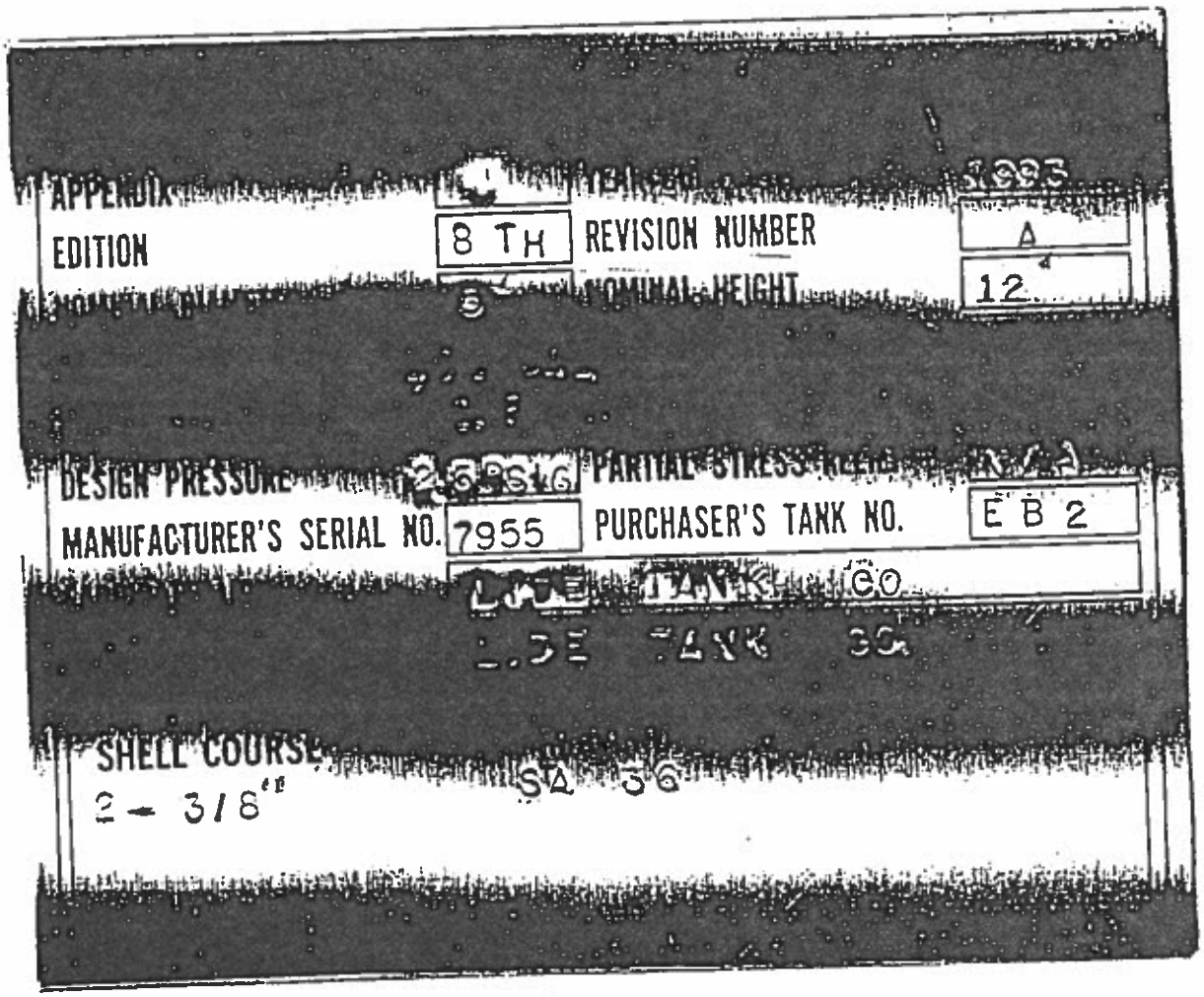
ELECTRICAL CHARACTERISTICS (QW-409)
Current AC or DC: DC Polarity: REV
Amps (Range): SEE BELOW Volts (Range): SEE BELOW
(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type: --- (Pure Tungsten, 2% Thoriated, etc.)
Mode of Metal Transfer for GMAW: --- (Spray arc, short circuiting arc, etc.)
Electrode Wire feed speed range: ---

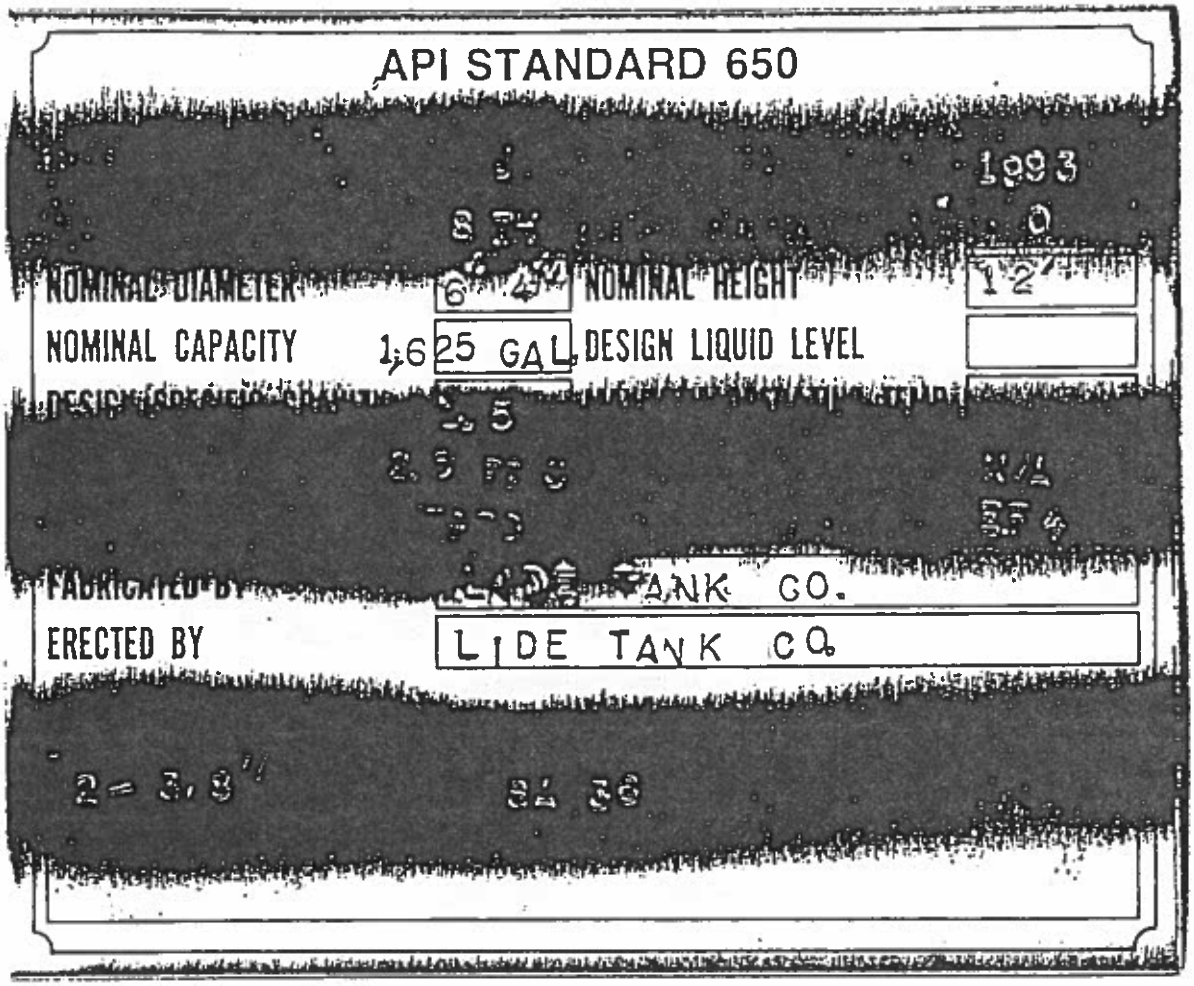
TECHNIQUE (QW-410)
String or Weave Bead: STRING
Orifice or Gas Cup Size: ---
Initial and Interpass Cleaning (Brushing, Grinding, etc.): BRUSH, GRIND, OR CHIP AS NEEDED
Method of Back Gouging: AIR ARC OR GRIND AS NEEDED
Oscillation: ---
Contact Tube to Work Distance: ---
Multiple or Single Pass (per side): MULTIPLE
Multiple or Single Electrodes: SINGLE
Travel Speed (Range): ---
Peening: NONE
Other: NO SINGLE PASS TO EXCEED 1/2" IN THICKNESS
* 200°F MINIMUM PREHEAT FOR THICKNESSES OVER 1.25" AND INCLUDING 1.5"

Weld Layer(s)	Process	Filler Metal Class	Filler Metal Dia.	Current Type Polar.	Current Amp. Range	Volt Range	Travel Speed Range	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, Etc.)
1&2	SMAW	E6010	1/8"	REV	75-125	18-24	NA	
"	"	"	5/32"	"	110-170	20-26	"	
REM	"	E7024	1/8"	"	140-190	18-24	"	
"	"	"	5/32"	"	180-250	20-26	"	
"	"	"	3/16	"	230-305	21-27	"	

USPCI


APPENDIX
EDITION
8 TH
REVISION NUMBER
A
12
DESIGN PRESSURE
MANUFACTURER'S SERIAL NO.
7955
PURCHASER'S TANK NO.
E B 2
SHELL COURSE
2 - 3/8"
SA 36

USPCI



API STANDARD 650

1993

NOMINAL DIAMETER 6' 4"

NOMINAL HEIGHT 12'

NOMINAL CAPACITY 1,625 GAL

DESIGN LIQUID LEVEL

FABRICATED BY ANK CO.

ERECTED BY LIDE TANK CO.

Tank Wall Thickness

KSL ENGINEERING & DESIGN INC.
306 RIDGECREST
TYLER, TEXAS 75701

CHECK SEISMIC

D/H = 5.0/12.0 = .42

TANK SHELL = 3360 lbs
TANK ROOF 400 lbs
TANK CONTENTS 14,700 lbs

FIND EFFECTIVE MASS W_1 & W_2

Z = .1875 FOR ZONE 1
I = 1.0

FROM APP. E FIG. E-2 FOR D/H = .42

$\frac{W_1}{W_T} = .1$ $\frac{W_2}{W_T} = .9$

$W_1 = 1470$ lbs $W_2 = 13,230$ lbs

FIND X_1 & X_2 FROM FIG. E-3

$X_1/H = .43$ $X_2/H = .85$

$X_1 = 5.2$ FT $X_2 = 10.2$ FT

NATURAL PERIOD $T = K\sqrt{D}$ WHERE K = .59 FOR FIG. E-4

$T = .59\sqrt{5} = 1.32$ $\Rightarrow C_1 = .24$ $C_2 = \frac{.30S}{T} = \frac{.30(1.5)}{1.32}$

$C_2 = .34$ for S = 1.5 UNKNOWN SOIL CONDITION

$M = ZI(C_1 W_S X_S + C_1 W_r H_t + C_1 W_1 X_1 + C_2 W_2 X_2)$
shell roof TANK SLOSHING

$M = .1875(1.0)[.24(3360)9.0 + .24(400)12 + .24(1470)5.2 + .34(13,230)10.2] =$

$M = 10,524$ ft-lb

FOR ANCHORED TANK CHECK SHELL COMP. STRESS b

$b = \frac{4200\text{ lb}}{5.0(\pi)} + \frac{1.273(10,524)}{(5.0)^2} = 803$ lb/ft of circ

Stress: $\frac{803}{12(.25)} = 270$ psi OK

Allow. Compressive = .50 F_y = .5(3

KSL ENGINEERING & DESIGN INC.
306 RIDGECREST
TYLER, TEXAS 75701

L. WEINBRENNER
Pg. 2 of 3

SHELL DESIGN

$$t_s = \frac{2.6\, D(H-1)\, G}{E\,(21{,}000)} + CA$$

$$t_s = \frac{2.6\,(.5)\,6\,(1.5)}{.7\,(21000)} + 1/8" \Rightarrow .008" + 1/8" = .133 \text{ in}$$

3/8" SHELL IS OK

HEAD DESIGN

BTM CONE

$$t_c = t_s/\cos\alpha = .008/\cos 42.7 = .0109 + 1/8" = .136"$$

3/8" CONE OK

TOP HEAD: FLAT PLATE DESIGN

LOADING IS 50psf DEAD + 100psf LIVE LOAD

$150\text{ psf}/144 = 1.04$ psi

$$t_h = D\sqrt{\frac{CP}{S}} + 1/8"$$ C = .25 FOR WELDED CORNER JOINT

$$t_h = 60"\sqrt{\frac{.25(1.04}{21{,}000}} + 1/8" \quad .211 + 1/8" = .336"$$

3/8" HEAD PLATE OK

CHECK WIND

ASSUME: TANK EMPTY
EFF DIA = 6'
SHAPE FACTOR .80

WIND PRESS. $.00256\,(100)^2 = 26$ psf

WIND FORCE $26\text{ psf}\,(.8)\,6'\,(12') = 1500^{\#}$

MOMENT = $1500\text{ lb}\,(12'/2) - 4200^{\#}\,(5.3/2) = -2130$ ft-lb

NO UPLIFT

KSL ENGINEERING & DESIGN INC.
306 RIDGECREST
TYLER, TEXAS 75701

STRUCTURAL DESIGN

5'-0" I.D. x 12'-0" TALL

DESIGN CONDITIONS: ATMOSPHERIC TANK

DESIGN TEMP 250°F

WIND VELOCITY 100 MPH SEISMIC ZONE 1

S.G. = 1.5

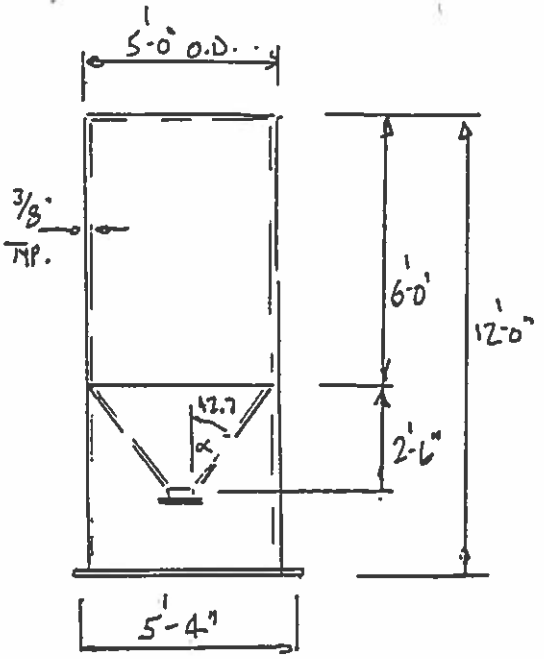
CORROSION ALLOW. = 1/8"

SHELL & HEAD 3/8" THK

CONE ANGLE α = 42.7°

TANK EMPTY 4200#

TANK FULL 17,200#



STRESS COLLECTION FOR 250°F = .90 Y_s

.90(36000) = 32,400 > 1 ALLOWABLE = $\frac{2}{3} Y_s = \frac{2}{3}(32,400)$

ALLOWABLE = 21,600 psi

Foundation Design Analysis

EB2 Tank Loading

Tank Volume = 1017 gal

Fluid Sp. Gr. = 1.5 maximum

Fluid Weight(max) = 1017 gal × 8.35 lb/gal(water) × 1.5 sp.gr. = 12,750 lb.

Tank Weight ≅ 5700 lb.

Weight of tank + contents = 5700 lb + 12,750 lb = 18,450 lb.

Weight distribution to base plate

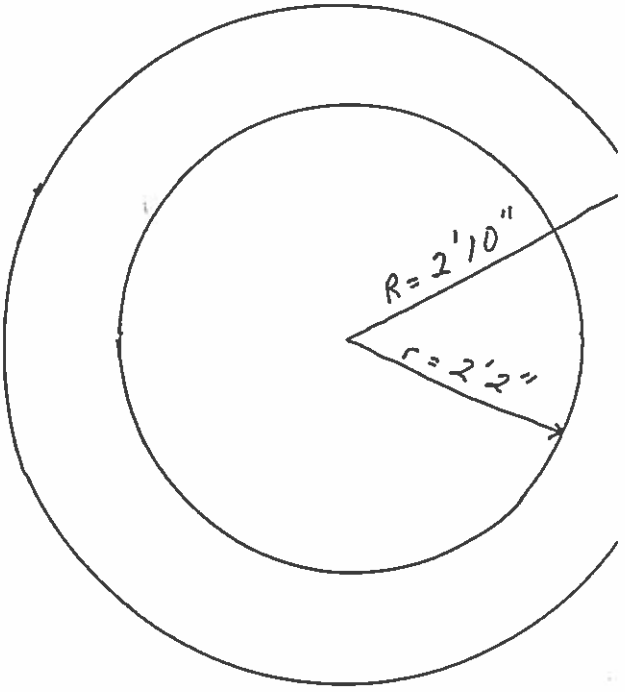
Base plate Area $= \pi (R^2 - r^2)$

$= \pi [(2'10")^2 - (2'2")^2]$

$= 10.5\ ft^2$

$$\text{Loading} = \frac{\text{wt (tank + contents)}}{A}$$

$$L = \frac{18{,}450\ lb}{10.5\ ft^2} = 1757\ lb/ft^2$$



Tank Base Plate

Assuming soil bearing capacity of 3000 lb/ft², calculations show sufficient bearing.

OTIS A. CLARK PE.

Phone
(405) 878-0338

130 Bdwy. Bldg.
Suite 202
Shawnee, OK. 74801

To: USPCI
Lone Mountain Facility
Route 2, Box 180A
Waynoka, Okla. 73806

Attn: Lawson Fenton

Feb. 8, 1995

The following is an investigation for the foundation support for the mezzanine platforms and pipe supports for the Wastewater Final Treatment Facility.

COLUMN	LOAD, KIPS	FOUNDATION CONDITION	REMARKS
A-1	1.2	17" floor slab	OK (see note #2)
A-2	2.4		
A-3	2.9		
A-5	3.4	6" floor slab	OK (see note #1)
A-7	1.6		
B-1	8.8	17" floor slab	OK (see note #2)
B-2	25.9		
B-3	19.3		
B-5	5.9	6" floor slab	OK (see note #1)
B-7	2.9		
C-3.1	5.2	17" floor slab	OK (see note #2)
C-4	15.1	24" x 36" cont.ftg.	Ok (see note #3)
C-6	15.1		

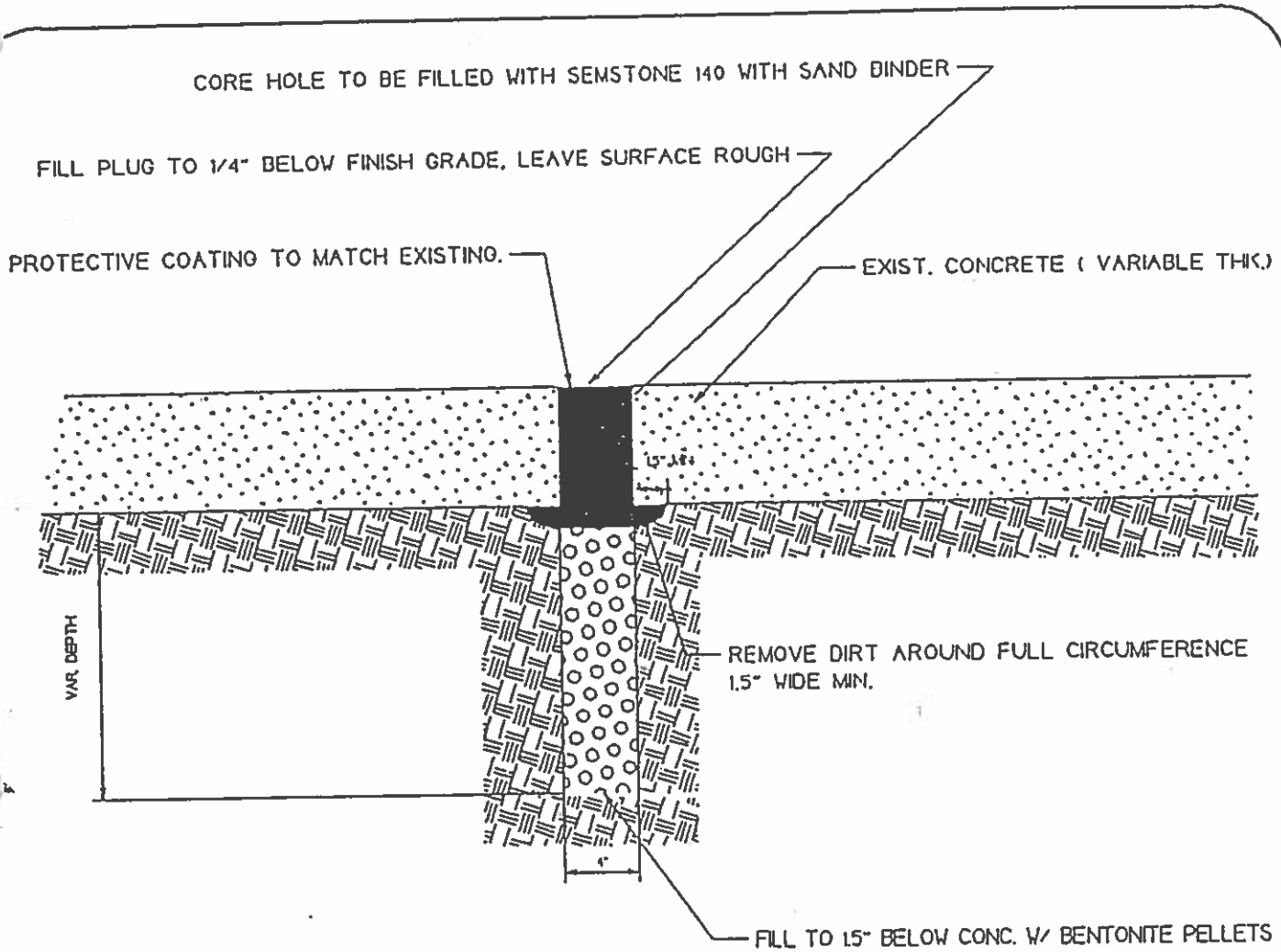
COLUMN	LOAD, KIPS	FOUNDATION CONDITION	REMARKS
C-7	7.6	6" floor slab	OK (see note #1)
C.9-1	9.0	17" floor slab	OK (see note #2)
C.9-3	15.9		
D-2	46.1		
D.1-1	14.5		
D.1-3	14.5		
E-1	14.5		
E-2	29.0		
E-3	14.5		
F-3.1	6.7	6" floor slab	OK (see note #1)
F-4	13.5	24" x 36" cont. ftg.	OK (see note #3)
F-6	13.5		
F-7	6.8	6" floor slab	OK (see note #1)

Note #1 = 6" floor slab. The 6" floor slab in reinforced with #4 @ 12" each way. Heaviest concentrated load on this slab is 7.6 kips. Using 3,000 lbs. per. sq. ft. allowable soil bearing the loaded area would be a 1'-7" square area under the column. This condition is OK.

Note #2 = 17" floor slab. The heaviest concentrated load on this slab is 46.1 kips. 3,000 lbs per. sq. ft. allowable soil bearing would give a 4'-0" square area supporting this column. This condition is OK

Note #3 = 24" x 36" cont. footing. The heaviest concentrated load on this footing is 15.1 kips. With 3,000 lb soil bearing only a 2'-6" strip (1'-3" each side of column) would be in bearing. This condition is OK.





CORE PLUG DETAIL

CORE PLUG DETAIL FOR
USPCI, LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
Oklahoma City Oklahoma

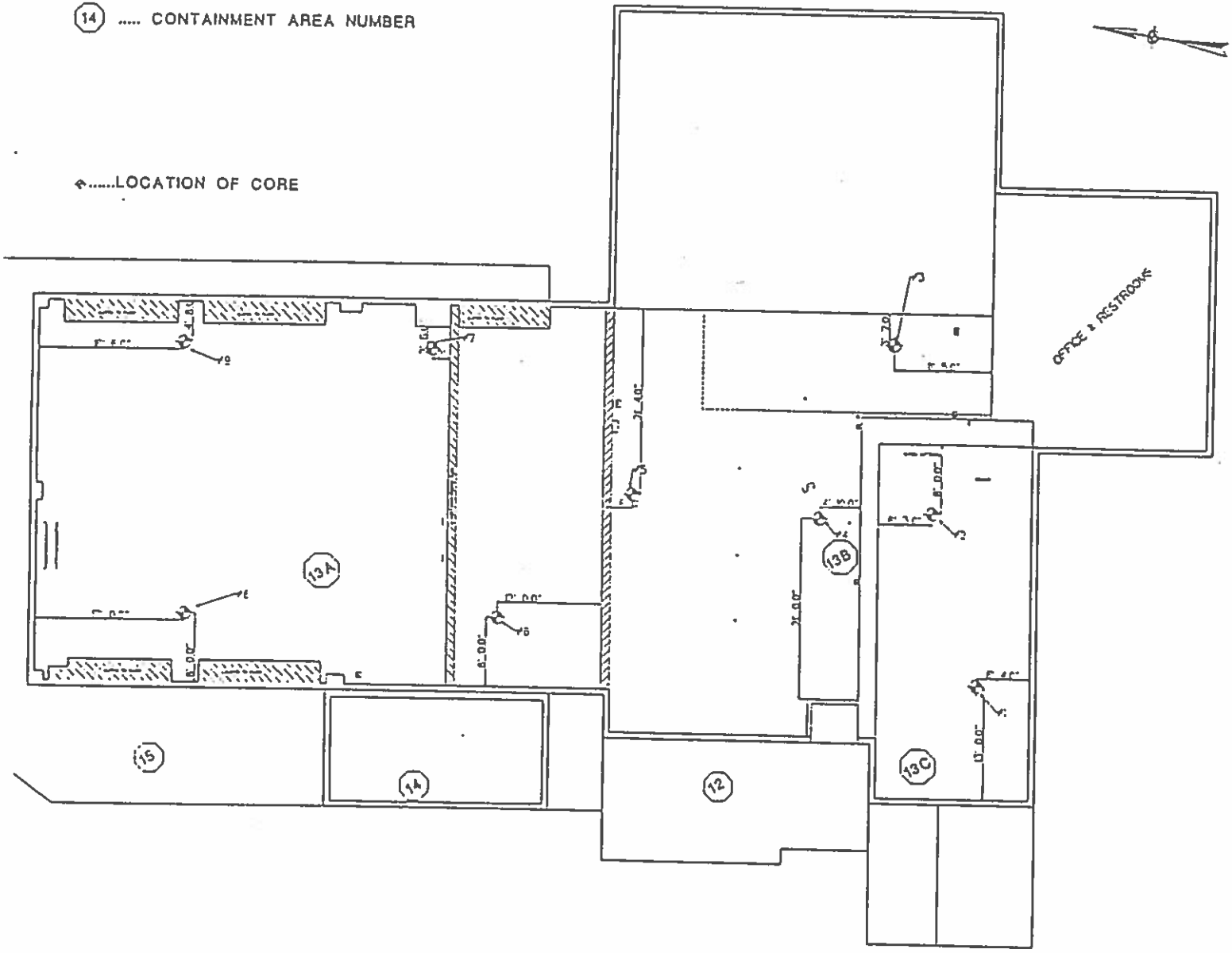
JOB NO. 511
SCALE NTS
DRAWN DMC
DATE 6/23/97

SHEET 1 OF 1

Specimen	Diameter, in.	Drilled Length, in.	Capped Length, in.	Crushing Load, lbs.	L/D Correction Factor	Compressive Strength, psi
PHI-1	3.75	5.5	5.7	32,440	0.96	2,810
PHI-2	3.75	5.5	4.9	47,200	0.93	3,980
PHI-3	3.75	6.5	4.5	41,400	0.93	3,490
PHI-4	3.75	7.5	4.6	60,700	0.93	5,110
PHI-5	3.75	7.0	7.1	43,000	0.99	3,860
PHI-6	3.75	6.5	4.1	57,100	0.88	4,550
PHI-7	3.75	7.0	5.8	43,800	0.96	3,810
PHI-8	3.75	6.0	5.8	74,800	0.96	6,480
PHI-9	3.75	5.0	5.5	33,900	0.96	2,950
PHI-10	3.75	6.0	4.7	72,500	0.93	6,100
PHI-11	3.75	6.0	5.6	55,720	0.96	4,840
PHI-12	3.75	6.0	6.6	65,600	0.98	5,800
PHI-13	3.75	5.0	5.3	68,700	0.94	5,850
PHI-14	3.75	5.0	5.3	80,200	0.95	6,900
PHI-15	3.75	6.0	5.1	60,200	0.97	5,290
FHI-1A	3.75	6.0	4.7	53,800	0.93	4,530
FHI-1B	3.75	13.0	6.0	50,800	0.97	4,460
FHI-2	3.75	22.0	7.0	30,740	0.99	2,760
aFHI-3	3.75	15.0	-	-	-	-
FHI-4	3.75	6.0	7.0	81,600	0.99	7,320
FHI-5	3.75	6.0	5.8	81,700	0.96	7,100
aFHI-6	3.75	19.0	-	-	-	-
aFHI-7	3.75	14.5	-	-	-	-
FHI-9	3.75	7.0	7.0	53,200	0.99	4,770

PHI - Pre-Water Treatment
FHI - Final Water Treatment

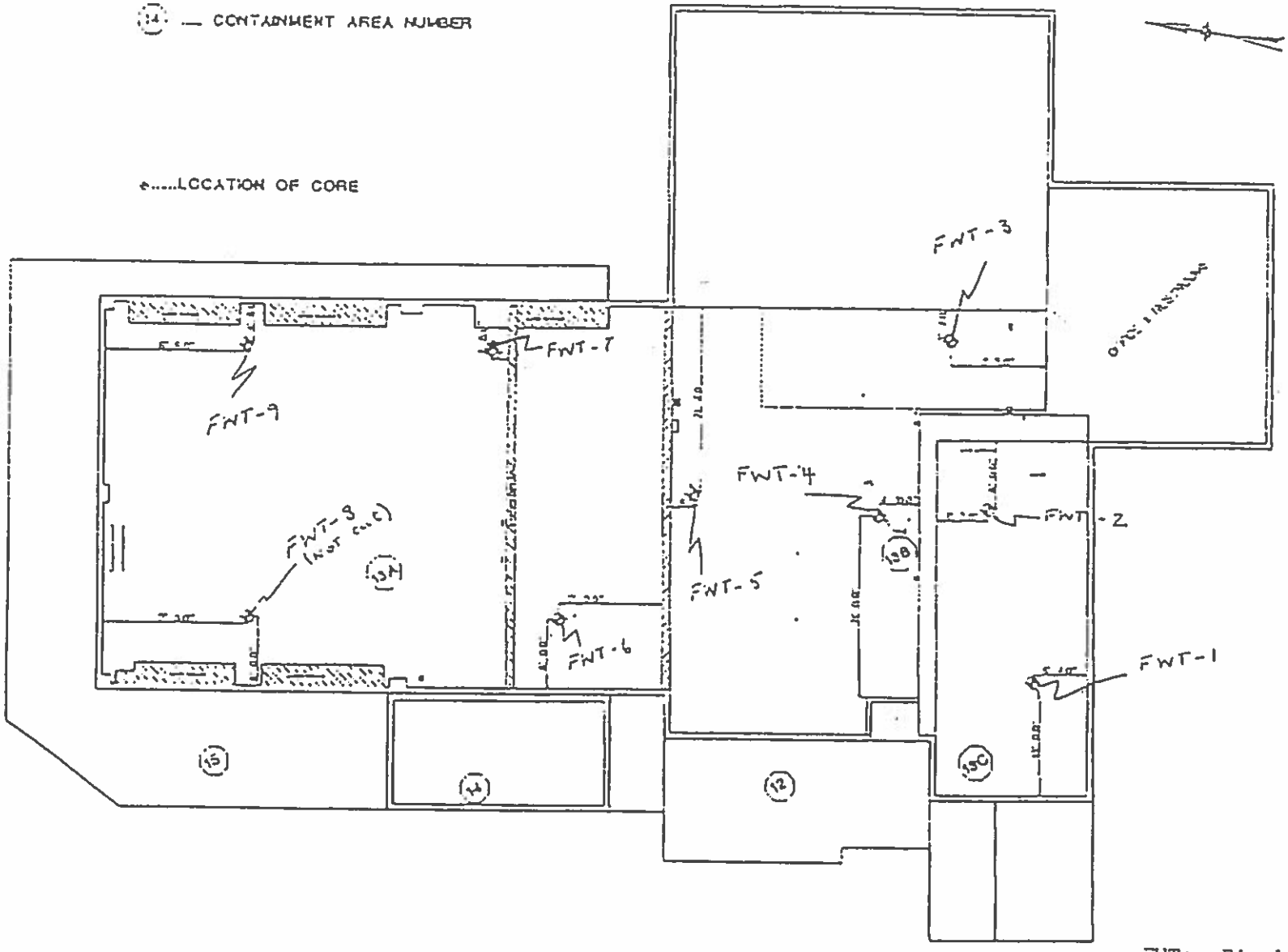
a Samples which we were not able to pull out of the hole.



LAYOUT OF WASTE WATER TREATMENT
BUILDING USPCI LONE MOUNTAIN HAZARDOUS
WASTE FACILITY WAYNOKA, OKLAHOMA

Myers
ENGINEERING CORPORATION
Oklahoma City Okla.

JOB NO. 581
SCALE
DATE 6-17-92
SHEET OF



FWT: Final Water Treatment

LAYOUT OF WASTE WATER TREATMENT BUILDING USPCI LONE MOUNTAIN HAZARDOUS WASTE FACILITY WAYNOKA, OKLAHOMA

Myers

USPCI
A Subsidiary of
Union Pacific Corporation

March 27, 1995

Mr. Jim Richenbaugh
Black & Veatch Waste Science
4717 Grand Avenue, Suite 500
Kansas City, MO 64112

Re: USPCI Lone Mountain Facility
Subject: Waste Water Treatment Floor Structural Design

The concrete floors in the area where the mezzanine has been erected were poured as part of two different building expansions. The first expansion was poured in the spring of 1987 and was designed to be eighteen inches thick with two layers of 3/4 inch reinforcement bars tied on one foot centers and separated by twelve inches between the top and bottom mats. All reinforcement bars were kept within three inches of the slab's surfaces and were supported by concrete brick on a two inch layer of sand. This slab underlies the area that supports the Flash Tanks and EF4 and extends to the south edge of the filter press mezzanine.

The second expansion attaches to the north side of the first slab and was poured in November of 1987. It was poured around four existing boiler foundations that were 2 feet wide, 3 feet deep, and 24 feet long. The floor slab was poured six inches thick and used a layer of 1/2 inch reinforcement bars tied on one foot centers, supported on a concrete brick and a 2 inch layer of sand. This slab underlies the area supporting the filter presses.

Both slabs were poured using a 4000 psi concrete strength mix as verified by the core sample tested by Meyers Engineering of which a report has been sent to you earlier this week.

I hope this will provide the information you needed for the certification work now in progress.

Sincerely,

Lawson Fenton

Lawson Fenton
Project Manager

..., Box 170
Waynoka, Oklahoma 73860-9622
Tel: 405/697-3500
Fax: 405/697-3596

Our Mission:
Provide the highest quality waste and by-product management services that consistently meet or exceed customer needs and regulatory requirements at competitive cost while enhancing shareholder value.

Tank Leak Tests

Hydrostatic Test Record

Customer: USPCI - Lone Mt. Facility

Project: Evaporation Blowdown Tank No. 2

Location: Waynoke, OK

Test Start Date 5/1/95 Test Start Time 2:30 p.m.

Test Finish Date 5/2/95 Test Finish Time 8:00 a.m.

Test Procedure:

Fill evaporator blowdown tank to the top mtd. nozzle with water.

Results:

All tank nozzles were flanged off below the test water level. There was no change in water level inside the feed tank. Visual inspection of tank and tank nozzles indicated no water leaks.

Witness _____ Date: 5/2/95

WISco, INC.

11811 North Fwy., Suite 670
Houston, Texas 77060
(713) 820-8066

Page 1 of 1
Report Date 11/19/93
Report No. 001

Customer USPCI Attn: Bruce Patterson
Order No. 12418-30-46 Dated _____ Rev. _____ Dated _____
Mat'l Destination Lone Mt. Facility, Waynoka, OK Req. Date _____
Shipment Date is now 11/24/93 As of 11/19/93 Changed from _____
Inspector estimated shipment date 11/24/93 Order is 85 percent completed
Vendor Lide Tank Co. Order No. _____ Dated _____
Manufacturer Lide Tank Co. Phone 817-562-5526
Shop Location Mexia, TX Shop Order TKEB2 & TKEF4
Inspector's Contact Mr. Billy Lide Position Customer Contact
Report is: X Interim ___ Final Regarding: X Inspection ___ Expediting ___ Status
MATERIAL DESCRIPTION:

Two (2) tanks - one 6' 4" OD x 12' 0" high; one 5' 0" OD X 12' 0" high
To specifications of USPCI and API 650

STATUS OF ORDER: Engineering, Materials, Fabrication, Inspection, Completion

The following was performed on each item:

Dimensional checks covering elevation, orientation, projection of all nozzles and manways. All of which were noted to be acceptable and as noted on shop approved drawings.

Fit-up of material: seams, junctions and welding of same was found to be very good. Visual inspection on nozzle fit-up and welding was noted as very good.

Review of two (2) spot x-rays (one on each item) was found to be satisfactory.

Leak test on each item was performed and noted as acceptable. Vessels were filled for over twelve (12) hours. Visual inspection disclosed no leaks or seeps.

Inspection of blasting and painting is scheduled for Wednesday, 11/24/93.

Rec 12-4-93 Dub

INSPECTOR: Dub Greer
INSPECTION ORDER: 12418-30-46

Piping Leak Tests

Tank Metallurgy

ACCEPTANCE STANDARD API 650 ITEM DESCRIPTION TK. EF4

RADIOGRAPHIC REQUIREMENTS RT-3

SOURCE:
TYPE Ir 192
SIZE .1
STRENGTH 41 ci.

EXPOSURE:
S. TO F. DISTANCE 16"
MAT'L THICKNESS .375
TIME 1 MIN 45 sec

VIEWING:
SINGLE ✓
COMPOSITE
SINGLE WALL
DOUBLE WALL

FILM:
MFG Kodak
TYPE T
SIZE 4½ x 10"

PENETRAMETER:
SIZE 17
SHIM THICKNESS .093
SOURCE SIDE yes
FILM SIDE

SCREENS:
FRONT .005
BACK .010

VIEW NUMBER	ACCEPT	REJECT	SLAG	POROSITY	INC. FUSION	BURN THRU	CRACK	UNDERCUT	INC. PENET	CONCAVE ROOT	CONVEX ROOT	UNDERFILL	OTHER
L-1													
1-2	✓												

RADIOGRAPHER D. Staley LEVEL II Q.C. MGR. Evan Lemon DATE 11-18-93

AUTHORIZED INSPECTOR Reviewed 11-19-93 Dale Brown Wisco Inc. DATE

COMMENTS:

PTANCE STANDARD API 650 ITEM DESCRIPTION TK. EB 2

ADIOGRAPHIC REQUIREMENTS RT-3

OURCE:
TYPE Ir 192
SIZE .1
STRENGTH 41 ci.

EXPOSURE:
S. TO F. DISTANCE 16"
MAT'L THICKNESS .375
TIME 1 MIN 45 sec

VIEWING:
SINGLE ✓
COMPOSITE
SINGLE WALL
DOUBLE WALL

LM:
MFG Kodak
TYPE T
SIZE 4½ x 10"

PENETRAMETER:
SIZE 17
SHIM THICKNESS .093
SOURCE SIDE yes
FILM SIDE

SCREENS:
FRONT .005
BACK .010

VIEW NUMBER	ACCEPT	REJECT	SLAG	POROSITY	INC. FUSION	BURN THRU	CRACK	UNDERCUT	INC. PENET	CONCAVE ROOT	CONVEX ROOT	UNDERFILL	OTHER
L-1													
1-2	✓												

RADIOGRAPHER D. Stanley LEVEL II Q.C. MGR. Evan Lemon DATE 11-18-93

AUTHORIZED INSPECTOR Reviewed 11-19-93 Duke Green WISCO Inc. DATE

COMMENTS:

GENEVA STEEL

JOB, CONTRACT

P.O. DATE	PURCHASE NO.
06/09/93	60-0641/X-53625

SHIPPERS NO.	MILL ORDER NO.	TALLY NO.
GC625400 09-23-93	EA66015	GC625400

VEHICLE IDENTITY SP 595603

VENDOR
GENEVA STEEL
P.O. BOX 2500
PROVO. UTAH 84603

SOLD TO
MANNESMANN PIPE&STEEL CORP
1990 POST OAK BLVD
HOUSTON TX 77056-3811

SHIP TO
ONEAL STEEL INC
10848 LUNA ROAD
DALLAS TEXAS

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MANUFACTURED. SAMPLED. TESTED AND/OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS REQUIREMENTS IN SUCH RESPECTS.

Edward T. Brodle

CORPORATE DIRECTOR. QUALITY

DATE 09-23-93

SPEC. H.R. SHEET C.25 MAX P.040 MAX S.050 MAX HR36S058 Y/P 36 KSI MIN
SP. T/S 58 KSI MIN DRY NO OIL (FOR CONVERSION TO ASTM A-36)

01 MILL RA/SN CERTIFIED T/R

ITEM NO.	MATERIAL DESCRIPTION: THICKNESS OR SECTION	WIDTH, DIA. OR FT. WT.	LENGTH	QUANTITY	WEIGHT	HEAT NO.	TEST OR PIECE IDENTITY	YIELD PT. PSI	TENSILE STR. PSI	ELONGATION % IN 8"	ELONGATION % IN 2"	% RED. OF AREA	BI
03	.3650"	72.0000"	COIL 655782	1	48630#	103294	.3610"	43000	62500	27.0			
							.3680"	46700	64900	24.0			
							***END OF	DATA***					

HEAT NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO
103294	HEAT	.24	.79	011	018	.06												
'GENEVA	STEEL	COMPANY	CERTIFIES	ALL	SMELTING.	MELTING	AND	MANUFACTURING	PROCESSES	OCCURRED	IN	THE	USA.'					
***END OF	DATA***																	

008064

GENEVA STEEL

Test Report

JOB, CONTRACT NO.

P.O. DATE	PURCHASE ORDER NO.
10/16/92	60-8349/23-3878-92

SHIPPERS NO.	MILL ORDER NO.	INVOICE NO.
GC508408 12-08-92	EA54100	GC508408

VEHICLE IDENTITY RG 310945

GENEVA STEEL
P.O. BOX 2500
PROVO, UTAH 84603

MANNESMANN PIPE&STEEL CORP
1990 POST OAK BLVD
HOUSTON TX 77056-3811

SHIP TO
FERRO UNION
7400 MESA ROAD
SP SPIN#243093
HOUSTON,TEXAS

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MANUFACTURED, SAMPLED, TESTED AND/OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS REQUIREMENTS IN SUCH RESPECTS.

Larry D. Clinger
MANAGER - QUALITY ASSURANCE
DATE 12-08-92

H.R. SHEET C.25MAX P.040MAX S.050MAX HR36S058 Y/P 36 KSI MIN T/S
58 KSI MIN DRY NO OIL

01 MILL RA/SN CERTIFIED T/R ANALYSIS REPORT TEST RESULTS PER PROD
SPECN CAPTION

ITEM NO.	MATERIAL DESCRIPTION: THICKNESS OR SECTION	WIDTH, DIA. OR FT. WT.	LENGTH	QUANTITY	WEIGHT	HEAT NO.	TEST OR PIECE IDENTITY	YIELD PT. PSI	TENSILE STR. PSI	ELONGATION % IN 8"	ELONGATION % IN 2"	% RED. OF AREA	BEN
	.3600"	72.0000"	COIL 566534	1	43230#	1C3269	.3600"	46600	70600	20.0			
	3/8						.3600"	51100	72000	23.0			
							***END OF	DATA***					

HEAT-NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO
1C3269	HEAT	23	86	011	022	03												
'GENEVA	STEEL	COMPANY	CERTIFIES	ALL	SMELTING,	MELTING	AND	MANUFACTURING	PROCESSES	OCCURRED	IN	THE	USA.'					
***END OF	DATA***																	

Piping Metallurgy

BELLVILLE TUBE CORP

P.O.Box 220
Bellville, Texas 77418

MILL CERTIFICATION

S.O.#	CUSTOMER ORDER #:	DATE:	SOLD
001363	74454	5-13-93	20142

SOLD TO:
Texas Pipe & Supply
2330 Holmes Rd.
Houston, Texas
77051

SHIP TO:
Texas Pipe & Supply
2330 Holmes RD.
Houston, Texas

SIZE:	WALL	GRADE:	TYPE	LENGTH	QUANTITY
3.500"	.216"	5L Gr B/X42 / A53 Gr B	ERW	SEE BELOW	1,303 Pcs.

SPECIAL INSTRUCTIONS: 25°
BEVELED FOR WELDING

LOT	HEAT	C	Mn	P	S	Si	ULT.	YIELD	%El.
DE009	25963	.20	.99	.010	.006	.22	72,710	51,254	45.7
DE010	25965	.21	.98	.010	.004	.21	72,510	50,313	45.7
DE011	25965	.21	.98	.010	.004	.21	72,903	51,479	44.7
DE012	25965	.21	.98	.010	.004	.21	72,054	48,330	45.3
DE013	25962	.20	1.00	.011	.005	.20	71,971	49,872	45.4
DE014	25962	.20	1.00	.011	.005	.20	75,206	53,979	43.8
DE015	25962	.20	1.00	.011	.005	.20	74,687	54,291	42.1
DE016	25965	.21	.98	.010	.004	.21	71,451	48,730	45.1

All material has passed API flatting tests,
and Hydrostatic tests.

Notwithstanding any other provision in this contract, B.T.C. sales no warranty as to the suitability or fitness of this product for upgrading by Quench and Temper or any other process, unless B.T.C. shall be consulted in advance and give its approval in writing.

We hereby certify that the above information is true and correct as contained in the records of this division.

HACKNEY, INC.

A DIVISION OF TRINITY INDUSTRIES

P.O. Box 568867 • 2525 Stemmons Freeway
Dallas, Texas 75356-8867 • (214) 634-2650

YOUR ORDER NUMBER	REFERENCE	CUSTOMER NO.	INVOICE NO.	INVOICE DATE	DATE SHIPPED
DARRELL ANDERSO		454634			

SOLD TO: K & K SUPPLY CO
PO BOX 548
DUNCAN OK 75533

SHIP TO:

CERTIFIED TEST REPORT

H 414 (R 8/91)

ITEM	QUANTITY	DESCRIPTION/SPECIFICATION	HEAT CODE
		6 STD LR 90 A234-92A/SA234 WPB A106B 09 / U60907 STRESS RELIEVED AT 1200 F	C66W

CODE	C	Mn	P	S	Si	Cr	Mo	Cu	Ni	V	Nb		C.E.-
6W	.17	.77	.011	.007	.23	.02	.00	.01	.01	.00	.00		.30

HEAT CODE	TENSILE * KSI	YIELD KSI	% Elong. IN 2"	Hardness HB	Size MM x 10 mm	Temp. °F	FOOT POUNDS	LATERAL EXPANSION	% SHEAR
C66W	65.9 L	41.9	33.0	126					

* = LONGITUDINAL, T = TRANSVERSE

C66W CONFORMS TO THE REQUIREMENTS OF NACE MR0175-92

e above items were heat treated in accordance with the requirements of the specification to which they were manufactured.

at the products covered by this report comply with the applicable requirements of ASTM and/or ASME specifications, as noted for each item.

he... ...rtify that the above figures are correct, as contained in the records of the Company.

Blinda Leathers

HACKNEY, INC.

A DIVISION OF TRINITY INDUSTRIES

P.O. Box 568887 • 2525 Stemmons Freeway
Dallas, Texas 75356-8887 • (214) 634-2850

YOUR ORDER NUMBER	REFERENCE	CUSTOMER NO.	INVOICE NO.	INVOICE DATE	DATE SHIPPED
0099-001186	C121252	454634	982719	01/20/94	01/20/94

Woodward

SOLD TO: M & M SUPPLY CO
PO BOX 548
DUNCAN OK 75533

SHIP TO: M&M SUPPLY CO
2512 NO. 4TH STREET
ENID, OK 73701

CERTIFIED TEST REPORT

3I 414 (R 8/91)

ITEM	QUANTITY	DESCRIPTION/SPECIFICATION		HEAT CODE
1	8	6 150 RF WN STD	A105-92 /SA105	1293LB
		A105 01 / DJB	AS FORGED	
10	8	8 STD LR 90	A234-92A/SA234 WPB	C67R
		A106B 09 / X63386	STRESS RELIEVED AT 1200 F	

CHEMICAL ANALYSIS

CODE	C	Mn	P	S	Si	Cr	Mo	Cu	Ni	V	Nb		C.E.=
1293LB	.19	1.02	.012	.022	.25	.07	.01	.17	.06	.02	.00		.40
C67R	.18	.84	.008	.005	.25	.02	.01	.01	.02	.00	.00		.33

PHYSICAL PROPERTIES / CHARPY RESULTS

HEAT CODE	TENSILE * KSI	YIELD KSI	% Elong. IN 2"	Hardness HB	Size MM x 10 mm	Temp. °F	FOOT POUNDS	LATERAL EXPANSION	% SHEAR
1293LB	88.8	58.4	30.6	187					
	% R.A.	=63.4		MAX					
C67R	71.1 L	46.6	37.0	153					

*L = LONGITUDINAL, T = TRANSVERSE

1293LBC67R CONFORM TO THE REQUIREMENTS OF NACE MR0175-92

: items were heat treated in accordance with the requirements of the specification to which they were manufactured.

We ce / that the products covered by this report comply with the applicable requirements of ASTM and/or ASME specifications, as noted for each item.

We hereby certify that the above figures are correct, as contained in the records of the Company.

By: Rhonda Matthews

MILL TEST REPORTS FURNISHED BY
TEXAS PIPE & SUPPLY CO., INC.
CUSTOMER_____
CUSTOMER PO #

☐9

NORTH STAR STEEL
Seamless Tubular Products

CERTIFIED TEST REPORT

HEAT NO.: SLN 8Y0167		NSSQ MILL ORDER NO.: 0-0017155-0
PRODUCT DESCRIPTION : 6.625 OD 0.280 WALL 18.97 LBS/FT PE DRL	CUSTOMER ORDER NO.: 7273	NSSH W/O NO.:
GRADE :API 5L X42/B	CUSTOMER SPEC.:	NSSH LOT NO.:

MECHANICAL PROPERTIES: LONGITUDINAL

SPECIMEN CROSS SECTION			ACTUAL LOAD (KIPS)		STRENGTH (KSI)		ELONGATION	
WIDTH (IN)	THICK (IN)	AREA (SQ IN)	YIELD	TENSILE	YIELD	TENSILE	GAGE LENGTH	% ELONG
1.479	0.273	0.4038	20.4	31.0	50.5	76.8	2.0	36.8
1.472	0.287	0.4225	22.1	32.9	52.3	77.9	2.0	38.8

COMMENTS

This material is also manufactured to
ASTM A53B Rev. 94b
ASTM A106B Rev. 91
ASME SA53-B Rev. 94b
ASME SA106-B Rev. 91

CHEMICAL ANALYSIS: NS61

	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	Cb	V	Al	Ca	B	Ti	N	CE
HEAT	0.21	0.76	0.007	0.007	0.25	0.25	0.11	0.07	0.03	0.015		0.001	0.026	0.0028			0.0104	0.38
PRODUCT #1	0.21	0.76	0.008	0.007	0.24	0.25	0.11	0.07	0.03	0.016		0.002	0.025	0.0017			0.0112	0.38
PRODUCT #2	0.21	0.78	0.008	0.007	0.25	0.25	0.11	0.07	0.03	0.016		0.002	0.026	0.0017				0.38
PRODUCT #3	0.21	0.77	0.007	0.008	0.25	0.25	0.11	0.07	0.03	0.015		0.002	0.024	0.0019				0.38
PRODUCT #4	0.21	0.77	0.007	0.003	0.25	0.25	0.11	0.07	0.03	0.015		0.002	0.025					0.38

HYDROSTATIC TEST (psi): 2660

SUPPLEMENTAL REQUIREMENTS	YES	NO	REMARKS
HARDNESS	X		RB AVG 85
CHARPY IMPCT TST			
FLATTENING TEST	X		PASSED
NACE TEST			
JOMINY HARDEN			
GRAIN SIZE			
OTHER			Satisfies NACE MR-01-75

[illegible]

SIGNED: [signature]

DATE: 2-2-94

APPROVED: _____

SWORN AND SUBSCRIBED TO BEFORE ME

THIS _____ DAY _____

_____
Notary Public

MY COMMISSION EXPIRES _____

THIS CERTIFICATE IS NOTORIZED ONLY WHEN REQUESTED

WELDED PIPE SECTION

REPORT OF CHEMICAL ANALYSIS AND PHYSICAL TESTS

Newport Steel

Oil Country Tubular Goods
Line Pipe • Fittings

NINTH & LOWELL STREETS • NEWPORT, KY. 41072
606-292-6000

DATE 12/18/92 | CUSTOMER'S PURCHASE ORDER 73581

CERTIFICATION NUMBER C18871 | TUBULAR MILL ORDER T5694

SHIP DATE 12/16/92 | BILL OF LADING NUMBER B25404

VEHICLE I.D. | RANGE NUMBER C&O 356426

MADE AND MANUFACTURED IN U.S.A.

CERTIFICATION STATEMENT

This is to certify that the product described is in accordance with the described specification and all information shown is correct as contained in the records of this company. Prepared by the office of D. K. Heppard-Manager Metallurgy & Inspection.

12/18/92

SOLD TO
TEXAS PIPE & SUPPLY, INC.
2330 HOLMES ROAD
HOUSTON TX
77051

COMMENTS

SHIP TO
TEXAS PIPE & SUPPLY INC.
SP DELIVERY PIERCE JCT. TRACK
SPIN 774190
HOUSTON, TEXAS.

DESCRIPTIONS AND SPECIFICATIONS: API-5L X42 GRADE

GAUGE AND SIZE: .237 4-1/2"

CHEMICAL ANALYSIS

HEAT	C0643		C0607		A6017		B4882		A6021			
LOT	121592D		121592D		121592D		121592D		121592D			
	LADLE	CHECK	LADLE	CHECK	LADLE	CHECK	LADLE	CHECK	LADLE	CHECK	LADLE	CHECK
C.	.1800	.1800	.1700	.1700	.1700	.1700	.1800	.1900	.1900	.1900		
Mn.	.5200	.5300	.5100	.5400	.5800	.5600	.5000	.4900	.5000	.4900		
P.	.0060	.0060	.0070	.0070	.0070	.0070	.0050	.0040	.0070	.0080		
S.	.0040	.0060	.0100	.0120	.0070	.0090	.0040	.0070	.0070	.0080		
Si.	.1600	.1500	.1500	.1600	.1700	.1800	.1500	.1600	.1700	.1600		
Cu.	.2000	.2000	.1000	.1000	.1700	.1600	.0900	.0900	.3100	.3000		
Ni	.0600	.0700	.0400	.0400	.0600	.0600	.0300	.0300	.0600	.0700		
Cr	.1000	.1000	.0500	.0500	.0700	.0700	.0400	.0400	.0900	.0900		
Mo	.0200	.0200	.0100	.0100	.0200	.0200	.0100	.0100	.0300	.0300		
Al	.0290	.0310	.0370	.0360	.0340	.0350	.0340	.0310	.0330	.0350		
V	.0010	.0010	.0010	.0010	.0010	.0010	.0010	.0010	.0010	.0010		
Cb.												
Ca	.0040	.0040	.0020	.0010	.0034	.0040	.0054	.0043	.0042	.0029		

PHYSICAL TESTS

TENSILE	64200	64900	65500	65900	80500	
WELD TEST						
YIELD	53300	53200	56800	55000	65900	
ELG	39	37	37	38	32	
TEST PRESS	2650	2650	2650	2650	2650	
FLAT	OK	OK	OK	OK	OK	

KOPPEL DIVISION
AMBRIDGE DIVISION
PHONE: 412-843-7100
FAX: 412-847-4071

KOPPEL STEEL
A Subsidiary of Ind Group Inc.

TUBULAR TEST REPORT

ORDER NO: T3334

SOLD TO:	SHIP TO:	CUST P.O.
TEXAS PIPE & SUPPLY CO., INC. ATTN: PURCHASING DEPARTMENT 2330 HOLMES ROAD HOUSTON, TX 77051	TEXAS PIPE & SUPPLY CO., INC. HOUSTON, TX SPIN 774190 S. PIERCE JUNCTION TEAM TRACK	79335 H

SPECIFICATION(S): ASTM ASME SA/A53-93a SA/A106-93/API 5L GR B/X42

O.D.	WALL	WT/FT	GRADE	QUALITY
3.5000	.216	7.58	1023M	SEAMLESS HOT FINISH

CONDITION (SPECIAL):

HEAT #		C	Mn	S	P	Si	Cr	Ni	Mo	Cu	Al	SN	CB	V	CA
414840	L	.19	.51	.013	.010	.24	.12	.10	.02	.19	.022			.002	
	P	.19	.51	.014	.010	.24	.12	.10	.02	.19	.024			.002	
	P	.19	.51	.013	.009	.24	.12	.10	.02	.19	.022			.002	
	P	.19	.51	.012	.010	.24	.12	.10	.02	.19	.022			.002	
	P	.19	.51	.012	.009	.24	.12	.10	.02	.19	.022			.002	

LOT #	SPECIMEN	YIELD KSI	TENSILE KSI	ELONG 2"	R\A	BHN	ROCK WELL	GRAIN SIZE	MAGNAFLU. F S
	.750 " STR	48.8 49.6	71.2 72.3	36 36				7	

MATERIAL MELTED AND MANUFACTURED IN USA

OTHER

HYDRO - 3000 PSI 5 SEC HOLD
FLATS - OK
CERTIFIED NACE MR0175

MILL TEST REPORTS FURNISHED BY
TEXAS PIPE & SUPPLY, CO. INC.
CUSTOMER _____
CUSTOMER PO# _____

7-26-94 Laurie Burnette pp
DATE QUALITY ASSURANC

MATERIAL WAS NOT EXPOSED TO MERCURY DURING PROCESSING.

NO WELDING OR WELD REPAIR PERFORMED ON THIS MATERIAL.

TEST REPORT

Koppel Steel Corporation
Ambridge Tube Operations
P.O. Box 410
Ambridge, PA 15003
Koppel Steel Operations/General Offices
P.O. Box 750
Beaver Falls, PA 15010
Phone 412-843-7100, Fax 412-847-6255

MILL TEST REPORTS FURNISHED BY
TEXAS PIPE & SUPPLY CO., INC.

CUSTOMER_____

CUSTOMER PO #_____

KOPPEL DIVISION
AMBRIDGE DIVISION
PHONE: 412-843-7100
FAX: 412-947-4071

KOPPEL STEEL
A Subsidiary of KS Group Inc.

TUBULAR
T E S T R E P O R T

ORDER NO: T3561

SOLD TO:
TEXAS PIPE & SUPPLY CO., INC.
ATTN: PURCHASING DEPARTMENT
3330 HOLMES ROAD
HOUSTON, TX 77051

SHIP TO:
TEXAS PIPE & SUPPLY CO., INC.
RAIL SPUR NO. 774190
HOUSTON, TX

CUST P.O.
80477H

SPECIFICATION(S): ASTM A53M SA/A53-93A SA/A106-93/API 5L GR B/X42
CERTIFIED NACE MR0175

O.D.	WALL	WT/FT	GRADE	QUALITY
3.5000	.216	7.58	1023M	SEAMLESS HOT FINISH

CONDITION (SPECIAL):

HEAT #		C	Mn	S	P	Si	Cr	Ni	Mo	Cu	Al	BN	CB	V	CA
416412	L	.20	.51	.011	.006	.26	.07	.07	.01	.15	.021			.001	
	P	.19	.49	.009	.006	.25	.08	.07	.01	.15	.020			.001	
	P	.18	.49	.010	.006	.25	.08	.07	.01	.15	.020			.001	
	P	.19	.50	.009	.006	.26	.07	.08	.01	.15	.020			.001	
	P	.18	.49	.010	.006	.25	.07	.07	.01	.14	.019			.001	

LOT #	SPECIMEN	YIELD KSI	TENSILE KSI	ELONG 2"	R\A	BHN	ROCK WELL	GRAIN SIZE	MAGNAFLUX F B
	.750 " STR	51.8 52.7	72.8 73.5	36 34				7	

MATERIAL MELTED AND MANUFACTURED IN USA

OTHER

HYDRO - 3000 PSI 5 SEC HOLD
FLATS - OK

lb

10-11-94 Lauri Ruinette
DATE QUALITY ASSURANCE

MATERIAL WAS NOT EXPOSED TO MERCURY DURING PROCESSING.

NO WELDING OR WELD REPAIR PERFORMED ON THIS MATERIAL.

T E S T R E P O R T

Koppel Steel Corporation
Ambridge Tube Operations
P.O. Box 410
Ambridge, PA 15003
Koppel Steel Operations/General Offices
P.O. Box 750
Beaver Falls, PA 15010
Phone 412-843-7100, Fax 412-847-4255

OF USA CORPORATION — METALLURGICAL TEST REPORT — 48M 10:41:34

IB. CONTRACT NO.

USS TUBULAR PRODUCTS

P.O. DATE	PURCHASER P.O.	INVOICE NO.
	1349287	1
SHIPPERS NO. R13523	MILL ORDER NO. D589600-01	
VEHICLE IDENTITY LT2240		

MAIL TO

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MFG., SAMPLED, TESTED, AND/OR INSPD. IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS REQUIREMENTS IN SUCH RESPECTS.
APPROVED BY OFFICE OF:
D.S. DABKOWSKI MGR. MET. &
O.A. USS TUBULAR PRODUCTS

DATE 02/23/93

MILL TEST REPORTS FURNISHED BY
TEXAS PIPE & SUPPLY CO., INC.
CUSTOMER MGM
CUSTOMER PO # DTL 100213

NO.	MATERIAL DESCRIPTION: SIZE	WALL	SPECIFICATION & GRADE	MATL	HEAT/LOT NO.	MIN. HYDRO PSI	YIELD STR. PSI	TENSILE STR. PSI	ELONG. % IN 2"	GAGE WIDTH IN.	FLAT	BEND
	2 3/8	.154	ASTM A53-90BGR.B ASME SA53 GR.B 89ED.91 ADD ASTM A106 91 GR.B ASME SA106 GR.B 89 ED.91 ADD. API 5L GR.B/X42 10TH ED.11/92	SML	N66003	3000	74400	74400	35.0	3/4		OK
	2 3/8	.154	ASTM A53-90BGR.B ASME SA53 GR.B 89ED.91 ADD ASTM A106 91 GR.B ASME SA106 GR.B 89 ED.91 ADD. API 5L GR.B/X42 10TH ED.11/92	SML	N66011	3000	75400	75700	32.0	3/4		OK

NO.	HEAT NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	BN	AL	N	V	B	TI	CB	CO	
1	N66003	HEAT	16	106	012	005	28	02	01	04	01				001					CE=.36
1	N66003	PROD	19	107	008	007	25	01	01	08	01				001					HRB=76.0
1	N66011	HEAT	17	103	011	011	26	02	01	05	01				001					CE=.35
1	N66011	PROD	17	106	007	012	25	02	01	06	01				001					HRB=73.0

*** END OF DATA THIS SHEET *** ALL MELTING AND MANUFACTURING TOOK PLACE IN THE USA.

DECIMAL POSITIONS FOR ELEMENTS ARE INDICATED BY THE LEFT MARGIN VERTICAL DOTTED LINE OR DECIMAL POINT.

MILL TEST REPORTS FURNISHED BY
TEXAS PIPE & SUPPLY CO., INC.
CUSTOMER_____
CUSTOMER PO #_____

KOPPEL DIVISION
AMBRIDGE DIVISION
PHONE: 412-343-7100
FAX: 412-847-4071

KOPPEL STEEL
A Subsidiary of KS Group Inc.

TUBULAR TEST REPORT

ORDER NO: TJ554

SOLD TO:
TEXAS PIPE & SUPPLY CO., INC.
ATTN: PURCHASING DEPARTMENT
2330 HOLMES ROAD
HOUSTON, TX 77051

SHIP TO:
TEXAS PIPE & SUPPLY CO., INC.
RAIL SPUR 774190
HOUSTON, TX

CUST P.O.
9C477H

SPECIFICATION(S):ASTM A5NE SA/A53-93a/SA/A106-93/API 5L GR B/X42

O.D.	WALL	WT/FT	GRADE	QUALITY
2.3750	.154	3.65	1023M	SEAMLESS HOT FINISH

CONDITION (SPECIAL):

HEAT #		C	Mn	S	P	Si	Cr	Ni	Mo	Cu	Al	SN	CB	V	CA
418827	L	.19	.52	.009	.006	.29	.09	.09	.02	.18	.018				
	P	.19	.52	.010	.006	.28	.10	.09	.02	.18	.020				
	P	.19	.53	.010	.006	.27	.09	.09	.02	.19	.019				
	P	.18	.53	.010	.006	.27	.09	.09	.02	.18	.018				
	P	.19	.52	.010	.006	.28	.09	.09	.02	.18	.020				

LOT #	SPECIMEN	YIELD KSI	TENSILE KSI	ELONG 2"	R\A	BHN	ROCK WELL	GRAIN SIZE	MAGNAFLUX F	MAGNAFLUX S
	.750 x STR	54.9 54.4	73.8 73.1	33 38				7		

MATERIAL MELTED AND MANUFACTURED IN USA

OTHER

HYDRO - 3000 PSI 5 SEC HOLD
BENDS - OK
CERTIFIED NACE MR0175

MILL TEST REPORTS FURNISHED BY
TEXAS PIPE & SUPPLY, CO. INC.
CUSTOMER_____
CUSTOMER PO#_____

9-21-94 Laurie Russitto
DATE QUALITY ASSURANCE

MATERIAL WAS NOT EXPOSED TO MERCURY DURING PROCESSING.

NO WELDING OR WELD REPAIR PERFORMED ON THIS MATERIAL.

TEST REPORT

HACKNEY, INC.

A DIVISION OF TRINITY INDUSTRIES

P.O. Box 568887 • 2525 Stemmons Freeway
Dallas, Texas 75356-8887 • (214) 634-2850

YOUR ORDER NUMBER	REFERENCE	CUSTOMER NO.	INVOICE NO.	INVOICE DATE	DATE SHIPPED
0099-002979	C139654	454634	819873	12/02/94	12/02/94

SOLD TO: M & M SUPPLY CO
PO BOX 548
DUNCAN OK 75533

SHIP TO: M & M SUPPLY
3923 OKLAHOMA AVE
WOODWARD, OK 73801

CERTIFIED TEST REPORT

TRI 414 (R 12/93)

ITEM	QUANTITY	DESCRIPTION/SPECIFICATION	HEAT CODE
30		3X1 STD CONC. A234-92A/SA234 WPB A106B 09 / N69975	XGJ
31	12	3X2 STD CONC A234-92A/SA234 WPB A106B 09 / L82128 STRESS RELIEVED AT 1200 F	LYW1
32	6	4X2 STD CONC A234-92A/SA234 WPB A106B 09 / C86737 STRESS RELIEVED AT 1200 F	MAL1
33	12	4X3 STD CONC. A234-92A/SA234 WPB A106B 09 / C86737 STRESS RELIEVED AT 1200 F	MAL1

CHEMICAL ANALYSIS

HEAT CODE	C	Mn	P	S	Si	Cr	Mo	Cu	Ni	V	Nb		CE *
XGJ	.18	.82	.010	.009	.26	.06	.01	.01	.02	.00	.00		.33
LYW1	.18	.83	.011	.004	.26	.06	.02	.03	.02	.00	.00		.34
MAL1	.18	.78	.010	.010	.24	.03	.01	.01	.00	.00	.00		.32
MAL1	.18	.78	.010	.010	.24	.03	.01	.01	.00	.00	.00		.32

PHYSICAL PROPERTIES / CHARPY RESULTS

HEAT CODE	TENSILE * KSI	YIELD KSI	% Elong. IN 2"	Hardness HB	Size MM x 10 mm	Temp. °F	FOOT POUNDS	LATERAL EXPANSION	% SHEAR
XGJ	70.0 L	45.3	37.0	197 MAX					
LYW1	62.1 L	42.5	26.0	125					
MAL1	67.80L	47.7	31.0	121					
MAL1	67.80L	47.7	31.0	121					

*L = LONGITUDINAL, T = TRANSVERSE, R = ROUND, S = STRIP

HACKNEY is a domestic manufacturer, and these items conform to the following specifications as they apply:
FITTINGS: ASTM A234 WPB, ASME SA234 WPB, ANSI B16.9, B16.28, AND NACE MR01-75.
FLANGES: ASTM A105 AND A516-70, ASME SA105, ANSI B16.5, and NACE MR01-75.
were heat treated as required by the applicable specification. They also conform to the requirements of Parts 192 and 195, Title 49, Code of Federal ons. All welded fittings are welded by certified welders to ASME Section X, and 100% radiographically examined per Article 2, ASME Section V. All are in ce with the requirements of Paragraph UG-11, Section VII, Division 1 of the ASME code. Hackney weld caps meet ASME Division 1, Section VIII Pressu Vessel Code Requirements, Paragraph UCS-79d. We certify these flanges and fittings capable of passing a hydrostatic test compatible with their rating, and that above figures are correct as contained in the records of the Company. Hardness testing and stamping are per NACE MR01-75.

/S/ [signature]

HACKNEY, INC.

A DIVISION OF TRINITY INDUSTRIES

P.O. Box 568887 • 2525 Stemmons Freeway
Dallas, Texas 75356-8887 • (214) 634-2850

YOUR ORDER NUMBER	REFERENCE	CUSTOMER NO.	INVOICE NO.	INVOICE DATE	DATE SHIPPED
0099-002979	C139554	454634	819873	12/02/94	12/02/94

SOLD TO: M & M SUPPLY CO
PO BOX 548
DUNCAN OK 75533

SHIP TO: M & M SUPPLY
3923 OKLAHOMA AVE
WOODWARD, OK 73801

CERTIFIED TEST REPORT

RI 414 (R 12/93)

ITEM	QUANTITY	DESCRIPTION/SPECIFICATION		HEAT CODE
28	7	8 STD WC A516-70 TUSCL 5892016	A234-92A/SA234 WPB	AZKD
29	3	10 STD WC A516-70 TUSCL 5892016	A234-92A/SA234 WPB	AZJW
30	8	3X1 STD CONC. A106B 09 / N76276	A234-92A/SA234 WPB	XCV
30		3X1 STD CONC. A106B 15 / 76406	A234-92A/SA234 WPB	XCC

CHEMICAL ANALYSIS

CODE	C	Mn	P	S	Si	Cr	Mo	Cu	Ni	V	Nb		C.E.*
AZKD	.24	1.07	.020	.009	.22	.03	.00	.03	.02	.00	.00		.43
AZJW	.24	1.07	.020	.009	.22	.03	.00	.03	.02	.00	.00		.43
XCV	.17	1.03	.004	.003	.22	.04	.01	.02	.02	.00	.00		.36
XCC	.19	1.00	.026	.009	.29	.01	.01	.01	.00	.00	.00		.36

PHYSICAL PROPERTIES / CHARPY RESULTS

HEAT CODE	TENSILE * KSI	YIELD KSI	% Elong. IN 2"	Hardness HB	Size MM x 10 mm	Temp. °F	FOOT POUNDS	LATERAL EXPANSION	% SHEAR
AZKD	80.1 T	55.7	33.0	197 MAX					
AZJW	85.0 T	58.6	32.0	197 MAX					
XCV	74.4 L	48.1	35.0	197 MAX					
XCC	75.4 L	51.5	31.0	197 MAX					

*L = LONGITUDINAL, T = TRANSVERSE, R = ROUND, S = STRIP

HACKNEY is a domestic manufacturer, and these items conform to the following specifications as they apply:
FITTINGS: ASTM A234 WPB, ASME SA234 WPB, ANSI B16.9, B16.28, AND NACE MR01-75.
FLANGES: ASTM A105 AND A516-70, ASME SA105, ANSI B16.5, and NACE MR01-75.

were heat treated as required by the applicable specification. They also conform to the requirements of Parts 192 and 195, Title 49, Code of Federal ns. All welded fittings are welded by certified welders to ASME Section X, and 100% radiographically examined per Article 2, ASME Section V. All are in e with the requirements of Paragraph UG-11, Section VII, Division 1 of the ASME code. Hackney weld caps meet ASME Division 1, Section VIII Pressure Vessel Code Requirements, Paragraph UCS-79d. We certify these flanges and fittings capable of passing a hydrostatic test compatible with their rating, and that the above figures are correct as contained in the records of the Company. Hardness testing and stamping are per NACE MR01-75.

/S/

HACKNEY, INC.

A DIVISION OF TRINITY INDUSTRIES

P.O. Box 568887 • 2525 Stemmons Freeway
Dallas, Texas 75356-8887 • (214) 634-2850

YOUR ORDER NUMBER	REFERENCE	CUSTOMER NO.	INVOICE NO.	INVOICE DATE	DATE SHIPPED
0099-002979	C139654	454634	819873	12/02/94	12/02/94

SOLD TO: H & M SUPPLY CO
PO BOX 548
DUNCAN OK 75533

SHIP TO: H & M SUPPLY
3923 OKLAHOMA AVE
WOODWARD, OK 73801

HI 414 (R 12/93)

CERTIFIED TEST REPORT

ITEM	QUANTITY	DESCRIPTION/SPECIFICATION	HEAT CODE
24	6	3 600 RF BLIND — A105-93B/SA105	0894CE
		A105 04 / H0787 — NORMALIZED AT 1650 F	
25	6	2 STD HC — A234-92A/SA234 WPB	AZFD
		A516-70 40 / J3543	
26	5	3 STD HC — A234-92A/SA234 WPB	AZHP
		A516-70 40 / K0848	
27	5	6 STD W/C — A234-92A/SA234 WPB	AZJH
		A516-70 TUSCL 88551000	

CHEMICAL ANALYSIS

CODE	C	Mn	P	S	Si	Cr	Mo	Cu	Ni	V	Nb		CE
0894CE	.25	1.04	.015	.027	.26	.08	.03	.28	.08	.00	.00		.47
AZFD	.17	1.01	.027	.010	.27	.09	.00	.03	.11	.02	.00		.37
AZHP	.15	1.08	.010	.009	.31	.06	.01	.03	.09	.01	.00		.35
AZJH	.26	1.19	.013	.014	.22	.01	.01	.02	.02	.00	.00		.46

PHYSICAL PROPERTIES / CHARPY RESULTS

HEAT CODE	TENSILE * KSI	YIELD KSI	% Elong. IN 2"	Hardness HB	Size MM x 10 mm	Temp °F	FOOT POUNDS	LATERAL EXPANSION	% SHEAR
0894CE	93.5 T % R.A.	55.6 =54.0	27.0	159					
AZFD	73.7 T	54.0	29.0	197 MAX					
AZHP	73.9 T	54.3	29.0	197 MAX					
AZJH	79.1 T	52.1	33.0	197 MAX					

* = LONGITUDINAL, T = TRANSVERSE, R = ROUND, S = STRIP

HACKNEY is a domestic manufacturer, and these items conform to the following specifications as they apply:
FITTINGS: ASTM A234 WPB, ASME SA234 WPB, ANSI B16.9, B16.28, AND NACE MR01-75.
FLANGES: ASTM A105 AND A516-70, ASME SA105, ANSI B16.5, and NACE MR01-75.
were heat treated as required by the applicable specification. They also conform to the requirements of Parts 192 and 195, Title 49, Code of Federal s. All welded fittings are welded by certified welders to ASME Section X, and 100% radiographically examined per Article 2, ASME Section V. All are in with the requirements of Paragraph UG-11, Section VII, Division 1 of the ASME code. Hackney weld caps meet ASME Division 1, Section VIII Pressure ssel Code Requirements, Paragraph UCS-79d. We certify these flanges and fittings capable of passing a hydrostatic test compatible with their rating, and that the ove figures are correct as contained in the records of the Company. Hardness testing and stamping are per NACE MR01-75.

/SI

HACKNEY, INC.

A DIVISION OF TRINITY INDUSTRIES
P.O. Box 568887 • 2525 Stemmons Freeway
Dallas, Texas 75356-8887 • (214) 634-2850

YOUR ORDER NUMBER	REFERENCE	CUSTOMER NO.	INVOICE NO.	INVOICE DATE	DATE SHIPPED
0099-002979	C139654	454634	821782	12/16/94	12/16/94

OLD TO: M & M SUPPLY CO
PO BOX 548
DUNCAN OK 75533

SHIP TO: M & M SUPPLY
3923 OKLAHOMA AVE
WOODWARD, OK 73801

CERTIFIED TEST REPORT

RI 414 (R 12/93)

ITEM	QUANTITY	DESCRIPTION/SPECIFICATION		HEAT CODE
42	100	3 STD LR 90 A106B 09 / L82412	A234-92A/SA234 WPB STRESS RELIEVED AT 1200 F	LZA1
51	3	8 STD TEE A106B 07 / H60403	A234-92A/SA234 WPB STRESS RELIEVED AT 1200 F	LZE1
53	6	4 XH LR 90 A106B 09 / U82173	A234-92A/SA234 WPB STRESS RELIEVED AT 1200 F	MCY1

CHEMICAL ANALYSIS

CODE	C	Mn	P	S	Si	Cr	Mo	Cu	Ni	V	Nb		C.E.
LZA1	.19	.80	.011	.009	.26	.04	.01	.02	.02	.00	.00		.34
LZE1	.14	.70	.006	.007	.17	.09	.02	.18	.09	.00	.00		.30
MCY1	.17	.78	.012	.010	.23	.03	.01	.01	.01	.00	.00		.31

PHYSICAL PROPERTIES / CHARPY RESULTS

HEAT CODE	TENSILE * KSI	YIELD KSI	% Elong. IN 2"	Hardness HB	Size MM x 10 mm	Temp °F	FOOT POUNDS	LATERAL EXPANSION	% SHEAR
LZA1	67.5 L	45.1	26.0	127					
LZE1	67.4 L	46.9	36.0	114					
MCY1	70.2 L	51.9	32.0	137					

L = LONGITUDINAL, T = TRANSVERSE, R = ROUND, S = STRIP

HACKNEY is a domestic manufacturer, and these items conform to the following specifications as they apply:
FITTINGS: ASTM A234 WPB, ASME SA234 WPB, ANSI B16.9, B16.28, AND NACE MR01-75.
FLANGES: ASTM A105 AND A516-70, ASME SA105, ANSI B16.5, and NACE MR01-75.
were heat treated as required by the applicable specification. They also conform to the requirements of Parts 192 and 195, Title 49, Code of Federal
ns. All welded fittings are welded by certified welders to ASME Section X, and 100% radiographically examined per Article 2, ASME Section V. All are i
e with the requirements of Paragraph UG-11, Section VII, Division 1 of the ASME code, Hackney weld caps meet ASME Division 1, Section VIII Pressu
essel Code Requirements, Paragraph UCS-79d. We certify these flanges and fittings capable of passing a hydrostatic test compatible with their rating, and that
bove figures are correct as contained in the records of the Company. Hardness testing and stamping are per NACE MR01-75.

/S/ Blinda Lanthier

HACKNEY, INC.

A DIVISION OF TRINITY INDUSTRIES

P.O. Box 568887 • 2525 Stemmons Freeway
Dallas, Texas 75356-8887 • (214) 634-2850

YOUR ORDER NUMBER	REFERENCE	CUSTOMER NO.	INVOICE NO.	INVOICE DATE	DATE SHIPPED
0099-002979	C139654	454634	824237	01/12/95	01/12/95

SOLD TO: M & M SUPPLY CO
P.O. BOX 548
DUNCAN OK 75533

SHIP TO: M & M SUPPLY
3923 OKLAHOMA AVE
WOODWARD, OK 73601

CERTIFIED TEST REPORT

RI 414 (R 12/93)

ITEM	QUANTITY	DESCRIPTION/SPECIFICATION	HEAT CODE
35	12	6X4 STD CONC A234-92A/SA234 WPB A106B 07 / H9036B STRESS RELIEVED AT 1200 F	MCA1
41	80	2 STD LR 90 A234-92A/SA234 WPB A106B 09 / L82414 STRESS RELIEVED AT 1200 F	MCW1
45	18	3 STD TEE A234-92A/SA234 WPB A106B 09 / L82412 STRESS RELIEVED AT 1200 F	LZA1
46	18	4 STD TEE A234-92A/SA234 WPB A106B 09 / X85246 STRESS RELIEVED AT 1200 F	MCO1

CHEMICAL ANALYSIS

CODE	C	Mn	P	S	Si	Cr	Mo	Cu	Ni	V	Nb		CE =
MCA1	.14	.64	.007	.006	.21	.08	.02	.14	.09	.00	.00		.25
MCW1	.17	.80	.010	.008	.24	.05	.01	.02	.03	.00	.00		.32
LZA1	.19	.80	.011	.009	.26	.04	.01	.02	.02	.00	.00		.34
MCO1	.15	.78	.014	.007	.22	.03	.01	.01	.01	.00	.00		.32

PHYSICAL PROPERTIES / CHARPY RESULTS

HEAT CODE	TENSILE * KSI	YIELD KSI	% Elong. IN 2"	Hardness HB	Size MM x 10 mm	Temp °F	FOOT POUNDS	LATERAL EXPANSION	% SHEAR
MCA1	62.6 L	43.7	38.0	107					
MCW1	70.2 L	45.9	35.5	197 MAX					
LZA1	67.5 L	45.1	26.0	127					
MCO1	68.1 L	46.7	47.6	197 MAX					

L = LONGITUDINAL, T = TRANSVERSE, R = ROUND, S = STRIP

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FITTINGS: ASTM A234 WPB, ASME SA234 WPB, ANSI B16.9, B16.28, AND NACE MR01-75.
FLANGES: ASTM A105 AND A516-70, ASME SA105, ANSI B16.5, and NACE MR01-75.
...were heat treated as required by the applicable specification. They also conform to the requirements of Parts 192 and 195, Title 49, Code of Federal ...s. All welded fittings are welded by certified welders to ASME Section X, and 100% radiographically examined per Article 2, ASME Section V. All are in ... with the requirements of Paragraph UG-11, Section VII, Division 1 of the ASME code. Hackney weld caps meet ASME Division 1, Section VIII Pressure Vessel Code Requirements, Paragraph UCS-79d. We certify these flanges and fittings capable of passing a hydrostatic test compatible with their rating, and that the above figures are correct as contained in the records of the Company. Hardness testing and stamping are per NACE MR01-75.

/S/

HACKNEY, INC.

A DIVISION OF TRINITY INDUSTRIES

P.O. Box 568887 • 2525 Stemmons Freeway
Dallas, Texas 75356-8887 • (214) 634-2850

YOUR ORDER NUMBER	REFERENCE	CUSTOMER NO.	INVOICE NO.	INVOICE DATE	DATE SHIPPED
0099-002979	C139654	454634	826204	01/25/95	01/25/95

SOLD TO: M & H SUPPLY CO
PO BOX 548
DUNCAN OK 75533

SHIP TO: M & H SUPPLY
3923 OKLAHOMA AVE
WOODWARD, OK 73801

CERTIFIED TEST REPORT

ZRI 414 (R 12/93)

ITEM	QUANTITY	DESCRIPTION/SPECIFICATION	HEAT CODE
10	6	2 150 RF SO A105-93B/SA105	1194CR
		A105 26 / 494-3223 AS FORGED	
34	12	6X3 STD CONC A234-92A/SA234 WPB	MCA1
		A1068 07 / H90368 STRESS RELIEVED AT 1200 F	

CHEMICAL ANALYSIS

CODE	C	Mn	P	S	Si	Cr	Mo	Cu	Ni	V	Nb		CE =
1194CR	.19	.83	.019	.029	.21	.05	.02	.22	.10	.00	.00		.36
MCA1	.14	.64	.007	.006	.21	.08	.02	.14	.09	.00	.00		.23

PHYSICAL PROPERTIES / CHARPY RESULTS

HEAT CODE	TENSILE * KSI	YIELD KSI	% Elong. IN 2"	Hardness HB	Size MM x 10 mm	Temp °F	FOOT POUNDS	LATERAL EXPANSION	% SHEAR
1194CR	80.4 T.R.A.	46.5 =65.0	31.0	135					
MCA1	62.6 L	43.7	38.0	107					

L = LONGITUDINAL T = TRANSVERSE R = ROUND S = STRIP

HACKNEY is a domestic manufacturer, and these items conform to the following specifications as they apply:
FITTINGS: ASTM A234 WPB, ASME SA234 WPB, ANSI B16.9, B16.28, AND NACE MR01-75.
FLANGES: ASTM A105 AND A516-70, ASME SA105, ANSI B16.5 and NACE MR01-75.
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Vessel Code Requirements, Paragraph UCS-79d. We certify these flanges and fittings capable of passing a hydrostatic test compatible with their rating, and that t
above figures are correct as contained in the records of the Company. Hardness testing and stamping are per NACE MR01-75.

HACKNEY, INC.

A DIVISION OF TRINITY INDUSTRIES

P.O. Box 568567 • 2525 Stemmons Freeway

Dallas, Texas 75356-8567 • (214) 631-2850

YOUR ORDER NUMBER	REFERENCE	CUSTOMER NO.	INVOICE NO.	INVOICE DATE	DATE SHIPPED
0026948	C116345	297190	974358	11/16/93	11/16/93

D TO: GRINNELL CORP.
4118 SOUTH 70TH AVE.
TULSA OK 74145

SHIP TO: GRINNELL CORP
4118 SOUTH 70TH EAST AVE.
TULSA, OK 74145

CERTIFIED TEST REPORT

(R 6/91)

EM	QUANTITY	DESCRIPTION/SPECIFICATION		HEAT CODE
	20	6 150 RF WN STD	A105-92 /SA105	0593CA
		A105 26 / 493-1631	AS FORGED	
		6 150 RF WN STD	A105-92 /SA105	0593AX
		A105 26 / 493-1247	AS FORGED	

CHEMICAL ANALYSIS

EAT CODE	C	Mn	P	S	Si	Cr	Mo	Cu	Ni	V	Nb		CE *
0593CA	.22	.84	.020	.023	.23	.07	.02	.27	.09	.00	.00		.40
0593AX	.25	.83	.034	.029	.24	.12	.02	.34	.09	.00	.00		.45

PHYSICAL PROPERTIES / CHARPY RESULTS

HEAT CODE	TENSILE * KSI	YIELD KSI	% Elong. IN 2"	Hardness HB	Size MM x 10 mm	Temp. °F	FOOT POUNDS	LATERAL EXPANSION	% SHEAR
0593CA	74.4	56.0	30.0	150					
	% R.A.	=58.0							
0593AX	84.3	48.9	28.0	156					
	% R.A.	=52.0							

* LONGITUDINAL, T = TRANSVERSE

0593CA 0593AX CONFORM TO THE REQUIREMENTS OF NACE MR0175-92

al[illegible] items were heat treated in accordance with the requirements of the specification to which they were manufactured.

certify that the products covered by this report comply with the applicable requirements of ASTM and or ASME specifications, as noted for each item.

hereby certify that the above figures are correct as contained in the records of the Company.

Tank Corrosion Protection

PROTECTIVE MAINTENANCE COATINGS DATA

For Industrial Use and Professional Application Only
Rust Inhibitive Polyamide Epoxy Coating

GLID-GUARD® Corrosion Resistant HS Epoxy No. 5465 Series

For Interior-Exterior Metal

Read Label and Material Safety Data Sheet Prior to Use.
See other cautions on last page. DSF1-0690

PRODUCT DESCRIPTION

GLID-GUARD Corrosion Resistant HS Epoxy is a low VOC, high solids, two package polyamide epoxy coating intended for direct application to interior and exterior metal. It is rust inhibitive and resistant to moisture and many chemicals. The product's excellent penetrating properties result in superior adhesion.

This product is an excellent choice for application to metal when surface preparation is limited to Hand Tool or Power Tool Cleaning. It is also suitable for use as a high build intermediate coat in heavy-duty industrial systems and may be used as a topcoat when the color and sheen are acceptable.

Like most epoxy coatings, GLID-GUARD Corrosion Resistant HS Epoxy will chalk and lose gloss on exposure to direct sunlight but will maintain excellent film integrity and continue to provide excellent protection to the substrate.

PRODUCTS AVAILABLE

GLID-GUARD Corrosion Resistant HS Epoxy Red No. 5465 (Component A)
GLID-GUARD Corrosion Resistant HS Epoxy Gray No. 5466 (Component A)
GLID-GUARD Corrosion Resistant HS Epoxy White No. 5467 (Component A)
GLID-GUARD Corrosion Resistant HS Epoxy Aluminum Mastic No. 5468 (Component A)
GLID-GUARD Corrosion Resistant HS Epoxy Curing Agent No. 5469 (Component B)

NOTE: Refer to Protective Maintenance Coatings Data sheet Section 8 No. 29 for detailed information on Aluminum Mastic No. 5468.

TYPICAL USES

Ideal for use as a primer and intermediate build coat on storage tanks, structural steel, machinery and equipment in the food processing industries, chemical industries, petroleum refineries, paper mills, marine structures, mining industries, waste water treatment facilities, and general industrial buildings.

PRODUCT ADVANTAGES

- Low VOC
- Rust inhibitive
- Tolerates surface moisture during application
- Long term flexibility—does not become brittle with age
- Hard, tough film
- Free of toxic amine curing agents
- Excellent alkali and solvent resistance
- High film build
- Protection in fresh or salt water immersion
- Lead and chromate free
- Simple 1 to 1 mixing ratio

SERVICE CONDITIONS

Do not use for potable water or direct food contact service. Do not use on unprimed wood or unprimed gypsum wallboard. Do not use on surfaces that may be subjected to severe abrasion.

Will withstand 250°F. continuous and 300°F. intermittent dry heat. The color may change as these limits are approached, but the film will remain intact.

REGULATORY RESTRICTIONS

The application VOC of this product may be restricted by law in some locations. Application VOC is increased by thinning with solvent. If the application VOC is restricted to 420 gm/liter (3.5 lbs/gal.), thinning must not exceed 7% by volume (9 fl.oz./gal.) with GLID-GUARD Epoxy Solvent No. 5568. If the application VOC is restricted to 450 gm/liter (3.75 lbs./gal.) or higher or is not restricted, thinning with up to 10% (12 fl.oz./gal.) is permissible.

TECHNICAL DATA

All data shown is for a mixed (converted) gallon unless otherwise noted

*Product No.—5467/5469
Generic Type—Polyamide epoxy
Color—White
Gloss—Approximately 30 @ 60°
Percent Solids by Weight—71% ± 1%
Percent Solids by Volume—54% ± 1%
Theoretical Coverage per 1.0 dry mil (1.9 mils wet)—866 sq.ft./gallon
**Recommended Film Build/Coverage (theoretical, unreduced)
  Minimum—3.0 mils dry (5.5 mils wet) 289 sq.ft./gallon
  Typical—5.0 mils dry (9.5 mils wet) 173 sq.ft./gallon
  Maximum—8.0 mils dry (15.0 mils wet) 108 sq.ft./gallon
  (wet mil figures rounded to the nearest 0.5 mil)
  When computing working coverage, allow for application losses, surface irregularities, any solvent addition, etc.
Percent Vehicle (Solids) by Weight—28% ± 1%
Percent Pigment by Weight—43% ± 1%
Percent Solvent by Weight—29% ± 1%
Viscosity—95-100 KU
Weight per Gallon—11.1 lbs.
Flash Point (Closed Cup)—Base No. 5467—46°F. Curing Agent No. 5469—43°F.
VOC—3.24 lbs/gallon (388 gm/liter) unreduced
  3.48 lbs/gallon (417 gm/liter) reduced 7% by volume with No. 5568
  3.56 lbs/gallon (427 gm/liter) reduced 10% by volume with No. 5568
Drying Time (70°F., 50% Relative Humidity)
  Touch—1-2 hours
  Handle—7 hours
  Recoat—7 hours
  Full Cure—7 days
Reduction Solvent—GLID-GUARD Epoxy Solvent No. 5568 (10% maximum)
Clean-Up Solvent—GLID-GUARD Epoxy Solvent No. 5568 or MEK
Type of Cure—Converted
Mixing Ratio (Base/Curing Agent) by Volume—1 to 1
Induction Before Use—30 minutes @ material temperatures >70°F.
  60 minutes @ material temperatures 60°-70°F.
Pot Life—4 hours @ 70°F.
Tinting—DO NOT TINT

*Compositional data for other products in this series may differ slightly.
**As measured over the peaks of any surface projections or blast profile.

GLID-GUARD Corrosion Resistant HS Epoxy (Continued)

MATERIAL PREPARATION

Do not add unspecified curing agents or solvents or mix with other paints. Do not tint.

Thoroughly mix the selected GLID-GUARD Corrosion Resistant HS Epoxy (Component A) and Corrosion Resistant HS Epoxy Curing Agent No. 5469 (Component B) separately, then combine the two components in equal parts by volume using power agitation. If agitation equipment is not explosion proof, provide good ventilation to prevent build up of vapors. Allow the combined material to stand 30 minutes before use. Extend this induction (standing) time to 60 minutes if the surface or material temperature is 60°—70°F. After the induction period has elapsed, add up to 10% by volume GLID-GUARD Epoxy Solvent No. 5568 (12 fluid ounces per gallon of combined material) if necessary for application and mix thoroughly (see "Regulatory Restrictions" above). Pot life is 4 hours at 70°F., less at higher temperatures.

SURFACE PREPARATION

All surfaces should be clean, dry and free of all contaminants.

Metal Surfaces

Ferrous Metal

Surface preparation is dependent upon service conditions as follows:

TYPE A—AGGRESSIVELY CORROSIVE
This exposure is an area characterized by aggressive chemical fumes, mists or dusts or other chemical contaminants that combine with high humidity and condensed moisture to corrode zinc at rates greater than one mil per year. The need to limit air pollution and protect personnel generally confines chemical concentrations of such an aggressive nature to within a radius of about 50 yards from the source of contamination. For Type A environments and all immersion exposures, White Metal Blast Cleaning (SSPC-SP5-82 and SSPC-SP-COM) is recommended. For splash and spillage, Near-White Blast Cleaning (SSPC—SP10-82 and SSPC-SP-COM) is satisfactory.

TYPE C—CORROSIVE
This exposure is less destructive than Type A exposure and is characterized by moderately aggressive chemical fumes, mists, or dusts that combine with moisture and high humidity to corrode zinc at rates less than one mil per year. Type A exposure may, in many instances, become Type C exposure outside of a radius of about 50 yards from the source of contamination for a limited further distance. For Type C environments, Near-White Blast Cleaning (SSPC-SP10-82 and SSPC-SP-COM) is recommended.

TYPE M—MODERATE
This exposure is generally outdoors and is characterized by normal atmospheric weathering and/or light or moderate concentrations of chemical fumes that combine with humidity and condensed moisture to corrode carbon steel at rates less than three mils per year. Zinc in this exposure is virtually free of corrosion. Light to moderate chemical fume concentrations in indoor areas without excessive humidity may produce similar conditions. For Type M environments, Commercial Blast Cleaning (SSPC-SP6-82 and SSPC-SP-COM) is recommended. Where exposure is normal weathering only, Brush-Off Blast Cleaning (SSPC-SP7-82 and SSPC-SP-COM), Power Tool Cleaning (SSPC-SP3-82 and SSPC-SP-COM), or Hand Tool Cleaning (SSPC-SP2-82 and SSPC-SP-COM) will provide excellent service.

TYPE P—PROTECTED (ARCHITECTURAL)
In this category, surfaces are generally indoors and are not subjected to high humidity or chemical contaminants that will attack paint or steel. For Type P environments, Brush-Off Blast Cleaning (SSPC-SP7-82 and SSPC-SP-COM), Power Tool Cleaning (SSPC-SP3-82 and SSPC-SP-COM), or Hand Tool Cleaning (SSPC-SP2-82 and SSPC-SP-COM) will provide the sound substrate needed for proper adhesion.

Galvanized and Aluminum

Sandblasting is unnecessary. Remove oil, grease, dirt, dust and chemical contaminants using the prescribed cleaning methods.

Poured Concrete

Verify that all surface projections have been leveled. Remove all oils, grease, dust, dirt and chemical contaminants with the prescribed cleaning methods. Remove weak or powdery surfaces by acid etching or brush abrasive blasting. Dull very smooth concrete by similar means. Prime with this product thinned 10% by volume with GLID-GUARD Epoxy Solvent No. 5568 (see "Regulatory Restrictions" above).

Previously Painted Surfaces

The performance of this coating over previously painted surfaces is directly influenced by the type, age and condition of the old finish. For best results in immersion situations, completely remove any old coating and prepare as for new surfaces. For non-immersion service, remove all blistered, loose or peeling old coating. Hard or glossy finishes should be dulled by sanding or other abrasive means. Apply to a test area; if wrinkling or lifting occurs after overnight drying, remove the old coating.

APPLICATION

Do not apply when air or substrate temperature is below 60°F.

For best appearance, primary application should be by airless or conventional spray. Use brush or roller application for small areas only—flow and leveling will be limited. Spray application is required to obtain 5.0 mils dry in a single coat. Application by brush or roller will limit the film thickness to 3.0-4.0 mils dry per coat.

SPRAY APPLICATION

Airless Spray

Glidden equipment is specified.
Gun: ASM 400 Fluid Tip: 315-619
Pump: GLIDDEN 500™, GLIDDEN 750™, GLIDDEN 750GE™, GLIDDEN FORMULA ONE™
Pressure: 2000-2500 psi
NOTE: All pumps must be kept well away from areas where vapors from this product may collect.

Conventional Spray

Gun: Binks Model 18, Binks 2001, or equivalent
Needle: Binks Model 63A or equivalent
Fluid Nozzle: Binks Modes 63PB or equivalent
Air Cap: Binks Model 63B or equivalent

COVERAGE

Typical coverage (calculated, unreduced) is 173 sq.ft./gallon at 5.0 mils dry (9.5 mils wet). Minimum film thickness is 3.0 mils dry (5.5 mils wet) 289 sq.ft./gallon, maximum is 8.0 mils dry (15.0 mils wet) 108 sq.ft./gallon. All wet mil figures are rounded to the nearest 0.5 mil. When computing working coverage, allow for application losses, surface irregularities, any solvent addition, etc.

DRYING

Dries to touch in 1-2 hours, to handle in 7 hours, to recoat in 7 hours, to full cure in 7 days at 70°F., 50% relative humidity. Allow longer drying times under cooler or more humid conditions.

CLEAN-UP

Clean all equipment immediately after use with GLID-GUARD Epoxy Solvent No. 5568 or methyl ethyl ketone.

TOPCOATS

SOLVENT EPOXY FINISHES
GLID-GUARD Corrosion Resistant HS Epoxy No. 5465/5469 series
GLID-GUARD Chemical Resistant Epoxy No. 5240/5242 series
GLID-GUARD High Solids Epoxy No. 5430/5434 series
GLID-GUARD® DURAMASTER™ High Solids Epoxy No. 5295/5299 series
GLID-GUARD® METALLITE™ High Build Epoxy No. 5475/5476
GLID-GUARD Cold Cure Epoxy No. 5281/5265
GLID-GUARD Coal Tar Epoxy No. 5270/5271
GLID-GUARD Hi-Build Coal Tar Epoxy No. 5273/5274
GLID-GUARD® GLID-TILE™ Epoxide No. 5550/5552 series
NU-PON® COTE Color Coat No. 7240/7200 series

WATER-BORNE EPOXY FINISHES
GLID-GUARD Acrylic Epoxy No. 5277/5278
GLID-GUARD Amine-Adduct Epoxy No. 5585/5586 series

POLYURETHANE FINISHES
GLID-THANE™ ONE Moisture Cured Polyurethane No. 6100 series
GLID-THANE II Acrylic Polyurethane No. 6200/6252 series
GLID-GUARD High Solids Acrylic/Polyester Urethane No. 5410/5414 series

SOLVENT VINYL FINISHES
GLID-GUARD Double Build Vinyl No. 5514
GLID-GUARD® VINYL-COTE™ High Build No. 5522

WATER-BORNE ACRYLIC FINISHES
LIFEMASTER™ PRO Hi Performance Acrylic No. 6900 series
LIFEMASTER PRO HB Acrylic No. 5440 series

SHERWIN WILLIAMS

The Sherwin-Williams Company
Cleveland, OH 44115

Hi-Mil Sher-Tar™ Epoxy—B69B40/B60V40

Description

Hi-Mil Sher-Tar Epoxy is a high build, polyamide cured epoxy coal tar coating. Can be applied at high film thicknesses in one coat.

Characteristics

Color:		Black
Coverage:		
Recommended:		45-68 sq. ft./gal. 24-35 mils wet; 16-24 mils dry
Theoretical, no loss:		1090 sq. ft./ gal. @ 1.0 mil dry
Curing Mechanism:		Crosslink Polymerization
Drying Schedule: (temperature & humidity dependent)		
@ 77°F & 50% RH @ 29 mils wet:		
To Touch:		8-10 hours
Tack Free:		48 hours
To Recoat:	Minimum	Maximum
@50-60°F	24 hours	72 hours
@60-80°F	16 hours	48 hours
@80-100°F	8 hours	16 hours
@100-120°F	1 hour	6 hours
Finish:		Semi-Gloss
Flash Point:	110°F (Pensky-Martens Closed Cup)	
Number of Components (Ratio):		2 (3:1)
Pot Life:		4 hours @ 77°F
Sweat-in time:		30 minutes @ 77°F
Solvent/Reducer:		Reducer #54
Vehicle Type:		Polyamide Epoxy
VOC:	306 grams/liter; 2.55 lbs /gal	
Volume Solids:		68 ± 2%
Weight Solids:		77 ± 2%
Weight per Gallon:		10.3 ± .3 lbs

Application

Application Conditions

Temperature (air, surface, material): ..... 50-100°F
(surface temp. at least 5°F above dew point)
Relative humidity: ..... 90% max.

Brush: No reduction required.Use a natural bristle brush.

Roller: No reduction required. Use a 3/4" woven nap with phenolic core.

Small areas may be brushed or rolled, but film build will be lower.

Airless spray:

Pump	30:1
Pressure	2500 - 3000 psi
Tip	.031"
Hose	3/8" - 1/2" I.D.
Filter	none

Reduction ... up to 1 quart per gallon of catalyzed material

Conventional spray:

Gun	Binks 18 gun
Air Pressure	60 psi
Fluid Pressure	40 psi
Fluid/Air Nozzle	66/63 PB
Hose	1/2" I.D.

Reduction ... up to 1 quart per gallon of catalyzed material

Specifications

Substrate — Surface Preparation (See pages 2 through 5)

Primer (see primer page for additional details) ..... Page #

Aluminum, atmospheric only ..... SSPC SP7/SW-18
No primer needed

Concrete ..... SW-6, A
No primer needed

Galvanized Metal, atmospheric only ... SSPC SP7/SW-18
No primer needed

Steel, atmospheric only ..... SSPC SP6/SW-17
Zinc Clad Primer 115-120
Tile-Clad II Epoxy Primer 109

Steel, immersion SSPC-SP5/SW-16
No primer needed

Performance Specifications

Physical Properties:

Abrasion Resistance (ASTM D4060, 1000 cycles)	101 mg
Direct Impact (ASTM G14)	>80 inch lbs.
Dry Heat Resistance (ASTM D2485)	250° F
Elcometer Adhesion (ASTM D4541)	600 psi
Flexibility (ASTM D522, 180° bend)	1" mandrel
Moisture Condensation Resistance (ASTM D4585)	1000 hours
Pencil Hardness (ASTM D3363)	4H
Salt Fog Resistance (ASTM B117)	1000 hours
Thermal Shock (ASTM D2246)	250 cycles
Wet Heat Resistance (not immersion)	120° F

Resistance Guide:
(Resistance to fumes, splash and spillage - not immersion-ASTM D3912)

Acid Salt Solutions	Severe
Aliphatic Hydrocarbons	Severe
Alkalies	Severe
Alkali Salt Solutions	Severe
Aromatic Hydrocarbon Solvents	Moderate
Chlorinated Solvents	Moderate
Fresh Water	Immersion
Salt Water	Immersion
Glycol ethers, alcohols, formaldehyde	Severe
Inorganic Acids	Severe
Oils (cutting, vegetable, lubricating)	Severe
Organic Acids	Severe
Oxygenated Solvents	Moderate

WISco, INC.

11811 North Fwy., Suite 670
Houston, Texas 77060
(713) 820-8066

Page 1 of 1
Report Date 11/25/93
Report No. 002

Customer USPCI Attn: Bruce Patterson
Order No. 12418-30-46 Dated _____ Rev. _____ Dated _____
Mat'l Destination Lone Mt. Facility, Waynoka, OK Req. Date _____
Shipment Date is now unknown As of 11/25/93 Changed from _____
Inspector estimated shipment date _____ Order is 90 percent completed
Vendor Delta Tank Co. Order No. _____ Dated _____
Manufacturer Lide Tank Co. Phone 817-562-5526
Shop Location Mexia, TX Shop Order TKEB2 & TKEF4
Inspector's Contact Mr. Billy Lide Position Customer Contact
Report is: x Interim ___ Final Regarding: x Inspection ___ Expediting ___ Status
MATERIAL DESCRIPTION:

Two (2) tanks - one 6' 4" OD x 12' 0" high; one 5' 0" OD X 12' 0" high
To specifications of USPCI and API 650

STATUS OF ORDER: Engineering, Materials, Fabrication, Inspection, Completion

Writer's visit to vendor on Wednesday, 11/24/93, was to witness sandblast, initial paint coating and first coat of Sher-Tar epoxy.

Sandblast was verified to be as required SSPC-SP6, but due to immediate change in weather conditions, writer informed vendor's Mr. Billy Lide, that painting and/or epoxy coating at this time was not recommended. He also agreed. Items are to be reblasted and inspection of first coatings is to be on Monday, 11/29/93 or Tuesday, 11/30/93, weather permitting.

A spark or holiday test is to be performed on Sher-Tar epoxy along with micro-test of same and external coating of Glidden epoxy #5466-3 to 4 mils. A requirement of 7 mils on Sher-Tar epoxy will also be verified.



INSPECTOR: Dub Greer
INSPECTION ORDER: 12418-30-46

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 8

To BRUCE PATTERSON	From Luana
Co.	Co.
Dept.	Phone #
Fax #	Fax #

, INC.

70

Page 1 of 1
Report Date 12/3/93
Report No. 003

Customer USPCI Attn: Bruce Patterson
Order No. 12418-30-46 Dated _____ Rev. _____ Dated _____
Mat'l Destination Lone Mt. Facility, Waynoka, OK Req. Date _____
Shipment Date is now ready now As of 12/3/93 Changed from _____
Inspector estimated shipment date ready now Order is 100 percent completed
Vendor Delta Tank Co. Order No. _____ Dated _____
Manufacturer Lide Tank Co. Phone 817-562-5526
Shop Location Mexia, TX Shop Order TKE-B2 & TKE-F4
Inspector's Contact Mr. Billy Lide Position Vice President
Report is: ___ Interim x Final Regarding: x Inspection ___ Expediting ___ Status
MATERIAL DESCRIPTION:

Two (2) tanks - one 6' 4" OD x 12' 0" high; one 5' 0" OD X 12' 0" high
To specifications of USPCI and API 650

STATUS OF ORDER: Engineering, Materials, Fabrication, Inspection, Completion

Writer's visits to vendor on Tuesday, 11/30/93, and Friday, 12/3/93, inspection functions were performed as follows:

11/30/93

First coat of Sher-Tar epoxy (internally) was micro-tested. Results were noted to be acceptable with an average of 3.5 mils.

Sandblast was verified to be SSPC-SP-6 with anchor pattern of 3.5 to 4.0. A Keane-Tator surface comparator was used to verify anchor pattern on each vessel.

12/3/93

Writer verified Sher-Tar epoxy to have mil thickness ranging from 7.2 to 14.8 on each vessel.

External gray primer paint range from 3.5 to 6.5 on each vessel.

A holiday test was performed internally on each vessel and found to be satisfactory. Items were released for shipment.

INSPECTOR: Dub Greer
INSPECTION ORDER: 12418-30-46

Piping Corrosion Protection

The Sherwin-Williams Company
Cleveland, OH 44115

Kem Kromik Universal Metal Primer—B50Z Series

Description

Kem Kromik Universal Metal Primer is a low VOC, modified alkyd resin primer designed for use over iron and steel substrates. Can be used as a "universal" primer under high performance topcoats and is also suitable as a "barrier" coat over conventional coatings which would normally be attacked by strong solvents in high performance coatings.

Characteristics

Color: Brown, Off White, and Buff

Coverage:

Recommended: 204-273 sq. ft./gal.
6-8 mils wet; 3-4 mils dry

Theoretical, no loss: 818 sq. ft./ gal. @ 1.0 mil dry

Curing Mechanism: Oxidation

Drying Schedule: (temperature & humidity dependent)
@ 6 mils wet, 50% R. H. and:

	@ 40°F	@77°F	@110° F
To Touch:	2 hours	30 minutes	15 minutes
Tack Free:	2½ hours	1 hour	20 minutes
To Recoat with:			
alkyds	2½ hours	1 hour	45 minutes
epoxy	36 hours	16 hours	16 hours
urethane	36 hours	16 hours	16 hours

Finish: 0-10 units @ 85°
Flash Point: 80°F (Pensky-Martens Closed Cup)
Solvent: Xylene
Vehicle Type: Phenolic Alkyd
VOC: 415 grams/liter; 3.45 lbs./gal.
Volume Solids: 51 ± 2%
Weight Solids: 72 ± 2%
Weight per Gallon: 12.5 ± .35 lbs
Meets the performance requirements, not necessarily composition, of Federal Specification: TT-P-664D

Application

Application Conditions

Temperature (air, surface, material): ..... 40-120°F
(surface temp. at least 5°F above dew point)
Relative humidity: ..... 85% maximum.

Brush: No reduction required. Use a natural bristle brush.

Roller: No reduction required. Use a 3/8" woven nap with phenolic core.

Airless spray:

Pressure ..... 1800-3000 psi
Tip ..... .015" - .019"
Hose ..... 1/4" I.D.
Filter ..... 60 mesh
Reduction ..... normally no reduction required

Conventional spray:

Specifications

Substrate	Surface Preparation (See pages 2 through 5)
Steel	SSPC SP2/ SW-14

2 topcoats are recommended over all primers/substrates.

Suggested topcoats	Page
A-100 Exterior Latex Finishes	24-26
Corothane II Satin Polyurethane	32
DTM Acrylic Coatings	34
Heavy Duty Epoxy	49
Hi-Bild Aliphatic Polyurethane	50
Hi-Solids Polyurethane	53
Industrial Enamel	54
Industrial Enamel HS	55
Metalatex Semi-Gloss Coating	64
ProMar Interior & Exterior Alkyd & Latex Topcoats	73-95
Sher-Tile Epoxy	100
Silver-Brite Aluminum	102
Tile-Clad High Solids Epoxy	108
Water Based Catalyzed Epoxy	111

Performance Specifications

Physical Properties:

Abrasion Resistance (ASTM D4060, 1000 cycles)	250 mg
Direct Impact (ASTM G14)	70 inch lbs.
Dry Heat Resistance (ASTM D2485)	200° F
Elcometer Adhesion (ASTM D4541)	260 psi
Exterior Durability (with chalk)	Good
Flexibility (ASTM D522, 180° bend)	1/4" mandrel
Moisture Condensation Resistance (ASTM D4585)	500 hrs.
Pencil Hardness (ASTM D3363)	H
Salt Fog Resistance (ASTM B117)	500 hours
Thermal Shock (ASTM D2246)	5 cycles

Resistance Guide:
(Resistance to fumes, splash and spillage - not immersion-ASTM D3912).

Acid Salt Solutions	Moderate
Aliphatic Hydrocarbons	Moderate
Alkalies	Not recommended
Aromatic Hydrocarbon Solvents	Light
Chlorinated Solvents	Not recommended
Fresh Water	Moderate
Salt Water	Moderate
Glycol ethers, alcohols, formaldehyde	Moderate
Oils (cutting, vegetable, lubricating)	Severe
Organic Acids	Light
Oxygenated Solvents	Not recommended

Secondary Containment Corrosion Protection

Dudick Inc.

1818 Miller Parkway
Streetsboro, Ohio 44241

(216) 562-1970
(216) 562-7638 FAX

Primer 67/67C

100 % SOLIDS, MOISTURE-TOLERANT EPOXY PRIMER FOR STEEL AND CONCRETE 3-4 MILS (0.1 mm)

RECOMMENDED APPLICATIONS

Concrete Substrates
Steel Substrates
Primer for Epoxy and Urethane
Floor Toppings, Linings, Coatings and Grout

PHYSICAL PROPERTIES

Tensile Strength ASTM C-307	2,000 - 2,500 PSI
Tensile Elongation ASTM C-307	12-25 %
Adhesion to Concrete ASTM D-4541	Cohesive Failure of concrete
Adhesion to Steel ASTM D-4541	2,200-2,500 PSI
Electrical Properties NFPA #99, ASTM F-150	< 25,000 ohms

SPECIFICATIONS

Primer shall be 3-4 mils thick, 100% solids bisphenol A epoxy cured with an amine adduct as manufactured by Dudick Inc. Primer 67 shall be brush, roller or spray applied in accordance with the manufacturer's recommended practices. Primer 67C must be spray or roller applied.

PRIMER 67

Primer 67 is designed to prevent abrasive-blasted steel from developing rust bloom prior to the application of a Dudick coating or lining system. For maximum performance all steel surfaces should be primed, but primer may not be needed for mild, non-immersion service. Concrete, however, must always be primed to aid in the "wetting out" required for good adhesion.

PRIMER 67C - CONDUCTIVE PRIMER

Primer 67C is a 100% solids, two component epoxy primer designed to be used over concrete whenever the coating or lining system must be spark tested.

ESTIMATING QUANTITIES AND ORDER BILL OF MATERIAL

SQUARE FEET PER GALLON		
	CONCRETE	STEEL
Primer 67	150-200	250-300
Primer 67C	100-150	———

Quantities shown are for estimating purposes only. Actual field usage may vary. Primer 67/67C are available in 1 and 2 gallon units.

APPLICATION INSTRUCTIONS

SURFACE PREPARATION

Metal: Surfaces must be abrasive blasted to an appropriate finish.

Immersion and heavy spillage service: White Metal SSPC SP-5 or NACE #1, 3.0 mil minimum profile.

Heavy, non-immersion service (i.e. fumes and spillage): Near white SSPC SP-10 or NACE #2, 2.0 mil minimum profile.

Atmospheric service: Commercial SSPC SP-6 or NACE #3, 2.0 mil minimum profile.

Concrete: Concrete must be abrasive blasted or etched with muriatic acid (Solution of 1 part 20° Be HCl and 1 part water) to remove surface laitance and other contaminants. Concrete must be free of curing compounds and form release agents. Surface texture should be similar to 40-60 grit sandpaper. The prepared surface should have a minimum tensile strength of 250 PSI per ASTM D-4541.

All concrete substrates must be checked for moisture prior to product application using the Plastic Sheet Test, ASTM D-4263.

Additional surface preparation will be required if a 40-60 grit texture is not achieved and the surface laitance not completely removed after a single application of acid or with the first mechanical preparation procedure.

Abrasive blasting removes laitance, exposing honeycombs or voids beneath the surface which must be filled with Scratch Coat 100. (Refer to separate product bulletin)

APPLICATION SPECIFICATIONS

Substrate temperature for both concrete and metal must be between 50°F and 110°F.

Relative humidity must not exceed 90%.

Substrate temperature must be 5°F above the Dew Point.

PRIMER 67/67C MIX RATIOS:

Primer 67	
Component A	1 gal.
Component B	1 gal.
Primer 67C	
Component A	1 gal.
Component B	95 fl. oz.

*Pre-mix primer 67C Component A for 1-2 minutes to disperse the conductive fillers prior to adding the correct amount of Component B.

Primer 67C must be spray or roller applied. Use brush application for small touch-up or repair work only.

The pot life of the mixed Primer 67/67C will depend on the temperature. To prevent material waste and avoid damage to equipment, do not open and mix more material than can be used according to the following table:

PRIMER 67/ 67C POT LIFE

TEMPERATURE	POT LIFE
50°F	90 min.
75°F	60 min.
90°F	30 min.

At 75° F the pot life and thin film cure of Primer 67 can be decreased by the addition of Accelerator #1 as follows:

Ozs./Accelerator #1 per mixed gal. Primer 67	Pot Life	Thin Film Cure
3-4	36 min.	4 hrs.
6-7	15 min.	2 hrs.

Using 7 ounces of accelerator #1 per mixed gallon of Primer 67, the thin film cure @ 40° F is reduced to 8 hours.

PRIMING

Metal: Mix the pre-measured units of Component A with Component B. Prime all metal surfaces to be coated with Primer 67 at 3-4 mils WFT.

Concrete: Mix the pre-measured units of Component A with Component B. Prime all concrete surfaces to be coated with either Primer 67 or 67C at 3-4 mils WFT. The basecoat may be applied over primer that is "tacky". Do not allow the primer to puddle.

Important - With all epoxies after priming and before each additional coat, examine the surface for amine blush (oily film). If present, remove by washing with warm water and detergent.

Cure Cycle for Primer 67/67C:

Temperature	Minimum Recoat Time	Maximum Recoat Time
50°F	12 hrs.	8 Days
75°F	6-8 hrs.	5 Days
90°F	4-5 hrs.	3 Days

To optimize intercoat adhesion, we recommend application of the basecoat while the primer is tacky. If this is not possible, the above recoat times must be observed. Exposure of the primer to direct sunlight will considerably shorten the recoat times. If recommended recoat times are exceeded, consult a Dudick Representative; sanding or abrasive blasting may be required before the coating, lining or floor topping can be applied.

CLEANING

Use S-10 Cleaning Solvent to clean tools and equipment. **DO NOT USE ACETONE.**

SHIPPING

Primer 67/67C Component A's are non-regulated plastic liquids. Primer 67/67C Component B's are flammable corrosives with a flash point of 106°F (Setaflash) and carry both a red warning label and a black and white warning label. S-10 Cleaning Solvent is a flammable liquid with a flash point of 52°F (PMCC) and carries a red warning label.

STORAGE

*Warning:*All Dudick products classified by DOT labels as either white, yellow or red labels, must not be mixed or stored together as an explosive reaction can occur. All products should be stored in a cool, dry area away from open flames, sparks or other hazards.

When properly stored in their original, unopened containers, Primer 67/67C components have a one year shelf life.

SAFETY

M.S.D.S - Sheets must always be read before using products. Primer 67/67C are intended for application by experienced, professional personnel. Dudick Inc. can supply supervision to help determine that the surface has been properly prepared, the ingredients correctly mixed, and the materials properly and safely applied.

If materials are to be applied by your own personnel or by a third party contractor, please be sure that they are aware of the following safety precautions:

• Exposure to resins and hardeners through direct skin contact and/or inhalation may cause severe dermatitis reactions in some people. Cleanliness of the skin and clothing is critical and must be of paramount concern.

• Fumes are flammable and heavier than air. Proper ventilation should be maintained to minimize breathing of concentrated fumes.

• Suitable respirators should be used during application.

• Safety glasses, gloves, and suitable protective clothing must be worn at all times during application.

• If contact with hardeners occurs, remove any clothing involved and flush the skin with flowing water. Discard the clothing. Do not attempt to wash and reuse it. Primer liquids can be removed with S-10 Cleaning Solvent, MEK, or lacquer thinner. **DO NOT USE ACETONE.**

• Keep open flames and sparks away from the area where materials are being mixed and applied.

• If a rash occurs, remove the individual from the work area and seek a physician's care for dermatitis.

• In case of eye contact, flush with water for at least 15 minutes and consult a physician.

• If swallowed, do not induce vomiting; call a physician immediately.

Note:
Dudick Inc. ("Dudick") warrants all goods of its manufacture to be as represented in its catalogs and that the application of its products by its employees or sub-contractors shall be performed in a workmanlike manner. Dudick's obligation under this warranty shall be the repair to and replacement of any applications which its examination shall disclose to be defective. Dudick makes no warranty concerning the suitability of its product for application to any surface, it being understood that the goods have been selected and the application ordered by the purchaser. DUDICK INC. MAKES NO WARRANTY, EXPRESS OR IMPLIED, THAT THE GOODS SHALL BE MERCHANTABLE OR THAT THE GOODS ARE FIT FOR ANY PARTICULAR PURPOSE. THE WARRANTY OF REPAIR OR REPLACEMENT SET FORTH HEREIN IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES ARISING BY LAW OR OTHERWISE; AND DUDICK INC. SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DOWN TIME, DAMAGES TO PROPERTY OF THE PURCHASER OR OTHER PERSONS, OR DAMAGES FOR WHICH THE PURCHASER MAY BE LIABLE TO OTHER PERSONS, WHETHER OR NOT OCCASIONED BY DUDICK'S NEGLIGENCE. This warranty shall not be extended, altered or varied except by written instrument signed by Dudick and Purchaser.

Dudick Inc.

Dudick Incorporated
Corrosion-Proof Products
1816 South Wason Drive
Streetsboro, Ohio 44241
216-562-1970
FAX No. 216-562-7638

Protecto-Coat 200

ELASTOMERIC, SPRAY APPLIED, ENVIRONMENTALLY SAFE, URETHANE COATING. 40-60 MILS (1-1 1/2 mm)

Protecto-Coat 200 is a high solids aromatic polyurethane coating with superior elongation. It is especially suited to bridge cracks in concrete.

RECOMMENDED APPLICATIONS

- Secondary Containment Areas
- Process Floors
- Railroad Tank Cars
- Underground Pipes & Tanks - Exterior
- Thickener Tanks & Mechanisms
- Spent Liquor Storage Tanks
- Food Processing
- Pharmaceutical
- Breweries
- Structural Steel

CHEMICAL RESISTANCE

Protecto-Coat 200 provides a tough, durable surface and will withstand splash and spills of many inorganic and organic acids as well as alkalies. Also resistant to aliphatic solvents.

PHYSICAL PROPERTIES

Protecto-Coat 200	40 Mil Basecoat	20 Mil Topcoat
Tensile Strength (PSI) ASTM C307	2,400-2,600	2,200-2,500
Elongation*	225% to 250%	50 to 60%
Shore D Hardness	40-45	65-70
Abrasion Resistance CS 17 wheels/1000 cycles x 1000 gm load	10 mg weight loss	32 mg weight loss
Solids by Volume	80%	100%

*At 60% elongation the chemical resistant topcoat begins to surface crack while the basecoat will continue to elongate to 250% extension.

SPECIFICATIONS

Coating shall be 40-60 mils thick, 80-100% solids aromatic urethane resin, consisting of 2 basecoats and a topcoat of 20 mils each, manufactured by Dudick, Inc. Materials shall be brush-, roller- or spray- applied in accordance with manufacturer's recommended practices.

THE PROTECTO-COAT 200 SYSTEM

The Protecto-Coat 200 system uses a moisture tolerant primer and two or three coats of elastomeric thermosetting urethane resins to protect concrete and steel.

Primer 67 is designed to prevent abrasive-blasted steel from developing rust bloom prior to the application of a Protecto-Coat System. For maximum performance, all steel surfaces should be primed, but primer may not be needed for mild, non-immersion service. Concrete, however, must always be primed to aid in the "wetting out" required for good bonding.

Protecto-Coat 200 is applied in three coats by brush, roller or spray. The elastomeric basecoat is applied in two 25 mil applications to achieve a nominal 40 mils DFT. The chemical resistant topcoat is applied in a single 20 mil application. Total thickness shall be a nominal 60 mils.

Post-it™ brand fax transmittal memo 7671 | # of pages ▸

To	Dominic Quiens	From	Rob
Co.		Co.	
Dept.		Phone #	Mid-America
Fax #	697-3592	Fax #	

ESTIMATING QUANTITIES AND ORDER BILL OF MATERIAL

SQUARE FEET PER GALLON		
	CONCRETE	STEEL
Primer 67	150-200	250-300
Protecto-Coat 200		
2 Base Coats Actual 35-40 mil DFT	25	25
Top Coat Actual 15-20 mil DFT	60	60
S-10 Solvent	500	500

Quantities shown are for estimating purposes only. Actual field usage may vary.

APPLICATION INSTRUCTIONS

SURFACE PREPARATION

Metal: For immersion service, abrasive blast to a white metal finish and a 2-4 mils minimum profile according to SSPC 5 or NACE No. 1. For fume or splash service, abrasive blast to a near-white metal finish according to SSPC 10 or NACE No. 2. Atmospheric service: Commercial SSPC 6 or NACE No. 3.

Concrete: Concrete must be abrasive-blasted or etched with muriatic acid (solution of 1 part 20° Be HCl and 1 part water) to remove surface laitance and other contaminants. Concrete must be free of curing compounds and form release agents. Surface texture should be similar to 40-60 grit sandpaper. The prepared surface should have a tensile strength of between 250 and 300 PSI per ASTM D4541.

Additional surface preparation will be required if a 40-60 grit texture is not achieved and the surface laitance not completely removed after a single application of acid or with the first mechanical preparation procedure.

If, after abrasive blasting, honeycombs/voids appear on the concrete, these have to be filled with a suitable material. Contact a Dudick representative for this information.

Recommended application temperatures should be between 40°F and 90°F substrate temperature. **Do not apply Protecto-Coat 200 over concrete exposed to direct sunlight during the warming trend of the concrete as measured by surface temperature.** To do so may lead to blistering, pinholes, or wrinkling in the coating due to outgassing of air in the concrete and high substrate temperatures. Wait for a definite downturn or cooling trend within the concrete as again measured by surface temperature. If this is not possible consult a Dudick representative for alternatives such as double priming.

PRIMING

Metal: For maximum performance, prime all steel surfaces with Primer 67, mixed with appropriate amount of hardener to 3-4 mils. For mild non-immersion service, priming of steel may be omitted.

Concrete: Concrete must be primed to aid in the "wetting out" required for good bonding. Mix Component A with Component B in the premeasured units for 2-3 minutes and apply by brush, roller, or spray. We recommend the basecoat be applied over slightly tacky or tack-free primer. Do not allow the primer to puddle.

Protecto-Coat 200 Mix Ratio:

Protecto-Coat 200 Basecoat	
Component A*	1 Gallon
Component B*	54 fl. ozs.

*Premeasured units by weight

Protecto-Coat 200 Topcoat	
Protecto-Coat 200 Top Coat Comp. A*	1 Gal.
Component B*	54 fl. oz.

*Premeasured quantities by weight

BASECOAT

Add appropriate amount of hardener for each gallon of Protecto-Coat Liquid and mix thoroughly until uniform color is achieved. Apply a 25 mil wet (20 mil DFT) basecoat using spray, brush or roller. Allow basecoat application to cure to at least a "firm" or slightly "tacky" feel before applying the second 25 mil wet (20 mil DFT) basecoat. Brush or roller may require several coats to achieve desired thickness.

Horizontal surfaces may be basecoated in one application by applying 50 mils wet (40 mil DFT) in a single coat.

TOPCOAT

Add appropriate amount of hardener for each gallon of Protecto-Coat Liquid and mix thoroughly until a uniform color is achieved. Apply a 20-mil-thick topcoat using spray, brush or roller.

Cure Cycle for Protecto-Coat 200

TEMPERATURE	RECOAT TIME	CURE TIME
50°	48 Hrs.	96 Hrs.
70°	24 Hrs.	48 Hrs.
90°	16 Hrs.	36 Hrs.

If these recoat times are exceeded, consult a Dudick representative: sanding or abrasive blasting may be required before the next coat. Recoat times are dramatically reduced when the coating is exposed to direct sunlight.

Single Component Airless Spray Equipment — Graco King 45-to-1 spray pump or equivalent. Use Graco Golden Mastic Gun or Graco No. 207945 Gun with airless adapter equipped with a Reverse-A-Clean tip and a tip size between .035-.041. Spray hose should be 1/2" or 3/8" ID. Available inlet pressure must be a minimum of 100 psi.

Brush or roller application may require additional coats to meet specified dry film thickness.

Pot life of the opened and mixed Protecto-Coat 200 will depend on the temperature at the work site. To prevent material waste and avoid damage to equipment, do not open and mix more material than can be used according to the following table:

TEMPERATURE	POT LIFE
50°F	120 Min.
75°F	60 Min.
90°F	45 Min.

Do not attempt to store mixed material. Residual material should be properly disposed of at the end of each work period.

Where immersion service is required, spark test the coating with a 5,000 to 7,000 volt AC spark tester. Mark and repair all pinholes. Use Protecto-Coat liquid mixed with the appropriate amount of hardener. Retest only the repairs.

CLEANING

Use S-10 Solvent to clean tools and equipment.

SHIPPING

Protecto-Coat 200 Topcoat A and B and Protecto-Coat 200 Basecoat A are classified as plastic liquids and are non-regulated.

Protecto-Coat 200 Basecoat B is combustible. Primer 67 Component B is corrosive and carries a black and white warning label. Primer 67 Component A is classified as a plastic liquid and is nonregulated, while S-10 Cleaning Solvent is red label liquid with a flash point of 52°F (PMCC).

STORAGE

Warning: All Dudick products classified by DOT labels as either white, yellow or red labels must not be mixed or stored together as an explosive reaction may occur.

When stored in a cool and dry location, Protecto-Coat 200 ingredients have a one-year shelf life. Exposure to excessive heat may cause premature gelling and reduce working time.

SAFETY

M.S.D.S. - Sheets must always be read before using products. Protecto-Coat Systems are intended for application by experienced, professional personnel. Dudick Inc. can supply Protecto-Coat systems supervision to help determine that the surface has been properly prepared, the ingredients correctly mixed, and the materials properly and safely applied.

If Protecto-Coat materials are to be applied by your own personnel or by a third-party contractor, please be sure that they are aware of the following safety precautions:

- Exposure to resins and hardeners may cause severe dermatitis reactions in some people. Cleanliness of the skin and clothing is critical and must be of paramount concern.

- Safety glasses, gloves and suitable protective clothing must be worn at all times during application.

- Suitable respirators should be used.

- If contact with hardeners occurs, remove any clothing involved and wash the skin with large amounts of water. Discard the clothing. Do not attempt to wash and reuse it. Protecto-Coat liquid may be washed off with S-10 Cleaning Solvent, MEK liquid, or laquer thinner.

- Fumes are flammable and heavier than air. Proper ventilation should be maintained to minimize breathing of concentrated fumes.

- If a rash or dermatitis occurs, remove the individual from the work area and seek a physician's care for dermatitis.

- Keep open flames and sparks away from the area where toppings are being mixed and applied.

- In case of eye contact, wash with water for at least 15 minutes and consult a physician. If swallowed, do not induce vomiting: call a physician immediately.

Note:

Dudick Inc. ("Dudick") warrants all goods of its manufacture to be as represented in its catalogs and that the application of its products by its employees or sub-contractors shall be performed in a workmanlike manner. Dudick's obligation under this warranty shall be the repair to and replacement of any applications which its examination shall disclose to be defective. Dudick makes no warranty concerning the suitability of its product for application to any surface, it being the understood that the goods have been selected and the application ordered by the purchaser. DUDICK INC. MAKES NO WARRANTY, EXPRESS OR IMPLIED, THAT THE GOODS SHALL BE MERCHANTABLE OR THAT THE GOODS ARE FIT FOR ANY PARTICULAR PURPOSE. THE WARRANTY OF REPAIR OR REPLACEMENT SET FORTH HEREIN IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES ARISING BY LAW OR OTHERWISE; AND DUDICK INC. SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DOWN TIME, DAMAGES TO PROPERTY OF THE PURCHASER OR OTHER PERSONS, OR DAMAGES FOR WHICH THE PURCHASER MAY BE LIABLE TO OTHER PERSONS, WHETHER OR NOT OCCASIONED BY DUDICK'S NEGLIGENCE. This warranty shall not be extended, altered or varied except by written instrument signed by Dudick and Purchaser.

Dudick Incorporated
Corrosion-Proof Products
1818 South Wason Drive
Streetsboro, Ohio 44241
(12-91)

Waste Analysis

Treated Blowdown

ANACHEM INC.
8 Prestige Circle, Suite 104 • Allen, Texas 75002
214/727-9003 • FAX # 214/727-9686 • 1-800-966-1186

Customer Name: USPCI
Date Received: August 17, 1994 at 11:10:45
Date Reported: August 26, 1994
Submission #: 9408000203
Project: HEAT EXCHANGERS

SAMPLES The submission consisted of 1 sample with sample I.D. shown in the attached data table.

TESTS The sample listed in the attached result pages was analyzed for:

* ALKALINITY, TOTAL (EPA 310.1)
* ANION/CATION RATIO (CALCULATION)
* CALCIUM/Ca (EPA 215.1)
* CHLORIDE (EPA 300.6)
* CYANIDE, TOTAL (EPA 335.2)
* HARDNESS, TOTAL (BASED ON AAS/ICP)
* ICP SCAN (EPA 200.7)
* IRON/Fe (EPA 236.1)
* MAGNESIUM/Mg (EPA 242.1)
* MICROWAVE DIGESTION (EPA 3015)
* pH (EPA 150.1)
* POTASSIUM/K (EPA 200.7)
* SILICA (EPA 370.1)l
* SODIUM/Na (EPA 273.1)
* SPECIFIC CONDUCTANCE (EPA 120.1)
* SULFATE (EPA 375.4)
* TDS-TOTAL DISSOLVED SOLIDS (EPA 160.1)
* TSS-TOTAL SUSPENDED SOLIDS (EPA 160.2)

Distribution Of Reports
2-Bruce Patterson of USPCI
Ph. (405) 697-3500 Fax (405) 697-3592

Respectfully Submitted,
Anachem,Inc.

C E Newton

C.E. Newton, Ph.D.
Chemist

Submission #: 9408000203 lims

NOTE: Submitted material will be retained for 60 days unless notified or consumed in analysis. Material determined to be hazardous will be returned or a $20 disposal fee will be assessed. Our letters and reports are for the exclusive use of the client to whom they are addressed. The use of our name must receive our prior written approval. Our letters and reports apply to the sample tested and/or inspected, and are not necessarily indicative of the qualitites of apparently identical or similar materials.

35372 to 35372

Client Name: USPCI
ubmission #: 9408000203
roject Name: HEAT EXCHANGERS
Report Date: 08/26/94

ient Sample #: TREATED EXHAUST BLOWOFF
boratory ID #: 35372 Matrix: Liquid
mple Container: 3xGallon Plastic
mpling Location: Not listed on the chain of custody.
mpling Date : Not listed on the chain of custody.
mperature (Celcius):21

KALINITY, TOTAL (EPA 310.1)

alyte	Results(mg/l)	Det.Limit
tal Alkalinity	7800	1

ION/CATION RATIO (CALCULATION)

alyte	Results(%)	Det.Limit
ion/Cation Ratio	1.00	0

LCIUM/Ca (EPA 215.1)

alyte	Results(mg/l)	Det.Limit
lcium	30.2	0.01

LORIDE (EPA 300.6)

alyte	Results(mg/l)	Det.Limit
loride	145000	0.1

ANIDE, TOTAL (EPA 335.2)

alyte	Results(mg/l)	Det.Limit
tal Cyanide	23.9	0.20

ESS, TOTAL (BASED ON AAS/ICP)

alyte	Results(mg/l)	Det.Limit
rdness, Calculated	1500	

P SCAN (EPA 200.7)

alyte	Results(mg/l)	Det.Limit
ver	<0.0120	0.0120
mium	0.072	0.0014
romium	0.112	0.0146
pper	0.286	0.0046
balt	1.38	0.0028
ad	0.362	0.042
nganese	0.034	0.0004
kel	0.925	0.0049
timony	<0.0246	0.0246
allium	0.286	0.056
ic	0.031	0.0031
senic	32.6	0.044
lenium	2.61	0.026
minum	2.96	0.107
rium	0.152	0.045
ryllium	<0.0011	0.0011
lybdenum	31.2	0.0069
	<0.023	0.023
anium	<0.017	0.017
ndium	0.139	0.0037
icon	4.09	0.015
ontium	1.33	0.0013
hium	12	0.001

Ic (EPA 236.1)

	Results(mg/l)	Det.Limit
	5.09	0.03

GNESIUM/Mg (EPA 242.1)

alyte	Results(mg/l)	Det.Limit
gnesium	31.7	0.01

Client Name: USPCI
Submission #: 9408000203
Project Name: HEAT EXCHANGERS
Report Date: 08/26/94

pH (EPA 150.1)

Analyte	Results(----)	Det.Limit
pH For Liquid	7.5	0

POTASSIUM/K (EPA 200.7)

Analyte	Results(mg/l)	Det.Limit
Potassium	12300	0.010

SILICA (EPA 370.1)l

Analyte	Results(mg/l)	Det.Limit
Silicon Dioxide/Silica	100	2

SODIUM/Na (EPA 273.1)

Analyte	Results(mg/l)	Det.Limit
Sodium	105000	0.01

SPECIFIC CONDUCTANCE (EPA 120.1)

Analyte	Results(umhos/cm	Det.Limit
pecific Conductance	78900	1

SULFATE (EPA 375.4)

Analyte	Results(mg/l)	Det.Limit
Sulfate	30200	1

TDS-TOTAL DISSOLVED SOLIDS (EPA 160.1)

Analyte	Results(mg/l)	Det.Limit
issolved Solids	299000	1

TOTAL SUSPENDED SOLIDS (EPA 160.2)

Analyte	Results(mg/l)	Det.Limit
Total Suspended Solids	1440	1

Report to: USPCI
Lab Number: 9408000203
Page 4 of 4

Project: Heat Exchangers

QUALITY CONTROL DATA

ANALYTE	DATE ANALYZED	SPIKE VOL	STAND. DEV.	COEFF. OF VAR %	REC1/%	REC2/%
Hardness, Calc.	8/19/94	----	0	0	96	----
Total Alkalinity	8/19/94	----	5.7	0.7	100	----
Silica	8/25/94	----	0	0	100	----
Sulfate	8/19/94	----	0.31	1.2	100	----
Chloride	8/25.04	----	178	8	100	----
T.S.S.	8/18/94	----	181	10	99	98
Total Cyanide	8/25/94	----	0	0	109	----

Standard Deviation = (x1-x2)/1.414
Coefficient of Variability % = (S.D./Avg.) X 100
Recovery % = [(spiked-unspiked)/expected] X 100

ICP SCAN INFORMATION

Note: ***ICP scans are very general in nature and do not include precise calibration or quality control. The process is intended as a screening procedure to identify very high metal concentrations.***

t Name: USPCI
: 9407000227
mo: HEAT EXCHANGERS
Date: 08/04/94

Evaporator Blowdown

t Sample #: EV #1
atory ID #: 33964 Matrix: Liquid
le Container: 2 Liter Plastic Bottle
ling Location: Not listed on the chain of custody.
ling Date : Not listed on the chain of custody.

CAN (EPA 6010)	Results(mg/l)	Det.Limit
te		
	333	
um	2.4 –	
ium	0.166	
nium	0.514	
er	1.76	
lt	97.6	
	12600	
sium	0.242	
	41.7	
nesium	0.264	
ganese	136000	
m	36.4	
l	0.336	
mony	0.198	
lium	0.264	
	52.2	
nic	4.5	
nium		
inum		
	67.2	
ium		
rium	3.1	
dium		
on	1	
ntium	22.4	
ium		

RCURY DIGESTION (EPA 7470)
e of Mercury Digestion:07/20/94

RCURY/Hg BY COLD VAPOR (EPA 245.1)	Results(mg/l)	Det.Limit
alyte		
rcury	0.002	

ent Sample #: EV #2
oratory ID #: 33965 Matrix: Liquid
mple Container: 2x2Liter Plastic Bottle
mpling Location: Not listed on the chain of custody.
mpling Date : Not listed on the chain of custody.

KALINITY, TOTAL (EPA 310.1)	Results(mg/l)	Det.Limit
alyte		
tal Alkalinity	18900	1

ION/CATION RATIO (CALCULATION)	Results()	Det.Limit
alyte		
ion/Cation Ratio	1.08	0

NATE ALKALINITY (EPA 310.1)	Results(mg/l)	Det.Limit
nate Alkalinity	23100	1

ALCIUM/Ca (EPA 200.7)	Results(mg/l)	Det.Limit
nalyte		
lcium	735 –	0.001

Name: USPCI
9407000227
HEAT EXCHANGERS
08/04/94

	Results(mg/l)	Det.Limit
NATE ALKALINITY (EPA 310.1)		
ite Alkalinity	<1	1
IDE (EPA 300.6)	Results(mg/l)	Det.Limit
a	176000	0.1
DE, TOTAL (EPA 335.2)	Results(mg/l)	Det.Limit
yanide	<0.02	0.02
Fe (EPA 200.7)	Results(mg/l)	Det.Limit
	112	0.013
ESIUM/Mg (EPA 200.7)	Results(mg/l)	Det.Limit
ium	222	0.030
A 150.1)	Results(----)	Det.Limit
Liquid	13	0
SIUM/K (EPA 200.7)	Results(mg/l)	Det.Limit
	17400	0.010
EPA 370.1)l	Results(mg/l)	Det.Limit
Dioxide/Silica	400	2
M/Na (EPA 200.7)	Results(mg/l)	Det.Limit
	150000	0.001
FIC CONDUCTANCE (EPA 120.1)	Results(umhos/cm	Det.Limit
c Conductance	840000	1

IS A CALCULATED VALUE; THE MATRIX OF THE
LE PRECLUDED THE USE OF A CONDUCTIVITY
E DUE TO OILY COATING; THE CALCULATED VALUE
MES INFINITE DILUTION OF THE SAMPLE.)

	Results()	Det.Limit
FIC GRAVITY (USP 841)		
ic Gravity	1.31	1
ATE (EPA 375.4)	Results(mg/l)	Det.Limit
e	55300	1
OTAL DISSOLVED SOLIDS (EPA 160.1)	Results(mg/l)	Det.Limit
Dissolved Solids	417000	1
OTAL SUSPENDED SOLIDS (EPA 160.2)	Results(mg/l)	Det.Limit
nded Solids	6780	1

o: USPCI
Number: 9407000227
ge 4 of 4

Project: Heat Exchangers

QUALITY CONTROL DATA

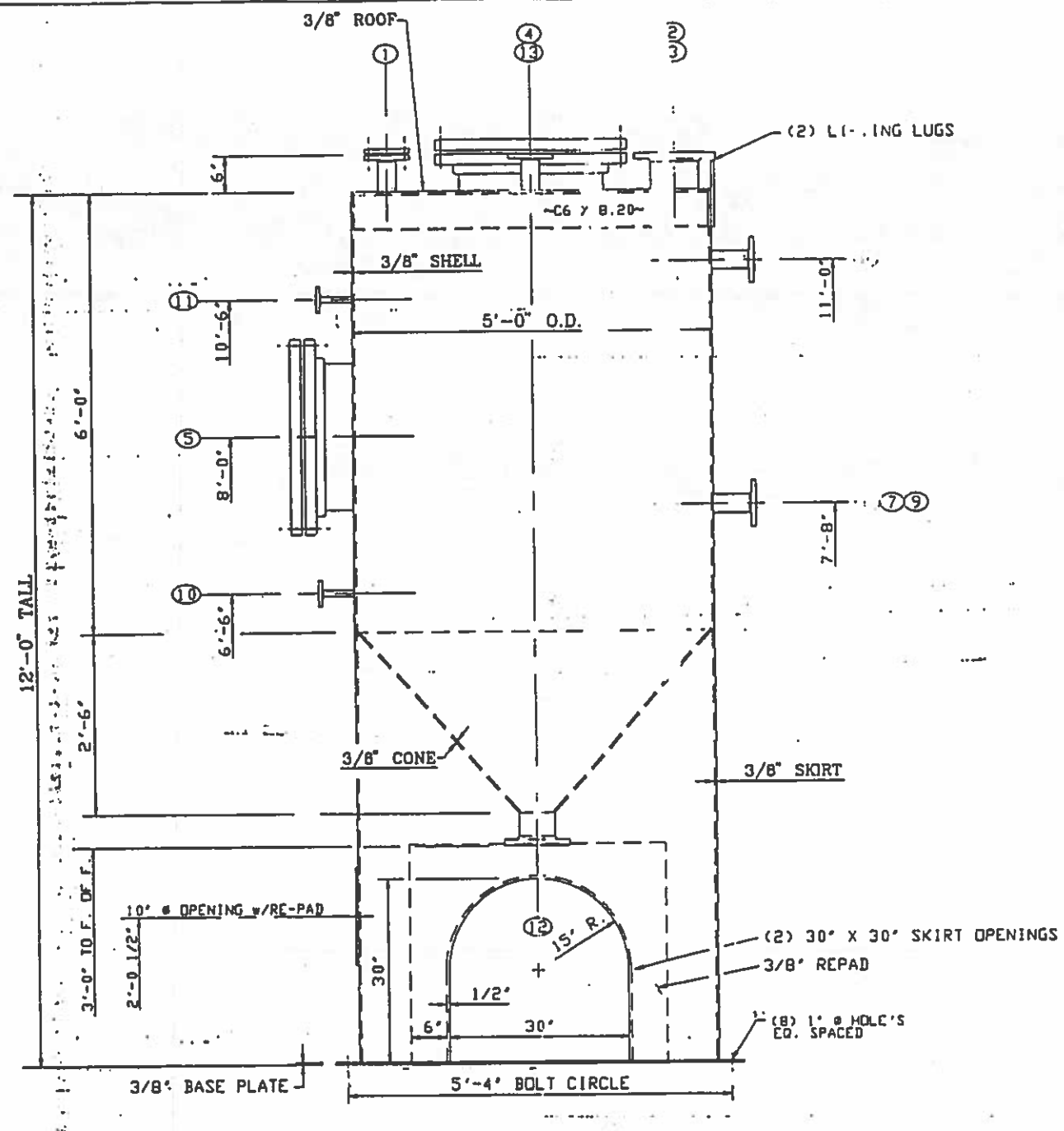
ALYTE	DATE ANALYZED	SPIKE VOL	STAND. DEV.	COEFF. OF VAR %	REC1/%	REC2/%
rcury	7/20/94	---	0.141	2.0	102	99
al Alkalinity	7/26/94	---	0	0	100	---
.S.	7/28/94	995	304	0.1	96	96
icon Dioxide/ lica	8/1/94	---	0	0	100	---
lfate	8/1/94	---	5	2.4	99	---
loride	7/26/94	500	2.1	1.1	100	99
rdness, Calcium	8/1/94	---	±4.2	1.1	110	100
.S.	7/21/94	298	0.7	0	98	95

ndard Deviation = (x1-x2)/1.414
ient of Variability % = (S.D./Avg.) X 100
y % = [(spiked-unspiked)/expected] X 100

ICP SCAN INFORMATION

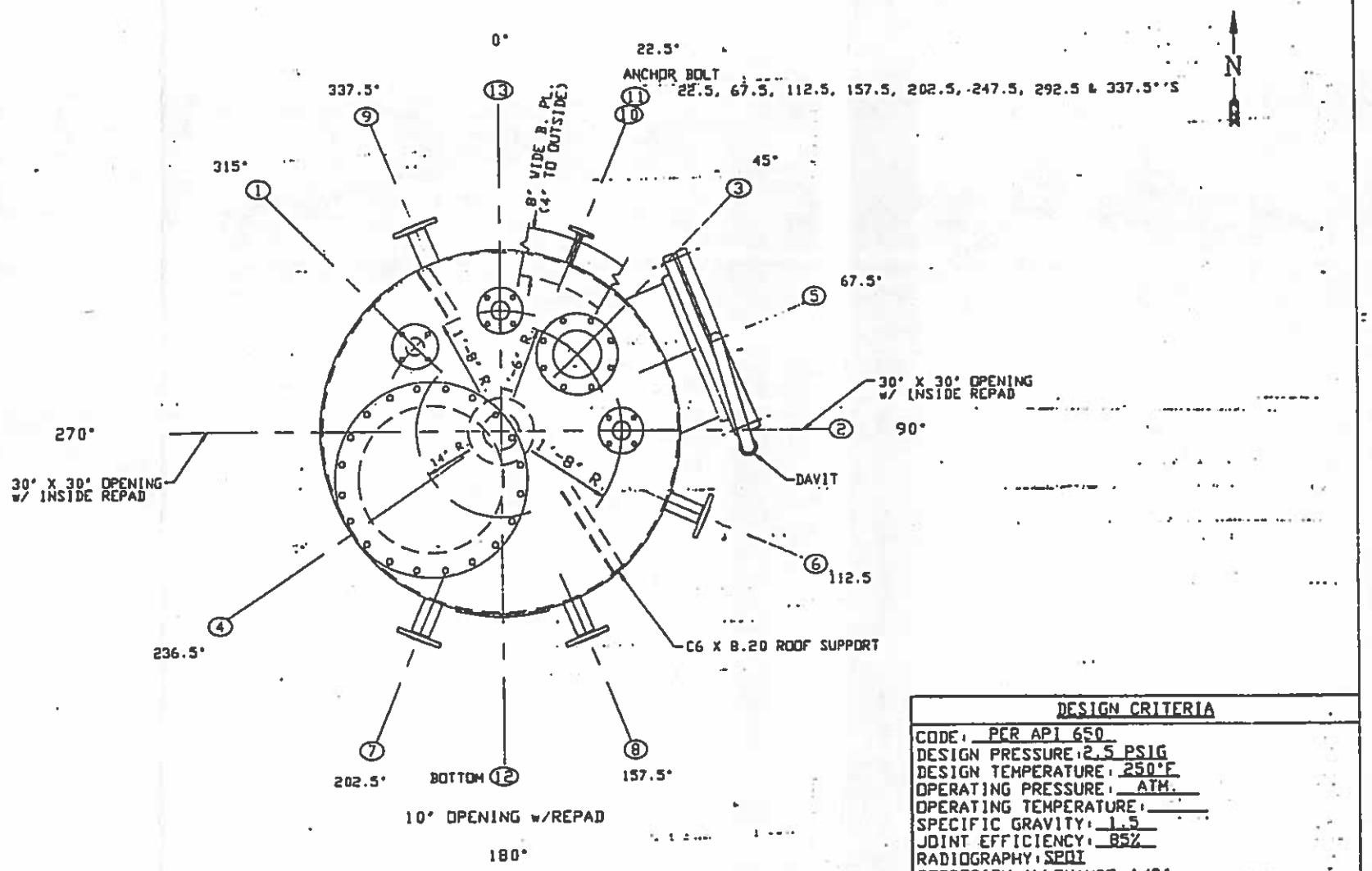
te: ***ICP scans are very general in nature and do not include precise calibration or quality control. The process is intended as a screening procedure to identify very high metal concentrations.***

Tank Drawings



ELEVATION

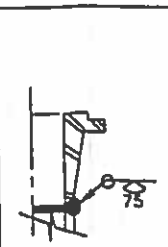
SEE PLAN VIEW FOR TRUE ORIENTATION.



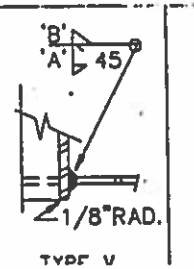
PLAN VIEW

MARK	NO. REQ'D.	SIZE	RATING	FACING	NECK	O.S. PROJ.	I.S. PROJ.	TYPE	'A'	'B'	REINFORCEMENT PAD	'C'	BLIND	NO STUDS	STUD SIZE	SERVICE	MARK
13	1	3"	150#	RFSO	SCH 80	SEE DWG	3/8"	I,V	3/8"	3/8"	N/A					LEVEL TRANSMITTER	13
12	1	6"	150#	RFSO	SCH 80	SEE DWG	3/8"	I,V	3/8"	3/8"	N/A					PUMP SUCTION	12
11	1	1"	150#	RFSO	SCH 80	6"	3/8"	I,V	3/8"	3/8"	N/A					SIGHT GLASS	11
10	1	1"	150#	RFSO	SCH 80	6"	3/8"	I,V	3/8"	3/8"	N/A					SIGHT GLASS	10
9	1	3"	150#	RFSO	SCH 80	7"	3/8"	I,V	3/8"	3/8"	N/A		YES	4	5/8"	FILL	9
8	1	8"	150#	RFSO	SCH 80	7"	3/8"	I,V	3/8"	3/8"	N/A					OVERFLOW	8
7	1	3"	150#	RFSO	SCH 80	7"	3/8"	I,V	3/8"	3/8"	N/A					FILL	7
6	1	3"	150#	RFSO	SCH 80	7"	3/8"	I,V	3/8"	3/8"	N/A					FILL	6
5	1	24"	150#	RFSO	SCH 80	8"	3/8"	I,V	3/8"	3/8"	N/A		YES	20	1 1/4"	MANWAY	5
4	1	24"	150#	RFSO	SCH 80	SEE DWG	3/8"	I,V	3/8"	3/8"	N/A		YES	20	1 1/4"	MANWAY	4
3	1	8"	150#	RFSO	SCH 80	SEE DWG	3/8"	I,V	3/8"	3/8"	N/A					VENT	3
2	1	3"	150#	RFSO	SCH 80	SEE DWG	3/8"	I,V	3/8"	3/8"	N/A		YES	4	5/8"	LEVEL TRANSMITTER	2
1	1	3"	150#	RFSO	SCH 80	SEE DWG	3/8"	I,V	3/8"	3/8"	N/A					FUTURE USE	1

SCHEDULE OF OPENINGS



TYPE II



TYPE V

DESIGN CRITERIA

CODE: PER API 650
DESIGN PRESSURE: 2.5 PSIG
DESIGN TEMPERATURE: 250°F
OPERATING PRESSURE: ATM.
OPERATING TEMPERATURE:
SPECIFIC GRAVITY: 1.5
JOINT EFFICIENCY: 85%
RADIOGRAPHY: SPOT
CORROSION ALLOWANCE: 1/8"

MATERIAL

ROOF, SHELL & BOTTOM: A-36
REINFORCEMENT PADS: A-36
STRUCTURAL SUPPORTS: A-36
PIPE: SA-106 GR. B
FLANGES, BLINDS, COUPLINGS & PLUGS: SA-105
BOLTING: SA-193 B7
SERVICE GASKETS: 1/8" GASKET
ESTIMATED WEIGHT EMPTY: 5,700 LBS
CAPACITY: 1,017 GAL.
SURFACE PREPARATION: INSIDE SSPC-SP 6
OUTSIDE SSPC-SP 6

PAINT:
INSIDE - (2) Coats of S.V. Hi-Hil Sher-Tac Epoxy (7 mils DFT)
OUTSIDE - Prime w/ Glidden Epoxy No. 5466 (3 - 4 mils DFT)

A	10-19-93	REVISED PER CUSTOMER COMMENTS
0	8-27-93	ISSUED FOR APPROVAL

REVISIONS

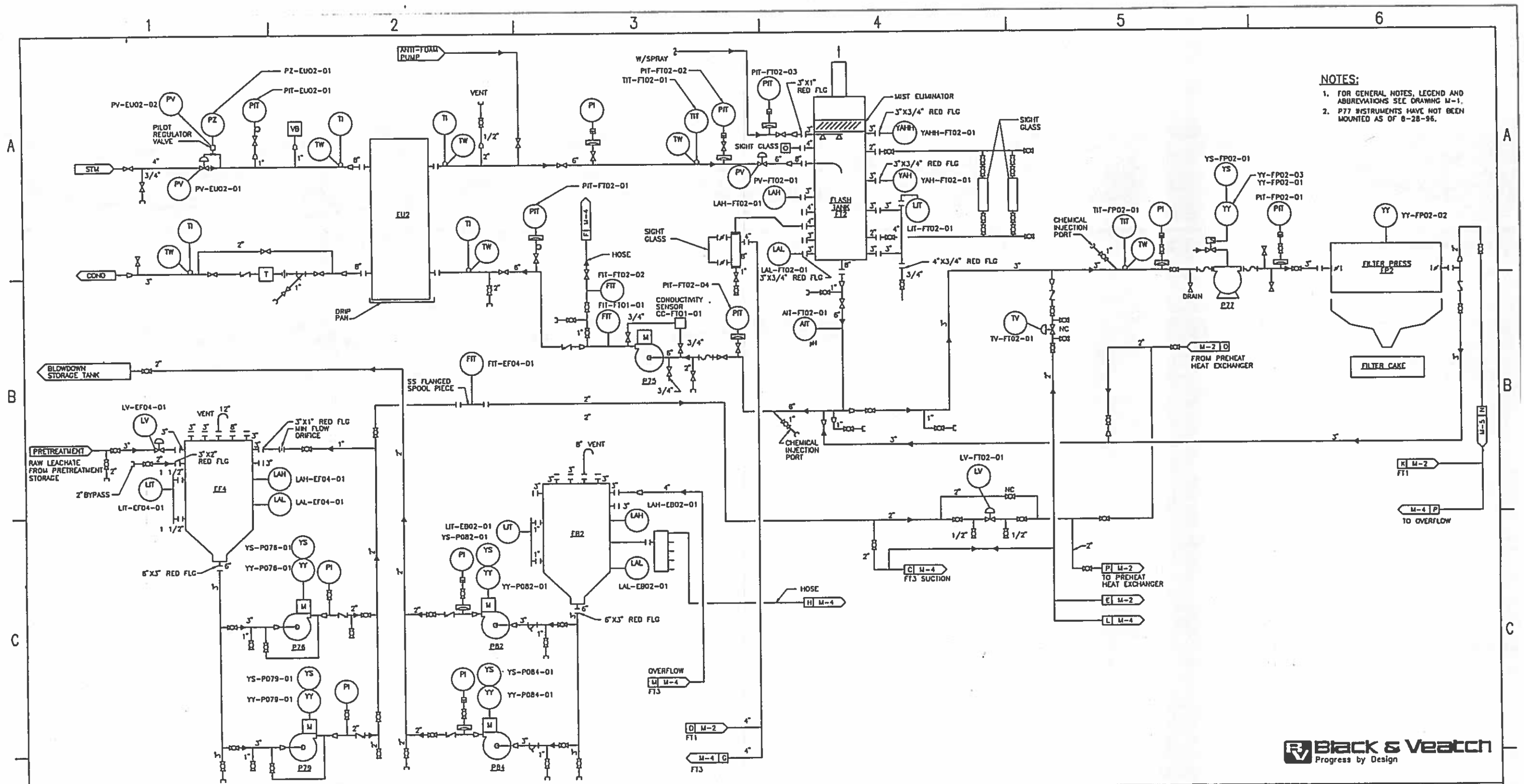
DRAWN BY: BDL
CHECKED BY: BLI
SHOP ORDER NO.:
DATE: 8-27-93
PURCHASE ORDER NO.
DRAWING NAME: USPC12

USPCI
DELTA TANK CO.
LONE MOUNTAIN FACILITY WAYNOKA, OKLAHOMA
ITEM# EB2 5'-0" O.D. X 8'-6" TALL EVAPORATOR BLOWDOWN TANK

LIDE TANK COMPANY
RT. 2 BOX 168 D
MEXIA, TEXAS 76667

SHEET 1 OF 1

Ancillary Equipment Drawings



PRETREATMENT
PRETREATMENT STORAGE
RAW LEACHATE
FLOW RATE: VARIABLE
SPECIFIC GRAVITY: 1.03
TOTAL SOLIDS: 2-4%

FF4
EVAPORATION FEED TANK
ATMS DESIGN TANK
SIZE: 6'-4" DIA X 10' HIGH
MATERIAL: CARBON STEEL
VOLUME: 1625 GAL±
MAKE UP: LEVEL CONTROLLED
INSULATION: NONE

P76 & P79
RAW LEACHATE FEED PUMP
DESIGN: END SUCTION
GPM: 80
HEAD: 50 FT(PRELIMINARY)
HP: 2
SPECIFIC GRAVITY: 1.03
LB/HR: 20412± (PER FT)
TEMP: 40 TO 80 F

P75
EVAPORATION FT PUMP
DESIGN: END SUCTION
GPM: 800
HEAD: 231 FEET
HP: 60
SPECIFIC GRAVITY: 1.2
LB/HR: 451,800
TEMP: 200 TO 210 F

EU2
EVAPORATION HEAT EXCHANGER
DESIGN: PLATE & FRAME
MATERIAL: STAINLESS STEEL
HEAT TRANSFER: 13,300,000± BTUH

FT2
FLASH TANK
ATMS DESIGN TANK
SIZE: 6'-4" DIA X 12' HIGH
MATERIAL: CARBON STEEL
VOLUME: 2200± GAL
MAKE UP: LEVEL CONTROL
INSULATION: 2" MINIMUM

P77
BLOWDOWN PUMP
DESIGN: DIAPHRAM TYPE
GPM: 100 TO 0
HEAD:
SPECIFIC GRAVITY: 1.2±
LB/HR: 58,000±
TEMP: 170 F

FP2
FILTER PRESS
DESIGN:
VOLUME: 40 CU FT
TEMP: 170 F MAX.

EB2
BLOWDOWN TANK
ATMS DESIGN
SIZE: 5'-0" DIA X 10' HIGH
VOLUME: 1000± GAL
MATERIAL: CARBON STEEL
INSULATION: NONE

PB2 & PB4
BLOWDOWN RECIRCULATION PUMP
GPM: 30
HEAD: 50 FT
HP: 1

REVISIONS						REVISIONS						REFERENCE DRAWINGS		ISSUE RECORD					ENGR RECORD		
NO	DESCRIPTION	DATE	BY	CHK	APP	NO	DESCRIPTION	DATE	BY	CHK	APP	DRAWING NO.	TITLE	DATE	ISS	REV	TO	FOR		BY	DATE
																			DRAWN		
																			CHECKED		
																			PROJECT ENG		
																			PROJECT MANAGER		
																			CONSULTANT	B&V	8/6/96
																			APPROVED		
														9/18/96	1	0	PERMIT	CONFORMED DWG	APPROVED		

CURRENT DRAWING STATUS	BY	DATE
PRELIMINARY OR PLANNING	B&V	10/24/94
APPROVED FOR FINAL DESIGN		
IN FINAL DESIGN		
APPROVED FOR QUOTE/PURCH		
APPROVED FOR CONSTRUCTION		

USPCI
A Subsidiary of Union Pacific Corporation

LONE MOUNTAIN FACILITY
5 MI. EAST, 1 MI. NORTH OF JUNCTION 281, WAYNOKA OK. 73860 (405) 697-3380

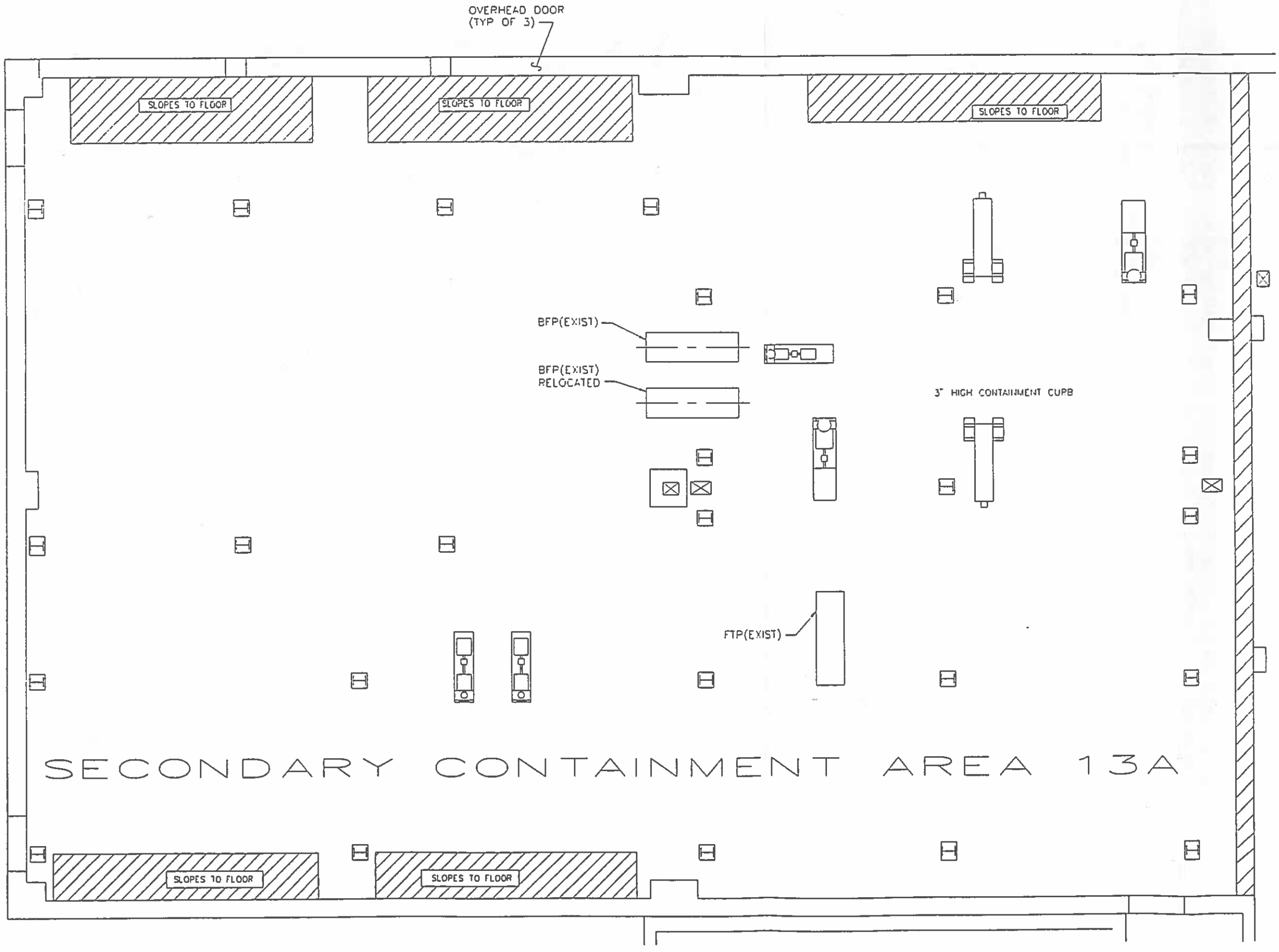
TITLE
WASTEWATER FINAL TREATMENT FACILITY
EVAPORATOR SYSTEM NO.2
PROCESS DIAGRAM

FOR

SCALE	JOB NO	DRAWING NUMBER	CAD NUMBER	REV
NONE		M-3	M-3.DWG	0

40455-001-DM-ANCV-EC001
R13PWEDSH FLAG 12
8/6/96 by
10/23/96 08:39:29

Secondary Containment Drawings


OVERHEAD DOOR
(TYP OF 3)
SLOPES TO FLOOR
SLOPES TO FLOOR
SLOPES TO FLOOR
BFP(EXIST)
BFP(EXIST)
RELOCATED
3" HIGH CONTAINMENT CURB
FTP(EXIST)
SECONDARY CONTAINMENT AREA 13A
SLOPES TO FLOOR
SLOPES TO FLOOR

SECTION EF1

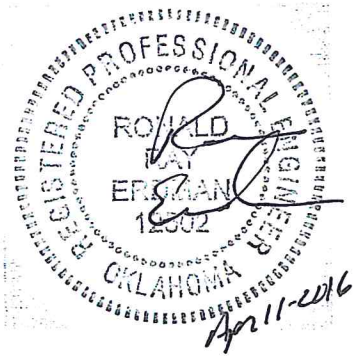
EVAPORATOR FEED TANK NO. 1 (EF1)
ASSESSMENT

LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

PREPARED FOR

CleanHarbors
ENVIRONMENTAL SERVICES, INC.

April 2016



CA1960
6-30-2016

015449

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APPENDIX E. FOUNDATION DESIGN ANALYSIS *(NOVEMBER 2000)*
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1. TANK SYSTEM DESCRIPTION

ENVIROTECH ENGINEERING & CONSULTING, INC., was retained by Clean Harbors, Inc., to conduct the required 5-year reassessment of Evaporator Feed Tank No. 1 (EF1), as outlined in the previous March 2010 Assessment. A visual inspection of Tank EF1 was conducted by Envirotech on October 29, 2015. This report is a continuation of previous assessments and references the original design data developed for this tank. Evaporator Feed Tank No. 1 (EF1) is a 60-ft.-dia. circular-steel aboveground open-top wastewater storage and treatment tank installed in July 1987. The 360,000-gal. (nominal) tank is utilized for the storage and incidental treatment of pre-treated wastewater. Certain wastewater not requiring pretreatment may also be stored in the tank (i.e., contaminated rainwater, landfill leachates, etc.) After storage, the wastewater is transferred for final treatment and/or disposal. The tank (along with Tank EF2 and a tank holding reagent-grade bleach) is located immediately east of the pretreatment area in a common, concrete-lined secondary containment system. Tank volume calculations are included in *Appendix A*. An "As-Built" drawing depicting the tank details is included herein as *Figure 1*.

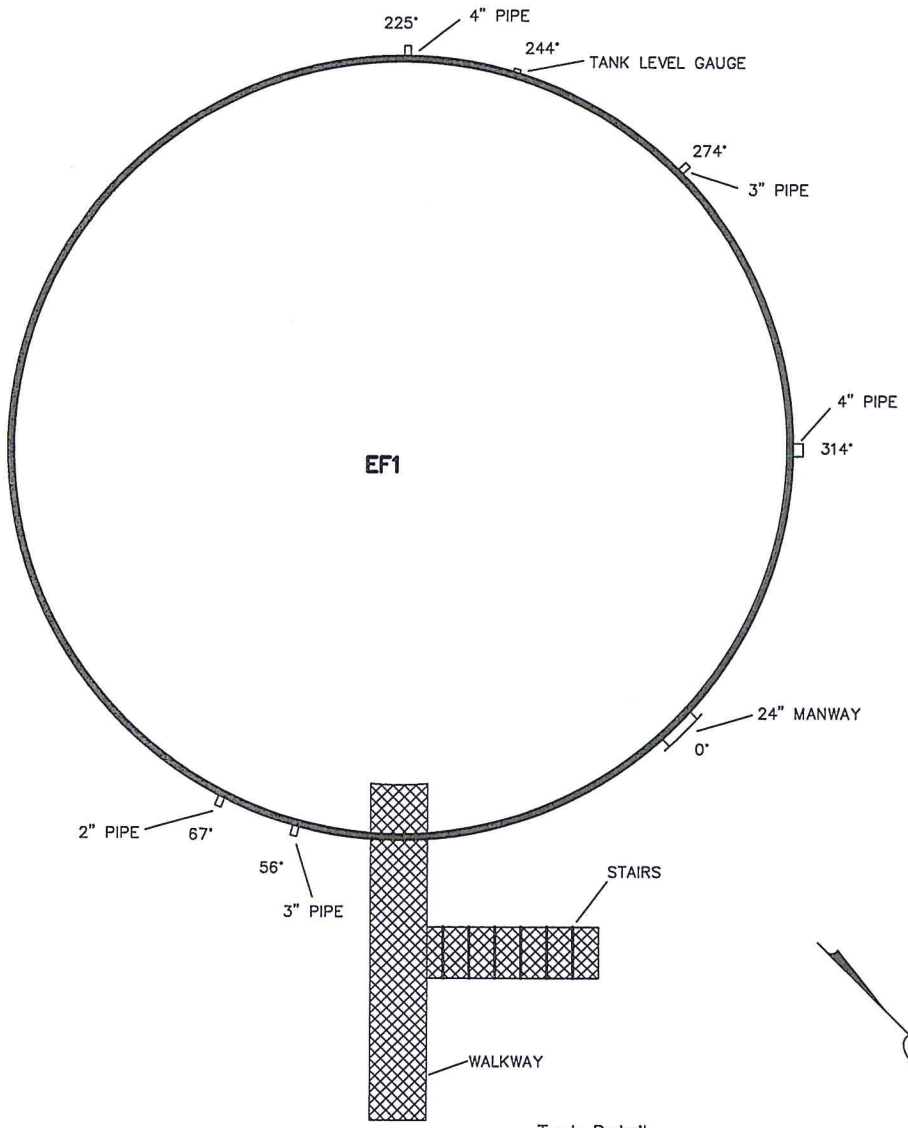
2. TANK SYSTEM ASSESSMENT

2.1 General Description of Evaporator Feed Tank No. 1 (EF1). Evaporator Feed Tank No. 1 (EF1) is a vertical, circular, carbon-steel tank with a nominal diameter of 60-ft. sitting on an 8-in. channel resting upon a concrete ring wall foundation. A sand base and high-density polyethylene (HDPE) liner leak detection system is located directly under the primary tank floor with detector pipes extending through the ring wall and liner for positive leak identification.

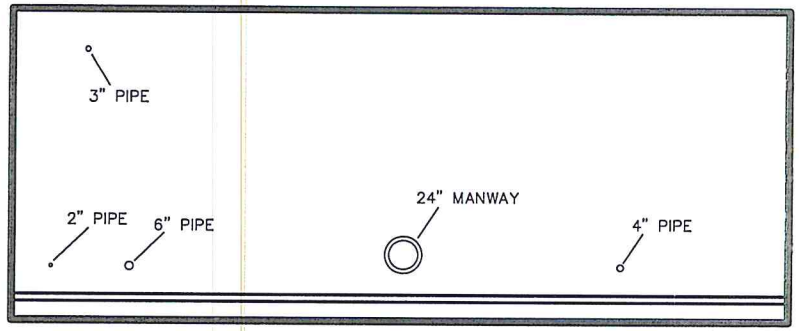
2.2 Design Standard(s). The tank was constructed in 1987 and appears to be field-designed and constructed. Previous structural calculations (November 2000 assessment) that compared the existing tank and supports to applicable sections in the *American Petroleum Institute Standard 650 - 1988 Edition (API-650)* and the *American Institute of Steel Construction (AISC) Manual of Steel Construction - 8TH Edition* are included in *Appendices B through D*. The actual steel specifications to which the tanks are constructed are not known, but were assumed to be A36 (carbon steel).

2.3 Hazardous Characteristics of Waste(s) to be Handled. The wastes managed in this tank are both characteristic and listed waste, as found in *40 CFR Part 261, Subparts C and D*. This is a storage tank where aqueous-based waste materials that required oxidation, neutralization, filtration, or settling (among other physical/chemical treatment methods) were stored prior to evaporation or shipment off-site. Currently, the only material placed in the tank is treated wastewater. According to Clean Harbors, Inc., the waste managed in this tank has the following general characteristics:

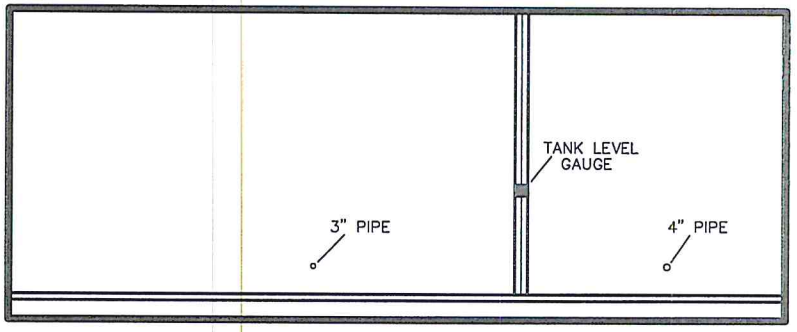
- ❒ $4 < pH < 13$;
- ❒ $N > 1$;
- ❒ Temperature = Ambient; and



Tank Detail
Scale 1"=10'



North View



West View

CleanHarbors ENVIRONMENTAL SERVICES, INC.

LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Evaporator Feed Storage Tank No. 1
Tank Details

ENVIROTECH

Date:	August 2000 (Original)
Scale:	n.t.s.
Designed by:	R. ERDMAN
Drawn by:	T. HURST
Checked By:	R. ERDMAN
Project No.	015449-00-000

Fig. 1

❒ Low Solvent Constituents.

The inside of the tank is coated with coal tar that is resistant to most constituents-of-concern. The coal tar coating has survived well in this working environment.

Regarding the potential for corrosion, it was previously determined that the pH and normality levels of the waste are the primary areas-of-concern. This was to determine the applicability of a corrosion allowance for the tank material-type and thickness.

2.4 **Existing Corrosion Protection.** The tank is isolated from soil and water by means of a ring wall equipped with a leak detection system below. This system is comprised of an HDPE liner between a layer of sand and a concrete mat foundation. The HDPE and concrete mat foundation isolate the sand from the underlying soil. Water may be entrained in the sand that was placed prior to construction of the tank bottom, but the secondary containment system is designed to drain entrained fluids to one of the leak detection drains that penetrate the ring wall. For further protection, a coal tar coating is employed on the bottom and sidewalls of the tank interior. In addition, the tank has an exterior epoxy paint layer and the new tank bottom has a protective coating on the underside of the plate.

2.5 **Documented Age of Tank.** Tank EF1 was erected/installed in July 1987 and is approximately 28-years-old as of this assessment conducted in October 2015.

2.6 **Results of Leak Test.** On October 25, 2015, a visual inspection of the containment area and leak detection pipes was conducted to satisfy the requirements of a leak test. A visual inspection of the containment area and leak detection pipes was conducted to satisfy the requirements of a leak test. No evidence of leakage from the manways or signs of penetration of the tank was observed. Based on this inspection, this tank appears not to be leaking.

2.7 **Existing Data Obtained.** The following *Table 2.1* summarizes the existing data associated with the referenced tank.

TABLE 2.1
EF1 TANK DATA

Tank Diameter	60-ft.
Tank Height	16.9-ft.
Maximum Operating Level	15.9-ft.
Material	A36 (Assumed)
Wall Thickness (*See Appendix B*)	0.25-in.
Specific Gravity	1.3
Operating Temperature	Ambient

TABLE 2.1 EF1 TANK DATA	
Maximum Volume	47,785.26-cf
Seismic Zone	1

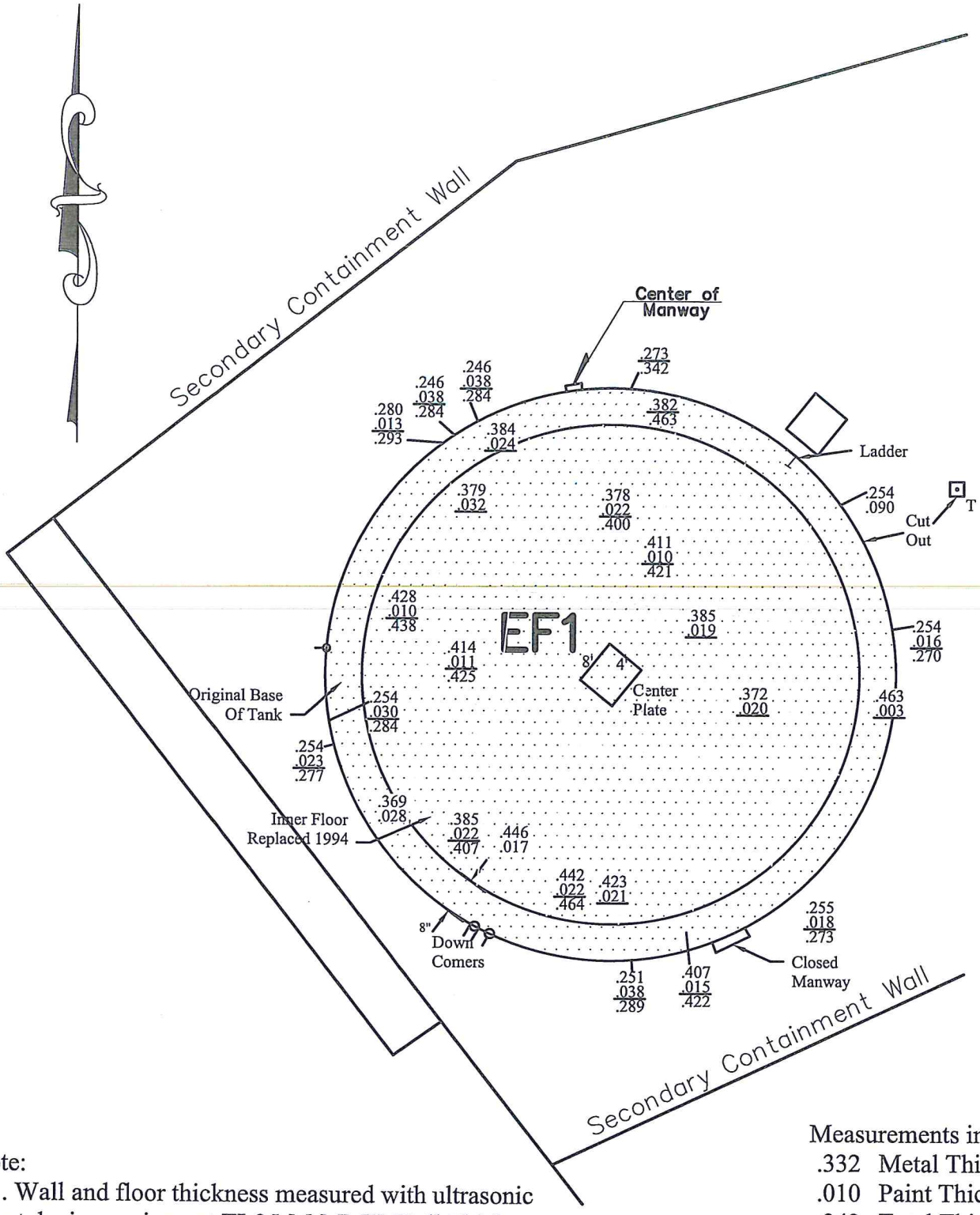
2.8 Calculation of Foundation Loading. The total weight of the tank and its contents equals 1,976-ton. Previous detailed calculations (November 2000 assessment) reflecting the minimum required foundation thickness and steel reinforcement are included herein as *Appendix E.*

2.9 Required Structural Calculation. The calculated required wall thickness for this tank is 0.2363-in. This thickness includes 0.0625-in. added for corrosion allowance, based on a "best-engineering" estimate that considered the materials being treated and a 20-yr. design life. Previous detailed calculations (November 2000 assessment) required for wall thickness and structural analysis of the tank support system are included herein as *Appendices B thru D.*

2.10 Comparison of Actual Structural to Theoretical Values. The following *Table 2.2* summarizes the comparison of actual structural to theoretical values. Some minor variance of instrument readings can be attributed partially to the idiosyncrasies of the testing equipment such as density of "couplant" and roughness of tank surface at each test point.

TABLE 2.2 COMPARISON OF ACTUAL STRUCTURAL TO THEORETICAL VALUES FOR THE EF1 TANK	
WALL THICKNESS COMPARISON	
Calculated Required Wall Thickness	0.2363-in.
Minimum Required Wall Thickness by API 650	0.1875-in.
Original Plate Thickness	0.250
Measured Wall Thickness w/Coating (Minimum)	0.270-in.
BOTTOM THICKNESS COMPARISON	
Minimum Required Bottom Thickness by API 650	0.250-in.
Original Plate Thickness	0.375
Measured Bottom Thickness w/Coating (Inner)	0.392-in.
Measured Bottom Thickness w/Coating (Outer Ring)	0.397-in.

2.10.1 Wall Thickness Comparison. In the October 2015 assessment, a visual inspection and an ultrasonic thickness corrosion survey were conducted on the tank walls. Wall thickness measurements of the interior protective surface ranging from 0.246- to 0.280-in. exceeded the minimum required wall thickness of 0.236-in. and 0.1738-in., as graphically depicted on *Figure 1a.* Separate readings indicating that



Note:

1. Wall and floor thickness measured with ultrasonic test device equipment TI-25-M-MMX Wall Thickness Gauge (owned by Luckinbill Mechanical Contractors) on Mar 15, 2010.
2. Wall thickness measured at height of 3' to 6' above floor , base, and inner floor around the perimeter.
3. Thickness shown in 0.000" measured inside the tank.

Measurements in Inches

.332 Metal Thickness
.010 Paint Thickness
.342 Total Thickness

Survey Points Tank (EF1)
Scale 1"=20'

Clean Harbors ENVIRONMENTAL SERVICES, INC.
LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Evaporator Feed Storage Tank No. 1
Measured Plate Thickness

ENVIROTECH

Date:	March 16, 2010
Scale:	NTS
Designed by:	R. ERDMAN
Drawn by:	R. UNGER
Checked By:	R. ERDMAN
Project No.	015449-00-000

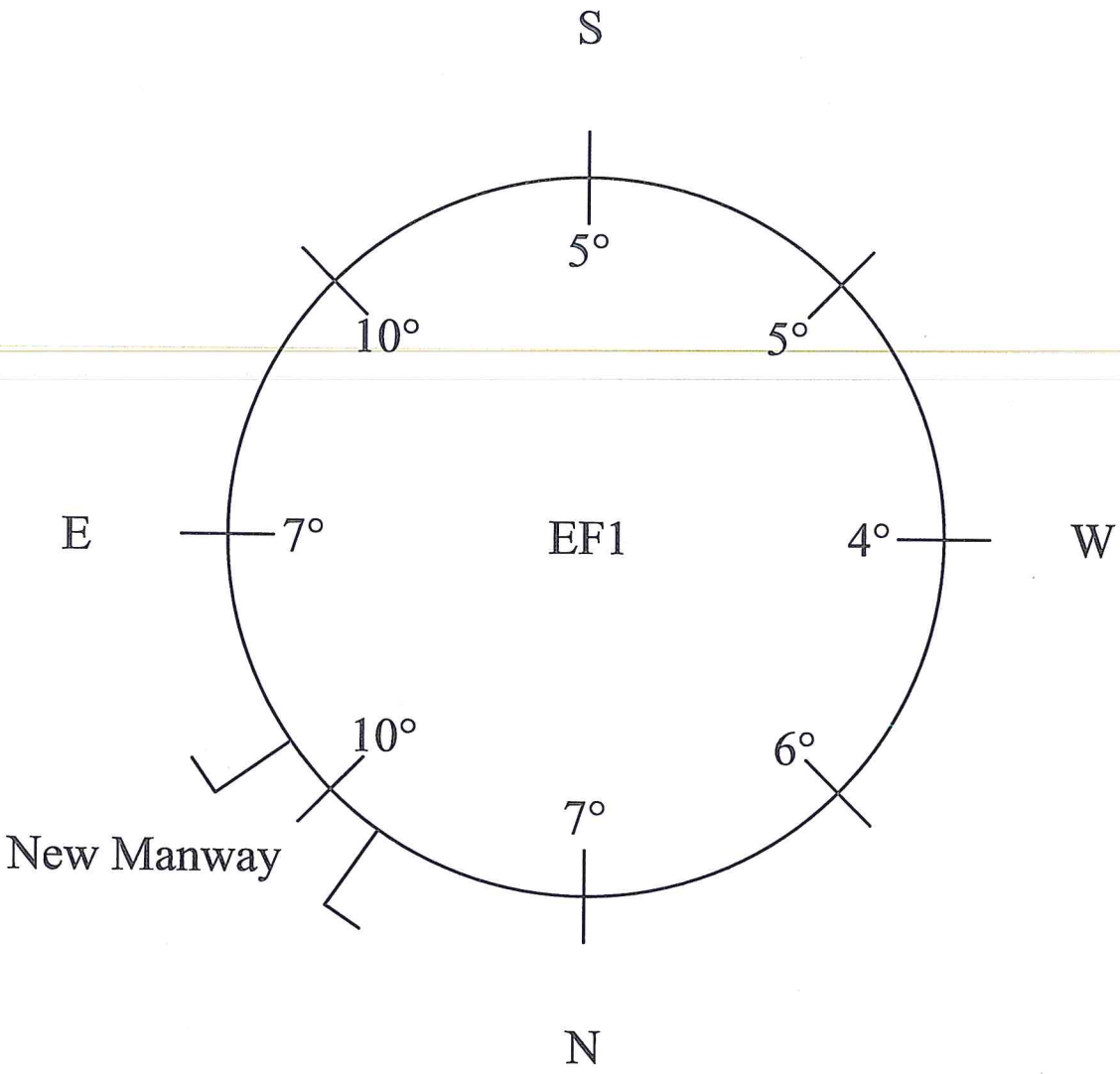
Fig. 1a

the coating thickness varies are attributed to normal wear and tear. Furthermore, the difference in values does not indicate a reduction that would adversely impact the minimum thickness requirement.

2.10.2 Bottom Thickness Comparison. A new tank bottom was installed in May 1994 by Ratliff, Inc., of Ponca City, Oklahoma. The specifications called for the bottom material to be A-36 steel with a thickness of 0.375-in. that exceeded the API-88 minimum thickness requirement of 0.25-in. An ultrasonic thickness corrosion survey was conducted by ENVIROTECH on October 29, 2015. This survey included the new bottom plates and the existing outer fringe portion of the original floor that the new floor was welded to. Floor (plate) thickness measurements of the interior protective surface ranging from 0.372 in. (minimum bottom thickness on the new floor section) and 0.369-in. (original floor perimeter section) exceeded the minimum required floor thickness of 0.250-in. and 0.1875-in., as graphically depicted on *Figure 1a*. Furthermore, the difference in values does not indicate a reduction that would adversely impact the minimum thickness requirement.

2.10.3 Foundation Integrity. Evaporator Feed Tank No. 1 (EF1) is situated on a concrete ring foundation with a sand base. The sand base rests on a concrete slab that is tied to the foundation ring. Minor cracks in the foundation ring are apparent from a visual inspection and continue to be coated with an impermeable coating. The tank is attached to a steel channel located on the top of the foundation ring. The steel channel experienced a rotation deformation when the new bottom was installed in the tank.

In order to monitor the foundation integrity, the angle of deflection caused by rotation deformation of the steel channel has been measured frequently, as outlined in the monitoring documents included in *Appendix F*. ENVIROTECH'S recommendation in the July 1995 tank assessment report indicated that deflection measurements should be collected annually and compared with the initial measurements recorded subsequent to rotation deformation. In the event the deflection measurement is 2° greater than the initial measurement, ENVIROTECH recommended that a new assessment of the tank be conducted. Time has shown that deflection has settled into a movement range of two degrees (2°). Therefore, we recommend that a new assessment be considered when a deflection greater than two degrees (2°) of the previous two (2) measurements is observed. Actual deflection data is included in *Appendix F,* and *Figure 2* illustrates the measuring points with the initial deflection data. An updated evaluation of this angle deflection is summarized in the following *Table 2.3*.



CleanHarbors ENVIRONMENTAL SERVICES, INC.

LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Evaporator Feed Storage Tank No. 1
Initial Deflection Data

ENVIROTECH

Date:	August 2000 (Original)
Scale:	NTS
Designed by:	R. ERDMAN
Drawn by:	T. HURST
Checked By:	R. ERDMAN
Project No.	015449-00-000

Fig. 2

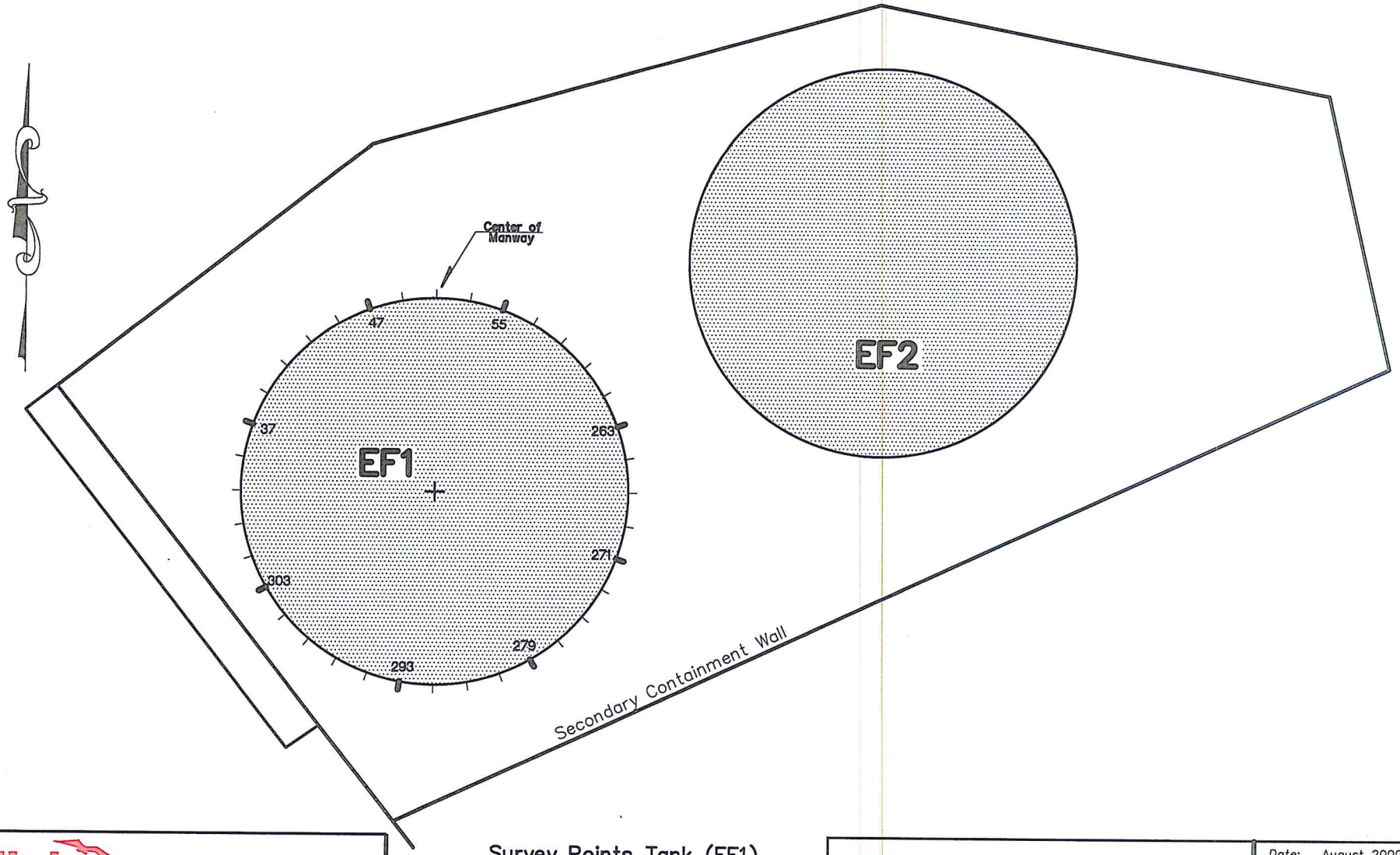
TABLE 2.3
COMPARISON OF HISTORICAL DEFLECTION DATA

Initial Deflection Data		Measurement Dates								
		3/97	2/98	4/00	10/01	12/03	4/05	12/07	3/10	01/16
S	5°	4°	6°	6°	6°	5°	5°	5°	6°	5°
	5°	5.5°	6°	6°	6°	5°	5°	5°	5°	6°
E	4°	4°	5°	5°	4°	4°	3°	4°	4°	4°
	6°	5°	7°	6°	5°	5°	5°	5°	5°	7°
N	7°	4°	6°	5°	4°	4°	4°	4°	4°	7°
	10°	4°	6°	4°	4°	4°	5°	4°	4°	6°
E	7°	6°	6°	5°	5°	6°	6°	6°	8°	5°
	10°	6°	8°	7°	7°	7°	7°	7°	6°	6°

A review of the data indicates that the entrance hatch area of the tank experiences deflection measurements greater than 2° from the initial measurements. However, the visual inspection gave no indication of compromised foundation integrity.

In addition, previous field survey data indicated that some settlement had occurred in the tank foundation ring. In September 1993, USPCI (former facility owner) retained Law Engineering to conduct an investigation that would yield site-specific subsurface data in the vicinity of Tank EF1. Law drilled four (4) geotechnical borings as part of this investigation. In general, the soil profile consisted of 1- to 2-ft. of gravel followed by 15- to 20-ft. of soft-to-hard, reddish-brown silty clay. A review of the data within the Law report, including the boring logs, indicates the soil strengths should be adequate to support the tank and associated ring foundation. The applicable portion of the Law report is included herein as *Appendix G*. Based on this information, a foundation design analysis, prepared in November 2000, is included in *Appendix E*.

To quantify foundation settlement since the March 2010 assessment, Jividens Surveying shot eight (8) points around the perimeter of the tank on several occasions, as indicated in the monitoring documents included in *Appendix F*. The survey points are graphically depicted on the drawing included herein as *Figure 3*. These existing foundation elevations were compared with previous surveys of the same points. The historical foundation data is graphically presented as *Figure 4*. The latest elevation measurements indicate greater movement than past observations. The movement is upward and generally uniform. As a whole, it appears that the tank foundation



Survey Points Tank (EF1)
Scale 1"=20'

CleanHarbors ENVIRONMENTAL SERVICES, INC.

LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Evaporator Feed Storage Tank No. 1
Survey Points Schematic

ENVIROTECH

Date:	August 2000 (Original)
Scale:	NTS
Designed by:	R. ERDMAN
Drawn by:	T. HURST
Checked By:	R. ERDMAN
Project No.	015449-00-000

Fig. 3

EVAPORATOR FEED TANK NO. 1

Foundation Survey Data

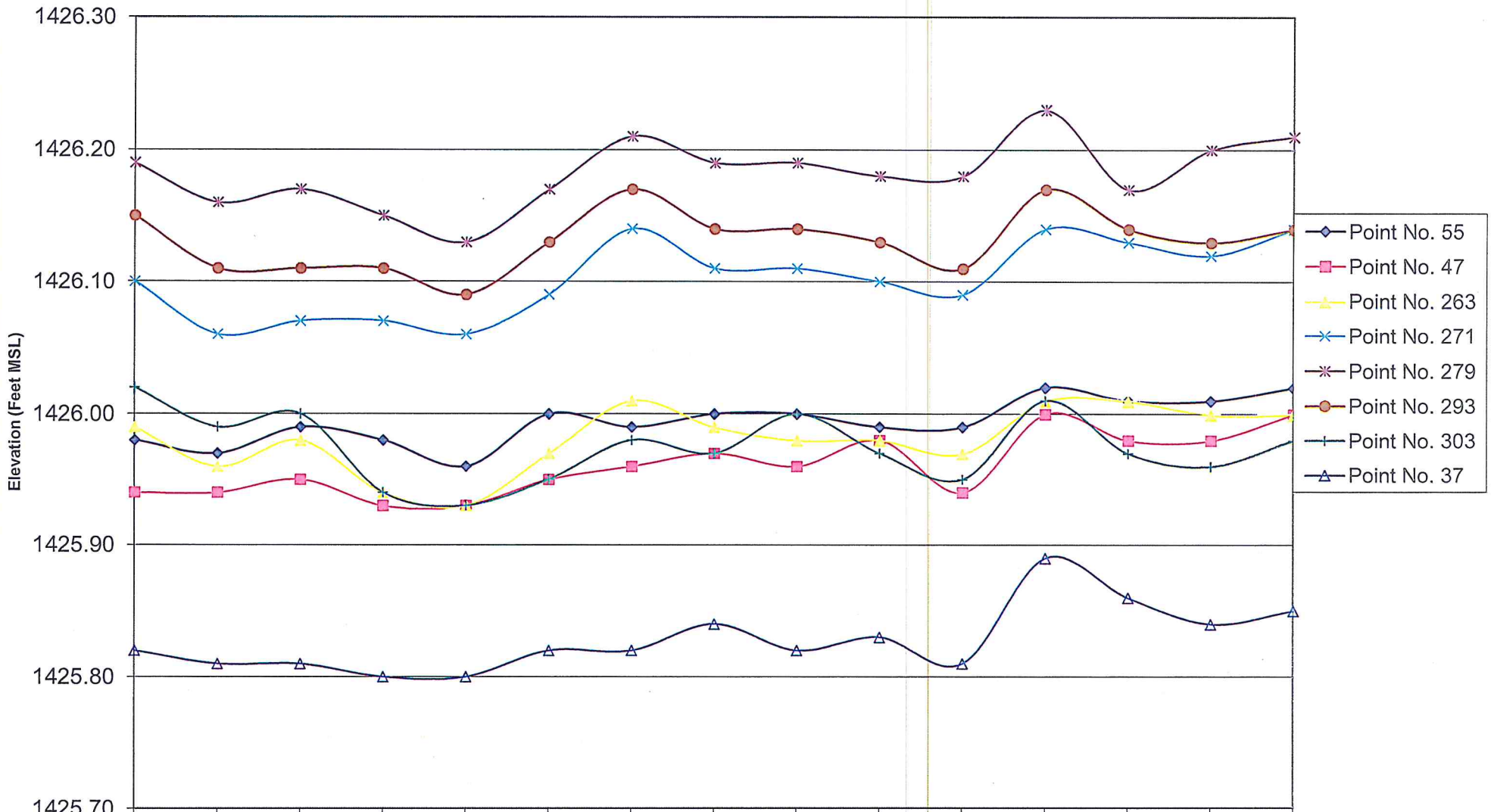


Figure 4

experienced fairly uniform movement. In addition, no significant impacts to the foundation or tank structure were observed.

3. SECONDARY CONTAINMENT SYSTEM

3.1 General Description of Secondary Containment. The secondary containment system is designed and operated to prevent migration of wastes or liquids out of the system. Evaporator Feed Tank Nos. 1 and 2 are located in a reinforced-concrete-base floor area with vertical concrete sidewalls. This area is inspected on a daily basis.

Prior to the November 2000 assessment, a visual inspection revealed apparent stress cracks or other conditions that would indicate an insufficiency in the foundation design. A previously-referenced geotechnical investigation addressed these issues. This apparent failure in the concrete was determined to be the result of a lack of proper steel reinforcement and/or differential settlement (consolidation) in the subgrade. The subgrade appeared to be fill material and it is possible that the subgrade was not properly compacted prior to pouring the concrete.

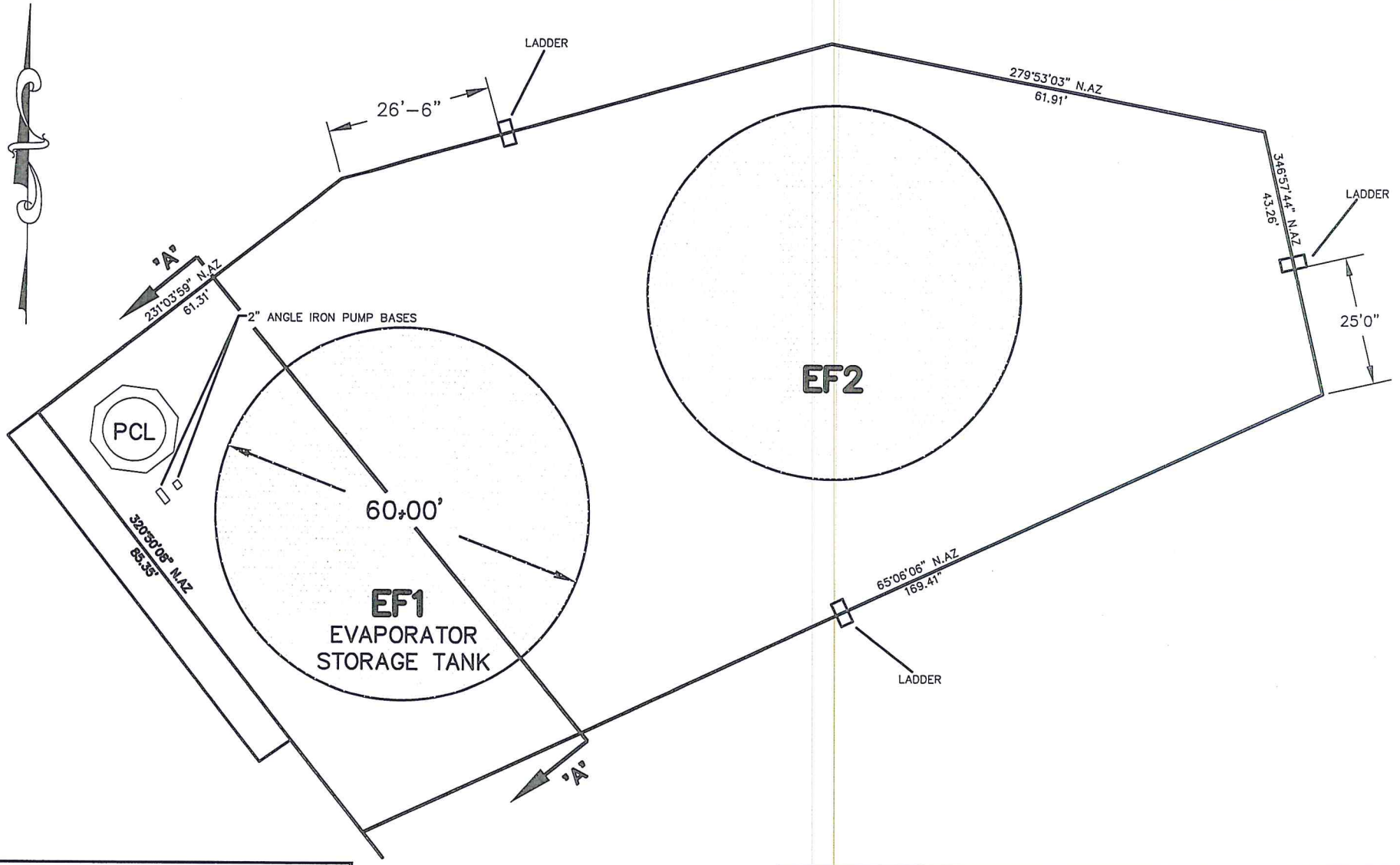
During this assessment, the concrete secondary containment area appeared to be in fair condition. The ground surrounding the secondary containment system is sloped to shed rainfall runoff to aid in preventing saturated soil.

The containment system is walled-off and receives no direct vehicular traffic. The foundation walls and base are mass-poured in-place.

The containment area and tanks are visually monitored on a daily basis for leaks. The floor is sloped to collect any drainage or spills, and any released tank contents or surface runoff will drain on top of the sloped concrete to the sump area. The accumulated liquids are then withdrawn within a specified time period. The secondary containment system is graphically depicted in the drawings included herein as *Figures 5 and 6*.

3.2 Design Standards. For purposes of the November 2000 assessment, "As-Built" drawings for this area were utilized as a reference. The structural capacity of the foundation and walls were compared to those sections that are applicable in the *API 650-88* and the *American Concrete Institute (ACI 318/89/318r-89)*. These calculations were used as a guide in verifying the ability of the system to contain hazardous waste.

3.3 Hazardous Characteristics of Wastes Stored. The wastes managed in the primary tank are both characteristic and listed waste, as found at *40 CFR Part 261, Subparts C and D*. This is a storage tank where aqueous-based waste materials that required oxidation, neutralization, filtration, or settling (among other physical/chemical treatment methods) were stored prior to evaporation or shipment off-site. Currently, the only material placed in the tank is treated wastewater. The waste managed in this tank has the following general characteristics:



CleanHarbors ENVIRONMENTAL SERVICES, INC.

LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

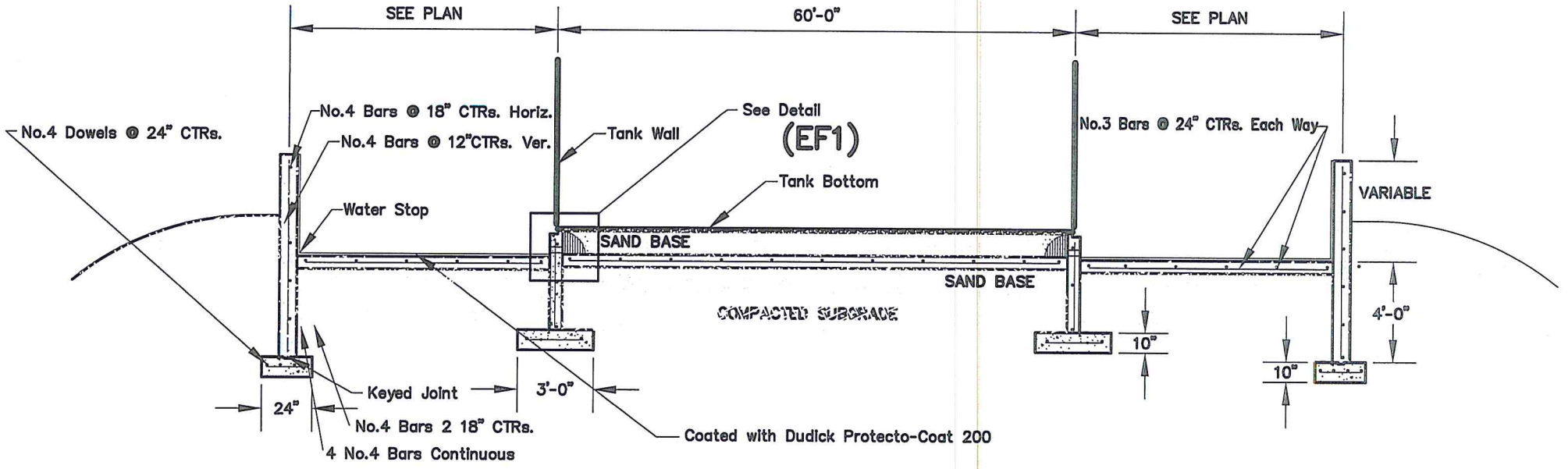
Evaporator Feed Storage Tank No. 1
Secondary Containment System

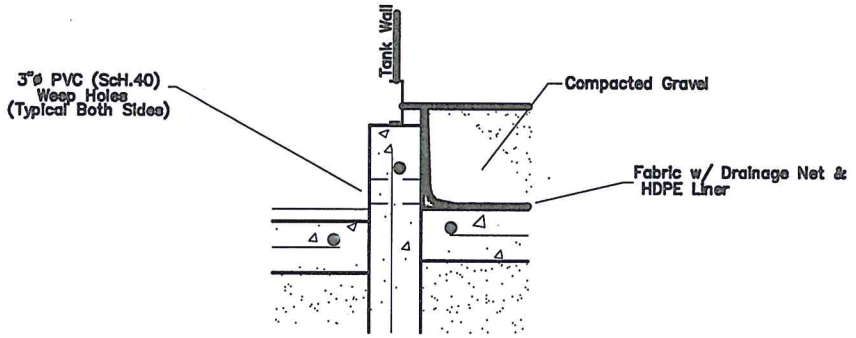
Containment Details
Scale 1"=20'

ENVIROTECH

Date:	August 2000 (Original)
Scale:	n.t.s.
Designed by:	R. ERDMAN
Drawn by:	T. Hurst
Checked By:	R. ERDMAN
Project No.	015449-00-000

Fig. 5





Liner Detail

Containment Section Details
Scale = N.T.S.

CleanHarbors ENVIRONMENTAL SERVICES, INC.

LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Evaporator Feed Storage Tank No. 1
Secondary Containment Section A-A

ENVIROTECH

Date:	August 2000 (Original)
Scale:	n.t.s.
Designed by:	R. ERDMAN
Drawn by:	T. Hurst
Checked By:	R. ERDMAN
Project No.	015449-00-000

Fig. 6

- ❒ $4 < pH < 13$;
- ❒ $N > 1$;
- ❒ Temperature = Ambient; and
- ❒ Low Solvent Constituents.

The hazardous characteristics of the waste treated in the primary tank were examined. It was determined that the pH and normality levels of the waste are the primary areas of concern.

3.4 Existing Corrosion Protection. The entire secondary containment area has been coated with Dudick, Inc., Protecto-Coat 200.

3.5 Documented Age of the Containment System. The secondary containment system was constructed and installed in 1987, thus making the system 28-yr. old at the time of this assessment. The system has undergone significant upgrading since it was initially installed to include the following:

- ❒ A coating was applied in June 2012. The secondary containment surface coating is comprised of Chemproof Polymers-Permacoat 3000 on horizontal surfaces and Chemproof Polymers-Permacoat 3000V on vertical surfaces. Equivalent or superior coating materials are used during any necessary repairs to the coating. Information regarding Chemproof Polymere-Permacoat is included herein as *Appendix H*.

- ❒ Potential cross-connections were eliminated in 1993. The main lines from the primary treatment and storage area exited the containment area through the floor of the secondary containment area down to the final treatment area, thereby potentially allowing material from a tank failure to migrate into the secondary containment area within the final treatment area. Elimination of this potential cross-connection acts to segregate the secondary containment area for EF1 and EF2 from any other.

3.6 Results of Leak Test. A visual inspection of the containment area and leak detection pipes was conducted to satisfy the requirements of a leak test. No evidence of leakage from the manways or signs of penetration of the tank was observed. Based on this inspection, the secondary containment does not appear to be leaking. Prior to the November 2000 assessment, an inspection of the non-exposed portion of the containment area beneath the tank floor revealed it was in fair condition, and installation of the HDPE liner appears to prohibit migration of waste out of the containment area.

3.7 **Existing Data Obtained.** The following *Table 3.1* summarizes the existing data collected as regards the secondary containment area.

TABLE 3.1 SECONDARY CONTAINMENT AREA DATA	
Area	14,589-ft.^{2}
Available Wall Height	5.5-ft.
Material	Concrete
Gross Volume	80,240-ft.^{3}

3.8 **Calculation of Existing Capacity.** The volume containment capacity available (CCA) calculation is:

CCA = Gross Volume - Volume of Items in Containment - Volume of Rainfall

The containment capacity available is 59,487-cf, as depicted in the detailed calculations included herein as *Appendix I*.

3.9 **Required Volume.** The containment capacity required (CCR) is calculated as follows:

CCR = Volume of Largest Tank in Secondary Containment = (EF1) = 47,785.26-cf

3.10 **Comparison of Available Volume to Required Volume.** The containment capacity comparison is calculated as follows:

Containment Capacity Required = 47,785.26-cf
Secondary Containment Volume Available = 59,487-cf
Excess Containment Volume = 11,702-cf
Safety Factor = 1.24

CCA > CCR. Adequate capacity (under normal operating conditions) is available.

4. CONCLUSIONS

4.1 **Primary Tank Vessel.** The tank vessel at the time of inspection is appropriate for use with the present waste stream at given densities and chemical and physical characteristics, as verified by Clean Harbors, Inc. The useful life of the steel tank would be estimated at 5-yr., provided as follows:

(a) Although the original design life was estimated to be 20-years in 1987, the tank appears to be in good condition with coatings that demonstrate no significant deterioration.

(b) The 8-in. channel has been inspected annually at the points previously identified in *Figure 2* and some deflection has been observed greater than 2° from its current position.

(c) A Survey of the tank foundation has been conducted at the points previously identified in *Figure 3* and the annual maximum settlement does not exceed 1-in.

In the event the 8-in. channel deflection increases more than 2° from its current position and/or the tank foundation settles more than 1-in/yr., ENVIROTECH requests that a new tank assessment be conducted immediately.

4.2 **Secondary Containment.** The secondary containment area at the time of inspection is appropriate for use with the present waste stream at given densities and chemical and physical characteristics. The useful life of the secondary containment area would be estimated at 5-yr., provided the constraints addressed in *Section 4.1(b) and (c)* are observed.

5. RECOMMENDATIONS

5.1 **Primary Tank.** Clean Harbors should continually ensure compatibility with the waste and densities stored. Daily inspections should be continued to detect any visual corrosion or defects. Due to the known history and pattern of movement, inspection in terms of collecting and evaluating the 8-inch channel deflection and foundation survey for settlement shall be performed between one (1) to three (3) years. Since the steel base channel under Tank EF1 rotated greater than 2°, it is recommended to evaluate the foundation settlement and rotation in 2017. Repair action shall be evaluated on a case-by-case basis.

5.2 **Secondary Containment.** The secondary containment should be visually inspected periodically for any deterioration as well as structural integrity.

5.3 **Routine Inspections.** When routine and preventive measures are to be implemented, the tank should be cleaned and internally inspected to determine any interior defects or corrosion. Continued routine painting and coating of tanks on the interior and exterior, as well as routine inspections, is recommended.

6. CERTIFICATION

"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 ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment, for knowing violations."

DATED this _____ day of April, 2016.

Ron Erdman, P.E.
ENVIROTECH ENGINEERING & CONSULTING, INC.

C.A. 1960 - Expiration 06/30/16

APPENDIX A.

PRIMARY TANK VOLUME CALCULATIONS

PRIMARY TANK VOLUME CALCULATIONS

❒ DIMENSIONS:

Geometry:	Cylindrical
Diameter:	60.00-ft.
Height:	16.90-ft.
Operating Height:	15.50-ft.
Bottom:	Flat

❒ TANK VOLUME:

Maximum Volume	=	47,785.26-cf	=	357,458.57-gal.
Operating Volume	=	43,826.72-cf	=	327,846.63-gal.
Total Primary Tank Volume	=	*47,785.26-cf*	=	*357,458.57-gal.*

❒ WEIGHT ON FOUNDATION:

Contents S.G.	1.3
Density	81.12-lb/cf

❒ SURFACE AREA CALCULATION:

Tank Top	=	n/a
Tank Bottom	=	2,827.53-sf
Tank Wall	=	3,185.68-sf
Total Surface Area	=	*6,013.21-sf*

Steel Thickness:	Sidewalls	=	0.250-in.
	Bottom	=	0.375-in.
Volume of Steel:	Sidewalls	=	66.37-cf
	Bottom	=	88.36-cf
Density of Steel		=	490-lb/cf
Weight of Steel (Tank):		=	37.91-ton = 75,817.08-lb.
Weight of Tank Contents		=	*1,938-ton = 3,876,340-lb.*
Total Weight of Tank and Contents		=	*1,976-ton = 3,952,157-lb.*

APPENDIX B.

PRIMARY TANK WALL THICKNESS

PRIMARY TANK WALL THICKNESS

❒ **DIMENSIONS:**

Geometry:	Cylindrical
Diameter:	60.00-ft.
Height:	16.90-ft.
Specific Gravity:	1.30
Normal Operating Temperature:	Ambient

❒ **STEEL THICKNESS CALCULATIONS:**

Thickness (t) = (2.6 * H * D * S.G.) / (s * E) + CA

s	=	Allowable Design Stress	=	23,200.00-psi
E	=	Joint Efficiency	=	85.00%
Thickness (t)			=	0.1738-in.
Corrosion Allowance			=	0.0625-in.
Calculated Minimum Wall Thickness			=	*0.2363-in.*

APPENDIX C.

SEISMIC CALCULATIONS

SEISMIC CALCULATIONS

DIMENSIONS:

Diameter:	60.00-ft.
Height:	16.90-ft.
Weight of Tank (Steel):	75,817.00-lb.
Weight of Maximum Contents:	3,876,340.00-lb.
Tank Shell Thickness:	0.25-in.
Tank Bottom Thickness:	0.375-in.

STRESS IN TANK SHELL FROM SEISMIC FORCES:

Maximum weight of tank contents that may be used to resist shell overturning moment: WI

WI	=	7.9 * tb * (Fby * G * H)□ .5	
Fby	=	Minimum Yield Strength in Bottom Plate	36,000.00
tb	=	Thickness of Tank Bottom	0.375
G	=	Design Specific Gravity of Liquid	1.3
WI	=		2,634.66
Note:		*WI Shall Not Exceed 1.25 * G * H * D*	*1,647.75-lb/ft. of Shell Circumference*
Density of Tank Shell Material			490.00-lb/cf
WT	=	Weight of Tank Shell	172.52-lb/ft. of Shell Circumference
M/[D□2(WT+WI)]			0.1071

b = Maximum Longitudinal Compressive Force at the Bottom of Tank Shell

b = WT + 1.273*M/D□2

b = 420.63-lb/ft. of Shell

G*H*D□2/t□2 = 1,265,472

Fa = 10□6*t/D = 4,167-psi

OR

Fa = .5*Fty = 18,000-psi

Use Minimum Value for Fa Fa = 4,167-psi

b/12*t = 140.21-psi

Note: b/12t Cannot Exceed Fa for a Stable Tank

❒ OVERTURNING MOMENT:

Overturning Moment (M)	=	Z*I*(C1*Ws*Xs+C1*W1*X1+C2*W2*X2)	
Zone Coefficient (Z)		=	0.1875
Essential Facilities Factor (I)		=	1.000
Lateral Earthquake Force Coefficient (C1)		=	0.240
D/H		=	3.55
k Factor (@ D/H = 3.55)		=	0.680
Site Amplification Factor (S)		=	1.5
Natural Period of First Sloshing Mode (T)		=	5.11
Lateral Earthquake Force Coefficient (C2)		=	0.07755
Weight of Tank (Ws)		=	75,817.00
Weight of Tank Contents (Wt)		=	3,876,340.00
W1 / Wt (@ D/H = 3.55)		=	0.32
W2 / Wt (@ D/H = 3.55)		=	0.60
Weight of Effective Mass (W1)		=	1,240,428.80
Weight of Effective Mass (W2)		=	2,325,804.00
Ht from Btm of Shell to Cent. of Shell (Xs)		=	8.45
X1/H		=	0.38
Ht from Btm of Cent. of Lat Seismic Force (X1)		=	6.422
X2/H		=	0.55
Ht from Btm of Cent. of Lat. Seismic Force (X2)		=	9.295
Overturning Moment	*M*	=	*701,645-ft/lb.*
Opposing Moment	*M**	=	*118,564,710-ft/lb.*

APPENDIX D.

WIND LOAD CALCULATIONS

WIND LOAD CALCULATIONS

❒ DIMENSIONS:

Diameter:	60.00-ft.
Height:	16.90-ft.
Weight of Tank (Steel):	75,817.00-lb.
Weight of Max. Contents:	3,876,340.00-lb.
Tank Shell Thickness:	0.25-in.
Tank Bottom Thickness:	0.375-in.

❒ OVERTURNING MOMENT FROM WIND LOADS:

M = Overturning Moment Due to Wind Loading

M = Pw * Ap * Hc

Pw	=	Wind Pressure (Assume 18-psi for 100-MPH Wind on Cylinders)	=	18.00-psi
Ap	=	Projected Frontal Area of Tank (H*D)	=	1,014-Ft^2
H1	=	Height from Ground to Centroid of Tank	=	8.45-ft.
M	=			154,229.40-ft-lb.
M Max	=			.66*(WD)/2
W	=	Wt of Tank	=	75,817-lb.
M Max	=			1,501,177-ft-lb.

M Must Be Less Than M Max

APPENDIX E.

FOUNDATION DESIGN ANALYSIS

FOUNDATION DESIGN ANALYSIS

❒ DIMENSIONS:

Diameter:	60.00-ft.
Height:	16.90-ft.
Weight of Tank (Steel):	75,817.00-lb.
Weight of Max. Contents:	3,876,340.00-lb.
Tank Shell Thickness:	0.25-in.
Tank Bottom Thickness:	0.375-in.

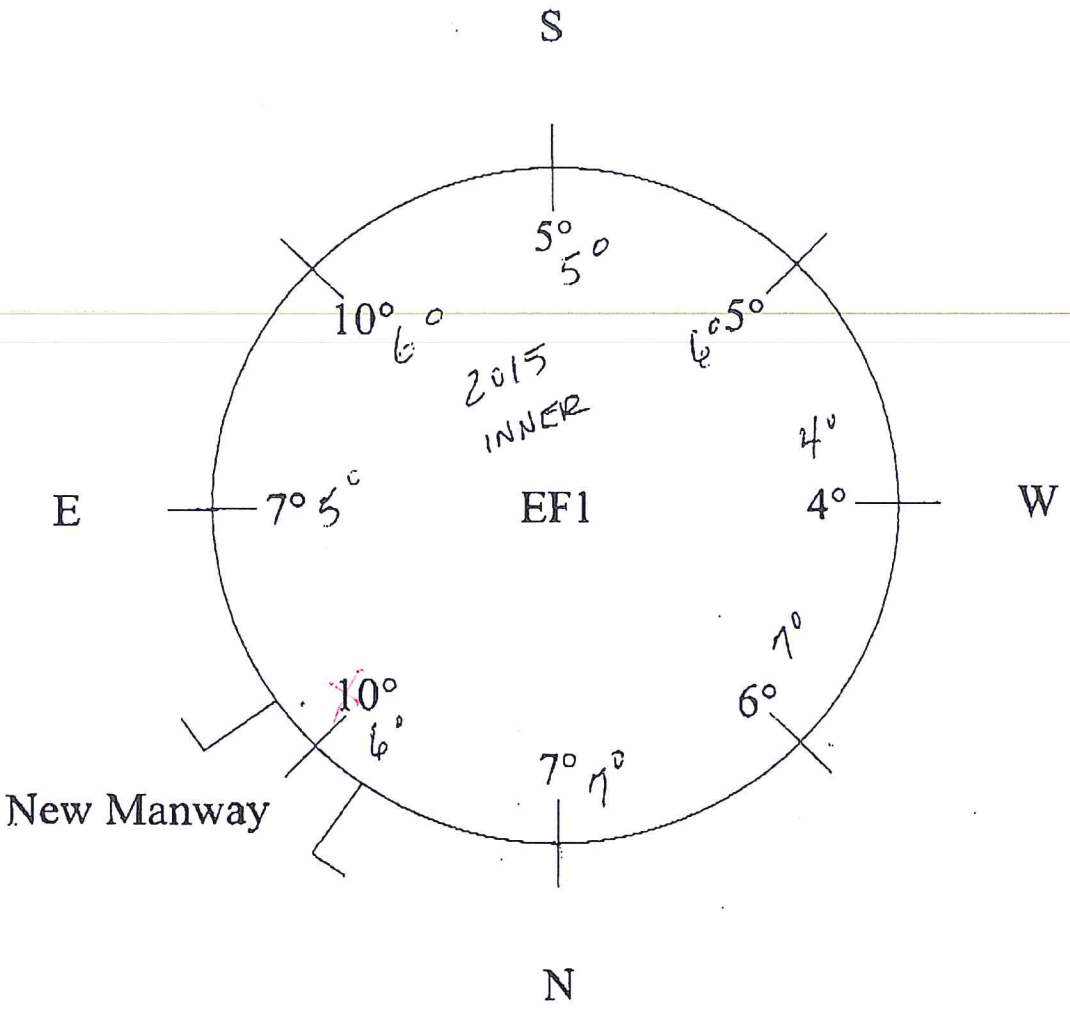
❒ CONCRETE FOUNDATION DESIGN:

Assumed Footing Depth	=	48-in.
Assumed Footing Width	=	12-in.
Assumed Effective Soil Pressure (Based on Law Engineering Investigation)	=	1,500-psf
Maximum Shell Compression at Bottom of Shell (Based on Seismic Analysis) b	=	420.63-lb/ft. of circ.
Footing Width	=	1.00-ft.
Actual Applied Loading	=	420.63-psf

The actual applied loading is significantly less than the assumed effective soil pressure and therefore, the foundation should be stable.

APPENDIX F.

FOUNDATION INTEGRITY MONITORING DOCUMENTS



580 - 237-4302

LeanHarbors
ENVIRONMENTAL SERVICES, INC.

LONE MOUNTAIN FACILITY
WAYNOKA, OKLAHOMA

Evaporator Feed Storage Tank No. 1
Initial Deflection Data

ENVIROTECH
ENGINEERING & CONSULTING, INC.
7500 North 9th Street - Enid, Oklahoma 73701
Phone (580) 234-9780 Fax (580) 237-4302
C.A. #1860 - Expiration Date: 6-30-2008
www.envirotech-consulting.com

Date:	August 2000 (Original)
Scale:	NTS
Designed by:	R. ERDMAN
Drawn by:	T. HURST
Checked By:	R. ERDMAN
Project No.	03.187-00-050

Fig. 2

Annual Tank In-Service Inspection Checklist

Tank Name: EF-1 Tank Number: #1

Tank Location: LSWPT Date: 04-01-2012

Inspected By: JIVIDEN SURVEY Signature: MIKE GOOSSEN

Date of Last Inspection: _____

I. Foundation

A. Measure foundation levelness and bottom elevations (8 points for EF-1 and 9 points for EF-2).
Note: No other tanks require foundation levelness and elevation survey.

EF-1:

37 1425.86	47 1425.98	55 1426.01	263 1426.01
271 1426.13	279 1426.17	285 1426.14	303 1425.97

EF-2:

65 _____	73 _____	81 _____	89 _____	181 _____
205 _____	211 _____	219 _____	227 _____	

B. Has the yearly maximum settlement exceeded 1 inch? (EF-1 and EF-2 only)

EF-1:		EF-2:	
Yes_____	No_____	Yes_____	No_____

C. Check 8 inch annular channel for deflection of more than 2 degrees from its correct position. (EF-1 only)

Deflection _____

Comments: _____

Annual Tank In-Service Inspection Checklist

Tank Name: EF-1 Tank Number: #1

Tank Location: WWPT Date: 05-19-2014

Inspected By: JIVIDEN SURVEY Signature: Mike Gossett

Date of Last Inspection: _____

I. Foundation

A. Measure foundation levelness and bottom elevations (8 points for EF-1 and 9 points for EF-2). Note: No other tanks require foundation levelness and elevation survey.

EF-1:

37 1425.84 47 1425.98 55 1426.01 263 1426.00

271 1426.12 279 1426.20 293 1426.14 303 1425.96

EF-2:

65 _____ 73 _____ 81 _____ 89 _____ 191 _____

205 _____ 211 _____ 219 _____ 227 _____

B. Has the yearly maximum settlement exceeded 1 inch? (EF-1 and EF-2 only)

EF-1: EF-2:

Yes____ No____ Yes____ No____

C. Check 8 inch annular channel for deflection of more than 2 degrees from its correct position. (EF-1 only)

Deflection _____

Comments: _____

Annual Tank In-Service Inspection Checklist

Tank Name: EF-1 Tank Number: _____

Tank Location: WWPT Date: 11-09-2015

Inspected By: _____ Signature: _____

Date of Last Inspection: _____

I. Foundation

A. Measure foundation levelness and bottom elevations (8 points for EF-1 and 9 points for EF-2). Note: No other tanks require foundation levelness and elevation survey.

EF-1:

37 1425.85 47 1426.00 55 1426.02 263 1426.00

271 1426.14 279 1426.21 293 1426.14 303 1425.98

EF-2:

65 _____ 73 _____ 81 _____ 89 _____ 191 _____

205 _____ 211 _____ 219 _____ 227 _____

B. Has the yearly maximum settlement exceeded 1 inch? (EF-1 and EF-2 only)

EF-1: EF-2:

Yes____ No____ Yes____ No____

C. Check 8 inch annular channel for deflection of more than 2 degrees from its correct position. (EF-1 only)

Deflection _____

Comments:

_____

_____

_____

APPENDIX G.

LAW ENGINEERING GEOTECHNICAL REPORT

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

lovember 22, 1993

Ir. Walter Sonne, P.E.
USPCI, Inc.
515 West Greens Road, Suite 500
ouston, Texas 77067

SUBJECT: REVISED REPORT OF GEOTECHNICAL EXPLORATION
Expansion of Wastewater Treatment Facilities--
Lone Mountain Facility, Major County, Oklahoma
Law Engineering Projects No. 392-01406-01

Law Engineering, Inc. has completed the geotechnical exploration at the subject site. Our ervices were provided in accordance with our Revised Proposal for Geotechnical , xploration Services No. HP-8173-93G, dated September 22, 1993; and a Request for Change Order letter dated October 12, 1993. This report briefly discusses our nderstanding of the project information, describes our exploratory procedures and ..ndings, and presents our recommendations and conclusions. The data obtained during the field exploration and from the laboratory testing program is presented in the endices.

We will be happy to discuss our recommendations with you and would welcome the pportunity to provide the additional studies or construction testing services necessary .o complete this project. We look forward to serving as your geotechnical engineer on the remainder of this project and on future projects.

n you have any questions, or if you require additional information, please do not hesitate to contact us.

Sincerely,

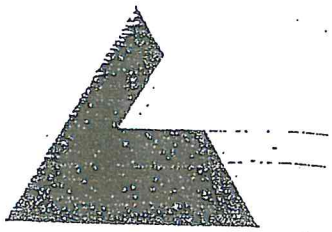
AW ENGINEERING, INC.

Fernando Pons, E.I
Project Geotechnical Engineer

Michael W. Palmer, P.E.
Principal Geotechnical Engineer
USPCI - Client Manager

Michael H. Homan, P.E.
Principal Geotechnical Engineer
Oklahoma Registration No. 15777

Distribution Copies:
Walter Sonne (2) - USPCI
Larry Marr (1) - USPCI



LAW ENGINEERING

REVISED REPORT OF GEOTECHNICAL EXPLORATION

EXPANSION
OF WASTEWATER TREATMENT FACILITIES

LONE MOUNTAIN FACILITY
MAJOR COUNTY, OKLAHOMA

prepared for
USPCI, Inc.
HOUSTON, TEXAS

LAW ENGINEERING PROJECT NO. 392-1406-01

NOVEMBER 1993

1.0 PURPOSE OF EXPLORATION

The purpose of this exploration was to obtain specific subsurface data at the site and to provide recommendations and opinions for:

- ~~General geotechnical design and construction criteria for the Expansion of Wastewater Final Treatment Facilities (WWFT): Phase I (Expansion of the WWFT Building) and Phase II (Leachate Storage Tanks).~~
- ~~Site preparation and construction of compacted fills for the WWFT Phase I, and the WWFT Phase II.~~
- Soil stratigraphy at the Wastewater Pretreatment Facilities (WWPT): Phase III tanks.

It should be noted that it was not the purpose of this study to directly assess or to address any environmental conditions at the site, i.e., the presence of contaminants or hazardous substances in the soil, rock, or ground water. An additional study should be undertaken if USPCI decides to specifically address environmental conditions.

2.2 LEACHATE STORAGE TANKS

We understand that USPCI plans to construct three tanks within a containment area. The proposed site of construction is south of Cell 4. The proposed tanks will include a 60-foot diameter, 16-feet tall, 300,000 gallon tank; and two 33-foot diameter, 16-feet tall, 100,000 gallon tanks.

The proposed tanks, containing leachate with a specific gravity of 1.3, will be located within a concrete containment structure with walls on the order of 7 feet in height.

We understand that the preferred foundation system at the present time is a drilled pier underground system, 18-inch diameter, straight-sided drilled piers founded at 8-feet on centers. In turn, these drilled piers will support the containment wall and a 10-inch thick concrete slab on 6 inches of sand and 24 inches of structural fill.

2.3 WASTEWATER PRETREATMENT (WWPT) BUILDING

We understand that two existing on-line 300,000 storage tanks structures within the Wastewater Pretreatment (WWPT) Building are experiencing foundation distress. We further understand that these two tanks and the containment area are supported on shallow footings.

4.1.3 Wastewater Pretreatment (WWPT) Building

Exploration borings L-5, L-6, L-6A, and L-7 were drilled in this area. The measured surface elevation of these borings were 1418.35, 1428.62, 1428.48, and 1430.23 feet MSL, respectively, as provided by USPCI. The subsurface conditions for this area are generalized as follows:

AREA C

WASTEWATER PRETREATMENT BUILDING

(Borings L-5, L-6, L-6A, and L-7)

STRATUM	DEPTH (ft)	DESCRIPTION	USCS CLASSIFICATION[2]
I C	0 to 2	FILL: GRAVEL	Unclassified
II C	1 to 22.5	FILL: Soft to hard, reddish brown with gray, silty CLAY, with gypsum fragments and gravel.	CL
III C	15.5 to 20.5	Very stiff to hard, reddish brown with gray, silty CLAY, with gypsum fragments and gray silt streaks.	CL
IV C	18.5 to TOB[1]	Gray silty CLAYSTONE to reddish brown silty CLAYSTONE	Unclassified

[1] Termination of Boring
[2] Unified Soil Classification System

ith reference to the Soil Stratum Summary, the TEST BORING RECORDS, Soil Profiles and the Laboratory Test Results, our discussion of the soil conditions for Area C is as lows:

Stratum IC consists of GRAVEL to gravelly fill soils encountered in all borings from a isting surface to approximately 2 feet below existing grade.

Stratum IIC consists of fill soils of soft to hard, reddish brown with gray, silty CLAY with psum fragments and gravel. Law personnel performed continuous sampling with helby tubes, and utilized on-site extruding techniques to better identify the extent of this fill stratum. These fill soils were encountered from a depth of 1 foot from existing surface 22.5 feet below grade. Organic odor and wet seams were identified in the lower two eet of this formation in Borings L-6 and L-7. Plasticity for this stratum was medium with plasticity index values ranging from 17 to 21. Liquid limit values range from 43 to 45 rcent and plastic limit values range from 24 percent to 26 percent. Stratum IIC soils were generally moist with occasional wet seams. Natural moisture contents ranged from 24 to 30 percent, and were from 0 to 2 percent above corresponding PL values.

Pocket penetrometer tests and laboratory unconfined compression tests, on relatively ndisturbed samples, indicated shear strength values that varied erratically throughout e fill depth in Boring L-5 (easternmost boring). Shear strength values in Borings L-6 and L-7 were similar throughout the same depths of the fill stratum. There was a similar niform decrease of shear strength values with depth in Borings L-6 and L-7 to a depth approximately 12.5 feet. (See TEST BORING RECORDS L-6 and L-7).

Stratum IIIC consists of very stiff to hard, reddish brown with gray, silty CLAY with psum fragments and gray silt streaks. These soils were encountered in all borings, except Boring L-5, from 15.5 feet from existing surface to a depth of 20.5 feet below ade. One Standard Penetration Test N-value was 40 blows per foot (bpf) at a depth 17 feet in Boring L-6A. Plasticity for this stratum was medium with a plasticity index value of 13, a LL value of 32 percent, and a PL value of 19 percent. One natural moisture ntent was 24 percent. Based on this natural moisture content and corresponding terberg Limit tests, the soil was very moist with a moisture content 5 percent above the corresponding PL value. Pocket penetrometer tests resulted in cohesion values ranging m 3,750 psf to an excess of 4,500 psf.

Stratum IVC consists of gray silty CLAYSTONE to reddish brown silty CLAYSTONE. This formation was encountered from a depth of 18.5 feet below existing surface to termination depth. Standard Penetration Test N-values resulted in refusal values ranging from 6 inches per 50 blows to 4.5 inches per 50 blows. One natural moisture content was 21 percent. All pocket penetrometer tests resulted in cohesion values in excess of 4,500 psf.

4.2 WATER LEVEL CONDITIONS

~~Water level observations were made in the boreholes during drilling operations and 24~~ hours after completion of drilling to investigate the short term ground water levels.

Ground water was identified during our subsurface exploration at depths of 7 feet and 6.5 feet in Borings L-1 and L-2A, respectively (24 hour readings). Ground water was encountered 1.5-feet to 1-foot above the top of the claystone formation in these borings.

~~Borings L-3 and L-4 were dry at the time of drilling and 24 hours thereafter.~~

Water was identified during drilling at a depth of 24 feet below existing ground surface in Boring L-5. Boring L-6 was dry to termination depth during drilling operations and 24 hours thereafter. Ground water was not identified in Borings L-6A and L-7 during and immediately following drilling operations. Law personnel could not obtain 24 hour water level readings at L-5, L-6A, or L-7, due to caving soils in L-5 at 15.8 feet, and surficial cuttings that obstructing the boreholes at L-6A and L-7.

Fluctuations in rainfall, evaporation, construction activity, surface runoff, and other site specific factors could cause ground water conditions at the time of construction to vary from that observed during our field exploration.

5.4.3 Settlement

Predicted settlements for the drilled piers will be relatively small and are expected to be limited to the elastic compression of the founding claystone formation. The maximum total settlement of any drilled shaft under the anticipated sustained loading conditions is predicted to be less than 0.25 inch.

5.5 CONSTRUCTION CONSIDERATIONS

Once a foundation excavation is completed, the setting of reinforcing steel and placement of concrete should proceed expeditiously to reduce exposure of the bearing stratum and possible disturbance of the material. Should the bottom of an excavation become disturbed due to ponding of water or desiccation, the disturbed soils should be removed before concrete is placed.

We recommend that the geotechnical engineer, or their representative, observe the footing excavations immediately prior to placing concrete. The engineer should compare the soils exposed with those encountered in the soil test borings and document the results. Any significant differences should be brought to the attention of the Owner's representatives along with appropriate recommendations. The foundation bearing area should be level or suitably benched. It should also be free of loose soil, ponded water and debris prior to the inspection.

5.6 WASTEWATER PRETREATMENT BUILDING STRATIGRAPHY

We understand that two existing on-line 300,000 storage tanks structures within the Wastewater Pretreatment (WWPT) Building are experiencing foundation distress. We further understand that these two tanks and the containment area are supported on shallow footings, which are currently bearing in fill soils consisting of soft to hard, reddish brown with gray, silty CLAY with gypsum fragments and gravel (Stratum IIC).

As discussed previously in this report, the soil stratigraphy encountered in the WWPT area generally consists of silty fill soils to a maximum depth of 22.5 feet underlain by silty clay soils which grade into claystone. Law personnel performed continuous sampling in borings L-5, L-6, and L-7 and utilized shelby tubes and on-site extruding techniques to better identify the extent of this fill stratum.

The properties of the soils, deemed significant in the evaluation of distress of the structures, are the following:

(a) the moist condition of the silty clay fill soils (Stratum IIC) at the site;

(b) the medium shrink-swell potential of the silty clay matrix within the zone of major seasonal moisture change;

(c) the erratic variation in consistency of the fill soils encountered in Boring L-5;

(d) the similar uniform decrease in shear strength in Borings L-6 and L-7 to a minimum at approximately 13 feet from existing ground level;

(e) the presence of wet seams, organics, and organic odor in the fill soils
of Boring L-6 and Boring L-5;

(f) the presence of ground water in Boring L-5 at a depth of 24.5 feet;

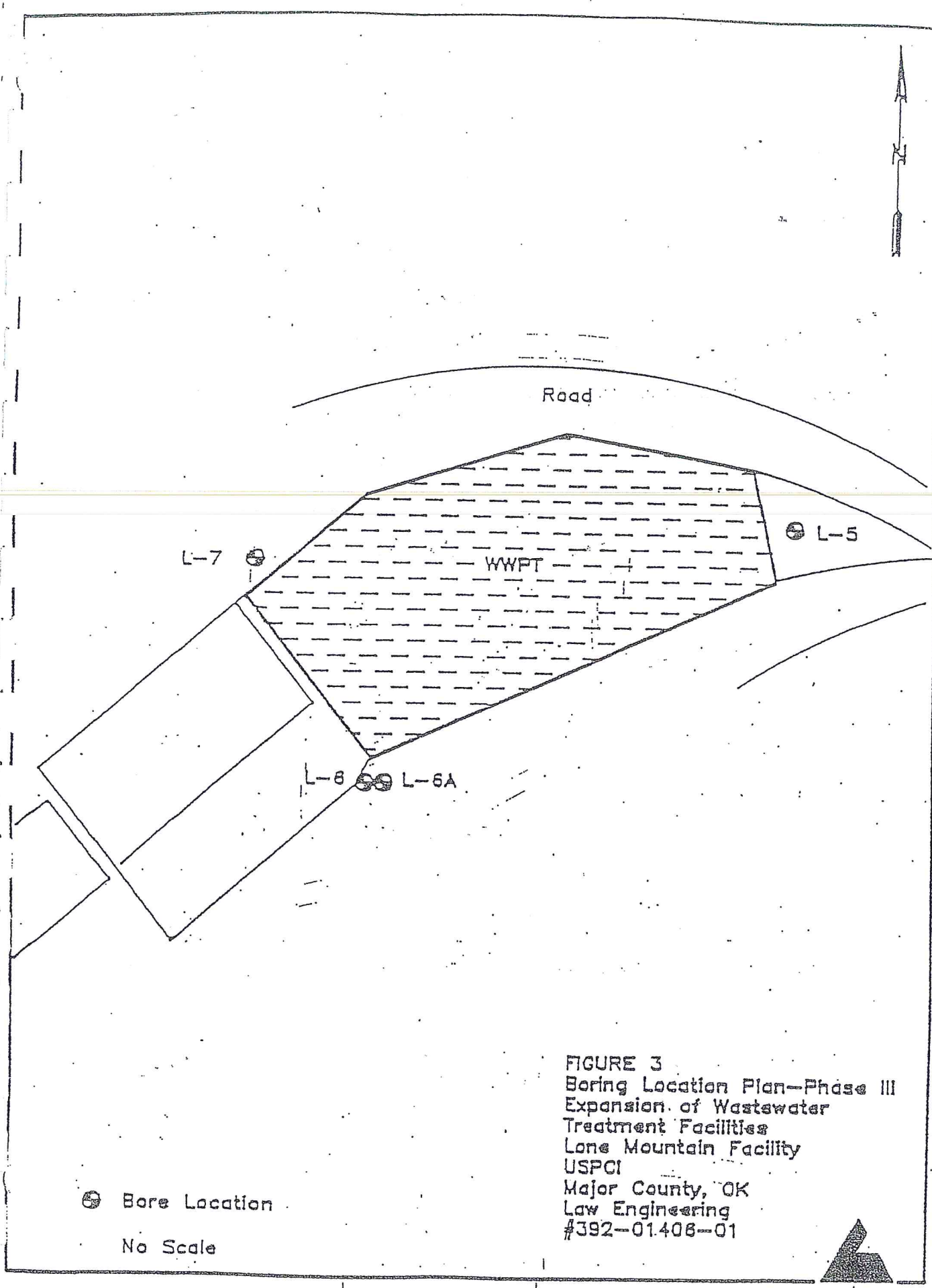
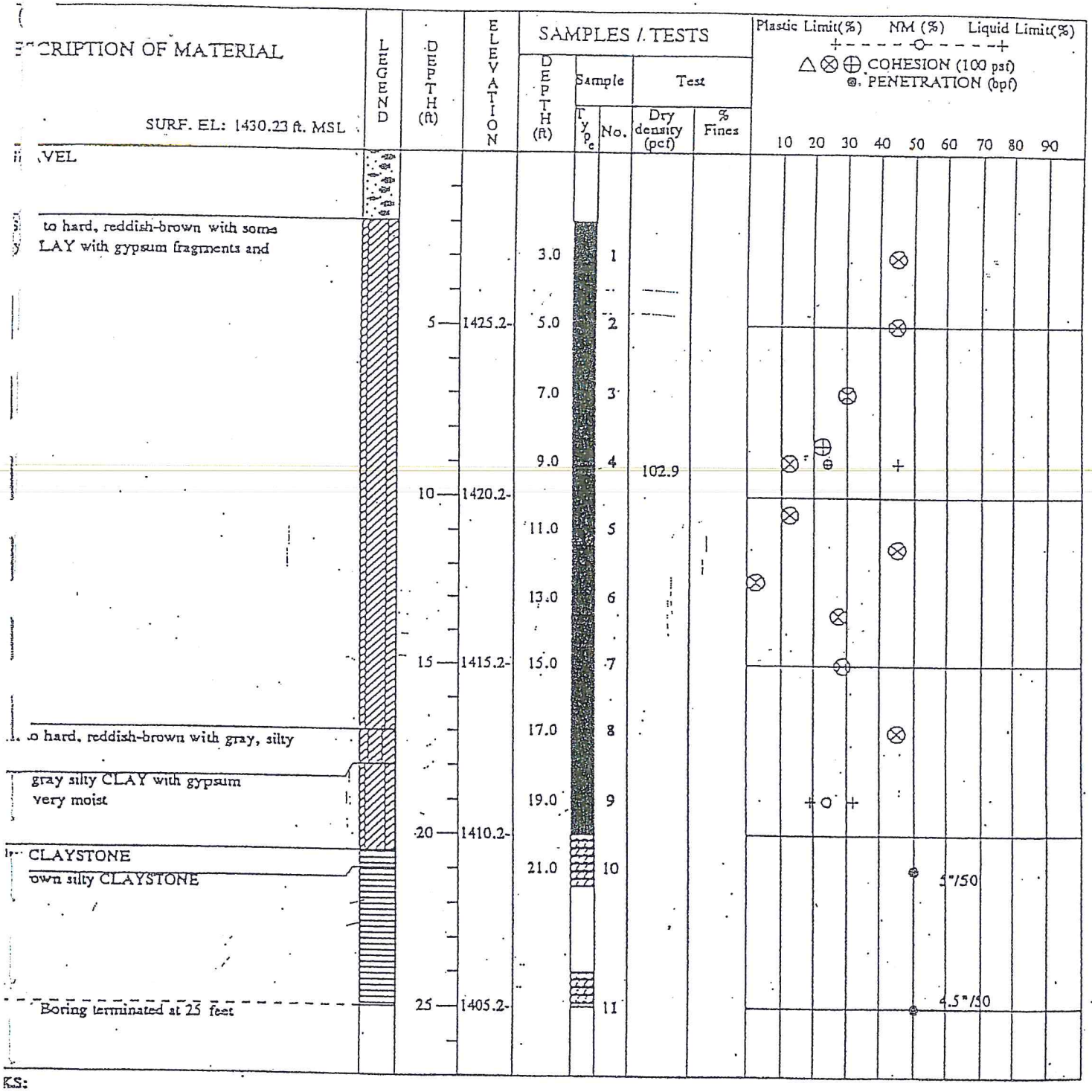


FIGURE 3
Boring Location Plan—Phase III
Expansion of Wastewater
Treatment Facilities
Lone Mountain Facility
USPCI
Major County, OK
Law Engineering
#392-01406-01



KS:

TES: N10920.34 E9182.90. Borehole advanced
5 truck-mounted drill rig using 3 1/4" I.D. hollow

rnold Caeser

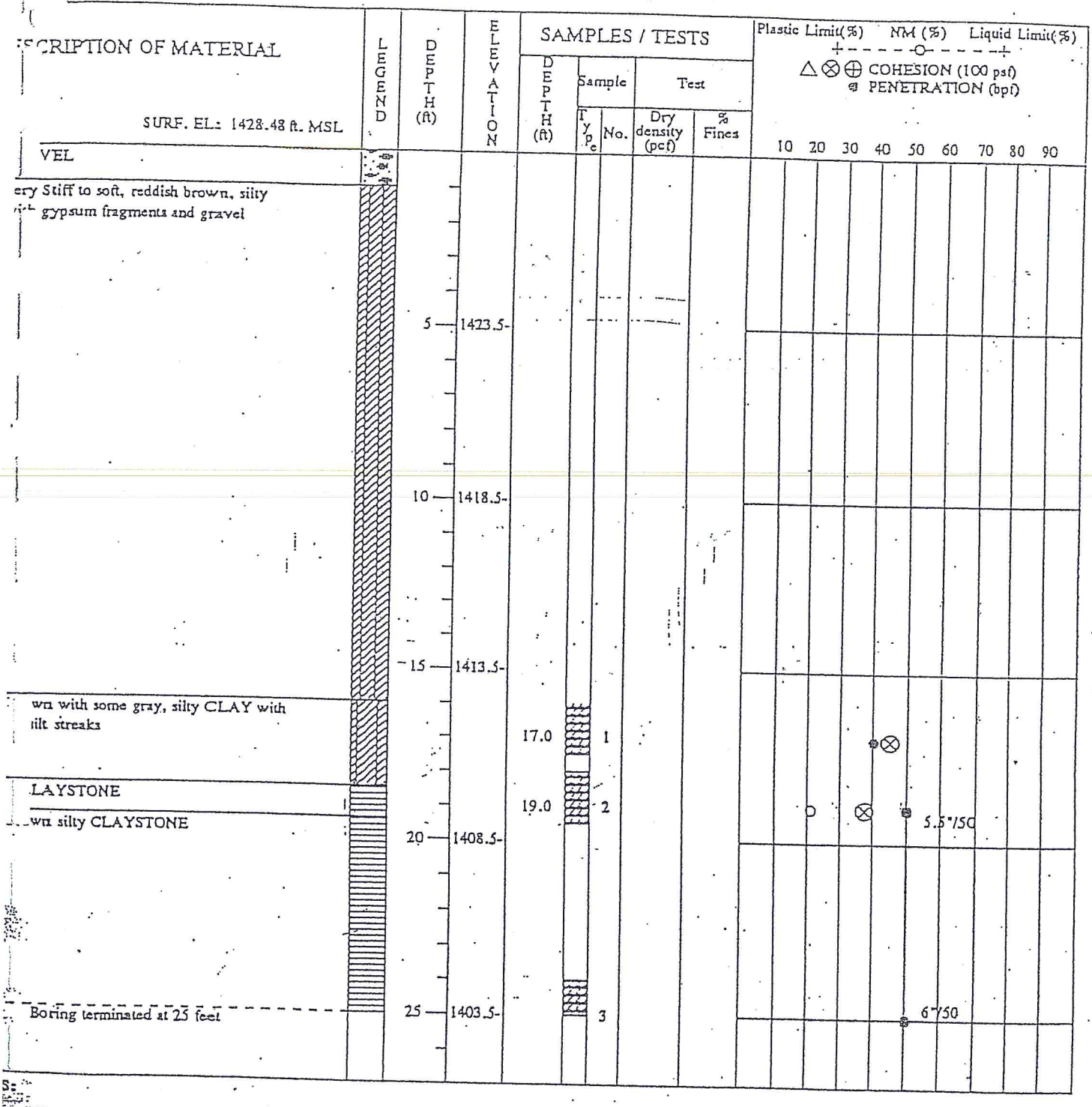
ndo Pons

SEE KEY SHEET FOR EXPLANATION OF
YMBOLS AND ABBREVATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	L-7
DATES DRILLED	Start: October 1, 1993 Complete: October 1, 1993
PROJECT NUMBER	392-01406-01
PROJECT	Expansion of WWT Facilities
PAGE 1 OF 1	

LAW ENGINEERING
Tulsa, Oklahoma



ES: N10829.08 E9253.23. Borehole advanced
truck-mounted drill rig using 3 1/4" I.D. hollow
Soil classification from 0 to 16 feet is based on

old Caeser
nando Pons.

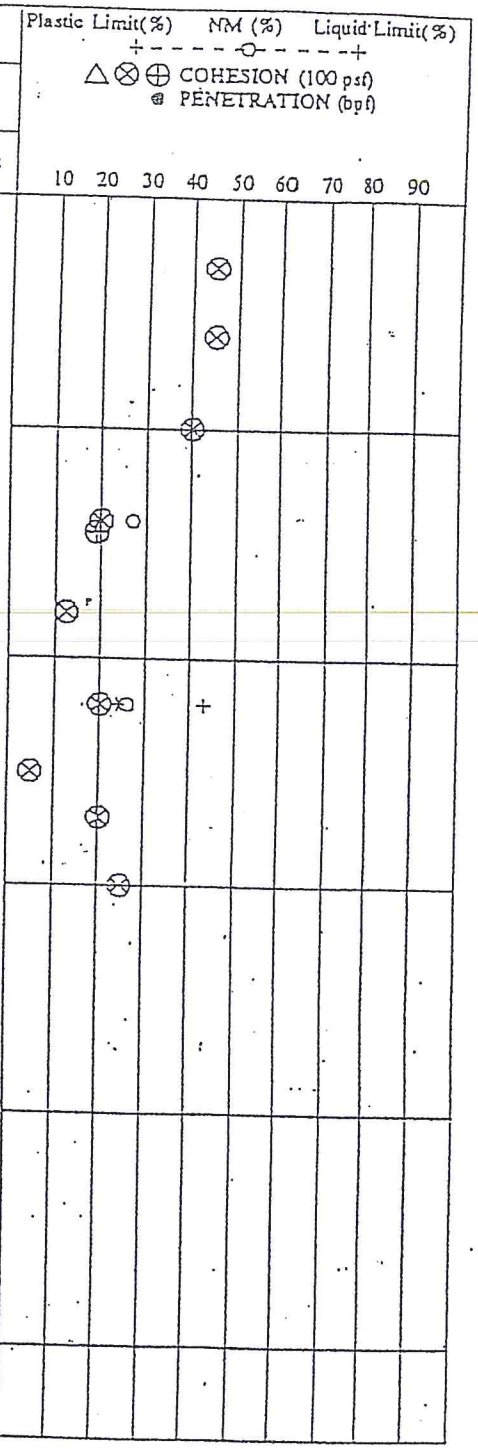
E KEY SHEET FOR EXPLANATION OF
MBOLS AND ABBREVATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	L-6A
DATES DRILLED	Start: October 1, 1993 Complete: October 1, 1993
PROJECT NUMBER	392-01406-01
PROJECT	Expansion of WWT Facilities
PAGE 1 OF 1	

LAW ENGINEERING
Tulsa, Oklahoma

SCRIPTION OF MATERIAL SURF. EL: 1428.62 ft. MSL	LEGEND	DEPTH (ft)	ELEVATION	SAMPLES / TESTS DEPTH (ft)	Sample Type	Sample No.	Test Dry density (pcf)	Test % Fines
AVEL								
Soft to hard, reddish brown, silty CLAY um fragments and gravel						1		
				3.0		2		
me gray at 4'- 6'								
		5	1423.6-	5.0		3		
				7.0		4	99.0	
wet seams at 8'-10' ome paper or plastic debris moist at 8'				9.0		5		
wet seams and organics at 10' - 12'		10	1418.6-					
				11.0		6		
organic odor and 1" to 2" thick wet seam				13.0		7		
lotches, wet seams and organic ' to 15'								
		15	1413.6-	15.0		8		
h-brown with some gray, silty CLAY with y silt streaks by tube from 16' to 18'								
Boring terminated at 18 feet								
		20	1408.6-					
		25	1403.6-					



KS:

ATES: N10826.86 E9250.81. Borehole advanced 75 truck-mounted drill rig using 3 1/4" I.D. hollow gers. Borehole dry 24 hours after drilling.

Arnold Caeser

ndo Pons

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	L-6
DATES DRILLED	Start: October 1, 1993 Complete: October 1, 1993
PROJECT NUMBER	392-01406-01
PROJECT	Expansion of WWT Facilities
PAGE 1 OF 1	

LAW ENGINEERING
Tulsa, Oklahoma

DESCRIPTION OF MATERIAL	LEGEND	DEPTH (ft)	ELEVATION	SAMPLES / TESTS: Sample DEPTH (ft)	Sample Type	Sample No.	Test: Dry density (pcf)	Test: % Fines	Plastic Limit(%) NM (%) Liquid Limit(%); COHESION (100 psf); PENETRATION (bpf)
SURF. EL: 1418.35 ft. MSL									10 20 30 40 50 60 70 80 90
:AVEL									
Soft to hard, reddish brown with gray, silty ···th some gravel				3.0		1			
						2			
		5	1413.4	5.0		3			
				7.0		4	96.7		
				9.0		5			
		10	1408.4						
				11.0		6			
				13.0		7			
		15	1403.4	15.0		8			
				17.0		9			
				19.0		10			
		20	1398.4						
				21.0		11			
with organics and organic odor at 22									
wet seam with some gravel						12			
rown silty CLAYSTONE									
ube refusal at 23 feet									
Boring terminated at 23 feet		25	1393.4			13			50/6"

KS:

ATES: N10939.63 E9409.49. Borehole advanced 5 truck-mounted drill rig using 3 1/4" I.D. HSAs. ired immediately following drilling operations. hole at 15.8' identified on 10/2/93.

rnold Caeser

rnando Pons

SEE KEY SHEET FOR EXPLANATION OF YMBOLS AND ABBREVATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	L-5
DATES DRILLED	Start: October 1, 1993 Complete: October 1, 1993
PROJECT NUMBER	392-01406-01
PROJECT	Expansion of WWT Facilities
PAGE 1 OF 1	

LAW ENGINEERING
Tulsa, Oklahoma

APPENDIX H.

CHEMPROOF, PERMACOAT 3000 DOCUMENTATION



Home
Heavy Duty
Medium Duty
PermaCoat 2000
PermaCoat 2000 SL
PermaCoat 3000
PermaCoat 4000
PermaCoat 5000
PermaCoat 6000
PermaCoat 6500
Construction Details
Application Guidelines
System Specifications
About Us
Contact Us

PERMACOAT 3000

Epoxy Floor Coating

DESCRIPTION

PERMACOAT 3000 is a 100% solids floor coating. PERMACOAT 3000 can be utilized as a glaze coat for the PERMATEC high build floors, or as a two coat floor or containment system (30-80 mils). When applied as a two coat floor or containment system, a silica broadcast is used between coats.

The PERMACOAT 3000 consists of two components, resin and hardener, in both the horizontal and vertical formulations. Its application is accomplished with rubber squeegees and short nap paint rollers.

FUNCTION

PERMACOAT 3000 is designed as a medium duty (30-80 mils) floor coating and/or secondary containment system where moderate mechanical abuse and chemical exposure are anticipated, so you may use the Chemical Resistant Flooring. PERMACOAT 3000 can be installed over most sound floors, including new or old concrete, steel and wood, providing a cost effective alternative to high-build floor toppings.

TYPICAL APPLICATIONS

- Food processing plants
- Chemical processing plants
- Breweries
- Laboratories
- Pulp and paper mills

TYPICAL PROPERTIES

Solids, by Volume	100%
Hardness Shore D ASTM D2240	82-85
Taber Abrasion ASTM D4060 CS 17 Wheels	Loss/1000 cycles = 25mg
Compressive Strength ASTM C579	14,400 psi
Flexural Strength ASTM D790	16,500 psi
Tensile Strength ASTM D307	11,000 psi
Bond Strength to Concrete ASTM D4541	Exceeds tensile strength of concrete. Failure in concrete

PACKAGING & COVERAGE

PERMACOAT 3000 is packaged in one and three gallon units. Each unit consists of premeasured components, Part A (Resin) and Part B (Hardener).

Application thickness may vary from 30 to 80 mils, depending on the expected service conditions. Factors to consider are 1) length of chemical exposure; 2)mechanical abuses; and 3) substrate texture.

- Processing area in general where chemicals are used
- Any area that requires a safe, non-slip floor

FEATURES

PERMACOAT 3000 allows for fast, easy application. It also offers chemical resistance and physical performance much higher than those found in paints and other thin mil coatings.

Note: At 30-50 mils, PERMACOAT 3000 provides excellent chemical resistance for splash and spill exposures. In addition, when applied at 50-80 mils, it can often be recommended for containment service. (For specific recommendations refer to PERMATEC 3000 "Chemical Resistance Guide" and your local distributor.)

OTHER FEATURES INCLUDE:

- Rapid cure resulting in minimal "downtime"
- Odor-free
- Nonskid safety finish optional

MIXING

Prior to application, the PERMACOAT 3000 (Resin, Hardener, and Silica) and the substrate should be between 70 degrees and 95 degrees F.

Premix the Resin (Part A) for 30 seconds using a Jiffler mixer blade attached to a 500-750 RPM drill. Add the Hardener (Part B) only when the batch is ready to be applied. Mix for approx. 90-120 seconds. After mixing pour immediately onto floor.

APPLICATION

Use a rubber squeegee to spread

CURE TIME

The cure time of PERMACOAT 3000 and other resinous systems are very dependent upon the temperature of the substrate. The chart below represents the approximate times for the respective service conditions, following the last coat:

Service (hours)	70°F	80°F	90°F
Foot traffic	10	8	6
Light Chemical	14	12	10
Fork Lift	20	16	12

CLEAN-UP

All mixing and application equipment should be cleaned immediately after use. If this is done, soap and water, or biodegradable cleaners can be used. If the material has begun to set, more aggressive solvents may be necessary. Before using solvents, refer to their respective MSDS for handling considerations.

MAINTENANCE

For systems designed for splash and spill exposures, routine washdowns are recommended to reduce the length of chemical exposure. This step is not necessary where the product is recommended for containment service.

WARRANTY

For product warranty see ChemProof Polymers, Inc. "Standard Limited Warranty." If one is not included with this literature contact your local distributor or ChemProof Polymers, Inc. for a copy.

STORAGE & SHELF LIFE

PERMACOAT 3000 should be stored at 50-90°F out of direct sunlight. All containers should

the resin over the pre-measured area to be covered. Immediately back roll the PERMACOAT 3000 with a short nap (1/8 inches) wool or mohair roller. At this point several pre-specified readings should be made with a wet mil gauge to assure uniform coverage. After the coating has been back rolled and uniform thickness verified, the surface should be saturated with a silica broadcast.

After the first coat supports foot traffic, the excess silica can be removed. Within 24 hours a second coat of PERMACOAT 3000 should be applied using the same procedure, minus the silica broadcast.

Note: Additional broadcasts and roll coats can be utilized to increase floor thickness.

SAFETY

PERMACOAT 3000 contains blended Epoxies as the resin and blended Amines as the hardener. Protective clothing and gloves are recommended to prevent sensitization to these materials. In case of ingestion or eye contact, contact a physician immediately. MSDS are available for this product upon request.

remain unopened until ready for use. If stored as set out above, PERMACOAT 3000 has a minimum shelf life of one year.

WHERE PERMACOAT 3000 SHOULD NOT BE INSTALLED

PERMACOAT 3000 should not be applied over substrates:

- which are wet during the application
- subject to hydrostatic pressure
- which are unsound
- which are contaminated and cannot be cleaned
- at temperatures below 70°F (consult ChemProof Polymers)

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APPENDIX I.

SECONDARY CONTAINMENT CALCULATIONS

SECONDARY CONTAINMENT CALCULATIONS

❒ DIMENSIONS:

EF Tank Diameter:	60.00-ft.
PCL Tank Diameter:	12.00-ft.
Secondary Containment Height - Hsc	5.50
Secondary Containment Surface Area - Asc	14,589.00-sf
Gross Volume of Secondary Containment	80,239.50-cf

❒ DISPLACEMENT VOLUMES:

EF Tank Base	PI*D□2/4*Hsc	15,551.42-cf
PCL Tank Base	PI*D□2/4*Hsc	622.06-cf

Note: Displacement volumes include only one of the EF tanks. It is assumed that a failed tank would not displace available secondary containment.

Displacement Volume *16,173.47-cf*

❒ RAINFALL VOLUMES:

Depth of Rainfall	6.150-in.
Impacted Area	8,934.00-sf
Rainfall Volume	4,578.68-cf

❒ CONTAINMENT CAPACITY AVAILABLE:

CCA = Gross Volume - Displacement Volume - Rainfall Volume

CCA	=	*59,487-cf*
Volume of Largest Tank (EF1)	=	*47,785.26-cf*
Excess Containment Volume	=	*11,702-cf*
Safety Factor	=	*1.24*