ORDER FOR SUPPLIES OR SERVICES

1 CONTRACT/PURCH ORDER/ AGREEMENT NO	2 DELIVERY ORDER/ CALL NO	3 DATE OF ORDER/CALL (YYYYMMMDD)	4 REQ / PURCH REQUEST NO	5 PRIORITY
N47408-04-D-8503	0031	2007 Aug 31	ACQR528772	

6 ISSUED BY CODE N62473

NAVFAC SOUTHWEST
SPECIALTY CENTER CONTRACTS CORE
CODE RAQN0/NAVAL BASE VENTURA COUNTY
1205 MILL RD BLDG 850
PORT HUENEME CA 93043-4347

7 ADMINISTERED BY *(if other than 6)* CODE

SEE ITEM 6

8 DELIVERY FOB

- [X] DESTINATION
- [ ] OTHER

(See Schedule if other)

9 CONTRACTOR CODE 1YNH3 FACILITY

NAME AND ADDRESS
SHAW ENVIRONMENTAL INC
PATRICIA OLSON
6330 COMMERCE DR STE 190
IRVING TX 75063-2625

10 DELIVER TO FOB POINT BY (Date) *(YYYYMMMDD)*
SEE SCHEDULE

11 MARK IF BUSINESS IS

- [ ] SMALL
- [ ] SMALL DISADVANTAGED
- [ ] WOMEN-OWNED

12 DISCOUNT TERMS

13 MAIL INVOICES TO THE ADDRESS IN BLOCK
See Block 6

14 SHIP TO CODE

SEE SCHEDULE

15 PAYMENT WILL BE MADE BY CODE S33150

DFAS CO
STOCK FUND DIRECTORATE
ATTN: DFAS CO BVDFB
P. O. BOX 182317
COLUMBUS OH 43218-6254

MARK ALL PACKAGES AND PAPERS WITH IDENTIFICATION NUMBERS IN BLOCKS 1 AND 2.

16 TYPE OF ORDER			
	DELIVERY/ CALL	X	This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract
	PURCHASE		Reference your quote dated Furnish the following on terms specified herein REF:

ACCEPTANCE THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME

NAME OF CONTRACTOR	SIGNATURE	TYPED NAME AND TITLE	DATE SIGNED (YYYYMMMDD)

[X] If this box is marked, supplier must sign Acceptance and return the following number of copies: 1

17 ACCOUNTING AND APPROPRIATION DATA/ LOCAL USE

See Schedule

18 ITEM NO	19 SCHEDULE OF SUPPLIES/ SERVICES	20 QUANTITY ORDERED/ ACCEPTED*	21 UNIT	22 UNIT PRICE	23 AMOUNT
	SEE SCHEDULE				

** If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.*

24. UNITED STATES OF AMERICA
TEL: 805-982-4414
EMAIL: [redacted]1
BY: [redacted]

[redacted]
CONTRACTING / ORDERING OFFICER

25 TOTAL $5,935,738.00

26 DIFFERENCES

27a QUANTITY IN COLUMN 20 HAS BEEN

- [ ] INSPECTED
- [ ] RECEIVED
- [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

b SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE	c DATE (YYYYMMMDD)	d PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

e MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE	28 SHIP NO	29 DO VOUCHER NO	30 INITIALS
	[ ] PARTIAL [ ] FINAL	32 PAID BY	33 AMOUNT VERIFIED CORRECT FOR
f TELEPHONE NUMBER / g E-MAIL ADDRESS	31 PAYMENT [ ] COMPLETE [ ] PARTIAL [ ] FINAL		34 CHECK NUMBER
36. I certify this account is correct and proper for payment. a DATE (YYYYMMMDD) / b SIGNATURE AND TITLE OF CERTIFYING OFFICER			35 BILL OF LADING NO

37 RECEIVED AT	38 RECEIVED BY	39 DATE RECEIVED (YYYYMMMDD)	40 TOTAL CONTAINERS	41 S/R ACCOUNT NO	42 S/R VOUCHER NO

Section B - Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
0010		[redacted]	Dollars, U.S.	[redacted]	$5,935,738.00 NTE
EXERCISED OPTION	Option Year III FFP Clean, Inspect, and Repair Tanks 2 and 20, FISC, Pearl Harbor, HI in accordance with the attached Statement of Work, clarifications, previously supplied information such as, Tank History for Tanks 2 and 20, Dwgs. 294006, 293943, 293963, 293987, and 293923, Wage Determination HI070001 dated 4/13/07 HI1. Contractor final revised proposal dated August 10, 2007 is accepted and is incorporated by reference. FOB: Destination PURCHASE REQUEST NUMBER: [redacted]				
				MAX NET AMT	$5,935,738.00

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
001001		UNDEFINED		UNDEFINED	UNDEFINED
	[redacted]				
				MAX NET AMT	UNDEFINED
	[redacted]				$3,000,000.00

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
001002	[redacted]	UNDEFINED		UNDEFINED	UNDEFINED
				MAX NET AMT	UNDEFINED
	[redacted]				$2,935,738.00

Section C - Descriptions and Specifications

STATEMENT OF WORK

Location: **Pearl Harbor FISC, HI**
Project: **Clean, Inspect, and Repair Storage Tanks 2 and 20**

Statement of Work
Clean, Inspect, and Repair Storage Tanks

1.0 GENERAL

1.1 Scope

This Statement of Work defines the scope for cleaning, inspecting and repairing military storage tanks worldwide. Depending on tank type and/or history a complete out-of-service API 653 inspection, an in-service API 653 inspection, a modified API 653, or Steel Tank Institute (STI) inspection will be performed. Tank repairs under this scope shall include installation of tank gauging tubes (stilling wells) for all tanks over 30,000 gal. The repairs of deficiencies found during the inspection shall be an option to the contract. Site specific information including the type of inspection, the need for stilling wells and other applicable information is located in Section 2.0.

1.2 Requirements

The following are requirements that shall be followed unless stated otherwise in Section 2.0. Latest editions of all codes shall be used.

1.2.1 All work shall be performed in a safe and professional manner in accordance to applicable federal, state and local regulations.

1.2.2 Inspections and repairs shall be carried out in accordance to American Petroleum Institute (API) Standard 653, *Tank Inspection, Repair, Alteration And Reconstruction*, Steel Tank Institute (STI) SP001-00 *Standard for the Inspection of Aboveground Storage Tanks SP001*, and all amendments as supplemented by this statement of work. Types of inspections to be performed are specified in Section 2.0.

1.2.3 All coating work shall be performed by SPCC QP-1 certified contractors in accordance to UFGS 09970, 09971, and 09973.

1.2.4 The tank evaluation shall be performed by a qualified inspector or engineer, experienced in tank design, fabrication, repair, construction, inspection, operation and behavior. The inspection report shall be signed by the API 653 inspector and stamped and signed by a registered professional engineer familiar with the provisions of the API Standard 653.

2.0 SITE SPECIFIC INFORMATION

The following section is created for this specific location(s) for this proposal request. The rest of the scope of work shall be followed unless Section 2.0 states otherwise.

2.1 Tank Information

The facility identified above requires services for tanks 2 and 20. Relevant information for each tank can be found in Table 2.1 in Appendix A.

The Red Hill fuel storage tank complex is located on the Island of Oahu, Hawaii. The Red Hill fuel storage tank complex consists of multiple underground storage tanks constructed in 1942-1943. The Red Hill Tanks have a coated welded steel liner backed up by concrete which bears against the solid rock from which the tanks were carved. Each tank's nominal capacity is 302,000 barrels of JP-5. The configuration of these vertical cylindrical tanks is 100 feet in diameter and 250 feet in height. The tank is domed on the lower and upper ends. Access to the tanks is provided by an upper access tunnel 190 feet above the tank bottom and a lower access tunnel just below the tank bottom.

2.2 Inspections Due

In this section identify what type of inspection is due for each tank.

Tank 2 – Modified API 653 Out of Service Inspection
Tank 20 – Modified API 653 Out of Service Inspection

2.3 Gauge Tubes (Stilling Wells)

This section will identify what tanks have gauge tubes and what tanks need gauge tubes.

No gauge tubes are required.

2.4 Anticipated Problems

In this section include any anticipated problems such as coating failures, inventory problems, etc.

None know at this time.

2.5 Government Furnished Information

Information is located in Appendix E.

2.5.1 History of Tank 2 & 20
2.5.2 Drawings of Tank 2 & 20.
2.5.3 Drawings of hydraulic boom and basket. This information is provided to the Contractor for the bidding purpose

2.6 Government Services Available to the Contractor

Table 2.2, lists the services, if any, the facility can provide to the contractor for purposes of completing the required tasks stated in this SOW.

Table 2.2. Government Services Available to the Contractor

	Yes/No	If Yes, limits on what the government can provide or accept.
Government will provide water for tank cleaning	Yes	
Government will accept residual fuel/ wash rinsates /sludge	Yes/No/No	
Government to provide electricity	Yes	Government can provide electricity inside the tunnel, but not outside for trailers.
Government will provide compressed air	No	
Government will install high legs for tanks with floating roofs	NA	
Other	The Government will provide train assistance in tunnel. See Section 2.10.7.	

2.7 Tank History

In this section include any information regarding upgrades, coatings, repairs, damage, unauthorized release of product, etc.

Tanks 2 & 20 were both constructed in 1942.

2.8 Base Access

In order for the contractor to gain access to the facility in a timely manner the following needs to be submitted.

2.8.1 **Contractor Information**

The information required to obtain base access shall be submitted to the NTR 14 calendar days prior to arrival:

2.8.1.1 Full Name with Middle Initial
2.8.1.2 SSN
2.8.1.3 Date of Birth
2.8.1.4 Driver's License with State of Issuance
2.8.1.5 Employer's Name, address, phone number
2.8.1.6 Planned arrival date and planned finish date for site personnel

If a rental car is used, the rental agreement shall be presented to Pass and Decal when access is required. A valid picture ID will need to be presented at the time of arrival.

2.8.2 **Special Security Measures**

Red Hill access will also need to be obtained. For this access the need information is the same as 2.8.1, but a recent photo of each person is required. A digital photo is acceptable.

2.9 Scheduling

This section includes when, how many, and for how long tanks be taken down.

Initially the Contractor will be given one tank. After the cleaning, inspection, and recommendations have been made, the Contractor will be given the second tank. Contract modification negotiations and other contract administration will be done while the Contractor is working on the second tank.

2.10 Other

This section includes other items not address in the Site Specific Section or the remaining of the SOW.

2.10.1 Hydrostatic pressure test the piping between the tanks' skin valves and the tank. These lines shall be tested to 1.5 MAWP for a minimum of two hours. There is approximately 20 ft of pipe per tank to test.

2.10.2 Once the degassing of tank is completed, the Contractor shall notify the NTR to make arrangement with FISC to remove tank gauging and temperature sensing equipment from the tank. The Contractor shall maintain a vapor-free condition inside of the tank. The ventilation equipment shall be explosion proof and have an air rate of one change per hour.

2.10.3 Prior to any work inside of tank, replace any missing structural members to repair the tower and the access catwalk. The Contractor shall provide a separate cost estimate for any repair of the tower and the access catwalk. This shall be an option for Delivery Order modification. The Contractor shall provide structural integrity certification of the tower and the access walkway by a registered professional structural engineer.

2.10.4 The information of existing Government booms and baskets will be provided to the Contractor for their information only. The Government provided booms and baskets cannot be utilized for execution of the project.

2.10.5 Due to the unusual dimensions and configurations of the Red Hill Tanks and the requirement of cleaning and inspection of entire tank interior, the Contractor shall provide a detailed plan of engineering approach how to access all the steel plates of Tank 2 & 20. The plan shall be reviewed and approved by the Government as a part of the Work Plan. A brief discussion of this shall also be included in the bid proposals.

2.10.6 The Contractor shall thoroughly clean the tank including the center tower, catwalk structure, top & bottom domes, and the shell. All sludge, sediment, wash water and other deleterious material from the tank shall be removed and disposed of by the Contractor. For the bidding purposes, the Contractor shall estimate 20 barrels of sludge to be present in each tank. Assume minimal residual fuel is present.

2.10.7 The Government will provide train assistance to a maximum of four hours on any work day in the Lower Access Tunnel only. Train support shall only be provided during standard Government work hours of 8 am to 4 pm, Monday thru Friday. The Contractor shall notify the Government no less than one (1) day in advance of the time and location that the contractor requires the train support. All loading, unloading and securing of material onto flat beds shall be the Contractor's responsibility. Contractor retains responsibility for all items during Government transport.

2.10.8 The Contractor shall disconnect pipelines (two fuel lines and one slop line) connected to the tank bottom by removing double-block-and-bleed plug valves and/or ball valves and installing solid-plate blind flanges to prevent any flammable material entering from the tanks to the active pipelines. The skin valves to be removed are motor operated valves, and all electrical components shall be disengaged by a certified electrician before removing the valves from the pipelines. Upon completion of the inspection (post-repair inspection, if there is any repair done), the valves shall be installed back to the pipelines and the electrical components shall be restored for normal operating condition with new gaskets and bolts. The Contractor shall confirm the sizes of valves to remove at site-walk. Control system to be locked and tagged out by Government.

2.10.9 Inspection shall include assessments of upper dome, extension, under catwalk, entire course shells, lower dome, appurtenances, accessways, vents, and coatings. Upper & lower domes, shell, and all welds shall be 100% inspected. The Contractor shall propose type with recommendation why each inspection methods to be used in the inspection process. This shall be included in the bid proposals. Some example methods are Magnetic Flux Leakage (MFL), Low Frequency Electromagnetic Technique (LFET), Ultrasonic Thickness (UT) scanning, Eddie Current, Balance Field Electromagnetic Technique (BFET), etc. Contractor shall take every precaution not to damage the tank coating. The Contractor/inspector shall be responsible for any damage to interior tank coating during work.

2.10.10 Prior to starting work inside of the tanks, the Contractor shall install probe port covers of existing Mass Tank Gauging (MTG) system of Tank 2 & 20. These probe port covers shall be removed upon completion of post-repair inspection.

2.10.11 Inspection reports shall include detailed information about the recommend repairs and their locations. Each recommended repair shall be labeled and referenced in such as manner that the Government shall be capable of locating these deficiencies from the report. These locations shall also be identified and referenced on the actual tank.

2.10.12 Abrasive blasting is considered Hot Work.

2.11 Government Points of Contact (POC)

2.11.1 **Contracting Officer**
The Contracting Officer is:

[redacted]
Naval Facilities Engineering Command Southwest
Specialty Center Contracts Core, Code AQN00
151 36th Avenue, Suite 2 Port Hueneme, CA 93043-4438
Telephone (805) 982-2479
[redacted]

2.11.2 **Contracts Officer Representative**
The Contracts Officer Representative for this contract is:

[redacted]
Naval Facilities Engineering Service Center (NFESC), Code ESC 232
1100 23rd Avenue Port Hueneme, CA 93043
Telephone (805) 982-3597
[redacted]

2.11.3 **Naval Technical Representative (NTR)**
The NTR for this contract is:

[redacted]
Naval Facilities Engineering Service Center (NFESC), Code ESC 232
1100 23rd Avenue Port Hueneme, CA 93043
Telephone (805) 982-3592
[redacted]

3.0 REFERENCES

The work performed shall comply with all federal, state, and local regulations. In addition applicable, but not limited to, codes for this work include:

3.1 American Petroleum Institute (API)

3.1.1 API Recommended Practice 574, *Inspection Practices for Piping System Components*, Latest Edition.
3.1.2 API Recommended Practice 575, *Inspection of Atmospheric and Low-Pressure Storage Tanks*, Latest Edition.
3.1.3 API Standard 650, *Welded Steel Tanks for Oil Storage*, Latest Edition.
3.1.4 API Recommended Practice 651, *Cathodic Protection of Aboveground Petroleum Storage Tanks*, Latest Edition.
3.1.5 API Recommended Practice 652, *Lining of Aboveground Petroleum Storage Tanks*, Latest Edition.
3.1.6 API Standard 653, *Tank Inspection, Repair, Alteration and Reconstruction,* Latest Edition.
3.1.7 API/ANSI Standard 2015, *Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks*
3.1.8 API/ANSI RP 2016 *Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks*
3.1.9 API Standard 2550, *Measurement and Calibration of Upright Cylindrical Tanks*

3.2 American Society of Mechanical Engineers (ASME)

3.2.1 ASME B31.3, *Process Piping*, Latest Edition.
3.2.2 ASME B31.4, *Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids,* Latest Edition.
3.2.3 ASME IX,

3.3 Code of Federal Regulations (CFR)

3.3.1 29 CFR 1910, *Permit-Required Confined Spaces for General Industry*.

3.3.2 40 CFR 112, *Oil Pollution Prevention*.

3.4 Military Handbooks (MIL-HDBK)

3.4.1 MIL-HDBK 1022A, *Department of Defense Handbook: Petroleum Fuel Facilities,* 01 November 1999.

3.4.2 MIL-HDBK 201B, *Military Standardization Handbook: Petroleum Operations.*

3.5 National Association of Corrosion Engineers (NACE)

3.5.1 NACE Recommended Practice, RP0184-97, *Repair of Lining Systems*.

3.5.2 NACE Recommended Practice, RP0193, *External Cathodic Protection of On-Grade Metallic Storage Tank Bottoms.*

3.5.3 NACE Recommended Practice, RP0288-94, *Inspection of Linings on Steel and Concrete*.

3.6 National Fire Protection Association (NFPA)

3.6.1 NFPA-30, *Flammable and Combustible Liquids Code*.

3.7 Steel Tank Institute (STI)

3.7.1 STI SP001, *Standard for the Inspection of Aboveground Storage Tanks.*

3.8 Safety

3.8.1 EM 385-1-1, *U.S. Army Corps of Engineers Safety and Health Requirement, Appendix A Minimum Basic Outline for Accident Prevention, and paragraph 6*.

3.9 Unified Facilities Criteria (UFC)

3.9.1 UFC 3-460-01, *Petroleum Fuel Facilities.*

”

3.10 Unified Facilities Guide Specification (UFGS)

3.10.1 UFGS 09970, Epoxy/Fluoropolyurethane Interior Coating Of Welded Steel Petroleum Fuel Tank

3.10.2 UFGS 09971, Exterior Coating System for Welded Steel Petroleum Storage Tanks

3.10.3 UFGS 09973, Interior Coating System for Welded Steel Petroleum Storage Tanks

3.10.4 UFGS 01351, Safety, Health, and Emergency Response

3.10.5 UFGS 13205, Steel Tanks with Fixed Roofs

4.0 WORK REQUIREMENTS

Work shall be performed in compliance with applicable federal, state and local codes and regulations. This includes adherence to all military service regulations concerning safety, work quality and security.

4.1 Tank Cleaning

The tank(s) shall be professionally cleaned for personnel entry. The tank cleaning contractor shall coordinate all site work with the base POC and the designated Navy Technical Representative (NTR). The Contractor shall provide adequately trained personnel, necessary personal protective equipment (PPE) and conduct safety meetings in accordance to API 2015, 2016 and UFGS 01351.

4.1.1 **Tank Lockout/Tag-Out**

The contractor shall be responsible for ensuring the tanks are properly locked and tagged out and procedures shall be discussed with onsite personnel. Items for lockout/tag-out include: valves, pumps, motor starters, etc. Lockout/tag-out and shall also consist of installing skillets or temporarily replacing valves with blinds to prevent unauthorized fuel transfer into the tank.

4.1.2 **Residual Fuel, Sludge and Wash Rinsates**

The contractor shall be responsible for proper disposal of any residual fuel, sludge and/or wash rinsates, encountered during the tank cleaning if the facility cannot accept as stated in Section 2.0.

4.1.3 Floating Roofs (if applicable)

Unless otherwise stated in Appendix A of this SOW the base shall be responsible for installing the high level legs on tanks with floating roofs prior to performing the inspection. The Contractor shall make their best attempt to clean the interface between the floating roof and the tank shell and remove all fuel from floating roof seals.

4.1.4 Safe for Entry/Inspection Certification

A certified Marine Chemist or a certified Industrial Hygienist is to issue a Safe for Entry Permit after cleaning and before inspection and repairs.

4.2 Inspections

The type of inspection to be performed is identified in Section 2.0 for each tank. The inspector shall coordinate all site work with the designated Navy Technical Representative (NTR) and the base POC. The inspector shall arrive at the site with all testing equipment necessary to perform a thorough inspection. The inspector shall verify that all testing equipment is calibrated and in good working order and shall include proof in the inspection report. Facility personnel will be briefed on all inspection results before the inspectors leave.

4.2.1 In-Service API 653 Inspection of Aboveground Storage Tanks

This inspection shall be performed while the tank is still in service. The following shall be performed:

4.2.1.1 Non-Destructive Testing

4.2.1.1.1 Visual Inspection

Visually inspect the overall condition of the tank. This includes plates, corrosion, coating, welds, appurtenances, gauging, presence of cathodic protection, foundation, secondary containment, stairways, nozzles, grounding, etc.

4.2.1.1.2 Ultrasonic Thickness (UT) Measurements and Recording

Perform UT measurements of the tank shell, roof, and nozzles. UT measurements shall be taken around the first course and on the upper courses accessible by stairways. The UT reading will be used for documentation, shell/roof thickness acceptability, and if applicable, remaining life calculations.

4.2.1.2 Color Photographs

Color photographs shall be taken to document tank condition, discrepancies and overall construction.

4.2.1.3 API 653 Checklist in Appendix C

The appropriate API 653 Checklist in Appendix C shall be performed.

4.2.1.4 Mapping

As-built mapping shall be performed of shell and roof plate orientation. Stairways, appurtenances, manways, vents and other significant tank details shall also be included.

4.2.1.5 Settlement Survey and Evaluation

A shell and floor edge settlement survey shall be performed to identify edge settlement, differential settlement, and/or planar tilt. The results of the evaluation shall be discussed in the body of the report and the acceptability of these results shall also be made. A graphical representation of the settlement shall be included in the report. The tank will be accessed for out-of-roundness as well.

4.2.1.6 Coating

A coating assessment shall be made by the persons inspecting. The inspectors shall be familiar with military coatings, but if significant or complex coating issues are present the contractor shall provide a NACE certified coating inspector. The NACE inspector shall only be included at the request of the

Contracting Officer. Dry Film Thickness (DFT) reading shall be taken at assessable tank locations (as applicable) to determine the average thickness readings of the internal/external shell, floor, and roof.

4.2.1.7 Secondary Containment

Visually inspect containment and assess the general secondary containment condition. Note the presence of cracks, settlement, and deterioration. Record condition and need for repairs is needed.

4.2.1.8 Tank Appurtenances

The tank nozzles, manways and other appurtenances shall be examined for adequacy and applicable standard compliance of wall thickness, reinforcement, weld spacing, and corrosion allowance. Tank accessories such as relief valves and level gauges shall be examined for general condition. Shell nozzles and reinforcements shall be ultrasonic thickness tested for determination of minimum required thicknesses, corrosion rates, and remaining life.

4.2.1.9 Level Alarms/Water Draw-Off/ATG Systems/Vents

Identify methods/systems for level alarms, water draw-off, ATG, and venting systems. Gather operability information from onsite personnel. General condition and system functionality shall be included in the report.

4.2.2 **Out-of-Service API 653 Inspection of Aboveground Storage Tanks**

This inspection shall be performed while the tank is out-of-service. The following shall be performed:

4.2.2.1 Non-Destructive Testing

4.2.2.1.1 Visual Inspection (VT)

Visually inspect the overall condition of the tank. This includes plates, roof underside, corrosion, coating, welds, appurtenances, gauging, presence of cathodic protection, foundation, secondary containment, stairways, nozzles, grounding, sumps, etc.

4.2.2.1.2 Ultrasonic Thickness (UT) Measurements and Recording

Perform UT measurements of the tank shell, floor, roof, and nozzles. UT measurements shall be taken around the first course and on the upper courses accessible by stairways. The UT reading will be used for documentation, shell/roof/floor thickness acceptability, and if applicable, remaining life calculations.

4.2.2.1.3 Magnetic Flux Leakage (MFL)

MFL floor scanning shall be performed on all accessible areas of the floor. Topside or bottom side corrosion indications shall be verified by VT and/or UT. In areas inaccessible by scanning, a sufficient number of UT readings shall be taken to gain a representation of the bottom underside condition.

4.2.2.1.4 Vacuum Box Testing (VBT)

On uncoated floors and shells, VBT all welds on the tank floor and internal shell to floor weld. If the floor is coated, the contactor should have the capability to perform VBT if needed.

4.2.2.2 Color Photographs

Color photographs shall be taken to document tank condition, discrepancies and overall construction.

4.2.2.3 API 653 Checklist in Appendix C

The appropriate API 653 Checklist in Appendix C shall be performed.

4.2.2.4 Mapping

As-built mapping shall be performed of shell, floor, and roof plate orientation. Stairways, appurtenances, manways, vents and other significant tank details shall also be included.

4.2.2.5 Settlement Survey and Evaluation

A shell and floor edge settlement survey shall be performed to identify edge settlement, differential settlement, and/or planar tilt. The results of the evaluation shall be discussed in the body of the report and the acceptability of these results shall also be made. A graphical representation of the settlement shall be included in the report. The tank will be accessed for out-of-roundness as well.

4.2.2.6 Coating

A coating assessment shall be made by the persons inspecting. The inspectors shall be familiar with military coatings, but if significant or complex coating issues are present the contractor shall provide a NACE certified coating inspector. The NACE inspector shall only be included at the request of the Contracting Officer. Dry Film Thickness (DFT) reading shall be taken at assessable tank locations (as applicable) to determine the average thickness readings of the internal/external shell, floor, and roof.

4.2.2.7 Secondary Containment

Visually inspect containment and assess the general secondary containment condition. Note the presence of cracks, settlement, and deterioration. Record condition and need for repairs is needed.

4.2.2.8 Tank Appurtenances

The tank nozzles, manways and other appurtenances shall be examined for adequacy and applicable standard compliance of wall thickness, reinforcement, weld spacing, and corrosion allowance. Tank accessories such as relief valves and level gauges shall be examined for general condition. Shell nozzles and reinforcements shall be ultrasonic thickness tested for determination of minimum required thicknesses, corrosion rates, and remaining life.

4.2.2.9 Level Alarms/Water Draw-Off/ATG Systems/Vents

Identify methods/systems for level alarms, water draw-off, ATG, and venting systems. Gather operability information from onsite personnel. General condition and system functionality shall be included in the report.

4.2.3 **Modified API 653 Inspection**

This section includes all other tanks that do not fall under the API 653 definition of an Aboveground Storage Tank.

4.2.3.1 Field Erected Cut and Cover Tanks

As applicable, use Section 4.2.1.10 "Out-of-Service Inspection of Aboveground Storage Tanks" for inspection of cut and cover tanks. The following will also be performed:

4.2.3.1.1 UT scan four locations from the tank floor/shell weld to the tank roof. This will used for shell backside evaluation.

4.2.3.2 Horizontal Cyclical Welded Steel Underground Tanks (Section to be included at a later date.)

4.2.3.3 Shop Fabricated Aboveground Tanks (Section to be included at a later date.)

4.2.3.4 Other (Section to be included at a later date.)

4.2.4 **Steel Tank Institute Inspection**

STI SP001 shall be used as guidance on all storage tanks not in contact with the ground. These tanks are typically smaller shop fabricated in a horizontal position. The purpose of the inspection shall be to document the tank and secondary containment condition, and ensure is the tank is not leaking.

4.3 Tank Calibration (Strapping Charts)

Prepare two calibration tables for each tank specified in Section 2.0, one in English units and one in metric units. Both tables shall show the volume of the fuel for all liquid levels in the tank starting at the shell to bottom joint and going up to the level of the overflow. Tank calibration shall be in accordance with API 2003 “Manual of Petroleum Measurements Standards” for “critical measurement,” API Standard 2550 “Measurement and Calibration of Upright Cylindrical Tanks” and in accordance with UFGS Specification 33 56 13.13, paragraph 3.4.1.d (Chapter 2.2D, Internal Electro-optical Distance Ranging Method (EODR) (using a theodolite with an electronic distance ranging device).)

The English units calibration table shall show the volume of the fuel in barrels of 42 gallon and the level in 1/16-inch increments. The metric unit calibration table shall show the volume of the fuel in cubic meters and the level of the fuel in 2.0 mm increments. The zero level shall be the bottom of the shell. The level of the bottom of the shell and the level of the overflows shall be identified on the calibration table (strapping chart). The table shall not include tank volume above the level of the overflows. Preparation of new calibration tables from API report information or by interpolation of existing tables shall not be permitted. The table shall be certified by a third party. The tables shall be include in the tank inspection report and in addition two laminated copies each of English and metric units provide shall be sent to the facility.

4.4 Tank Gauging Tubes (Stilling Wells)

The government is in the process of refining requirements for gauge tubes in all storage tanks. The standard design shall be used for the installation of the gauge tubes. Modification to any existing tubes shall be made if acceptable and feasible. All damaged coatings shall be repaired in accordance to UFGS 09770 and UFGS 09771.

4.4.1 **Standard Design**

The standard details shall be used for each tank identified in Section 2.0 and the Contractor shall make site specific adjustments as appropriate for each tank. The Contractor shall develop applicable details to retrofit identified tanks. Location of gauging tubes is critical for water and temperature sensing. Tubes shall be constructed of schedule 40 aluminum. Special considerations shall be made for unusual circumstances such as geodesic domes, very large or uncommonly shaped tanks, etc. These special circumstances will be addressed in Section 2.0.

4.4.2 **Gauge Tube Requirements**

The gauge tubes will need to provide the capability for the ATG system servo float, the temperature sensor (maybe included inside the ATG system gauge tube), and manual gauging.

4.5 Daily Reports

Daily reports shall be generated by the contractor for each work day while on site. Daily reports shall be emailed by 0900 the following work day to the NTR and all agreed upon parties. A daily report format is included in Appendix C.

4.6 Inspection Reports

4.6.1 Preliminary Reports

Upon completion of the field work, a preliminary report shall be communicated to the NFESC. This information will be utilized in determining whether repairs need to be accomplished prior to returning the tank(s) into service. Preliminary reports shall be submitted within 48 hours of completing each inspection.

As a minimum, preliminary inspection reports shall include:

4.6.1.1.1 Tank ID, location, and inspection date
4.6.1.1.2 Statement if tank is suitable for service or should be removed or reduced from service. If tank is unsuitable for service, a brief description of tank issue(s) shall be discussed.
4.6.1.1.3 Inspector(s) name, certification number, and date.

4.6.2 **Inspection Reports**

A separate report shall be provided for each tank inspected. Provide hardcopies of each report in plastic ring binding with a plastic sleeve inside to hold an electronic copy of each report. NFESC will provide the report covers with a report number.

Inspection Reports shall include:

4.6.2.1 Executive Summary
One page summary of the condition of the tank and basic recommendations for repairs

4.6.2.2 Suitability for Service Statement
This statement shall be a one page document with both the API 653 inspector's number and signature and the professional engineer's stamp and signature.

4.6.2.3 Tank History
The inspector shall establish a complete historical record of the entire tank. The records shall include as much information as possible including:

4.6.2.3.1 Nameplate Information
4.6.2.3.2 Products previously and presently stored in the tank.
4.6.2.3.3 List of previous inspections
4.6.2.3.4 List and describe any significant environmental (earthquake, hurricane, etc) or operational (over-pressure, vacuum, foundation settlement, etc) events.
4.6.2.3.5 List and describe any repairs or alterations performed (Include significant drawings, executive summaries from other repair reports, etc in the Report Appendix).
4.6.2.3.6 Other pertinent information and details.

4.6.2.4 Methodology
Detailed discussion on the actual methodology of how each component was inspected. This section includes type of inspection, equipment, and methods.

4.6.2.5 Findings
Detailed description of each component including containment, foundation, bottom, shell, appurtenances, access ways, floating roof/pan, and fixed roof. Provide discussion on all findings.

4.6.2.6 Recommendations
Recommendations shall be included in the report and broken into three categories. These categories are Mandatory, Near Future, and Long Term repairs.

4.6.2.6.1 Mandatory
Provide mandatory actions that need to be completed before the tank can be returned to service.

4.6.2.6.2 Near Future
Provide recommended actions that should be programmed for completion within 2-3 years. All recommendations shall be accompanied by a recommended completion date.

4.6.2.6.3 Long Term
Provide recommended actions that currently have no adverse affect on tank operability or integrity but should be monitored and/or performed to ensure long term continued service. All recommendations shall be accompanied by a recommended completion date.

4.6.2.7 Report Appendices

4.6.2.7.1 Data (UT, MFE, Settlement, Safe Fill Heights, etc)

Include all data collected during the inspection along with an interpretation and discussion of the data. Data will be in tabular form with tank locations.

4.6.2.7.2 API checklist in API 653 Appendix C
Include actual notes and readings taken by the field inspector including: tank history, visual checklist and definitive inspection results.

4.6.2.7.3 Drawings
As a minimum, the following drawings, if applicable, shall be included in the report: shell, roof, and floor plate orientation with appurtenances and other significant tank details.

4.6.2.7.4 Photographs
Color photographs with captions shall be included to document tank condition, discrepancies and overall construction.

4.6.2.7.5 Calculations
Provide calculations required by API 653. This includes determination of the minimum shell thickness, next inspection date, safe fill height, settlement, nozzle reinforcement requirements, and estimated remaining service life of shell, nozzles, roof and floor.

4.7 Repairs
The Government shall have the option to modify the contract to include repairs identified during the inspection. This section shall include all repairs identified in the inspection, but shall not include tank gauge tubes that are in Section 4.4. If significant repairs are needed, the Government will require an API 653 inspector certify all repairs/NDT work. If repairs are deemed necessary, the government will submit a scope of work for repairs and request a modification to the existing contract. Once modification is awarded, the contractor shall prepare the following:

4.7.1 **Work Plan**
The Contractor shall prepare a Work Plan and it will be reviewed and approved before performing repairs to the tank(s). The Contractor shall have the option to amend the existing Work Plan or create a new plan. The Work Plan shall incorporate all Federal, State, and Local environmental regulations. The Repair Work Plan shall include all information requested in Section 5.2, but should also include the following if applicable:

4.7.1.1 Hydrostatic Testing Plan
If significant repairs are made, especially in the tank critical zone, the contractor may recommend a hydrostatic test be performed. The hydro test shall be performed in accordance to API Standard 653. Personnel performing the test shall be identified and documentation on qualifications shall be submitted.

4.7.1.2 Non-Destructive Testing (NDT)
The Contractor shall be responsible for performing all necessary NDT to prove the validity of repairs. NDT methods and technician qualification shall be chosen and applied according to API Standard 653.

4.7.2 **Health and Safety Plan**
The Health and Safety Plan for the repairs shall follow all the guidelines in Section 5.3.

4.7.3 **Repair Certification Reports**
A separate report shall be provided for each tank repaired. These reports will include thorough documentation all work performed. Hard copies of each tank shall be bind in plastic ring binding with a plastic sleeve inside to hold electronic copy of each report. NFESC will provide the cover and report number.

Repair Reports Shall Include:

4.7.3.1 Executive Summary
4.7.3.2 Suitability for Service Statement
4.7.3.3 Work Performed
4.7.3.4 Timeline

Appendices:
4.7.3.5 Documenting Photographs
4.7.3.6 Personnel Certifications
4.7.3.7 NDT Documentation
4.7.3.8 QC Documentation
4.7.3.9 Materials and Coating Data
4.7.3.10 As-built Drawings, if applicable
4.7.3.11 API 653 follow up inspection (if deemed necessary)

5.0 POST AWARD, PRE-WORK SUBMITTALS

Prior to the start of work, all submittals shall be reviewed and approved in accordance to Appendix xxx.

5.1 Schedule

After contract award, a projected schedule with dates of mobilization, major milestone and demobilization shall be submitted.

5.2 Work Plan

Provide a written plan for cleaning, inspecting and stilling well repairs for the requested storage tanks in Section 2.0. The work plan shall include the following:

5.2.1 Project Summary and Background

5.2.2 Detailed Schedule
This schedule shall have more detail the previous schedule required in Section 5.1.

5.2.3 Methodology
Provide details on the proposed methodology for completing the required work.

5.2.4 Execution Strategy
Provide strategy for execution. This should include incorporate the work methodology and schedule along with quality control, mobilization/demobilization, applicable permitting, etc.

5.2.5 Key Personnel and Subcontractors
Provide contact information for key personnel and subcontractors. Include brief description qualifications and responsibilities of all parties.

5.2.6 Materials and Equipment to be Used
Provide list materials and major equipment to be used. These items will need to be review and approved by the NTR. Material specification sheets shall be submitted in accordance to Appendix D.

5.2.7 Hazardous Waste Disposal
Provide a plan for proper identification, handling, storage, transportation and disposal of any anticipated hazardous material.

5.3 Health and Safety Plan (H&SP)

5.3.1 General Work Safety

The Contractor shall submit a Health & Safety Plan detailing such items as briefings, training, hazard control, general housekeeping, personal protective equipment, etc. Submit in accordance with EM 385-1-1 Appendix A Minimum Basic Outline for Accident Prevention. It is stressed the contractor shall perform all work in a safe manner and maintain all proper documentation. A complete hard copy of the H&SP shall be on-site at all times.

5.3.2 Confined Space Plan

Only a qualified person shall issue tank entry and confined space permits. Tank atmosphere shall be gas-freed and monitored in accordance with OSHA guidelines for oxygen content, flammable, and toxic vapors. API standard 2015 and 29 CFR 1910.146 shall also be followed.

5.3.3 Hazardous Materials Handling

Hazardous material handling shall be performed according to the manufacturer's specifications and conform to all applicable federal, state, and local regulations. Personnel handling hazardous materials shall be properly trained and provided with any required personal protective equipment (PPE).

5.3.4 Environmental Protection

Preventative measures shall be addressed and followed to protect the environment from any work being performed. This section shall also discuss contingency plans to contain and clean up in the event a spill.

5.3.5 Hot Work

Hot work permits shall be obtained prior to any hot work being performed. Hot work procedures for both above the floor work and on the floor work shall be included in the H&SP as well as the Work Plan. The Contract shall obtain Hot Work permits from a Marine Chemist or Certified Industrial Hygienist and also the local base fire department. Hot work is defined as welding, cutting, etc. Abrasive blasting will be considered hot work unless stated otherwise in Section 2.9.

5.4 Personnel and Contractor Qualifications

Provide information on experience, training and licensing.

5.4.1 Project Manager

The Project Manager for this project shall have the technical and practical background in petroleum storage tank construction and inspection. This person shall be familiar with the applicable API, STI, and other Military standards and recommend practices. This person shall be knowable of appropriate NDE/NDT techniques and quality assurance of these practices.

5.4.2 Site Manager

The Site Manager for this project shall have the technical and practical background in petroleum storage tank construction and inspection. This person shall be familiar with the applicable API, STI, and other Military standards and recommend practices. This person shall be knowable of appropriate NDE/NDT techniques and quality assurance of these practices. The site manager will also ensure all persons onsite are abiding to all safety measures outlined in the Health and Safety Plan.

5.4.3 Tank Cleaning Personnel

Tank cleaning personnel shall be trained in all safety equipment and procedures needed to perform work. This shall include, but not be limited to confine space, hazardous material handling, hazardous atmosphere monitoring, fall protection, etc. All appropriate safety regulations and guidelines shall be followed.

5.4.4 API 653 Inspectors

The inspectors shall be experienced with various types of storage tanks. Inspectors shall be a certified in accordance with to API 653 Appendix D - Authorized Inspector Certification. Inspectors shall furnish proof of API certification.

5.4.5 **NDE/NDT Technicians**
All non-destructive examination (NDE) testing shall be conducted by personnel qualified to ASNT Level II in accordance with inspection company's procedures or by an ASNT Level I qualified individual under the direct supervision of an ASNT Level II or Level III. Technicians shall provide NDE/NDT qualifications.

5.4.6 **STI Inspectors**
Inspectors performing STI inspections shall be certified in accordance to STI SP001.

5.4.7 **Welders**
Welding Procedure Specification (WPS) and welders shall be qualified in accordance with Section IX of the ASME Code. Personnel performing welds shall be experienced with construction and repairs of petroleum storage tanks and pipelines.

5.4.8 **Coating Applicators**
All contractors and subcontractors that perform surface preparation and coating application shall be certified by the Society for Protective Coatings (formerly Steel Structure Painting Council) (SSPC) to the requirement of SSPC QP 1 prior to contract award, and shall remain certified while accomplishing any surface preparation or coating application. Contractors shall be familiar with military coatings and experienced with their application.

5.4.9 **National Association of Corrosion Engineers (NACE) Inspector – (**If applicable)
As an option, a tank coating inspection shall be performed by a certified NACE Level III Coatings Inspector in accordance with the National Association of Corrosion Engineers (NACE).

5.4.10 **Marine Chemist/Industrial Hygienist**
The Marine Chemist or Certified Industrial Hygienist shall be certified by the American Board of Industrial Hygiene.

5.4.11 **Tank Calibration Personnel**
Contractor shall provide the services of a specialty calibration organization to provide tank field measurements to produce tank calibration charts (strapping tables) and electronic data files for use by the ATG system.

6.0 MEETINGS

6.1 Work Kickoff Meeting
A Work Kickoff meeting will be coordinated by NFESC to establish the responsibilities of each party involved, discussion of the schedule, and to ensure a mutual understanding of the scope.

6.2 Repair Kickoff Meeting (If applicable)
A Repair Kickoff Meeting shall be held if work outside the original scope is being performed. This does not apply stilling well installation. This meeting is to be conducted to establish each party's responsibilities and achieve consensus on the repairs scope.

6.3 Work Completion Walk Through
Upon completion of the required tasks a Work Completion Walk Through is to be conducted. The purpose of this meeting is to ensure that all the government's requirements and expectations have been successfully completed and the government will accept all work performed.

7.0 BID PROPOSAL REQUIREMENTS
The contractor bid proposals are to include the following:

7.1 Brief Work Plan
A brief statement of how the contractor plans to complete the required tasks.

7.2 Schedule
Provide a schedule which identifies major milestones along with projected start and end dates.

7.3 Project Personnel and Subcontractors
Provide the names and contact information for the planned project personnel and subcontractors.

7.4 Costs Proposal
Provide a cost proposal for entire project. As part of the proposal, costs for cleaning, inspecting, and repairing each tank shall be included. These broken out costs will be used for government information only and the project will not be de-scoped according to them.

APPENDIX A

TANK INFORMATION

APPENDIX B

GAUGE TUBE STANDARD DESIGN

(N/A)

APPENDIX C

DAILY REPORT FORMAT

DAILY PRODUCTION REPORTS
A Production Report is required for each day that work is performed on the tanks. Unless unusual circumstances arise, the Production Report should be limited to 1-2 pages. The report is informal and can consist of hand written notes on a standard form. The report shall account for each calendar day while on-site. The reporting of work shall be identified by terminology consistent with the statement of work. Contractor Production Reports are to be prepared, signed and dated by the contractor's on-site Project Supervisor and shall contain the following information:

1.0 Date of report, report number, name of contractor, Delivery Order Number, title and location of tasks, and Construction manager present.

2.0 Weather conditions in the morning and in the afternoon. Include temperature, wind, rain, fog, and humidity.

3.0 A list of contractor and subcontractor personnel on the work site, their trades, employer, work location, descriptions of work performed, and hours worked.

4.0 A list of contractor and subcontractor equipment on the work site, rented or owned, if rented - from who, location, description of work performed with equipment, and hours the Equipment was on-site, used, idle, and/or down for repair.

5.0 A list of contractor and subcontractor equipment on the work site, rented or owned, if rented-from who, location, description of work performed with equipment and hours the equipment was on-site, used, idle, and/or down for repair.

6.0 A list of job safety action taken and safety inspection and safety inspections conducted. Indicate that safety requirements have been met including the results of the following:

- **6.1.** Was a job safety meeting held? (If YES, attach a copy of the meeting minutes.)
- **6.2.** Were there any lost time accidents? (If YES, attach a copy of the completed OSHA report.)
- **6.3.** Was crane/trenching/scaffold/high voltage electrical/ high work done? (If YES, attach a statements or checklist showing inspection performed.)
- **6.4.** Was hazardous material/waste released into the environment? (If YES, attach a description of what was released, how it was released, actions taken to contain/clean-up, people/organizations contacted, meetings held, and future actions to be taken.)
- **6.5.** A list of material received each day that is incorporated into the project.
- **6.6.** Include a “Remarks” Section in the report which will contain the following: pertinent information including problems encountered during work, delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, minutes of QC meeting and/or other meetings, and a record of visitors to the work site.

APPENDIX D

SUBMITTAL LIST, SCHEDULE, AND DISTRIBUTION

SUBMITTAL LIST, SCHEDULE, AND DISTRIBUTION

SUBMITTAL	**SUBMITTAL SCHEDULE**			**DISTRIBUTION - NUMBER OF COPIES**	
	DRAFT (WACA)	GOVT Review	FINAL (WAGR)	NFESC	SCCC
SCHEDULE	2	1		EC	
WORK PLAN					
DRAFT	4	2	1	EC	
FINAL				EC	
HEALTH AND SAFETY PLAN					
DRAFT	4	2	1	EC	
FINAL				EC	
QUALIFICATIONS	2	1	-	EC	
MATERIAL SUBMITTALS	2	1	-	EC	
	DRAFT (WACO)	GOVT Review	FINAL (WAGR)		
API 653 REPORTS					
PRELIMINARY	48 hrs	-	-	EC	
DRAFT	7	2	2	EC	
FINAL				4 HC w/ CD, 4 additional CDs	
QUALITY CONTROL DAILY REPORTS ⁅				EC	EC
MEETING MINUTES ⁅ ,⦸				EC	

NOTES:
WACA – Weeks after Contract Award, WACO – Weeks after Completion
GOVT Review – Number of weeks for Government review after receipt of submittal.
WAGR – Weeks after Government Review
EC = Electronic Copy, HC = Hard Copy
⦸ - Include 1 CD-ROM with each FINAL report
⦸ - Include 2 CD-ROMs with each FINAL report
⁅ - Daily reports shall be e-mailed daily, by 0900 local time, the following day.
⦸ - Minutes of meetings shall be e-mailed no later than three (3) working days following each meeting.

APPENDIX E

GOVERNMENT FURINISHED INFORMATION

Section E - Inspection and Acceptance

INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted at:

CLIN	INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
0010	Destination	Government	Destination	Government
001001	Destination	Government	Destination	Government
001002	Destination	Government	Destination	Government

Section F - Deliveries or Performance

DELIVERY INFORMATION

CLIN	DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
0010	30-SEP-2008	5,935,738	N/A FOB: Destination	
001001	30-SEP-2008		N/A FOB: Destination	
001002	30-SEP-2008		N/A FOB: Destination	

Section G - Contract Administration Data

INVOICING INSTRUCTIONS

All invoices shall be submitted to NAVFAC_SW_SCCC_Invoices@navy.mil with a copy to [redacted]

ACCOUNTING AND APPROPRIATION DATA

[redacted] [redacted]
[redacted]
AMOUNT: $3,000,000.00
[redacted]: $3,000,000.00

[redacted] [redacted]
[redacted]
AMOUNT: $2,935,738.00
[redacted]: $2,935,738.00

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE: J	PAGE OF PAGES: 1 of 4		
2. AMENDMENT/MODIFICATION NO: 01	3. EFFECTIVE DATE: 05-Nov-2008	4. REQUISITION/PURCHASE REQ NO: ACQR528772	5. PROJECT NO (If applicable):
6. ISSUED BY — CODE N62583		7. ADMINISTERED BY (If other than item 6) — CODE	

6. ISSUED BY: NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE RAQN0/NAVAL BASE VENTURA COUNTY
1205 MILL RD BLDG 850
PORT HUENEME CA 93043-4347

7. ADMINISTERED BY: **See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
SHAW ENVIRONMENTAL INC
PATRICIA OLSON
6330 COMMERCE DR STE 190
IRVING TX 75063-2625

CODE 1YNH3 — FACILITY CODE

9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MOD. OF CONTRACT/ORDER NO. N47408-04-D-8503-0031

X 10B. DATED (SEE ITEM 13) 31-Aug-2007

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

☐ A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

☐ B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

X C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
FAR 52.243-1 Changes

☐ D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

1. The purpose of this supplemental agreement is to add work associated with the attached statement of work for post inspection repairs. Contractor revised proposal dated October 29, 2008 is accepted as proposed and incorporated by reference.

2. Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

3. All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) [redacted] / CONTRACTS TEL: 805-982-3427 EMAIL: [redacted]

15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 05-Nov-2008

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $1,621,497.00 from $5,935,738.00 to $7,557,235.00.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0010
The pricing detail quantity has increased by 1,621,497.00 from 5,935,738.00 to 7,557,235.00.
The total cost of this line item has increased by $1,621,497.00 from $5,935,738.00 to $7,557,235.00.

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0010 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-SEP-2008	5,935,738	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
15-MAY-2009	7,557,235	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 001001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-SEP-2008		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
15-MAY-2009		N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 001002 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-SEP-2008		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
15-MAY-2009		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $1,621,497.00 from $5,935,738.00 to $7,557,235.00.

SUBCLIN 001002:

[redacted] was increased by $1,621,497.00 from $2,935,738.00 to $4,557,235.00

(End of Summary of Changes)

The following items are applicable to this modification:

SECTION C - DESCRIPTIONS AND SPECIFICATIONS
ADDITIONAL WORK

STATEMENT OF WORK
ENGINEERING SERVICES FOR
POST INSPECTION REPAIR OF TANK 2 AT RED HILL
FISC PEARL HARBOR

1. Repair Scopes
   All repairs shall meet all requirements and provisions set forth by original DO. This modification SOW contains more detail work scope for repair phase of DO.
   a. Pre On-Site Requirements
      i. Work Plan: The Contractor shall submit detail work procedures and plans for the government review/approval. No work shall begin without approval of this plan. Addendum to current WP is acceptable.
      ii. Health and Safety Plan/Environmental Protection Plan: The Contractor shall submit detail site/project specific HSP and EPP. Addenda to current HSP and EPP are acceptable.
   b. Coat lower dome of Tank 2

i. Remove existing coating system from the lower dome, and prepare the surface to SSPC SP 10, near white metal. Submit documentation that blaster is qualified by SSPC to the SSPC C-7 Dry Abrasive Blaster Qualification Program.
ii. Current coating samples shall be collected and tested for any hazardous content. Abrasive blasting procedure must be determined based on the test result.
iii. All coating work shall be performed after any mechanical repair under this modification specified in Section 1. b of this SOW.
iv. Surface preparation and new coating application shall conform all requirements in UFGS – 09 97 13.15, Epoxy/Fluoropolyurethane interior coating of welded steel petroleum fuel tanks. Qualification requirement for coating contractor shall be SSPC QP 1. An independent coating inspection entity shall be hired according to the UFGS. Their qualification shall be SSPC QP 5 Level III.
v. All blasting and coating material submittals shall be provided to the government for review/approval. No work shall start without the approval on the submittals.
vi. Work Plan shall be submitted with detail information to accomplish the specified coating work. No work will be authorized prior to review/approval of Work Plan by the Government.
vii. It is the Contractor's responsibility to prove the condition of Tank 2 can be remained under manufacturer's recommended relative humidity level inside of tank.
viii. The Contractor shall provide all necessary personnel qualification information to the Government including SSPC QP 5 Level III inspection company/individual.
ix. Submit daily production report and QC report (by coating inspector) by 0900 hours next day.
x. Schedule bi-weekly QC meeting with all stakeholders.
xi.

c. Mechanical Repair of Tank 2
   i. Weld repairs: 43 locations with weld defects/thin spots in Tank 2 shall be repaired. The detail locations of the nature of defects are addressed in API 653 report. Based on API 653 recommendations, place a patch plate over 6 locations with crack welds to reinforce the joint after weld repair.
   ii. Pitting repairs on the floor: TesTex flaws #82 and #83.
   iii. Bulge repair in lower dome: Fill the void space behind the bulges in plates 1 & 2 with grout.
   iv. Repair 6" slop line that did not pass the pressure test.
   v. Repair cracked welds of the sample line penetrations in the welded plate of the casing to the lower access tunnel.
   vi. Install 3/8" datum plate directly under existing MTG probe.
   vii. Replace seven (7) sample tubes with the new skin valves. Sample lines in the tank shall be installed along the center tower structure.
   viii. Welding procedures, welders and welding operators shall be qualified. All supporting documents of qualifications shall be submitted to the Government.
   ix. Prior to perform any repairs, a marine chemist shall certify the condition of repair locations for safe hot work.
   x. All weld repairs shall be tested by appropriate NDE test methods. NDE personnel shall be certified in accordance with ASME B31.3 for each NDE procedure.
   xi. The Contractor shall submit qualifications of NDE personnel.
   xii. Center tower structural repairs performed after structural analysis..

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 / 4

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
02	28-Jan-2009	ACQR528772	

6. ISSUED BY CODE N62583

NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE RAQN0/NAVAL BASE VENTURA COUNTY
1205 MILL RD BLDG 850
PORT HUENEME CA 93043-4347

7. ADMINISTERED BY (If other than item 6) CODE

See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
SHAW ENVIRONMENTAL INC
PATRICIA OLSON
6330 COMMERCE DR STE 190
IRVING TX 75063-2625

CODE 1YNH3 FACILITY CODE

9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MOD. OF CONTRACT/ORDER NO.
N47408-04-D-8503-0031

X 10B. DATED (SEE ITEM 13)
31-Aug-2007

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

X C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
FAR 52.243-1 Changes

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

1. The purpose of this supplemental agreement is to add work as identified in the attached Statement of Work. Contractor proposal dated January 12, 2009 is accepted as proposed and incorporated by reference.

2. Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

3. All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)

16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
[redacted] / SUPV CONTRACT SPECIALIST
TEL: 805-982-5054 EMAIL: [redacted]

15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		BY [redacted] (Signature of Contracting Officer)	28-Jan-2009

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $467,042.00 from $7,557,235.00 to $8,024,277.00.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0010
The pricing detail quantity has increased by 467,042.00 from 7,557,235.00 to 8,024,277.00.
The total cost of this line item has increased by $467,042.00 from $7,557,235.00 to $8,024,277.00.

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0010 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
15-MAY-2009	7,557,235	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
16-JUN-2009	8,024,277	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 001001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
15-MAY-2009		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
16-JUN-2009		N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 001002 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
15-MAY-2009		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
16-JUN-2009		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $467,042.00 from $7,557,235.00 to $8,024,277.00.

SUBCLIN 001002:

[redacted] was increased by $467,042.00 from $4,557,235.00 to $5,024,277.00

(End of Summary of Changes)

The following items are applicable to this modification:

SECTION C - DESCRIPTIONS AND SPECIFICATIONS
ADDITIONAL WORK

1. Repair Scopes
   All repairs shall meet all requirements and provisions set forth by original DO. This modification SOW contains more detail work scope for repair phase of DO.

   a. Mechanical Repair of Tank 20
      i. Remove 7 old tell-tale pipes running from the lower dome to upper expansion spring line. Each tell-tale pipe has 30 tell-tale pipe connections that need to be cut.
      ii. Remove one hundred sixty five (165) tell-tale jump pipes.
      iii. Total cold cut number is five hundred sixty four (564).
      iv. Remove existing sample tubes.
      v. Center tower structural repairs performed after structural analysis, including removal of wooden elevator guide.
      vi. Removal of vertical pipes adjacent to the center tower for boom access. Re-attach the pipes cost shall be included.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 | 3

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
03	03-Dec-2009	ACQR528772	

6. ISSUED BY CODE N62583	7. ADMINISTERED BY (If other than item 6) CODE
NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE RAQN0/NAVAL BASE VENTURA COUNTY 1205 MILL RD BLDG 850 PORT HUENEME CA 93043-4347	See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
SHAW ENVIRONMENTAL INC PATRICIA OLSON 6330 COMMERCE DR STE 190 IRVING TX 75063-2625		9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
	X	10A. MOD. OF CONTRACT/ORDER NO. N47408-04-D-8503-0031
CODE 1YNH3 FACILITY CODE	X	10B. DATED (SEE ITEM 13) 31-Aug-2007

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

**13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.243-1 Changes
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Modification Control Number: [redacted]

1. the purpose of this supplemental agreement is to extend the period of performance at no additional cost to either party based on the time required to generate and have Government comments provided on the Construction Certification Report.

2. Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the w ork as herein revised.

3. All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		[redacted] / CONTRACT SPECIALIST TEL: 805-982-2479 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		BY [redacted] (Signature of Contracting Officer)	07-Dec-2009

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0010 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
16-JUN-2009	8,024,277	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-APR-2010	8,024,277	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 001001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
16-JUN-2009		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-APR-2010		N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 001002 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
16-JUN-2009		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-APR-2010		N/A FOB: Destination	

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE: J	PAGE OF PAGES: 1 5		
2. AMENDMENT/MODIFICATION NO: 04	3. EFFECTIVE DATE: 21-Jul-2014	4. REQUISITION/PURCHASE REQ NO: ACQR528772	5. PROJECT NO (If applicable)
6. ISSUED BY CODE N39430 NAVFAC EXWC CODE ACQ / NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4301		7. ADMINISTERED BY (If other than item 6) CODE See Item 6	
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code) CB&I FEDERAL SERVICES LLC JUSTIN MYERS 2370 TOWNE CENTER BLVD BATON ROUGE LA 70806-8172		9A. AMENDMENT OF SOLICITATION NO.	
		9B. DATED (SEE ITEM 11)	
		X 10A. MOD. OF CONTRACT/ORDER NO. N47408-04-D-8503-0031	
CODE 1YQ36	FACILITY CODE	X 10B. DATED (SEE ITEM 13) 31-Aug-2007	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14 The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified

12. ACCOUNTING AND APPROPRIATION DATA (If required)

See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
X	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☒ is not, ☐ is required to sign this document and return ____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Modification Control Number: [redacted]

Prepared by: [redacted]

This unilateral administrative modification is to change the line of accounting (LOA) in Section G. The funding amount for this task order remains unchanged. Future invoice submissions shall reference the new LOA. This administrative change is necessary due to Defense Logistics Agency Energy accounting system conversion.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) [redacted] / CONTRACTS TEL: 805-982-2565 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 25-Jul-2014

EXCEPTION TO SF 30
APPROVED BY OIRM 11-84

30-105-04

STANDARD FORM 30 (Rev. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $2,965.54 from $8,024,277.00 to $8,027,242.54.
The 'Payment will be made by' organization has changed from
DFAS CO
STOCK FUND DIRECTORATE
ATTN: DFAS CO BVDFB
P. O. BOX 182317
COLUMBUS OH 43218-6254
to
DFAS CLEVELAND
CLEVELAND NORFOLK ACCOUNTS PAYABLE
PO BOX 998022
CLEVELAND OH 44199-8022

The contractor organization has changed from
SHAW ENVIRONMENTAL INC
PATRICIA OLSON
6330 COMMERCE DR STE 190
IRVING TX 75063-2625
to
CB&I FEDERAL SERVICES LLC
JUSTIN MYERS
2370 TOWNE CENTER BLVD
BATON ROUGE LA 70806-8172

The remittance organization has changed from
SHAW ENVIRONMENTAL INC
PATRICIA OLSON
6330 COMMERCE DR STE 190
IRVING TX 75063-2625
to
CB&I FEDERAL SERVICES LLC
JUSTIN MYERS
2370 TOWNE CENTER BLVD
BATON ROUGE LA 70806-8172

SECTION B - SUPPLIES OR SERVICES AND PRICES

Global Changes

CLIN 0010 -- SUBCLIN 001002
The FSC code has changed from R425 to Y1PZ.

CLIN 0010
The pricing detail quantity has increased by 2,965.54 from 8,024,277.00 to 8,027,242.54.

The unit of issue has changed from Dollars, U.S. to Each.
The total cost of this line item has increased by $2,965.54 from $8,024,277.00 to $8,027,242.54.

SUBCLIN 001003 is added as follows:

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
001003	[redacted]	UNDEFINED		UNDEFINED	$0.00
				MAX NET AMT	$0.00
	[redacted]				$2,965.54

SECTION E - INSPECTION AND ACCEPTANCE

The following Acceptance/Inspection Schedule was added for SUBCLIN 001003:

INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
N/A	N/A	N/A	Government

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule Item has been deleted from CLIN 0010:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-APR-2010	8,024,277	N/A FOB: Destination	

The following Delivery Schedule item has been added to CLIN 0010:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC

POP 31-AUG-2007 TO 30-APR-2010	N/A	NAVFAC EXWC [redacted] CODE ACQ / NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4301 805-982-2515 FOB: Destination	N39430

The following Delivery Schedule Item has been deleted from SUBCLIN 001001:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-APR-2010		N/A FOB: Destination	

The following Delivery Schedule Item has been deleted from SUBCLIN 001002:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-APR-2010		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

SUBCLIN 001002:

[redacted] was decreased by $2,965.54 from $5,024,277.00 to $5,021,311.46

SUBCLIN 001003:
Funding on SUBCLIN 001003 is initiated as follows:

[redacted]

Acctng Data: [redacted]

Increase: $2,965.54

Total: $2,965.54

Cost Code: [redacted]

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE: J	PAGE OF PAGES: 1 / 3		
2. AMENDMENT/MODIFICATION NO: 05	3. EFFECTIVE DATE: 28-Jul-2014	4. REQUISITION/PURCHASE REQ. NO: ACQR528772	5. PROJECT NO. (If applicable)
6. ISSUED BY CODE N39430 NAVFAC EXWC CODE ACQ / NAVAL BASE VENTURA COUNTY 1100 23RD AVE. BLDG 1100 PORT HUENEME CA 93043-4301		7. ADMINISTERED BY (If other than item 6) CODE See Item 6	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
CB&I FEDERAL SERVICES LLC
JUSTIN MYERS
2370 TOWNE CENTER BLVD
BATON ROUGE LA 70806-8172

CODE 1YQ36 FACILITY CODE

9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MOD. OF CONTRACT/ORDER NO.
N47408-04-D-8503-0031

X 10B. DATED (SEE ITEM 13)
31-Aug-2007

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
X	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☒ is not, ☐ is required to sign this document and return ______ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]
Prepared by: [redacted]

The purpose of this modification is to correct an error made on the previous modification. Modification 04 inadvertently increased the Task Order by $2,965.54. This modification will decrease the Task Order by $2,965.54.

All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) [redacted] CONTRACTS TEL: 805-982-2515 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 28-Jul-2014

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was decreased by $2,965.54 from $8,027,242.54 to $8,024,277.00.
The 'issued by' organization has changed from
NAVFAC SOUTHWEST
SPECIALTY CENTER CONTRACTS CORE
CODE RAQN0/NAVAL BASE VENTURA COUNTY
1205 MILL RD BLDG 850
PORT HUENEME CA 93043-4347
to
NAVFAC EXWC
CODE ACQ / NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4301

The 'administered by' organization has changed from
NAVFAC SOUTHWEST
SPECIALTY CENTER CONTRACTS CORE
CODE RAQN0/NAVAL BASE VENTURA COUNTY
1205 MILL RD BLDG 850
PORT HUENEME CA 93043-4347
to
NAVFAC EXWC
CODE ACQ / NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4301

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0010
The pricing detail quantity has decreased by 2,965.54 from 8,027,242.54 to 8,024,277.00.
The total cost of this line item has decreased by $2,965.54 from $8,027,242.54 to $8,024,277.00.

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0010 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC

POP 31-AUG-2007 TO 30-APR-2010	N/A	NAVFAC EXWC [redacted] CODE ACQ / NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4301 805-982-2515 FOB: Destination	N39430

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 31-AUG-2007 TO 30-APR-2010	N/A	NAVFAC EXWC [redacted] CODE ACQ / NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4301 805-982-2515 FOB: Destination	N39430

(End of Summary of Changes)

NFESC CONTRACT N47408-04-D-8503, DELIVERY ORDER 0031

TANK 2
ENGINEERING REVIEW AND SUITABILITY FOR SERVICE EVALUATION

API 653 OUT-OF-SERVICE TANK INSPECTION BY OTHERS

FISC PEARL HARBOR
RED HILL COMPLEX, HAWAII

Final Report October 2008

Prepared For:

NAVFAC

Naval Facilities Engineering Command
Engineering Service Center
1100 23rd Avenue, Code 232
Port Hueneme, California 93043-4370

Presented By:

Shaw

Shaw Environmental Inc.
590 Paiea Street
Honolulu, Hawaii 96819-1835

Prepared By:

ENTERPRISE ENGINEERING, INC.

Stephen J. DiGregorio, P.E.
Structural Engineer, API 653 Certificate No. 1113

Submitted By:

Stephen S. Brooks, P.E.
Principal, API 653 Certificate No. 17
2525 Gambell Street, Suite 200, Anchorage, AK 99503

EEI Project 08-4895

RED HILL TANK 2
FISC PEARL HARBOR, HAWAII

SUITABILITY FOR SERVICE EVALUATION
(API 653 TANK INSPECTION BY OTHERS)

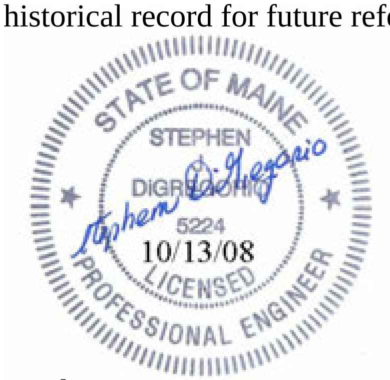
ABSTRACT

The API 653 out-of-service inspection of Tank 2 at FISC Pearl Harbor, Red Hill was performed by Engineering & Inspections Hawaii, Inc. (E&I) during April 2008 under contract to Shaw. Non-destructive examination of Tank 2 was performed by TesTex. Enterprise Engineering, Inc. (EEI) has reviewed the documentation on Tank 2 prepared by E&I and TesTex and has prepared this engineering evaluation of Tank 2. The engineering evaluation was performed in accordance with the applicable sections of API Standard 653 Third Edition December 2001, Addendum 3 February 2008 and is solely based on the items presented in E&I's inspection report and follow-up correspondence and discussions. Information not presented by E&I, but possibly relevant to the integrity of the tank, has not been considered in this evaluation. This report only provides a review of relevant inspection findings by others, plus an evaluation of tank suitability for service completed by EEI, and should be read in conjunction with the formal report prepared by E&I. The E&I recommendations for repair prior to returning the tank to service are discussed herein as necessary from an engineering and repair requirements perspective.

Based on information presented in E&I's report and information provided by TesTex, our evaluation determined there are conditions that affect the hydraulic and structural integrity of Tank 2. Mandatory repairs are required prior to placing the tank back in-service.

EEI recommends the next API 653 out-of-service internal inspection be scheduled for no later than April 2028 (i.e. 20 years from the date of the inspection). The next out-of-service internal inspection should be performed sooner than April 2028 if a change in condition or a change in service occurs. EEI also recommends the condition of the interior coating be inspected and assessed at every fuel quality inspection.

In accordance with API Standard 653, this report satisfies the requirement for an out-of-service integrity evaluation and as such, must be kept permanently available for the life of the tank as a historical record for future reference.



I hereby acknowledge that being familiar with the provisions of API Standard 653, the engineering evaluation was performed in accordance with the provisions of API Standard 653 and good engineering practices, and with the exercise of usual and customary care.

This tank inspection determined that mandatory repairs are required. Based on the extent of the out-of-service inspection, Tank 2 is considered suitable for service after mandatory repairs are completed.

Stephen J. DiGregorio, P.E.
Chief Structural Engineer
ANSI/API 653 Aboveground Storage Tank Inspector No. 1113

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APPENDICES

RED HILL TANK 2
FISC PEARL HARBOR, HAWAII

ENGINEERING REVIEW AND SUITABILITY FOR SERVICE EVALUATION

SUMMARY

Enterprise Engineering, Inc. (EEI) performed an engineering review and suitability for service evaluation of Tank 2 based on the API 653 out-of-service inspection report prepared by Engineering & Inspections Hawaii, Inc (E&I) and follow-up correspondence and discussions. Additionally, EEI performed a visit to Tank 2 on June 17, 2008 to observe the condition of the joint between the barrel and upper dome, the joint between the barrel and lower dome, and conditions in the lower dome. The engineering evaluation was performed in accordance with the applicable sections of API Standard 653 Third Edition December 2001, Addendum 3 February 2008. API 653 has only limited application to this highly custom designed concrete tank with a steel liner.

This report provides an engineering review of the E&I report with additional suitability for service assessment comments as appropriate. Information not presented by E&I, but possibly relevant to the integrity of the tank, has not been considered in this evaluation.

REPAIR ITEMS

Repair Categories

The recommendations for repair were categorized by E&I based on paragraph 4.6.2.6 in the NFESC Statement of Work. The categorization is a practical time line basis, not necessarily considering whether a repair recommendation is considered a mandatory repair to meet the strict provisions of API 653, or a compelling recommendation based on life extension and preservation or military criteria.

Repairs - Standard of Care

All repairs shall strictly meet the requirements of API 650 and API 653 regarding material, welding procedures and qualification of welders, non destructive examination (NDE) of welding, and testing requirements.

Mandatory Repairs

Mandatory repairs are repairs that are required prior to placing the tank in service as either compelling under API 653, for hydraulic and structural integrity, or from a practical consideration as the only opportunity to complete the work is prior to filling the tank. The following repairs are listed in the E&I report as mandatory.

1. Tank Access Structure: Clean the additional structural members welded to the central tower and inspect by visual and magnetic particle inspection.

   EEI Comments:

   - No exception taken to E&I's recommendation.
   - Paragraph "Access Structure" of E&I's report states the welding to the central tower was noted to be covered by slag deposits and could not be inspected. EEI suggests the following clarification to E&I's recommendation: Remove slag deposits and inspect the welds of the additional structural members recommended by Hawaii Engineering Group.
   - As the internal tower and access walkway was inspected by Hawaii Engineering Group, EEI is excluding review and comment of their findings and recommendations from our review of Tank 2 inspection.

2. Internal Coating: Evaluate the Internal Coating by a certified NACE inspector.

   EEI Comments:

   - It is EEI's understanding that NFESC had a coating inspector inspect the interior coating; another inspection by a NACE coating inspector provided by Shaw is not be necessary.
   - As EEI has not received a copy of the NFESC coating inspection report, we can not make any comment regarding inspecting or repairing the interior coating.
   - During EEI's site visit to Tank 2 on June 17, 2008, EEI noted that the coating in the lower dome has failed. Coating failures are also present at spot locations on the barrel and to a lesser degree, on the upper dome.
   - Based on discussions with Shaw, the government has decided to re-coat the lower dome.

3. Steel Liner Repairs: E&I's report recommends repair of flaws in the steel liner plates and welds based on findings provided by TesTex.

   EEI Comments:

   - No exception taken to the list of liner repairs identified in E&I's report.
   - TesTex NDE data lists a 31" long x 18" high bulge in the barrel (flaw #44). The remaining wall thickness is reported as 0.230". This bulge is relatively small and does not require repair.
   - Repair the flaws listed in E&I's report. See the discussion that follows for EEI recommendations on repair requirements.
   - Before performing any repairs of the steel liner, EEI recommends a Marine Chemist evaluate conditions at the area of repair for hot work and prepare hot work

requirements. Past history on Red Hill has found some areas safe for hot work and some areas not safe unless special purging requirements are followed. EEI recommends the Marine Chemist prepare a series of procedures for conditions found.

Steel Liner Repair Requirements

1. Cracks in Welds
    - Remove cracks by grinding.
    - Perform magnetic particle or ultrasonic inspection to verify that the cracks have been removed.
    - Provide welds passes to restore the full thickness of the weld. Control heat input and rate of cooling to prevent new cracks from forming.
    - Perform magnetic particle or ultrasonic inspection of the completed repair. Inspect for cracks, lack of fusion, porosity, and slag inclusions. Repair all rejectable defects found.
    - NOTE: It may be necessary to weld a doubler plate over the repaired welds to reinforce the joint.
2. Incomplete Penetration in Welds
    - Remove lack of fusion by grinding.
    - Perform magnetic particle or ultrasonic inspection to verify that the lack of fusion has been removed.
    - Provide welds passes to restore the full thickness of the weld.
    - Perform magnetic particle or ultrasonic inspection of the completed repair. Inspect for cracks, lack of fusion, porosity, and slag inclusions. Repair all rejectable defects found.
3. Porosity in Welds
    - Remove porosity by grinding.
    - Perform magnetic particle or ultrasonic inspection to verify that the porosity has been removed.
    - Provide welds passes to restore the full thickness of the weld.
    - Perform magnetic particle or ultrasonic inspection of the completed repair. Inspect for cracks, lack of fusion, porosity, and slag inclusions. Repair all rejectable defects found.
4. Slag Inclusions
    - Remove slag inclusions by grinding.
    - Perform magnetic particle or ultrasonic inspection to verify that the slag inclusions have been removed.
    - Provide welds passes to restore the full thickness of the weld.
    - Perform magnetic particle or ultrasonic inspection of the completed repair. Inspect for cracks, lack of fusion, porosity, and slag inclusions. Repair all rejectable defects found.

5. Arc Strikes
    - Remove arc strikes by grinding.
    - Perform magnetic particle inspection to verify that the arc strike has been removed and that there are no cracks in the base metal.
    - Repair areas having a remaining metal thickness less than 0.200” by welding to restore the thickness of the liner plate.
    - Perform magnetic particle or ultrasonic inspection of the weld repair. Inspect for cracks, lack of fusion, porosity, and slag inclusions. Repair all rejectable defects found.
6. Backside Corrosion
    - Repair by welding a 1/4” thick patch plate over the area.
    - Perform magnetic particle inspection and vacuum box testing of the patch plate weld. Inspect for cracks, lack, of fusion, porosity, and leak indications. Repair all rejectable defects found.
7. Through Wall Hole
    - Repair by welding a 1/4” thick patch plate over the area.
    - Perform magnetic particle inspection and vacuum box testing of the patch plate weld. Inspect for cracks, lack, of fusion, porosity, and leak indications. Repair all rejectable defects found.

EEI Added Mandatory Repairs

1. Repair Topside Pitting in Floor of Lower Dome
    - TesTex’s NDE report lists two locations of topside pitting in the floor of the lower dome (Flaws #82 and #83). The pitting is located in the 1/2” thick floor plate adjacent to the welded joint that joins the bottom course of the lower dome to the floor plate. As the pitting is close to the weld, EEI recommends the pitted areas be repaired by welding to fill the pits.
2. Repair Bulges in Lower Dome
    - TesTex’s NDE report identifies a large bulge in plates 1 and 2 of the lower dome. EEI performed spot hammer testing of the bulges on June 17, 2008 and detected voids below the bulges.
    - EEI recommends voids behind the bulges be filled with grout.
3. Repair cracked welds of the sampling line penetrations in the welded plate on the end of the casing in the lower tunnel.
    - Lightly grind the welds to remove the cracks.

- Perform magnetic particle (MT) or liquid penetrant (PT) inspection of the areas to verify that the cracks have been removed.
- Repair the areas by welding additional passes.
- Perform magnetic particle (MT) or liquid penetrant (PT) inspection of the weld repairs. Inspect for cracks, lack of fusion, porosity, and other detectable leak paths.

Near Future Recommended Repairs (Non-Mandatory)

Near future recommended repairs are repairs not mandatory per API 653 or for structural and hydraulic integrity of the tank but should be performed if approved by the government in conjunction with the mandatory repairs, or within a 2-3 year period to preserve the integrity of the tank.

1. The E&I report does not list any recommended near future repairs.

   EEI Comment: No exception taken.

Recommended Repairs for Long Term Serviceability

Long term repairs are repairs that are not critical to the hydraulic and structural integrity of the tank and are not required prior to placing Tank 2 in service. Long term repairs consist of items that should be deferred to the next out of service inspection cycle.

1. Program the tank for the next out-of-service inspection in 20 years (April 2028).

ADDITIONAL COMMENTS AND RECOMMENDATIONS

Inspection of Steel Liner Plates

Per EEI discussions with TesTex not all areas of the steel liner plates could be inspected by L.F.E.T. (Low Frequency Electromagnetic Technique). TesTex reported that courses D, E, and F of the upper dome were not tested with L.F.E.T. due to accessibility issues. Per TesTex, courses D and E were 100% inspected using a specially designed UT shoe which traversed the entire surface of the plates. Course F is the top of the upper dome and is located directly above the central tower. Ultrasonic testing was performed on course F as far as could be reached from the penthouse platform.

EEI Comment: No exception taken to the extent of inspection performed.

Inspection of Steel Liner Welds

Per EEI discussions with TesTex the welds in the floor, lower dome, and barrel were inspected using Balanced Field Electromagnetic Technique (B.F.E.T.). TesTex's NDE report lists several locations of intermittent cracks in the welds of the lower dome. Per EEI discussion with TesTex, the cracks appear to be from a combination of overstressing and corrosion, since they originate in the center of the welds. E&I has recommended that the cracks be repaired.

EEI Comments:

- Cracks in welded joints are a concern as they are located on the in the lower dome which is subject to high fluid pressure.
- EEI concurs that the cracked welds be repaired. The method of repairing the cracks must be carefully considered to prevent new cracks from forming. Refer discussion on Steel Liner Repair Requirements for EEI recommendations on repairing cracked welds.

Existing Lap Welded Patch Plates

E&I's report states there are numerous lap-welded patch plates throughout the entire tank and that patch plates were noted that do not have radius corners and are smaller than the 6-inch minimum size required by API 653. Per EEI discussions with TesTex, UT readings were taken on all patch plates. Additionally TesTex reported that all patch plate welds were inspected by L.F.E.T.

EEI Comments:

- No exception taken to the extent of inspection performed.
- As TesTex did not report any flaws in the patch plates welds, no repairs are required.
- Patch plates having non-radius corners and patch plates smaller than 6-inch minimum size required by API 653 do not need to be replaced with new patch plates.

Channels in the Upper Dome

The upper dome has channels covering the original welds. TesTex's NDE report stated that spot ultrasonic testing was performed at 6" intervals on the channels; the welds attaching the channels to the upper dome, however, were not inspected. As the welds attaching the channels to the dome are a potential leak path, EEI recommended these welds be inspected for detectable leak paths (i.e. cracks, lack of fusion, and porosity). See "Addendum to TesTex Inspection" for additional discussion.

Barrel to Upper Dome Junction

EEI observed the condition of the barrel to upper dome joint during a site visit on June 17, 2008. The joint is an expansion joint as shown on record drawings of the Red Hill tanks. The expansion joint consists of two 1/4" thick horizontal plates (one on top of the other) that project into the tank. The top plate is welded to the upper dome and lower plate is welded to the barrel. The plates are welded to each other with plug welds at 24" on center and a fillet weld along the inner edge to form a hinge. EEI's observations found no indication of distortion, overstress, or movement.

Per EEI discussions with TesTex, the weld attaching the top plate to the upper dome and the weld attaching the lower plate to the barrel was inspected with B.F.E.T. The plates, plug welds, and fillet weld along the edge of the plates were not inspected. As the expansion joint plates, plug welds, and fillet weld are a potential leak path, EEI recommended the plates of the expansion joint including the plug welds joining the plates and fillet weld along the edge (hinge side) of the joint be inspected as these areas are a potential leak path. EEI recommended the plates be inspected for metal loss and areas having a remaining thickness less than 0.170” be repaired. EEI also recommended the plug welds and the fillet welds be inspected for cracks, lack of fusion, and porosity. See “Addendum to TesTex Inspection for additional discussion.

Addendum to TesTex Inspection

An addendum dated September 24, 2008 to TesTex’s inspection states that inspection of Tank 2 resumed on September 8, 2008 to inspect the welds of the channels in the upper dome, the barrel / upper dome expansion joint, and the plates in the top course (course F) of the upper dome. The addendum states all of the channels in the upper dome and welds of the barrel / upper dome were inspected. TesTex reported the following findings:

- No reportable defects were found in the channel welds.
- No reportable defects were found in the welds of the barrel / upper dome expansion joint.
- Two defects in Upper Dome Course F: A 0.500” diameter through wall hole in plate 12 (32” from the manhole) and a dent in plate 21 (5 feet from the manhole).

EEI Comments and Recommendations

- Channels in the Upper Dome: As the inspection found no reportable defects in the welds, no repairs are required.
- Barrel / Upper Dome Expansion Joint: As the inspection found no reportable defects in the welds, no repairs are required. TesTex’s addendum, however, makes no mention of the condition of the plates of the expansion joint. EEI’s visual observation of the upper and lower plates of the expansion joint on June 17, 2008 found no indication of distortion, overstress, or movement.
- Upper Dome Course F: Repair the hole in upper dome plate 12 by welding a patch plate over the hole. Refer to “Steel Liner Repair Requirements” item 7 for requirements for repair of through wall holes. The dent in upper dome plate 21 does not need to be repaired.

Barrel to Lower Dome Junction

Per EEI discussions with TesTex, the welds of the joint were inspected with B.F.E.T.

EEI Comments:

- No exceptions taken.
- EEI observed the condition of the barrel to lower dome joint during a site visit on June 17, 2008. The joint consists of a 1/2” thick horizontal plate between the barrel and lower dome as shown on record drawings of the Red Hill tanks. EEI’s observations found no indication of distortion, overstress, or movement.

Existing Grout Ports

Per EEI discussions with TesTex all grout ports were previously removed from Tank 2 and the openings in the liner have been closed with cover plates. TesTex reported that all cover plates were inspected by UT.

EEI Comment: No exceptions taken.

Piping Penetrations in Liner Plates

Per EEI discussions with TesTex, the welds in the floor of the lower dome around piping penetrations and reinforcing plate welds were tested by B.F.E.T.

EEI Comment: No exceptions taken.

Interior Coatings

Coating repairs and coating repair systems are being address by others.

Hydrostatic Testing of Tank 2 Piping

Information provided by Shaw (and included in E&I's inspection report) indicate the following piping was hydrotested: sampling lines (4 total), 6" slop line, 16" fuel line, and 20" fuel line (32" inside the tank). The hydrotest records state the piping was hydrotested at 150 psig for 4 hours and observed for leaks. The hydrotest records indicate that the 6" slop line failed the hydrotest; the sampling lines, 16" fuel pipe and 20" fuel pipe passed hydrostatic testing. Per discussions with Shaw, the 6" slop line will be repaired using a repair that was approved by NAVFAC for other Red Hill tanks by inserting a stainless steel flexible braided hose into the slop line.

The four sampling lines enter the tank through an old steam line (referred to as "casing" in the hydrotest record). The casing is located in the lower tunnel and extends in into the tank. The end of the casing in the lower tunnel is sealed with a blind flange. A plate is welded to the blind flange and the sampling lines enter the casing through the welded plate and blind flange. Hydrotest records indicate the casing was hydrotested and passed the hydrotest. The hydrotest record also indicates "slight" cracks were detected in the welds of the sampling line penetrations in the welded plate on the blind flange at the end of the casing in the lower tunnel.

EEI Comments:

- Shaw reported that the hydrotests were conducted in accordance Shaw's Work Plan, performed by Dunkin & Bush, and certified and monitored under NFESC, FISC, and Shaw. E&I was not present during the hydrotest procedure.
- EEI's review of the hydrotest records of the sample line found the pressure dropped 14 psi in the 200 ft long sample line, 10 psi in the 70 ft long sample line, and 3.5 psi in the 10 ft sample line. The hydrotest records indicate the drop in pressure was due to a leak through a ball valve at the sample stations and that the cause of the pressure drop was confirmed by manually releasing test water from the sample lines and measuring the amount of liquid captured and pressure drop. EEI has no exceptions taken to the results of the hydrotest.
- EEI recommends the cracked welds of the sampling line penetrations in the welded plate of the casing be repaired.

SUITABILITY FOR SERVICE EVALUATION

Hydraulic and Structural Integrity

The following table provides an assessment of the hydraulic and structural integrity of Tank 2 based on the E&I inspection data provided to EEI for review and assessment.

HYDRAULIC AND STRUCTURAL INTEGRITY		
Evaluation Item	**Findings**	**Comment**
Lower Dome	Intermittent cracks are present in the lower dome welds. The cracks are predominantly located in the weld junction between the plates of the lower dome and the floor plate. E&I's inspection report also lists other flaws in the lower dome that require repair.	Repair the cracked welds in lower dome. Repair flaws in the lower dome listed in E&I's inspection report. Repair bulges in plates 1 and 2 of the lower dome.
Barrel/Lower Dome Junction	TesTex's inspection found no defects in the welds. EEI's observations found no indication of distortion, overstress, or movement.	No concerns noted.
Barrel	E&I's inspection report lists flaws in the barrel that require repair.	Repair flaws in the barrel listed in E&I's inspection report.
Barrel/Upper Dome Junction	The barrel to upper dome joint is an expansion joint as shown on record drawings of the Red Hill tanks. EEI's observations found no indication of distortion, overstress, or movement. Inspection of the plug welds and fillet welds of the expansion joint found no reportable defects.	No concerns noted
Upper Dome	The upper dome has channels covering the original welds. Inspection of the welds attaching the channels to the dome found no reportable defects. Inspection of course F found a through-hole in plate 12 and a dent in plate 21.	Repair the hole in plate 12.
Hydrostatic Test of Piping	Hydrotest records indicate that the 6" slop line failed the hydrotest; the sampling lines, 16" fuel pipe, 20" fuel pipe, and casing containing the sample lines passed hydrostatic testing. Hydrotest records indicates "slight" cracks were detected in the welds of the sampling line penetrations in the welded plate on the blind flange at the end of the casing in the lower tunnel.	No exceptions taken to the results of the hydrotests. Provide repair of the 6" slop line. Repair cracked welds of the sampling line penetrations in the welded plate of the casing.

STEEL LINER PLATE MINIMUM THICKNESS ASSESSMENT

EEI performed a calculation of corrosion rate and the minimum required thickness of the 1/4” thick steel liner plates. This minimum thickness served as the criteria for determining the need to repair thin areas and pits in the steel liner plates for another 20-year interval until the next inspection.

EEI recommended a Tmin = 0.170” be used as the criteria for determining whether thin and pitted areas in the 1/4-inch thick steel liner plates in the upper dome, barrel, and lower dome require repair. This recommendation was reviewed and accepted by the government. The calculation of corrosion rate and Tmin = 0.170” is based on the following:

- Year Tank Constructed: 1942
- Original Thickness of Liner Plates: 0.250”
- Age of tank in 2028 = 2028 - 1942 = 86 years
- Remaining Thickness at the Next Inspection: 0.10” based on the tank having no means to contain a leak
- Interval until the Next Inspection: 20 years maximum

Corrosion Rate and Minimum Thickness Discussion

It is not possible calculate an actual corrosion rate for the Red Hill Tanks because the time interval during which corrosion occurred is unknown and can not be determined. Depending on the time interval that is assumed, the corrosion rate can be higher or lower compared to the actual corrosion rate. It is possible that conditions causing external corrosion can change over time. Additionally, the rock stratum surrounding the Red Hill tanks varies in type and porosity, thus the water content and corrosivity of the rock can vary from one location to another. Because of these highly variable conditions, selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank. It is possible that more severe corrosion could exist at areas that are not measured.

For a 20-year service interval starting in 2008, the next inspection would be in 2028. Using the API 653 straight-line method of calculating corrosion rates and a 0.10” remaining thickness at the next inspection in 2028, the external corrosion rate is calculated as follows:

> Maximum permissible metal loss = 0.250” – 0.10” = 0.150”
> Age of tank in 2028 = 2028 - 1942 = 86 years
>
> Considering the 0.150” of metal loss occurs over the life of the tank, the hypothetical external corrosion rate is: 0.150” / 86 years = 0.001744 in / year

EEI’s calculation of the external corrosion rate follows the procedure outlined in API 653 section 4.4.5, which assumes a linear (i.e. constant) corrosion rate based on the age of the tank. The external corrosion rate was calculated based on the age of the tank in 20-years (i.e. 86 years old in 2028). EEI acknowledges that this calculated corrosion rate is not based on thickness data of the steel liner plates; however as stated above, selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank.

Following the guidance of API 570 which uses 2 times the corrosion rate to determine the interval until the next inspection, 2 times the corrosion rate results in a Tmin = 0.170 inches as follows:

> Two times corrosion rate = (2) (0.001744 in / yr) = 0.003488 in /yr
>
> A two times the corrosion rate, the metal loss that is expected to occur during the next 20 years = (0.003488 in / year) (20 years) = 0.070"

The minimum thickness required in 2008 to have 0.1" remaining thickness in 2028 at twice the corrosion rate of 0.001744 in / yr is:

> Tmin = 0.070" + 0.100" = 0.170"

CONCLUSIONS

Based upon our evaluation of the inspection results presented by E&I and inspection addendum provided by TesTex, Tank 2 is considered suitable for service after mandatory repairs are completed.

APPENDIX A

STEEL LINER PLATE THICKNESS ASSESSMENT

Stephen J. DiGregorio

From: Stephen J. DiGregorio [sjd@eeiteam.com]
Sent: Tuesday, April 22, 2008 8:06 PM
To: Wilfred Chun
Cc: 'Weese, Todd'; 'Dygart, Aaron'; 'Phillips, David'; Steve Brooks; Stacy Kaplan-McMillan
Subject: Red Hill Tank 2 and 20 Tmin Calculation

Wilfred,

My responses to Incheol's comments are provided below. Due to the uncertainty in calculating corrosion rates, applying a factor of safety to Tmin has merit. You will see in the calculations and recommendations that follow, I have recommended a revised Tmin = 0.170 inches. I will revise EEI's formal Steel Liner Plate Minimum Thickness Assessment to reflect the new Tmin calculations and recommendations.

EEI Response to Comments

1. It is not possible calculate an actual corrosion rate for the Red Hill Tanks because the time interval during which corrosion occurred is unknown and can not be determined. Depending on the time interval that is assumed, the corrosion rate can be higher or lower compared to the actual corrosion rate. Additionally, it is possible that conditions causing external corrosion can change over time. Available record drawings indicate the rock face of the barrel of the tanks is lined with gunite and coated with either asphalt paint or "red dirt" paint; and that the space between the gunite lining and the steel liner plates is filled with reinforced concrete. It is known that cracks or other conditions have developed in the gunite or reinforced concrete allowing water to migrate to the steel liner plates and corrode steel liner plates that previously had no indication of external corrosion. This has been going on probably for the entire life of the tank, so it is not new.
2. The rock stratum surrounding the Red Hill tanks varies in type and porosity, thus the water content and corrosivity of the rock can vary from one location to another. Because of these highly variable conditions, selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank. It is possible that more severe corrosion could exist at areas that are not measured.
3. EEI's calculation of the external corrosion rate (0.001744 inches per year) and Tmin =0.140 inches follows the procedure outlined in API 653 section 4.4.7.1, which assumes a linear (i.e. constant) corrosion rate based on the age of the tank. For Tanks 2 and 20, the external corrosion rate was calculated based on the age of the tank in 20-years (i.e. 86 years old in 2028). EEI acknowledges that this calculated corrosion rate is not based on thickness data of the steel liner plates; however as stated above, selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank. On the other hand, there may not be any location on the tank that would have a more aggressive corrosion rate than that determined by our method of calculation, unless there has been a drastic change in conditions. Should areas be present that have a higher corrosion rate than our calculated corrosion rate, the remaining thickness will have a Tmin less than 0.140 inches and would be repaired.
4. EEI has not established a 20-year interval until the next inspection. A 20-year interval was used to calculate Tmin. A shorter interval until the next inspection could be used.

Summary and Conclusions

1. It is not possible calculate an actual corrosion rate for the Red Hill Tanks because the time interval during which corrosion occurred is unknown and can not be determined.
2. Selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank because the rock stratum surrounding the Red Hill tanks varies in type and porosity.
3. EEI's calculated Tmin = 0.140 inches is based on the age of the tank in 20-years (i.e. 86 years old in 2028). As stated in EEI's Steel Liner Plate Thickness Assessment, a Tmin = 0.140 inches has no safety factor. If a more conservative approach is desired, a shorter interval until the next inspection (i.e. 10 years) or Tmin based on higher external corrosion rate or both could be used. Given the uncertainty in calculating a

corrosion rate, using factor of safety for Tmin has merit.

Recommendations

1. As it is not possible to establish actual corrosion rates, a factory of safety applied to the previously recommended Tmin = 0.140 inches may have merit. Considering the guidance of API 570, which uses twice the corrosion rate in any remaining life, or pressure capability calculations, the new Tmin, at twice the corrosion rate, would be 0.170 inches. This new Tmin takes into consideration the uncertainty of calculating a corrosion rate and the potential for internal corrosion given the reported condition of the interior coating.
2. EEI, therefore recommends Tmin = 0.170" be used as the criteria for determining whether thin and pitted areas in the 1/4-inch thick steel liner plates in the, barrel, and lower dome require repair.
3. Tmin = 0.170 inches does not apply to the 1/2-inch thick floor (base plate) of the lower dome.
4. As the steel liner plates are not structural elements and should not be relied upon as a structural element to resist hoop and tensile stresses in the barrel and lower dome or compressive stress in the upper dome, consult EEI when voids are found behind liner plates.

Revised Tmin Calculations

Following the guidance of API 570 which uses twice the corrosion rate in any remaining life, or pressure capability calculations, a revised corrosion rate and Tmin is calculated as follows:

Parameters

- Original Thickness of Liner Plates: 0.250"
- Remaining Thickness at the Next Inspection: 0.10" based on the tank having no means to contain a leak
- Interval until the Next Inspection: 20 years maximum
- Year Tank Constructed: 1942

Revised Corrosion Rate and Minimum Thickness

For a 20-year service interval starting in 2008, the next inspection would be in 2028. Using the API 653 straight-line method of calculating corrosion rates and a 0.10" remaining thickness at the next inspection in 2028, the external corrosion rate is as follows:

Maximum permissible metal loss = 0.250" – 0.10" = 0.150"
Age of tank in 2028 = 2028 - 1942 = 86 years

Considering the 0.150" of metal loss occurs over the life of the tank, the external corrosion rate is:

External corrosion rate = 0.150" / 86 years = 0.001744 in / year

Following the guidance of API 570, using 2 times the corrosion rate results in a Tmin = 0.170 inches as follows:

Two times corrosion rate = (2) (0.001744 in / yr) = 0.003488 in /yr

A two times the corrosion rate, the metal loss that is expected to occur during the next 20 years is:

Metal loss during next 20 years = (0.003488 in / year) (20 years) = 0.0.70"

The minimum thickness required in 2008 to have 0.1" remaining thickness in 2028 at twice the corrosion rate of 0.001744 in / yr is:

Tmin = 0.070" + 0.100" = 0.170"

Steve

Stephen J. DiGregorio, P.E.
Chief Civil / Structural Engineer
Enterprise Engineering, Inc.
5 Depot Street
Freeport, ME 04032
TEL: (207) 869-8006

RED HILL TANKS 2 AND 20
FISC PEARL HARBOR, HAWAII

Steel Liner Plate Minimum Thickness Assessment
April 15, 2008

EEI Project No. 08-4895

GENERAL

Shaw is providing cleaning, inspection, and repair services for Tanks 2 and 20 at FISC Pearl Harbor Red Hill, Hawaii. Shaw has requested Enterprise Engineering, Inc. (EEI) calculate corrosion rates and the minimum thickness of the steel liner plates which will be used as the criteria for determining the need for repair based on a 20-year interval until the next inspection.

Record drawings of the Red Hill tanks indicate the steel liner plates in the upper dome, barrel, and lower dome in all of the tanks are 1/4" thick plate nominal. The floor (referred to as "base plate" on record drawings) of the lower dome in all of the tanks is indicated as 1/2" thick plate. This document prepared by EEI provides a calculation of corrosion rates and minimum required thickness of the 1/4" thick steel liner plates. This minimum thickness will serve as the criteria for determining the need to repair thin areas and pits for another 20-year interval until the next inspection.

RECOMMENDED REPAIR CRITERIA: STEEL LINER MINIMUM THICKNESS

It is reported that a Tmin of 0.19 inches was used on previous projects at Red Hill. EEI is not able to determine how this value was established. EEI recommends the following:

1. A minimum thickness (Tmin) of 0.140 inches be used as the criteria for determining whether thin and pitted areas in the 1/4-inch thick steel liner plates in the, barrel, and lower dome require repair. The upper dome area, with increased potential for atmospheric corrosion on the inside, can also use this Tmin criteria of 0.140 inches if it is determined the coating system is sound, there is no present internal corrosion, and the coating system has a remaining life of 20 years. Note: the Tmin value of 0.140 inches does not include any safety factor that the thickness of the steel liner plates will not be less than a minimum thickness of 0.10 inches at the end of another 20-year service interval. The justification for not using a safety factor is:

    a. API 653 does not use a safety factor.

    b. Tmin is based on a constant rate of corrosion (i.e. corrosion is assumed to not vary over time). Using a constant rate of corrosion is in accordance with API 653 and is considered

conservative in that corrosion rates generally decrease over time unless conditions change.

c. A safety factor could be added to Tmin; however, this will involve more repairs and is not justified unless desired by the government or conditions are found indicating corrosion rates are higher than calculated.

2. Repair thin and pitted areas in the 1/4-inch thick steel liner plates in the upper dome, barrel, and lower dome having a minimum thickness (Tmin) less than 0.140 inches. Areas having Tmin equal to or greater than 0.140 inches do not require repair for a 20-year interval until the next inspection.

3. Tmin = 0.140 inches does not apply to the floor (base plate) of the lower dome.

4. EEI also calculated Tmin for a 10-year interval until the next inspection and determined Tmin in this case would be 0.120 inches. EEI can evaluate this alternative if desired.

5. Using Tmin = 0.140 inches as determined for 20-year interval until the next inspection and applying this criteria for a 10-year interval is an option as it is conservative and provides a factor of safety.

COMMENTS AND CLARIFICATIONS

EEI's calculation of Tmin is based on the following:

1. A 20-year interval until the next inspection in 2028 as indicated in Shaw's Work Plan.

2. An original plate thickness of 0.250 inches. Our calculation of Tmin does not take into account the original thickness of the plates may be thinner due to plate fabrication tolerances or other conditions. EEI recommends Shaw's inspector obtain ultrasonic thickness measurements of each plate (6 measurements minimum per plate). Submit for EEI review and assessment thickness measurements of plates having an average thickness less than 0.240". The 0.240 thickness is the ASTM A 6/A6M minimum thickness tolerance for 1/4-inch thick plates.

3. The rate of external corrosion was calculated using the API 653 straight line method and assuming metal loss occurring over the life of the tank (86 years) from tank construction in 1942 to the next inspection in 2028. The calculated rate of external corrosion does not take into consideration potential areas of concentrated corrosion caused by artifacts, welding rods, debris, rocks, microbial induced corrosion (MIC) in the form of small "worm-like" corrosion trails, or other conditions on the exterior of the liner plates the would cause concentrated corrosion. If these conditions are found, contact EEI for interpretation.

4. The rate of external corrosion and Tmin does not apply to the heat-affect zone of liner plates adjacent to welds (within 1 inch of the weld). As the corrosion rate in the heat-affected zone can be higher than areas outside the heat-affected zone, a higher Tmin value may be needed for the heat-affected zone. Information on plate thickness in the heat affected zone is needed to determine corrosion rates and Tmin of the heat affected zones of the steel liner plates. EEI

recommends Shaw's inspector obtain ultrasonic thickness measurements in the heat-affected zone in random areas in each quadrant of the upper dome, barrel, and lower dome for EEI assessment. Given the large quantity of welds in the liner plate joints, EEI recommends 20 UT thickness measurements be obtained in the heat-affected zones in each quadrant. Additional UT measurements may necessary if results are not consistent. Additionally, EEI recommends that we be notified when the remaining thickness in the heat-affected zone is less than 0.200 inches as additional assessment may be necessary.

5. The corrosion rate of product side corrosion is assumed to be 0.00 inches per year. This assumption is only valid if the existing interior coating is in serviceable condition and its service life is equal to or greater than the 20-year interval until the next inspection. If the interior coating is not expected to last another 20 years, product side corrosion may occur and thus the Tmin will need to be recalculated and increased. It should be noted that product side corrosion is not of concern when the tank is filled as areas are covered by product except at a water bottom in the lower dome. The 0.00 inches per year product side corrosion rate also does not take into consideration potential atmospheric corrosion of the steel liner plates if the coating is failing and not repaired and liner plates are exposed to atmosphere. Additional information is needed on the condition of the interior coating and whether atmospheric corrosion is present. This additional information may result in a greater Tmin of the upper dome, where atmospheric corrosion, and or degraded coatings is present.

6. A minimum thickness of 0.10 inches at the next inspection is used in the calculation of Tmin. A 0.10 inch minimum thickness is used as the steel liner plates are a hydraulic barrier and are not relied upon as a structural element to resist hoop and tensile stresses in the barrel and lower dome or compressive stress in the upper dome. The 0.10-inch criteria is similar to API 653 criteria for tank floors that have no means for containment of a leak.

7. As the steel liner plates are not structural elements and should not be relied upon as a structural element to resist hoop and tensile stresses in the barrel and lower dome or compressive stress in the upper dome, consult EEI when voids are found behind liner plates.

8. Our calculation of Tmin does not include any safety factor. A safety factor could be added to Tmin; however, this will involve more repairs and is not justified unless desired by the government or conditions are found indicating corrosion rates are higher than calculated.

9. Consult EEI when areas of thinning or pitting are found that exceed 12" in diameter.

CALCULATIONS

Parameters

- Original Thickness of Liner Plates: 0.250”
- Remaining Thickness at the Next Inspection: 0.10” based on the tank having no means to contain a leak
- Interval until the Next Inspection: 20 years maximum
- Year Tank Constructed: 1942
- Product Side Corrosion Rate: Assumed to be 0.00” per year based on the tank interior being coated and the life of the coating expected to exceed the interval until the next inspection

Corrosion Rate and Minimum Thickness

For a 20-year service interval starting in 2008, the next inspection would be in 2028. Using the API 653 straight-line method of calculating corrosion rates and a 0.10” remaining thickness at the next inspection in 2028, the external corrosion rate is as follows:

Maximum permissible metal loss = 0.250” – 0.10” = 0.150”
Age of tank in 2028 = 2028 - 1942 = 86 years

Considering the 0.150” of metal loss occurs over the life of the tank, the external corrosion rate is:

External corrosion rate = 0.150” / 86 years = 0.001744 in / year

Using this external corrosion rate, the expected metal loss that would have occurred thus far, (1942 to 2008) is:

Number of years from 1942 to 2008 = 66 years
Metal loss over 66 years = (0.001744 in / year) (66 years) = 0.115”

The minimum thickness required in 2008 to have 0.1” remaining thickness in 2028 at a corrosion rate of 0.001744 in / year is:

Tmin = 0.250” – 0.115” = 0.135”

Thus if Tmin = 0.135” in 2008; using an external corrosion rate of 0.001744” / year, the remaining thickness in 20 years (2028) is:

Metal loss occurring over the next 20 years = (0.001744” / yr) (20 years) = 0.035”
Remaining thickness at the end of the next 20 years = 0.135” – 0.035” = 0.10”
Use Tmin = 0.140” (0.135” rounded to 0.140”)

Prepared by:
//signed/
Stephen J. DiGregorio, P.E.
Chief Structural Engineer
ANSI/API 653 Certified Aboveground Tank Inspector, Certificate No. 1113

Reliability • Integrity • Quality

ENGINEERING & INSPECTIONS HAWAII, INC.

May 30, 2008
Revised; September 29, 2008

Mr. Wilfred Chun P.E.
Shaw Environmental, Inc.
590-B Paiea St.
Honolulu, HI 96819

Subject: Tank No. 2 Red Hill Fuel Facility

SYNOPSIS

During April 2008, Engineering & Inspections Hawaii, Inc. performed a modified Out-of Service inspection on Tank **2** at the Red Hill fuel storage facility. This inspection was performed in accordance with the Clients requirements and the latest edition of API Standard 653, Tank Inspection, Repair, Alteration, and Reconstruction by a certified API 653 inspector. All personnel performing nondestructive examinations are certified to at least SNT-TC-1A level II.
Red Hill tanks are a design engineered underground storage tank and therefore do not fall under the requirements of API-653. The API-653 document was utilized as a guide for the evaluation of findings and recommendation of repairs, where necessary, during this inspection.

Tank Data

Tank No. 2
Year Built: 1942 - 1943
Design: Engineered Underground Storage Tank
Constructed: Morrison Knudsen
Product: JP-8
Capacity: 302,000 Bbls.
Size 100’ Dia. x 250’ High

P. O. Box 700217 • Kapolei, HI 96709-0217 • Tel: (808) 682-1667 • Fax: (808) 682-1834 • E-Mail: E I Hawaii@aol.com

Background

Tank 2 is located at the Red Hill fuel storage facility located underground in a ridgeline between Halawa Valley and Moanalua Valley.
Tank 2 was built in 1942 (completed in 1943). Its nominal capacity is 302,000 barrels. The tank, like the others in Red Hill, is a concrete tank with a steel liner. The configuration is a vertical cylinder measuring 100 feet in diameter and 250 feet in height. The tank is domed on the lower and upper ends. The primary access point to the tank is from the upper tunnel which is at the 200 foot level of the tank. The tank has a center tower extending from the top to the bottom that is connected to the access point by a catwalk.

Surrounding Area:

Red Hill Facility is located completely underground

Foundation:

Engineered high pressure grouting with steel liner underground storage tank.

Access Structure

The tank internal is accessed by an upper manway with a catwalk to a central structural tower which extends from the tank bottom to the tank top. This access structure contains two boom lifts and an air operated central lift for inspecting the internal of the tank. The structure was inspected by Hawaii Engineering Group, Inc., Certified structural engineers. Recommendations, based on their findings, to repair or replace hardware was performed by contractor Dunkin and Bush as safety precautions prior to the inspection of this tank.
Welding to the central tower was completed by a certified welder, however the welds were noted to be covered by slag deposits from the welding process limiting any post inspection of these welds.

Tank Internal

100% of the tank internal was inspected by the L.F.E.T (Low Frequency Electromagnetic Technique) by contractor TesTex Inc. Anomalies in the liner plate were identified by TesTex, Inc. and further evaluated as necessary. All areas below the nominal .250" for the liner plate were identified and mapped on TesTex reports, contained in the appendices of this report. Areas that were identified at or below .170" were evaluated and will be required to be repaired. Enterprise Engineering Inc. was

contracted for calculating a T-min thickness threshold of which repairs would be required.
Numerous lap welded patches were noted throughout the entire tank.
Due to this being the first known out-of-service inspection of tank number 2, no known history exists as to the reason for these patches. The patches vary in size and shape with numerous patches noted not to meet the requirements of API-653. Patches were noted with non-radius corners and smaller than the minimum required six inch circular dimension.

Coating

The tank has numerous areas of coating failure. The area referenced as the tank lower dome has approximately 90% coating failure with exposure of the tank steel liner. The area known as the tank Barrel section was noted to have large areas of coating failure covering several square feet. The tank upper dome was noted to have the best areas of coating with only minimal failure.

Hydrostatic Testing of Piping

Contractors Dunkin & Bush and Shaw Environmental Inc. performed the hydrostatic testing of the tank piping as defined in the work plan. Engineering and Inspection, Inc. did not witness these test but did review the final test data. Based on the information supplied, the following lines were tested with the results listed below; Copies of the data reports are included in the appendices of this report.

16” Pipeline	Acceptable
20” Pipeline	Acceptable
6” Slop line	Failed
10’ Sample Line	Acceptable
70’ Sample Line	Acceptable
135’ Sample Line	Acceptable
200’ Sample Line	Acceptable.

Settlement Survey

This is an underground storage tank; settlement surveys could not be performed.

Recommendations

Mandatory Repairs:

Repairs that affect the overall operability and integrity of the tank; and must be performed in the immediate near future.

1. Clean by mechanical means the additional structural members welded to the central tower as recommended in the Hawaii Engineering Group, Inc. report and inspect by visual and magnetic particle inspection methods.
2. Evaluate the internal coating system by a certified NACE Inspector.

Mandatory Repairs (Cont'd):

Based on the inspection findings provided by TesTex, Inc. and as referenced by the TesTex, Inc. Flaw Log for Tank No. 2. And further defined by remaining T-min thickness calculations as provided by Enterprise Engineering, Inc.

Flaw #2A&B	Cracks in weld; Lower Dome; Repair by Welding
Flaw #3	Crack in weld; Lower Dome; Repair by Welding
Flaw #4A	Incomplete Penetration in weld; Lower Dome; Repair by welding
Flaw #4B	Arc Strike at weld; Lower Dome; Repair by welding
Flaw #5A	Backside corrosion; Lower Dome; Repair by use of lap welded patch .250" thick 14" x 14" with radius corners.
Flaw #5B	Incomplete Penetration in weld; Lower Dome; Repair by welding
Flaw #7	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #14	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #17A	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #24	Porosity in weld; Barrel; Repair by welding
Flaw #25	Arc Strikes at weld; Barrel; Repair by welding
Flaw #26	Porosity in weld; Barrel; Repair by welding
Flaw #29A-D	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #33	Tack weld resulting in liner plate metal loss; Barrel; Repair by use of lap welded patch, .250" thick x 6-inch circular
Flaw #47A-D	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #49 A	Slag Inclusion in weld; Barrel; Repair by welding

Flaw #49B	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #50	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #52A&B	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #54	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #67A&B	Existing patch plate @ .141", and area of original liner plate at .185"; Upper Dome; Remove existing patch plate and repair entire area by use of lap patch plate .250" thick, 16" x 16" with radius corners
Flaw #76	Through Wall Pit 3/16" dia.; Upper dome; Repair by use of lap welded patch, .250" thick x 6-inch circular
Flaw #105A-C	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #106A&B	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #107A	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #107B	Crack in weld; Lower Dome; Repair by Welding
Flaw #108A,C, D	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #108B	Crack in weld; Lower Dome; Repair by Welding
Flaw #109A-E	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #110A-D	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #111A-D	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #112A-E	Cracks in weld; Lower Dome; Repair by Welding
Flaw #113A-C	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #114 A&B	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #115A&B	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #116A&B	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #117A&B	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #118A&B	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #119	Lack of Fusion in weld; Lower Dome; Repair by welding
Flaw #120A&B	Lack of Fusion in weld; Lower Dome; Repair by welding

	Flaw #121A&B	Cracks in weld; Lower Dome; Repair by Welding
	Flaw #122	Lack of Fusion in weld; Lower Dome; Repair by welding
	Flaw #83	Pitting in floor plate with remaining thickness of .336"; Engineering Evaluation Required due to unknown stresses on the tank floor.
9/29	Flaw, Course "F"	Through hole approximately ½" diameter on plate 12**;** Repair by the use of a 6" circular ¼" thick lap welded patch.

Note: All of the above repairs will require welding by a certified welder to approved welding procedures. All welds are required to be inspected by visual, magnetic particle and vacuum box inspection methods. Additionally, all welding defects identified by the ultrasonic shearwave inspection method, should be re-inspected by this method upon completion of the repairs.

Recommended Near Future Repairs:

Repairs that do not adversely affect the operability or integrity of the tank for continued service.

Continued service will be determined by Enterprise Engineering, Inc upon review of all data and T-min calculations.

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If you have any questions regarding this matter or require any additional information, please do not hesitate to contact Ken McNamara at (808) 682-1667 or by fax at (808) 682-1834.

Respectively submitted,

Ken McNamara
Certified API-653 Inspector No. 873

Reviewed By:____
Brian McKenna; Project Manager

Attachments____

A. Report; Hawaii Engineering Group, Inc.
B. Enterprise Engineering, Inc. T-min Calculations
C. Report; TesTex, Inc. Data mapping
D. Excel spread sheet of data findings and repair recommendations
E. Pressure test data sheets

E&I
ENGINEERING & INSPECTIONS
HAWAII. INC.

Attachment A

Report: Hawaii Engineering Group, Inc.

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Attachment B

T-min Calculations
Provided by; Enterprise Engineering Inc.

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ENGINEERING & INSPECTIONS HAWAII, INC.

Attachment C

Report: TesTex Data and Mapping

Attachment D

Spread sheet of data findings and repair recommendations

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ENGINEERING & INSPECTIONS HAWAII, INC.

Attachment E

Pressure test data

Attachment A

Report: Hawaii Engineering Group, Inc.

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HAWAII
ENGINEERING
GROUP, INC.

Consulting Civil Engineers, Structural Engineers & Land Surveyors
US (SBA), 8(a) & SDB Certified

February 14, 2008

Mr. Steve Skeel, Project Manager
Dunkin & Bush, Inc.
4648 Pacific Highway, Bellingham
Washington 98226

Project: Red Hill Tanks

Subject: Tower framing Inspection Tank #2

Dear Mr. Skeel

A site visit was held to inspect the tower framing of Red Hill Tank #2 on January 28, 2008. The inspection involved the top connection, the bottom connection, the bolts, the framing members.

No calculations or testing of any kind was performed. Architectural, Mechanical, Electrical, and other nonstructural aspects were not addressed. Compliance of design with the current building codes or the building code it was designed under was not checked.

The tower framing was visually observed. The existing steel framing members and connections were physically observed to be in good condition except those listed below.

Observations:

1. Hoist Connection at Top: visible slippages were typically observed on bolt connection. Proper sized washers are recommended to be added. (photo #1, #2)

2. Unused Hoist Connection: Large holes in the vertical legs of the tower which had been drilled for some connection should be covered and welded with plate of same thickness as the tower leg (photo #3 and #4)

3. Missing bolts were observed. Should be installed. (photo #5)

4. Bent framing members were observed. Should be fixed by adding a straight member adjacent to the existing bent member. (photo #6)

5. Missing diagonals were observed. Should be installed. (photo #7)

This report does not address portions of the structure other than those areas mentioned, nor does it provide any warranty either expressed or implied for any portion of the existing structure. If there are any comments or questions on any items above, please do not hesitate in calling.

Please call me if you have any questions.

Sincerely,

Hawaii Engineering Group, Inc.

Ather R. Dar, P.E.
President

Photo #1: *Visible slippage of the bolt connection*

Photo #2: *Visible slippage of the bolt connection*

Photo #3: *Big holes on the framing members*

Photo #4: *Big holes on the framing members*

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Email: heg@hawaiiengineering.net

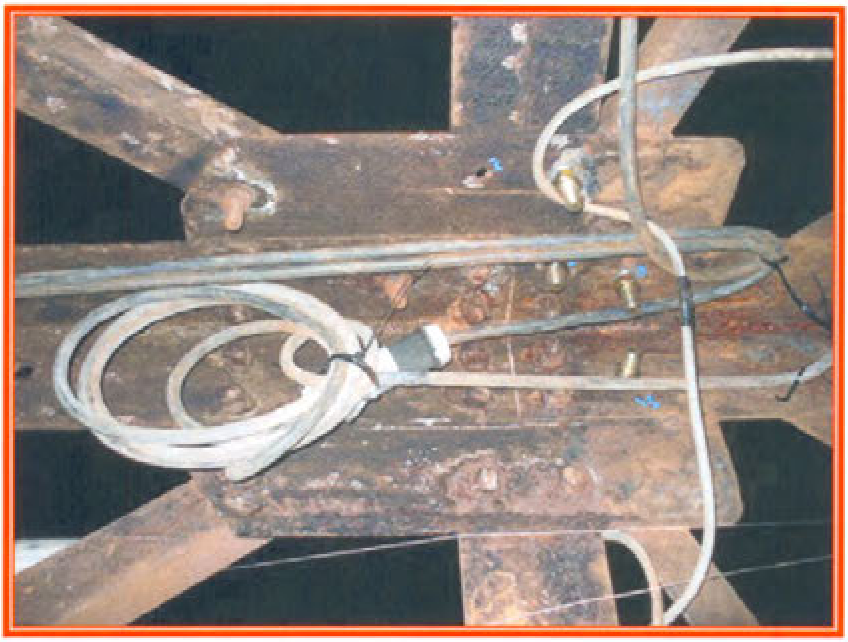

Photo #5: *Missing bolts*

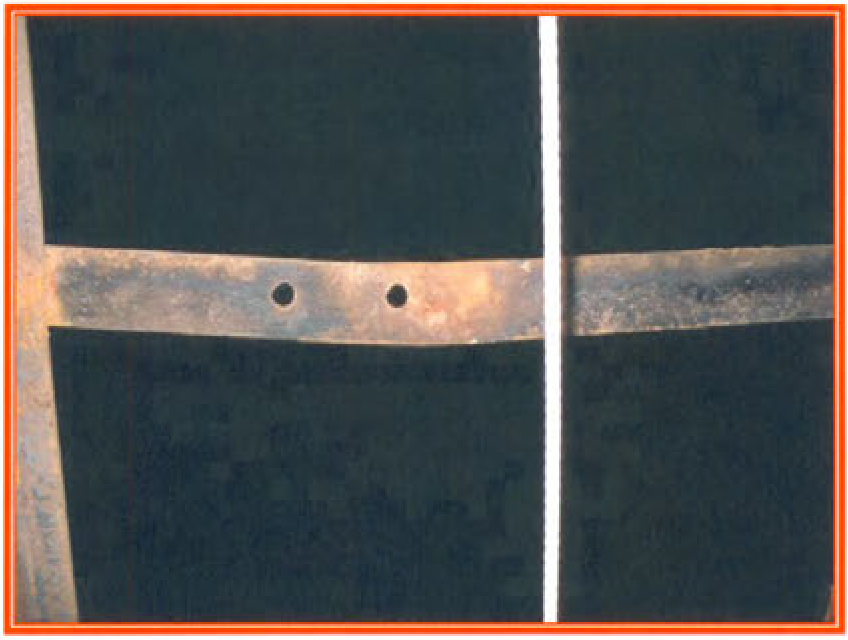

Photo #6: *Bent framing member*

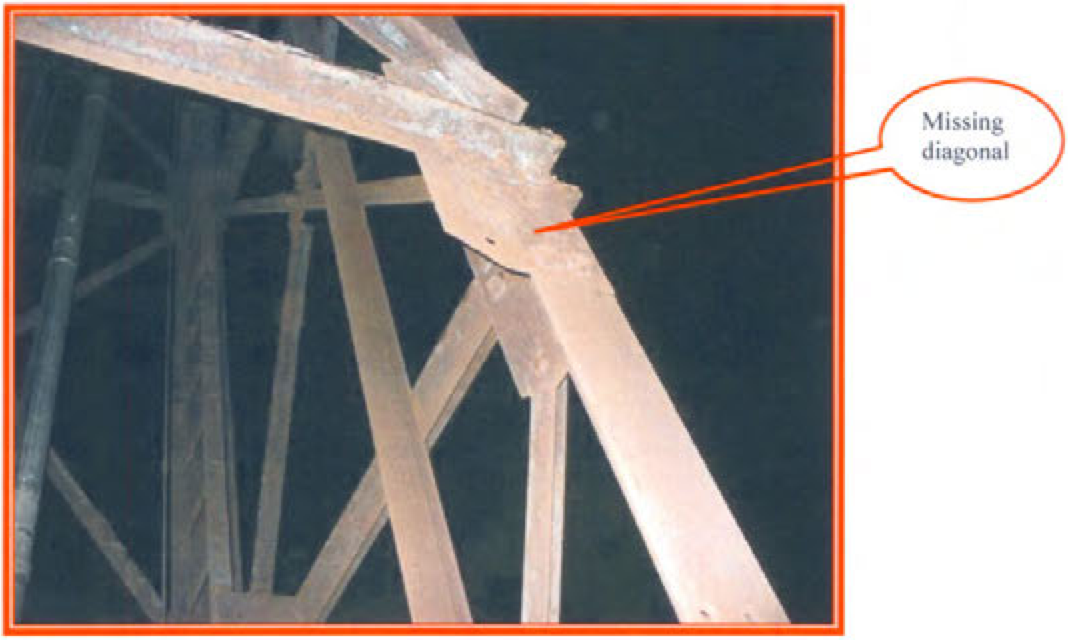

Photo #7: *Missing diagonal.*

Photo #8: *Missing diagonal*

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US (SBA), 8(a) & SDB Certified

April 2, 2008

Mr. Steve Skeel, Project Manager
Dunkin & Bush, Inc.
4648 Pacific Highway, Bellingham
Washington 98226

Project: Red Hill Tanks

Subject: Review of Cat Walk Framing - Tank #2

Dear Mr. Skeel

A site visit was made on March 19, 2008 to check the framing of the cat walk inside Tank #2. Our visual observations involved observing physical condition of the framing members and measuring them for analysis. The boom crane and basket was used to observe conditions of members from bottom.

All framing members of the cat walk are in good condition (see photo #1 and #2). The welding of the major framing members to the tower steel wall are all in good condition (see photo #3 and #4) and are capable of providing fixed condition.

Photo #1: *Cat walk framing by the tank entrance*

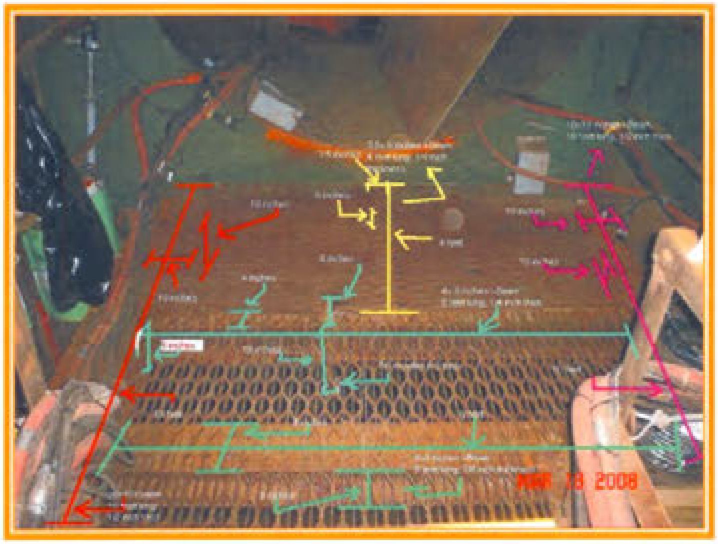

Photo #2: *Cat walk framing members and connections in good condition*

Photo #3: *Weld of the major I-beam is in good condition*

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Email: heg@hawaiiengineering.net

Photo #4: *Weld of the major I-beam is in good condition*

Our analysis indicates that the framing of the cat walk is able to support a live load of 200psf, and also to support the scaffold load of 2000lbs hung on the two points shown in photo #3.

Photo #5: *Proposed scaffold will be hung on points 1 & 2*

However, we suggest that loading of the cat walk framing be limited to no more than 4 persons at any one time while the scaffold is hung from the cat walk framing and is in use. We also recommend that loading of the scaffold hung on this platform framing be limited to 2000lbs and no more than 2 persons at any one time.

This report does not address portions of the structure other than those areas mentioned, nor does it provide any warranty either expressed or implied for any portion of the existing structure. If there are any comments or questions on any items above, please do not hesitate in calling.

Please call me if you have any questions.

Sincerely,

Hawaii Engineering Group, Inc.

Licensed Professional Engineer 7808-S

Ather R. Dar, P.E.
President

ENGINEERING & INSPECTIONS
HAWAII, INC.

Attachment B

T-min Calculations
Provided by; Enterprise Engineering Inc.

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Ken McNamara

From: Chun, Wilfred [wilfred.chun@shawgrp.com]

Sent: Tuesday, April 22, 2008 5:09 PM

To: Pang, Incheol (NFESC)

Cc: Dygart, Aaron; Phillips, David; Weese, Todd; kenm.eihawaii@hawaiiantel.net; Barry.eihawaii@hawaiiantel.net; l.mcdougal@testex-ndt.com; Steve Brooks; Steve DiGregorio

Subject: FW: Red Hill Tank 2 and 20 Tmin Calculation

Incheol – Forwarded for your info and use.

Rgds,

Wilfred Chun, P.E.
Project Manager
Shaw Environmental & Infrastructure, Inc.
590 B Paiea St.
Honolulu, HI 96819-1835
808.840-2015 direct
808.388-6878 cell
808.839-0339 fax
wilfred.chun@shawgrp.com

From: Stephen J. DiGregorio [mailto:sjd@eeiteam.com]
Sent: Tuesday, April 22, 2008 2:06 PM
To: Chun, Wilfred
Cc: Weese, Todd; Dygart, Aaron; Phillips, David; Steve Brooks; Stacy Kaplan-McMillan
Subject: Red Hill Tank 2 and 20 Tmin Calculation

Wilfred,

My responses to Incheol's comments are provided below. Due to the uncertainty in calculating corrosion rates, applying a factor of safety to Tmin has merit. You will see in the calculations and recommendations that follow, I have recommended a revised Tmin = 0.170 inches. I will revise EEI's formal Steel Liner Plate Minimum Thickness Assessment to reflect the new Tmin calculations and recommendations.

EEI Response to Comments

1. It is not possible calculate an actual corrosion rate for the Red Hill Tanks because the time interval during which corrosion occurred is unknown and can not be determined. Depending on the time interval that is assumed, the corrosion rate can be higher or lower compared to the actual corrosion rate. Additionally, it is possible that conditions causing external corrosion can change over time. Available record drawings indicate the rock face of the barrel of the tanks is lined with gunite and coated with either asphalt paint or "red dirt" paint; and that the space between the gunite lining and the steel liner plates is filled with reinforced concrete. It is known that cracks or other conditions have developed in the gunite or reinforced concrete allowing water to migrate to the steel liner plates and corrode steel liner plates that previously had no indication of external corrosion. This has been going on probably for the entire life of the tank, so it is not new.

2. The rock stratum surrounding the Red Hill tanks varies in type and porosity, thus the water content and corrosivity of the rock can vary from one location to another. Because of these highly variable conditions, selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank. It is possible that more severe corrosion could exist at areas that are not measured.

3. EEI's calculation of the external corrosion rate (0.001744 inches per year) and Tmin =0.140 inches follows the procedure outlined in API 653 section 4.4.7.1, which assumes a linear (i.e. constant) corrosion rate based on the age of the tank. For Tanks 2 and 20, the external corrosion rate was calculated based on the age of

the tank in 20-years (i.e. 86 years old in 2028). EEI acknowledges that this calculated corrosion rate is not based on thickness data of the steel liner plates; however as stated above, selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank. On the other hand, there may not be any location on the tank that would have a more aggressive corrosion rate than that determined by our method of calculation, unless there has been a drastic change in conditions. Should areas be present that have a higher corrosion rate than our calculated corrosion rate, the remaining thickness will have a Tmin less than 0.140 inches and would be repaired.

4. EEI has not established a 20-year interval until the next inspection. A 20-year interval was used to calculate Tmin. A shorter interval until the next inspection could be used.

Summary and Conclusions

1. It is not possible calculate an actual corrosion rate for the Red Hill Tanks because the time interval during which corrosion occurred is unknown and can not be determined.
2. Selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank because the rock stratum surrounding the Red Hill tanks varies in type and porosity.
3. EEI's calculated Tmin = 0.140 inches is based on the age of the tank in 20-years (i.e. 86 years old in 2028). As stated in EEI's Steel Liner Plate Thickness Assessment, a Tmin = 0.140 inches has no safety factor. If a more conservative approach is desired, a shorter interval until the next inspection (i.e. 10 years) or Tmin based on higher external corrosion rate or both could be used. Given the uncertainty in calculating a corrosion rate, using factor of safety for Tmin has merit.

Recommendations

1. As it is not possible to establish actual corrosion rates, a factory of safety applied to the previously recommended Tmin = 0.140 inches may have merit. Considering the guidance of API 570, which uses twice the corrosion rate in any remaining life, or pressure capability calculations, the new Tmin, at twice the corrosion rate, would be 0.170 inches. This new Tmin takes into consideration the uncertainty of calculating a corrosion rate and the potential for internal corrosion given the reported condition of the interior coating.
2. EEI, therefore recommends Tmin = 0.170" be used as the criteria for determining whether thin and pitted areas in the 1/4-inch thick steel liner plates in the, barrel, and lower dome require repair.
3. Tmin = 0.170 inches does not apply to the 1/2-inch thick floor (base plate) of the lower dome.
4. As the steel liner plates are not structural elements and should not be relied upon as a structural element to resist hoop and tensile stresses in the barrel and lower dome or compressive stress in the upper dome, consult EEI when voids are found behind liner plates.

Revised Tmin Calculations

Following the guidance of API 570 which uses twice the corrosion rate in any remaining life, or pressure capability calculations, a revised corrosion rate and Tmin is calculated as follows:

Parameters

- Original Thickness of Liner Plates: 0.250"
- Remaining Thickness at the Next Inspection: 0.10" based on the tank having no means to contain a leak
- Interval until the Next Inspection: 20 years maximum
- Year Tank Constructed: 1942

Revised Corrosion Rate and Minimum Thickness

For a 20-year service interval starting in 2008, the next inspection would be in 2028. Using the API 653 straight-line method of calculating corrosion rates and a 0.10" remaining thickness at the next inspection in 2028, the external corrosion rate is as follows:

Maximum permissible metal loss = 0.250" – 0.10" = 0.150"
Age of tank in 2028 = 2028 - 1942 = 86 years

Considering the 0.150" of metal loss occurs over the life of the tank, the external corrosion rate is:

External corrosion rate = 0.150" / 86 years = 0.001744 in / year

Following the guidance of API 570, using 2 times the corrosion rate results in a Tmin = 0.170 inches as follows:

Two times corrosion rate = (2) (0.001744 in / yr) = 0.003488 in /yr

A two times the corrosion rate, the metal loss that is expected to occur during the next 20 years is:

Metal loss during next 20 years = (0.003488 in / year) (20 years) = 0.0.70"

The minimum thickness required in 2008 to have 0.1" remaining thickness in 2028 at twice the corrosion rate of 0.001744 in / yr is:

Tmin = 0.070" + 0.100" = 0.170"

Steve

Stephen J. DiGregorio, P.E.
Chief Civil / Structural Engineer
Enterprise Engineering, Inc.
5 Depot Street
Freeport, ME 04032
TEL: (207) 869-8006

Original Message-----
From: Chun, Wilfred [mailto:wilfred.chun@shawgrp.com]
Sent: Thursday, April 17, 2008 1:08 PM
To: Steve DiGregorio ; Steve Brooks
Cc: Weese, Todd; Dygart, Aaron; Phillips, David
Subject: FW: Red Hill Tank 2 and Tmin Calculations

Steve - Request comment on Incheol's Tmin of 0.14 based on coating inspection below and serviceable for next 20 years.

Thks,

Wilfred Chun, P.E.
Project Manager
Shaw Environmental & Infrastructure, Inc.
590 B Paiea St.
Honolulu, HI 96819-1835
808.840-2015 direct
808.388-6878 cell
808.839-0339 fax
wilfred.chun@shawgrp.com
-----Original Message-----
From: Pang, Incheol (NFESC) [mailto:incheol.pang@navy.mil]
Sent: Wednesday, April 16, 2008 4:15 PM
To: Chun, Wilfred; Dygart, Aaron; Weese, Todd; Phillips, David
Cc: Pierce, William (NFESC); Oberst, Casey (NFESC); Rocha, Mike (NFESC); Moore, Terry L CIV NFELC, AQ01
Subject: RE: Red Hill Tank 2 and Tmin Calculations

Wilfred and Todd,

Thanks for forwarding the EEI's Tmin calculation for Tank 2 & 20. What does Shaw propose on this?

Here is my thoughts. Now EEI recommends 0.14" as minimum plate thickness based on two facts; 1/4" original plate & corrosion rate based on 0.1" minimum remaining thickness at the end of year 2028. I can understand how Stephen calculates Tmin for 20 year inspection cycle. However, here is my questions for this calculation and Tmin. The same question that I had on Tank 1405 (Tank 54) inspection interval. In normal API 653 inspection, a corrosion rate is established, and remaining life gets calculated to determine the next inspection date. On this calculation, Stephen established 20 year cycle, and calculate the corrosion rate. I guess it would be ok for 20 year long stand point. However, this would not give you a truly or close to real 'established corrosion rate'. Can this method be considered proper way to establish corrosion rate? This is exactly why I asked Shaw as part of Work Plan comments to justify 0.19" as Tmin for the inspection.

Also, Stephen assumed internal coating is serviceable for next 20 years as well to use 0.14" as Tmin. Recent coating inspection of Tank 2 by NAVFAC coating expert revealed that the existing coating was applied without any proper surface preparation in the 80's. And the current condition shows delaminating at substantial area of the interior. Under the consideration of tank age and condition, the coating expert recommended no coating repair. Repair attempt would do more harm than good. The bottom dome would be recoated after tank inspection, but no coating repair is considered on any part of the shell or upper dome area. If this information would make this calculation any different, please let Stephen know and recalculate Tmin based on current coating condition.

v/r,

Incheol

incheol.pang@navy.mil
805-331-2148

-----Original Message-----
From: Chun, Wilfred [mailto:wilfred.chun@shawgrp.com]
Sent: Wednesday, April 16, 2008 11:16
To: Pang, Incheol (NFESC); kenm.eihawaii@hawaiiantel.net
Cc: Barry.eihawaii@hawaiiantel.net; Dygart, Aaron; l.mcdougal@testex-ndt.com; Weese, Todd
Subject: FW: Red Hill Tank 2 and Tmin Calculations

Incheol - Attached is the Tmin by Enterprise.

Thks,

Wilfred Chun, P.E.

Project Manager

Shaw Environmental & Infrastructure, Inc.

590 B Paiea St.

Honolulu, HI 96819-1835

808.840-2015 direct

808.388-6878 cell

808.839-0339 fax

wilfred.chun@shawgrp.com

From: Stephen J. DiGregorio [mailto:sjd@eeiteam.com]
Sent: Wednesday, April 16, 2008 7:52 AM
To: Chun, Wilfred
Cc: Weese, Todd; Steve Brooks; Stacy Kaplan-McMillan
Subject: Red Hill Tank 2 and Tmin Calculations

Wilfred,

Enclosed are my calculations of Tmin for Red Hill Tanks 2 and 20. Let me know if you or the government have questions.

Steve

Stephen J. DiGregorio, P.E.

Chief Civil / Structural Engineer

Enterprise Engineering, Inc.

5 Depot Street

Freeport, ME 04032

TEL: (207) 869-8006

ENTERPRISE ENGINEERING, INC.

RED HILL TANKS 2 AND 20
FISC PEARL HARBOR, HAWAII

Steel Liner Plate Minimum Thickness Assessment
April 15, 2008

EEI Project No. 08-4895

GENERAL

Shaw is providing cleaning, inspection, and repair services for Tanks 2 and 20 at FISC Pearl Harbor Red Hill, Hawaii. Shaw has requested Enterprise Engineering, Inc. (EEI) calculate corrosion rates and the minimum thickness of the steel liner plates which will be used as the criteria for determining the need for repair based on a 20-year interval until the next inspection.

Record drawings of the Red Hill tanks indicate the steel liner plates in the upper dome, barrel, and lower dome in all of the tanks are 1/4" thick plate nominal. The floor (referred to as "base plate" on record drawings) of the lower dome in all of the tanks is indicated as 1/2" thick plate. This document prepared by EEI provides a calculation of corrosion rates and minimum required thickness of the 1/4" thick steel liner plates. This minimum thickness will serve as the criteria for determining the need to repair thin areas and pits for another 20-year interval until the next inspection.

RECOMMENDED REPAIR CRITERIA: STEEL LINER MINIMUM THICKNESS

It is reported that a Tmin of 0.19 inches was used on previous projects at Red Hill. EEI is not able to determine how this value was established. EEI recommends the following:

1. A minimum thickness (Tmin) of 0.140 inches be used as the criteria for determining whether thin and pitted areas in the 1/4-inch thick steel liner plates in the, barrel, and lower dome require repair. The upper dome area, with increased potential for atmospheric corrosion on the inside, can also use this Tmin criteria of 0.140 inches if it is determined the coating system is sound, there is no present internal corrosion, and the coating system has a remaining life of 20 years. Note: the Tmin value of 0.140 inches does not include any safety factor that the thickness of the steel liner plates will not be less than a minimum thickness of 0.10 inches at the end of another 20-year service interval. The justification for not using a safety factor is:

   a. API 653 does not use a safety factor.

   b. Tmin is based on a constant rate of corrosion (i.e. corrosion is assumed to not vary over time). Using a constant rate of corrosion is in accordance with API 653 and is considered

conservative in that corrosion rates generally decrease over time unless conditions change.

c. A safety factor could be added to Tmin; however, this will involve more repairs and is not justified unless desired by the government or conditions are found indicating corrosion rates are higher than calculated.

2. Repair thin and pitted areas in the 1/4-inch thick steel liner plates in the upper dome, barrel, and lower dome having a minimum thickness (Tmin) less than 0.140 inches. Areas having Tmin equal to or greater than 0.140 inches do not require repair for a 20-year interval until the next inspection.

3. Tmin = 0.140 inches does not apply to the floor (base plate) of the lower dome.

4. EEI also calculated Tmin for a 10-year interval until the next inspection and determined Tmin in this case would be 0.120 inches. EEI can evaluate this alternative if desired.

5. Using Tmin = 0.140 inches as determined for 20-year interval until the next inspection and applying this criteria for a 10-year interval is an option as it is conservative and provides a factor of safety.

COMMENTS AND CLARIFICATIONS

EEI's calculation of Tmin is based on the following:

1. A 20-year interval until the next inspection in 2028 as indicated in Shaw's Work Plan.

2. An original plate thickness of 0.250 inches. Our calculation of Tmin does not take into account the original thickness of the plates may be thinner due to plate fabrication tolerances or other conditions. EEI recommends Shaw's inspector obtain ultrasonic thickness measurements of each plate (6 measurements minimum per plate). Submit for EEI review and assessment thickness measurements of plates having an average thickness less than 0.240". The 0.240 thickness is the ASTM A 6/A6M minimum thickness tolerance for 1/4-inch thick plates.

3. The rate of external corrosion was calculated using the API 653 straight line method and assuming metal loss occurring over the life of the tank (86 years) from tank construction in 1942 to the next inspection in 2028. The calculated rate of external corrosion does not take into consideration potential areas of concentrated corrosion caused by artifacts, welding rods, debris, rocks, microbial induced corrosion (MIC) in the form of small "worm-like" corrosion trails, or other conditions on the exterior of the liner plates the would cause concentrated corrosion. If these conditions are found, contact EEI for interpretation.

4. The rate of external corrosion and Tmin does not apply to the heat-affect zone of liner plates adjacent to welds (within 1 inch of the weld). As the corrosion rate in the heat-affected zone can be higher than areas outside the heat-affected zone, a higher Tmin value may be needed for the heat-affected zone. Information on plate thickness in the heat affected zone is needed to determine corrosion rates and Tmin of the heat affected zones of the steel liner plates. EEI

recommends Shaw's inspector obtain ultrasonic thickness measurements in the heat-affected zone in random areas in each quadrant of the upper dome, barrel, and lower dome for EEI assessment. Given the large quantity of welds in the liner plate joints, EEI recommends 20 UT thickness measurements be obtained in the heat-affected zones in each quadrant. Additional UT measurements may necessary if results are not consistent. Additionally, EEI recommends that we be notified when the remaining thickness in the heat-affected zone is less than 0.200 inches as additional assessment may be necessary.

5. The corrosion rate of product side corrosion is assumed to be 0.00 inches per year. This assumption is only valid if the existing interior coating is in serviceable condition and its service life is equal to or greater than the 20-year interval until the next inspection. If the interior coating is not expected to last another 20 years, product side corrosion may occur and thus the Tmin will need to be recalculated and increased. It should be noted that product side corrosion is not of concern when the tank is filled as areas are covered by product except at a water bottom in the lower dome. The 0.00 inches per year product side corrosion rate also does not take into consideration potential atmospheric corrosion of the steel liner plates if the coating is failing and not repaired and liner plates are exposed to atmosphere. Additional information is needed on the condition of the interior coating and whether atmospheric corrosion is present. This additional information may result in a greater Tmin of the upper dome, where atmospheric corrosion, and or degraded coatings is present.

6. A minimum thickness of 0.10 inches at the next inspection is used in the calculation of Tmin. A 0.10 inch minimum thickness is used as the steel liner plates are a hydraulic barrier and are not relied upon as a structural element to resist hoop and tensile stresses in the barrel and lower dome or compressive stress in the upper dome. The 0.10-inch criteria is similar to API 653 criteria for tank floors that have no means for containment of a leak.

7. As the steel liner plates are not structural elements and should not be relied upon as a structural element to resist hoop and tensile stresses in the barrel and lower dome or compressive stress in the upper dome, consult EEI when voids are found behind liner plates.

8. Our calculation of Tmin does not include any safety factor. A safety factor could be added to Tmin; however, this will involve more repairs and is not justified unless desired by the government or conditions are found indicating corrosion rates are higher than calculated.

9. Consult EEI when areas of thinning or pitting are found that exceed 12" in diameter.

CALCULATIONS

Parameters

- Original Thickness of Liner Plates: 0.250"
- Remaining Thickness at the Next Inspection: 0.10" based on the tank having no means to contain a leak
- Interval until the Next Inspection: 20 years maximum
- Year Tank Constructed: 1942
- Product Side Corrosion Rate: Assumed to be 0.00" per year based on the tank interior being coated and the life of the coating expected to exceed the interval until the next inspection

Corrosion Rate and Minimum Thickness

For a 20-year service interval starting in 2008, the next inspection would be in 2028. Using the API 653 straight-line method of calculating corrosion rates and a 0.10" remaining thickness at the next inspection in 2028, the external corrosion rate is as follows:

Maximum permissible metal loss = 0.250" – 0.10" = 0.150"
Age of tank in 2028 = 2028 - 1942 = 86 years

Considering the 0.150" of metal loss occurs over the life of the tank, the external corrosion rate is:

External corrosion rate = 0.150" / 86 years = 0.001744 in / year

Using this external corrosion rate, the expected metal loss that would have occurred thus far, (1942 to 2008) is:

Number of years from 1942 to 2008 = 66 years
Metal loss over 66 years = (0.001744 in / year) (66 years) = 0.115"

The minimum thickness required in 2008 to have 0.1" remaining thickness in 2028 at a corrosion rate of 0.001744 in / year is:

Tmin = 0.250" – 0.115" = 0.135"

Thus if Tmin = 0.135" in 2008; using an external corrosion rate of 0.001744" / year, the remaining thickness in 20 years (2028) is:

Metal loss occurring over the next 20 years = (0.001744" / yr) (20 years) = 0.035"
Remaining thickness at the end of the next 20 years = 0.135" – 0.035" = 0.10"
Use Tmin = 0.140" (0.135" rounded to 0.140")

Prepared by:

Stephen DiGregorio

Stephen J. DiGregorio, P.E.
Chief Structural Engineer
ANSI/API 653 Certified Aboveground Tank Inspector, Certificate No. 1113

ENGINEERING & INSPECTIONS
HAWAII, INC.

Attachment C

Report: TesTex Data and Mapping

P. O. Box 700217 • Kapolei, HI 96709-0217 • Tel: (808) 682-1667 • Fax: (808) 682-1834 • E-Mail: E I Hawaii@aol.com

TesTex

STATE OF THE ART PRODUCTS AND SERVICES FOR NON-DESTRUCTIVE TESTING

535 Old Frankstown Road
Pittsburgh, PA 15239

E-mail: testex-ndt@verizon.net
Website: www.testex-ndt.com

Wednesday, September 24, 2008

Addendum to Tank 2 final report

Expansion Joint, Upper Dome U-Channel Welds, Course F Scanning

On September 8th 2008 work resumed in tank 2 at the Red Hill facility. This work consisted of scanning the welds associated with the Expansion joint and all U-channels of the upper dome and additionally, the surface area of course F. The following is the total linear footage of welds and surface area scanned:

1) Expansion joint welds: 4 different welds at approximately 314 linear feet each **(1,256 linear feet total)**

2) Upper dome U-channel welds:

Course A, approximately	2,788 linear feet
Course B, approximately	2,756 linear feet
Course C, approximately	1,970 linear feet
Course D, approximately	1,864 linear feet
Course E, approximately	1,180 linear feet
Course F, approximately	512 linear feet
	(11,070 linear feet)

3) Course F surface area: approximately **491 square feet**

The scanning concluded on September 11th 2008 with **no reportable defects found in the 12,326 linear feet of welds** that was scanned. However, **two defects were found in the surface area of course F.** One defect was approximately a **0.500" diameter through hole** on plate 12, 32 inches from the manway and 6 inches from the plate 12/13 intersection. The other defect was a **dent** in plate 21, 5 foot from the manway and 4 inches from the plate 21/22 intersection.

Jason Tonini

Jason T

Sr. Field Engineer

TesTex

STATE OF THE ART PRODUCTS & SERVICES
FOR NON-DESTRUCTIVE TESTING

LOW FREQUENCY ELECTROMAGNETIC TECHNIQUE

INSPECTION REPORT

OF

TANK # 2

AT

RED HILL

IN

HONOLULU, HI

BY

TESTEX, INC.

TESTED: 3/31 - 5/12, 2008

AUTHOR: LARRY McDOUGAL

REVIEWED BY: SID RAMCHANDRAN

TABLE OF CONTENTS

1.0 RESULTS AND CONCLUSIONS
Dunkin and Bush, Inc.
Honolulu, HI
Tank #2

INTRODUCTION

An NDT inspection was conducted on Tank #2 at Red Hill in Honolulu, HI on March 31st – May 13th, 2008. This inspection focused on 100% testing of the floor, lower dome, barrel, and upper dome areas. The inspection was performed with the TesTex developed ***TS-2000 NDT Multi-channel System*** (for plate scanning using the principles of the ***Low Frequency Electromagnetic Technique***) and the ***Hawkeye 2000 System*** **(**for weld testing focusing on surface and subsurface cracking and pinholes). All defected areas found with the above-mentioned TesTex equipment were backed up and sized using regular ***Ultrasonic Technique*** and ***Ultrasonic Shear wave Technique***. The ***Ultrasonic Shear wave Technique*** was an additional service used which measured the depth of detected pinholes, provided they were oriented in a position that could be tested. The results of this inspection are detailed in the following report.

RESULTS

In beginning this inspection (March 31, 2008), TesTex started scanning the floor plates (7 plates totaling 25 ft. in diameter) of tank #2. By day two (April. 1st), scanning was complete on the floor (491 sq ft) and moved to course 1 of the lower dome. Day 3 saw the completion of course 1 (2,695 sq ft) and the first 3' of course 2. In addition, scanning of the welds was performed by a fifth TesTex person using the Hawkeye on the floor (and around all pipe entry points), course 1, and the first 3' of course 2 during the first three days. It is to be mentioned that all scanning to this point could be reached from standing on either the floor or course 1 of the lower dome. The end of the week saw work starting from the baskets on the remainder of course 2. Now, both types of scanning (LFET for liner plates and BFET for welds) were performed together by the basket crews. The course was finished by day's end (4,573 sq ft). In beginning the week of April 7th, 2008, TesTex personnel was back to four. The first day consisted of scanning course 3. This course (5,797 sq ft) was finished by both baskets by days end. The next day (April 8th) started with scanning course 4 and ended with its completion (5,634 sq ft). Day three (April 9th) saw the start of barrel scanning. The scans consisted of 8 ft. wide (the width of the basket) drops from the upper dome/barrel interface down to the lower dome/barrel interface. By the end of day four (April, 10th), approximately 15% of the barrel was completed. The third week picked back up with Barrel scanning and by the end of the first day (April 14th), 25% of the barrel was complete. Over the course of the next 3 days, the total finished barrel percentage rose to 50% to end the week (April 17th). The fourth week would see the completion of barrel (41,598 sq ft) scanning at the end of the third day (April 23rd). On the last day of the week (April 24th), Scanning began on course A of the upper dome. Week 5 started with the completion of course A (4,437 sq ft) at the end of the first day (April 28th). Course B was started on day two (April 29th) and finished (4,082 sq ft) halfway through the next day (April 30th). The second half of the day three saw the starting of course C and its completion (3,458 sq ft) at the end of day four (May 1st). The last week of the inspection, week six, marked the return of the fifth TesTex person and an ultrasonic technician. The ultrasonic technician began using Shear Wave technology (May 5th) on the lower dome/floor interface and

1.0 RESULTS AND CONCLUSIONS
Dunkin and Bush, Inc.
Honolulu, HI
Tank #2
shear wave prove-up on any possible weld defects found in the tank. The first day also saw the beginning of inspection, with one team, of the barrel under the catwalk. On the second day (May 6th), the second team began scanning course D and E using ultrasonic trolleys in quadrants C and D. In addition, the team under the catwalk finished their scanning (2,895 sq ft). The third day of the week (May 7th) consisted of finishing courses D and E in Quadrant C and D (2,148 sq ft) and starting the same for quadrants A and B for one team and the other team worked in the lower tunnel on U.T. spot checks inside of the 32-inch and 18-inch lines. These spot checks were done on the 32-inch line from the inside and consisted of a group of 8 circumferential readings taken every 3 feet across the approximate 40-foot span. The 18-inch line was too small to access internally, so readings could only be taken at 8 and 18 inches from the end. On the fourth day (May 8th), scanning was completed on courses D and E in quadrants A and B (2,148 sq ft). Also, course F was U.T spot-checked from the gallery and the inside of the manway was scanned using the LFET scanner. In wrapping up the day, both teams covered the tank to confirm all defect locations and documentation. This marked the end of the inspection for the two TesTex teams who were there for the entire inspection. The following day (May 9th) was used to finish shear wave scans of the remaining welds. All of the gathered data was examined over the weekend and a preliminary report was given on Monday May 12th, which outlined all defects found in the tank. This report characterized type, size, location, etc. for each.

In addition to the above-mentioned scanning, all weld cover channels in the scanned areas of the upper dome were U.T. spot-checked on their faces in 6” increments. This was done in accordance to specifications established for tanks 15, 16, and 6.

CONCLUSIONS

As a result of this inspection, TesTex found 172 flaw indications most of which were either proved up with ultrasonic thickness measurements or sized using Ultrasonic Shear Wave Technique. All defects including their respective depth or other flaw characterization may be found in Section 4.0, **PLATE TEST SUMMARY**.

Section 3.0 is **TANK MAPS,** which clarifies the numbering system and tank layout. Section 5.0 shows typical waveforms collected from these sections. Printouts of waveforms collected from this unit are included in **APPENDIX A** and are correlated to each plate where the original flaw indication(s) was observed.

2.0 UNIT DETAILS

Dunkin and Bush, Inc.
Honolulu, HI
Tank #2

	Totals
Orientation	**Vertical**
Plate Thickness	
Upper Dome	**0.250”**
Lower Dome	**0.250”**
Barrel	**0.250”**
Floor	**0.500”**
Plate Material	**Carbon Steel**
Total Surface Area of Tank #2	**≈ 79,621 sq ft (plates)**
Upper Dome	**≈ 16,763 sq ft (plates)**
Barrel	**≈ 43,668 sq ft (plates)**
Lower Dome	**≈ 19,190 sq ft (plates)**
Total Surface Area Scanned by TesTex	**≈ 79,135 sq ft (plates)**
	≈ 16,968 linear ft (welds)
Upper Dome	**≈ 16,277 sq ft (plates)**
course A	**≈ 4,437 sq ft (plates)**
course B	**≈ 4,082 sq ft (plates)**
course C	**≈ 3,458 sq ft (plates)**
course D	**≈ 2,632 sq ft (plates)**
course E	**≈ 1,664 sq ft (plates)**
course F: (U.T. spot checks)	**≈ 5 sq ft (plates)**
Barrel	**≈ 43,668 sq ft (plates)**
	≈ 11,346 linear ft (welds)
Lower Dome	**≈ 19,190 sq ft (plates)**
	≈ 5,622 linear ft (welds)
course 4	**≈ 5,634 sq ft (plates)**
	≈ 1,439 linear ft (welds)
course 3	**≈ 5,797 sq ft (plates)**
	≈ 1,507 linear ft (welds)
course 2	**≈ 4,573 sq ft (plates)**
	≈ 1,500 linear ft (welds)
course 1	**≈ 2,695 sq ft (plates)**
	≈ 1,007 linear ft (welds)
base:	**≈ 491 sq ft (plates)**
	≈ 169 linear ft (welds2

2.0 UNIT DETAILS
Dunkin and Bush, Inc.
Honolulu, HI
Tank #2

Percent surface area of Tank #2 inspected	**≈ 99.4%**
Surface area of Upper Dome inspected	**≈ 97%**
Surface area of Barrel inspected	**≈ 100%**
Surface area of Lower Dome inspected	**≈ 100%**

Tank Numbering System See **3.0 TANK MAP**

	Totals
Defect distribution	
Tank #2	172
Area	
Upper Dome	28
Barrel	58
Lower Dome	84
Floor	2
Type	
Underside corrosion	48
Through holes	1
Topside (pits gouges)	24
Dents/bulges	28
Weld: LOF/IP	53
Weld: Cracking	12
Weld: Porosity	2
Weld: Misc.(AS, SL, TW, etc.)	4

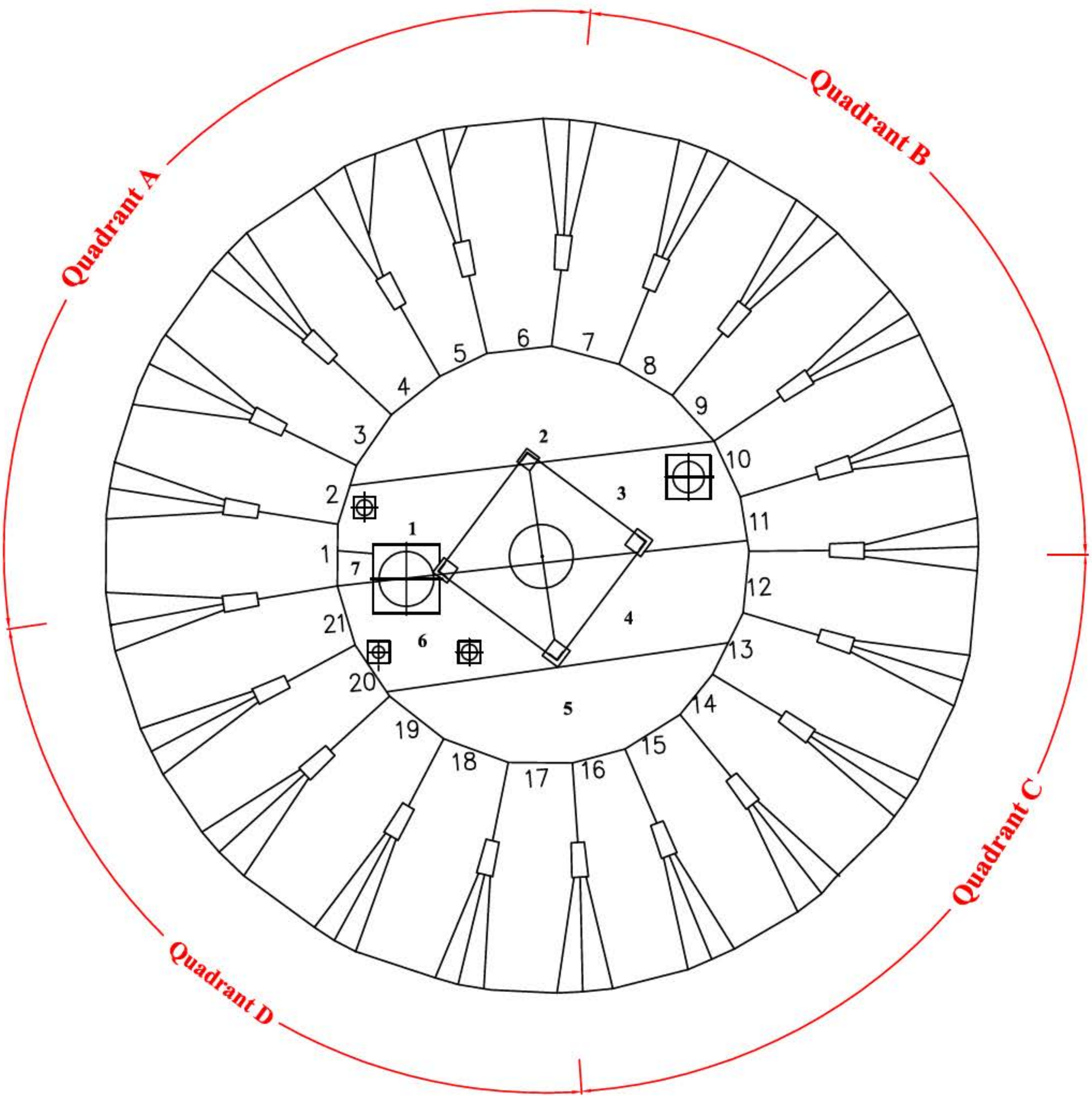
Test Equipment:

Electronics:
TS-2000, 8 Channel Plate Scanner
Hawkeye, Single Channel Pencil Probe Weld Scanner

Hardware:
U.T. Viper (Magnetic manual Crawler)

Ultrasonic Thickness Meter:
DMS-2 Krautkramer (with A-Scan Display)

TANK # 2 - LOWER DOME - COURSE 1

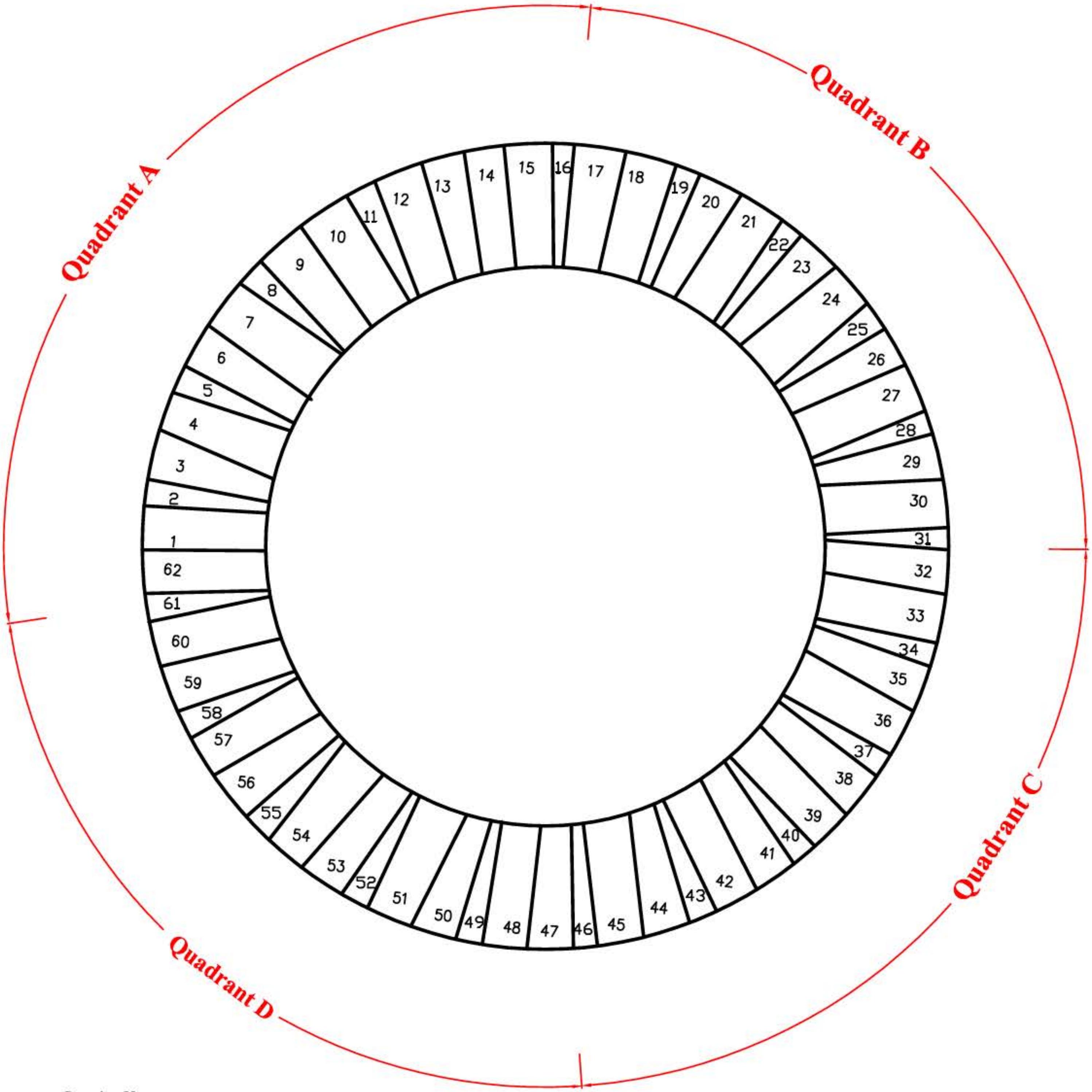


Drawing Notes:

1. Tank is divided into 4 quadrants (A-D).
2. Course 1 is comprised of 21 total plates.
3. Quadrant A is comprised of 6 plates (1-6).
4. Quadrant B is comprised of 5 plates (7-11).
5. Quadrant C is comprised of 5 plates (12-16).
6. Quadrant D is comprised of 11 plates (17-21).
7. This numbering convention begins with plate #1 being the first plate of quadrant A.

Drawing is not to scale

TANK # 2 - LOWER DOME - COURSE 2

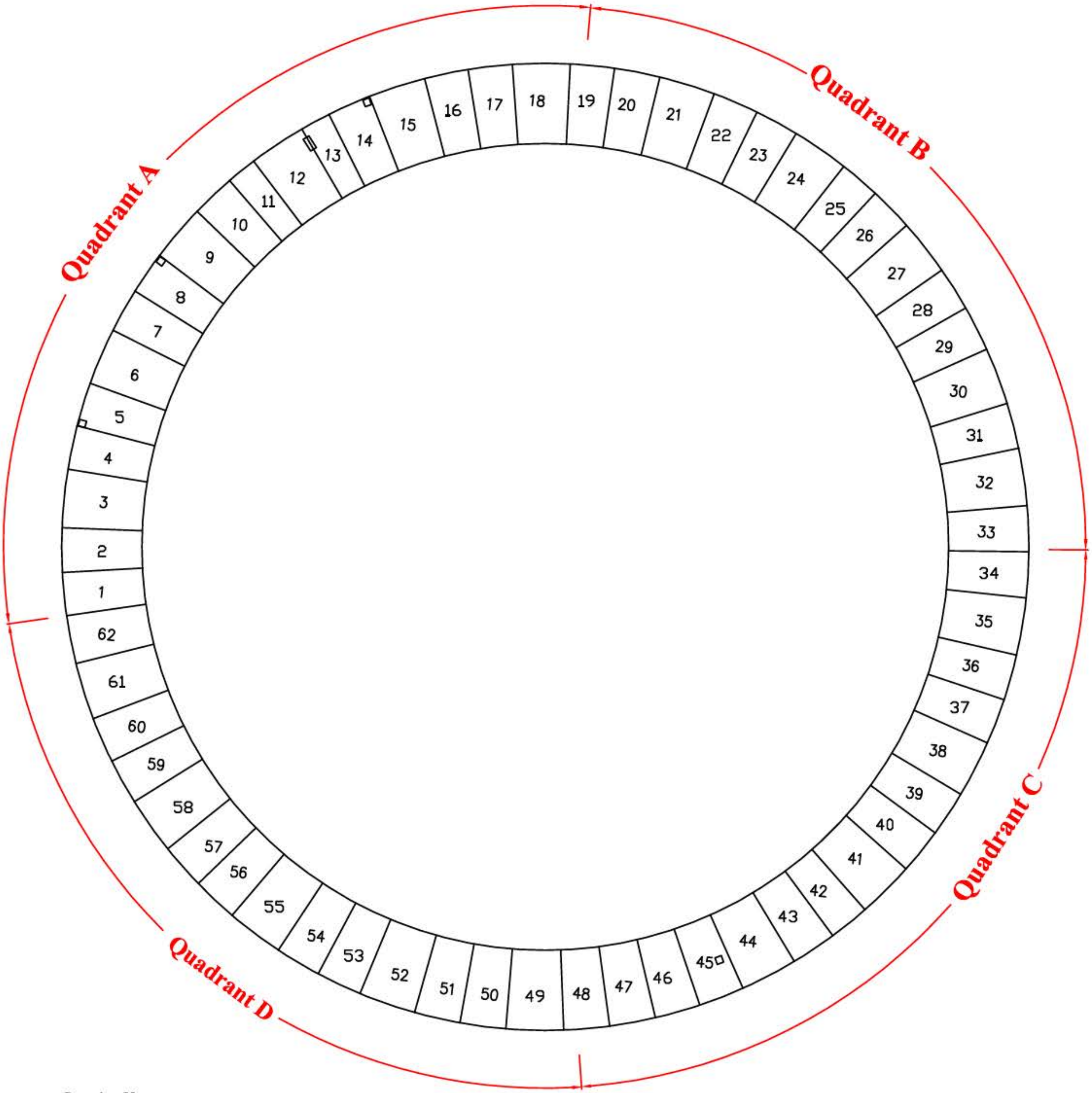


Drawing Notes:

1. Tank is divided into 4 quadrants (A-D).
2. Quadrant A is comprised of 17 plates.(62 - 16)
3. Quadrant B is comprised of 15 plates.(17 - 31)
4. Quadrant C is comprised of 15 plates.(32 - 46)
5. Quadrant D is comprised of 15 plates.(47 - 61)
6. This numbering convention begins with plate #1 being the first plate of quadrant A.

Drawing is not to scale

TANK # 2 - LOWER DOME - COURSE 3



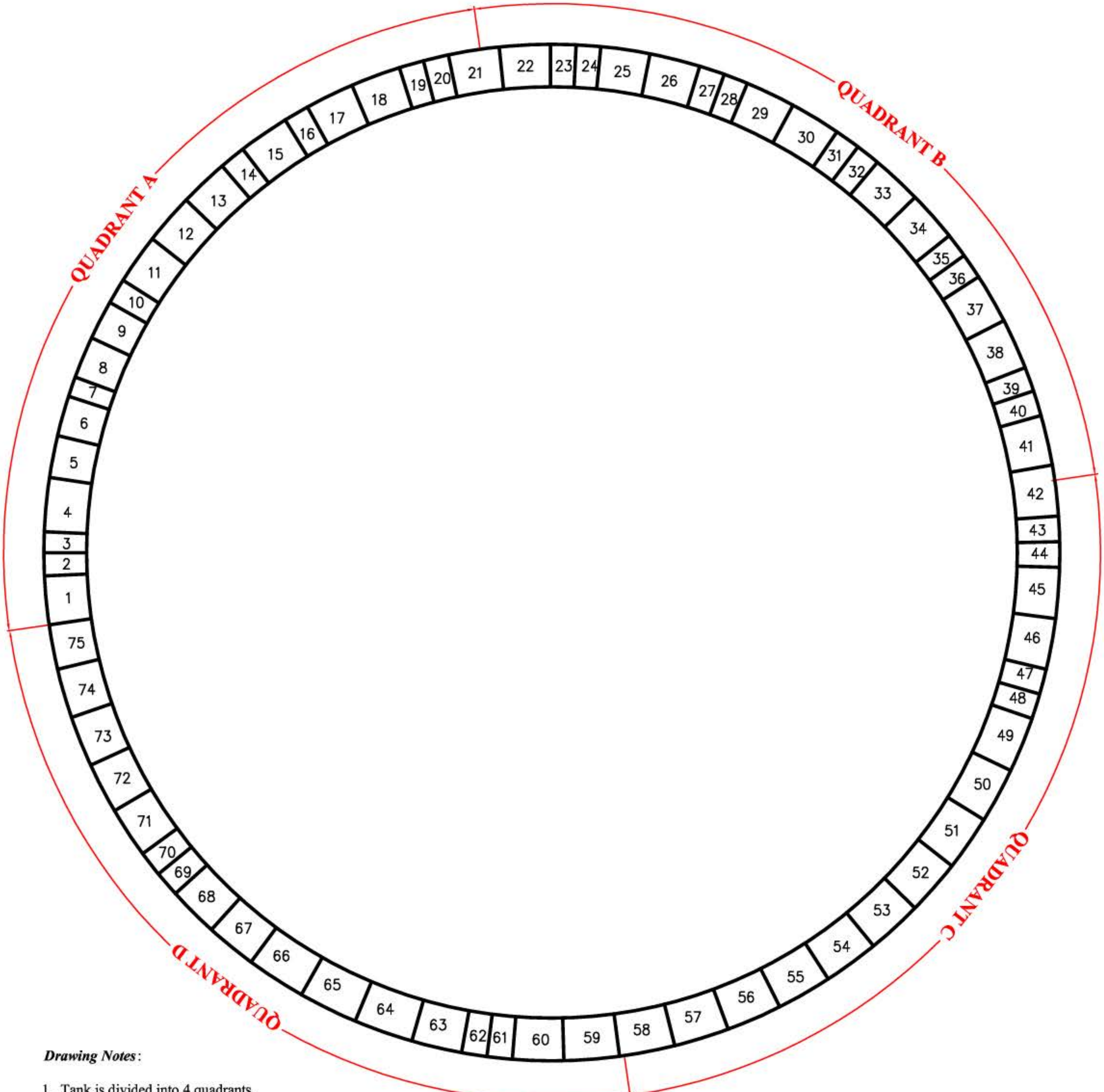
Drawing Notes:

1. Tank is divided into 4 quadrants (A-D).
2. Quadrant A is comprised of 19 plates.(1 - 18)
3. Quadrant B is comprised of 15 plates.(19 - 33)
4. Quadrant C is comprised of 15 plates.(34 - 48)
5. Quadrant D is comprised of 14 plates.(49 - 62)
6. This numbering convention begins with plate #1 being the first plate of quadrant A.

Drawing is not to scale

3.0 Tank Maps
Dunkin & Bush, Inc.
Honolulu, HI
Tank # 2 - Lower Dome Liner Plates

TANK # 2 - LOWER DOME - COURSE 4



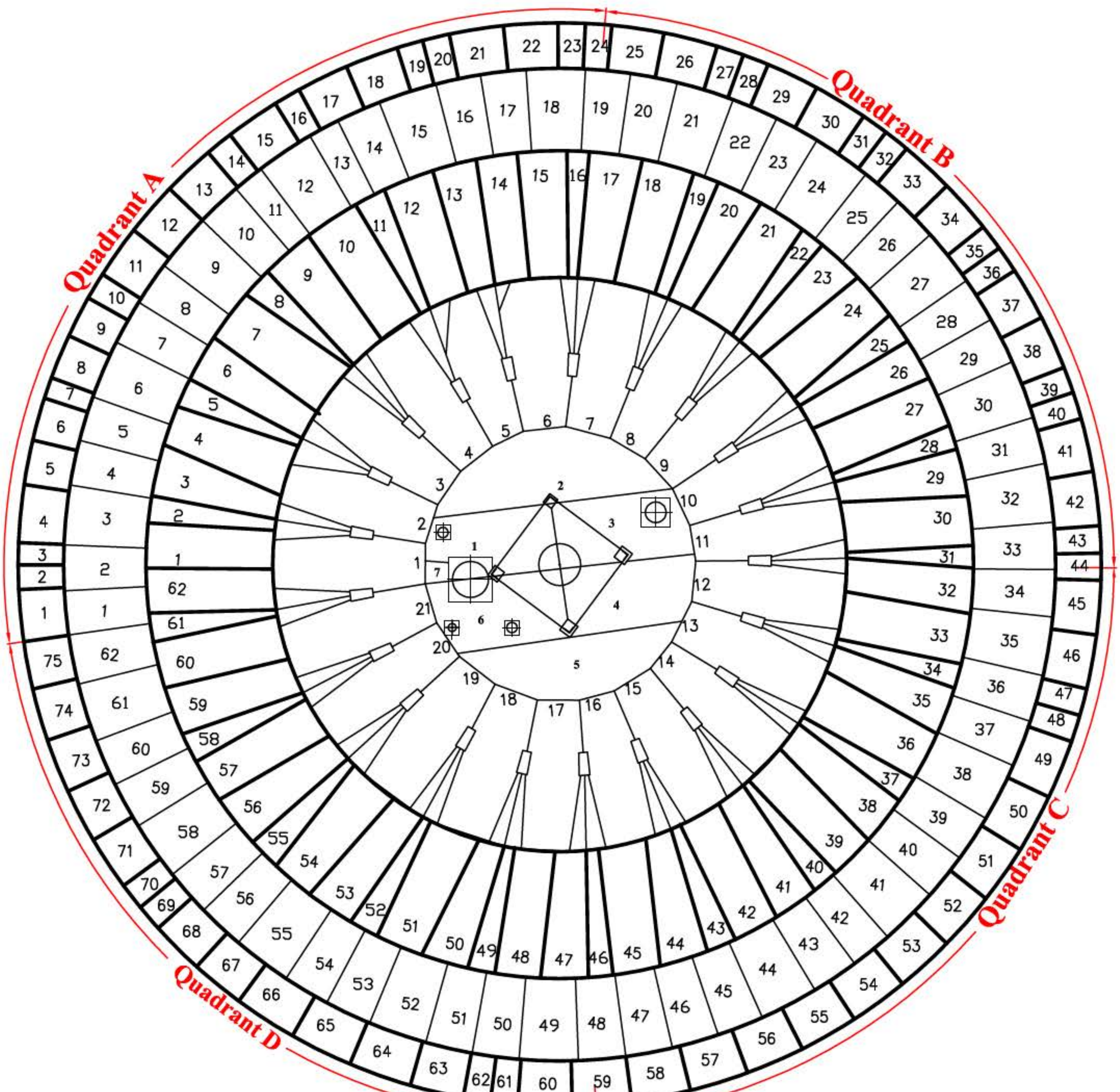
***Drawing Notes*:**

1. Tank is divided into 4 quadrants.
2. Quadrant A is comprised of 21 plates.(1 - 21)
3. Quadrant B is comprised of 20 plates.(22 - 41)
4. Quadrant C is comprised of 17 plates.(42 - 58)
5. Quadrant D is comprised of 17 plates.(59 - 75)
6. This numbering convention begins with plate #1 being the first plate of quadrant A.

Drawing is not to scale

3.0Tank Maps
Dunkin & Bush, Inc.
Honolulu, HI
Tank # 2 - Lower Dome

TANK # 2 - LOWER DOME - LINER PLATES



Drawing Notes:

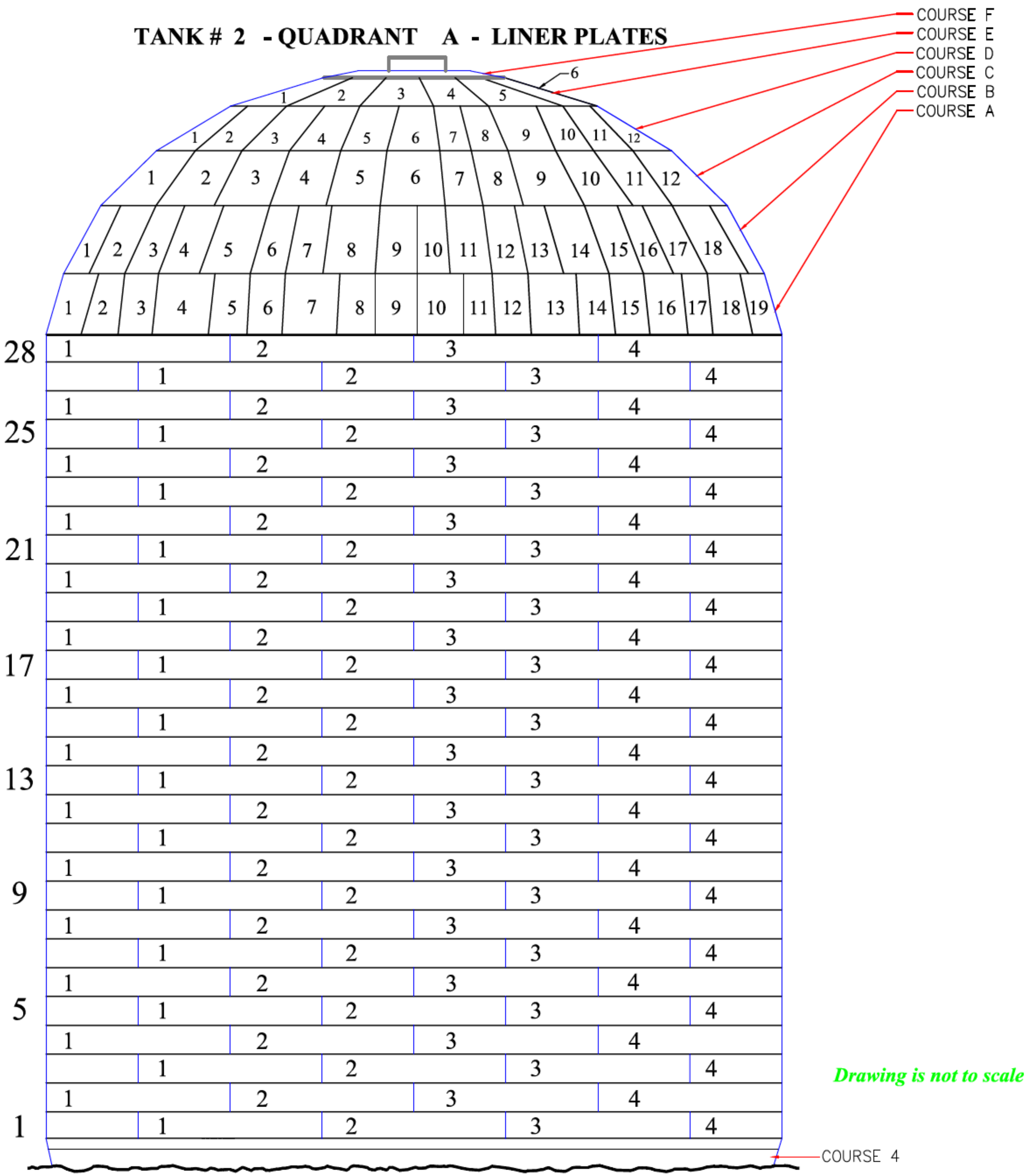
1. Tank is divided into 4 quadrants .
2. Course 1 is comprised of 21 plates.
3. Course 2 is comprised of 62 plates .
4. Course 3 is comprised of 62 plates .
5. Course 4 is comprised of 75 plates .
6. This numbering convention begins with plate #1 being the first plate of quadrant A.

Drawing is not to scale

3.0 TANK MAPS

Dunkin & Bush, Inc.

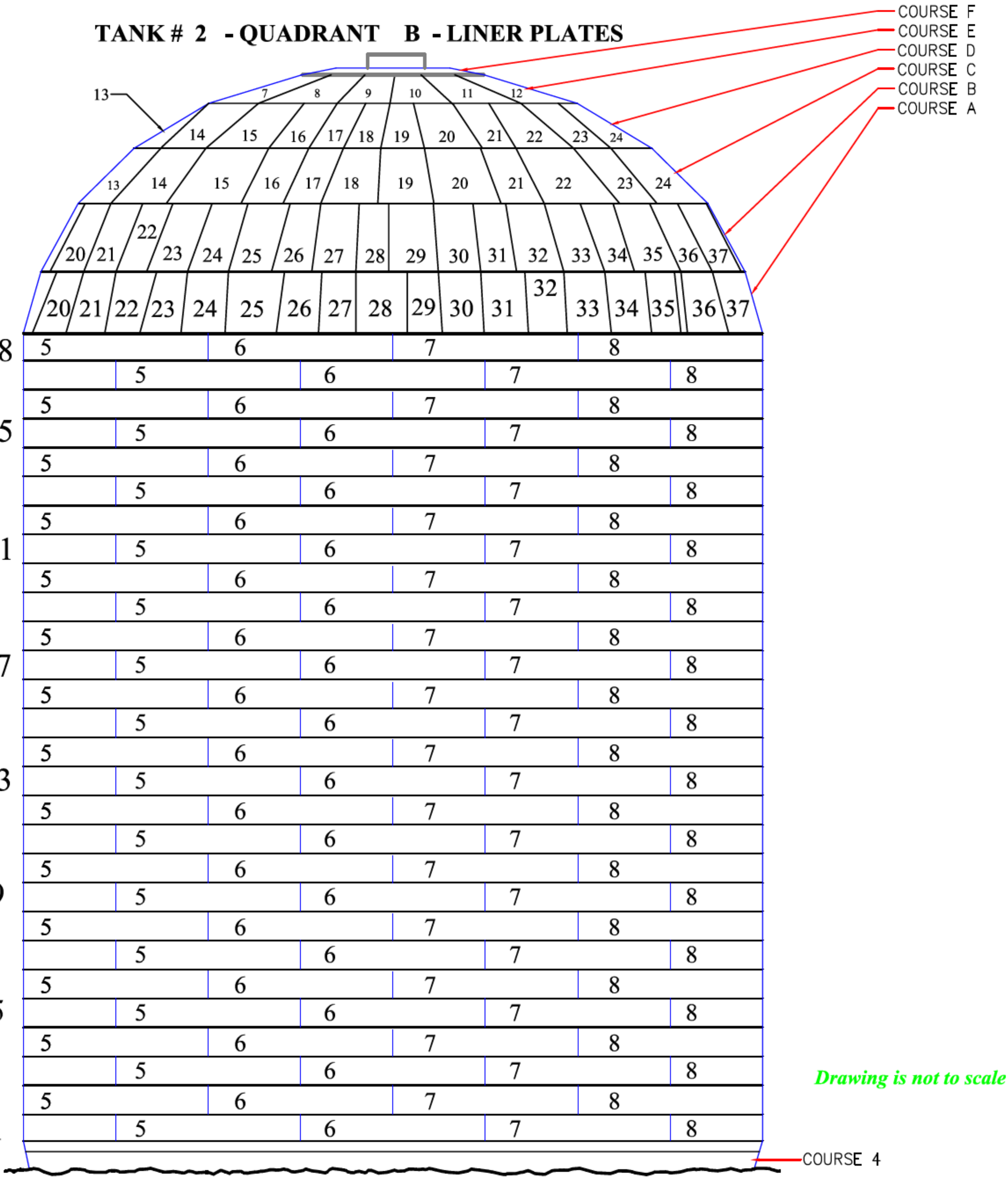
Honolulu, HI



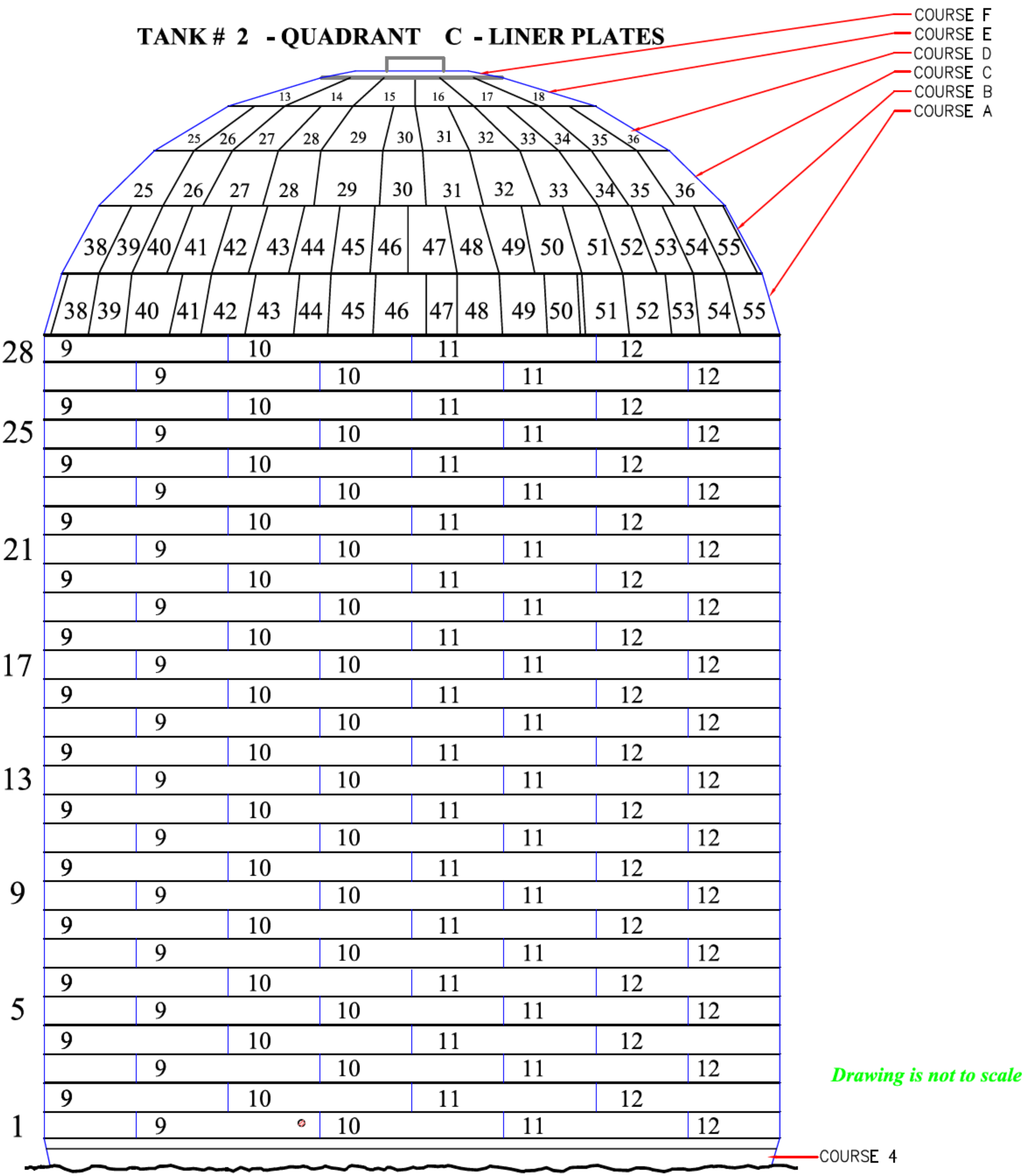
3.0 TANK MAPS

Dunkin & Bush, Inc.

Honolulu, HI

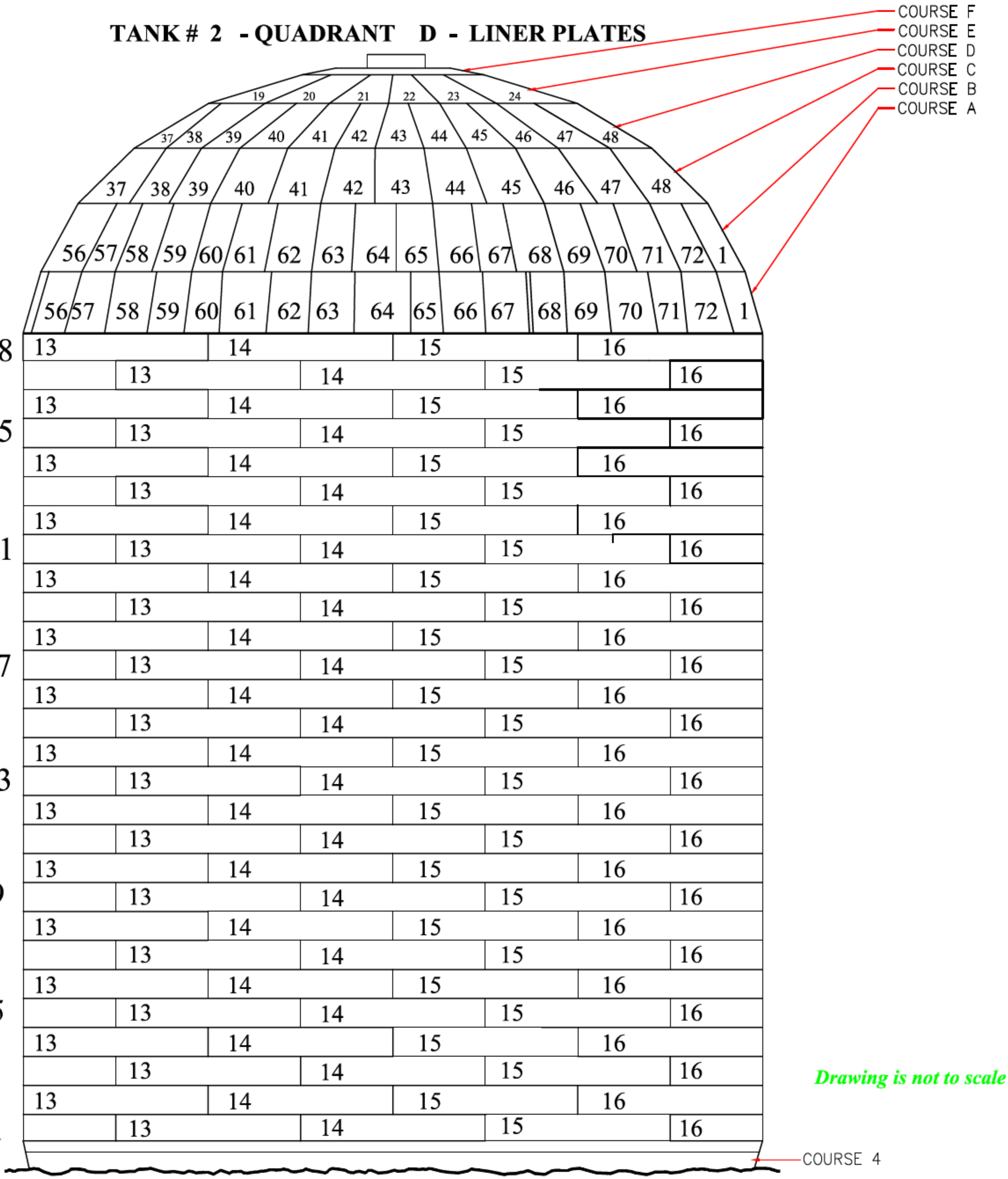


3.0 TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI



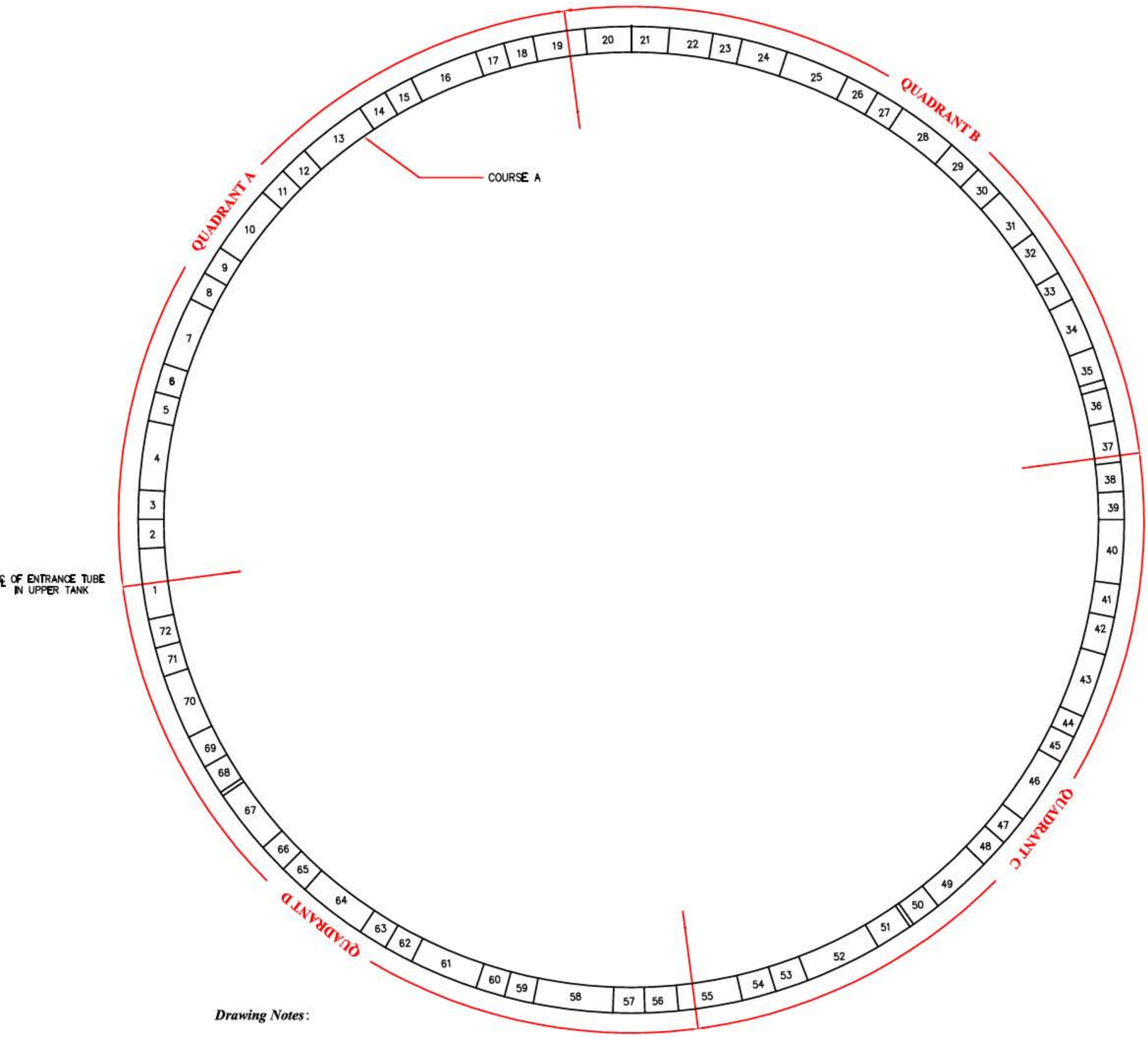
3.0TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

TANK # 2 - QUADRANT D - LINER PLATES



3.0 Tank Maps
Dunkin & Bush, Inc.
Honolulu, HI
Tank # 2 - Upper Dome Liner Plates

TANK # 2 - UPPER DOME COURSE A



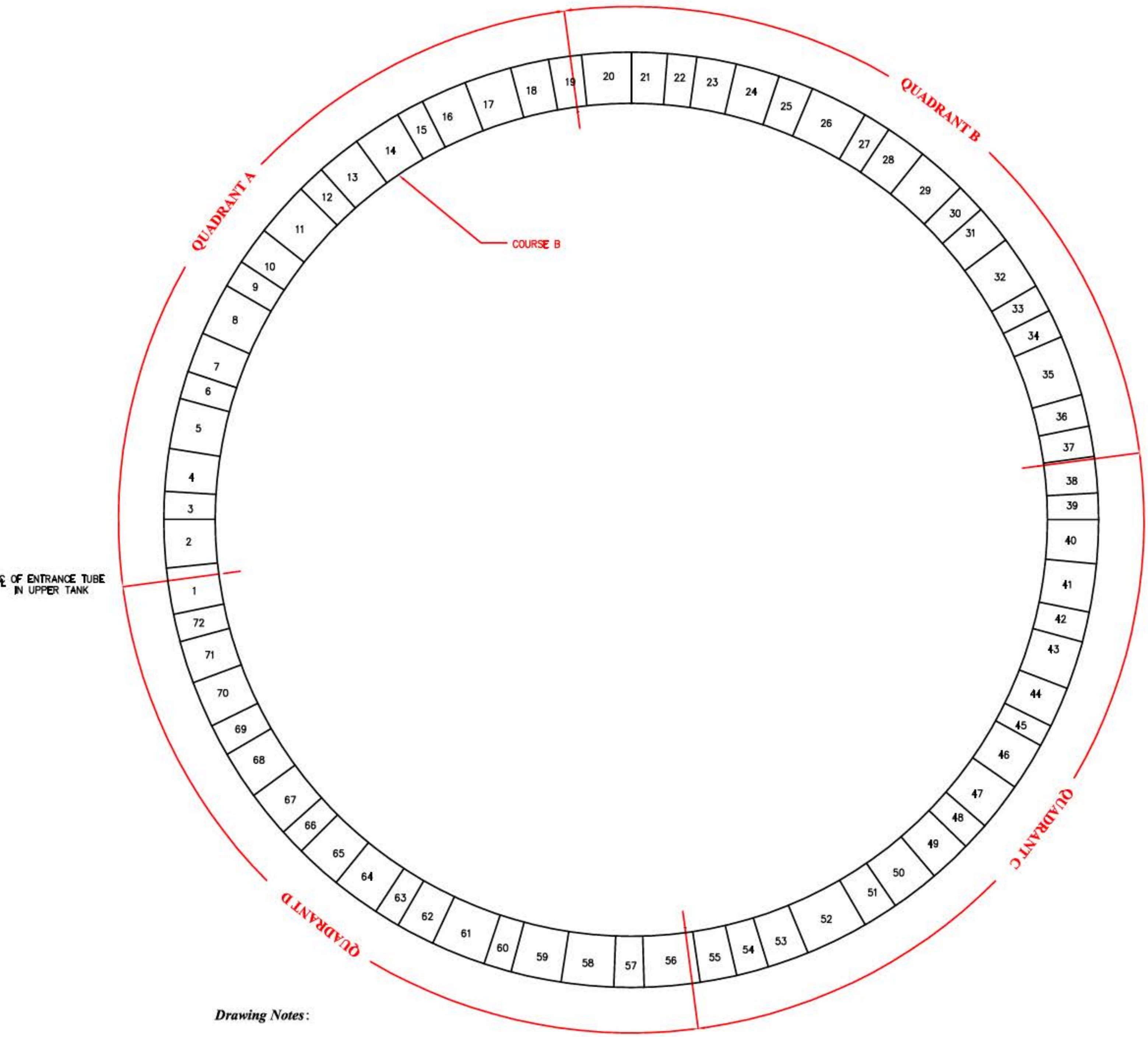
***Drawing Notes*:**

1. Tank is divided into 4 quadrants (A-D).
2. Course A is comprised of 72 total plates.
3. Quadrant A is comprised of 19 plates (1-19).
4. Quadrant B is comprised of 18 plates (20-37).
5. Quadrant C is comprised of 18 plates (38-55).
6. Quadrant D is comprised of 17 plates (56-72).
7. This numbering convention begins with plate #1 being the first full plate to the left of the manway in plan view.
8. All Plate intersection welds are covered with 3" wide channels.

Drawing is not to scale

3.0 Tank Maps
Dunkin & Bush, Inc..
Honolulu, HI
Tank # 2 - Upper Dome Liner Plates

TANK # 2 - UPPER DOME COURSE B



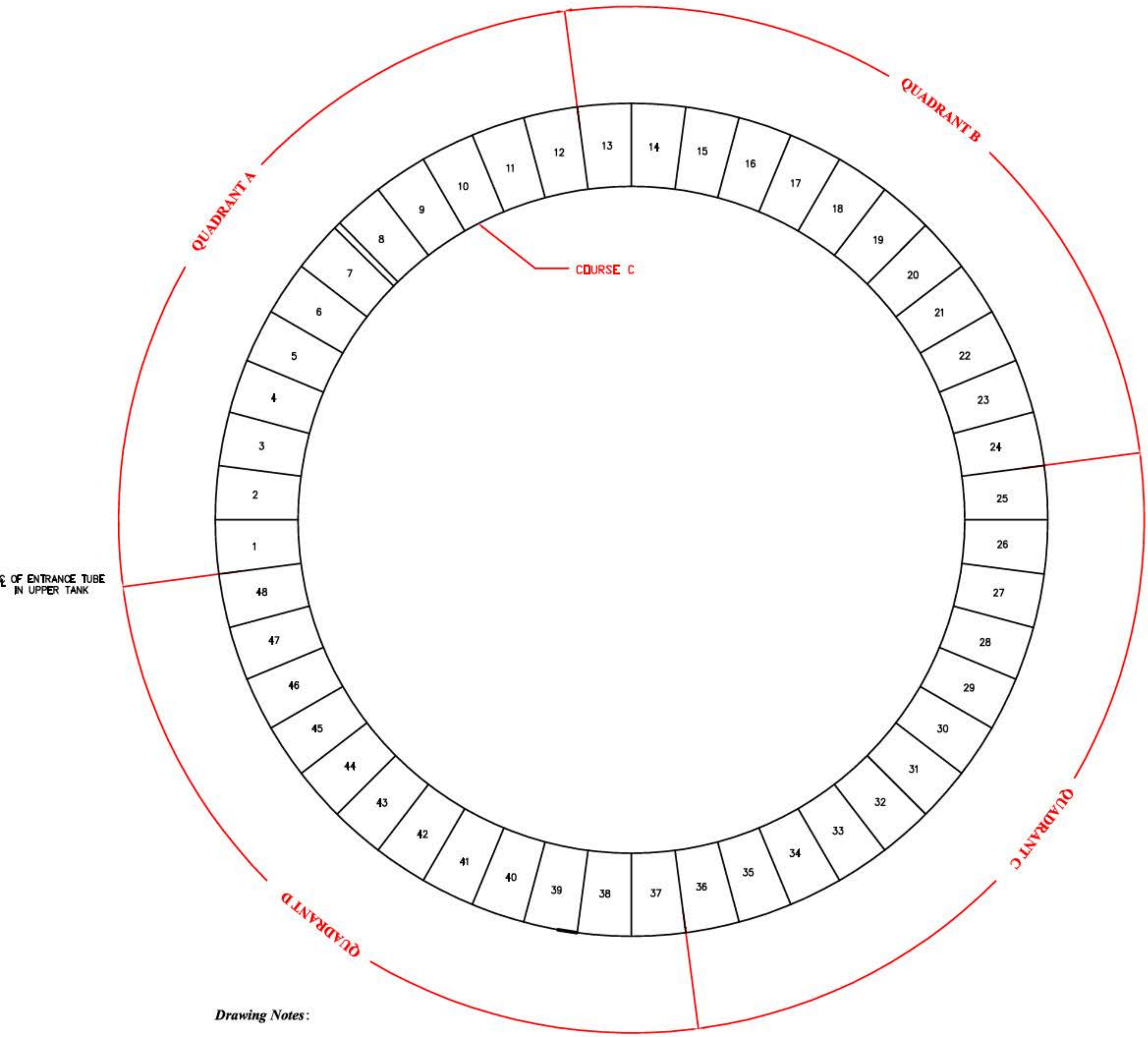
***Drawing Notes*:**

1. Tank is divided into 4 quadrants (A-D).
2. Course B is comprised of 72 total plates.
3. Quadrant A is comprised of 19 plates (1-19).
4. Quadrant B is comprised of 18 plates (20-37).
5. Quadrant C is comprised of 18 plates (38-55).
6. Quadrant D is comprised of 17 plates (56-72).
7. This numbering convention begins with plate #1 being the first full plate to the left of the manway in plan view.
8. All Plate intersection welds are covered with 3" wide channels.

Drawing is not to scale

3.0 Tank Maps
Dunkin & Bush, Inc..
Honolulu, HI
Tank # 2 - Upper Dome Liner Plates

TANK # 2 - UPPER DOME COURSE C



***Drawing Notes*:**

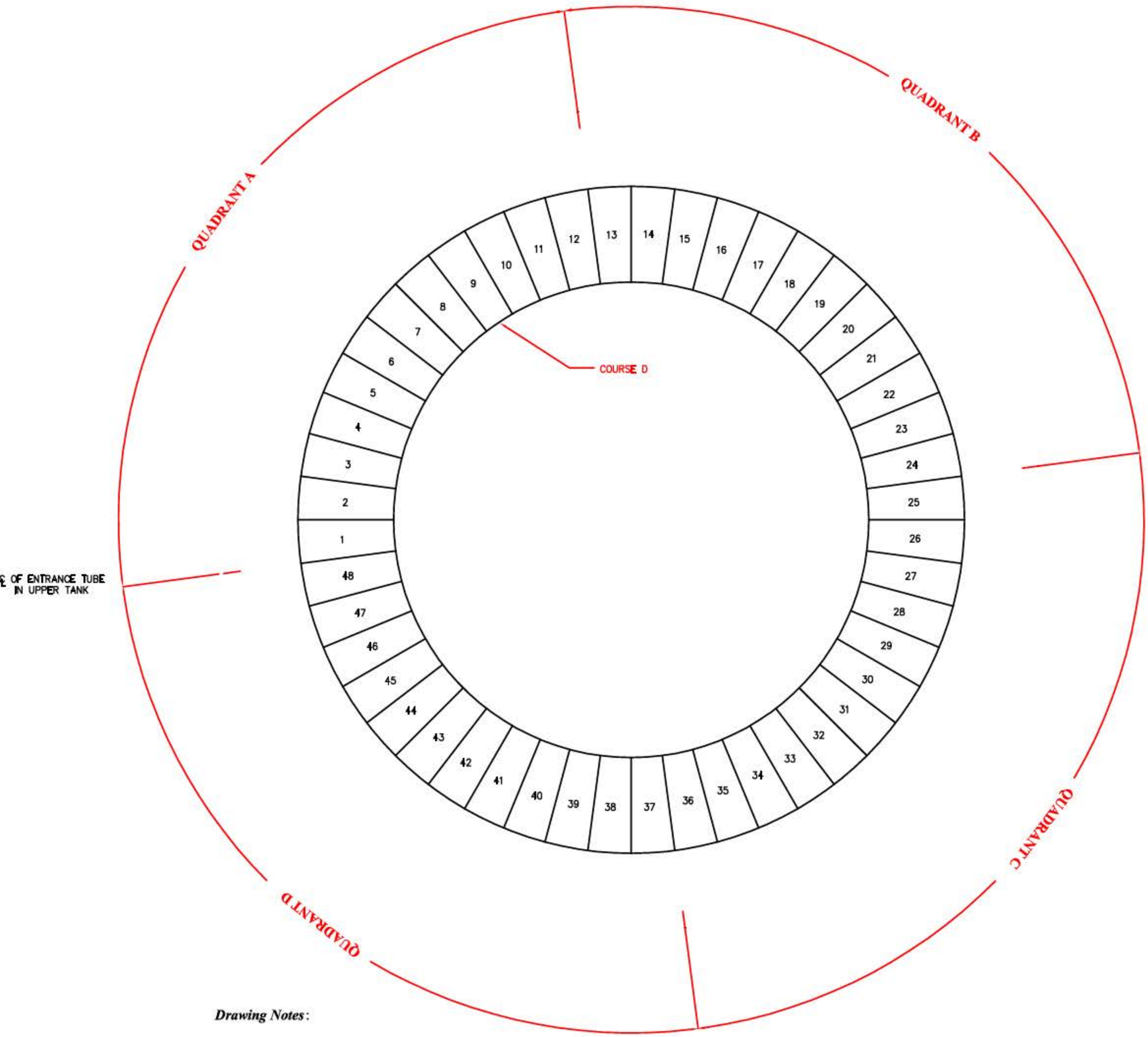
1. Tank is divided into 4 quadrants (A-D).
2. Course C is comprised of 48 total plates.
3. Quadrant A is comprised of 12 plates (1-12).
4. Quadrant B is comprised of 12 plates (13-24).
5. Quadrant C is comprised of 12 plates (25-36).
6. Quadrant D is comprised of 12 plates (37-48).
7. This numbering convention begins with plate #1 being the first full plate to the left of the manway in plan view.
8. All Plate intersection welds are covered with 3" wide channels.

Drawing is not to scale

3.0 Tank Maps

Dunkin & Bush, Inc..
Honolulu, HI
Tank #   - Upper Dome Liner Plates

TANK # 2 - UPPER DOME COURSE D



Drawing Notes:

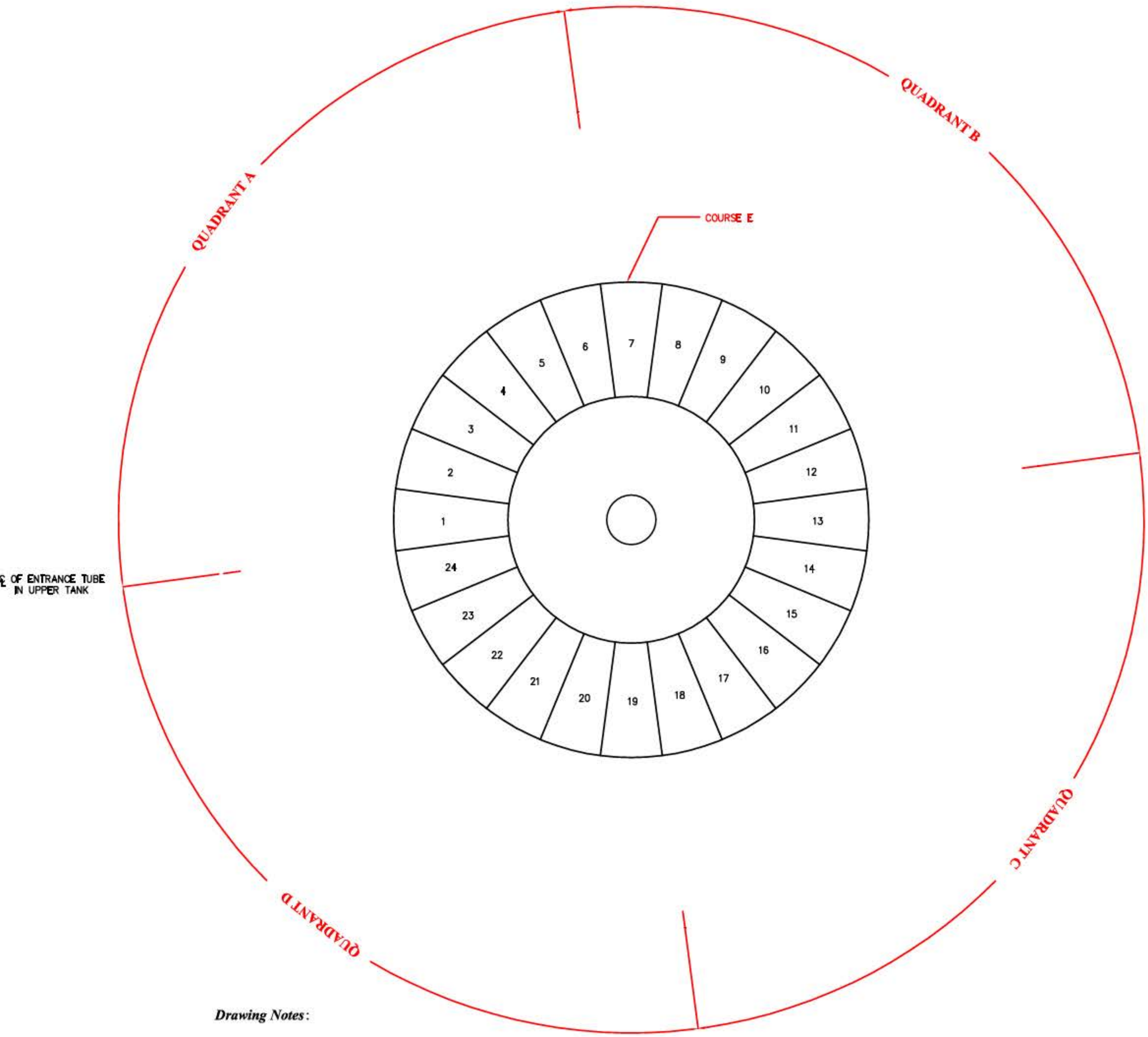
1. Tank is divided into 4 quadrants (A-D).
2. Course D is comprised of 48 total plates.
3. Quadrant A is comprised of 12 plates (1-12).
4. Quadrant B is comprised of 12 plates (13-24).
5. Quadrant C is comprised of 12 plates (25-36).
6. Quadrant D is comprised of 12 plates (37-48).
7. This numbering convention begins with plate #1 being the first full plate to the left of the manway in plan view.
8. All Plate intersection welds are covered with 3" wide channels

Drawing is not to scale

3.0 Tank Maps

Dunkin & Bush, Inc..
Honolulu, HI
Tank # 2 - Upper Dome Liner Plates

TANK # 2 - UPPER DOME COURSE E



Drawing Notes:

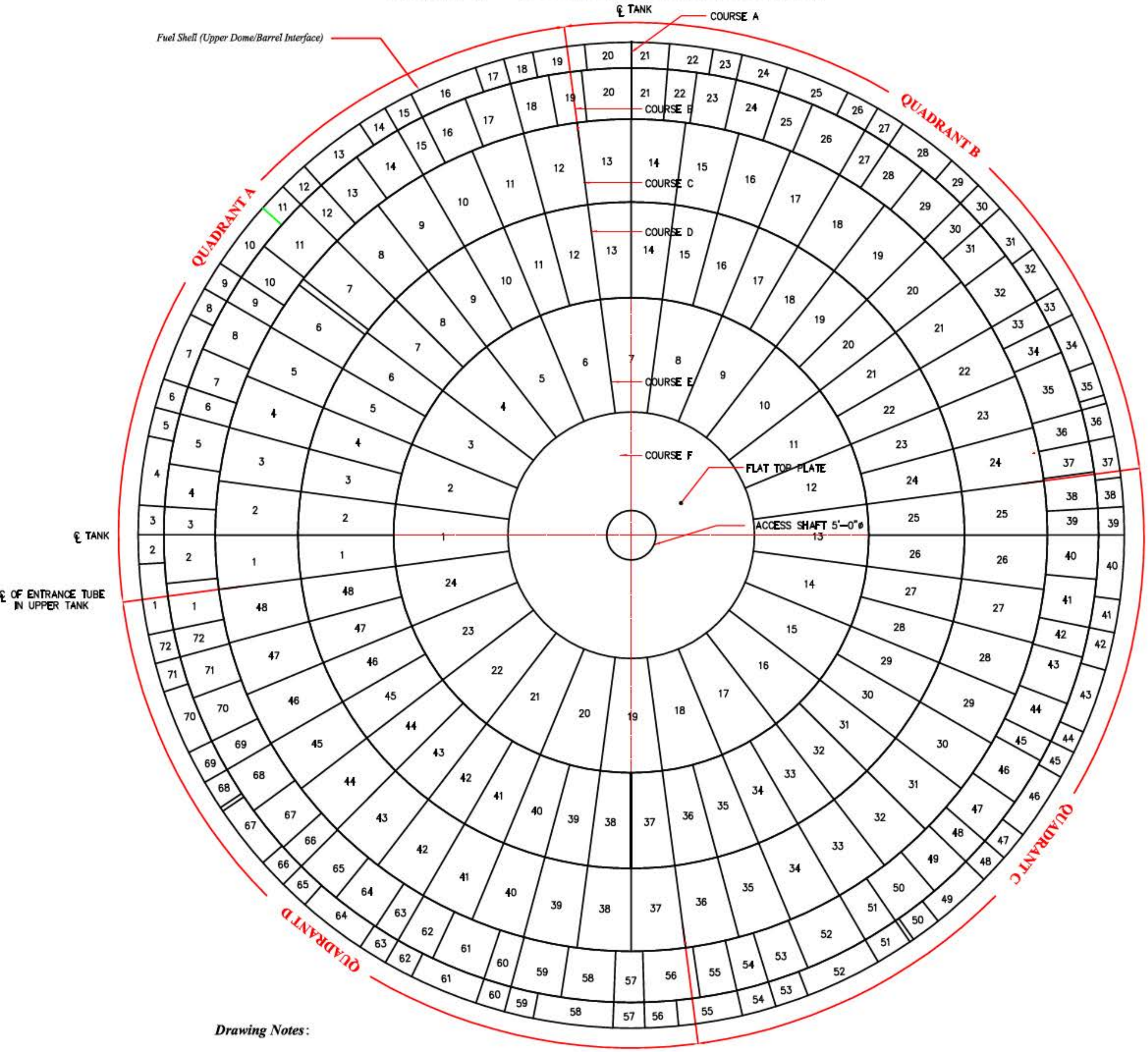
1. Tank is divided into 4 quadrants (A-D).
2. Course E is comprised of 24 total plates.
3. Quadrant A is comprised of 6 plates (1-6).
4. Quadrant B is comprised of 6 plates (7-12).
5. Quadrant C is comprised of 6 plates (13-18).
6. Quadrant D is comprised of 6 plates (19-24).
7. This numbering convention begins with plate #1 being the first full plate to the left of the manway in plan view.
8. All Plate intersection welds are covered with 3" wide channels.

Drawing is not to scale

3.0 Tank Maps

Dunkin & Bush, Inc..
Honolulu, HI
Tank # 2 - Upper Dome Liner Plates

TANK # 2 - UPPER DOME LINER PLATES



***Drawing Notes*:**

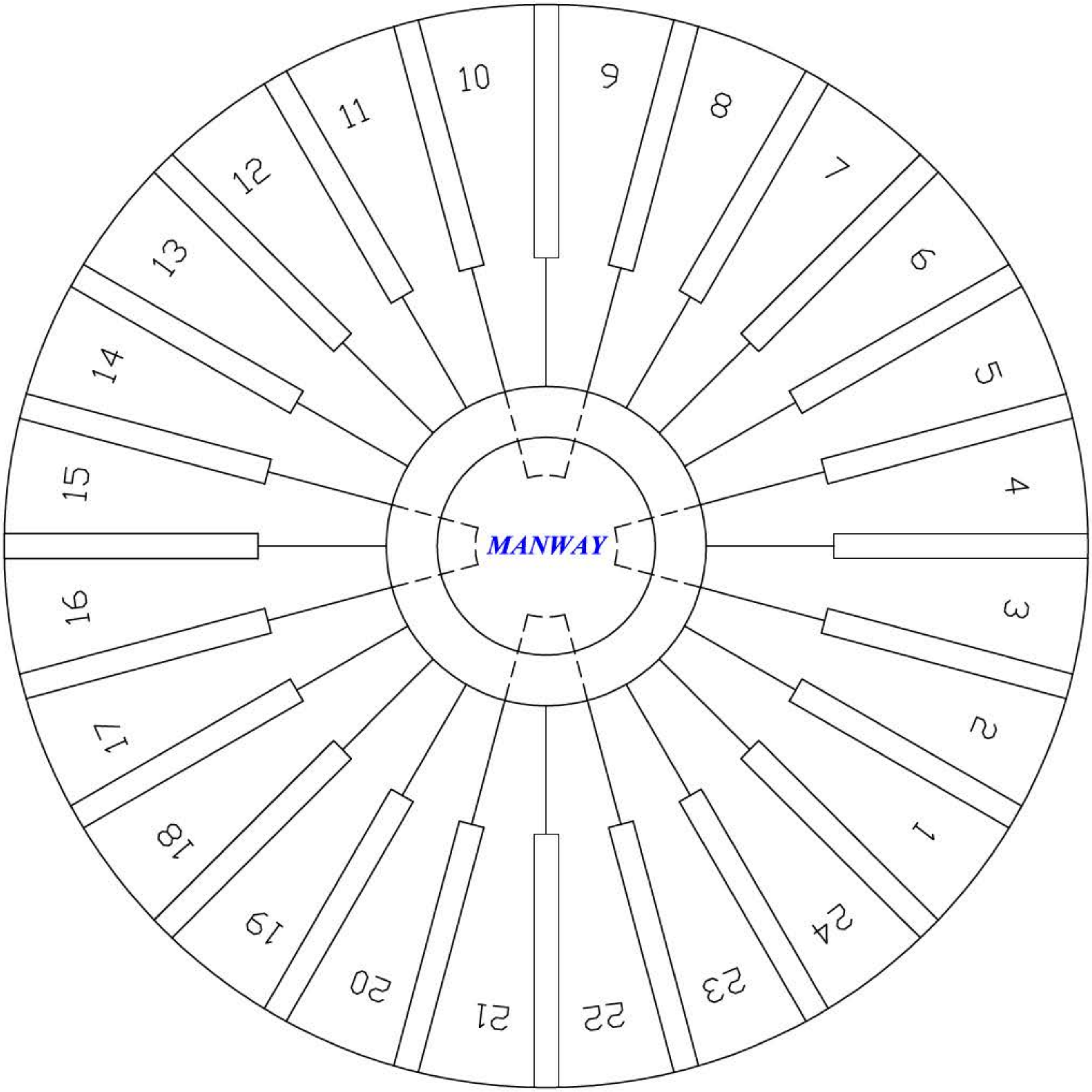
1. Tank is divided into 4 quadrants (A-D).
2. Course A is comprised of 72 total plates.
3. Course B is comprised of 72 total plates.
4. Course C is comprised of 48 total plates.
5. Course D is comprised of 48 total plates.
6. Course E is comprised of 24 total plates.
7. This numbering convention begins with plate #1 being the first full plate to the left of the manway in plan view.
8. All Plate intersection welds are covered with 3" wide channels.

Drawing is not to scale

Date Inspected/Confirmed: 5/6/2008

Tank Section: Upper Dome
Quadrant: A, B, C, D
Course: F

TANK #2 - Upper Dome Course F



Drawing is not to scale

TANK #2 - QUADRANT A

Nominal Plate Thickness: 0.250"

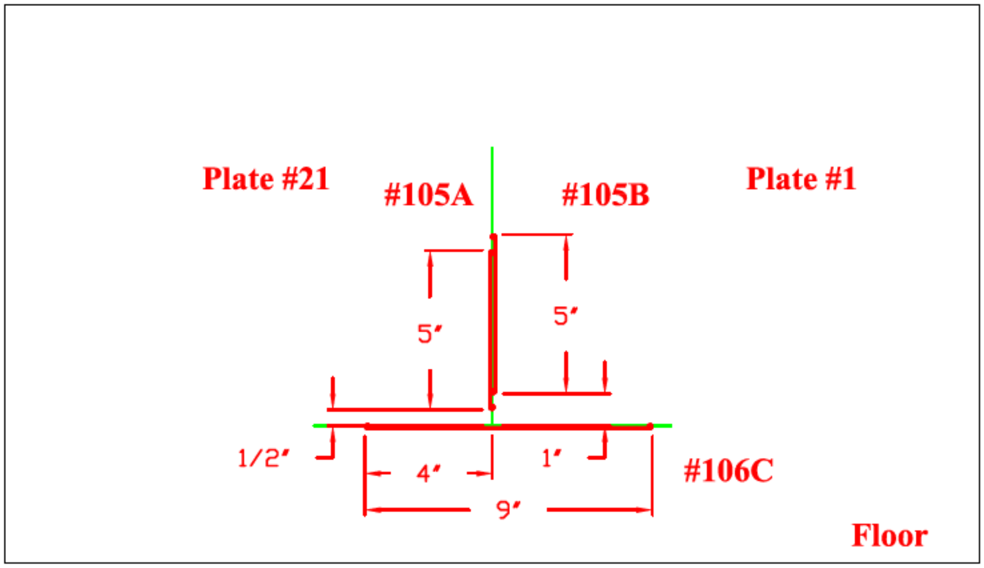
Date Inspected/Confirmed: 05/08/2008

Tank Section: Floor/Shell
Quadrant: A
Course:
Plate: # 21 - 1

Flaw # 105A - Lack of fusion .094 depth 5" long (left)

Flaw # 105B - Lack of fusion .081 depth 5" long (right)

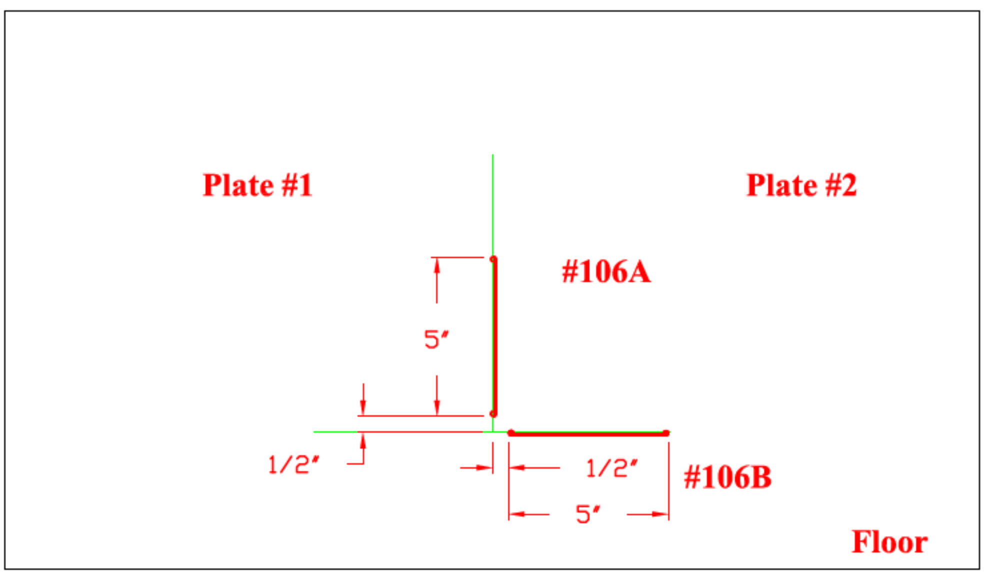
Flaw # 105C - Lack of fusion .100 depth 9" long (bottom)



Tank Section: Floor/Shell
Quadrant: A
Course:
Plate: # 1 - 2

Flaw # 106A - Lack of fusion .086 depth 5" long (right)

Flaw # 106B - Lack of fusion .084 depth 5" long (bottom)



Drawing is not to scale

TANK #2 - QUADRANT A

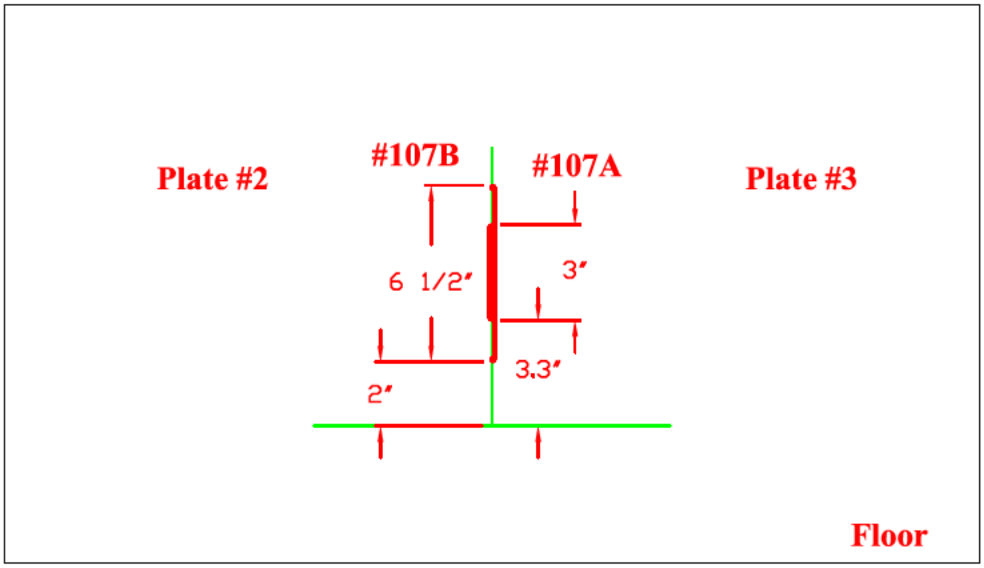
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/08/2008

Tank Section: Floor/Shell
Quadrant: A
Course:
Plate: # 2 - 3

Flaw #107A - Lack of fusion
.201 depth 6 ½" long (right)

Flaw #107B - Lack of fusion
.217 depth 3" long (left)



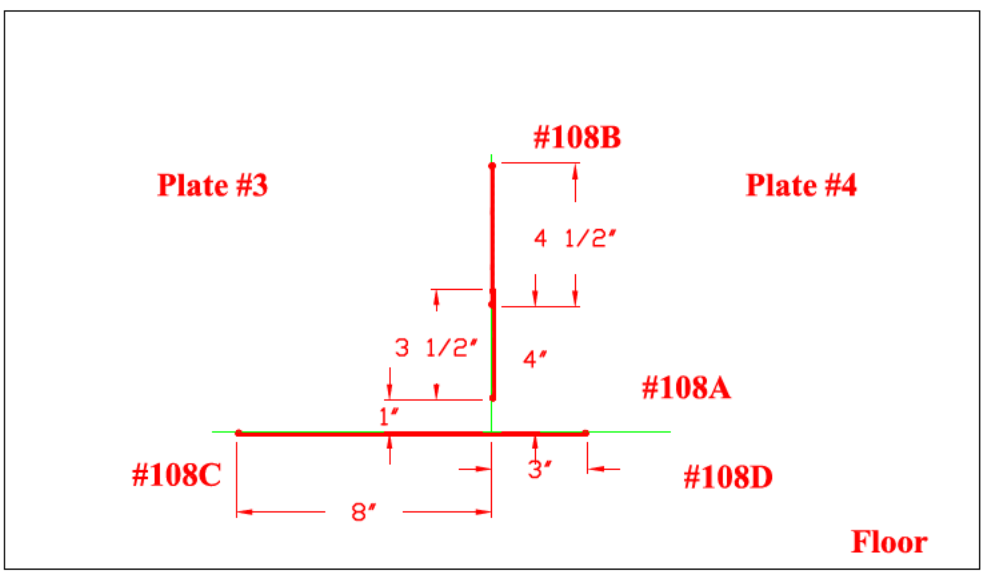
Tank Section: Floor/Shell
Quadrant: A
Course:
Plate: # 3 - 4

Flaw #108A - Lack of fusion
.206 depth 3 ½" long (right)

Flaw #108B - Lack of fusion
.200 depth 4 ½" long (center)

Flaw #108C - Lack of fusion
.080 depth 8" long (bottom)

Flaw #108D - Lack of fusion
.135 depth 3" long (bottom)



Drawing is not to scale

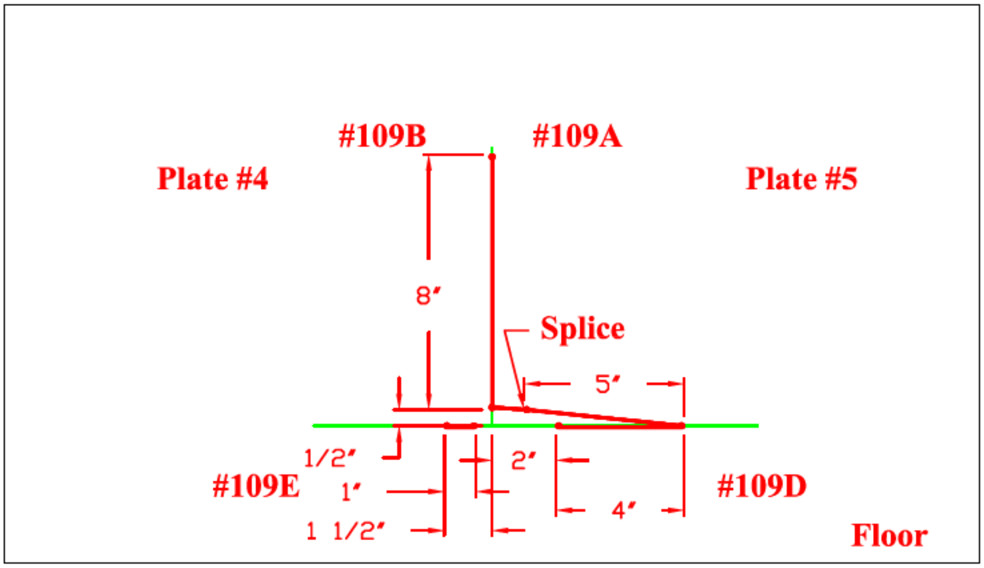
TANK #2 - QUADRANT A

Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/09/2008

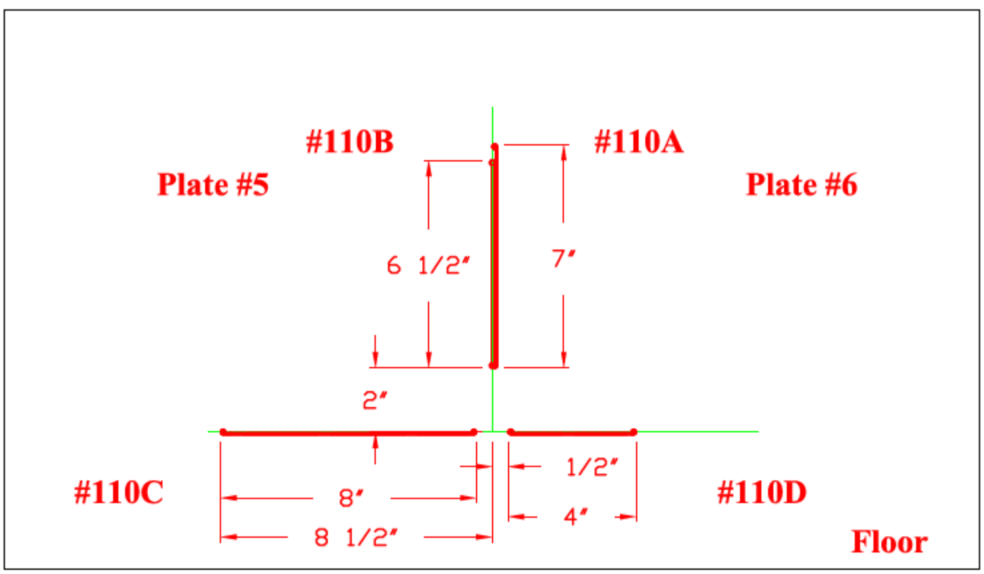
Tank Section: Floor/Shell
Quadrant: A
Course:
Plate: # 4 - 5

Flaw #109A,B - Lack of fusion
.201 depth 8" long (right)
.212 depth 8" long (left)
Flaw #109C - Lack of fusion
.201 depth 5" long (center)
Flaw #109D,E - Lack of fusion
.086 depth 4" long (bottom)
.162 depth 1" long (bottom)



Tank Section: Floor/Shell
Quadrant: A
Course:
Plate: # 5 - 6

Flaw #110A - Lack of fusion
.193 depth 7" long (right)
Flaw #110B - Lack of fusion
.198 depth 6 1/2" long (left)
Flaw #110C - Lack of fusion
.065 depth 8" long (bottom)
Flaw #110D - Lack of fusion
.148 depth 4" long (bottom)



Drawing is not to scale

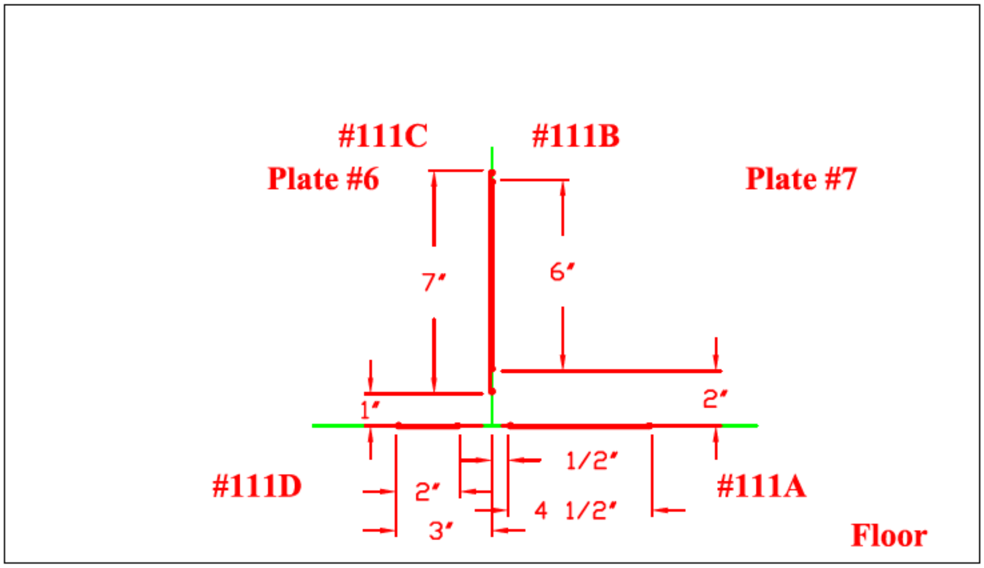
TANK #2 - QUADRANT AB

Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/09/2008

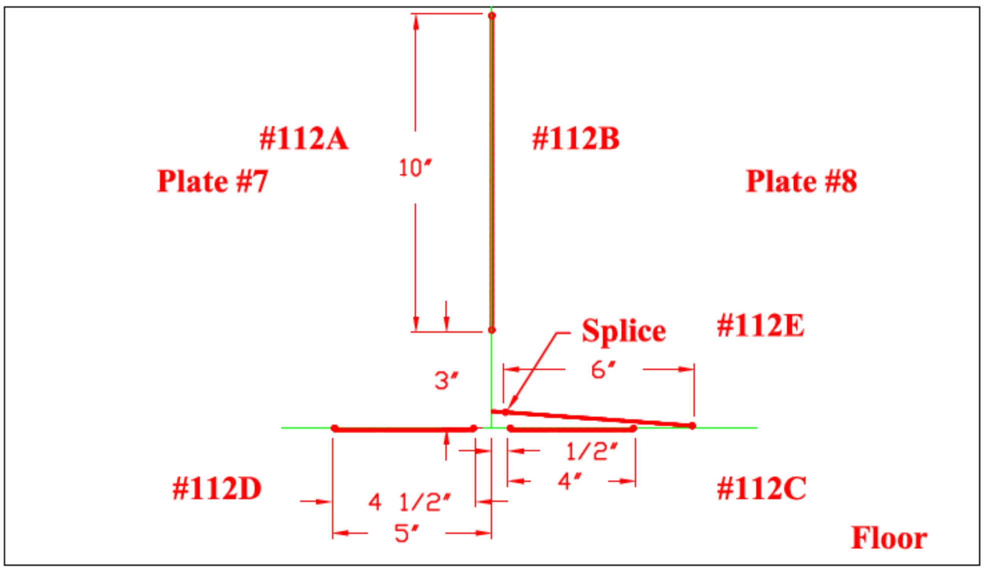
Tank Section: Floor/Shell
Quadrant: AB
Course:
Plate: # 6 - 7

Flaw #111A - Lcak of fusion
.185" depth 4 ½" long (bottom)
Flaw #111 B,C - Lcak of fusion
.157" depth 6" long (right)
.197" depth 7" long (left)
Flaw #111 D - Lcak of fusion
.195" depth 2" long (bottom)



Tank Section: Floor/Shell
Quadrant: AB
Course:
Plate: # 7 - 8

Flaw #112A,B - Intermittent crack
.145" depth 10" long (left)
.222" depth 10" long (right)
Flaw #112C - Intermittent crack
.188" depth 4" long (top)
Flaw #112D - Intermittent crack
.182" depth 4 1/2" long (bottom)
Flaw #112E - Splice -Intermittent crack
.218" depth 6" long (center)



Drawing is not to scale

TANK #2 - QUADRANT B

Nominal Plate Thickness: 0.250"

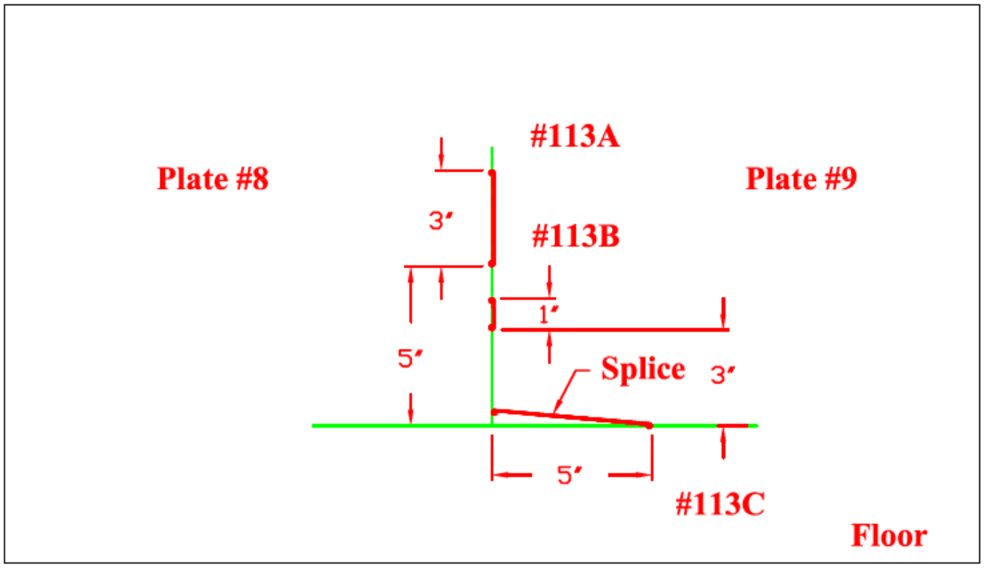
Date Inspected/Confirmed: 05/08/2008

Tank Section: Floor/Shell
Quadrant: B
Course:
Plate: # 8 - 9

Flaw #113A - Lack of fusion .079" depth 3" long (right)

Flaw #113B - Lack of fusion .207" depth 1" long (right)

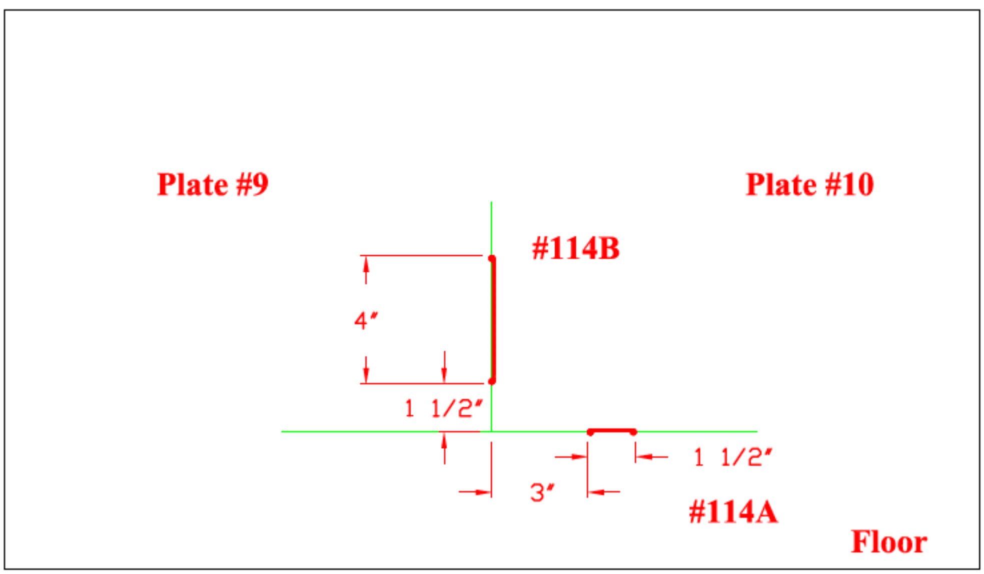
Flaw #113C - Lack of fusion .086" depth 5" long (top)



Tank Section: Floor/Shell
Quadrant: B
Course:
Plate: # 9 - 10

Flaw #114A - Lack of fusion .133" depth 1 1/2" long (top)

Flaw #114B - Lack of fusion .216" depth 4" long (right)



Drawing is not to scale

TANK #2 - QUADRANT BC

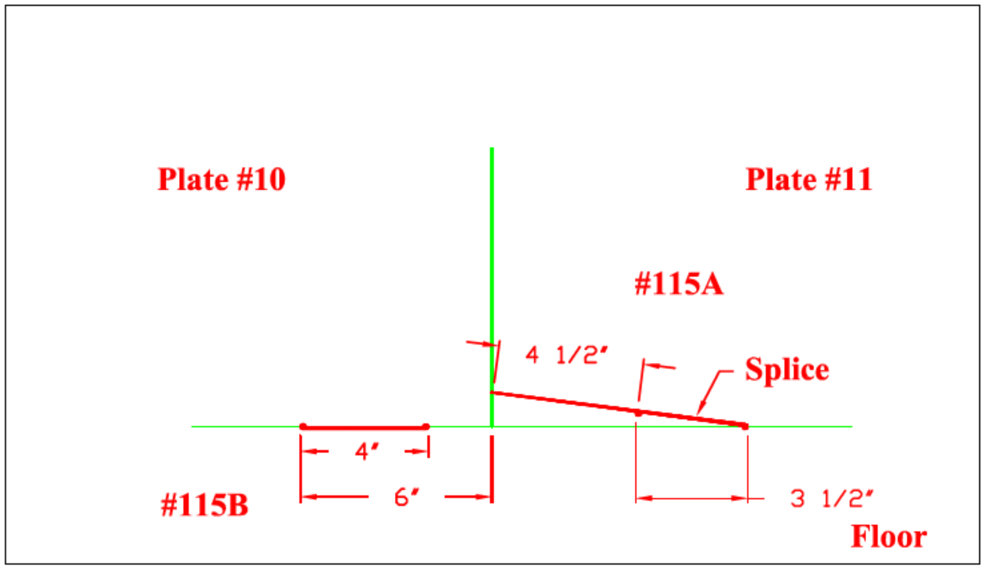
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/08/2008

Tank Section: Floor/Shell
Quadrant: B
Course:
Plate: # 10 - 11

Flaw # 115A - Splice - LOF
.082" depth 3 1/2" long (top)

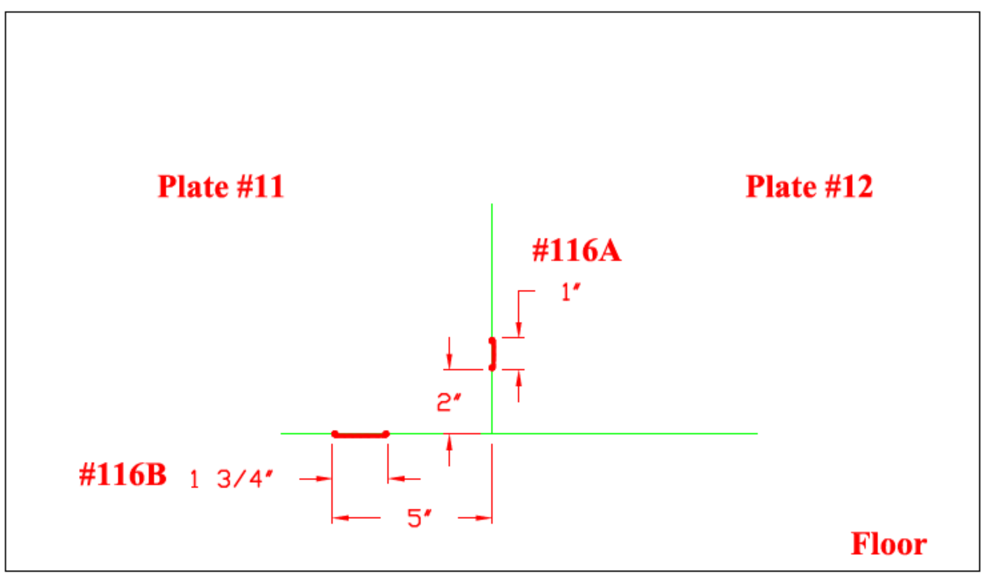
Flaw # 115B - Lack of fusion
.080" depth 4" long (bottom)



Tank Section: Floor/Shell
Quadrant: BC
Course:
Plate: # 11 -12

Flaw # 116A - Lack of fusion
.216" depth 1" long (right)

Flaw # 116B - Lack of fusion
.071" depth 1 3/4" long (bottom)



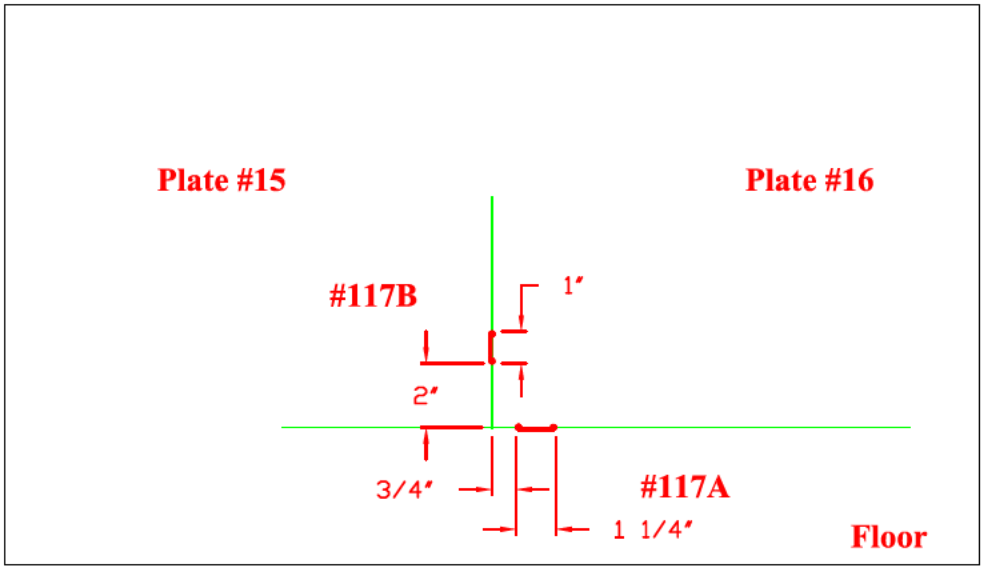
Drawing is not to scale

TANK #2 - QUADRANT CD
***Nominal Plate Thickness: 0.250"*

Date Inspected/Confirmed: 05/08/2008

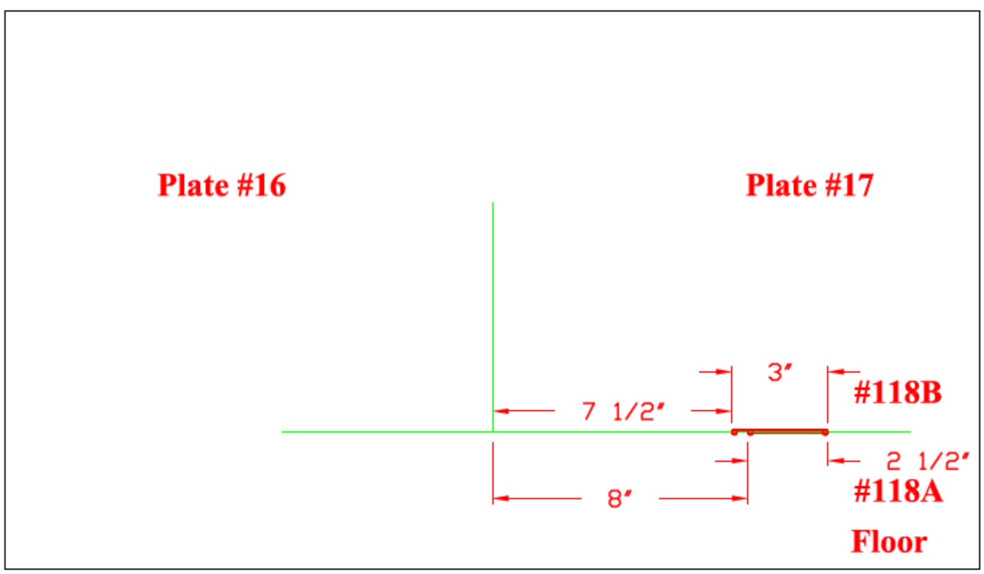
Tank Section: Floor/Shell
Quadrant: C
Course:
Plate: # 15 - 16

Flaw #117A - Lack of fusion
.102" depth 1 1/4" long (bottom)
Flaw #117B - Lack of fusion
.197" depth 1" long (left)



Tank Section: Floor/Shell
Quadrant: CD
Course:
Plate: # 16 - 17

Flaw #118A - Lack of fusion
.080" depth 2 1/2" long (bottom)
Flaw # 118B - Lack of fusion
.085" depth 3" long (top)



Drawing is not to scale

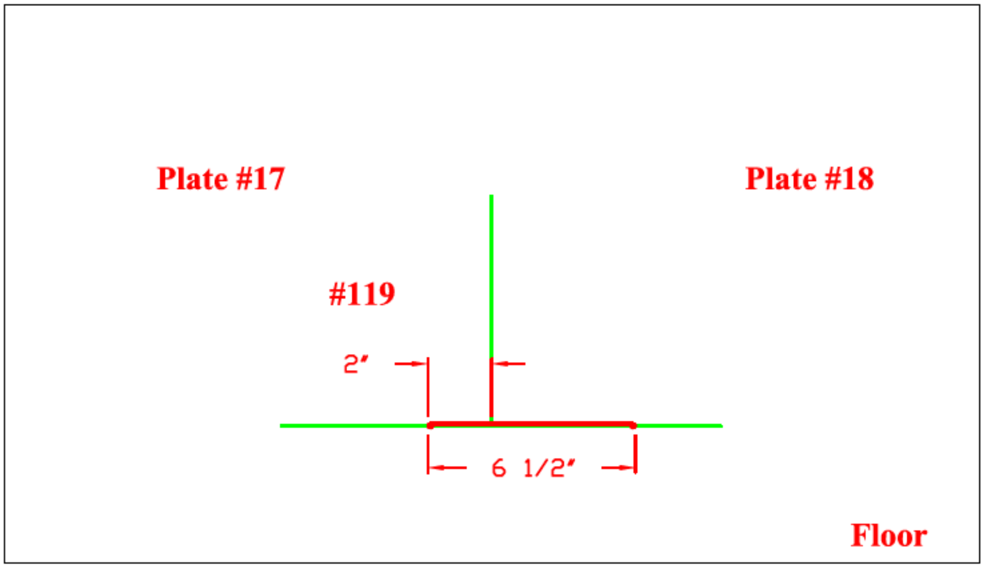
TANK #2 - QUADRANT D

Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/05/2008

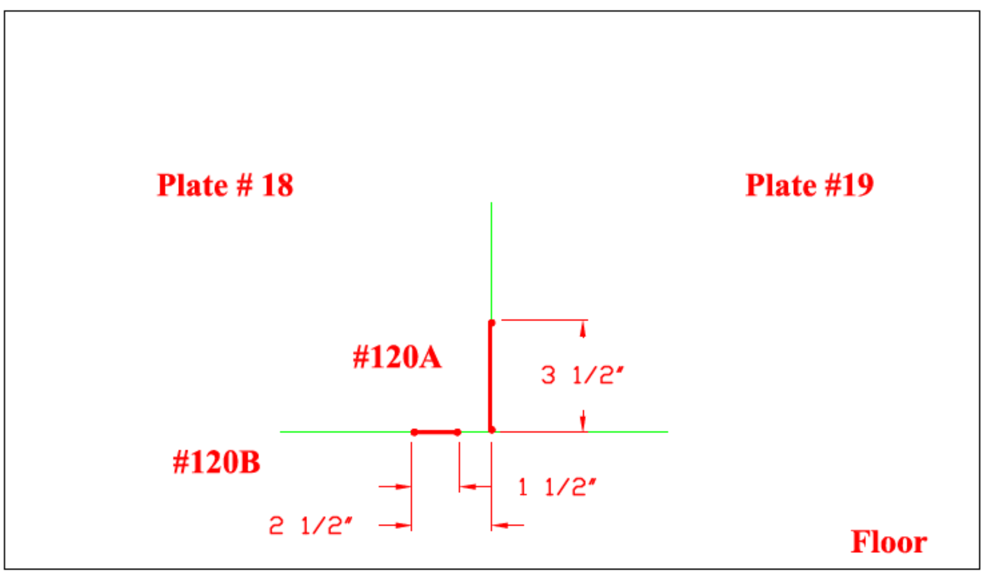
Tank Section: Floor/Shell
Quadrant: D
Course:
Plate: # 17 - 18

Flaw #119 - Lack of fusion
.211" depth 6 ½" long (top)



Tank Section: Floor/Shell
Quadrant: D
Course:
Plate: # 18 - 19

Flaw #120A - Lack of fusion
.088" depth 3 ½" long (left)
Flaw #120B - Incomplete pen.
.228" depth 1 ½" long (center)



Drawing is not to scale

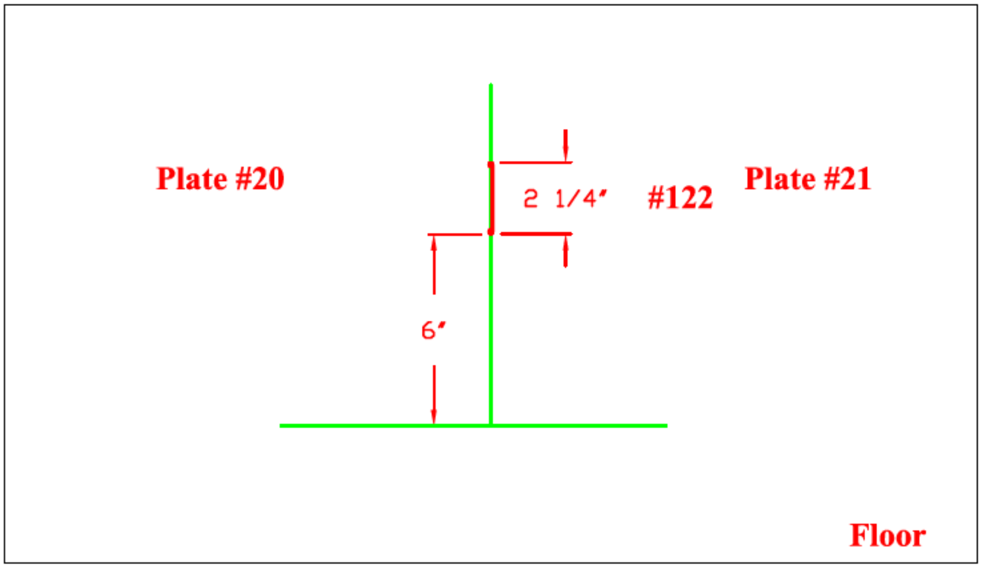
TANK #2 - QUADRANT D

Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/08/2008

Tank Section: Floor/Shell
Quadrant: D
Course:
Plate: # 20 - 21

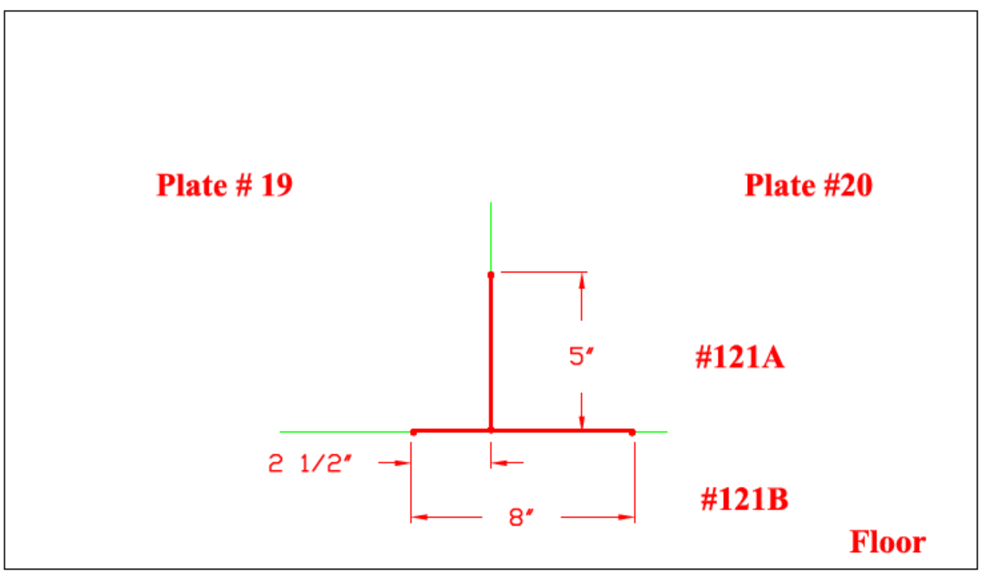
Flaw #122 - Lack of fusion
.192 depth 2 ¼" long (Right)



Tank Section: Floor/Shell
Quadrant: D
Course:
Plate: # 19 - 20

Flaw #121A - Intermittent crack
.238 depth 5" long (center)

Flaw #121B - Intermittent crack
.231 depth 8" long (top)



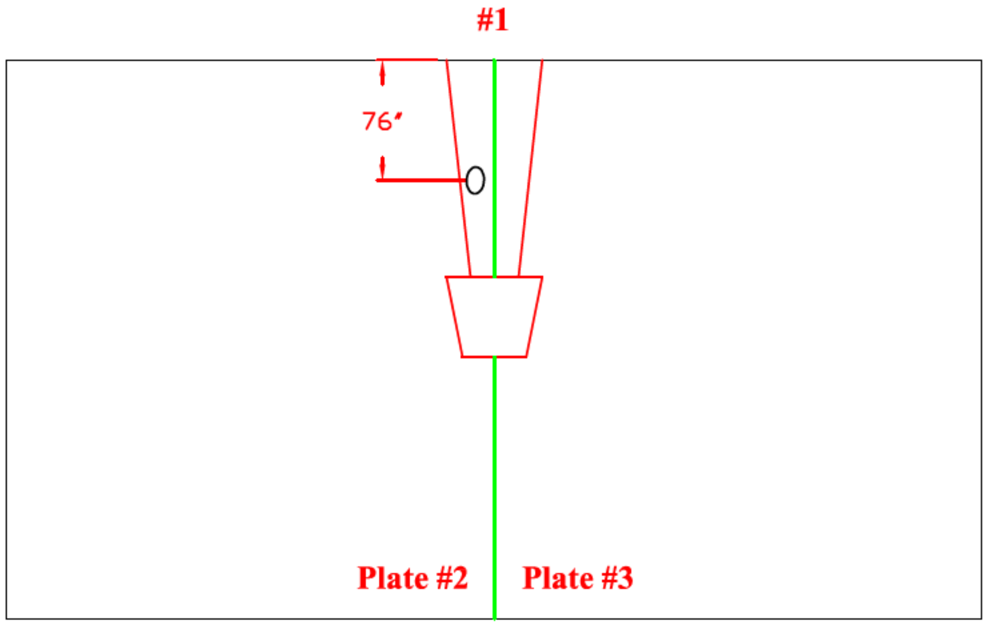
Drawing is not to scale

TANK #2 - QUADRANT A-B
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/06/2008

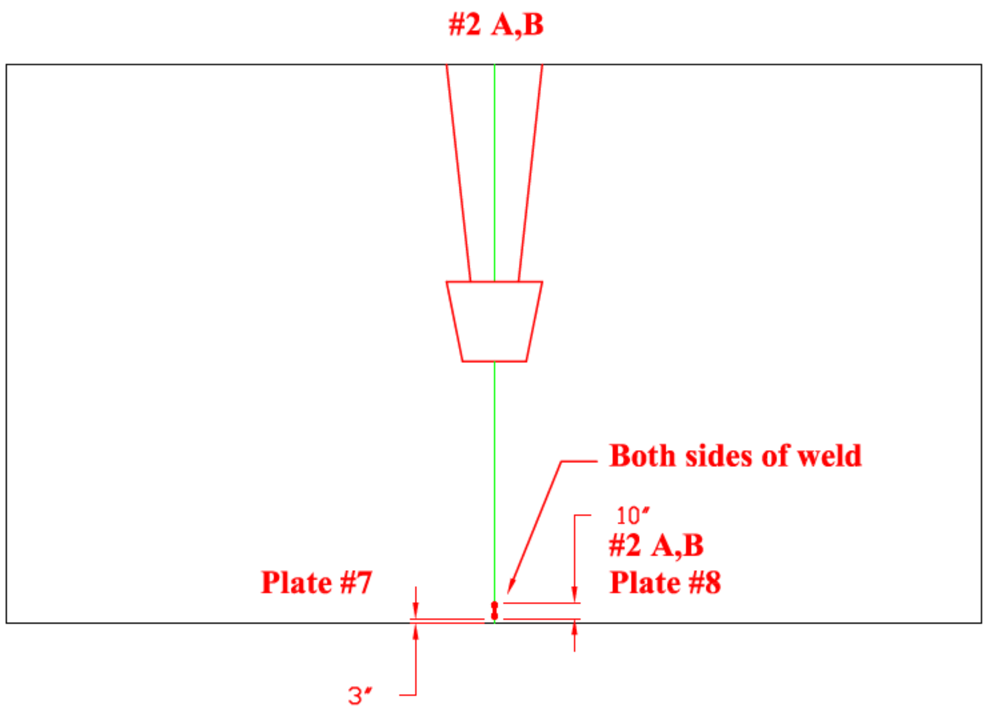
Tank Section: Lower dome
Quadrant: A
Course: 1
Plate: # 2 - 3

Flaw #1 - Dent
⅜" deep
1" dia



Tank Section: Lower dome
Quadrant: B
Course: 1
Plate: # 7 - 8

Flaw #2 - Intermittent crack
2A - .229" depth 10" long (right side)
2B - .154" depth 10" long (left side)



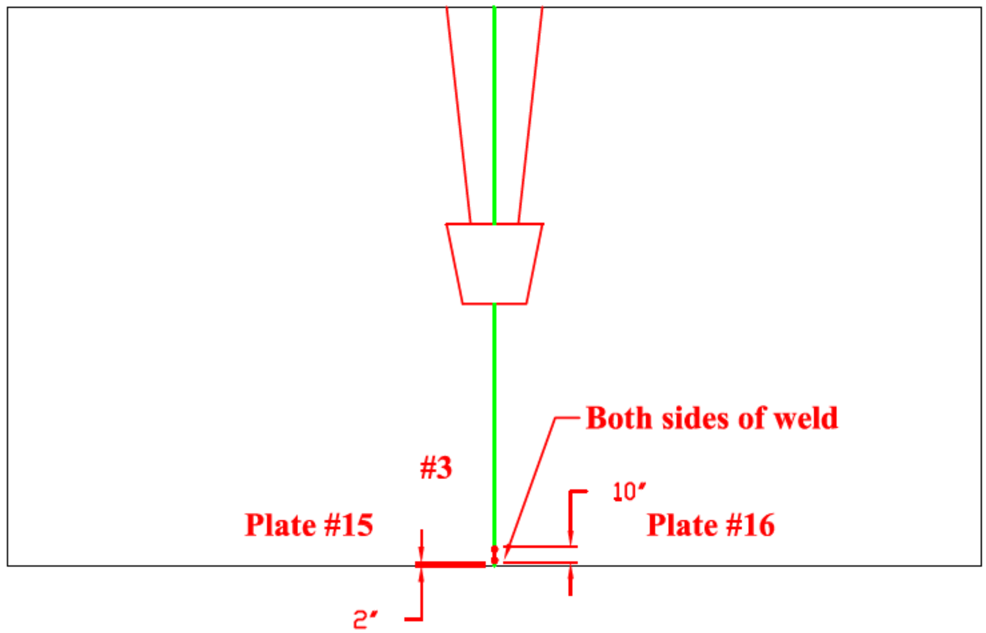
Drawing is not to scale

TANK #2 - QUADRANT C-D
***Nominal Plate Thickness: 0.250"**

Date Inspected/Confirmed: 05/06/2008

Tank Section: Lower dome
Quadrant: C
Cours: 1
Plate: # 15 - 16

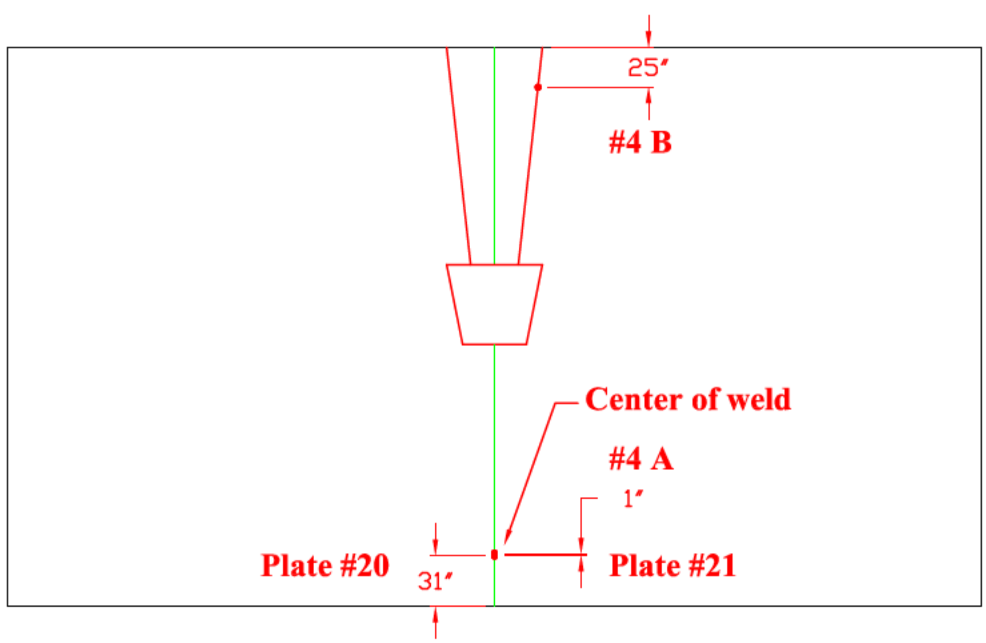
Flaw #3 - Intermittent crack
3A - .223" depth 10" long (left side)
3B - .214" depth 10" long (right side)



Tank Section: Lower dome
Quadrant: D
Course: 1
Plate: # 20 - 21

Flaw #4A - Incomplete
.222" depth 1" long

Flaw #4B - Arc strike at toe
.069" depth 2" long



Drawing is not to scale

TANK #2 - QUADRANT D-C

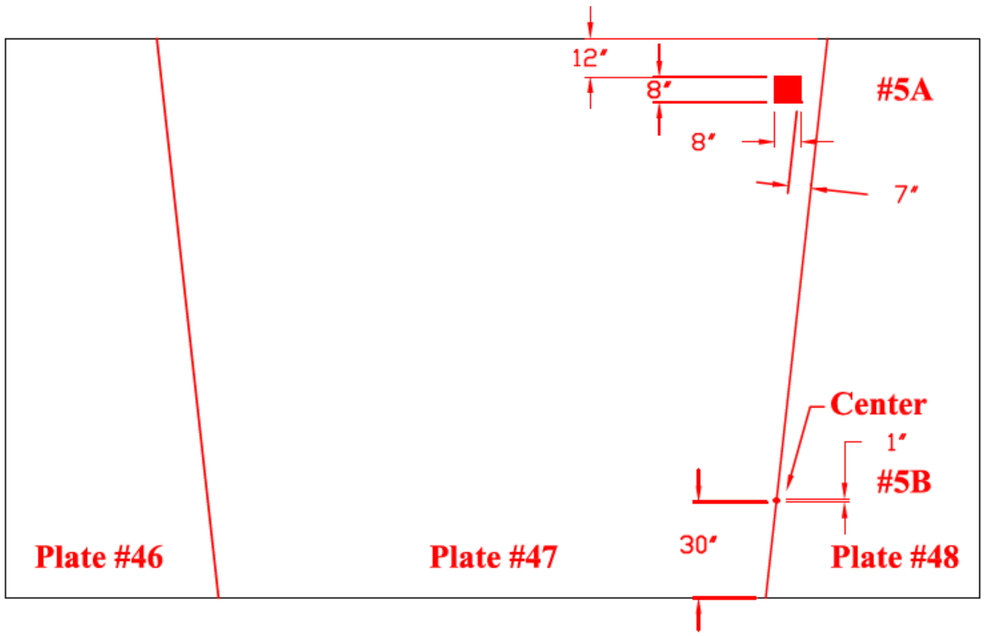
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/06/2008

Tank Section: Lower dome
Quadrant: D
Course: 2
Plate: # 47

Flaw # 5A - W.L.
.147" - .210" Remaining

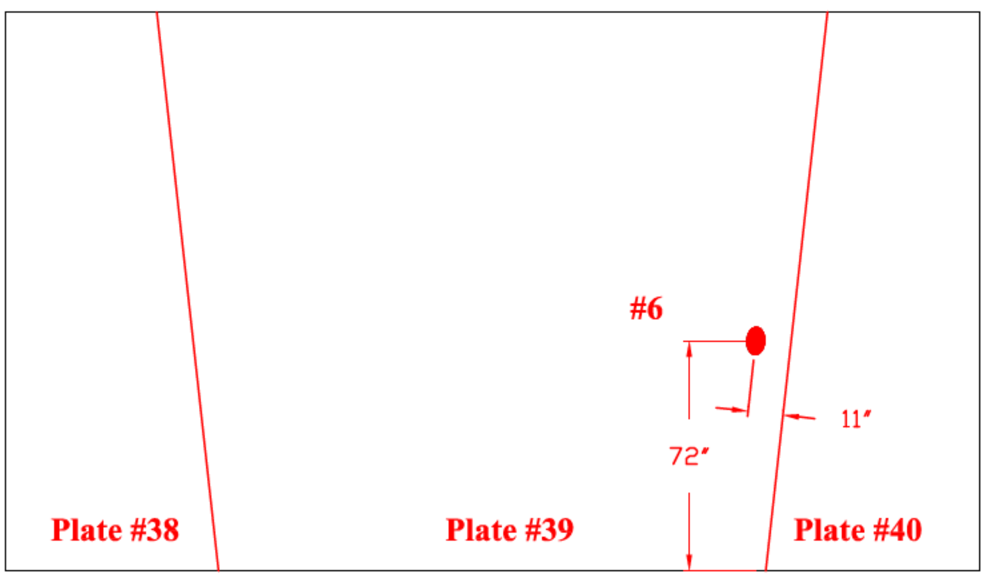
Flaw # 5B - Incomplete Pen.
.215" depth 1" long



Tank Section: Lower dome
Quadrant: C
Course: 2
Plate: # 39

Flaw # 6 - Dent

N.S.W.L.



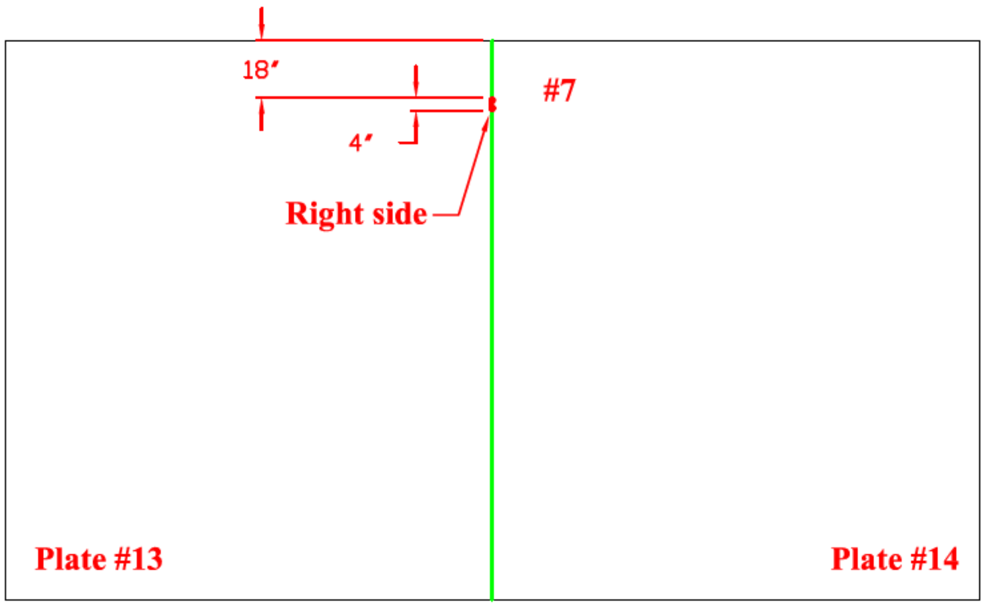
Drawing is not to scale

TANK #2 - QUADRANT A
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/07/2008

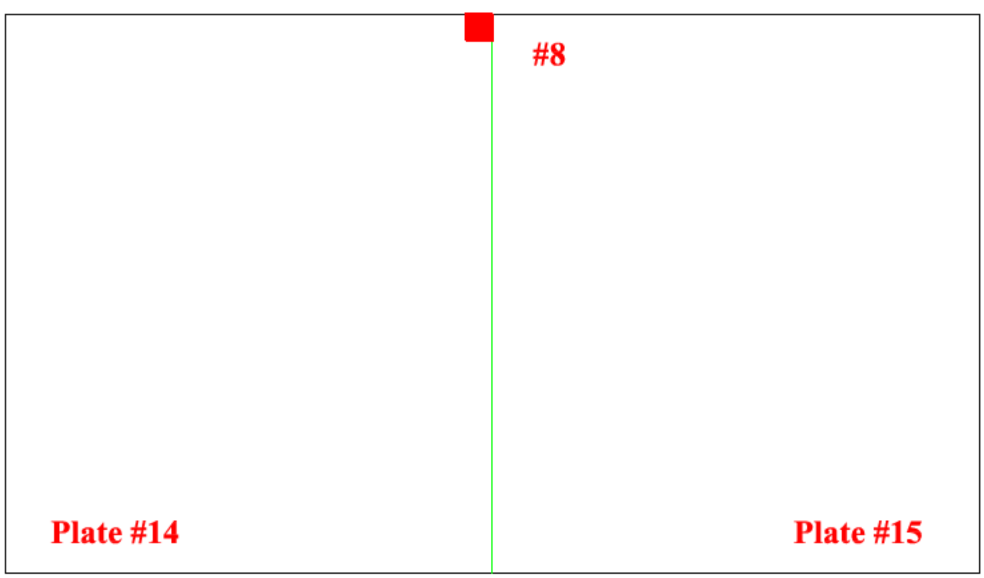
Tank Section: Lower dome
Quadrant: A
Course: 3
Plate: #13 - 14

Flaw #7 - Lack of fusion
.195" depth 4" long
(right side)



Tank Section: Lower dome
Quadrant: A
Course: 3
Plate: #14 - 15

Flaw #8 - W.L.
.223" Remaining



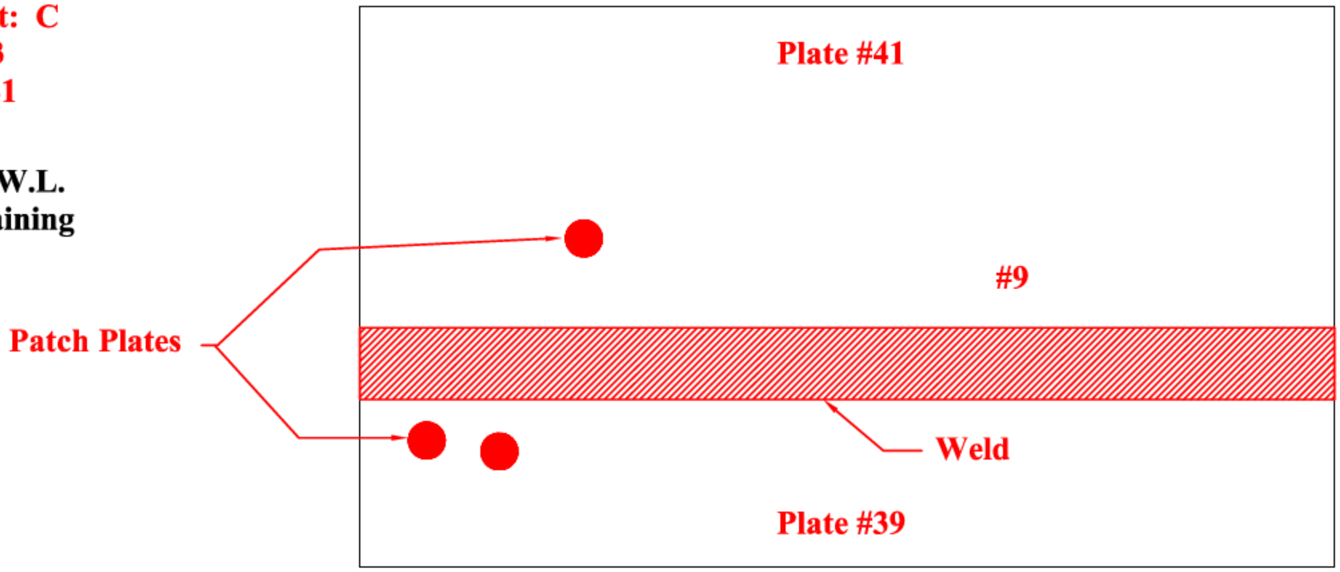
Drawing is not to scale

TANK #2 - QUADRANT C
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/03/2008

Tank Section: Lower dome
Quadrant: C
Course: 3
Plate: #41

Flaw #9 - W.L.
.230 Remaining



Tank Section: Lower dome
Quadrant: C
Course: 3
Plate: #45

Flaw #10 - W.L./Pit
.219 Remaining

Drawing is not to scale

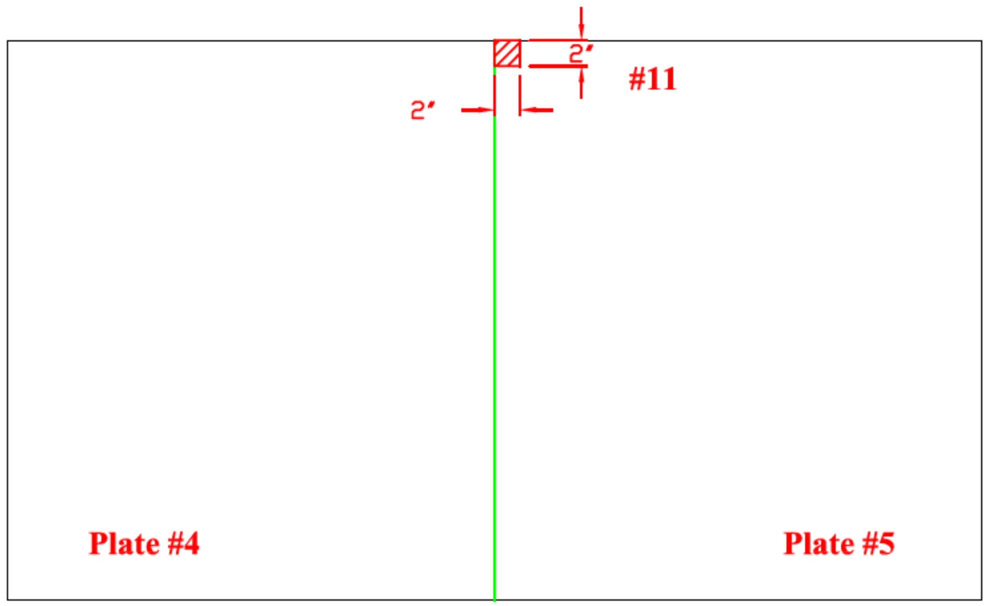
TANK #2 - QUADRANT A

Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/08/2008

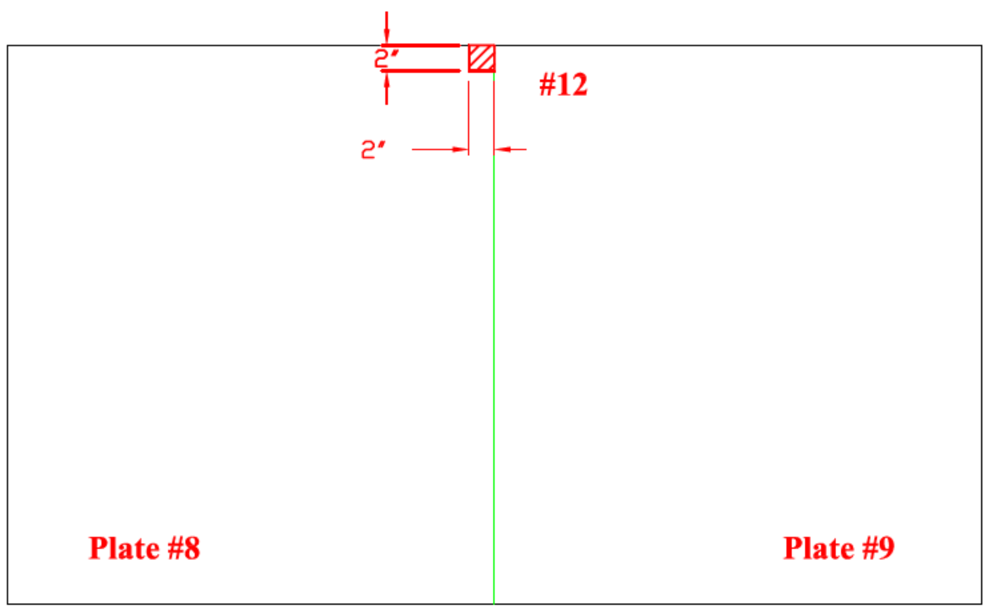
Tank Section: Lower dome
Quadrant: A
Course: 3
Plate: # 5

Flaw #11 - W.L.
.226" Remaining



Tank Section: Lower dome
Quadrant: A
Course: 3
Plate: # 8

Flaw #12 - W.L.
.233" Remaining



Drawing is not to scale

Date Inspected/Confirmed: 04/09/2008

TANK # 2 - QUADRANT A

***Nominal Plate Thickness: 0.250"**

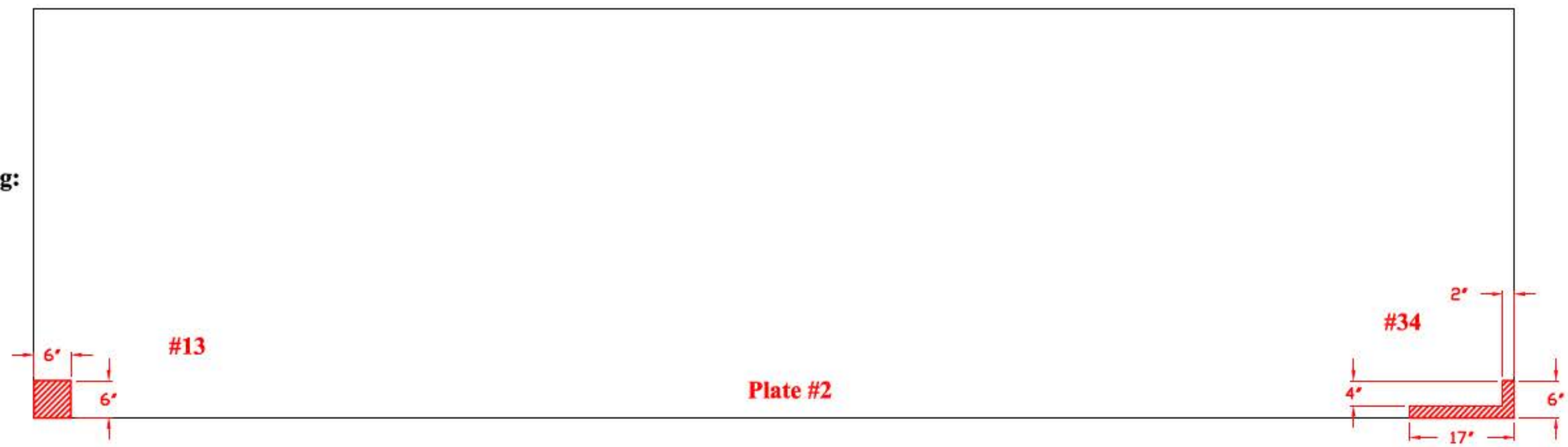
Tank Section: Barrel

Course: 25
Plate #: 2

Flaw # - Type - Remaining:

#13 - W.L. - .231"

#34 - W.L. - .219"



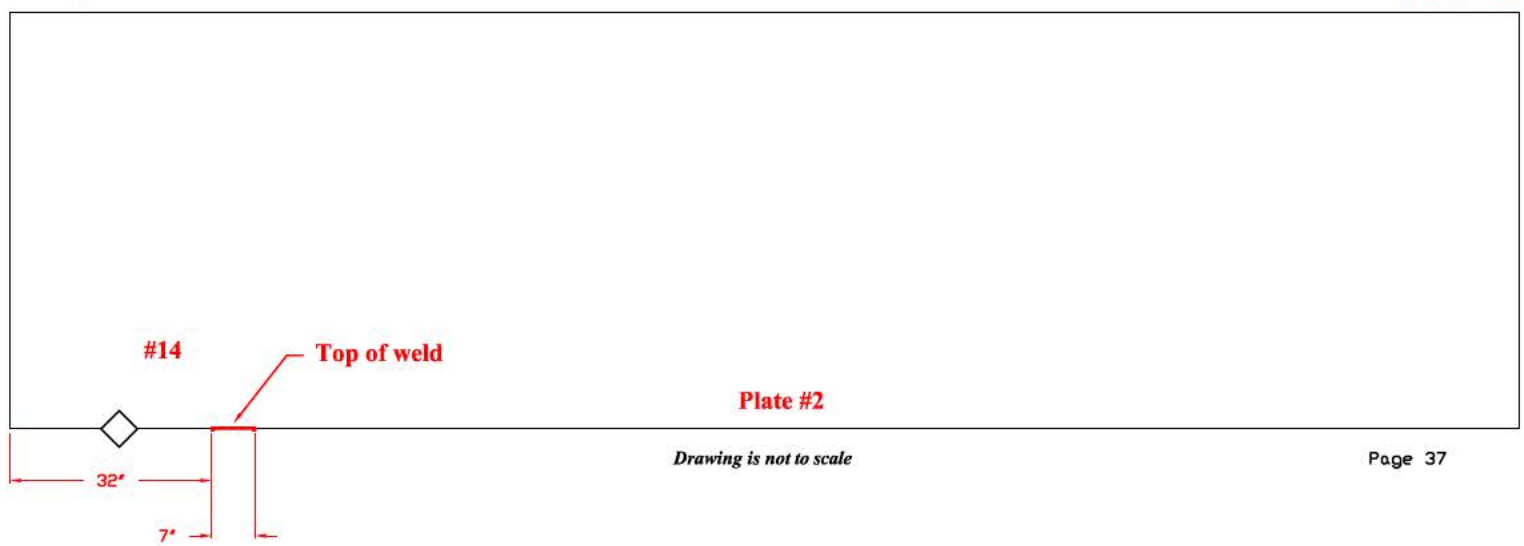
Tank Section: Barrel

Course: 2
Plate #: 2

Flaw # - Type - Remaining:

#14 - Lack of fusion

.125" depth 7" long
Top of weld



Drawing is not to scale

TANK # 2 - QUADRANT A
Nominal Plate Thickness: 0.250"

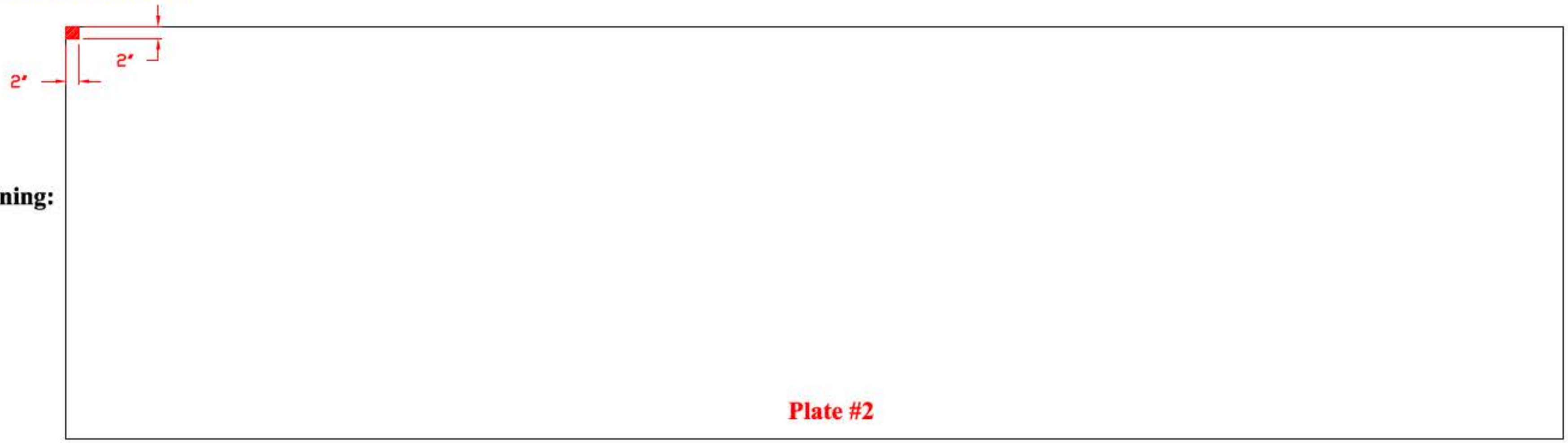
Date Inspected/Confirmed: 04/09/2008

Tank Section: Barrel

Course: 21
Plate #: 2

Flaw # - Type - Remaining:

#15 - W.L. - .233"



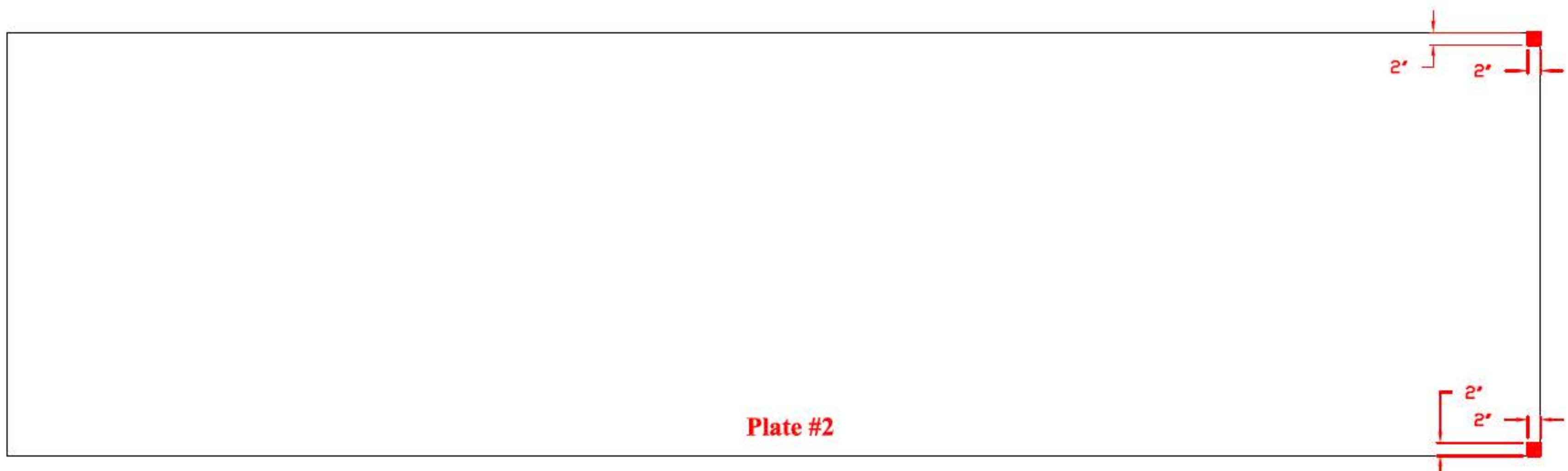
Tank Section: Barrel

Course: 25
Plate #: 1

Flaw # - Type - Remaining:

#16A - W.L. - .232"

#16B - W.L. - .227"



Drawing is not to scale

Date Inspected/Confirmed: 04/10/2008

TANK # 2 - QUADRANT A
Nominal Plate Thickness: 0.250"

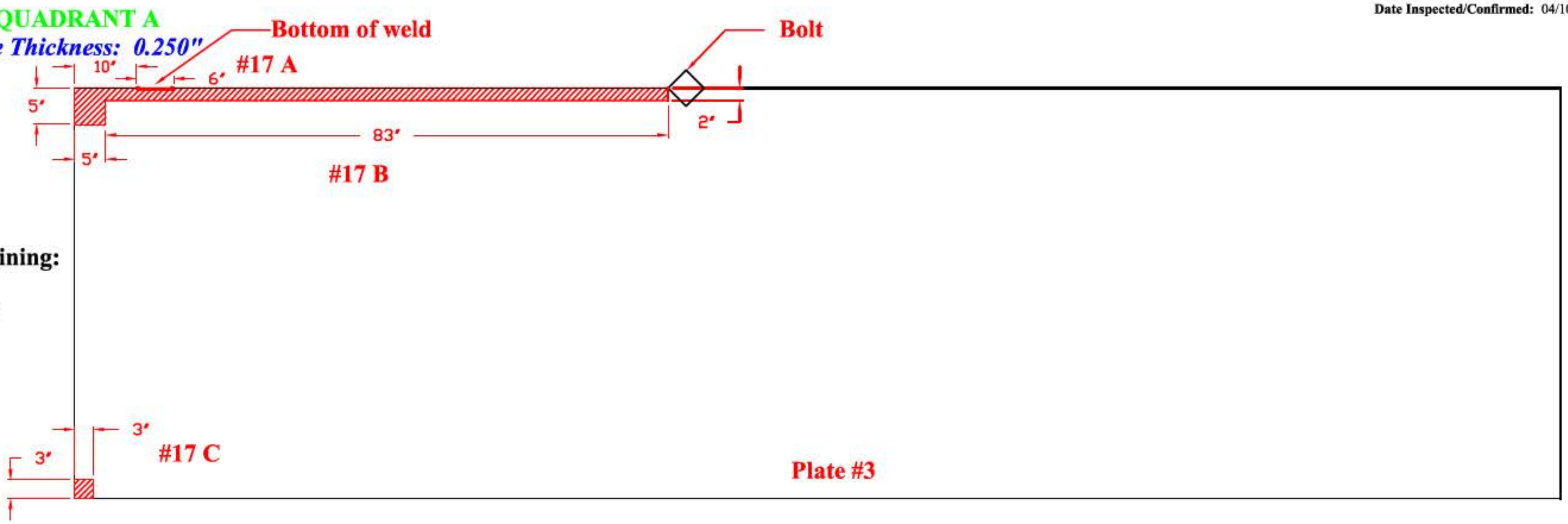
Tank Section: Barrel

Course: 21
Plate #: 3

Flaw # - Type - Remaining:

#17A - Lack of fusion .173" depth 6" long (bottom of weld)

#17B - W.L. - .224"
#17C - W.L. - .234"

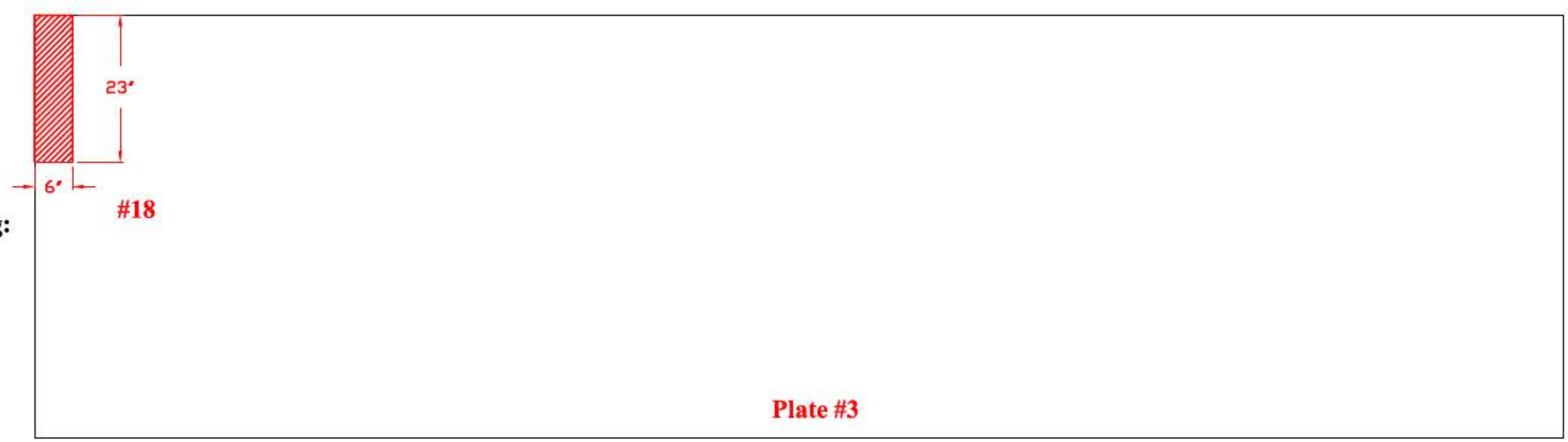


Tank Section: Barrel

Course: 7
Plate #: 3

Flaw # - Type - Remaining:

#18 - W.L. - .228"



Drawing is not to scale

TANK # 2 - QUADRANT D
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/10/2008

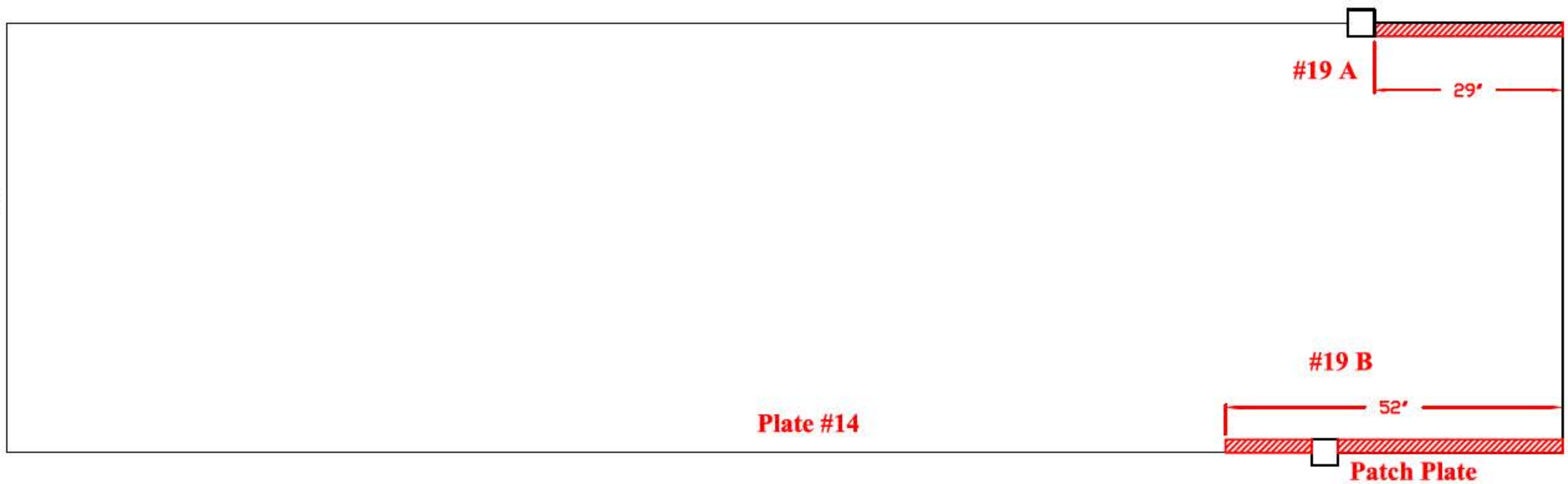
Tank Section: Barrel

Course: 24
Plate #: 14

Flaw # - Type - Remaining:

#19A - W.L. - .227"

#19B - W.L. - .232"

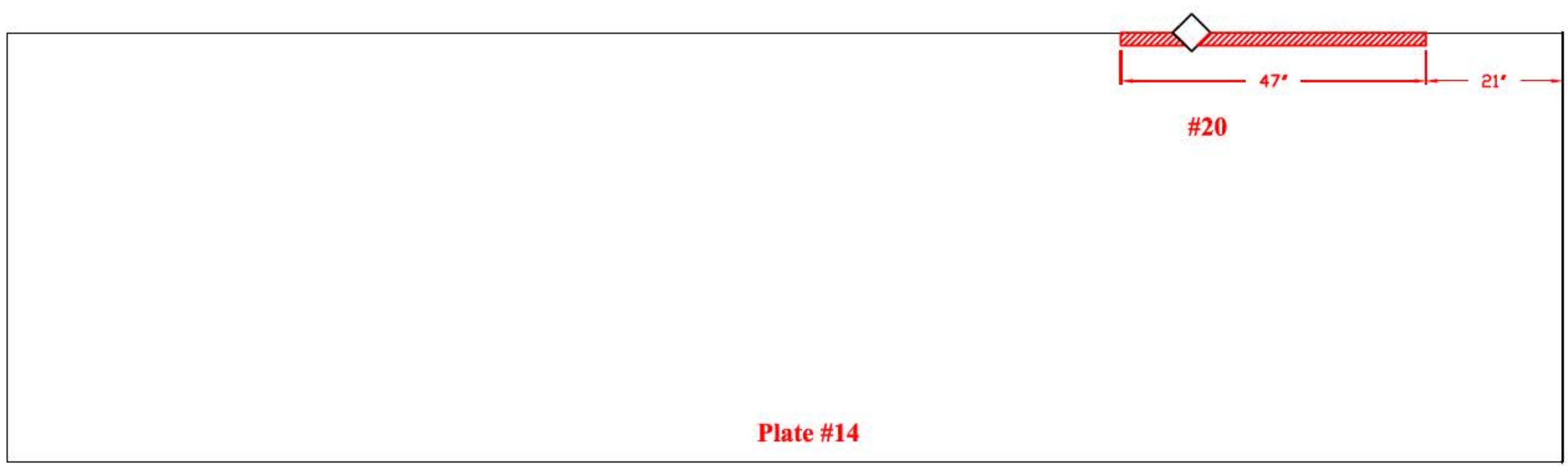


Tank Section: Barrel

Course: 22
Plate #: 14

Flaw # - Type - Remaining:

#20 - W.L. - .234"



Drawing is not to scale

TANK # 2 - QUADRANT D

Date Inspected/Confirmed: 04/10/2008

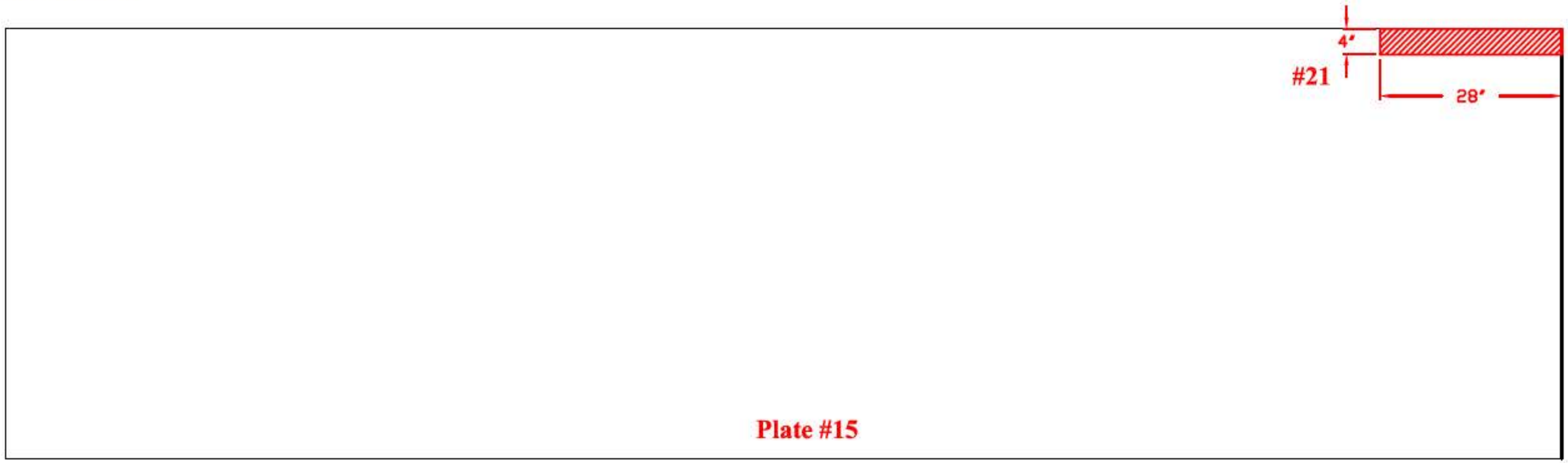
Nominal Plate Thickness: 0.250"

Tank Section: Barrel

Course: 4
Plate #: 15

Flaw # - Type - Remaining:

#21 - W.L. - .235"



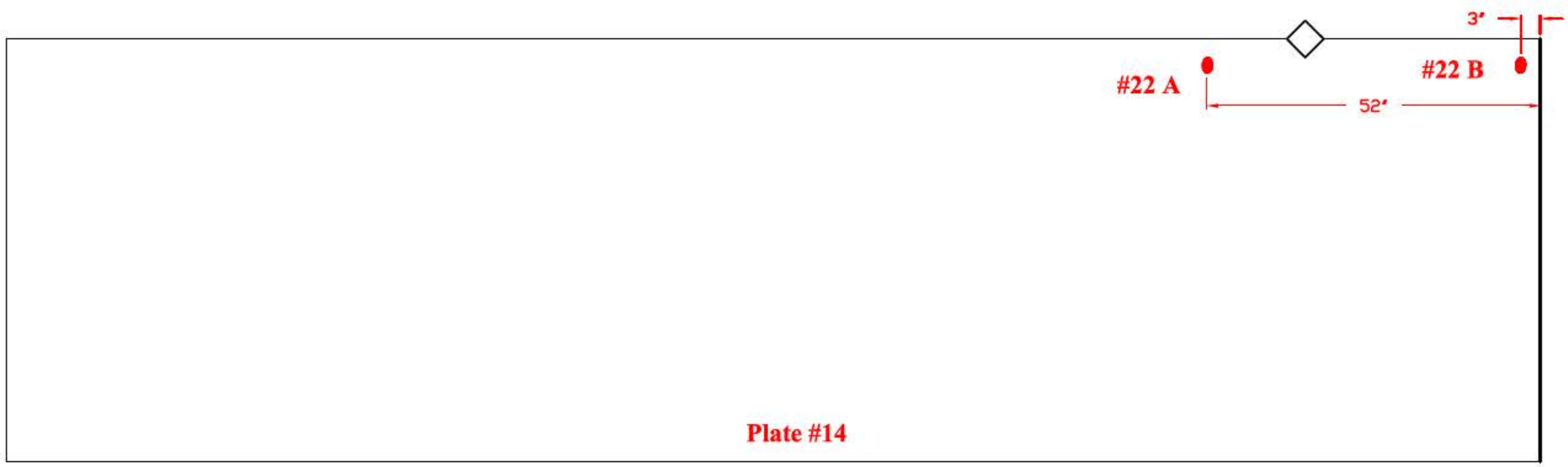
Tank Section: Barrel

Course: 8
Plate #: 14

Flaw # - Type - Remaining:

#22A - W.L./Pit - .230"

#22B - W.L./Pit - .221"



Drawing is not to scale

TANK # 2 - QUADRANT A

Nominal Plate Thickness: 0.250"

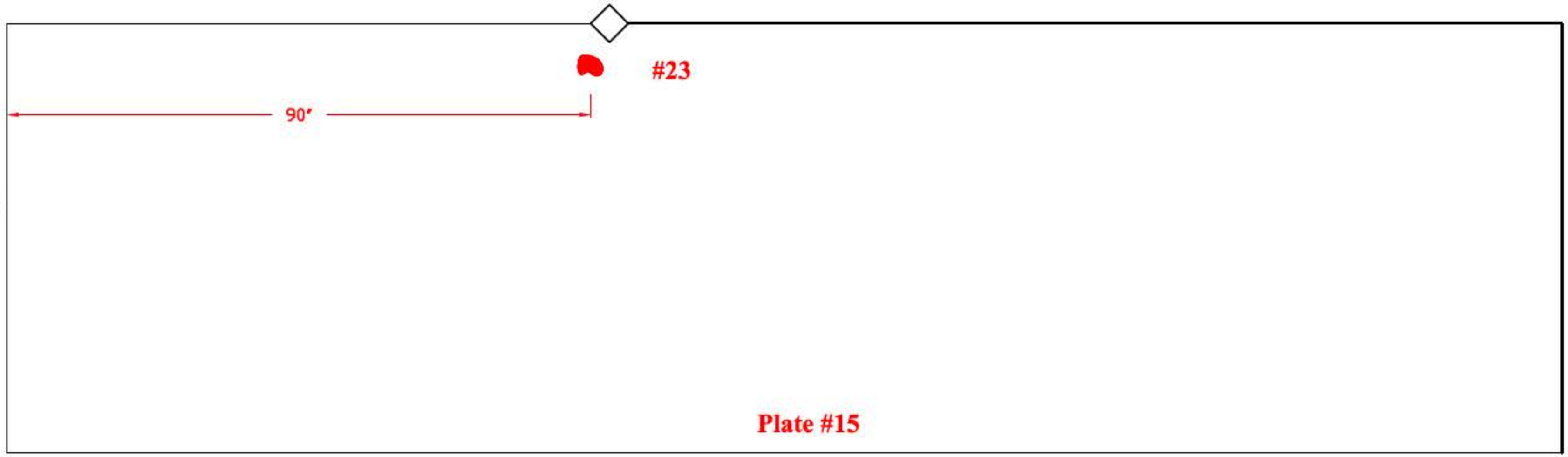
Date Inspected/Confirmed: 04/14/2008

Tank Section: Barrel

Course: 8
Plate #: 15

Flaw # - Type - Remaining:

#23 - W.L./Pit - .228"



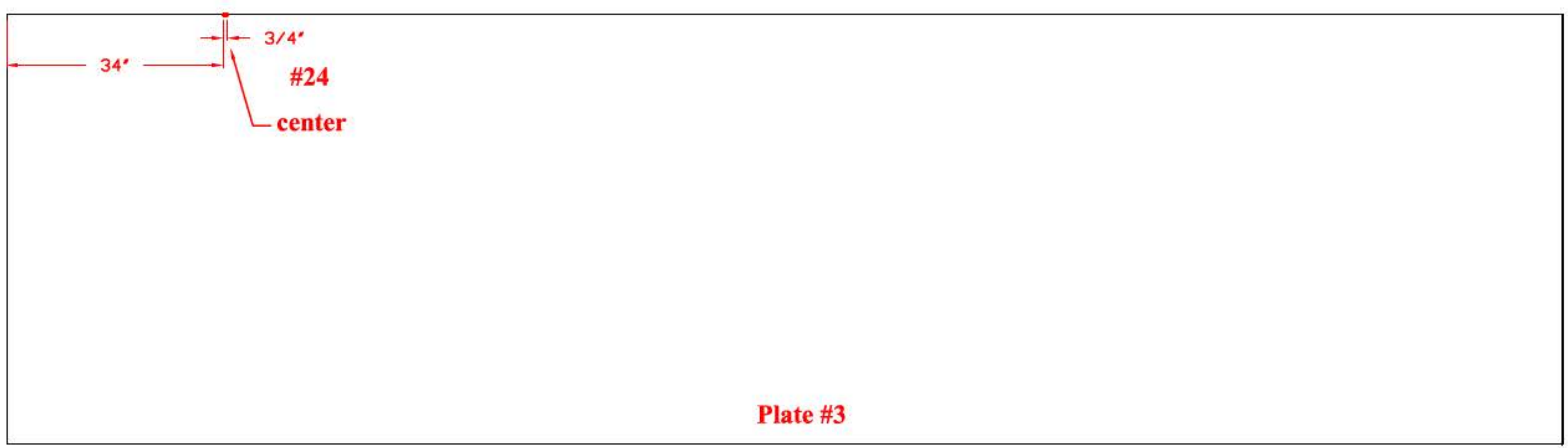
Tank Section: Barrel

Course: 26
Plate #: 3

Flaw # - Type - Remaining:

#24 - Porosity

.210" depth ¾" long
(center of weld)



Drawing is not to scale

TANK # 2 - QUADRANT A
Nominal Plate Thickness: 0.250"

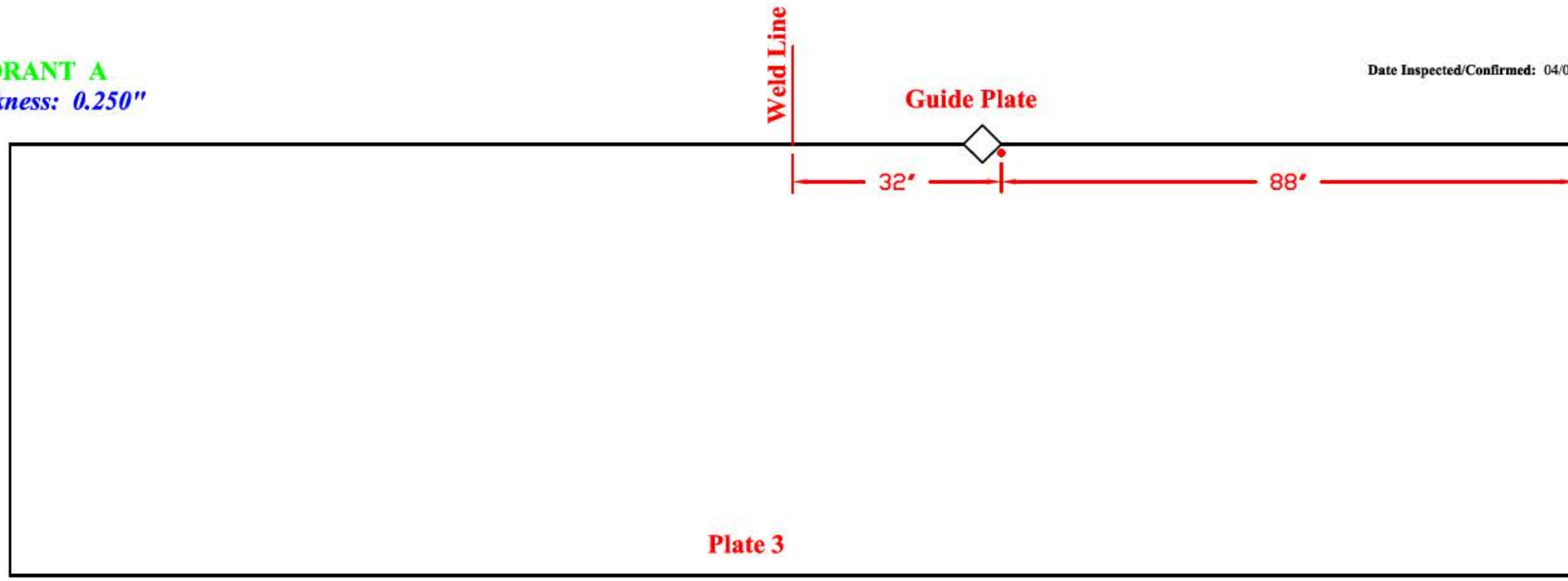
Date Inspected/Confirmed: 04/04/2008

Tank Section: Barrel

Course: 17
Plate #: 3

Flaw # - Type - Remaining:

#25 - Toe Arc Strikes
.063" depth
5½" L x 3" W

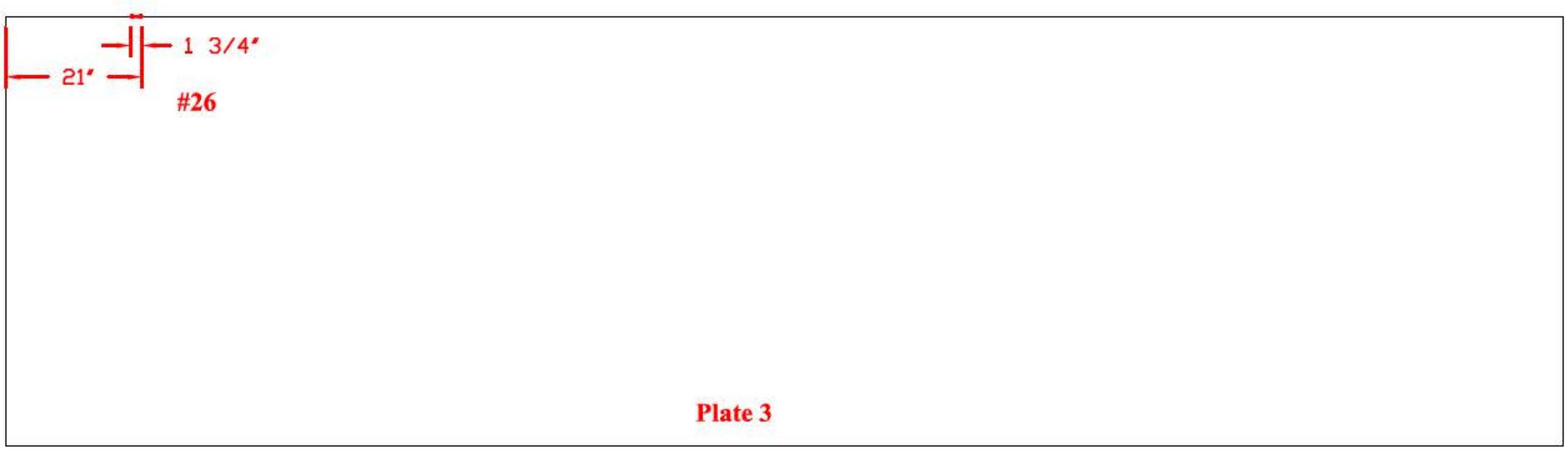


Tank Section: Barrel

Course: 20
Plate #: 3

Flaw # - Type - Remaining:

#26 - Porosity
.181" depth 1¾" long
(bottom of weld)



Drawing is not to scale

TANK # 2 - QUADRANT A
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/14/2008

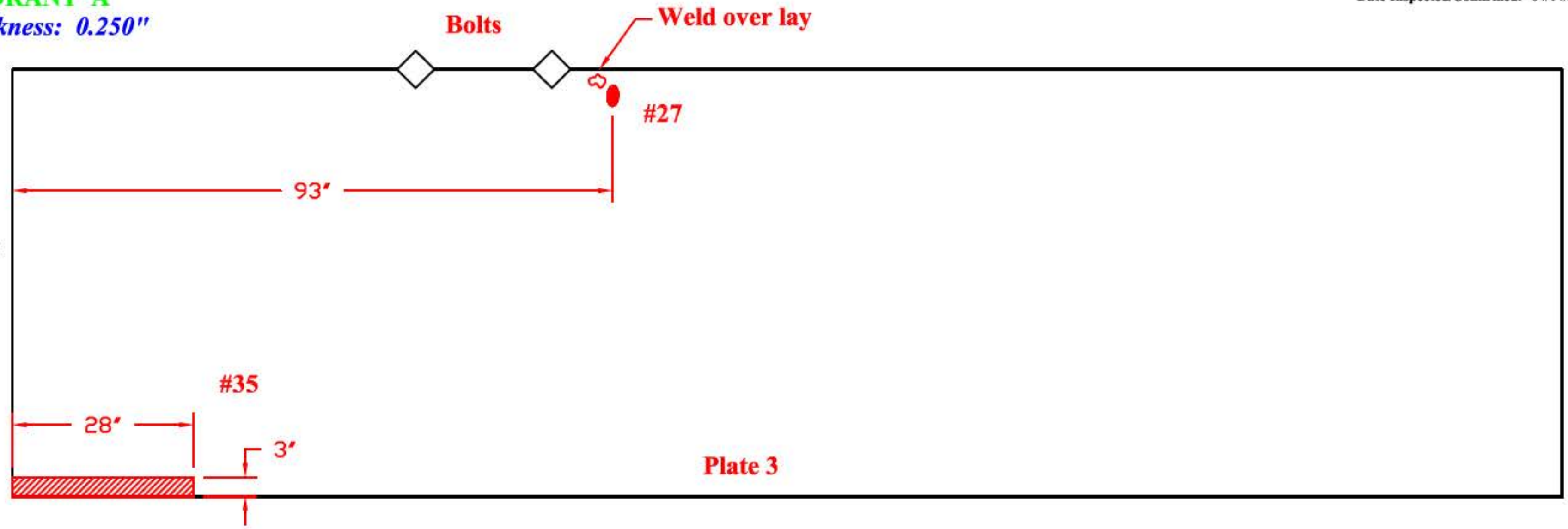
Tank Section: Barrel

Course: 25
Plate #: 3

Flaw # - Type - Remaining:

#27 - Pit - .234"

#35 - W.L. - .221"

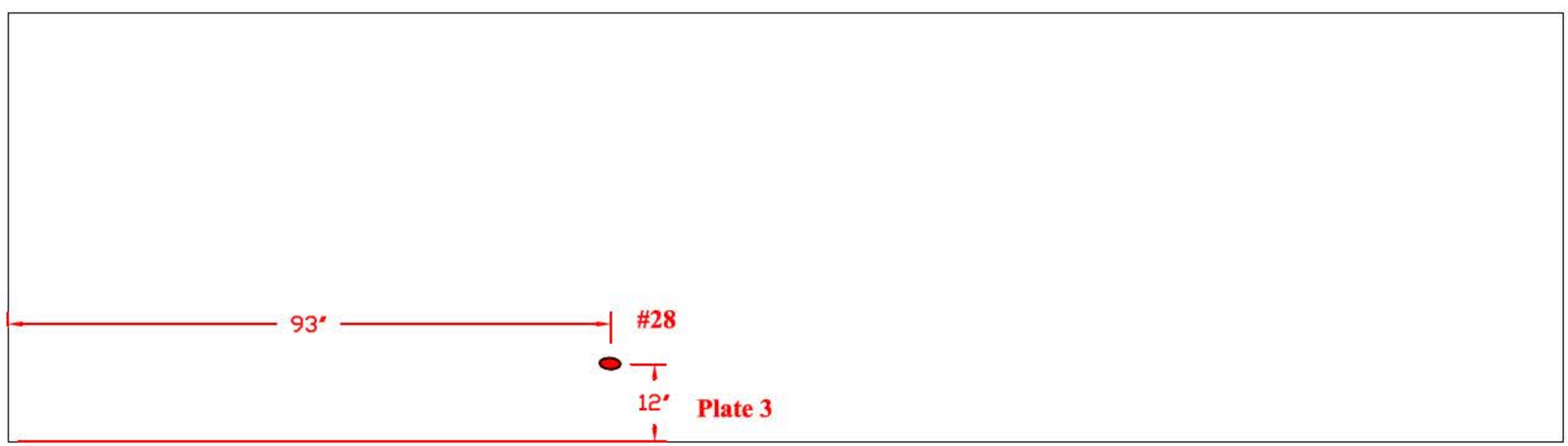


Tank Section: Barrel

Course: 8
Plate #: 3

Flaw # - Type - Remaining:

#28 - Pit - .220"



Drawing is not to scale

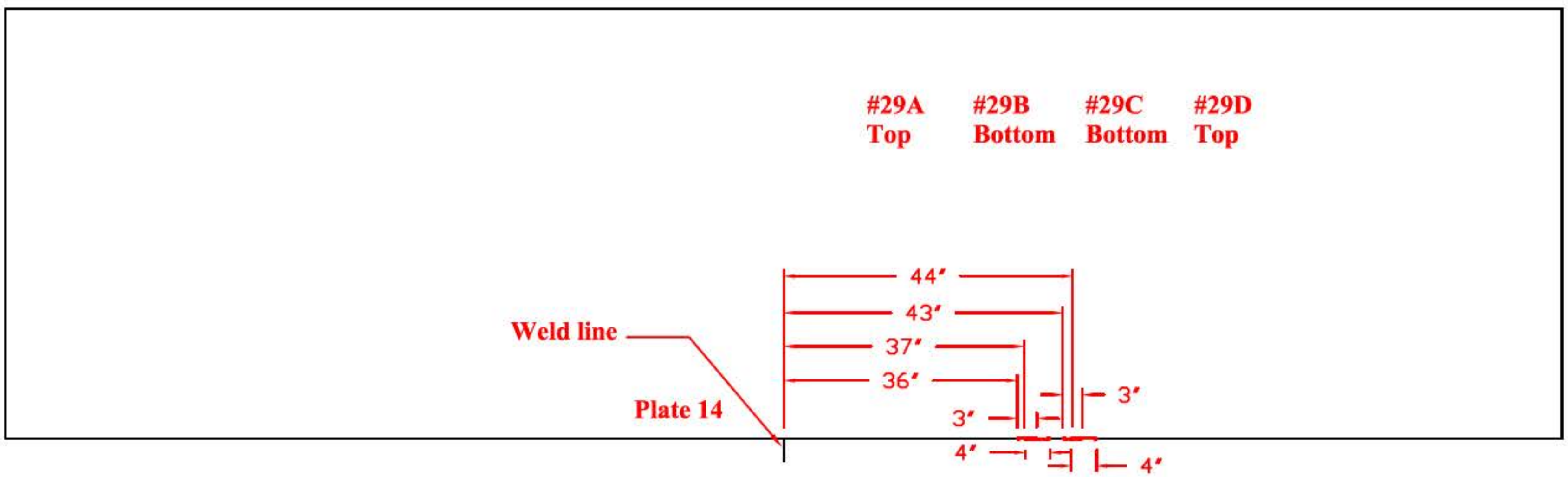
TANK # 2 - QUADRANT D
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/14/2008

Tank Section: Barrel

Course: 13
Plate #: 14

Flaw # - Type - Remaining:
#29 - Lack of fusion
A- .173" depth 3" long (top)
B- .112" depth 4" long (bottom)
C- .205" depth 3" long (bottom)
C- .206" depth 4" long (top)

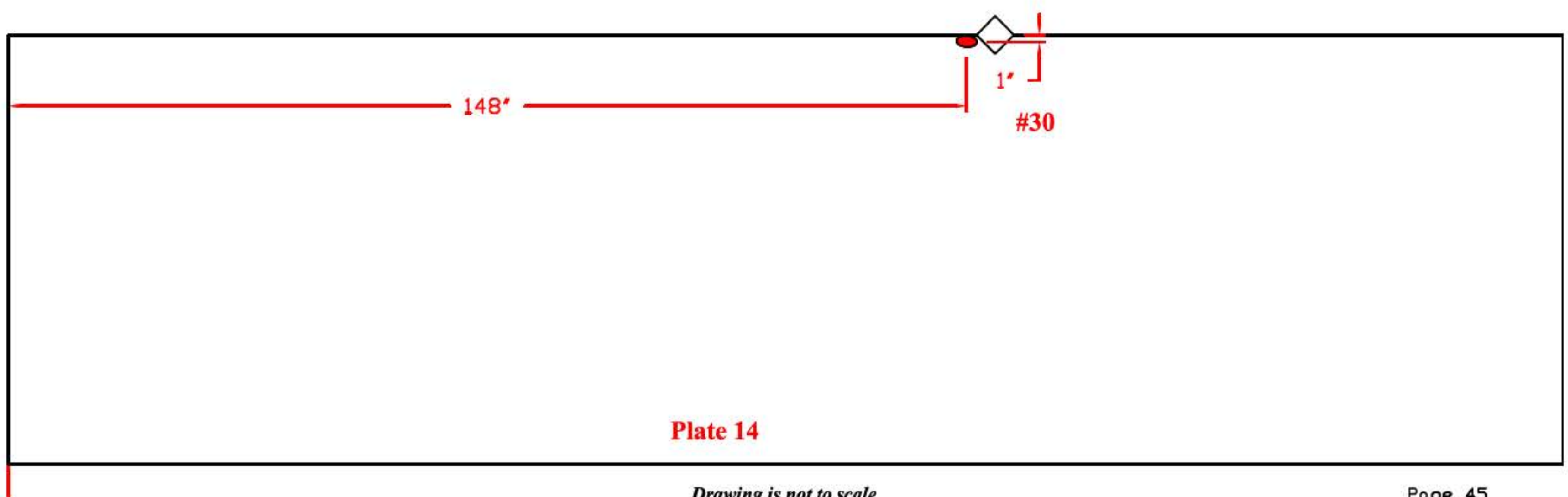


Tank Section: Barrel

Course: 4
Plate #: 14

Flaw # - Type - Remaining:

#30 - Pit -.226"



Drawing is not to scale

TANK # 2 - QUADRANT D

***Nominal Plate Thickness: 0.250"**

Date Inspected/Confirmed: 04/10/2008

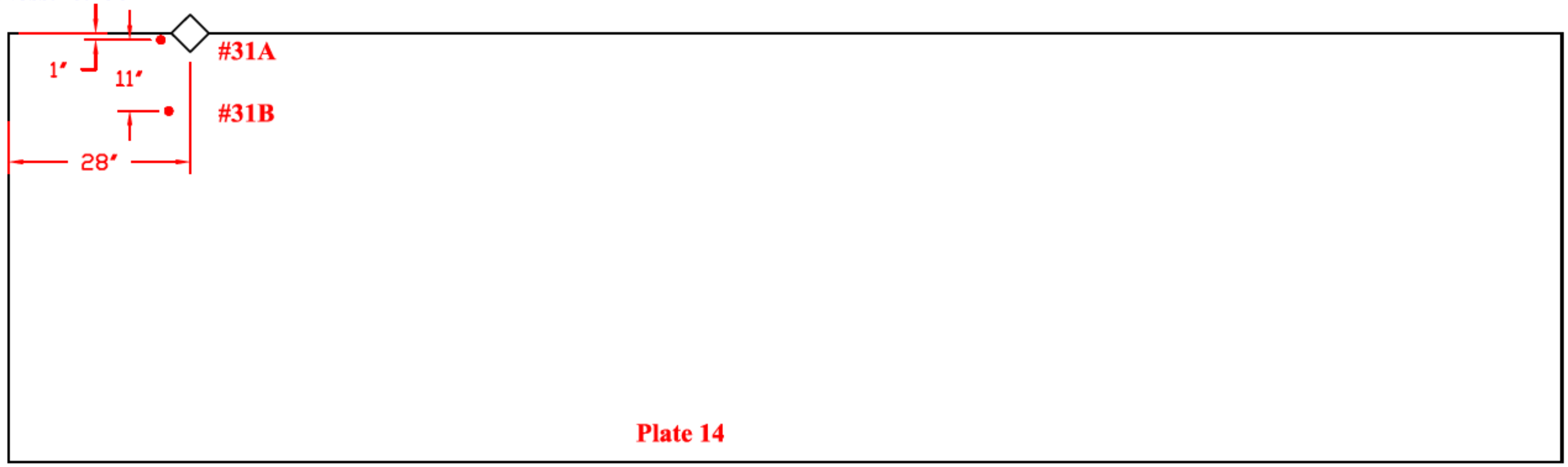
Tank Section: Barrel

Course: 5
Plate #: 14

Flaw # - Type - Remaining:

#31A - W.L./Pit - .235"

#31B - W.L./Pit - .235"



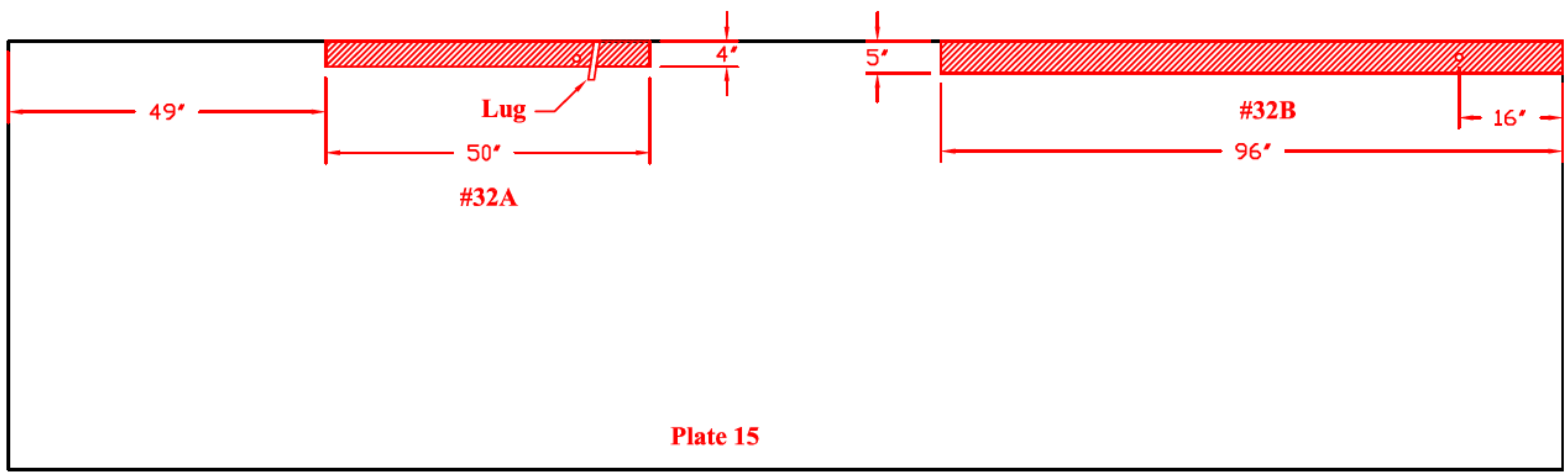
Tank Section: Barrel

Course: 21
Plate #: 15

Flaw # - Type - Remaining:

#32A - W.L. - .230"

#32B - W.L. - .219"



Drawing is not to scale

TANK # 2 - QUADRANT D - A
***Nominal Plate Thickness: 0.250"**

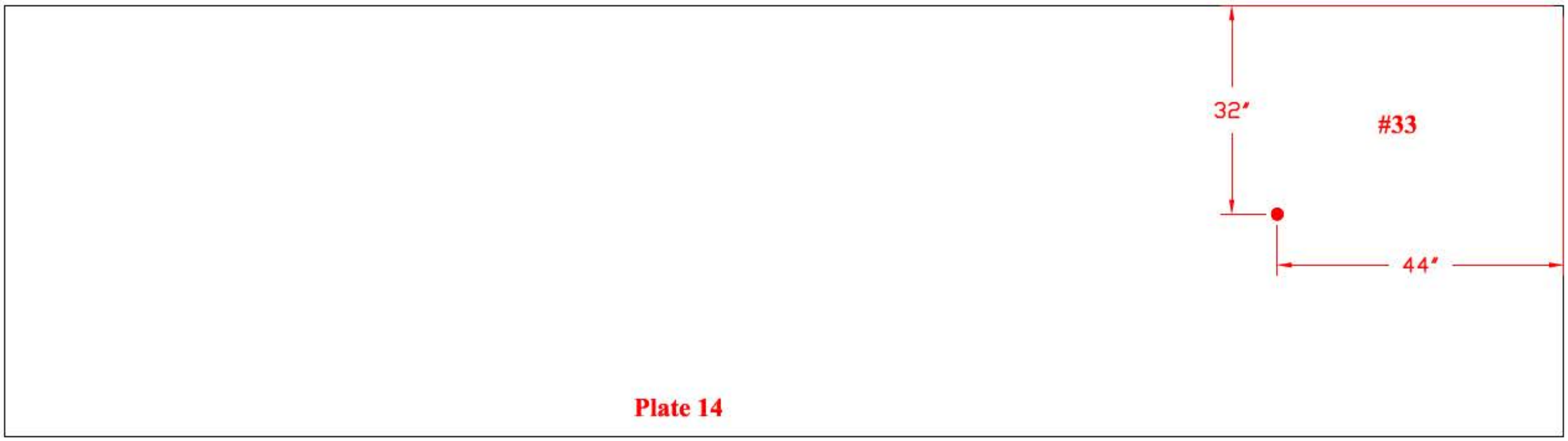
Date Inspected/Confirmed: 04/10/2008

Tank Section: Barrel

Course: 20
Plate #: 14

Flaw # - Type - Remaining:

#33 - Tack weld
.082" depth
1½" L x ¼" W

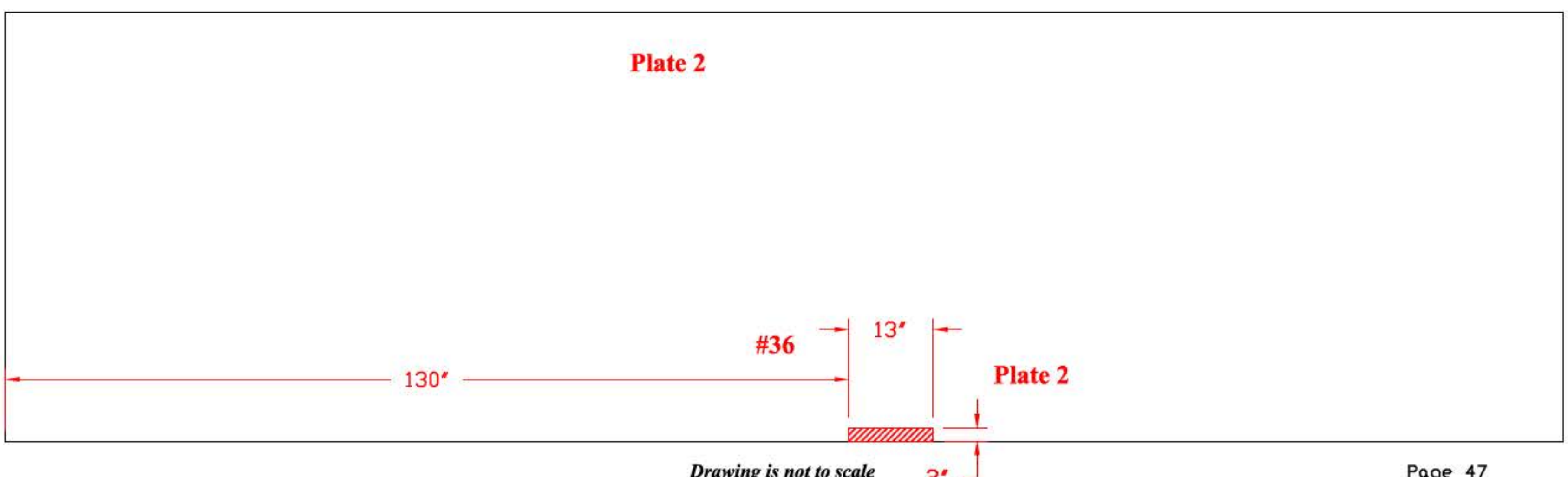


Tank Section: Barrel

Course: 10
Plate #: 2

Flaw # - Type - Remaining:

#36 - W.L. - .218"



Drawing is not to scale

TANK # 2 - QUADRANT D

Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/10/2008

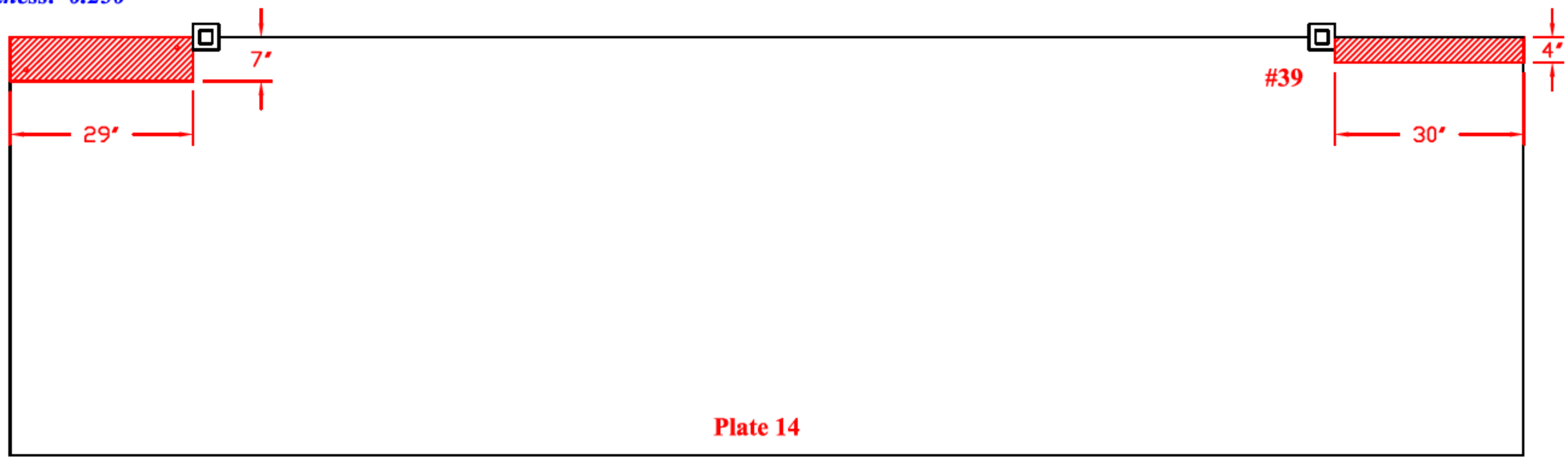
Tank Section: Barrel

Course: 25
Plate #: 14

Flaw # - Type - Remaining:

#39 - W.L. - .230"

#42 - W.L. - .234" A
.223" B

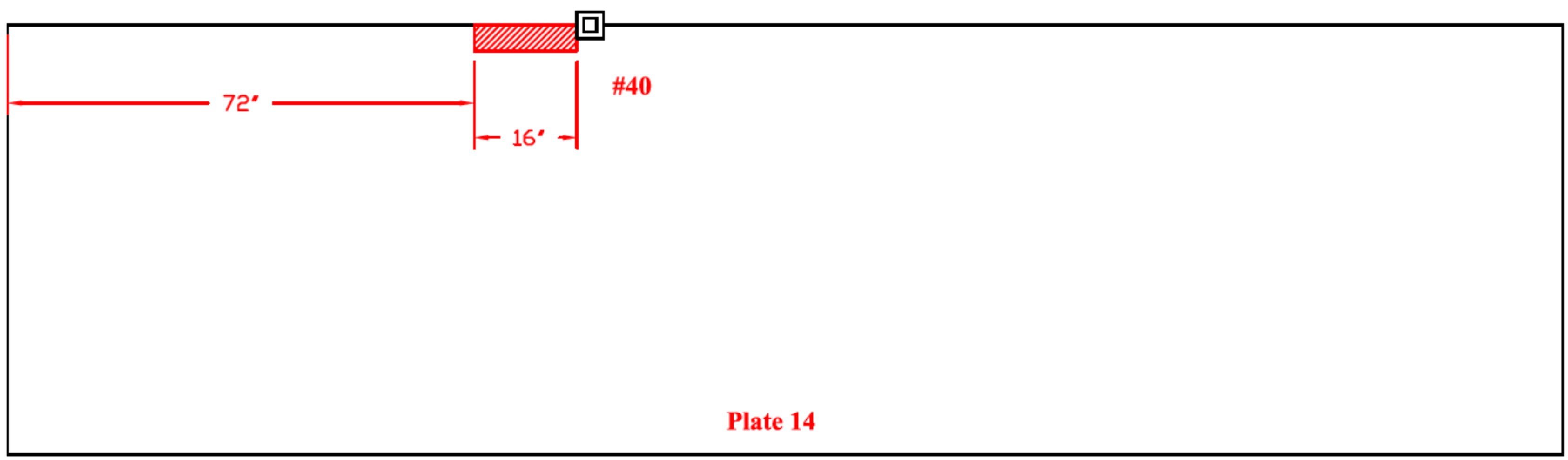


Tank Section: Barrel

Course: 26
Plate #: 14

Flaw # - Type - Remaining:

#40 - W.L. - .214"



Drawing is not to scale

TANK # 2 - QUADRANT D - A

Nominal Plate Thickness: 0.250"

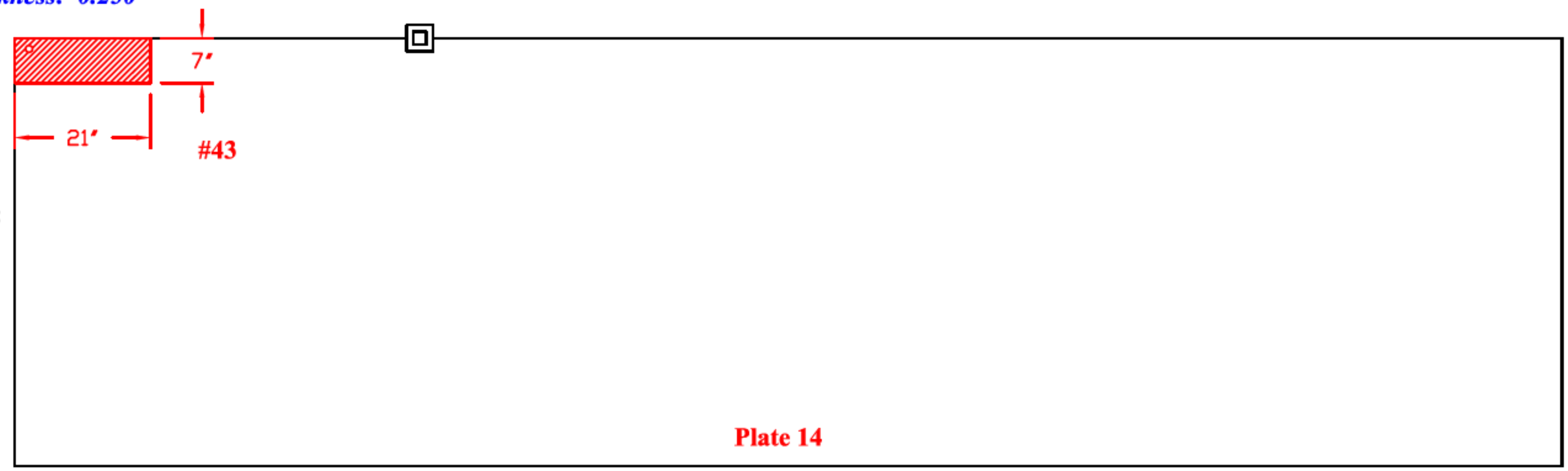
Date Inspected/Confirmed: 04/15/2008

Tank Section: Barrel

Course: 27
Plate #: 14

Flaw # - Type - Remaining:

#43 - W.L. - .229"

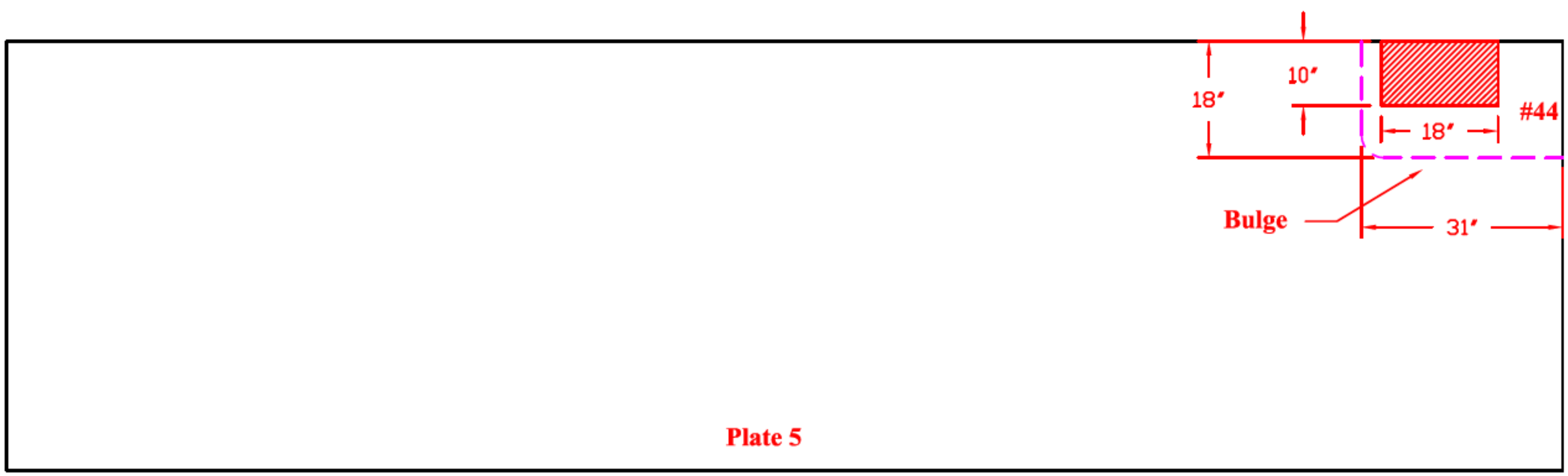


Tank Section: Barrel

Course: 27
Plate #: 15

Flaw # - Type - Remaining:

#44 - W.L. - .230"



Drawing is not to scale

TANK # 2 - QUADRANT B - D
***Nominal Plate Thickness: 0.250"**

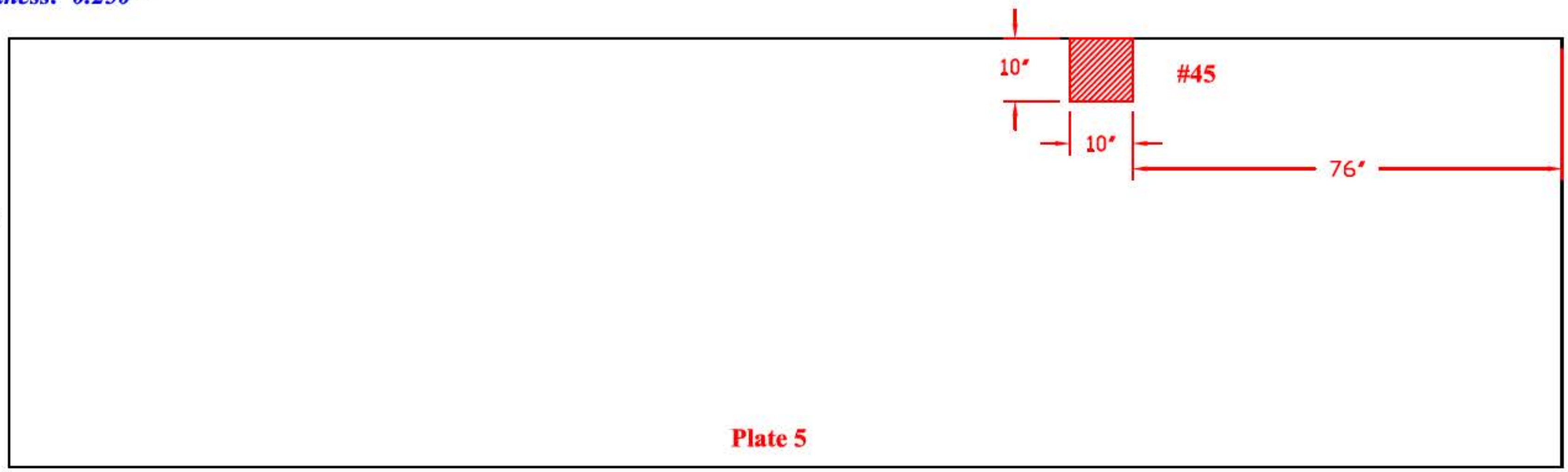
Date Inspected/Confirmed: 04/16/2008

Tank Section: Barrel

Course: 2
Plate #: 5

Flaw # - Type - Remaining:

#45 - W.L. - .225"

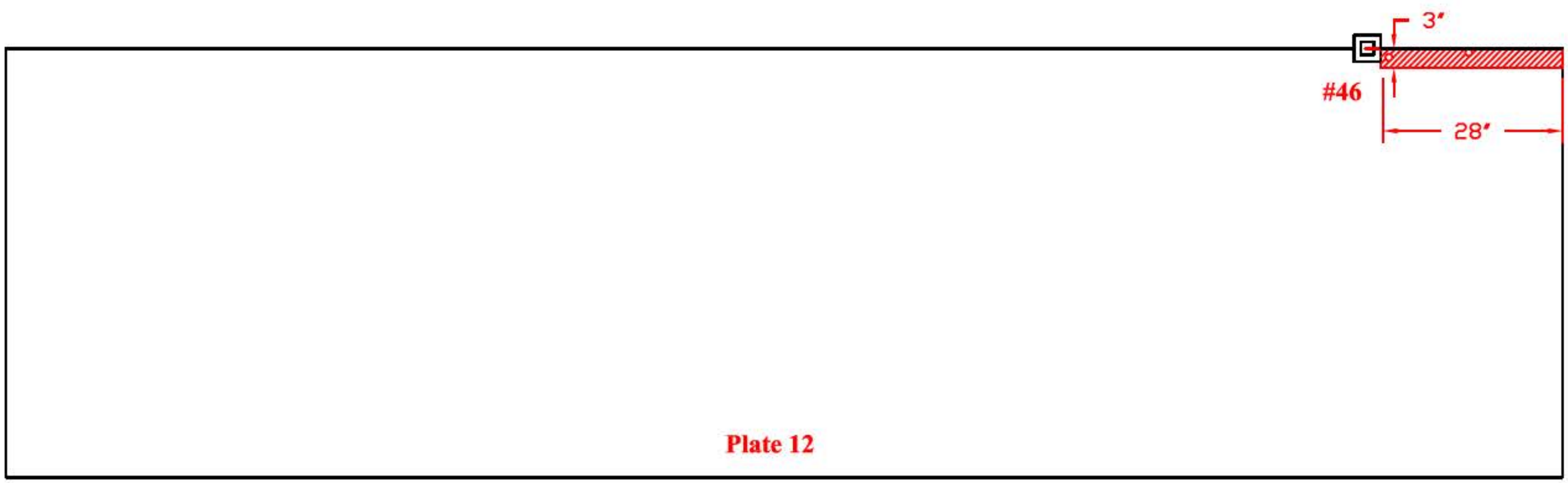


Tank Section: Barrel

Course: 25
Plate #: 12

Flaw # - Type - Remaining:

#46 - W.L. - .230"



Drawing is not to scale

TANK # 2 - QUADRANT D - B

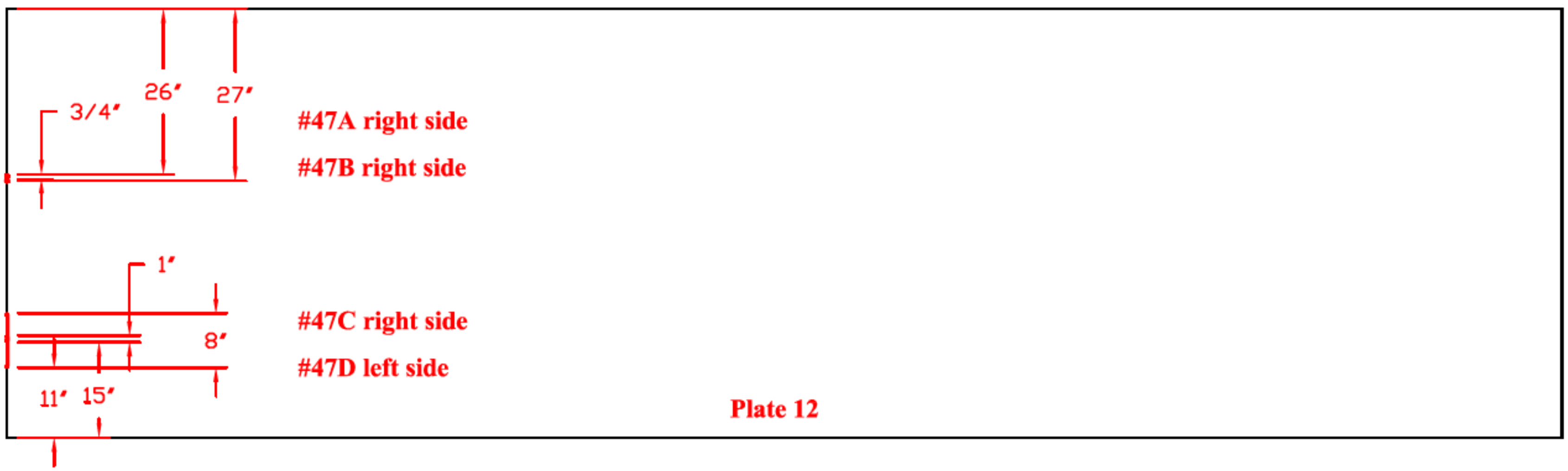
***Nominal Plate Thickness: 0.250"**

Date Inspected/Confirmed: 04/16/2008

Tank Section: Barrel

Course: 20
Plate #: 12

Flaw # - Type - Remaining:
#47A - Lack of fusion
.211" depth ¾"long (right)
#47B - Pin hole
.088" depth ⅛"dia (right)
#47C - Lack of fusion
.219" depth 8"long (right)
#47C - Lack of fusion
.221" depth 1"long (left)

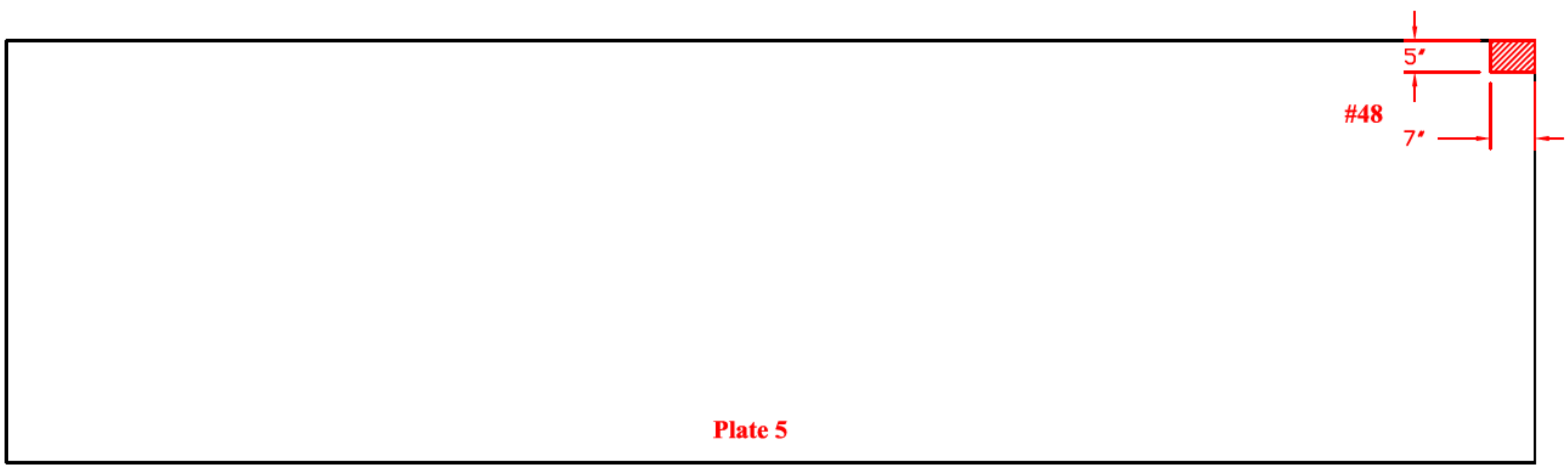


Tank Section: Barrel

Course: 17
Plate #: 5

Flaw # - Type - Remaining:

#48 - W.L. - .232"



Drawing is not to scale

TANK # 2 - QUADRANT B
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/17/2008

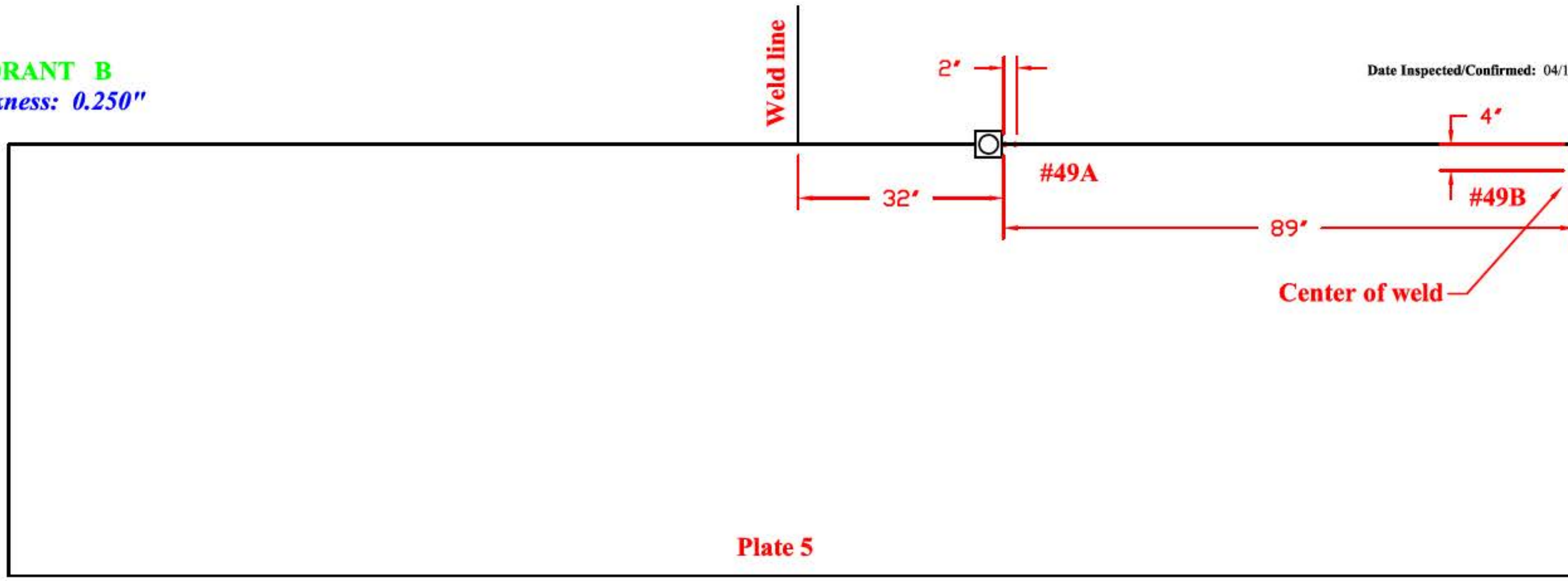
Tank Section: Barrel

Course: 26
Plate #: 5

Flaw # - Type - Remaining:

#49A - Slag line
.114" depth 2"long

#49B - Lack of fusion
.083" depth 4" long

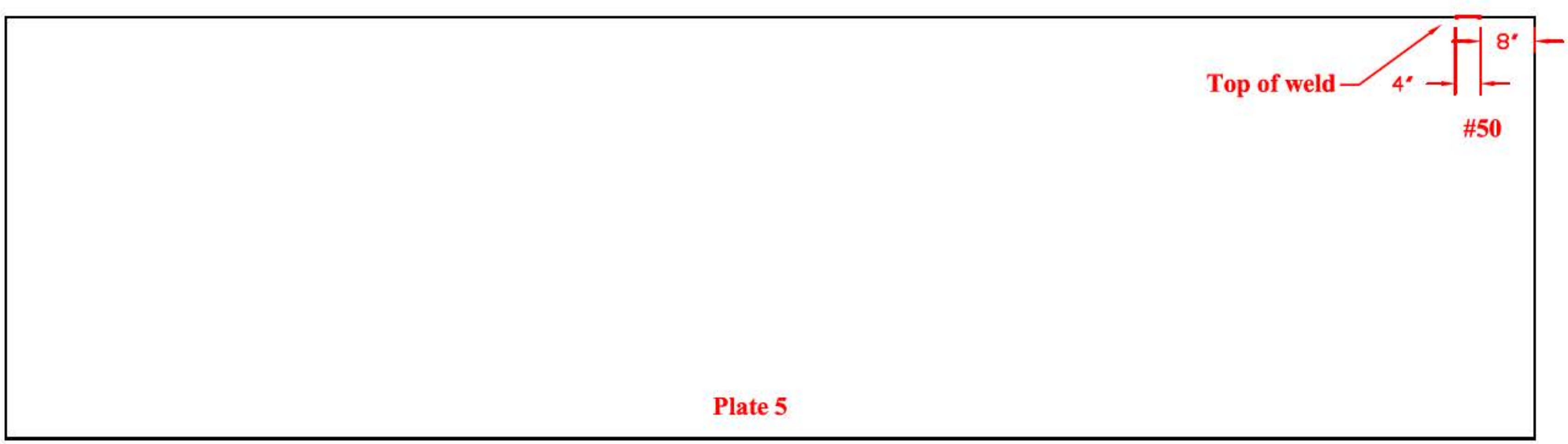


Tank Section: Barrel

Course: 28
Plate #: 5

Flaw # - Type - Remaining:

#50 - Lack of fusion
.104" depth 4" long



Drawing is not to scale

TANK # 2 - QUADRANT B
***Nominal Plate Thickness: 0.250"**

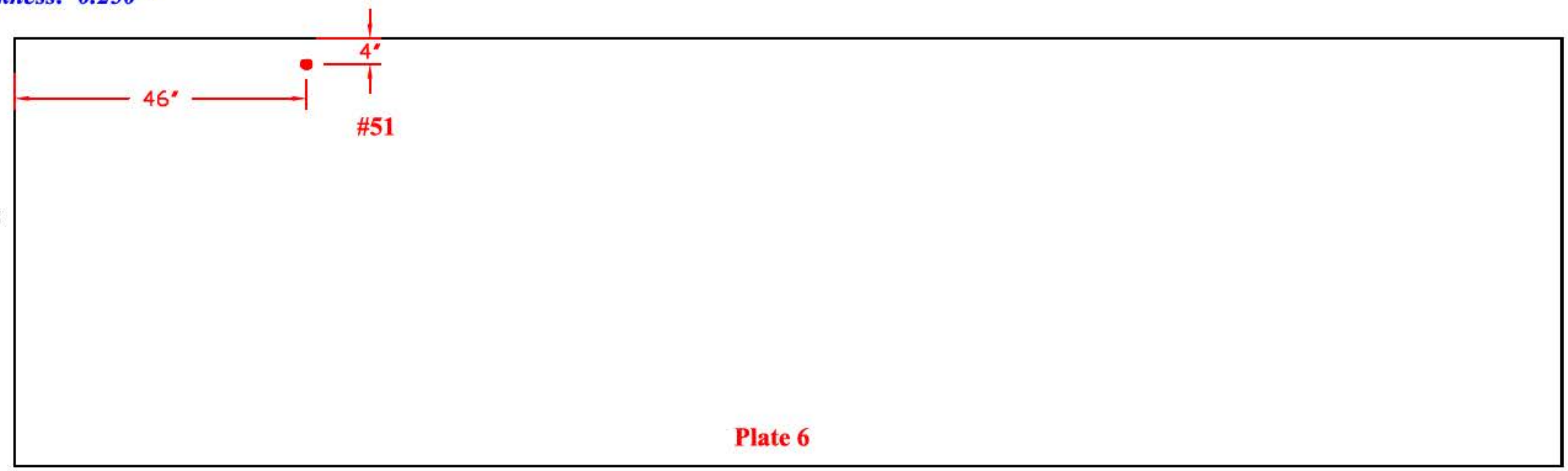
Date Inspected/Confirmed: 04/17/2008

Tank Section: Barrel

Course: 26
Plate #: 6

Flaw # - Type - Remaining:

#51 - W.L./Pit - .220"

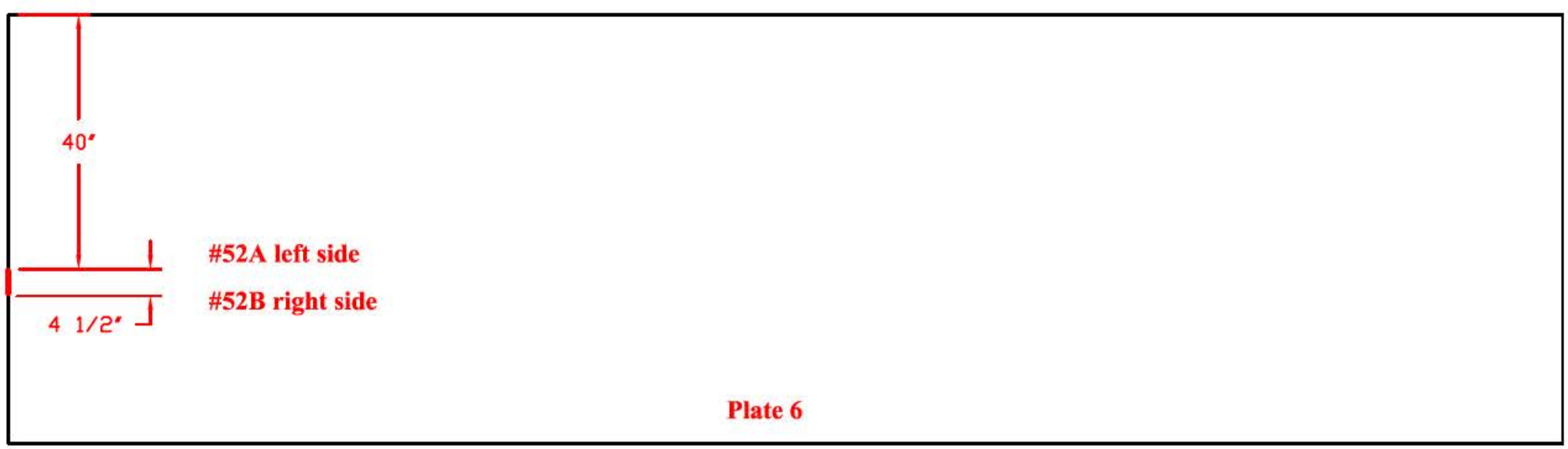


Tank Section: Barrel

Course: 22
Plate #: 6

Flaw # - Type - Remaining:

#52A - Lack of fusion
.169" depth 4 1/2" long
(left side)
#52B - Lack of fusion
.154" depth 4 1/2" long
(right side)



Drawing is not to scale

TANK # 2 - QUADRANT B

Nominal Plate Thickness: 0.250"

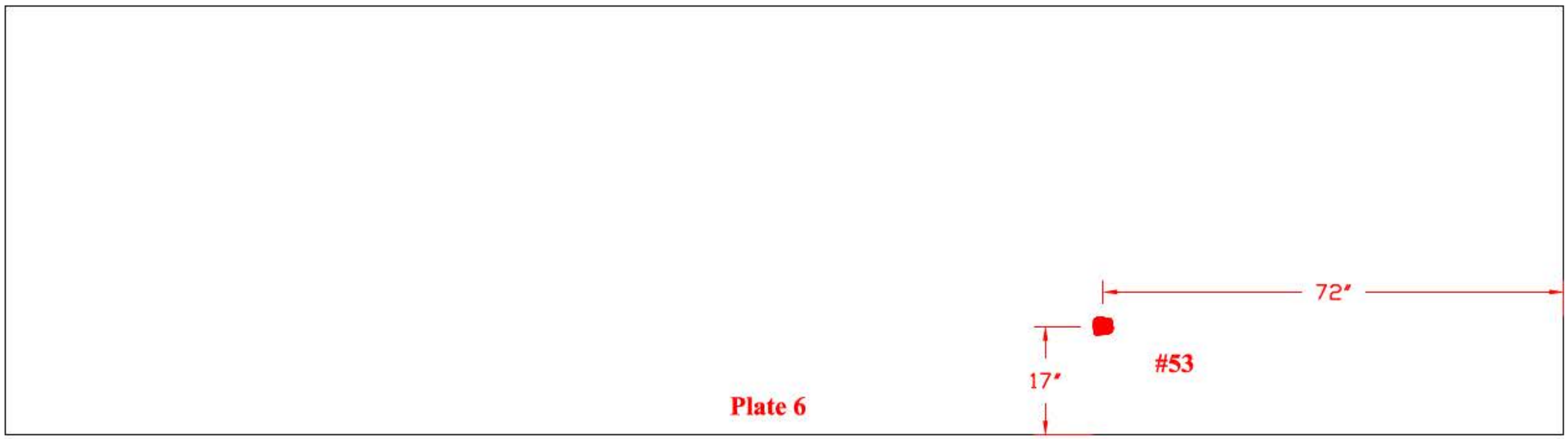
Date Inspected/Confirmed: 04/17/2008

Tank Section: Barrel

Course: 19
Plate #: 6

Flaw # - Type - Remaining:

#53 - W.L./Pit - .220"

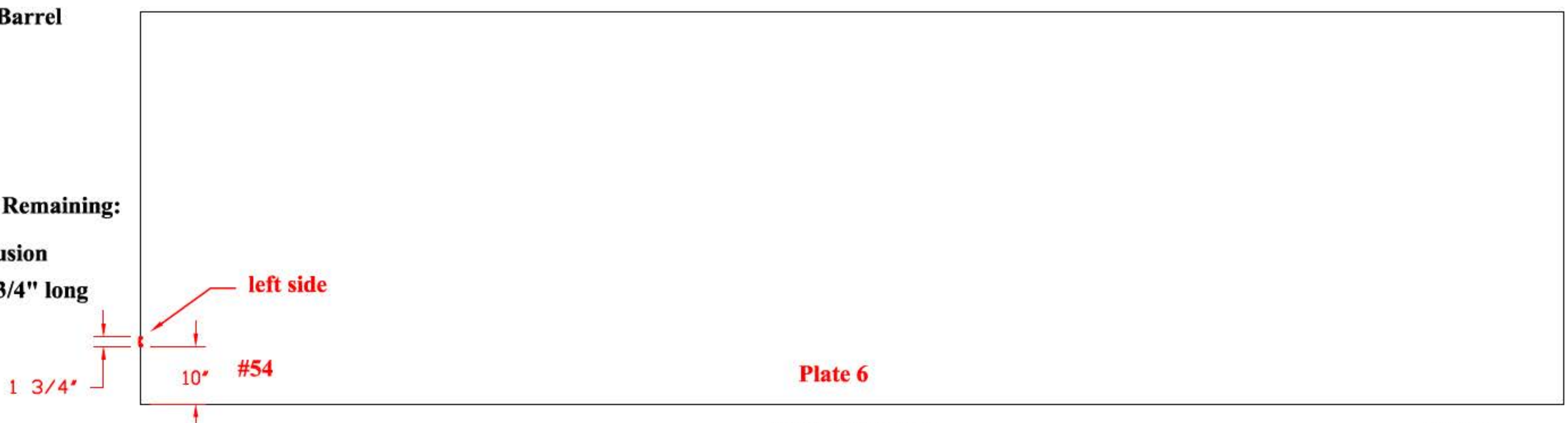


Tank Section: Barrel

Course: 2
Plate #: 6

Flaw # - Type - Remaining:

#54 - Lack of fusion
.219" depth 1 3/4" long
(left side)



Drawing is not to scale

TANK # 2 - QUADRANT C
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/17/2008

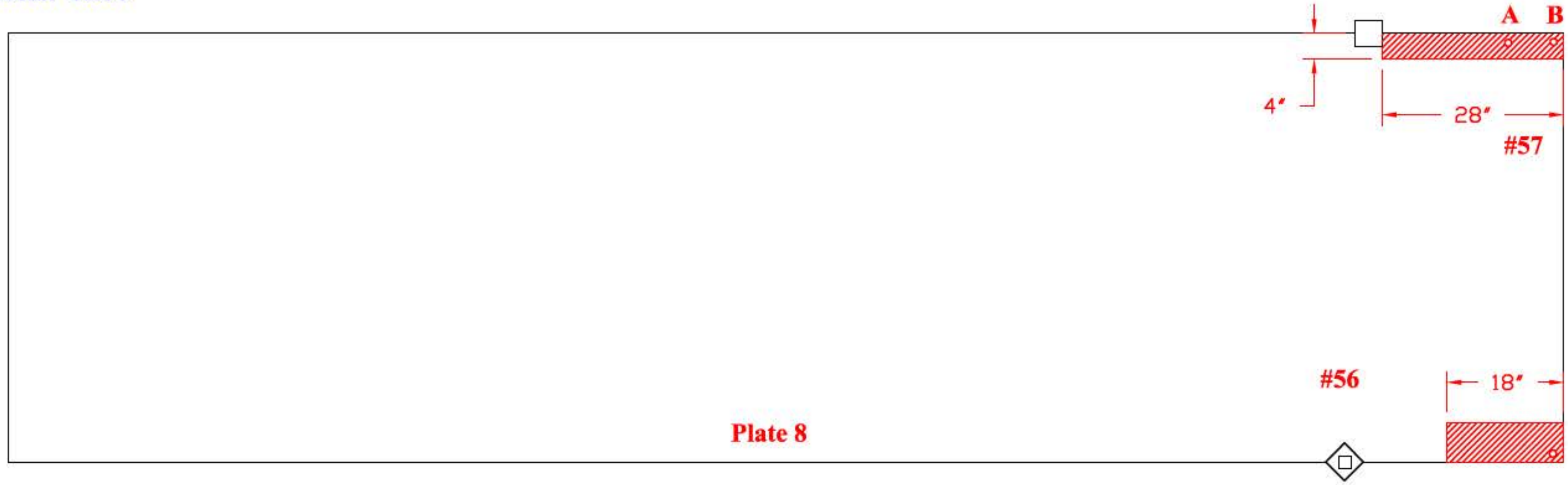
Tank Section: Barrel

Course: 6
Plate #: 8

Flaw # - Type - Remaining:

#56 - W.L. - .225"

#57 - W.L. - .229" A
.231" B

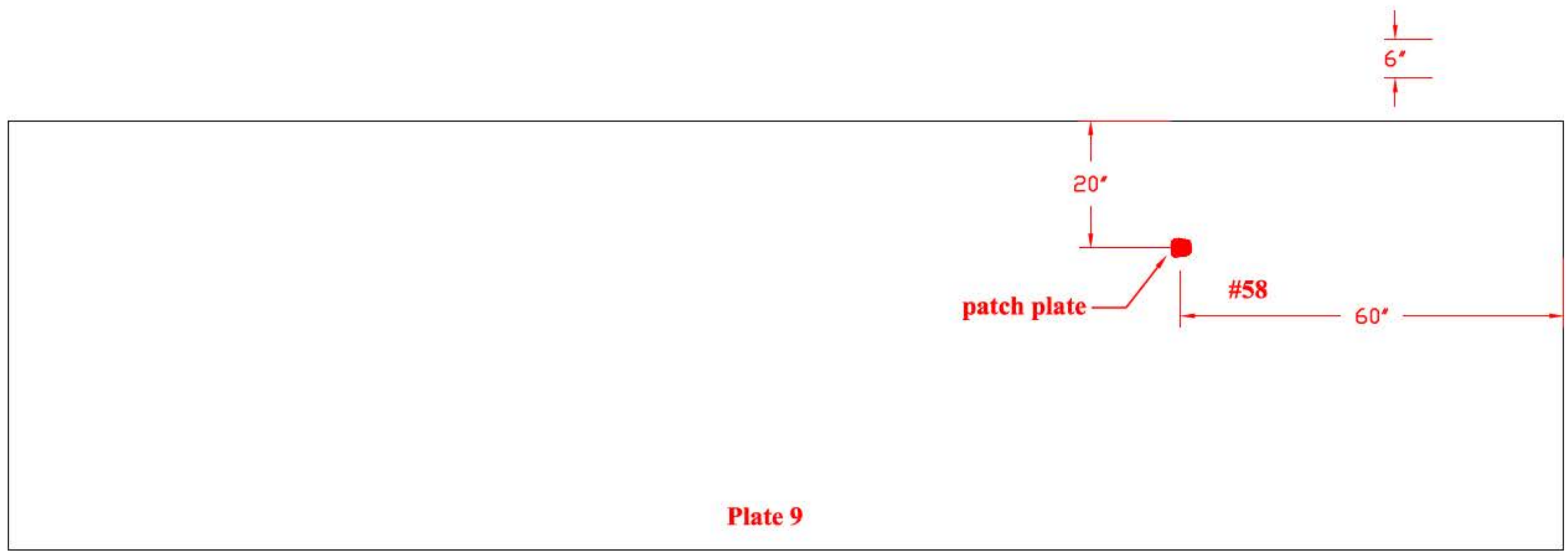


Tank Section: Barrel

Course: 1
Plate #: 9

Flaw # - Type - Remaining:

#58 - W.L. - .200"
on patch plate



Drawing is not to scale

TANK # 2 - QUADRANT C
Nominal Plate Thickness: 0.250"

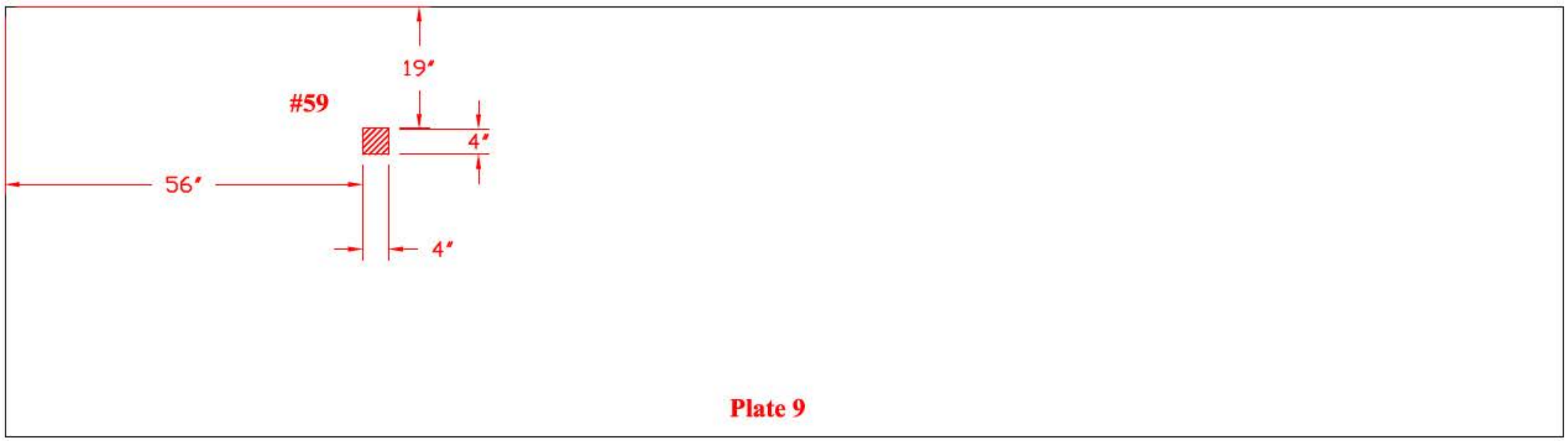
Date Inspected/Confirmed: 04/23/2008

Tank Section: Barrel

Course: 22
Plate #: 9

Flaw # - Type - Remaining:

#59 - W.L. - .186"

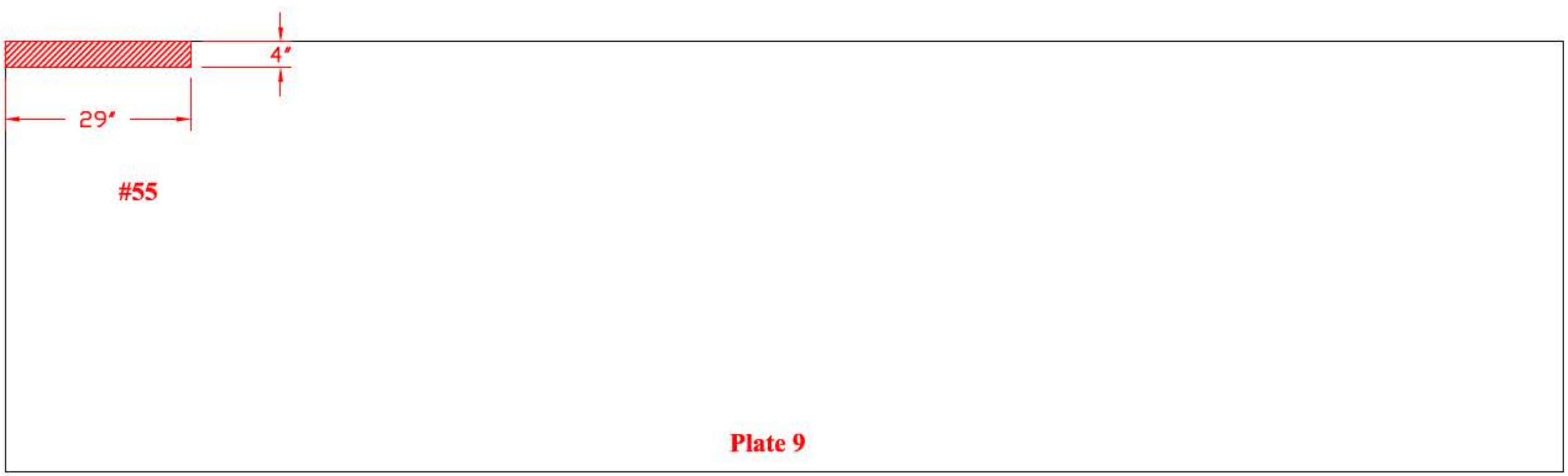


Tank Section: Barrel

Course: 23
Plate #: 9

Flaw # - Type - Remaining:

#55 - W.L. - .228"



Drawing is not to scale

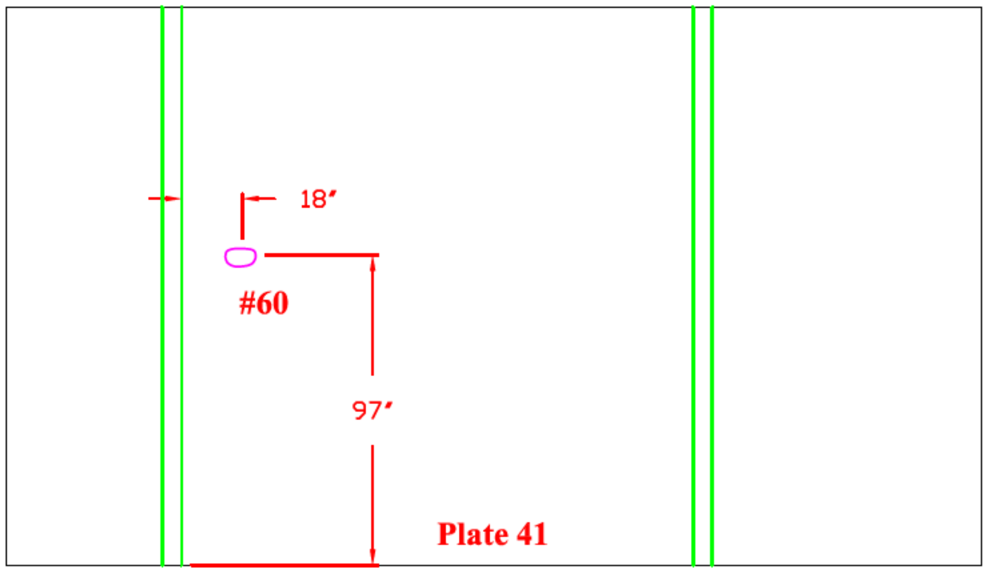
TANK #2 - QUADRANT C

Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/24/2008

Tank Section: Upper dome
Quadrant: C
Course: A
Plate: # 41

Flaw # 60 - Dent
.165 deep 1½" dia N.S.W.L.

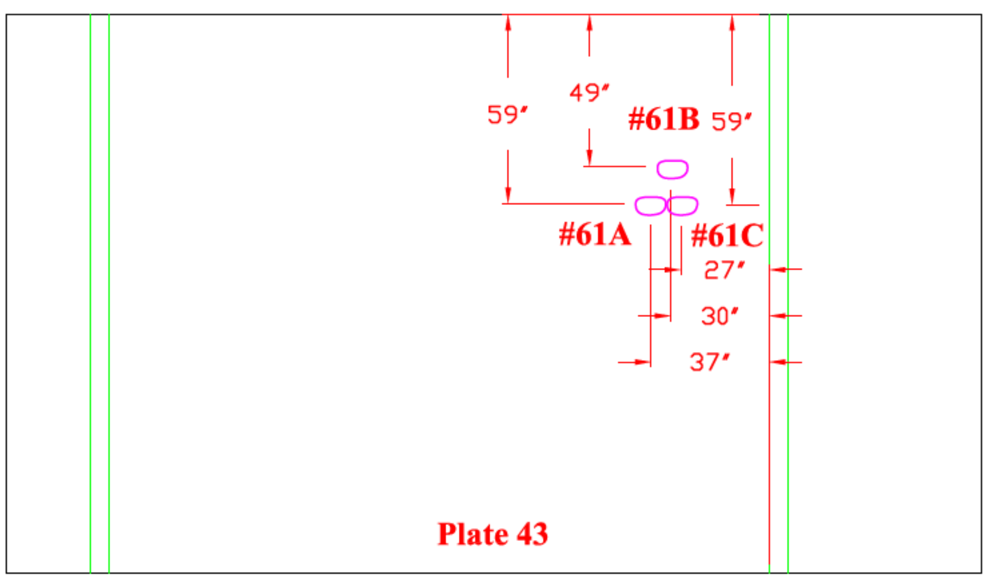


Tank Section: Upper dome
Quadrant: C
Course: A
Plate: # 46

Flaw # 61A - Dent
.215 deep 1½"-2" dia N.S.W.L.

Flaw # 61B - Dent
.095 deep 1½"-2" dia N.S.W.L.

Flaw # 61C - Dent
.265 deep 1½"-2" dia N.S.W.L.



Drawing is not to scale

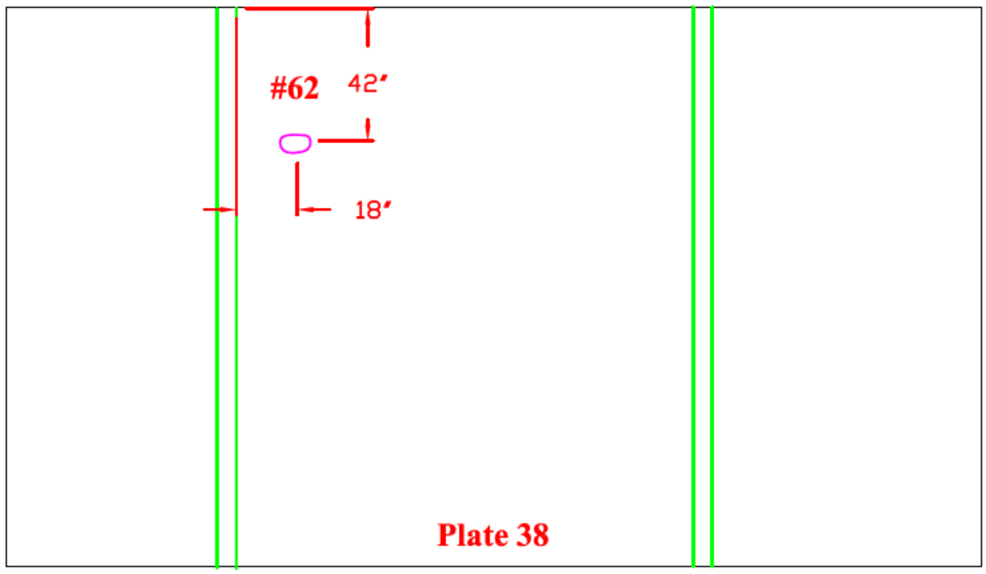
TANK #2 - QUADRANT C

Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/24/2008

Tank Section: Upper dome
Quadrant: C
Course: A
Plate: # 38

Flaw # 62 - Dent
.480 deep 2" dia N.S.W.L.

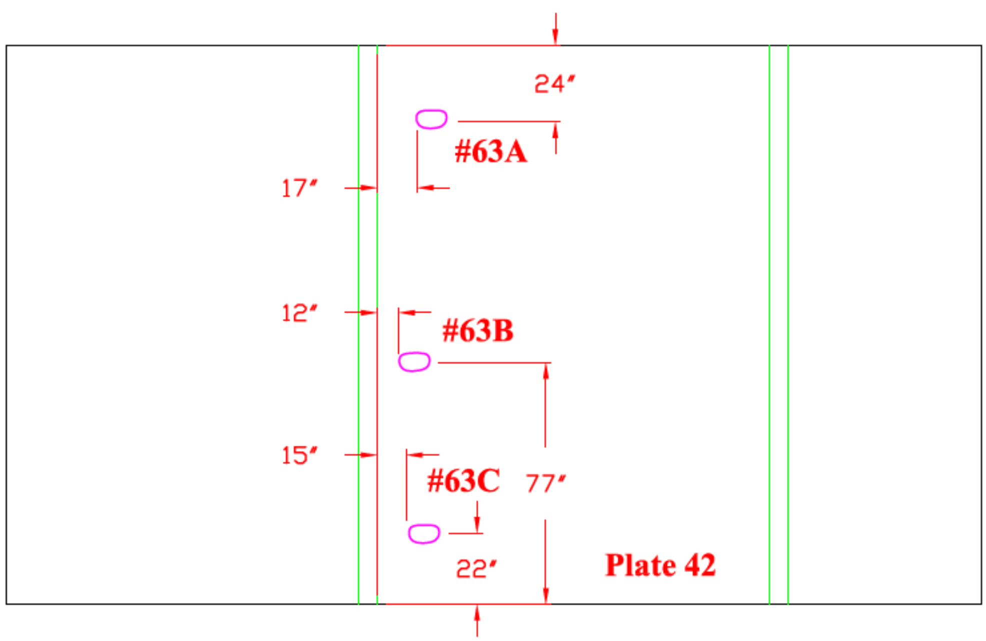


Tank Section: Upper dome
Quadrant: C
Course: A
Plate: # 42

Flaw # 63A - Dent
.130 deep 1½"-2" dia N.S.W.L.

Flaw # 63B - Dent
.170 deep 1½"-2" dia N.S.W.L.

Flaw # 63C - Dent
.155 deep 1½"-2" dia N.S.W.L.



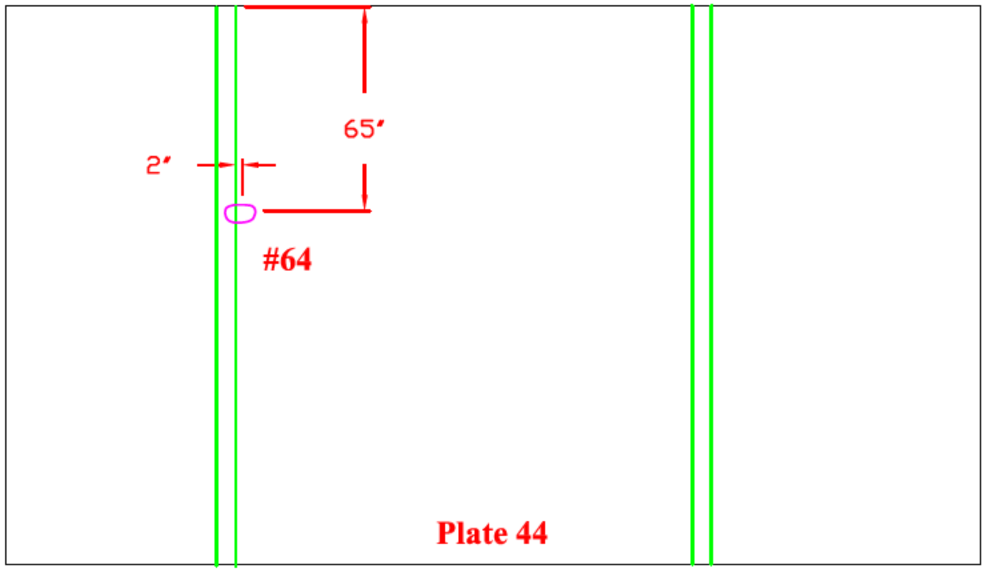
Drawing is not to scale

TANK #2 - QUADRANT C
***Nominal Plate Thickness: 0.250"**

Date Inspected/Confirmed: 04/24/2008

Tank Section: Upper dome
Quadrant: C
Course: A
Plate: # 44

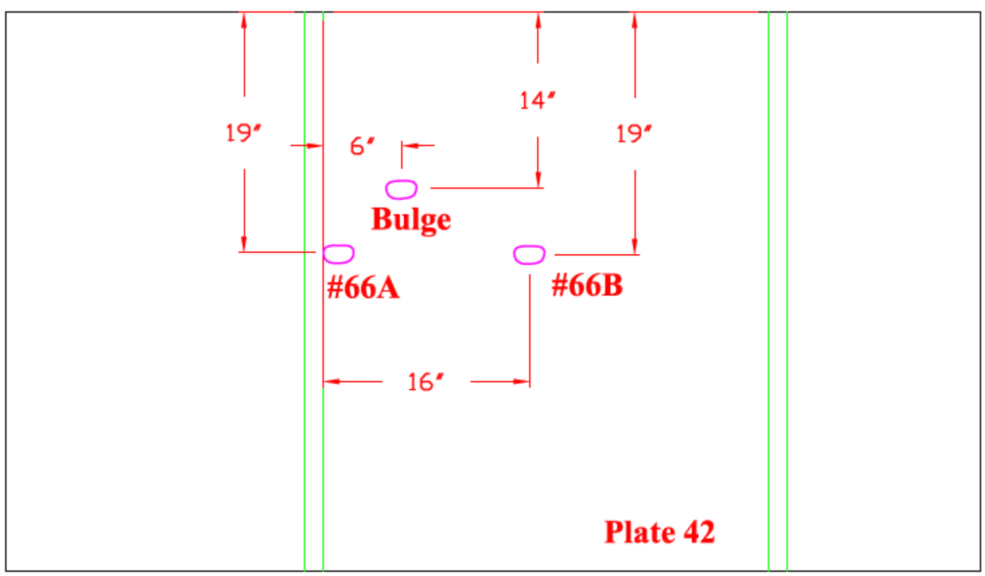
Flaw # 64 - Dent
.115 deep 2" dia N.S.W.L.



Tank Section: Upper dome
Quadrant: C
Course: B
Plate: # 41

Flaw # 66A - Dent
.065 deep 1½" dia N.S.W.L.

Flaw # 66B - Dent
.025 deep 1½" dia N.S.W.L.



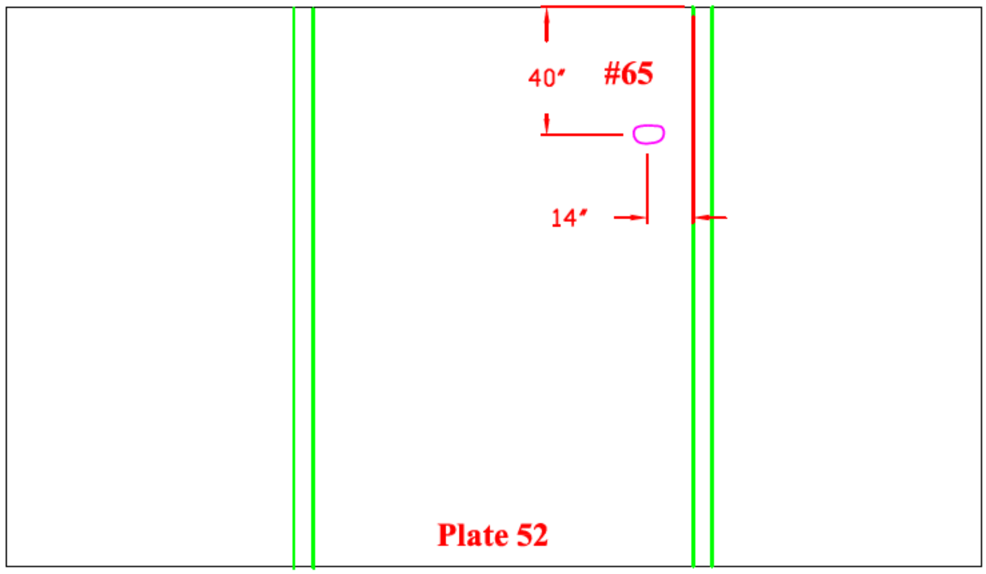
Drawing is not to scale

TANK #2 - QUADRANT C - B
***Nominal Plate Thickness: 0.250"**

Date Inspected/Confirmed: 04/28/2008

Tank Section: Upper dome
Quadrant: C
Course: A
Plate: # 52

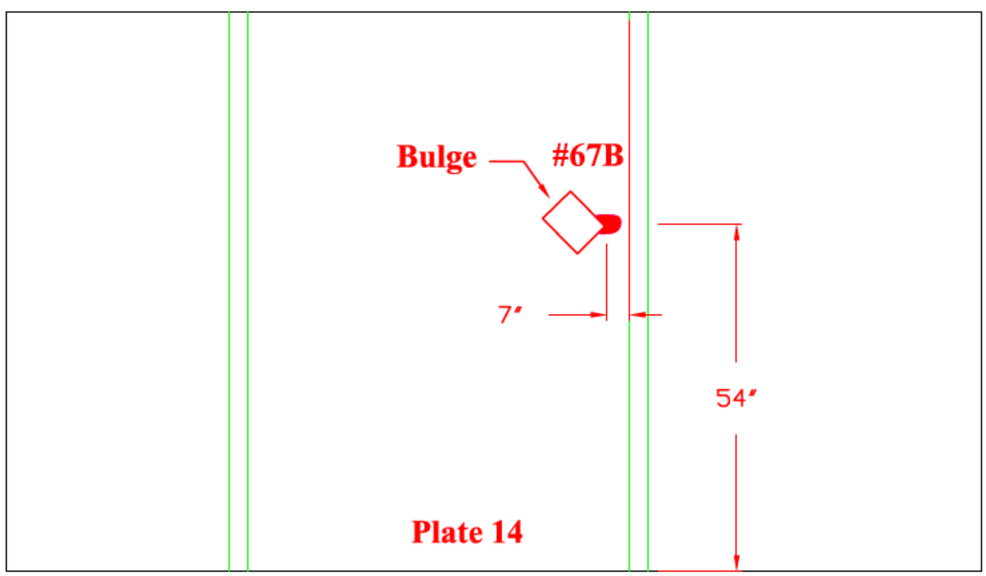
Flaw # 65 - Dent
.085 deep 1 1/2" dia N.S.W.L.



Tank Section: Upper dome
Quadrant: B
Course: C
Plate: # 14

Flaw # 67A - Patch
.141 Remaining

Flaw # 67B - W.L.
.185 Remaining



Drawing is not to scale

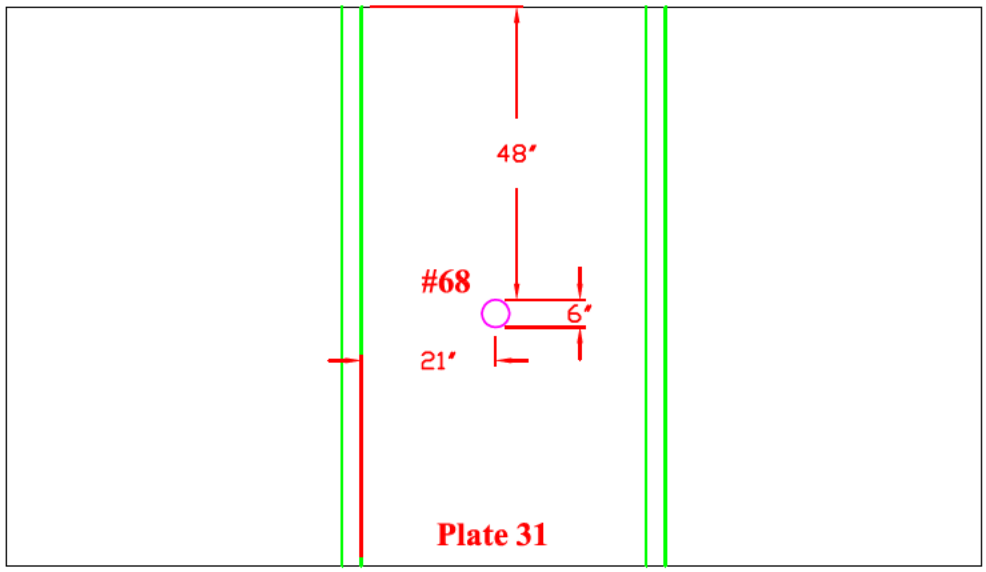
TANK #2 - QUADRANT B

Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/01/2008

Tank Section: Upper dome
Quadrant: B
Course: B
Plate: # 31

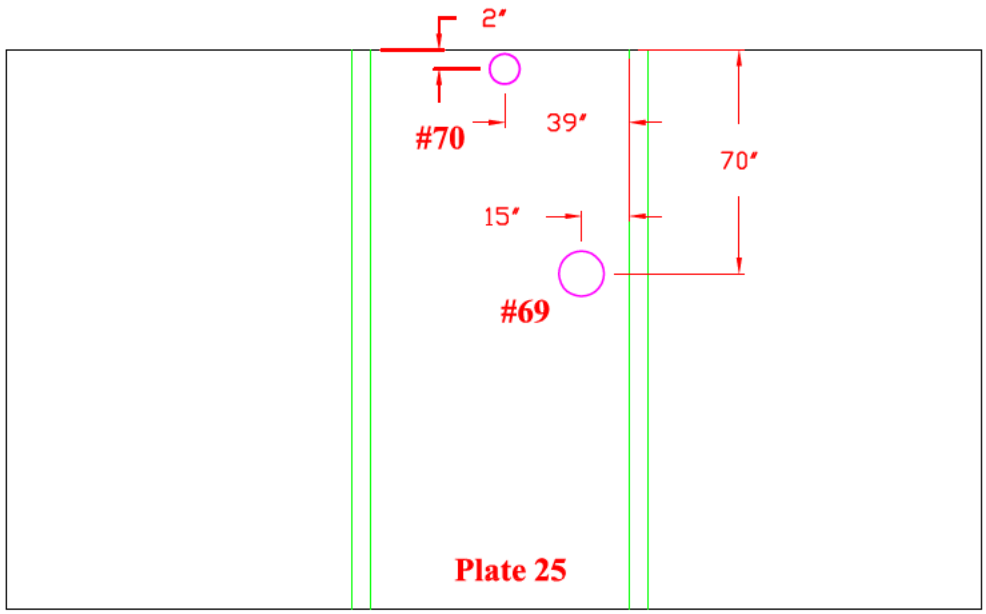
Flaw # 68 - Dent
.300 deep 6" dia N.S.W.L.



Tank Section: Upper dome
Quadrant: B
Course: A
Plate: # 25

Flaw # 69 - Patch
.120 deep 1 ½" dia N.S.W.L.

Flaw # 70 - Dent
.200 deep 2 ½" dia N.S.W.L.



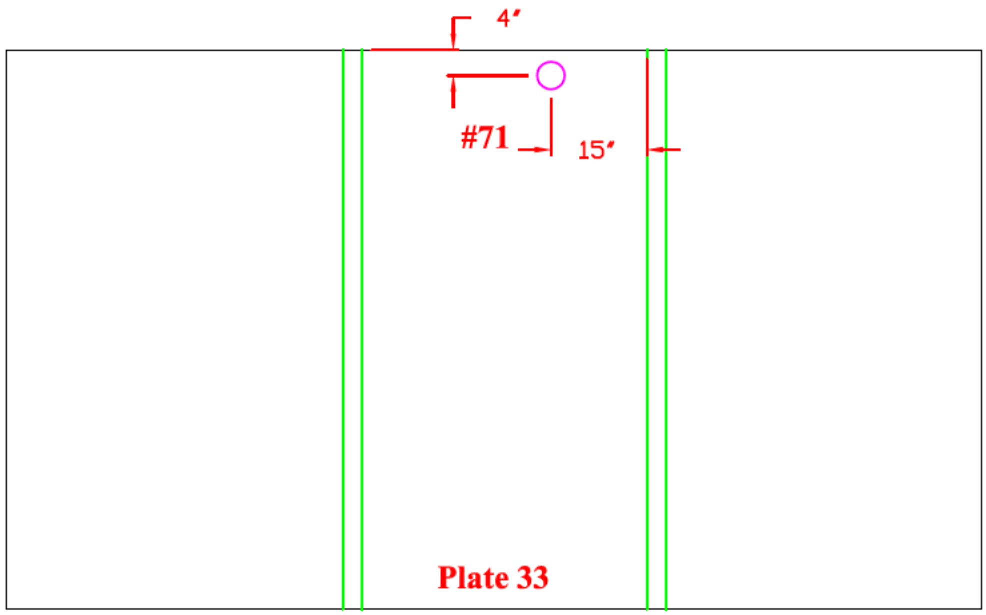
Drawing is not to scale

TANK #2 - QUADRANT B
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/01/2008

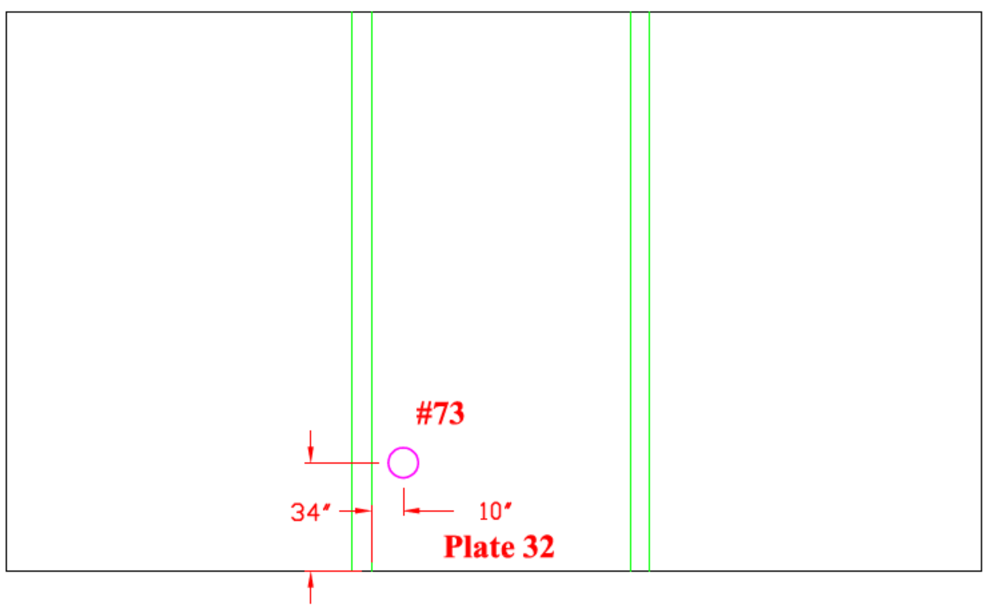
Tank Section: Upper dome
Quadrant: B
Course: A
Plate: # 33

Flaw # 71 - Dent
.320 deep 3" dia N.S.W.L.



Tank Section: Upper dome
Quadrant: B
Course: A
Plate: # 32

Flaw # 73 - Dent
.170 deep 2" dia N.S.W.L.



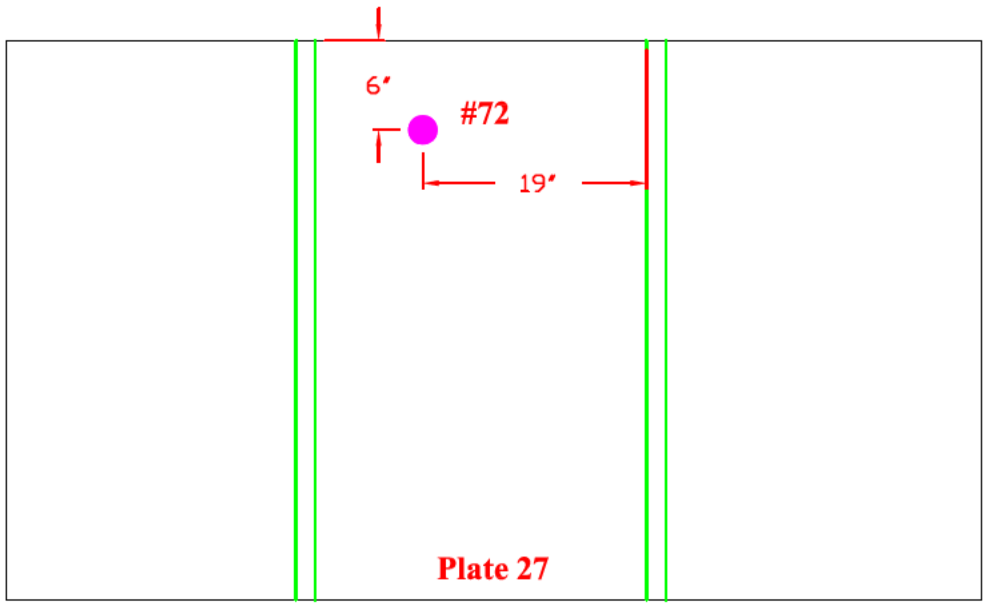
Drawing is not to scale

TANK #2 - QUADRANT B
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/01/2008

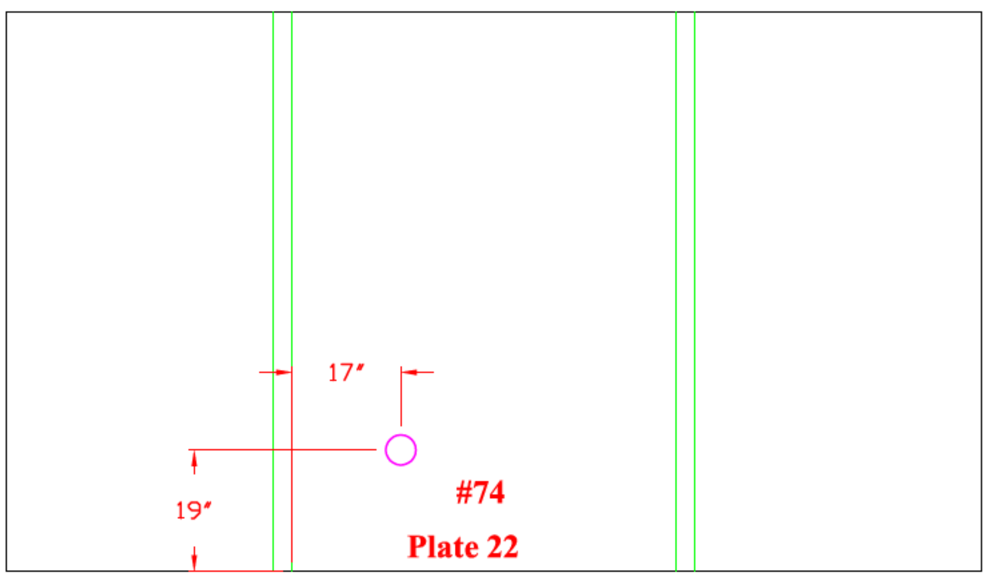
Tank Section: Upper dome
Quadrant: B
Course: A
Plate: # 27

Flaw # 72 - T.S. Pit
.210" Remaining



Tank Section: Upper dome
Quadrant: B
Course: B
Plate: # 22

Flaw # 74 - Dent
.260 deep 3" dia N.S.W.L.



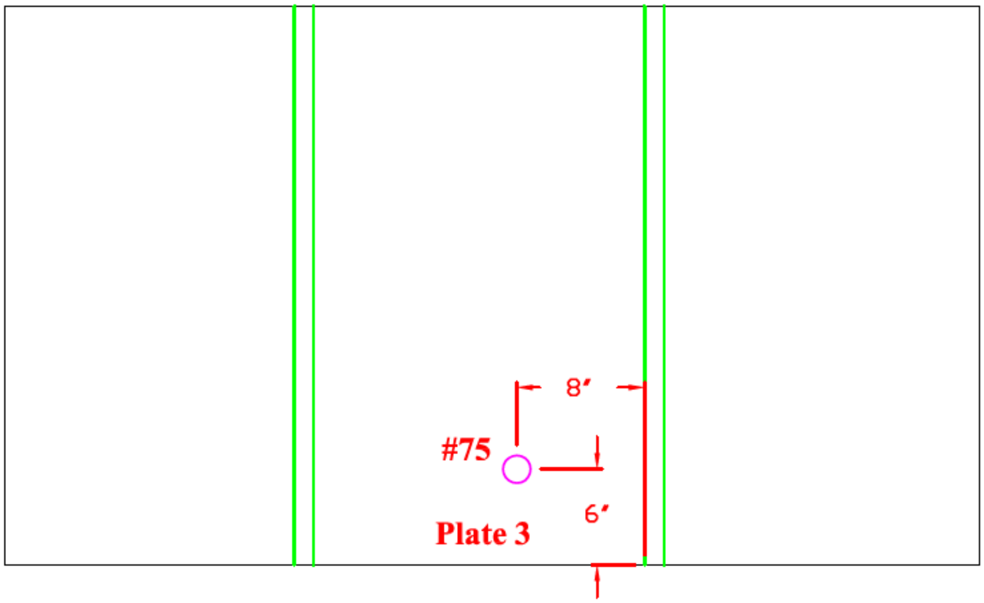
Drawing is not to scale

TANK #2 - QUADRANT A
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/01/2008

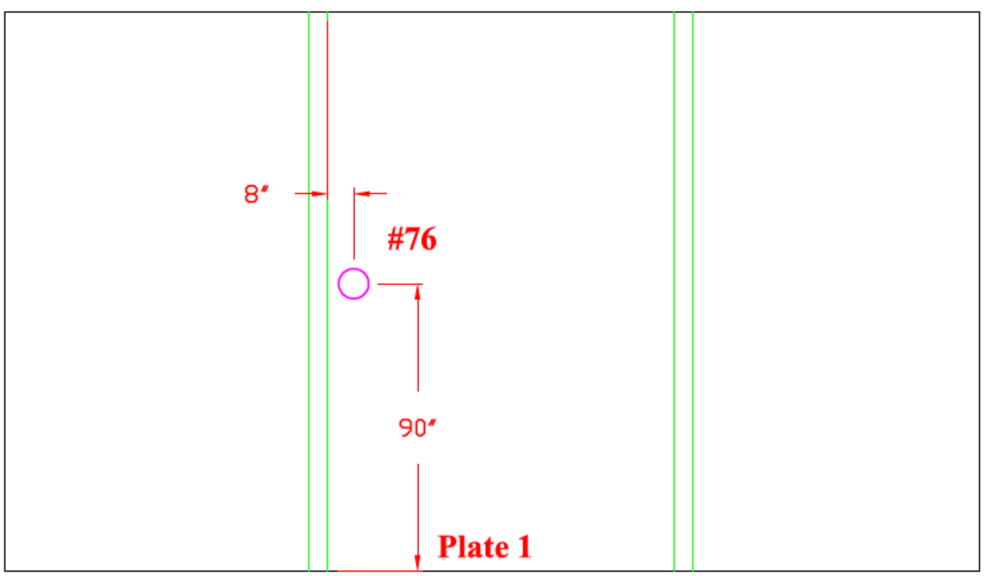
Tank Section: Upper dome
Quadrant: A
Course: B
Plate: # 3

Flaw # 75 - Dent
.250" deep 1½"-2" dia
N.S.W.L.



Tank Section: Upper dome
Quadrant: A
Course: B
Plate: # 1

Flaw # 76 - Thru Wall Pit
.232 depth 3/16" dia



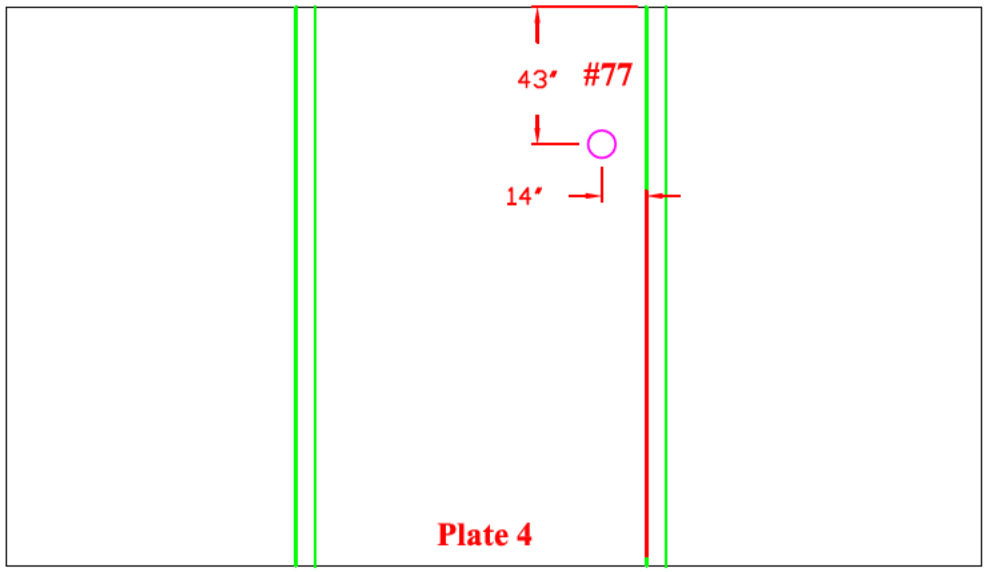
Drawing is not to scale

TANK #2 - QUADRANT A
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/01/2008

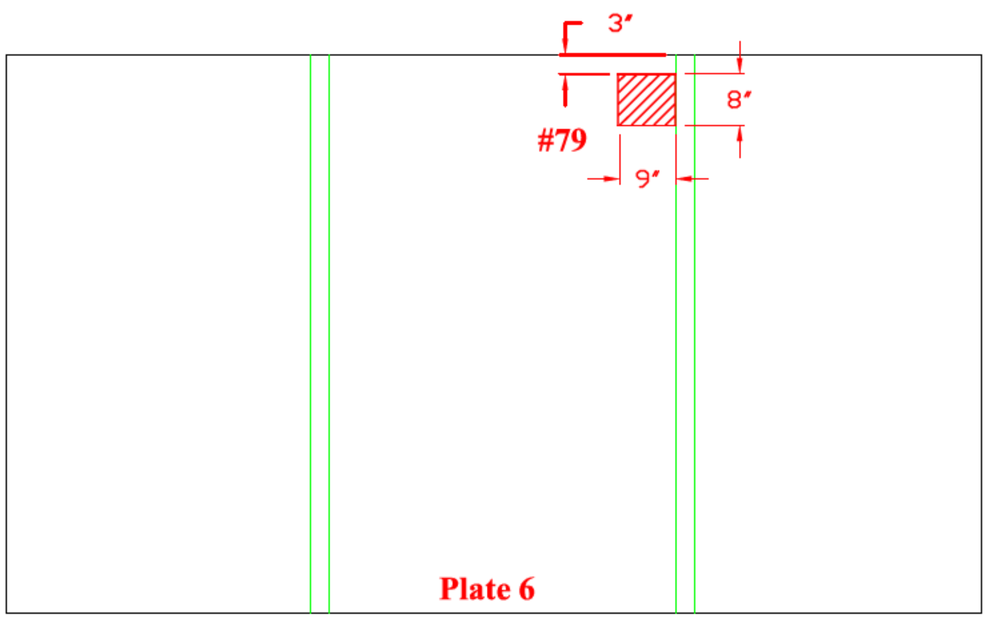
Tank Section: Upper dome
Quadrant: A
Course: A
Plate: # 4

Flaw # 77 - Dent
.165" deep 3" dia
N.S.W.L.



Tank Section: Upper dome
Quadrant: A
Course: C
Plate: # 6

Flaw # 79 - W.L.
.210 Remaining



Drawing is not to scale

TANK #2 - QUADRANT C

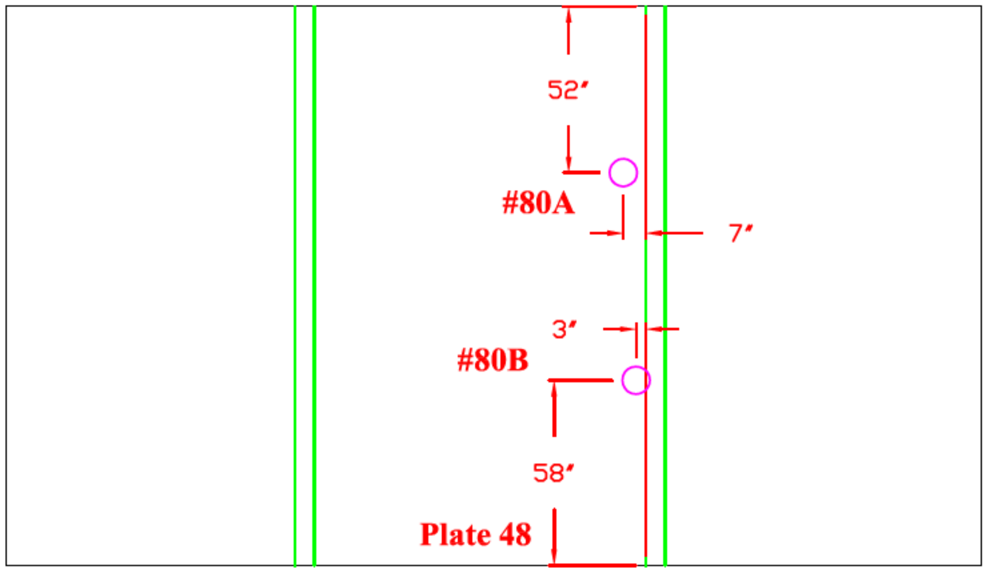
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 04/24/2008

Tank Section: Upper dome
Quadrant: C
Course: A
Plate: # 48

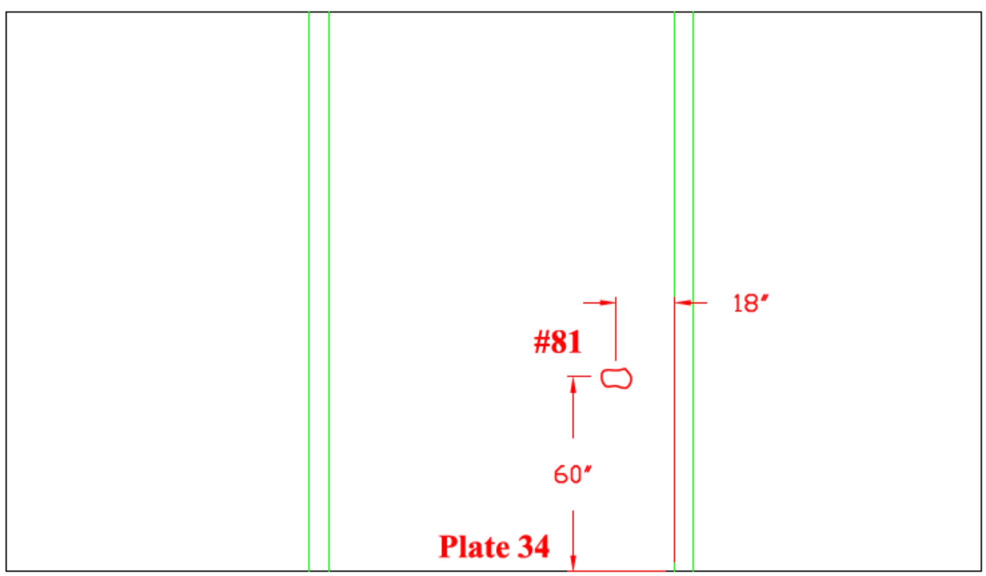
Flaw # 80A - Dent
.255" deep 1 1/2" - 2" dia
N.S.W.L.

Flaw # 80B - Dent
.140" deep 1 1/2" - 2" dia
N.S.W.L.



Tank Section: Upper dome
Quadrant: C
Course: C
Plate: # 34

Flaw # 81 - T.S. Pit
.055 deep



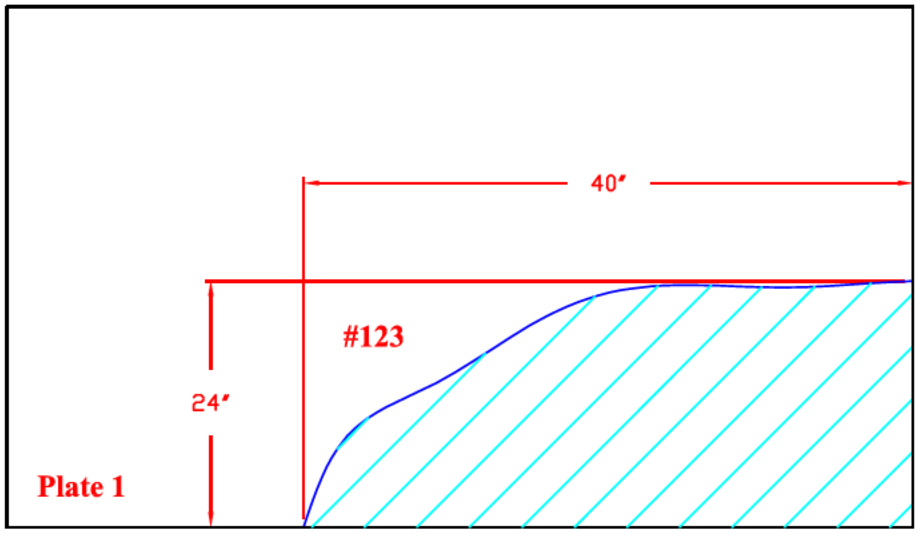
Drawing is not to scale

TANK #2 - QUADRANT A -D
Nominal Plate Thickness: 0.250"

Date Inspected/Confirmed: 05/08/2008

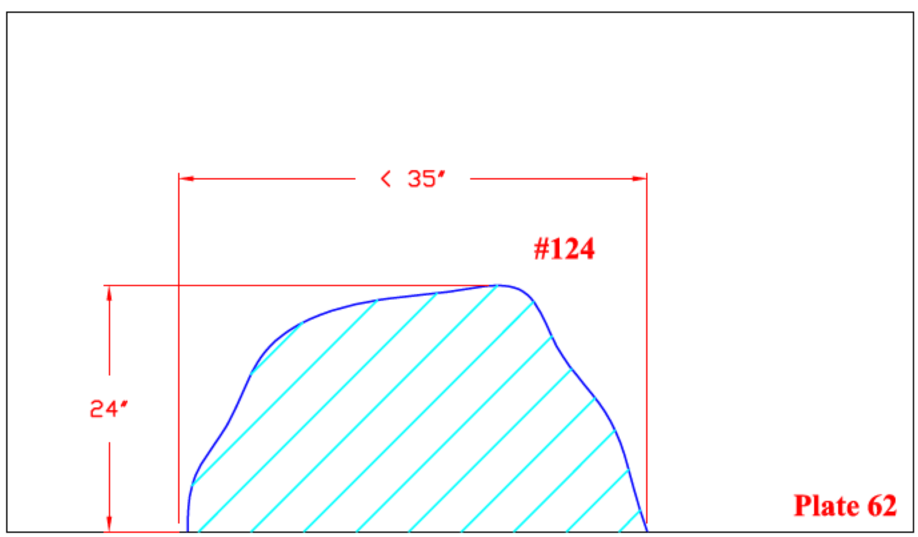
Tank Section: Lower Dome
Quadrant: A
Course: 2
Plate: # 1

Flaw # 123 - Bulge - N.S.W.L.
Shear wave technique was performed on all welds in bulge area.



Tank Section: Lower Dome
Quadrant: D
Course: 2
Plate: # 62

Flaw # 124 - Bulge - N.S.W.L.
Shear wave technique was performed on all welds in bulge area.



Drawing is not to scale

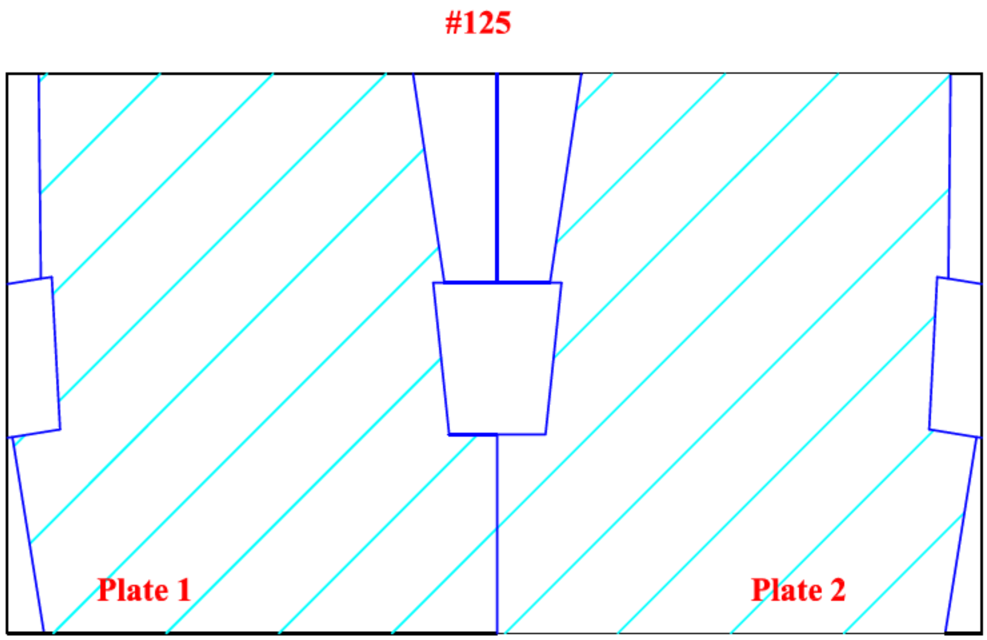
TANK #2 - QUADRANT A
***Nominal Plate Thickness: 0.250"**

Date Inspected/Confirmed: 05/08/2008

Tank Section: Lower Dome
Quadrant: A
Course: 1
Plate: # 1-2

Flaw # 125 - Bulge - N.S.W.L.
Shear wave technique was performed on all welds in bulge area.

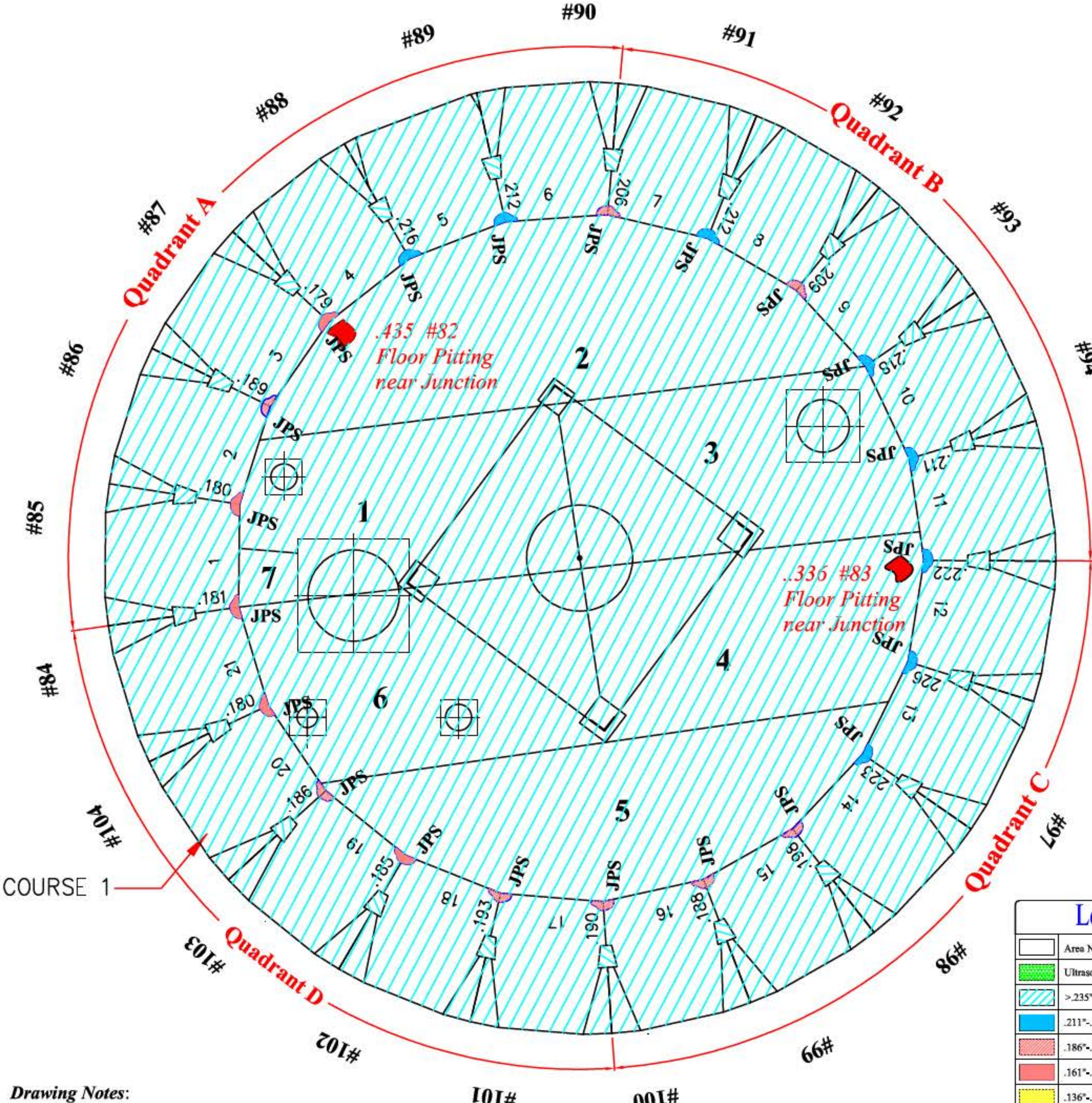
*** Note: This bulge encompassed both plates thru entire lengths.**

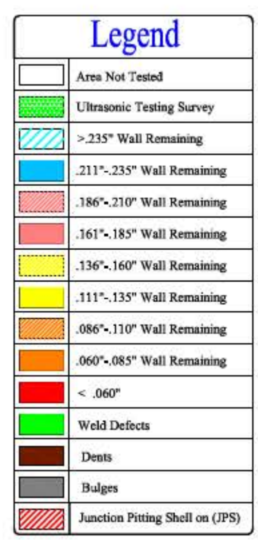


Drawing is not to scale

3.0 Tank Maps
Dunkin & Bush, Inc.
Honolulu, HI
Tank # 2 - Lower Dome

TANK # 2 - LOWER DOME - PITTING - FLOOR , COURSE 1



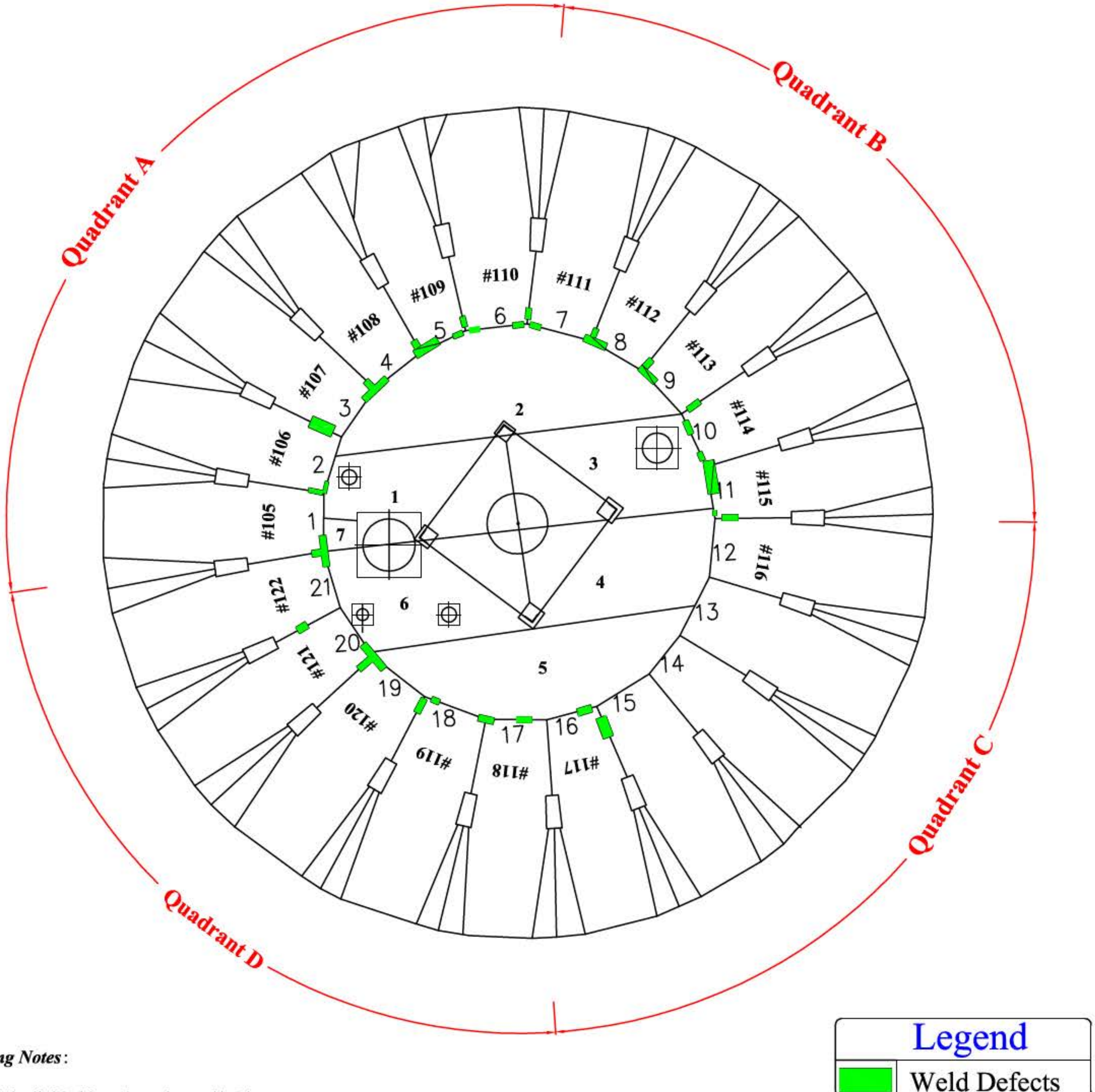


Drawing Notes:

1. Tank is divided into 4 quadrants (A-D).
2. Course 1 is comprised of 21 total plates.
3. Quadrant A is comprised of 6 plates (1-6).
4. Quadrant B is comprised of 5 plates (7-11).
5. Quadrant C is comprised of 5 plates (12-16).
6. Quadrant D is comprised of 5 plates (17-21).
7. This numbering convention begins with plate #1 being the first plate of quadrant A.

Drawing is not to scale

TANK # 2 - LOWER DOME - COURSE 1- WELD DEFECTS

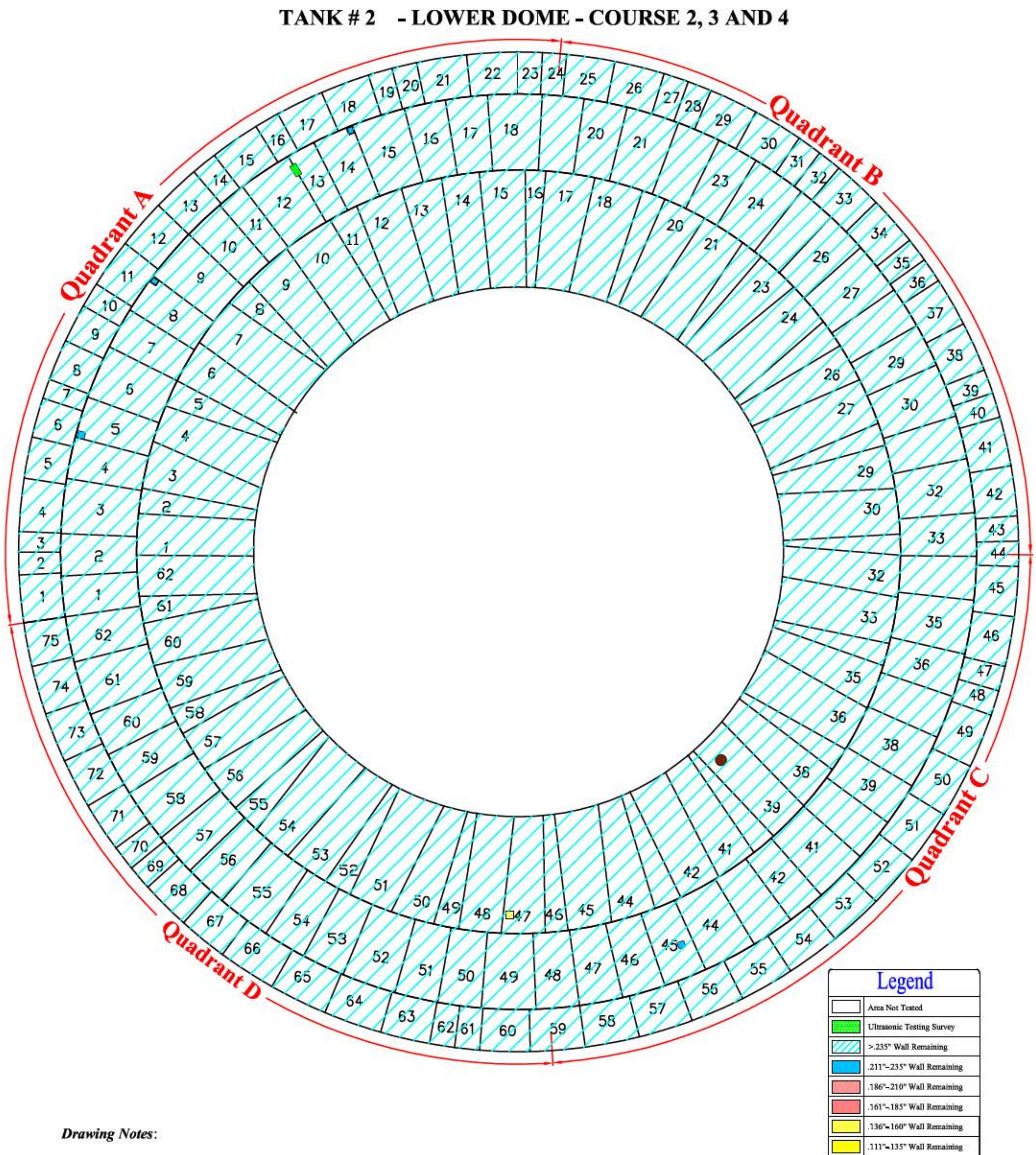


***Drawing Notes*:**

1. Tank is divided into 4 quadrants (A-D).
2. Course 1 is comprised of 21 total plates.
3. This numbering convention begins with plate #1 being the first plate of quadrant A.

Drawing is not to scale

Dunkin & Bush, Inc.
Honolulu, HI
Tank # 2 - Lower Dome

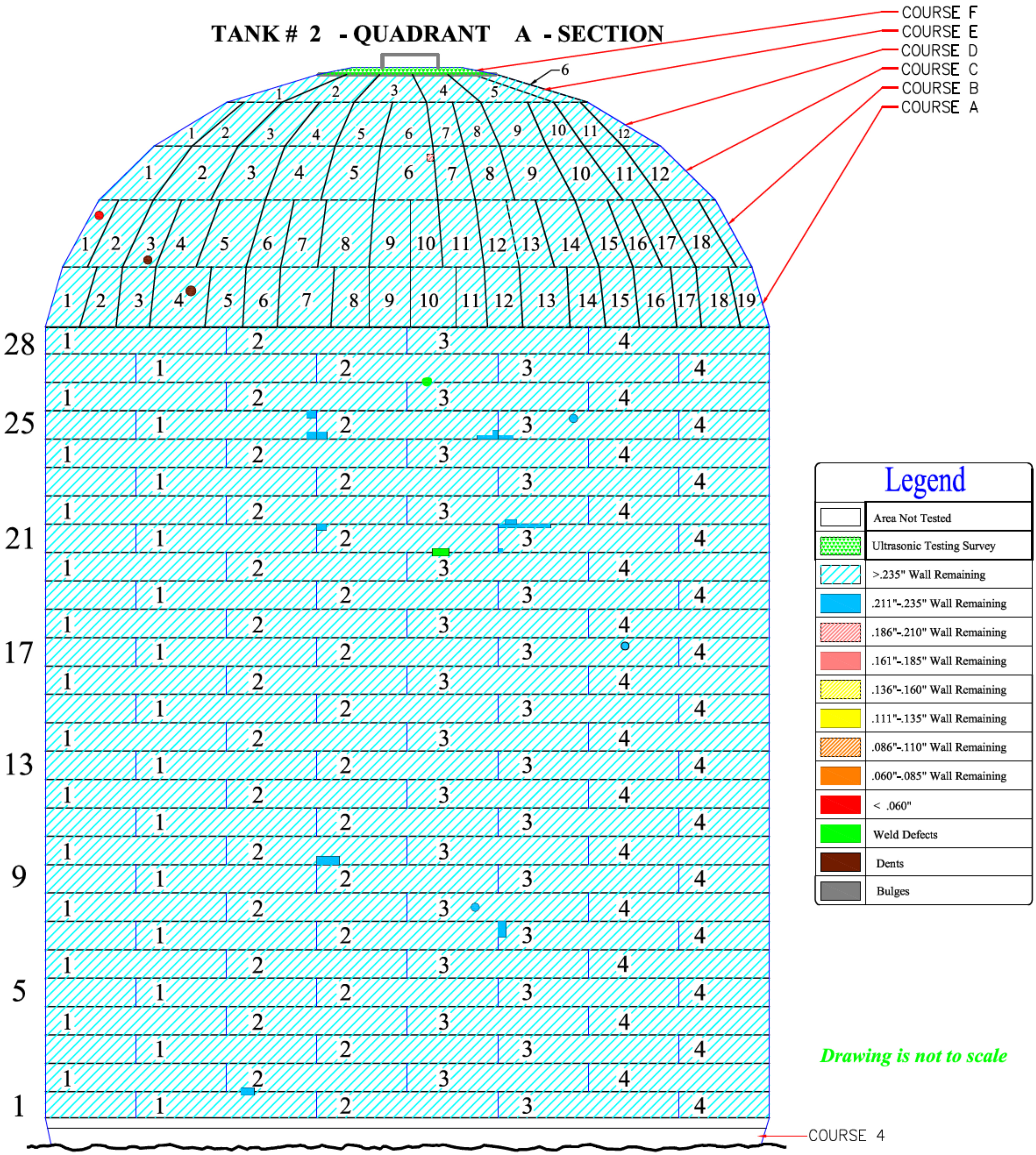


Drawing Notes:

1. Tank is divided into 4 quadrants .
2. Course 2 is comprised of 62 plates .
3. Course 3 is comprised of 62 plates .
4. Course 4 is comprised of 75 plates .
5. This numbering convention begins with plate #1 being the first plate of quadrant A.

Drawing is not to scale

3.0 TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

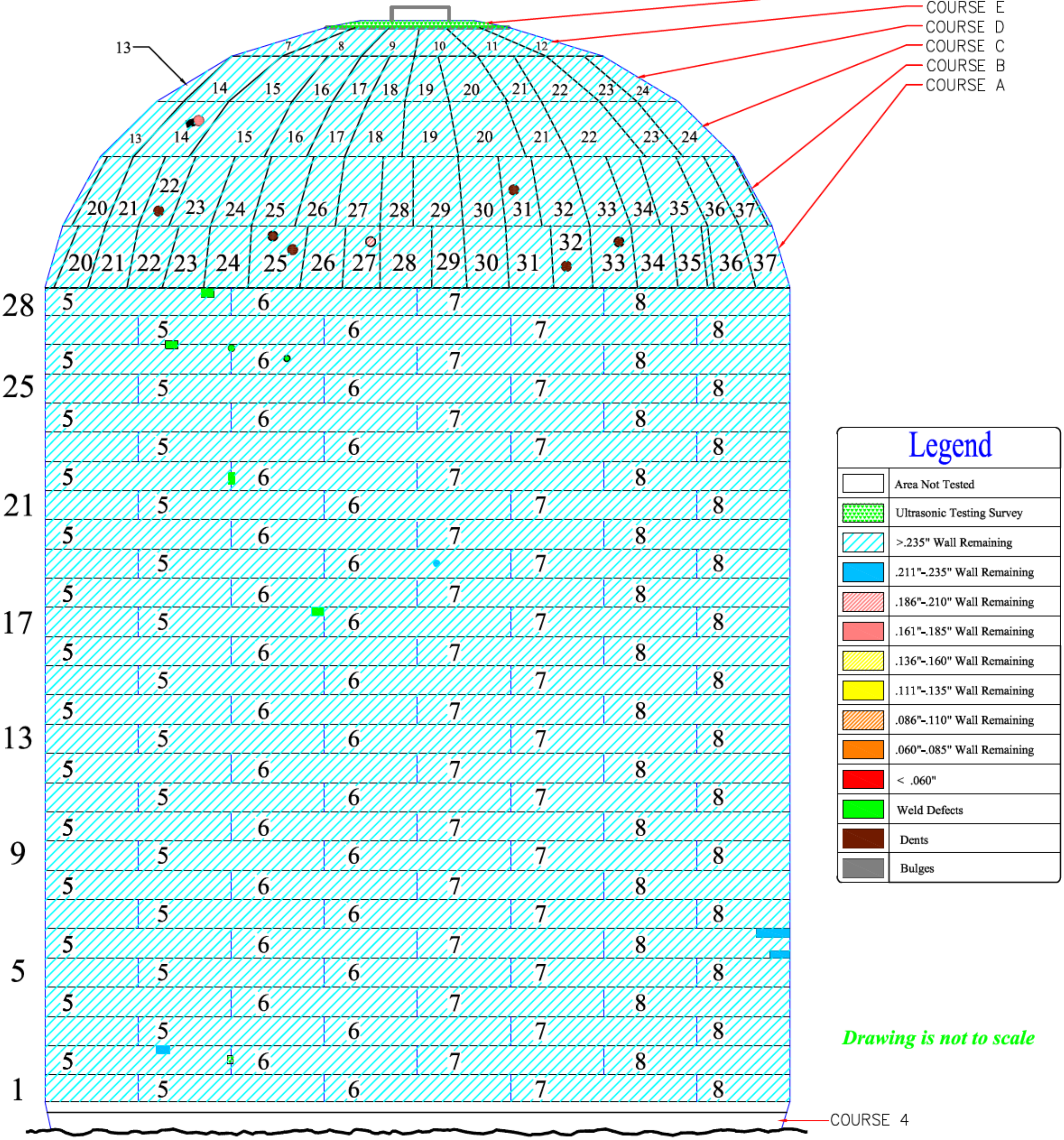


3.0 TANK MAPS

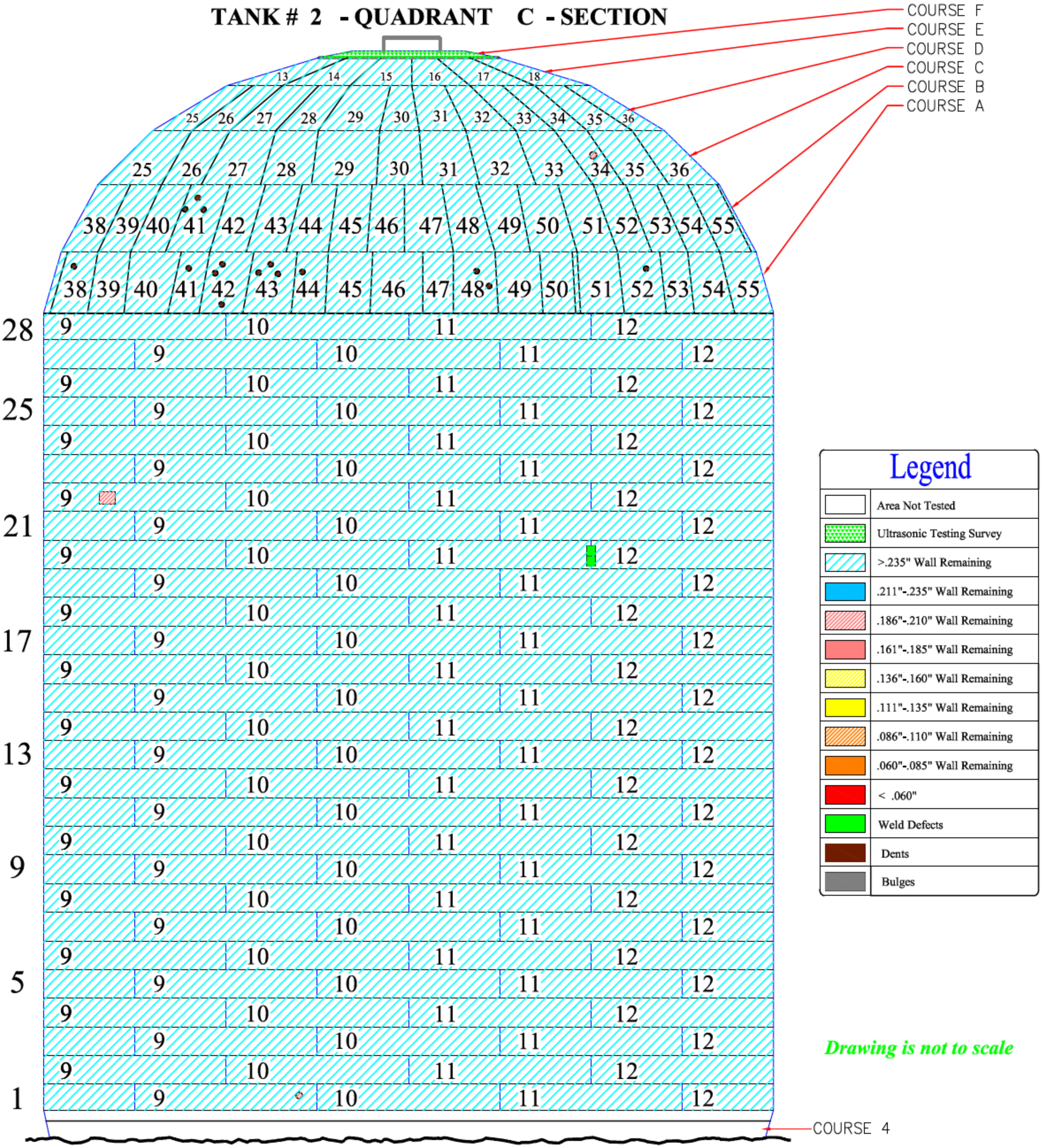
Dunkin & Bush, Inc.

Honolulu, HI

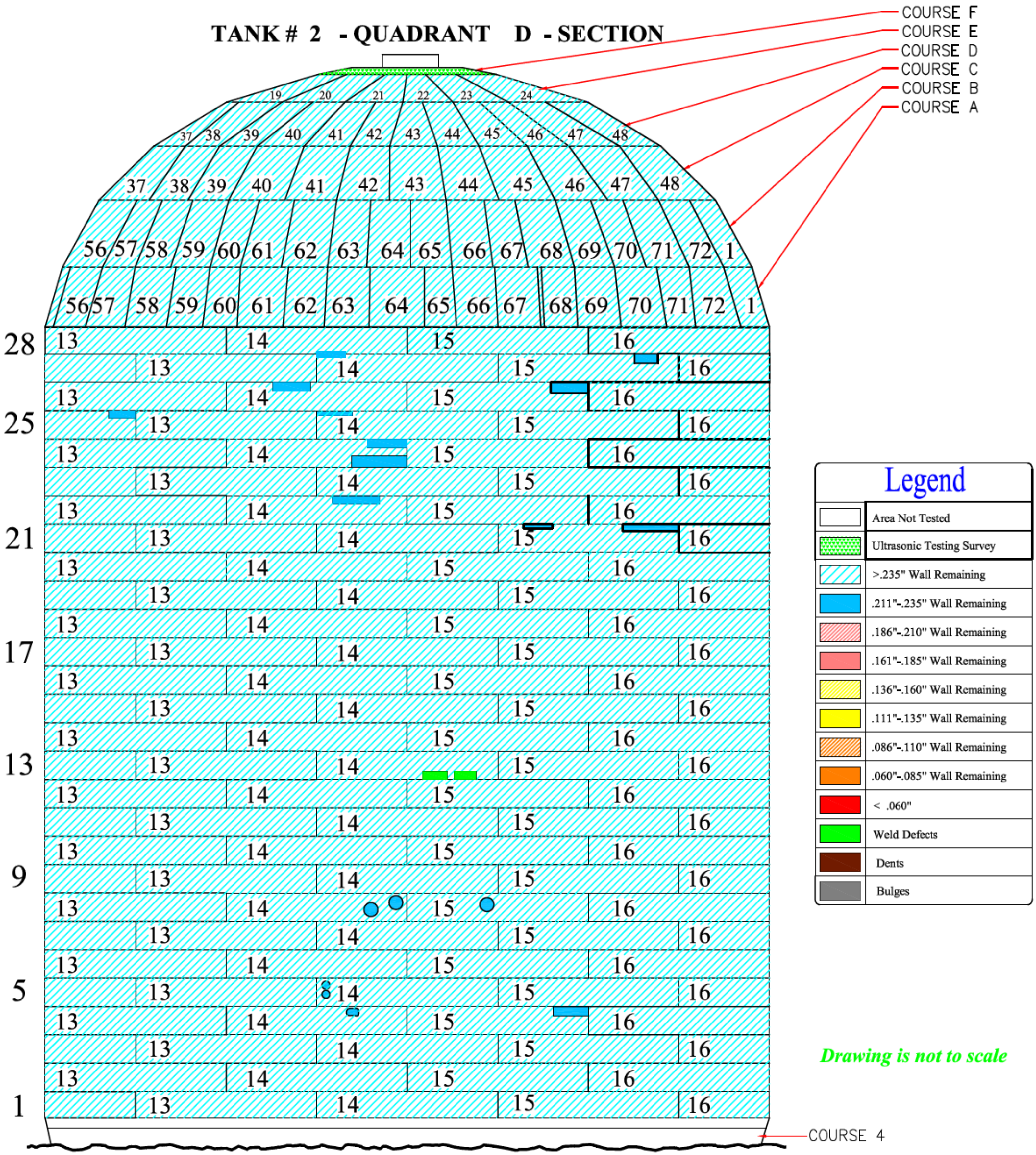
TANK # 2 - QUADRANT B - SECTION



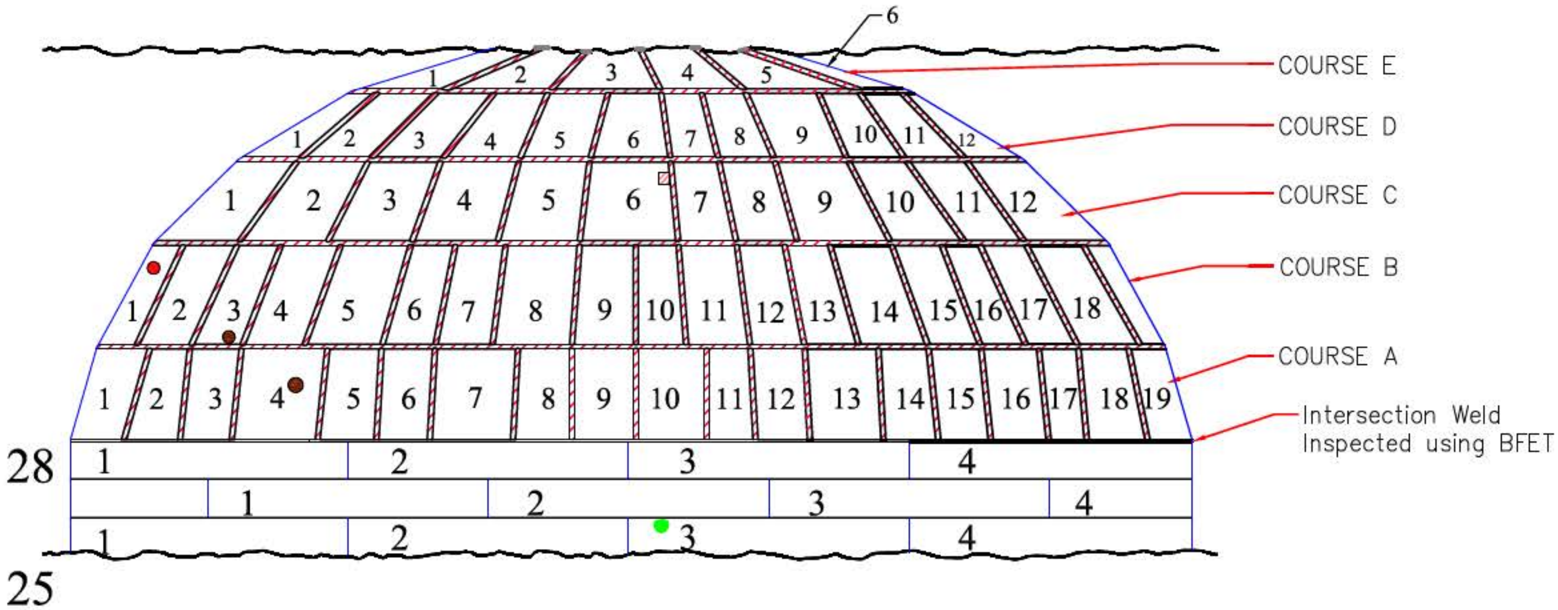
3.0
TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI



3.0TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

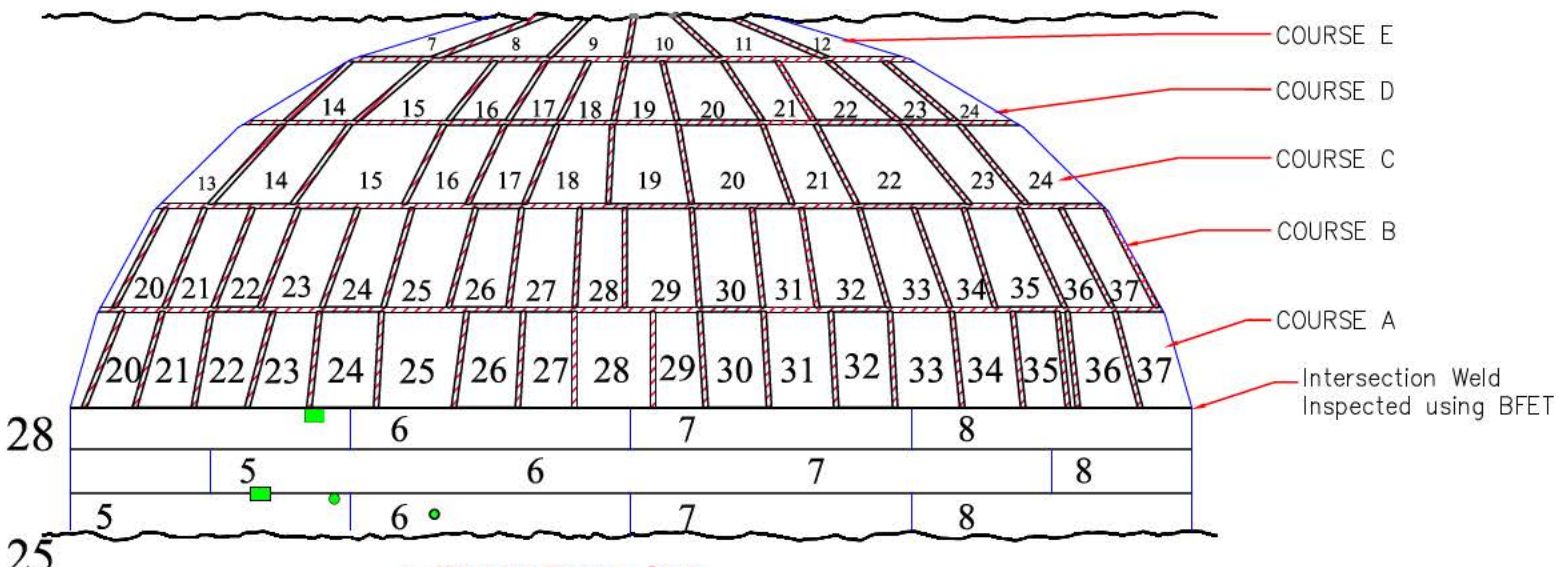


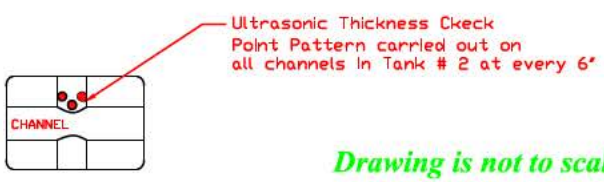
TANK # 2 - QUADRANT - A UPPER DOME (SECTIONS)



U.T. Range for All Channels tested: 0.135 - 0.150

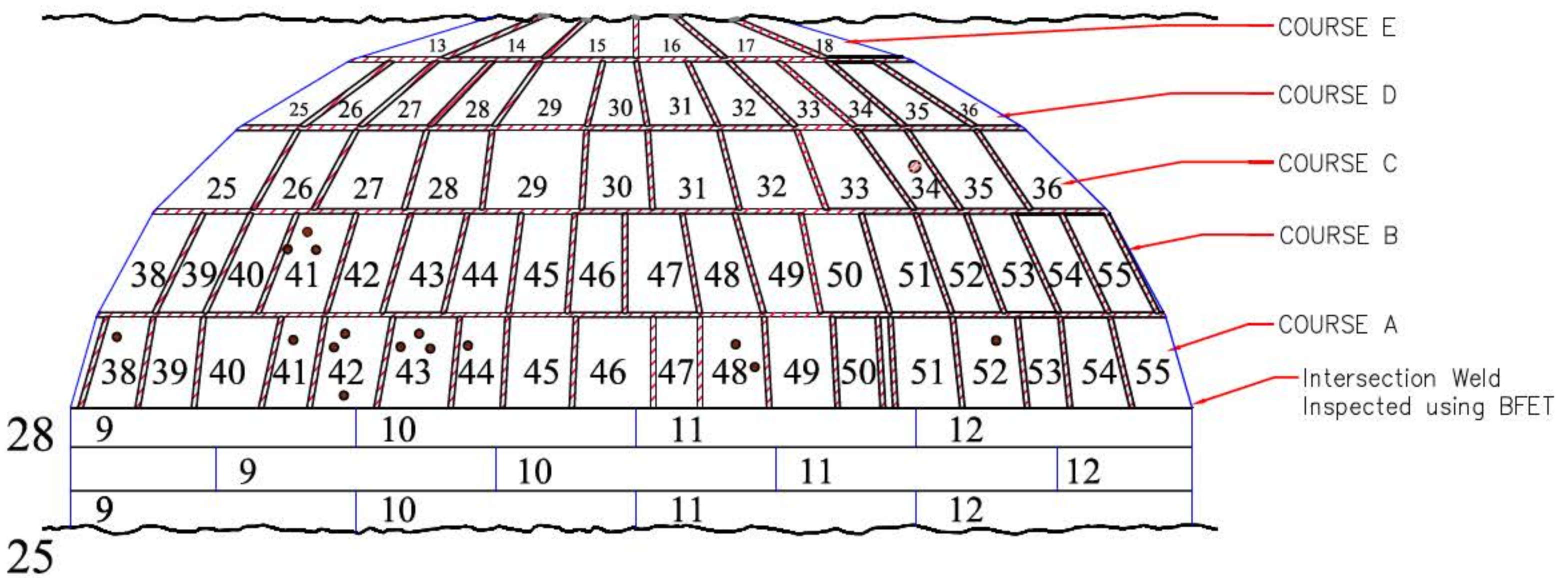
TANK # 2 - QUADRANT - B UPPER DOME (SECTIONS)





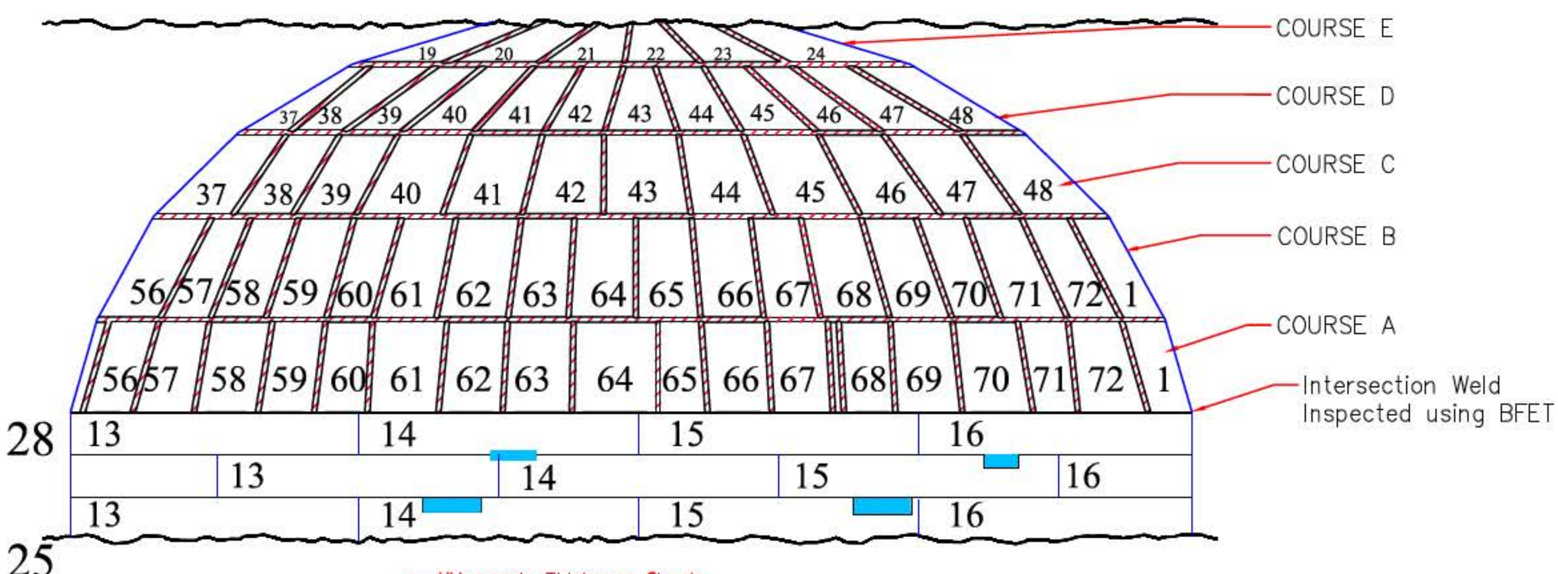
Drawing is not to scale

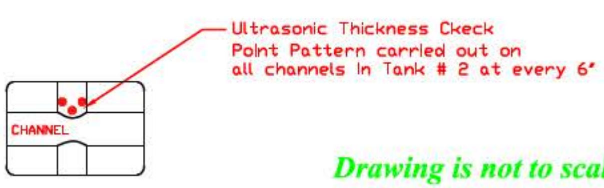
TANK # 2 - QUADRANT - C UPPER DOME (SECTIONS)



U.T. Range for All Channels tested: 0.135 - 0.150

TANK # 2 - QUADRANT - D UPPER DOME (SECTIONS)





Drawing is not to scale

Legend

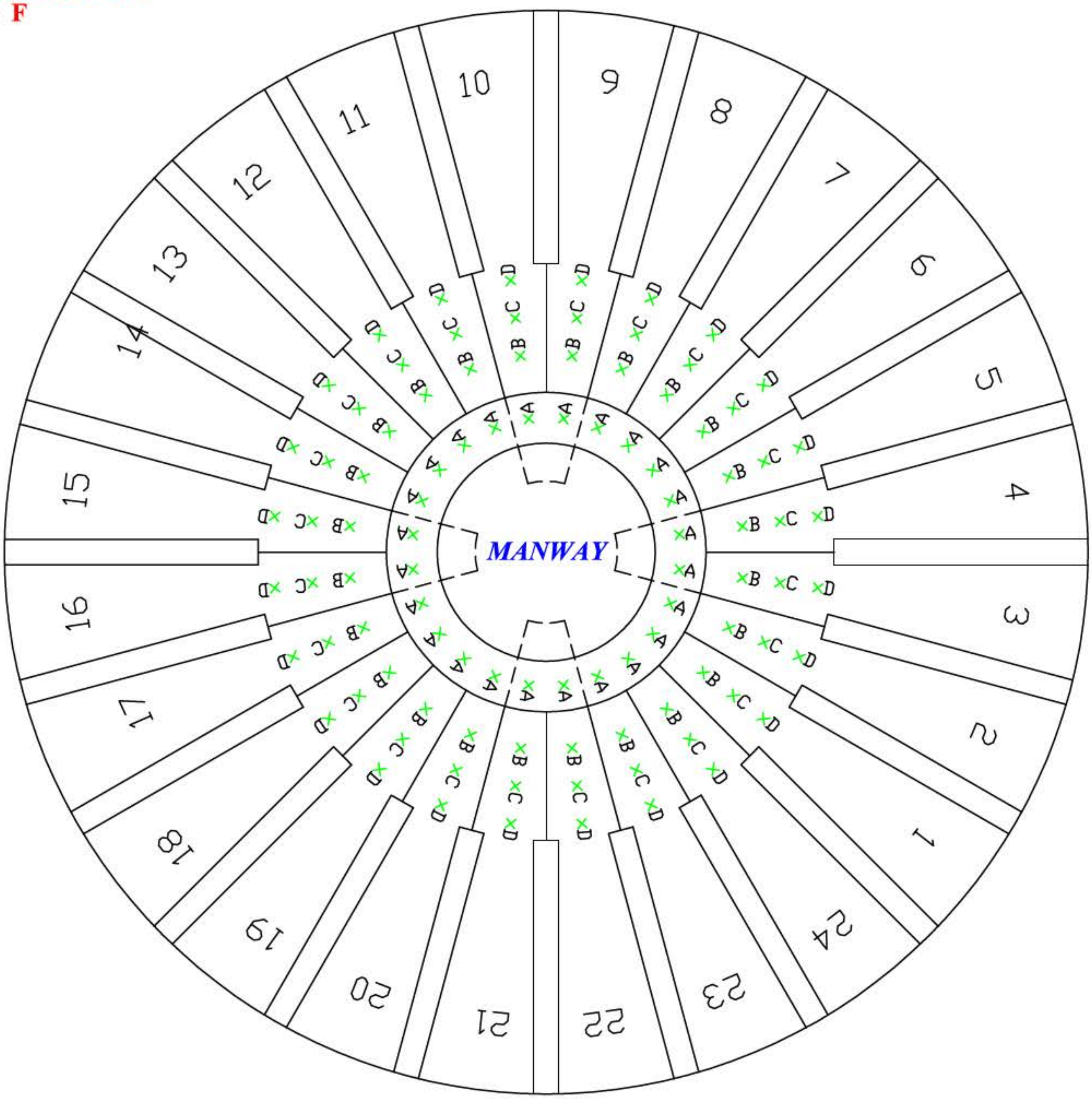
(hatched)	U.T. Spot Checked

Dunkin and Bush, Inc.
Honolulu, HI
Tank #2 - Upper Dome Course F
Ultrasonic Testing Survey

Date Inspected/Confirmed: 5/6/2008

Tank Section: Upper Dome
Quadrant: A, B, C, D
Course: F

TANK #2 - Upper Dome Course F (U.T. Survey)
Nominal Plate Thickness: 0.250"



**Note: The U.T. Survey points on each plate in Course F of the Upper Dome were reachable from the gallery and are consequently close to the inside edge of each plate even though the pictorial representation above exaggerates the distance from the manway for illustration purposes.*

LEGEND	
×	***Ultrasonic Testing Survey Point***

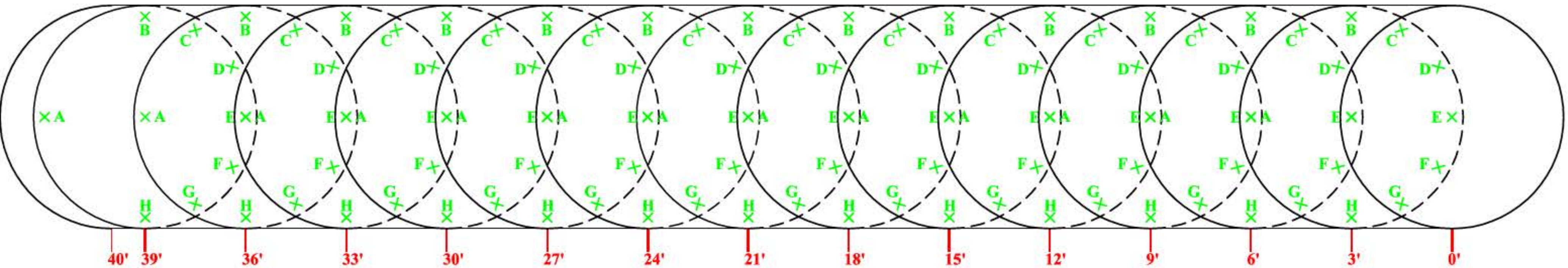
Drawing is not to scale

U.T. Thickness Measurements of Upper Dome Course F

Plate #	A	B	C	D
1	0.257"	0.273"	0.280"	0.280"
2	0.256"	0.259"	0.271"	0.259"
3	0.262"	0.244"	0.251"	0.246"
4	0.255"	0.257"	0.253"	0.261"
5	0.270"	0.277"	0.246"	0.253"
6	0.265"	0.259"	0.274"	0.275"
7	0.250"	0.293"	0.267"	0.270"
8	0.260"	0.262"	0.267"	0.277"
9	0.273"	0.252"	0.263"	0.268"
10	0.281"	0.258"	0.257"	0.262"
11	0.285"	0.268"	0.286"	0.280"
12	0.272"	0.282"	0.270"	0.278"
13	0.236"	0.263"	0.267"	0.269"
14	0.266"	0.263"	0.295"	0.274"
15	0.278"	0.288"	0.269"	0.270"
16	0.328"	0.287"	0.270"	0.288"
17	0.265"	0.284"	0.280"	0.286"
18	0.253"	0.269"	0.290"	0.288"
19	0.248"	0.271"	0.250"	0.261"
20	0.260"	0.270"	0.266"	0.266"
21	0.269"	0.261"	0.292"	0.266"
22	0.266"	0.277"	0.299"	0.277"
23	0.253"	0.262"	0.283"	0.273"
24	0.261"	0.249"	0.252"	0.282"

TANK MAPS
Dunkin and Bush, Inc.
Honolulu, HI
Tank #2 - 32" Fuel Pipe Nozzle
Ultrasonic Testing Survey

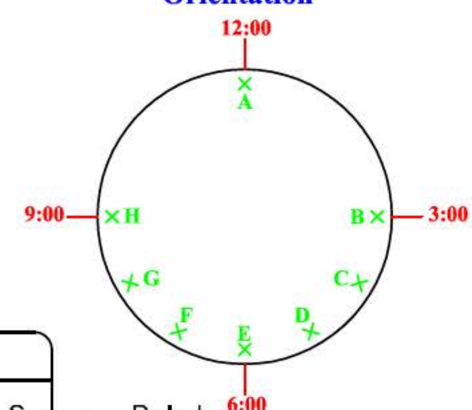
TANK #2 - 32" FUEL PIPE NOZZLE (U.T. Survey)



U.T. Thickness Measurements

	B	C	D	E	F	G	H	A
3'	0.385"	0.382"	0.390"	0.381"	0.380"	0.380"	0.383"	0.380"
6'	0.390"	0.388"	0.380"	0.387"	0.390"	0.390"	0.390"	0.400"
9'	0.399"	0.395"	0.380"	0.380"	0.390"	0.390"	0.390"	0.404"
12'	0.400"	0.420"	0.410"	0.379"	0.393"	0.410"	0.398"	0.408"
15'	0.403"	0.388"	0.399"	0.397"	0.390"	0.400"	0.393"	0.400"
18'	0.405"	0.400"	0.385"	0.399"	0.390"	0.385"	0.395"	0.405"
21'	0.394"	0.387"	0.385"	0.363"	0.368"	0.382"	0.393"	0.406"
24'	0.406"	0.420"	0.420"	0.400"	0.420"	0.400"	0.392"	0.373"
27'	0.400"	0.397"	0.409"	0.420"	0.400"	0.399"	0.396"	0.377"
30'	0.391"	0.391"	0.395"	0.420"	0.430"	0.389"	0.384"	0.370"
33'	0.374"	0.369"	0.370"	0.365"	0.369"	0.369"	0.366"	0.391"
36'	0.370"	0.395"	0.372"	0.373"	0.377"	0.385"	0.372"	0.400"
39'	0.390"	0.402"	0.400"	0.388"	0.406"	0.390"	0.400"	0.413"

Orientation



LEGEND

× Ultrasonic Testing Survey Point

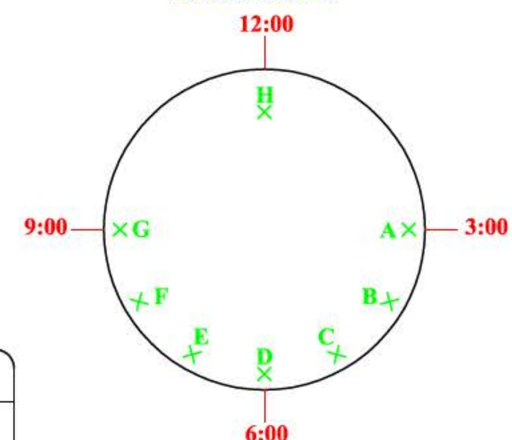
Drawing is not to scale

TANK #2 - 18" FUEL PIPE NOZZLE (U.T. Survey)

U.T. Thickness Measurements

	A	B	C	D	E	F	G	H
8"	0.380"	0.387"	0.390"	0.400"	0.386"	0.389"	0.380"	0.384"
18"	0.416"	0.402"	0.412"	0.380"	0.408"	0.390"	0.379"	0.388"

Orientation



LEGEND

× *Iltrasonic Testing Survey Point*

Drawing is not to scale

4.0 PLATE TEST SUMMARY
Dunkin and Bush, Inc.
Honolulu, HI
Tank #2

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
1	Lower Dome	A	1	2 & 3	Dent	NSWL
2	Lower Dome	B	1	7 & 8	WD-IMC	0.229
3	Lower Dome	C	1	15 & 16	WD-IMC, IMC	.223, .214
4	Lower Dome	D	1	20 & 21	WD-IP, AS	.222, .069
5	Lower Dome	D	2	47	WL, WD	0.147-.210, .215
6	Lower Dome	C	2	39	Dent	NSWL
7	Lower Dome	A	3	13 & 14	WD-LOF	0.195
8	Lower Dome	A	3	14 & 15	WL	0.233
9	Lower Dome	C	3	41	WL	0.230
10	Lower Dome	C	3	45	WL/PIT	0.219
11	Lower Dome	A	3	5	WL	0.226
12	Lower Dome	A	3	8	WL	0.233
13	Barrel	A	25	2	WL	0.231
14	Barrel	A	2	2	WD-LOF	0.125
15	Barrel	A	21	2	WL	0.233
16	Barrel	A	25	1	WL	0.232, 0.227
17	Barrel	A	21	3	WD-LOF, WL, WL	.173, 0.224, 0.234
18	Barrel	A	7	3	WL	0.228
19	Barrel	D	24	14	WL, WL	0.227, 0.232
20	Barrel	D	22	14	WL	0.234
21	Barrel	D	4	15	WL	0.235
22	Barrel	D	8	14	WL, WL	.230, .221
23	Barrel	D	8	15	WL	0.228
24	Barrel	A	26	3	WD-Porosity	0.210
25	Barrel	A	17	3	WD-AS	0.063
26	Barrel	A	20	3	WD-Porosity	0.181
27	Barrel	A	25	3	Pitting	0.234
28	Barrel	A	8	3	Pitting	0.220
29	Barrel	D	13	14	WD-LOF,LOF,LOF,LOF	.173, .112, .205, .206
30	Barrel	D	4	14	Pitting	0.226
31	Barrel	D	5	14	Pitting, Pitting	0.235, .235
32	Barrel	D	21	15	WL, WL	.230, 0.219
33	Barrel	D	20	14	WD-Tack weld	0.082
34	Barrel	A	25	2	WL	0.219
35	Barrel	A	25	3	WL	0.221
36	Barrel	A	10	2	WL	0.218
39	Barrel	D	25	14	WL	0.230
40	Barrel	D	26	14	WL	0.214
42	Barrel	D	25	14	WL	0.223/0.234
43	Barrel	D	27	14	WL	0.229
44	Barrel	A	27	5	WL/Bulge	0.230
45	Barrel	A	2	5	WL	0.225
46	Barrel	D	25	12	WL	0.230
47	Barrel	D	20	12	WD-LOF, PH, LOF,LOF	.211, .088, .219, .221

4.0 PLATE TEST SUMMARY
Dunkin and Bush, Inc.
Honolulu, HI
Tank #2

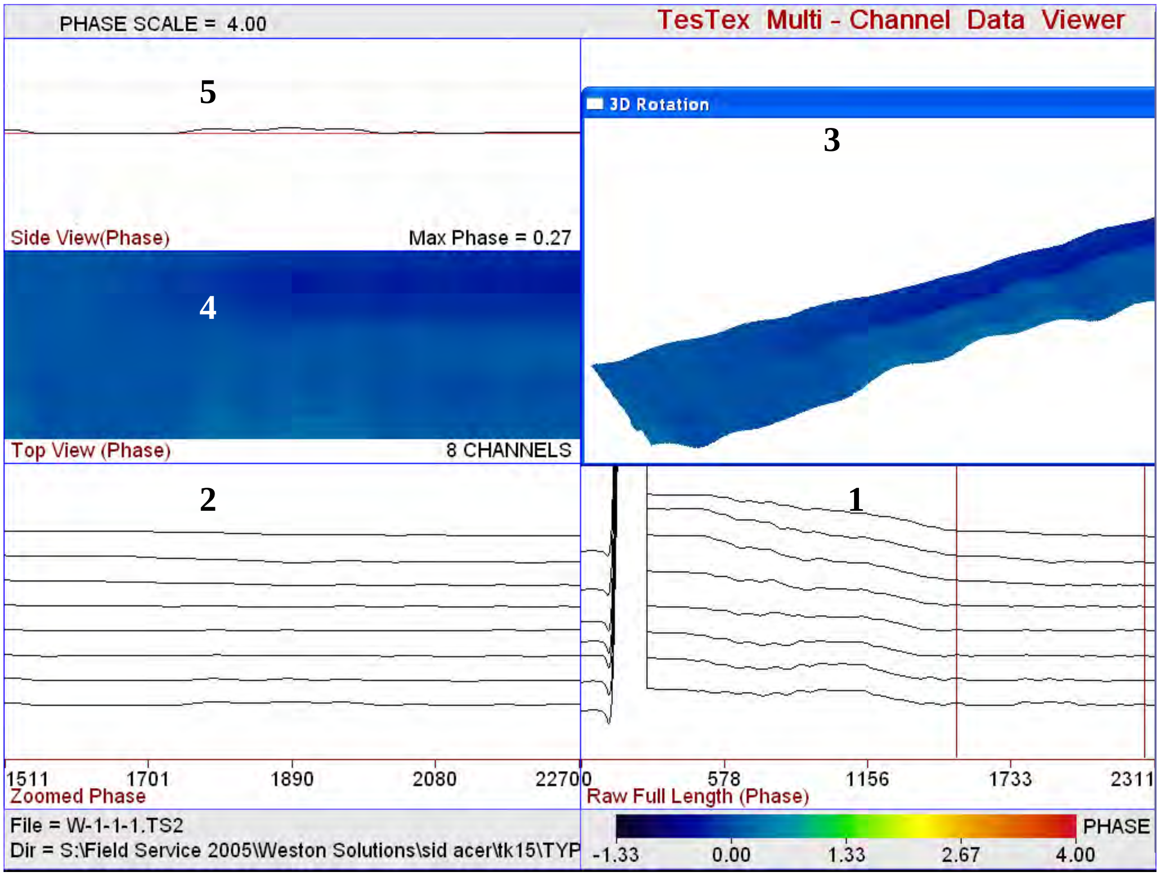
Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
48	Barrel	B	17	5	WL	0.232
49	Barrel	B	26	5	WD-SL, LOF	.114, .083
50	Barrel	B	28	5	WD-LOF	0.104
51	Barrel	B	26	6	Pitting	0.220
52	Barrel	B	22	6	WD-LOF, LOF	.169, .154
53	Barrel	B	19	6	Pitting	0.220
54	Barrel	B	2	6	WD-LOF	0.219
55	Barrel	C	23	11	WL	0.228
56	Barrel	C	6	8	WL	0.225
57	Barrel	C	6	8	WL	0.229/0.231
58	Barrel	C	1	9	WL on PP	0.200
59	Barrel	C	22	9	WL	0.186
60	Upper Dome	C	A	41	Dent	NSWL
61	Upper Dome	C	A	43	Dent, Dent, Dent	NSWL
62	Upper Dome	C	A	38	Dent	NSWL
63	Upper Dome	C	A	42	Dent, Dent, Dent	NSWL
64	Upper Dome	C	A	44	Dent	NSWL
65	Upper Dome	C	A	52	Dent	NSWL
66	Upper Dome	C	B	41	Bulge, Dent, Dent	NSWL
67	Upper Dome	B	C	14	WL-PP, WL	0.141, 0.185
68	Upper Dome	B	B	31	Dent	NSWL
69	Upper Dome	B	A	25	Dent	NSWL
70	Upper Dome	B	A	25	Dent	NSWL
71	Upper Dome	B	A	33	Dent	NSWL
72	Upper Dome	B	A	27	Pitting	0.210
73	Upper Dome	B	A	32	Dent	NSWL
74	Upper Dome	B	B	22	Dent	NSWL
75	Upper Dome	A	B	3	Dent	NSWL
76	Upper Dome	A	B	1	Pitting	THRU/.018
77	Upper Dome	A	A	4	Dent	NSWL
79	Upper Dome	A	C	6	WL	0.210
80	Upper Dome	A	A	48	Dent, Dent	NSWL
81	Upper Dome	C	C	34	TS Pitting	0.055
82	Floor	A		2	TS pitting	0.435
83	Floor	B		4	TS pitting	0.336
84	Lower Dome	DA	1	21 & 1	Junction Pitting Shell	0.181
85	Lower Dome	A	1	1 & 2	JPS	0.180
86	Lower Dome	A	1	2 & 3	JPS	0.189
87	Lower Dome	A	1	3 & 4	JPS	0.179
88	Lower Dome	A	1	4 & 5	JPS	0.216
98	Lower Dome	A	1	5 & 6	JPS	0.212
90	Lower Dome	AB	1	6 & 7	JPS	0.206
91	Lower Dome	B	1	7 & 8	JPS	0.212
92	Lower Dome	B	1	8 & 9	JPS	0.209

4.0 PLATE TEST SUMMARY
Dunkin and Bush, Inc.
Honolulu, HI
Tank #2

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
93	Lower Dome	B	1	9 & 10	JPS	0.218
94	Lower Dome	B	1	10 & 11	JPS	0.211
95	Lower Dome	BC	1	11 & 12	JPS	0.222
96	Lower Dome	C	1	12 & 13	JPS	0.226
97	Lower Dome	C	1	13 & 14	JPS	0.223
98	Lower Dome	C	1	14 & 15	JPS	0.198
99	Lower Dome	C	1	15 & 16	JPS	0.188
100	Lower Dome	CD	1	16 & 17	JPS	0.190
101	Lower Dome	D	1	17 & 18	JPS	0.193
102	Lower Dome	D	1	18 & 19	JPS	0.185
103	Lower Dome	D	1	19 & 20	JPS	0.186
104	Lower Dome	D	1	20 & 21	JPS	0.180
105	Lower Dome	DA	1	21 & 1	WD-LOF	.094, .081, .100
106	Lower Dome	A	1	1 & 2	WD-LOF	.086, .084
107	Lower Dome	A	1	2 & 3	WD-LOF, Crack	.201, .217
108	Lower Dome	A	1	3 & 4	WD-LOF, Crack, LOF, LOF	.206, .200, .080, .135
109	Lower Dome	A	1	4 & 5	WD-LOF, LOF, LOF, LOF, LOF	.201, .212, .201, .086, .162
110	Lower Dome	A	1	5 & 6	WD-LOF, LOF, LOF, LOF	.193, .198, .065, 148
111	Lower Dome	AB	1	6 & 7	WD-LOF, LOF, LOF, LOF	.185, .157, .197, .195
112	Lower Dome	B	1	7 & 8	WD-IMC, IMC, IMC, IMC, IMC	.145, .222, .188, .182, .218
113	Lower Dome	B	1	8 & 9	WD-LOF, LOF, LOF	.079, .207, .086
114	Lower Dome	B	1	9 & 10	WD-LOF, LOF	.133, .216
115	Lower Dome	B	1	10 & 11	WD-LOF, LOF	.082, .080
116	Lower Dome	BC	1	11 & 12	WD-LOF, LOF	.216, .071
117	Lower Dome	C	1	15 & 16	WD-LOF, LOF	.102, .197
118	Lower Dome	CD	1	16 & 17	WD-LOF, LOF	.080, .085
119	Lower Dome	D	1	17 & 18	WD-LOF	0.211
120	Lower Dome	D	1	18 & 19	WD-LOF, IP	.088, .288
121	Lower Dome	D	1	19 & 20	WD-IMC, IMC	.238, .231
122	Lower Dome	D	1	20 & 21	WD-LOF	0.192
123	Lower Dome	A	2	1	Bulge	NSWL
124	Lower Dome	D	2	62	Bulge	NSWL
125	Lower Dome	A	1	1 & 2	Bulge (both plates entirely)	NSWL

* Note: Flaws in "Red" are shown in depth, not remaining. All others in "Black" are in remaining. Abbreviations are as follows; WD (weld defect), LOF (lack of fusion), IMC (intermittent cracking), IP (incomplete Penetration), AS (arc strike), PH (pin hole), SL (slag line), PP (patch plate), WL (wall loss), TS (topside), NSWL (no significant wall loss), JPS (junction pitting on shell).

5.0 TYPICAL WAVEFORMS
Dunkin and Bush, Inc.
Honolulu, HI
Tank #15



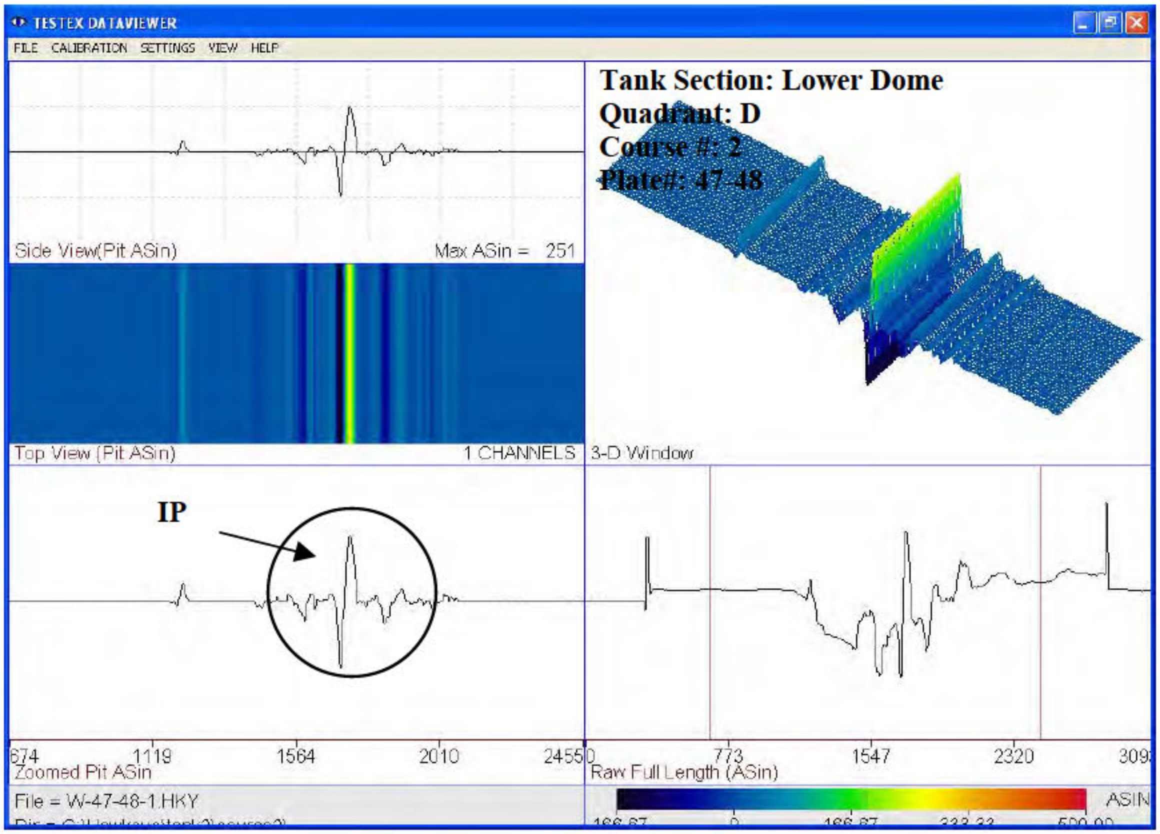
Shown above is a typical **TS-2000** waveform collected from the Barrel of Tank #15. This particular plate exhibits nominal wall thickness.

The **TS-2000** display has 5 windows to facilitate the interpretation of each plate. Window 1 shows raw data from the scanner before the signal is processed or filtered. The 2nd window shows the raw data filtered and processed. The 3rd window shows a 3-D view of the plate. The 4th window shows a topside view of the plate. The 5th window shows the highest and lowest points of the plate baseline.

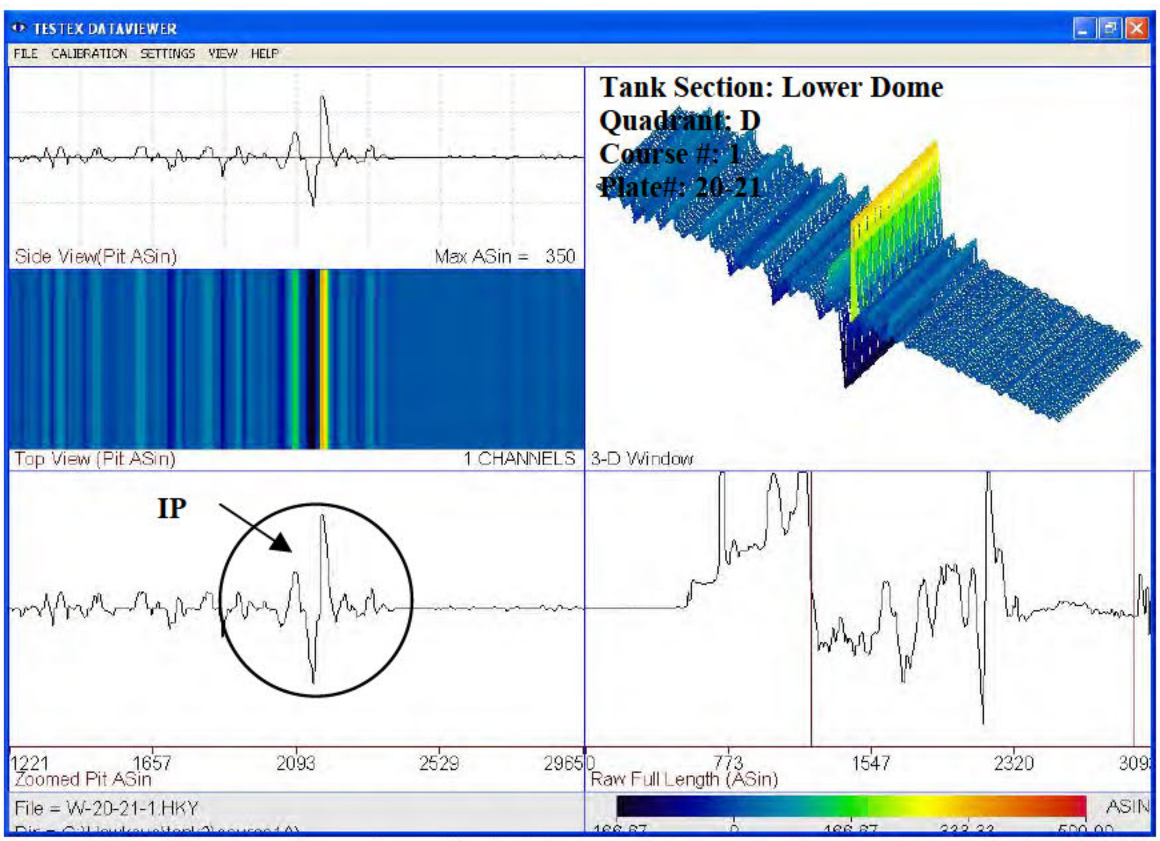
The **TS-2000** scanner is comprised of 8 sensors, which gives more sensitivity to pitting and cracking. Each sensor is individually represented by a line in windows 1, 2, and 3. The 4th window shows each sensor and is color marked as it detects wall loss. Any rise in the waveform indicates wall loss. The magnitude of the response is given by a color and is coded to the right of the waveform. From this color and comparing it to a calibration, a percent wall loss or wall remaining value can therefore be determined.

APPENDIX A – SAMPLE WAVEFORMS

APPENDIX A – SAMPLE WAVEFORMS

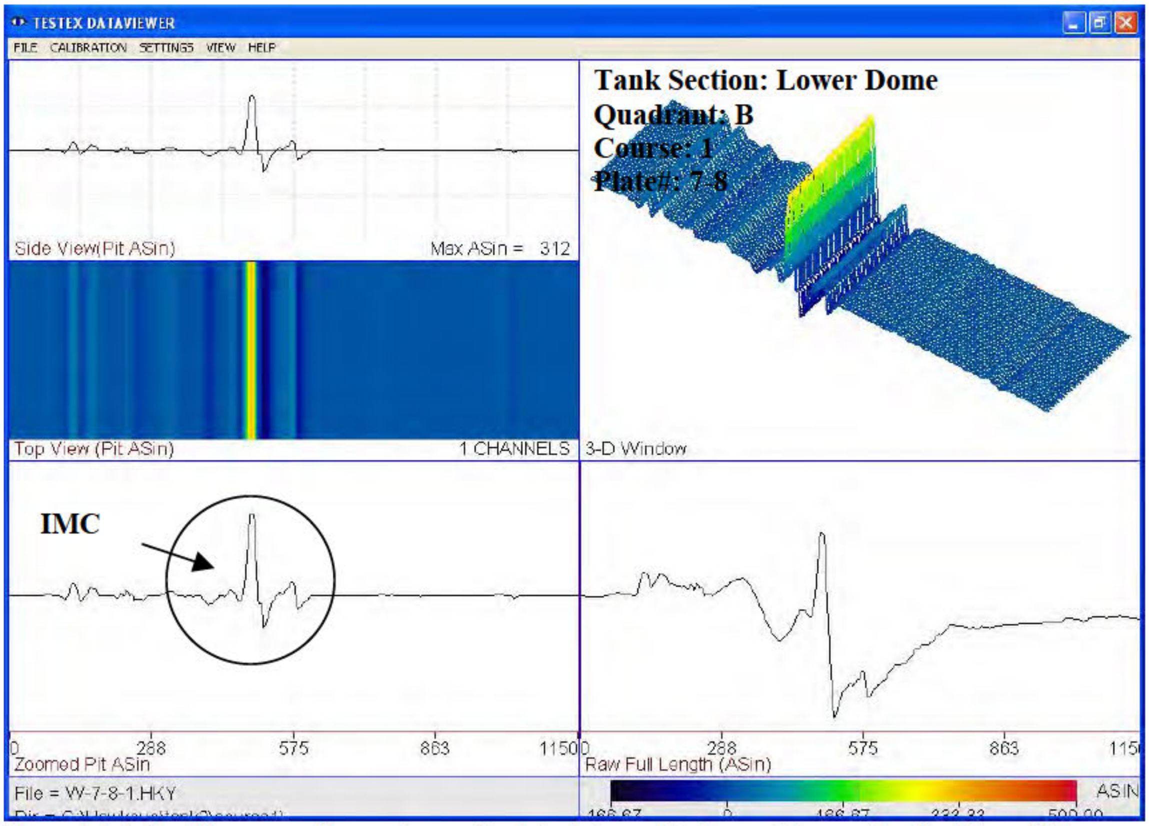


Flaw # 5B: The waveform above depicts incomplete penetration on the vertical weld, 1" long, at a depth of .215".

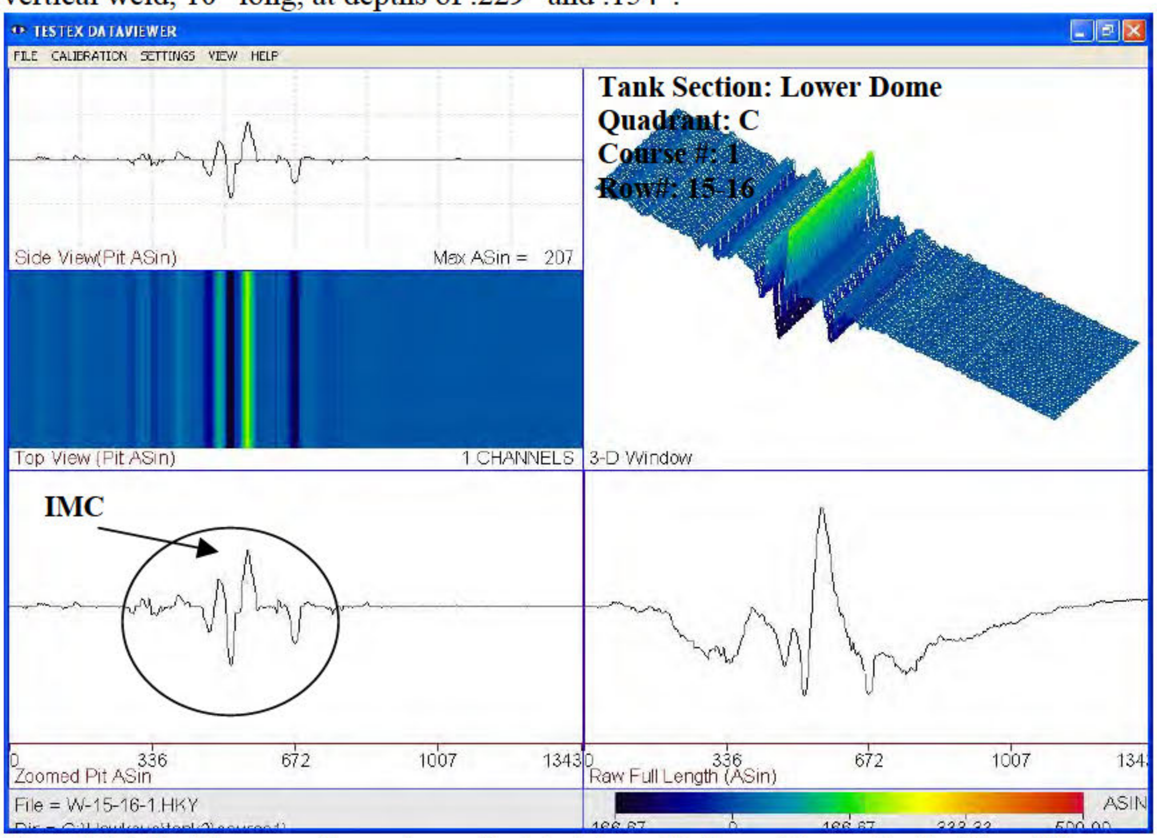


Flaw # 4A: The waveform above depicts incomplete penetration on the vertical weld, 1" long, at a depth of .222".

APPENDIX A – SAMPLE WAVEFORMS

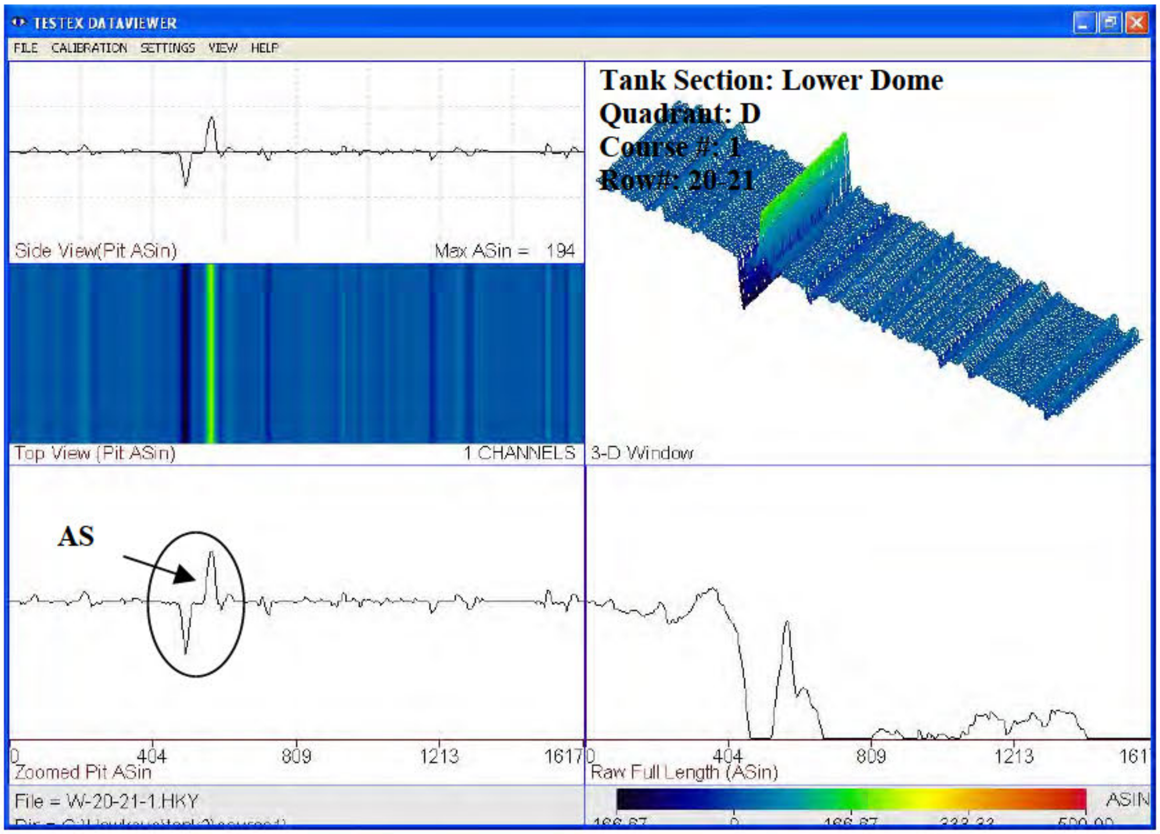


Flaw # 2A,B: The waveform above depicts intermitted cracking on both sides of the vertical weld, 10" long, at depths of .229" and .154".

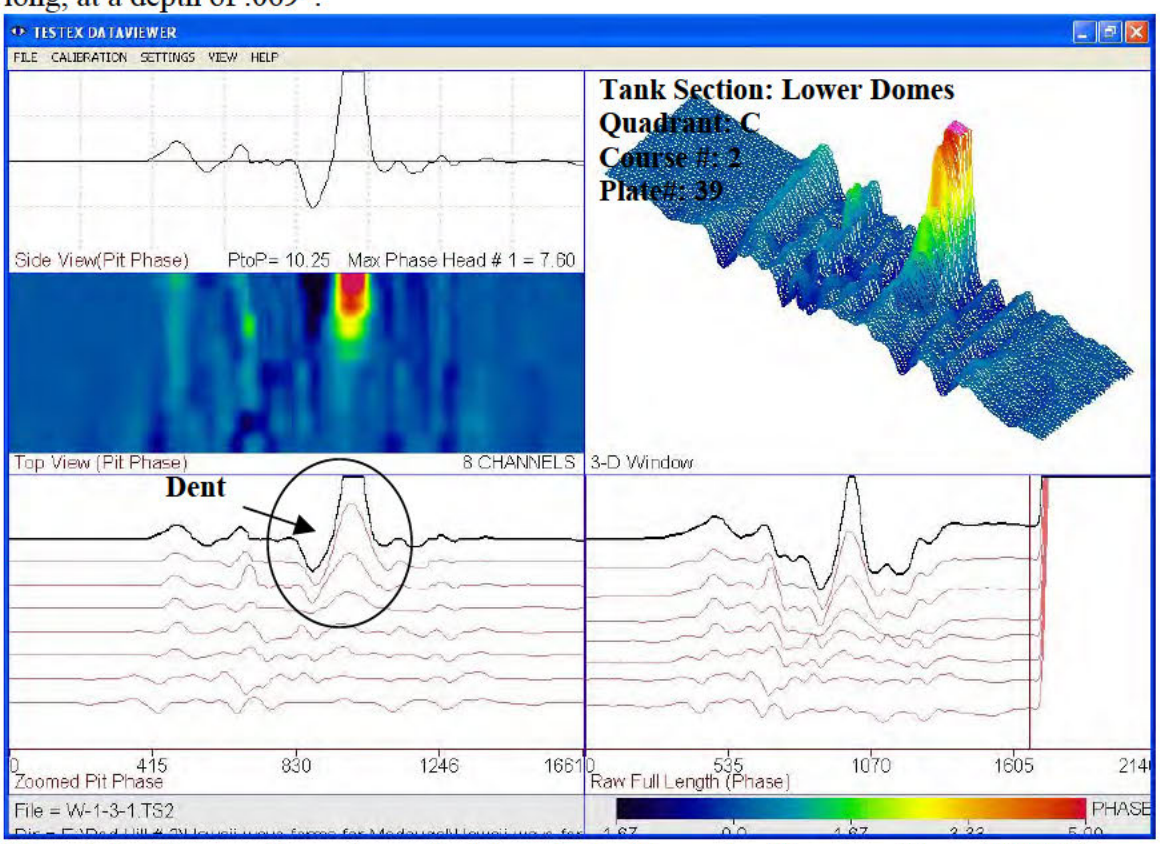


Flaw # 3A,B: The waveform above depicts intermitted cracking on both sides of the vertical weld, 10" long, at depths of .223" and .214".

APPENDIX A – SAMPLE WAVEFORMS

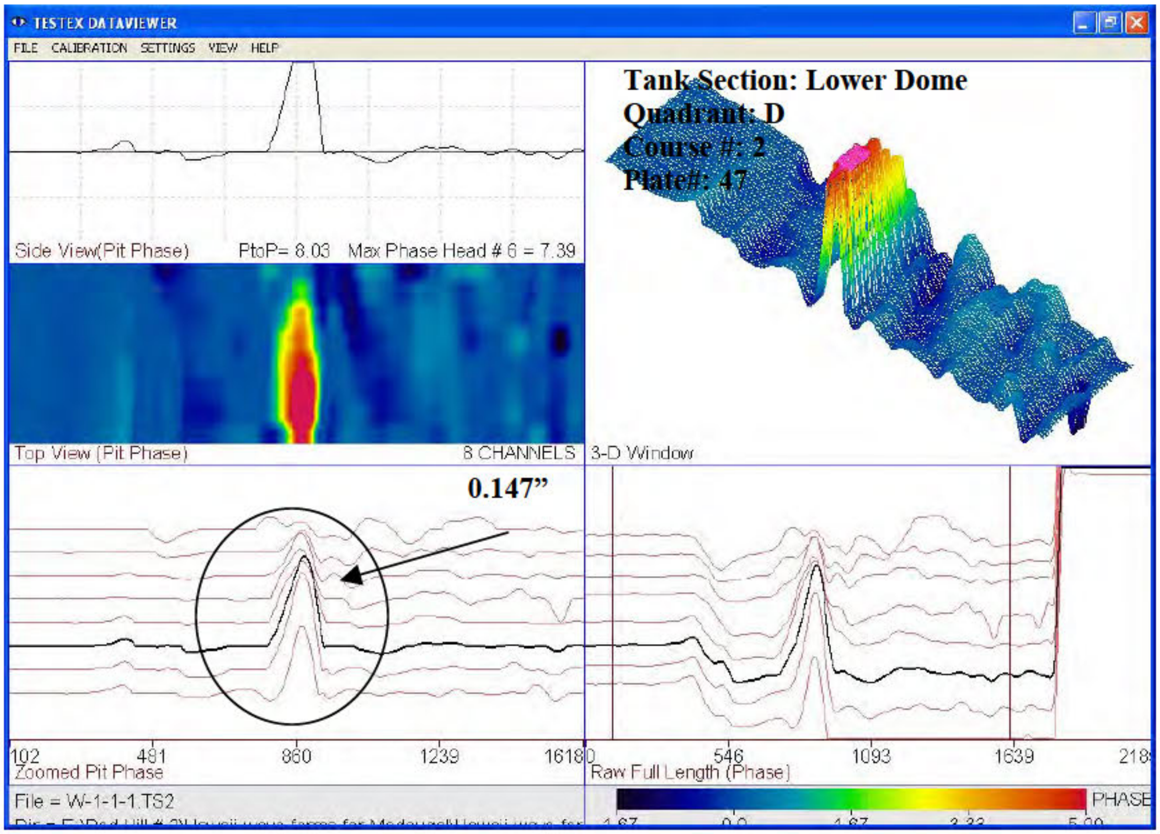


Flaw # 4B: The waveform above depicts arc strike at the toe on the vertical weld, 2" long, at a depth of .069".

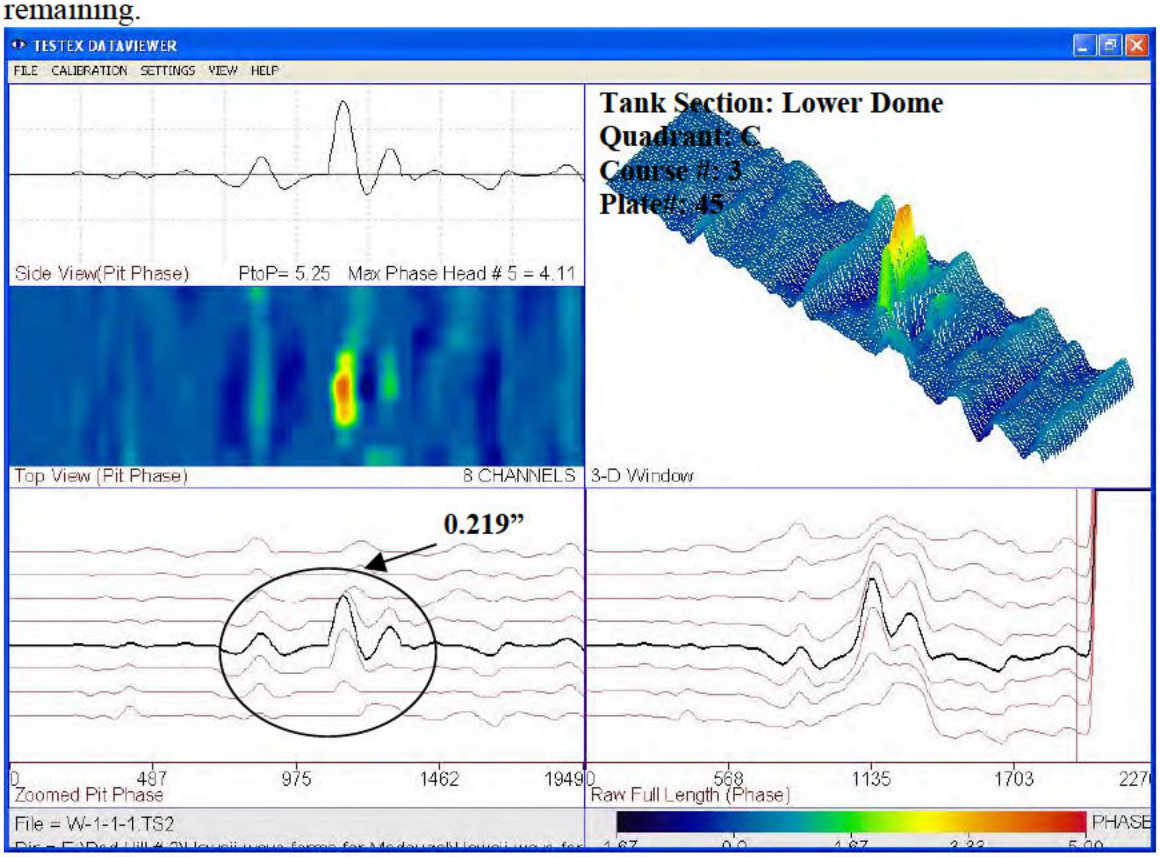


Flaw # 6: The waveform above depicts a dent with no significant wall loss (NSWL).

APPENDIX A – SAMPLE WAVEFORMS

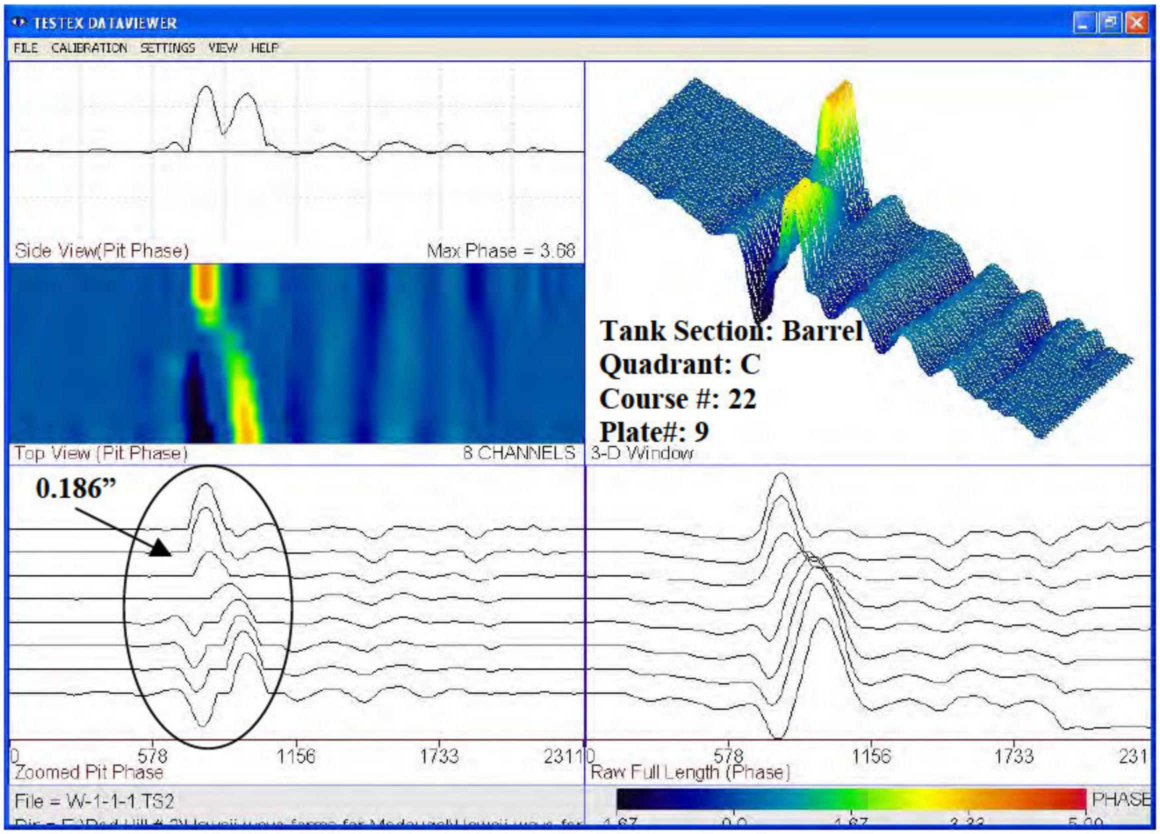


Flaw # 5A: The waveform above depicts underside corrosion exhibiting 0.147" wall remaining.



Flaw # 10: The waveform above depicts underside corrosion exhibiting 0.219" wall remaining.

APPENDIX A – SAMPLE WAVEFORMS

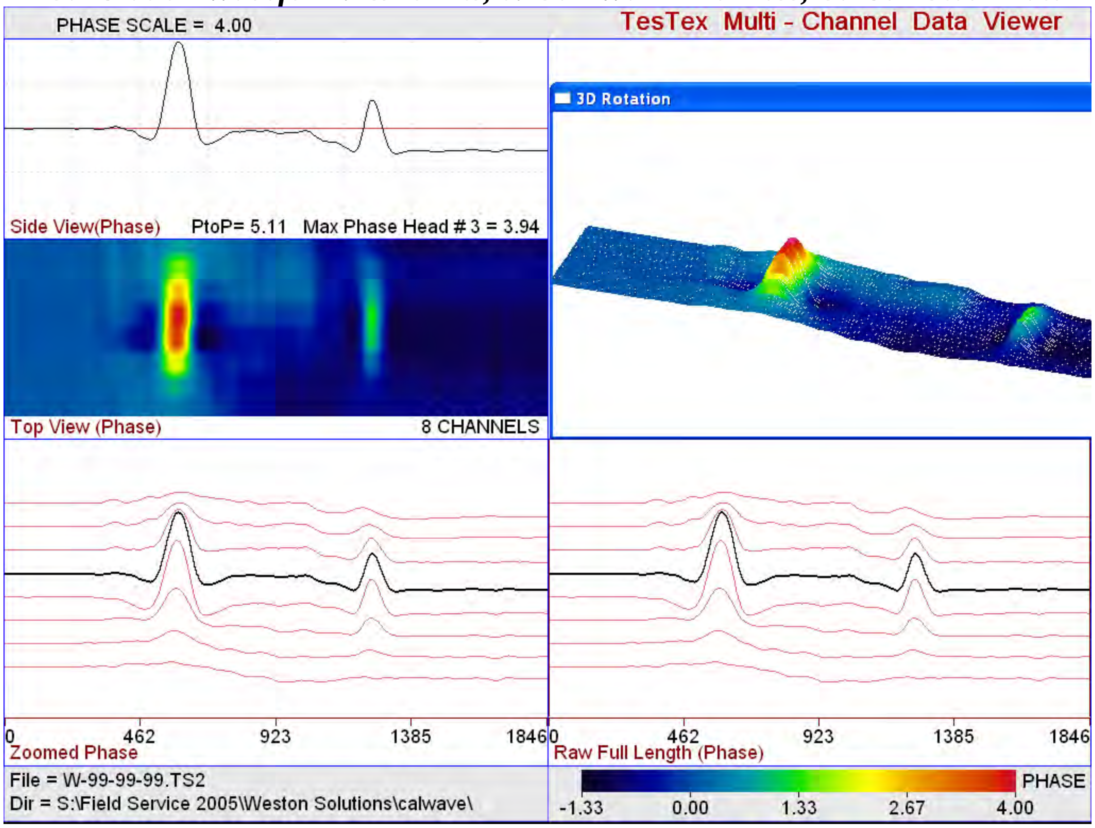


Flaw # 59: The waveform above depicts underside corrosion exhibiting 0.186" wall remaining.

APPENDIX B – CALIBRATION

APPENDIX B – CALIBRATION

Calibration Waveform: 5/16 Pits, 0.250" Wall Thickness, Carbon Steel Plate



Calibration Table: 5/16 Pits, 0.250" Wall Thickness, Carbon Steel Plate

5/16 Pits, 0.250" WALL THICKNESS, CARBON STEEL, FREQ. 10 HZ.
PROBE# 8.0" Scanner, FILE# 99-99-99, DATE 08/15/2005, UNIT# TS-2000
% WL 1 = 30.00, PHASE 1 = 0.91, AMP 1 = 0.10 | *
% WL 2 = 60.00, PHASE 2 = 1.96, AMP 2 = 0.10 | * [QUADRATIC FIT]

% WALL LOSS	DELTA PHASE	DELTA LNA	WALL REMAINING
5.0	0.14	0.03	0.238
10.0	0.29	0.05	0.225
15.0	0.44	0.06	0.213
20.0	0.59	0.08	0.200
25.0	0.75	0.09	0.188
30.0	0.91	0.10	0.175
35.0	1.08	0.11	0.163
40.0	1.25	0.11	0.150
45.0	1.42	0.11	0.138
50.0	1.60	0.11	0.125
55.0	1.78	0.11	0.113
60.0	1.96	0.10	0.100
65.0	2.15	0.09	0.088
70.0	2.34	0.08	0.075

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

Principles of LFET

Low Frequency Electromagnetic Technique (LFET) was developed out of further research of Remote Field Electromagnetic Technique (RFET). The main difference of LFET is the placement of the sensors between the two poles of an electromagnetic driver.

With a low frequency AC driver signal of 3 to 40 Hz for carbon steel (see Figure 1), the driver signal fully penetrates the material being tested. When the scanner passes over an area with no defects, the magnetic fields are not distorted.

When the test material has a defect and the sensors are located above that defect, distortions in the magnetic field indicate presence of the flaw. LFET instruments measure this distortion as changes in phase and amplitude. Depth of the flaw is proportional to these phase and amplitude changes. Diameter of the defect is related to the number of sensors affected.

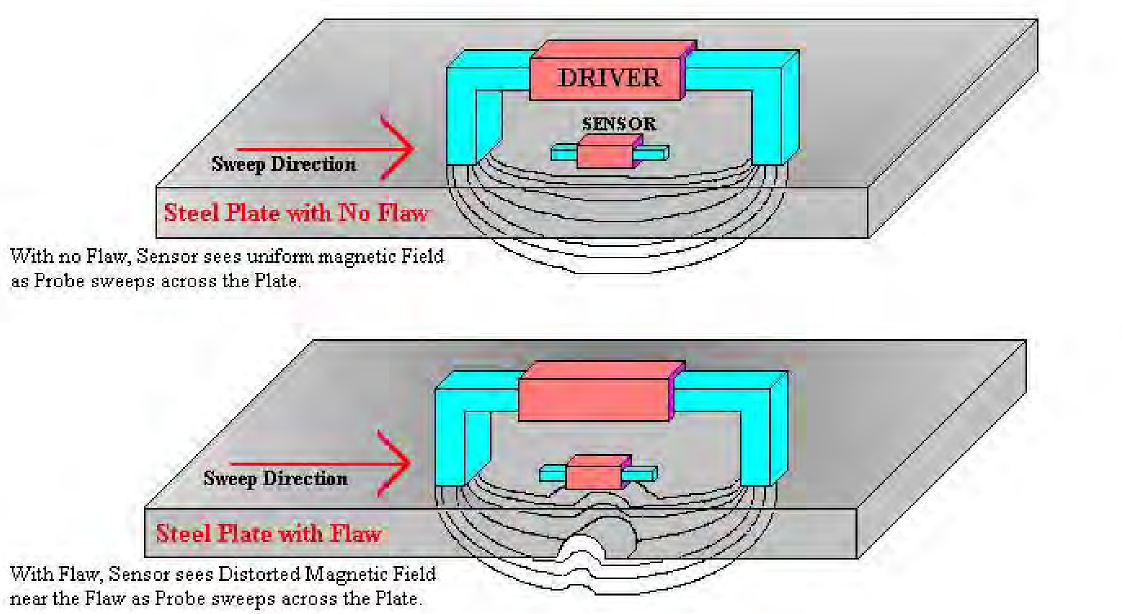


Figure 1.
Principles of Low Frequency Electromagnetic Technique (LFET)

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

Tank Floor Scanning Theory/Background

FALCON 2000 SYSTEM

The TesTex Tank Floor Inspection System consists of a sixteenth inch modular swath containing 32 probe heads. This configuration allows for a 100% coverage of the tank plate. The probe emits a very low frequency electromagnetic field which penetrates the tank floor. Any variation in the tank floor thickness will cause the electromagnetic field to change. These changes are very small, which makes it necessary to use digital signal processing to enhance the resulting signal. The resulting processed signal is in the form of phase and amplitude readings. Calibration tables are used to convert these signals into percentage wall loss values.

PROCEDURES

Each tank floor is mapped out by measuring the length, width, and orientation of the individual plates. The wall loss information for each plate is stored on a floppy disk.

SOFTWARE

The data acquisition module collects the plate data at a given sample rate. The menu-driven program provides for real-time display of phase, amplitude, and probe position across the plate. The x-y geometry of the plate, probe speed, and other details are also handled by the data acquisition module.

The data analysis and display module contain the calibration curves for wall thinning, volume losses, and pitting. His module correlates calibration standards information with the plant data for flaw sizing and evaluation. Several routines for digital the filtering, averaging techniques, background evaluation, curve fitting, and other useful signal processing techniques are also available. Up to 16 waveforms can be displayed simultaneously in the screen while “zooming” algorithms are used to easily examine small segments of the waveforms.

Plate Scanning Theory/Background

To test vertically/horizontally-oriented plates, the ***TS 2000*** scanner is placed on an unobstructed area on the topside of one of the plates. The equipment is then zeroed using the ***TS 2000 PLATE SCAN*** software’s auto-set function. This action also selects the right time constant, sets the gains of the internal amplifiers, and ensures that the data is displayed on the screen as it is being collected.

After zeroing, the scanner is moved to the beginning of the scan sweep area. The scanner is then gradually moved across the surface of the tube and data is collected via magnetic medium on the PC. The processing of the data occurs real-time and the data is stored as several waveforms and stored as several signal responses. Among these are phase and amplitude for each individual channel.

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

SYSTEM DESCRIPTION

ELECTRONICS: The digital system consists of function generators, power amplifiers, difference amplifiers, phase rotators, auto-zero phase shifters, A-to-D converters, digital controllers, etc. One of the key design objectives was to achieve as low a noise as possible. We detect phase changes to an accuracy of 1/10 of a degree and amplitude signals of a fraction of a microvolt. The ***TS 2000*** contains all the electronics and software for data acquisition. It contains an internal A-to-D converter, which connects to the PC through a serial port.

SOFTWARE: Consists of two modules

The data acquisition module collects the tube data at a given sample rate. The menu driven, user-oriented program provides for real-time display of phase, amplitude, and probe position in the tube. The row and column of the tube, probe speed, and other bookkeeping details are also handled by the data acquisition module.

The data analysis and display module contains the calibration curves for plate thinning, volume losses, pits, vibration/fret wear, and correlates the calibration standard information with the actual plant data for flaw sizing and evaluation. It has routines for digital filtering, averaging techniques, background evaluation, curve fitting, and other useful signal processing techniques. Up to three waveforms can be displayed simultaneously on the screen and the "zooming" algorithm enables the user to easily examine small segments of the waveform.

DETECTION ACCURACY

The ***TesTex, Inc.*** developed lock-in amplifier is capable of measuring very low level signals in the microvolt range and can measure small phase angle changes of a fraction of a degree, even in the presence of a considerable amount of noise. This system, when used in conjunction with the calibration standards: partial and through-wall pitting, gradual wall thinning. Hydrogen damage, etc. and their respective calibration curves, allows us to measure small gradual wall losses on the order of 10%, pits of diameter 0.062" (1.57mm), and vibration/fret wear of five volume percent.

Weld Scanning Theory/Background

TesTex, Inc. has developed a special electromagnetic probe based on the principle of achieving a “balanced field” for the probe. This probe is also very sensitive to small changes in electromagnetic field and the noise is significantly reduced by appropriate phase rotation of the horizontal and vertical component of the signal. A single element probe of this type was used to detect “surface and subsurface cracking” This probe was called Hawkeye and it is successfully used for testing cracks, welds, pipes, plates, etc.

The system works by PHASE ROTATING liftoff noise into the ACOS signal while leaving the CRACK signal in the ASIN waveform. Processing is used to reduce gradual changes in the waveform to make detection easier.

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

Ultrasonic Shear Wave (Angle Beam) Testing Description

The instrument used for Shear Wave or Angle Beam Testing is a simple pulse-echo flaw detector with A-Scan, receiving, and transmitting capabilities in which the user can size the length, depth, and distance of the flaw.

The primary reason for using shear waves is for the detection of discontinuities with geometries and orientations non-parallel to the testing surface. The Angle Beam technique is extensively used for weld testing at ½ step and full step distances. The frequency range specifically for weld testing with angle beam transducers is 1MHz to 5MHz. The most common Angle Beam contact transducers are designed to produce shear waves of 45, 60, and 70° in steel.

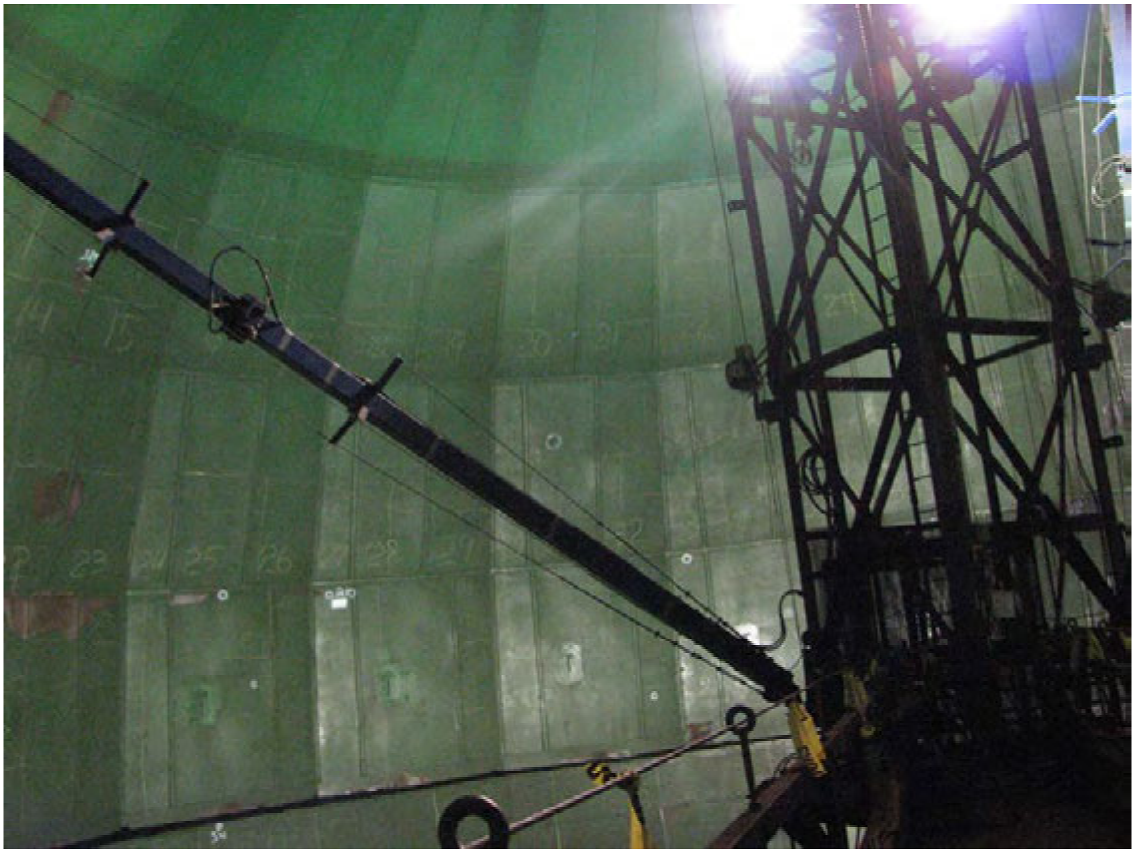
APPENDIX D – TANK INTERIOR PHOTOGRAPHS

APPENDIX D – TANK INTERIOR PHOTOGRAPHS

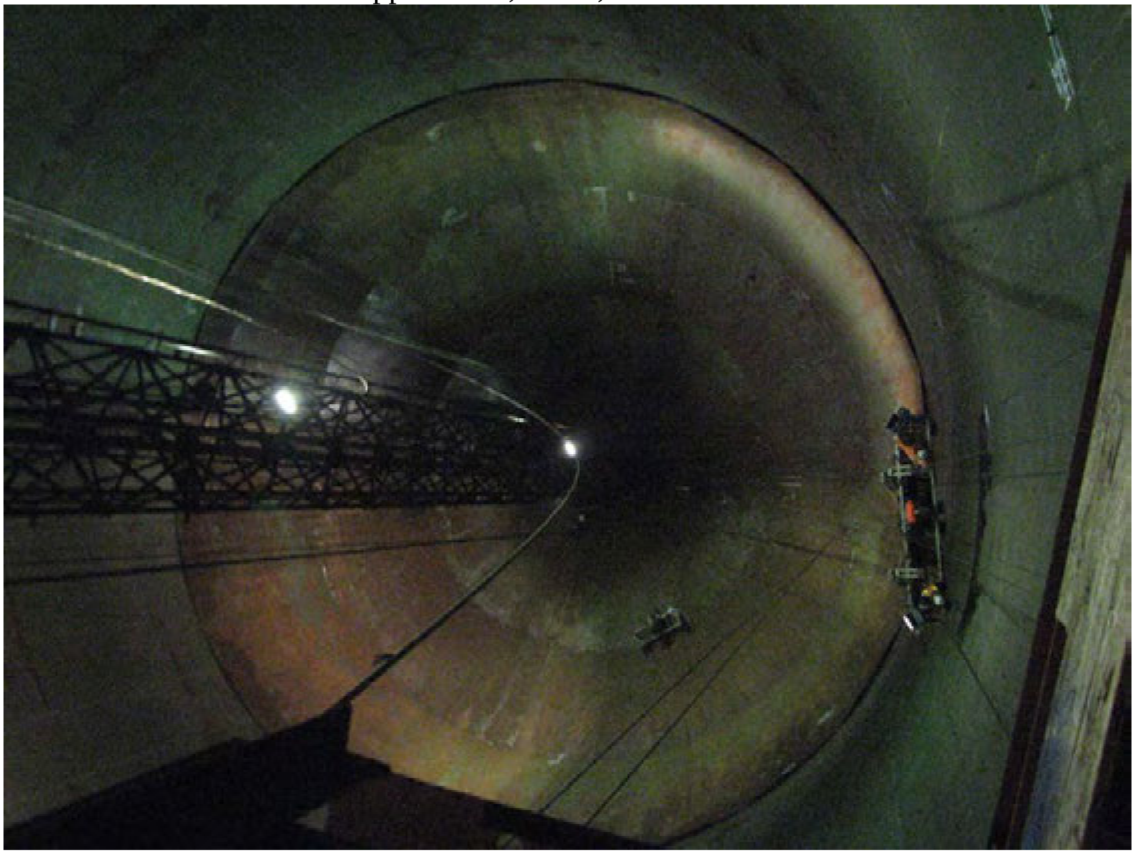
A view of the tunnel area around tank #2.

A view of the manway leading into tank #2.

APPENDIX D – TANK INTERIOR PHOTOGRAPHS

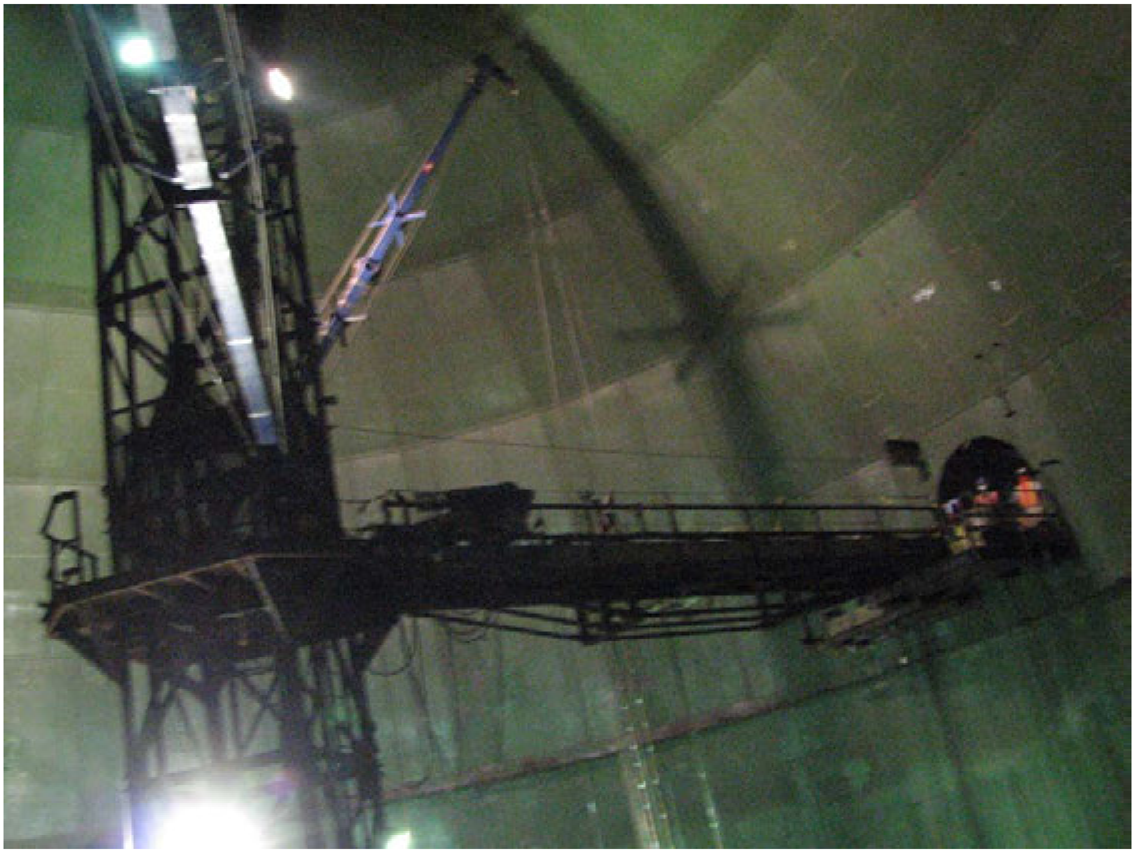


A view of the upper dome, tower, and booms from the catwalk.



Looking down at the lower dome and the crew inspecting under the catwalk.

APPENDIX D – TANK INTERIOR PHOTOGRAPHS



Looking at the tower/catwalk structure while descending in one of the baskets.

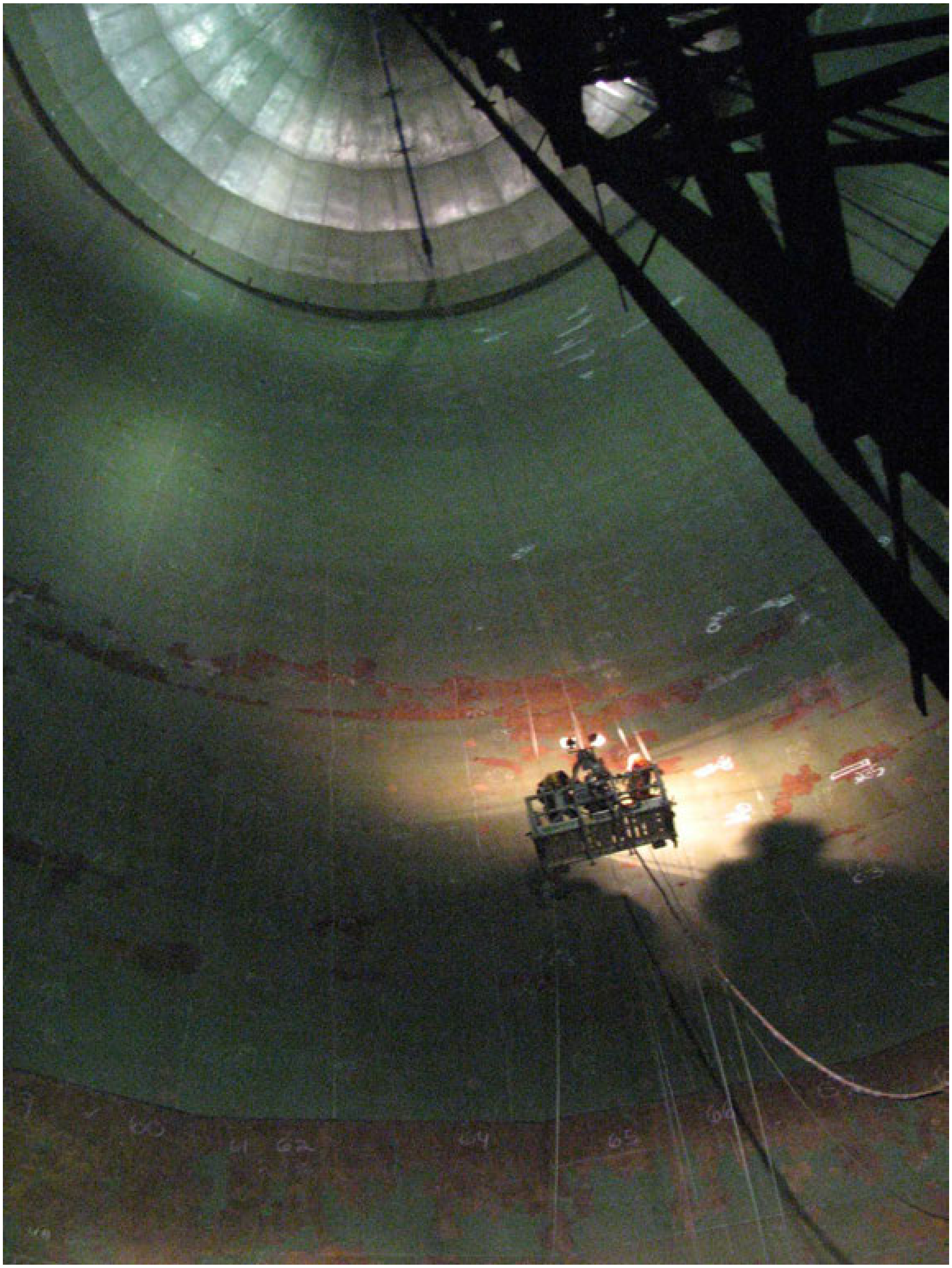
Lower dome view from above showing extensive coating failure.

APPENDIX D – TANK INTERIOR PHOTOGRAPHS

A view from the tank bottom of one of the teams scanning the barrel

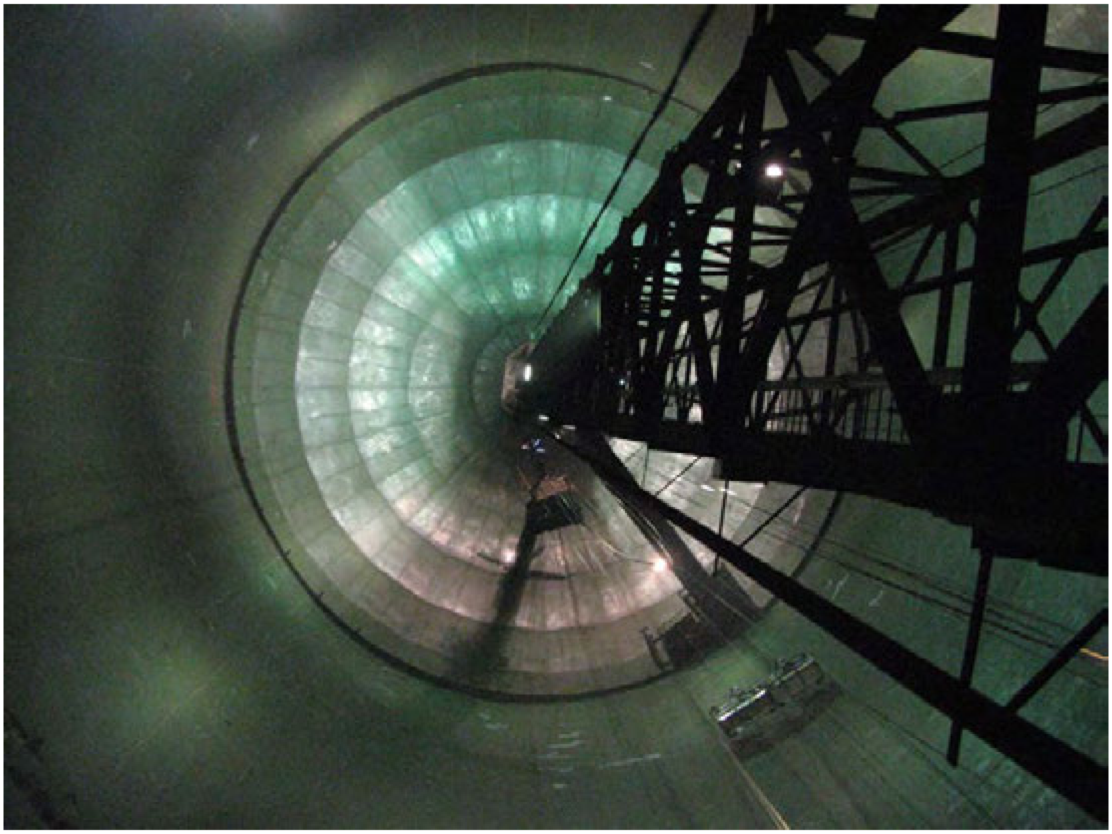
Picture showing part of the floor and lower dome

APPENDIX D – TANK INTERIOR PHOTOGRAPHS



Another view of one crew inspecting the barrel just above the lower dome.

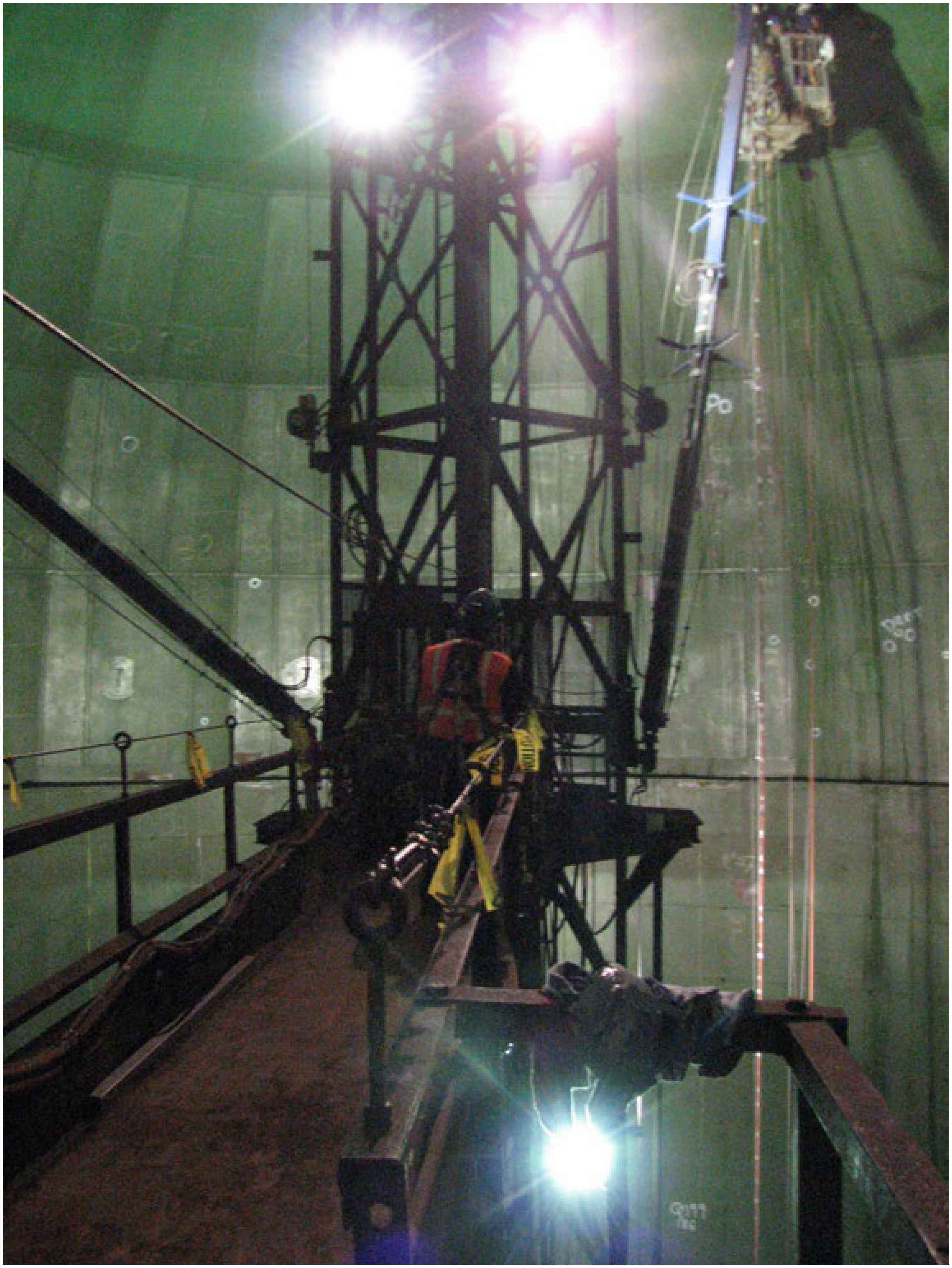
APPENDIX D – TANK INTERIOR PHOTOGRAPHS



Looking up from the floor at one crew inspecting the barrel under the catwalk and the other crew-inspecting course E of the upper dome.

A view of the very top of tank # 2 showing courses D, E, and F with a TesTex crew

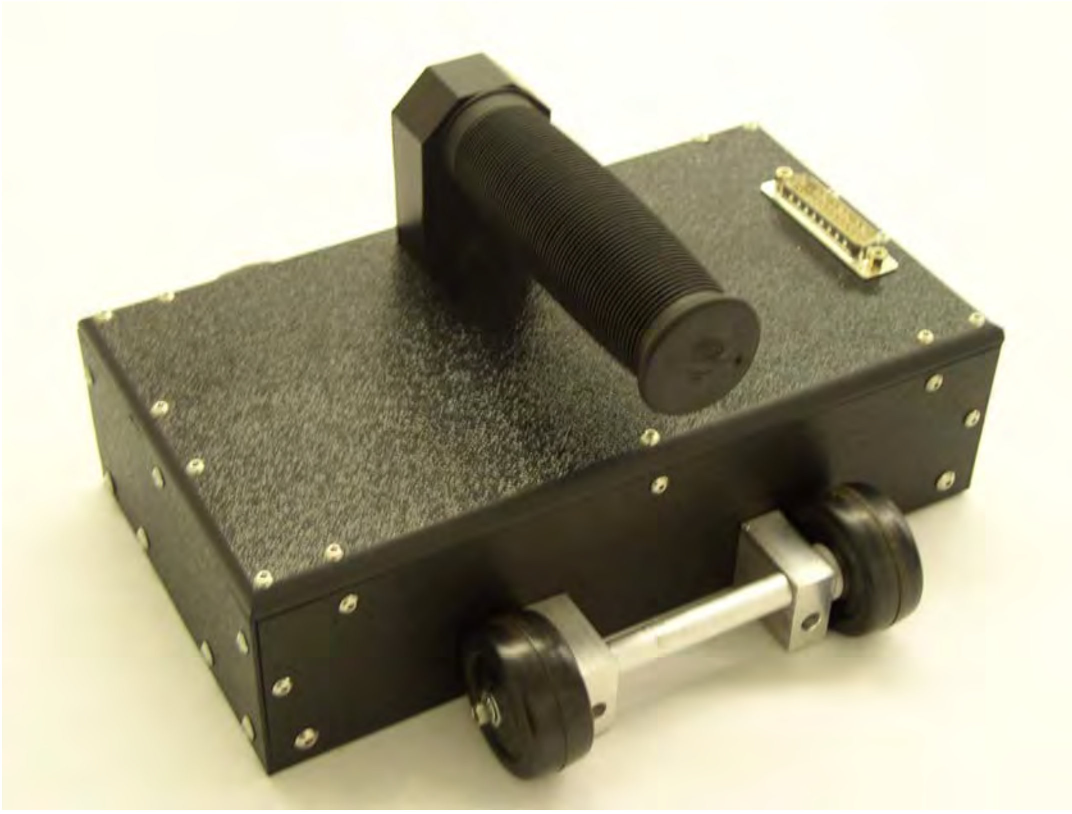
APPENDIX D – TANK INTERIOR PHOTOGRAPHS



A view just inside of tank #2 with a TesTex crew inspecting course D and E of the upper dome.

APPENDIX E – TESTEX EQUIPMENT

APPENDIX E – TESTEX EQUIPMENT



Above: A specially developed 8" wide hand scanner used for the majority of the surface scanning. Below: A TesTex crewmember using the hand scanner from one of the baskets.

APPENDIX E – TESTEX EQUIPMENT

Above: The Hawkeye Pencil Probe used for testing all welds in tank # 2. Below: A TesTex crewmember using the Hawkeye a weld from one of the baskets.

APPENDIX F – DEFECT AREA PHOTOGRAPHS

APPENDIX F – DEFECT AREA PHOTOGRAPHS

Intersecting welds between plates 21 and 1 of course 1 and the floor.


Intersecting welds between plates 1 and 2 of course 1 and the floor.

APPENDIX F – DEFECT AREA PHOTOGRAPHS

Intersecting welds between plates 2 and 3 of course 1 and the floor.

Intersecting welds between plates 3 and 4 of course 1 and the floor.

APPENDIX F – DEFECT AREA PHOTOGRAPHS

Intersecting welds between plates 4 and 5 of course 1 and the floor.

Intersecting welds between plates 5 and 6 of course 1 and the floor.

APPENDIX F – DEFECT AREA PHOTOGRAPHS


Intersecting welds between plates 6 and 7 of course 1 and the floor.


Intersecting welds between plates 7 and 8 of course 1 and the floor.

APPENDIX F – DEFECT AREA PHOTOGRAPHS

Intersecting welds between plates 8 and 9 of course 1 and the floor.

Intersecting welds between plates 9 and 10 of course 1 and the floor.

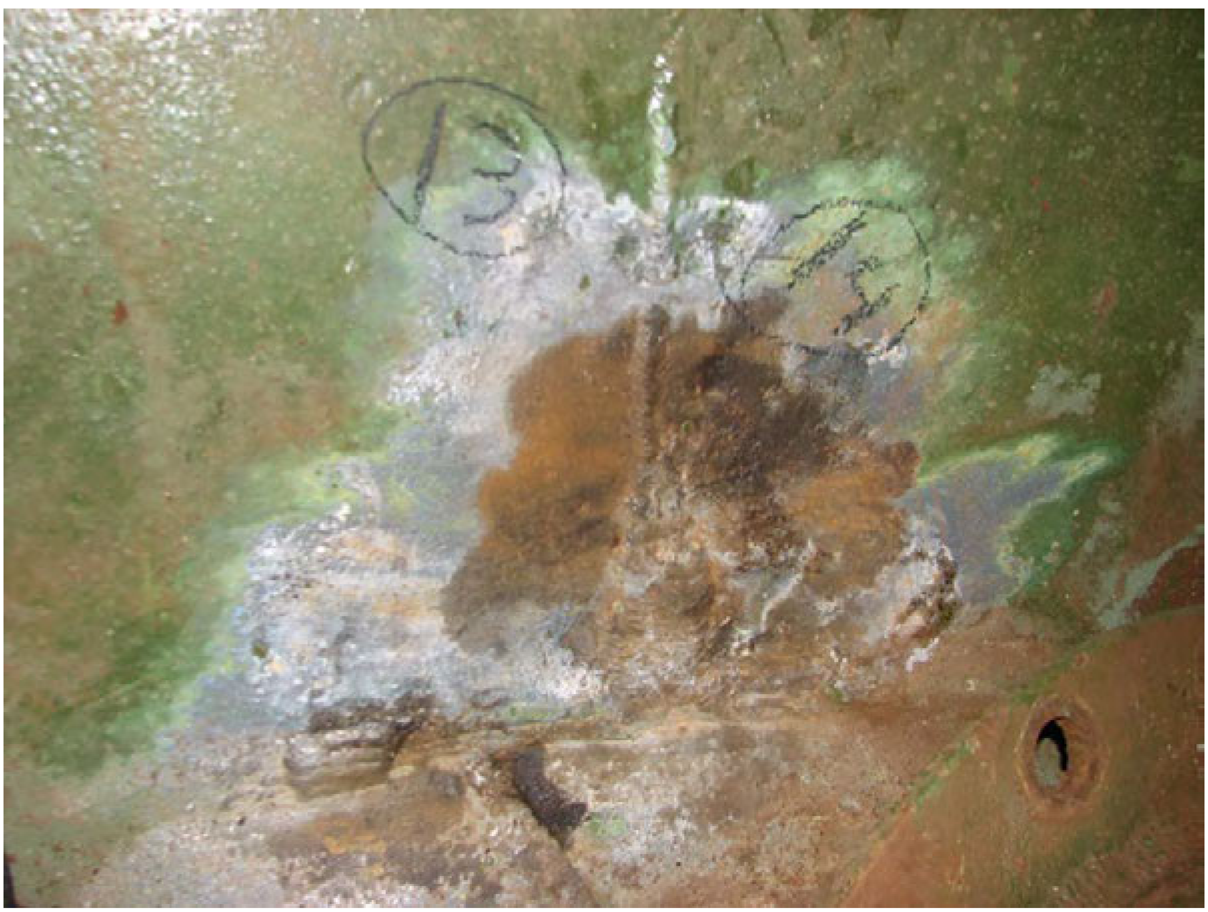
APPENDIX F – DEFECT AREA PHOTOGRAPHS

Intersecting welds between plates 10 and 11 of course 1 and the floor.

Intersecting welds between plates 11 and 12 of course 1 and the floor.

APPENDIX F – DEFECT AREA PHOTOGRAPHS

Intersecting welds between plates 12 and 13 of course 1 and the floor.



Intersecting welds between plates 13 and 14 of course 1 and the floor.

APPENDIX F – DEFECT AREA PHOTOGRAPHS

Intersecting welds between plates 14 and 15 of course 1 and the floor.

Intersecting welds between plates 15 and 16 of course 1 and the floor.

APPENDIX F – DEFECT AREA PHOTOGRAPHS

Intersecting welds between plates 17 and 18 of course 1 and the floor.

Intersecting welds between plates 19 and 20 of course 1 and the floor.

APPENDIX F – DEFECT AREA PHOTOGRAPHS

Intersecting welds between plates 20 and 21 of course 1 and the floor.

Flaw # 83, topside pitting on plate 4 of the floor, 0.336" remaining, near plates 11 and 12 of course 1

APPENDIX G – SHEAR WAVE REPORT AND CALIBRATIONS

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

REPORT NO. ____________ DATE: ____________

BAKER INSPECTION GROUP ASSUMES NO RESPONSIBILITY FOR LOSSES OF ANY KIND DUE TO OUR INTERPRETATION OF THE QUALITY OF MATERIAL SUBMITTED. ALL DATA IS HELD STRICTLY CONFIDENTIAL. (FORM No. 123R1-QA)

CLIENT: ____________ JOB LOCATION: ____________ JOB NO. ____________

CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

INST CAL. DATE ________ PROCEDURE ______ REV. ____ ACCEPTANCE STD. ____________ TEST SURFACE TEMP. _____ °F

MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ____________

CLIENT REVIEW ____________ DATE ____________ PAGE ____ OF ____

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

REPORT NO. ____________ DATE: ____________

CLIENT: ____________ JOB LOCATION: ____________ JOB NO. ____________

CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

INST CAL. DATE ________ PROCEDURE _____ REV. ____ ACCEPTANCE STD. ________ TEST SURFACE TEMP. ____ °F

MATERIAL ____________ THICKNESS _____ in. or SCHEDULE _____ DIAMETER _____ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ________

CLIENT REVIEW ____________ DATE ________ PAGE ____ OF ____

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

REPORT NO. ______ DATE: ______

CLIENT: ______ JOB LOCATION: ______ JOB NO. ______

CLIENT PO# ______ CLIENT JOB NO: ______ INSTRUMENT TYPE/SN# ______

INST CAL. DATE ______ PROCEDURE ______ REV. ______ ACCEPTANCE STD. ______ TEST SURFACE TEMP. ______ °F

MATERIAL ______ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ______ TEST SURFACE ______ TIME START ______ TIME STOP ______

0 REFERENCE: X-Axis ______ Y-Axis ______

SURFACE CONDITION ______

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ______ SNT-TC-1A LEVEL ______ DATE ______

CLIENT REVIEW ______ DATE ______ PAGE ______ OF ______

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

REPORT NO. ____________ DATE: ____________

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CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

INST CAL. DATE ________ PROCEDURE _____ REV. ____ ACCEPTANCE STD. ____________ TEST SURFACE TEMP. ____ °F

MATERIAL ____________ THICKNESS _____ in. or SCHEDULE ______ DIAMETER _____ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ________

CLIENT REVIEW ____________ DATE ________ PAGE ____ OF ____

Baker Inspection Group, LLC

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INST CAL. DATE ________ PROCEDURE ______ REV. ____ ACCEPTANCE STD. ____________ TEST SURFACE TEMP. _____ °F

MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ____________

CLIENT REVIEW ____________ DATE ____________ PAGE ____ OF ____

Baker Inspection Group, LLC

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0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

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MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

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COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

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SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

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CLIENT REVIEW ____________ DATE ____________ PAGE ____ OF ____

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

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CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

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MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ____________

CLIENT REVIEW ____________ DATE ____________ PAGE ____ OF ____

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

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CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

INST CAL. DATE ________ PROCEDURE ______ REV. ____ ACCEPTANCE STD. ____________ TEST SURFACE TEMP. _____ °F

MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ____________

CLIENT REVIEW ____________ DATE ____________ PAGE ____ OF ____

BAKER INSPECTION GROUP, LLC
UT CALIBRATION SHEET
CALIBRATION SHEET NUMBER ____

PLANT ____ **DATE** ______________

JOB NUMBER _______________________________ **PROCEDURE** ______ **REV. NO.** _______

OPERATOR ____ **LEVEL** __________
ASSISTANT ____ **LEVEL** __________

ULTRASONIC INSTRUMENT MANUFACTURER AND MODEL ____________________________________
SERIAL NO. _____________ FREQUENCY ____ MHz SWEEP RANGE _____ IN.
SOUND VEL. ___________ GAIN: REFERENCE LEVEL _____ dB +14 dB SCANNING LEVEL _____ dB
DAMPING _______ REJECT _______ PROBE DELAY _____ μSEC DISPLAY DELAY _____ μSEC

SEARCH UNIT MANUFACTURER _________________________ TYPE ____________________
SERIAL NO. _____________ DIA. OR DIMENSIONS ______ IN. REFRACTED ANGLE ____ DEG.
FREQUENCY ____ MHz CABLE TYPE __________________ CABLE LENGTH _________ FEET

CALIBRATION STANDARD SERIAL NO. _____________ THICKNESS ____________ IN.
MATERIAL _________________ DIAMETER _____ IN. NOTCHES ___ SIDE DRILLED HOLES ___
PIPE ___ DIAMETER ___ IN. SCHEDULE _______ TEMPERATURE ____ DEG. F CRACKS _____
WELD EXAM ___ MATERIAL EXAM ___ NOZZLE INNER RADIUS ___

COUPLANT MANUFACTURER ______________ TYPE ________ BATCH NO. ____________

OTHER EQUIPMENT ____
____
____

SCREEN HEIGHT LINEARITY
% FSH AMPLITUDE

LARGER	SMALLER
________	________
________	________
80	________
________	________
________	________
________	________
________	________
________	________
________	________

AMPLITUDE CONTROL LINEARITY
Gain Control Setting (dB)
Low ____ Medium ____ High ____

% FSH	dB CHANGE	READING % FSH			INDICATION LIMITS (% FSH)
80	-6	____	____	____	32 to 48
80	-12	____	____	____	16 to 24
40	+6	____	____	____	64 to 96
20	+12	____	____	____	64 to 96

TECHNIQUE STRAIGHT BEAM _____ ANGLE BEAM _____
CONTACT _____ IMMERSION _____
SCAN DIRECTION _____ AXIAL _____ CIRCUMFERENTIAL
WELD _____ MATERIAL _____ INNER RADIUS _____

BP ___ or DEPTH ___

CAL. TIME >			______		______		______	
DATA SHEET NO.>			______		______		______	
NOTCH	HOLE	BP OR DEPTH (INCH)	SR	%FSH	SR	%FSH	SR	%FSH
1/2 VEE	1/4 t	________	________	________	________	________	________	________
1 VEE	1/2 t	________	________	________	________	________	________	________
3/2 VEE	3/4 t	________	________	________	________	________	________	________
2 VEE	5/4 t	________	________	________	________	________	________	________
5/2 VEE	6/4 t	________	________	________	________	________	________	________
3 VEE	7/4 t	________	________	________	________	________	________	________
NOTCH @1/2 VEE		________	________	________	________	________	________	________
IR NOTCH	#1	________	________	________	________	________	________	________
IR NOTCH	#2	________	________	________	________	________	________	________
IR NOTCH	#3	________	________	________	________	________	________	________

BP = Beam Path VEE = VEE Path SR = Sweep Reading FSH = Full Screen Height IR = Inner Radius Notch or Crack No.

BAKER INSPECTION GROUP, LLC
UT CALIBRATION SHEET
CALIBRATION SHEET NUMBER ____

PLANT ____ **DATE** ______________

JOB NUMBER _______________________________ **PROCEDURE** ______ **REV. NO.** _______

OPERATOR ____ **LEVEL** __________
ASSISTANT ____ **LEVEL** __________

ULTRASONIC INSTRUMENT MANUFACTURER AND MODEL ____________________________________
SERIAL NO. _____________ FREQUENCY ____ MHz SWEEP RANGE _____ IN.
SOUND VEL. ___________ GAIN: REFERENCE LEVEL _____ dB +14 dB SCANNING LEVEL _____ dB
DAMPING _______ REJECT _______ PROBE DELAY _____ μSEC DISPLAY DELAY _____ μSEC

SEARCH UNIT MANUFACTURER ________________________ TYPE ____________________
SERIAL NO. _____________ DIA. OR DIMENSIONS ______ IN. REFRACTED ANGLE ____ DEG.
FREQUENCY ____ MHz CABLE TYPE __________________ CABLE LENGTH _________ FEET

CALIBRATION STANDARD SERIAL NO. _____________ THICKNESS ____________ IN.
MATERIAL _________________ DIAMETER _____ IN. NOTCHES ___ SIDE DRILLED HOLES ___
PIPE ___ DIAMETER ___ IN. SCHEDULE _______ TEMPERATURE ____ DEG. F CRACKS _____
WELD EXAM ___ MATERIAL EXAM ___ NOZZLE INNER RADIUS ___

COUPLANT MANUFACTURER ______________ TYPE ________ BATCH NO. ____________

OTHER EQUIPMENT ____
____
____

SCREEN HEIGHT LINEARITY
% FSH AMPLITUDE

LARGER	**SMALLER**
________	________
________	________
80	________
________	________
________	________
________	________
________	________
________	________
________	________

AMPLITUDE CONTROL LINEARITY
Gain Control Setting (dB)
Low ____ Medium ____ High ____

% FSH	**dB CHANGE**	**READING % FSH**			**INDICATION LIMITS (% FSH)**
80	-6	____	____	____	32 to 48
80	-12	____	____	____	16 to 24
40	+6	____	____	____	64 to 96
20	+12	____	____	____	64 to 96

TECHNIQUE STRAIGHT BEAM _____ ANGLE BEAM _____
CONTACT _____ IMMERSION _____
SCAN DIRECTION _____ AXIAL _____ CIRCUMFERENTIAL
WELD _____ MATERIAL _____ INNER RADIUS _____

BP ___ or DEPTH ___

		CAL. TIME >	______		______		______	
		DATA SHEET NO.>	______		______		______	
NOTCH	HOLE	BP OR DEPTH (INCH)	SR	%FSH	SR	%FSH	SR	%FSH
1/2 VEE	1/4 t	________	________	________	________	________	________	________
1 VEE	1/2 t	________	________	________	________	________	________	________
3/2 VEE	3/4 t	________	________	________	________	________	________	________
2 VEE	5/4 t	________	________	________	________	________	________	________
5/2 VEE	6/4 t	________	________	________	________	________	________	________
3 VEE	7/4 t	________	________	________	________	________	________	________
NOTCH @1/2 VEE		________	________	________	________	________	________	________
IR NOTCH	#1	________	________	________	________	________	________	________
IR NOTCH	#2	________	________	________	________	________	________	________
IR NOTCH	#3	________	________	________	________	________	________	________

BP = Beam Path VEE = VEE Path SR = Sweep Reading FSH = Full Screen Height IR = Inner Radius Notch or Crack No.

BAKER INSPECTION GROUP, LLC
UT CALIBRATION SHEET
CALIBRATION SHEET NUMBER ____

PLANT ____ **DATE** ______________

JOB NUMBER _______________________________ **PROCEDURE** ______ **REV. NO.** _______

OPERATOR ____ **LEVEL** __________
ASSISTANT ____ **LEVEL** __________

ULTRASONIC INSTRUMENT MANUFACTURER AND MODEL ____________________________________
SERIAL NO. _____________ FREQUENCY ____ MHz SWEEP RANGE _____ IN.
SOUND VEL. ___________ GAIN: REFERENCE LEVEL _____ dB +14 dB SCANNING LEVEL _____ dB
DAMPING ________ REJECT ________ PROBE DELAY _____ µSEC DISPLAY DELAY _____ µSEC

SEARCH UNIT MANUFACTURER _________________________ TYPE ____________________
SERIAL NO. _____________ DIA. OR DIMENSIONS ______ IN. REFRACTED ANGLE ____ DEG.
FREQUENCY ____ MHz CABLE TYPE __________________ CABLE LENGTH __________ FEET

CALIBRATION STANDARD SERIAL NO. _____________ THICKNESS ____________ IN.
MATERIAL _________________ DIAMETER _____ IN. NOTCHES ___ SIDE DRILLED HOLES ___
PIPE ___ DIAMETER ___ IN. SCHEDULE _______ TEMPERATURE ____ DEG. F CRACKS _____
WELD EXAM ___ MATERIAL EXAM ___ NOZZLE INNER RADIUS ___

COUPLANT MANUFACTURER ______________ TYPE ________ BATCH NO. ____________

OTHER EQUIPMENT ____
____
____

SCREEN HEIGHT LINEARITY
% FSH AMPLITUDE

LARGER	**SMALLER**
________	________
________	________
80	________
________	________
________	________
________	________
________	________
________	________
________	________

AMPLITUDE CONTROL LINEARITY
Gain Control Setting (dB)
Low ____ Medium ____ High ____

% FSH	**dB CHANGE**	**READING % FSH**			**INDICATION LIMITS (% FSH)**
80	-6	____	____	____	32 to 48
80	-12	____	____	____	16 to 24
40	+6	____	____	____	64 to 96
20	+12	____	____	____	64 to 96

TECHNIQUE STRAIGHT BEAM _____ ANGLE BEAM _____
CONTACT _____ IMMERSION _____
SCAN DIRECTION _____ AXIAL _____ CIRCUMFERENTIAL
WELD _____ MATERIAL _____ INNER RADIUS _____

BP ___ or DEPTH ___

			CAL. TIME >	______		______		______
			DATA SHEET NO.>	______		______		______
NOTCH	HOLE	BP OR DEPTH (INCH)	SR	%FSH	SR	%FSH	SR	%FSH
1/2 VEE	1/4 t	________	________	________	________	________	________	________
1 VEE	1/2 t	________	________	________	________	________	________	________
3/2 VEE	3/4 t	________	________	________	________	________	________	________
2 VEE	5/4 t	________	________	________	________	________	________	________
5/2 VEE	6/4 t	________	________	________	________	________	________	________
3 VEE	7/4 t	________	________	________	________	________	________	________
NOTCH @1/2 VEE		________	________	________	________	________	________	________
IR NOTCH	#1	________	________	________	________	________	________	________
IR NOTCH	#2	________	________	________	________	________	________	________
IR NOTCH	#3	________	________	________	________	________	________	________

BP = Beam Path VEE = VEE Path SR = Sweep Reading FSH = Full Screen Height IR = Inner Radius Notch or Crack No.

BAKER INSPECTION GROUP, LLC
UT CALIBRATION SHEET
CALIBRATION SHEET NUMBER ____

PLANT ____ **DATE** ______________

JOB NUMBER _______________________________ **PROCEDURE** ______ **REV. NO.** _______

OPERATOR ____ **LEVEL** __________
ASSISTANT ____ **LEVEL** __________

ULTRASONIC INSTRUMENT MANUFACTURER AND MODEL ____________________________________
SERIAL NO. _____________ FREQUENCY ____ MHz SWEEP RANGE _____ IN.
SOUND VEL. ___________ GAIN: REFERENCE LEVEL _____ dB +14 dB SCANNING LEVEL _____ dB
DAMPING _______ REJECT _______ PROBE DELAY _____ μSEC DISPLAY DELAY _____ μSEC

SEARCH UNIT MANUFACTURER ______________________ TYPE __________________
SERIAL NO. _____________ DIA. OR DIMENSIONS ______ IN. REFRACTED ANGLE ____ DEG.
FREQUENCY ____ MHz CABLE TYPE _________________ CABLE LENGTH _________ FEET

CALIBRATION STANDARD SERIAL NO. _____________ THICKNESS ___________ IN.
MATERIAL ________________ DIAMETER _____ IN. NOTCHES ___ SIDE DRILLED HOLES ___
PIPE ___ DIAMETER ___ IN. SCHEDULE _______ TEMPERATURE ____ DEG. F CRACKS _____
WELD EXAM ___ MATERIAL EXAM ___ NOZZLE INNER RADIUS ___

COUPLANT MANUFACTURER ______________ TYPE ________ BATCH NO. ____________

OTHER EQUIPMENT ____
____
____

SCREEN HEIGHT LINEARITY
% FSH AMPLITUDE

LARGER	**SMALLER**
________	________
________	________
80	________
________	________
________	________
________	________
________	________
________	________
________	________

AMPLITUDE CONTROL LINEARITY
Gain Control Setting (dB)
Low ____ Medium ____ High ____

% FSH	**dB CHANGE**	**READING % FSH**			**INDICATION LIMITS (% FSH)**
80	-6	____	____	____	32 to 48
80	-12	____	____	____	16 to 24
40	+6	____	____	____	64 to 96
20	+12	____	____	____	64 to 96

TECHNIQUE STRAIGHT BEAM _____ ANGLE BEAM _____
CONTACT _____ IMMERSION _____
SCAN DIRECTION _____ AXIAL _____ CIRCUMFERENTIAL
WELD _____ MATERIAL _____ INNER RADIUS _____

BP ___ or CAL. TIME > ______ ______ ______
DEPTH ___ DATA SHEET NO.> ______ ______ ______

NOTCH	HOLE	BP OR DEPTH (INCH)	SR	%FSH	SR	%FSH	SR	%FSH
1/2 VEE	1/4 t	________	________	________	________	________	________	________
1 VEE	1/2 t	________	________	________	________	________	________	________
3/2 VEE	3/4 t	________	________	________	________	________	________	________
2 VEE	5/4 t	________	________	________	________	________	________	________
5/2 VEE	6/4 t	________	________	________	________	________	________	________
3 VEE	7/4 t	________	________	________	________	________	________	________
NOTCH @1/2 VEE		________	________	________	________	________	________	________
IR NOTCH	#1	________	________	________	________	________	________	________
IR NOTCH	#2	________	________	________	________	________	________	________
IR NOTCH	#3	________	________	________	________	________	________	________

BP = Beam Path VEE = VEE Path SR = Sweep Reading FSH = Full Screen Height IR = Inner Radius Notch or Crack No.

BAKER INSPECTION GROUP, LLC
UT CALIBRATION SHEET
CALIBRATION SHEET NUMBER ____

PLANT ______________________________________ **DATE** _____________

JOB NUMBER _____________________________ **PROCEDURE** ______ **REV. NO.** _______

OPERATOR ______________________________________ **LEVEL** __________
ASSISTANT ______________________________________ **LEVEL** __________

ULTRASONIC INSTRUMENT MANUFACTURER AND MODEL __________________________________
SERIAL NO. ____________ FREQUENCY ____ MHz SWEEP RANGE _____ IN.
SOUND VEL. ___________ GAIN: REFERENCE LEVEL _____ dB +14 dB SCANNING LEVEL _____ dB
DAMPING _______ REJECT _______ PROBE DELAY _____ μSEC DISPLAY DELAY _____ μSEC

SEARCH UNIT MANUFACTURER _______________________ TYPE ___________________
SERIAL NO. ____________ DIA. OR DIMENSIONS ______ IN. REFRACTED ANGLE ____ DEG.
FREQUENCY ____ MHz CABLE TYPE _________________ CABLE LENGTH _________ FEET

CALIBRATION STANDARD SERIAL NO. ____________ THICKNESS ___________ IN.
MATERIAL ________________ DIAMETER _____ IN. NOTCHES ___ SIDE DRILLED HOLES ___
PIPE ___ DIAMETER ___ IN. SCHEDULE _______ TEMPERATURE ____ DEG. F CRACKS _____
WELD EXAM ___ MATERIAL EXAM ___ NOZZLE INNER RADIUS ___

COUPLANT MANUFACTURER _____________ TYPE ________ BATCH NO. ____________

OTHER EQUIPMENT ____
____
____

SCREEN HEIGHT LINEARITY
% FSH AMPLITUDE

LARGER	**SMALLER**
________	________
________	________
80	________
________	________
________	________
________	________
________	________
________	________
________	________

AMPLITUDE CONTROL LINEARITY
Gain Control Setting (dB)
Low ____ Medium ____ High ____

% FSH	**dB CHANGE**	**READING % FSH**			**INDICATION LIMITS (% FSH)**
80	-6	____	____	____	32 to 48
80	-12	____	____	____	16 to 24
40	+6	____	____	____	64 to 96
20	+12	____	____	____	64 to 96

TECHNIQUE STRAIGHT BEAM _____ ANGLE BEAM _____
CONTACT _____ IMMERSION _____
SCAN DIRECTION _____ AXIAL _____ CIRCUMFERENTIAL
WELD _____ MATERIAL _____ INNER RADIUS _____

BP ___ or CAL. TIME > ______ ______ ______
DEPTH ___ DATA SHEET NO.> ______ ______ ______

NOTCH	HOLE	BP OR DEPTH (INCH)	SR	%FSH	SR	%FSH	SR	%FSH
1/2 VEE	1/4 t	________	________	________	________	________	________	________
1 VEE	1/2 t	________	________	________	________	________	________	________
3/2 VEE	3/4 t	________	________	________	________	________	________	________
2 VEE	5/4 t	________	________	________	________	________	________	________
5/2 VEE	6/4 t	________	________	________	________	________	________	________
3 VEE	7/4 t	________	________	________	________	________	________	________
NOTCH @1/2 VEE		________	________	________	________	________	________	________
IR NOTCH	#1	________	________	________	________	________	________	________
IR NOTCH	#2	________	________	________	________	________	________	________
IR NOTCH	#3	________	________	________	________	________	________	________

BP = Beam Path VEE = VEE Path SR = Sweep Reading FSH = Full Screen Height IR = Inner Radius Notch or Crack No.

ENGINEERING & INSPECTIONS HAWAII, INC.

Attachment D

Spread sheet of data findings and repair recommendations

P. O. Box 700217 • Kapolei, HI 96709-0217 • Tel: (808) 682-1667 • Fax: (808) 682-1834 • E-Mail: E I Hawaii@aol.com

Red Hill Fuel Facility
Tank No. 2

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Repair Recommendation
1	Lower Dome	A	1	2 & 3	Dent 3/8"x 1"		Based on remaining thickness; No action is required
2A & B	Lower Dome	B	1	7 & 8	Weld Defect, Cracks		Repair by Welding (see note: 1)
3	Lower Dome	C	1	15 & 16	Weld Defect, Cracks		Repair by Welding (see note: 1)
4A & B	Lower Dome	D	1		Weld Defect, I P; Arc Strike		Repair by Welding (see note: 1)
5A	Lower Dome	D	2	47	Backside Defect	0.150	Repair by lap welded patch 14" x 14"; with radius corners (see note: 2)
5B	Lower Dome	D	2	47	Weld Defect, I P		Repair by Welding (see note: 1)
6	Lower Dome	C	2	39	Topside Dent (Shallow)		Based on remaining thickness; No action is required
7	Lower Dome	A	3	13 & 14	Weld Defect, LOF		Repair by Welding (see note: 1)
8	Lower Dome	A	3	14 & 15	Thickness	0 233	Based on remaining thickness; No action is required
9	Lower Dome	C	3	41	Thickness	0 230	Based on remaining thickness; No action is required
10	Lower Dome	C	3	45	Topside Pit	0 219	Based on remaining thickness; No action is required
11	Lower Dome	A	3	4 & 5	Thickness	0 226	Based on remaining thickness; No action is required
12	Barrel	A	4	8 & 9	Thickness	0 233	Based on remaining thickness; No action is required
13	Barrel	A	25	2	Thickness	0 227	Based on remaining thickness; No action is required
14	Barrel	A	C	2	Weld Defect, LOF		Repair by Welding (see note: 1)
15	Barrel	A	21	2	Thickness	0 233	Based on remaining thickness; No action is required
16A & B	Barrel	A	25	1	Thickness	0.232/0.229	Based on remaining thickness; No action is required
17A	Barrel	A	23	3	Weld Defect, LOF		Repair by Welding (see note: 1)
17B & C	Barrel	A	23	3	Thickness	0.224/0.234	Based on remaining thickness; No action is required
18	Barrel	A	7	3	Thickness	0.228	Based on remaining thickness; No action is required
19A & B	Barrel	D	24	14	Thickness	0.227/0.232	Based on remaining thickness; No action is required
20	Barrel	D	22	14	Thickness	0.234	Based on remaining thickness; No action is required
21	Barrel	D	4	15	Thickness	0.235	Based on remaining thickness; No action is required
22A & B	Barrel	D	18	14	Topside Pits	0.230/0.221	Based on remaining thickness; No action is required
23	Barrel	D	8	15	Topside Pit	0.228	Based on remaining thickness; No action is required
24	Barrel	A	26	3	Weld Defect; Porosity		Repair by Welding (see note: 1)
25	Barrel	A	17	3	Weld Defect, Arc Strikes		Repair by Welding (see note: 1)
26	Barrel	A	20	3	Weld Defect, Porosity		Repair by Welding (see note: 1)
27	Barrel	A	25	3	Topside Pit	0 234	Based on remaining thickness; No action is required
28	Barrel	A	8	3	Topside Pit	0 220	Based on remaining thickness; No action is required
29A-D	Barrel	D	13	14	Weld Defect, LOF		Repair by Welding (see note: 1)
30	Barrel	D	4	14	Topside Pit	0 226	Based on remaining thickness; No action is required
31A & B	Barrel	D	5	14	Topside Pits	0.235/0.235	Based on remaining thickness; No action is required
32A & B	Barrel	D	21	15	Thickness	0.230/0.219	Based on remaining thickness; No action is required
33	Barrel	D	20	14	Weld Defect, Tack Weld	0.168	Repair by Welding (see note: 1)
34	Barrel	A	25	2	Thickness	0 219	Based on remaining thickness; No action is required
35	Barrel	A	25	3	Thickness	0.221	Based on remaining thickness; No action is required
36	Barrel	A	10	2	Thickness	0.218	Based on remaining thickness; No action is required
37							Removed, Duplicated Item; See Flaw 34
38							Removed, Duplicated Item; See Flaw 35
39	Barrel	D	25	14	Thickness	0 230	Based on remaining thickness; No action is required
40	Barrel	D	26	14	Thickness	0 214	Based on remaining thickness; No action is required

Red Hill Fuel Facility
Tank No. 2

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Repair Recommendation
41	Barrel	C	3	45	Topside Pit	0 222	Based on remaining thickness; No action is required
42A & B	Barrel	D	25	14	Thickness	0.223/0.234	Based on remaining thickness; No action is required
43	Barrel	D	27	14	Thickness	0 229	Based on remaining thickness; No action is required
44	Barrel	A	27	5	Thickness/Bulge	0 230	Based on remaining thickness; No action is required
45	Barrel	A	2	5	Thickness	0 225	Based on remaining thickness; No action is required
46	Barrel	D	25	12	Thickness	0 230	Based on remaining thickness; No action is required
47A, C-D	Barrel	D	20	12	Weld Defect, LOF		Repair by Welding (see note: 1)
47B	Barrel	D	20	12	Topside Pit	0.162	Repair by Welding (see note: 1)
48	Barrel	B	17	5	Thickness	0.232	Based on remaining thickness; No action is required
49A	Barrel	B	26	5	Weld Defect, Slag Inclusion		Repair by Welding (see note: 1)
49B	Barrel	B	26	5	Weld Defect, LOF		Repair by Welding (see note: 1)
50	Barrel	B	28	5	Weld Defect, LOF		Repair by Welding (see note: 1)
51	Barrel	B	26	6	Topside Pit	0.220	Based on remaining thickness; No action is required
52A & B	Barrel	B	22	6	Weld Defect, LOF		Repair by Welding (see note: 1)
53	Barrel	B	19	6	Topside Pit	0.220	Based on remaining thickness; No action is required
54	Barrel	B	2	6	Weld Defect, LOF		Repair by Welding (see note: 1)
55	Barrel	C	23	11	Thickness	0.228	Based on remaining thickness; No action is required
56	Barrel	C	6	8	Thickness	0 225	Based on remaining thickness; No action is required
57A & B	Barrel	C	6	8	Thickness	0.229/0.231	Based on remaining thickness; No action is required
58	Barrel	C	1	9	Thickness on Lap Patch	0 200	Based on remaining thickness; No action is required
59	Barrel	C	22	9	Thickness	0.186	Based on remaining thickness; No action is required
60	Upper Dome	C	1	41	Dent		Based on remaining thickness; No action is required
61A - C	Upper Dome	C	1	43	Dents 3 ea		Based on remaining thickness; No action is required
62	Upper Dome	C	1	38	Dent		Based on remaining thickness; No action is required
63A - C	Upper Dome	C	1	42	Dents 3 ea		Based on remaining thickness; No action is required
64	Upper Dome	C	1	44	Dent		Based on remaining thickness; No action is required
65	Upper Dome	C	1	52	Dent		Based on remaining thickness; No action is required
66A & B	Upper Dome	C	2	41	Dents		Based on remaining thickness; No action is required
67A & B	Upper Dome	B	3	14	Thickness	0.185/0.141	Existing patch plate @ .141",area of original liner plate at .185"; Remove existing patch plate and repair entire area by use of lap patch plate .250" thick, 16" x 16" with radius corners
68	Upper Dome	B	2	31	Dent		Based on remaining thickness; No action is required
69	Upper Dome	A	1	25	Dent		Based on remaining thickness; No action is required
70	Upper Dome	A	1	25	Dent		Based on remaining thickness; No action is required
71	Upper Dome	A	1	33	Dent		Based on remaining thickness; No action is required
72	Upper Dome	A	1	27	Topside Pit	0 210	Based on remaining thickness; No action is required
73	Upper Dome	A	1	32	Dent		Based on remaining thickness; No action is required
74	Upper Dome	B	2	22	Dent		Based on remaining thickness; No action is required
75	Upper Dome	B	2	3	Dent		Based on remaining thickness; No action is required
76	Upper Dome	B	2	1	Through Wall Pit	0.000	Through Wall Pit 3/16" dia.; Upper dome; Repair by use of lap welded patch, .250" hick x 6-inch circle
77	Upper Dome	A	1	4	Dent	0.165	Based on remaining thickness; No action is required
78							Removed, Duplicated Item; See Flaw 67
79	Upper Dome	C	3	6	Thickness	0 210	Based on remaining thickness; No action is required

Red Hill Fuel Facility
Tank No. 2

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Repair Recommendation
80A & B	Upper Dome	A	1	48	Dent		Based on remaining thickness; No action is required
81	Upper Dome	C	3	81	Topside Pit	0.195	Based on remaining thickness; No action is required
82	**Lower Dome**	**A**	**0**	**Floor Plate 2**	**Topside Pitting**	**0.435**	**Engineering Evaluation by EEI Required, Due to Location**
83	**Lower Dome**	**B**	**0**	**Floor Plate 4**	**Topside Pitting**	**0.336**	**Engineering Evaluation by EEI Required, Due to Location**
84	Lower Dome	A	1	1	Topside Pit ing	0.181	Based on remaining thickness; No action is required
85	Lower Dome	A	1	2	Topside Pit ing	0.180	Based on remaining thickness; No action is required
86	Lower Dome	A	1	3	Topside Pit ing	0.189	Based on remaining thickness; No action is required
87	Lower Dome	A	1	4	Topside Pit ing	0.179	Based on remaining thickness; No action is required
88	Lower Dome	A	1	5	Topside Pit ing	0 216	Based on remaining thickness; No action is required
89	Lower Dome	A	1	6	Topside Pit ing	0 212	Based on remaining thickness; No action is required
90	Lower Dome	B	1	7	Topside Pit ing	0 206	Based on remaining thickness; No action is required
91	Lower Dome	B	1	8	Topside Pit ing	0 212	Based on remaining thickness; No action is required
92	Lower Dome	B	1	9	Topside Pit ing	0 209	Based on remaining thickness; No action is required
93	Lower Dome	B	1	10	Topside Pit ing	0 218	Based on remaining thickness; No action is required
94	Lower Dome	B	1	11	Topside Pit ing	0 211	Based on remaining thickness; No action is required
95	Lower Dome	C	1	12	Topside Pit ing	0 222	Based on remaining thickness; No action is required
96	Lower Dome	C	1	13	Topside Pit ing	0 226	Based on remaining thickness; No action is required
97	Lower Dome	C	1	14	Topside Pit ing	0 223	Based on remaining thickness; No action is required
98	Lower Dome	C	1	15	Topside Pit ing	0.198	Based on remaining thickness; No action is required
99	Lower Dome	C	1	16	Topside Pit ing	0.188	Based on remaining thickness; No action is required
100	Lower Dome	D	1	17	Topside Pit ing	0.190	Based on remaining thickness; No action is required
101	Lower Dome	D	1	18	Topside Pit ing	0.193	Based on remaining thickness; No action is required
102	Lower Dome	D	1	19	Topside Pit ing	0.185	Based on remaining thickness; No action is required
103	Lower Dome	D	1	20	Topside Pit ing	0.186	Based on remaining thickness; No action is required
104	Lower Dome	D	1	21	Topside Pit ing	0.180	Based on remaining thickness; No action is required
105 A - C	Lower Dome	A	Floor/Shell Jnct.	21/1	Welding Defects, LOF		Repair by Welding (see note: 1)
106 A & B	Lower Dome	A	Floor/Shell Jnct.	1/2	Welding Defects, LOF		Repair by Welding (see note: 1)
107A	Lower Dome	A	Floor/Shell Jnct.	2/3	Welding Defect, LOF		Repair by Welding (see note: 1)
107B	Lower Dome	A	Floor/Shell Jnct.	2/3	Welding Defect, Crack		Repair by Welding (see note: 1)
108A, C,D	Lower Dome	A	Floor/Shell Jnct.	3/4	Welding Defect, LOF		Repair by Welding (see note: 1)
108B	Lower Dome	A	Floor/Shell Jnct.	3/4	Welding Defect, Crack		Repair by Welding (see note: 1)
109A-E	Lower Dome	A	Floor/Shell Jnct.	4/5	Welding Defects, LOF		Repair by Welding (see note: 1)
110A-D	Lower Dome	A	Floor/Shell Jnct.	5/6	Welding Defects, LOF		Repair by Welding (see note: 1)
111A-D	Lower Dome	A/B	Floor/Shell Jnct.	6/7	Welding Defects, LOF		Repair by Welding (see note: 1)
112A-E	Lower Dome	B	Floor/Shell Jnct.	7/8	Welding Defects, Cracks		Repair by Welding (see note: 1)
113A-C	Lower Dome	B	Floor/Shell Jnct.	8/9	Welding Defects, LOF		Repair by Welding (see note: 1)
114A & B	Lower Dome	B	Floor/Shell Jnct.	9/10	Welding Defects, LOF		Repair by Welding (see note: 1)
115A & B	Lower Dome	B	Floor/Shell Jnct.	10/11	Welding Defects, LOF		Repair by Welding (see note: 1)
116A & B	Lower Dome	B/C	Floor/Shell Jnct.	11/12	Welding Defects, LOF		Repair by Welding (see note: 1)
117A & B	Lower Dome	C	Floor/Shell Jnct.	15/16	Welding Defects, LOF		Repair by Welding (see note: 1)
118A & B	Lower Dome	C/D	Floor/Shell Jnct.	16/17	Welding Defects, LOF		Repair by Welding (see note: 1)
119	Lower Dome	D	Floor/Shell Jnct.	17/18	Welding Defect, LOF		Repair by Welding (see note: 1)
120A	Lower Dome	D	Floor/Shell Jnct.	18/19	Welding Defect, LOF		Repair by Welding (see note: 1)
120B	Lower Dome	D	Floor/Shell Jnct.	18/19	Welding Defect, I P		Repair by Welding (see note: 1)
121A & B	Lower Dome	D	Floor/Shell Jnct.	19/20	Welding Defects, Cracks		Repair by Welding (see note: 1)
122	Lower Dome	D	Floor/Shell Jnct.	20/21	Welding Defects, LOF		Repair by Welding (see note: 1)
9/29/2008	Upper dome	F		12	Through Hole 1/2" Dia.		Repair by use of 6" circular lap welded patch

Red Hill Fuel Facility
Tank No. 2

Note 1: All welding defects are to be removed after he location is deemed safe for Hot Work. Defects should be removed by grinding and verified by either the magnetic particle or liquid penetrant inspectin method for complete removal. Final weld pass should be examined by the liquid penetrant or magnetic particle test method with final weld acceptance by ultrasonic shear wave inspection method.

ENGINEERING & INSPECTIONS
HAWAII, INC.

Attachment E

Pressure test data

P. O. Box 700217 • Kapolei, HI 96709-0217 • Tel: (808) 682-1667 • Fax: (808) 682-1834 • E-Mail: E I Hawaii@aol.com

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 3/27/08

Tank No. 2 Pipe Line: 135 FT SAMPLE TUBE

Portion of Line Tested: 135 FT SAMPLE TUBE

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable X Retest Required_______

Procedure: Step (1) ensure all lines have been emptied, (2) Cap/Blind each line (3) Fill line with water (4) Bleed line of all excess air (5) Pressurize line to 150 psig (6) Inspect line/blinds/cap & joints for leakage (7) If leaks are present repair as necessary (8) If no leaks hold pressure for four hours (9) Record pressure and temperature readings every ten minutes on appropriate log.

Notes:

D&B Representative: [signature]

Shaw CQC: [signature]

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 2 **Pipe Line:** 135' - SAMPLE TUBE

Date: 3/27/08

Start Time: 0825 **Ambient Temperature:** 76.8

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	153		
15 Minutes	154		
30 Minutes	154		
45 Minutes	155		77.4
60 Minutes	155		
75 Minutes	155		
90 Minutes	155		77.5
105 Minutes	155		
120 Minutes	155		
135 Minutes	156		77.4
150 Minutes	156		
165 Minutes	155		77.5
180 Minutes	154		77.4
195 Minutes	154		
210 Minutes	154		
225 Minutes	153.5		
240 Minutes	152.5		77.5

D&B Test Witnessed By:

Shaw/Govt. Test Witnessed By:

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 3/28/08

Tank No. 2 Pipe Line: 200' SAMPLE TUBE

Portion of Line Tested: ENTIRE SAMPLE

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable X Retest Required ______

Procedure: Step (1) ensure all lines have been emptied, (2) Cap/Blind each line (3) Fill line with water (4) Bleed line of all excess air (5) Pressurize line to 150 psig (6) Inspect line/blinds/cap & joints for leakage (7) If leaks are present repair as necessary (8) If no leaks hold pressure for four hours (9) Record pressure and temperature readings every ten minutes on appropriate log.

Notes:

D&B Representative: [signature]

Shaw CQC: [signature]

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 2 Pipe Line: 200' SAMPLE TUBE

Date: 3/27/09

Start Time: 0827 Ambient Temperature: 77

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	150		drip @ coupling
15 Minutes	150		
30 Minutes	150		
45 Minutes	150		AMB. 77.4
60 Minutes	150		
75 Minutes	148.5		
90 Minutes	148		AMB 77.5
105 Minutes	146		
120 Minutes	146		
135 Minutes	144		AMB 77.4
150 Minutes	143		
165 Minutes	141		77.5
180 Minutes	140		
195 Minutes	139		(still dripping)
210 Minutes	138		
225 Minutes	136.5		
240 Minutes	136		77.5

D&B Test Witnessed By: [signature]

Shaw/Govt. Test Witnessed By: [signature] / [signature]

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 3/27/08

Tank No. 2 Pipe Line: 16" PIPELINE

Portion of Line Tested: ENTIRE 16" P/L

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable X Retest Required____

Procedure: Step (1) ensure all lines have been emptied, (2) Cap/Blind each line (3) Fill line with water (4) Bleed line of all excess air (5) Pressurize line to 150 psig (6) Inspect line/blinds/cap & joints for leakage (7) If leaks are present repair as necessary (8) If no leaks hold pressure for four hours (9) Record pressure and temperature readings every ten minutes on appropriate log.

Notes:

D&B Representative: [signature]

Shaw CQC: [signature]

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 2 Pipe Line: 16" [illegible]

Date: 3/27/08

Start Time: 0835 Ambient Temperature: 77.2

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	150	79	
15 Minutes	150		
30 Minutes	150		
45 Minutes	150		AMB 77.4
60 Minutes	150		
75 Minutes	150		
90 Minutes	150		AMB 77.5
105 Minutes	150		
120 Minutes	150		
135 Minutes	150		AMB 77.4
150 Minutes	150		
165 Minutes	150		AMB 77.5
180 Minutes	150		
195 Minutes	150		AMB 77.4
210 Minutes	150		
225 Minutes	149+		
240 Minutes	150		77.5

D&B Test Witnessed By: [signature]

Shaw/Govt. Test Witnessed By: [signature] / [signature]

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 3/27/08

Tank No. 2 Pipe Line: 20" 4HG

Portion of Line Tested: ENTIRE 20"

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable X Retest Required ____

Procedure: Step (1) ensure all lines have been emptied, (2) Cap/Blind each line (3) Fill line with water (4) Bleed line of all excess air (5) Pressurize line to 150 psig (6) Inspect line/blinds/cap & joints for leakage (7) If leaks are present repair as necessary (8) If no leaks hold pressure for four hours (9) Record pressure and temperature readings every ten minutes on appropriate log.

Notes:

D&B Representative: [signature]

Shaw CQC: [signature]

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 2 Pipe Line: 20" Line

Date: 3/27/08

Start Time: 0830 Ambient Temperature: 77.2

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	150	79	
15 Minutes	149 1/2		
30 Minutes	149 1/2		
45 Minutes	149 1/2		Amb. 77.4
60 Minutes	149 1/2		
75 Minutes	148		
90 Minutes	148		Amb 77.5
105 Minutes	148		
120 Minutes	148		
135 Minutes	148		Amb 77.4
150 Minutes	148		
165 Minutes	148		Amb 77.3
180 Minutes	148		Amb 77.4
195 Minutes	148		
210 Minutes	148		
225 Minutes	148		
240 Minutes	148		77.5

D&B Test Witnessed By: [signature]

Shaw/Govt. Test Witnessed By: [signature] / [signature]

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 3/27/09

Tank No. 2 Pipe Line: SLOP LINE 6"

Portion of Line Tested: ENTIRE SLOP LINE

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable______ Retest Required______

Procedure: Step (1) ensure all lines have been emptied, (2) Cap/Blind each line (3) Fill line with water (4) Bleed line of all excess air (5) Pressurize line to 150 psig (6) Inspect line/blinds/cap & joints for leakage (7) If leaks are present repair as necessary (8) If no leaks hold pressure for four hours (9) Record pressure and temperature readings every ten minutes on appropriate log.

Notes:

Not acceptable - replace/repair

D&B Representative: [signature]

Shaw CQC: [signature]

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 2 Pipe Line: 6" SLOP LINE

Date: 3/27/08

Start Time: 0830 Ambient Temperature: 77.2

STARTED @ 150 @ 8:15

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	146	79	
15 Minutes	141		
30 Minutes	139		
45 Minutes	135		AVG 77.4
60 Minutes	135.5		
75 Minutes	133.5		
90 Minutes	125		Avg 77.5
105 Minutes	122		
120 Minutes	120		
135 Minutes	118		Avg 77.4
150 Minutes	114		
165 Minutes	112		Avg 77.5
180 Minutes	111		Avg 77.4
195 Minutes	109		
210 Minutes	107		
225 Minutes	104.5		
240 Minutes	103.5		77.5

D&B Test Witnessed By: [signature]

Shaw/Govt. Test Witnessed By: [signature] / [signature]

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 3/27/08

Tank No. 2 Pipe Line: 10' SAMPLING TUBE

Portion of Line Tested: ENTIRE SAMPLING TUBE

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable X Retest Required______

Procedure: Step (1) ensure all lines have been emptied, (2) Cap/Blind each line (3) Fill line with water (4) Bleed line of all excess air (5) Pressurize line to 150 psig (6) Inspect line/blinds/cap & joints for leakage (7) If leaks are present repair as necessary (8) If no leaks hold pressure for four hours (9) Record pressure and temperature readings every ten minutes on appropriate log.

Notes:

D&B Representative: [signature]

Shaw CQC: [signature]

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 2 Pipe Line: 10' SAMPLE [illegible]

Date: 3/27/08

Start Time: 820 Ambient Temperature: 76.8

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	156 / 0820	79	
15 Minutes	150		
30 Minutes	150		
45 Minutes	150		Amb. 77.4
60 Minutes	150		
75 Minutes	150		
90 Minutes	148		amb 77.5 slight drop
105 Minutes	148		
120 Minutes	148		
135 Minutes	148		Amb 77.4
150 Minutes	148		
165 Minutes	148		77.5
180 Minutes	148		77.9
195 Minutes	147.5		
210 Minutes	147		
225 Minutes	147		
240 Minutes	146.5		77.5

D&B Test Witnessed By: [signature]

Shaw/Govt. Test Witnessed By: [signature] / [signature]

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 3/27/08

Tank No. 2 Pipe Line: 70' STAINLESS TUBE

Portion of Line Tested: ENTIRE

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable X Retest Required ______

Procedure: Step (1) ensure all lines have been emptied, (2) Cap/Blind each line (3) Fill line with water (4) Bleed line of all excess air (5) Pressurize line to 150 psig (6) Inspect line/blinds/cap & joints for leakage (7) If leaks are present repair as necessary (8) If no leaks hold pressure for four hours (9) Record pressure and temperature readings every ten minutes on appropriate log.

Notes:

D&B Representative: [signature]

Shaw CQC: [signature]

Dunkin & Bush, Inc.

BARRY

FINAL VERSION FOR RED HILL

I AM GOING TO BE WORKING

ON PRELIM FOR B-1

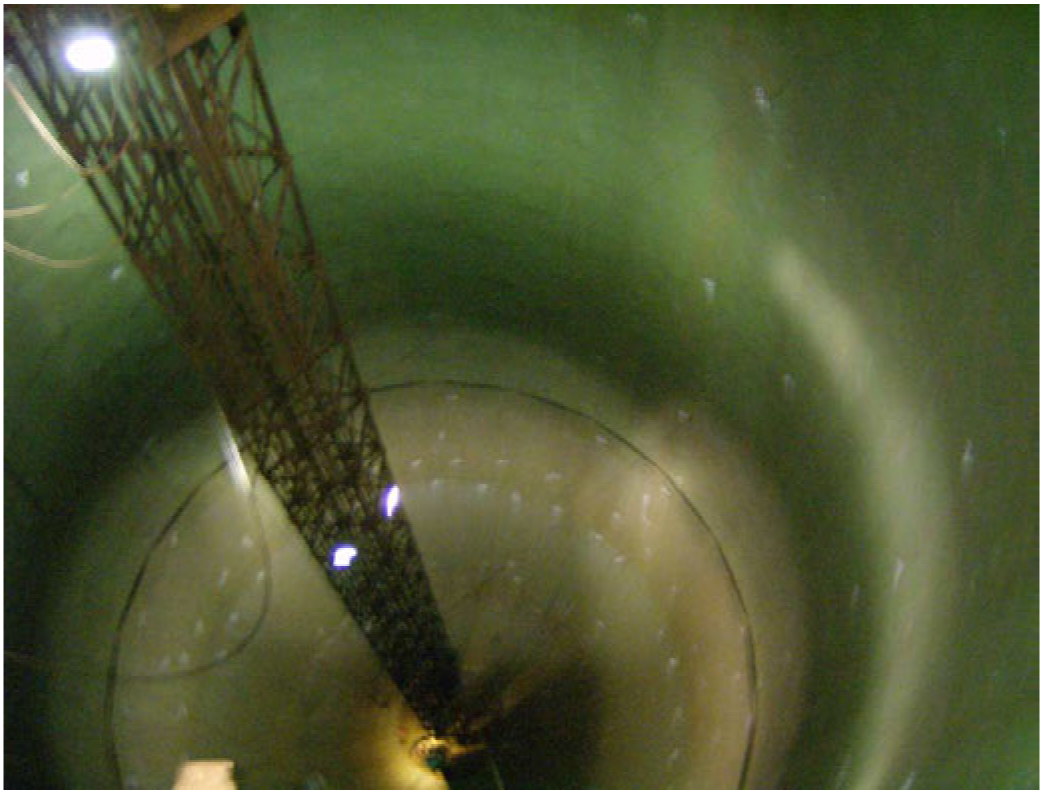
HOPE TO HAVE IT DONE

THIS AFTERNOON

KEN

Quality • Integrity • Reliability

MODIFIED API-653 OUT-OF-SERVICE
TANK 20
RED HILL



From:

P.O. Box 700217
Kapolei, HI. 96709-0217

"Providing Excellence in NDE and Quality Inspection Services to Industries Worldwide"

Quality • Integrity • Reliability

ENGINEERING & INSPECTIONS HAWAII, INC.

December 5, 2008

Mr. Bruce Huddleston M.S.
Shaw Environmental, Inc.
590-B Paiea St.
Honolulu, HI 96819

Subject: Tank No. 20 Red Hill Fuel Facility

SYNOPSIS

During September and October 2008, Engineering & Inspections Hawaii, Inc. performed a modified Out-of Service inspection on Tank **2** at the Red Hill fuel storage facility. This inspection was performed in accordance with the Clients requirements and the latest edition of API Standard 653, Tank Inspection, Repair, Alteration, and Reconstruction by a certified API 653 inspector. All personnel performing nondestructive examinations are certified to at least SNT-TC-1A level II.
Red Hill tanks are a design engineered underground storage tank and therefore do not fall under the requirements of API-653. The API-653 document was utilized as a guide for the evaluation of findings and recommendation of repairs, where necessary, during this inspection.

Tank Data

Tank No. 20
Year Built: 1943 - 1945
Design: Engineered Underground Storage Tank
Constructed: Morrison Knudsen
Product: JP-8
Capacity: 302,000 Bbls.
Size 100’ Dia. x 250’ High

Background

Tank 20 is located at the Red Hill fuel storage facility located underground in a ridgeline between Halawa Valley and Moanalua Valley.
Tank 20 was built in 1943 (completed in 1945). Its nominal capacity is 302,000 barrels. The tank, like the others in Red Hill, is a concrete tank with a steel liner. The configuration is a vertical cylinder measuring 100 feet in diameter and 250 feet in height. The tank is domed on the lower and upper ends. The primary access point to the tank is from the upper tunnel which is at the 200 foot level of the tank. The tank has a center tower extending from the top to the bottom that is connected to the access point by a catwalk.

Surrounding Area:

Red Hill Facility is located completely underground

Foundation:

Engineered high pressure grouting with steel liner underground storage tank.

Access Structure

The tank internal is accessed by an upper manway with a catwalk to a central structural tower which extends from the tank bottom to the tank top. This access structure contains two boom lifts and an air operated central lift for inspecting the internal of the tank. The structure was inspected by Hawaii Engineering Group, Inc., Certified structural engineers. Recommendations, based on their findings, to repair or replace hardware was performed by contractor Dunkin and Bush as safety precautions prior to the inspection of this tank. No documented inspection of the recommended repairs has been performed.

Tank Internal

100% of the tank internal was inspected by the L.F.E.T (Low Frequency Electromagnetic Technique) by contractor TesTex Inc. Anomalies in the liner plate were identified by TesTex, Inc. and further evaluated as necessary. All areas below the nominal .250" for the liner plate were identified and mapped on TesTex reports, contained in the appendices of this report. Areas that were identified at or below .170" were evaluated and will be required to be repaired. Enterprise Engineering Inc. was contracted for calculating a T-min thickness threshold of which repairs would be required.

Approximately 600 1½" tank piping penetrations were noted throughout the tank. The piping was removed by mechanically cutting at the interior re-pad interface. Based on information provided to Engineering & Inspections Hawaii, Inc., this condition will be addressed for repair recommendations by Engineering consultant; Enterprise Engineering, Inc.

Hammer testing of the lower dome revealed numerous voids behind the liner plate in the lower dome area. Of the 44 lower dome plates, approximately 22 were hammer tested with all 22 showing some degree of voids behind the plate. The smallest areas were noted to be six to eight square inches, the larger areas, specifically plates 23 and 24 have areas large enough that when hit with the hammer a visible deflecting of the plate was noticed.

Numerous lap welded patches were noted throughout the entire tank. Due to this being the first known out-of-service inspection of tank number 20, no known history exists as to the reason for these patches. The patches vary in size and shape with numerous patches noted not to meet the requirements of API-653. Patches were noted with non-radius corners and smaller than the minimum required six inch circular dimension.

Coating

The tank has numerous areas of coating failure. Numerous areas of positive corrosion blooms were also noticed during this inspection. Some of the corrosion blooms were 1½" in diameter with visible pitting beneath the corrosion. The entire lower dome is affected by active corrosion holidays or coating holidays making proper inspection difficult. The area referenced as the tank lower dome has approximately 40% coating failure with exposure of the tank steel liner. The area known as the tank Barrel section was noted to have smaller areas of coating failure. The tank upper dome was noted to have the best areas of coating with only minimal failure.

Hydrostatic Testing of Piping

Contractors Dunkin & Bush and Shaw Environmental Inc. performed the hydrostatic testing of the tank piping as defined in the work plan. Engineering and Inspection, Inc. did not witness these test but did review the final test data. Based on the information supplied, the following lines were tested with the results listed below; Copies of the data reports are included in the appendices of this report.

16" Pipeline	Acceptable
32" Pipeline	Acceptable
6" Slop line	Failed
6" Steam Line	Failed
8" Steam Line	Acceptable

Settlement Survey

This is an underground storage tank; settlement surveys could not be performed.

Recommendations

Mandatory Repairs:

Repairs that affect the overall operability and integrity of the tank; and must be performed in the immediate near future.

1. Perform visual and magnetic particle inspection of the internal structural tower and catwalk where additional structural members or repairs have been made by welding; as outlined in the Hawaii Engineering Group, Inc. report
2. Evaluate the internal coating system by a certified NACE Inspector.
3. Perform engineering evaluation of large voids noted behind the liner plate in the lower dome.

Based on the inspection findings provided by TesTex, Inc. and as referenced by the TesTex, Inc. Flaw Log for Tank No. 20. And further defined by remaining T-min thickness calculations as provided by Enterprise Engineering, Inc.

Flaw #47A-C	Lack of Fusion in weld; Lower Dome; Repair by Welding
Flaw #50	Lack of Fusion in weld; Lower Dome; Repair by Welding
Flaw #51	Lack of Fusion in weld; Lower Dome; Repair by Welding
Flaw #146	Lack of Fusion in weld; Barrel; Repair by Welding
Flaw #166	Mechanical Gouge; Barrel; Repair by Welding
Flaw #173	Mechanical Gouge; Barrel; Repair by Welding
Flaw #174A/B	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #212	Lack of Fusion in weld; Expansion Joint; Repair by welding
Flaw #215	Mechanical Gouge; Expansion Joint; Repair by Welding
Flaw #219	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #221	Mechanical Gouge; Expansion Joint; Repair by Welding
Flaw #227	Mechanical Gouge; Expansion Joint; Repair by Welding
Flaw #258	Lack of Fusion in weld; Expansion Joint; Repair by welding

Flaw #266A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #267	Pitting in weld; Expansion Joint; Repair by welding
Flaw #276	Mechanical Gouge; Expansion Joint; Repair by Welding
Flaw #277	Lack of Fusion in weld; Expansion Joint; Repair by welding
Flaw #278	Lack of Fusion in weld; Expansion Joint; Repair by welding
Flaw #302A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #303	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #304	Loss of Wall @ .165”; Upper Dome; Repair by use of lap patch plate .250” thick, 16” x 16” with radius corners
Flaw #305	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #312	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #313A/C	Pitting in Weld; Upper Dome; Repair by welding
Flaw #313B/D	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #314A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #325	Loss of Wall @ .137”; Upper Dome; Repair by use of Tombstone shaped lap patch plate .250” thick, 10” x 10” with radius top to cover Flaws 325 and 326
Flaw #329	Base Metal Arc Gouge; Expansion Joint; Repair by welding
Flaw #330	Base Metal Arc Gouge; Expansion Joint; Repair by welding
Flaw #334	Loss of Wall @ .137”; Expansion Joint; Repair by use of lap patch plate .250” thick, 16” x 16” with radius corners
Flaw #337	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #341A/C	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #345	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #346A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #347	Through Hole on Strap; Upper Dome; Repair by welding
Flaw #351	Base Metal Arc Gouge; Upper Dome; Repair by welding

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Flaw #352	Base Metal Arc Gouge; Upper Dome; Repair by welding
Flaw #353	Base Metal Arc Gouge; Upper Dome; Repair by welding
Flaw #358/477	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #359A-E	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #360	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #362	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #363	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #364	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #365	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #366	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #367	Mechanical Gouge; Upper Dome; Repair by Welding
Flaw #369	Weld Pit .125”; Upper Dome; Repair by welding
Flaw #375	Lack of Fusion in Weld; Upper Dome; Repair by Welding
Flaw #377	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #378	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #379A-C	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #380	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #381	Weld Pit .063”; Upper Dome; Repair by welding
Flaw #382A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #383A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #384	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #385	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #389	Mechanical Gouge; Upper Dome; Repair by Welding
Flaw #392	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #393	Lack of Fusion in weld; Upper Dome; Repair by welding

Flaw #394A-F	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #395	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #397	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #401	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #406	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #407	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #408A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #409	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #413A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #414A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #415	Mechanical Gouge; Barrel; Repair by Welding
Flaw #416	Weld Pit .125”; Upper Dome; Repair by welding
Flaw #417A/C-E	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #417B/F	Weld Gouge; Upper Dome; Repair by Welding
Flaw #421	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #423	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #426	Mechanical Gouge; Upper Dome; Repair by welding
Flaw #432	Lack of Fusion in tack weld; Upper Dome; Repair by welding
Flaw #433	Lack of Fusion in tack weld; Upper Dome; Repair by welding
Flaw #434	Lack of Fusion in tack weld; Upper Dome; Repair by welding
Flaw #435	Lack of Fusion in tack weld; Upper Dome; Repair by welding
Flaw #436	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #437A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #439	Lack of Fusion in weld; Upper Dome; Repair by welding

Flaw #441	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #442	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #447A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #449	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #451	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #452	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #453A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #455A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #463A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #467A/B	Lack of Fusion in weld; Barrel; Repair by welding
Flaw #468	Lack of Fusion in weld; Under Catwalk; Repair by welding
Flaw #469A/B	Lack of Fusion in weld; Manway; Repair by welding
Flaw #470	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #471	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #472	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #473A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #474A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #475	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #476	Lack of Fusion in weld; Extension; Repair by welding
Flaw #477/358	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #478	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #479	Weld Gouge .085”; Upper Dome; Repair by welding
Flaw #480A/B	Lack of Fusion in weld; Upper Dome; Repair by welding
Flaw #481A-C	Lack of Fusion in weld; Upper Dome; Repair by welding

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Flaw #482 Crack in weld; Lower Dome; Repair by Welding

Note: All of the above repairs will require welding by a certified welder to approved welding procedures. All repairs to existing welds requiring weld excavation are required to be inspected by magnetic particle or liquid Penetrant after excavation to ensure defect removal. Final welds are required to be inspected by visual, magnetic particle or liquid penetrant methods. Addition of lap welded patch plates where required will also require inspection by the vacuum box inspection method.

Recommended Near Future Repairs:

Repairs that do not adversely affect the operability or integrity of the tank for continued service.

Continued service will be determined by Enterprise Engineering, Inc upon review of all data and T-min calculations.

If you have any questions regarding this matter or require any additional information, please do not hesitate to contact Ken McNamara at (808) 682-1667 or by fax at (808) 682-1834.

Respectively submitted,

Ken McNamara

Certified API-653 Inspector No. 873

Reviewed By:

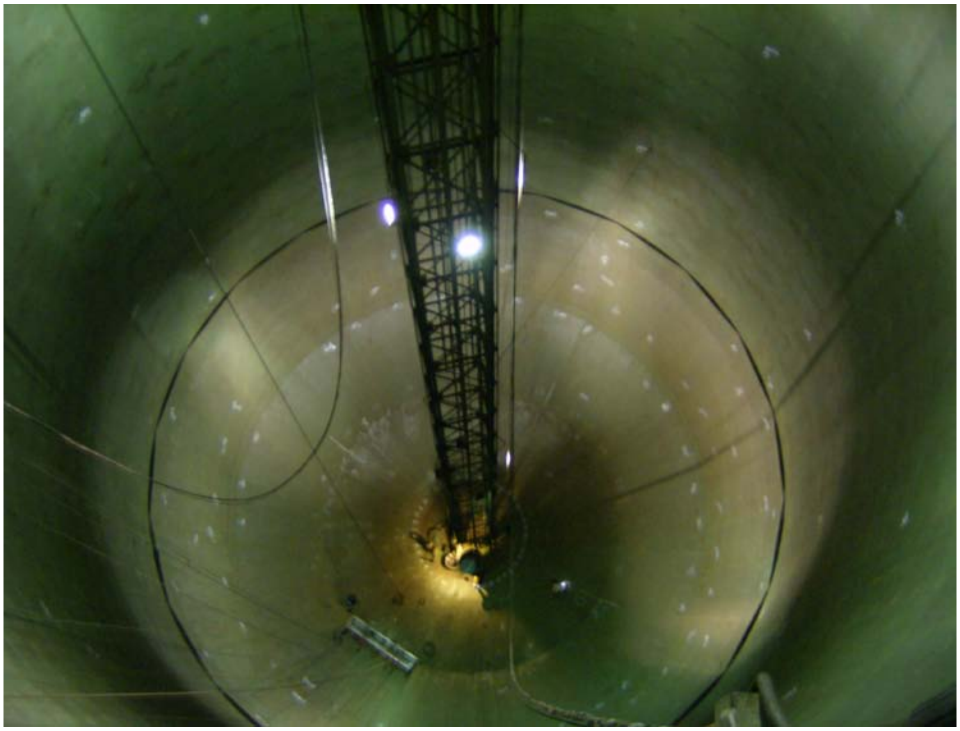
Brian McKenna; Project Manager

Attachments

A. Photographs
B. Report; Hawaii Engineering Group, Inc.
C. Enterprise Engineering, Inc. T-min Calculations
D. Report; TesTex, Inc. Data mapping
E. Excel spread sheet of data findings and repair recommendations
F. Pressure test data sheets

Attachment A

Photographs

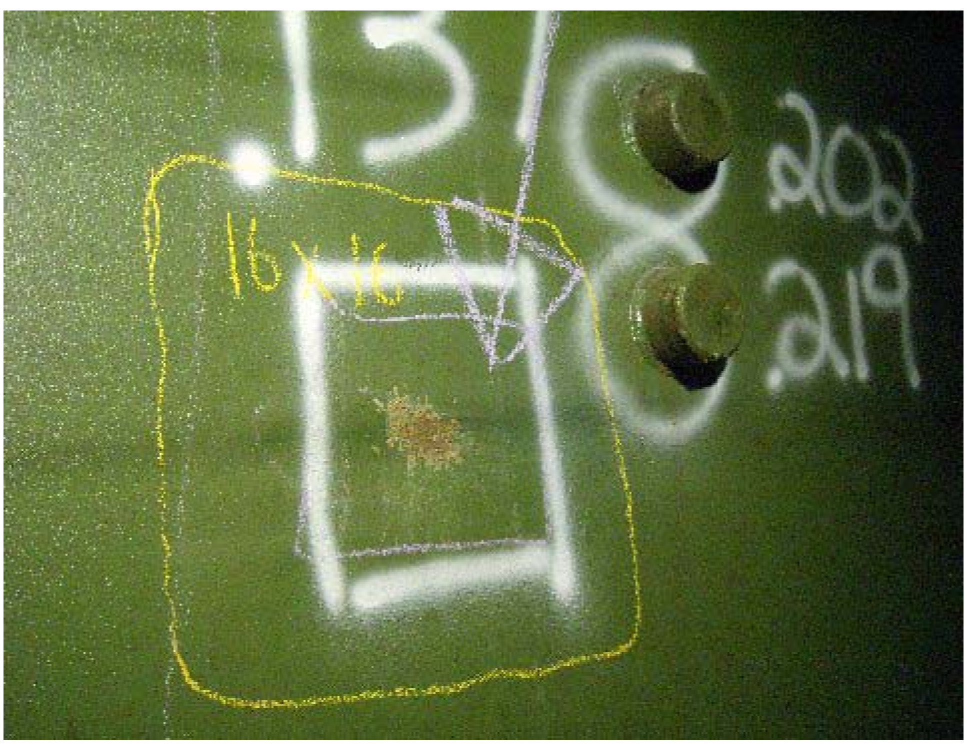


Looking down at the lower dome from the catwalk

Transition from tank floor to the lower dome section

ENGINEERING & INSPECTIONS
HAWAII, INC.

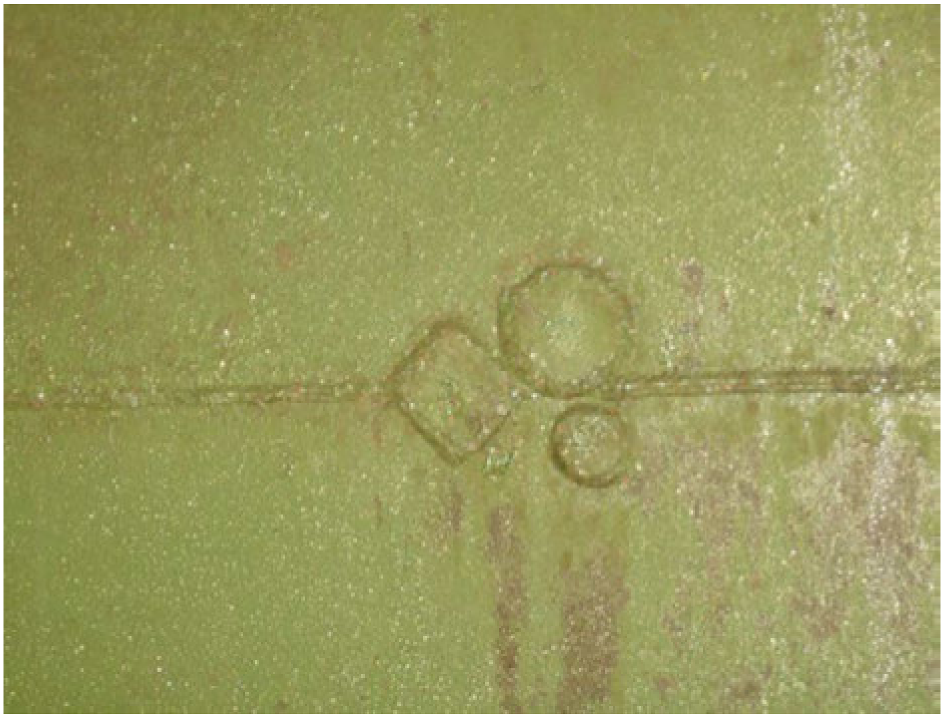
One of approximately *Six Hundred* piping penetrations that were removed requiring repair



Location of Flaw 334 Underside corrosion at .137” requiring a 16” X 16” Lap Welded Patch

Flaw 304 Loss of Wall measured .165"

Location of piping penetration removal; **Note:** Condition of Coating



Existing Lap Patches in the Barrel section of tank 20 **Note:** Coating condition

Flaw 347 through hole in strap

P. O. Box 700217 • Kapolei, HI 96709-0217 • Tel: (808) 682-1667 • Fax: (808) 682-1834 • E-Mail: E I Hawaii@aol.com

Attachment B

Report: Hawaii Engineering Group, Inc.

HAWAII
ENGINEERING
GROUP, INC.

Consulting Civil Engineers, Structural Engineers & Land Surveyors
US (SBA), 8(a) & SDB Certified

October 07, 2008

Mr. Steve Skeel, Project Manager
Dunkin & Bush, Inc.
4648 Pacific Highway, Bellingham
Washington 98226

Project: Red Hill Tanks
Subject: Verification of Tower inside Tank # 20

Dear Mr. Skeel

A site visit was made on June, 05, 2008 to inspect and report on the condition of the tower frame, boom, cables, work platforms and spider hoist assembly and support framing inside Tank # 20:

1. Tower Frame and Boom

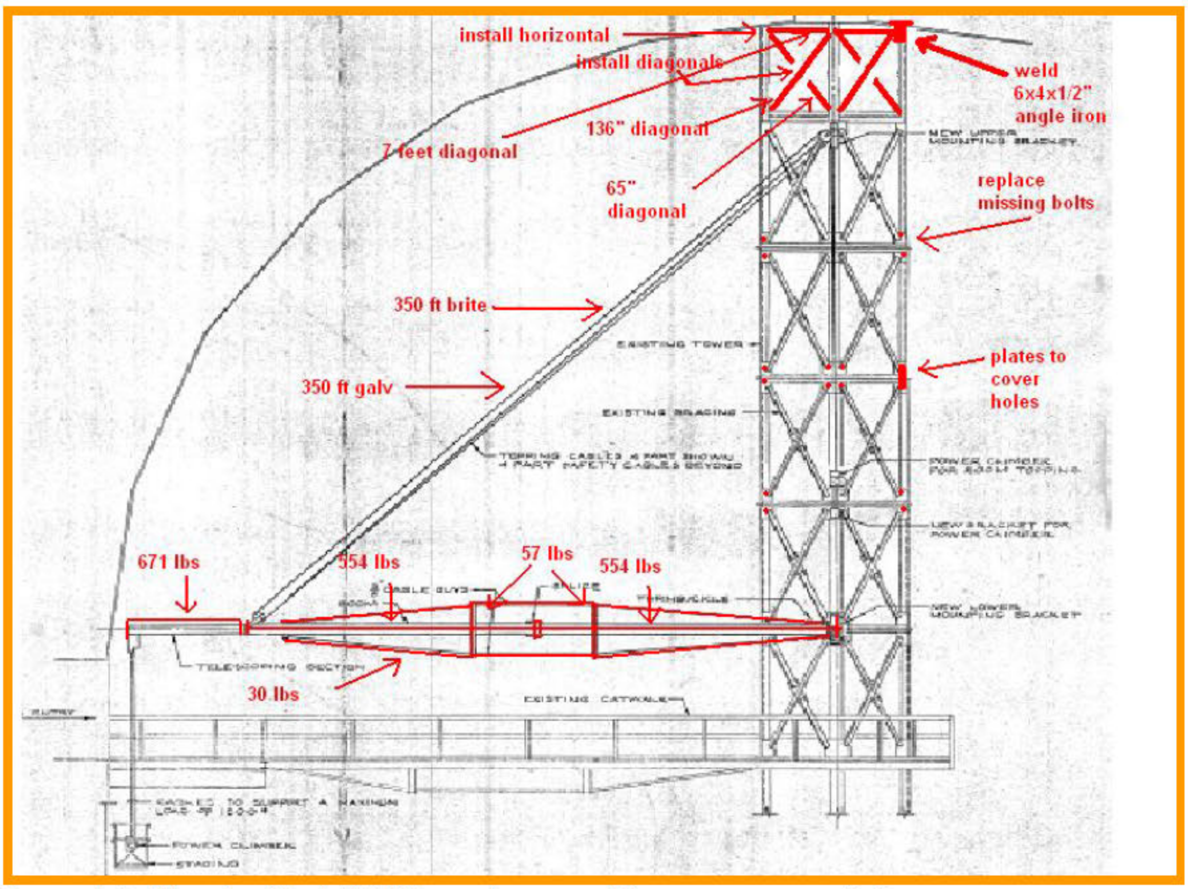
Upon inspection of the tower frame and boom, some horizontal and diagonal members were found to be missing, some bolts were found to be missing and some holes were found that needed to be covered by plates (see image #1 & #2)). The recommendations for the frame are summarized in the image #3 below:

Image 1: *Showing Tank #20 Tower frame and boom missing members and bolts*

1088 Bishop St., Suite 2506 Honolulu Hawaii 96813 – Tel: (808) 533-209 Fax: (808) 533-2059
Email: heg@hawaiiengineering.net

Tower legs were not supported by the tank at the top. These legs were welded to the tank for support and the missing braces were installed.

Image# 2: *Showing Tank #20 Tower leg not welded to the tank.*



Image# 3: *Showing Tank #20 Tower frame and boom recommendations*

All above proposed changes were accomplished safely.

2. Spider Hoist Assembly:

The assembly consists of three cables anchored on the top by a 42" long 8x8 I-Beam resting on a 1/4" thick top flange plate of the dome(See Image #3).

Image #3: *Showing Tank #20 Spider hoist assembly top anchoring*

A 5/16" spider hoist cable is attached to the top anchor I-Beam with a 3/8" choke cable and 5/8" diameter shackle (attached to a 7/8 shackle). The life line cables are also 5/16" thick and attached to the top anchor I-Beam with a 5/16" choke cable and 5/8" shackles. (See Image #4)

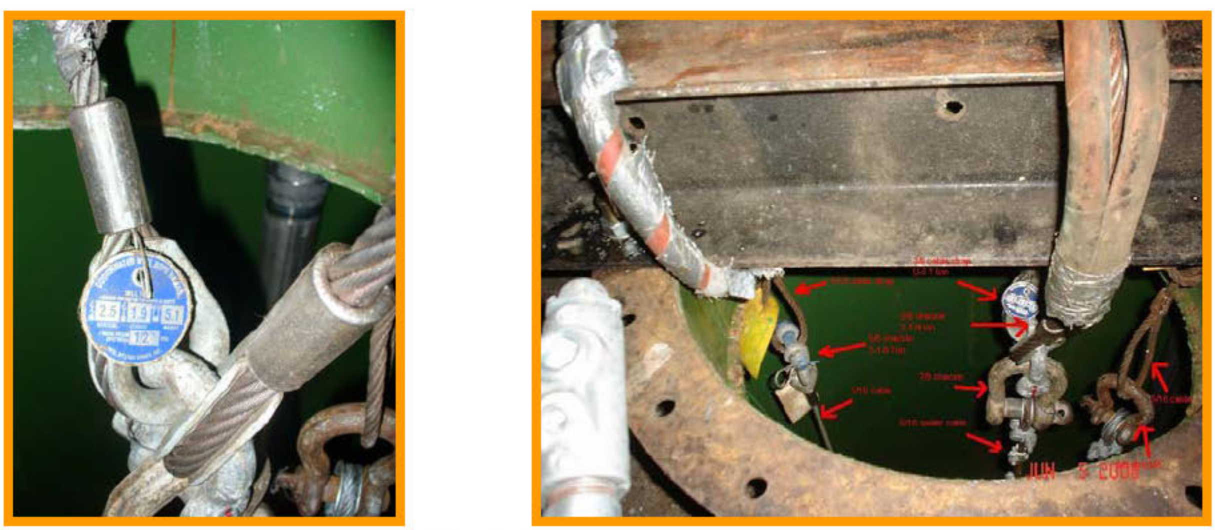


Image #4: *Showing Tank #20 Spider hoist assembly cables and shackles*

The Working Load Limit of a 5/16" choke cable is 2000 pounds. The smallest shackle in the assembly holding the spider is 5/8" shackle with a Working Load Limit of 3-1/4 ton, or 6,500 pounds. The cable bends and shackles reduce the Safe load another 50%. Therefore, a safe

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Email: heg@hawaiiengineering.net

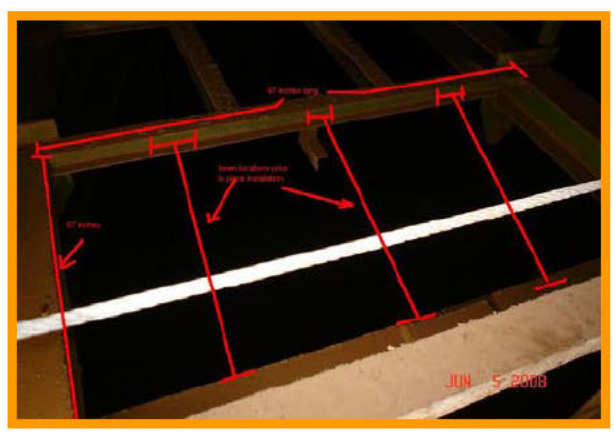
working load on the cables is 1,000 pounds. **We consider the installed cable and shackle configuration to be structurally safe for spider loads of upto1000 pounds.**

The beam supporting the spider hoist assembly was supported by the flange around the opening. This condition could produce buckling in the flange. Our recommendation was to cut off the excess length of the supporting beam and to provide blocking under the beam to avoid loading the flange. This was safely accomplished as seen in Image #5

Image# 5: *Showing Tank #20 Top Anchor I-Beam shortened and supported.*

3. Working Platform

To use the framing adjacent to the entrance of the tank as a work platform, our recommendation was to install four horizontal beams prior to installing floor sheathing. The proposed beams would match the existing beam sizes. The platform condition and the recommendations are shown in Image #6 below.



Image# 6: *Showing Tank #20 Work Platform and new beam installation recommendation .*

This report does not address portions of the structure other than those areas mentioned, nor does it provide any warranty either expressed or implied for any portion of the existing structure. If there are any comments or questions on any item above, please do not hesitate in calling.

Sincerely,

Hawaii Engineering Group, Inc.

Ather R. Dar, P.E.
President

Attachment C

T-min Calculations
Provided by; Enterprise Engineering Inc.

P. O. Box 700217 • Kapolei, HI 96709-0217 • Tel: (808) 682-1667 • Fax: (808) 682-1834 • E-Mail: E I Hawaii@aol.com

Ken McNamara

From: Chun, Wilfred [wilfred.chun@shawgrp.com]

Sent: Tuesday, April 22, 2008 5:09 PM

To: Pang, Incheol (NFESC)

Cc: Dygart, Aaron; Phillips, David; Weese, Todd; kenm.eihawaii@hawaiiantel.net; Barry.eihawaii@hawaiiantel.net; l.mcdougal@testex-ndt.com; Steve Brooks; Steve DiGregorio

Subject: FW: Red Hill Tank 2 and 20 Tmin Calculation

Incheol – Forwarded for your info and use.

Rgds,

Wilfred Chun, P.E.
Project Manager
Shaw Environmental & Infrastructure, Inc.
590 B Paiea St.
Honolulu, HI 96819-1835
808.840-2015 direct
808.388-6878 cell
808.839-0339 fax
wilfred.chun@shawgrp.com

From: Stephen J. DiGregorio [mailto:sjd@eeiteam.com]
Sent: Tuesday, April 22, 2008 2:06 PM
To: Chun, Wilfred
Cc: Weese, Todd; Dygart, Aaron; Phillips, David; Steve Brooks; Stacy Kaplan-McMillan
Subject: Red Hill Tank 2 and 20 Tmin Calculation

Wilfred,

My responses to Incheol's comments are provided below. Due to the uncertainty in calculating corrosion rates, applying a factor of safety to Tmin has merit. You will see in the calculations and recommendations that follow, I have recommended a revised Tmin = 0.170 inches. I will revise EEI's formal Steel Liner Plate Minimum Thickness Assessment to reflect the new Tmin calculations and recommendations.

EEI Response to Comments

1. It is not possible calculate an actual corrosion rate for the Red Hill Tanks because the time interval during which corrosion occurred is unknown and can not be determined. Depending on the time interval that is assumed, the corrosion rate can be higher or lower compared to the actual corrosion rate. Additionally, it is possible that conditions causing external corrosion can change over time. Available record drawings indicate the rock face of the barrel of the tanks is lined with gunite and coated with either asphalt paint or "red dirt" paint; and that the space between the gunite lining and the steel liner plates is filled with reinforced concrete. It is known that cracks or other conditions have developed in the gunite or reinforced concrete allowing water to migrate to the steel liner plates and corrode steel liner plates that previously had no indication of external corrosion. This has been going on probably for the entire life of the tank, so it is not new.
2. The rock stratum surrounding the Red Hill tanks varies in type and porosity, thus the water content and corrosivity of the rock can vary from one location to another. Because of these highly variable conditions, selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank. It is possible that more severe corrosion could exist at areas that are not measured.
3. EEI's calculation of the external corrosion rate (0.001744 inches per year) and Tmin =0.140 inches follows the procedure outlined in API 653 section 4.4.7.1, which assumes a linear (i.e. constant) corrosion rate based on the age of the tank. For Tanks 2 and 20, the external corrosion rate was calculated based on the age of

the tank in 20-years (i.e. 86 years old in 2028). EEI acknowledges that this calculated corrosion rate is not based on thickness data of the steel liner plates; however as stated above, selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank. On the other hand, there may not be any location on the tank that would have a more aggressive corrosion rate than that determined by our method of calculation, unless there has been a drastic change in conditions. Should areas be present that have a higher corrosion rate than our calculated corrosion rate, the remaining thickness will have a Tmin less than 0.140 inches and would be repaired.

4. EEI has not established a 20-year interval until the next inspection. A 20-year interval was used to calculate Tmin. A shorter interval until the next inspection could be used.

Summary and Conclusions

1. It is not possible calculate an actual corrosion rate for the Red Hill Tanks because the time interval during which corrosion occurred is unknown and can not be determined.
2. Selecting areas of the steel liner and measuring the remaining thickness to determine actual corrosion rates would not necessarily be representative of external corrosion conditions throughout the tank because the rock stratum surrounding the Red Hill tanks varies in type and porosity.
3. EEI's calculated Tmin = 0.140 inches is based on the age of the tank in 20-years (i.e. 86 years old in 2028). As stated in EEI's Steel Liner Plate Thickness Assessment, a Tmin = 0.140 inches has no safety factor. If a more conservative approach is desired, a shorter interval until the next inspection (i.e. 10 years) or Tmin based on higher external corrosion rate or both could be used. Given the uncertainty in calculating a corrosion rate, using factor of safety for Tmin has merit.

Recommendations

1. As it is not possible to establish actual corrosion rates, a factory of safety applied to the previously recommended Tmin = 0.140 inches may have merit. Considering the guidance of API 570, which uses twice the corrosion rate in any remaining life, or pressure capability calculations, the new Tmin, at twice the corrosion rate, would be 0.170 inches. This new Tmin takes into consideration the uncertainty of calculating a corrosion rate and the potential for internal corrosion given the reported condition of the interior coating.
2. EEI, therefore recommends Tmin = 0.170" be used as the criteria for determining whether thin and pitted areas in the 1/4-inch thick steel liner plates in the, barrel, and lower dome require repair.
3. Tmin = 0.170 inches does not apply to the 1/2-inch thick floor (base plate) of the lower dome.
4. As the steel liner plates are not structural elements and should not be relied upon as a structural element to resist hoop and tensile stresses in the barrel and lower dome or compressive stress in the upper dome, consult EEI when voids are found behind liner plates.

Revised Tmin Calculations

Following the guidance of API 570 which uses twice the corrosion rate in any remaining life, or pressure capability calculations, a revised corrosion rate and Tmin is calculated as follows:

Parameters

- Original Thickness of Liner Plates: 0.250"
- Remaining Thickness at the Next Inspection: 0.10" based on the tank having no means to contain a leak
- Interval until the Next Inspection: 20 years maximum
- Year Tank Constructed: 1942

Revised Corrosion Rate and Minimum Thickness

For a 20-year service interval starting in 2008, the next inspection would be in 2028. Using the API 653 straight-line method of calculating corrosion rates and a 0.10" remaining thickness at the next inspection in 2028, the external corrosion rate is as follows:

Maximum permissible metal loss = 0.250" – 0.10" = 0.150"
Age of tank in 2028 = 2028 - 1942 = 86 years

Considering the 0.150" of metal loss occurs over the life of the tank, the external corrosion rate is:

External corrosion rate = 0.150" / 86 years = 0.001744 in / year

Following the guidance of API 570, using 2 times the corrosion rate results in a Tmin = 0.170 inches as follows:

Two times corrosion rate = (2) (0.001744 in / yr) = 0.003488 in /yr

A two times the corrosion rate, the metal loss that is expected to occur during the next 20 years is:

Metal loss during next 20 years = (0.003488 in / year) (20 years) = 0.0.70"

The minimum thickness required in 2008 to have 0.1" remaining thickness in 2028 at twice the corrosion rate of 0.001744 in / yr is:

Tmin = 0.070" + 0.100" = 0.170"

Steve

Stephen J. DiGregorio, P.E.
Chief Civil / Structural Engineer
Enterprise Engineering, Inc.
5 Depot Street
Freeport, ME 04032
TEL: (207) 869-8006

Original Message-----
From: Chun, Wilfred [mailto:wilfred.chun@shawgrp.com]
Sent: Thursday, April 17, 2008 1:08 PM
To: Steve DiGregorio ; Steve Brooks
Cc: Weese, Todd; Dygart, Aaron; Phillips, David
Subject: FW: Red Hill Tank 2 and Tmin Calculations

Steve - Request comment on Incheol's Tmin of 0.14 based on coating inspection below and serviceable for next 20 years.

Thks,

Wilfred Chun, P.E.
Project Manager
Shaw Environmental & Infrastructure, Inc.
590 B Paiea St.
Honolulu, HI 96819-1835
808.840-2015 direct
808.388-6878 cell
808.839-0339 fax
wilfred.chun@shawgrp.com

-----Original Message-----
From: [redacted]
Sent: Wednesday, April 16, 2008 4:15 PM
To: Chun, Wilfred; Dygart, Aaron; Weese, Todd; Phillips, David
Cc: [redacted]
Subject: RE: Red Hill Tank 2 and Tmin Calculations

Wilfred and Todd,

Thanks for forwarding the EEI's Tmin calculation for Tank 2 & 20. What does Shaw propose on this?

Here is my thoughts. Now EEI recommends 0.14" as minimum plate thickness based on two facts; 1/4" original plate & corrosion rate based on 0.1" minimum remaining thickness at the end of year 2028. I can understand how Stephen calculates Tmin for 20 year inspection cycle. However, here is my questions for this calculation and Tmin. The same question that I had on Tank 1405 (Tank 54) inspection interval. In normal API 653 inspection, a corrosion rate is established, and remaining life gets calculated to determine the next inspection date. On this calculation, Stephen established 20 year cycle, and calculate the corrosion rate. I guess it would be ok for 20 year long stand point. However, this would not give you a truly or close to real 'established corrosion rate'. Can this method be considered proper way to establish corrosion rate? This is exactly why I asked Shaw as part of Work Plan comments to justify 0.19" as Tmin for the inspection.

Also, Stephen assumed internal coating is serviceable for next 20 years as well to use 0.14" as Tmin. Recent coating inspection of Tank 2 by NAVFAC coating expert revealed that the existing coating was applied without any proper surface preparation in the 80's. And the current condition shows delaminating at substantial area of the interior. Under the consideration of tank age and condition, the coating expert recommended no coating repair. Repair attempt would do more harm than good. The bottom dome would be recoated after tank inspection, but no coating repair is considered on any part of the shell or upper dome area. If this information would make this calculation any different, please let Stephen know and recalculate Tmin based on current coating condition.

v/r,

[redacted]
805-331-2148

-----Original Message-----
From: Chun, Wilfred [mailto:wilfred.chun@shawgrp.com]
Sent: Wednesday, April 16, 2008 11:16
To: Pang, Incheol (NFESC); kenm.eihawaii@hawaiiantel.net
Cc: Barry.eihawaii@hawaiiantel.net; Dygart, Aaron; l.mcdougal@testex-ndt.com; Weese, Todd
Subject: FW: Red Hill Tank 2 and Tmin Calculations

Incheol - Attached is the Tmin by Enterprise.

Thks,

Wilfred Chun, P.E.

Project Manager

Shaw Environmental & Infrastructure, Inc.

590 B Paiea St.

Honolulu, HI 96819-1835

808.840-2015 direct

808.388-6878 cell

808.839-0339 fax

wilfred.chun@shawgrp.com

From: Stephen J. DiGregorio [mailto:sjd@eeiteam.com]
Sent: Wednesday, April 16, 2008 7:52 AM
To: Chun, Wilfred
Cc: Weese, Todd; Steve Brooks; Stacy Kaplan-McMillan
Subject: Red Hill Tank 2 and Tmin Calculations

Wilfred,

Enclosed are my calculations of Tmin for Red Hill Tanks 2 and 20. Let me know if you or the government have questions.

Steve

Stephen J. DiGregorio, P.E.

Chief Civil / Structural Engineer

Enterprise Engineering, Inc.

5 Depot Street

Freeport, ME 04032

TEL: (207) 869-8006

RED HILL TANKS 2 AND 20
FISC PEARL HARBOR, HAWAII

Steel Liner Plate Minimum Thickness Assessment
April 15, 2008

EEI Project No. 08-4895

GENERAL

Shaw is providing cleaning, inspection, and repair services for Tanks 2 and 20 at FISC Pearl Harbor Red Hill, Hawaii. Shaw has requested Enterprise Engineering, Inc. (EEI) calculate corrosion rates and the minimum thickness of the steel liner plates which will be used as the criteria for determining the need for repair based on a 20-year interval until the next inspection.

Record drawings of the Red Hill tanks indicate the steel liner plates in the upper dome, barrel, and lower dome in all of the tanks are 1/4" thick plate nominal. The floor (referred to as "base plate" on record drawings) of the lower dome in all of the tanks is indicated as 1/2" thick plate. This document prepared by EEI provides a calculation of corrosion rates and minimum required thickness of the 1/4" thick steel liner plates. This minimum thickness will serve as the criteria for determining the need to repair thin areas and pits for another 20-year interval until the next inspection.

RECOMMENDED REPAIR CRITERIA: STEEL LINER MINIMUM THICKNESS

It is reported that a Tmin of 0.19 inches was used on previous projects at Red Hill. EEI is not able to determine how this value was established. EEI recommends the following:

1. A minimum thickness (Tmin) of 0.140 inches be used as the criteria for determining whether thin and pitted areas in the 1/4-inch thick steel liner plates in the, barrel, and lower dome require repair. The upper dome area, with increased potential for atmospheric corrosion on the inside, can also use this Tmin criteria of 0.140 inches if it is determined the coating system is sound, there is no present internal corrosion, and the coating system has a remaining life of 20 years. Note: the Tmin value of 0.140 inches does not include any safety factor that the thickness of the steel liner plates will not be less than a minimum thickness of 0.10 inches at the end of another 20-year service interval. The justification for not using a safety factor is:

    a. API 653 does not use a safety factor.

    b. Tmin is based on a constant rate of corrosion (i.e. corrosion is assumed to not vary over time). Using a constant rate of corrosion is in accordance with API 653 and is considered

conservative in that corrosion rates generally decrease over time unless conditions change.

c. A safety factor could be added to Tmin; however, this will involve more repairs and is not justified unless desired by the government or conditions are found indicating corrosion rates are higher than calculated.

2. Repair thin and pitted areas in the 1/4-inch thick steel liner plates in the upper dome, barrel, and lower dome having a minimum thickness (Tmin) less than 0.140 inches. Areas having Tmin equal to or greater than 0.140 inches do not require repair for a 20-year interval until the next inspection.

3. Tmin = 0.140 inches does not apply to the floor (base plate) of the lower dome.

4. EEI also calculated Tmin for a 10-year interval until the next inspection and determined Tmin in this case would be 0.120 inches. EEI can evaluate this alternative if desired.

5. Using Tmin = 0.140 inches as determined for 20-year interval until the next inspection and applying this criteria for a 10-year interval is an option as it is conservative and provides a factor of safety.

COMMENTS AND CLARIFICATIONS

EEI's calculation of Tmin is based on the following:

1. A 20-year interval until the next inspection in 2028 as indicated in Shaw's Work Plan.

2. An original plate thickness of 0.250 inches. Our calculation of Tmin does not take into account the original thickness of the plates may be thinner due to plate fabrication tolerances or other conditions. EEI recommends Shaw's inspector obtain ultrasonic thickness measurements of each plate (6 measurements minimum per plate). Submit for EEI review and assessment thickness measurements of plates having an average thickness less than 0.240". The 0.240 thickness is the ASTM A 6/A6M minimum thickness tolerance for 1/4-inch thick plates.

3. The rate of external corrosion was calculated using the API 653 straight line method and assuming metal loss occurring over the life of the tank (86 years) from tank construction in 1942 to the next inspection in 2028. The calculated rate of external corrosion does not take into consideration potential areas of concentrated corrosion caused by artifacts, welding rods, debris, rocks, microbial induced corrosion (MIC) in the form of small "worm-like" corrosion trails, or other conditions on the exterior of the liner plates the would cause concentrated corrosion. If these conditions are found, contact EEI for interpretation.

4. The rate of external corrosion and Tmin does not apply to the heat-affect zone of liner plates adjacent to welds (within 1 inch of the weld). As the corrosion rate in the heat-affected zone can be higher than areas outside the heat-affected zone, a higher Tmin value may be needed for the heat-affected zone. Information on plate thickness in the heat affected zone is needed to determine corrosion rates and Tmin of the heat affected zones of the steel liner plates. EEI

recommends Shaw's inspector obtain ultrasonic thickness measurements in the heat-affected zone in random areas in each quadrant of the upper dome, barrel, and lower dome for EEI assessment. Given the large quantity of welds in the liner plate joints, EEI recommends 20 UT thickness measurements be obtained in the heat-affected zones in each quadrant. Additional UT measurements may necessary if results are not consistent. Additionally, EEI recommends that we be notified when the remaining thickness in the heat-affected zone is less than 0.200 inches as additional assessment may be necessary.

5. The corrosion rate of product side corrosion is assumed to be 0.00 inches per year. This assumption is only valid if the existing interior coating is in serviceable condition and its service life is equal to or greater than the 20-year interval until the next inspection. If the interior coating is not expected to last another 20 years, product side corrosion may occur and thus the Tmin will need to be recalculated and increased. It should be noted that product side corrosion is not of concern when the tank is filled as areas are covered by product except at a water bottom in the lower dome. The 0.00 inches per year product side corrosion rate also does not take into consideration potential atmospheric corrosion of the steel liner plates if the coating is failing and not repaired and liner plates are exposed to atmosphere. Additional information is needed on the condition of the interior coating and whether atmospheric corrosion is present. This additional information may result in a greater Tmin of the upper dome, where atmospheric corrosion, and or degraded coatings is present.

6. A minimum thickness of 0.10 inches at the next inspection is used in the calculation of Tmin. A 0.10 inch minimum thickness is used as the steel liner plates are a hydraulic barrier and are not relied upon as a structural element to resist hoop and tensile stresses in the barrel and lower dome or compressive stress in the upper dome. The 0.10-inch criteria is similar to API 653 criteria for tank floors that have no means for containment of a leak.

7. As the steel liner plates are not structural elements and should not be relied upon as a structural element to resist hoop and tensile stresses in the barrel and lower dome or compressive stress in the upper dome, consult EEI when voids are found behind liner plates.

8. Our calculation of Tmin does not include any safety factor. A safety factor could be added to Tmin; however, this will involve more repairs and is not justified unless desired by the government or conditions are found indicating corrosion rates are higher than calculated.

9. Consult EEI when areas of thinning or pitting are found that exceed 12" in diameter.

CALCULATIONS

Parameters

- Original Thickness of Liner Plates: 0.250"
- Remaining Thickness at the Next Inspection: 0.10" based on the tank having no means to contain a leak
- Interval until the Next Inspection: 20 years maximum
- Year Tank Constructed: 1942
- Product Side Corrosion Rate: Assumed to be 0.00" per year based on the tank interior being coated and the life of the coating expected to exceed the interval until the next inspection

Corrosion Rate and Minimum Thickness

For a 20-year service interval starting in 2008, the next inspection would be in 2028. Using the API 653 straight-line method of calculating corrosion rates and a 0.10" remaining thickness at the next inspection in 2028, the external corrosion rate is as follows:

Maximum permissible metal loss = 0.250" – 0.10" = 0.150"
Age of tank in 2028 = 2028 - 1942 = 86 years

Considering the 0.150" of metal loss occurs over the life of the tank, the external corrosion rate is:

External corrosion rate = 0.150" / 86 years = 0.001744 in / year

Using this external corrosion rate, the expected metal loss that would have occurred thus far, (1942 to 2008) is:

Number of years from 1942 to 2008 = 66 years
Metal loss over 66 years = (0.001744 in / year) (66 years) = 0.115"

The minimum thickness required in 2008 to have 0.1" remaining thickness in 2028 at a corrosion rate of 0.001744 in / year is:

Tmin = 0.250" – 0.115" = 0.135"

Thus if Tmin = 0.135" in 2008; using an external corrosion rate of 0.001744" / year, the remaining thickness in 20 years (2028) is:

Metal loss occurring over the next 20 years = (0.001744" / yr) (20 years) = 0.035"
Remaining thickness at the end of the next 20 years = 0.135" – 0.035" = 0.10"
Use Tmin = 0.140" (0.135" rounded to 0.140")

Prepared by:

Stephen DiGregorio

Stephen J. DiGregorio, P.E.
Chief Structural Engineer
ANSI/API 653 Certified Aboveground Tank Inspector, Certificate No. 1113

Attachment D

Report: TesTex Data and Mapping

TesTex

STATE OF THE ART PRODUCTS & SERVICES
FOR NON-DESTRUCTIVE TESTING

LOW FREQUENCY ELECTROMAGNETIC TECHNIQUE

INSPECTION REPORT

OF

TANK #20

AT

RED HILL

IN

HONOLULU, HI

BY

TESTEX, INC.

DATE TESTED: SEPTEMBER 8, 2008 – OCTOBER 24, 2008

AUTHOR: LARRY MCDOUGAL

REVIEWED: PETE BERNARDING

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Tel: 082-289-6770
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INDIA
Tel: 91-22-55978015
Fax: 91-22-25510788

UNITED KINGDOM
Tel: 1469-541586
Fax: 1469-541587

TABLE OF CONTENTS

1.0 RESULTS AND CONCLUSIONS
Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

INTRODUCTION

An NDT inspection was conducted on Tank #20 at Red Hill in Honolulu, HI on September 8th – October 24th, 2008. This inspection focused on 100% testing of the Floor, Lower Dome, Barrel, Extension, and Upper Dome areas. The inspection was performed with the TesTex developed ***TS-2000 NDT Multi-channel System*** (for plate scanning using the principles of the ***Low Frequency Electromagnetic Technique***) and the ***Hawkeye 2000 System*** **(**for weld testing focusing on surface and subsurface cracking and pinholes). All defected areas found with the above-mentioned TesTex equipment were backed up and sized using regular ***Ultrasonic Technique, Ultrasonic Shear wave Technique*** and ***Magnetic Particle Technique***

The ***Ultrasonic Shear wave Technique*** was an additional service used which measured the depth of detected weld defects, provided they were oriented in a position that could be tested. The results of this inspection are detailed in the following report.

RESULTS

In beginning of this inspection (September 8, 2008), TesTex started scanning the floor plates (7 plates totaling 25 ft. in diameter) of tank #20. By end of the first day, surface area scanning was complete on the floor (491 sq ft), and started scanning on course 1 of the lower dome. Day 3 saw the completion of the surface area scanning of course 1 (2,695 sq ft) and the first 3-foot of course 2. Day 4 consisted of scanning of the welds using the Hawkeye on the floor (and around all pipe entry points), course 1, and the first 3 foot of course 2. The first week came to a close with the completion of the floor, course 1 and the beginning of course 2. It is to be mentioned that all scanning to this point could be reached from standing on either the floor or course 1 of the lower dome. In the beginning of the second week (September 15th, 2008), both teams had to set up the boomed baskets with the equipment for both types of scanning (LFET for liner plates and BFET for welds), since accessibility was no longer available from standing on the floor or course 1. Once the setup was complete, work continued on course 2 and was finished in the morning of day 2 (4,573 sq ft). The third day consisted of scanning course 3. This course (5,797 sq ft) was finished using both baskets by the morning of day 4. The rest of day 4 was spent scanning course 4. The third week (September 22nd, 2008) picked back up with course 4 of the lower dome, and saw its completion (5,634 sq ft) by the halfway point of the first day. The second half of the day marked the beginning of barrel scanning. The scans in this section of the tank consisted of 8 ft. wide (the width of the basket) drops from the extension/barrel interface down to the lower dome/barrel interface. Each team averages about 2 drops per day. By the end of the week, approximately 36% of the barrel was completed. The fourth week (September 29th, 2008) continued with Barrel scanning and by the end, the total finished barrel percentage rose to approximately 77%. The fifth week (October 6th, 2008) would begin with the completion of the barrel scanning (41,598 sq ft). By the second day scanning began in the extension area. This continued through the third day and into the afternoon of the fourth. Finishing out the last day of the week, scanning had started for team 2 on course A of the upper dome. Week six (October 13th, 2008) consisted of finishing up the extension (4,712 sq ft) for team 1, and the start of course A by the end of the first day. Team 2 continued on course A, and had moved into course B by the end of the second day. The third day marked the completion of course A (4,437 sq ft) by team 1 and team 2 moving into course C. Team 1finished Course B (4,082 sq ft) and team 2 started course D at the end of the third day. On the last day of the week, team 1 started and finished course C (3,458 sq ft) while team 2 finished course D. The last week of the inspection, week 7 (October 20th, 2008), marked the return of the fifth TesTex person and an ultrasonic technician. The ultrasonic technician began using Magnetic Particle technology on the lower dome/floor interface (this was done in place of Shear wave Technique because the intersection welds were covered with backer plates) and shear wave prove-up on any possible weld defects found in the tank. The first day also saw team 1 completing course D (2,632 sq ft) and team 2 finishing course E. On the second day, team 2 scanned the remaining portions of the lower dome, barrel, and extension under the catwalk. In addition, day two saw team 1 complete course E (1,664 sq ft). Day three was the last day that the two main teams worked in the tank. Team 1 scanned course F (491 sq ft) using ultrasonic trolleys while team 2 worked in the lower tunnel on U.T. spot checks inside of the 32-inch and 18-inch lines. These spot checks were done on the 32-inch line from the inside and consisted of a group of 8 circumferential readings taken every 1-foot across the approximate 40-foot span. The 18-inch line was too small to access internally, so readings could only be taken at 8 and 18 inches from the end. In addition, the inside of the manway was scanned using the LFET scanner. The following two days (October 23rd and 24th, 2008) were used to finish shear wave scans of the remaining possible weld defect locations. All of the gathered data was examined over the weekend, and a preliminary report was given on Sunday October 26th, which outlined all defects found in the tank. This report characterized type, size, location, etc. for each.

In addition to the above-mentioned scanning, all backer strips and associated welds in the upper dome were scanned using the Hawkeye BFET system.

CONCLUSIONS

As a result of this inspection, TesTex found 518 flaw indications most of which were either proved up with ultrasonic thickness measurements or sized using Ultrasonic Shear Wave Technique. All defects including their respective depth or other flaw characterization may be found in Section **4.0**, **PLATE TEST SUMMARY**.

Section **3.0** is **TANK MAPS,** which clarifies the numbering system and tank layout. Section **5.0** shows **typical waveforms** collected from these sections. Printouts of waveforms collected from this unit are included in **APPENDIX A** and are correlated to each plate where the original flaw indication(s) was observed.

2.0 UNIT DETAILS

Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

	Totals
Orientation	**Vertical**
Plate Thickness	
Upper Dome	**0.250”**
Lower Dome	**0.250”**
Barrel	**0.250”**
Floor	**0.500”**
Plate Material	**Carbon Steel**
Total Surface Area of Tank #20	**≈ 84,333 sq ft (plates)**
Upper Dome	**≈ 16,763 sq ft (plates)**
Extension	**≈ 4,712 sq ft (plates)**
Barrel	**≈ 43,668 sq ft (plates)**
Lower Dome	**≈ 19,190 sq ft (plates)**
Total Surface Area and Welds Scanned by TesTex	**≈ 84,333 sq ft (plates)**
	≈ 23,978 linear ft (welds)
Upper Dome	**≈ 16,277 sq ft (plates)**
	≈ 5,579 linear ft (welds)
course A	**≈ 4,437 sq ft (plates)**
	≈ 1,394 linear ft (welds)
course B	**≈ 4,082 sq ft (plates)**
	≈ 1,378 linear ft (welds)
course C	**≈ 3,458 sq ft (plates)**
	≈ 985 linear ft (welds)
course D	**≈ 2,632 sq ft (plates)**
	≈ 932 linear ft (welds)
course E	**≈ 1,664 sq ft (plates)**
	≈ 590 linear ft (welds)
course F	**≈ 491 sq ft (plates)**
	≈ 300 linear ft (welds)
Extension	**≈ 4,712 sq ft (plates)**
	≈ 2,094 linear ft (welds)
Barrel	**≈ 43,668 sq ft (plates)**
	≈ 11,346 linear ft (welds)
Lower Dome	**≈ 19,190 sq ft (plates)**
	≈ 4,959 linear ft (welds)
course 4	**≈ 5,634 sq ft (plates)**

2.0 UNIT DETAILS
Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

	≈ **1,569 linear ft (welds)**
course 3	≈ **5,797 sq ft (plates)**
	≈ **1,208 linear ft (welds)**
course 2	≈ **4,573 sq ft (plates)**
	≈ **1,135 linear ft (welds)**
course 1	≈ **2,695 sq ft (plates)**
	≈ **1,047 linear ft (welds)**
base:	≈ **491 sq ft (plates)**
	≈ **169 linear ft (welds)**

Percent surface area of Tank #2 inspected	≈ **100%**
Surface area of Upper Dome inspected	≈ **100%**
Surface area of Barrel inspected	≈ **100%**
Surface area of Lower Dome inspected	≈ **100%**

Tank Numbering System See **3.0 TANK MAP**

	Totals
Defect distribution	
Tank #20	518
Area	
Upper Dome	188
Extension	128
Barrel	60
Lower Dome	142
Floor	2
Type	
Underside corrosion	71
Through holes	1
Topside (pits gouges)	17
Dents/bulges	18
Weld: LOF/IP	125
Weld: Cracking	1
Weld: Misc. (WP, TW, etc.)	12
Grout Nozzles	273

2.0 UNIT DETAILS

Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

<u>Test Equipment</u>:

Electronics:
TS-2000, 8 Channel Plate Scanner
Hawkeye, Single Channel Pencil Probe Weld Scanner

Hardware:
U.T. Viper (Magnetic manual Crawler)

Ultrasonic Thickness Meter:
DMS-2 Krautkramer (with A-Scan Display)

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

TANK # 20 - QUADRANT A

Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 1
Plate #: 1

Flaw # - Type - Remaining:

#1 -Wall Loss (corner) - 0.236"R
#2 -Wall Loss (corner) - 0.240"R

Tank Section: Lower Dome
Quadrant: A

Course: 1
Plate #: 3

Flaw # - Type - Remaining:

#3 -Wall Loss (corner) - 0.240"R

Drawing is not to scale

TANK # 20 - QUADRANT A

**Nominal Plate Thickness: 0.250"*

Tank Section: Lower Dome
Quadrant: A

Course: 1
Plate #: 4

Flaw # - Type - Remaining:

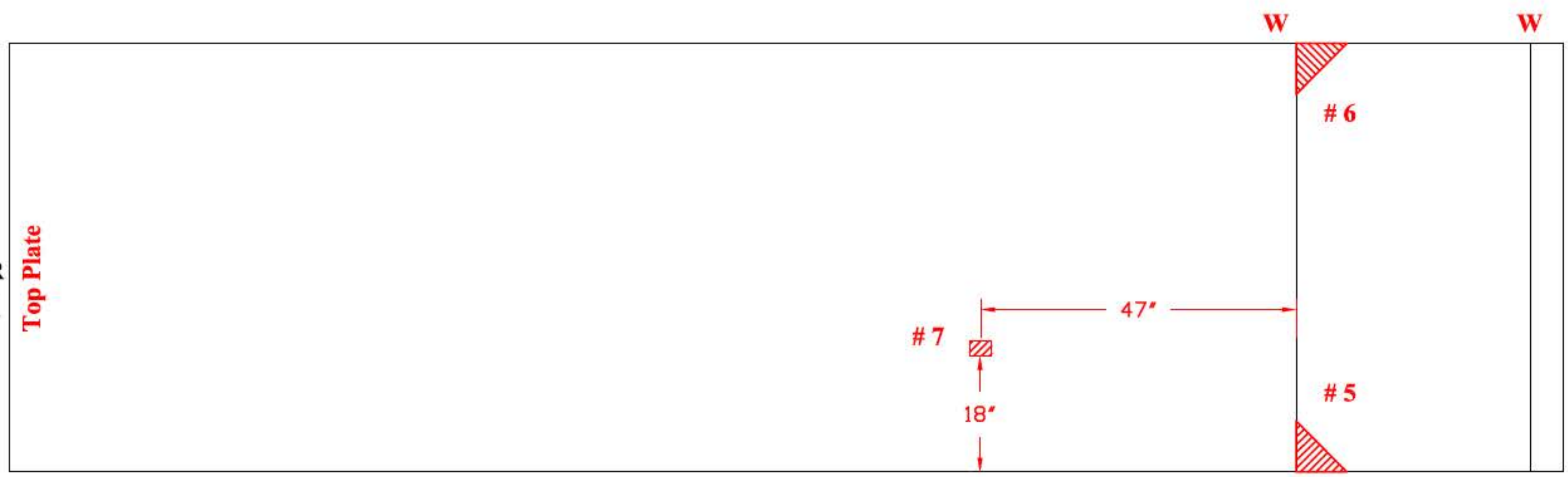
#4 -Wall Loss (corner) - 0.240"R

Tank Section: Lower Dome
Quadrant: A

Course: 1
Plate #: 6

Flaw # - Type - Remaining:

#5 -Wall Loss (corner) - 0.240"R
#6 -Wall Loss (corner) - 0.240"R
#7 -Wall Loss - 0.240"R



Drawing is not to scale

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

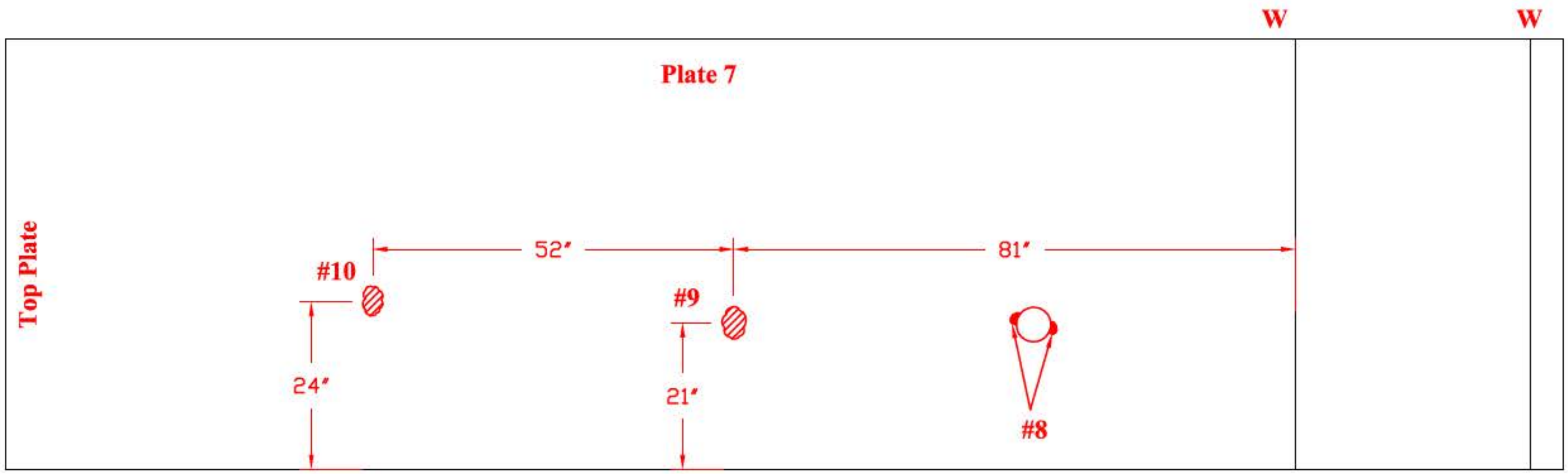
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 1
Plate #: 7

Flaw # - Type - Remaining:

#8 -Wall Loss (around PP) - 0.240"R
#9 -Wall Loss - 0.240"R
#10 -Wall Loss - 0.241"R

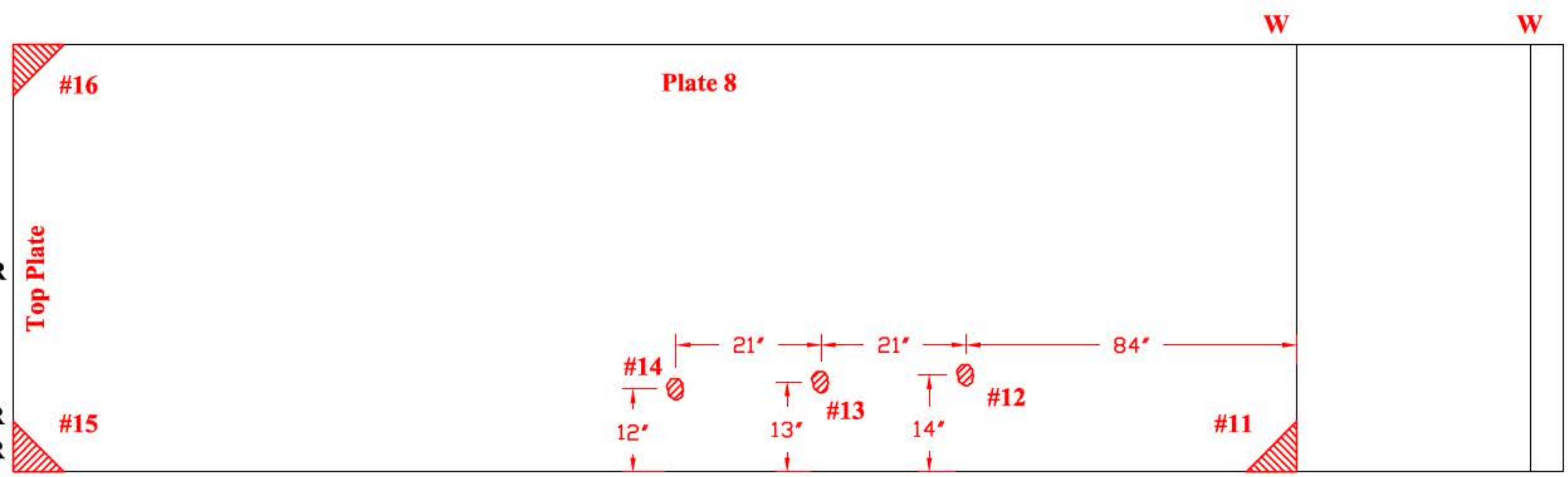


Tank Section: Lower Dome
Quadrant: A

Course: 1
Plate #: 8

Flaw # - Type - Remaining:

#11-Wall Loss (corner) - 0.240"R
#12-Wall Loss - 0.239"R
#13-Wall Loss - 0.241"R
#14-Wall Loss - 0.242"R
#15-Wall Loss(corner) - 0.240"R
#16-Wall Loss(corner) - 0.237"R



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TANK # 20 - QUADRANT A

Nominal Plate Thickness: 0.250"

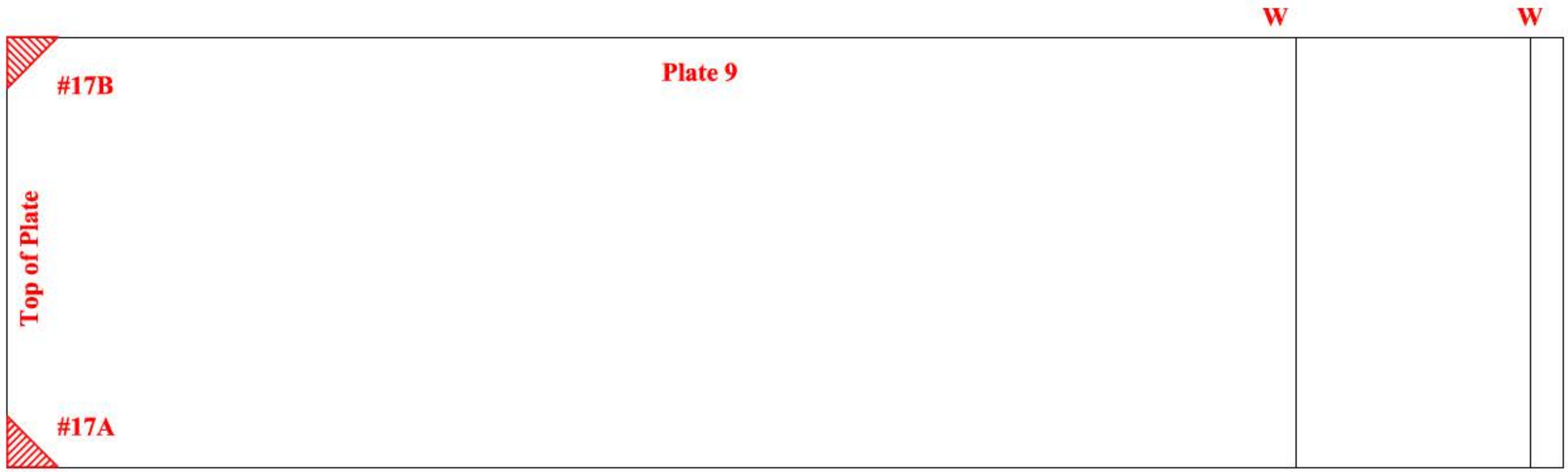
Tank Section: Lower Dome
Quadrant: A

Course: 1
Plate #: 9

Flaw # - Type - Remaining:

#17A -Wall Loss (corner) - 0.237"R

#17B -Wall Loss (corner) - 0.240"R



Tank Section: Lower Dome
Quadrant: A

Course: 1
Plate #: 10

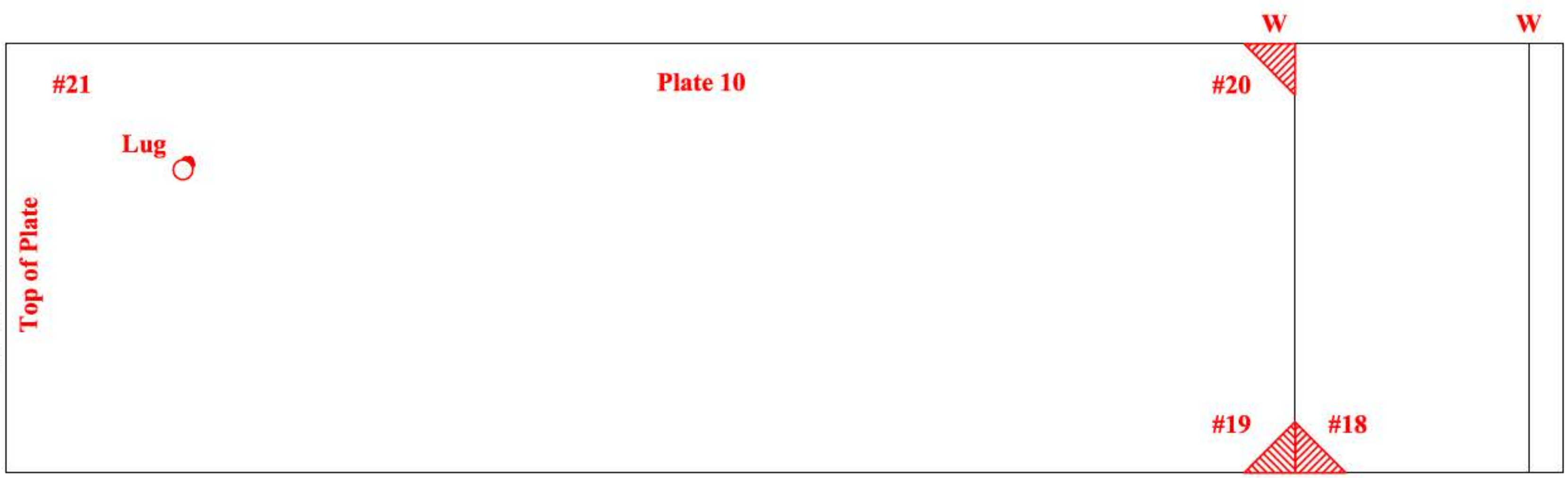
Flaw # - Type - Remaining:

#18-Wall Loss (corner) - 0.238"R

#19-Wall Loss (corner) - 0.240"R

#20-Wall Loss (corner) - 0.240"R

#21-Wall Loss (around lug) - 0.235"R



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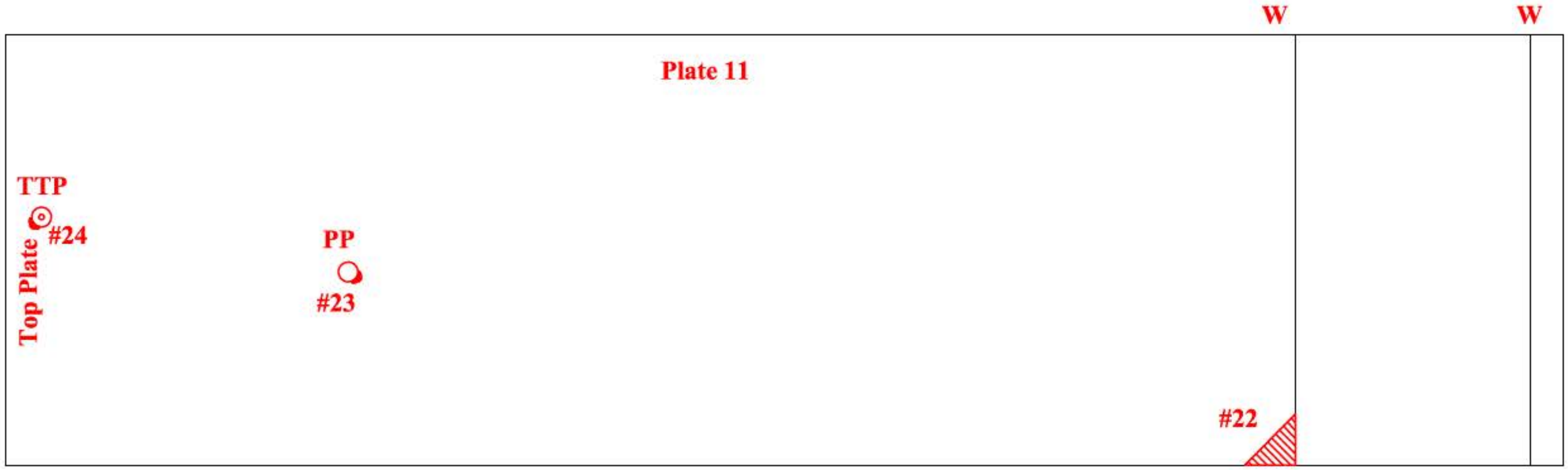
TANK # 20 - QUADRANT A AND B
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 1
Plate #: 11

Flaw # - Type - Remaining:

#22 -Wall Loss (corner) - 0.240"R
#23 -Wall Loss (around PP) - 0.237"R
#24 -Wall Loss (around PP) - 0.237"R



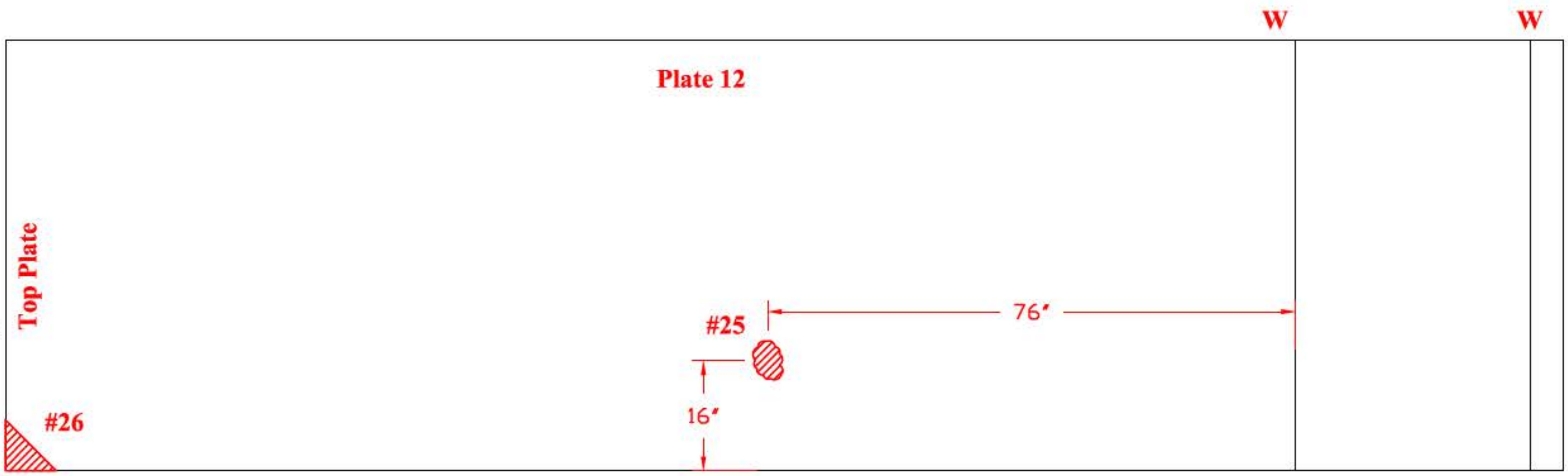
Tank Section: Lower Dome
Quadrant: B

Course: 1
Plate #: 12

Flaw # - Type - Remaining:

#25-Wall Loss - 0.242"R

#26-Wall Loss (corner) - 0.237"R



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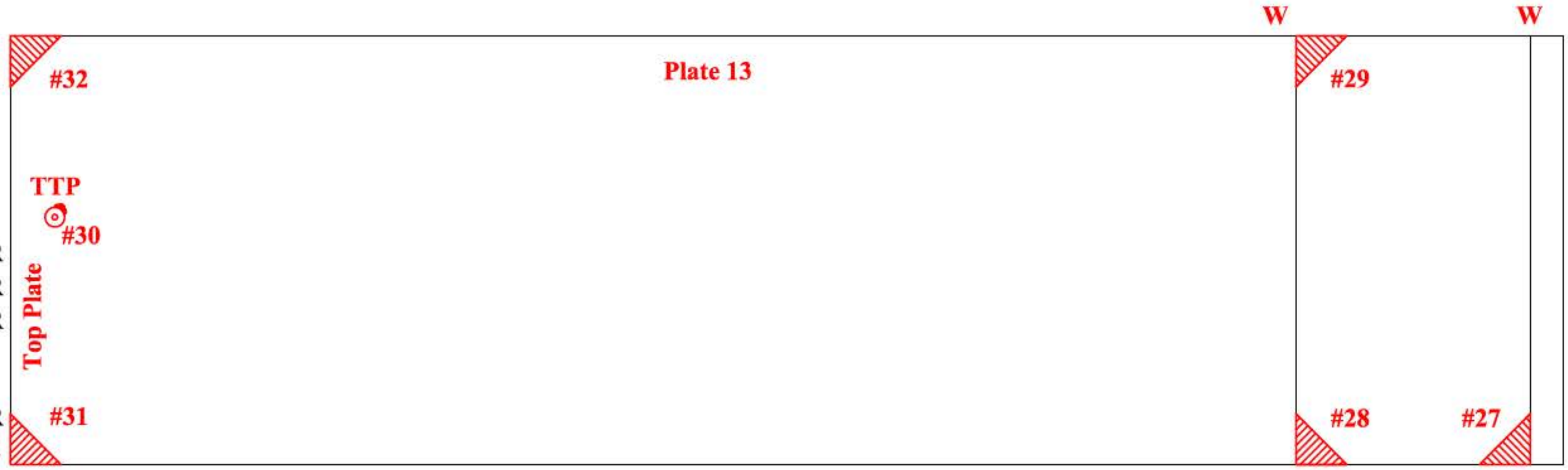
TANK # 20 - QUADRANT B
***Nominal Plate Thickness: 0.250"**

Tank Section: Lower Dome
Quadrant: B

Course: 1
Plate #: 13

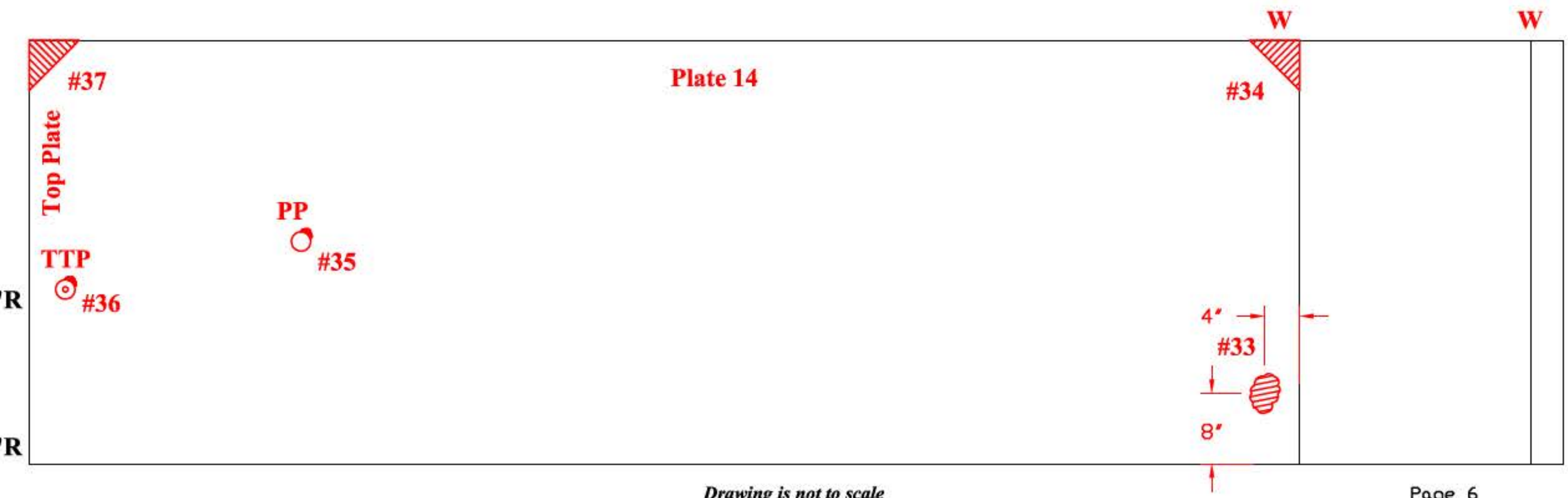
Flaw # - Type - Remaining:
#27-Wall Loss (corner)- 0.234"R
#28-Wall Loss (corner)- 0.228"R
#29-Wall Loss (corner)- 0.240"R
#30-Wall Loss (around PP) - 0.240"R
#31-Wall Loss (corner)- 0.240"R
#32-Wall Loss (corner)- 0.239"R



Tank Section: Lower Dome
Quadrant: B

Course: 1
Plate #: 14
Flaw # - Type - Remaining:

#33-Wall Loss - 0.240"R
#34-Wall Loss (corner)- 0.235"R
#35-Wall Loss (around PP) - 0.239"R
#36-Wall Loss (around PP) - 0.240"R
#37-Wall Loss (corner)- 0.240"R



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TANK # 20 - QUADRANT B

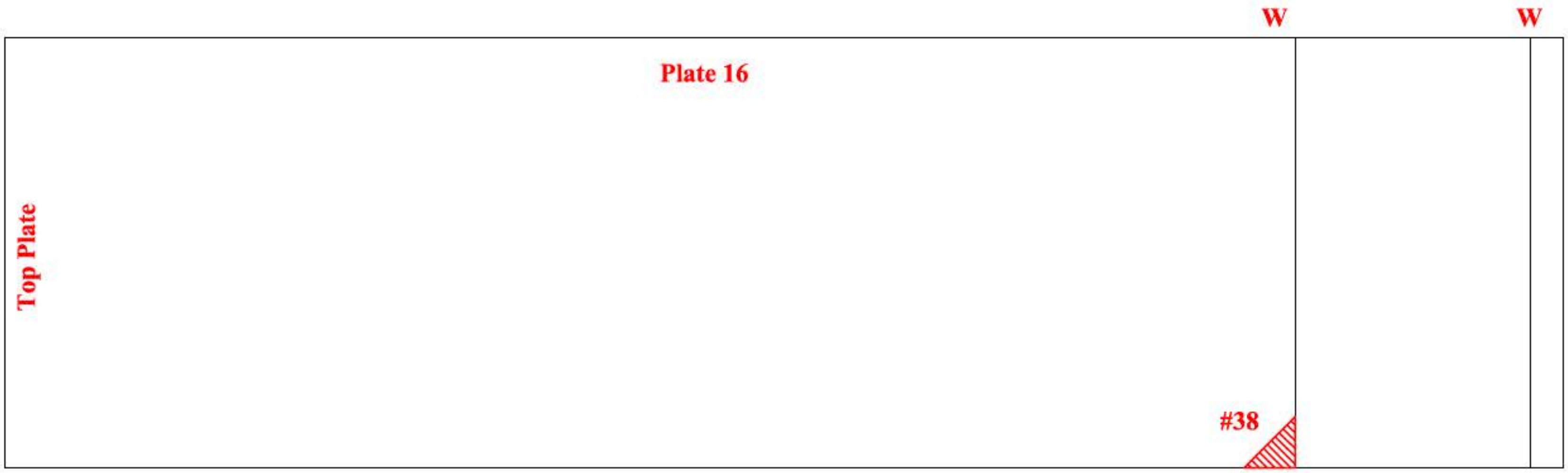
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: B

Course: 1
Plate #: 16

Flaw # - Type - Remaining:

#38-Wall Loss (corner)- 0.240"R

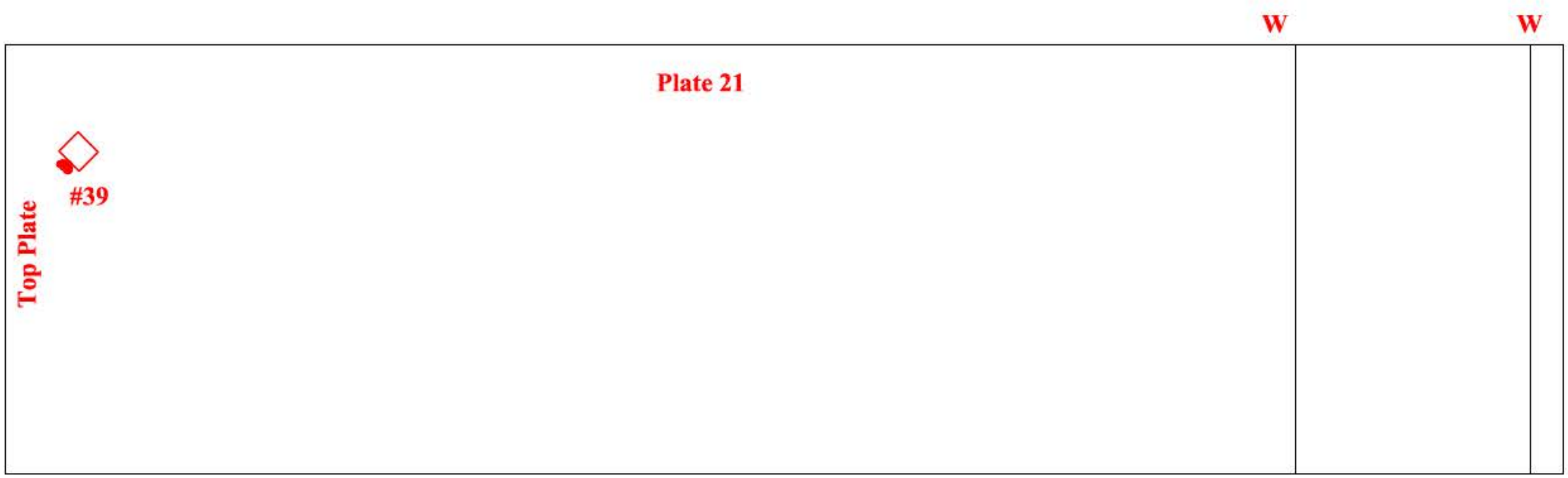


Tank Section: Lower Dome
Quadrant: B

Course: 1
Plate #: 21

Flaw # - Type - Remaining:

#39-Wall Loss
(around diamond plate)
- 0.244"R



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TANK # 20 - QUADRANT C

Nominal Plate Thickness: 0.250"

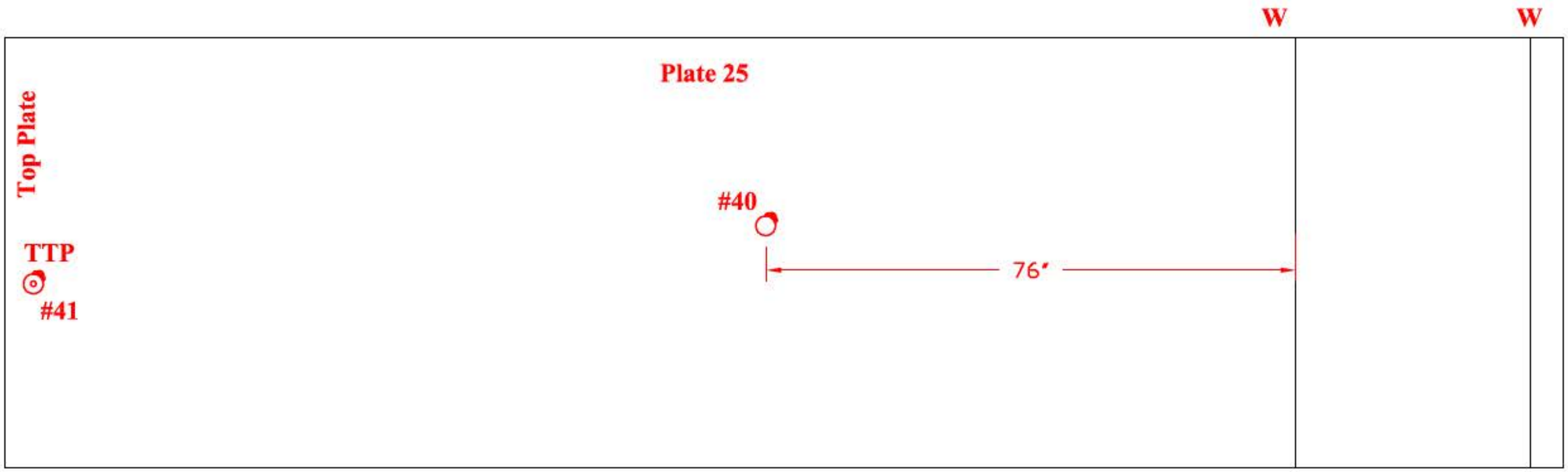
Tank Section: Lower Dome
Quadrant: C

Course: 1
Plate #: 25

Flaw # - Type - Remaining:

#40-Wall Loss (around PP)
- 0.243"R

#41-Wall Loss (around PP)
- 0.241"R

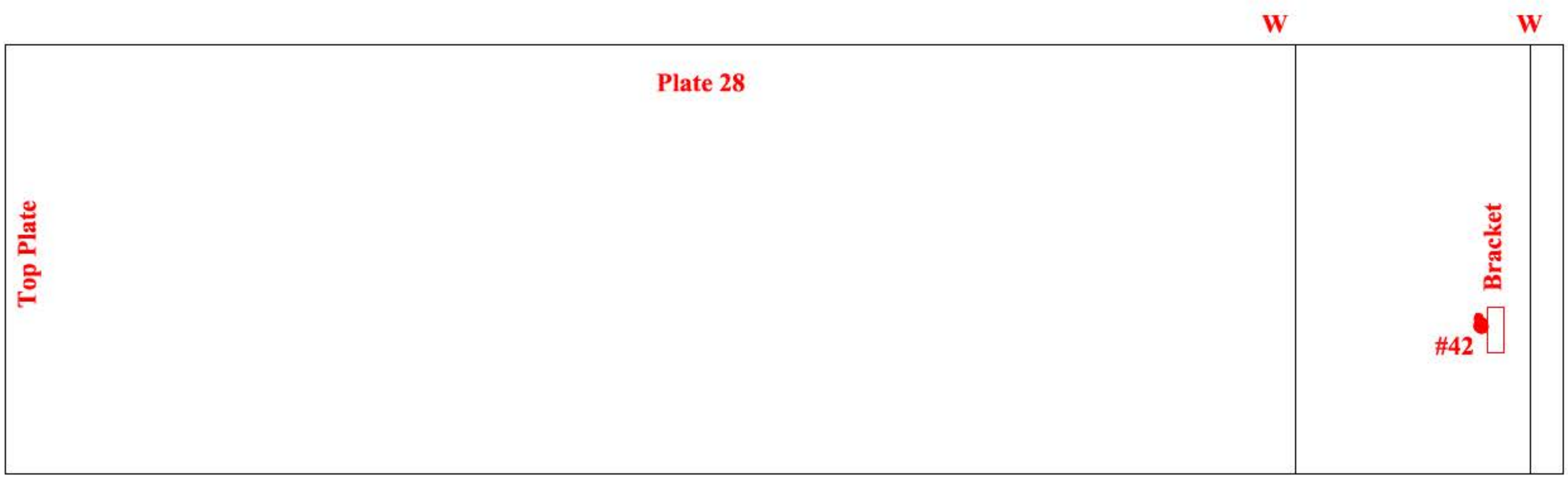


Tank Section: Lower Dome
Quadrant: C

Course: 1
Plate #: 28

Flaw # - Type - Remaining:

#42-Wall Loss (around bracket)
- 0.238"R



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TANK # 20 - QUADRANT C

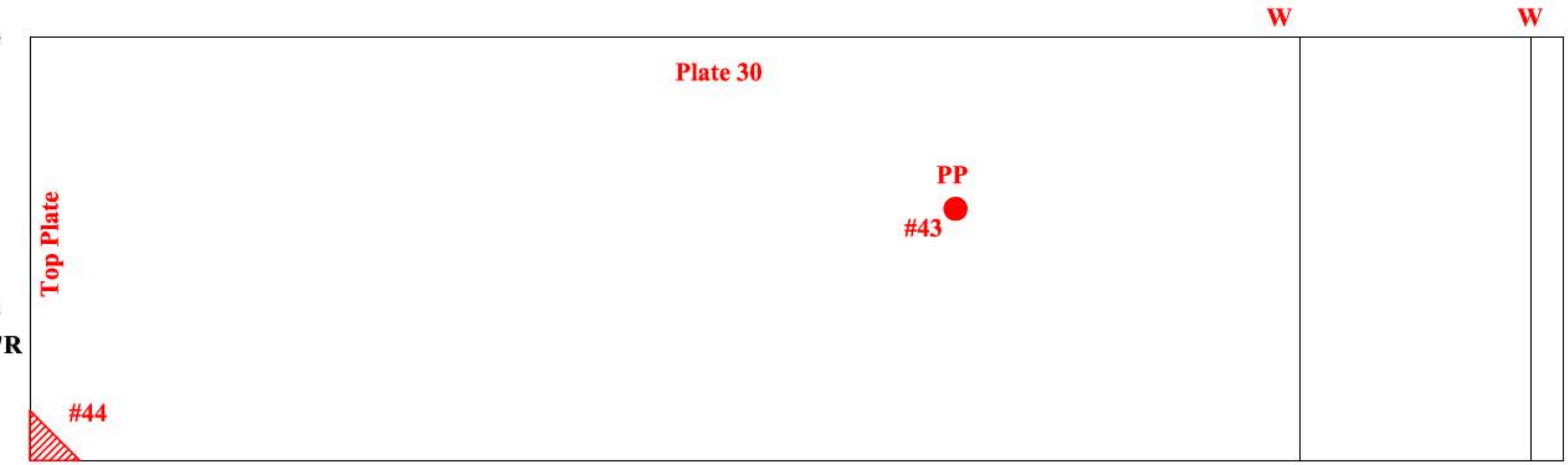
***Nominal Plate Thickness: 0.250"**

Tank Section: Lower Dome
Quadrant: C

Course: 1
Plate #: 30

Flaw # - Type - Remaining:

#43-Wall Loss (PP) - 0.239"R
#44-Wall Loss (corner)- 0.238"R

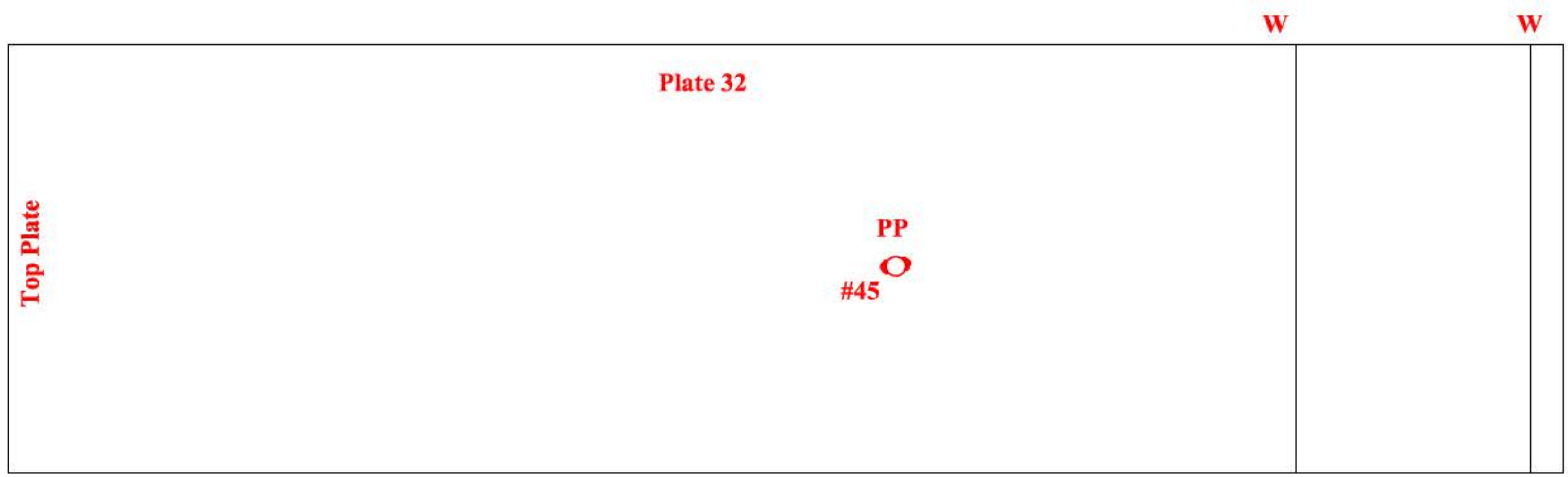


Tank Section: Lower Dome
Quadrant: C

Course: 1
Plate #: 32

Flaw # - Type - Remaining:

#45-Wall Loss (around PP)
- 0.237 - 0.240"R



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TANK # 20 - QUADRANT D

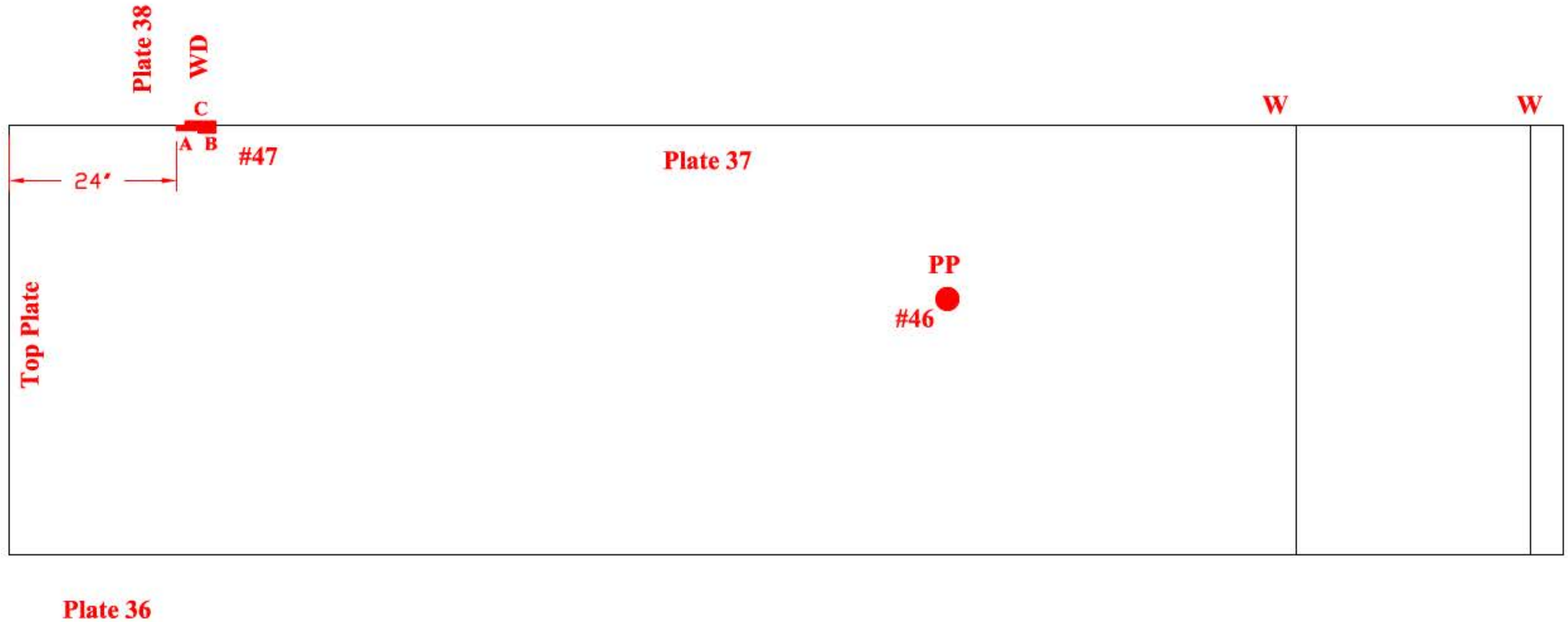
***Nominal Plate Thickness: 0.250"**

Tank Section: Lower Dome
Quadrant: D

Course: 1
Plate #: 37

Flaw # - Type - Remaining:

#46-Wall Loss (PP) - 0.240"R
#47: 1) LOF 0.120" D 6"L
2) LOF 0.189" D 4"L
3) LOF 0.125" D 8.5"L

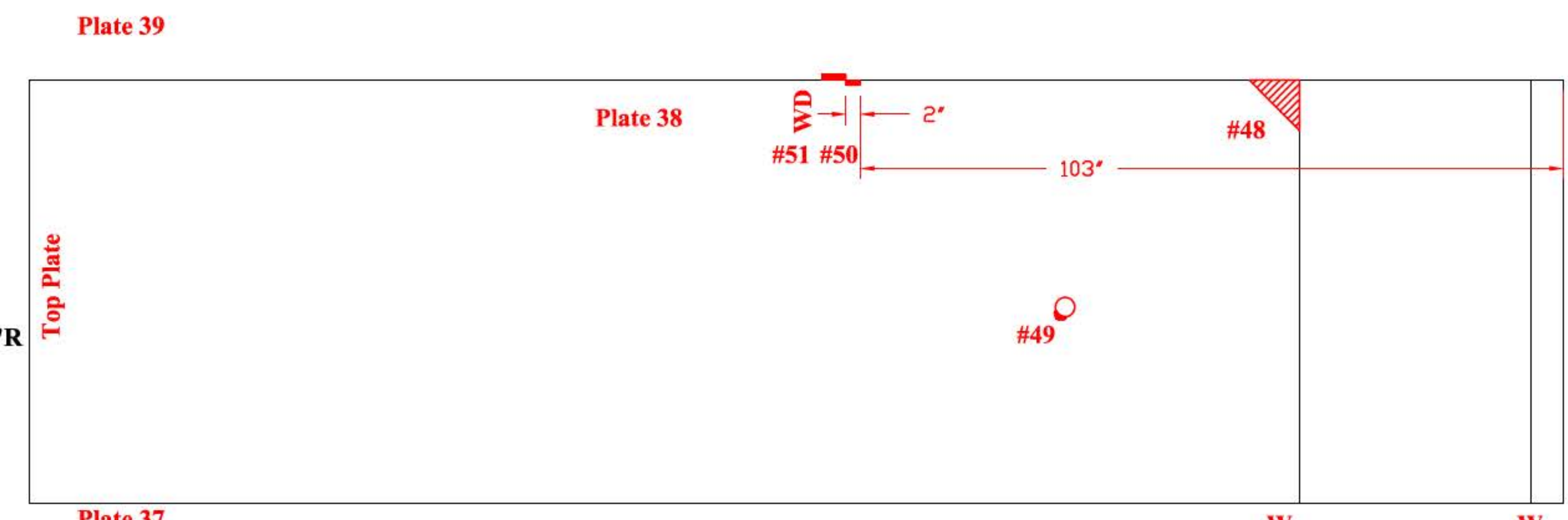


Tank Section: Lower Dome
Quadrant: D

Course: 1
Plate #: 38

Flaw # - Type - Remaining:

#48-Wall Loss (corner) - 0.240"R
#49-Wall Loss (around PP) - 0.237"R
#50- LOF 0.089" D 2"L
#51- LOF 0.118" D 11.5"L



TANK # 20 - QUADRANT D

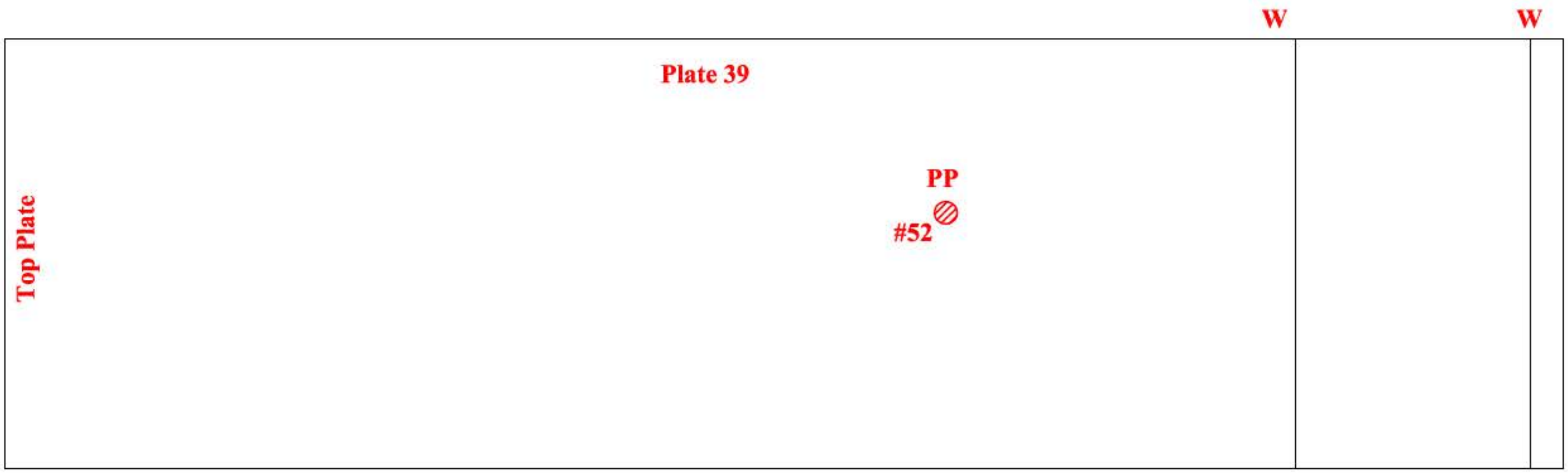
**Nominal Plate Thickness: 0.250"*

Tank Section: Lower Dome
Quadrant: D

Course: 1
Plate #: 39

Flaw # - Type - Remaining:

#52-Wall Loss (PP) - 0.230"R

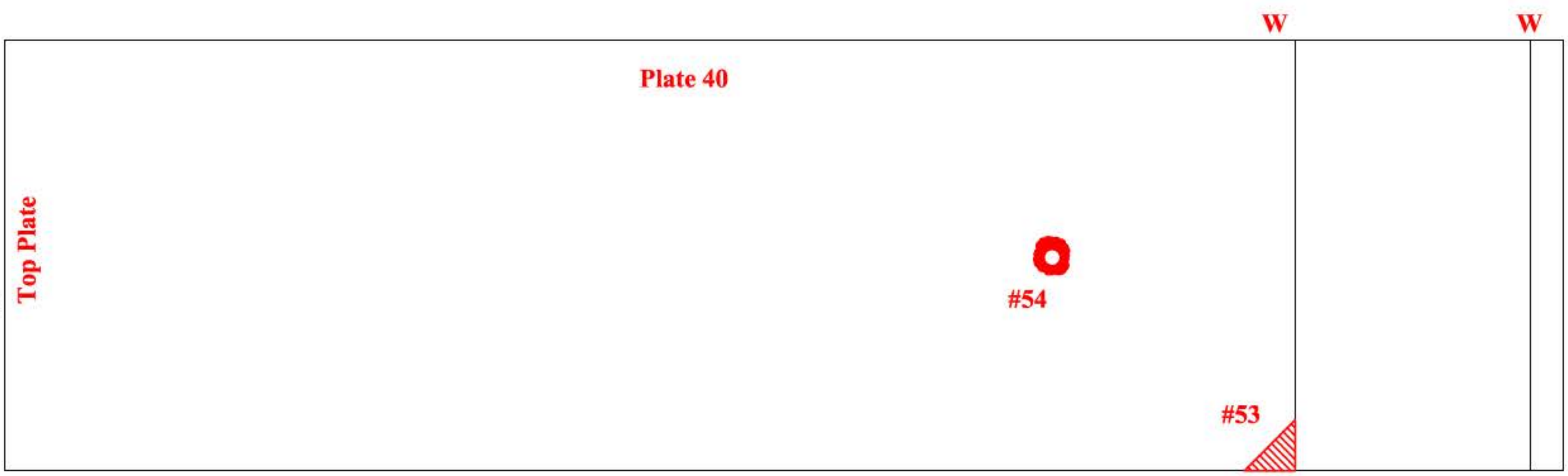


Tank Section: Lower Dome
Quadrant: D

Course: 1
Plate #: 40

Flaw # - Type - Remaining:

#53-Wall Loss (corner) - 0.240"R
#54-Wall Loss (around PP) - 0.238" - 0.240"R



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TANK # 20 - QUADRANT D

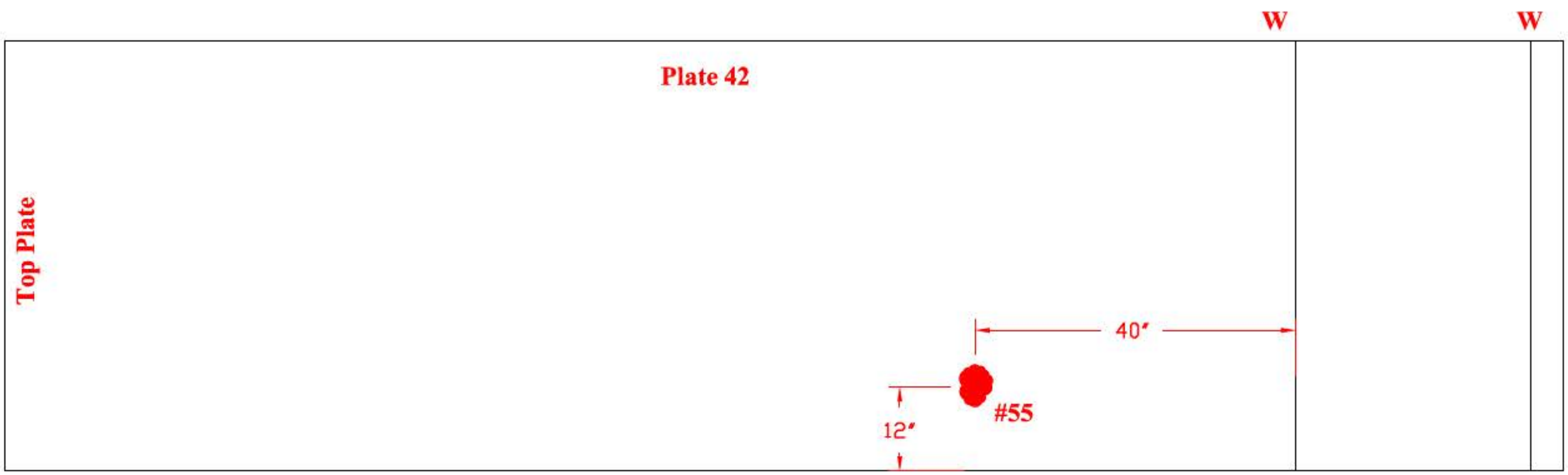
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 1
Plate #: 42

Flaw # - Type - Remaining:

#55-Wall Loss - 0.240"R

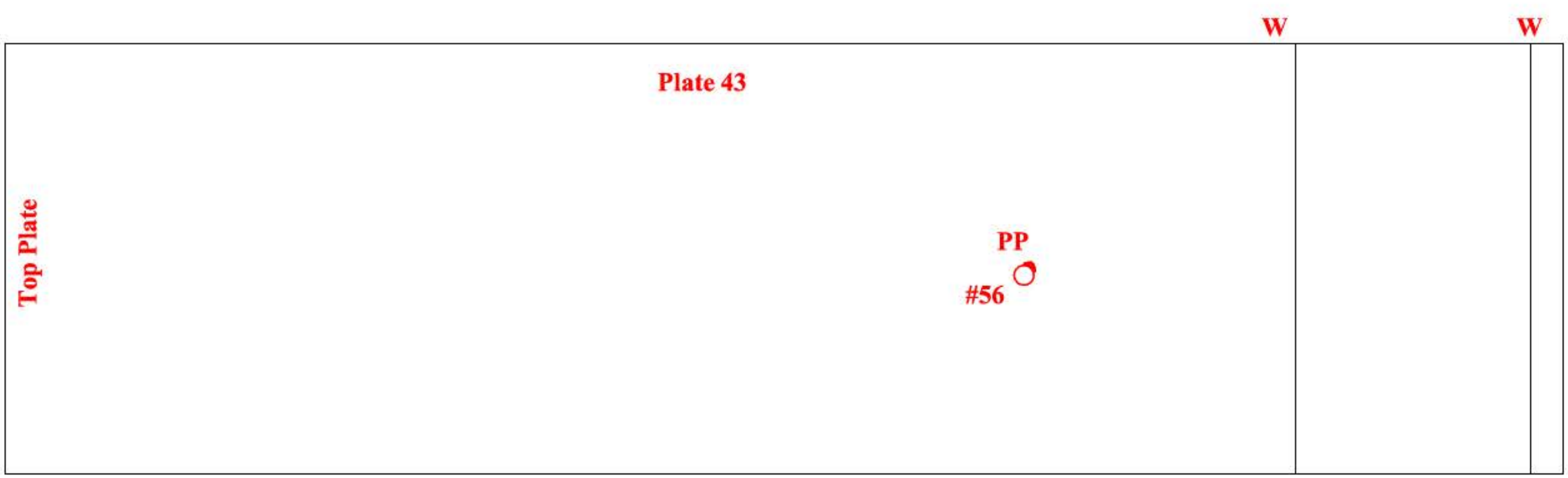


Tank Section: Lower Dome
Quadrant: D

Course: 1
Plate #: 43

Flaw # - Type - Remaining:

#56-Wall Loss (around PP) - 0.240"R



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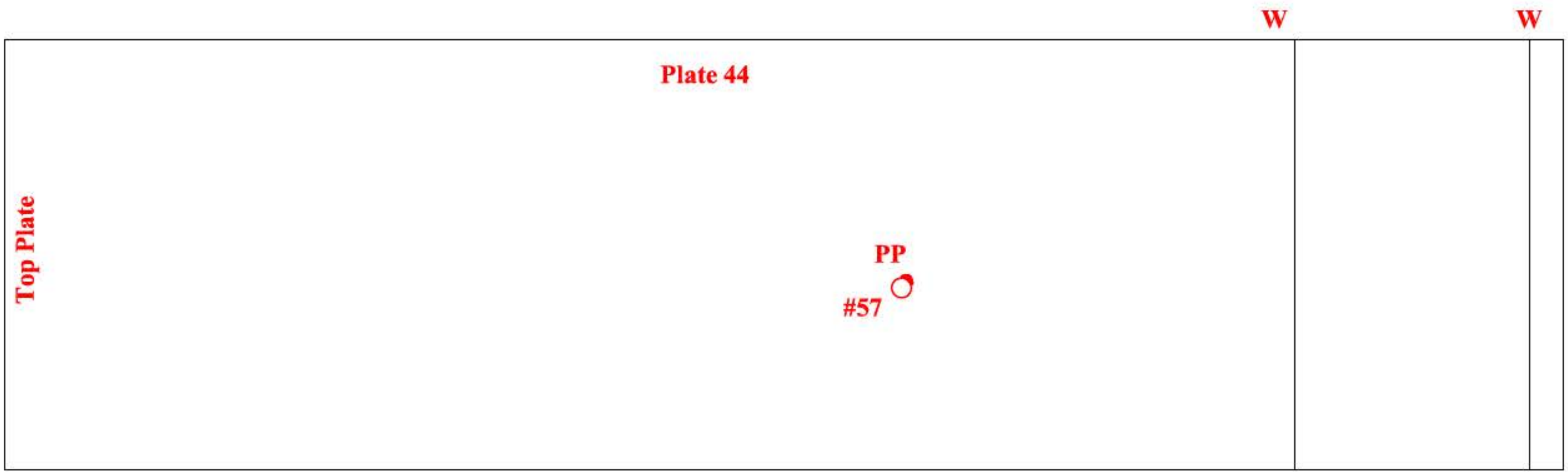
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 1
Plate #: 44

Flaw # - Type - Remaining:

#57-Wall Loss (around PP)
- 0.240"R



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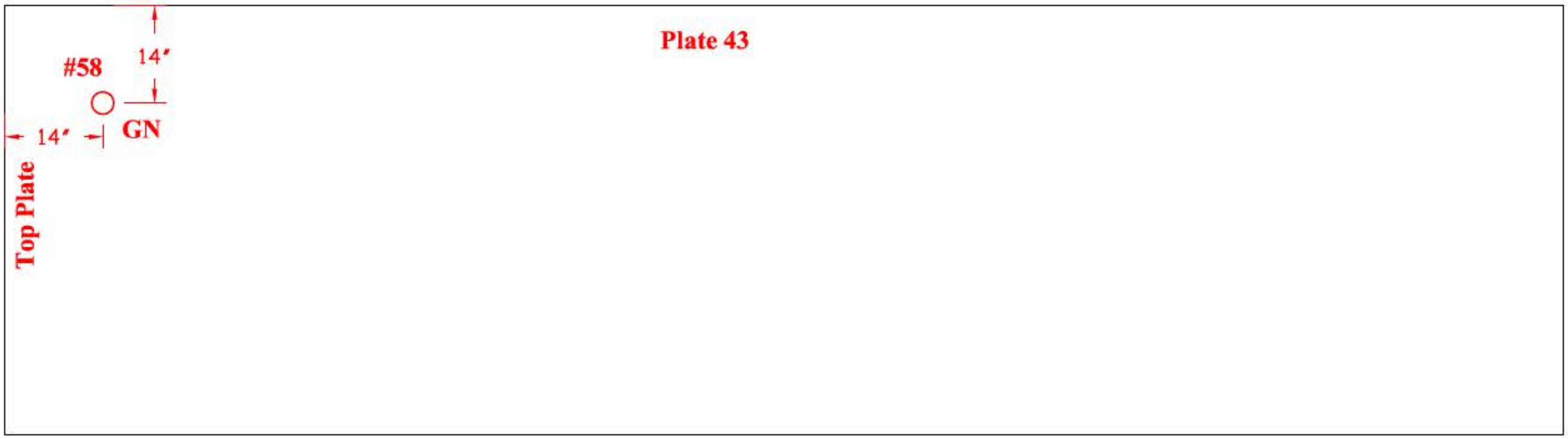
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 2
Plate #: 43

Flaw # - Type - Remaining:

#58 - Grout Nozzle - 0.210"R

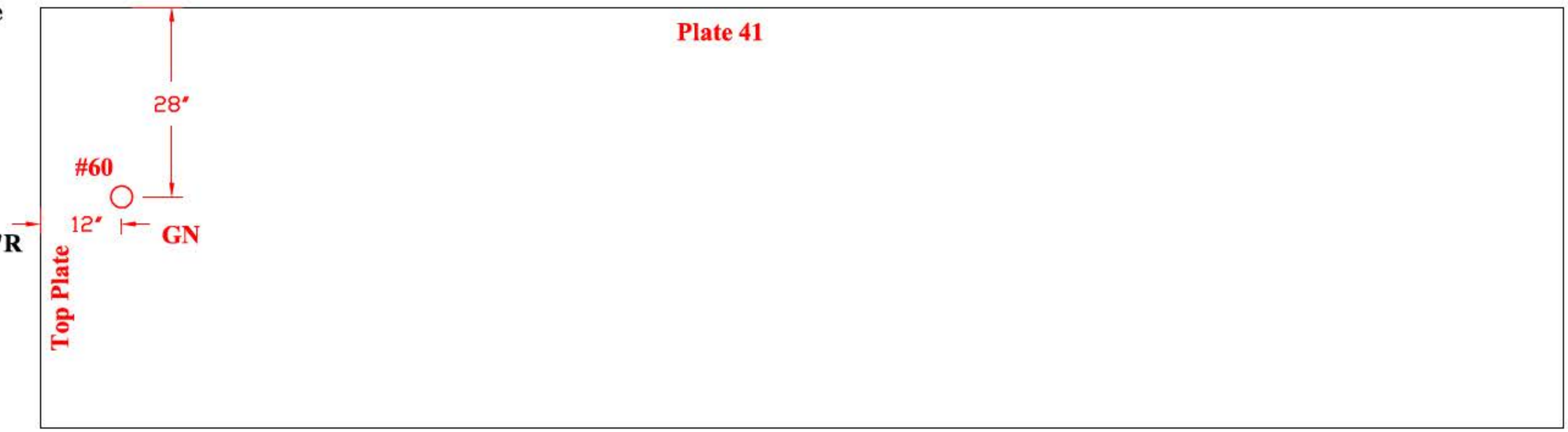


Tank Section: Lower Dome
Quadrant: D

Course: 2
Plate #: 41

Flaw # - Type - Remaining:

#60 - Grout Nozzle - 0.198"R



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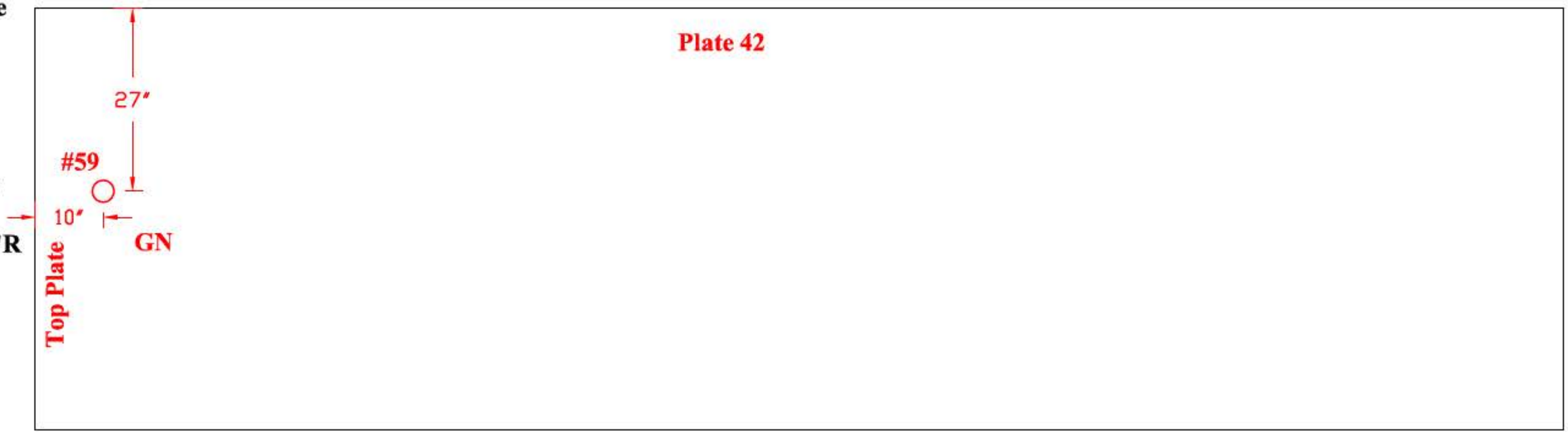
TANK # 20 - QUADRANT B AND D
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 2
Plate #: 42

Flaw # - Type - Remaining:

#59 - Grout Nozzle - 0.230"R

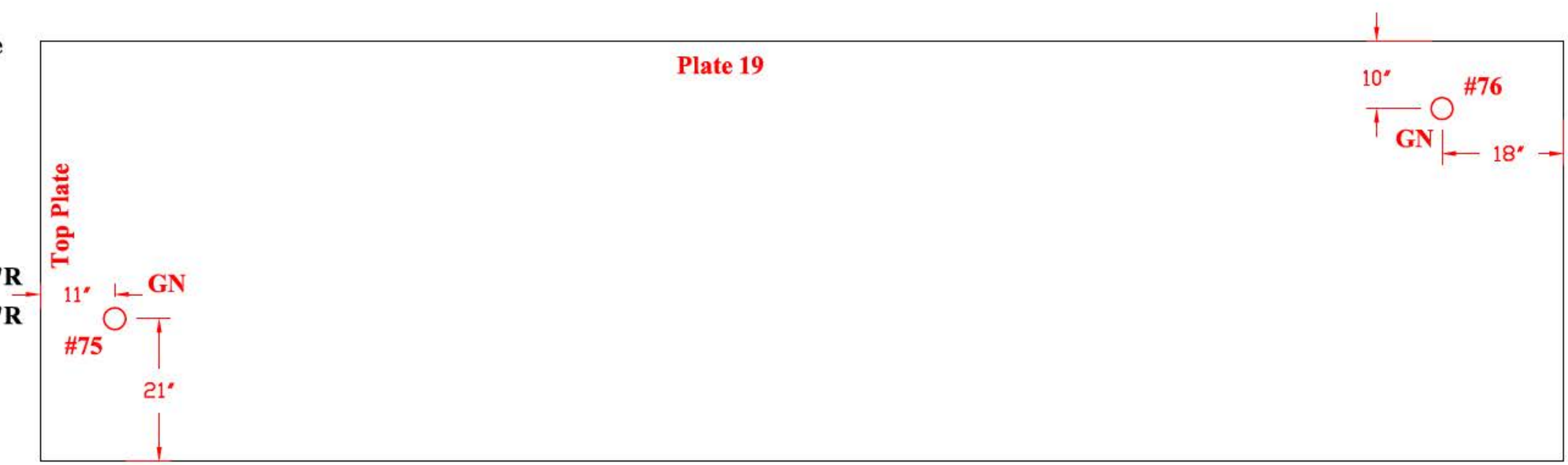


Tank Section: Lower Dome
Quadrant: B

Course: 2
Plate #: 19

Flaw # - Type - Remaining:

#75 - Grout Nozzle - 0.208"R
#76 - Grout Nozzle - 0.224"R



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TANK # 20 - QUADRANT D

Nominal Plate Thickness: 0.250"

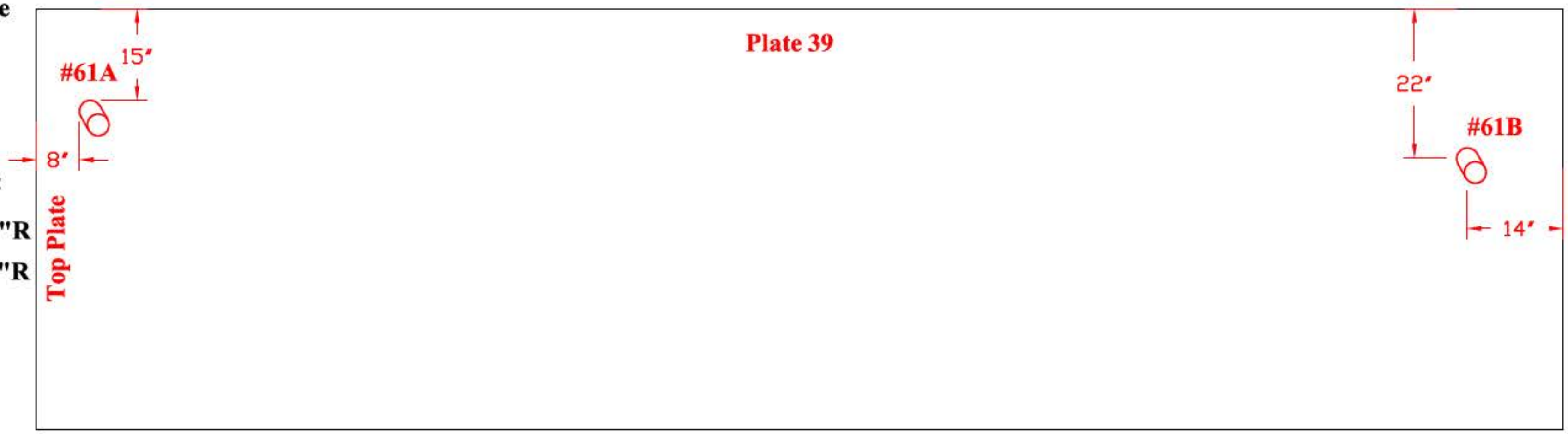
Tank Section: Lower Dome
Quadrant: D

Course: 2
Plate #: 39

Flaw # - Type - Remaining:

#61A - Grout Nozzle - 0.208"R

#61B - Grout Nozzle - 0.218"R

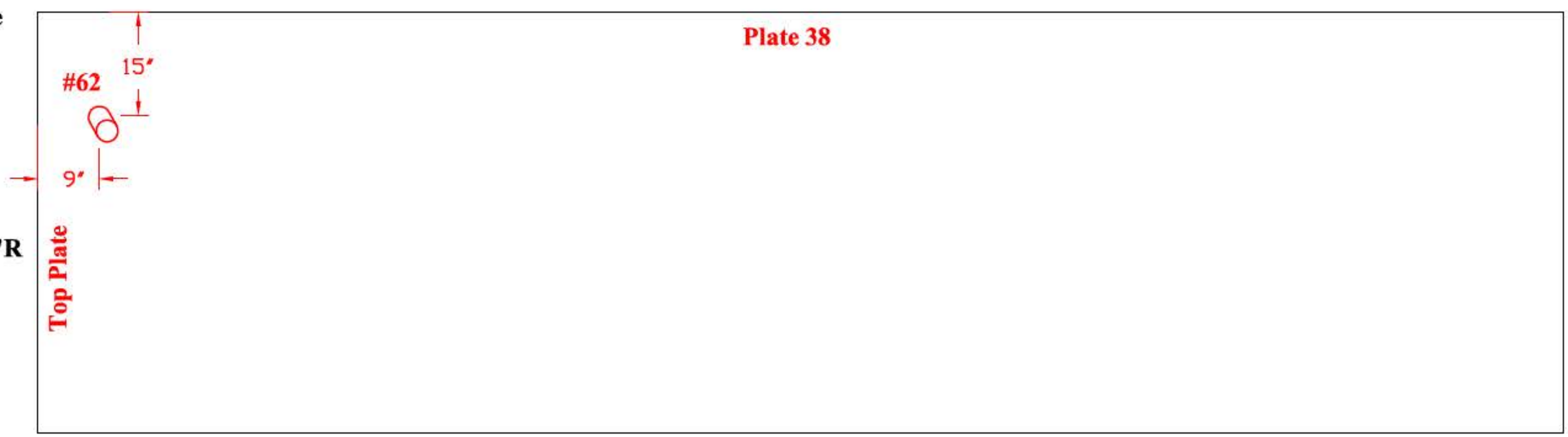


Tank Section: Lower Dome
Quadrant: D

Course: 2
Plate #: 38

Flaw # - Type - Remaining:

#62 - Grout Nozzle - 0.208"R



Drawing is not to scale

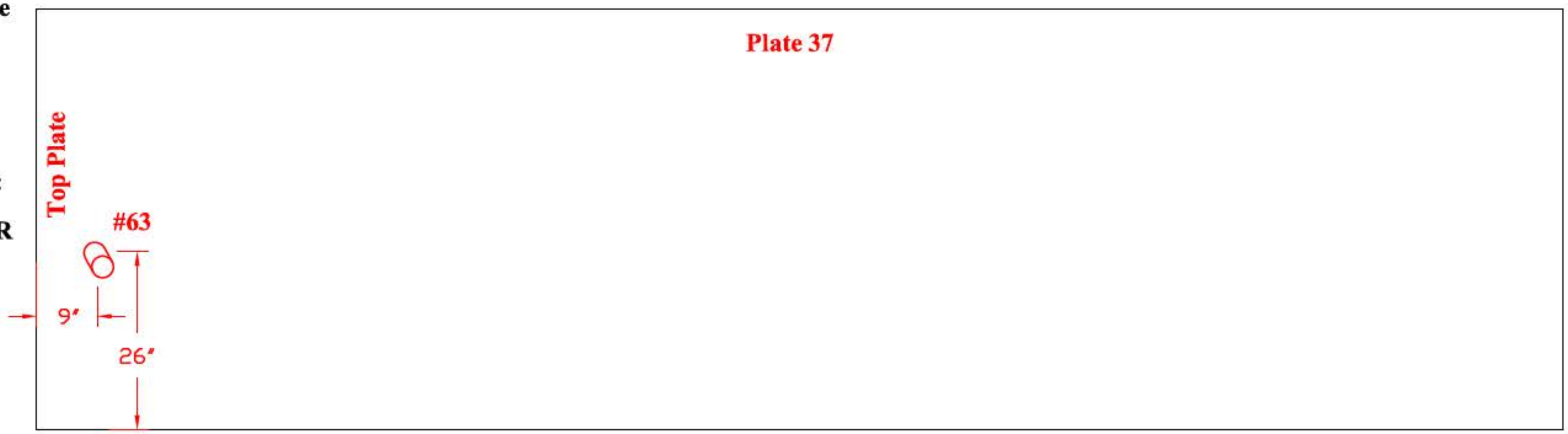
TANK # 20 - QUADRANT D
***Nominal Plate Thickness: 0.250"**

Tank Section: Lower Dome
Quadrant: D

Course: 2
Plate #: 37

Flaw # - Type - Remaining:

#63 - Grout Nozzle - 0.228"R

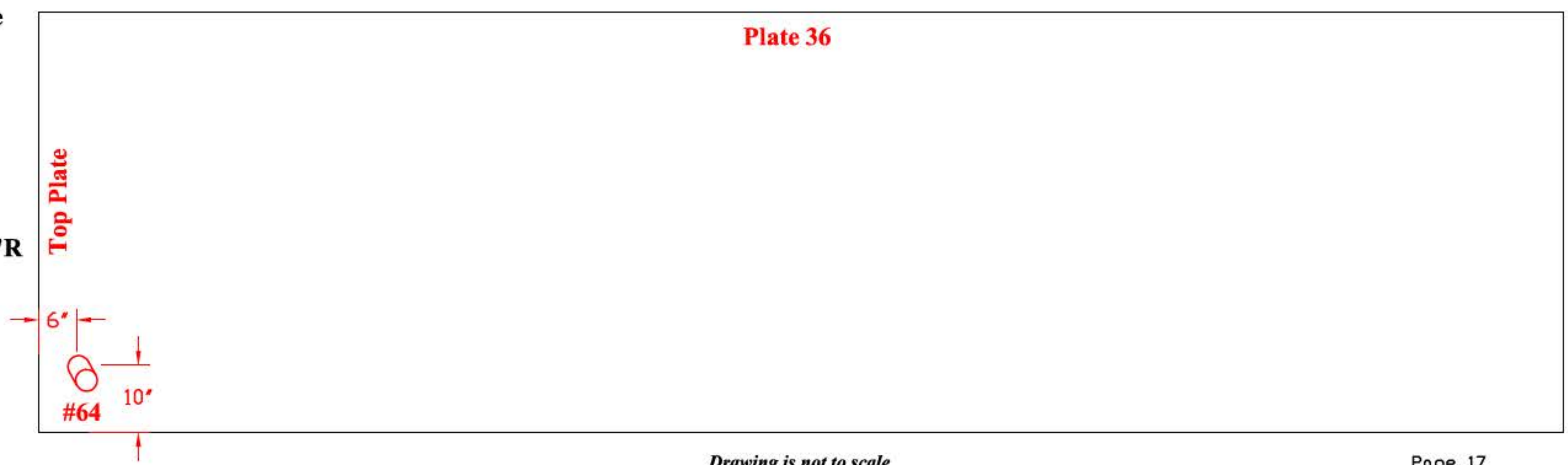


Tank Section: Lower Dome
Quadrant: D

Course: 2
Plate #: 36

Flaw # - Type - Remaining:

#64 - Grout Nozzle - 0.209"R



TANK # 20 - QUADRANT D

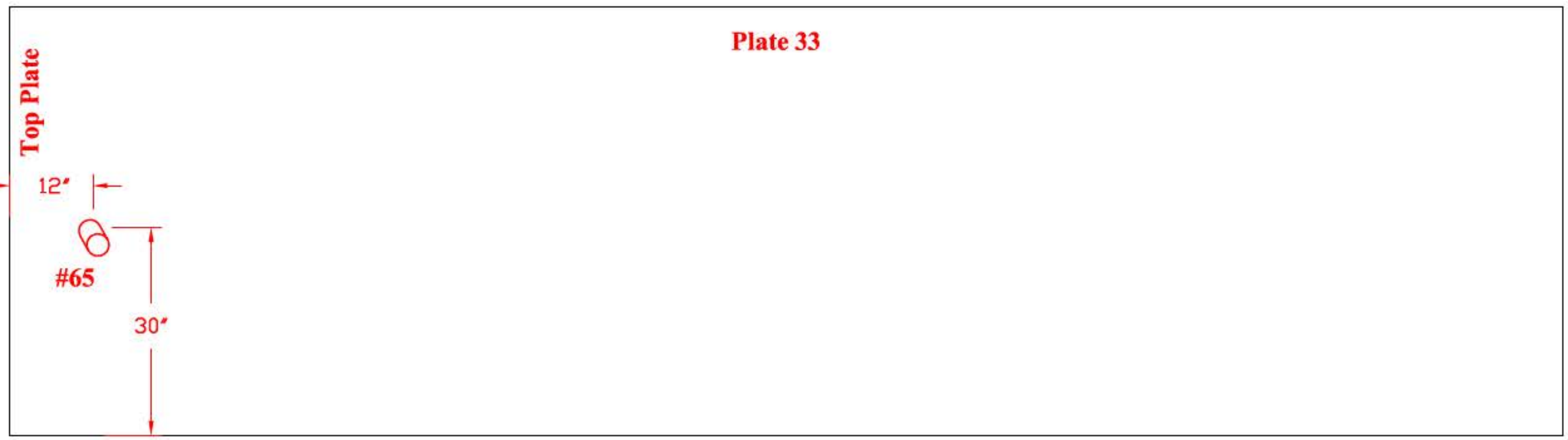
***Nominal Plate Thickness: 0.250"**

Tank Section: Lower Dome
Quadrant: D

Course: 2
Plate #: 33

Flaw # - Type - Remaining:

#65 - Grout Nozzle - 0.220"R

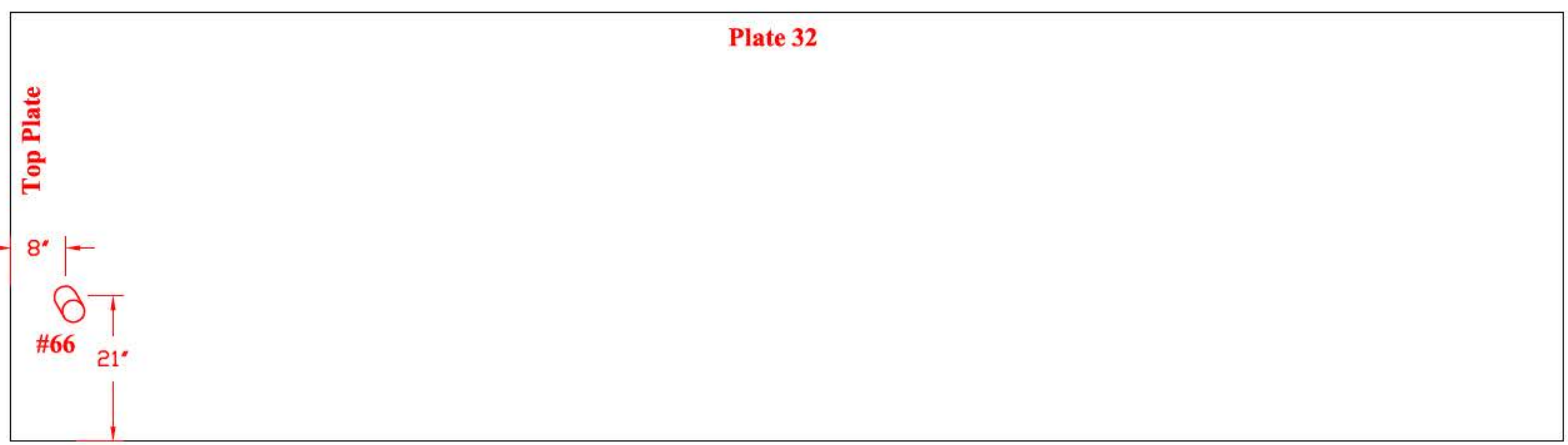


Tank Section: Lower Dome
Quadrant: D

Course: 2
Plate #: 32

Flaw # - Type - Remaining:

#66 - Grout Nozzle - 0.207"R



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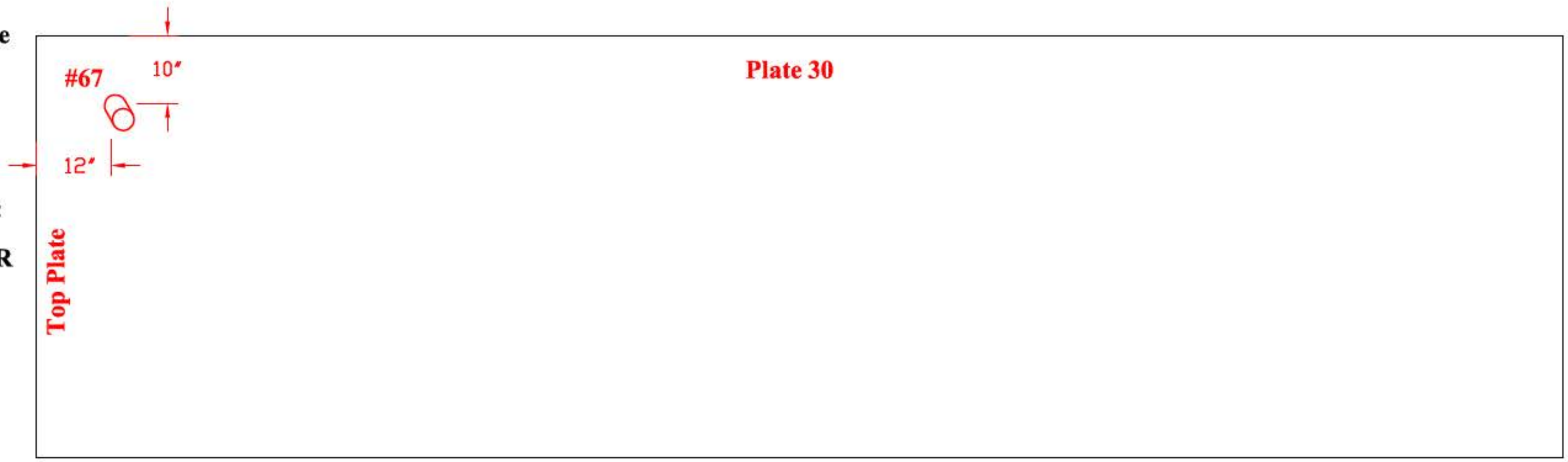
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: C

Course: 2
Plate #: 30

Flaw # - Type - Remaining:

#67 - Grout Nozzle - 0.220"R

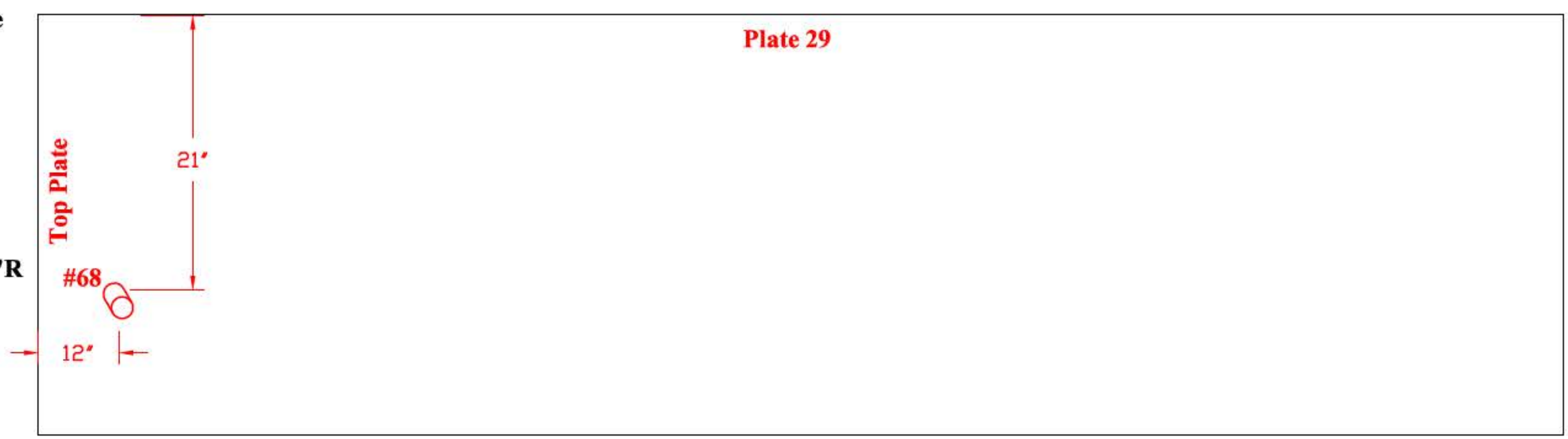


Tank Section: Lower Dome
Quadrant: C

Course: 2
Plate #: 29

Flaw # - Type - Remaining:

#68 - Grout Nozzle - 0.212"R



Drawing is not to scale

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TANK # 20 - QUADRANT A

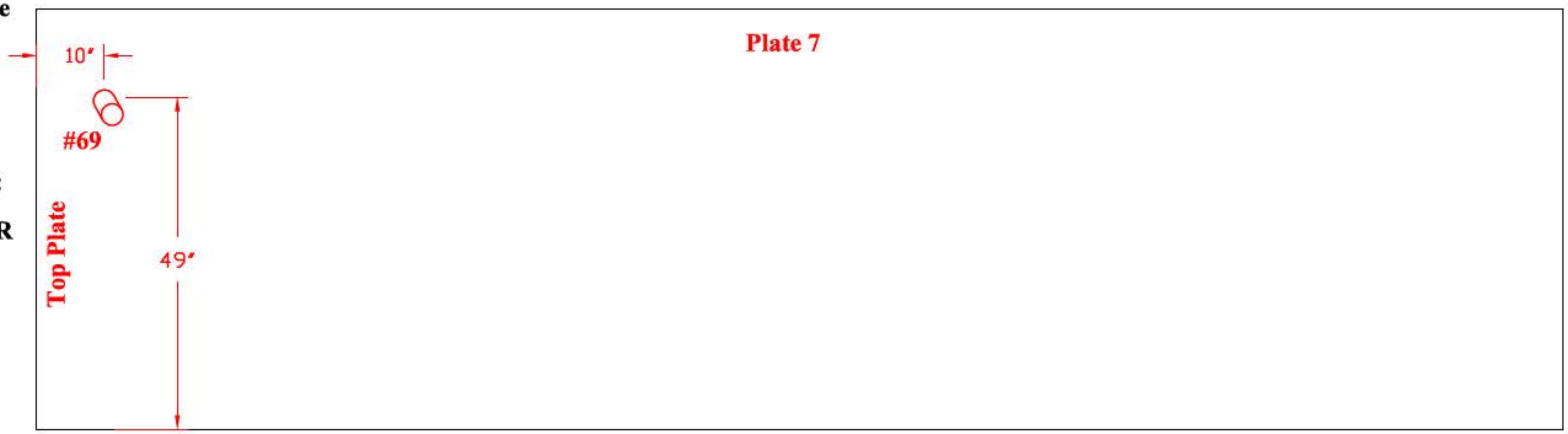
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 2
Plate #: 7

Flaw # - Type - Remaining:

#69 - Grout Nozzle - 0.200"R

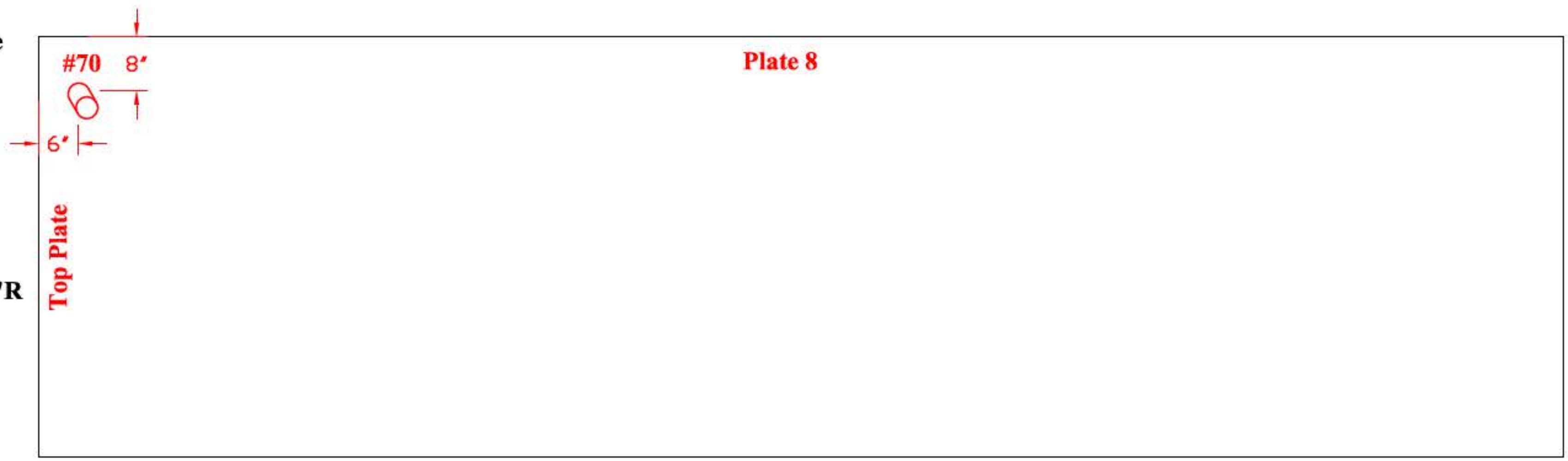


Tank Section: Lower Dome
Quadrant: A

Course: 2
Plate #: 8

Flaw # - Type - Remaining:

#70 - Grout Nozzle - 0.220"R



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TANK # 20 - QUADRANT B

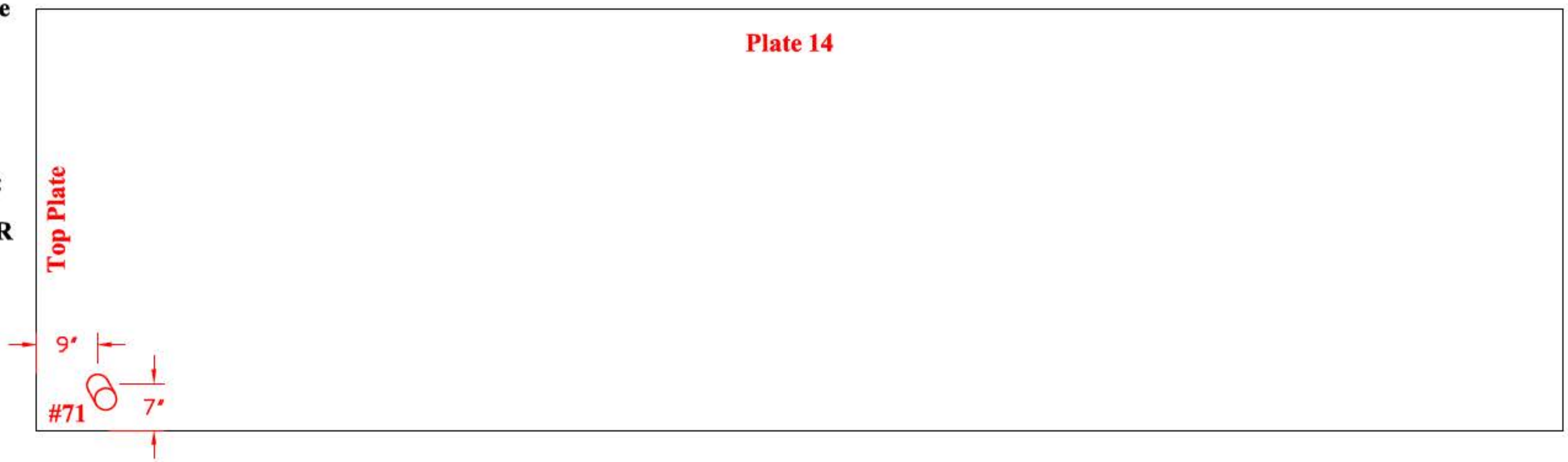
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: B

Course: 2
Plate #: 14

Flaw # - Type - Remaining:

#71 - Grout Nozzle - 0.212"R

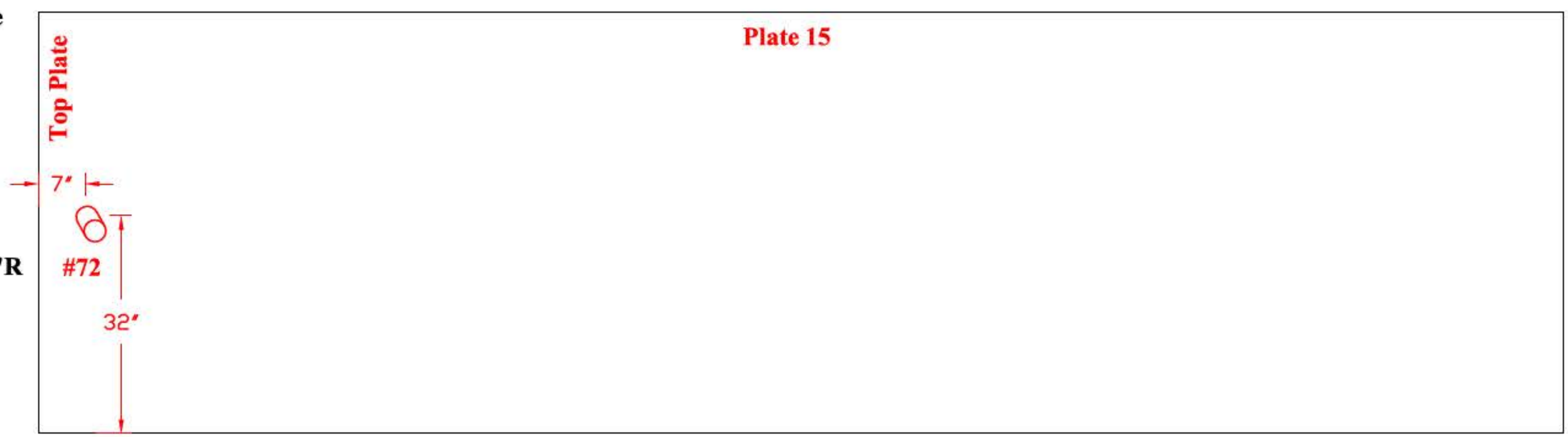


Tank Section: Lower Dome
Quadrant: B

Course: 2
Plate #: 15

Flaw # - Type - Remaining:

#72 - Grout Nozzle - 0.220"R



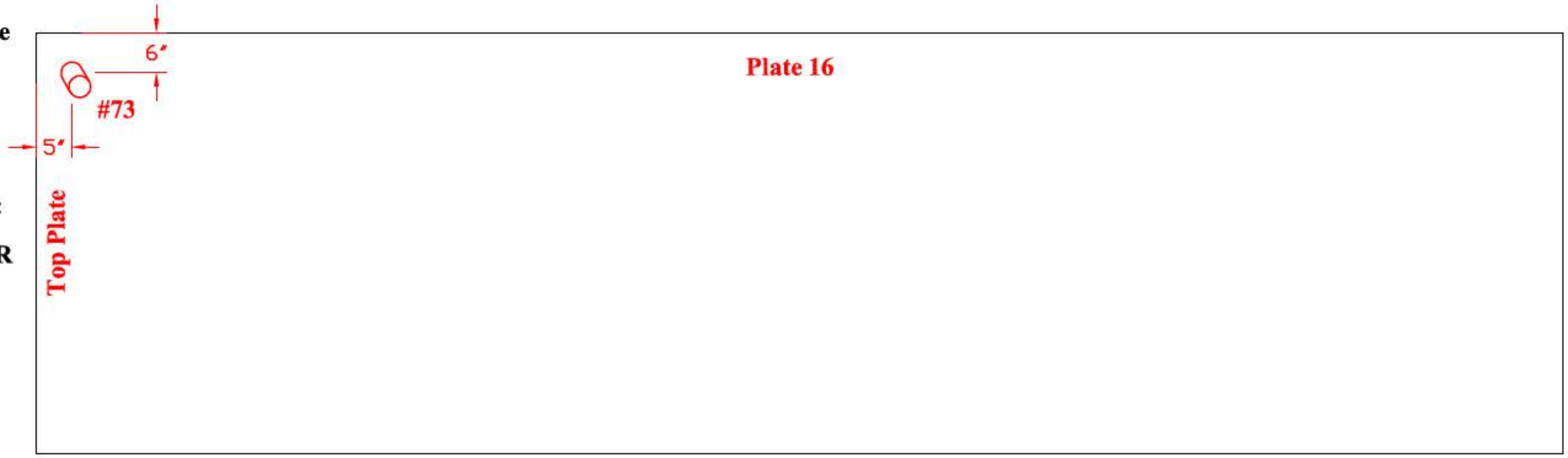
TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: B

Course: 2
Plate #: 16

Flaw # - Type - Remaining:

#73 - Grout Nozzle - 0.215"R

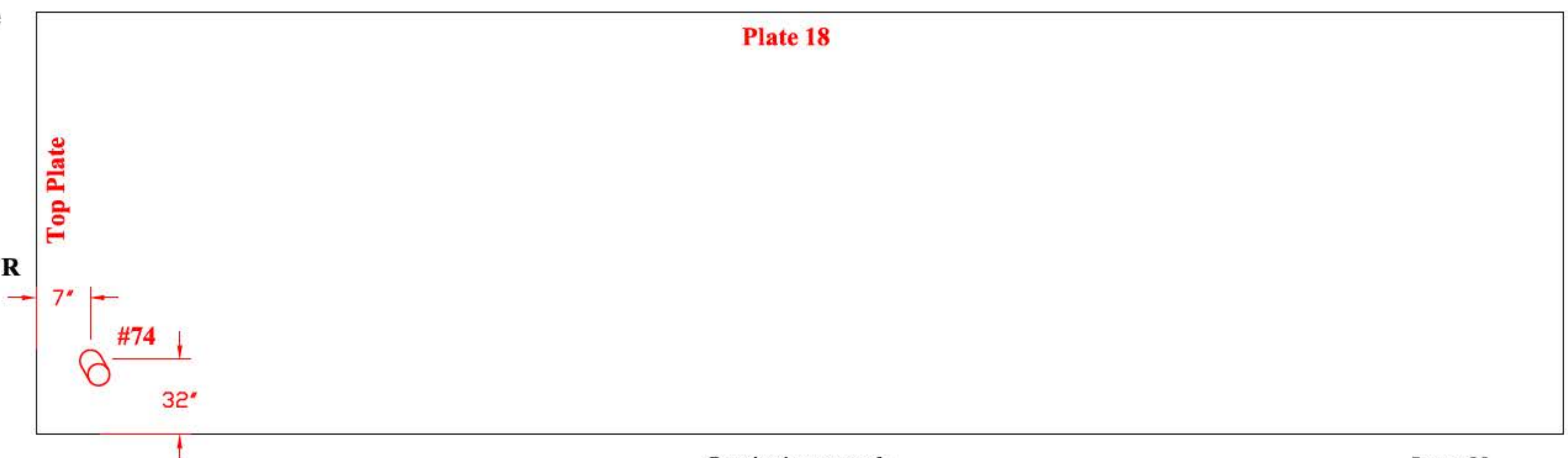


Tank Section: Lower Dome
Quadrant: B

Course: 2
Plate #: 18

Flaw # - Type - Remaining:

#74 - Grout Nozzle - 0.211"R



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TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

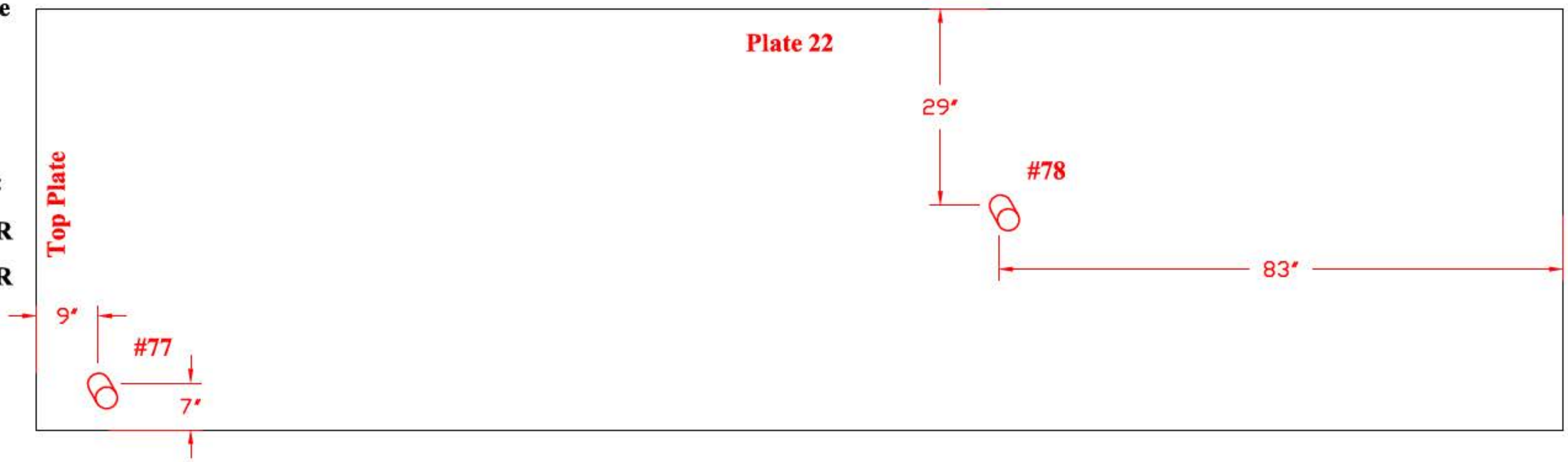
Tank Section: Lower Dome
Quadrant: B

Course: 3
Plate #: 22

Flaw # - Type - Remaining:

#77 - Grout Nozzle - 0.230"R

#78 - Grout Nozzle - 0.230"R

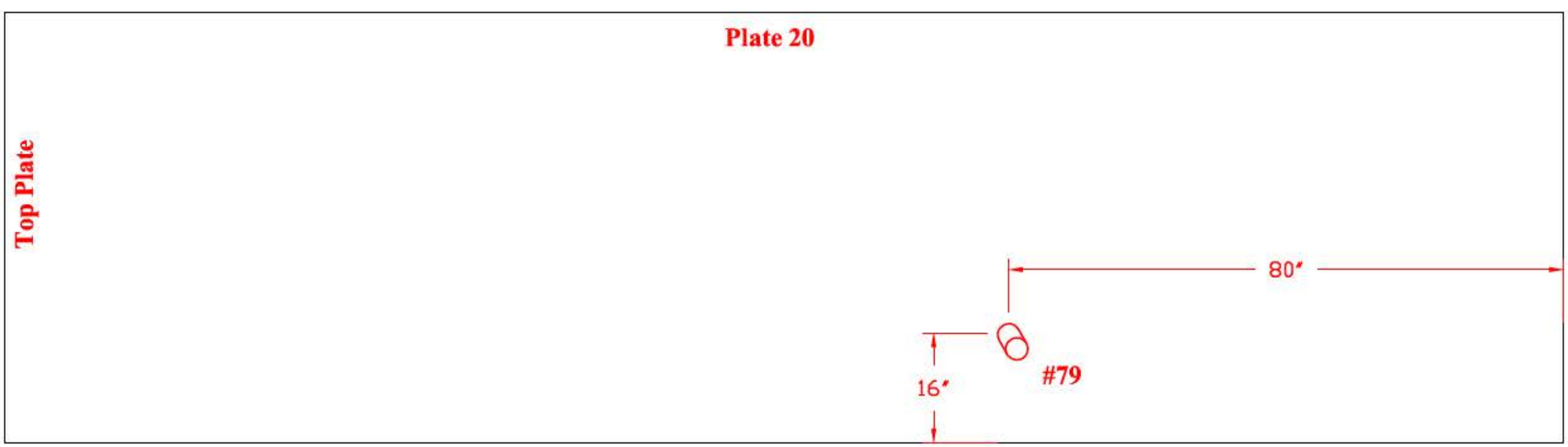


Tank Section: Lower Dome
Quadrant: B

Course: 3
Plate #: 20

Flaw # - Type - Remaining:

#79 - Grout Nozzle - 0.224"R



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TANK # 20 - QUADRANT B

**Nominal Plate Thickness: 0.250"*

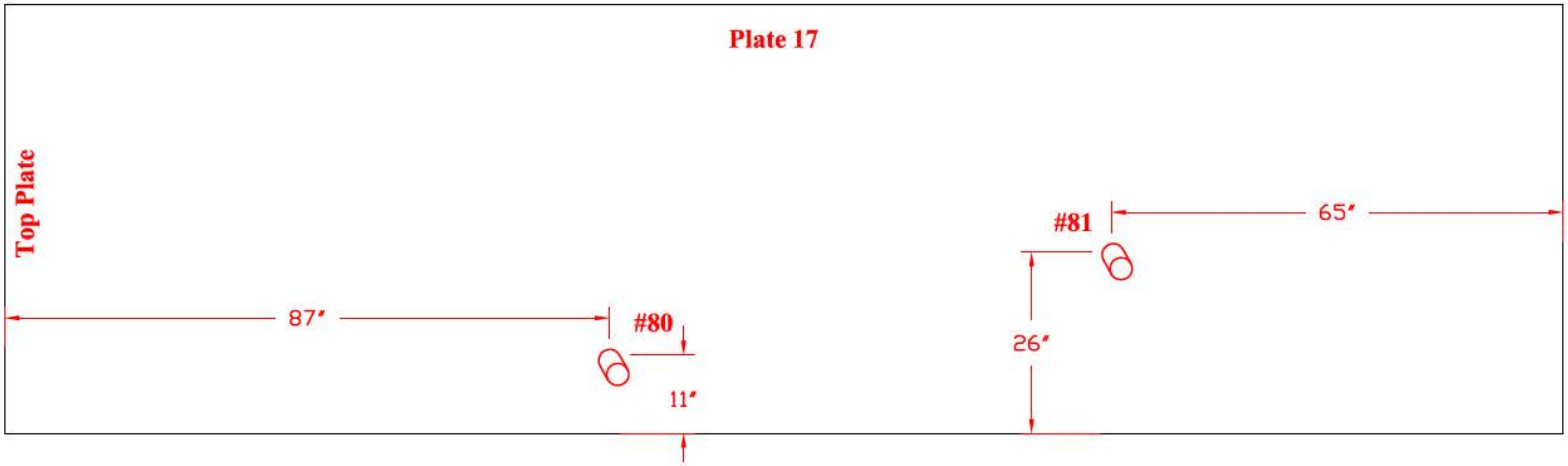
Tank Section: Lower Dome
Quadrant: B

Course: 3
Plate #: 17

Flaw # - Type - Remaining:

#80 - Grout Nozzle - 0.212"R

#81 - Grout Nozzle - 0.220"R

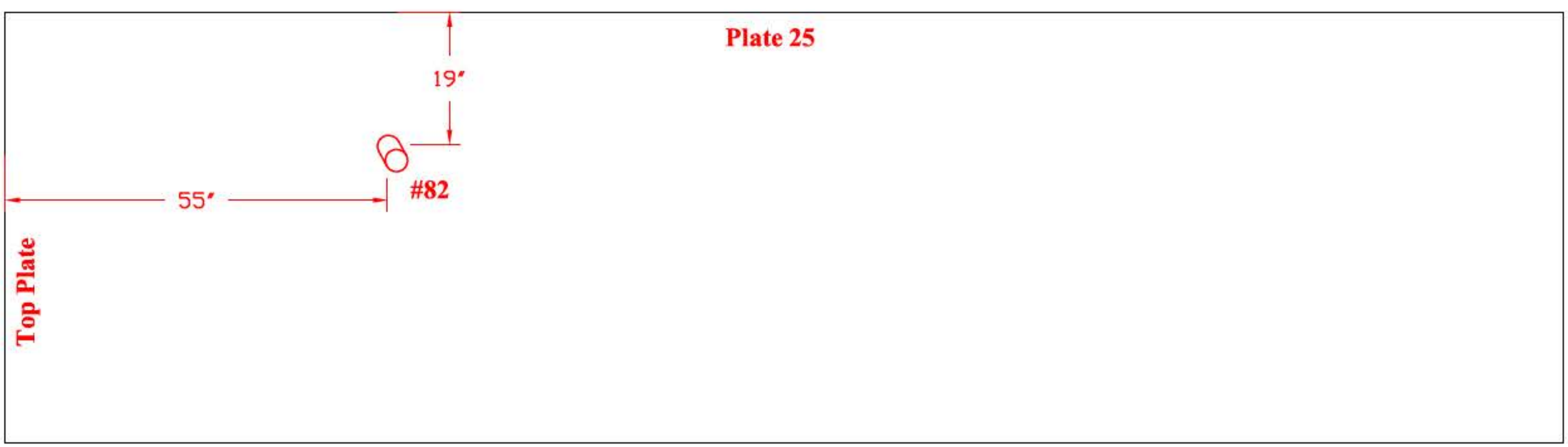


Tank Section: Lower Dome
Quadrant: B

Course: 4
Plate #: 25

Flaw # - Type - Remaining:

#82 - Grout Nozzle - 0.225"R



Drawing is not to scale

TANK # 20 - QUADRANT A AND B

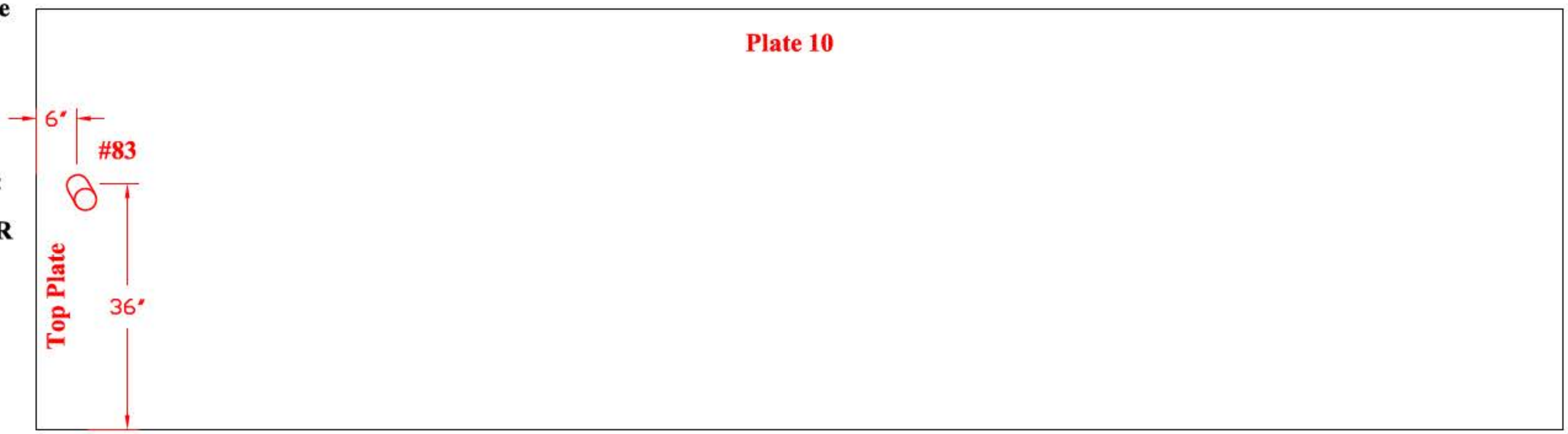
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 2
Plate #: 10

Flaw # - Type - Remaining:

#83 - Grout Nozzle - 0.236"R

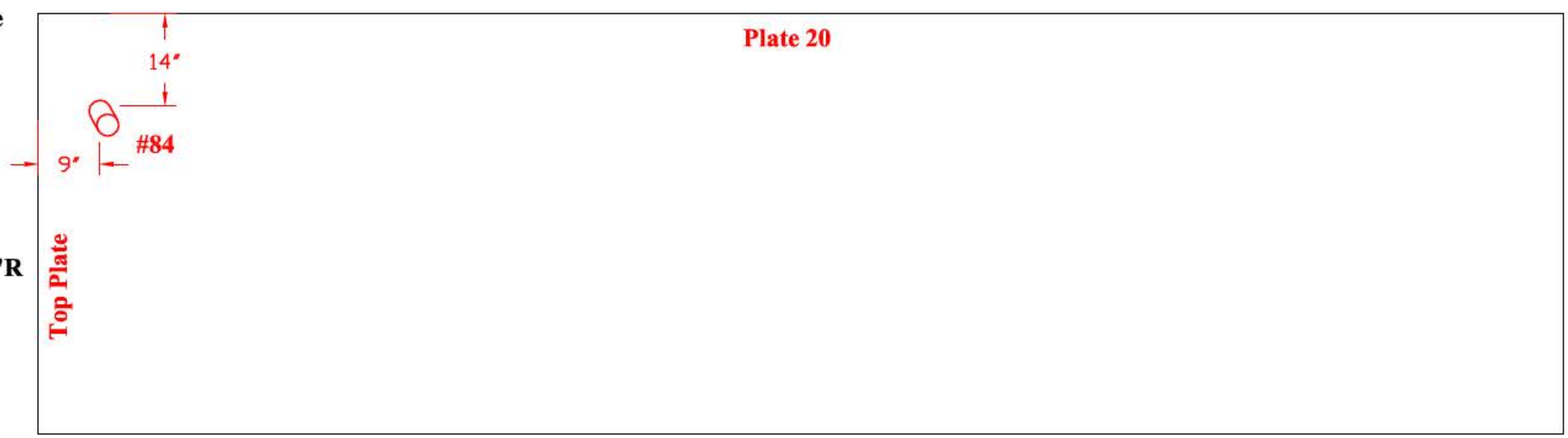


Tank Section: Lower Dome
Quadrant: B

Course: 2
Plate #: 20

Flaw # - Type - Remaining:

#84 - Grout Nozzle - 0.210"R



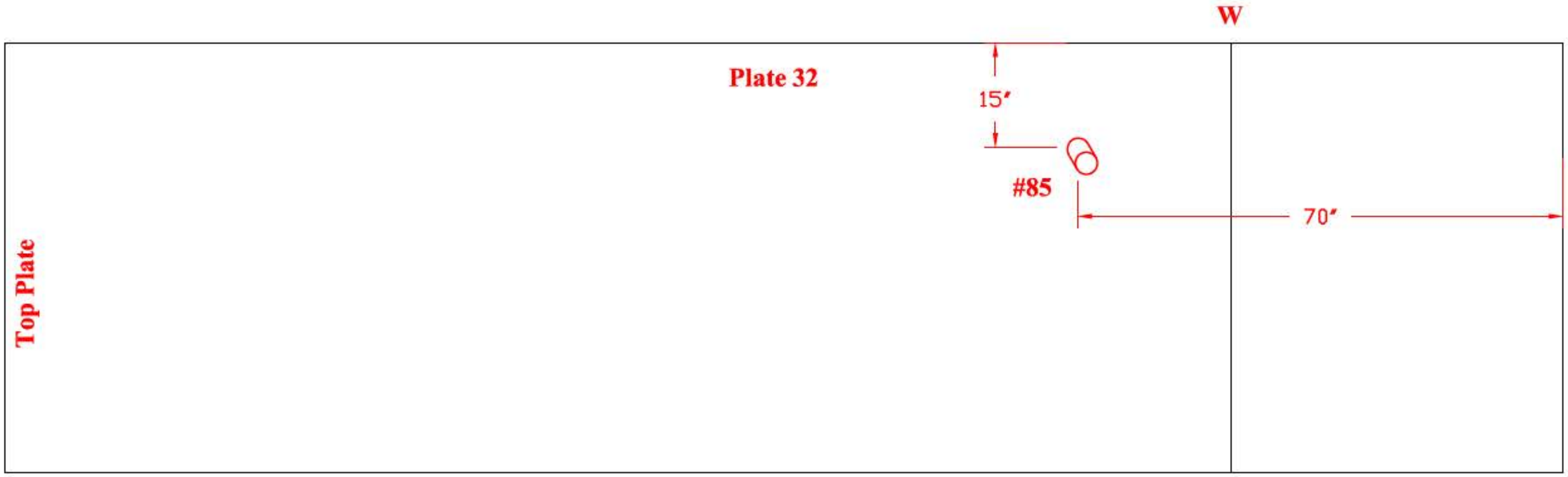
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 32

Flaw # - Type - Remaining:

#85 - Grout Nozzle - 0.207"R

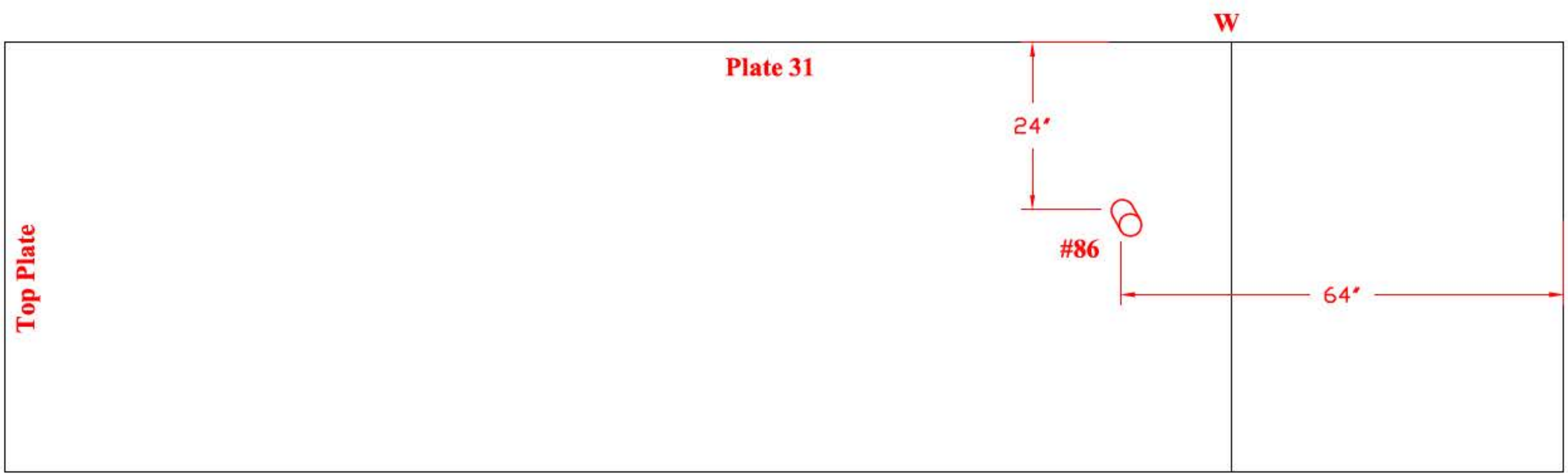


Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 31

Flaw # - Type - Remaining:

#86 - Grout Nozzle - 0.199"R



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TANK # 20 - QUADRANT C

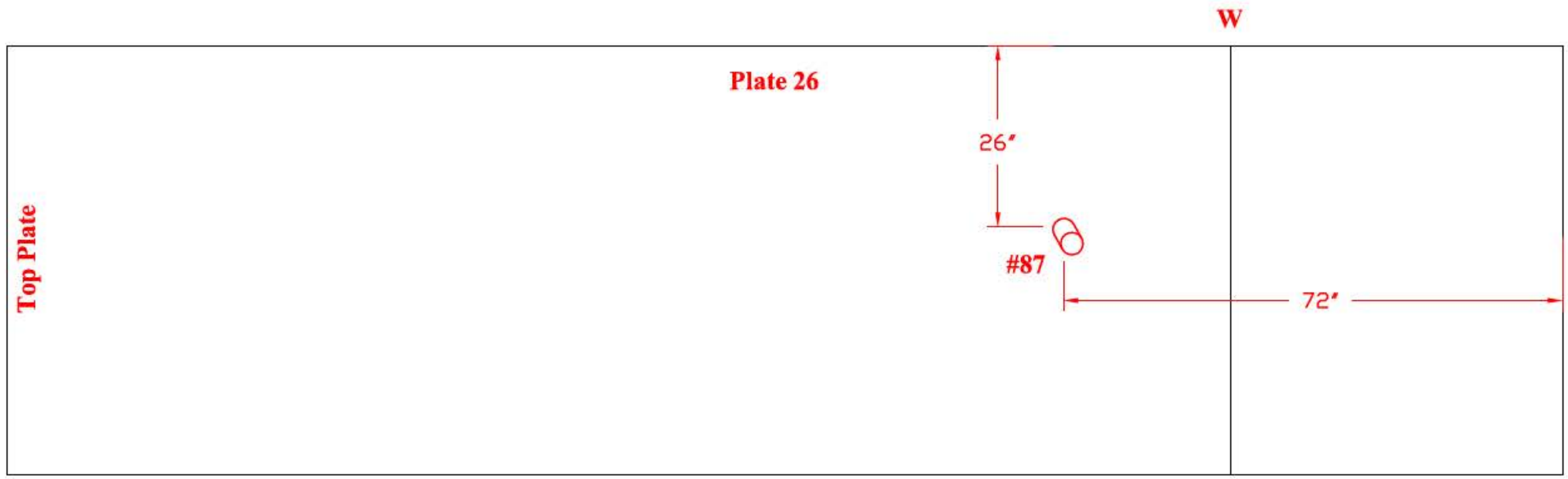
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 26

Flaw # - Type - Remaining:

#87 - Grout Nozzle - 0.216"R

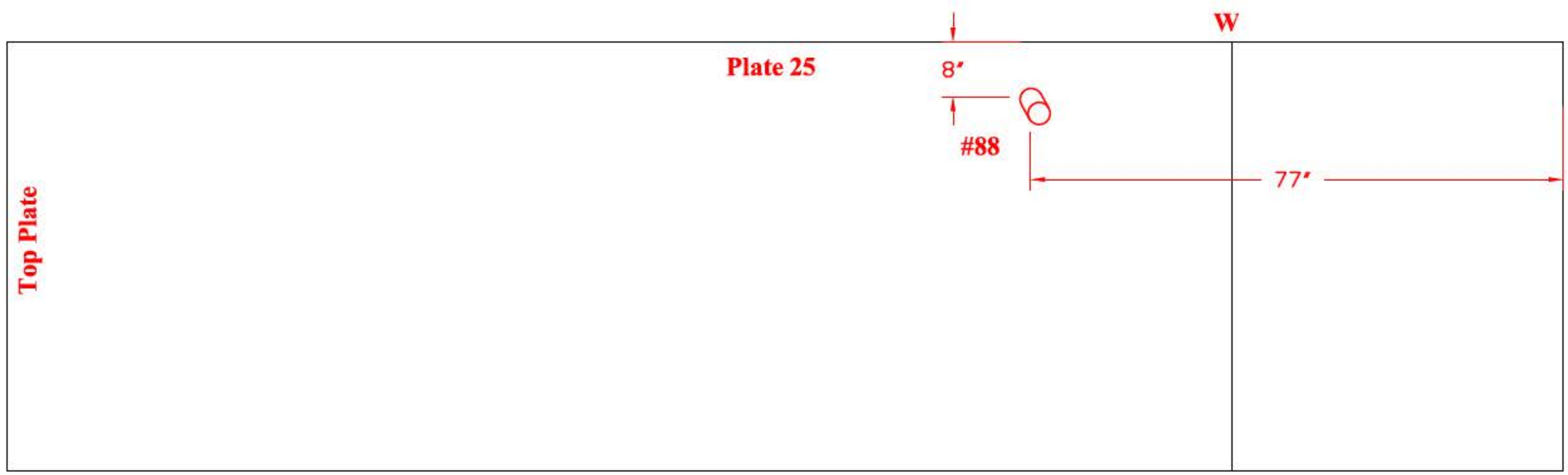


Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 25

Flaw # - Type - Remaining:

#88 - Grout Nozzle - 0.211"R



Drawing is not to scale

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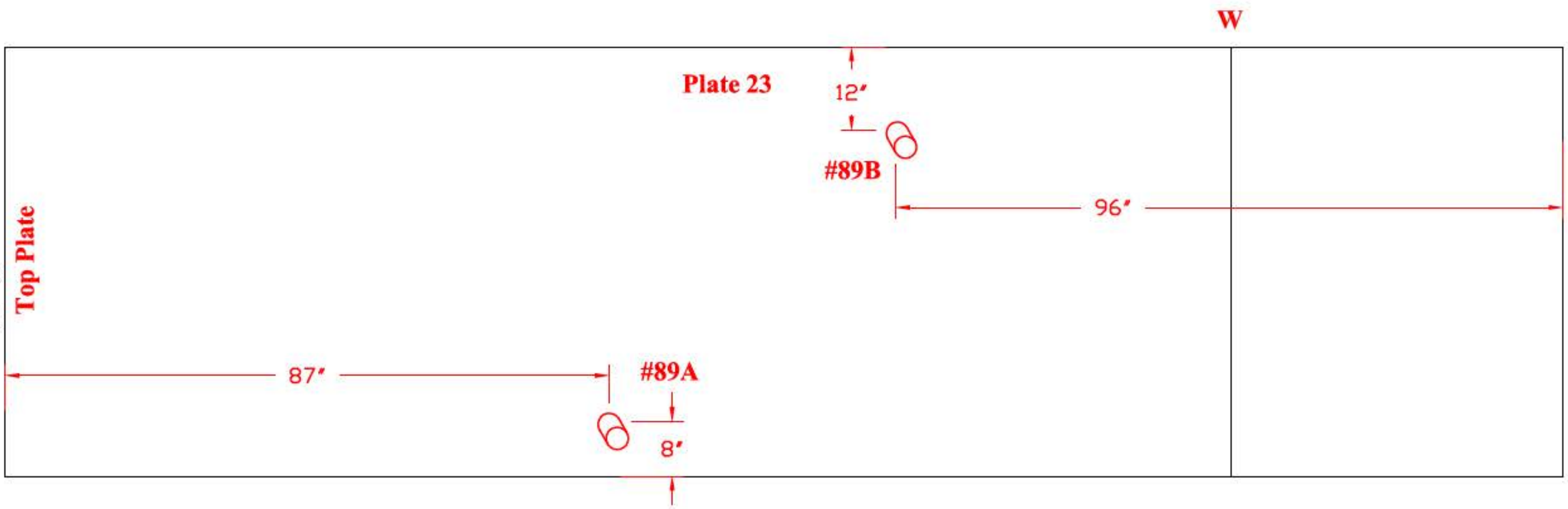
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 23

Flaw # - Type - Remaining:

#89A - Grout Nozzle - 0.207"R
#89B - Grout Nozzle - 0.217"R

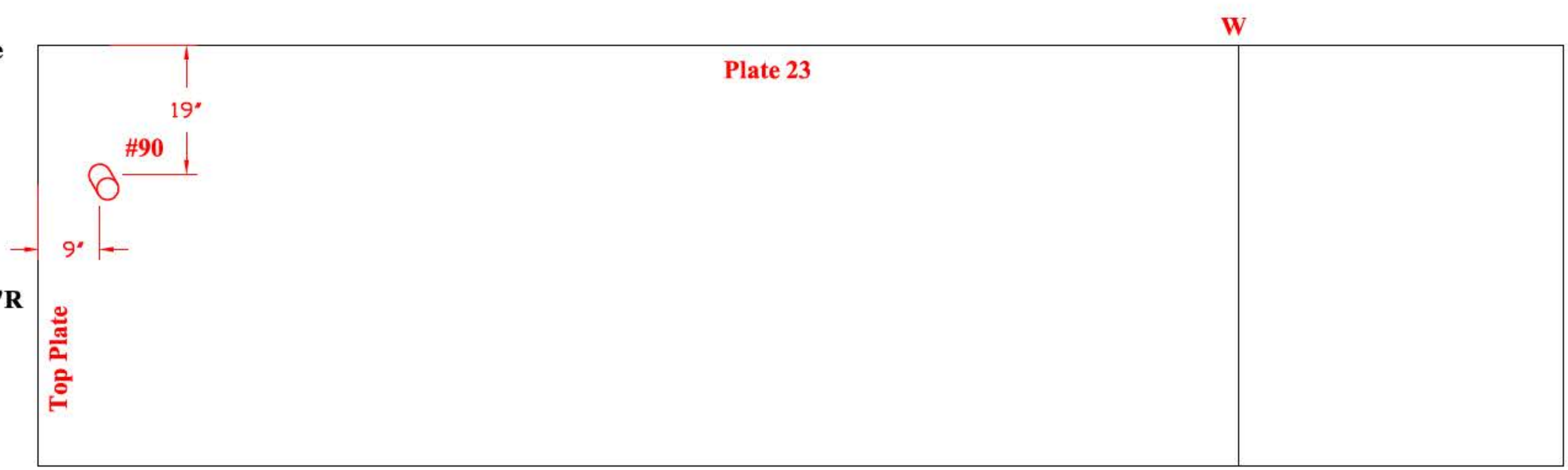


Tank Section: Lower Dome
Quadrant: C

Course: 2
Plate #: 23

Flaw # - Type - Remaining:

#90 - Grout Nozzle - 0.219"R



Drawing is not to scale

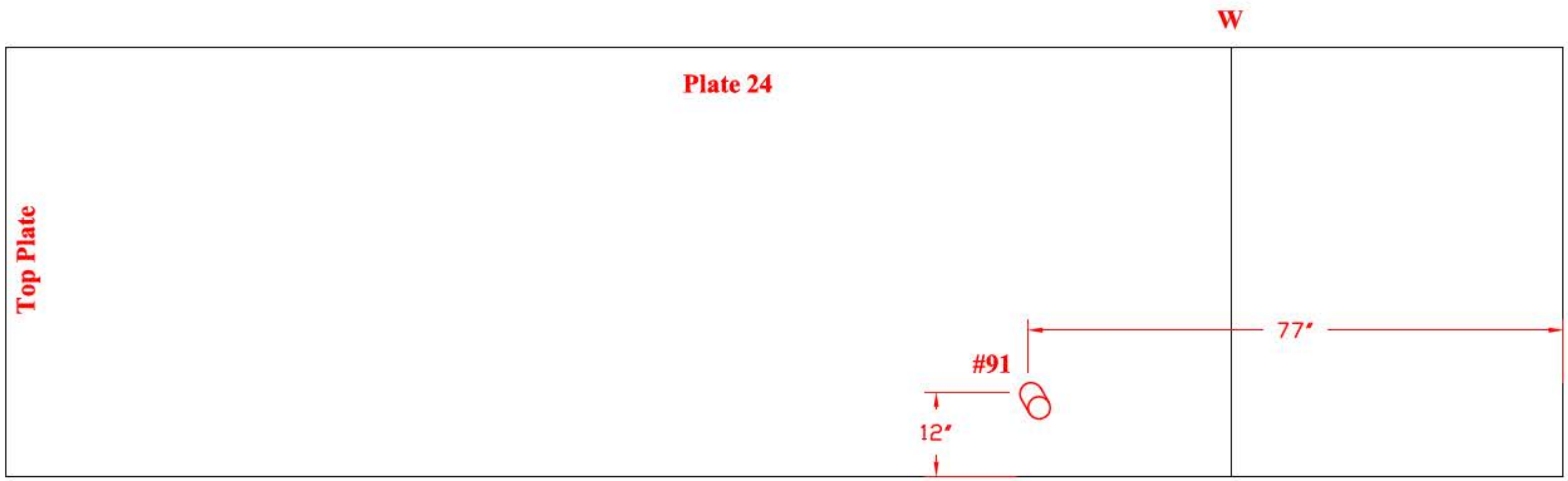
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: C

Course: 2
Plate #: 24

Flaw # - Type - Remaining:

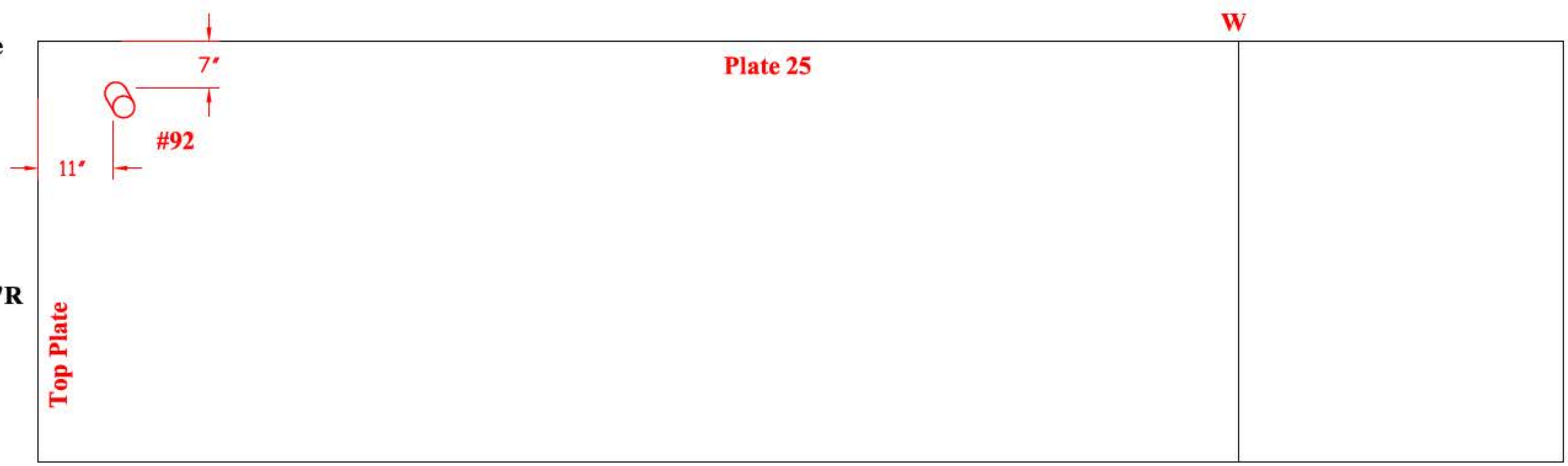
#91 - Grout Nozzle - 0.210"R



Tank Section: Lower Dome
Quadrant: C

Course: 2
Plate #: 25
Flaw # - Type - Remaining:

#92 - Grout Nozzle - 0.213"R



Drawing is not to scale

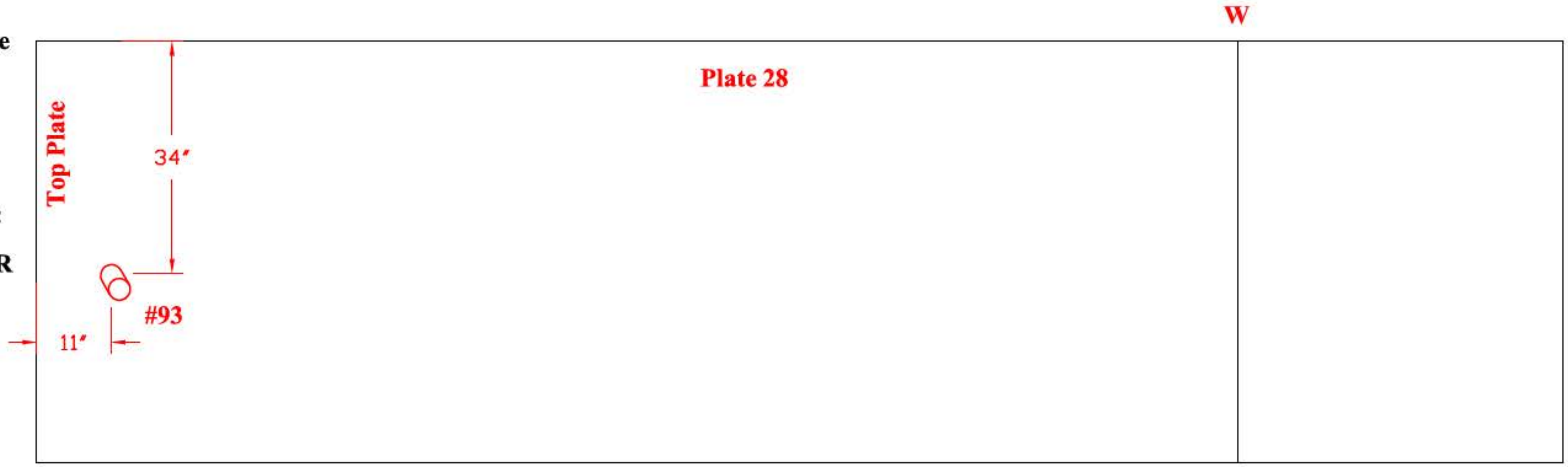
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 28

Flaw # - Type - Remaining:

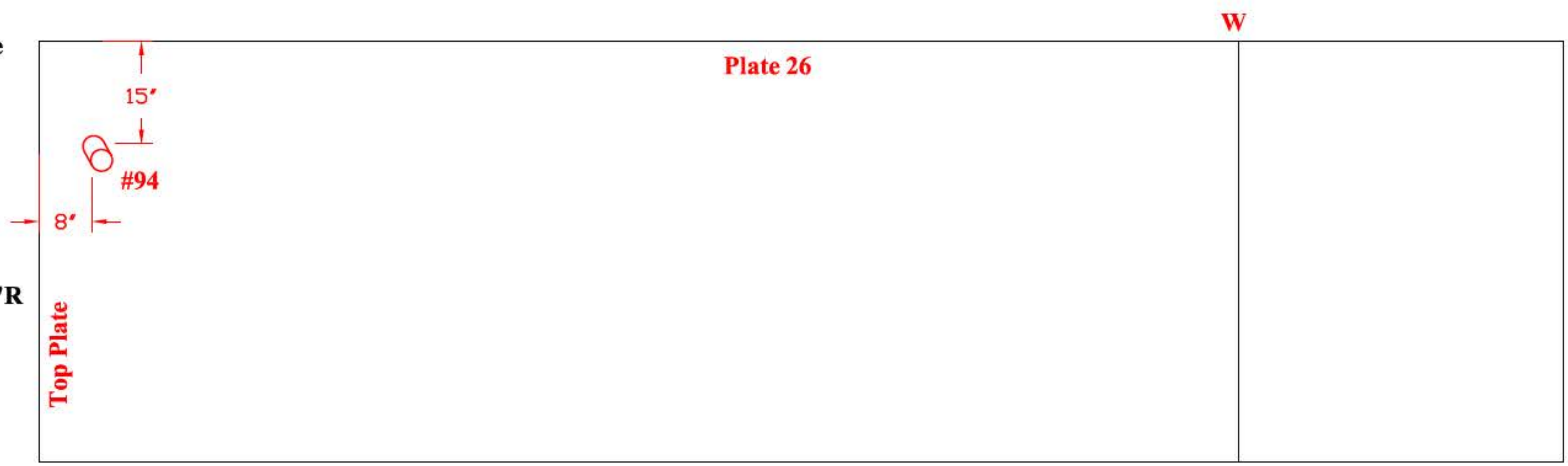
#93 - Grout Nozzle - 0.216"R



Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 26
Flaw # - Type - Remaining:

#94 - Grout Nozzle - 0.187"R



Drawing is not to scale

TANK # 20 - QUADRANT B

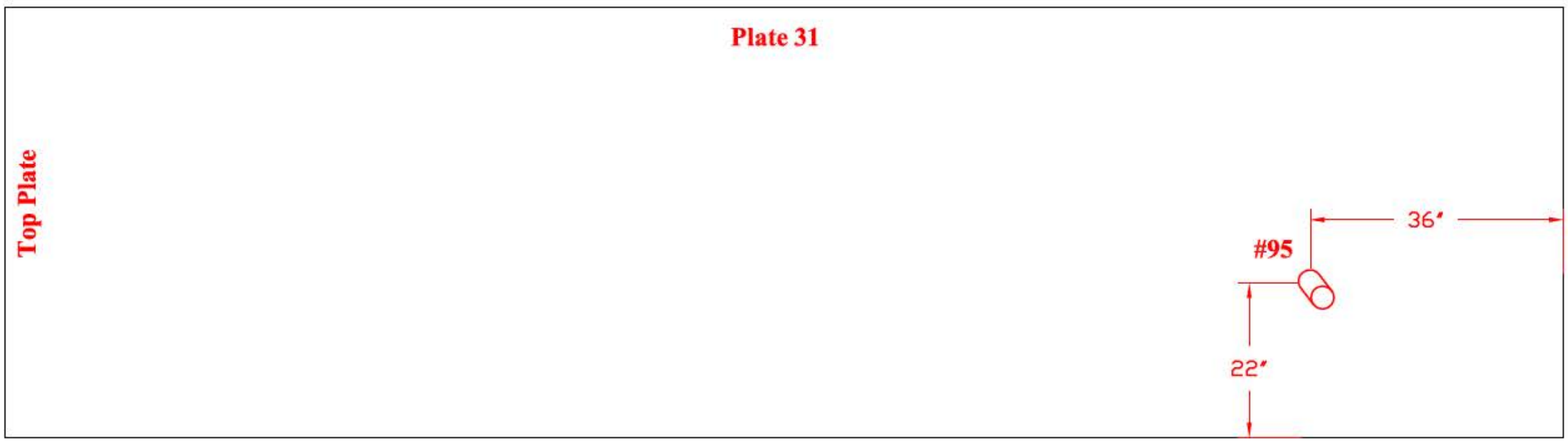
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: B

Course: 4
Plate #: 31

Flaw # - Type - Remaining:

#95 - Grout Nozzle - 0.215"R

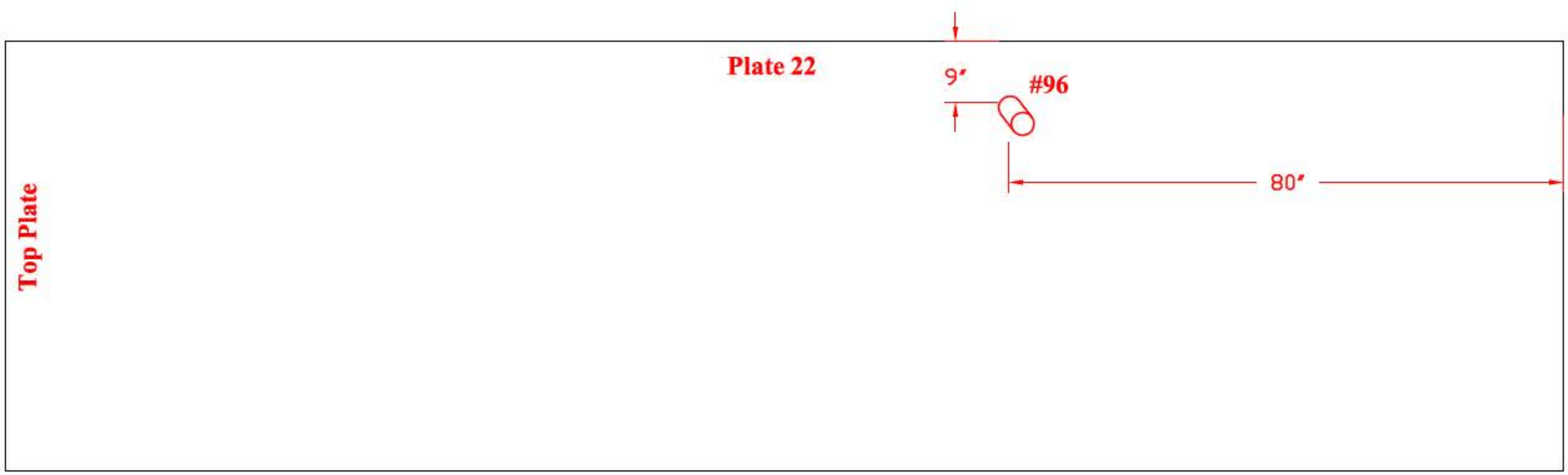


Tank Section: Lower Dome
Quadrant: B

Course: 3
Plate #: 22

Flaw # - Type - Remaining:

#96 - Grout Nozzle - 0.230"R



Drawing is not to scale

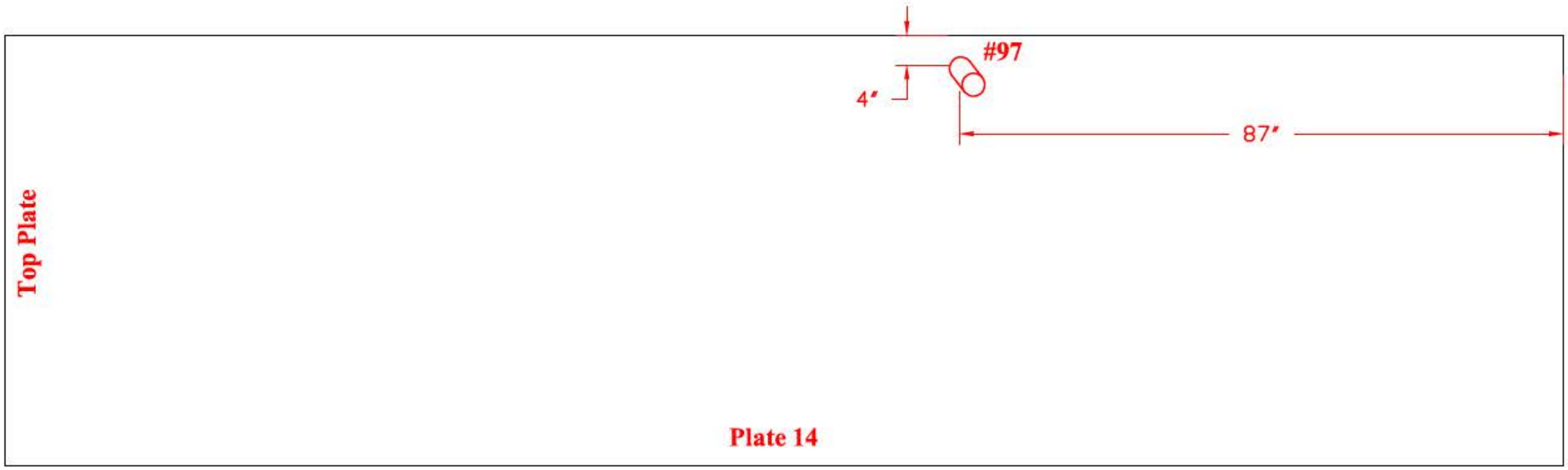
TANK # 20 - QUADRANT A AND B
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: B

Course: 3
Plate #: 14

Flaw # - Type - Remaining:

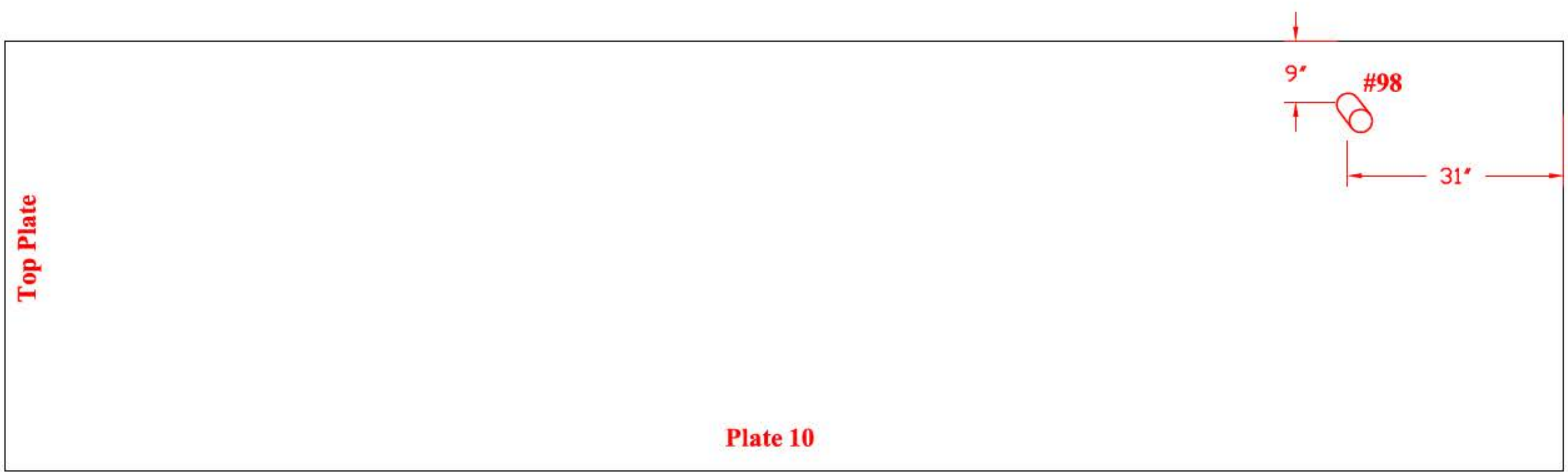
#97 - Grout Nozzle - 0.220"R



Tank Section: Lower Dome
Quadrant: A

Course: 3
Plate #: 10
Flaw # - Type - Remaining:

#98 - Grout Nozzle - 0.219"R



Drawing is not to scale

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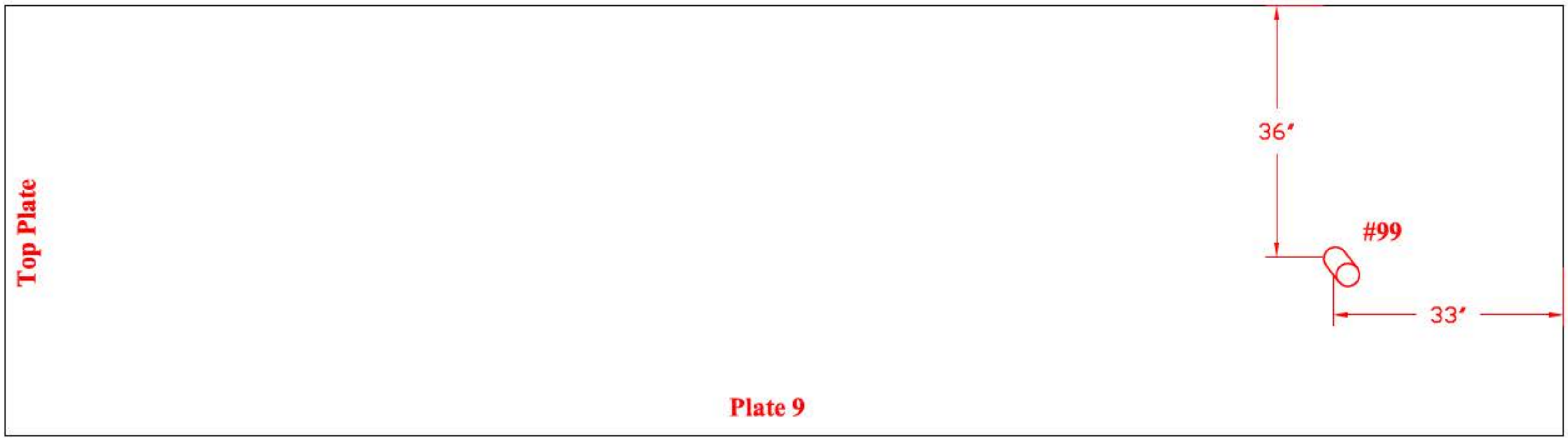
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 3
Plate #: 9

Flaw # - Type - Remaining:

#99 - Grout Nozzle - 0.198"R

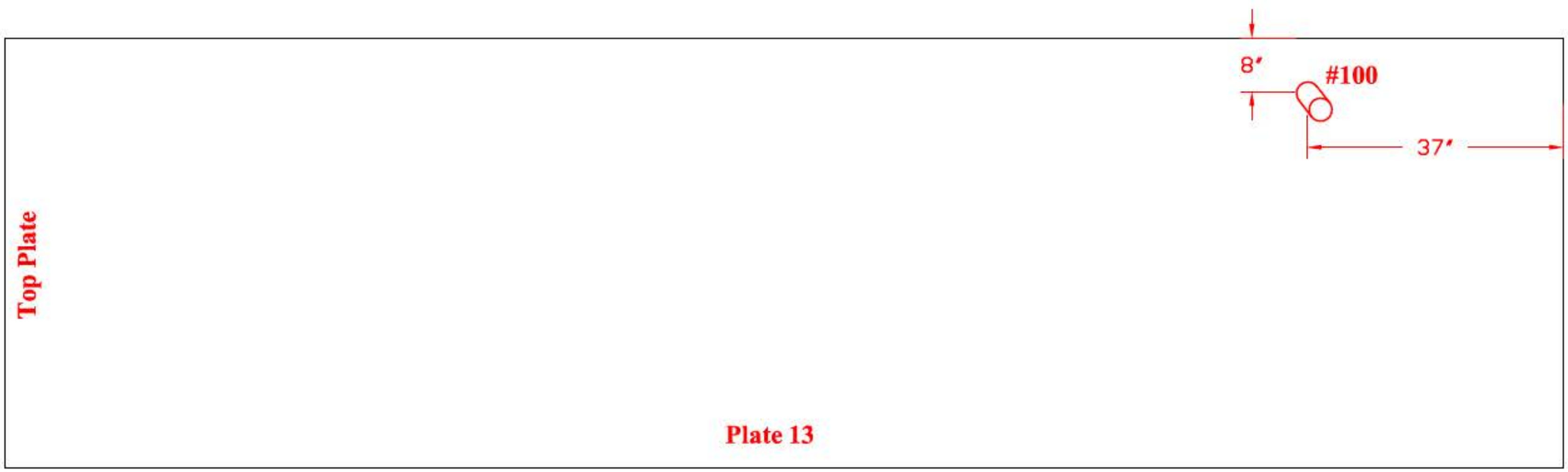


Tank Section: Lower Dome
Quadrant: A

Course: 4
Plate #: 13

Flaw # - Type - Remaining:

#100 - Grout Nozzle - 0.219"R



Drawing is not to scale

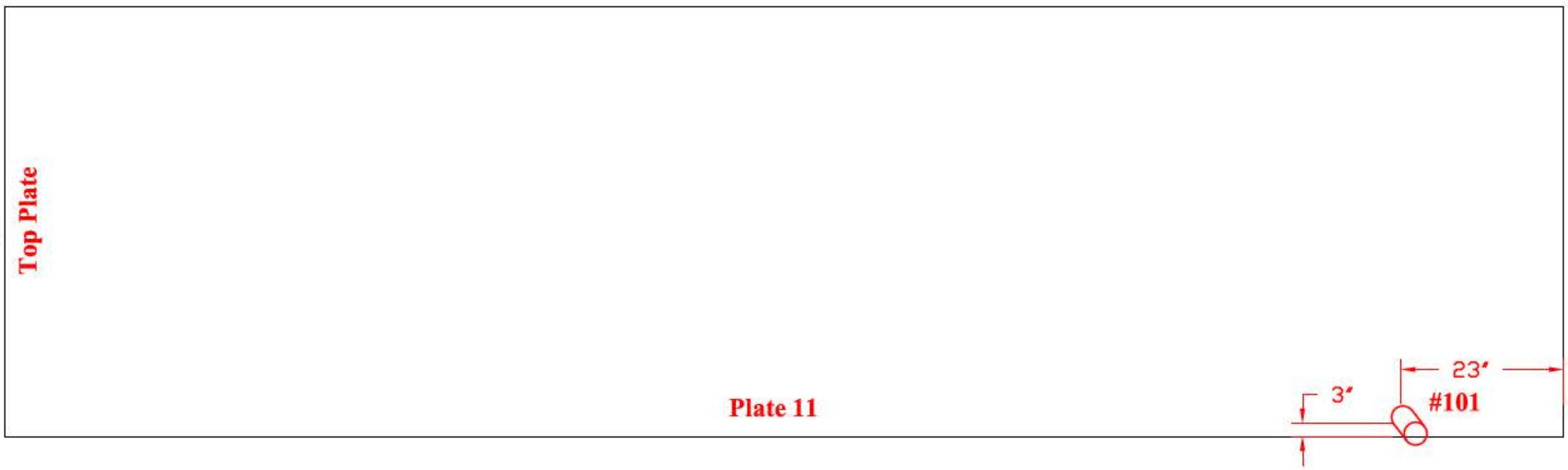
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 4
Plate #: 11

Flaw # - Type - Remaining:

#101 - Grout Nozzle - 0.222"R



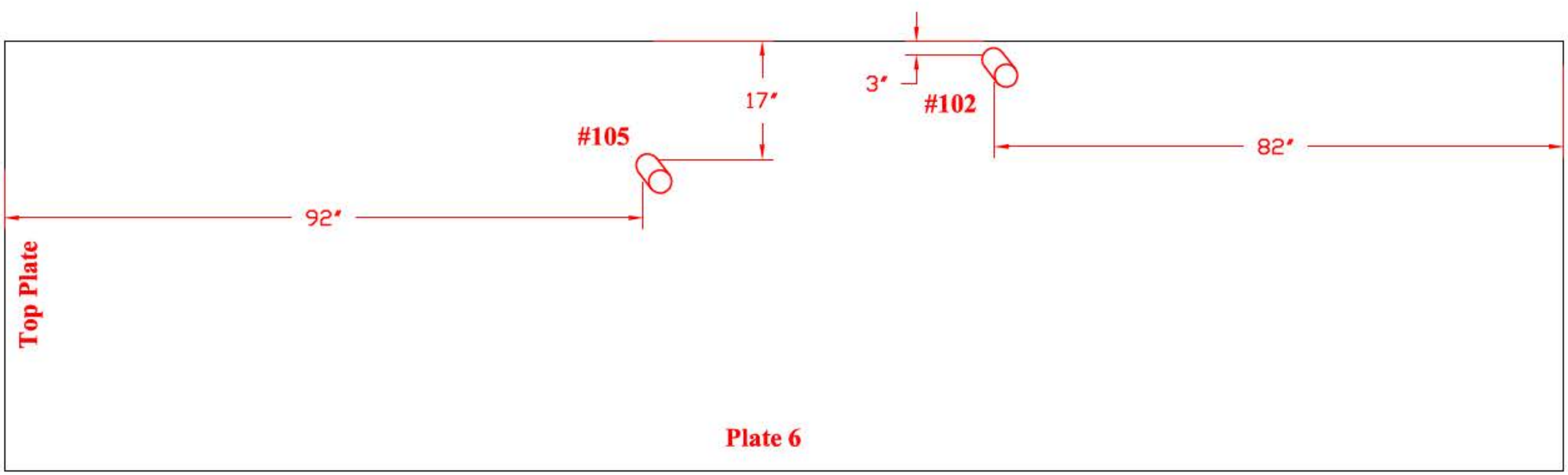
Tank Section: Lower Dome
Quadrant: A

Course: 3
Plate #: 6

Flaw # - Type - Remaining:

#102 - Grout Nozzle - 0.223"R

#105 - Grout Nozzle - 0.213"R



Drawing is not to scale

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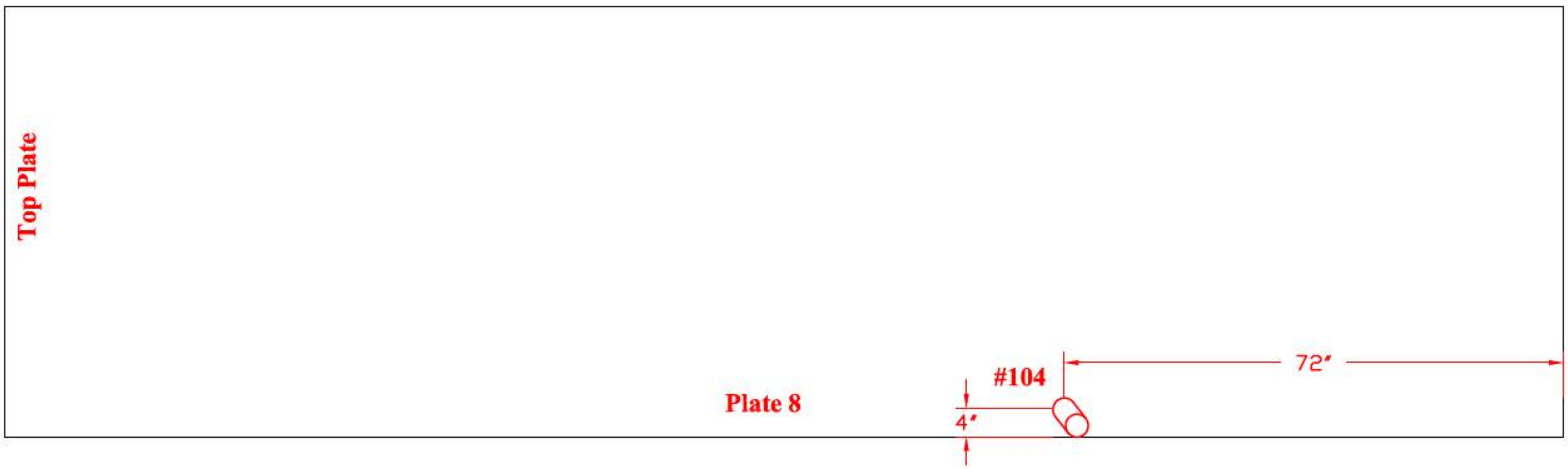
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 3
Plate #: 8

Flaw # - Type - Remaining:

#104 - Grout Nozzle - 0.230"R



Drawing is not to scale

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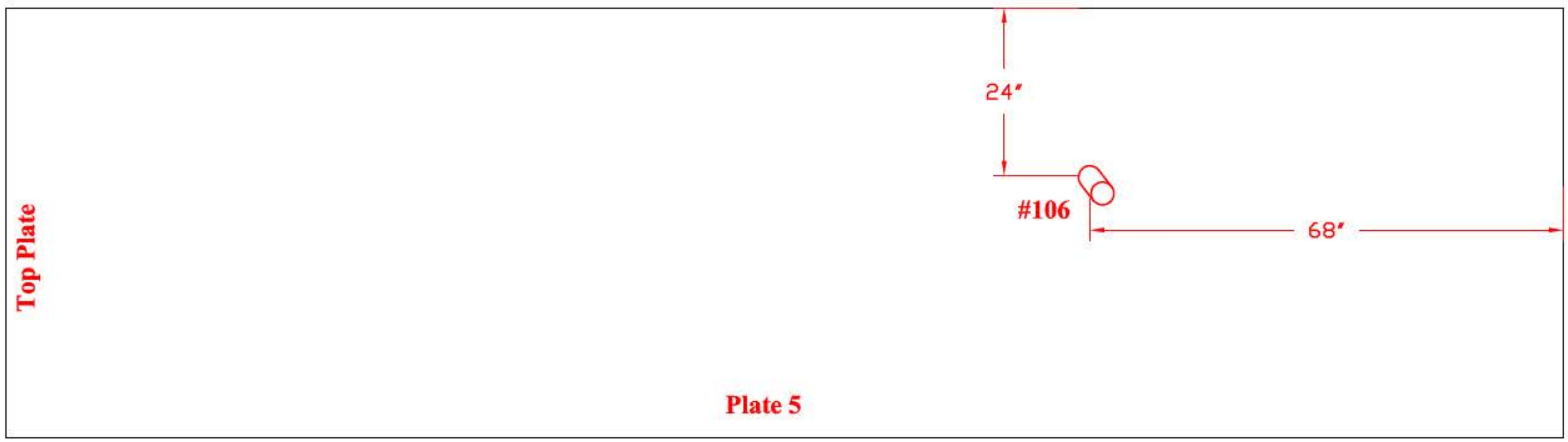
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 3
Plate #: 6

Flaw # - Type - Remaining:
#106 - Grout Nozzle - 0.222"R



Drawing is not to scale

TANK # 20 - QUADRANT A

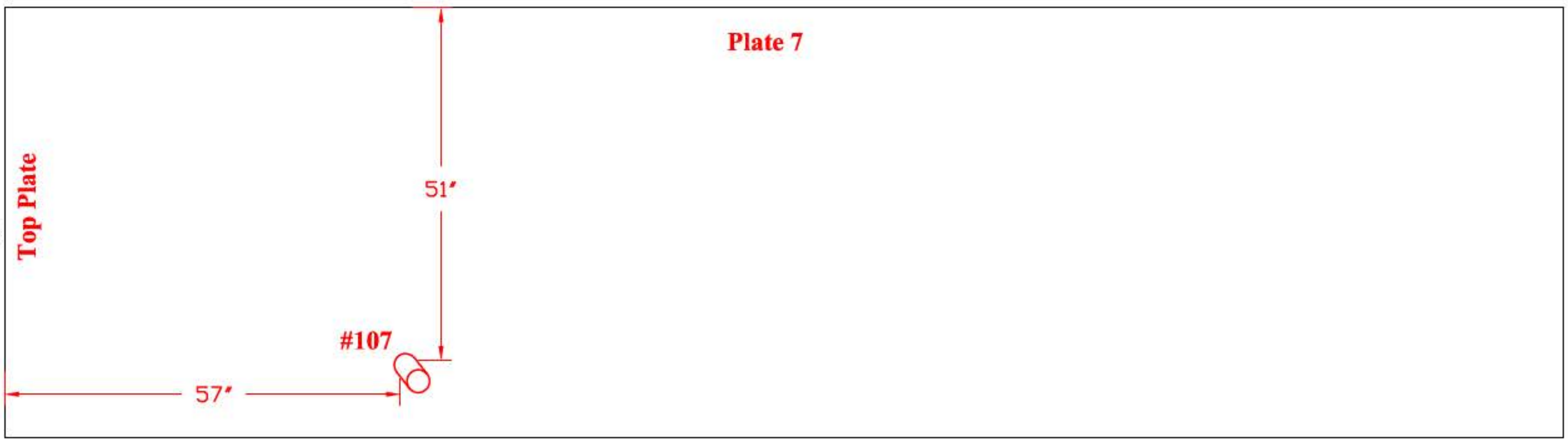
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 4
Plate #: 7

Flaw # - Type - Remaining:

#107 - Grout Nozzle - 0.214"R

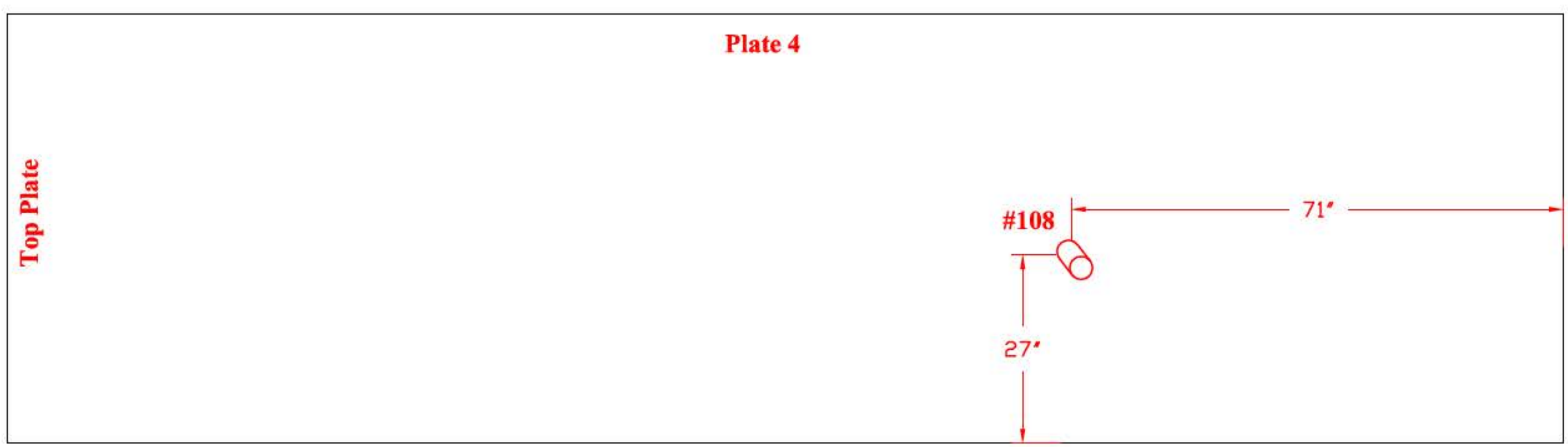


Tank Section: Lower Dome
Quadrant: A

Course: 3
Plate #: 4

Flaw # - Type - Remaining:

#108 - Grout Nozzle - 0.215"R



Drawing is not to scale

TANK # 20 - QUADRANT A
***Nominal Plate Thickness: 0.250"**

Tank Section: Lower Dome
Quadrant: A

Course: 3
Plate #: 3

Flaw # - Type - Remaining:

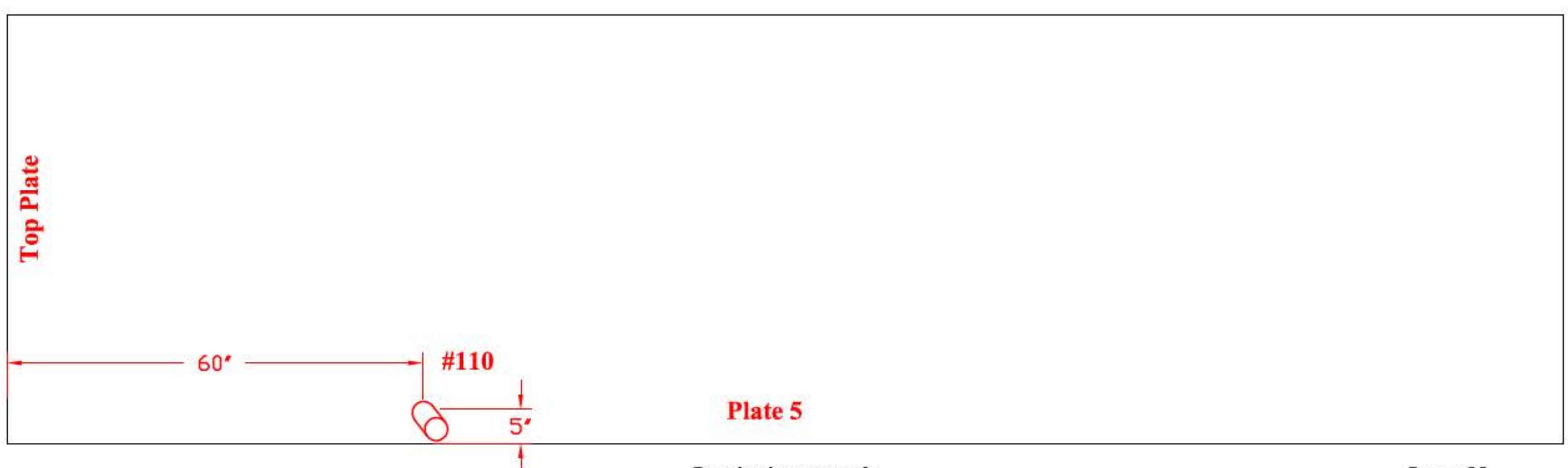
#109 - Grout Nozzle - 0.224"R

Tank Section: Lower Dome
Quadrant: A

Course: 4
Plate #: 5

Flaw # - Type - Remaining:

#110 - Grout Nozzle - 0.220"R



Drawing is not to scale

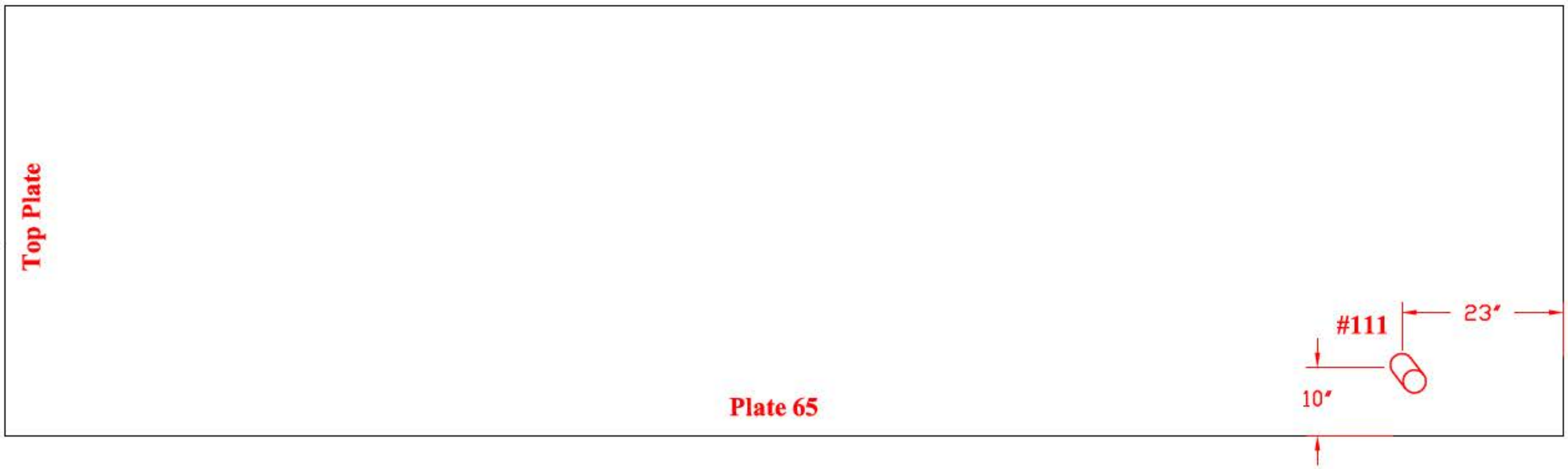
TANK # 20 - QUADRANT D

***Nominal Plate Thickness: 0.250"**

Tank Section: Lower Dome
Quadrant: D

Course: 4
Plate #: 65
Flaw # - Type - Remaining:

#111 - Grout Nozzle - 0.228"R

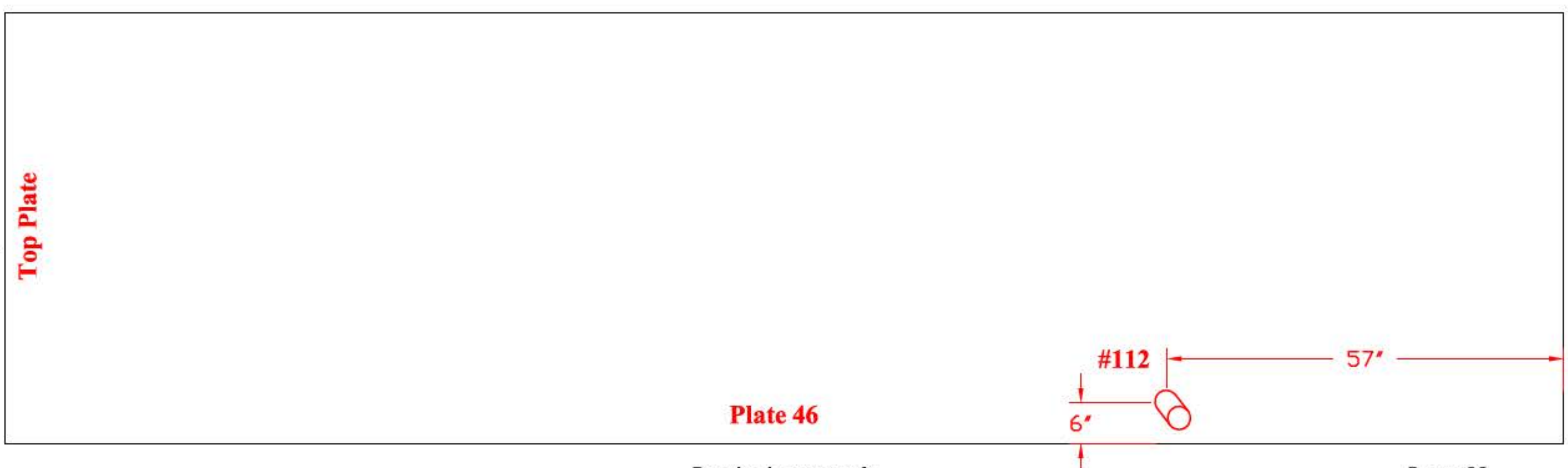


Tank Section: Lower Dome
Quadrant: D

Course: 4
Plate #: 46

Flaw # - Type - Remaining:

#112 - Grout Nozzle - 0.201"R



Drawing is not to scale

TANK # 20 - QUADRANT B AND C

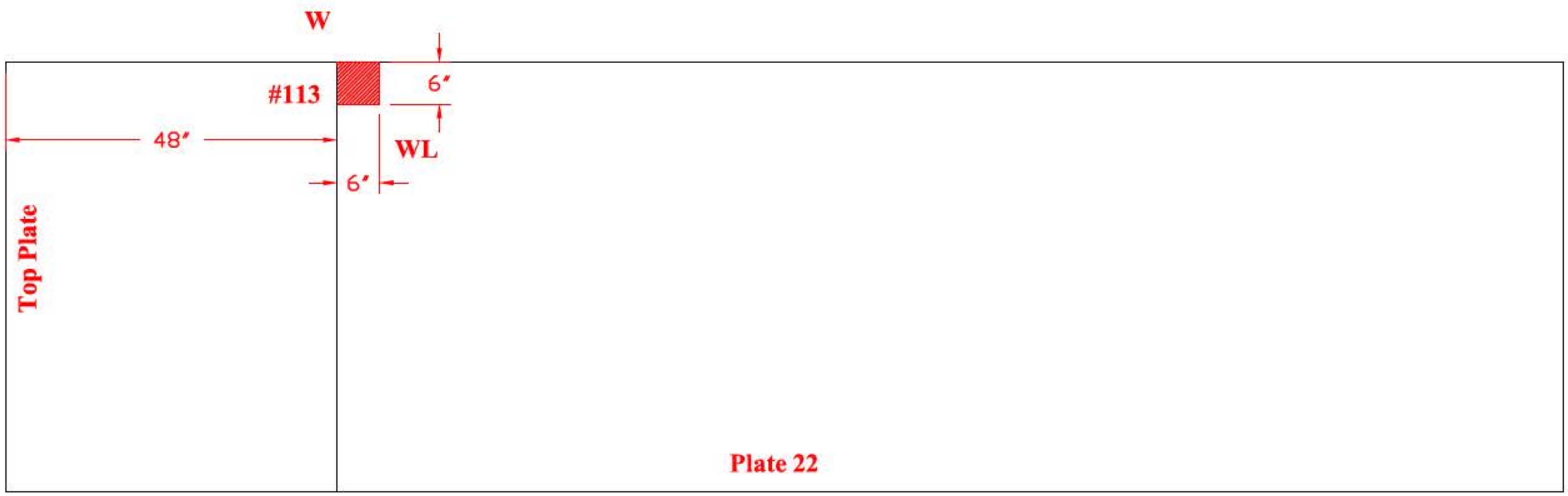
***Nominal Plate Thickness: 0.250"**

Tank Section: Lower Dome
Quadrant: B

Course: 3
Plate #: 22

Flaw # - Type - Remaining:

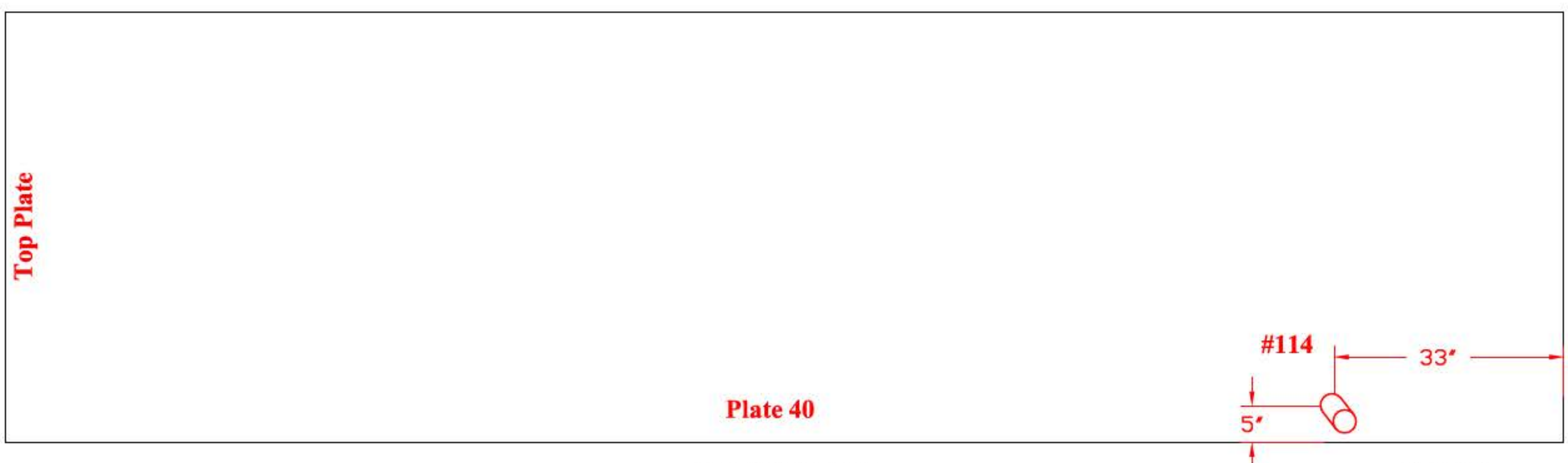
#113 - Wall Loss - 0.232"R



Tank Section: Lower Dome
Quadrant: C

Course: 4
Plate #: 40
Flaw # - Type - Remaining:

#114 - Grout Nozzle - 0.212"R



Drawing is not to scale

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

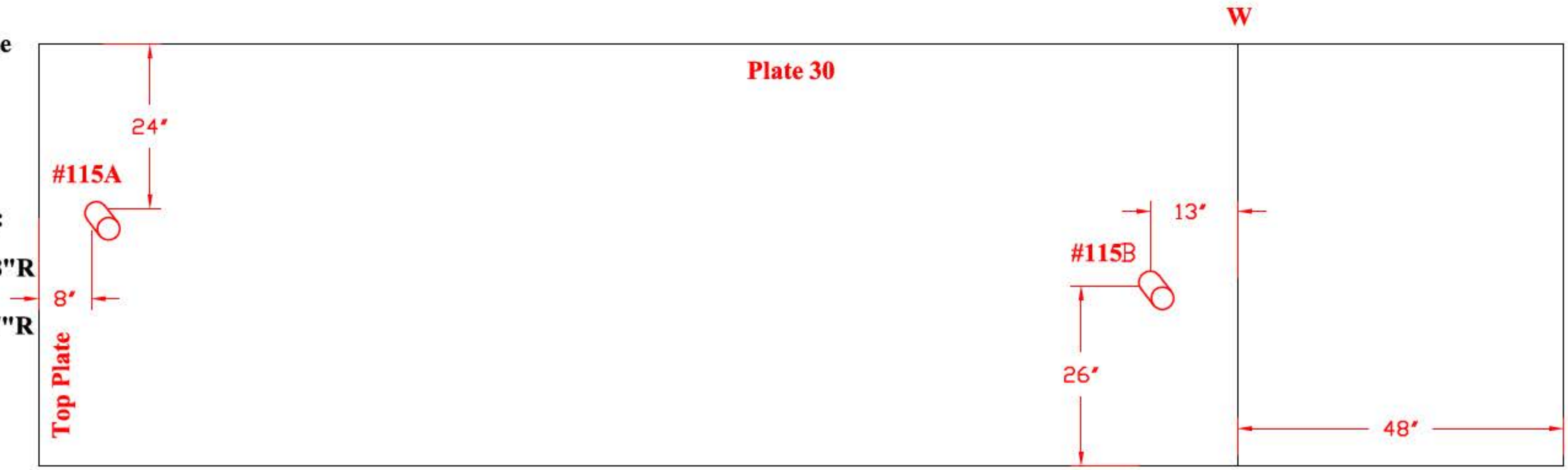
Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 30

Flaw # - Type - Remaining:

#115A - Grout Nozzle - 0.228"R

#115B - Grout Nozzle - 0.207"R

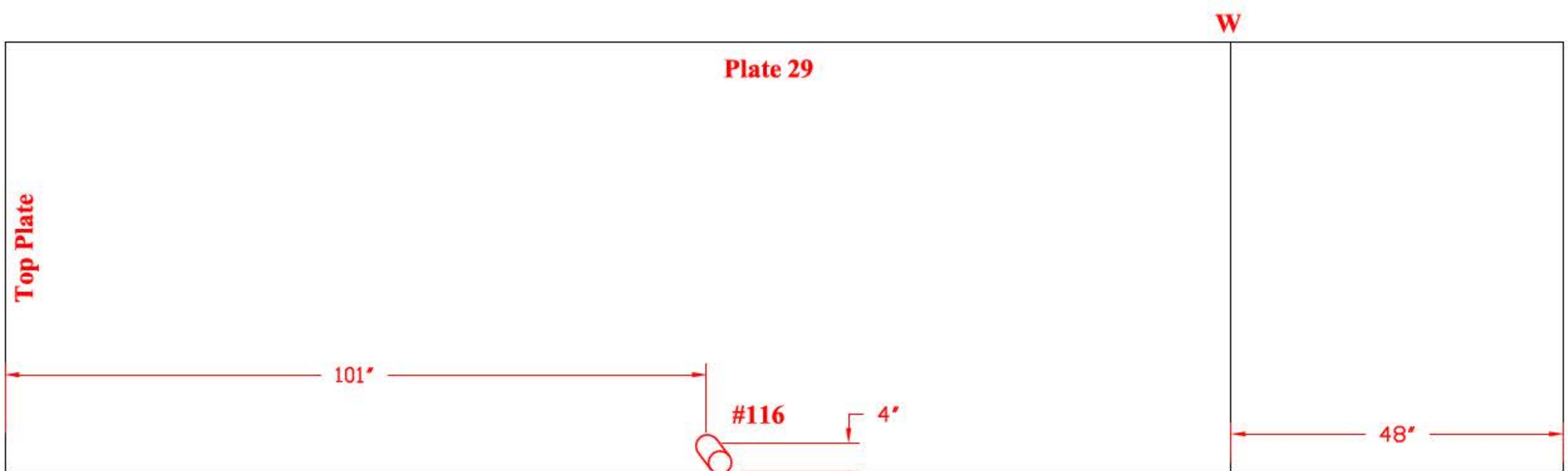


Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 29

Flaw # - Type - Remaining:

#116 - Grout Nozzle - 0.210"R



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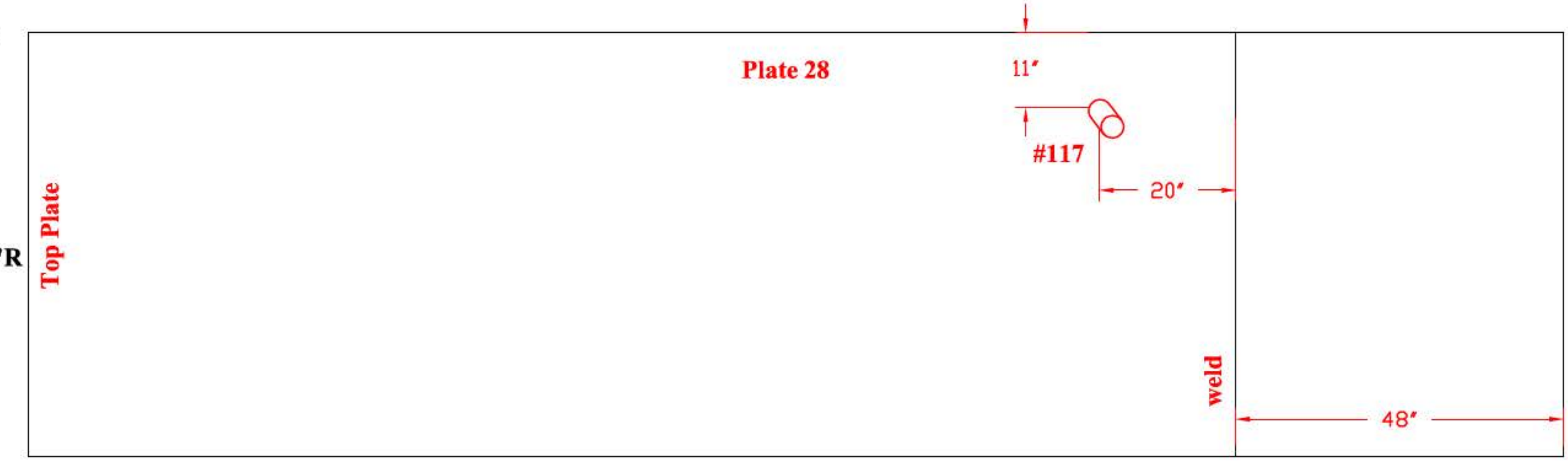
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 28

Flaw # - Type - Remaining:

#117 - Grout Nozzle - 0.216"R



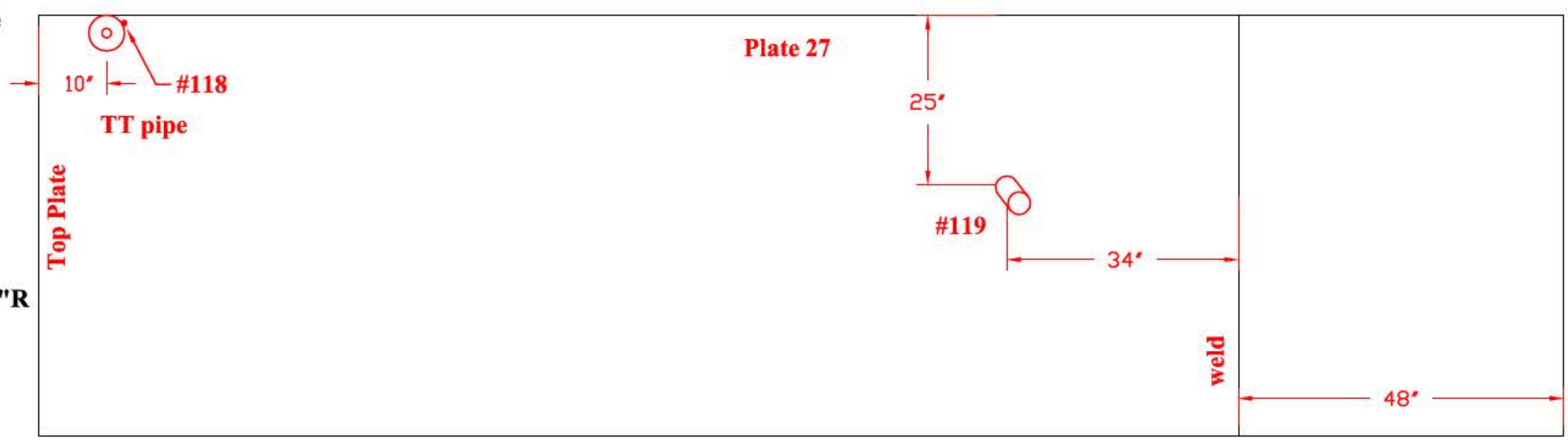
Tank Section: Lower Dome
Quadrant: C

Course: 3
Plate #: 27

Flaw # - Type - Remaining:

#118 - Pitting - 0.233"R

#119 - Grout Nozzle - 0.205"R



Drawing is not to scale

TesTex
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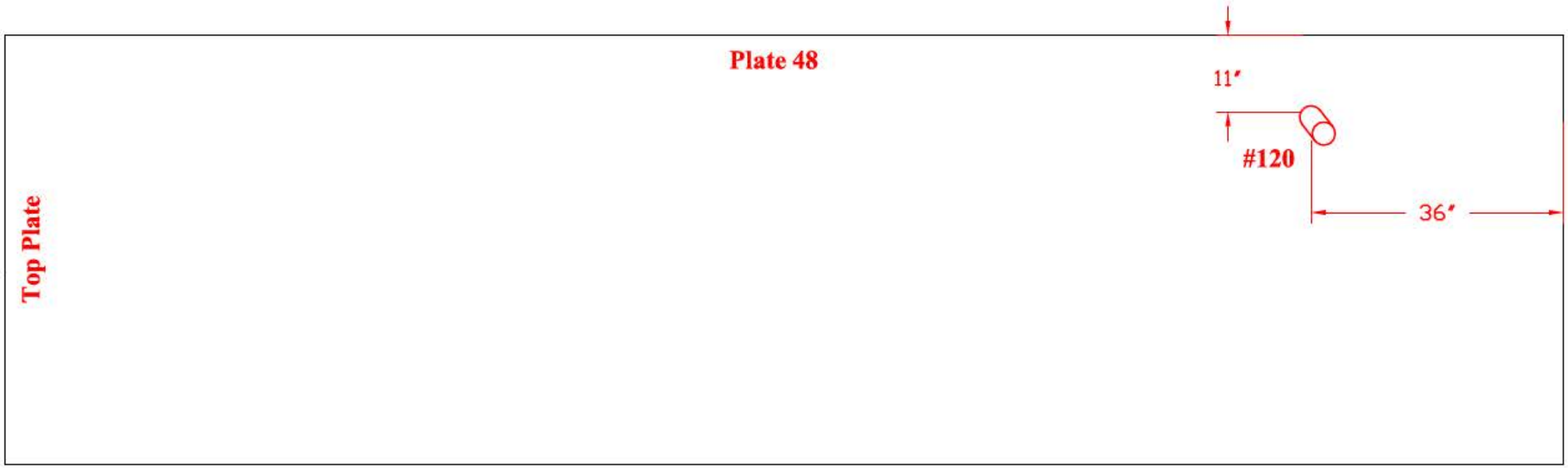
TANK # 20 - QUADRANT C AND D

Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: C

Course: 4
Plate #: 48
Flaw # - Type - Remaining:

#120 - Grout Nozzle - 0.211"R

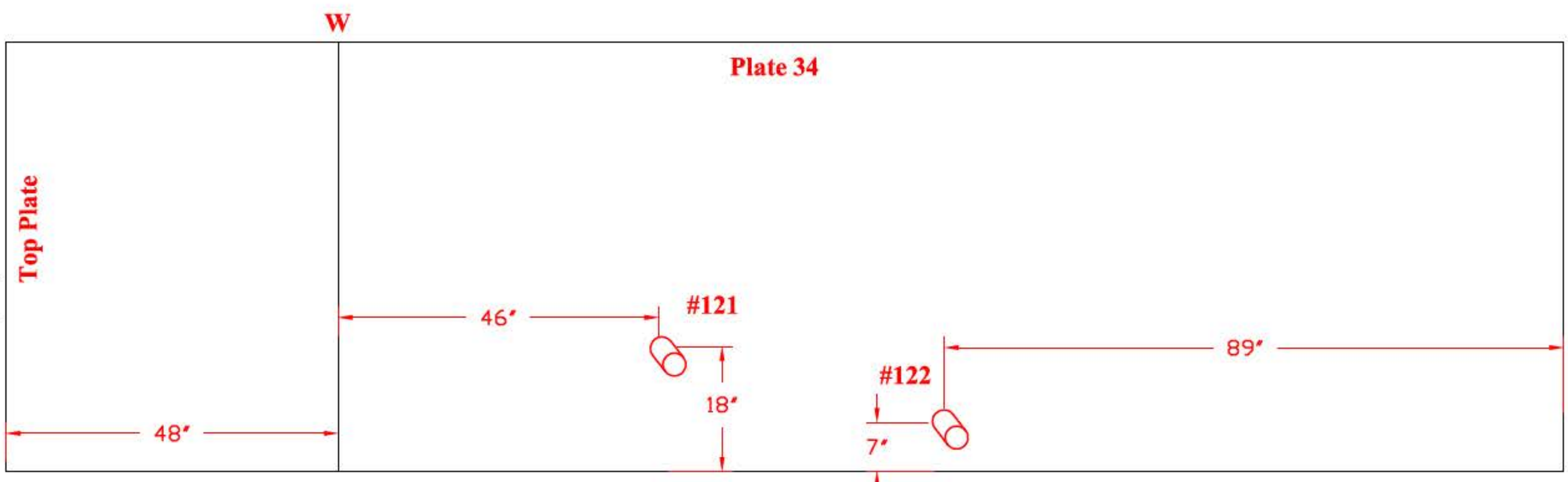


Tank Section: Lower Dome
Quadrant: D

Course: 3
Plate #: 34

Flaw # - Type - Remaining:

#121 - Grout Nozzle - 0.200"R
#122 - Grout Nozzle - 0.215"R



Drawing is not to scale

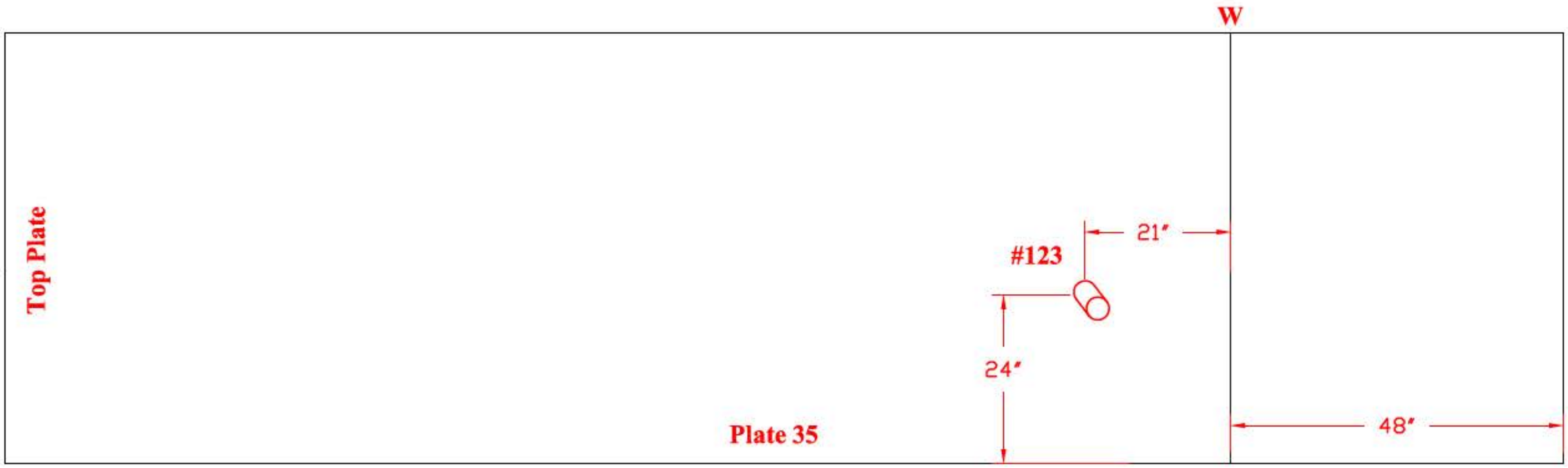
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 3
Plate #: 35

Flaw # - Type - Remaining:

#123 - Grout Nozzle - 0.200"R

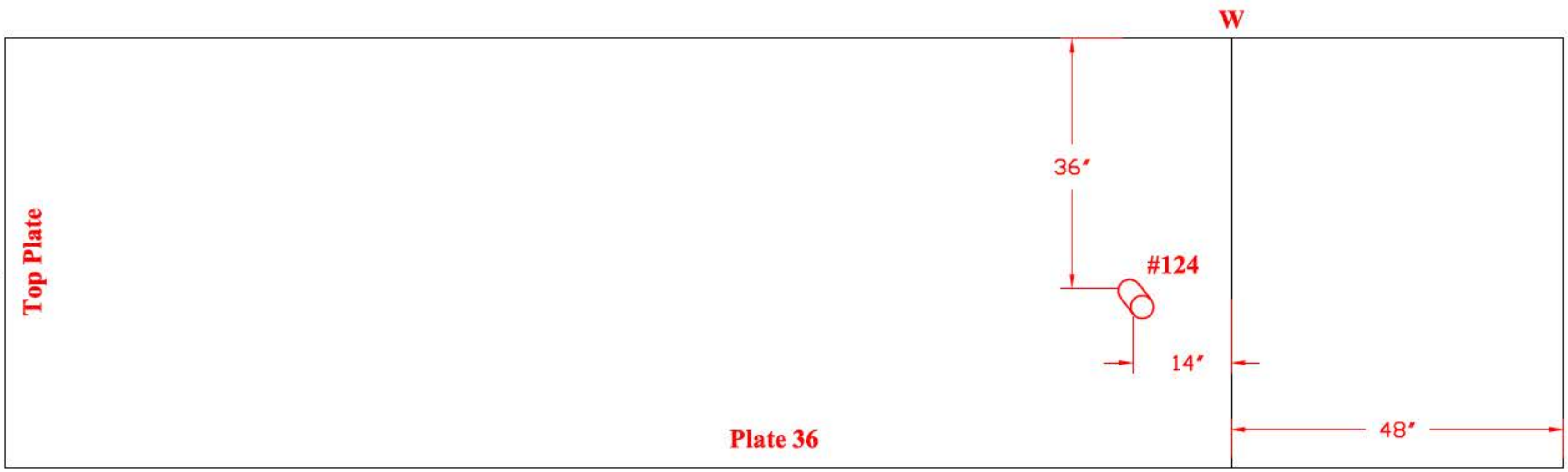


Tank Section: Lower Dome
Quadrant: D

Course: 3
Plate #: 36

Flaw # - Type - Remaining:

#124 - Grout Nozzle - 0.219"R



Drawing is not to scale

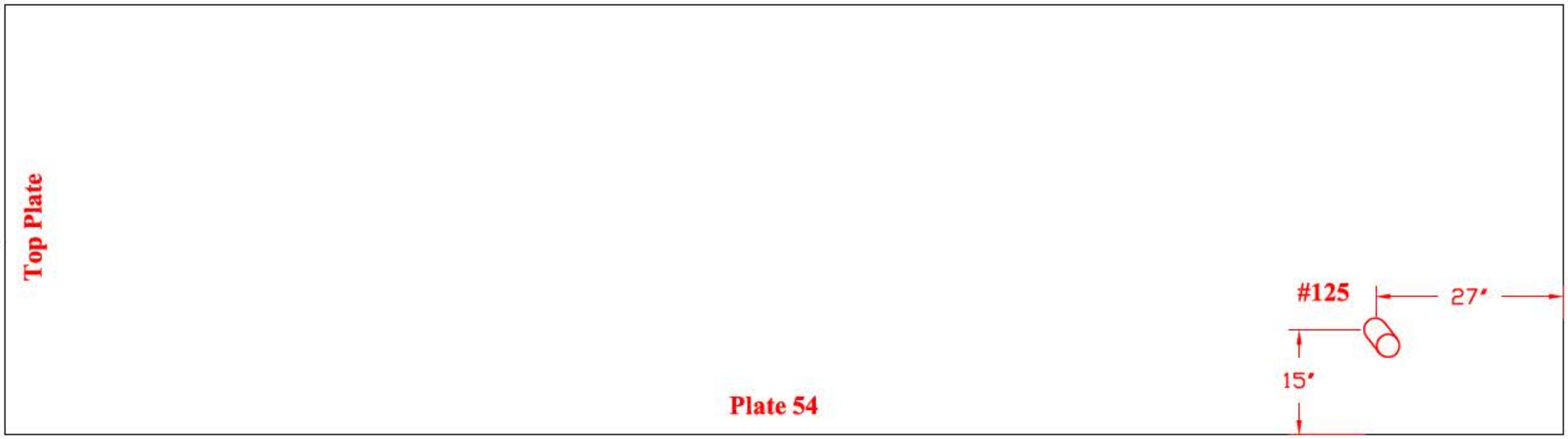
TANK # 20 - QUADRANT D

Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 4
Plate #: 54
Flaw # - Type - Remaining:

#125 - Grout Nozzle - 0.212"R

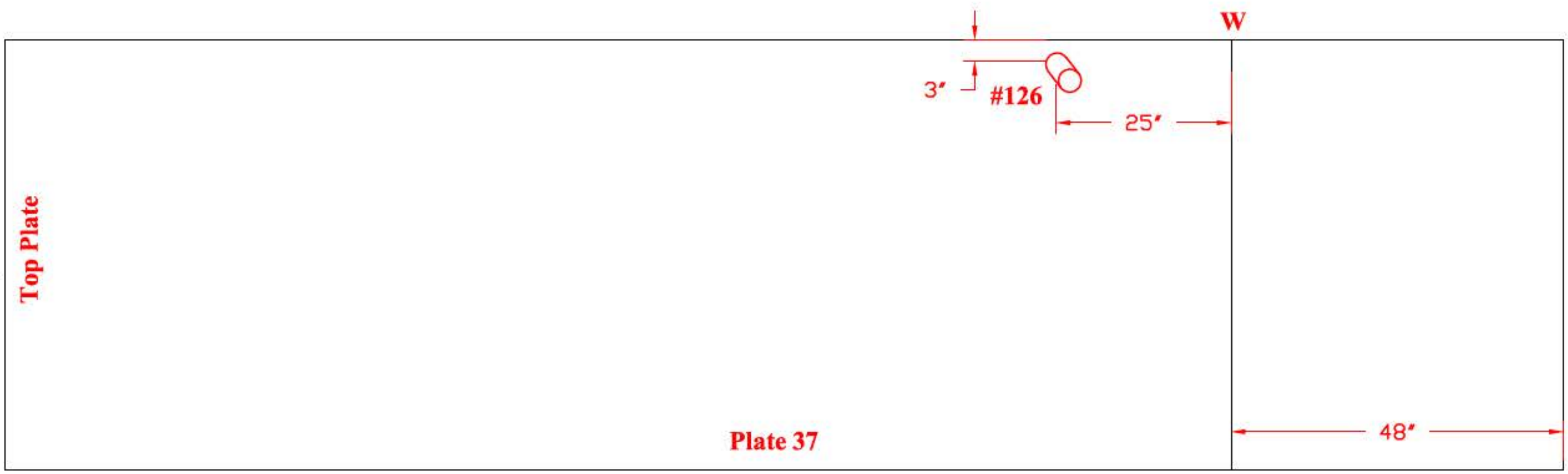


Tank Section: Lower Dome
Quadrant: D

Course: 3
Plate #: 37

Flaw # - Type - Remaining:

#126 - Grout Nozzle - 0.213"R



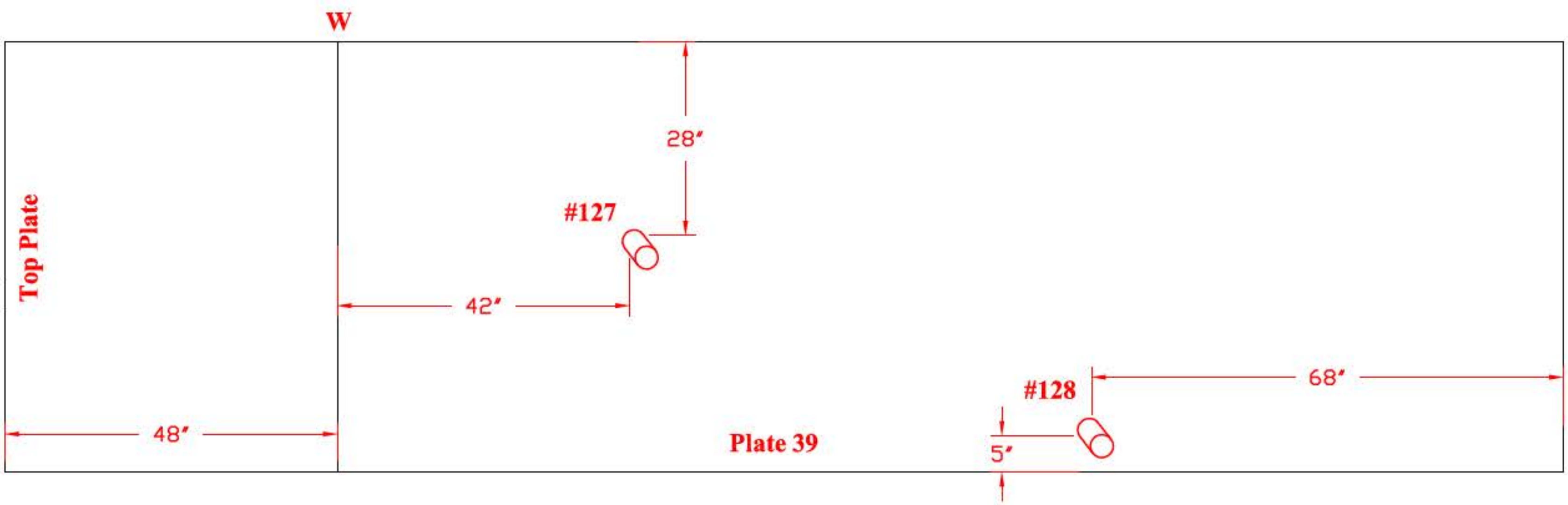
Drawing is not to scale

TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 3
Plate #: 39
Flaw # - Type - Remaining:

#127 - Grout Nozzle - 0.204"R
#128 - Grout Nozzle - 0.212"R

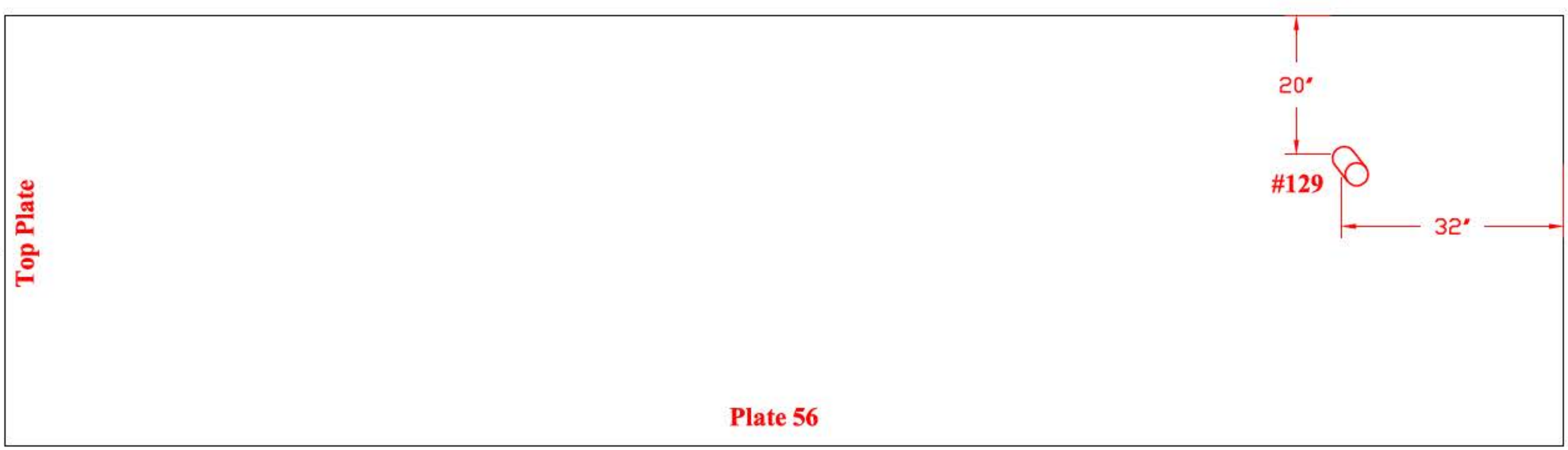


Tank Section: Lower Dome
Quadrant: D

Course: 4
Plate #: 56

Flaw # - Type - Remaining:

#129 - Grout Nozzle - 0.213"R



Drawing is not to scale

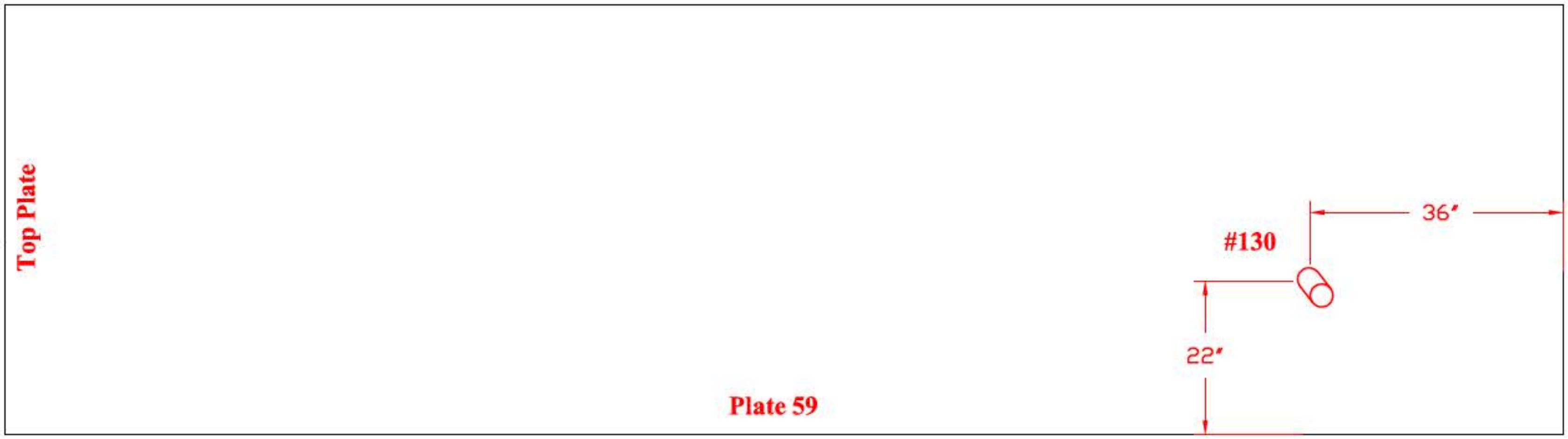
TANK # 20 - QUADRANT D

Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 4
Plate #: 59
Flaw # - Type - Remaining:

#130 - Grout Nozzle - 0.207"R

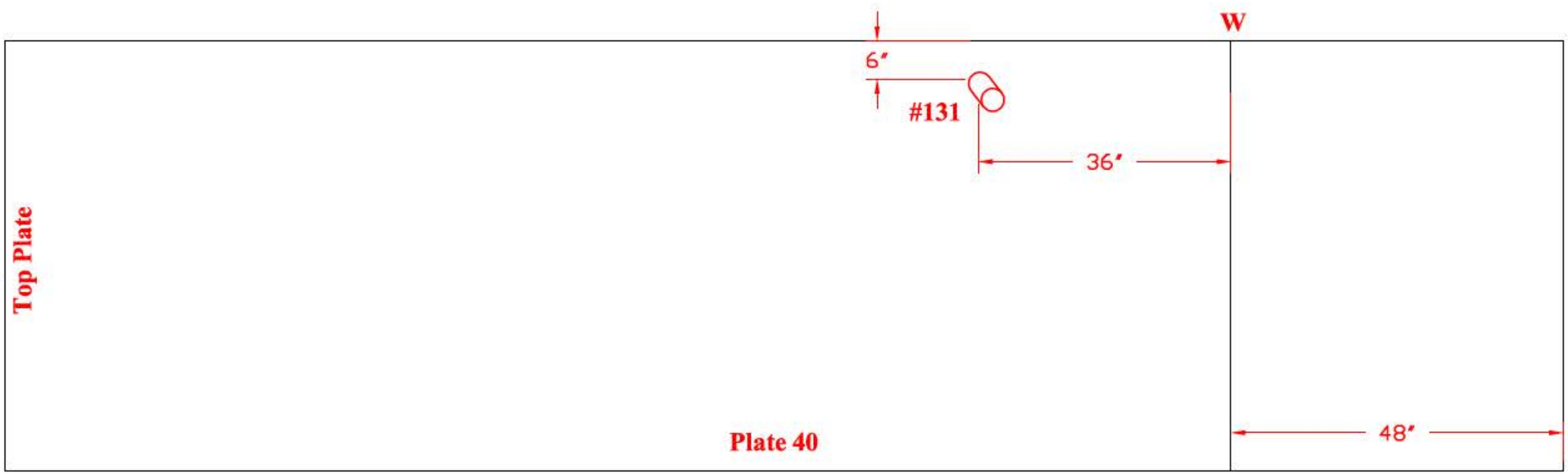


Tank Section: Lower Dome
Quadrant: D

Course: 3
Plate #: 40

Flaw # - Type - Remaining:

#131 - Grout Nozzle - 0.212"R



Drawing is not to scale

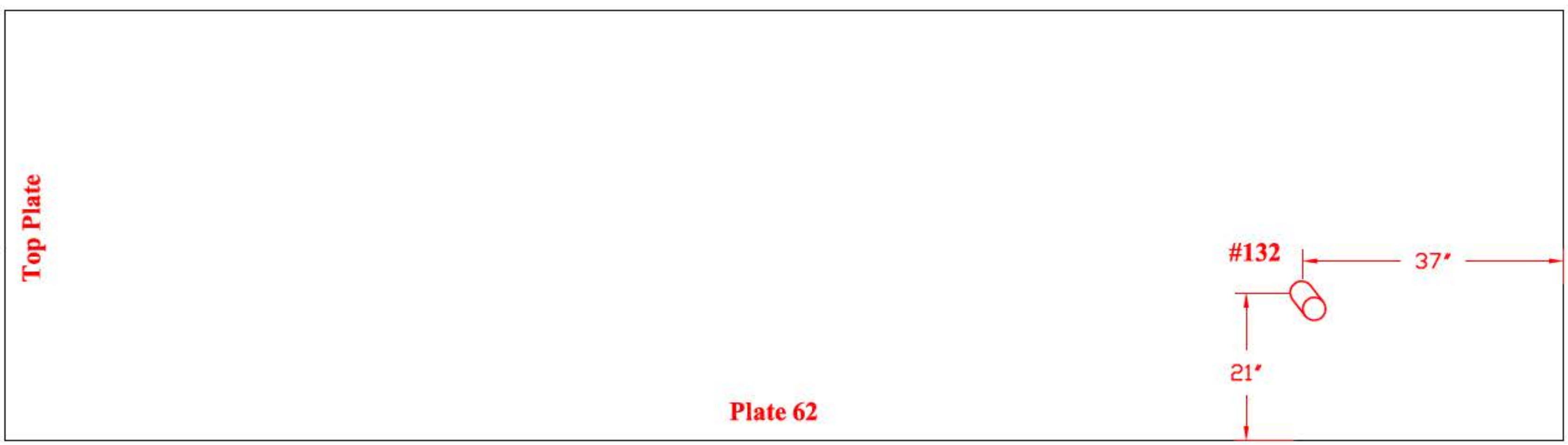
TANK # 20 - QUADRANT D

Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 4
Plate #: 62
Flaw # - Type - Remaining:

#132 - Grout Nozzle - 0.205"R

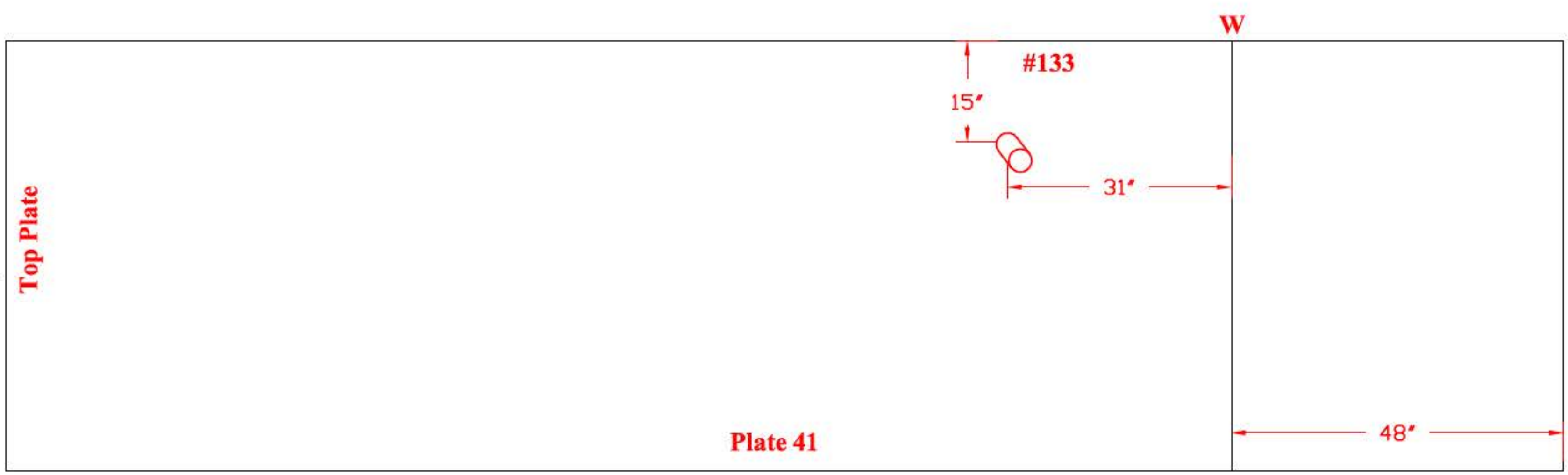


Tank Section: Lower Dome
Quadrant: D

Course: 3
Plate #: 41

Flaw # - Type - Remaining:

#133 - Grout Nozzle - 0.210"R

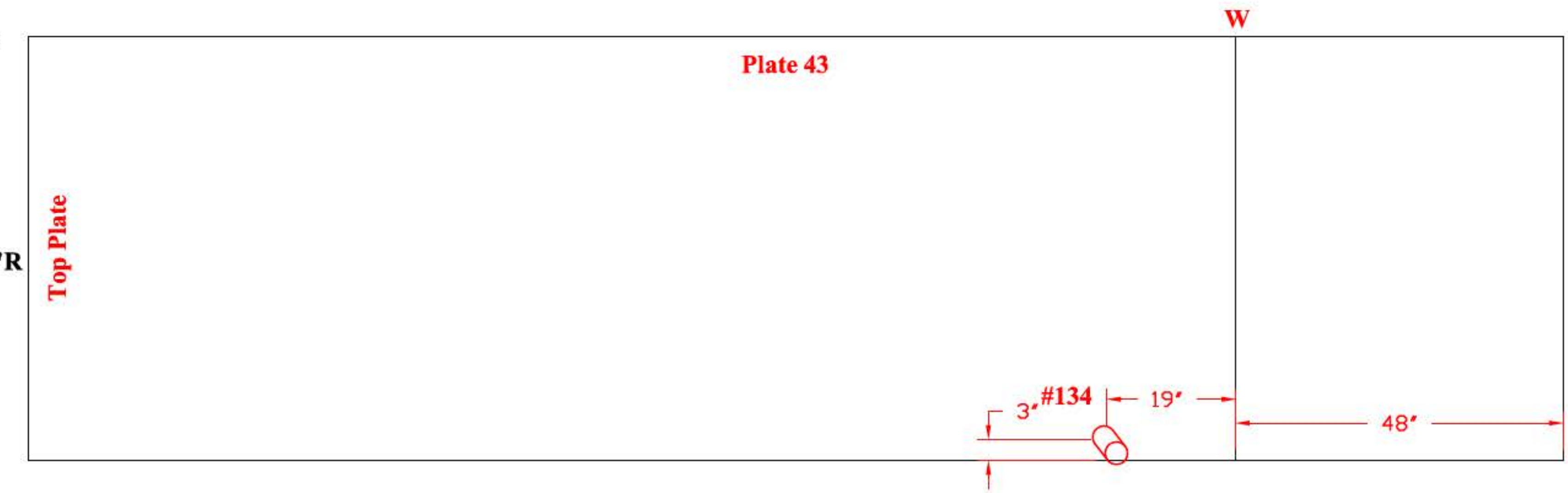


TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: D

Course: 3
Plate #: 43
Flaw # - Type - Remaining:

#134 - Grout Nozzle - 0.224"R

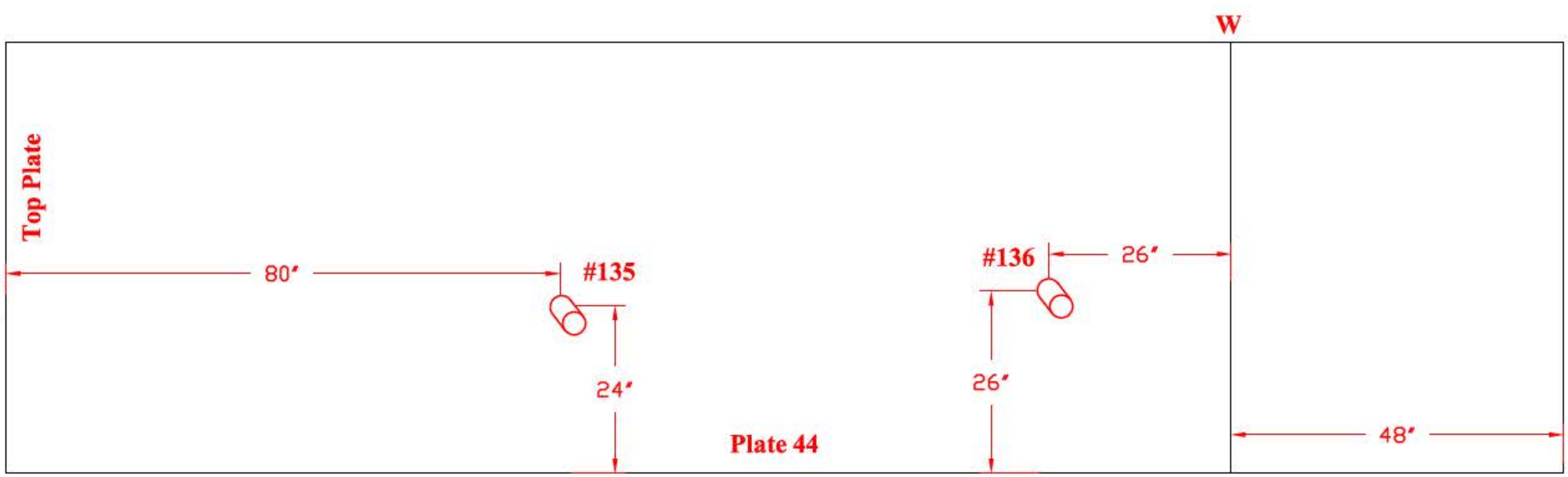


Tank Section: Lower Dome
Quadrant: D

Course: 3
Plate #: 44

Flaw # - Type - Remaining:

#135 - Grout Nozzle - 0.228"R
#136 - Grout Nozzle - 0.224"R



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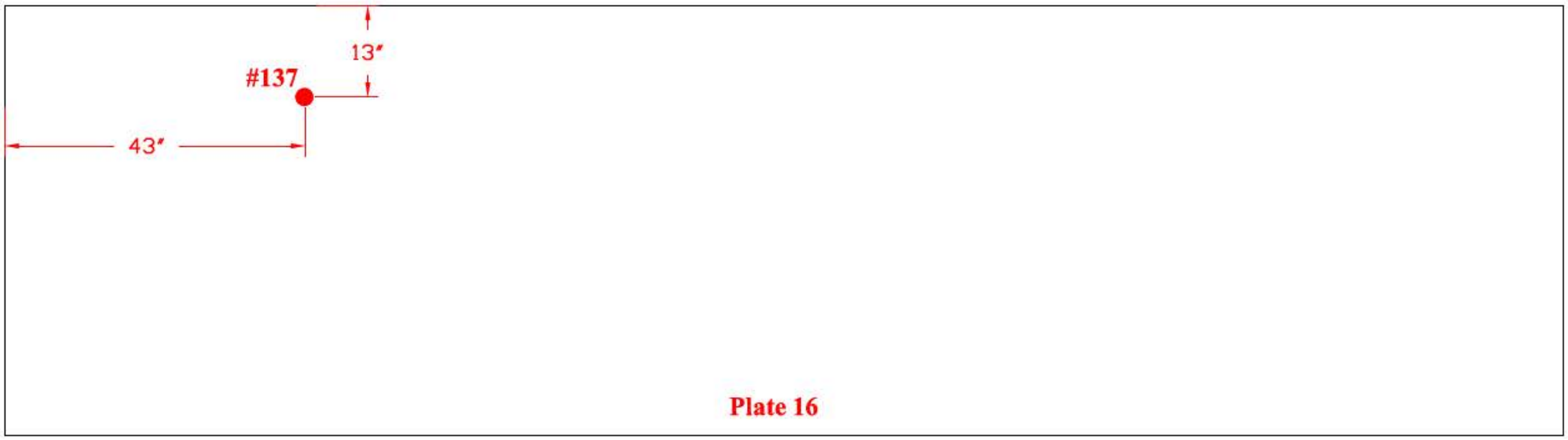
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: D

Course: 26
Plate #: 16
Flaw # - Type - Remaining:

#137 - Dent - 0.100" deep

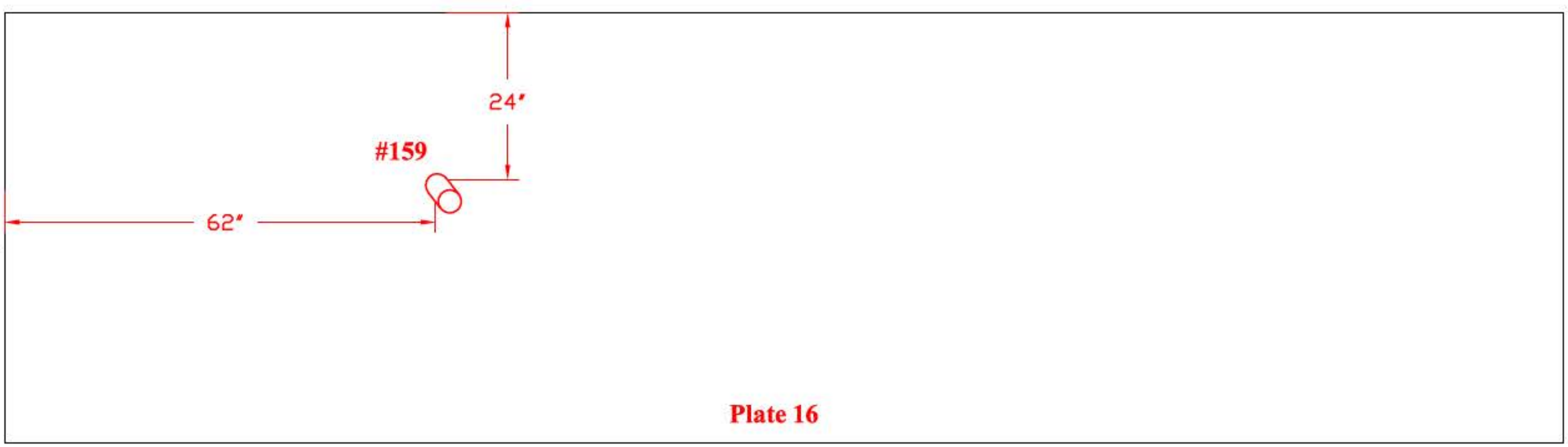


Tank Section: Barrel
Quadrant: D

Course: 5
Plate #: 16

Flaw # - Type - Remaining:

#138 - Grout Nozzle - 0.196"R



Drawing is not to scale

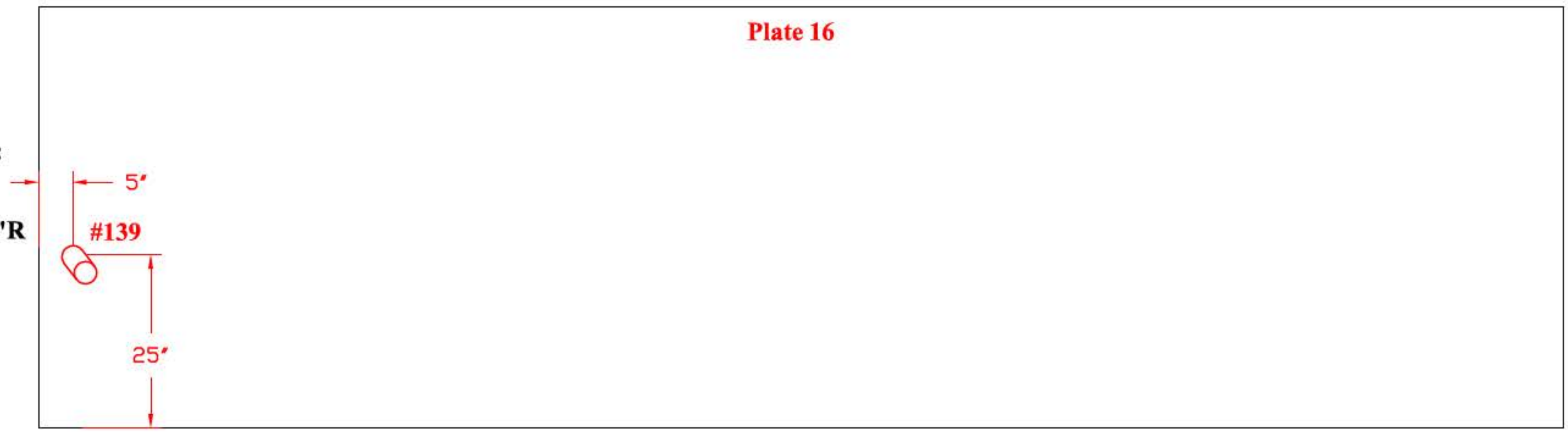
TANK # 20 - QUADRANT D

Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: D

Course: 19
Plate #: 16
Flaw # - Type - Remaining:

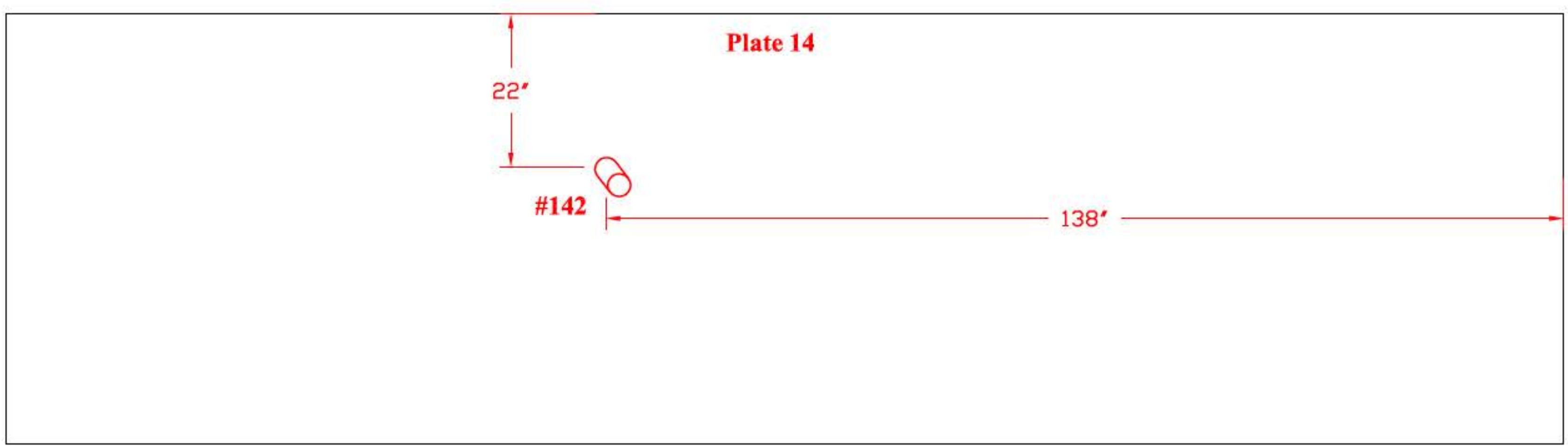
#139 - Grout Nozzle - 0.218"R



Tank Section:
Quadrant: D

Course: 12
Plate #: 14
Flaw # - Type - Remaining:

#142 - Grout Nozzle - 0.226"R



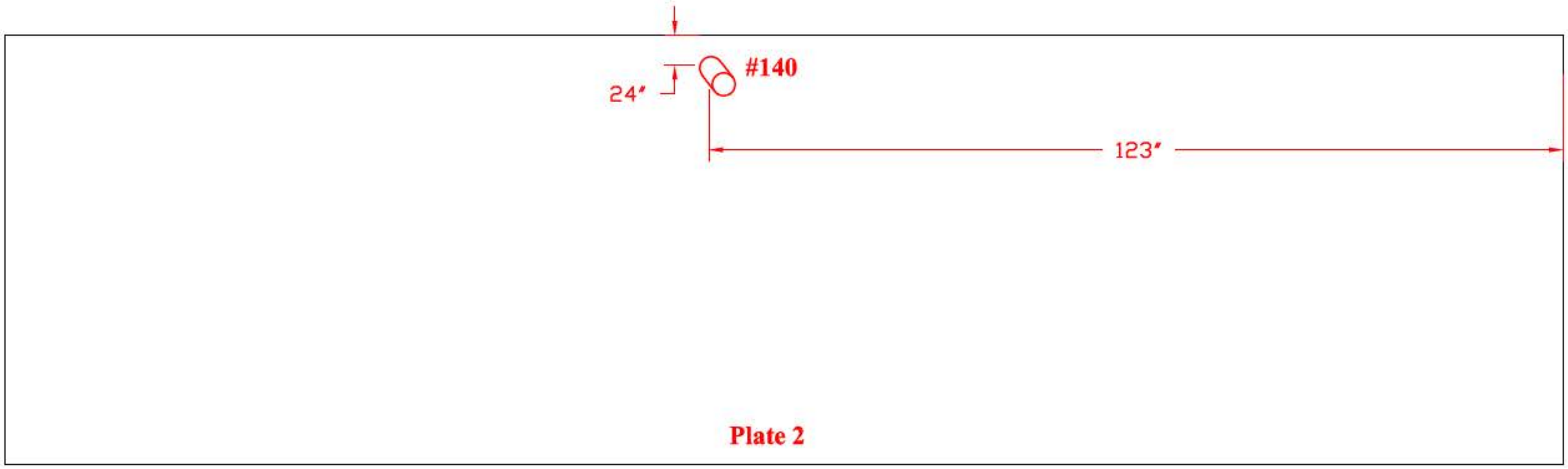
Drawing is not to scale

TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: A

Course: 12
Plate #: 2
Flaw # - Type - Remaining:

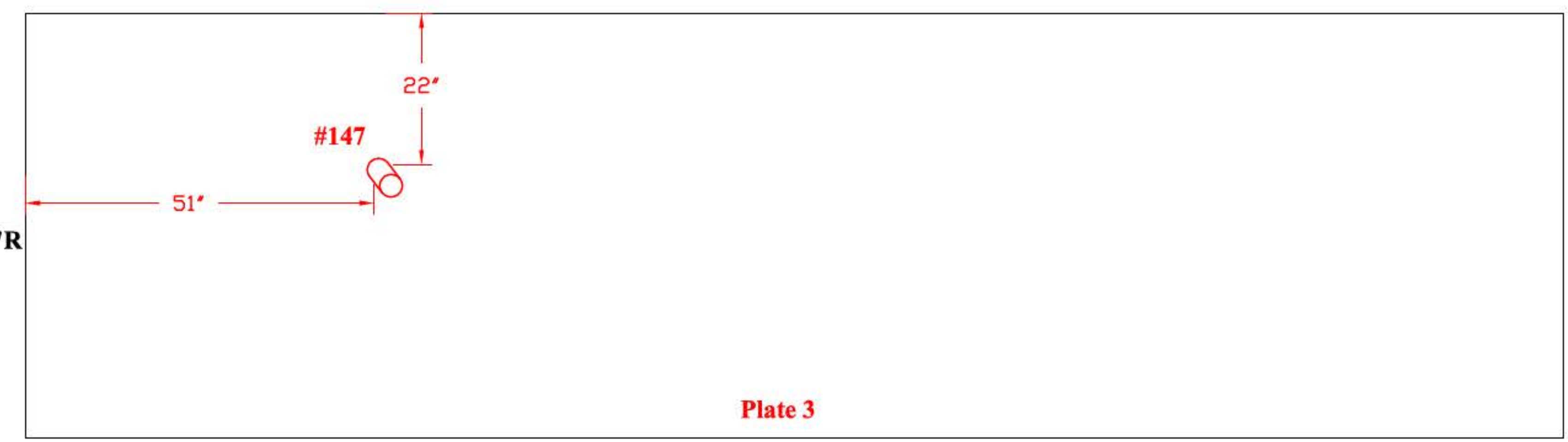
#140 - Grout Nozzle - 0.219"R



Tank Section: Barrel
Quadrant: A

Course: 19
Plate #: 3
Flaw # - Type - Remaining:

#141 - Grout Nozzle - 0.204"R



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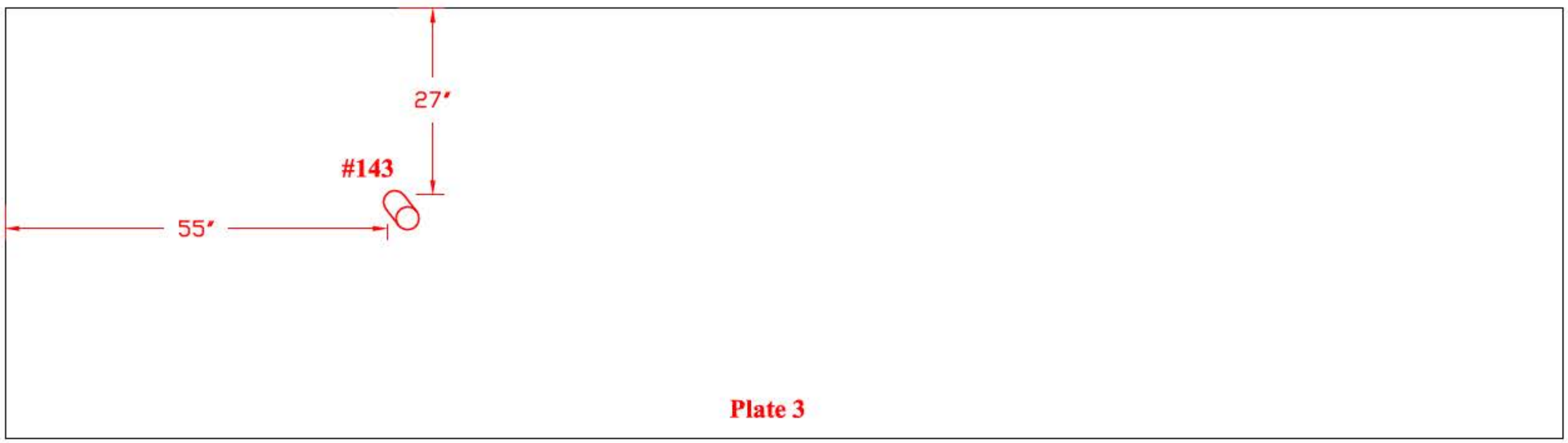
TANK # 20 - QUADRANT A AND B

Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: A

Course: 27
Plate #: 3
Flaw # - Type - Remaining:

#143 - Grout Nozzle - 0.202"R



Tank Section: Barrel
Quadrant: B

Course: 27
Plate #: 8
Flaw # - Type - Remaining:

#180 - Grout Nozzle - 0.203"R

Drawing is not to scale

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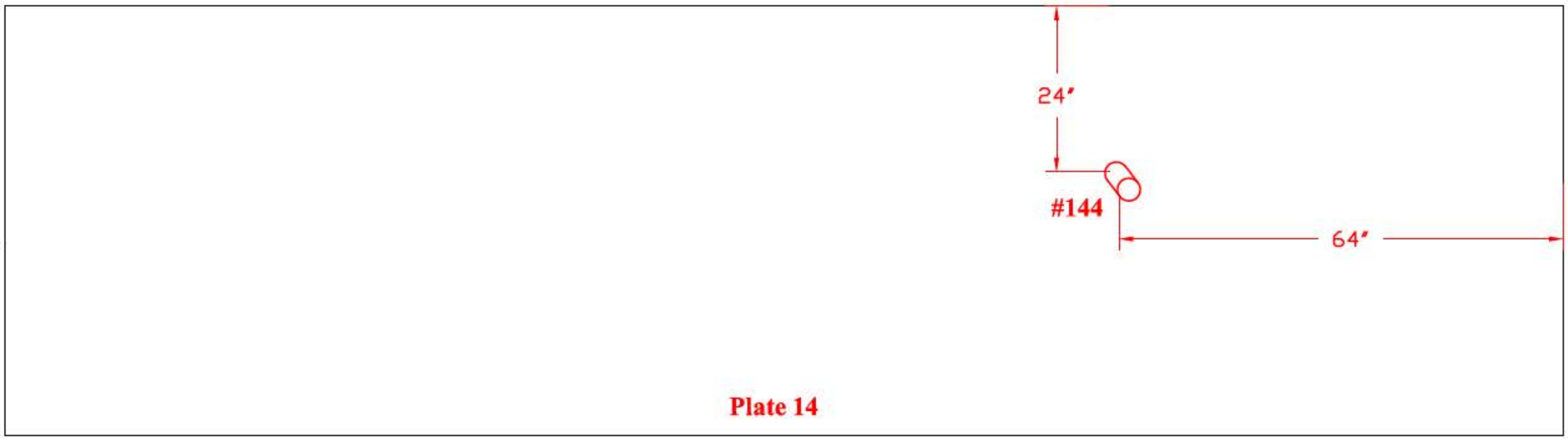
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: D

Course: 1
Plate #: 14
Flaw # - Type - Remaining:

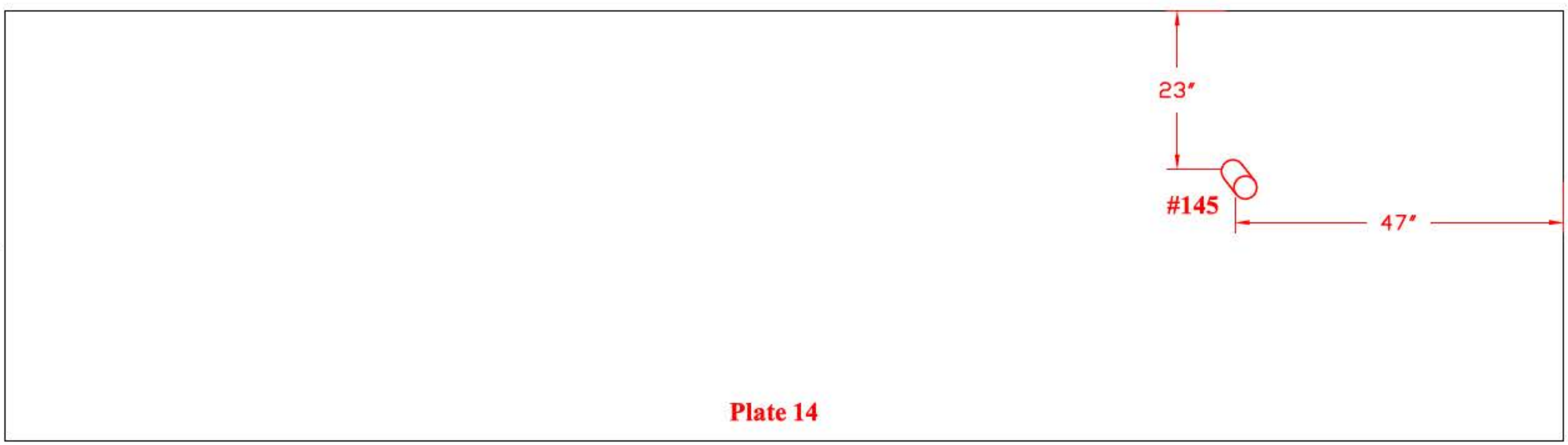
#144 - Grout Nozzle - 0.208"R



Tank Section: Barrel
Quadrant: D

Course: 5
Plate #: 14
Flaw # - Type - Remaining:

#145 - Grout Nozzle - 0.204"R



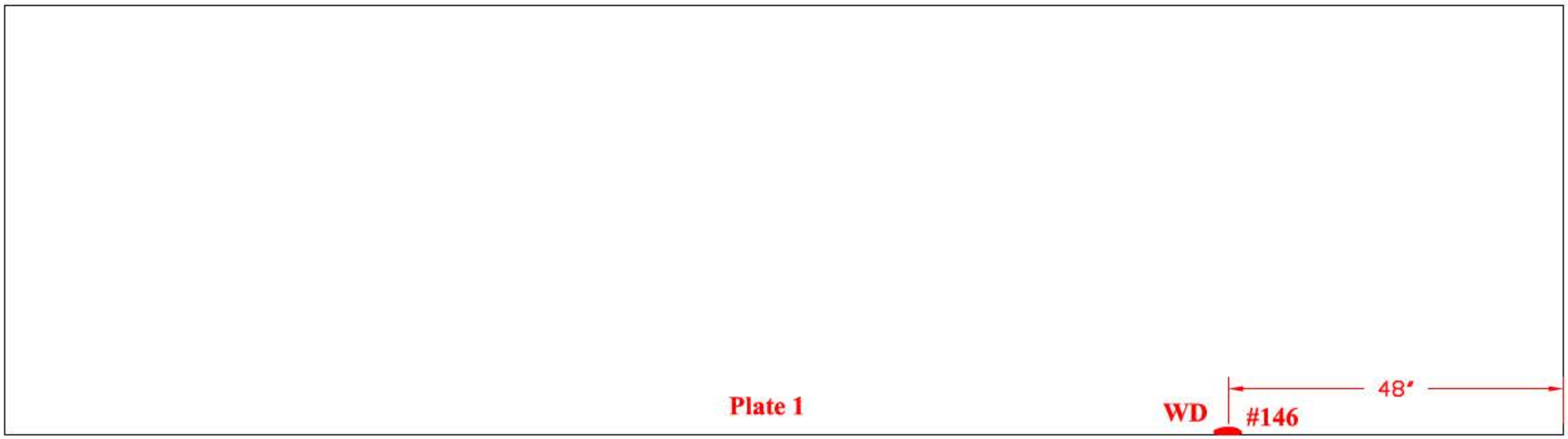
Drawing is not to scale

TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: A

Course: 11
Plate #: 1
Flaw # - Type - Remaining:

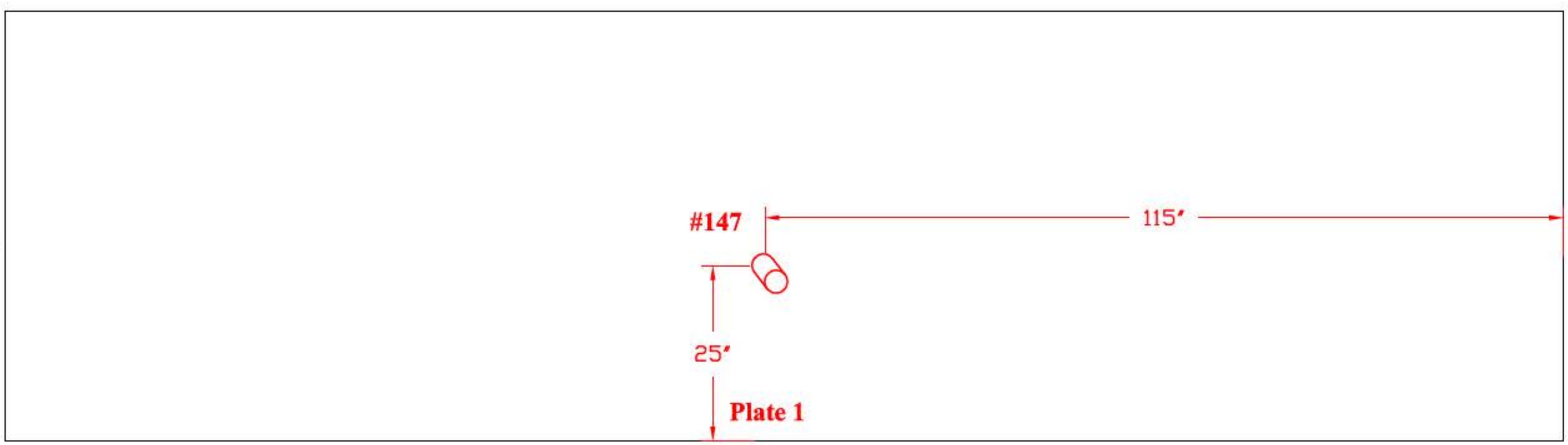
#146: LOF - .157" 5"L



Tank Section: Barrel
Quadrant: A

Course: 12
Plate #: 1
Flaw # - Type - Remaining:

#147 - Grout Nozzle - 0.230"R



Drawing is not to scale

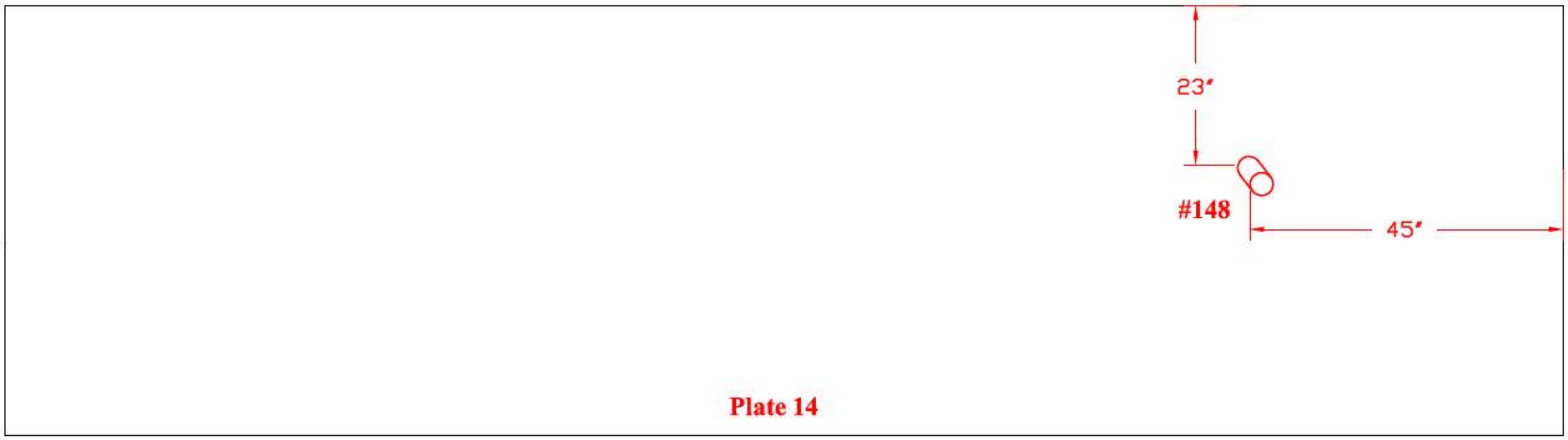
TANK # 20 - QUADRANT D

Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: D

Course: 19
Plate #: 14
Flaw # - Type - Remaining:

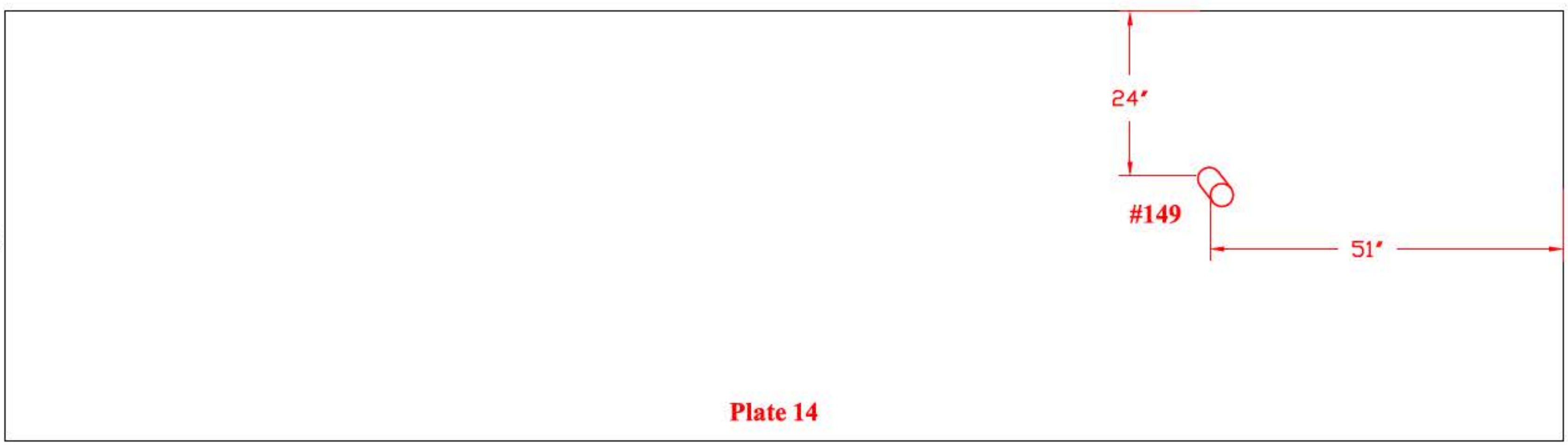
#148 - Grout Nozzle - 0.210"R



Tank Section: Barrel
Quadrant: D

Course: 27
Plate #: 14
Flaw # - Type - Remaining:

#149 - Grout Nozzle - 0.207"R



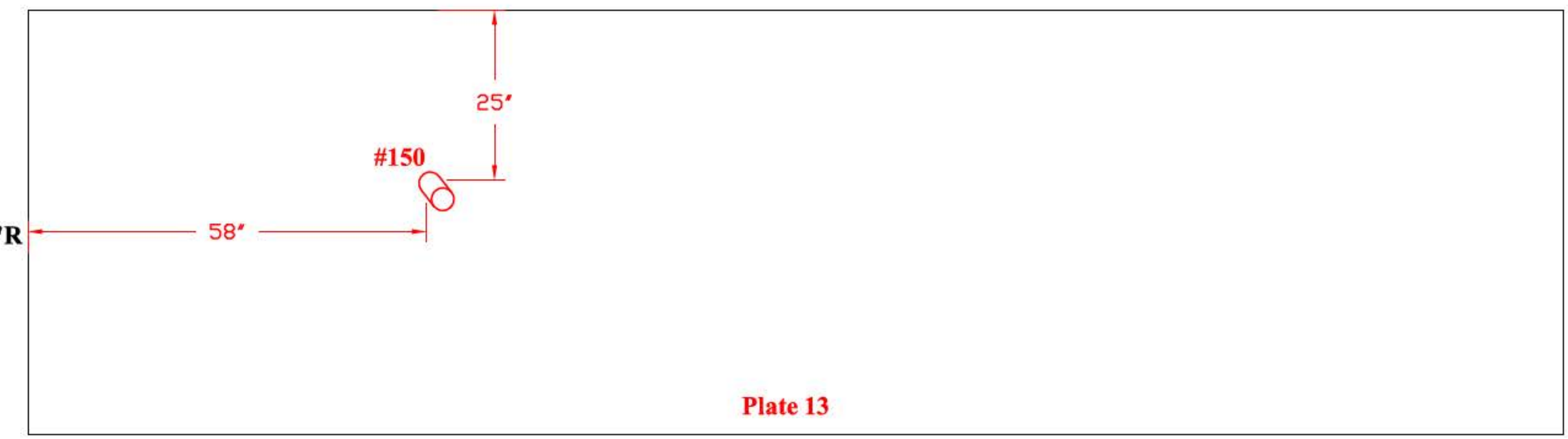
Drawing is not to scale

TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: D

Course: 12
Plate #: 13
Flaw # - Type - Remaining:

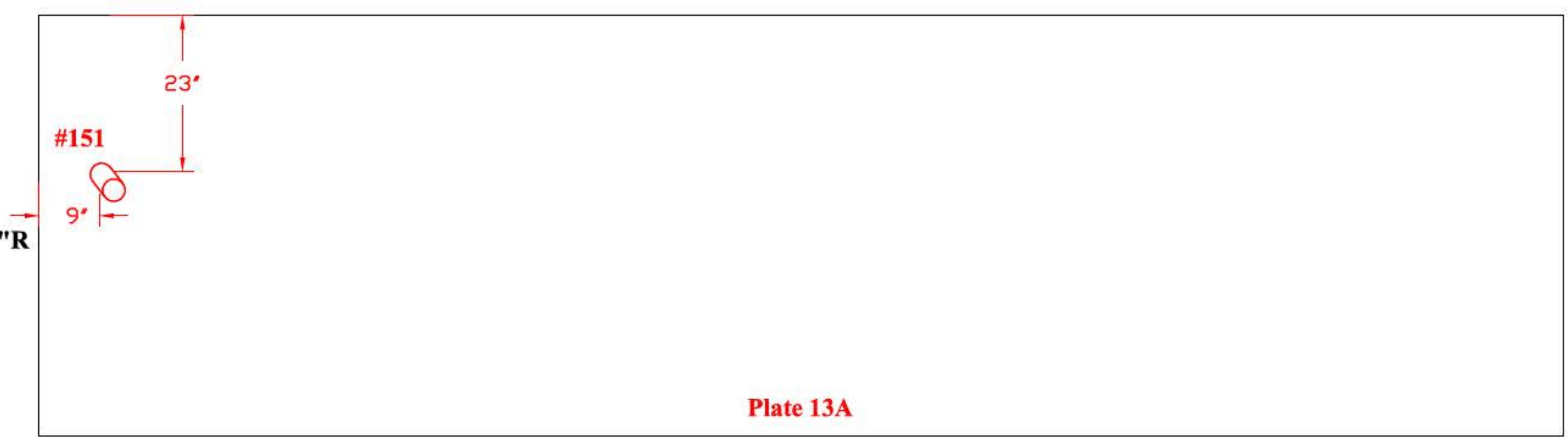
#150 - Grout Nozzle - 0.202"R



Tank Section: Barrel
Quadrant: D

Course: 19
Plate #: 13A
Flaw # - Type - Remaining:

#151 - Grout Nozzle - 0.212"R



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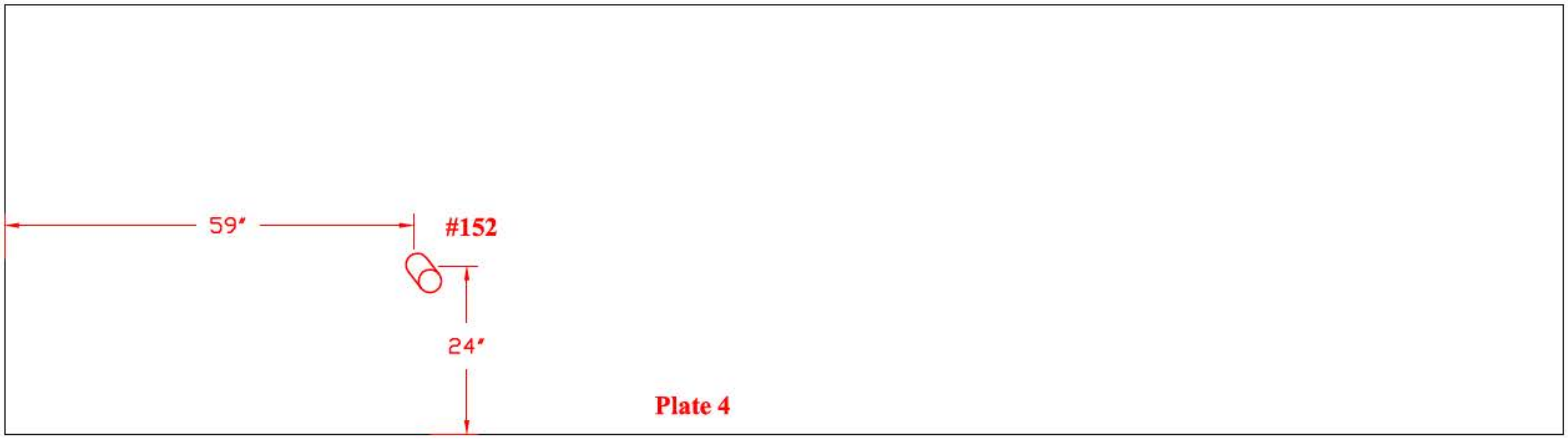
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: A

Course: 19
Plate #: 4
Flaw # - Type - Remaining:

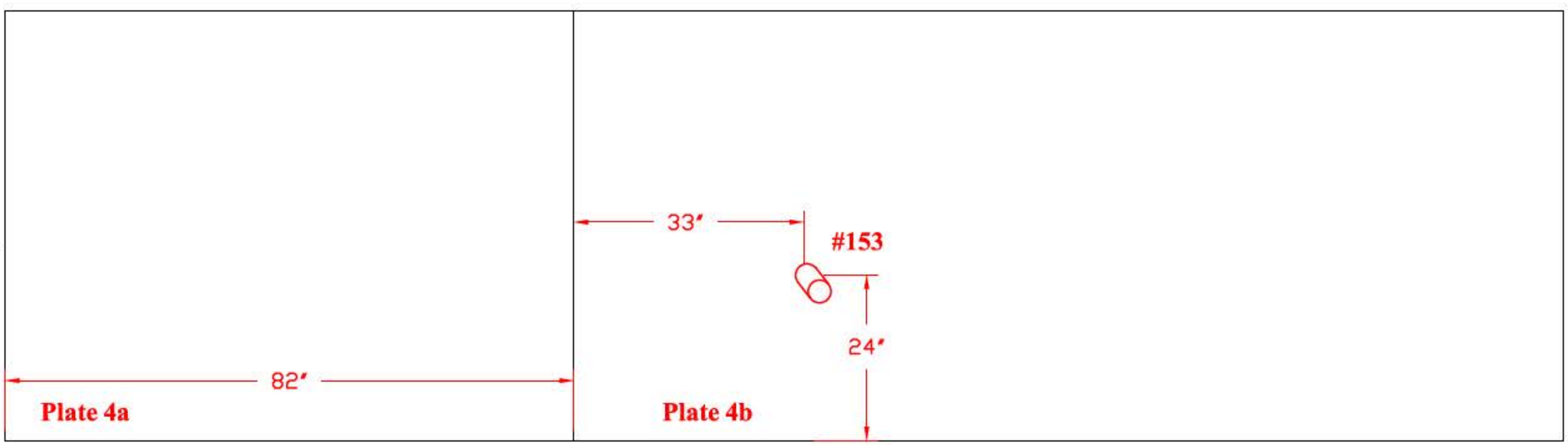
#152 - Grout Nozzle - 0.230"R



Tank Section: Barrel
Quadrant: A

Course: C
Plate #: 4b
Flaw # - Type - Remaining:

#153 - Grout Nozzle - 0.224"R



Drawing is not to scale

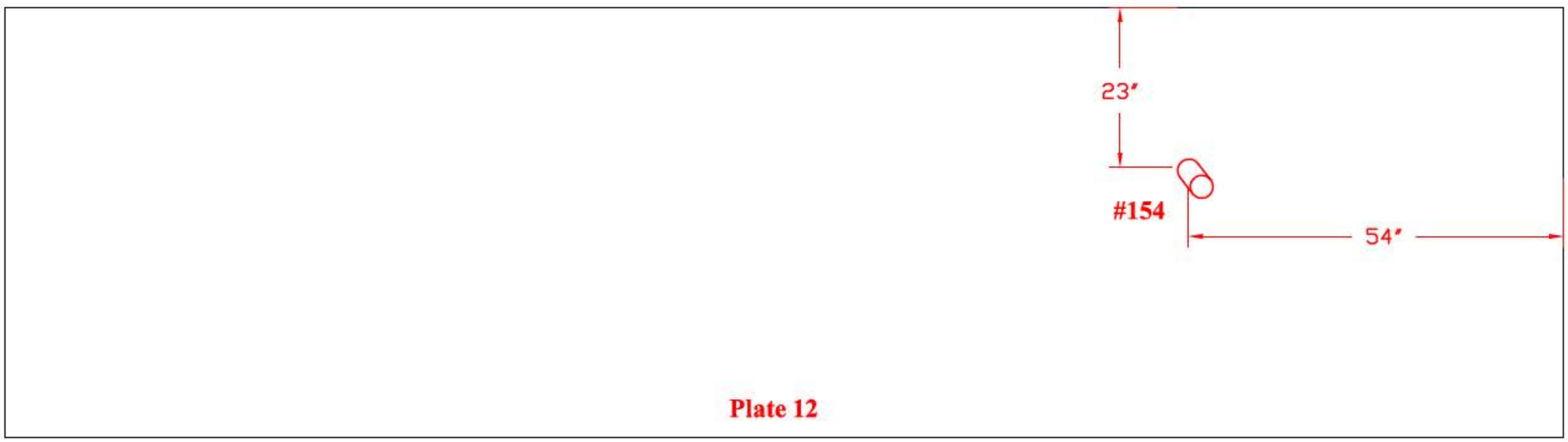
TANK # 20 - QUADRANT C AND D

Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: C

Course: 1
Plate #: 12
Flaw # - Type - Remaining:

#154 - Grout Nozzle - 0.204"R

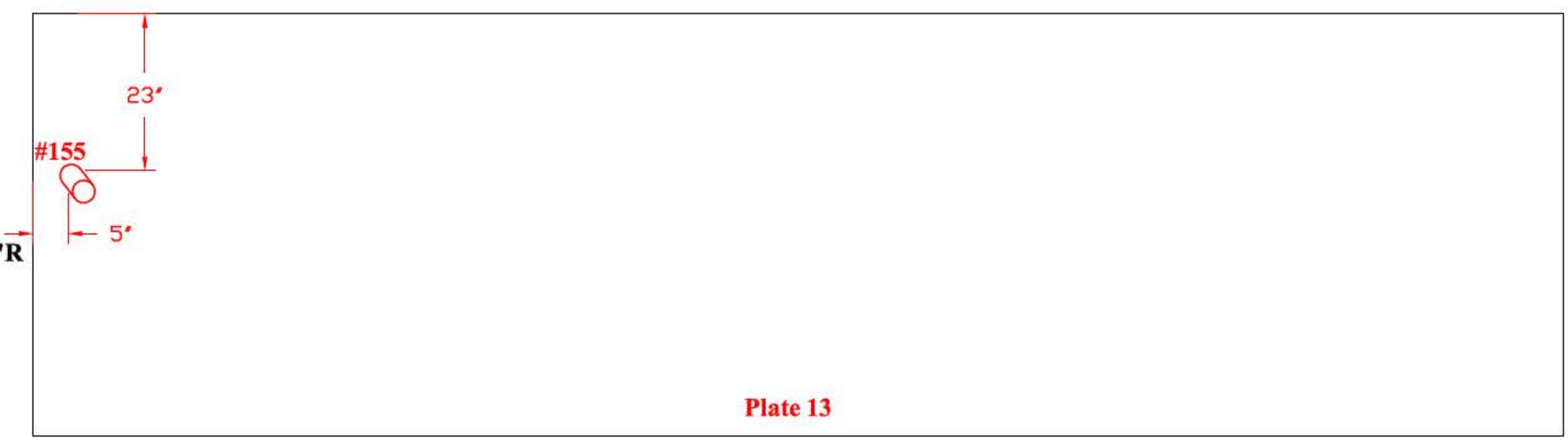


Tank Section: Barrel
Quadrant: D

Course: 5
Plate #: 13

Flaw # - Type - Remaining:

#155 - Grout Nozzle - 0.207"R



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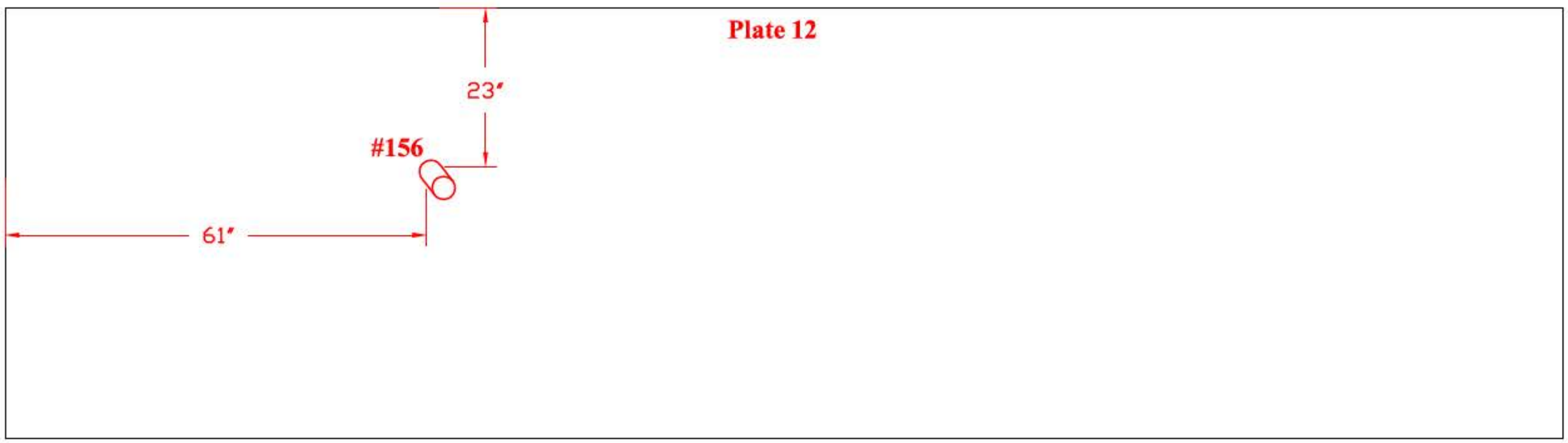
TANK # 20 - QUADRANT C AND D
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: C

Course: 12
Plate #: 12
Flaw # - Type - Remaining:

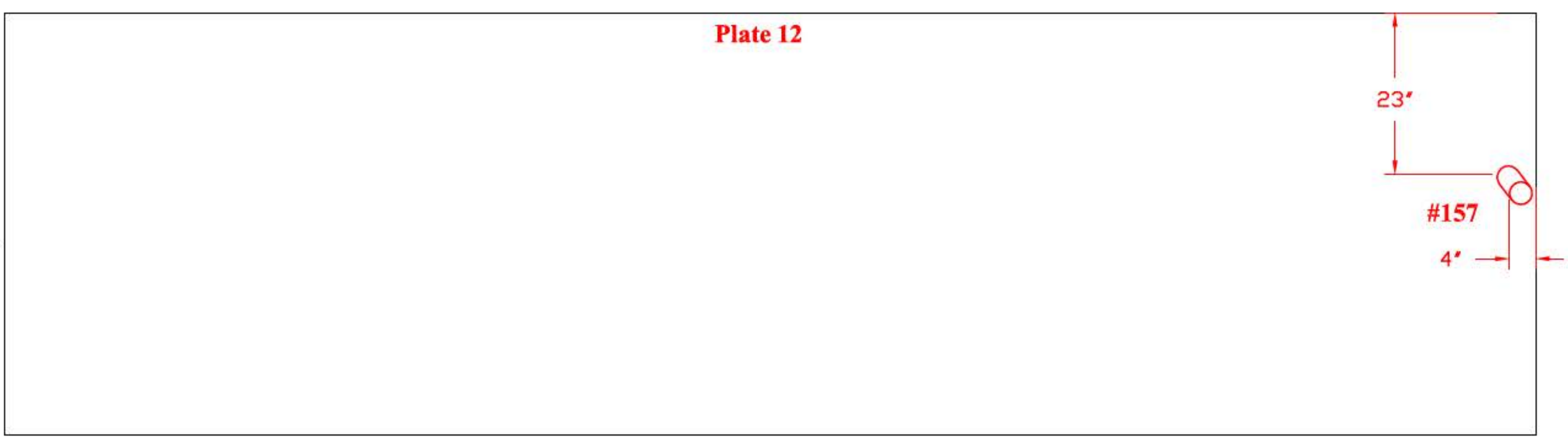
#156 - Grout Nozzle - 0.210"R



Tank Section: Barrel
Quadrant: D

Course: 27
Plate #: 12
Flaw # - Type - Remaining:

#157 - Grout Nozzle - 0.204"R



Drawing is not to scale

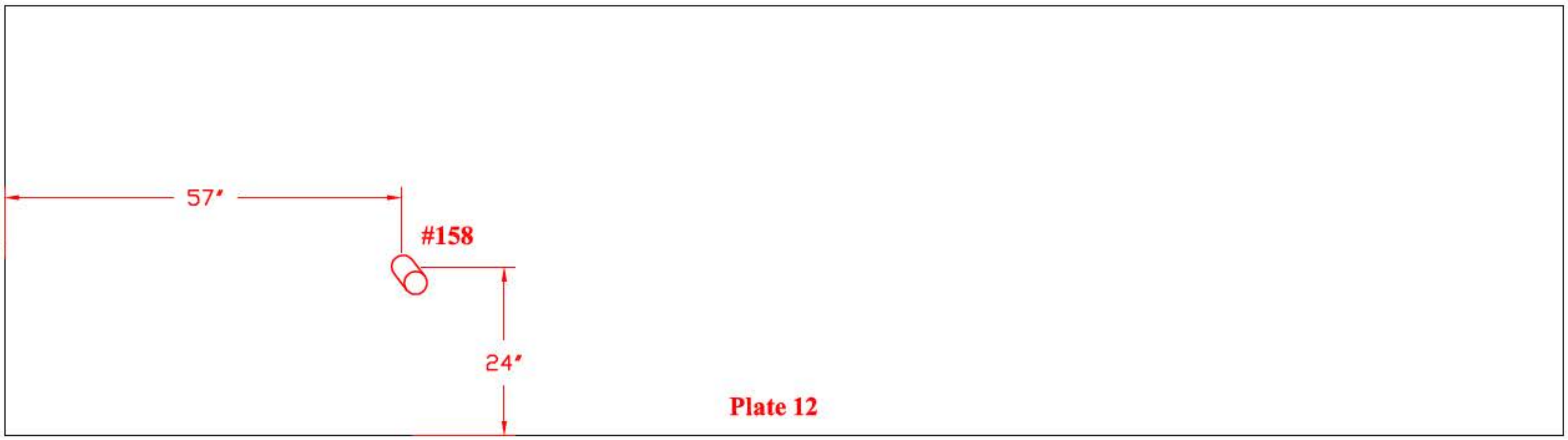
TANK # 20 - QUADRANT C AND D

***Nominal Plate Thickness: 0.250"**

Tank Section: Barrel
Quadrant: D

Course: 4
Plate #: 12
Flaw # - Type - Remaining:

#158 - Grout Nozzle - 0.197"R

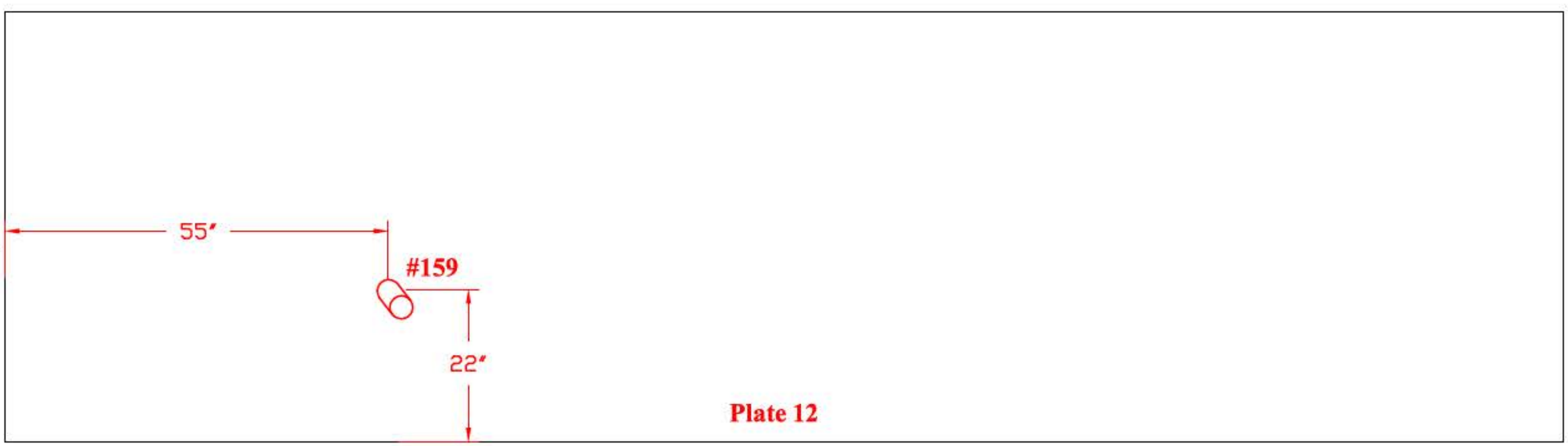


Tank Section: Barrel
Quadrant: C

Course: 19
Plate #: 12

Flaw # - Type - Remaining:

#159 - Grout Nozzle - 0.197"R

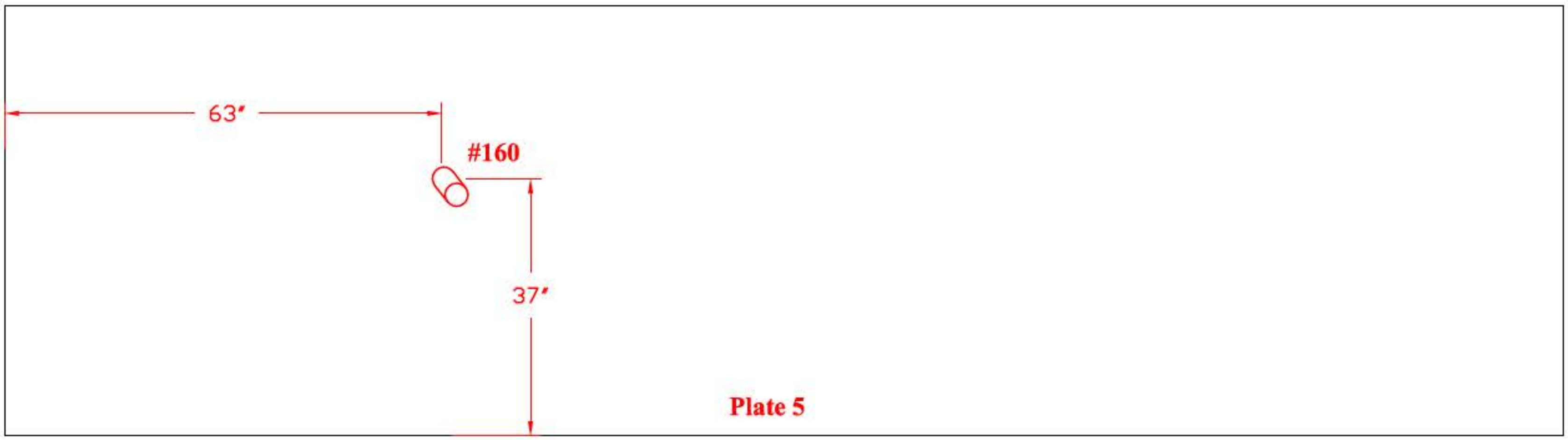


TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: B

Course: 27
Plate #: 5
Flaw # - Type - Remaining:

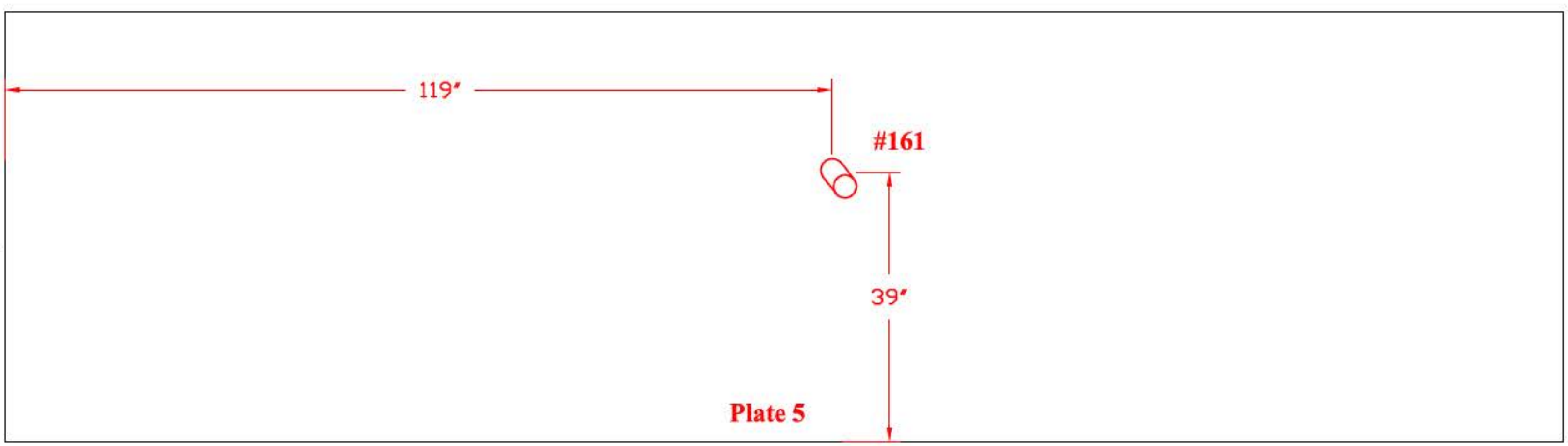
#160 - Grout Nozzle - 0.221"R



Tank Section: Barrel
Quadrant: B

Course: 12
Plate #: 5
Flaw # - Type - Remaining:

#161 - Grout Nozzle - 0.221"R



Drawing is not to scale

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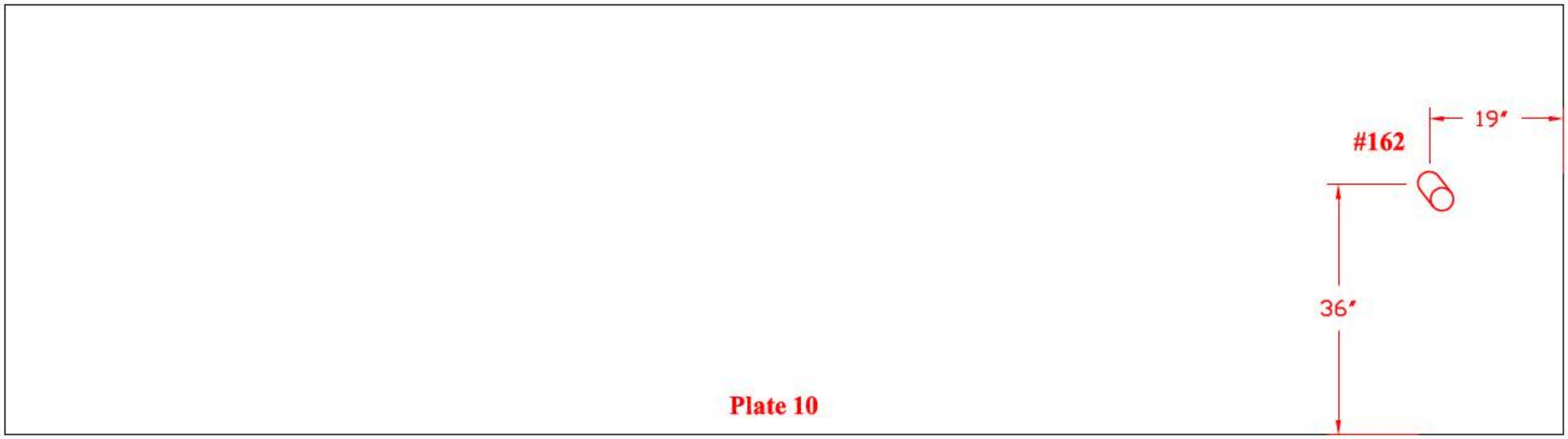
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: C

Course: 1
Plate #: 10
Flaw # - Type - Remaining:

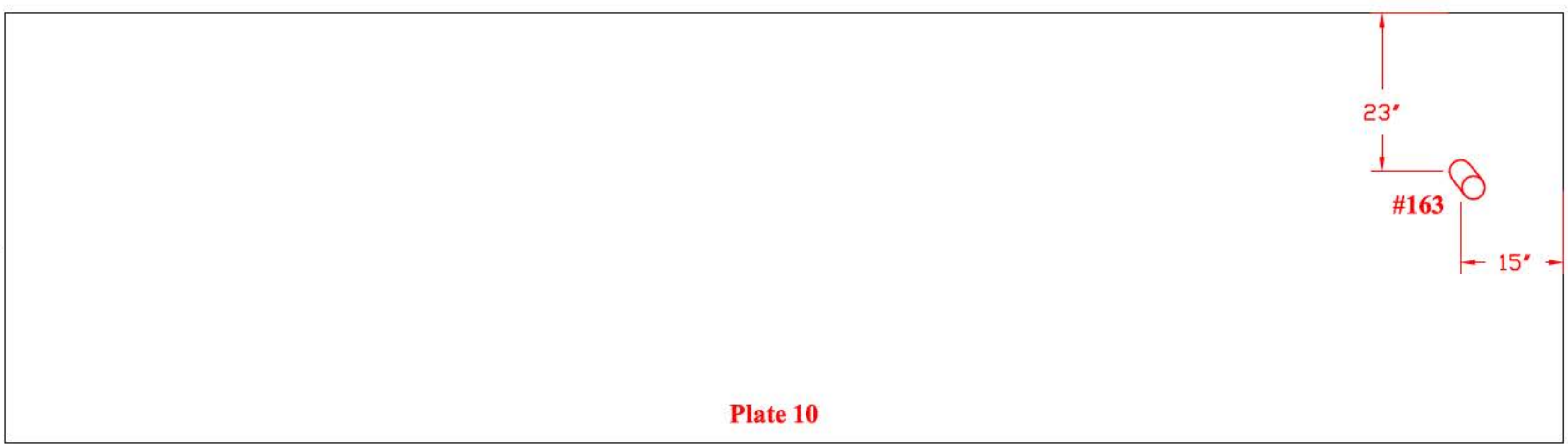
#162 - Grout Nozzle - 0.212"R



Tank Section: Barrel
Quadrant: C

Course: 5
Plate #: 10
Flaw # - Type - Remaining:

#163 - Grout Nozzle - 0.204"R



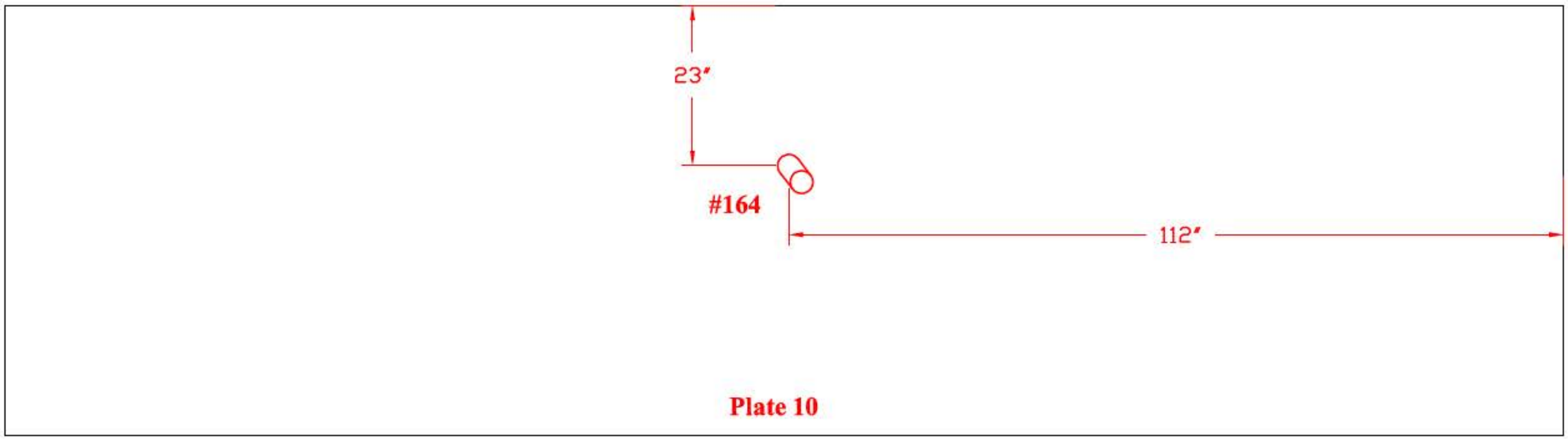
Drawing is not to scale

TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: C

Course: 12
Plate #: 10
Flaw # - Type - Remaining:

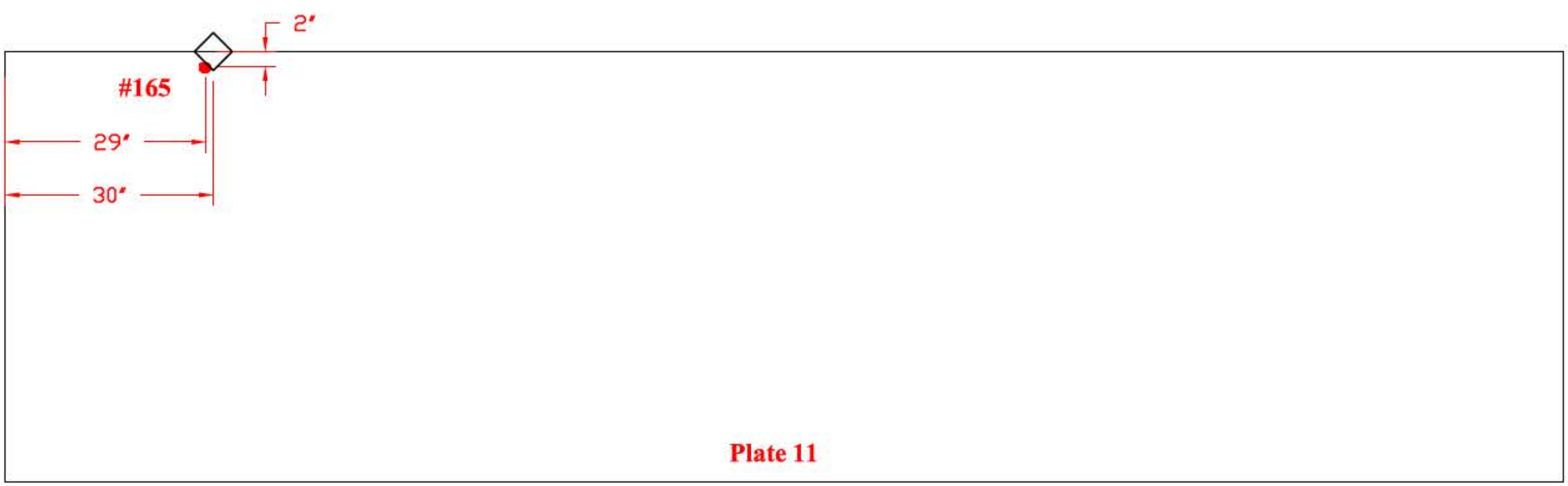
#164 - Grout Nozzle - 0.207"R



Tank Section: Barrel
Quadrant: C

Course: 15
Plate #: 11
Flaw # - Type - Remaining:

#165 - Pit - 0.231"R



Drawing is not to scale

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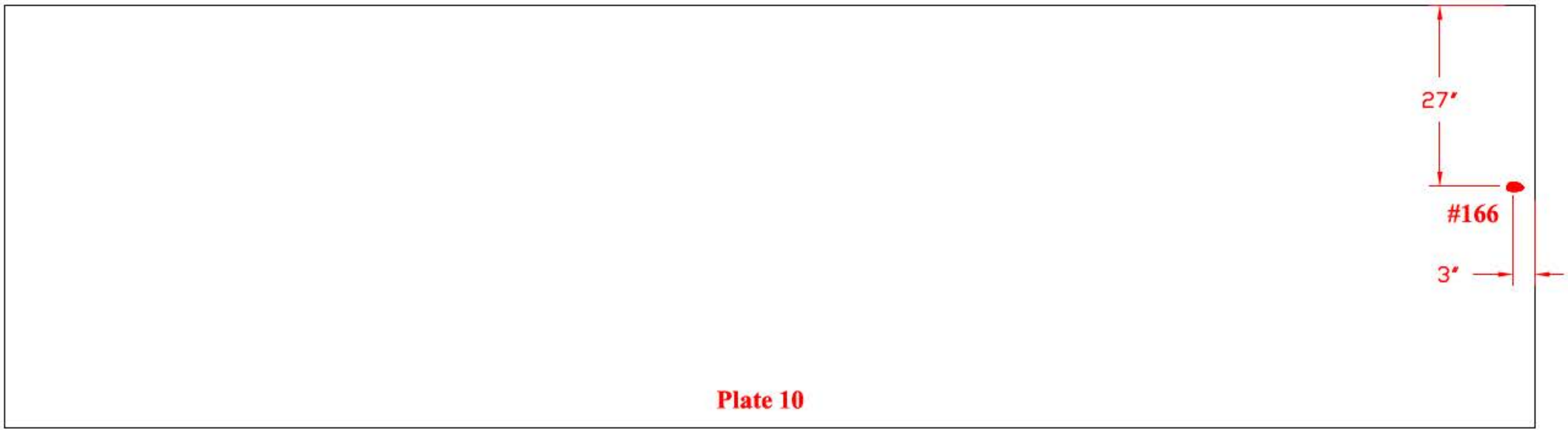
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: C

Course: 23
Plate #: 10
Flaw # - Type - Remaining:

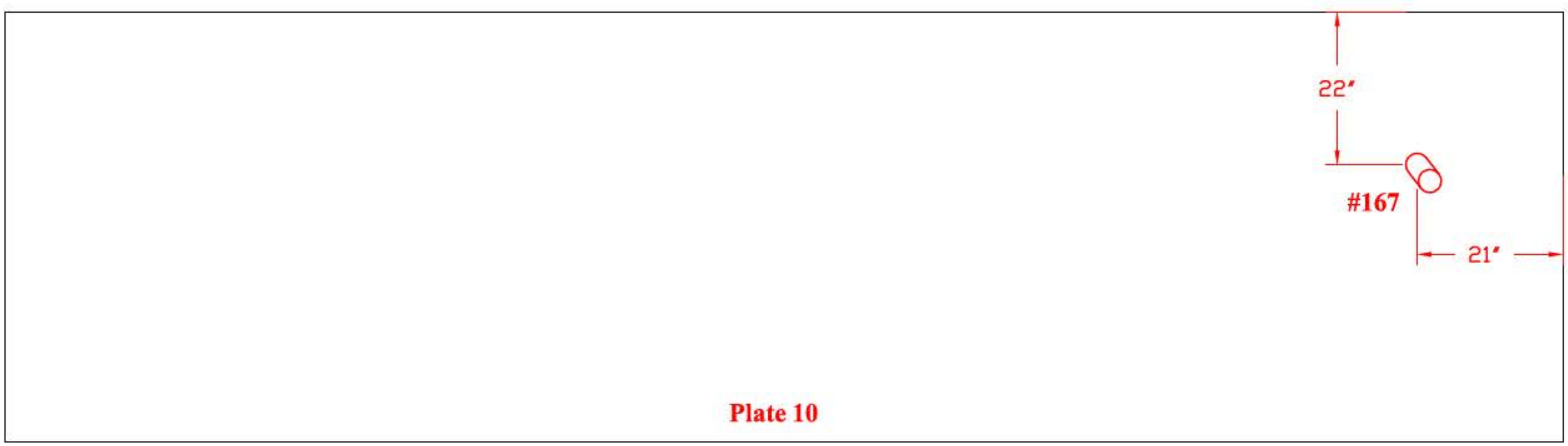
#166 - Gouge - 0.107 D
0.125 L
0.025 W



Tank Section: Barrel
Quadrant: C

Course: 19
Plate #: 10
Flaw # - Type - Remaining:

#167 - Low Spot - 0.204"R



Drawing is not to scale

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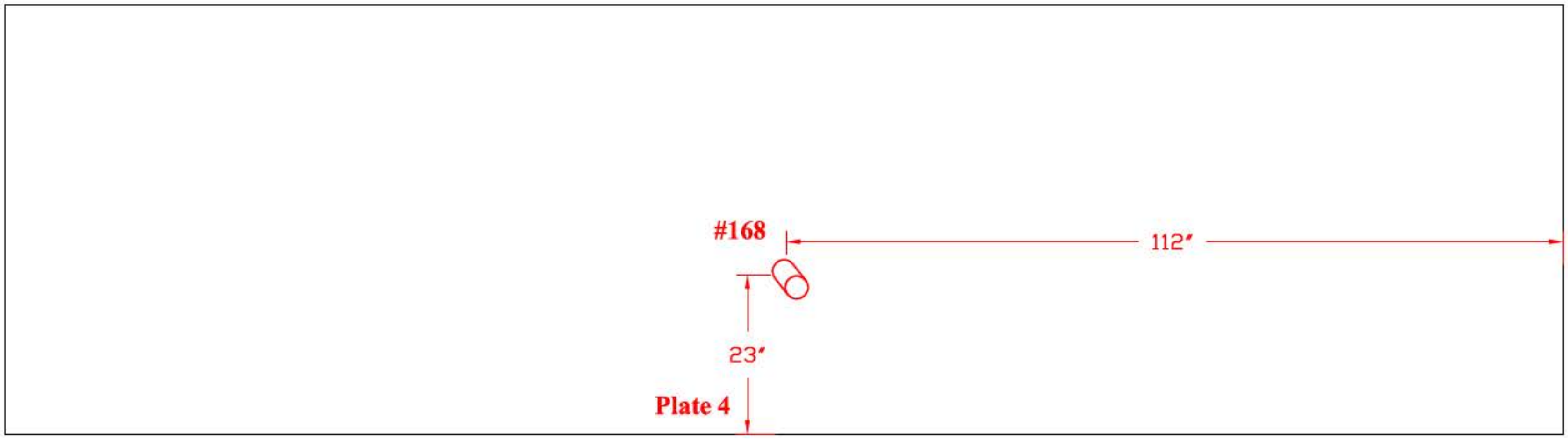
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: A

Course: 12
Plate #: 4
Flaw # - Type - Remaining:

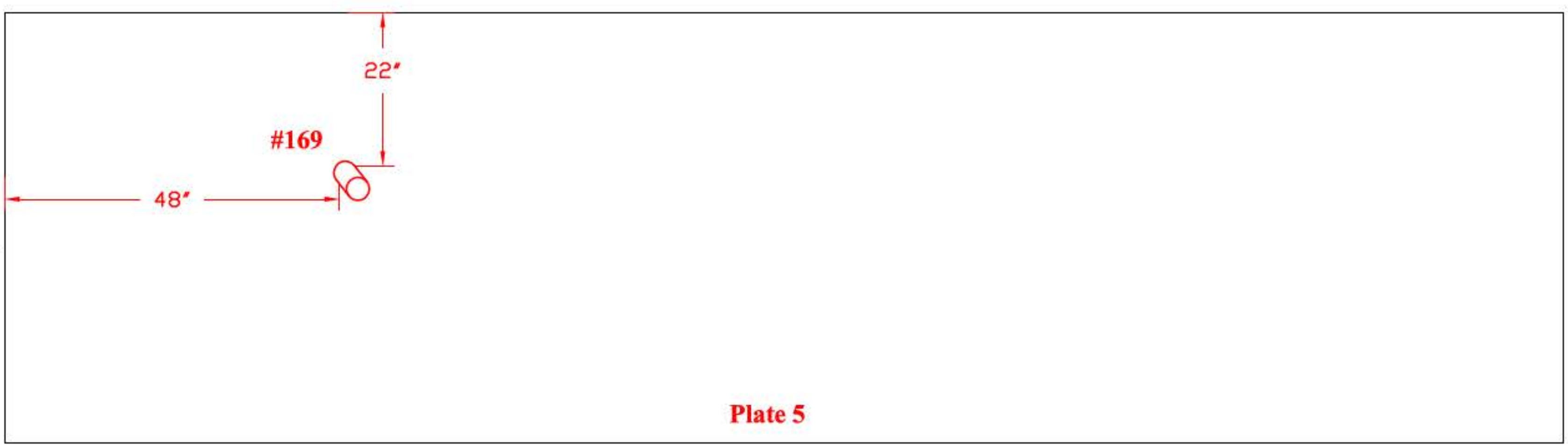
#168 - Grout Nozzle - 0.213"R



Tank Section: Barrel
Quadrant: A

Course: 1
Plate #: 5
Flaw # - Type - Remaining:

#169 - Grout Nozzle - 0.219"R



Drawing is not to scale

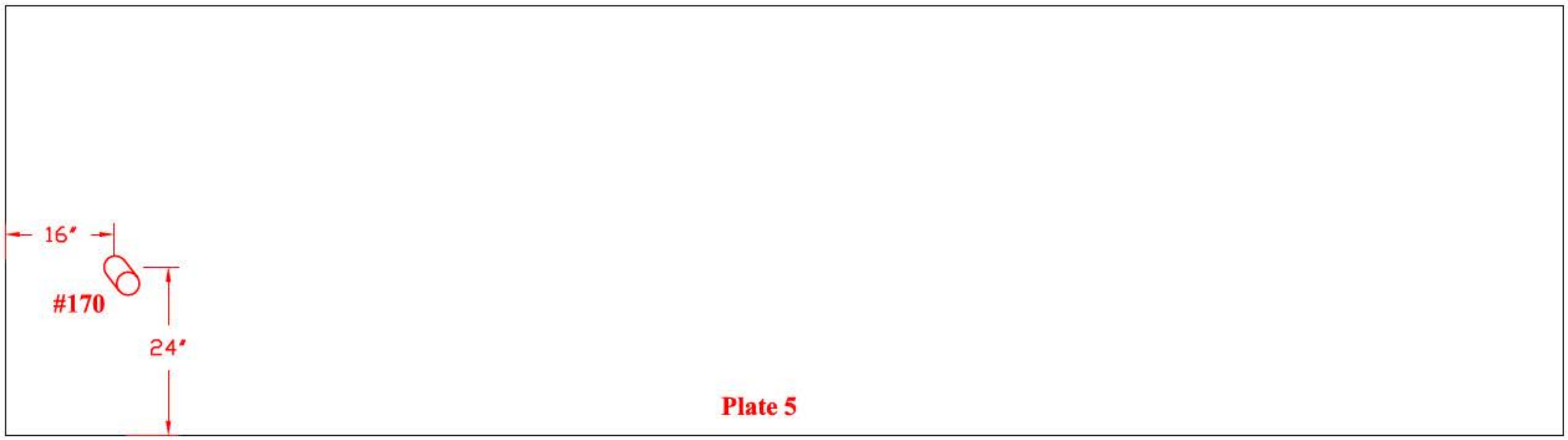
TANK # 20 - QUADRANT A

Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: A

Course: 19
Plate #: 5
Flaw # - Type - Remaining:

#170 - Grout Nozzle - 0.224"R



Drawing is not to scale

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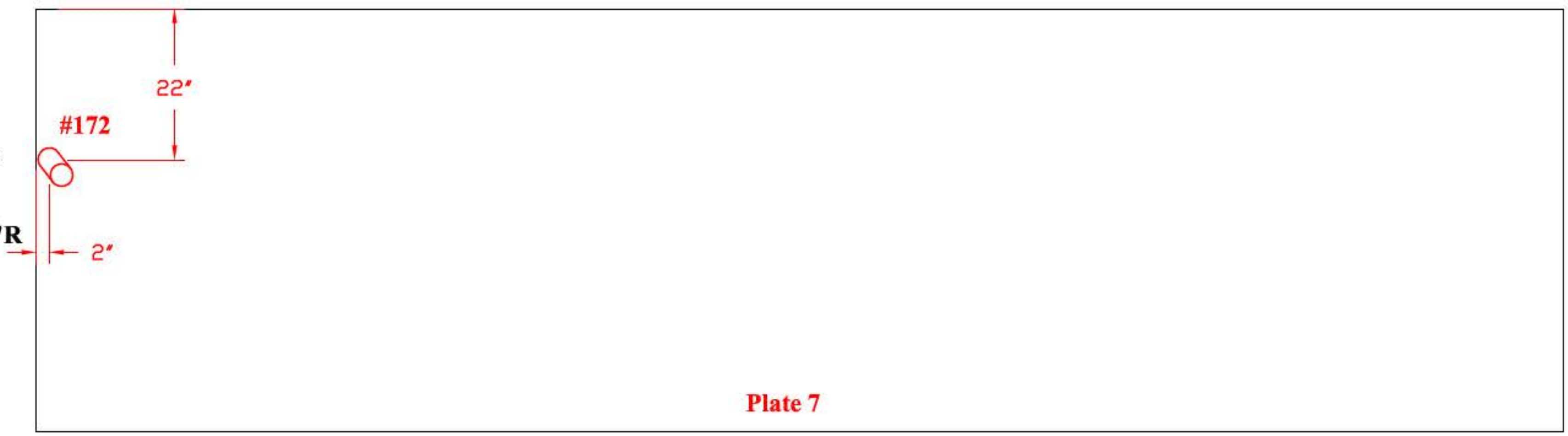
TANK # 20 - QUADRANT B

Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: B

Course: 19
Plate #: 7
Flaw # - Type - Remaining:

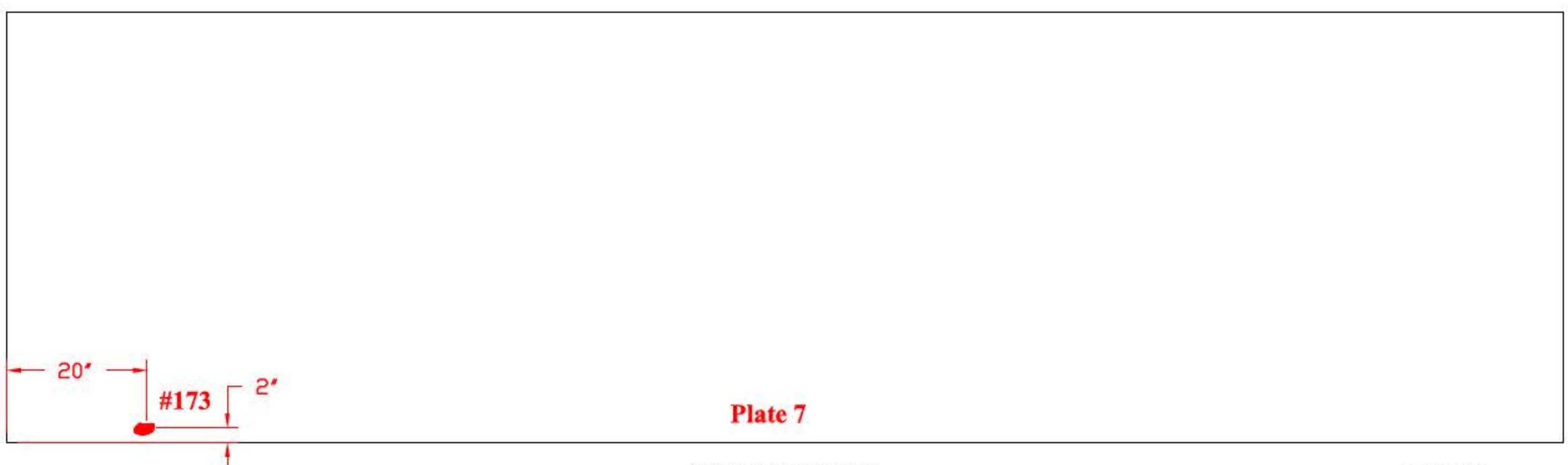
#172 - Grout Nozzle - 0.229"R



Tank Section: Barrel
Quadrant: B

Course: 28
Plate #: 7
Flaw # - Type - Remaining:

#173 - Gouge - 0.140"D
- 1.25"L



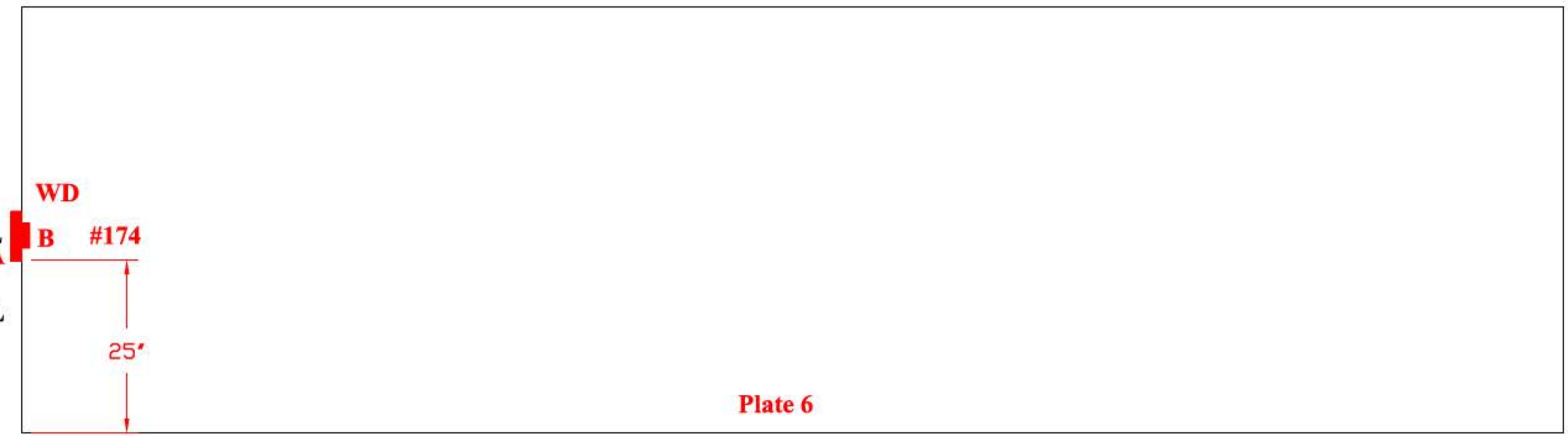
Drawing is not to scale

TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: B

Course: 22
Plate #: 6
Flaw # - Type - Remaining:

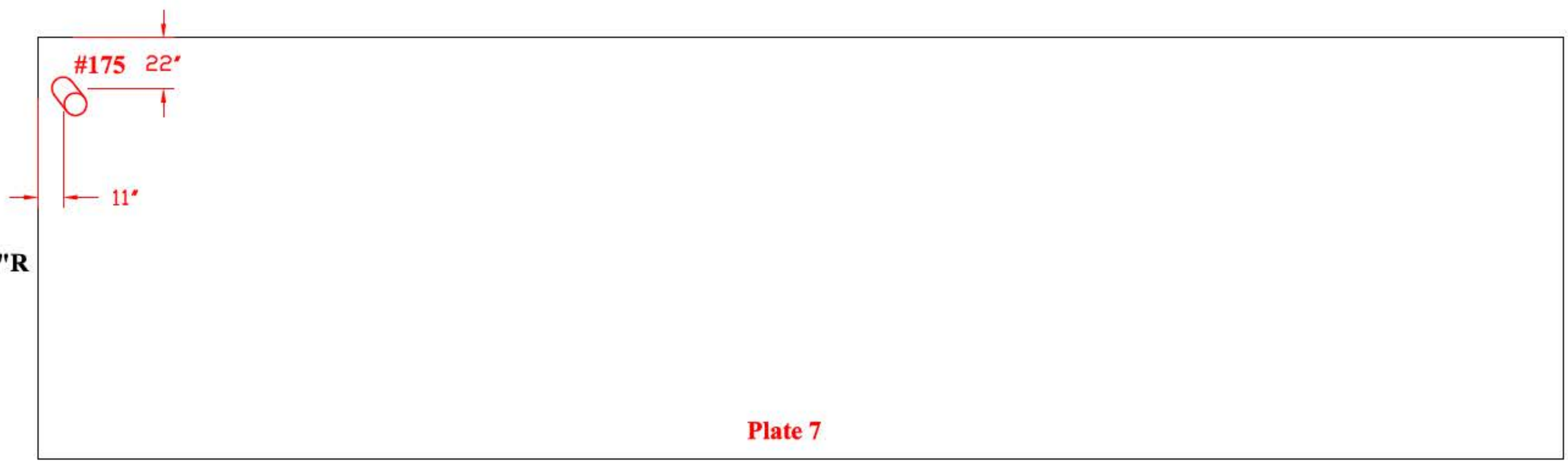
#174 - A) LOF 0.113"D 7"L
(2) Pits - 0.125" dia
B) LOF 0.121"D 2"L



Tank Section: Barrel
Quadrant: B

Course: 5
Plate #: 7
Flaw # - Type - Remaining:

#175 - Grout Nozzle - 0.230"R



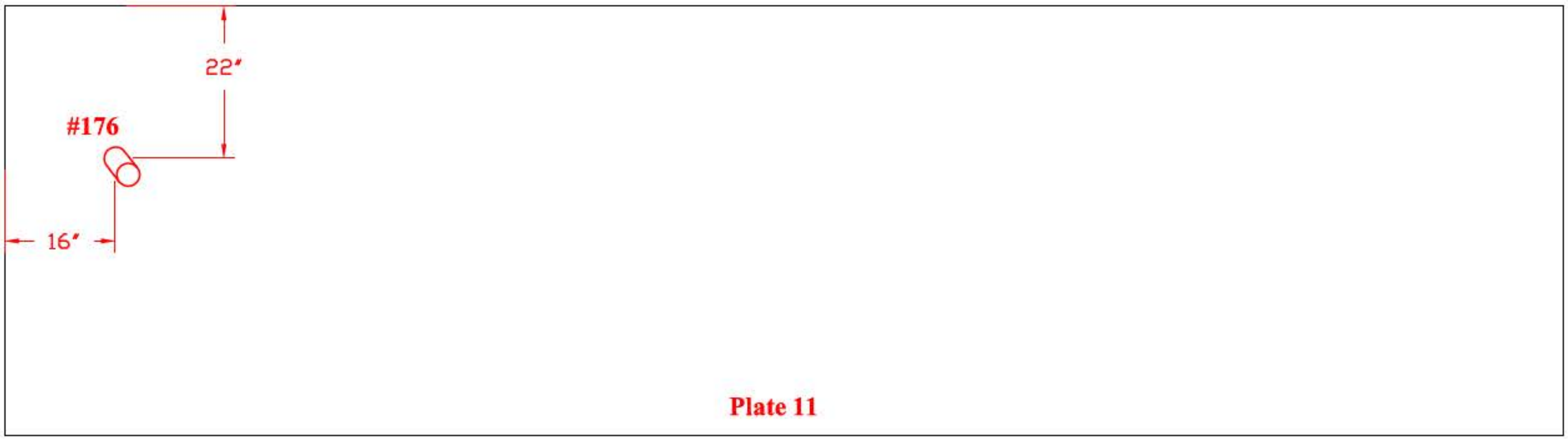
TANK # 20 - QUADRANT C

Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: C

Course: 27
Plate #: 11
Flaw # - Type - Remaining:

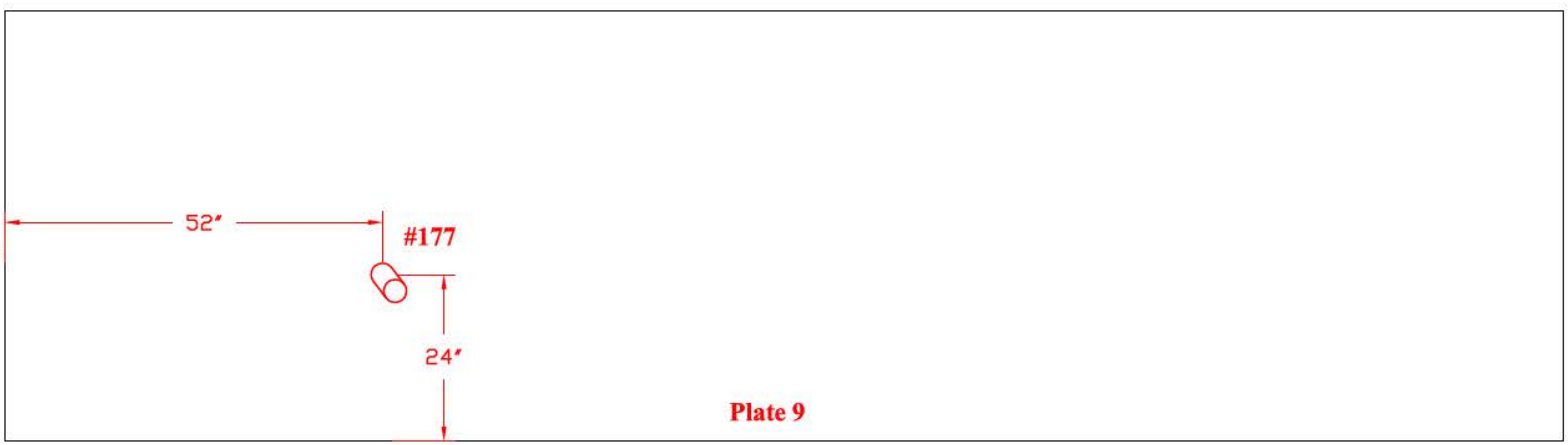
#176 - Grout Nozzle - 0.214"R



Tank Section: Barrel
Quadrant: C

Course: 12
Plate #: 9
Flaw # - Type - Remaining:

#177 - Grout Nozzle - 0.204"R



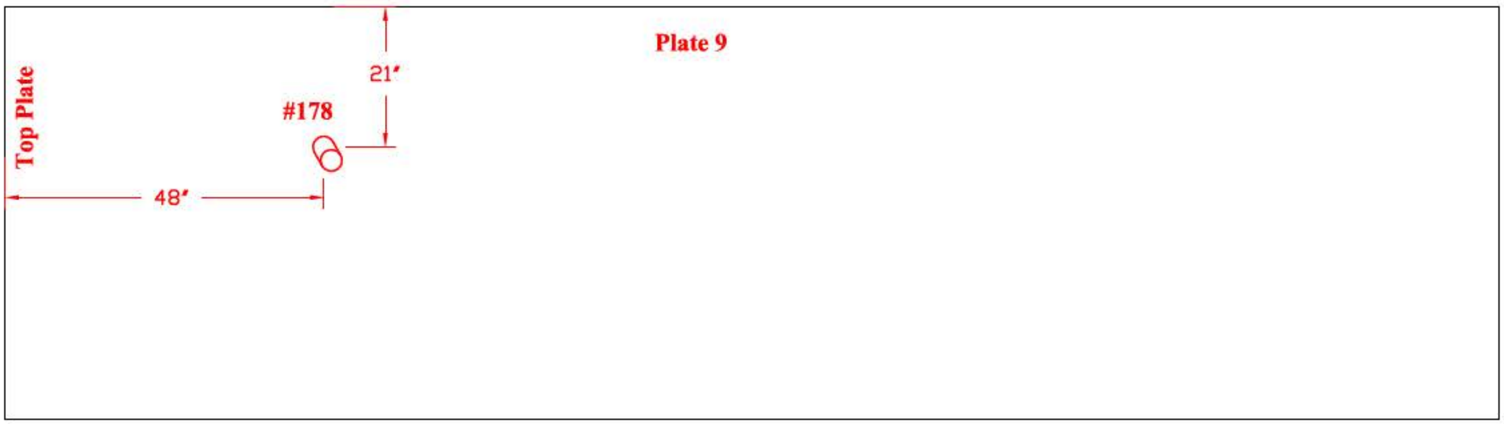
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: C

Course: 1
Plate #: 9

Flaw # - Type - Remaining:

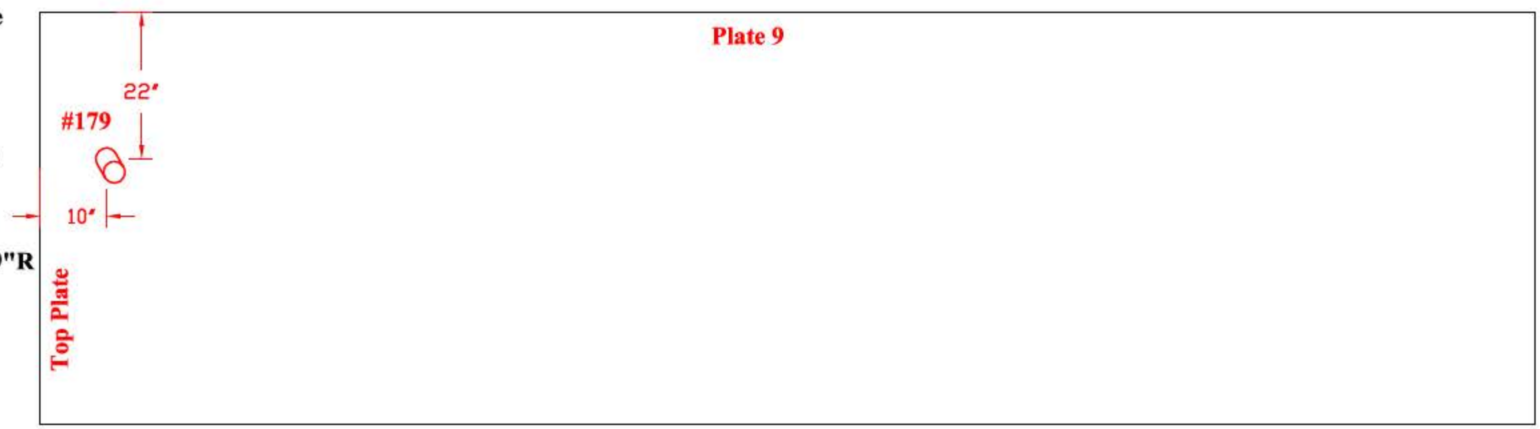
#178 - Grout Nozzle - 0.211"R



Tank Section: Lower Dome
Quadrant: C

Course: 5
Plate #: 9
Flaw # - Type - Remaining:

#179 - Grout Nozzle - 0.209"R



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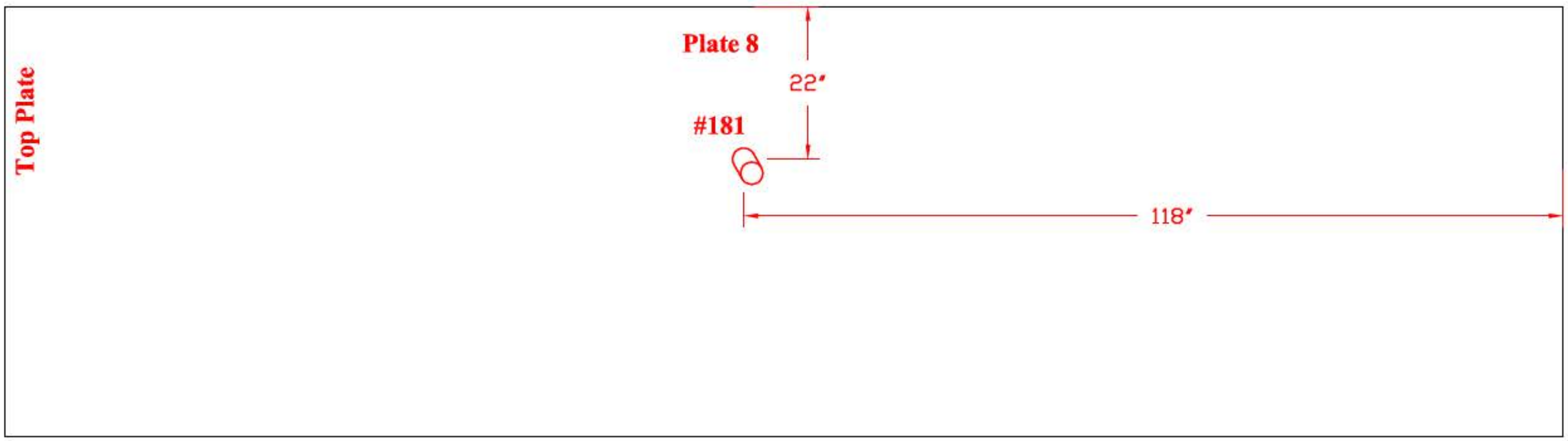
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: C

Course: 12
Plate #: 8

Flaw # - Type - Remaining:

#181 - Grout Nozzle - 0.222"R



Tank Section: Barrel
Quadrant: C

Course: 19
Plate #: 9A

Flaw # - Type - Remaining:

#182 - Grout Nozzle - 0.213"R

TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: C

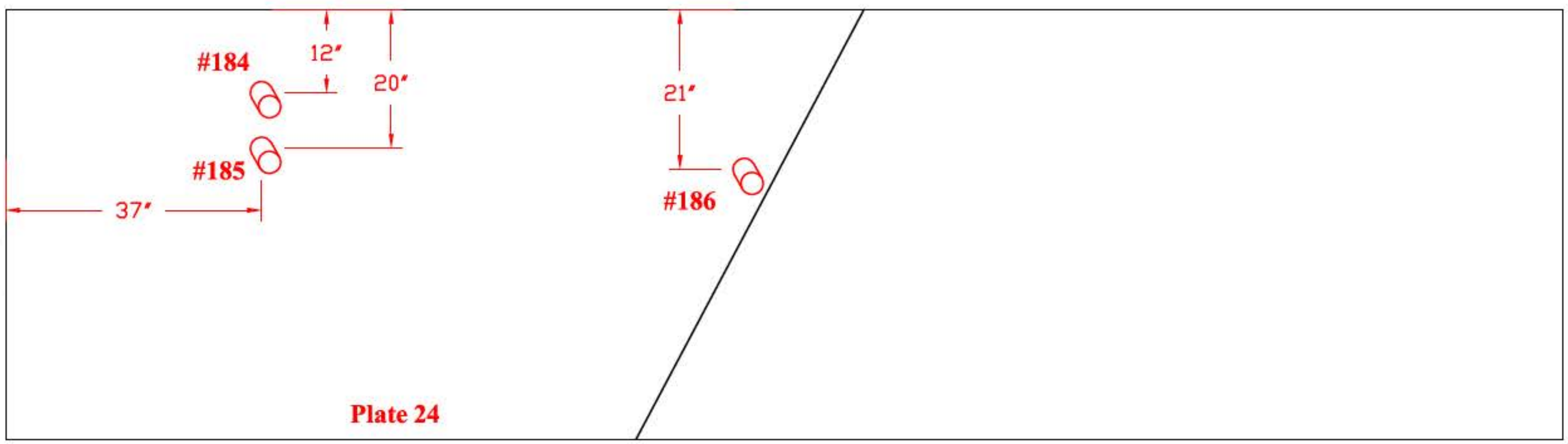
Course: 2
Plate #: 24

Flaw # - Type - Remaining:

#184 - Grout Nozzle - 0.207"R

#185 - Grout Nozzle - 0.208"R

#186 - Grout Nozzle - 0.220"R



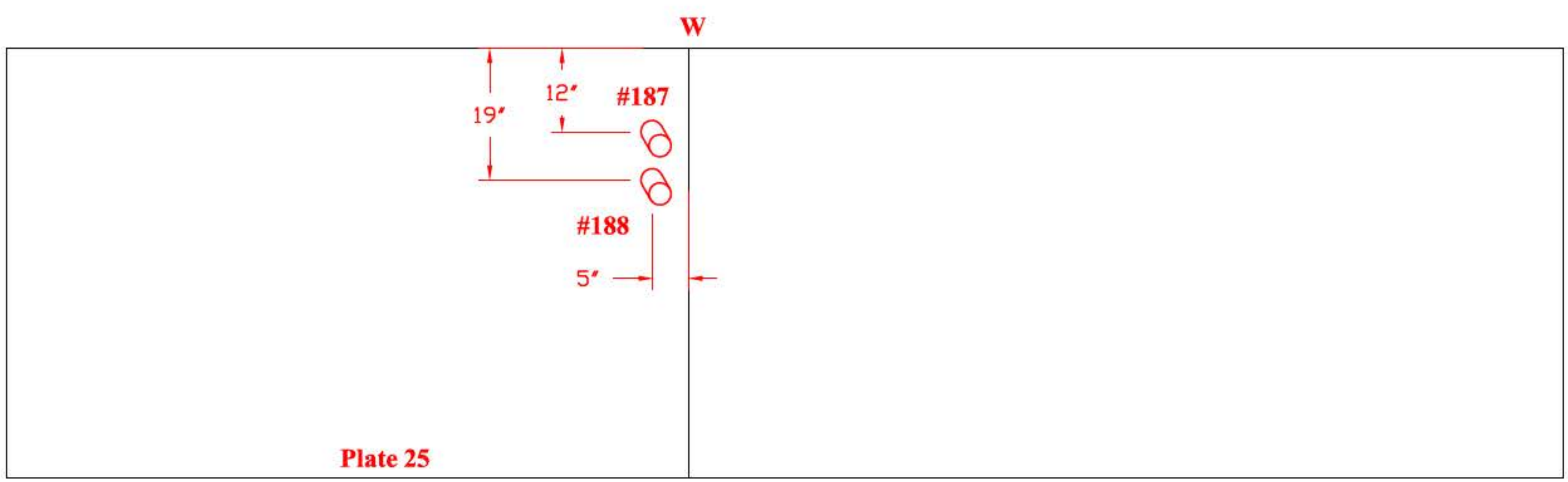
Tank Section: Extension
Quadrant: C

Course: 2
Plate #: 25

Flaw # - Type - Remaining:

#187 - Grout Nozzle - 0.227"R

#188 - Grout Nozzle - 0.223"R



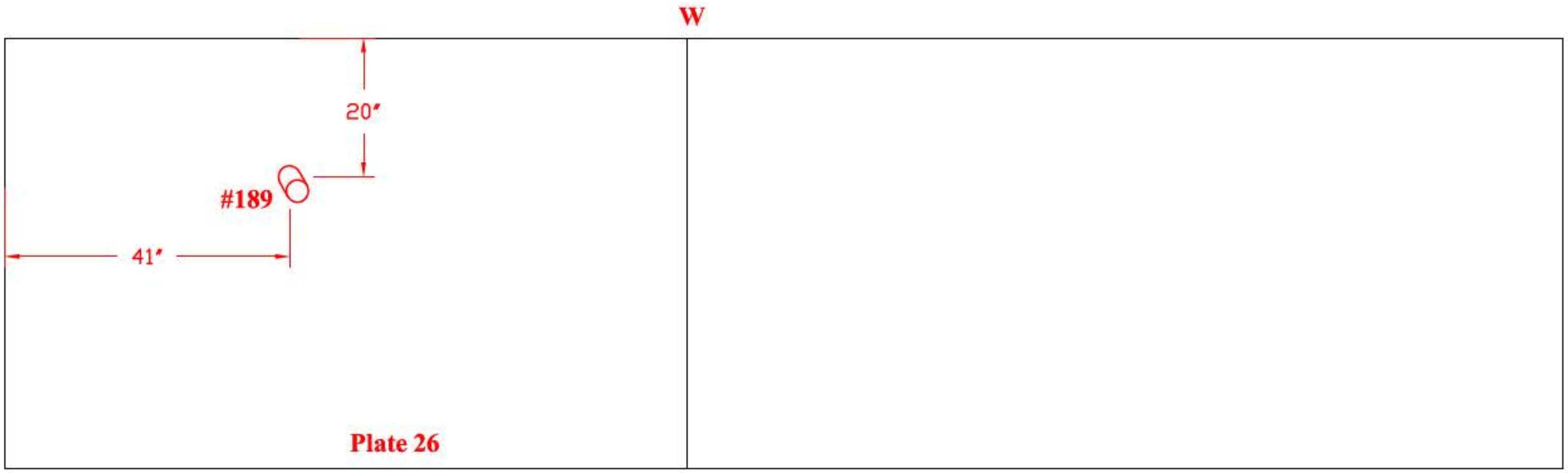
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: C

Course: 2
Plate #: 26

Flaw # - Type - Remaining:

#189 - Grout Nozzle - 0.200"R



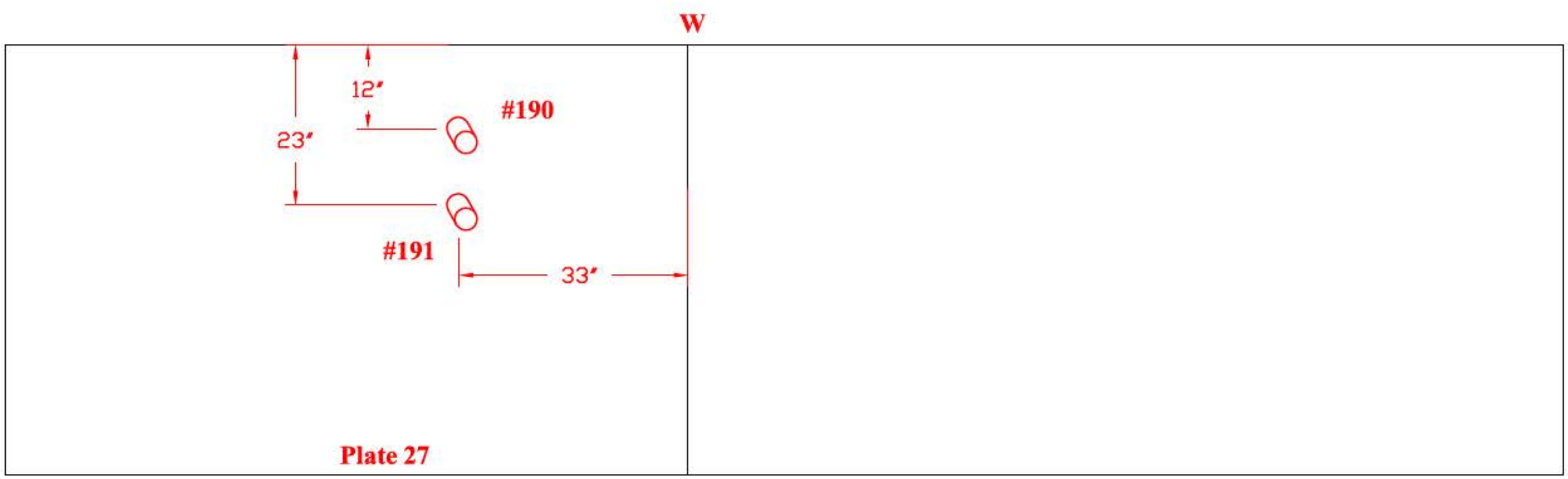
Tank Section: Extension
Quadrant: C

Course: 2
Plate #: 27

Flaw # - Type - Remaining:

#190 - Grout Nozzle - 0.208"R

#191 - Grout Nozzle - 0.217"R



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TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: C

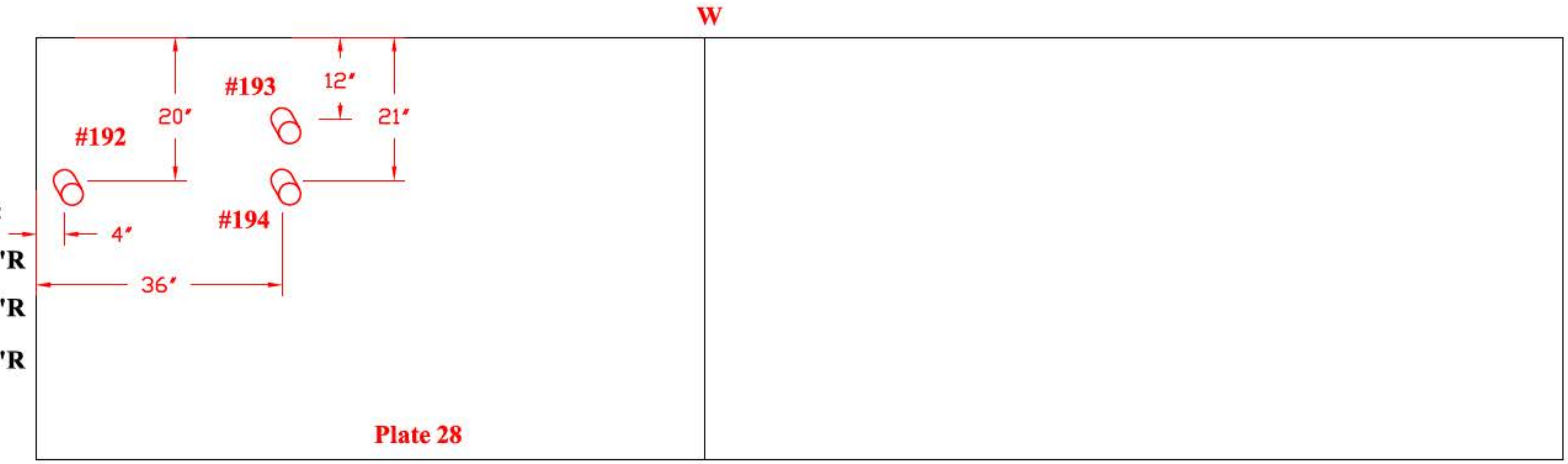
Course: 2
Plate #: 28

Flaw # - Type - Remaining:

#192 - Grout Nozzle - 0.199"R

#193 - Grout Nozzle - 0.200"R

#194 - Grout Nozzle - 0.217"R

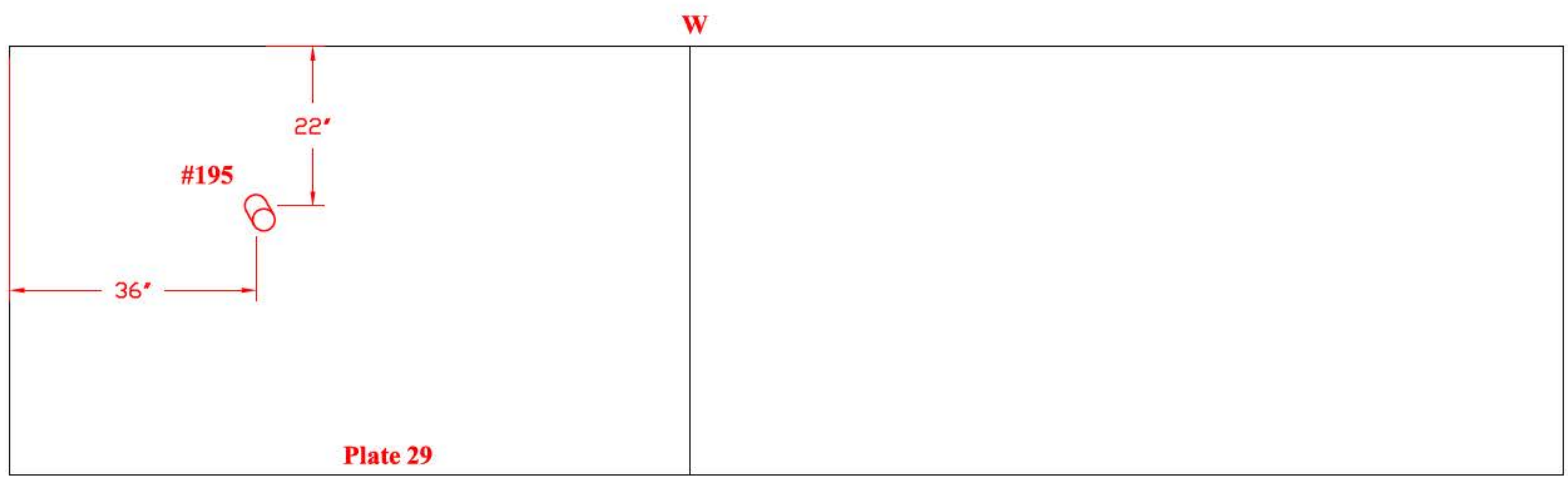


Tank Section: Extension
Quadrant: C

Course: 2
Plate #: 29

Flaw # - Type - Remaining:

#195 - Grout Nozzle - 0.210"R



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TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: C

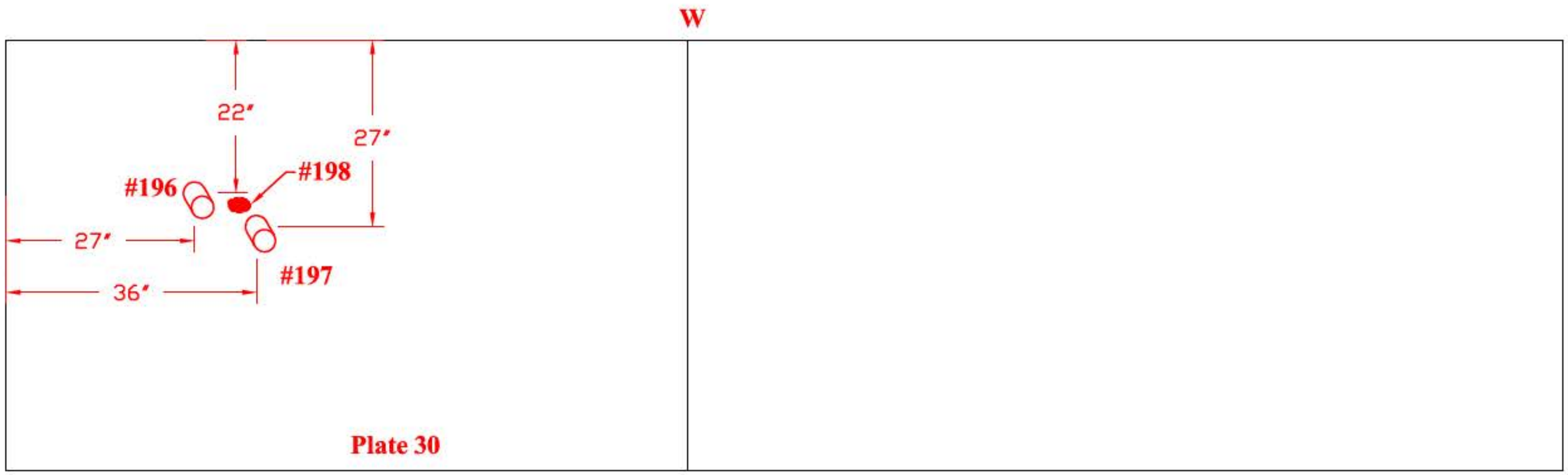
Course: 2
Plate #: 30

Flaw # - Type - Remaining:

#196 - Grout Nozzle - 0.200"R

#197 - Grout Nozzle - 0.192"R

#198 - Dent - 0.200" deep



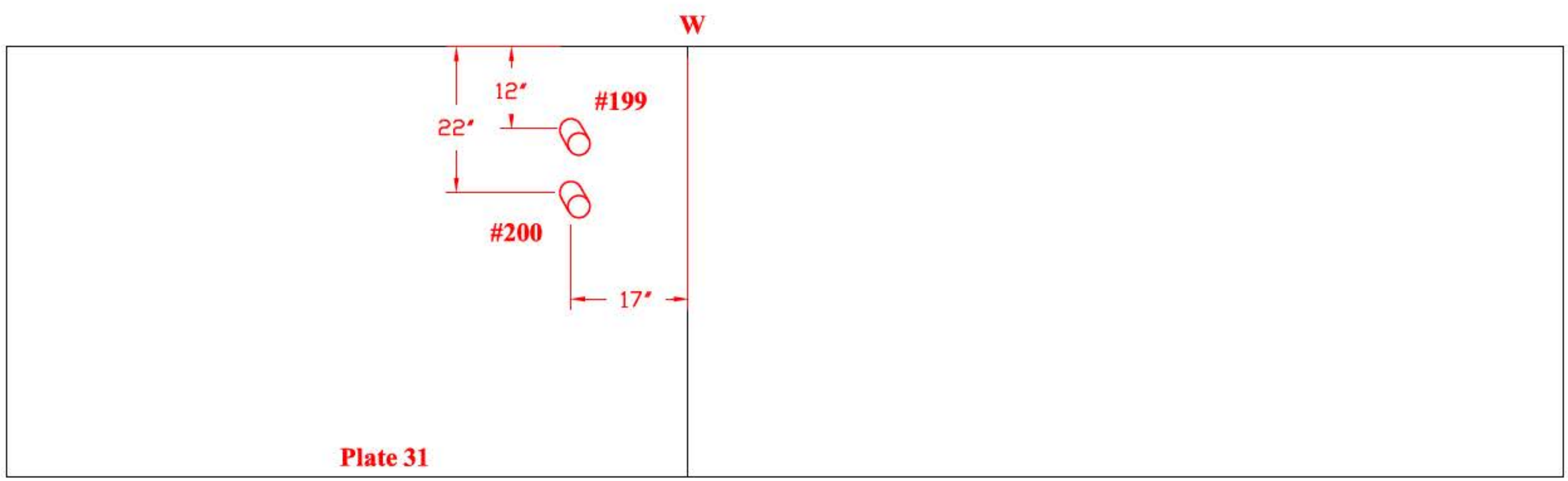
Tank Section: Extension
Quadrant: C

Course: 2
Plate #: 31

Flaw # - Type - Remaining:

#199 - Grout Nozzle - 0.219"R

#200 - Grout Nozzle - 0.204"R



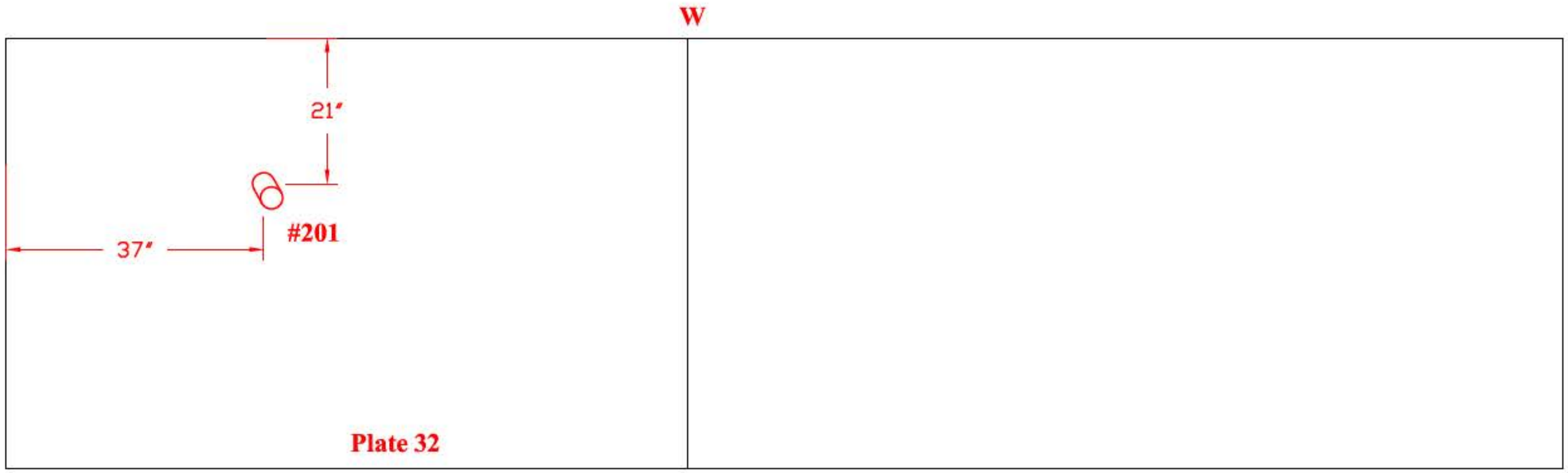
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: C

Course: 2
Plate #: 32

Flaw # - Type - Remaining:

#201 - Grout Nozzle - 0.211"R



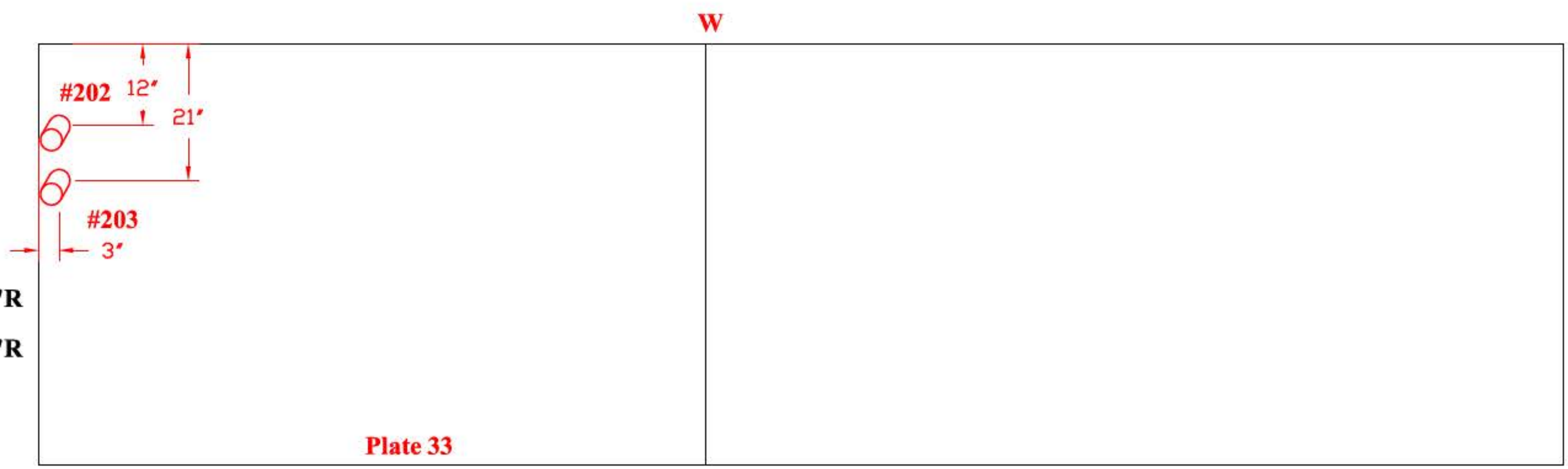
Tank Section: Extension
Quadrant: C

Course: 2
Plate #: 33

Flaw # - Type - Remaining:

#202 - Grout Nozzle - 0.211"R

#203 - Grout Nozzle - 0.211"R



TANK # 20 - QUADRANT C

Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: C

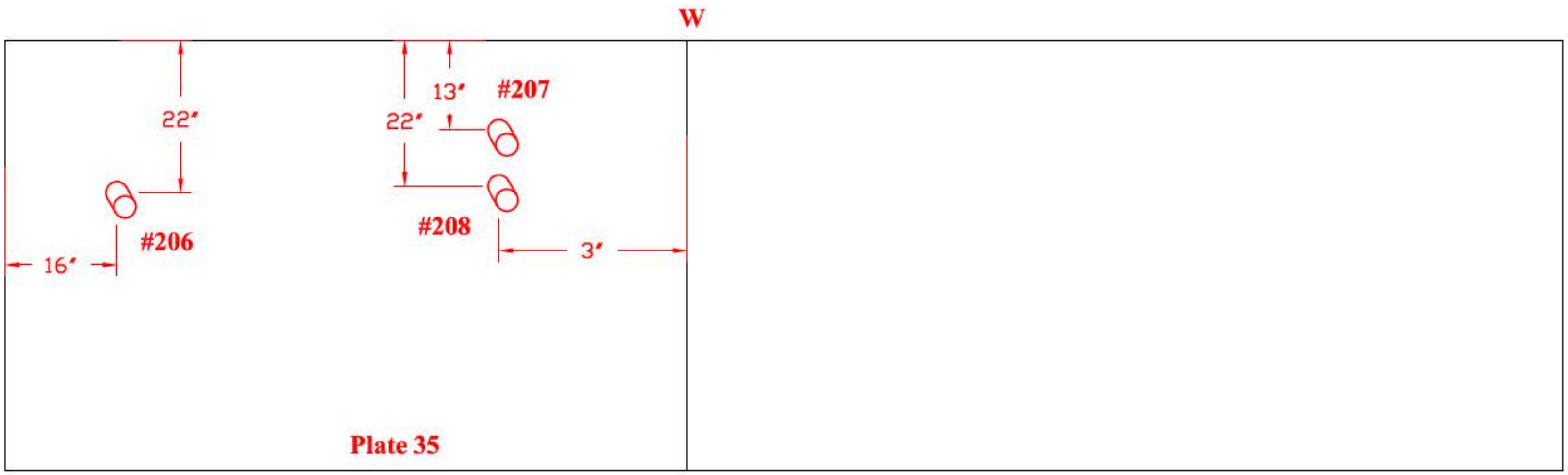
Course: 2
Plate #: 35

Flaw # - Type - Remaining:

#206 - Grout Nozzle - 0.195"R

#207 - Grout Nozzle - 0.205"R

#208 - Grout Nozzle - 0.213"R



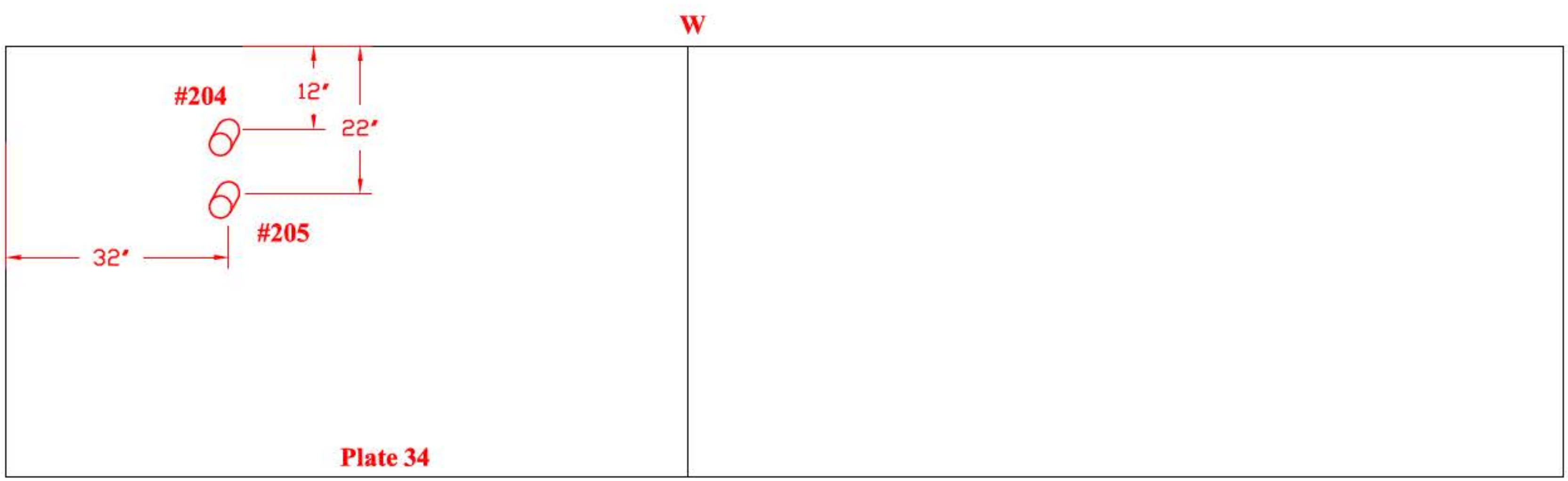
Tank Section: Extension
Quadrant: C

Course: 2
Plate #: 34

Flaw # - Type - Remaining:

#204 - Grout Nozzle - 0.214"R

#205 - Grout Nozzle - 0.210"R



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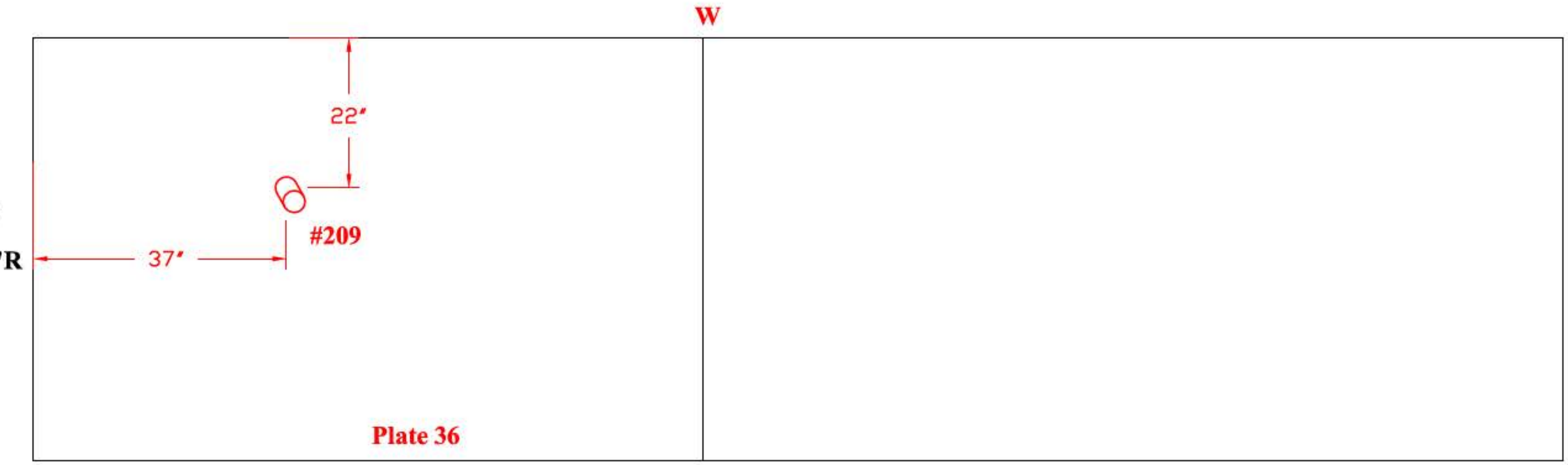
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: D

Course: 2
Plate #: 36

Flaw # - Type - Remaining:

#209 - Grout Nozzle - 0.193"R



Tank Section: Extension
Quadrant: D

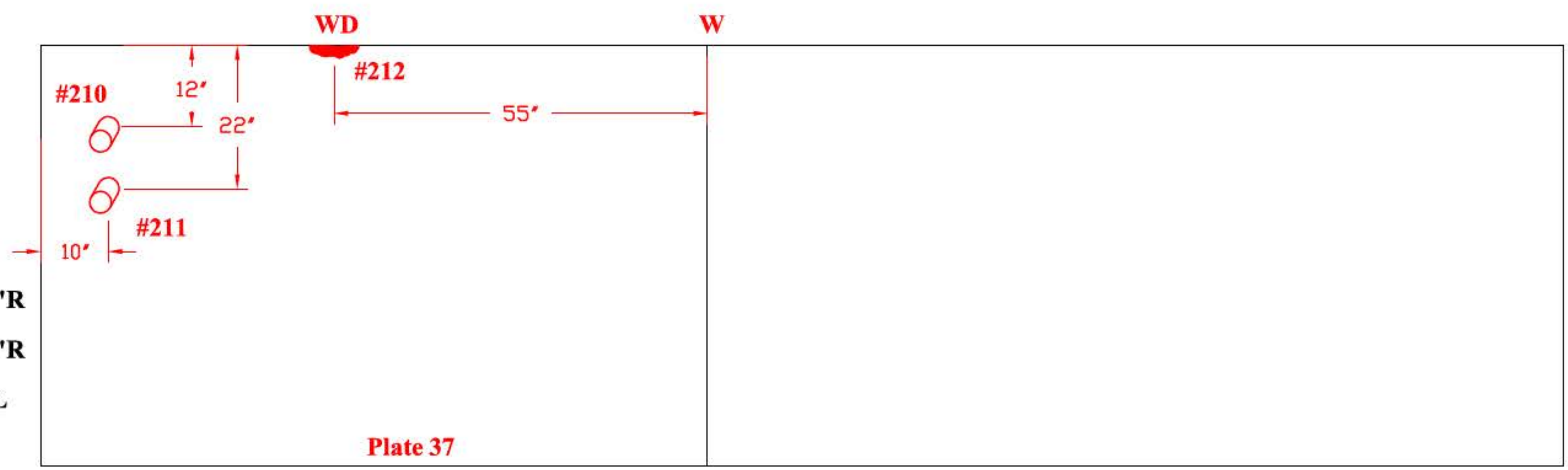
Course: 2
Plate #: 37

Flaw # - Type - Remaining:

#210 - Grout Nozzle - 0.213"R

#211 - Grout Nozzle - 0.200"R

#212 - LOF - 0.098"D 4.5"L



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TANK # 20 - QUADRANT B AND C

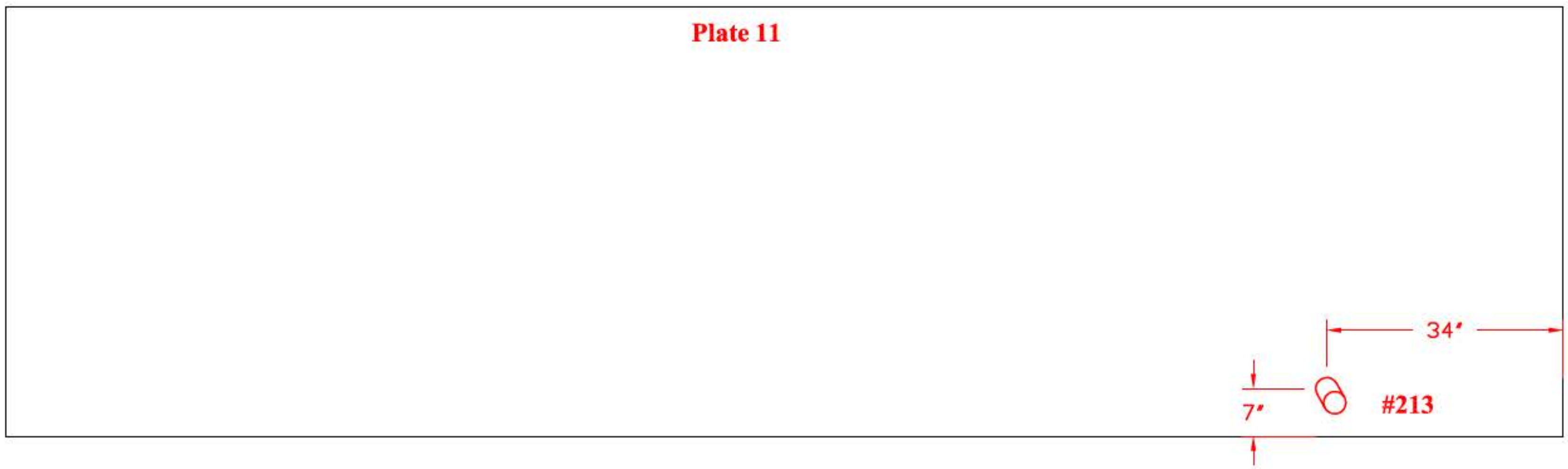
**Nominal Plate Thickness: 0.250"*

Tank Section: Extension
Quadrant: B

Course: 1
Plate #: 11

Flaw # - Type - Remaining:

#213 - Grout Nozzle - 0.205"R

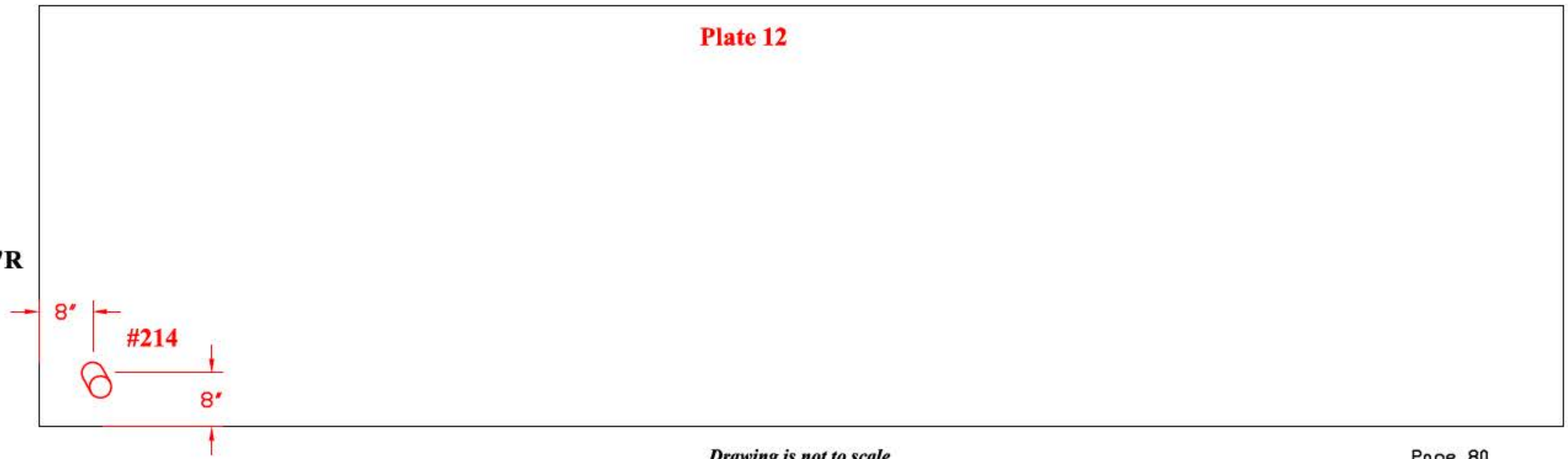


Tank Section: Extension
Quadrant: C

Course: 1
Plate #: 12

Flaw # - Type - Remaining:

#214 - Grout Nozzle - 0.207"R



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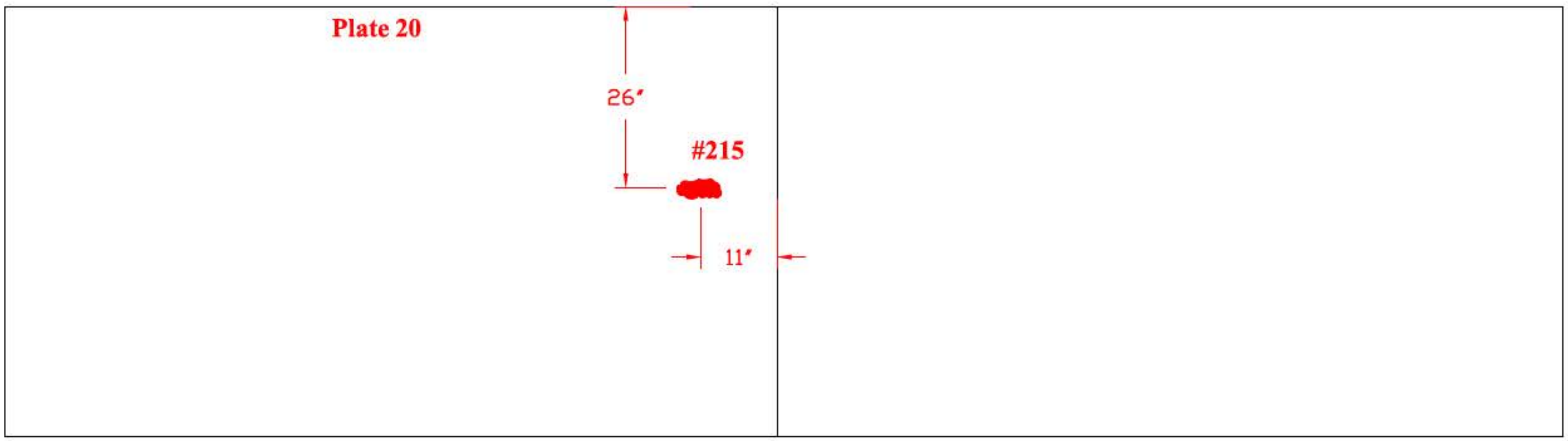
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: C

Course: 3
Plate #: 20

Flaw # - Type - Remaining:

#215 - Gouge - 0.160" deep

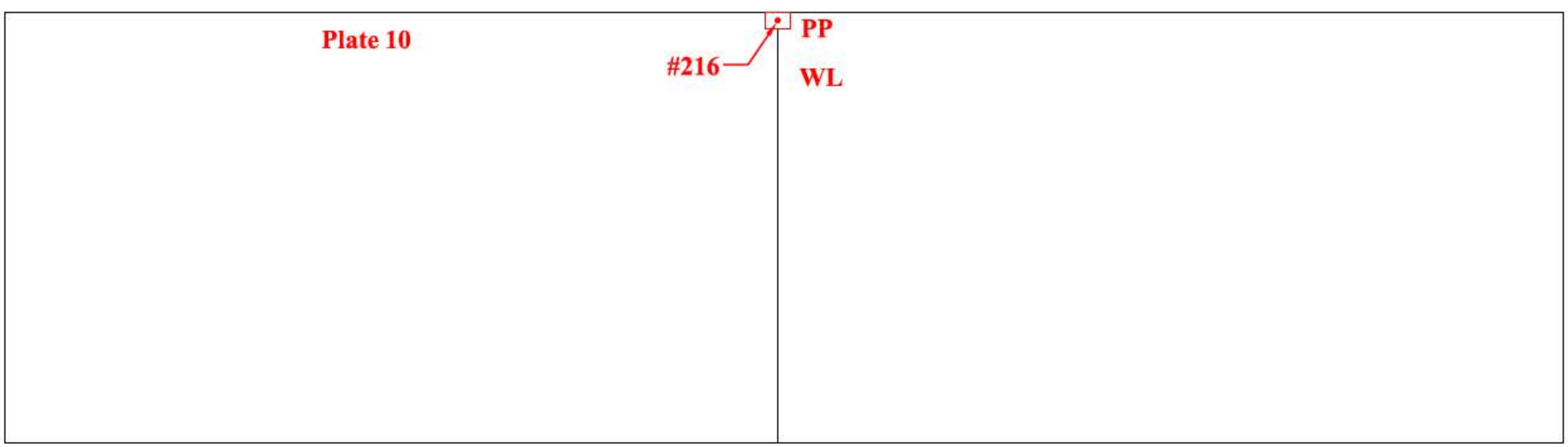


Tank Section: Extension
Quadrant: C

Course: 4
Plate #: 10

Flaw # - Type - Remaining:

#216 - WL - PP - 0.230"R



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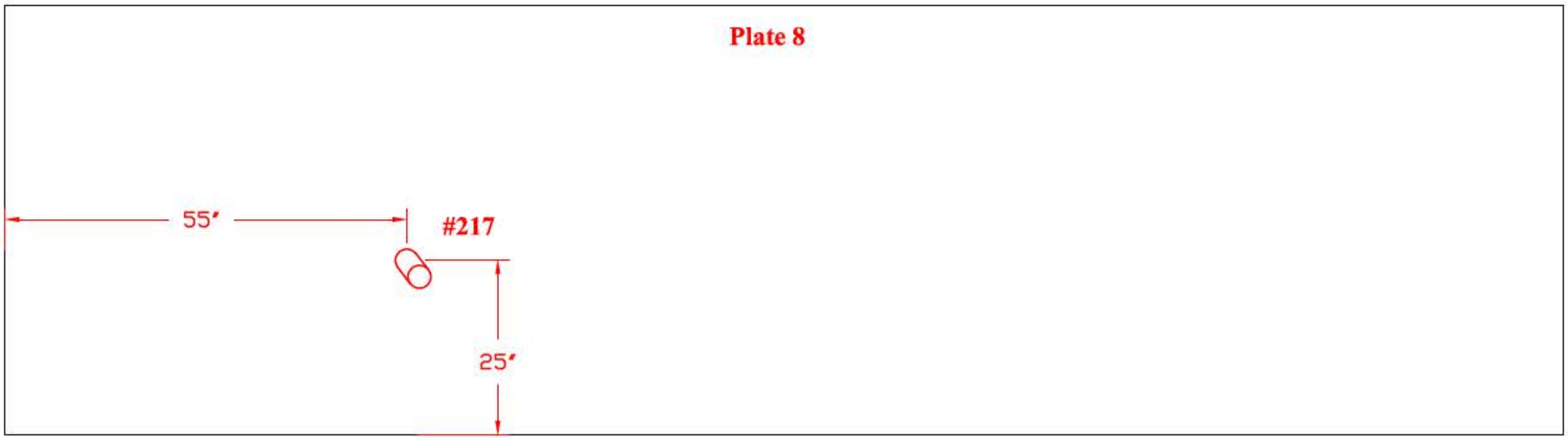
TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: B

Course: 5
Plate #: 8
Flaw # - Type - Remaining:

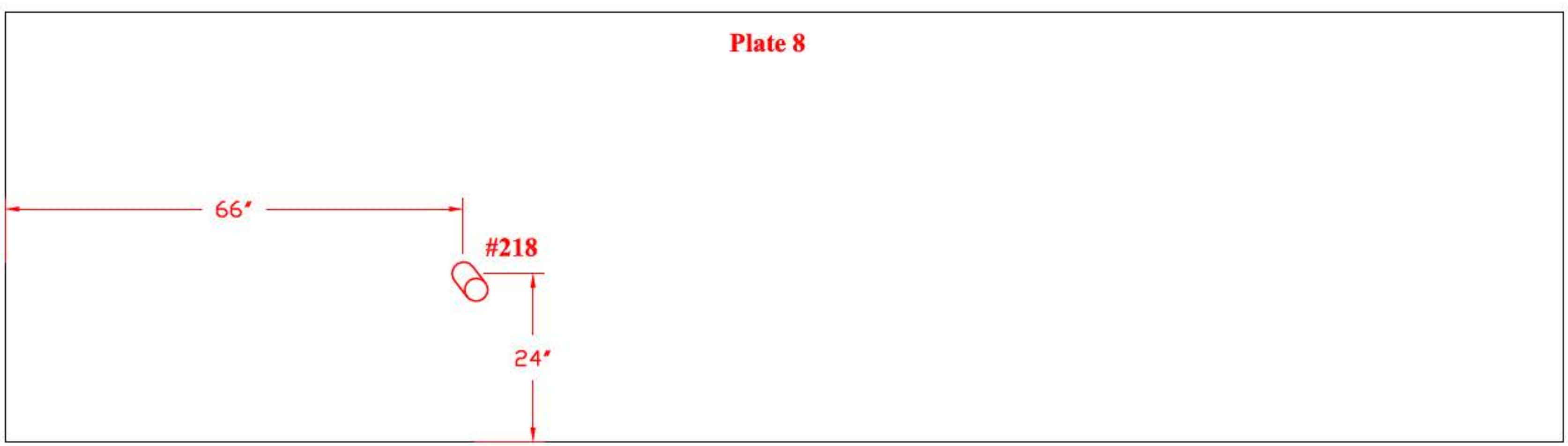
#217 - Grout Nozzle - 0.194"R



Tank Section: Barrel
Quadrant: B

Course: 19
Plate #: 8
Flaw # - Type - Remaining:

#218 - Grout Nozzle - 0.230"R



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TANK # 20 - QUADRANT A AND B

Nominal Plate Thickness: 0.250"

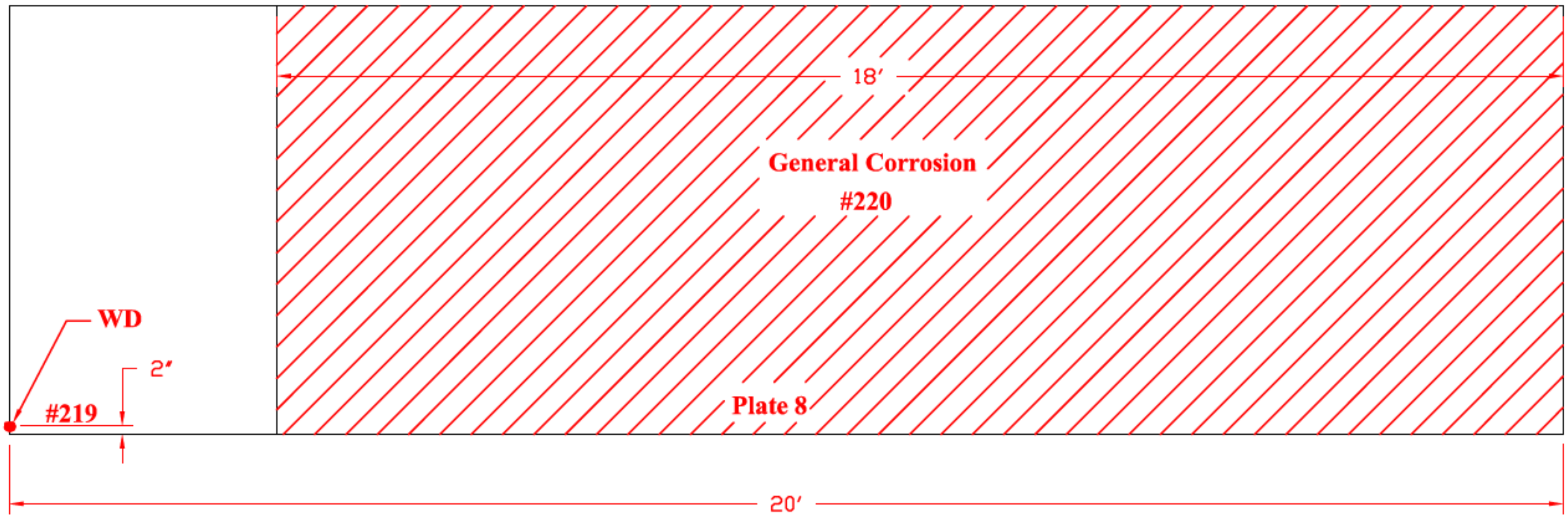
Tank Section: Barrel
Quadrant: B

Course: 27
Plate #: 8
Flaw # - Type - Remaining:

#219 - LOF 0.131"D 1.5"L

- LOF 0.137"D 2"L

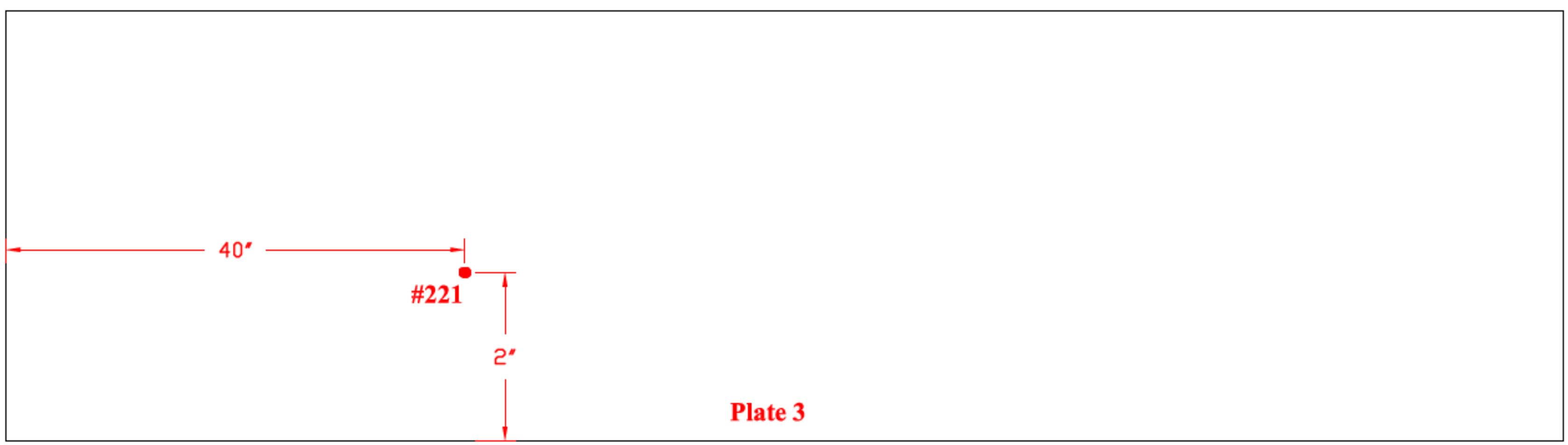
#220 - WL - 0.230"R



Tank Section: Expansion Joint
Quadrant: A

Course: 2
Plate #: 3
Flaw # - Type - Remaining:

#221 - Gouge - 0.210"Deep



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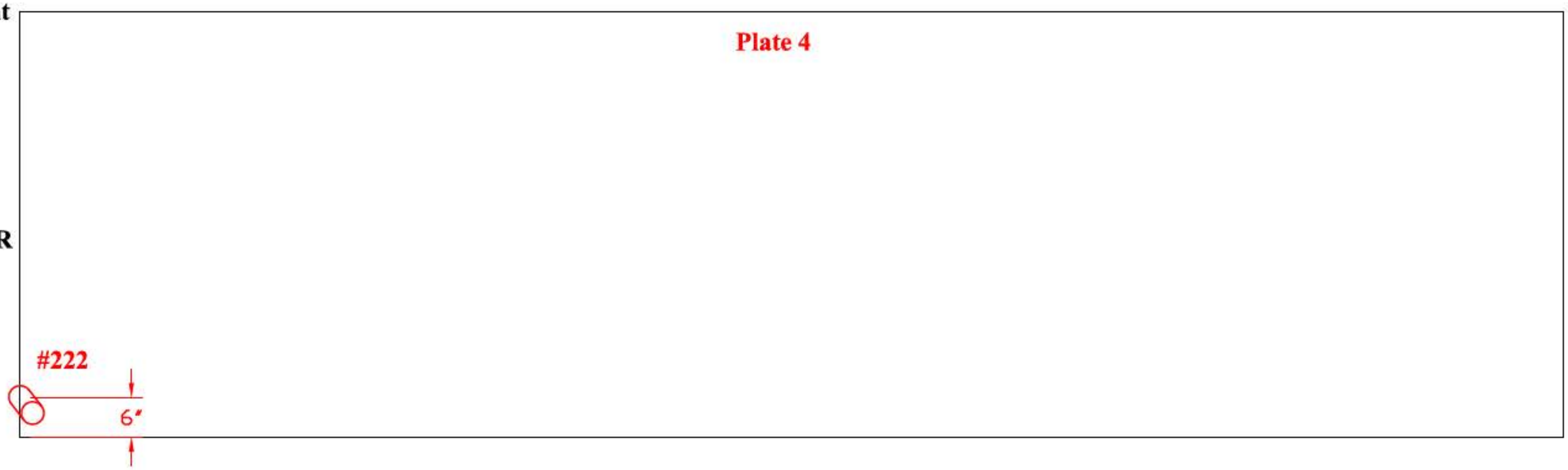
TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Expansion Joint
Quadrant: A

Course: 1
Plate #: 4
Flaw # - Type - Remaining:

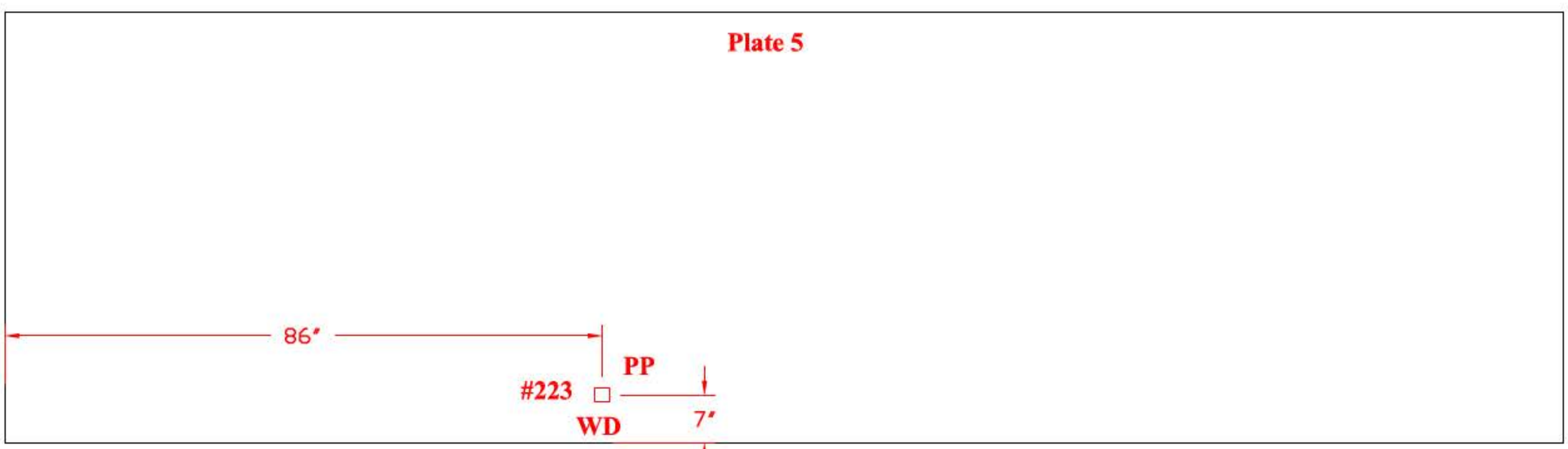
#222 - Grout Nozzle - 0.230"R



Tank Section: Expansion Joint
Quadrant: A

Course: 1
Plate #: 5
Flaw # - Type - Remaining:

#223 - PP - 0.230"R



Drawing is not to scale

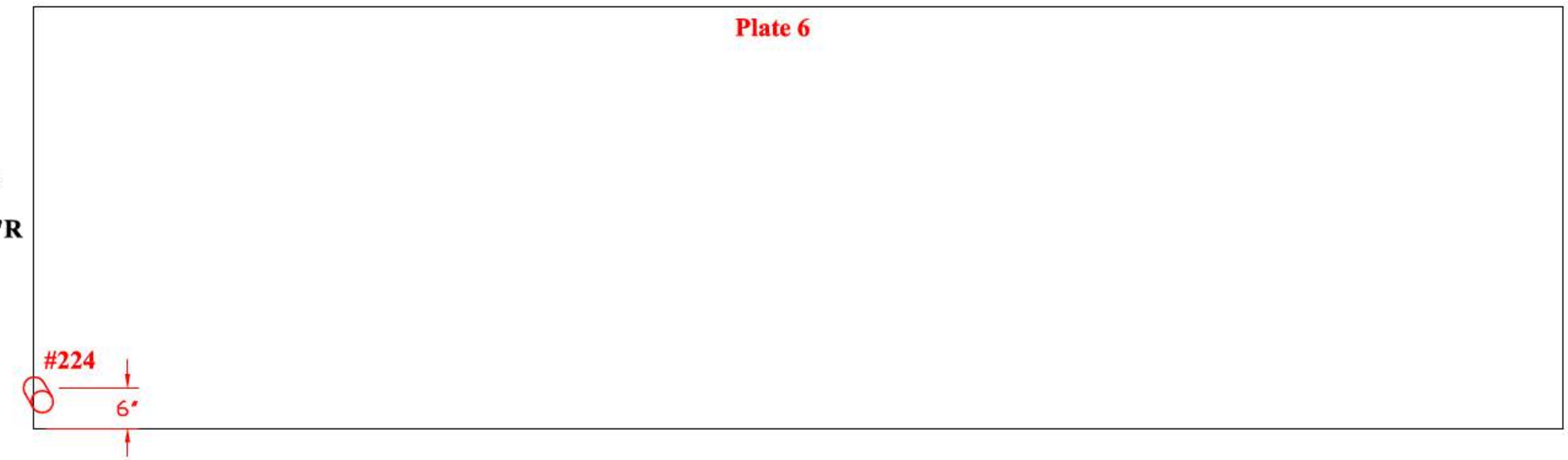
TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: B

Course: 1
Plate #: 6

Flaw # - Type - Remaining:

#224 - Grout Nozzle - 0.236"R

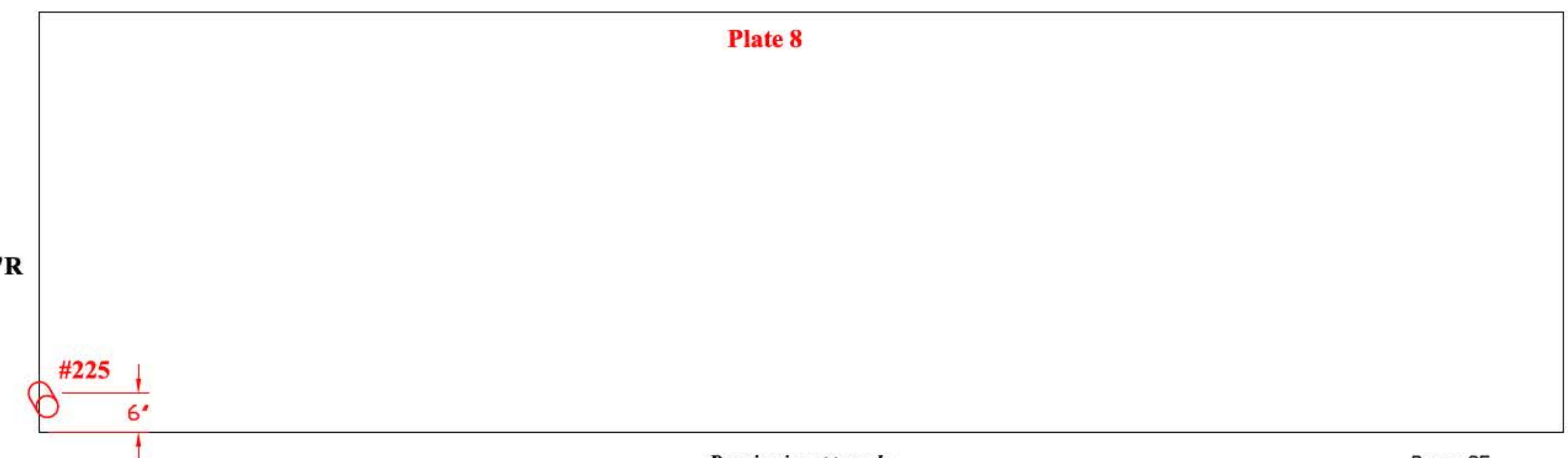


Tank Section: Extension
Quadrant: B

Course: 1
Plate #: 8

Flaw # - Type - Remaining:

#225 - Grout Nozzle - 0.232"R



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TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

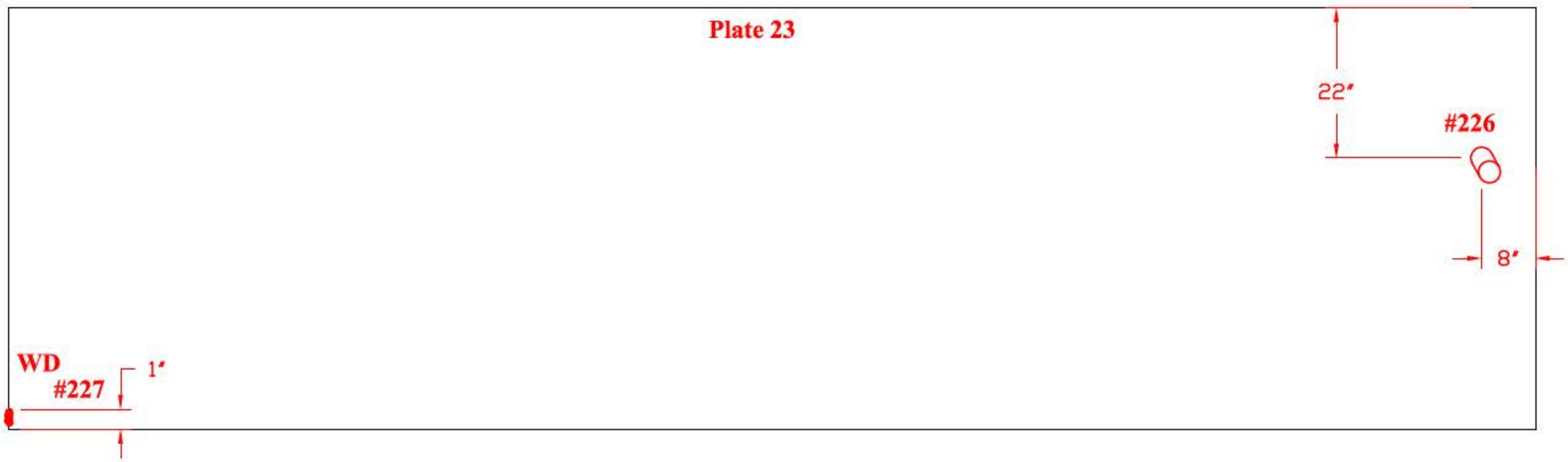
Tank Section: Extension
Quadrant: B

Course: 2
Plate #: 23

Flaw # - Type - Remaining:

#226 - Grout Nozzle - 0.208"R

#227 - WG - 0.127"D 1.75"L



Tank Section: Extension
Quadrant: B

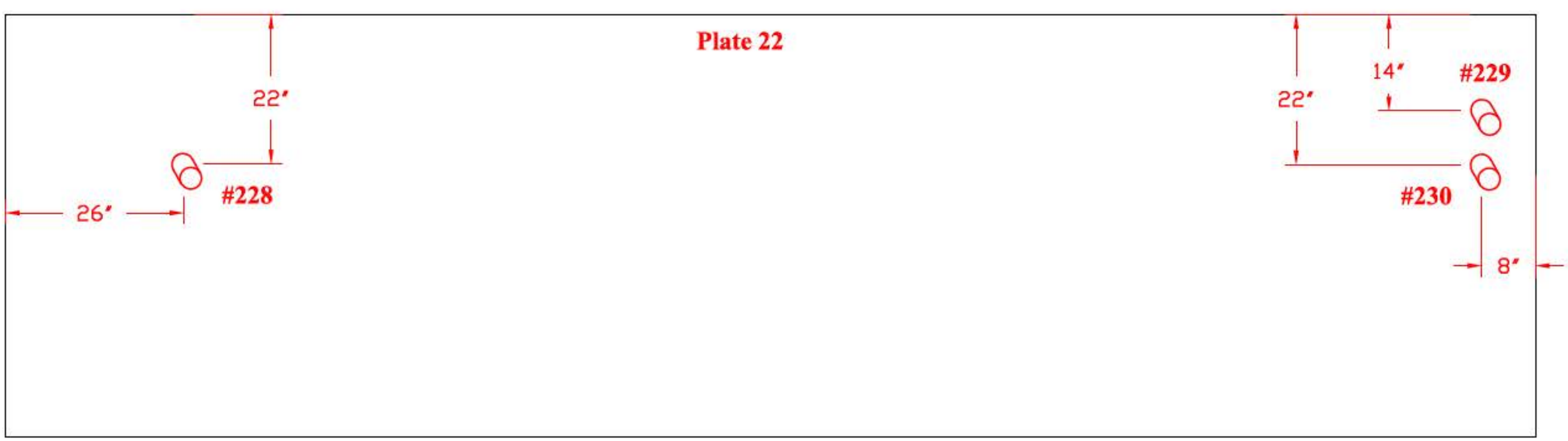
Course: 2
Plate #: 22

Flaw # - Type - Remaining:

#228 - Grout Nozzle - 0.209"R

#229 - Grout Nozzle - 0.229"R

#230 - Grout Nozzle - 0.236"R



Drawing is not to scale

TANK # 20 - QUADRANT B

**Nominal Plate Thickness: 0.250"*

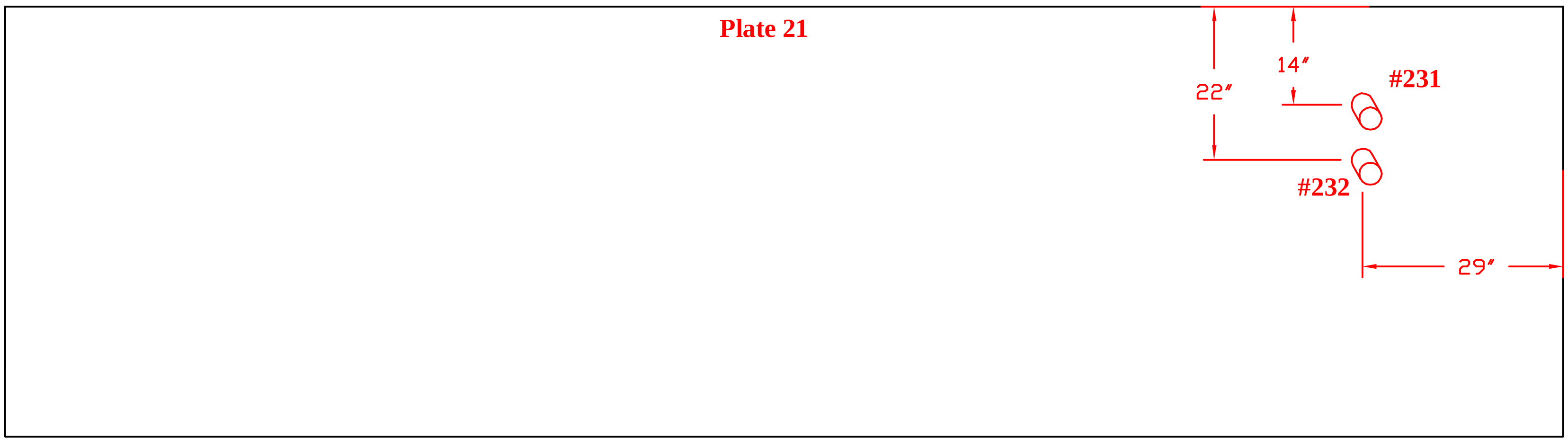
Tank Section: Extension
Quadrant: B

Course: 2
Plate #: 21

Flaw # - Type - Remaining:

#231 - Grout Nozzle - 0.226"R

#232 - Grout Nozzle - 0.219"R



Tank Section: Extension
Quadrant: B

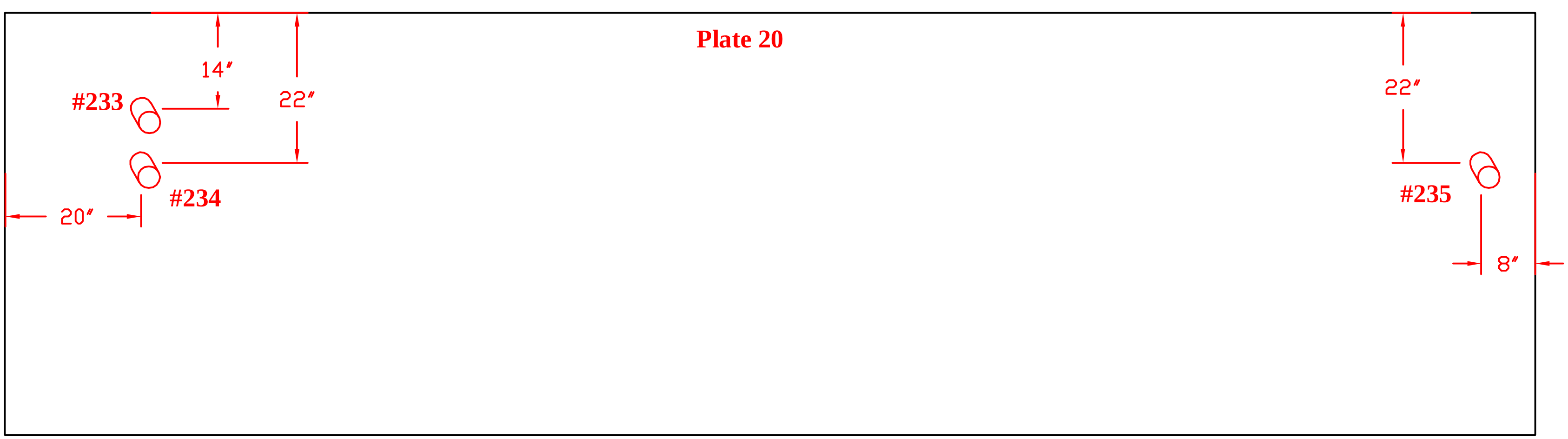
Course: 2
Plate #: 20

Flaw # - Type - Remaining:

#233 - Grout Nozzle - 0.224"R

#234 - Grout Nozzle - 0.240"R

#235 - Grout Nozzle - 0.219"R



Drawing is not to scale

TANK # 20 - QUADRANT B

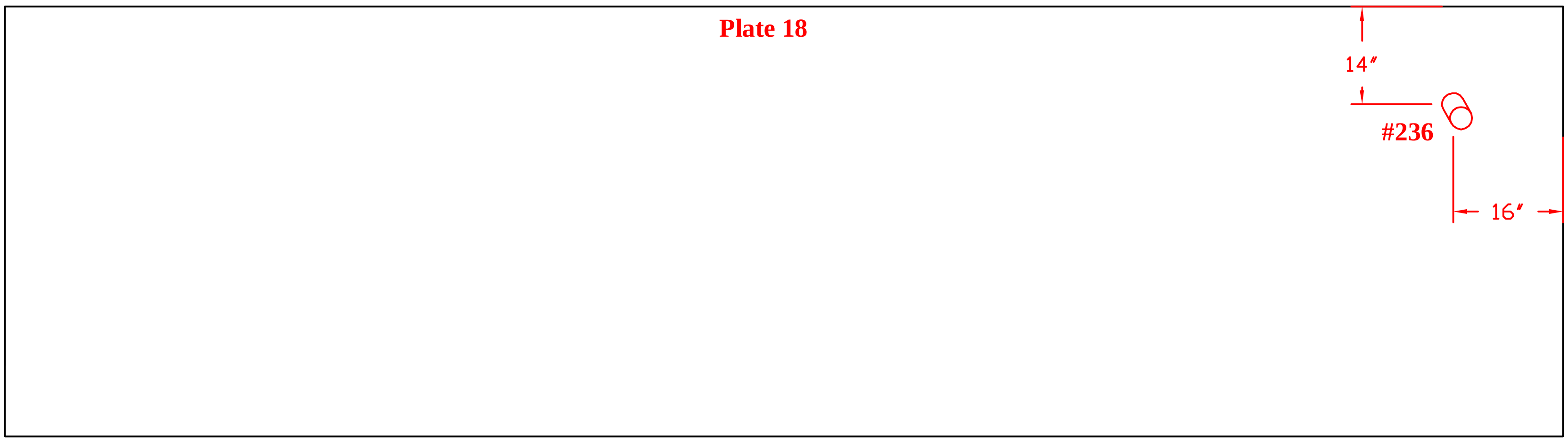
***Nominal Plate Thickness: 0.250"**

Tank Section: Extension
Quadrant: B

Course: 2
Plate #: 18

Flaw # - Type - Remaining:

#236 - Grout Nozzle - 0.209"R

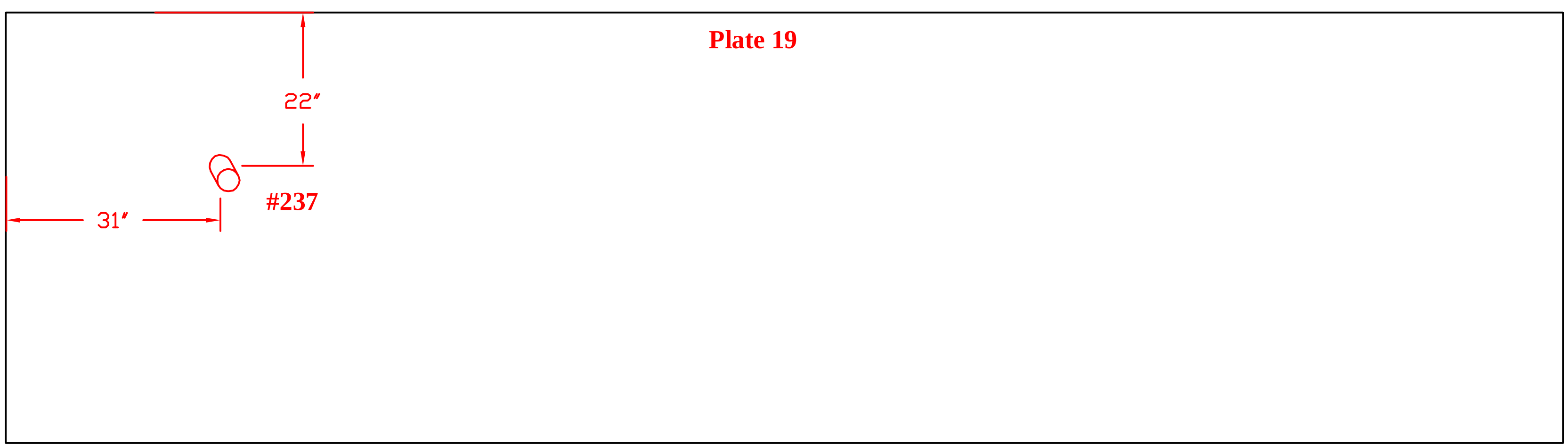


Tank Section: Extension
Quadrant: B

Course: 2
Plate #: 19

Flaw # - Type - Remaining:

#237 - Grout Nozzle - 0.212"R



TANK MAPS
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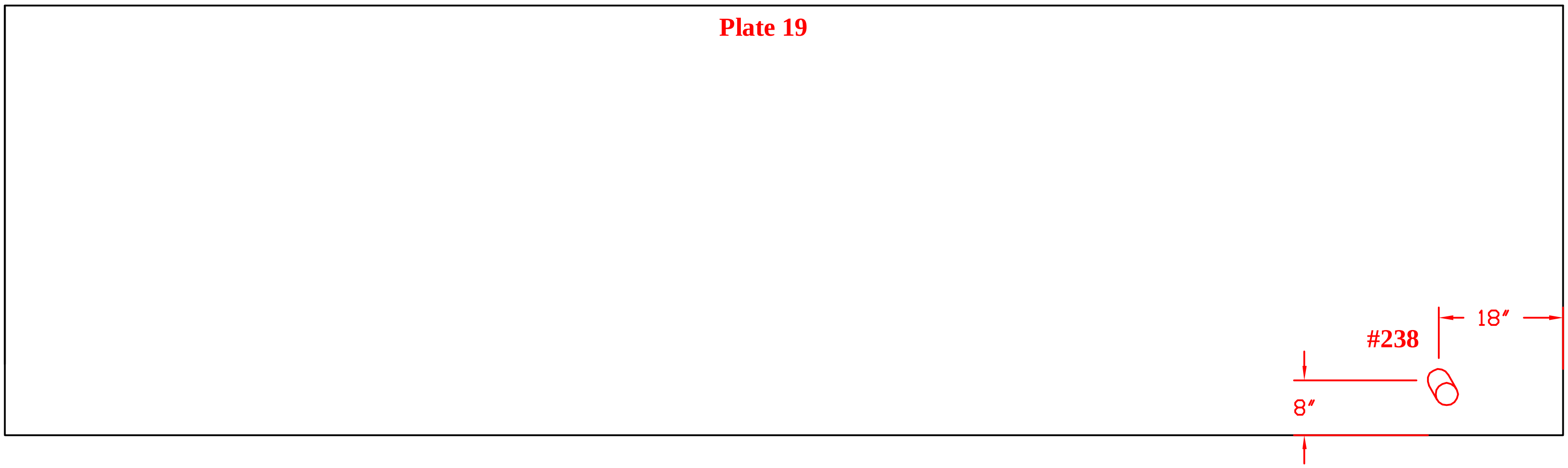
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: D

Course: 1
Plate #: 19

Flaw # - Type - Remaining:

#238 - Grout Nozzle - 0.205"R

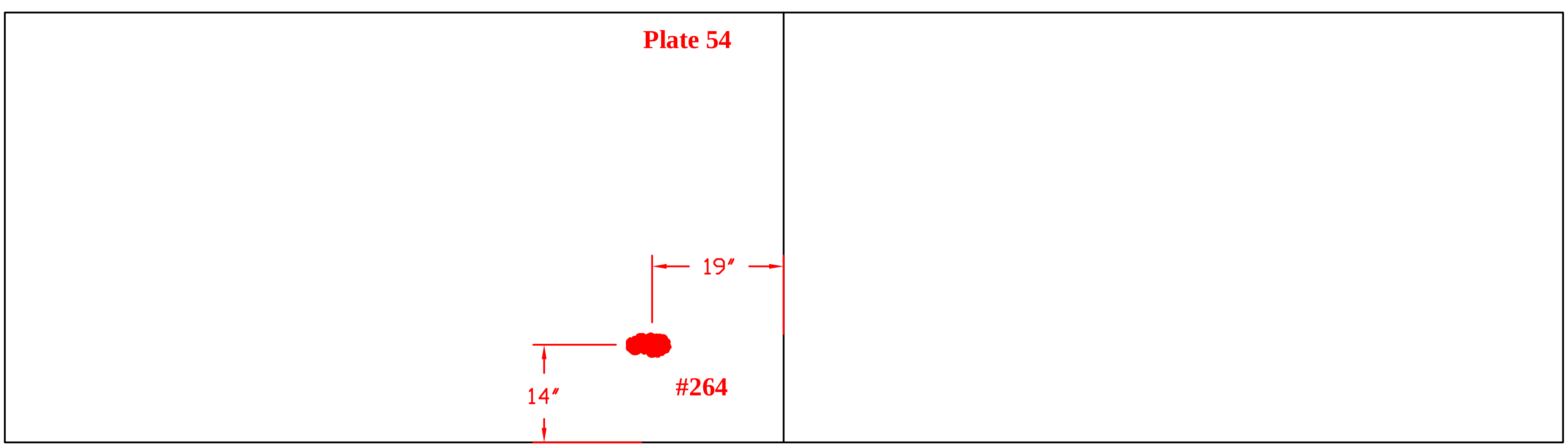


Tank Section: Upper Dome
Quadrant: D

Course: A
Plate #: 54

Flaw # - Type - Remaining:

#264 - Dent - 0.200" deep



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TANK # 20 - QUADRANT C AND D

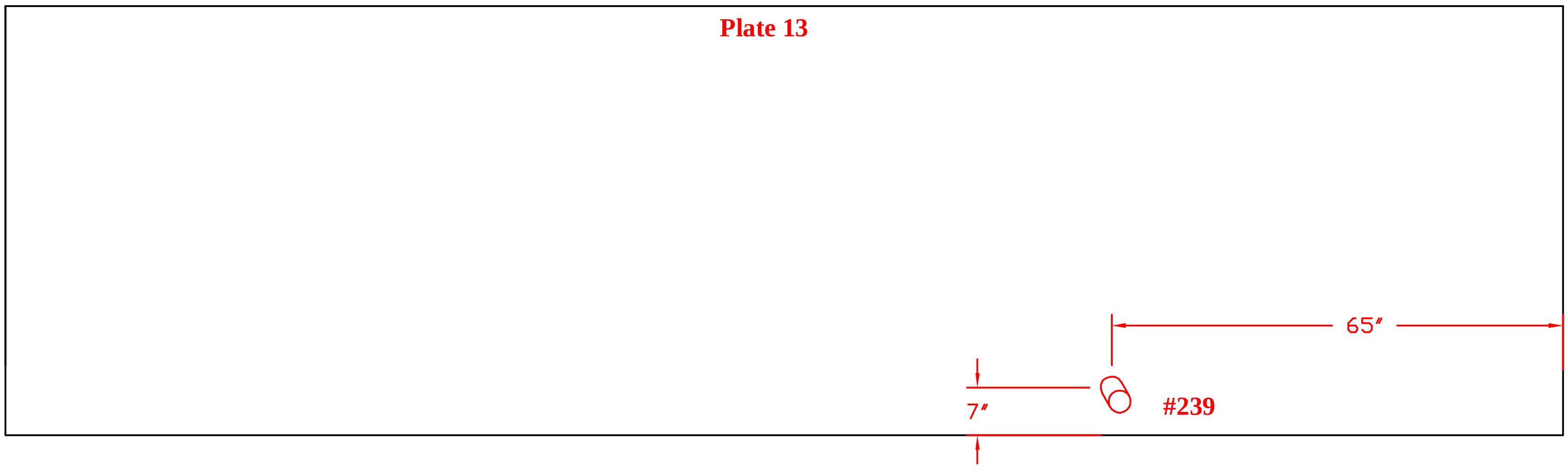
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: C

Course: 1
Plate #: 13

Flaw # - Type - Remaining:

#239- Grout Nozzle - 0.211"R

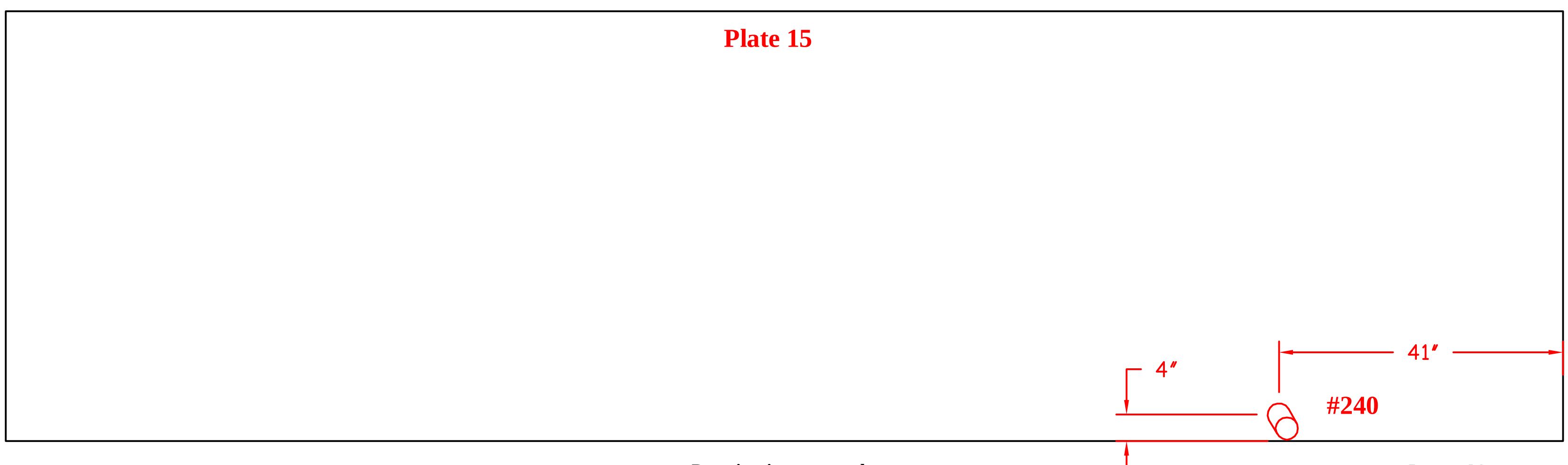


Tank Section: Extension
Quadrant: D

Course: 1
Plate #: 15

Flaw # - Type - Remaining:

#240 - Grout Nozzle - 0.221"R



Drawing is not to scale

TANK # 20 - QUADRANT D

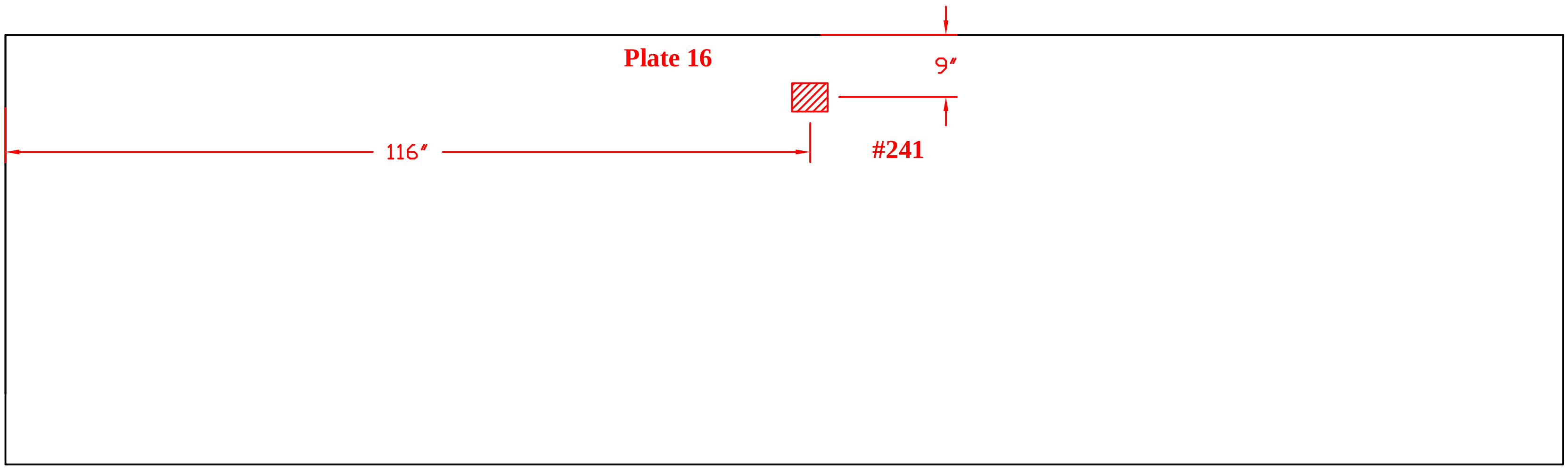
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: D

Course: 4
Plate #: 16

Flaw # - Type - Remaining:

#241- PP - 0.225"R

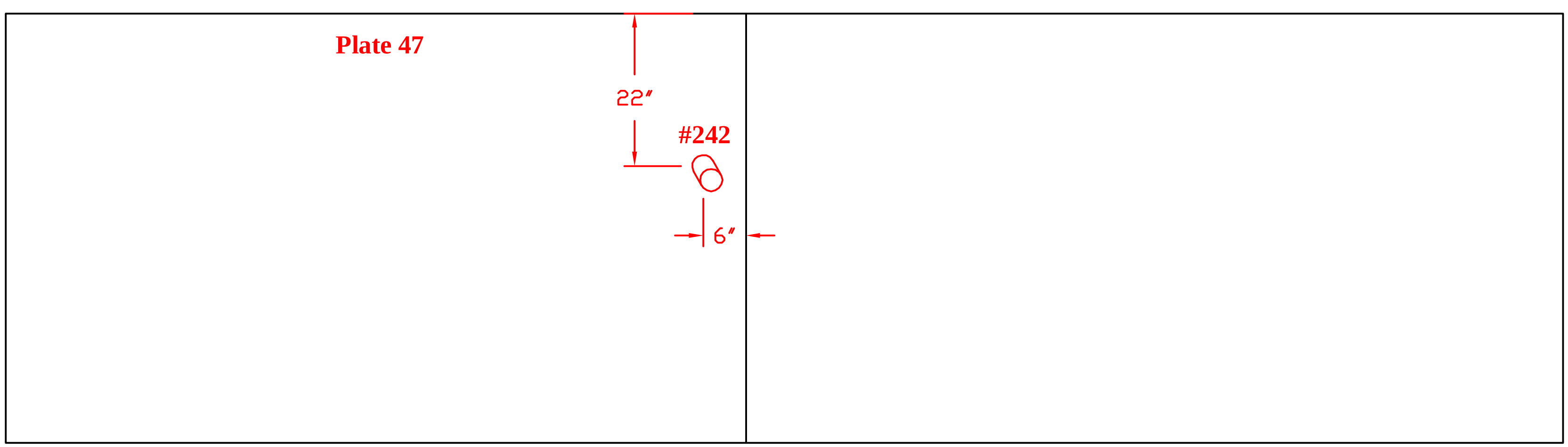


Tank Section: Extension
Quadrant: D

Course: 2
Plate #: 47

Flaw # - Type - Remaining:

#242 - Grout Nozzle - 0.200"R



Drawing is not to scale

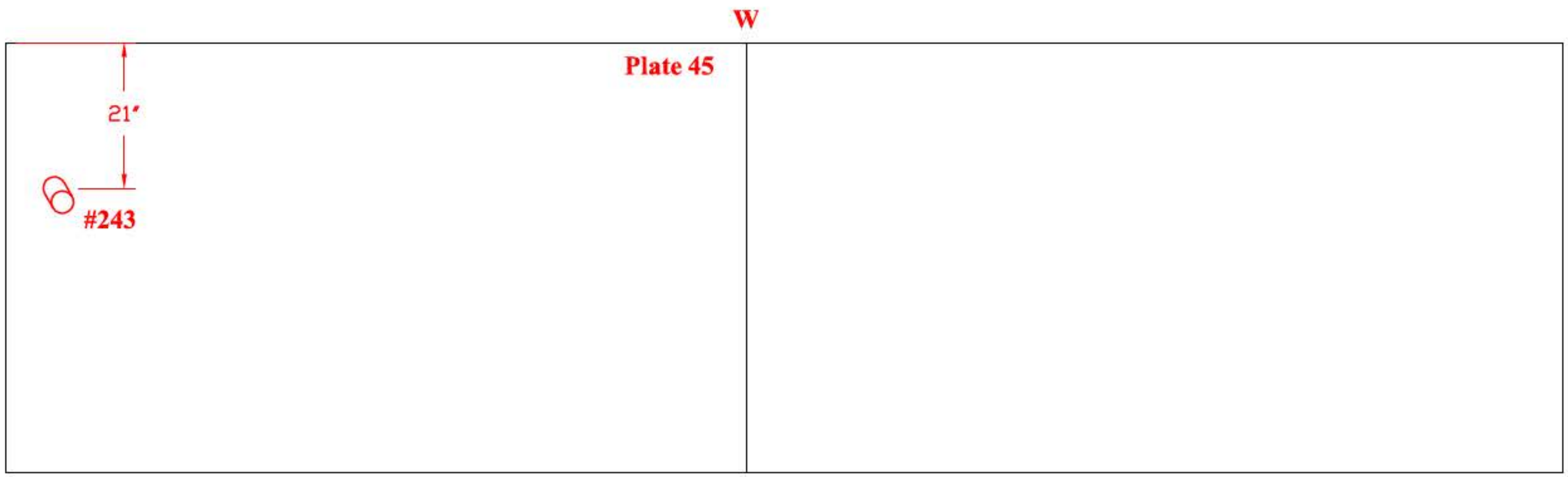
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: D

Course: 2
Plate #: 45

Flaw # - Type - Remaining:

#243 - Grout Nozzle - 0.211"R



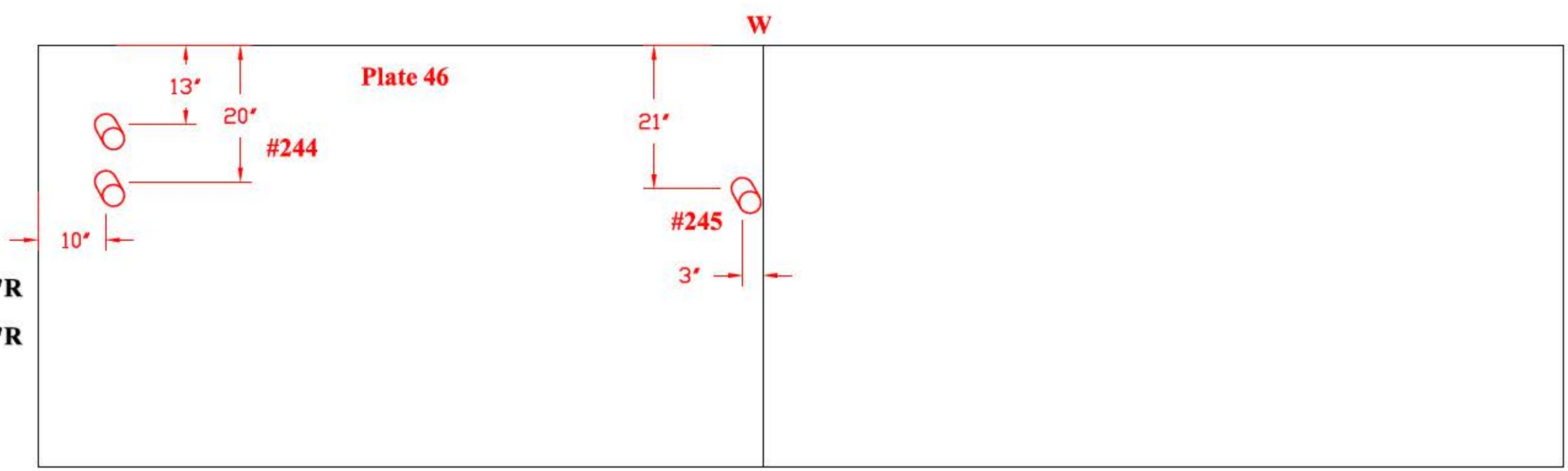
Tank Section: Extension
Quadrant: D

Course: 2
Plate #: 46

Flaw # - Type - Remaining:

#244 - Grout Nozzle - 0.202"R

#245 - Grout Nozzle - 0.211"R



Drawing is not to scale

TANK # 20 - QUADRANT D

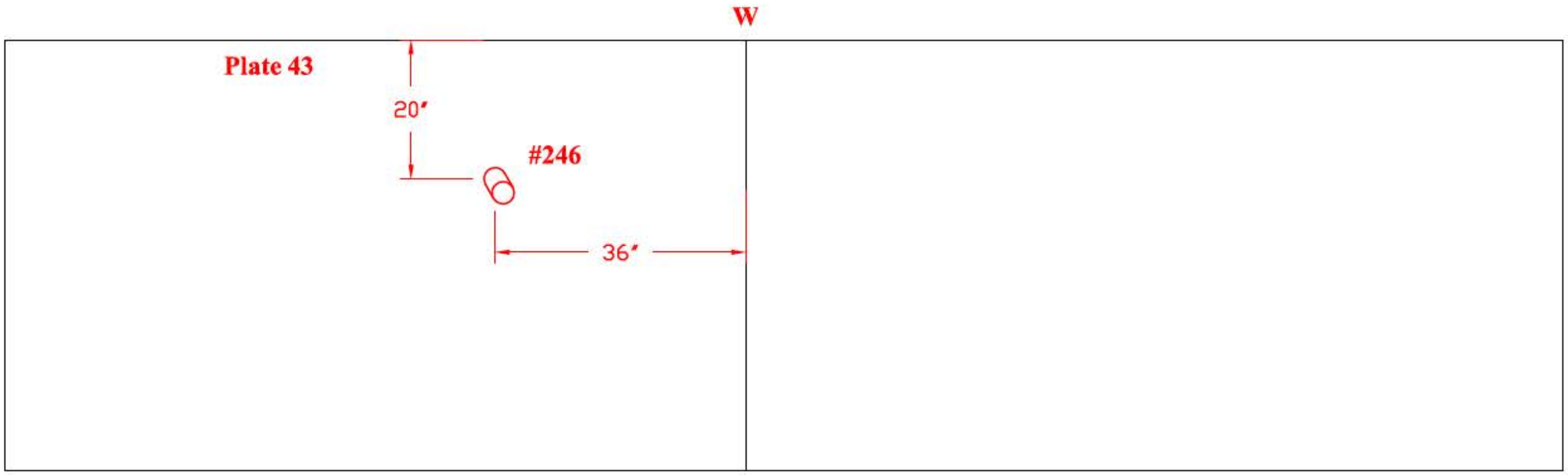
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: D

Course: 2
Plate #: 43

Flaw # - Type - Remaining:

#246 - Grout Nozzle - 0.197"R



Drawing is not to scale

TANK # 20 - QUADRANT D

***Nominal Plate Thickness: 0.250"**

Tank Section: Extension
Quadrant: D

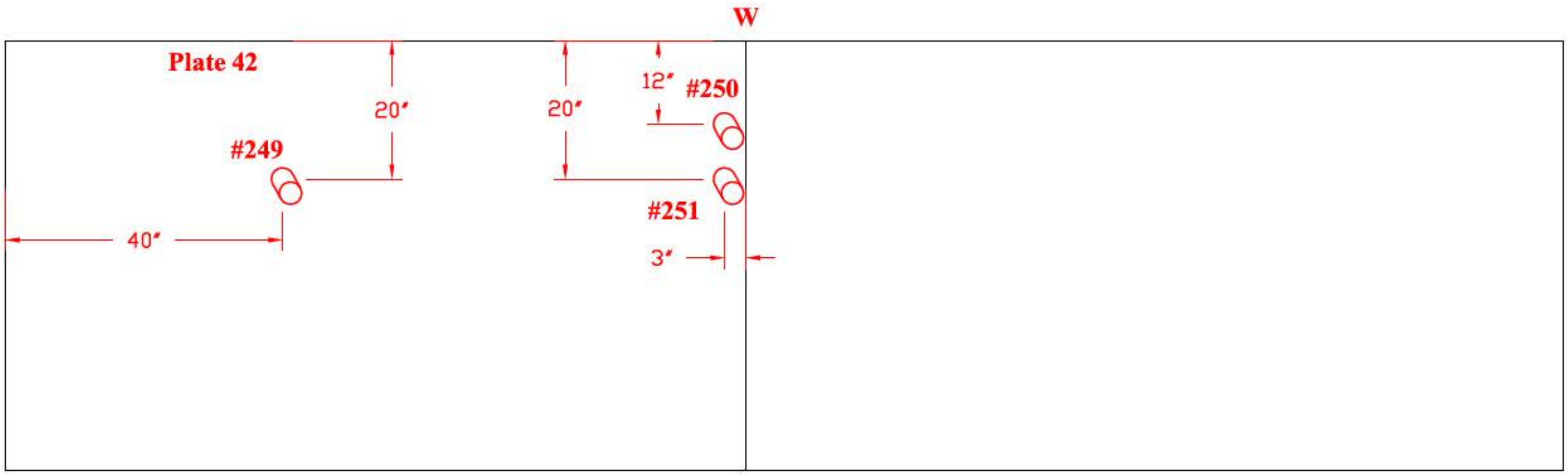
Course: 2
Plate #: 42

Flaw # - Type - Remaining:

#249 - Grout Nozzle - 0.212"R

#250 - Grout Nozzle - 0.209"R

#251 - Grout Nozzle - 0.215"R



Drawing is not to scale

TANK # 20 - QUADRANT D

Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: D

Course: 2
Plate #: 40

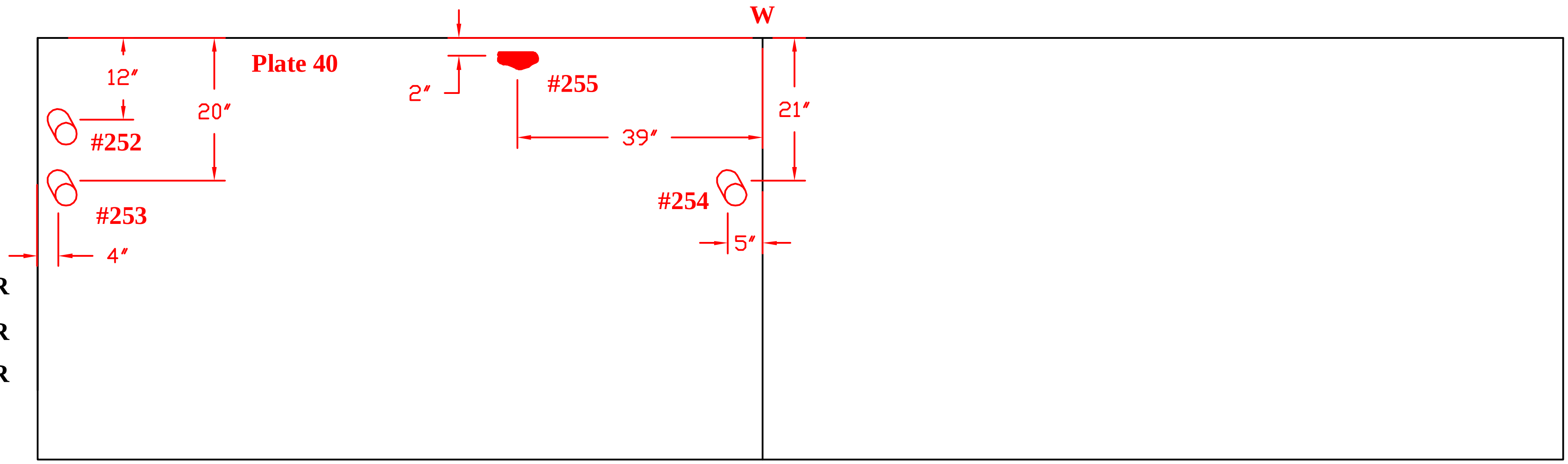
Flaw # - Type - Remaining:

#252 - Grout Nozzle - 0.214"R

#253 - Grout Nozzle - 0.210"R

#254 - Grout Nozzle - 0.203"R

#255 - Dent - 0.200" deep



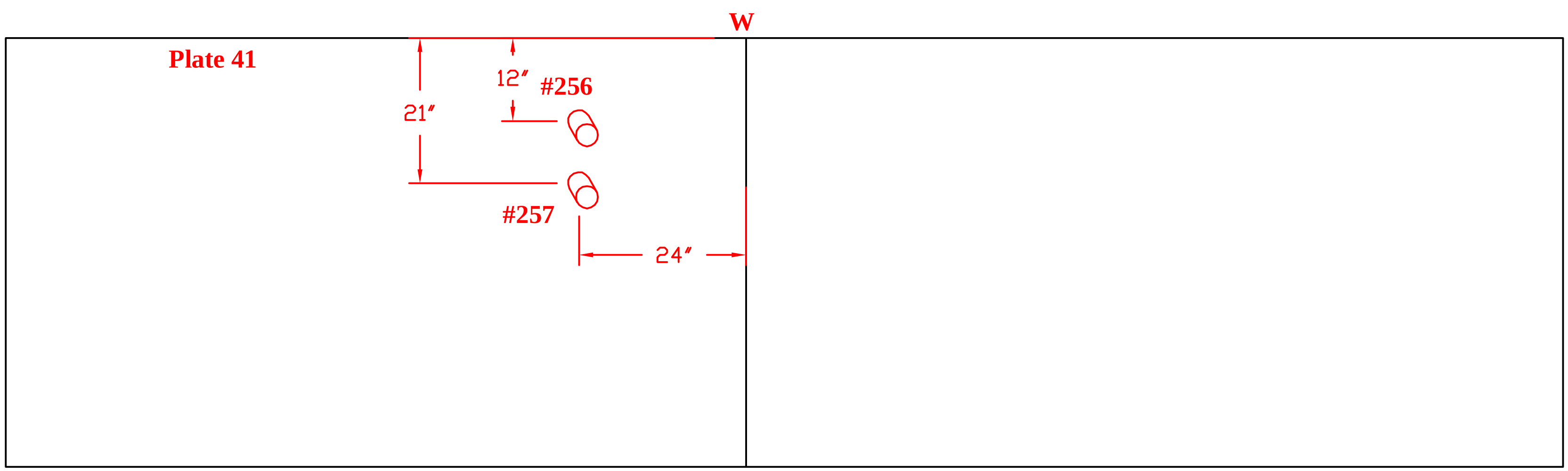
Tank Section: Extension
Quadrant: D

Course: 2
Plate #: 41

Flaw # - Type - Remaining:

#256 - Grout Nozzle - 0.212"R

#257 - Grout Nozzle - 0.214"R



Drawing is not to scale

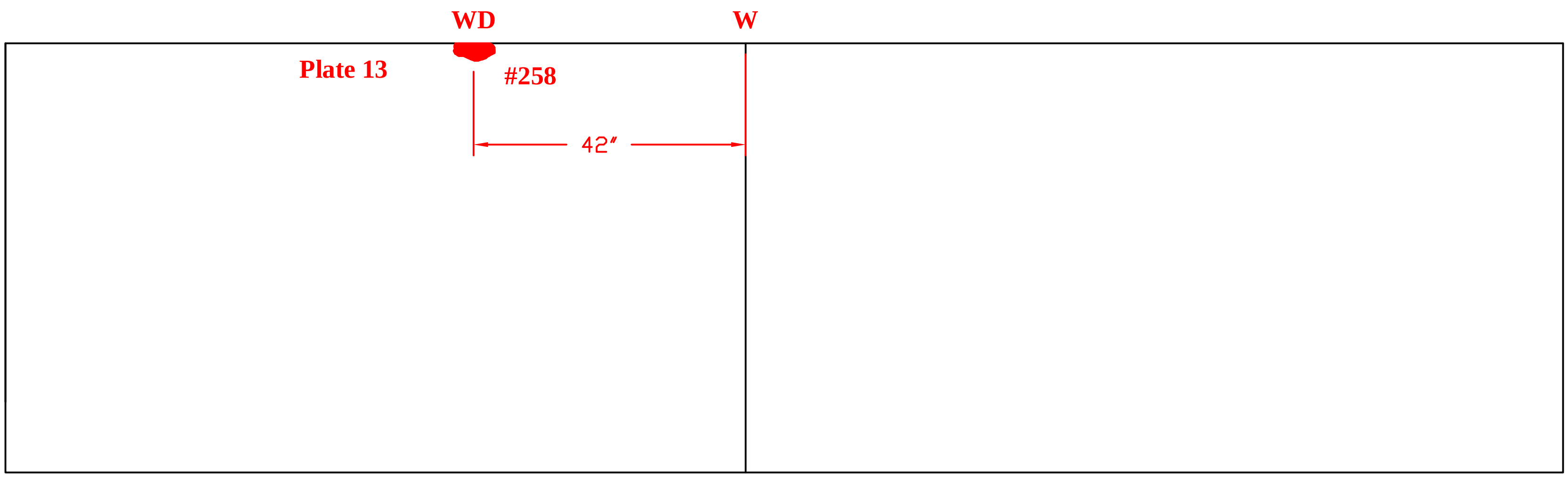
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: D

Course: 4
Plate #: 13

Flaw # - Type - Remaining:

#258 - LOF - 0.147" deep
2" circ.

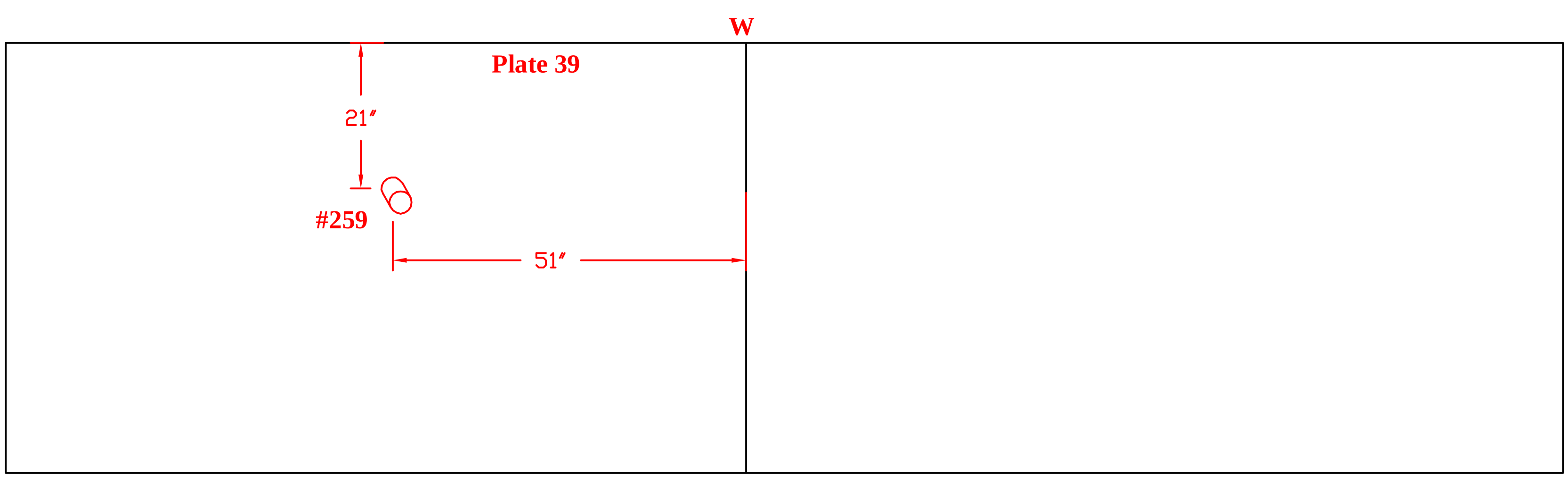


Tank Section: Extension
Quadrant: D

Course: 2
Plate #: 39

Flaw # - Type - Remaining:

#259 - Grout Nozzle - 0.200"R



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TANK # 20 - QUADRANT D

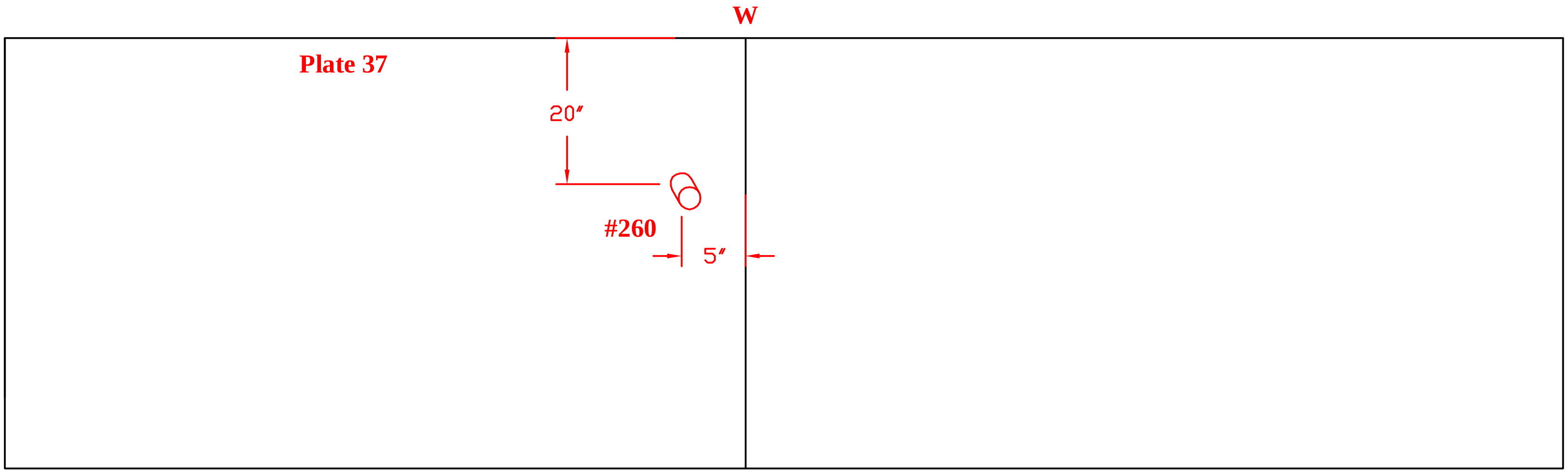
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: D

Course: 2
Plate #: 37

Flaw # - Type - Remaining:

#260 - Grout Nozzle - 0.203"R



Tank Section: Extension
Quadrant: D

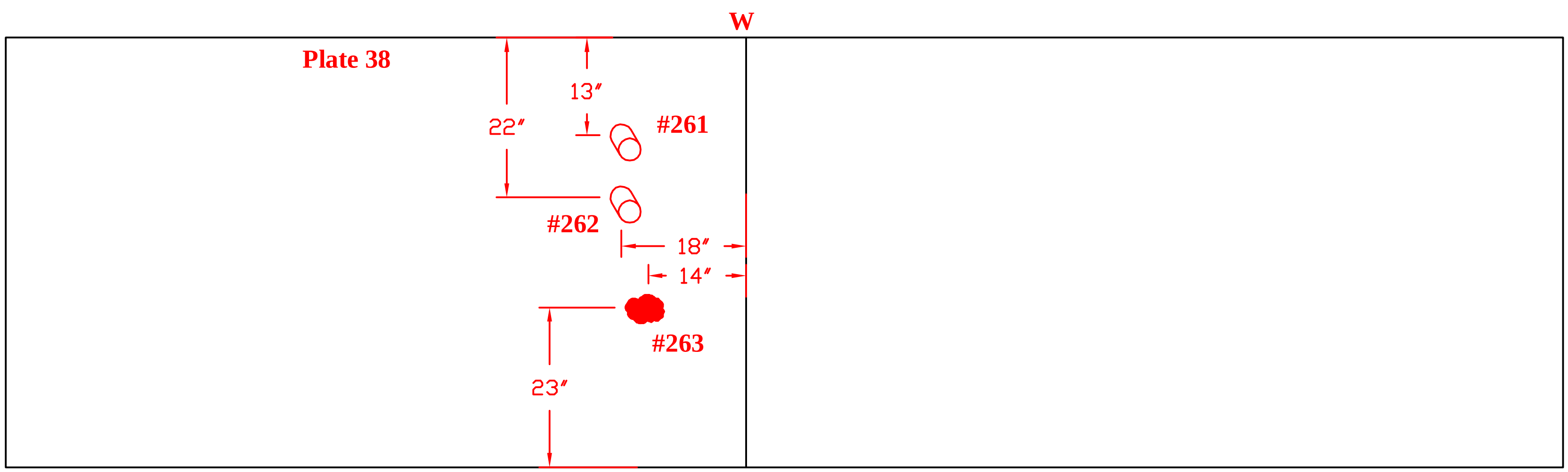
Course: 2
Plate #: 38

Flaw # - Type - Remaining:

#261 - Grout Nozzle - 0.209"R

#262 - Grout Nozzle - 0.205"R

#263 - Dent - 0.200" deep



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TANK # 20 - QUADRANT D

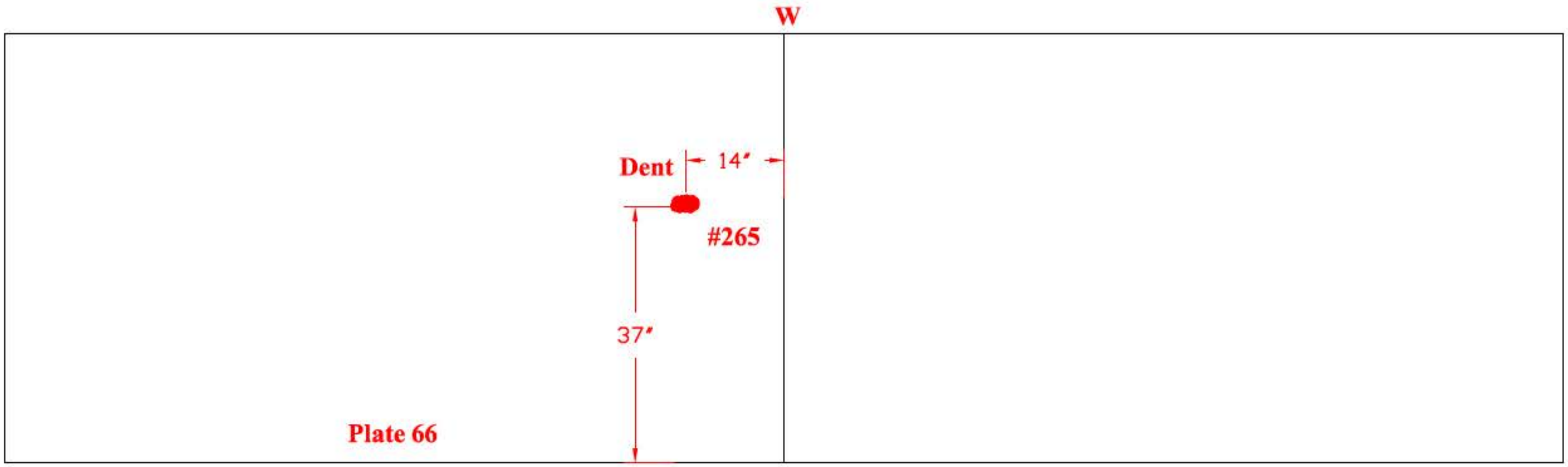
***Nominal Plate Thickness: 0.250"**

Date Inspected/Confirmed: 10/08/2008

Tank Section: Upper Dome
Quadrant: D

Course: A
Plate #: 66
Flaw # - Type - Remaining:

#265 - Dent - 0.200"deep

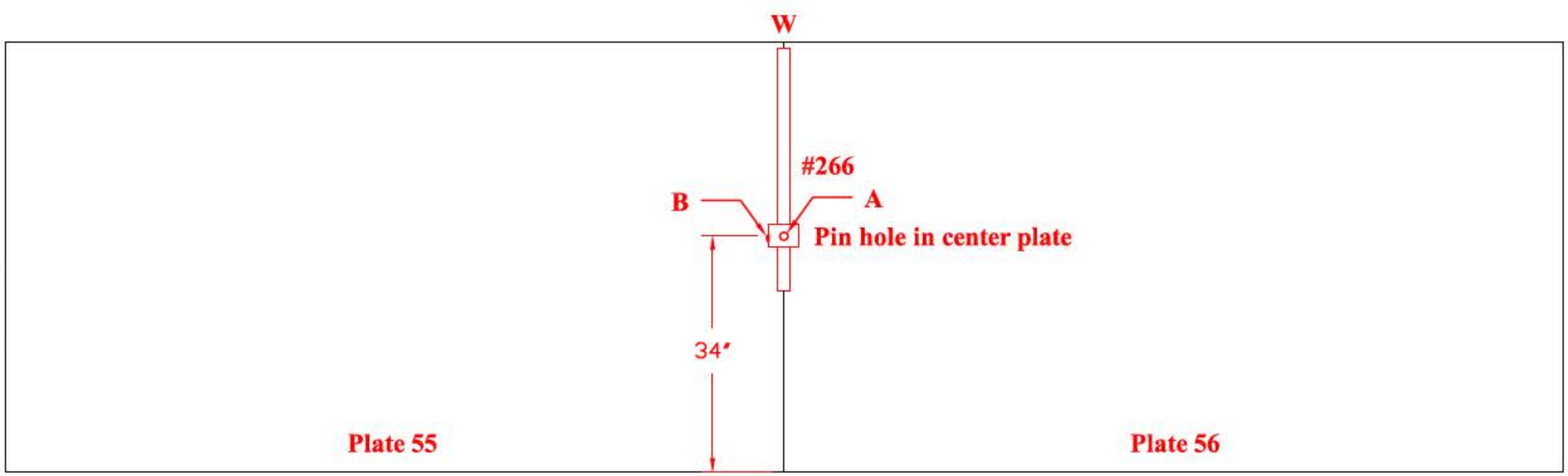


Tank Section:Upper Dome
Quadrant: D

Course: A
Plate #: 55/56
Flaw # - Type - Remaining:

#266: A) BS-TW-LOF-0.092"D
1 "dia

B) BS-TW-LOF-0.092"D
1 "dia



TANK MAPS
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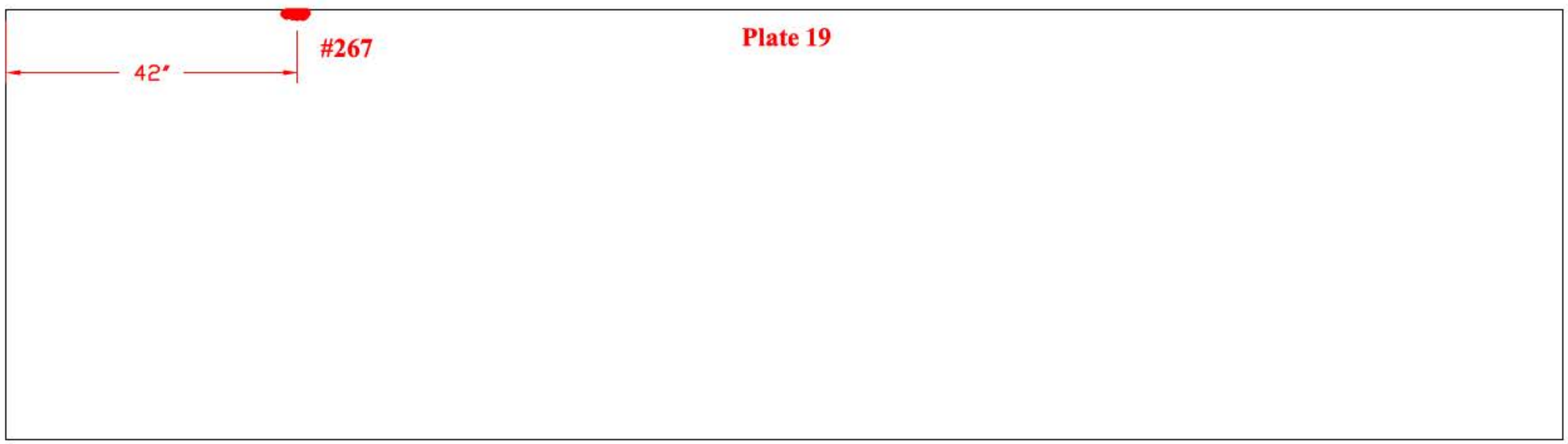
TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: B

Course: 2
Plate #: 19

Flaw # - Type - Remaining:

#267 - WP - 0.156" deep

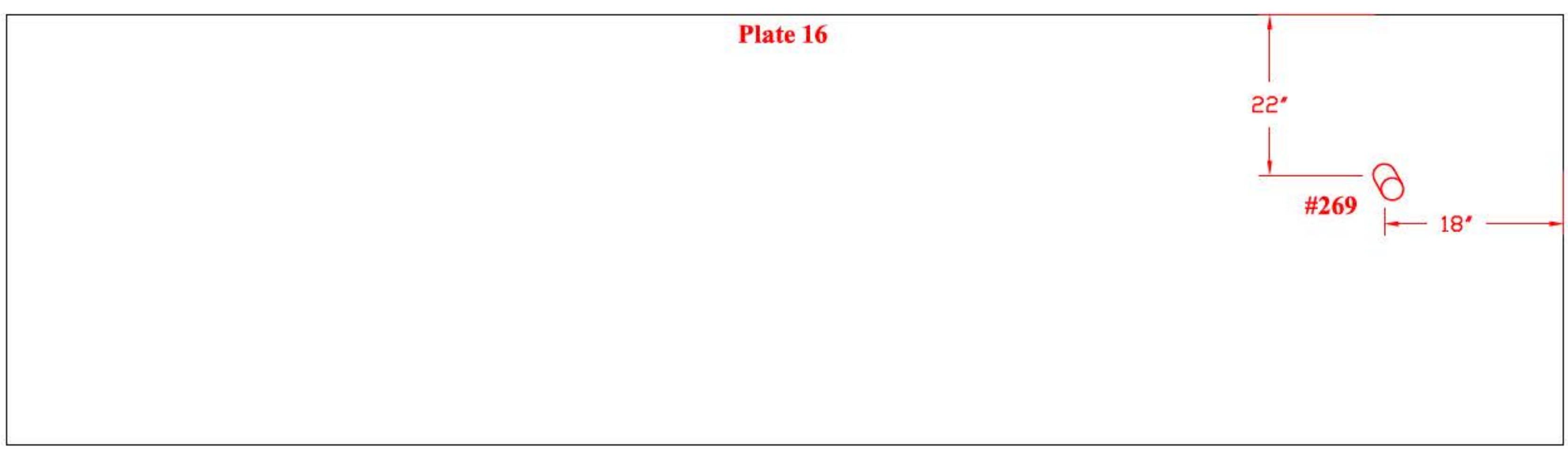


Tank Section: Extension
Quadrant: B

Course: 2
Plate #: 16

Flaw # - Type - Remaining:

#269 - Grout Nozzle - 0.212"R



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TANK MAPS
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Honolulu, HI

TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: B

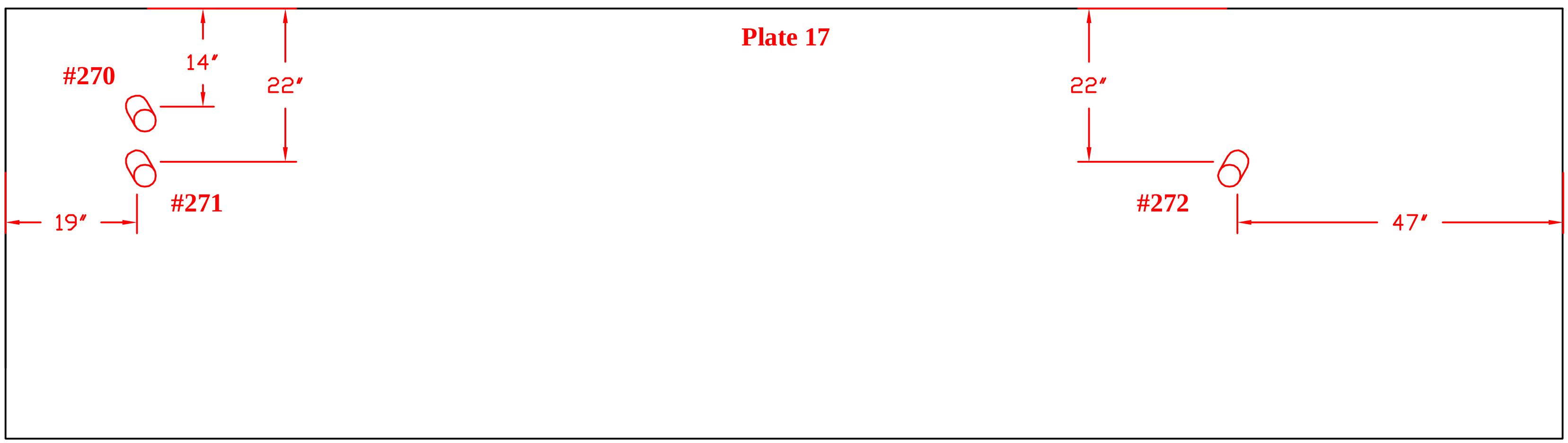
Course: 2
Plate #: 17

Flaw # - Type - Remaining:

#270 - Grout Nozzle - 0.217"R

#271 - Grout Nozzle - 0.215"R

#272 - Grout Nozzle - 0.196"R



Tank Section: Extension
Quadrant: B

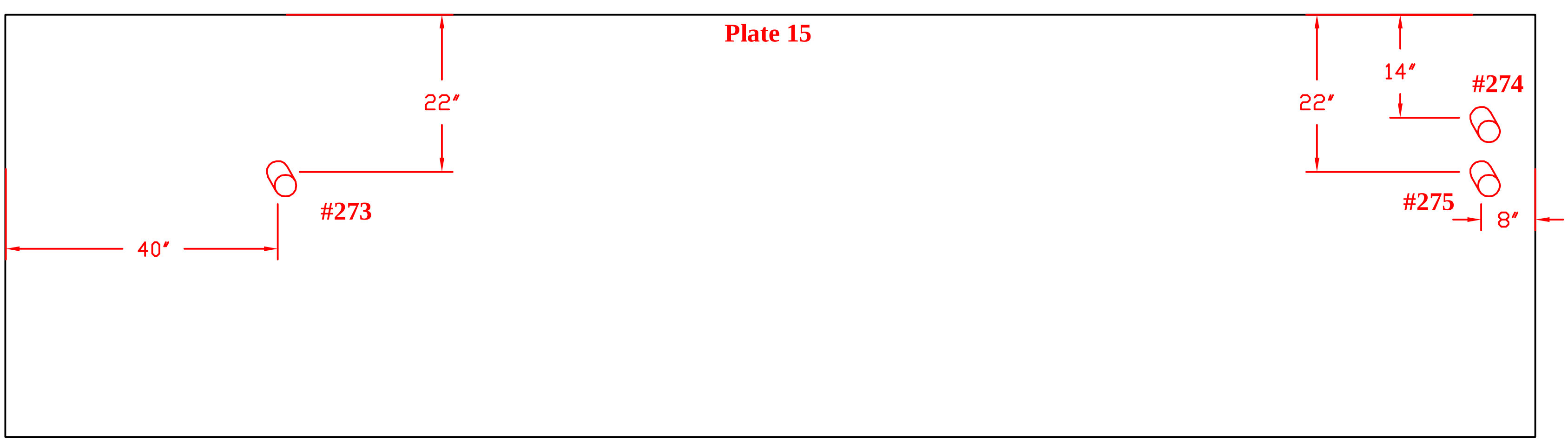
Course: 2
Plate #: 15

Flaw # - Type - Remaining:

#273 - Grout Nozzle - 0.217"R

#274 - Grout Nozzle - 0.210"R

#275 - Grout Nozzle - 0.219"R



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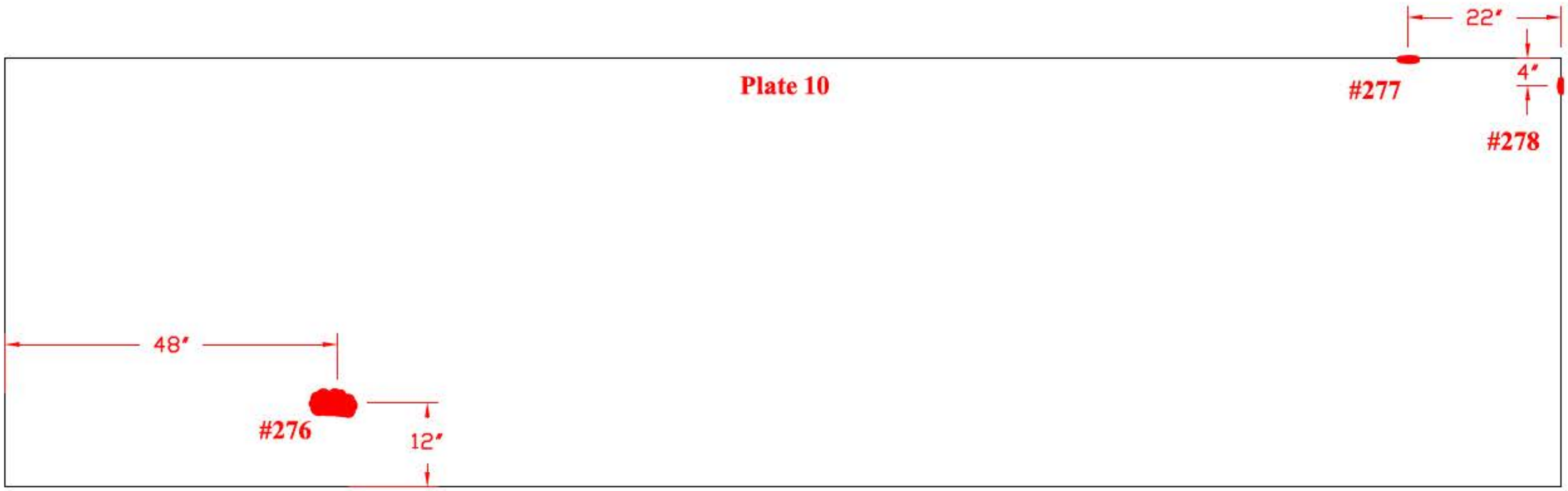
TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: B

Course: 3
Plate #: 10

Flaw # - Type - Remaining:

#276 - Gouge - 0.210" deep
#277 - LOF - 0.152" D 2.5"L
LOF - 0.094" D 2.5"L
#278 - LOF - 0.206" D 4"L
LOF - 0.230" D 4"L



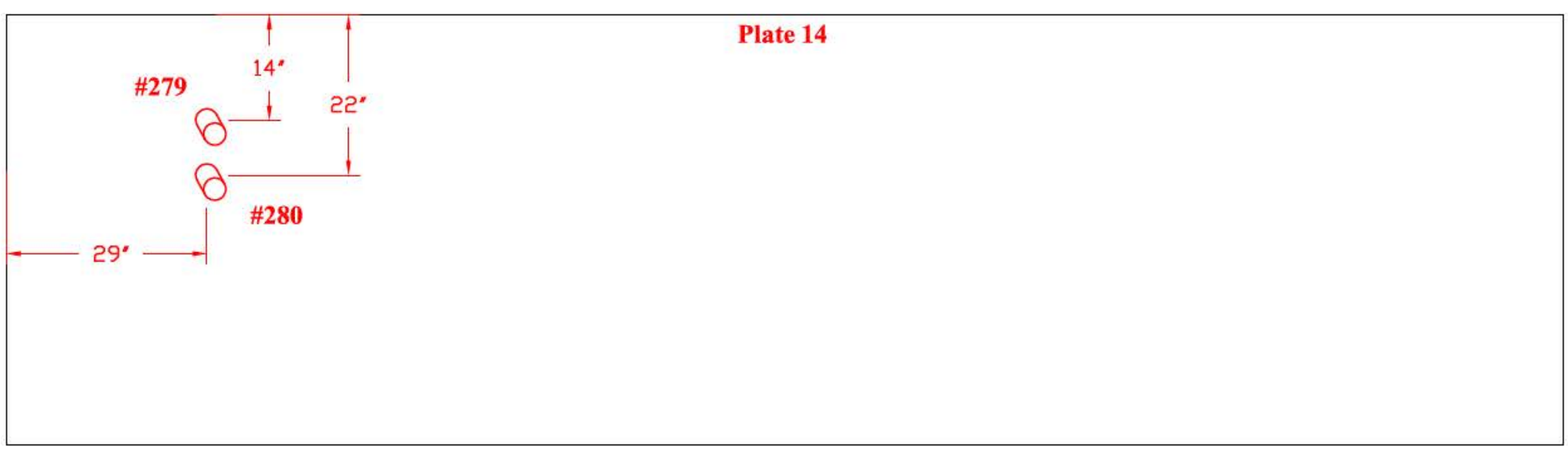
Tank Section: Extension
Quadrant: B

Course: 2
Plate #: 14

Flaw # - Type - Remaining:

#279 - Grout Nozzle - 0.237"R

#280 - Grout Nozzle - 0.235"R



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TANK MAPS
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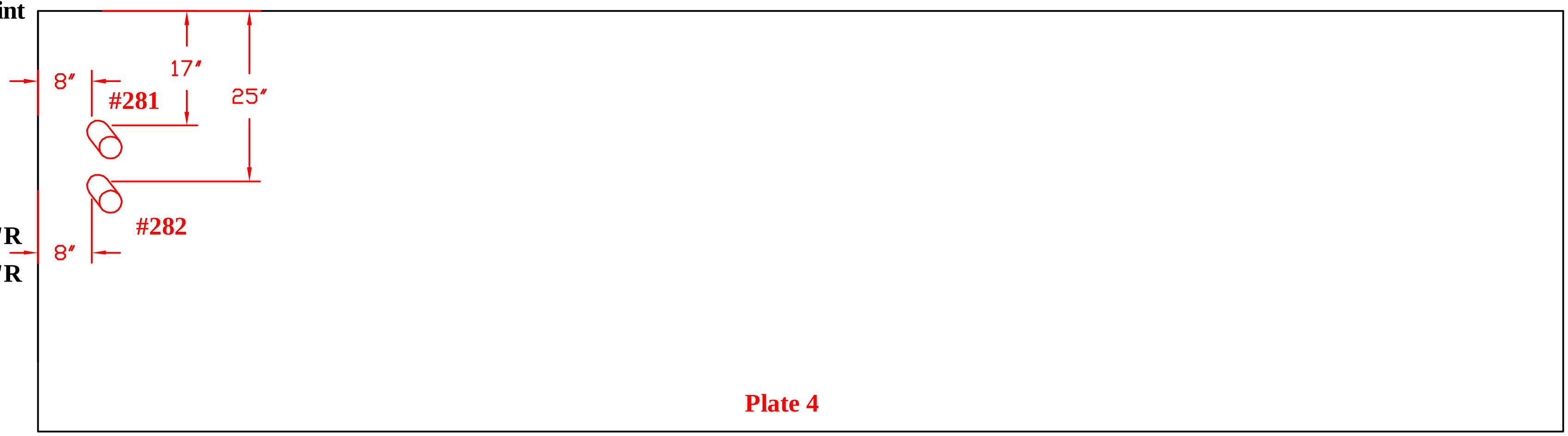
TANK # 20 - QUADRANT A
***Nominal Plate Thickness: 0.250"**

Tank Section: Expansion Joint
Quadrant: A

Course: 2
Plate #: 4
Flaw # - Type - Remaining:

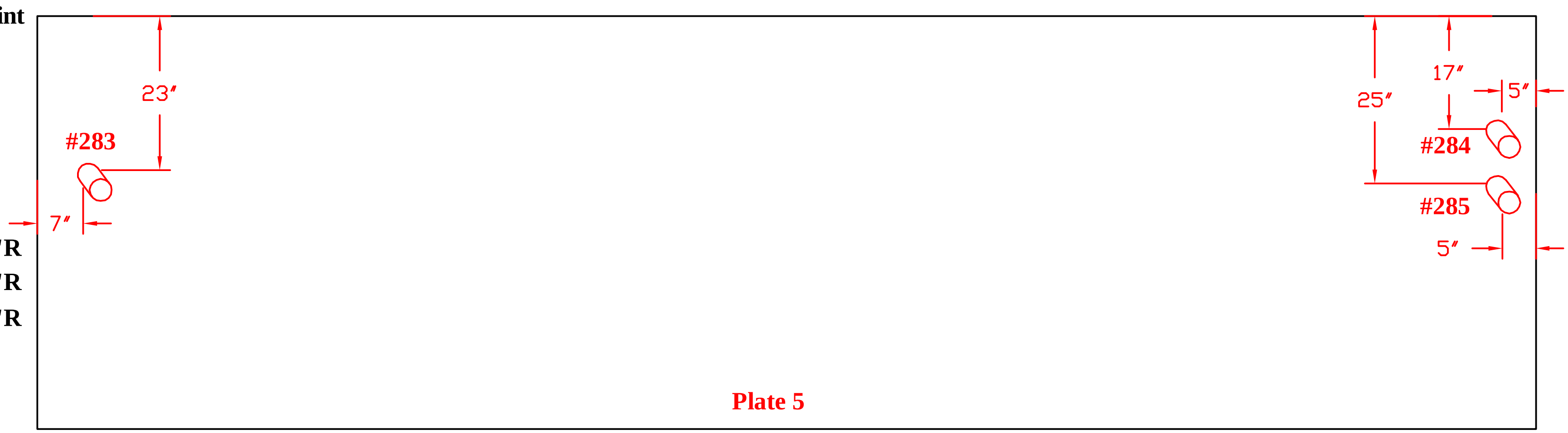
#281 - Grout Nozzle - 0.208"R
#282 - Grout Nozzle - 0.206"R



Tank Section: Expansion Joint
Quadrant: A

Course: 2
Plate #: 5
Flaw # - Type - Remaining:

#283 - Grout Nozzle - 0.195"R
#284 - Grout Nozzle - 0.194"R
#285 - Grout Nozzle - 0.208"R



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TANK MAPS
Dunkin & Bush, Inc.
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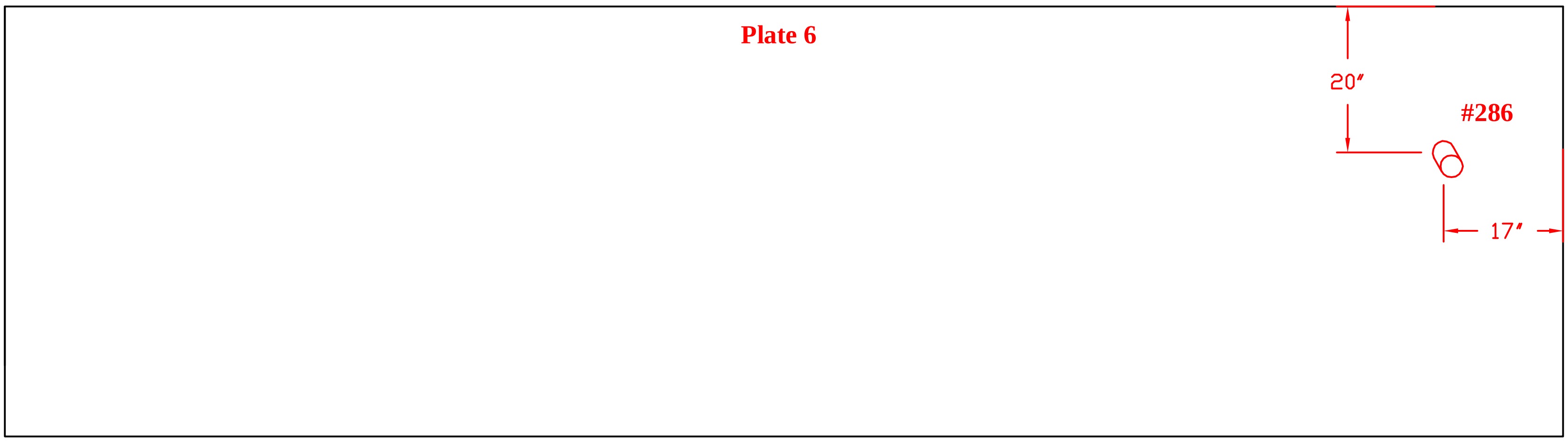
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: A

Course: 2
Plate #: 6

Flaw # - Type - Remaining:

#286 - Grout Nozzle - 0.198"R



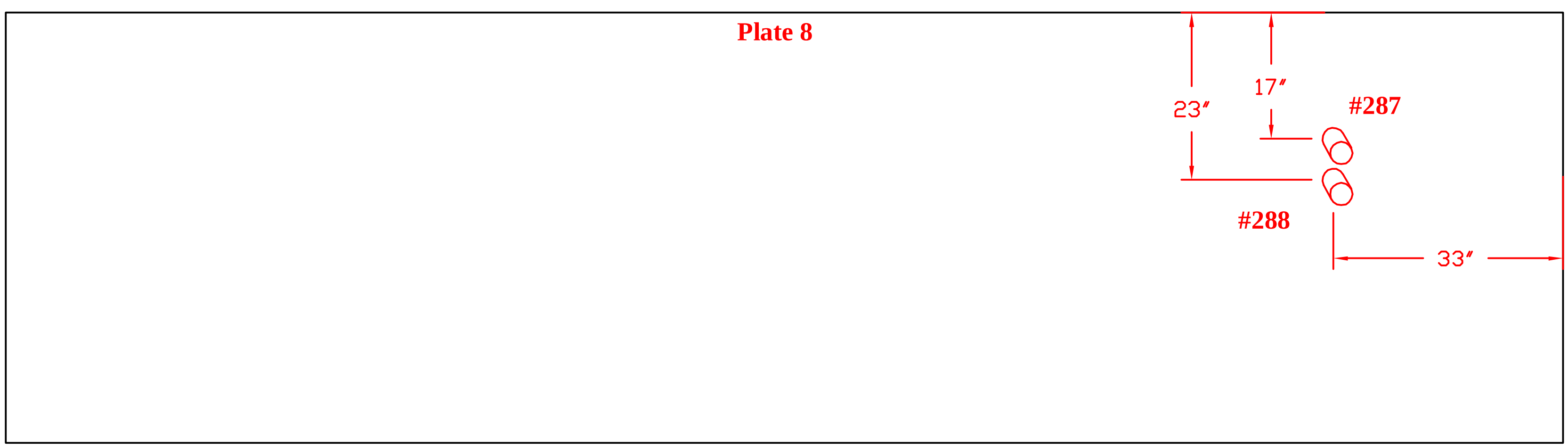
Tank Section: Extension
Quadrant: A

Course: 2
Plate #: 8

Flaw # - Type - Remaining:

#287 - Grout Nozzle - 0.216"R

#288- Grout Nozzle - 0.215"R



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TANK # 20 - QUADRANT A

***Nominal Plate Thickness: 0.250"**

Tank Section: Extension
Quadrant: A

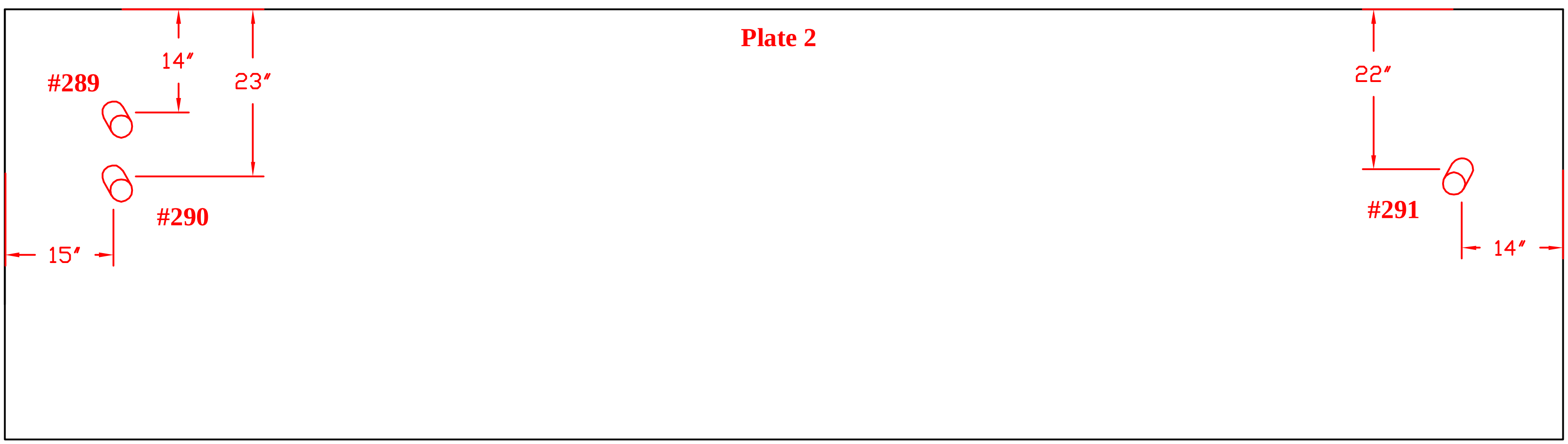
Course: 2
Plate #: 10

Flaw # - Type - Remaining:

#289 - Grout Nozzle - 0.224"R

#290 - Grout Nozzle - 0.228"R

#291 - Grout Nozzle - 0.208"R

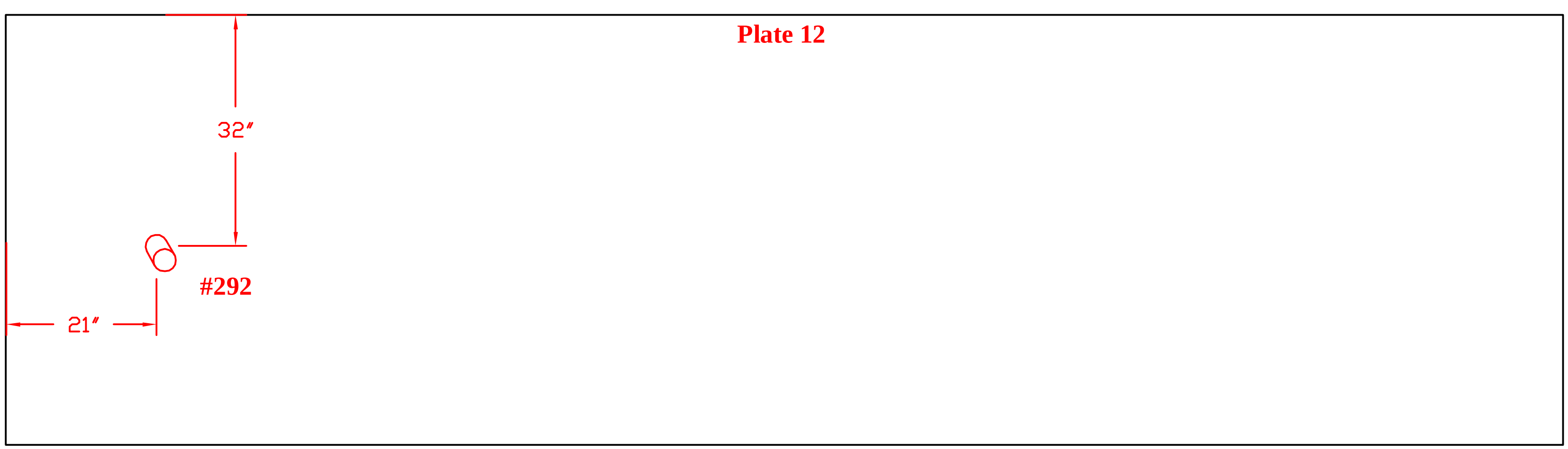


Tank Section: Extension
Quadrant: A

Course: 2
Plate #: 12

Flaw # - Type - Remaining:

#292 - Grout Nozzle - 0.210"R



TANK # 20 - QUADRANT A

Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: A

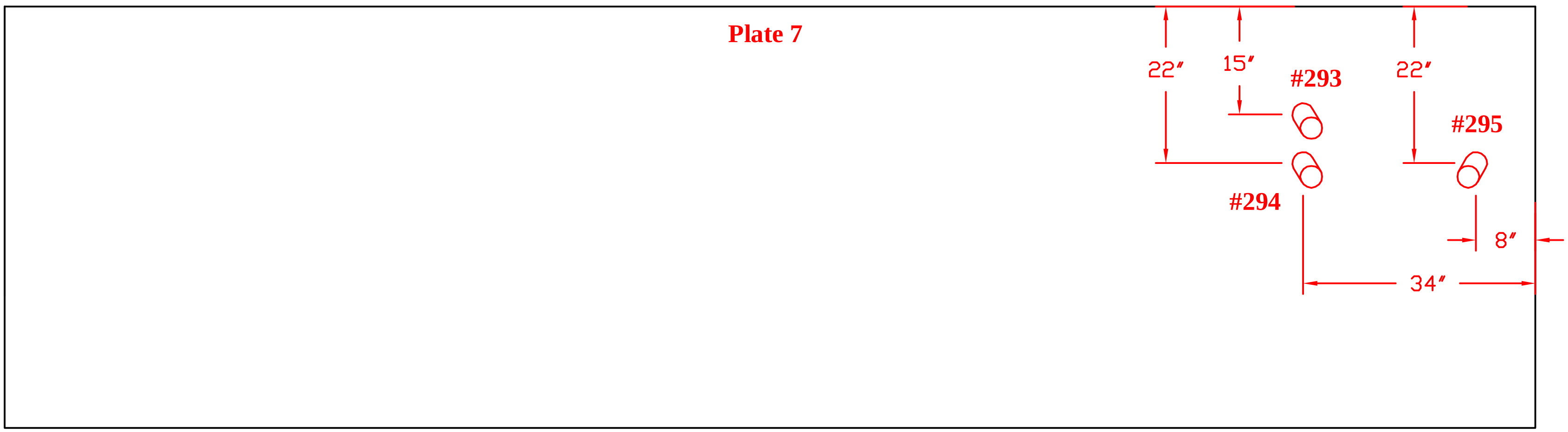
Course: 2
Plate #: 7

Flaw # - Type - Remaining:

#293 - Grout Nozzle - 0.202"R

#294 - Grout Nozzle - 0.219"R

#295 - Grout Nozzle - 0.194"R

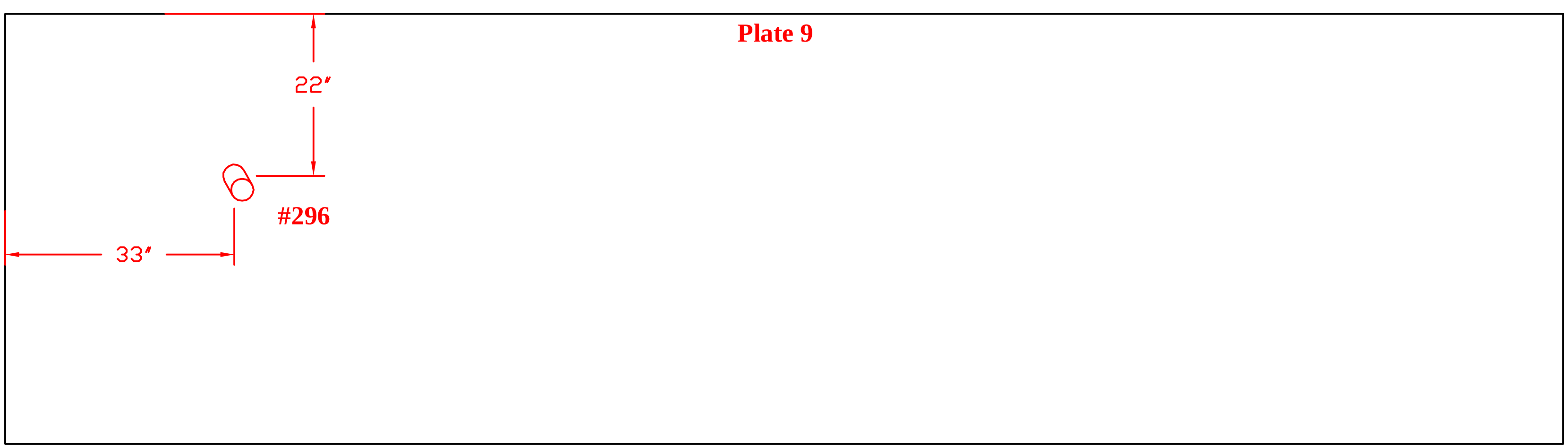


Tank Section: Extension
Quadrant: A

Course: 2
Plate #: 9

Flaw # - Type - Remaining:

#296 - Grout Nozzle - 0.218"R



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TANK # 20 - QUADRANT A AND B

Nominal Plate Thickness: 0.250"

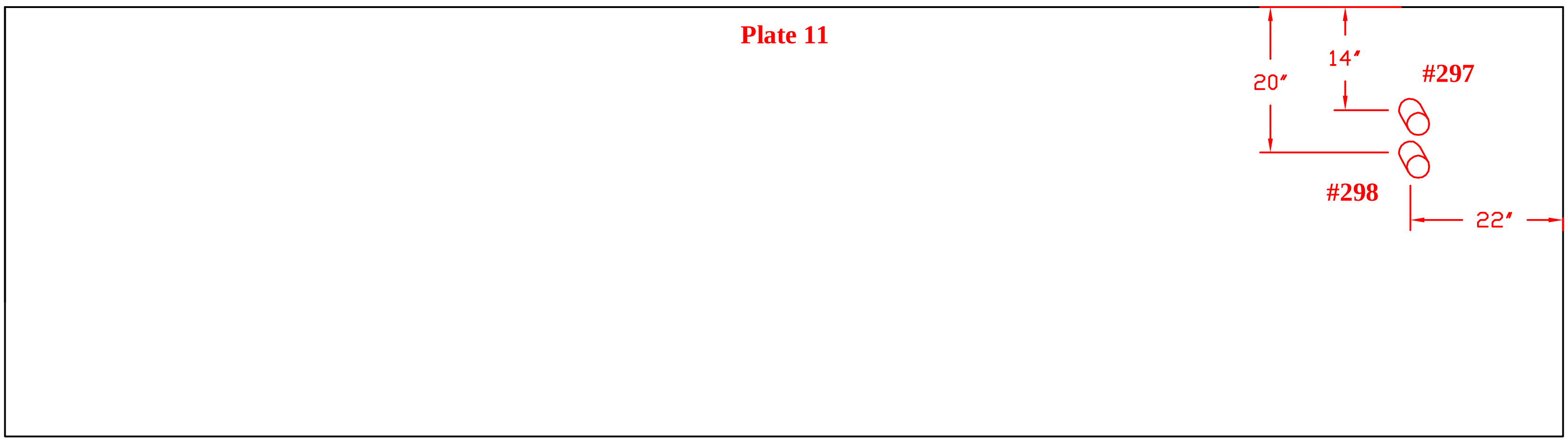
Tank Section: Extension
Quadrant: A

Course: 2
Plate #: 11

Flaw # - Type - Remaining:

#297 - Grout Nozzle - 0.197"R

#298 - Grout Nozzle - 0.208"R



Tank Section: Extension
Quadrant: B

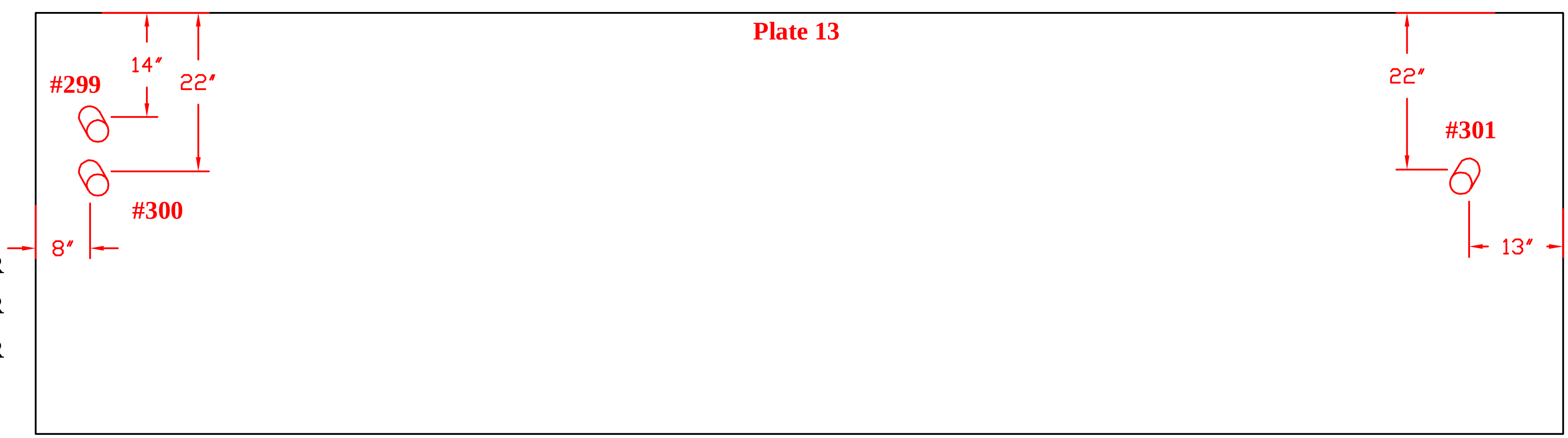
Course: 2
Plate #: 13

Flaw # - Type - Remaining:

#299 - Grout Nozzle - 0.222"R

#300 - Grout Nozzle - 0.219"R

#301 - Grout Nozzle - 0.215"R



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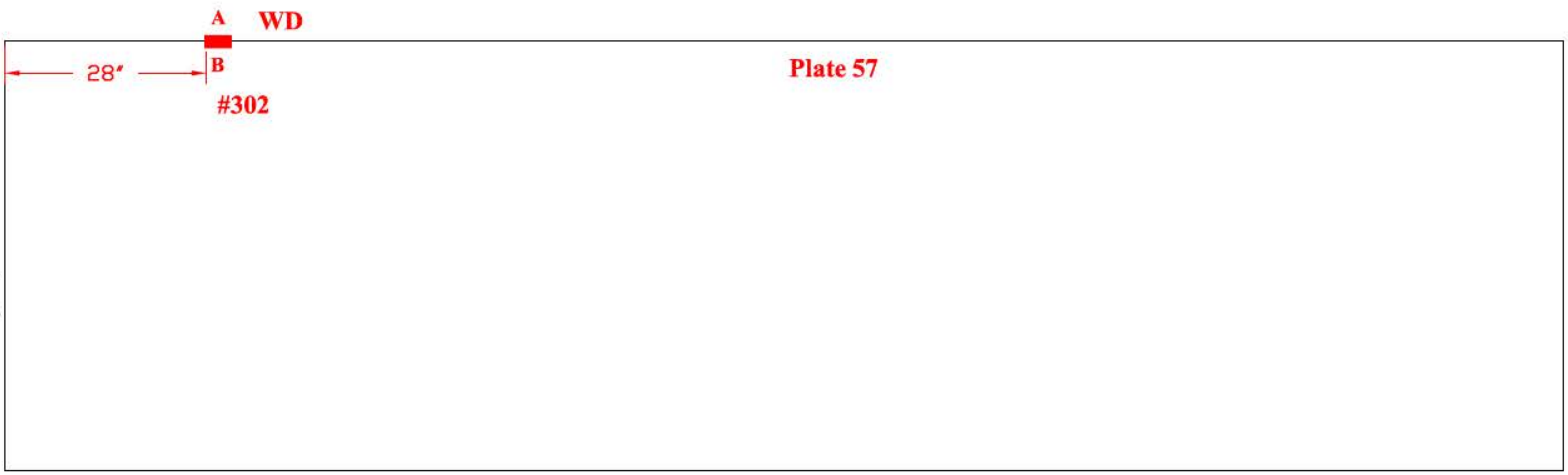
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: A
Plate #: 57
Flaw # - Type - Remaining:

#302: A) LOF - 0.234"D 1.5"L
B) LOF - 0.144"D 1.5"L



Drawing is not to scale

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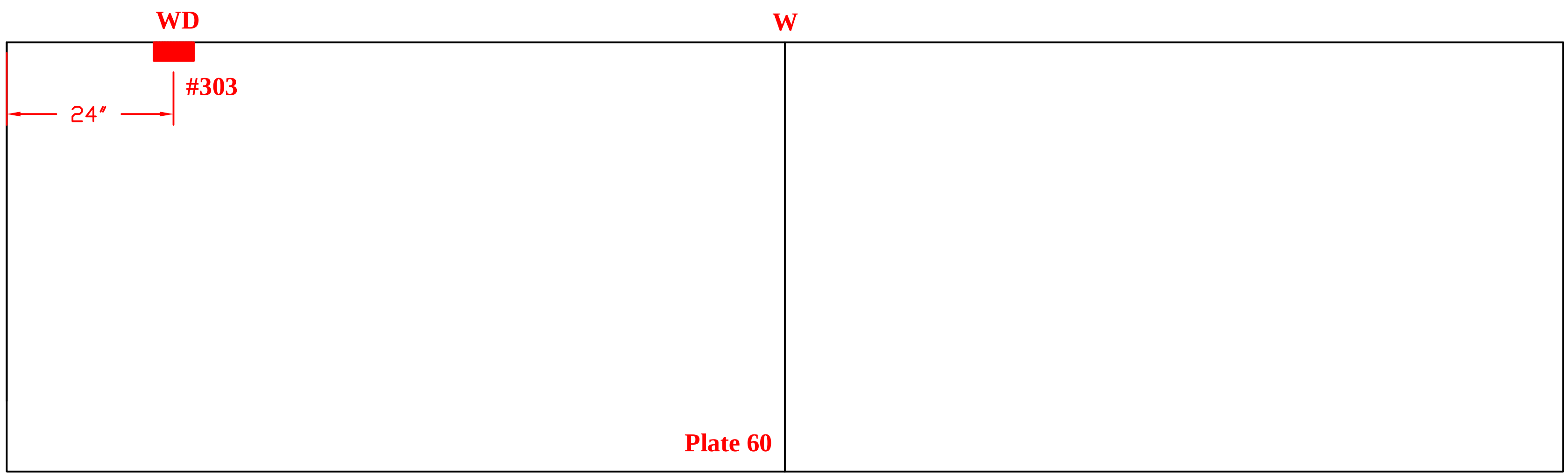
TANK # 20 - QUADRANT D

Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: A
Plate #: 60
Flaw # - Type - Remaining:

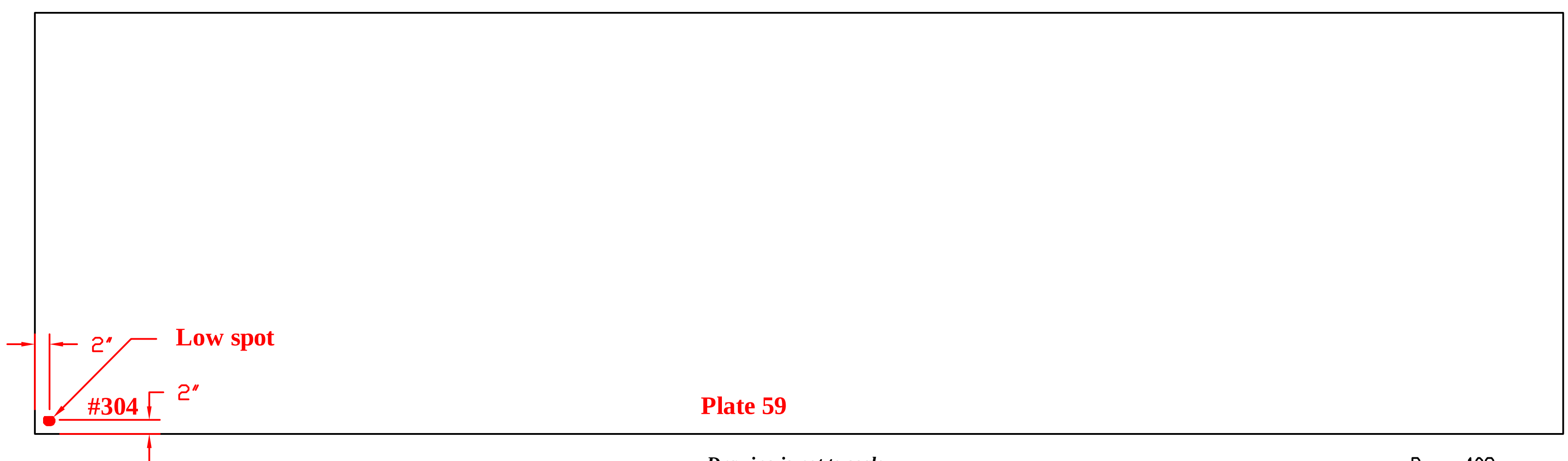
#303 - LOF - 0.081"D 2.5"L



Tank Section:Upper Dome
Quadrant: D

Course: A
Plate #: 59
Flaw # - Type - Remaining:

#304 - WL - 0.165"R

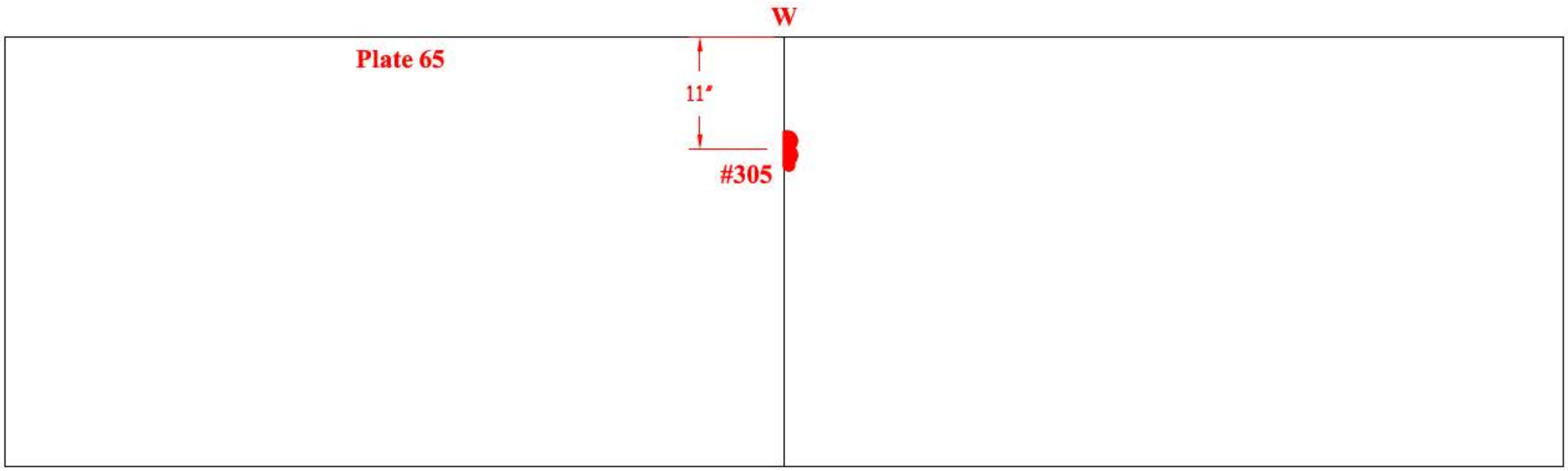


TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: A
Plate #: 65
Flaw # - Type - Remaining:

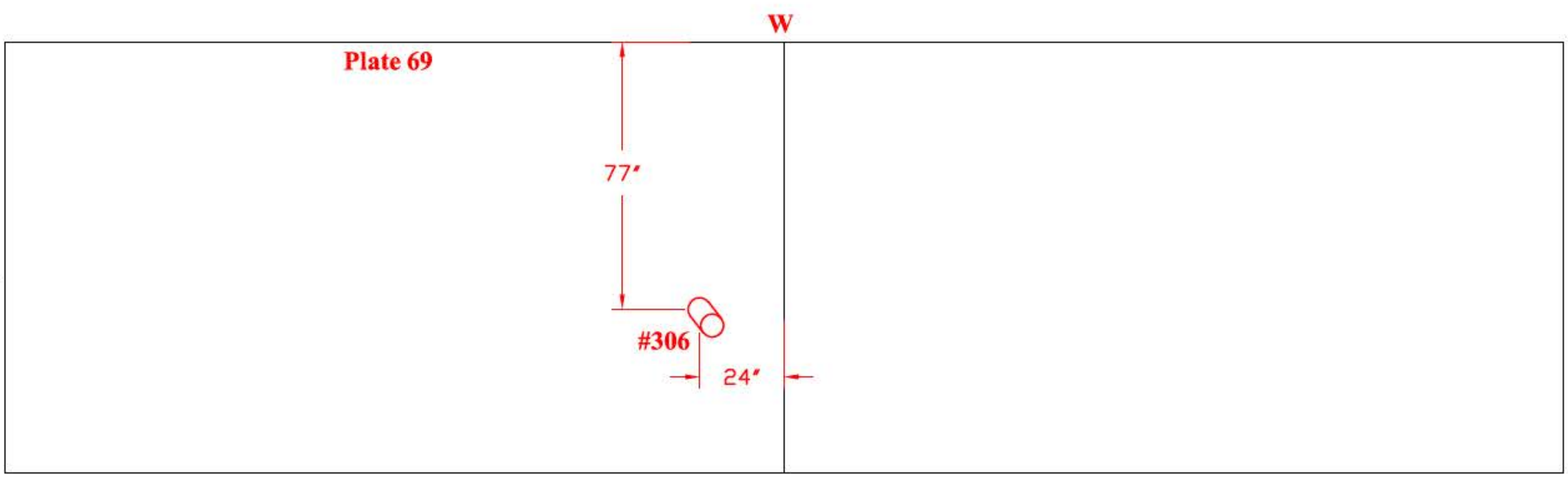
#305 - LOF - 0.127"D 5"L



Tank Section:Upper Dome
Quadrant: D

Course: A
Plate #: 69
Flaw # - Type - Remaining:

#306 - Grout Nozzle - 0.200"R



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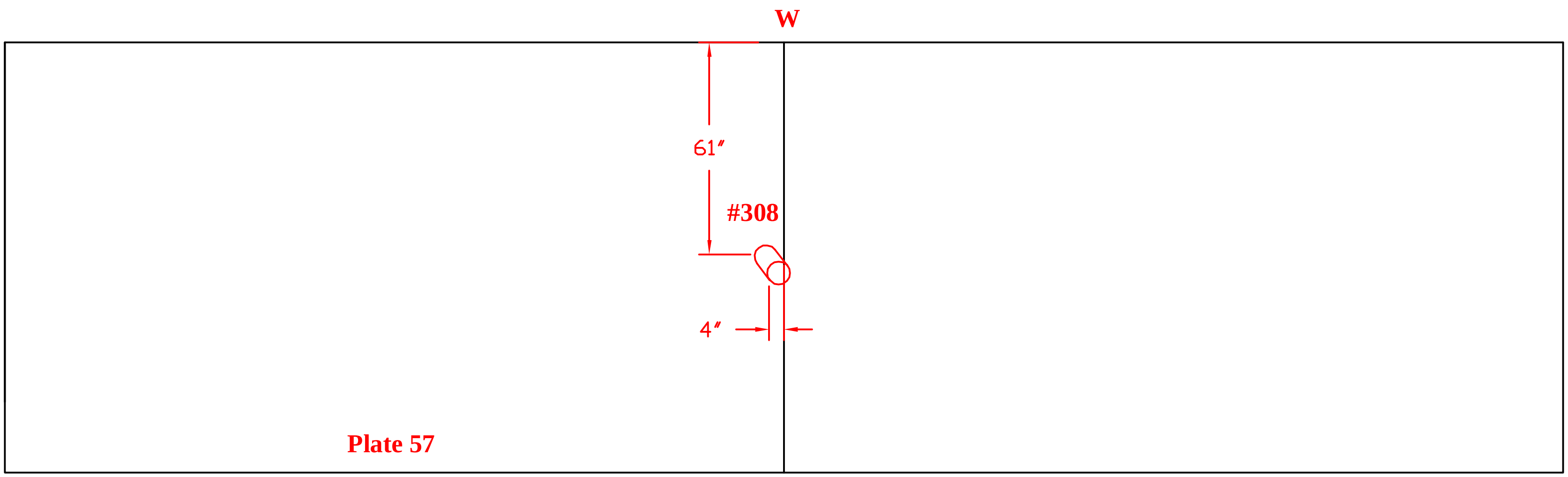
TANK # 20 - QUADRANT D

***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: D

Course: A
Plate #: 57
Flaw # - Type - Remaining:

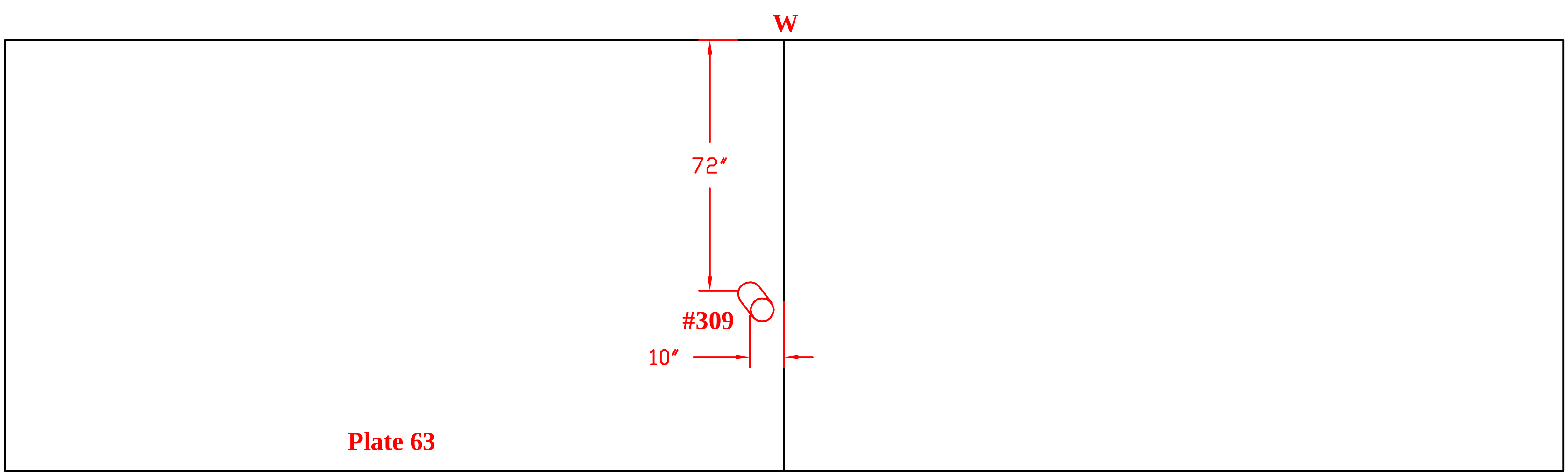
#308 - Grout Nozzle - 0.211"R



Tank Section:Upper Dome
Quadrant: D

Course: A
Plate #: 63
Flaw # - Type - Remaining:

#309 - Grout Nozzle - 0.213"R



Drawing is not to scale

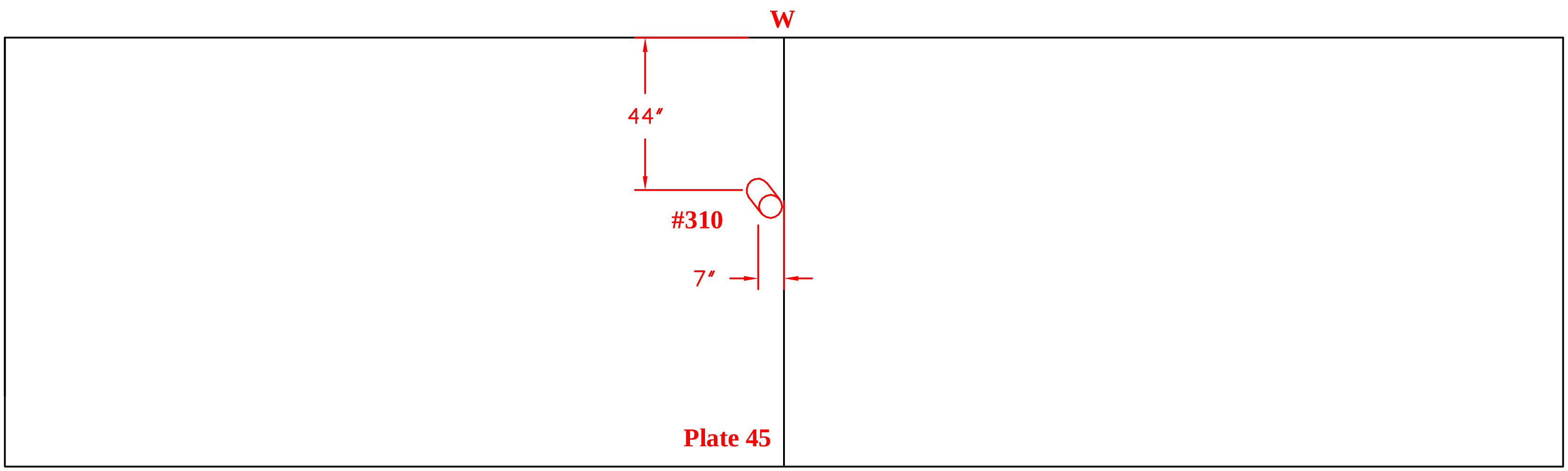
TANK # 20 - QUADRANT C

***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: C

Course: A
Plate #: 45
Flaw # - Type - Remaining:

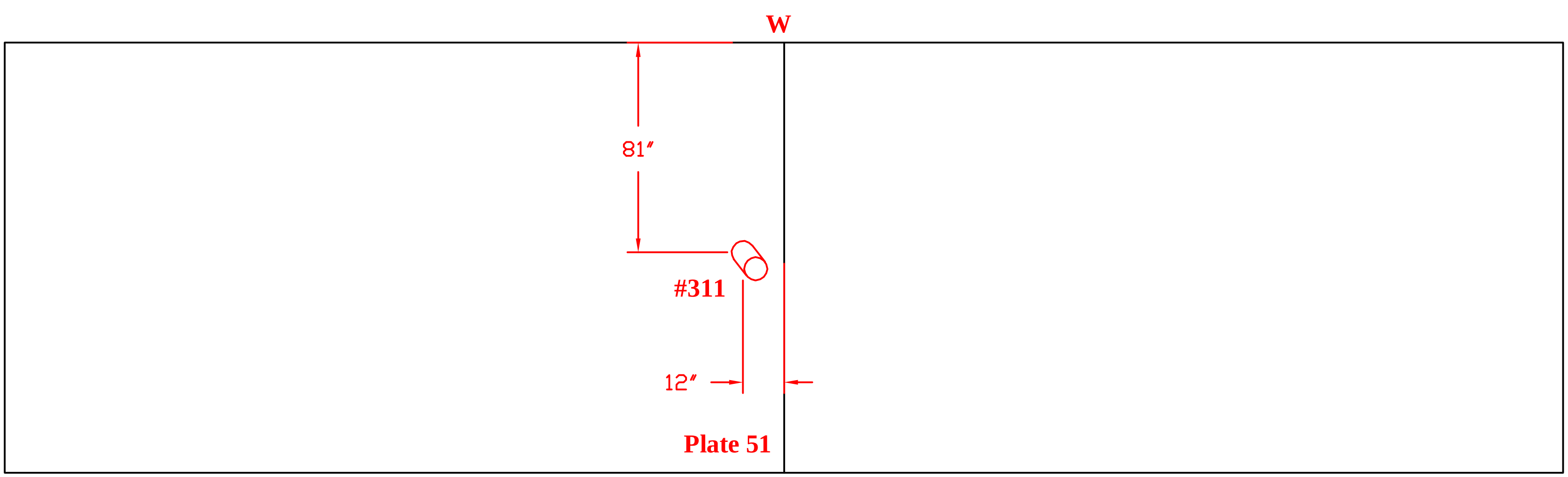
#310 - Gruot Nozzle - 0.203"R



Tank Section:Upper Dome
Quadrant:

Course: A
Plate #: 51
Flaw # - Type - Remaining:

#311 - Gruot Nozzle - 0.225"R



Drawing is not to scale

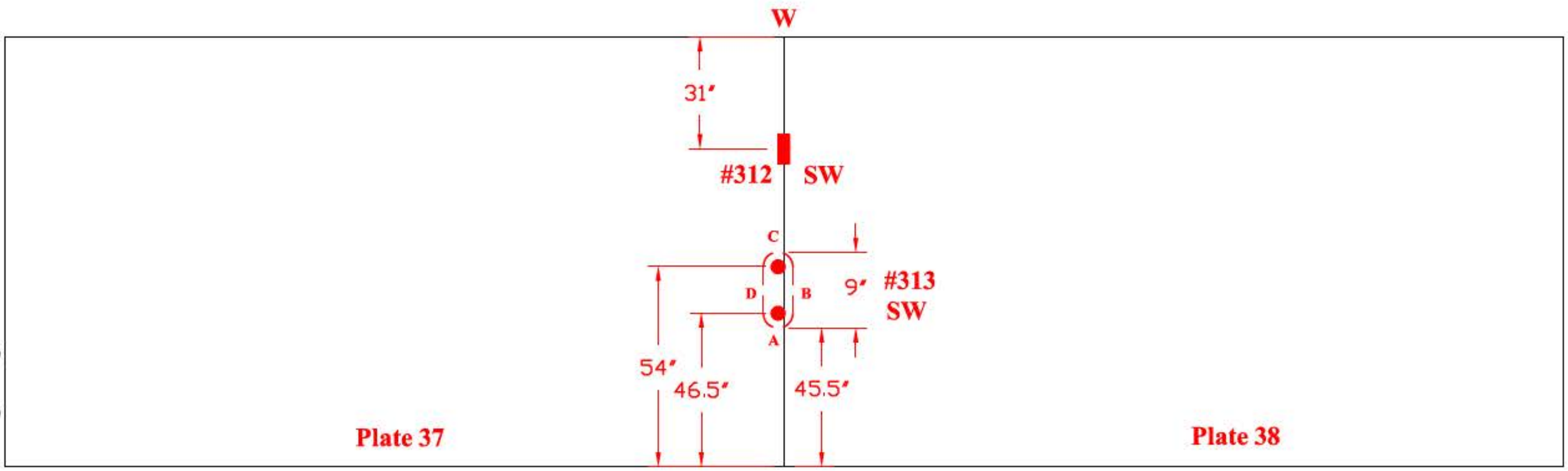
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: A
Plate #: 37
Flaw # - Type - Remaining:

#312 - LOF - 0.115"D 2"L

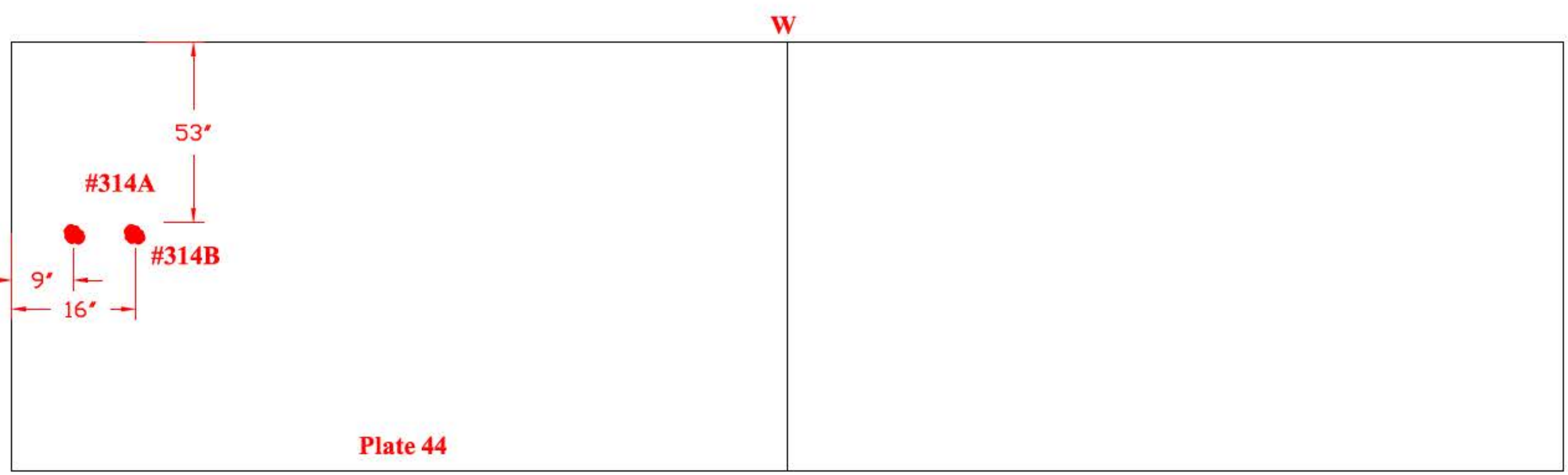
#313
- **(A) Pit - 0.125"dia 0.213"D**
- **(B) LOF - 0.109"D 9"L**
- **(C) Pit - 0.125"dia 0.194"D**
- **(D) LOF - 0.071"D 9"L**



Tank Section:Upper Dome
Quadrant: C

Course: A
Plate #: 44
Flaw # - Type - Remaining:

#314 - LOF - BM - 0.100"D 2"L
- LOF - BM - 0.126"D 2"L



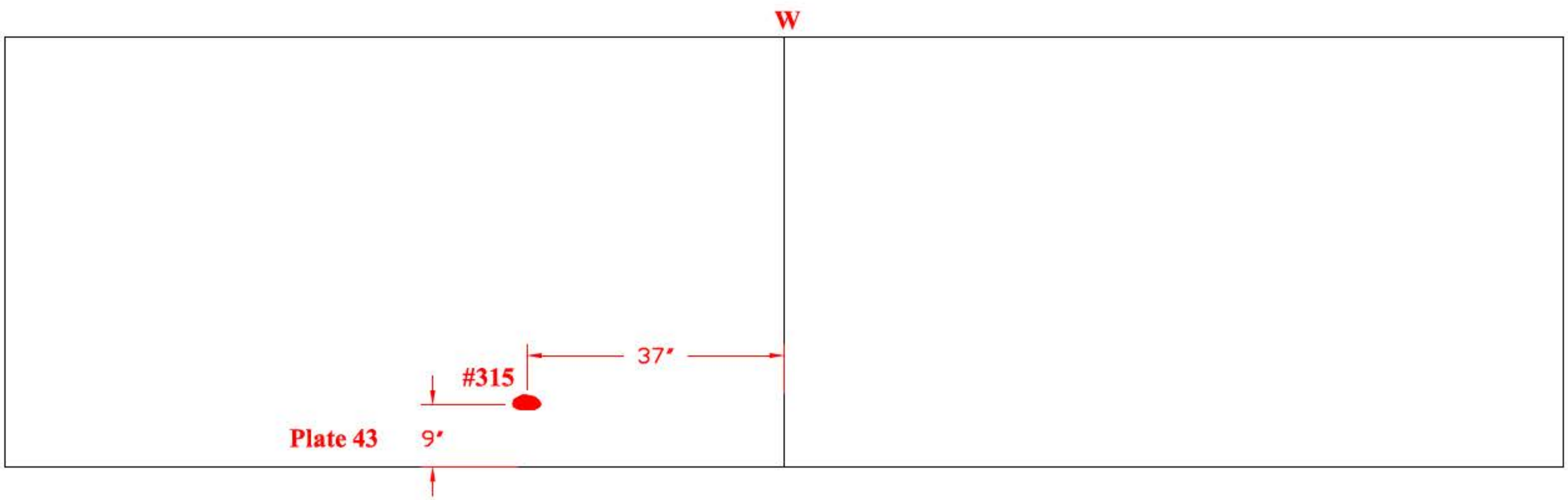
Drawing is not to scale

TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: A
Plate #: 43
Flaw # - Type - Remaining:

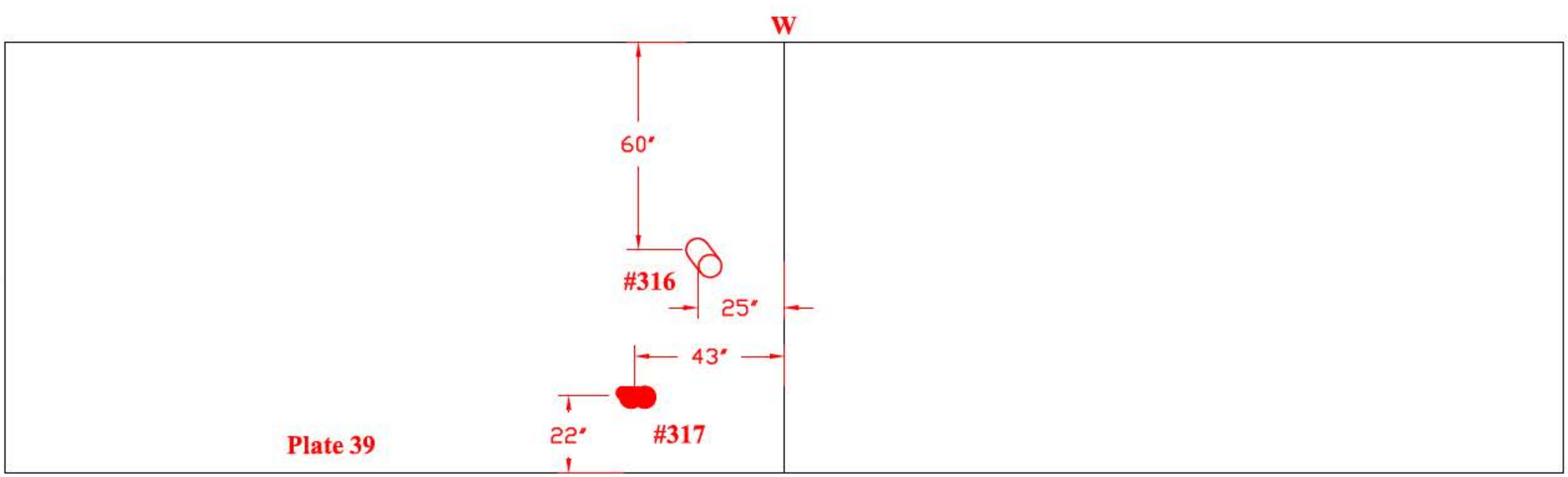
#315 - Dent - 0.200 deep



Tank Section:Upper Dome
Quadrant: A

Course: A
Plate #: 39
Flaw # - Type - Remaining:

#316 - Grout Nozzle - 0.200"R
#317 - Dent - 0.200"deep



Drawing is not to scale

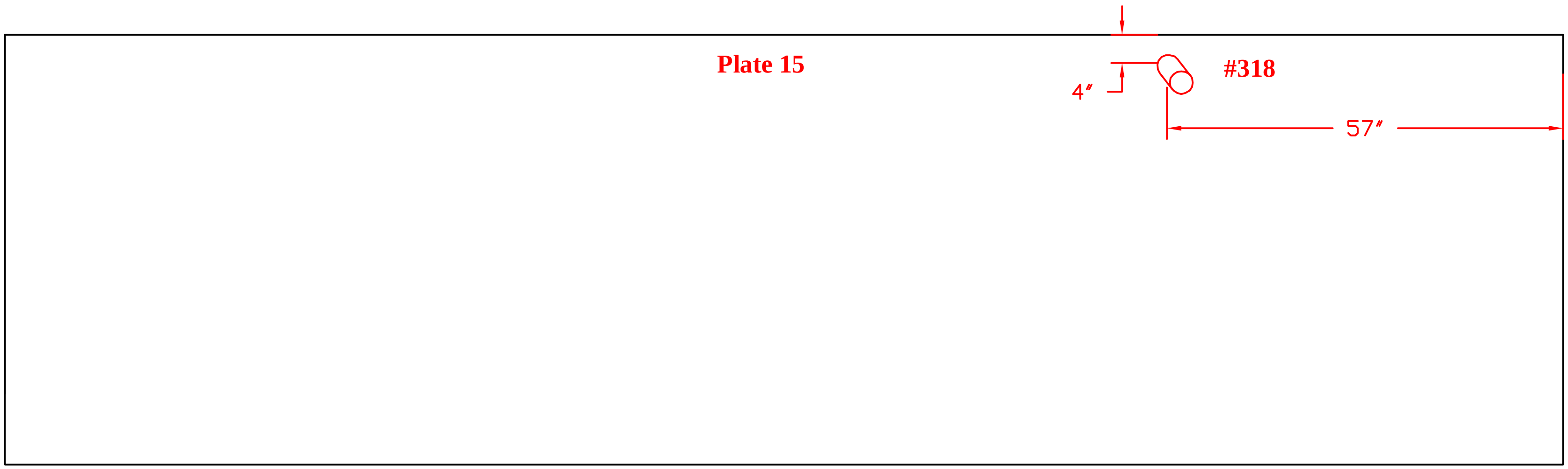
TANK # 20 - QUADRANT A

Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A

Course: A
Plate #: 15
Flaw # - Type - Remaining:

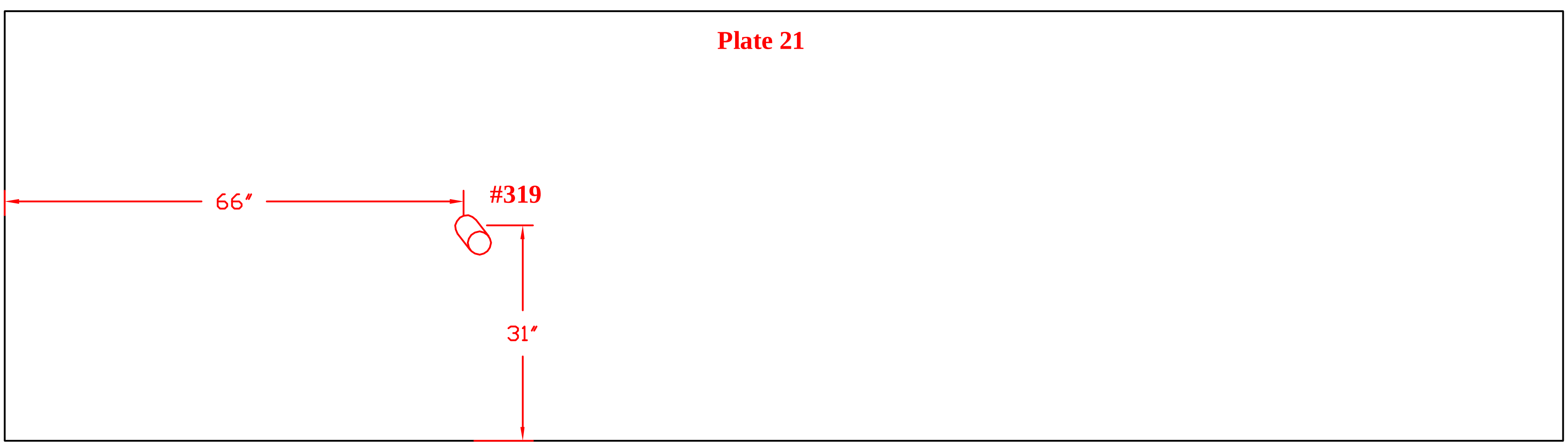
#318 - Grout Nozzle - 0.230"R



Tank Section:Upper Dome
Quadrant: A

Course: A
Plate #: 21
Flaw # - Type - Remaining:

#319 - Grout Nozzle - 0.206"R



Drawing is not to scale

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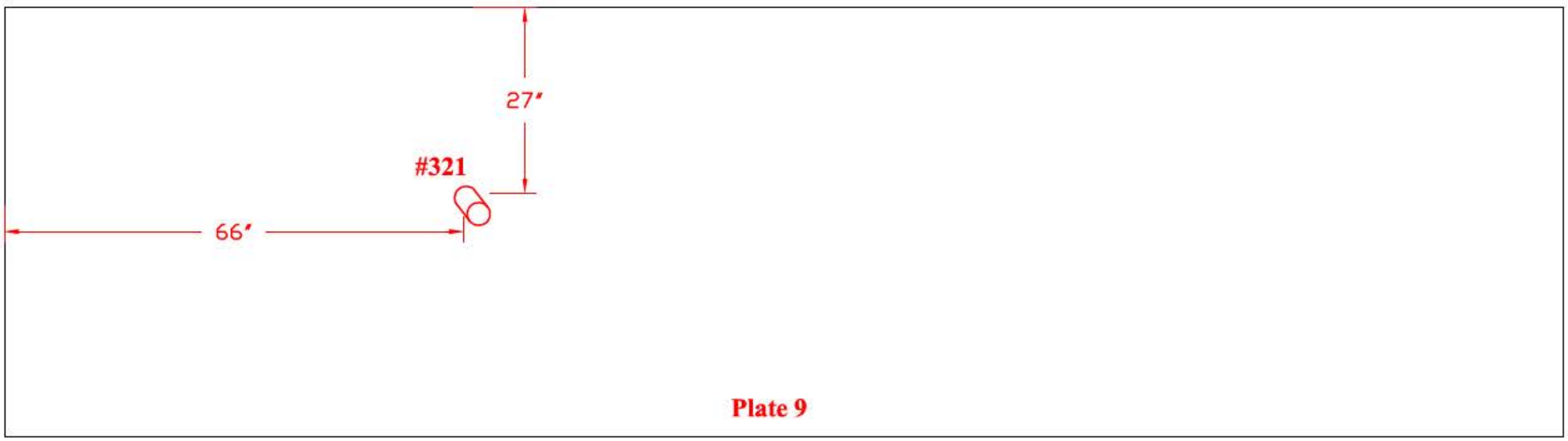
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section:Upper Dome
Quadrant: A

Course: A
Plate #: 9
Flaw # - Type - Remaining:

#321 - Grout Nozzle - 0.217"R



Drawing is not to scale

TANK # 20 - QUADRANT A

Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: A

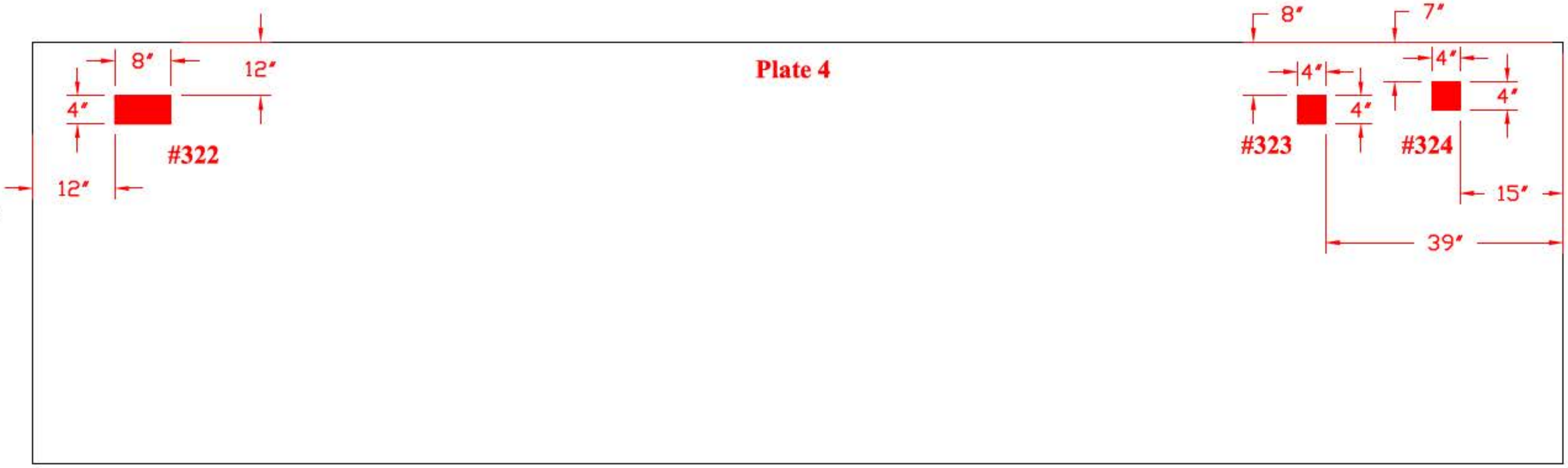
Course: 3
Plate #: 4

Flaw # - Type - Remaining:

#322 - WL - 0.220"R

#323 - WL - 0.230"R

#324 - WL - 0.220"R



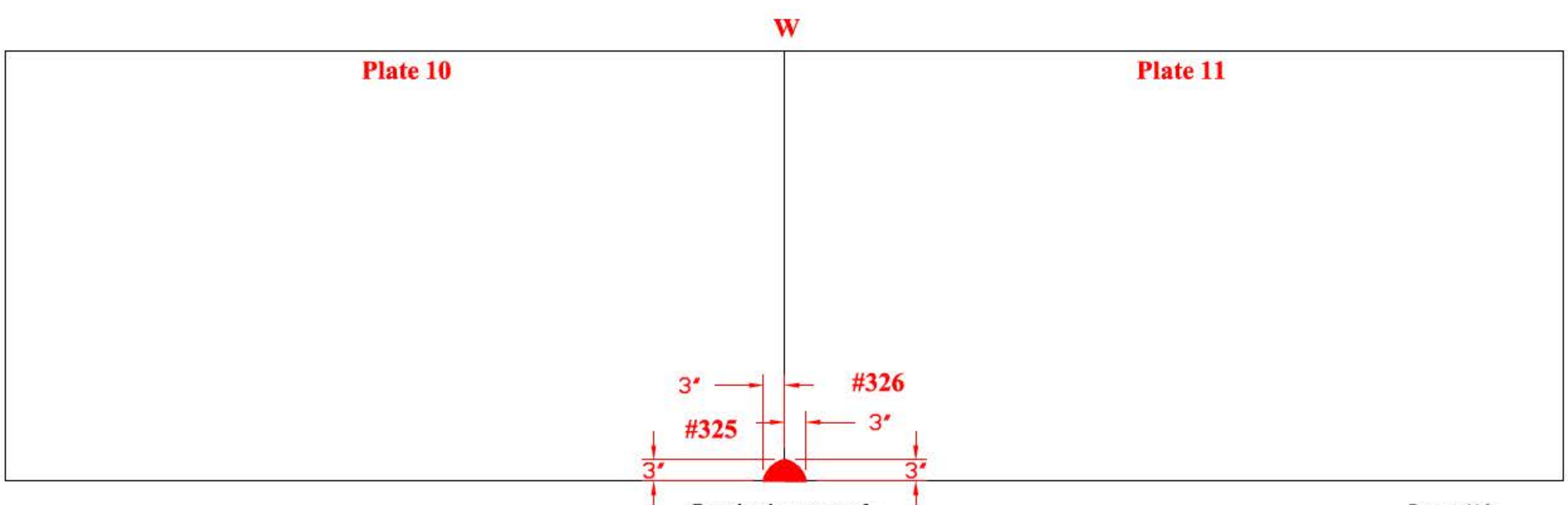
Tank Section: Extension
Quadrant: A

Course: A
Plate #: 10/11

Flaw # - Type - Remaining:

#325 - WL - 0.137"R

#326 - WL - 0.197"R



Drawing is not to scale

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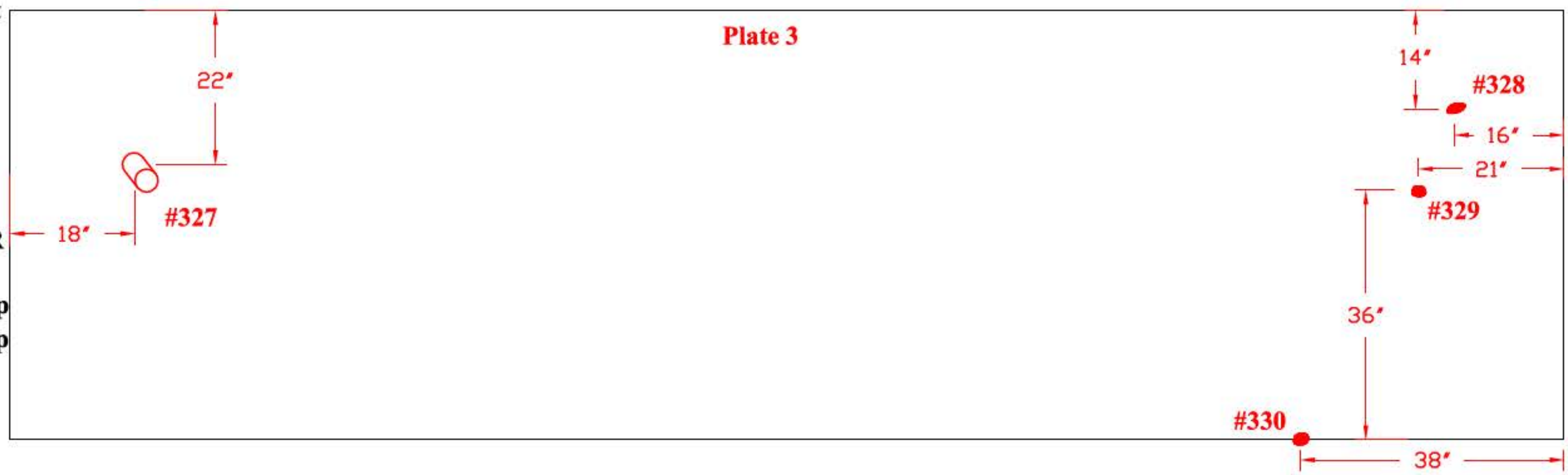
TANK # 20 - QUADRANT A AND B

Nominal Plate Thickness: 0.250"

Tank Section: Expansion Joint
Quadrant: A

Course: 2
Plate #: 3
Flaw # - Type - Remaining:

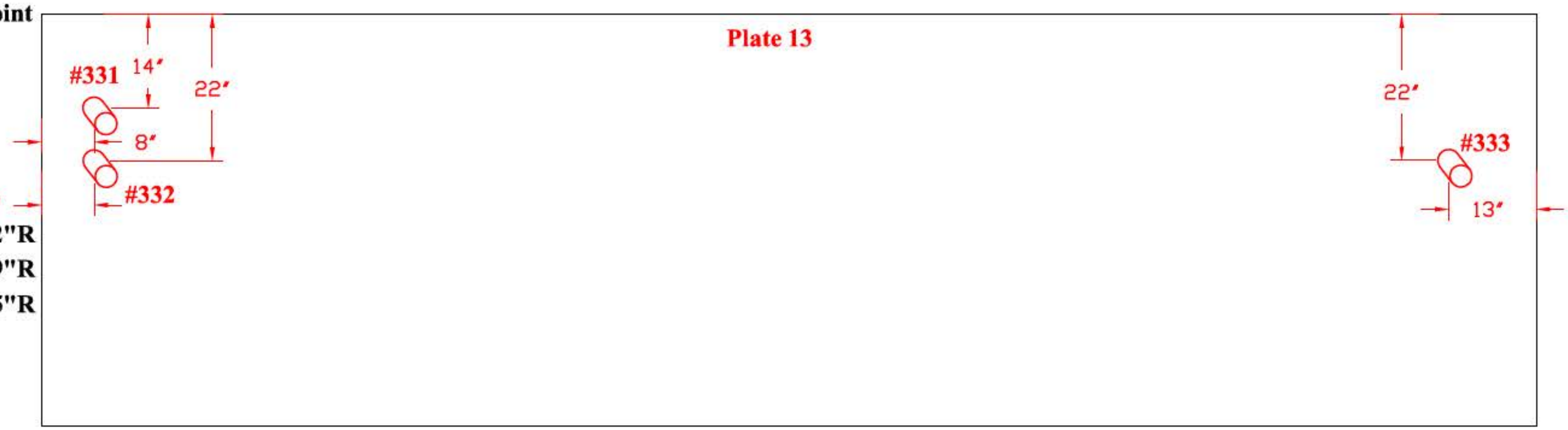
#327 - Grout Nozzle - 0.201"R
#328 - Dent - 0.160" deep
#329 - Arc Gouge - 0.160"deep
#330 - Arc Gouge - 0.160"deep



Tank Section: Expansion Joint
Quadrant: B

Course: 2
Plate #: 13
Flaw # - Type - Remaining:

#331 - Grout Nozzle - 0.222"R
#332 - Grout Nozzle - 0.219"R
#333 - Grout Nozzle - 0.215"R



Drawing is not to scale

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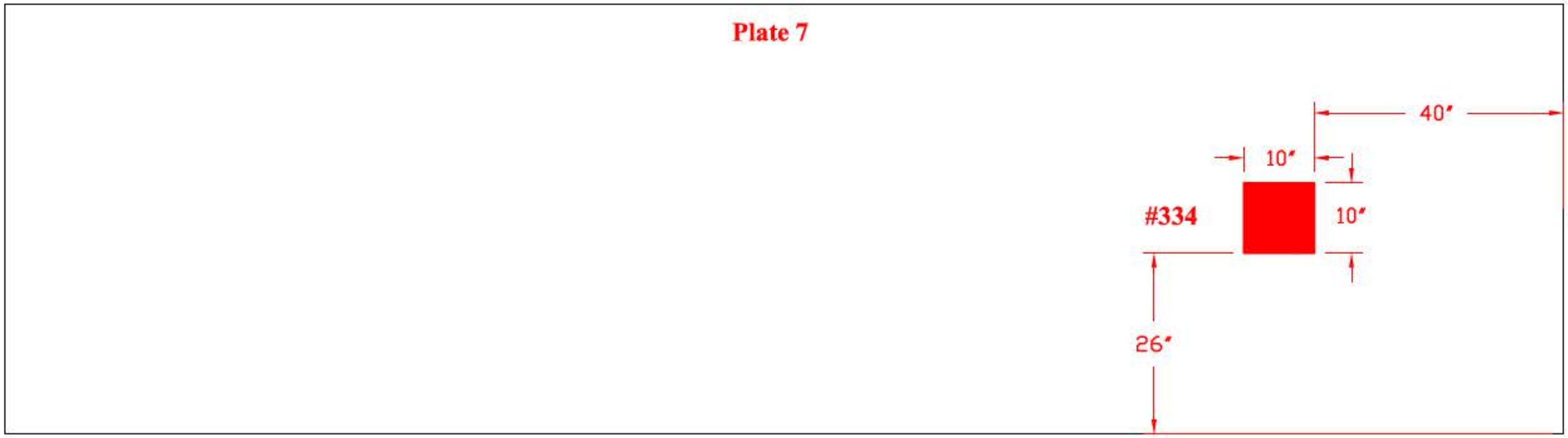
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: A

Course: 2
Plate #: 7

Flaw # - Type - Remaining:

#334 - WL - 0.137"R

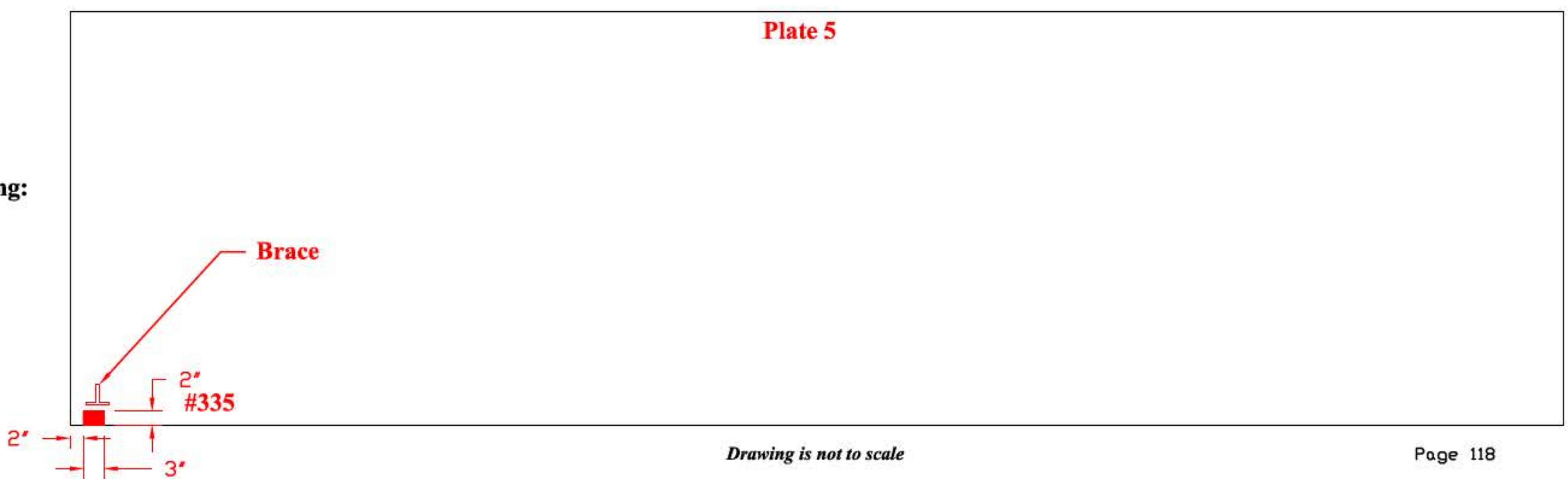


Tank Section: Extension
Quadrant: A

Course: 3
Plate #: 5

Flaw # - Type - Remaining:

#335 - WL - 0.208"R



Drawing is not to scale

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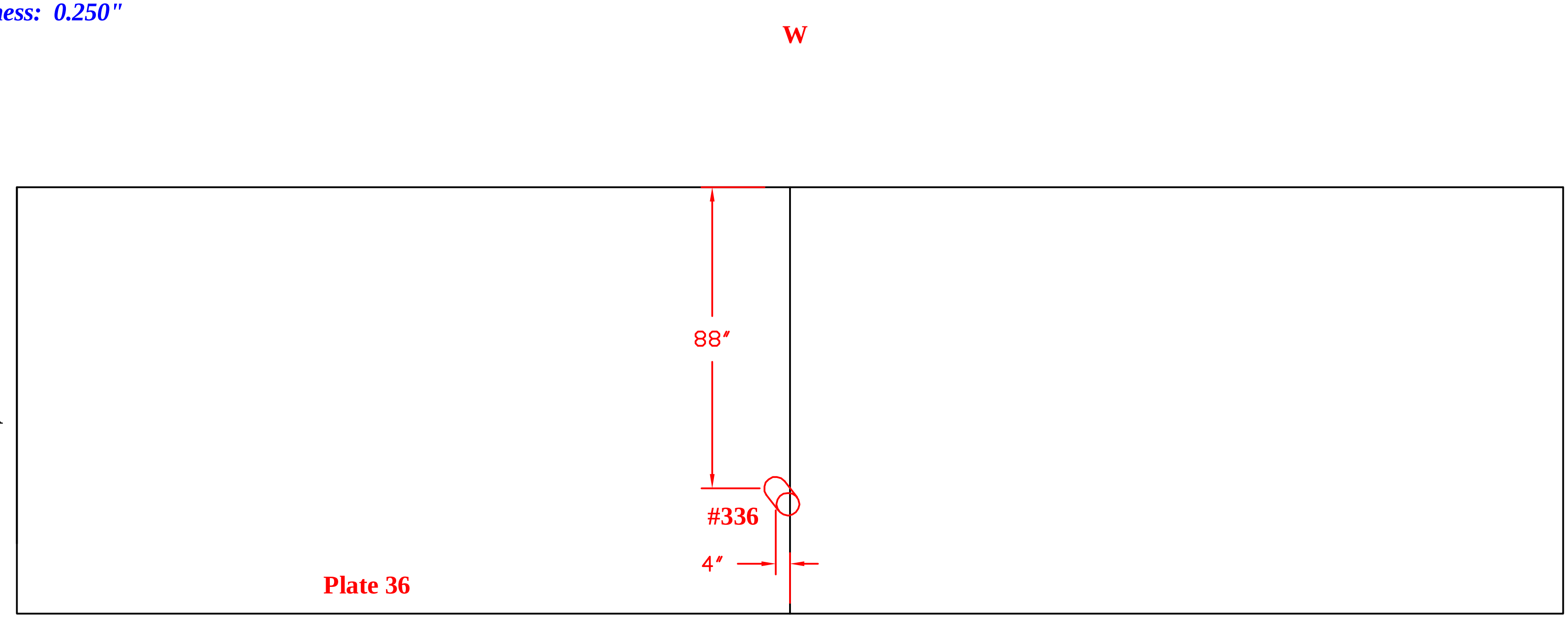
TANK # 20 - QUADRANT C

Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: B
Plate #: 36
Flaw # - Type - Remaining:

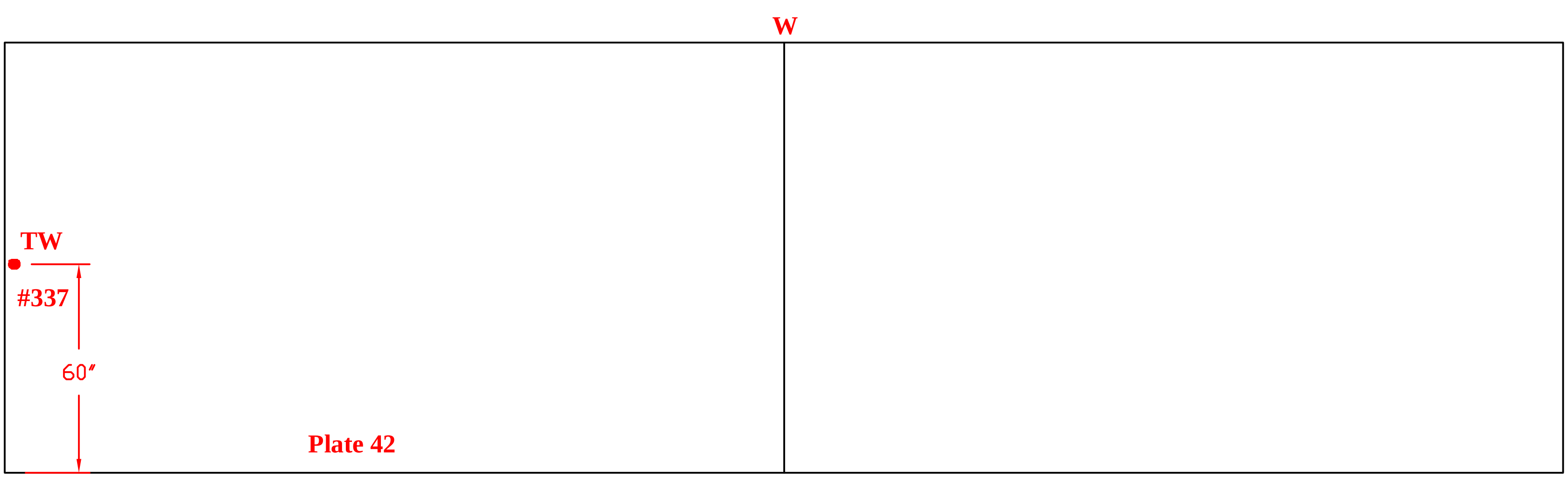
#336 - Grout Nozzle - 0.197"R



Tank Section:Upper Dome
Quadrant: C

Course: B
Plate #: 42
Flaw # - Type - Remaining:

#337 - TW-LOF-0.140"D 1"L



Drawing is not to scale

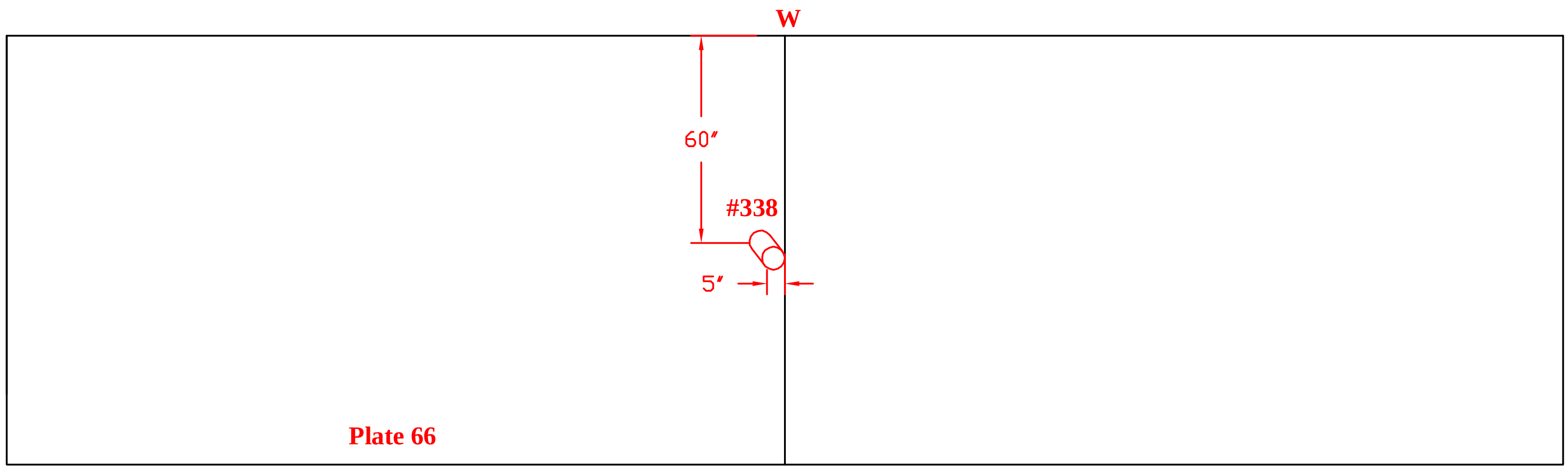
TANK # 20 - QUADRANT D

***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: D

Course: B
Plate #: 66
Flaw # - Type - Remaining:

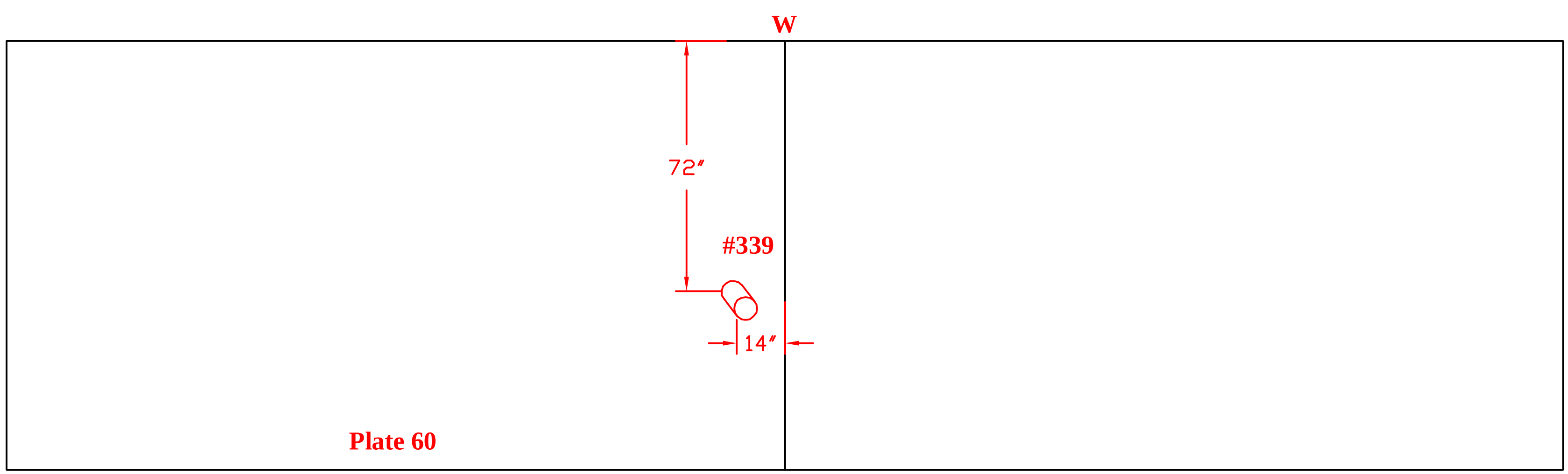
#338 - Grout Nozzle - 0.217"R



Tank Section:Upper Dome
Quadrant: D

Course: B
Plate #: 60
Flaw # - Type - Remaining:

#339 - Grout Nozzle - 0.218"R

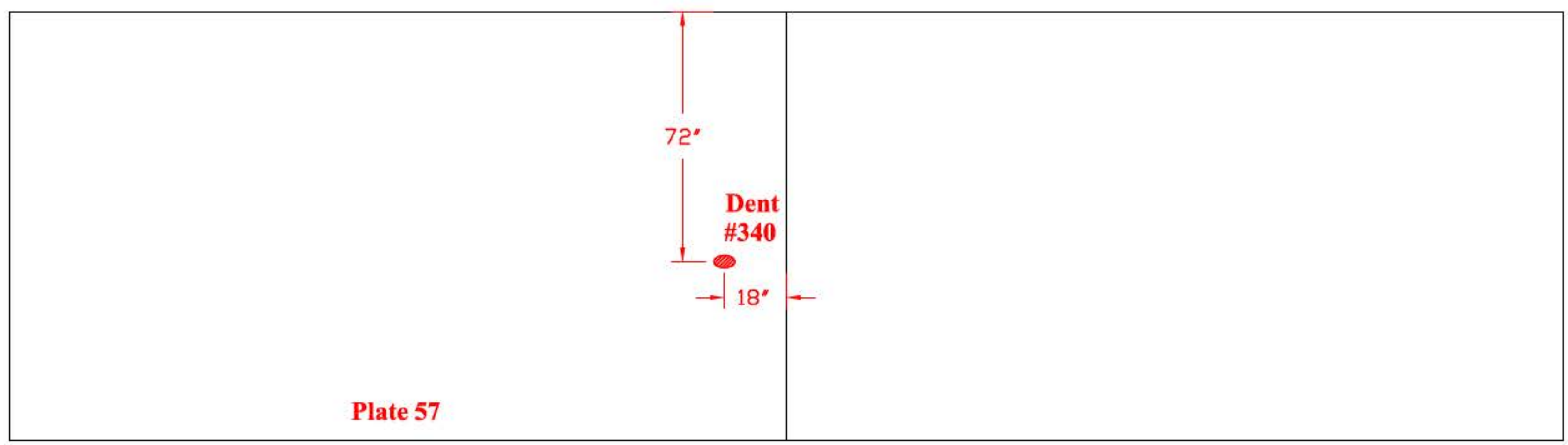


TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: B
Plate #: 57
Flaw # - Type - Remaining:

#340 - Dent - 0.200" deep



Tank Section:Upper Dome
Quadrant: D

Course: B
Plate #: 53
Flaw # - Type - Remaining:

#341: - A) LOF - 0.083"D 6.5"L
B) LOF - 0.217"D 1.5"L
C) LOF - 0.064"D 7"L

Drawing is not to scale

TesTex
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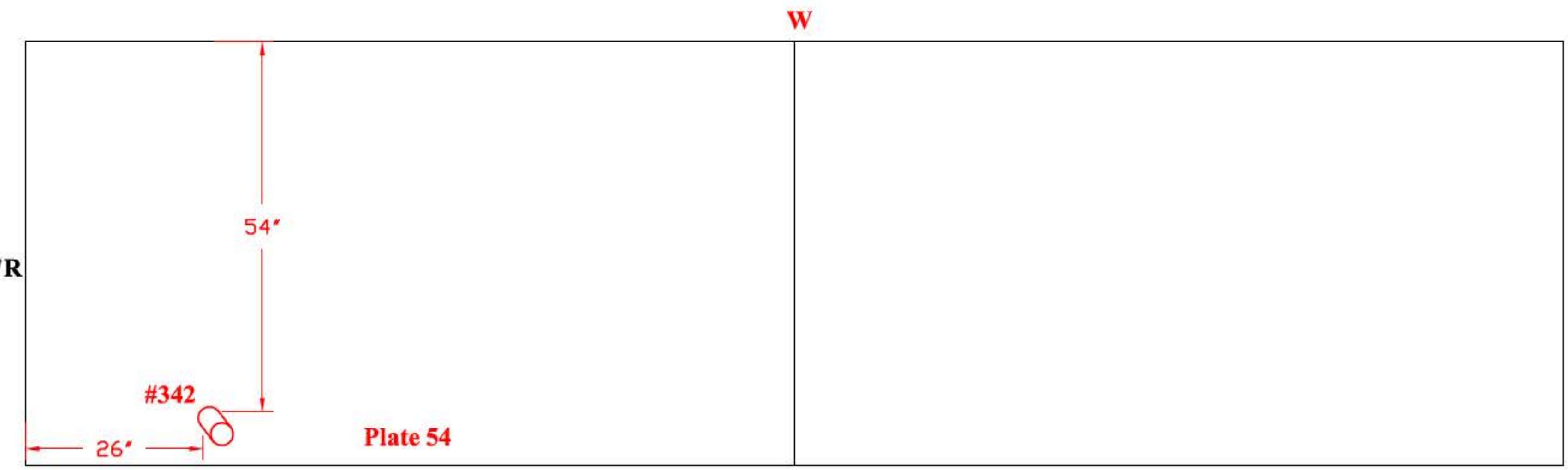
TANK # 20 - QUADRANT C AND D

Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: B
Plate #: 54
Flaw # - Type - Remaining:

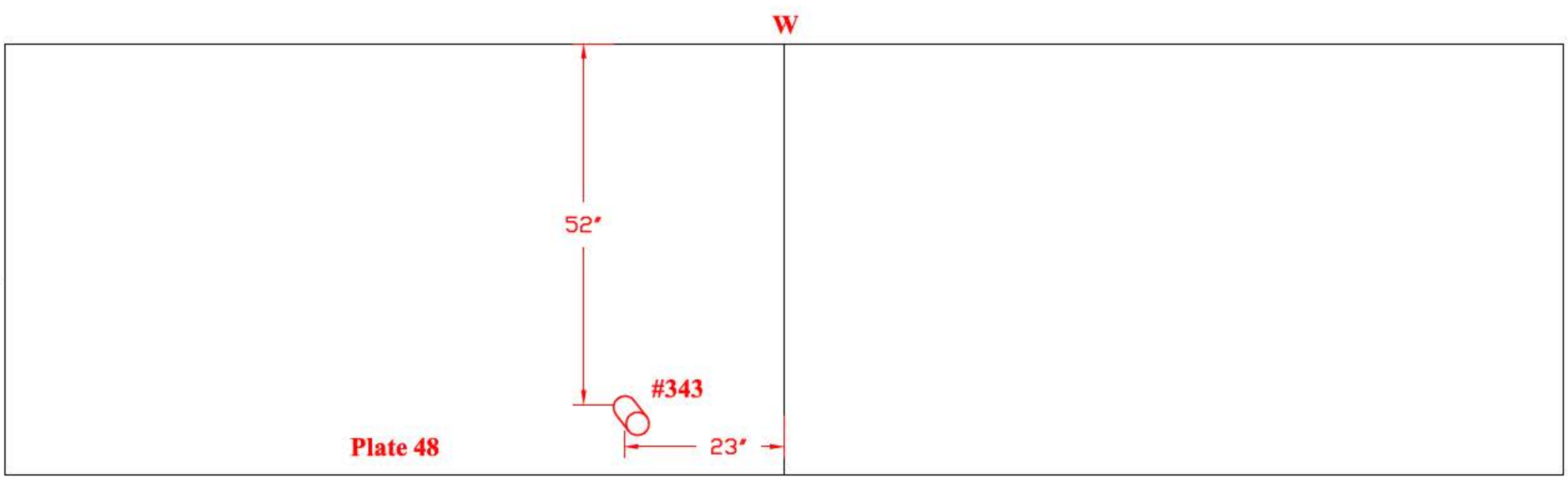
#342 - Grout Nozzle - 0.206"R



Tank Section:Upper Dome
Quadrant: C

Course: B
Plate #: 48
Flaw # - Type - Remaining:

#343 - Grout Nozzle - 0.212"R



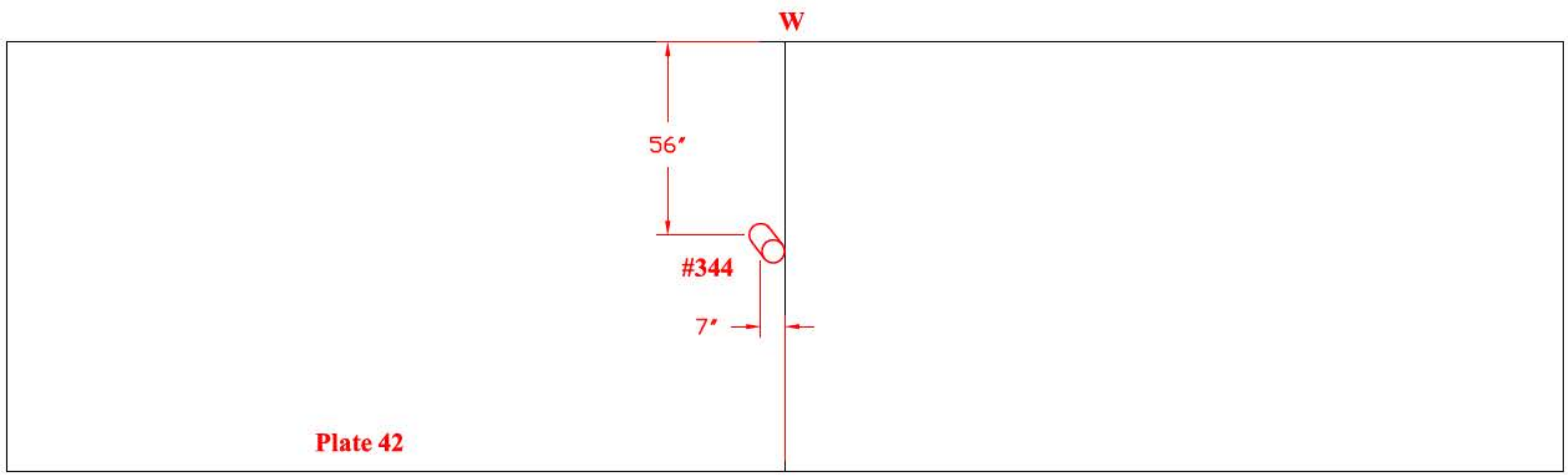
Drawing is not to scale

TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: B
Plate #: 42
Flaw # - Type - Remaining:

#344 - Grout Nozzle - 0.212"R



Tank Section:Upper Dome
Quadrant: C

Course: B
Plate #: 39
Flaw # - Type - Remaining:

#345 - LOF - 0.169"D 3"L

Drawing is not to scale

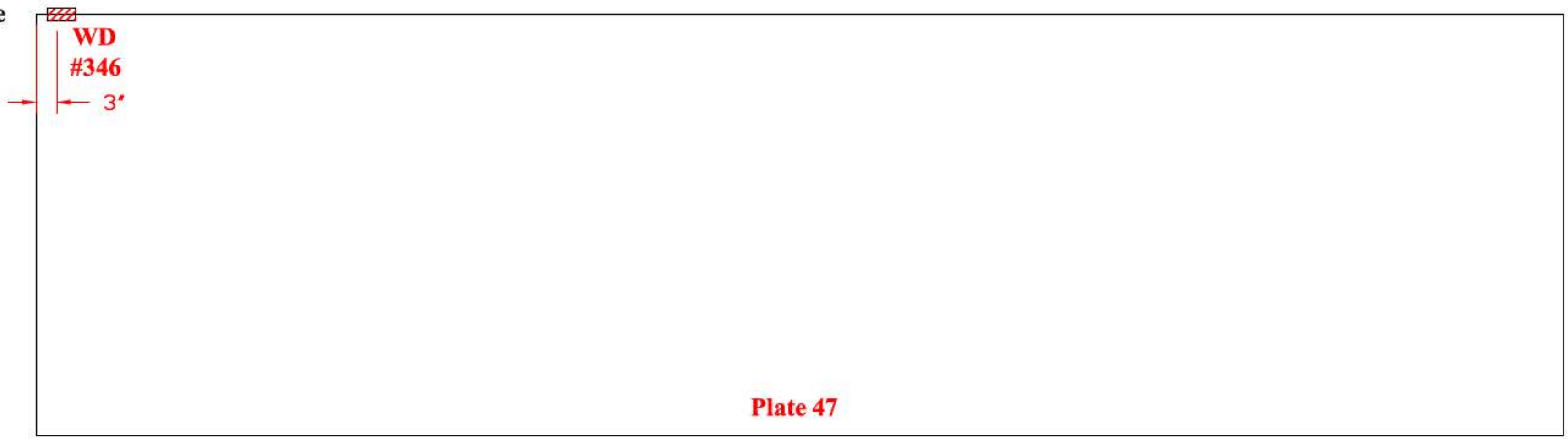
TANK # 20 - QUADRANT C

Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: B
Plate #: 47
Flaw # - Type - Remaining:

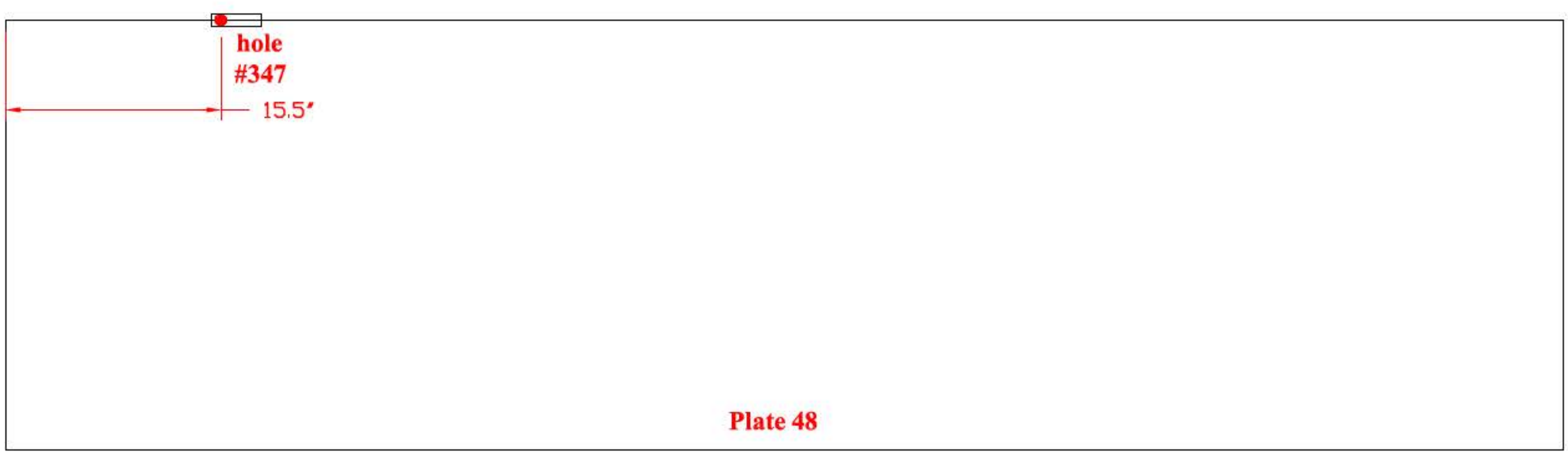
#346
A) - LOF - 0.188"D 2.5"L
B) - LOF - 0.221"D 2"L



Tank Section:Upper Dome
Quadrant: C

Course: B
Plate #: 48
Flaw # - Type - Remaining:

#347 - Hole - BS - 0.500"dia
Thru-wall 0.244"D



Drawing is not to scale

TesTex
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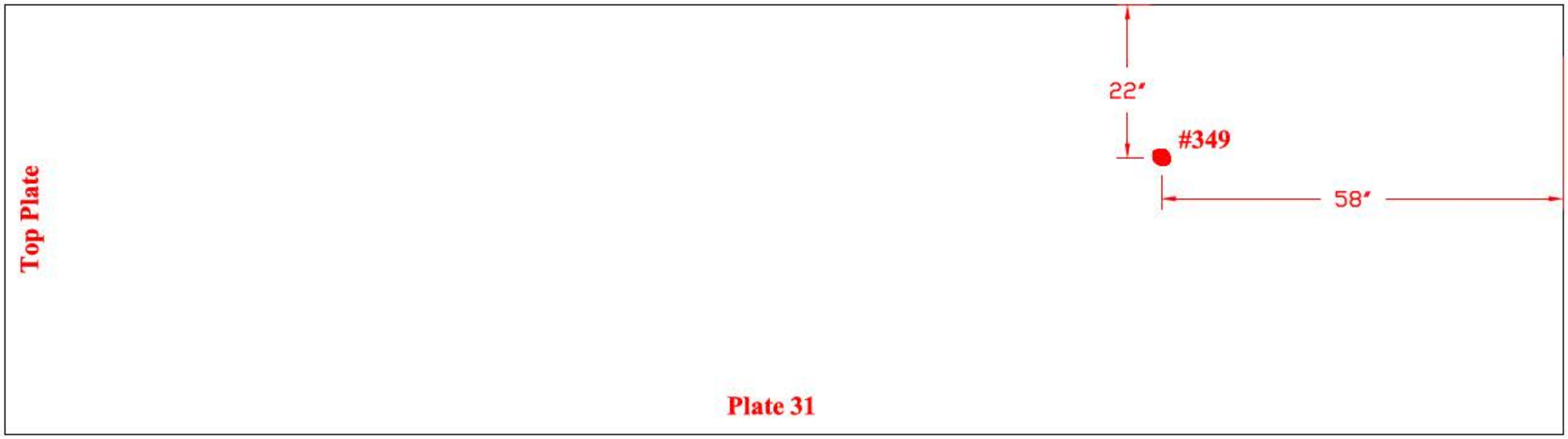
TANK # 20 - QUADRANT A AND B
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: B

Course: B
Plate #: 31
Flaw # - Type - Remaining:

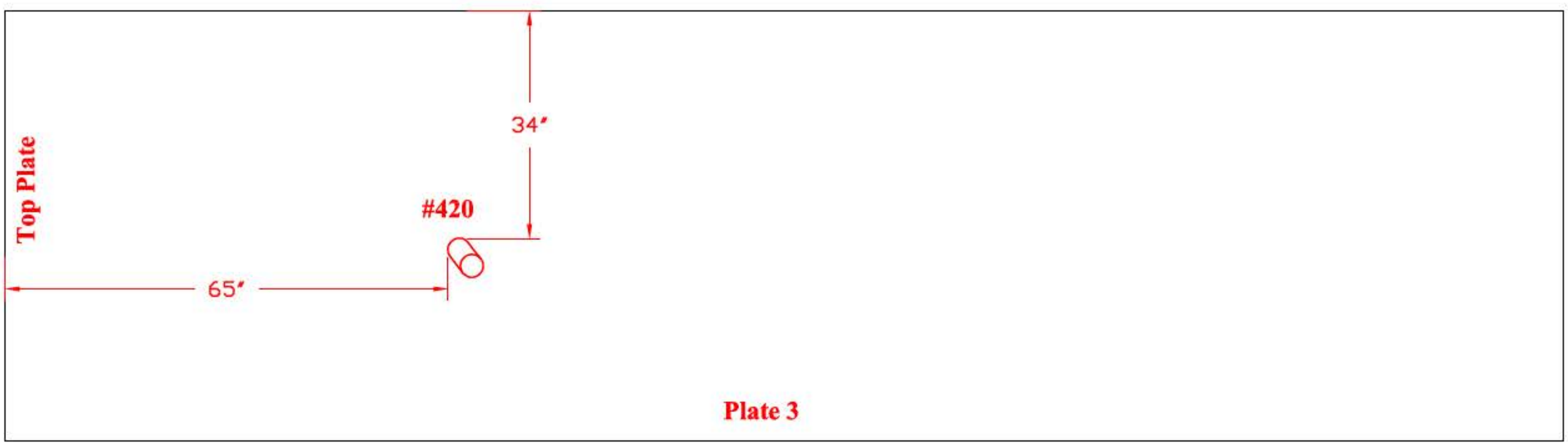
#349 - Dent - 0.160" deep



Tank Section:Upper Dome
Quadrant: A

Course: A
Plate #: 3
Flaw # - Type - Remaining:

#420 - Grout Nozzle - 0.230"R



Drawing is not to scale

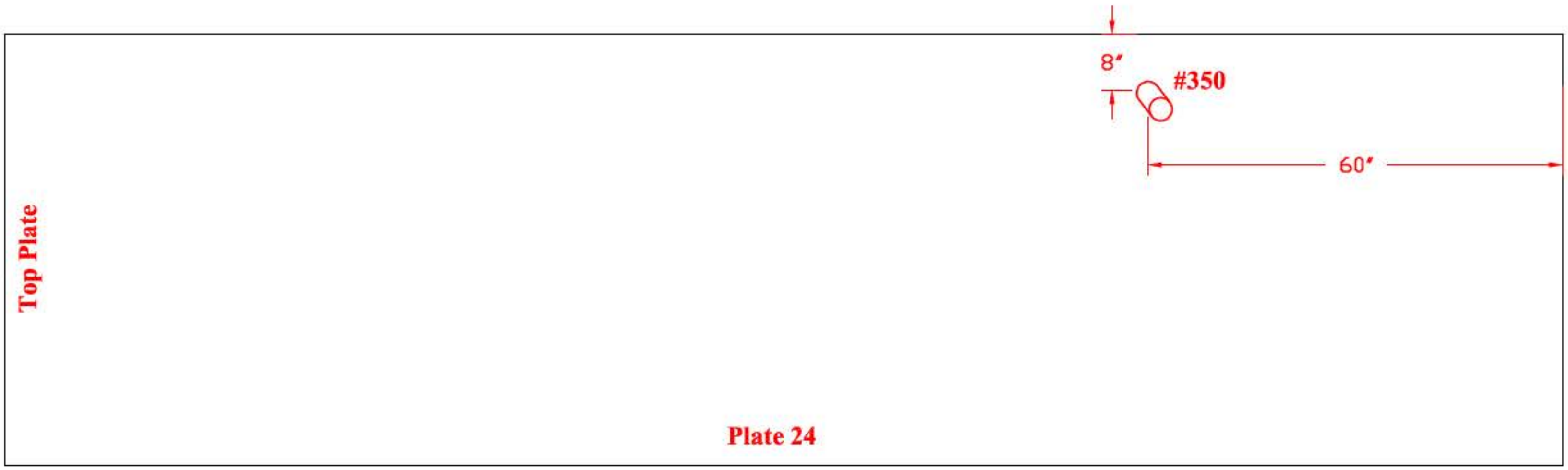
TANK # 20 - QUADRANT B
***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: B

Course: B
Plate #: 24

Flaw # - Type - Remaining:

#350 - Grout Nozzle - 0.221"R

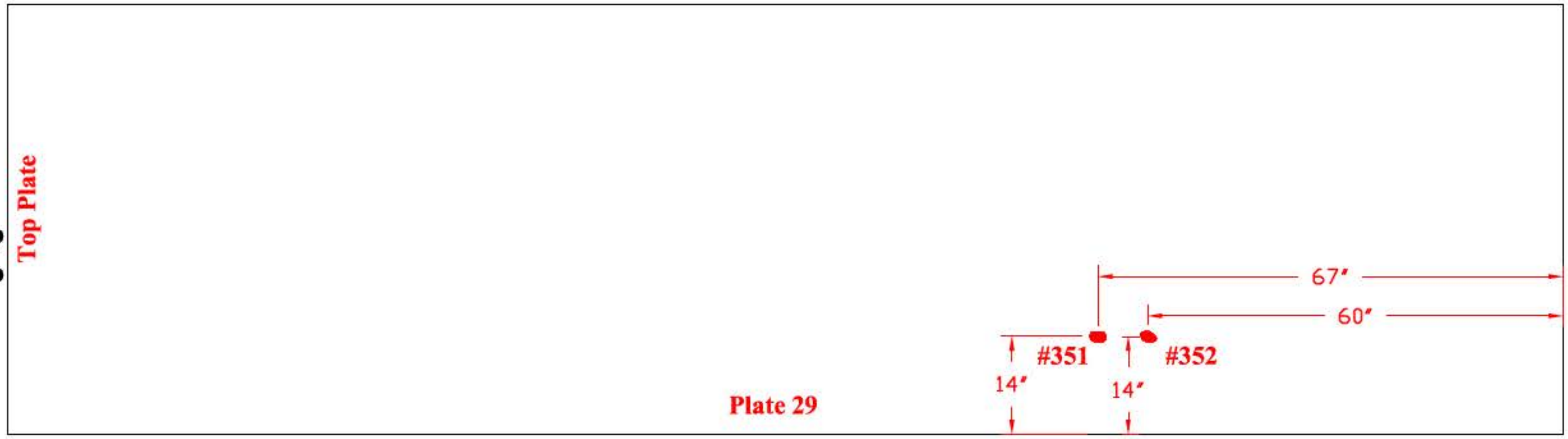


Tank Section:Upper Dome
Quadrant: B

Course: B
Plate #: 29

Flaw # - Type - Remaining:

#351 - Arc Gouge - 0.160"deep
#352 - Arc Gouge - 0.160"deep



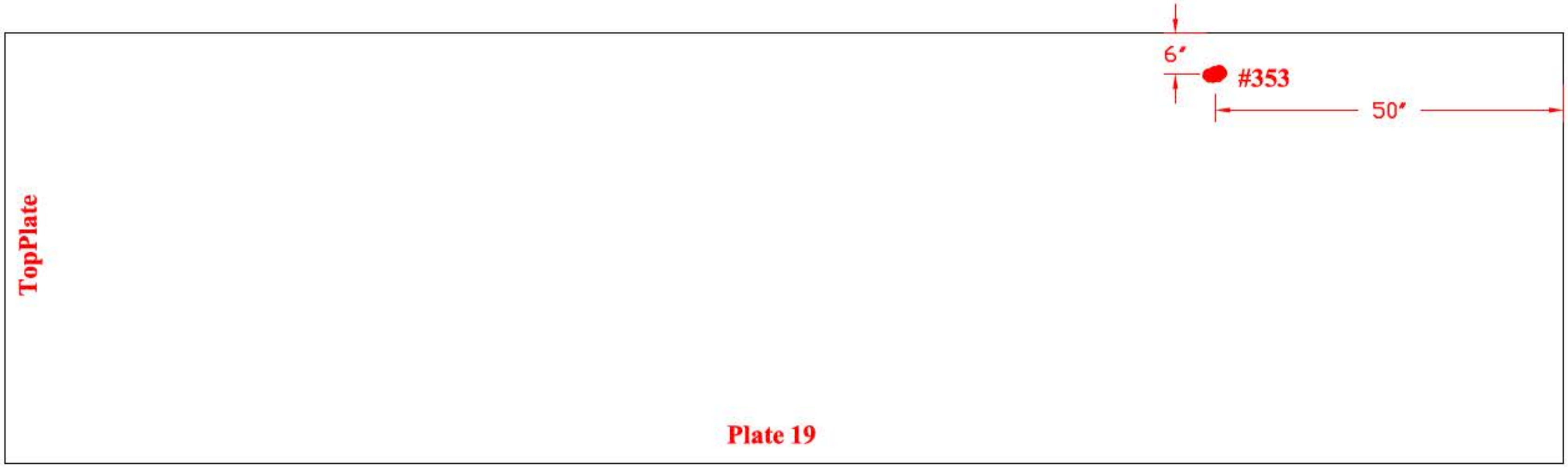
TANK # 20 - QUADRANT B
***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: B

Course: B
Plate #: 19

Flaw # - Type - Remaining:

#353-Arc Gouge - 0.160"Deep

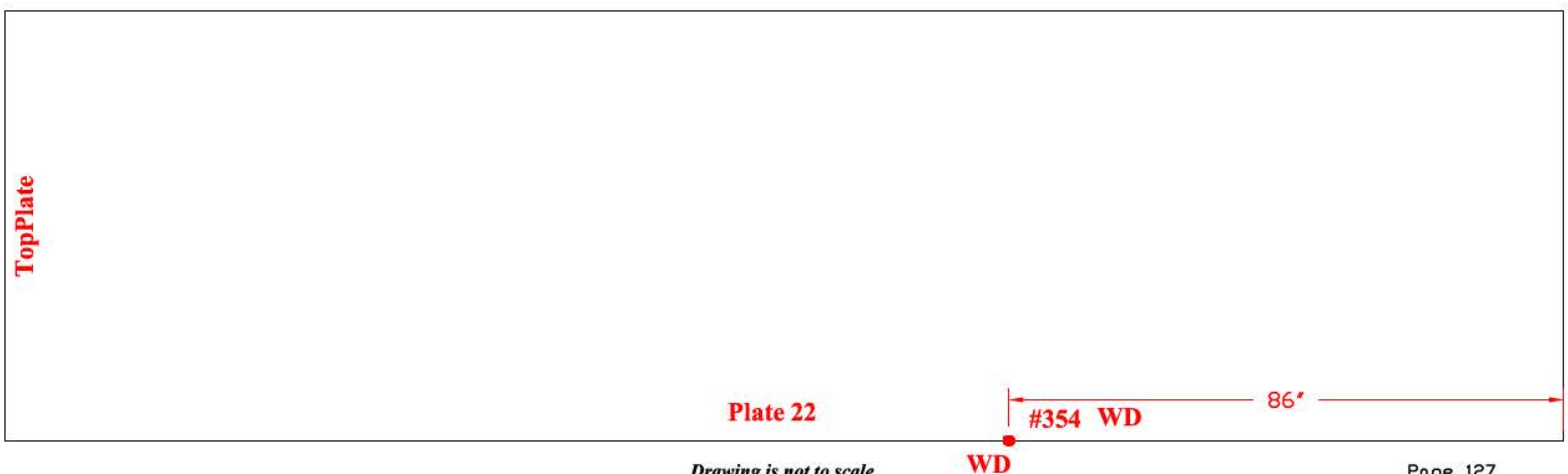


Tank Section:Upper Dome
Quadrant: B

Course: B
Plate #: 22

Flaw # - Type - Remaining:

#354 - Pit - 0.062"D - NRI
no significant depth



Drawing is not to scale

TANK # 20 - QUADRANT A

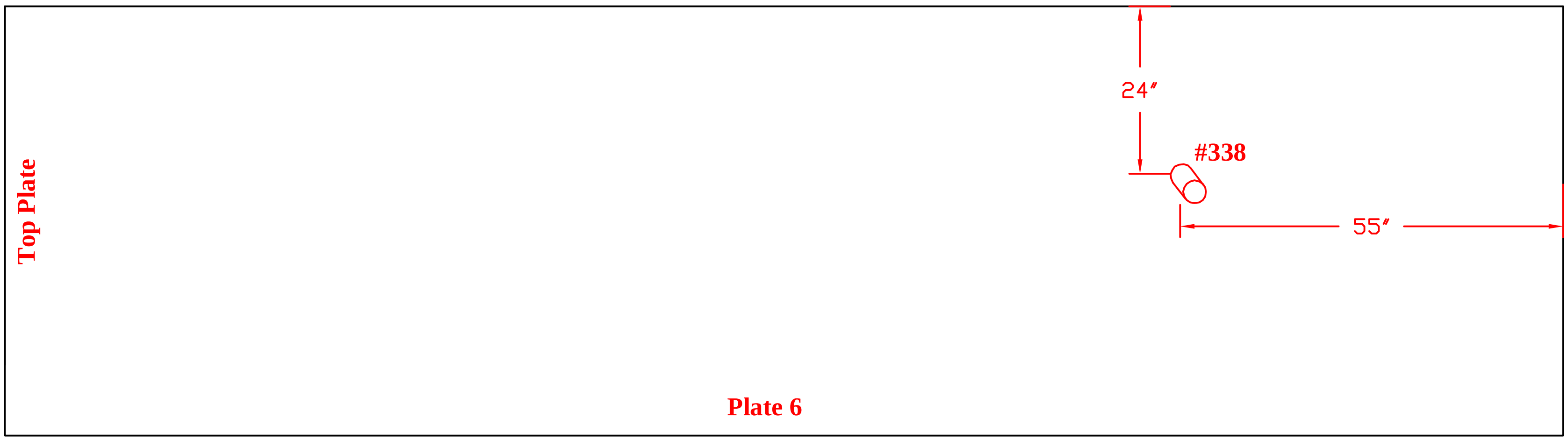
**Nominal Plate Thickness: 0.250"*

Tank Section: Upper Dome
Quadrant: A

Course: B
Plate #: 6

Flaw # - Type - Remaining:

#355 - Grout Nozzle - 0.214"R

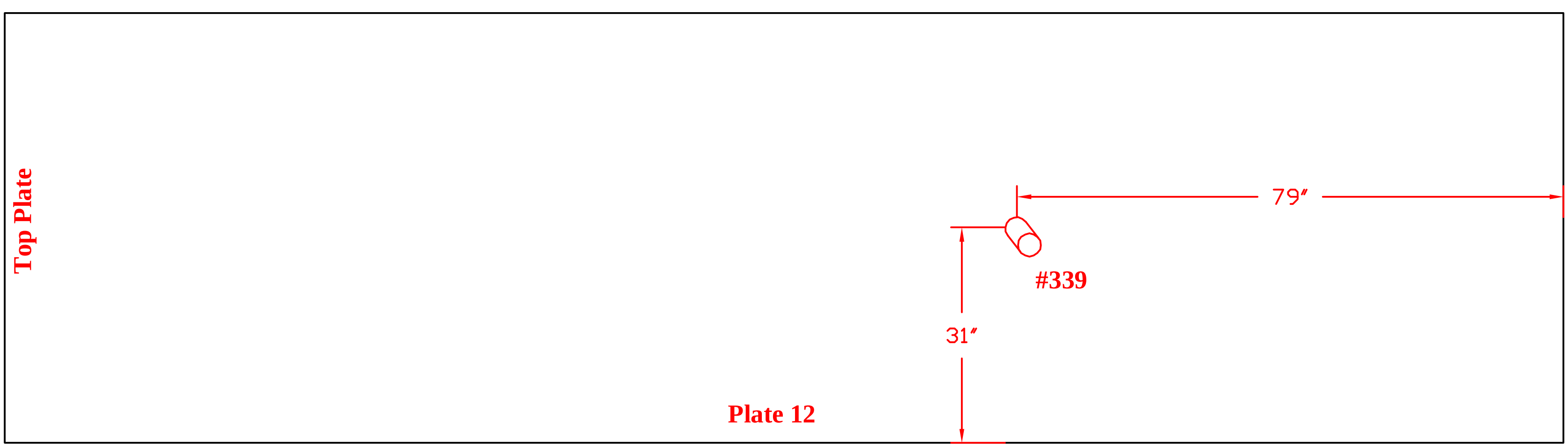


Tank Section:Upper Dome
Quadrant: A

Course: B
Plate #: 12

Flaw # - Type - Remaining:

#356 - Grout Nozzle - 0.210"R



Drawing is not to scale

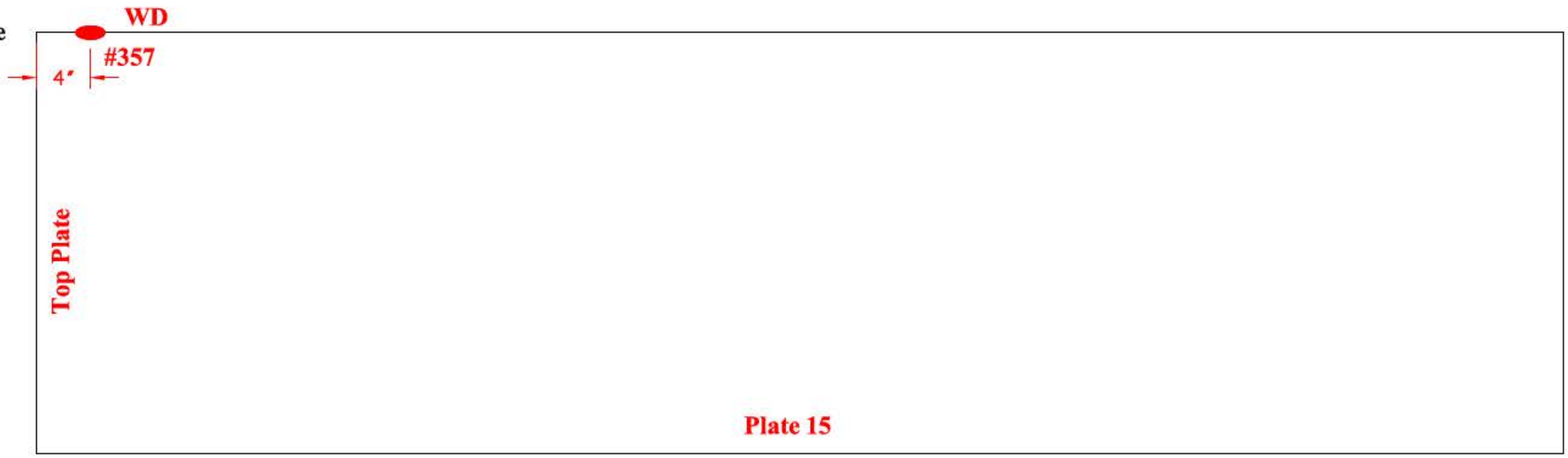
TANK # 20 - QUADRANT A
***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: A

Course: A
Plate #: 15

Flaw # - Type - Remaining:

#357 - Pits - .062"D

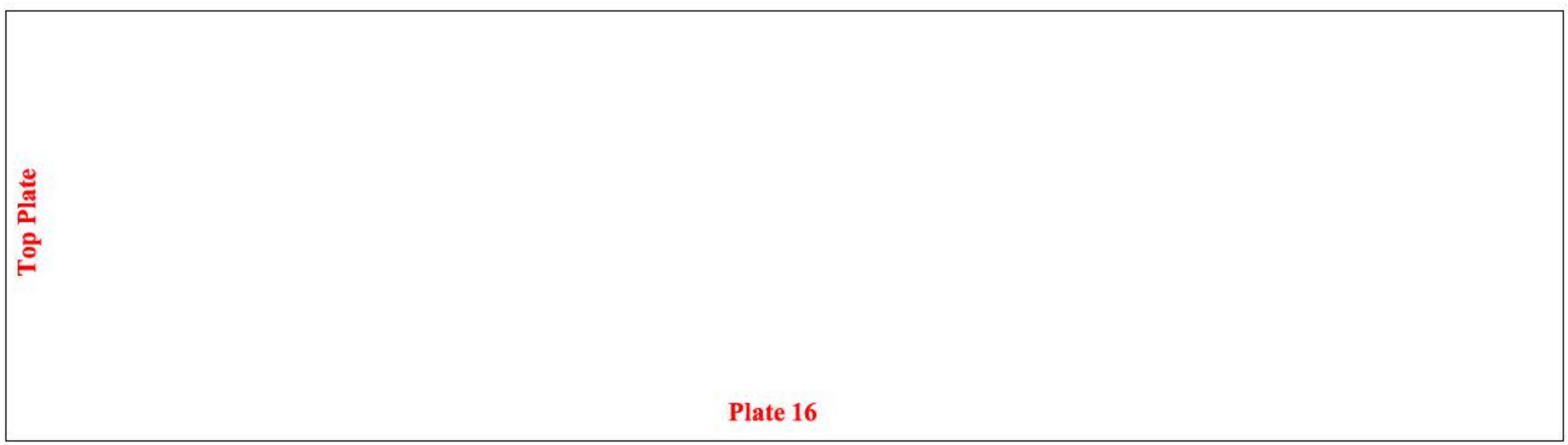


Tank Section:Upper Dome
Quadrant: A

Course: B
Plate #: 16

Flaw # - Type - Remaining:

#358
see #477



Drawing is not to scale

TANK # 20 - QUADRANT B

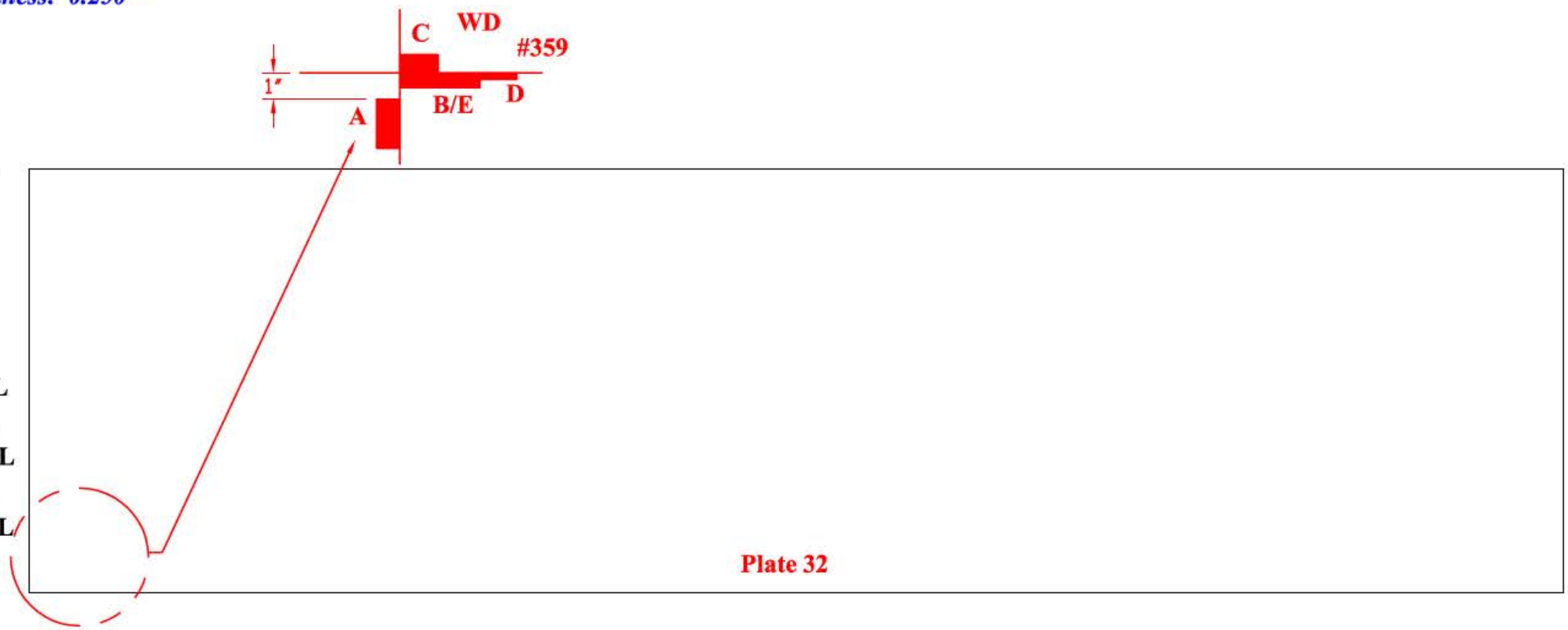
***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: B

Course: A
Plate #: 32

Flaw # - Type - Remaining:

#359:A) LOF-0.206"D 1.5"L
B) LOF-0.104"D 3"L
C) LOF-0.214"D 1.5"L
D) LOF-0.111"D 4"L
E) LOF-0.110"D 2.5"L

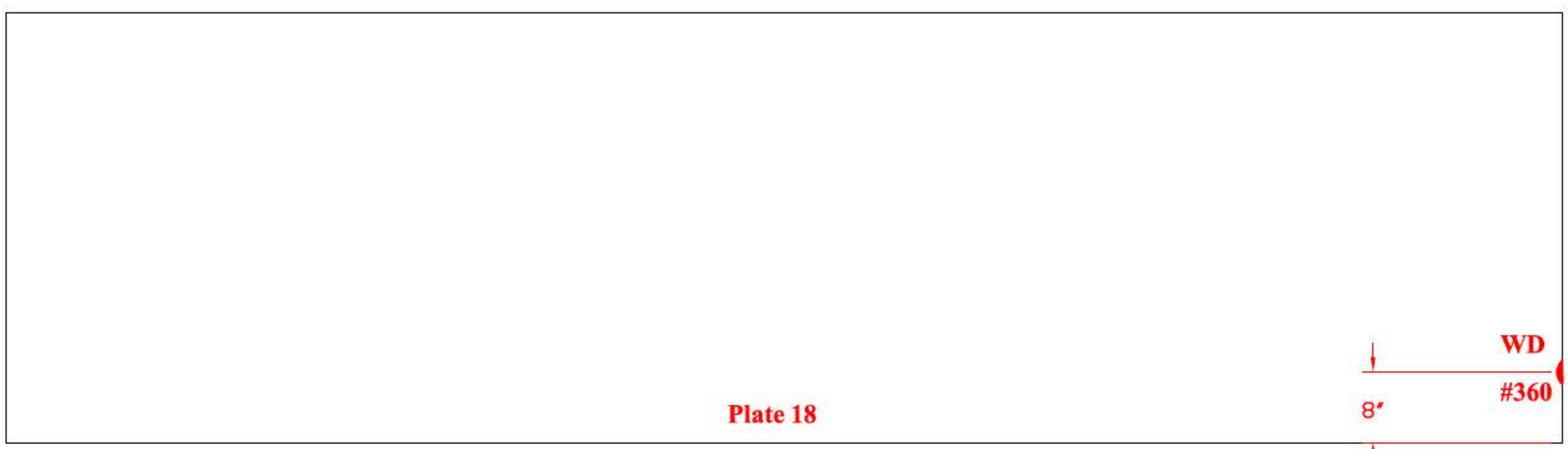


Tank Section:Upper Dome
Quadrant: B

Course: A
Plate #: 18

Flaw # - Type - Remaining:

#360: LOF-0.217"D 3"L



Drawing is not to scale

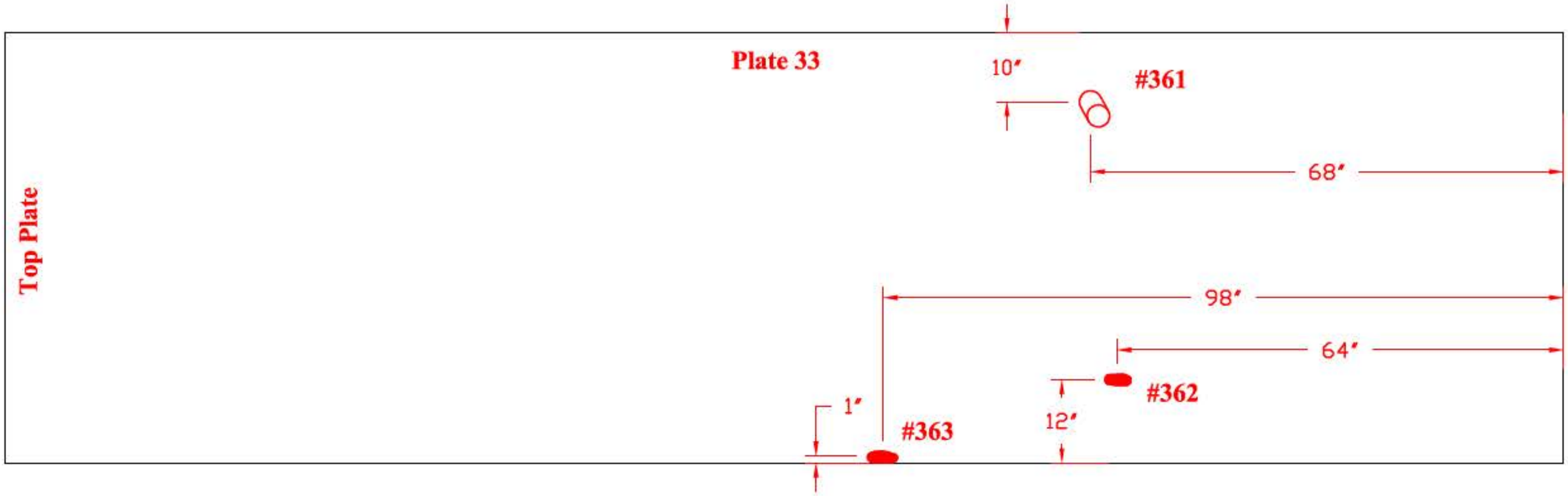
TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: B

Course: A
Plate #:33

Flaw # - Type - Remaining:

#361 - Grout Nozzle - 0.209"R
#362 - TW - 0.134"D
(LOF) - 1.5"L
#363 - TW - 0.169"D
(LOF) - 1.5"L

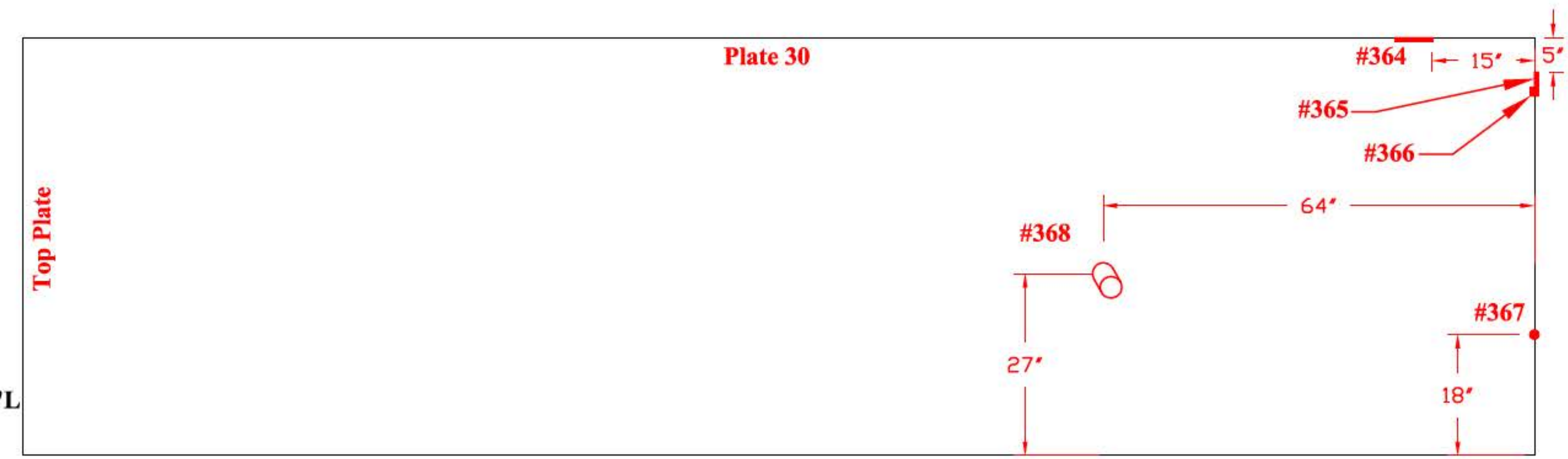


Tank Section: Upper Dome
Quadrant: B

Course: B
Plate #: 30

Flaw # - Type - Remaining:

#364 - LOF - 0.117"D 4"L
#365 - LOF - 0.093"D 5.5"L
#366 - LOF - 0.116"D 3"L
#367-Gouge-BS-0.137"D 0.05"L
#368 - Grout Nozzle - 0.217"R



Drawing is not to scale

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TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

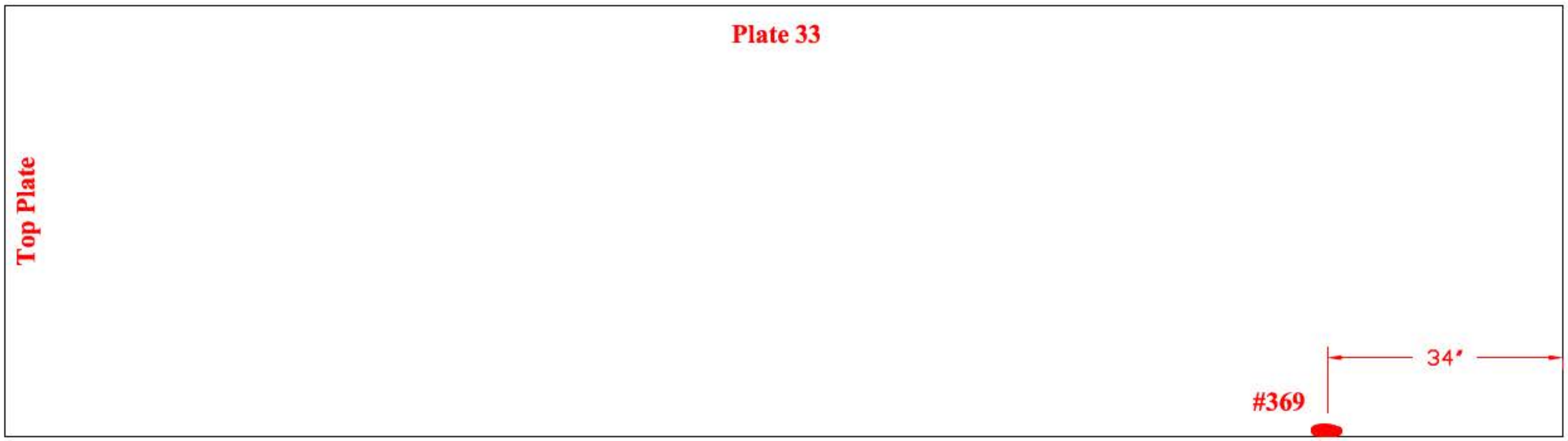
Tank Section: Upper Dome
Quadrant: B

Course: A
Plate #:29

Flaw # - Type - Remaining:

#369 - Pit - 0.125" DIA

Limited Scan (Interference)



Drawing is not to scale

TANK # 20 - QUADRANT A AND B

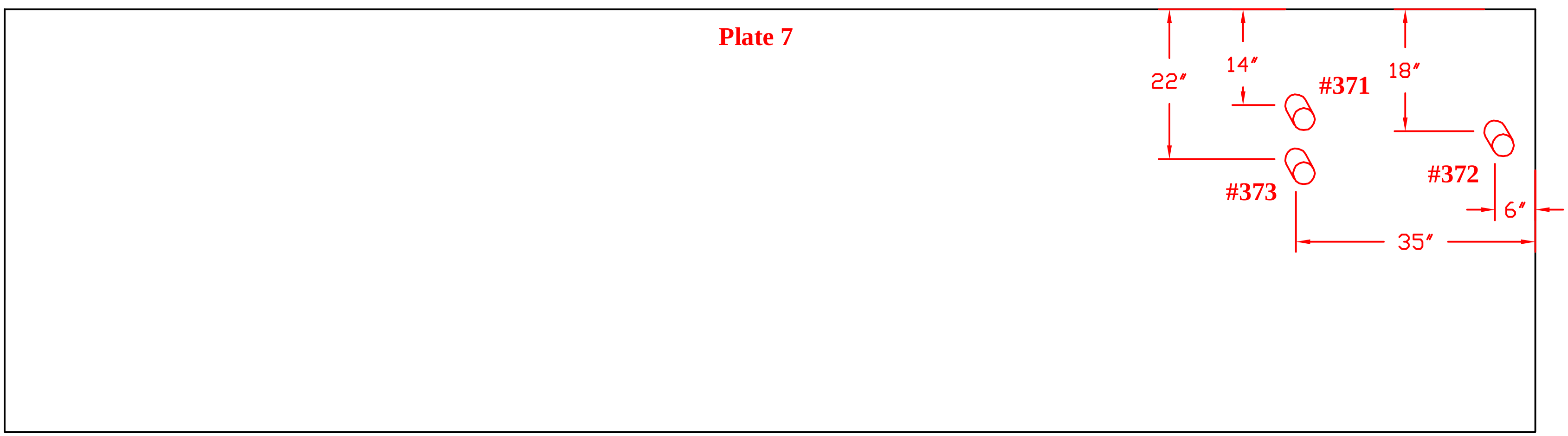
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: A

Course: 2
Plate #:7

Flaw # - Type - Remaining:

#371 - Grout Nozzle - 0.202"R
#372 - Grout Nozzle - 0.194"R
#373 - Grout Nozzle - 0.219"R

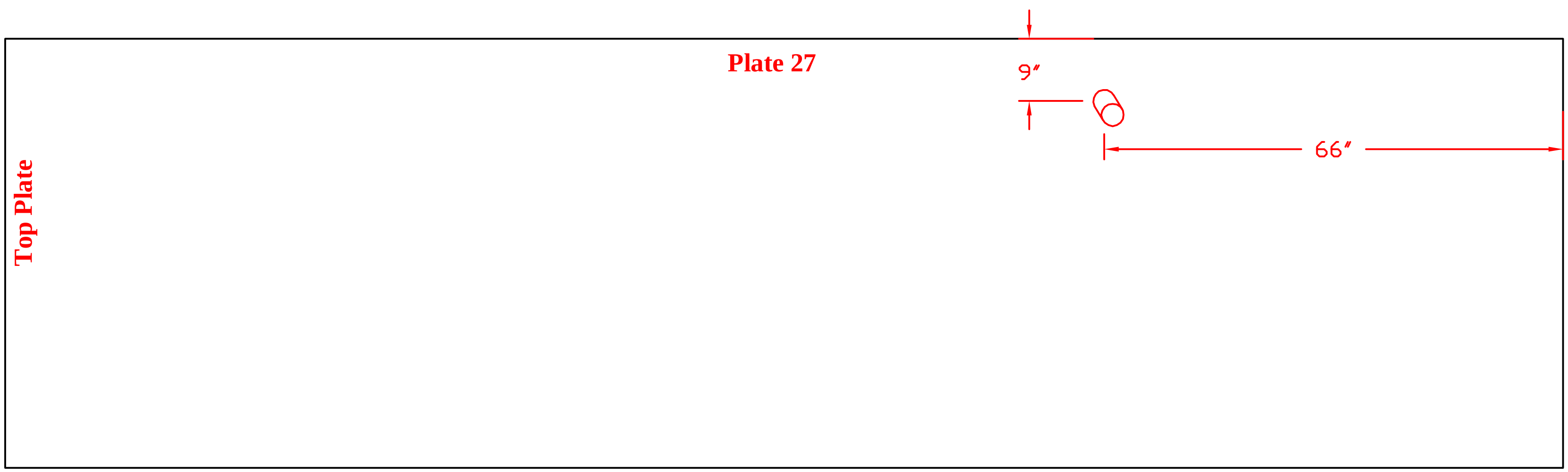


Tank Section: Upper Dome
Quadrant: B

Course: A
Plate #: 27

Flaw # - Type - Remaining:

#374 - Grout Nozzle - 0.214"R



Drawing is not to scale

TANK # 20 - QUADRANT A AND B

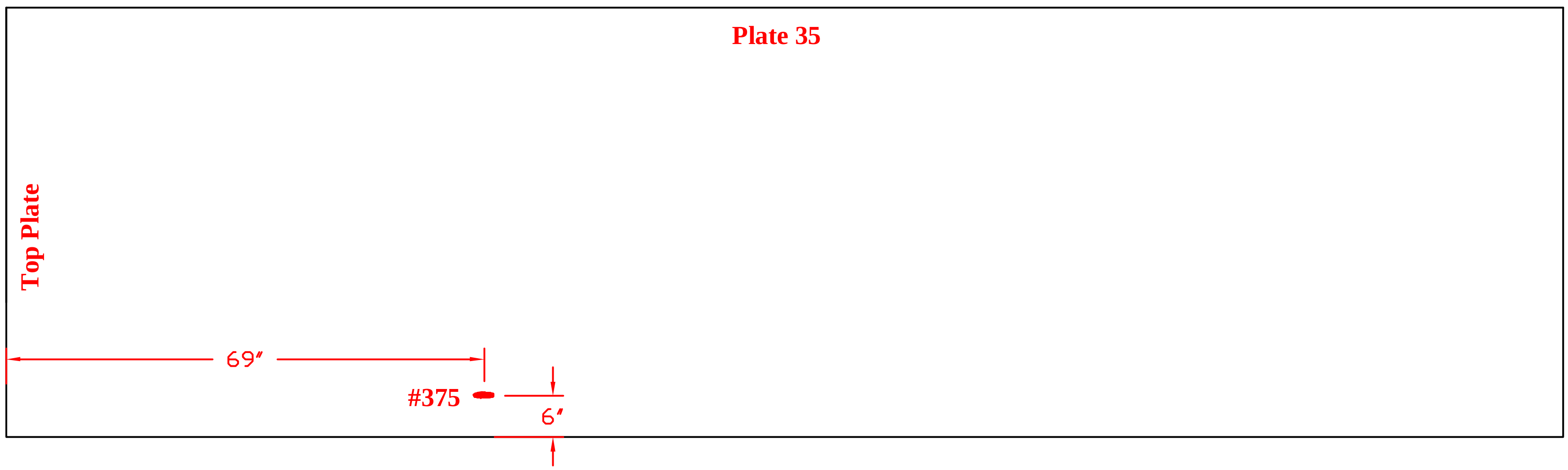
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: B

Course: B
Plate #:35

Flaw # - Type - Remaining:

#375 - TW - LOF
- 0.143"D 2.5"L

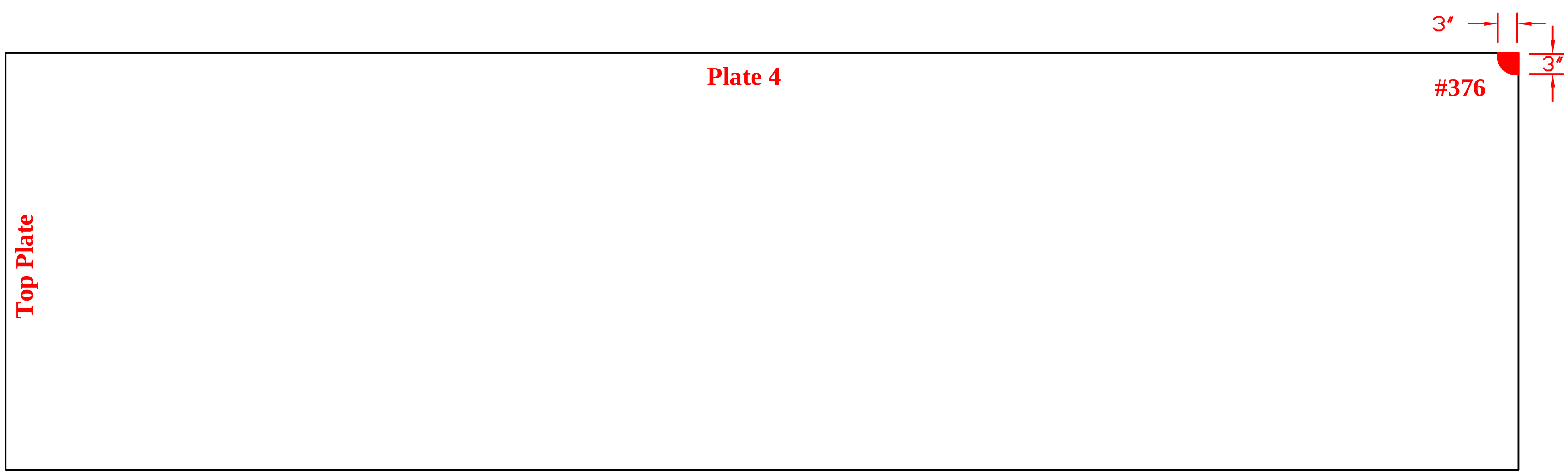


Tank Section: Upper Dome
Quadrant: A

Course: C
Plate #: 4

Flaw # - Type - Remaining:

#376 - WL - 0.230"R



Drawing is not to scale

TANK # 20 - QUADRANT A

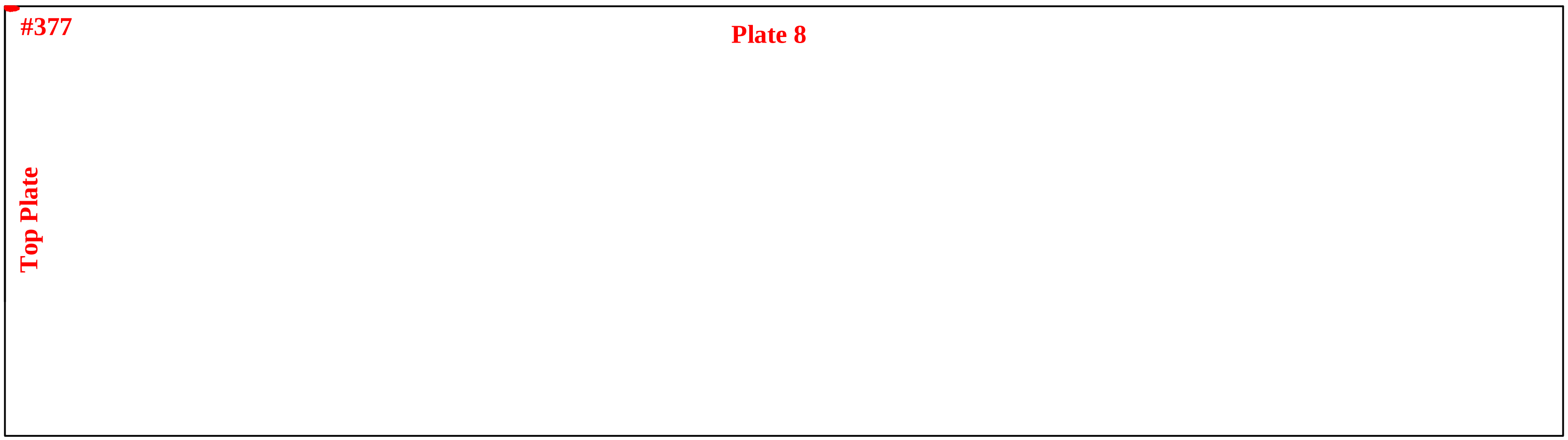
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A

Course: B
Plate #: 8

Flaw # - Type - Remaining:

#377 - LOF - 0.053"D 1"L

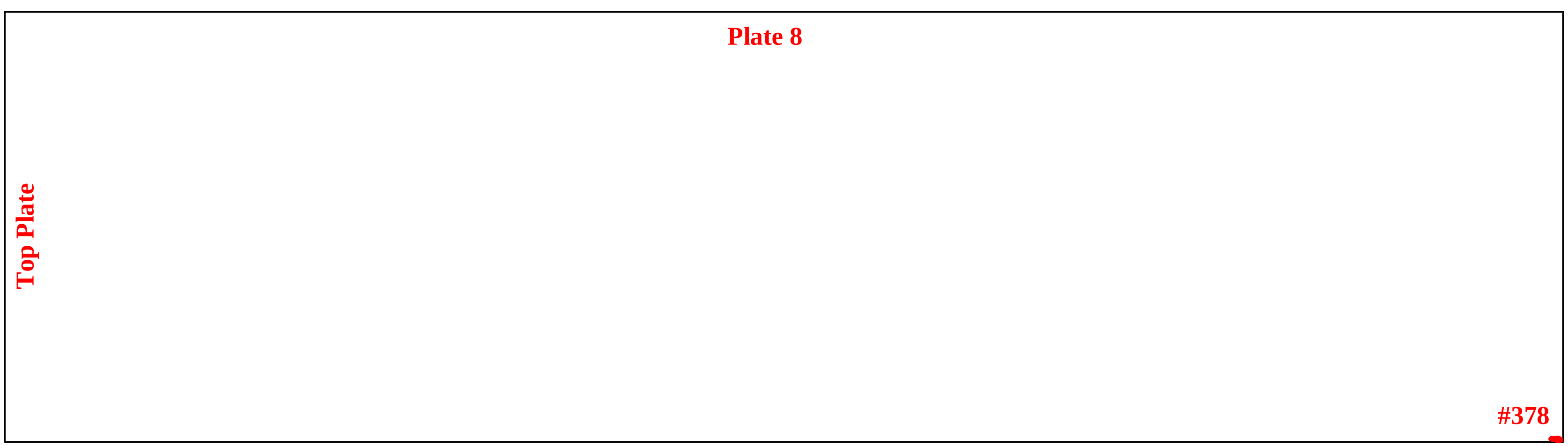


Tank Section: Upper Dome
Quadrant: A

Course: C
Plate #: 8

Flaw # - Type - Remaining:

#378 - LOF - 0.132"D 1"L

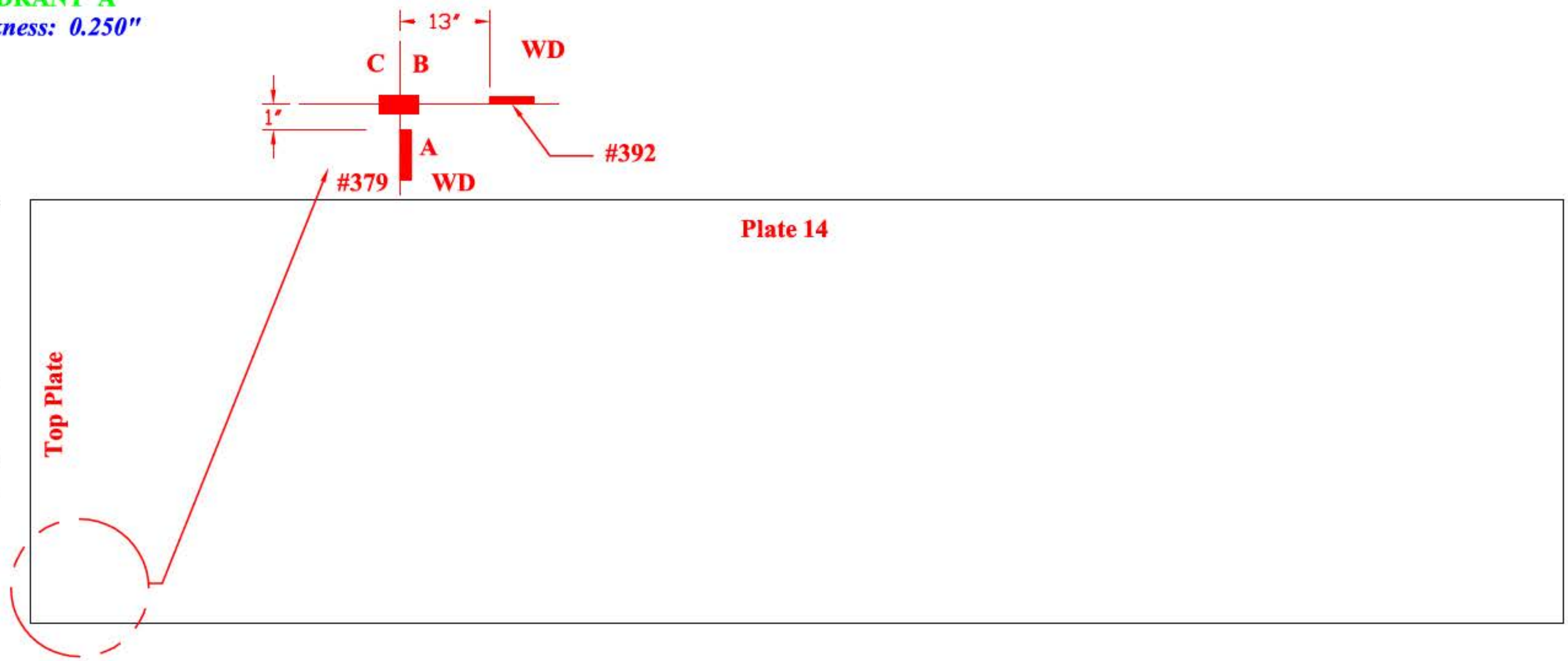


TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A

Course: B
Plate #: 14

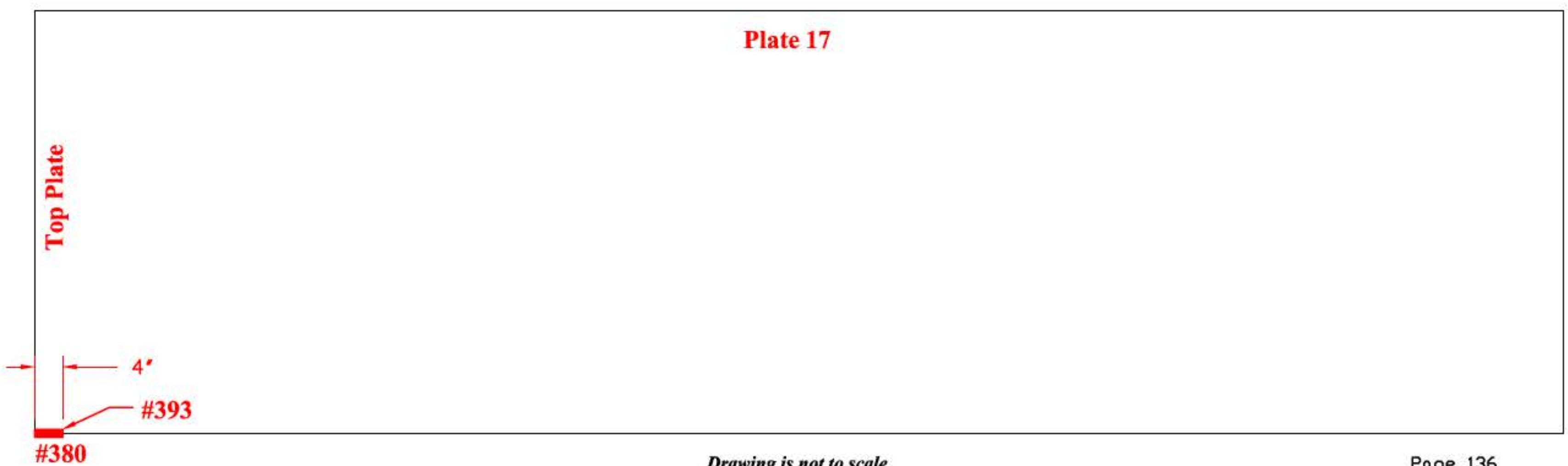
Flaw # - Type - Remaining:
#379:A) LOF-0.156"D 5"L
B) LOF-0.133"D 3"L
C) LOF-0.205"D 3"L
#392: LOF - 0.207"D 4"L



Tank Section:Upper Dome
Quadrant: A

Course: B
Plate #: 17

Flaw # - Type - Remaining:
#380: LOF - 0.109"D 4"L
#393: LOF - 0.207"D 4"L



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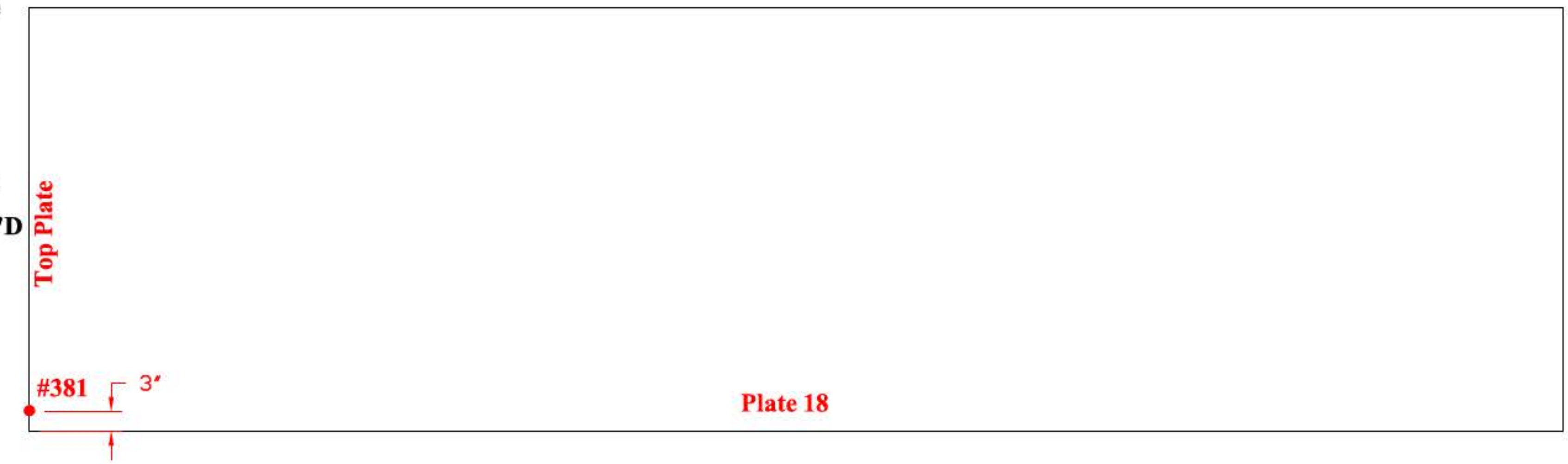
TANK # 20 - QUADRANT A AND B

Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A

Course: B
Plate #: 18

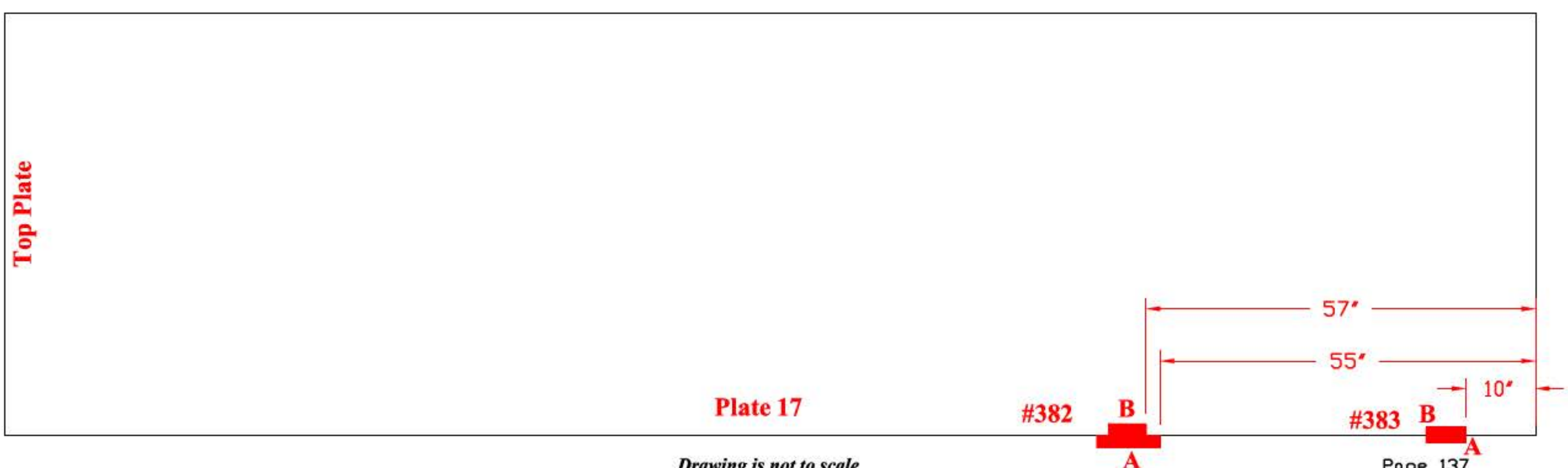
Flaw # - Type - Remaining:
#381-Pit - 0.063"DIA 0.063"D



Tank Section:Upper Dome
Quadrant: B

Course: C
Plate #: 17

Flaw # - Type - Remaining:
#382:A) LOF-0.116"D 7"L
B) LOF-0.073"D 7"L
#383:A) LOF-0.225"D 3"L
B) LOF-0.223"D 3"L



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TANK # 20 - QUADRANT B

***Nominal Plate Thickness: 0.250"**

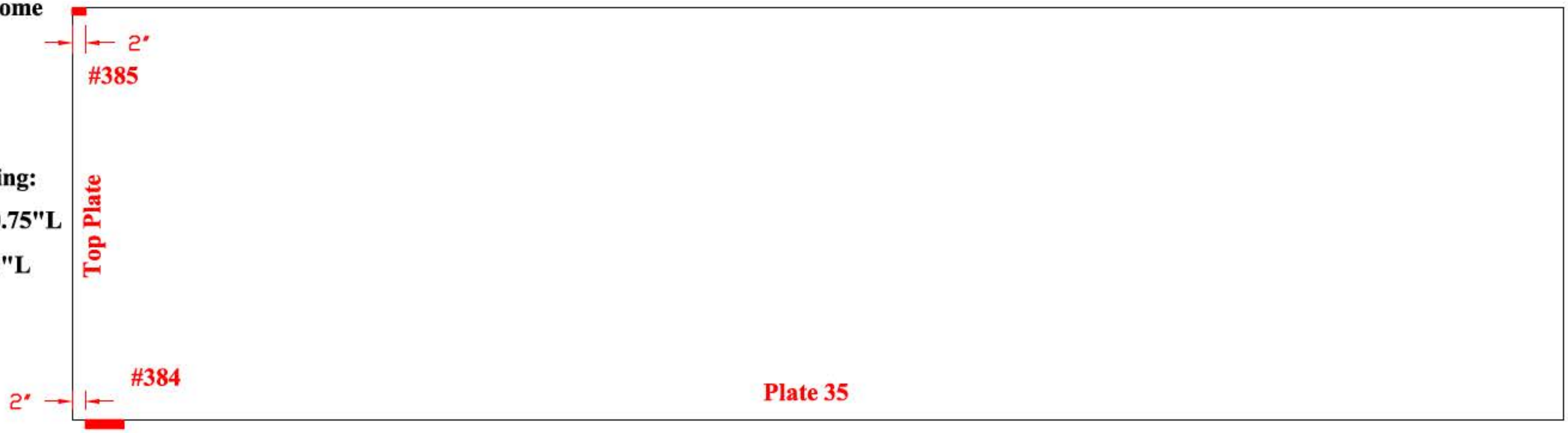
Tank Section: Upper Dome
Quadrant: B

Course: B
Plate #: 35

Flaw # - Type - Remaining:

#384 - LOF - 0.097"D 0.75"L

#385 - LOF - 0.106"D 2"L

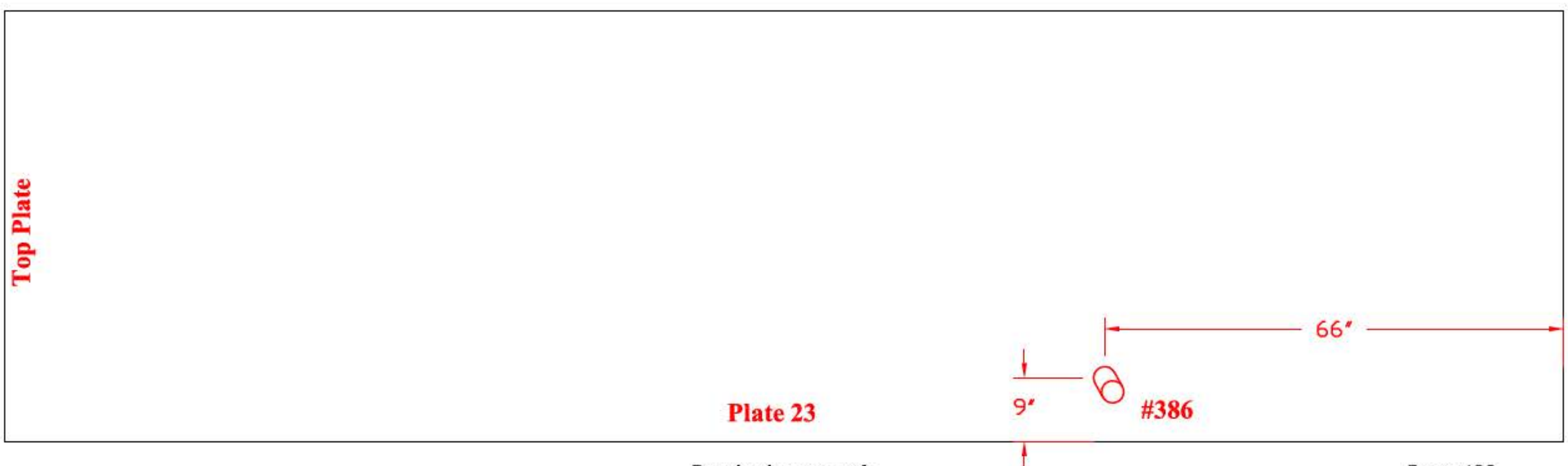


Tank Section:Upper Dome
Quadrant: B

Course: C
Plate #: 23

Flaw # - Type - Remaining:

#386 - Grout Nozzle - 0.180"R



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TANK # 20 - QUADRANT B
Nominal Plate Thickness: 0.250"

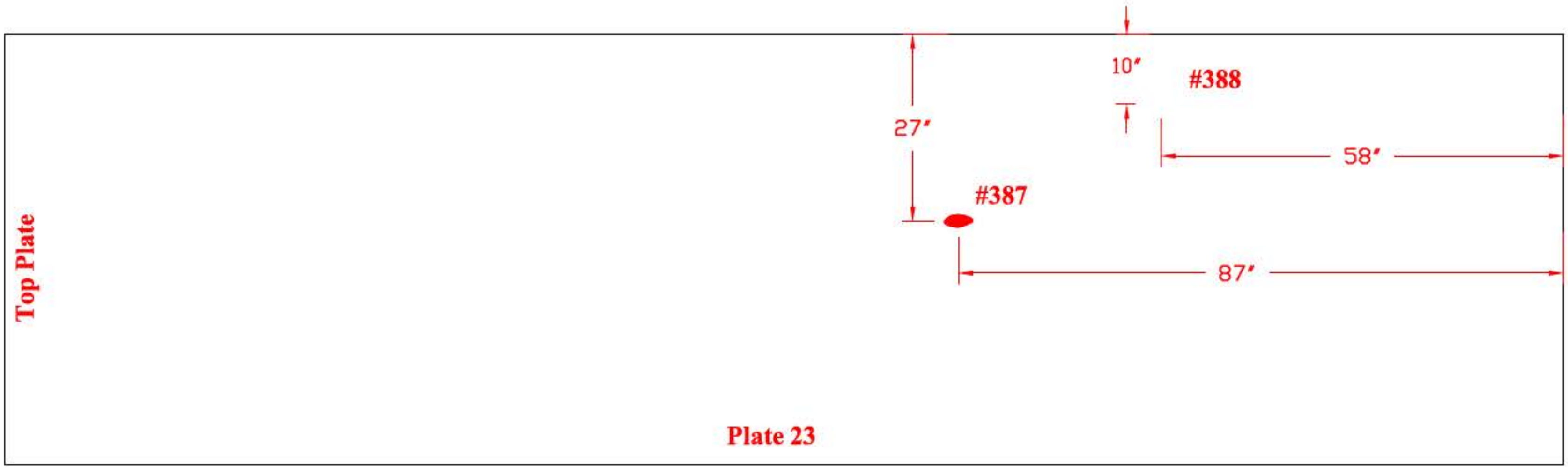
Tank Section: Upper Dome
Quadrant: B

Course: C
Plate #: 23

Flaw # - Type - Remaining:

#387 - Dent - 0.250" deep

#388 - Dent - 0.100" deep

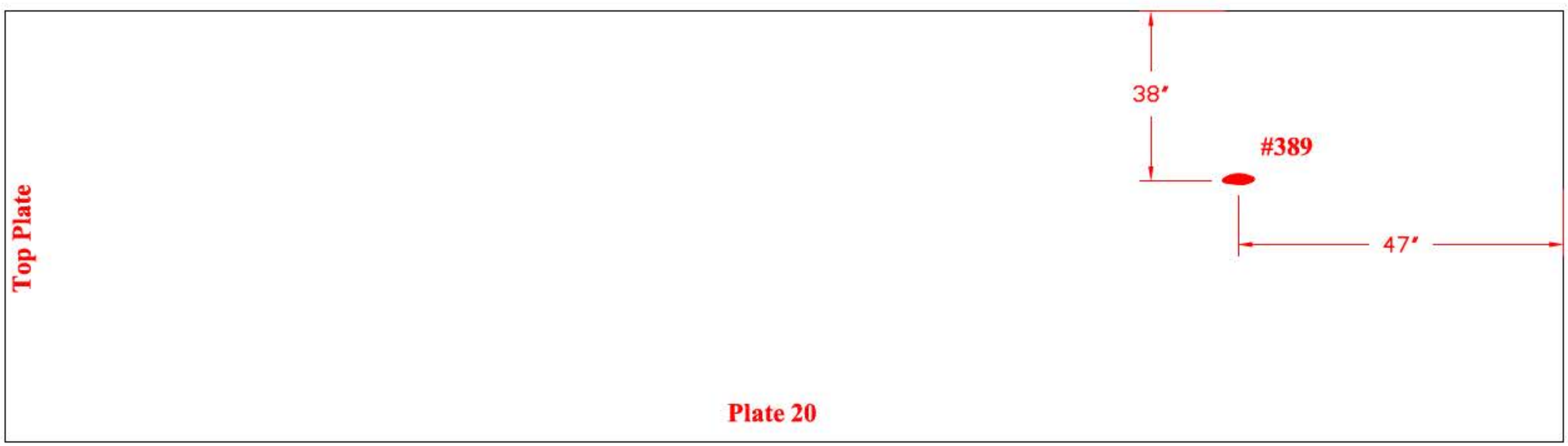


Tank Section: Upper Dome
Quadrant: B

Course: C
Plate #: 20

Flaw # - Type - Remaining:

#389 - Gouge - 0.137"D
1"L 0.500"W



Drawing is not to scale

TANK # 20 - QUADRANT A AND B

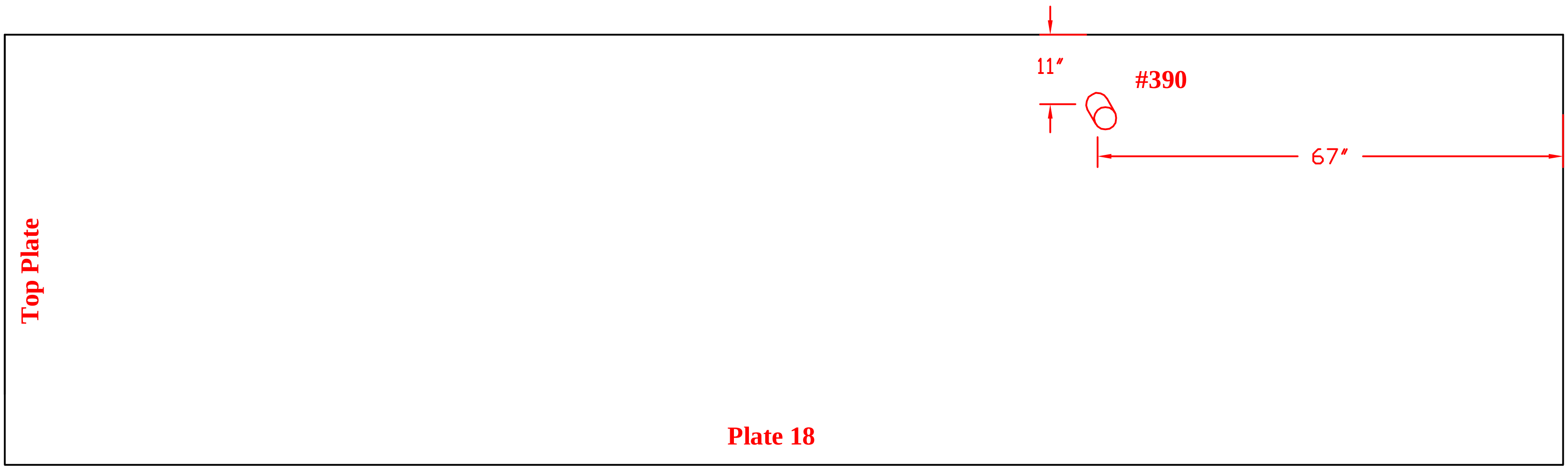
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: B

Course: C
Plate #: 18

Flaw # - Type - Remaining:

#390 - Grout Nozzle - 0.208"R

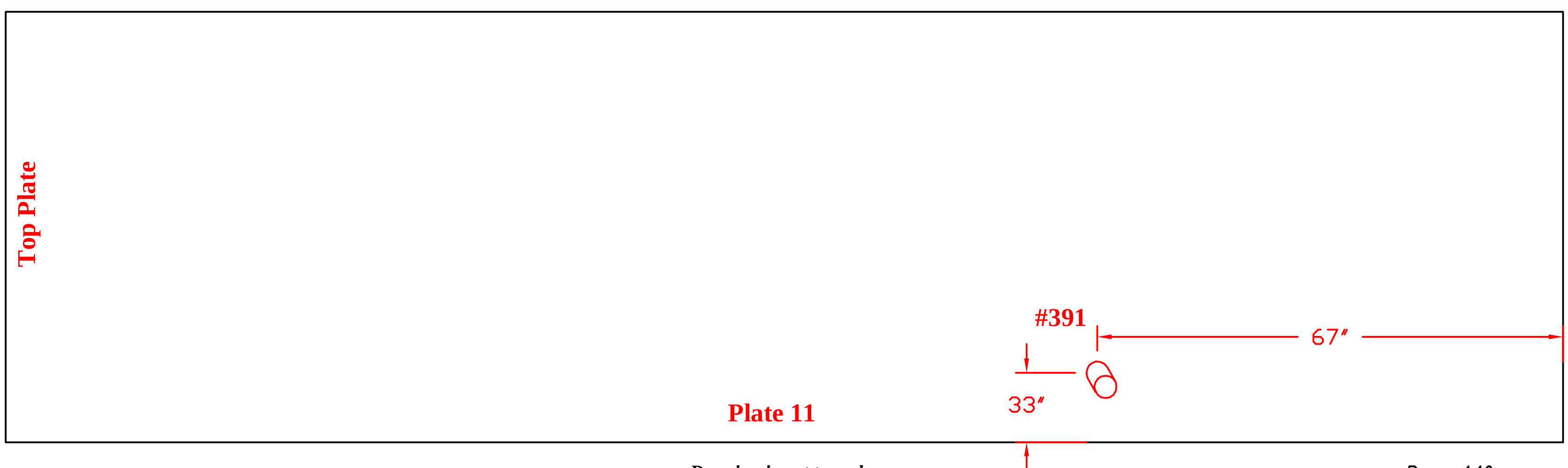


Tank Section:Upper Dome
Quadrant: A

Course: C
Plate #: 11

Flaw # - Type - Remaining:

#391 - Grout Nozzle - 0.220"R



Drawing is not to scale

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TANK # 20 - QUADRANT D

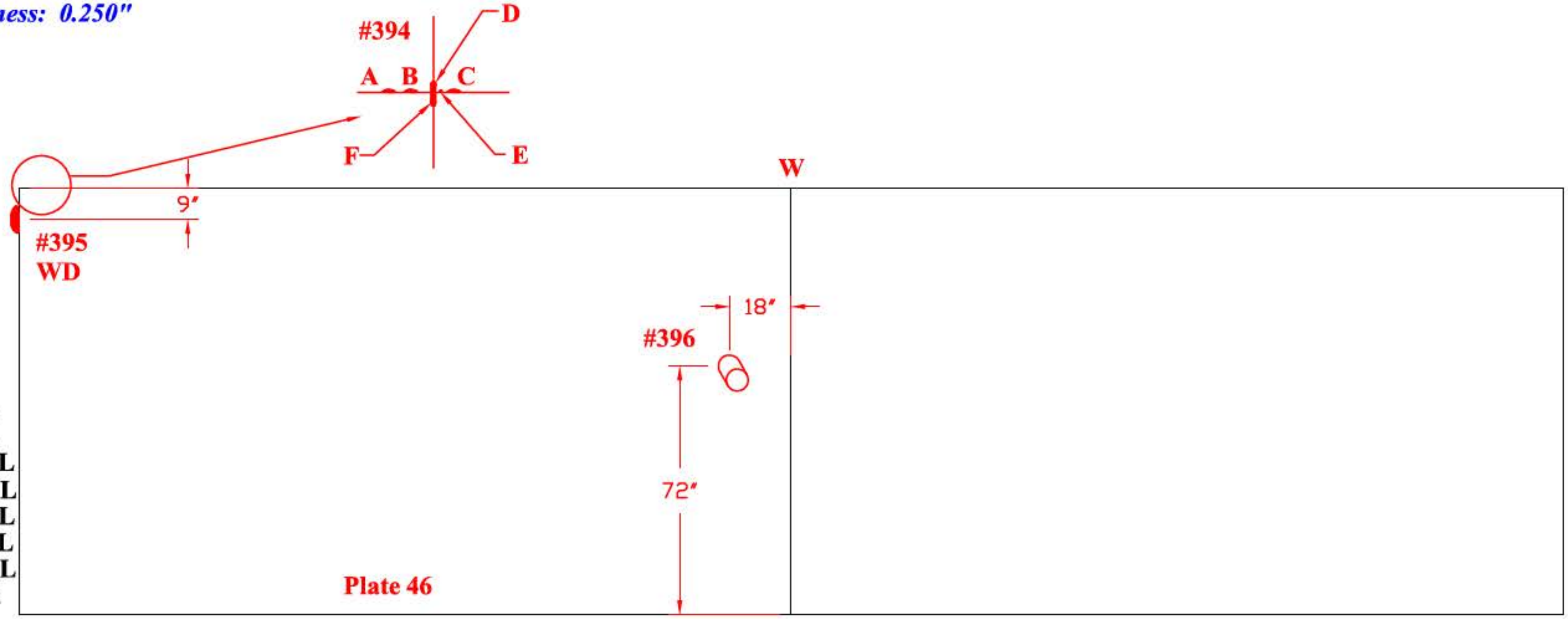
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: C
Plate #: 46

Flaw # - Type - Remaining:

#394 -A) LOF - 0.087"D 4"L
B) LOF - 0.147"D 3"L
C) LOF - 0.097"D 2.5"L
D) LOF - 0.199"D 2.5"L
E) LOF - 0.125"D.125"L
F) LOF - 0.115"D 4.5"L
#395 - A) LOF - 0.230"D 3.5"L
#396 - Grout Nozzle - 0.212"R

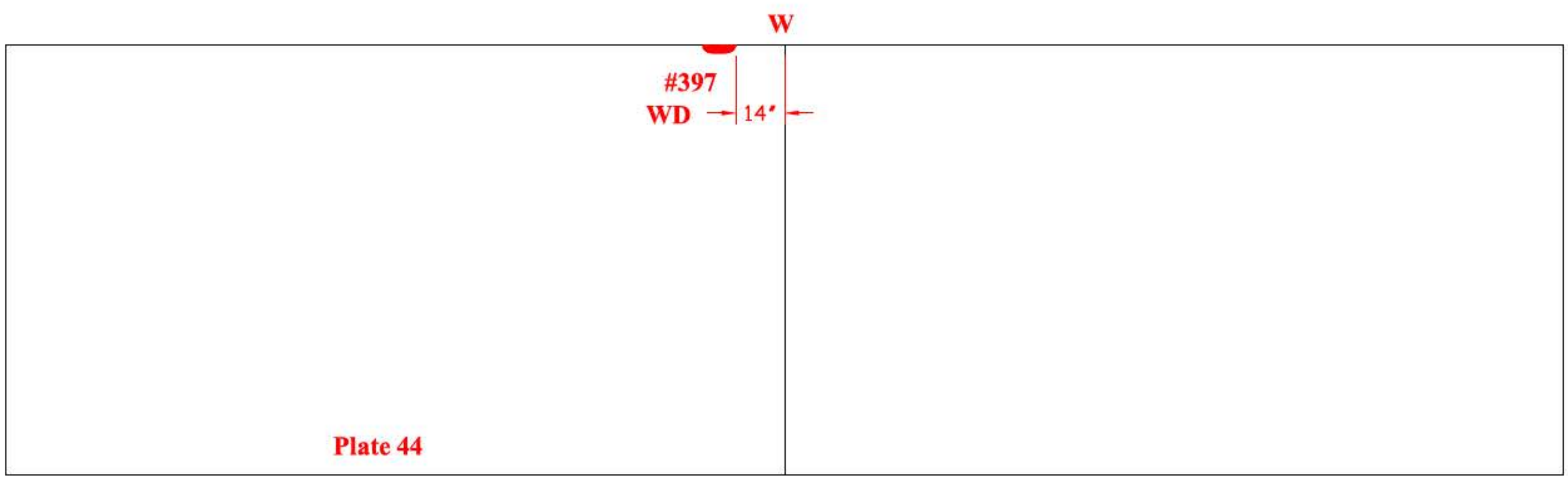


Tank Section:Upper Dome
Quadrant: D

Course: C
Plate #: 44

Flaw # - Type - Remaining:

#397 - LOF - 0.091"D 3"L
Pit - 0.125" DIA



Drawing is not to scale

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

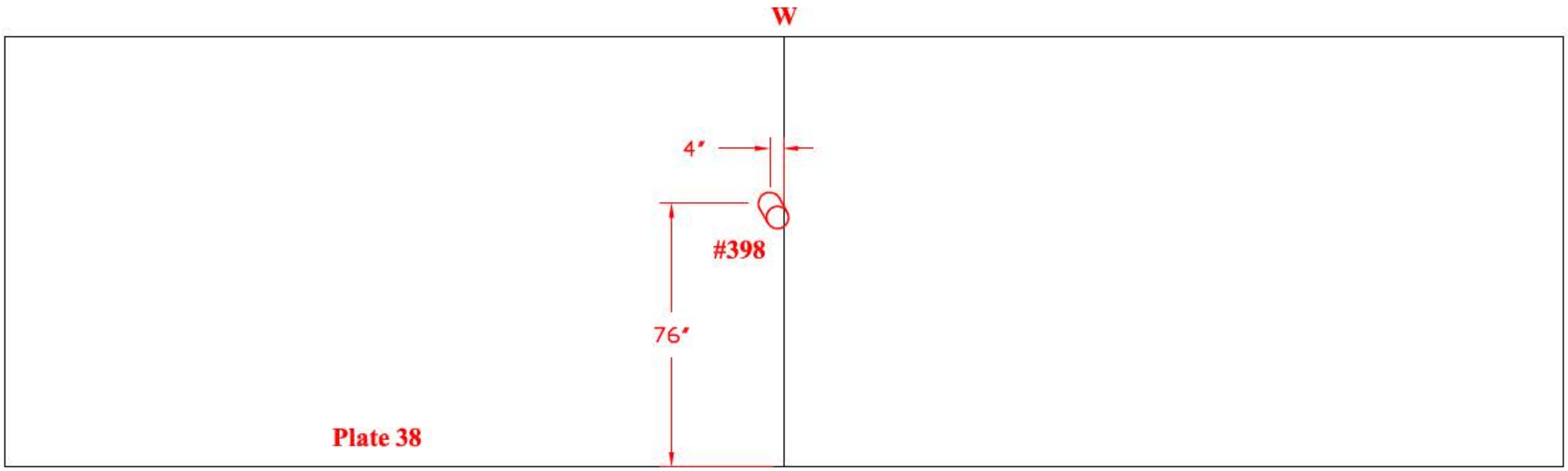
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: C
Plate #: 38

Flaw # - Type - Remaining:

#398 - Grout Nozzle - 0.220"R

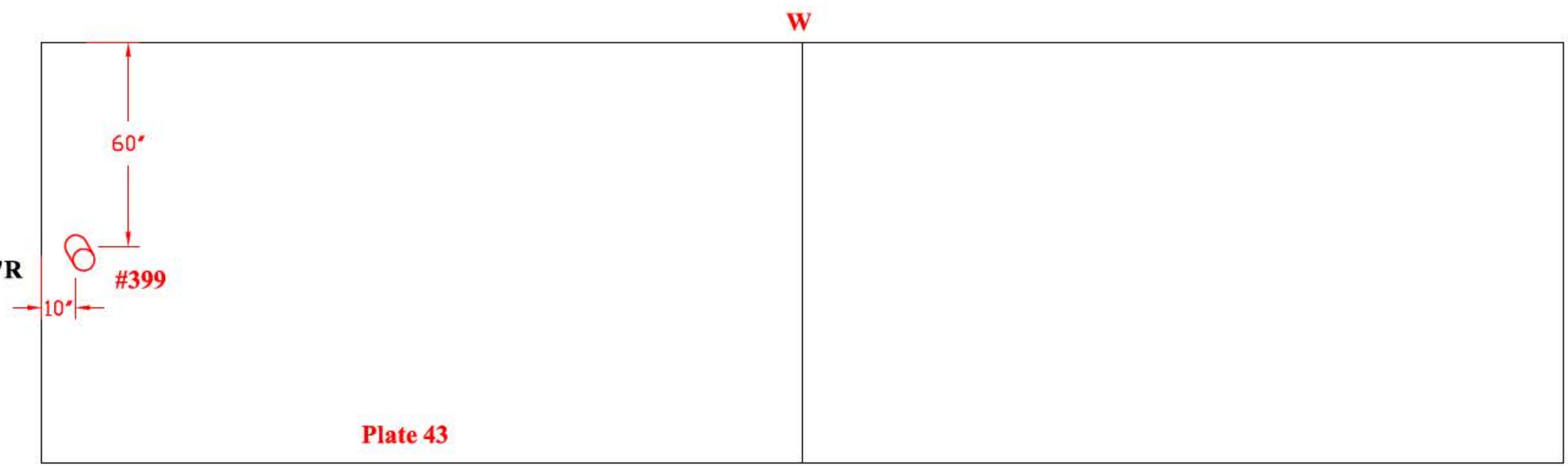


Tank Section:Upper Dome
Quadrant: D

Course: C
Plate #: 43

Flaw # - Type - Remaining:

#399 - Grout Nozzle - 0.220"R



Drawing is not to scale

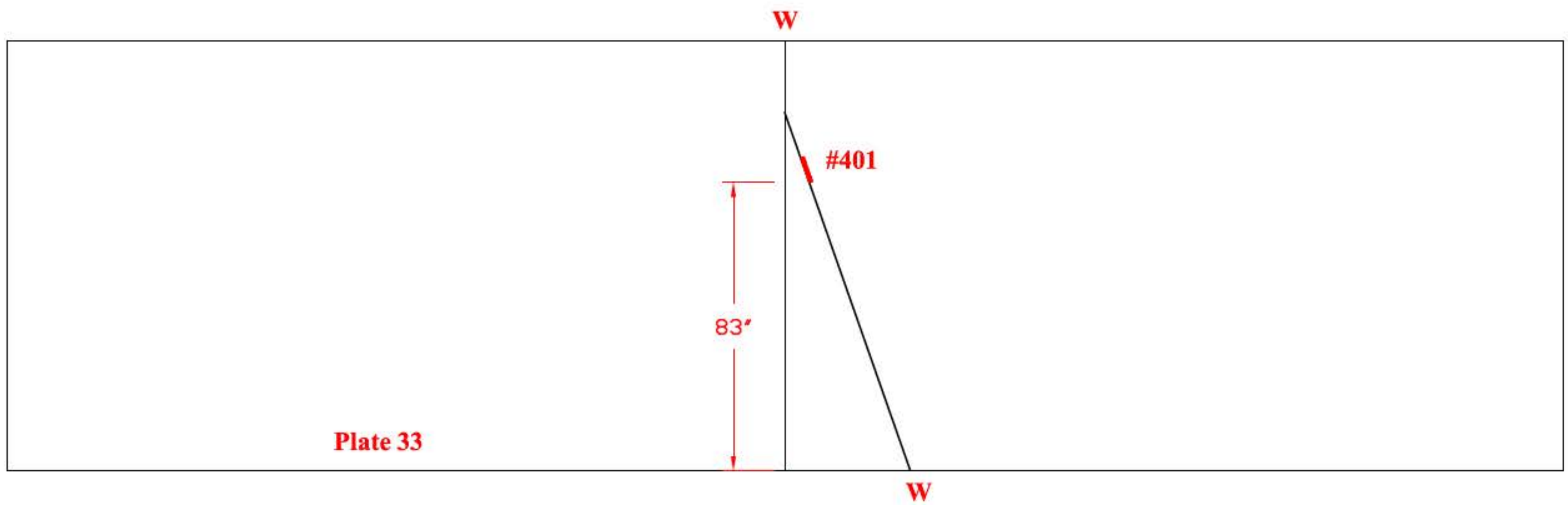
TANK # 20 - QUADRANT C AND D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: C
Plate #: 33

Flaw # - Type - Remaining:

#401 - LOF - 0.200"D 4.5"L

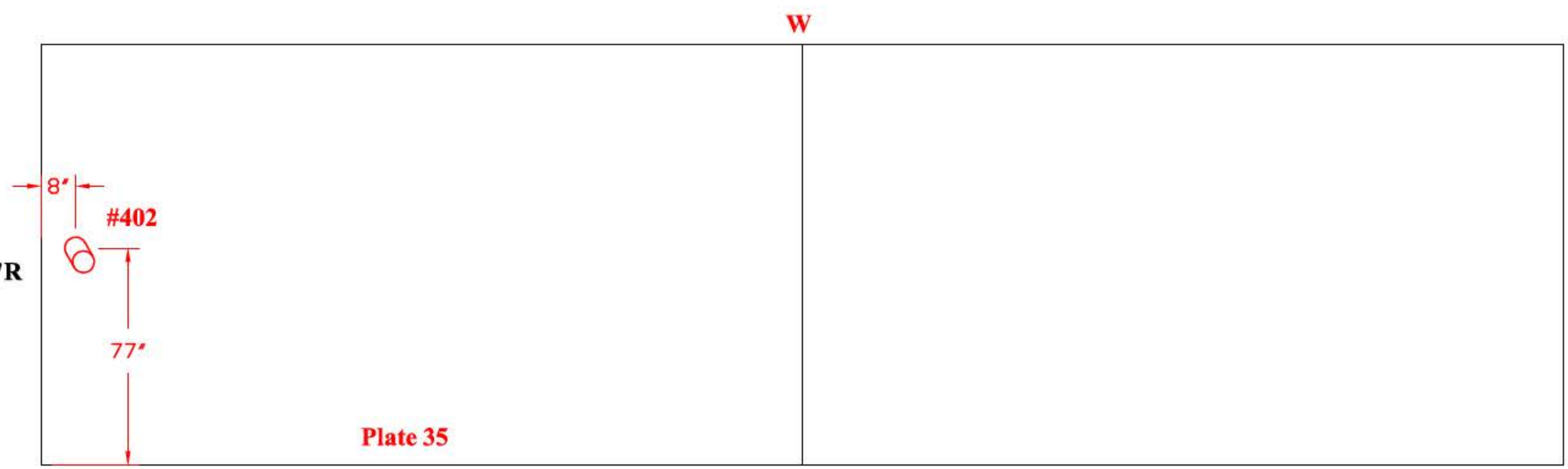


Tank Section:Upper Dome
Quadrant: D

Course: C
Plate #: 35

Flaw # - Type - Remaining:

#402 - Grout Nozzle - 0.229"R



Drawing is not to scale

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TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

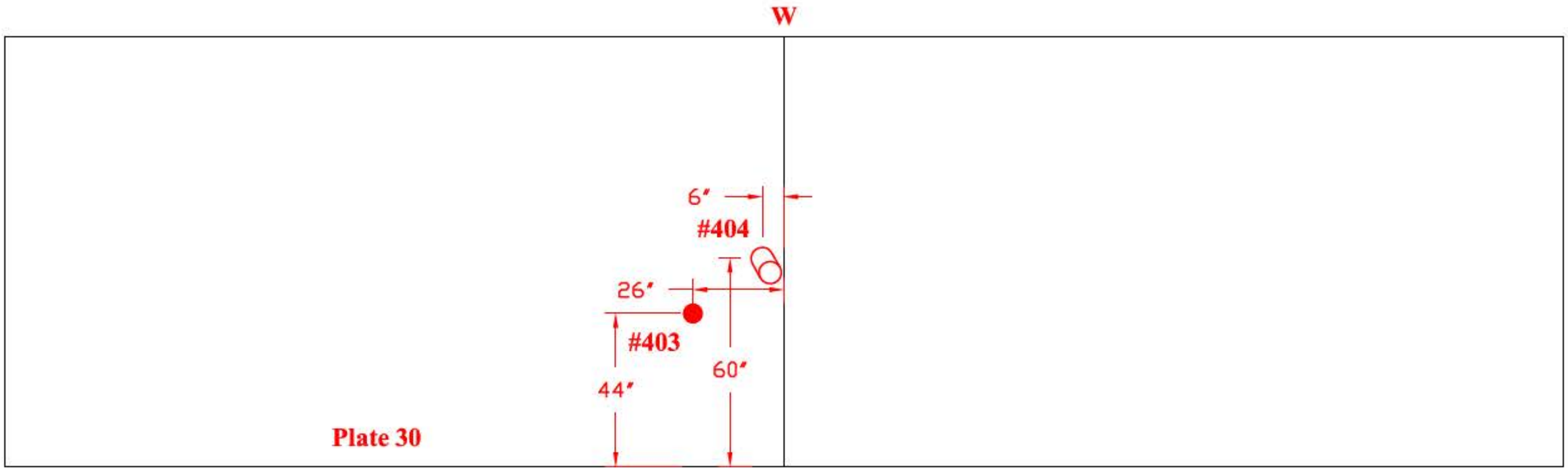
Tank Section: Upper Dome
Quadrant: C

Course: C
Plate #: 30

Flaw # - Type - Remaining:

#403 - Dent - 0.180" deep

#404 - Grout Nozzle - 0.218"R

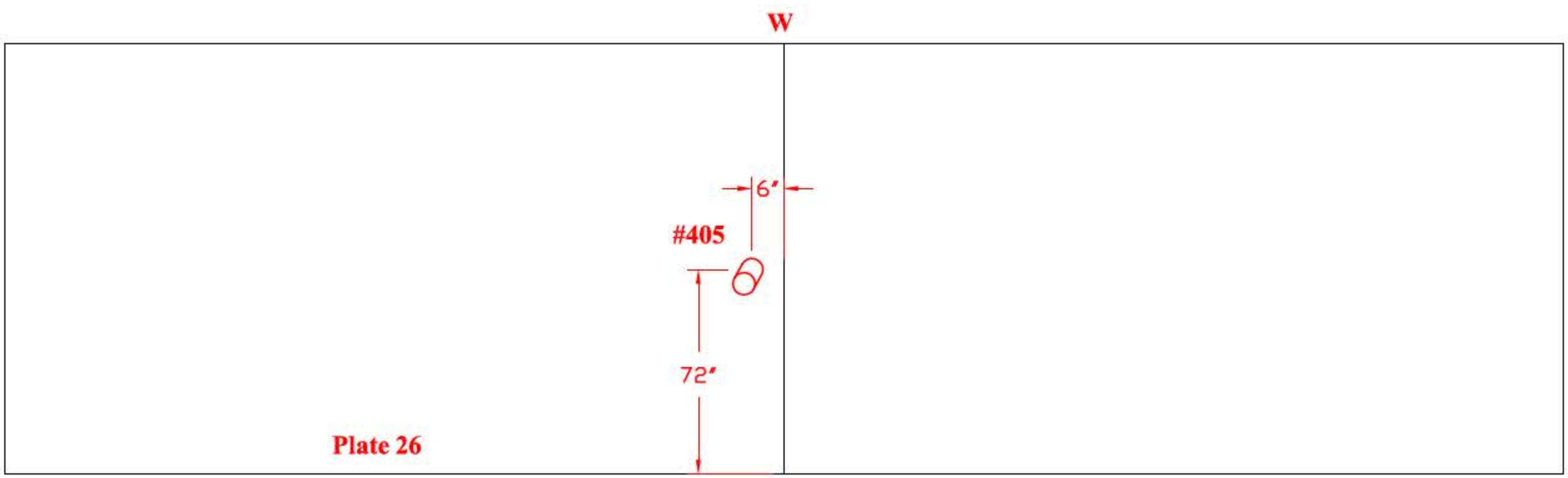


Tank Section:Upper Dome
Quadrant: C

Course: C
Plate #: 26

Flaw # - Type - Remaining:

#405 - Grout Nozzle - 0.218"R



Drawing is not to scale

TANK # 20 - QUADRANT C

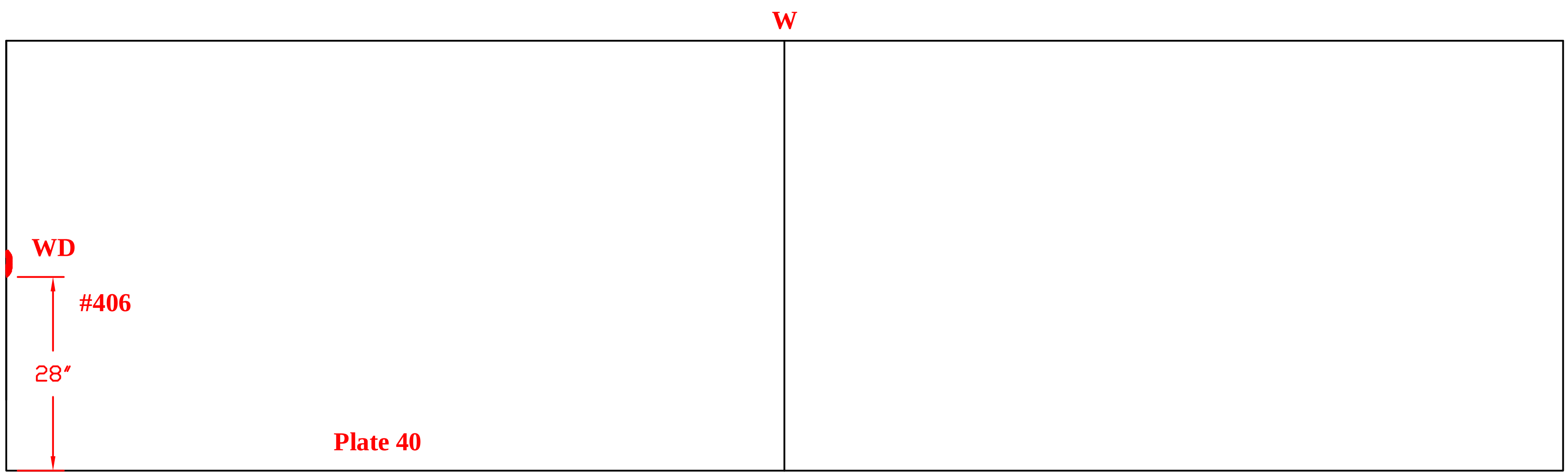
***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: C

Course: C
Plate #: 40

Flaw # - Type - Remaining:

#406 - LOF - 0.060"D 1"L
Pit - 0.063" DIA

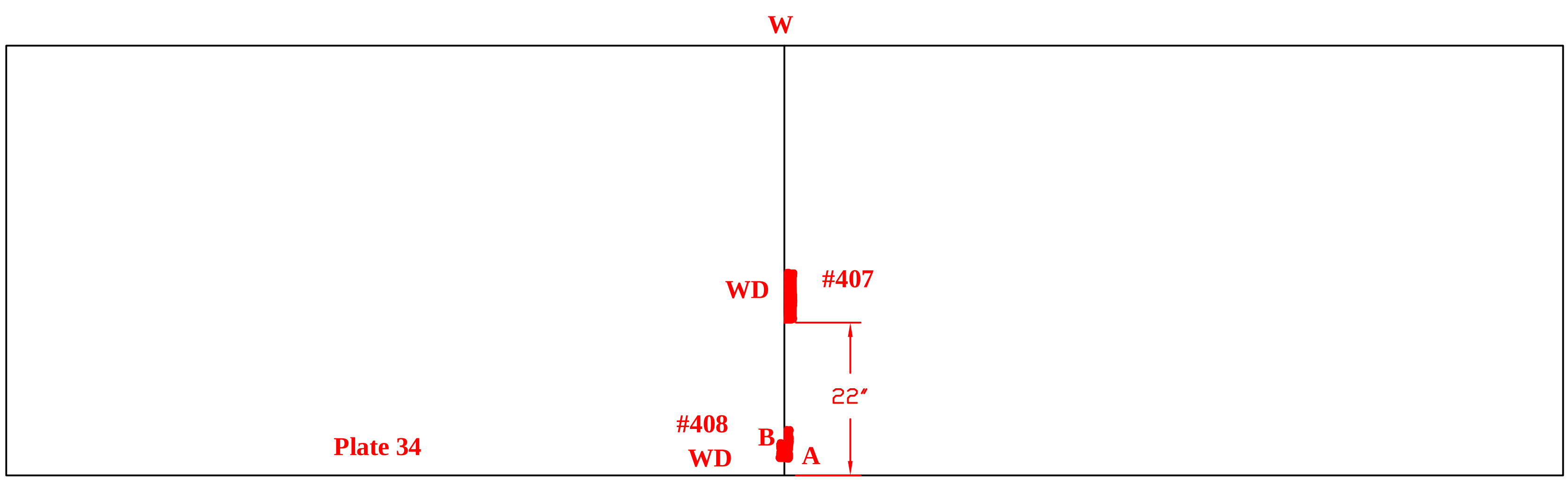


Tank Section:Upper Dome
Quadrant: C

Course: C
Plate #: 34

Flaw # - Type - Remaining:

#407 - LOF - 0.100"D 5"L
#408: A) LOF - 0.131"D 2"L
B) LOF - 0.111"D 1.5"L



Drawing is not to scale

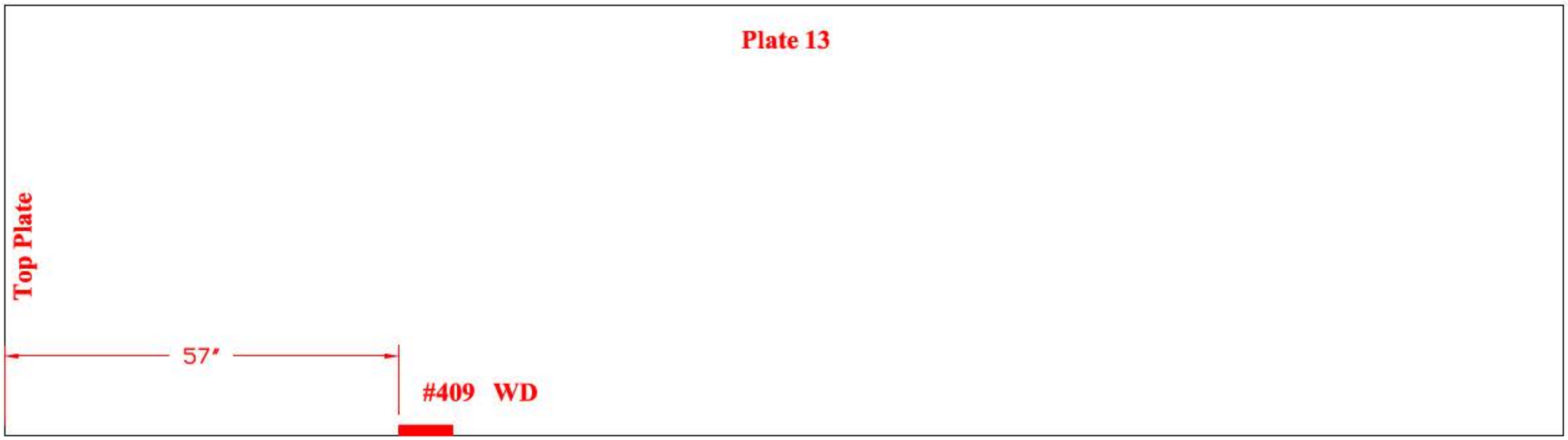
TANK # 20 - QUADRANT A AND B
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A

Course: C
Plate #: 13

Flaw # - Type - Remaining:

#409 - LOF - 0.089"D 4"L

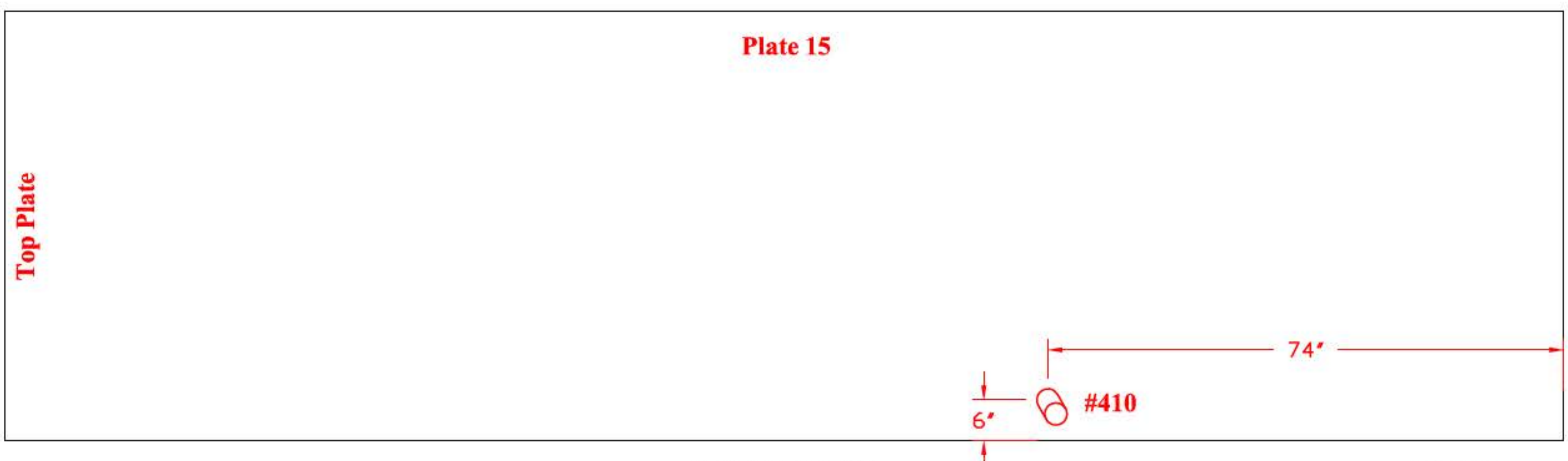


Tank Section:Upper Dome
Quadrant: B

Course: C
Plate #: 15

Flaw # - Type - Remaining:

#410 - Grout Nozzle - 0.190"R



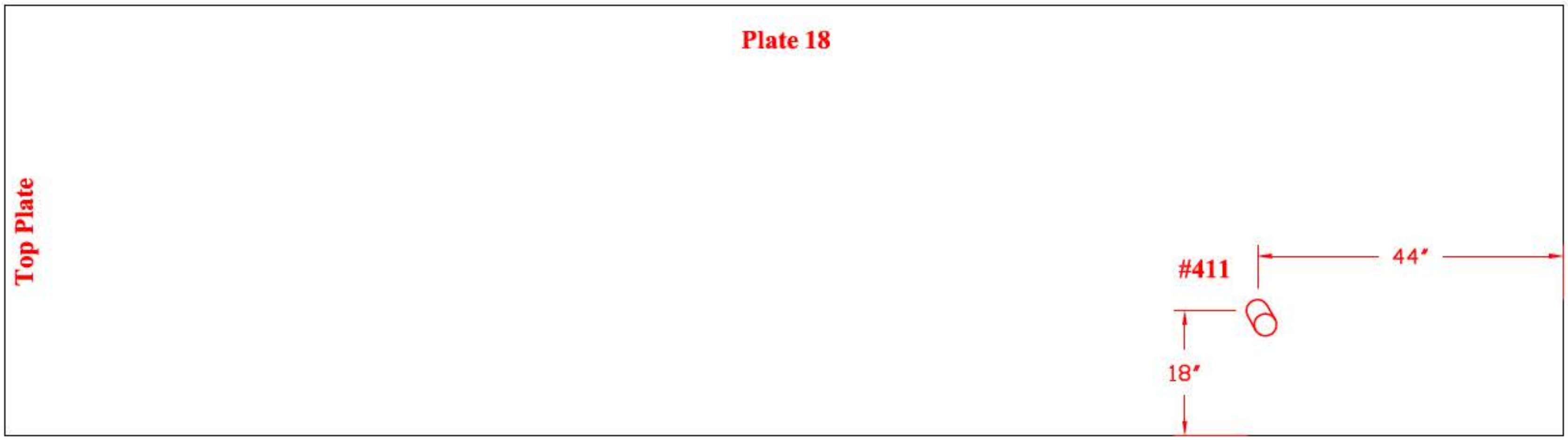
Drawing is not to scale

TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A
Course: B
Plate #: 18

Flaw # - Type - Remaining:

#411 - Grout Nozzle - 0.210"R

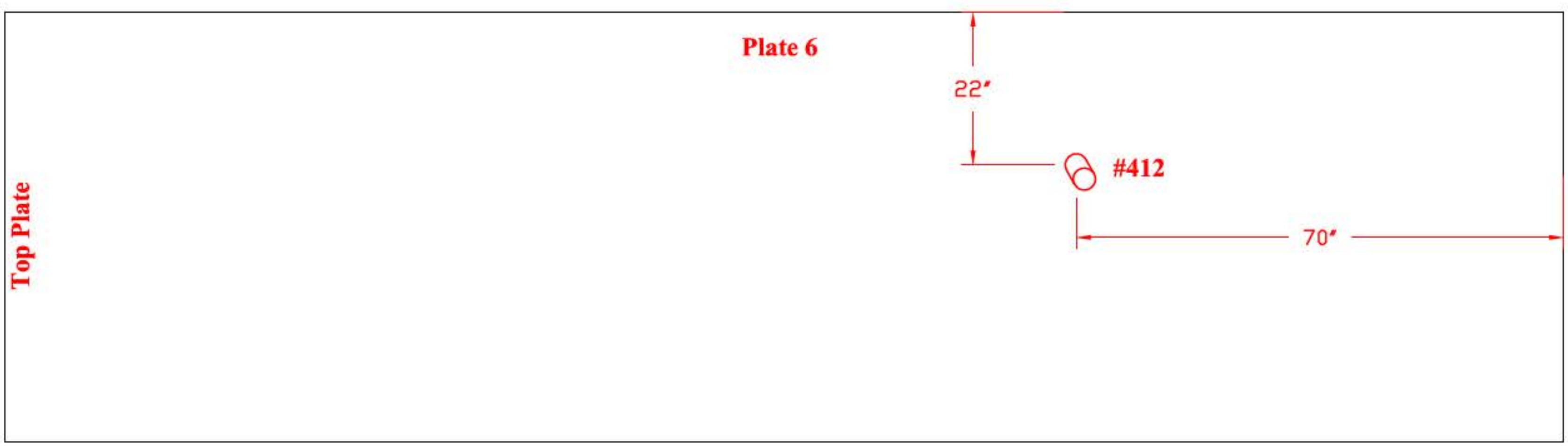


Tank Section:Upper Dome
Quadrant: A

Course: C
Plate #: 6

Flaw # - Type - Remaining:

#412 - Grout Nozzle - 0.225"R



Drawing is not to scale

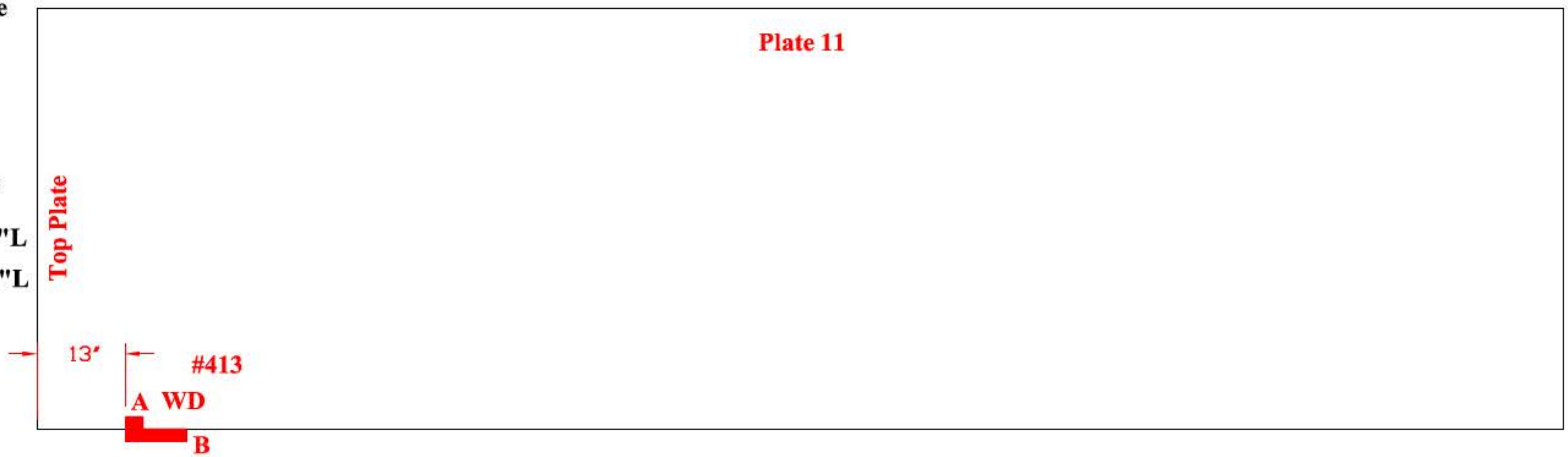
TANK # 20 - QUADRANT A
***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: A

Course: C
Plate #: 11

Flaw # - Type - Remaining:

#413: A) - LOF - 0.229"D 1"L
B) - LOF - 0.149"D 5"L

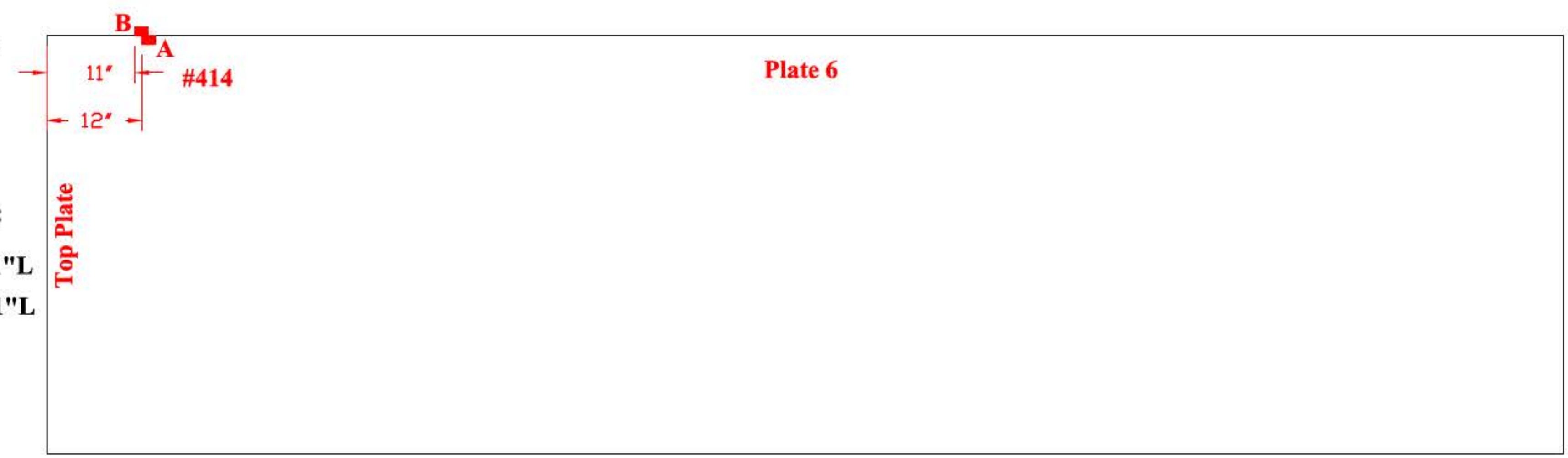


Tank Section: Upper Dome
Quadrant: A

Course: C
Plate #: 6

Flaw # - Type - Remaining:

#414: A) - LOF - 0.212"D 1"L
B) - LOF - 0.229"D 1"L



Drawing is not to scale

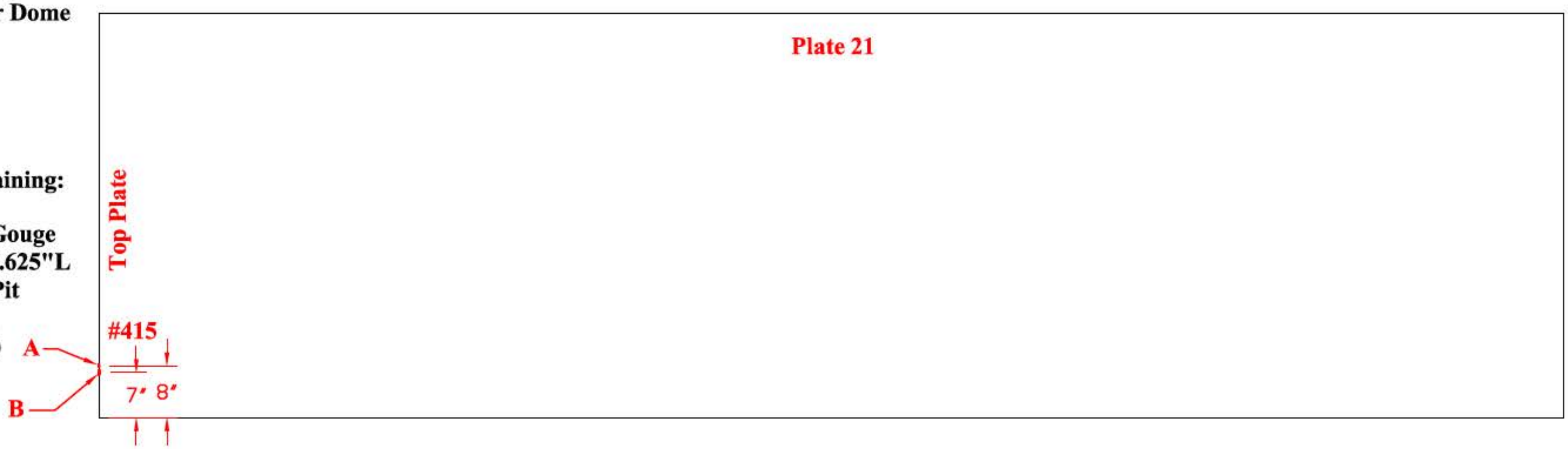
TANK # 20 - QUADRANT B AND C
***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: B

Course: C
Plate #: 21

Flaw # - Type - Remaining:

#415: A) - BS - BM - Gouge
- 0.132"D 0.625"L
B) - BS - BM - Pit
- 0.125"DIA
0.107" deep

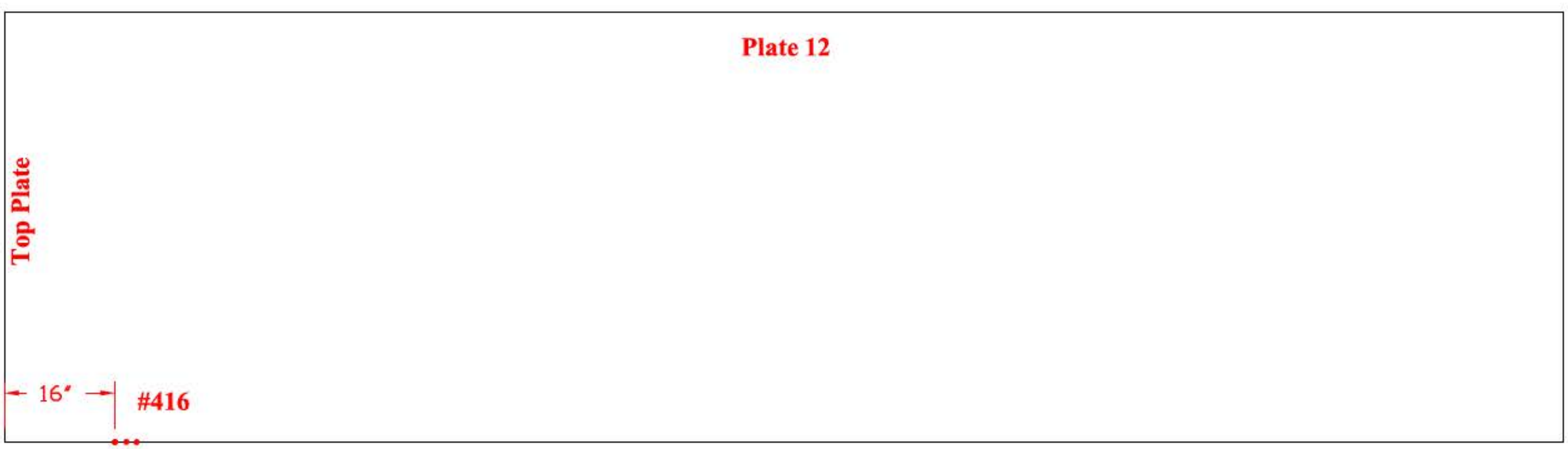


Tank Section:Upper Dome
Quadrant: C

Course: C
Plate #: 12

Flaw # - Type - Remaining:

#416 -WP- 0.125"DIA 0.089"D



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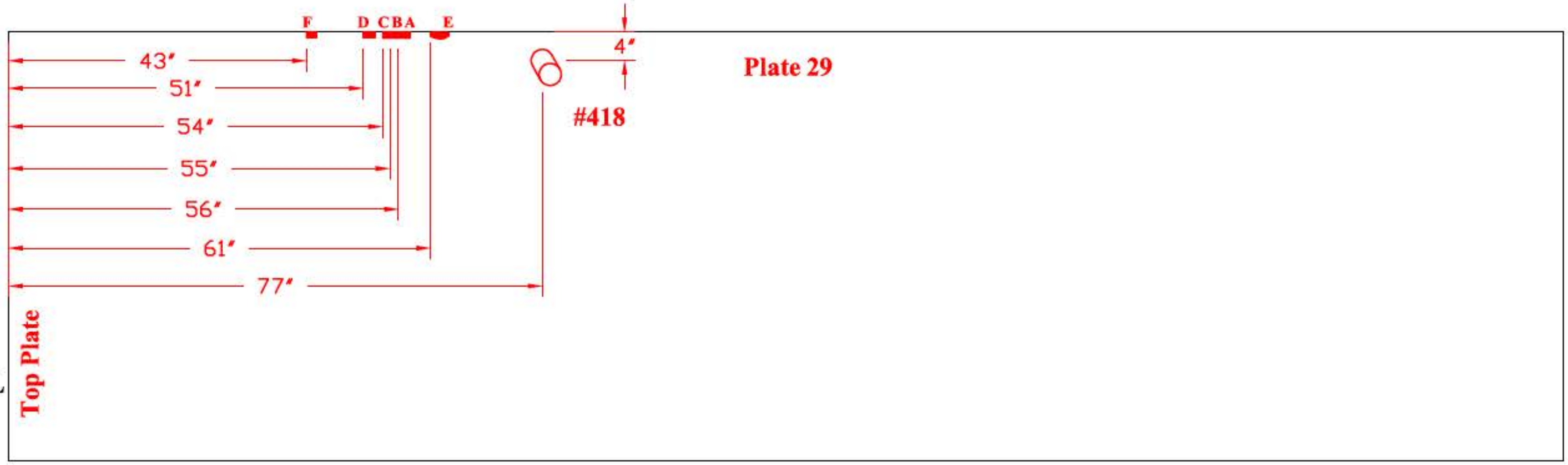
TANK # 20 - QUADRANT A AND C

Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: C
Plate #: 29
Flaw # - Type - Remaining:
#417:
A)BM-LOF-TW-0.091"D 2"L
B)BM-Gouge-0.115"D 1"L
C)BM-LOF-TW-0.047"D 1"L
D)BM-LOF-TW-0.106"D 2"L
E)BM-LOF-TW-0.054"D 3"L
B)BM - Gouge - 0.160"D 1.5"L 0.500W
#418 - Grout Nozzle - 0.236"R

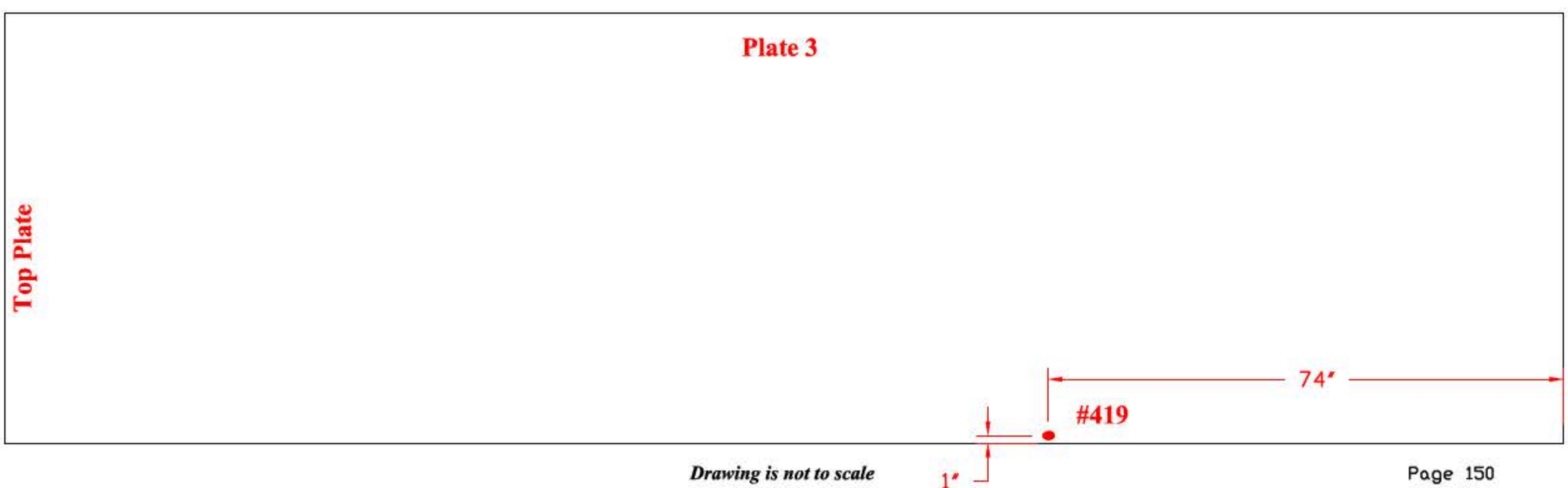


Tank Section:Upper Dome
Quadrant: A

Course: B
Plate #: 3

Flaw # - Type - Remaining:

#419 - Dent - 0.200" deep



Drawing is not to scale

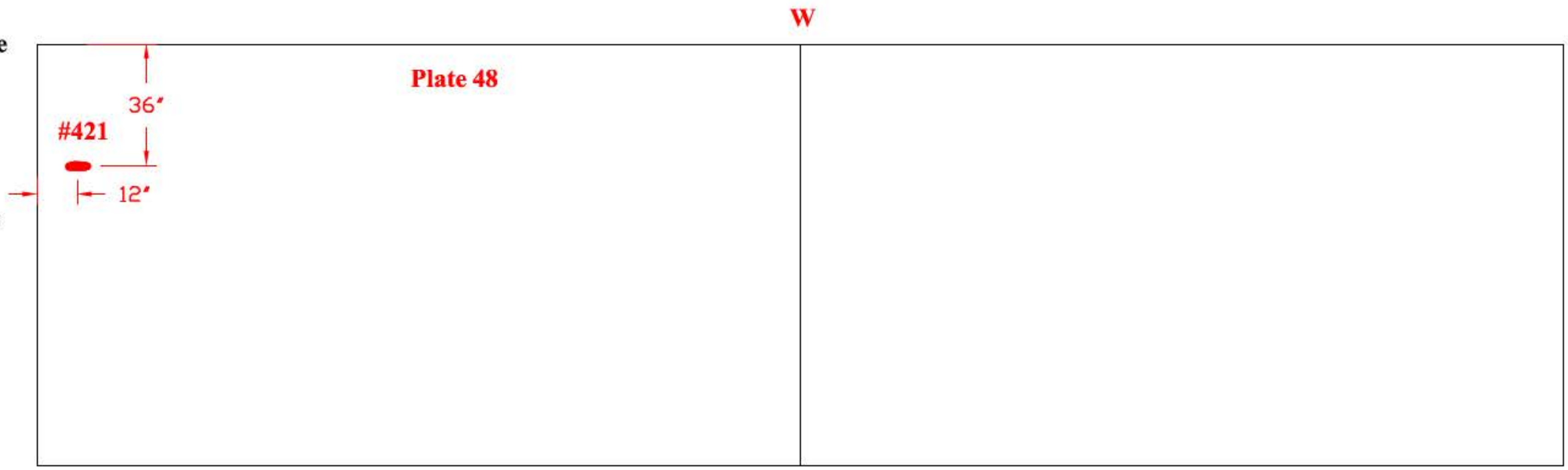
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: D
Plate #: 48

Flaw # - Type - Remaining:

#421 - TW - LOF
- 0.082"D 1.5" dia

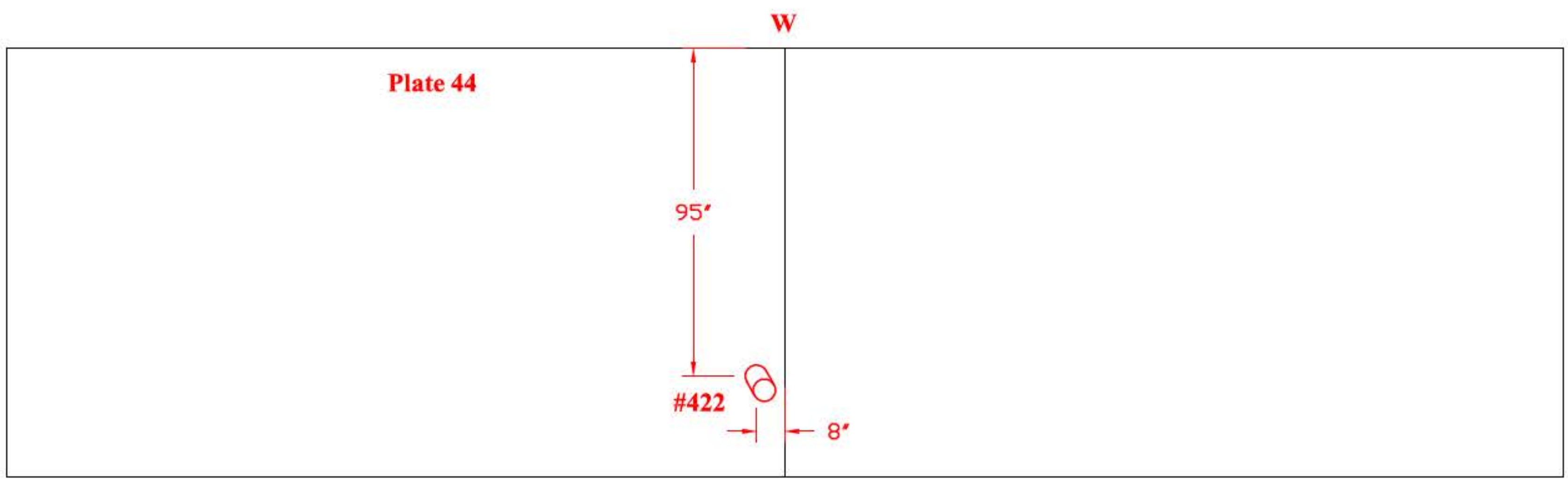


Tank Section:Upper Dome
Quadrant: D

Course: D
Plate #: 44

Flaw # - Type - Remaining:

#422 - Grout Nozzle - 0.200"R



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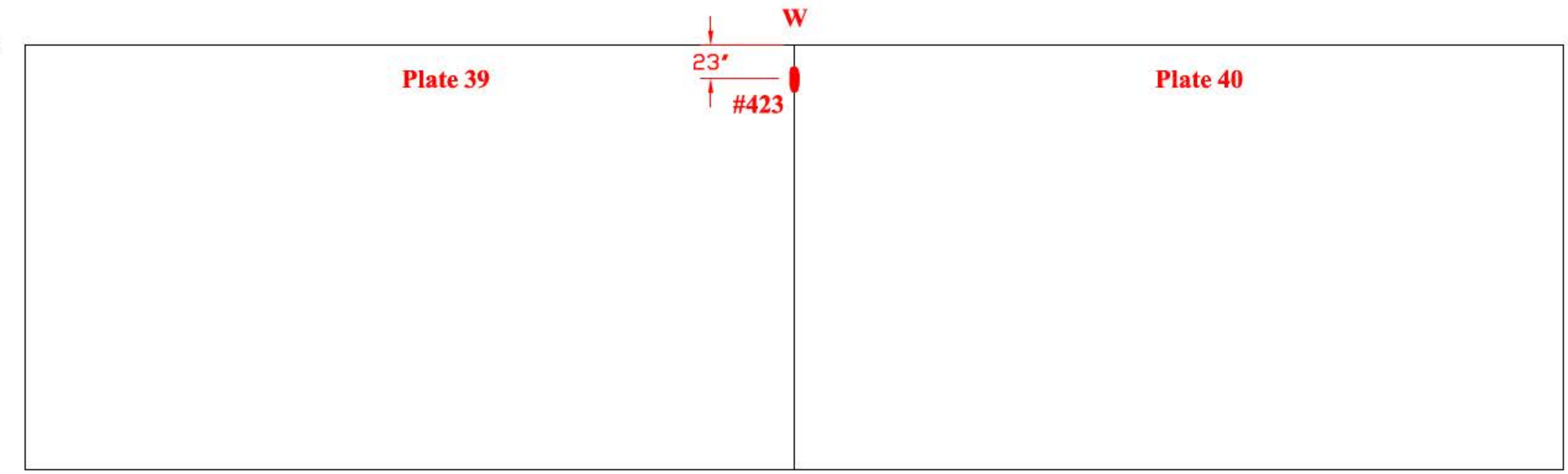
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: D
Plate #: 39

Flaw # - Type - Remaining:

#423 - LOF - 0.106"D 9"L
- LOF - 0.218"D 11"L

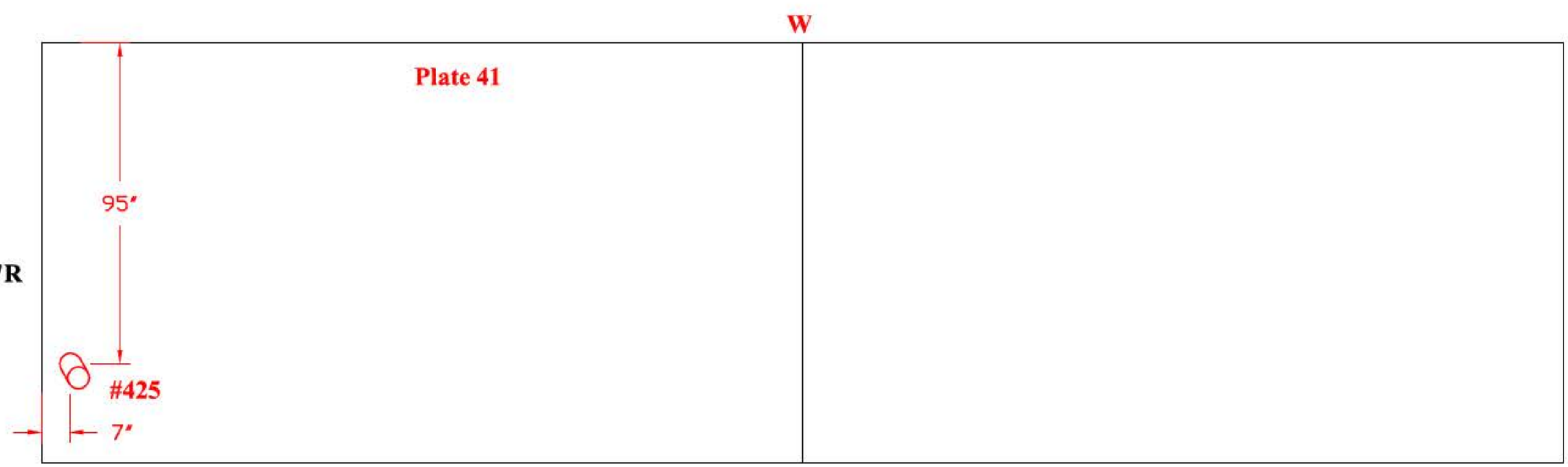


Tank Section:Upper Dome
Quadrant: D

Course: D
Plate #: 41

Flaw # - Type - Remaining:

#425 - Grout Nozzle - 0.206"R



Drawing is not to scale

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

TesTex
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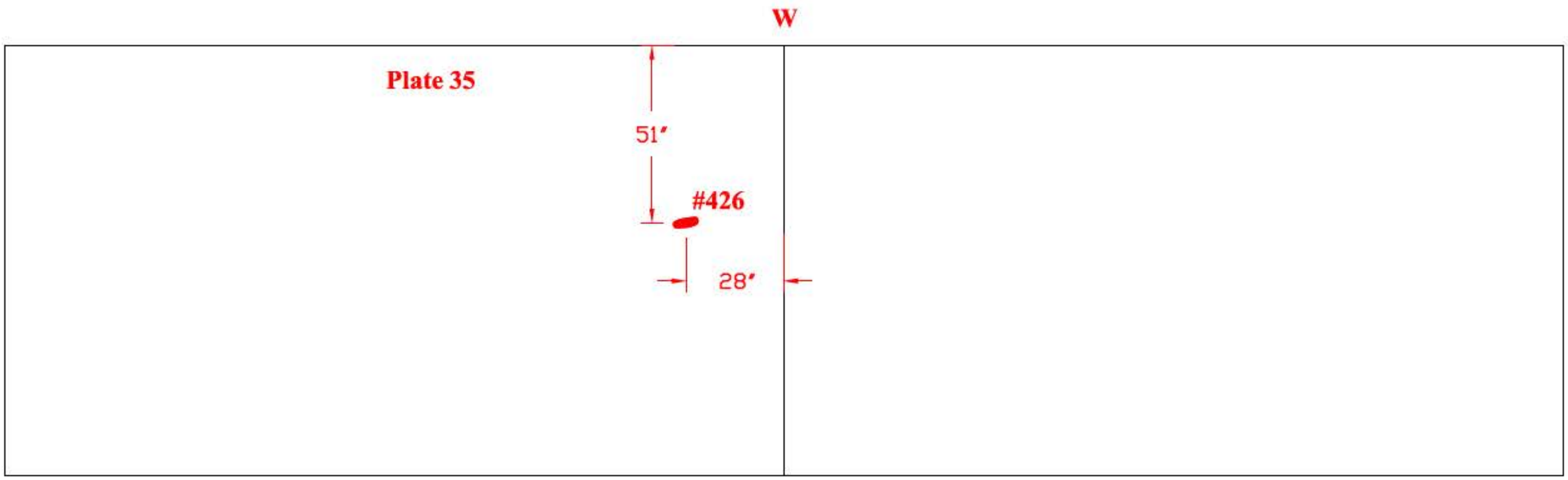
TANK # 20 - QUADRANT C
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: D
Plate #: 35

Flaw # - Type - Remaining:

#426 - Gouge - 0.244"D 2"L

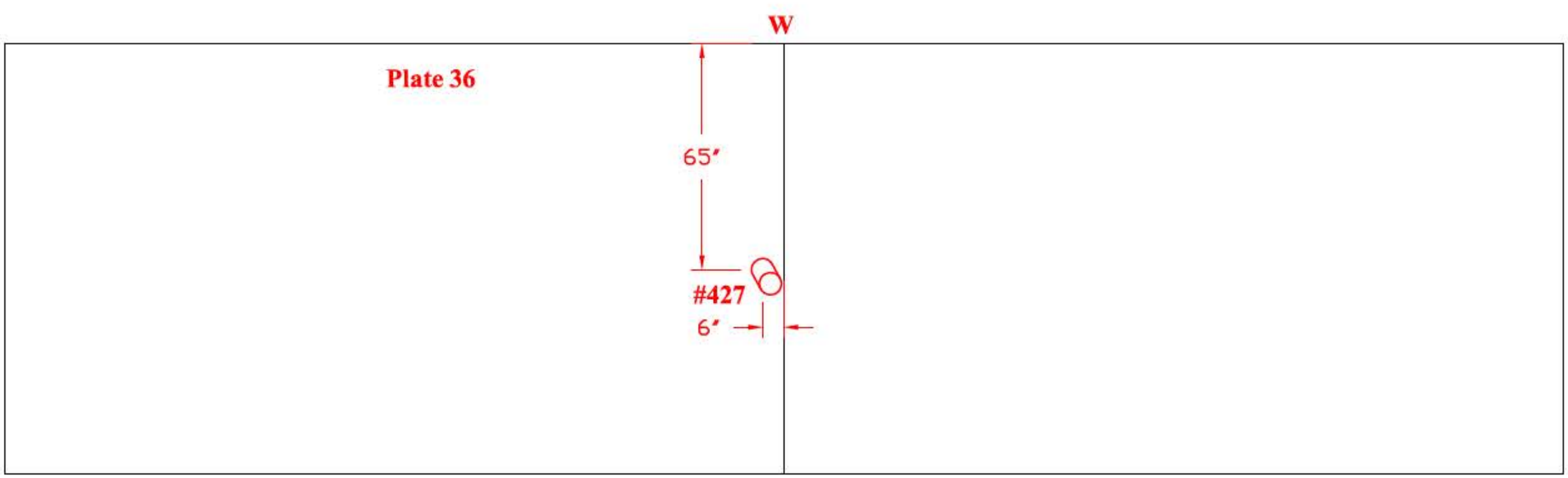


Tank Section:Upper Dome
Quadrant: C

Course: D
Plate #: 36

Flaw # - Type - Remaining:

#427 - Grout Nozzle - 0.200"R



Drawing is not to scale

TANK # 20 - QUADRANT C

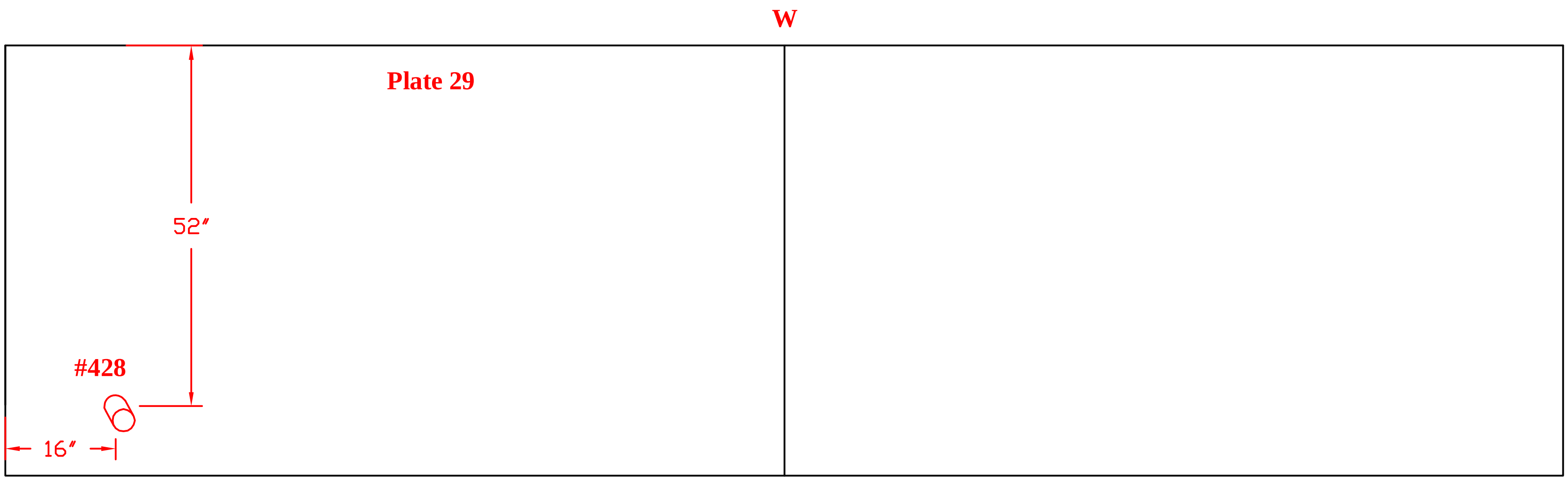
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: D
Plate #: 29

Flaw # - Type - Remaining:

#428 - Grout Nozzle - 0.204"R

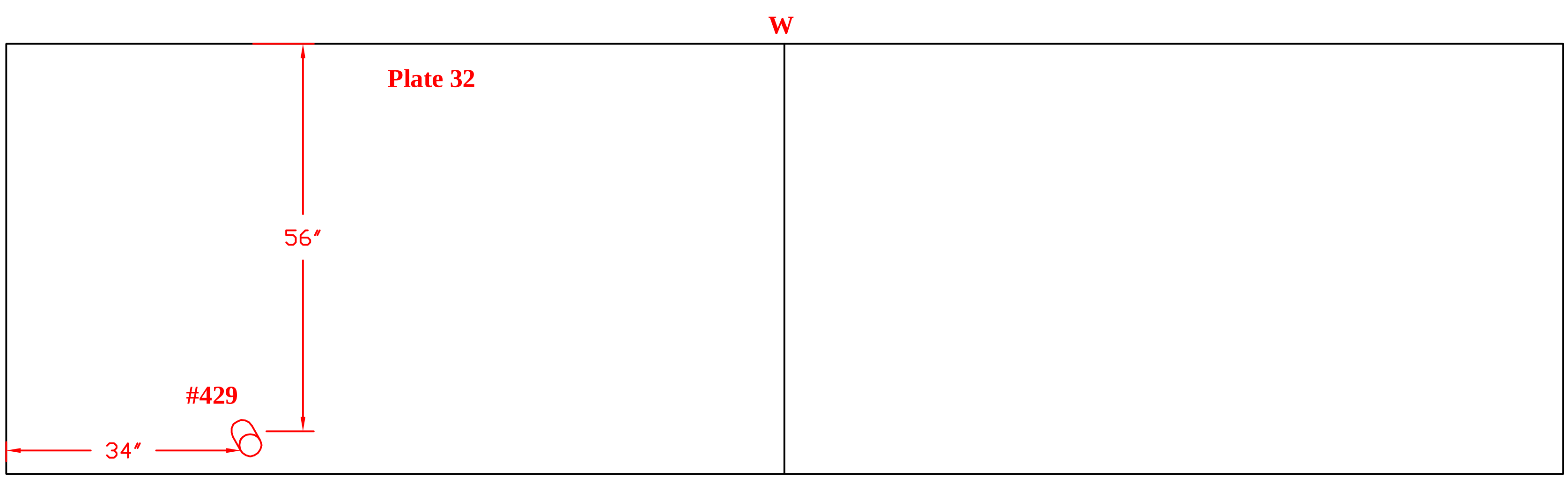


Tank Section:Upper Dome
Quadrant: C

Course: D
Plate #: 32

Flaw # - Type - Remaining:

#429 - Grout Nozzle - 0.205"R



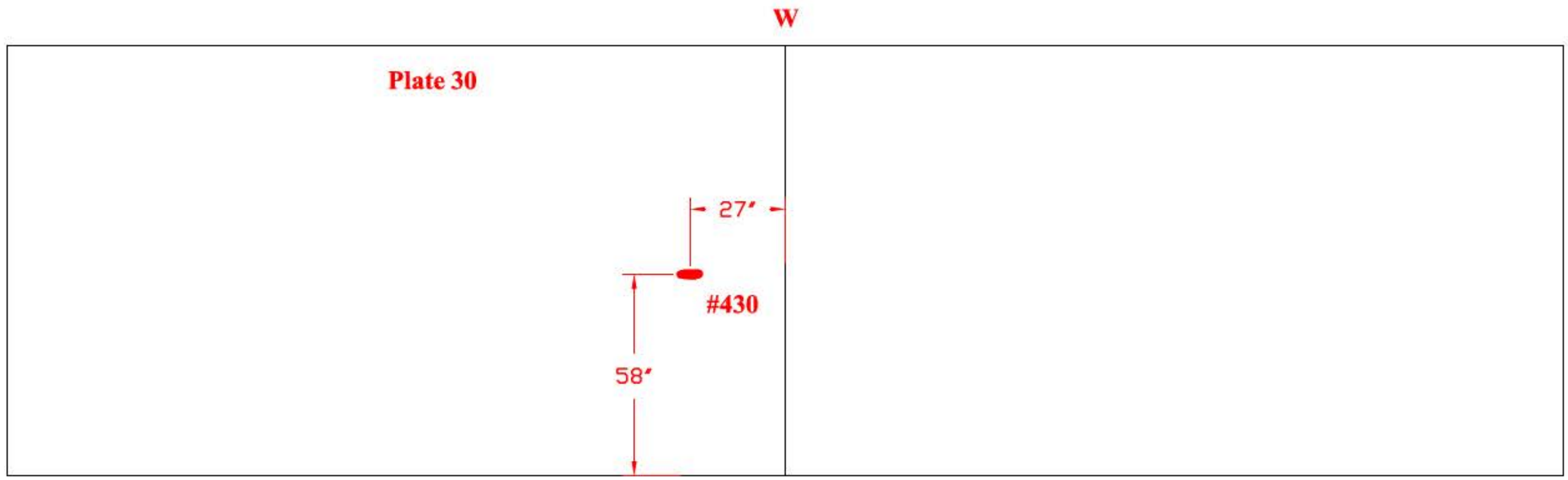
TANK # 20 - QUADRANT C AND D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: C

Course: D
Plate #: 30

Flaw # - Type - Remaining:

#430 - Dent - 0.200" deep

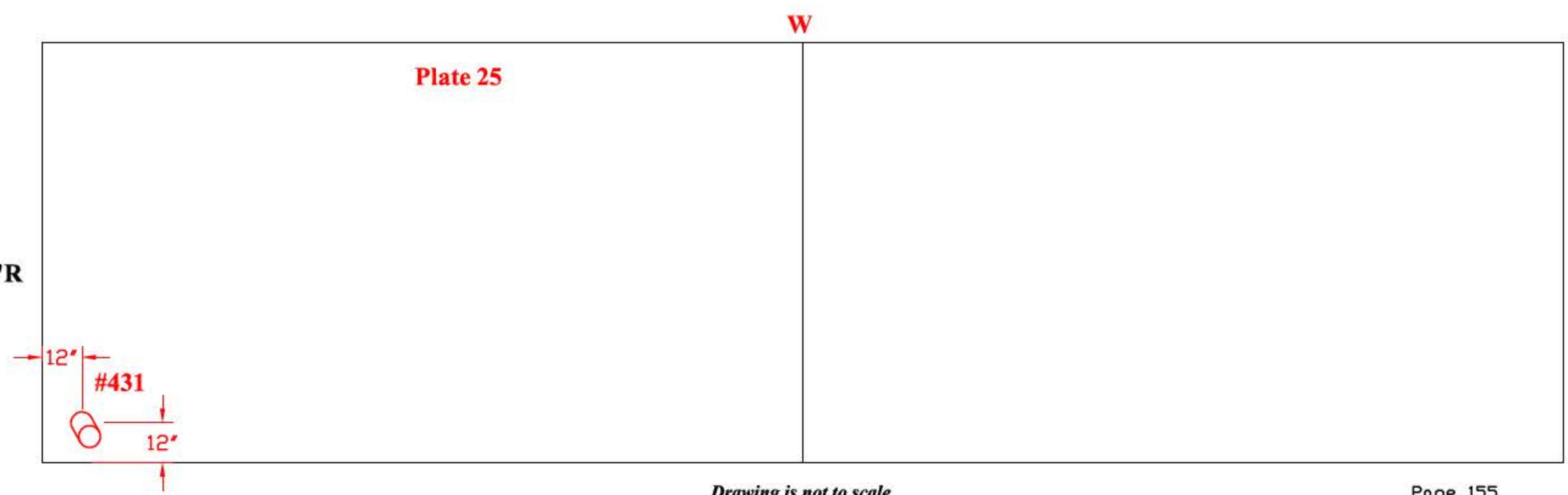


Tank Section:Upper Dome
Quadrant: D

Course: D
Plate #: 25

Flaw # - Type - Remaining:

#431 - Grout Nozzle - 0.223"R



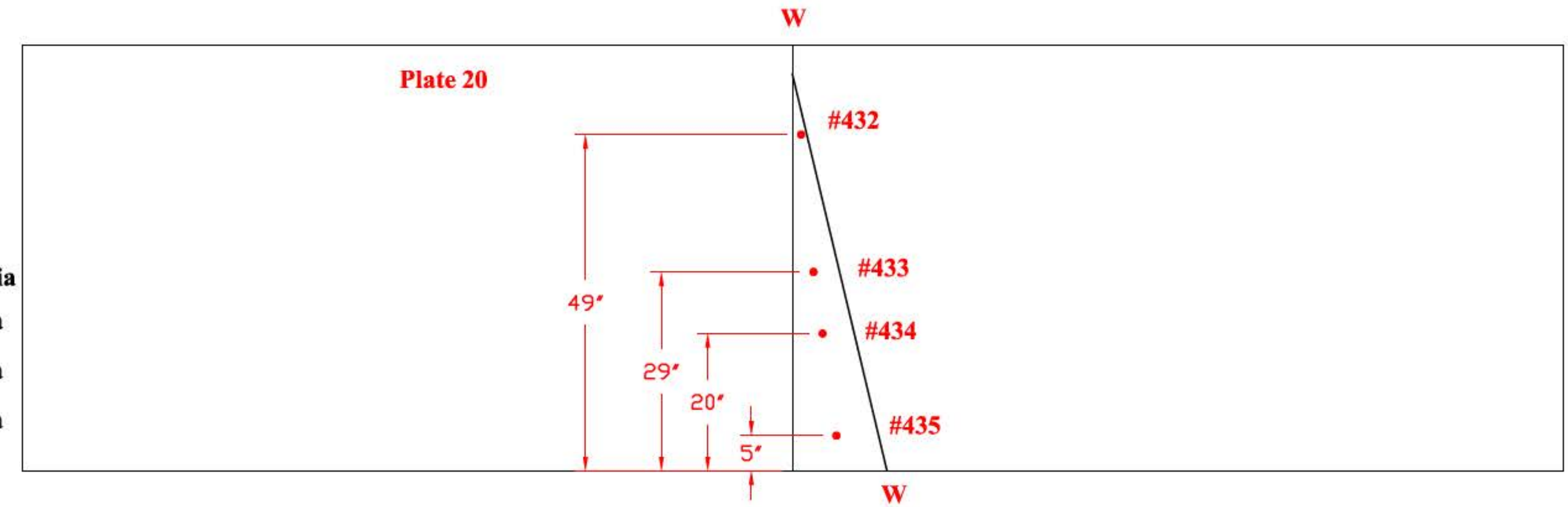
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: E
Plate #: 20

Flaw # - Type - Remaining:

#432 -TW - 0.090"deep 1.5"dia
#433 -TW - 0.077"deep 1"dia
#434 -TW - 0.090"deep 1"dia
#435 -TW - 0.075"deep 1"dia

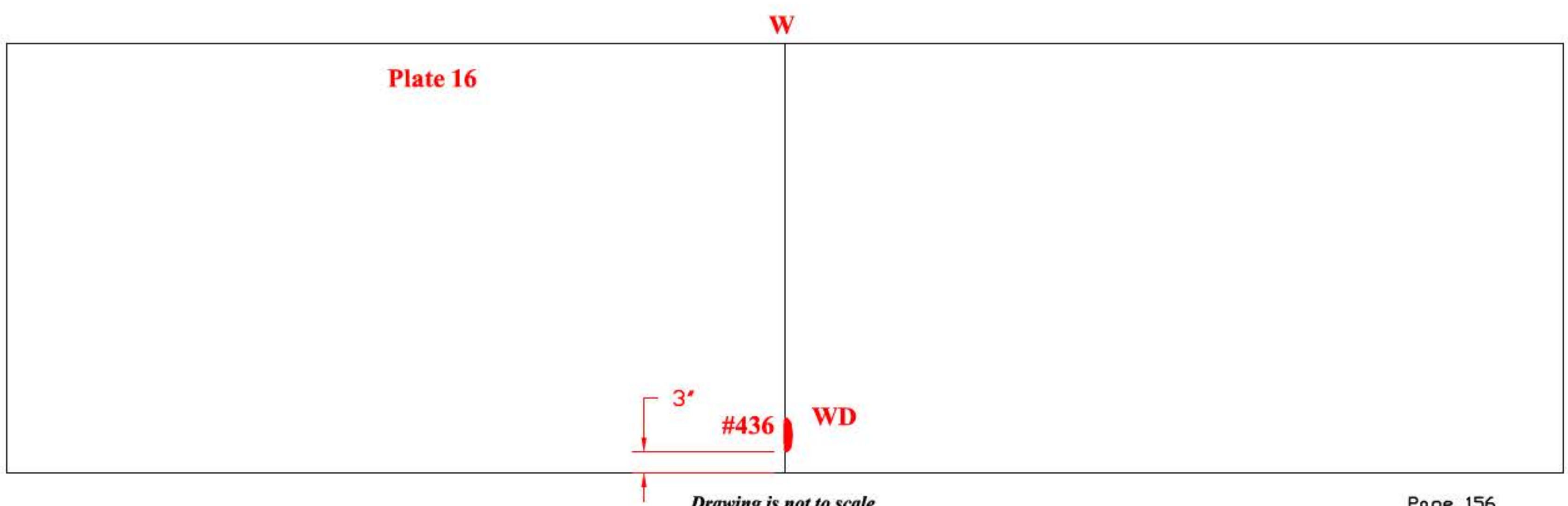


Tank Section:Upper Dome
Quadrant: C

Course: E
Plate #: 16

Flaw # - Type - Remaining:

#436 - LOF - 0.100"D 8"L



Drawing is not to scale

TANK # 20 - QUADRANT B

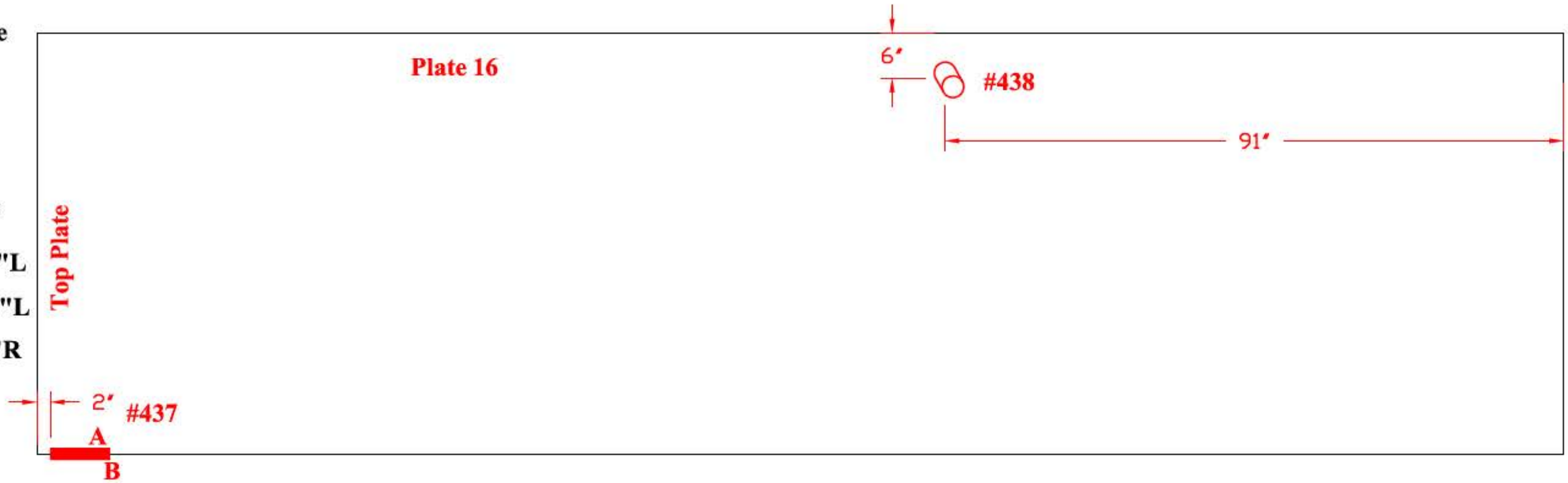
***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: B

Course: D
Plate #: 16

Flaw # - Type - Remaining:

#437: A) -LOF - 0.120"D 6"L
B) -LOF - 0.067"D 6"L
#438 - Grout Nozzle - 0.220"R



Tank Section:Upper Dome
Quadrant: B

Course: D
Plate #: 17

Flaw # - Type - Remaining:

#439 - LOF - 0.096"D 5"L

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TANK # 20 - QUADRANT A AND B
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A

Course: C
Plate #: 6

Flaw # - Type - Remaining:

#440 - Grout Nozzle - 0.230"R

Tank Section:Upper Dome
Quadrant: B

Course: D
Plate #: 24

Flaw # - Type - Remaining:

#441 - LOF - 0.110"D 6"L

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

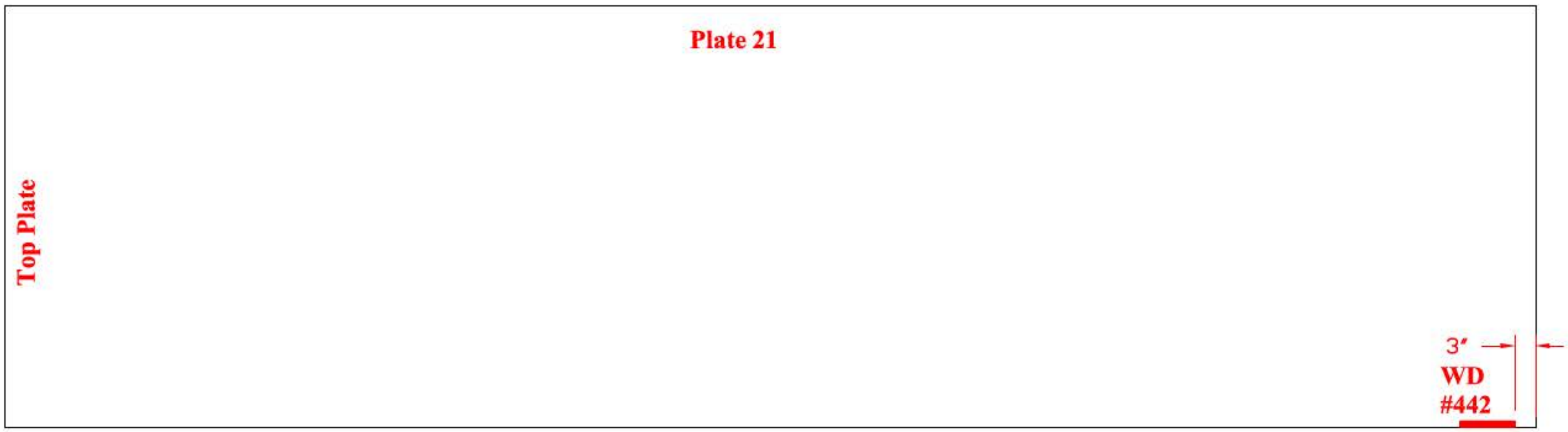
TANK # 20 - QUADRANT A AND B
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: B

Course: D
Plate #: 21

Flaw # - Type - Remaining:

#442 - LOF - 0.185"D 5"L

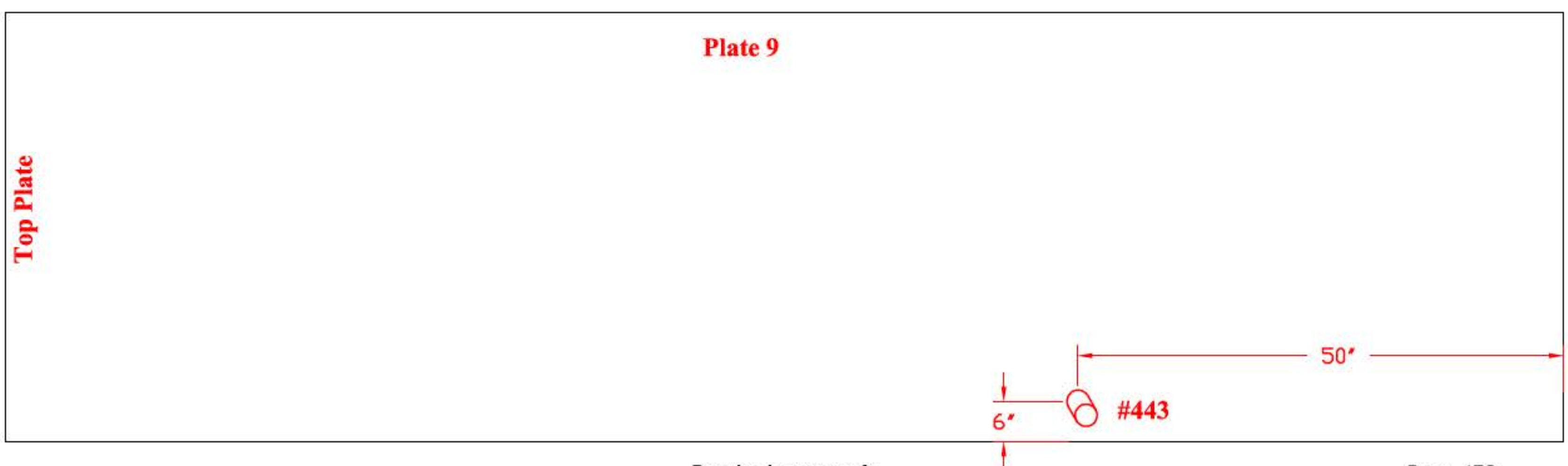


Tank Section:Upper Dome
Quadrant: A

Course: D
Plate #: 9

Flaw # - Type - Remaining:

#443 - Grout Nozzle - 0.210"R



Drawing is not to scale

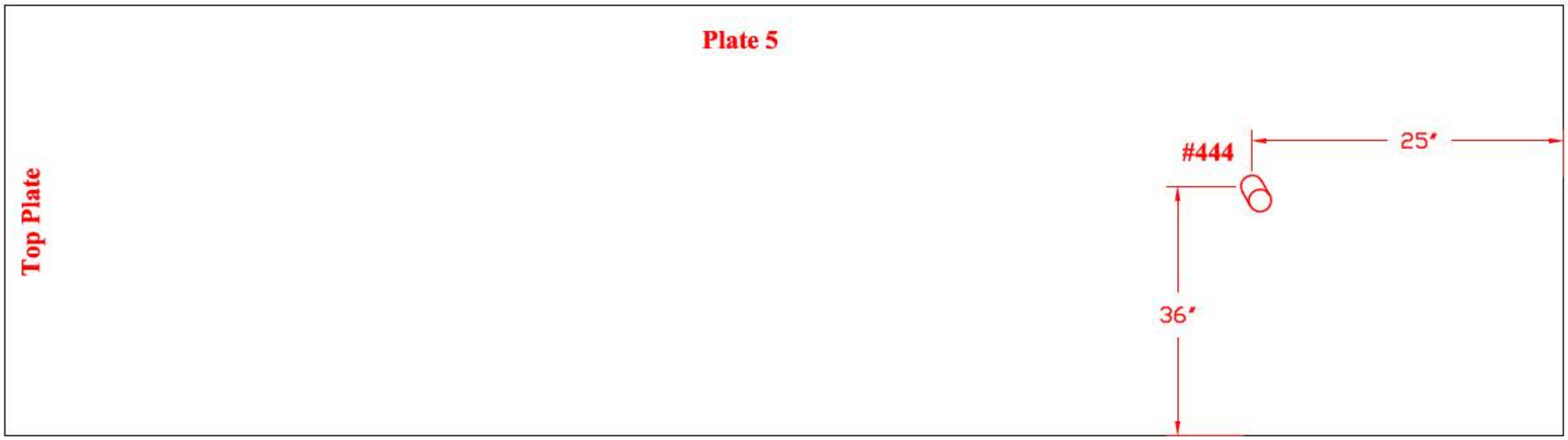
TANK # 20 - QUADRANT A AND B
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A

Course: D
Plate #: 5

Flaw # - Type - Remaining:

#444 - Grout Nozzle - 0.205"R

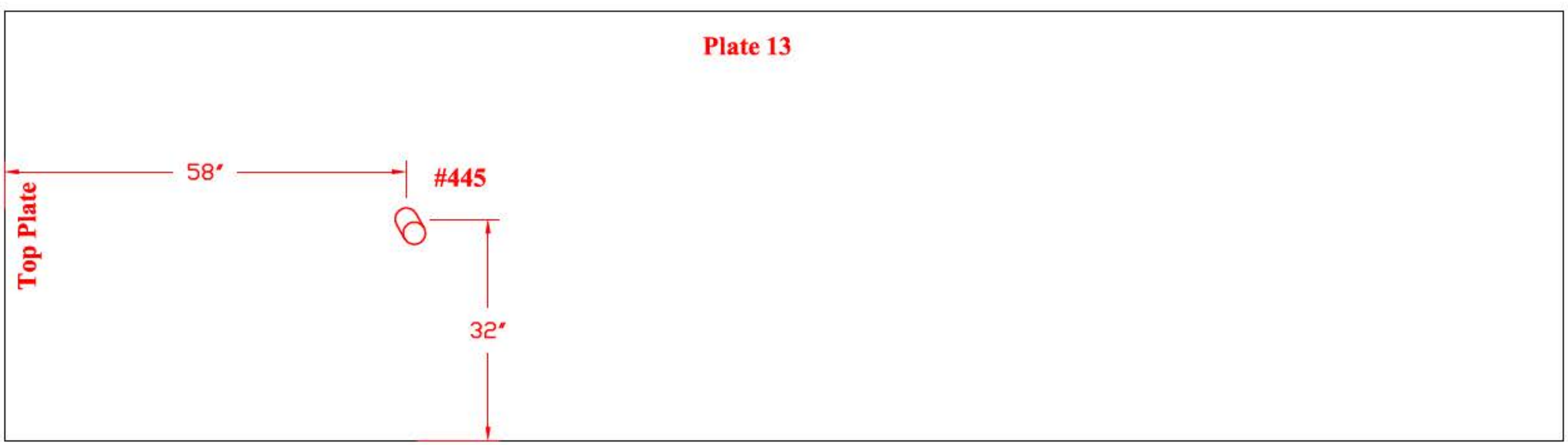


Tank Section:Upper Dome
Quadrant: B

Course: D
Plate #: 13

Flaw # - Type - Remaining:

#445 - Grout Nozzle - 0.210"R



Drawing is not to scale

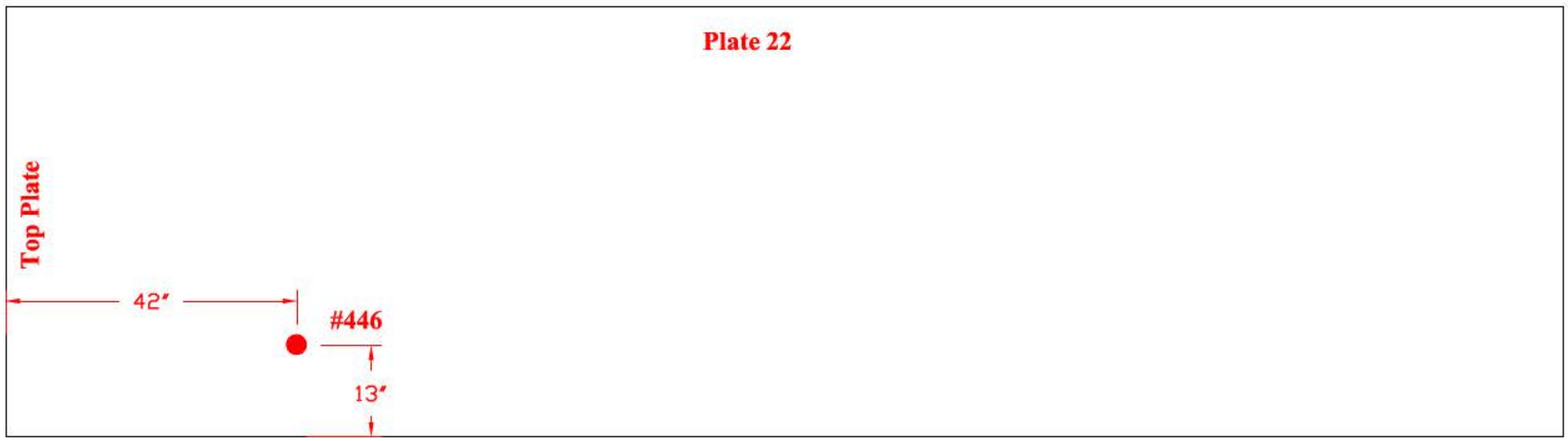
TANK # 20 - QUADRANT B
***Nominal Plate Thickness: 0.250"**

Tank Section: Upper Dome
Quadrant: B

Course: D
Plate #: 22

Flaw # - Type - Remaining:

#446 - Dent - 0.180"deep

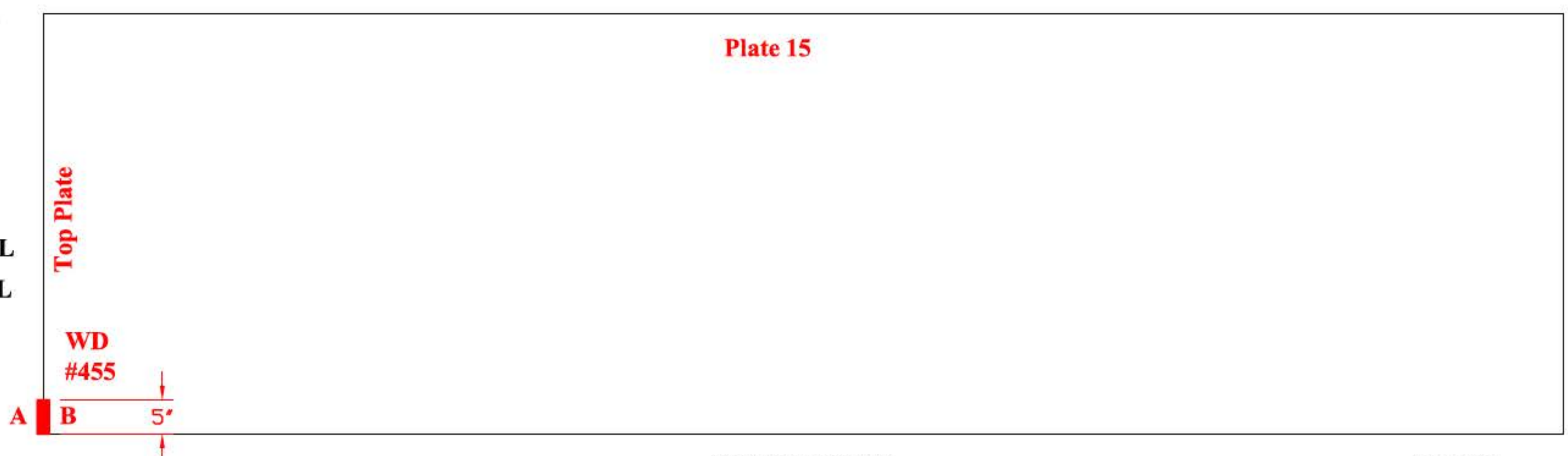


Tank Section: Upper Dome
Quadrant: B

Course: D
Plate #: 15

Flaw # - Type - Remaining:

#455: A) LOF - 0.099"D 5"L
B) LOF - 0.117"D 5"L



Drawing is not to scale

TANK # 20 - QUADRANT B

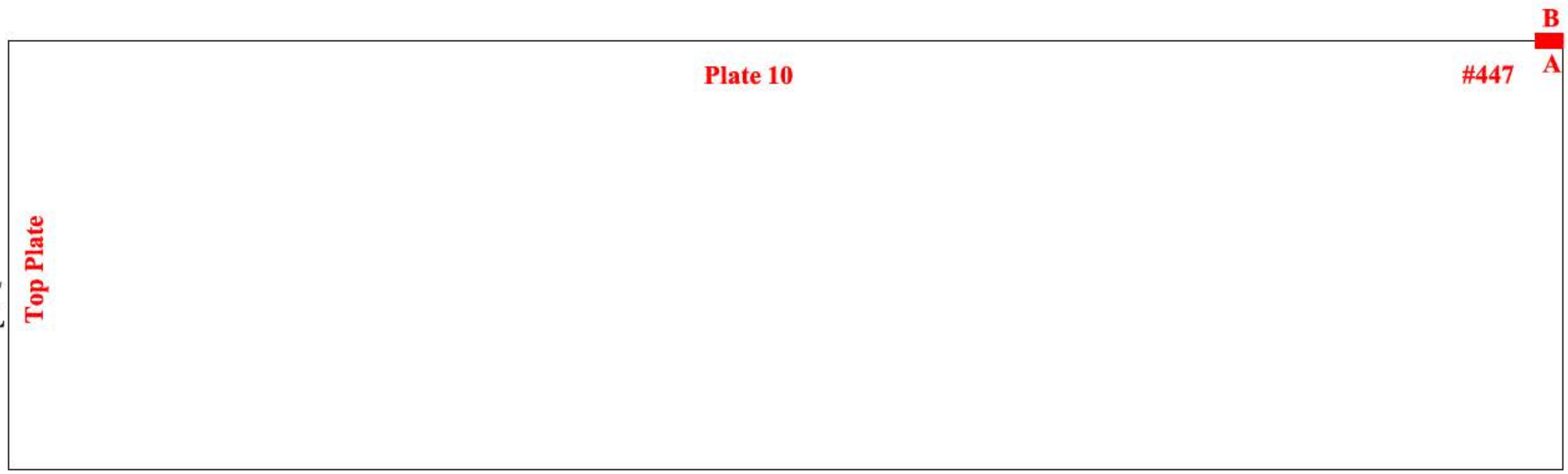
**Nominal Plate Thickness: 0.250"*

Tank Section: Upper Dome
Quadrant: B

Course: E
Plate #: 10

Flaw # - Type - Remaining:

#447: A) LOF - 0.193"D 3.5"L
B) LOF - 0.235"D 3.5"L



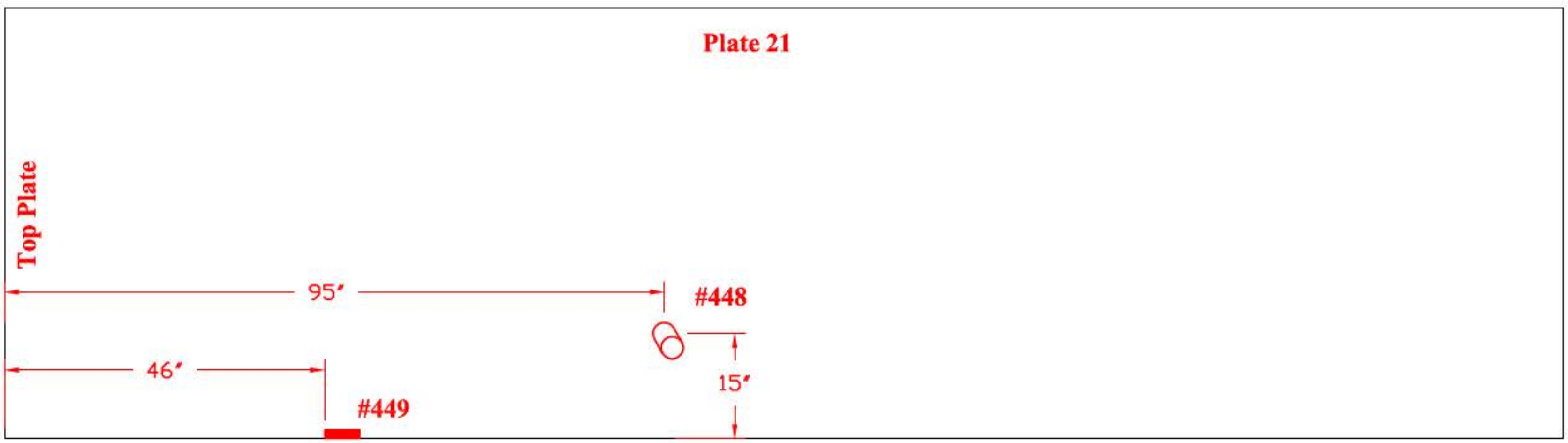
Tank Section:Upper Dome
Quadrant: B

Course: D
Plate #: 21

Flaw # - Type - Remaining:

#448 - Grout Nozzle - 0.215"R

#449 - LOF - 0.214"D 3"L



Drawing is not to scale

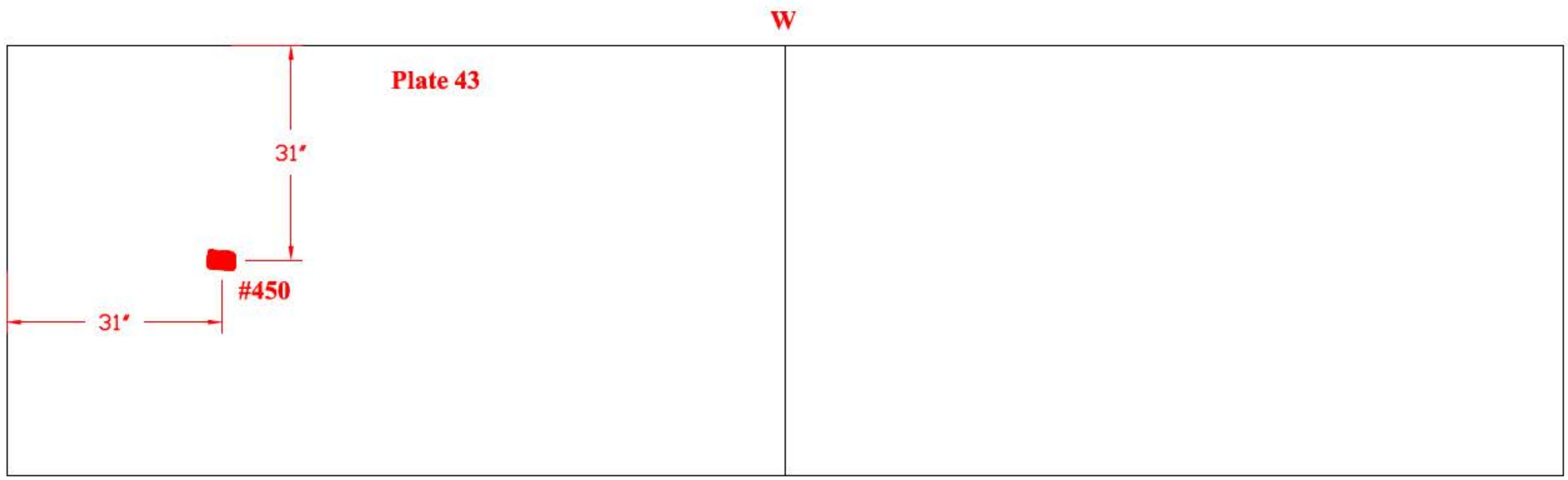
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: D
Plate #: 43

Flaw # - Type - Remaining:

#450 - Dent - 0.190" deep

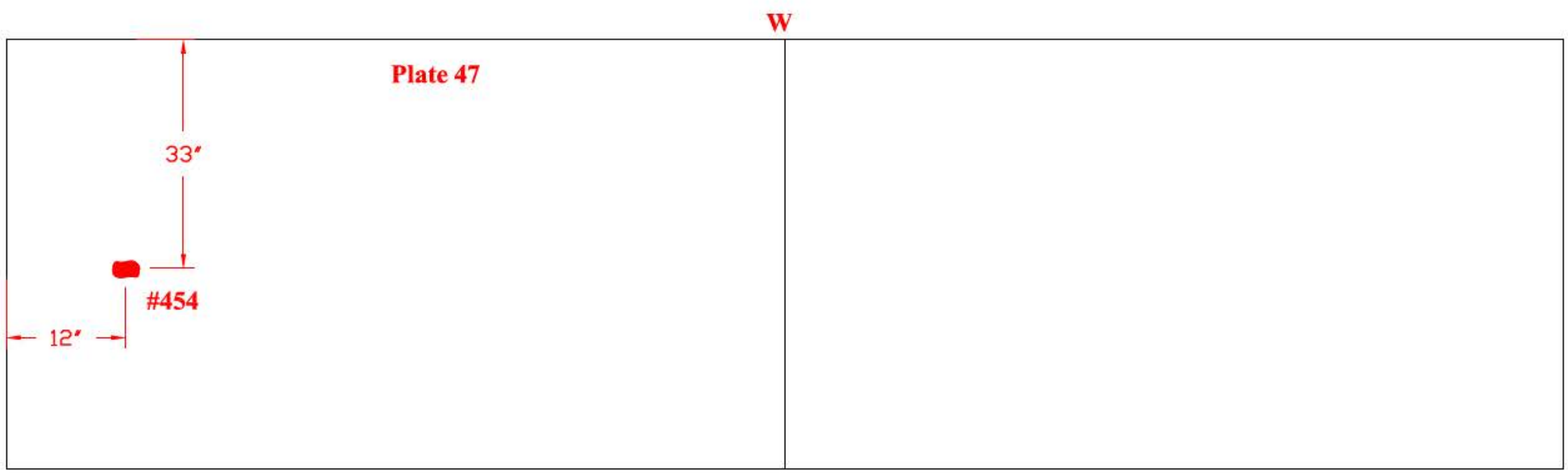


Tank Section:Upper Dome
Quadrant: D

Course: D
Plate #: 47

Flaw # - Type - Remaining:

#454 - Dent - 0.200" deep



Drawing is not to scale

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

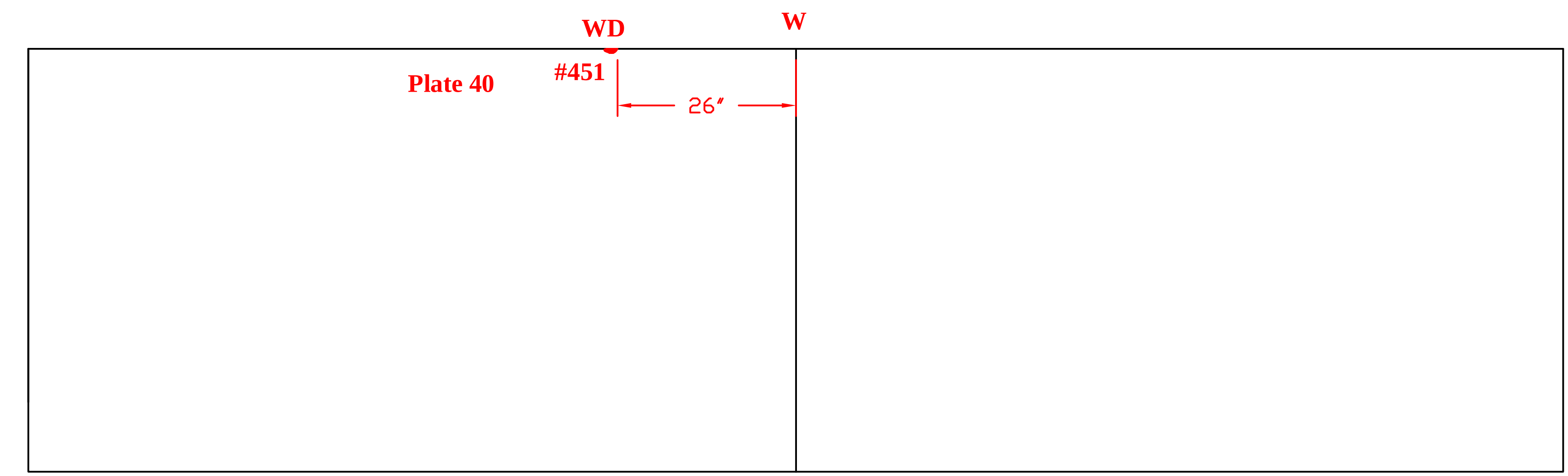
TANK # 20 - QUADRANT C AND D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: C
Plate #: 40

Flaw # - Type - Remaining:

#451 - LOF - 0.085"D 2"L



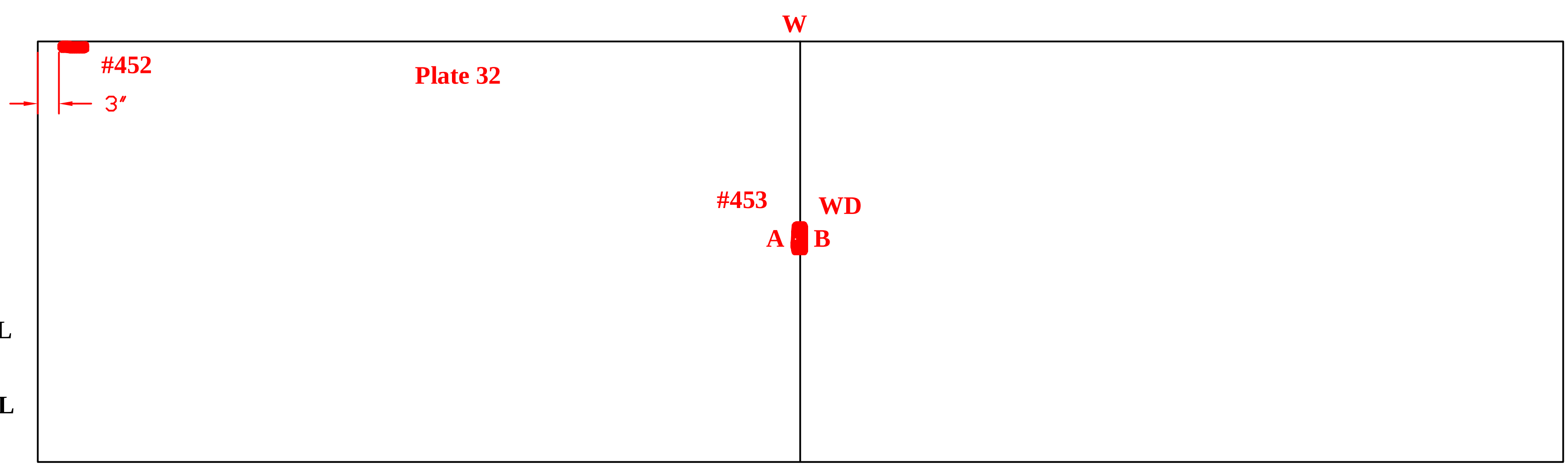
Tank Section: Upper Dome
Quadrant: C

Course: D
Plate #: 32

Flaw # - Type - Remaining:

#452 - LOF - 0.099"D 3"L

#453: A) LOF - 0.196"D 6"L
Pit - 0.1875" dia
B) LOF - 0.101"D 6"L



Drawing is not to scale

TANK # 20 - QUADRANT A AND D

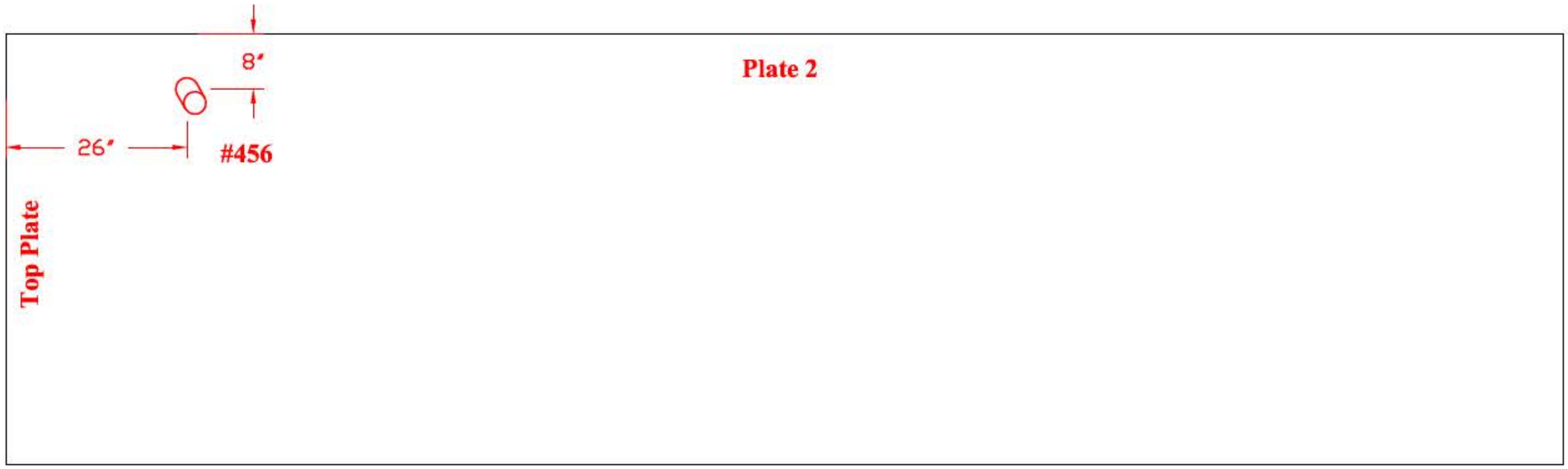
***Nominal Plate Thickness: 0.250"**

Tank Section: Lower Dome
Quadrant: A

Course: 2
Plate #: 2

Flaw # - Type - Remaining:

#456 - Grout Nozzle - 0.212"R

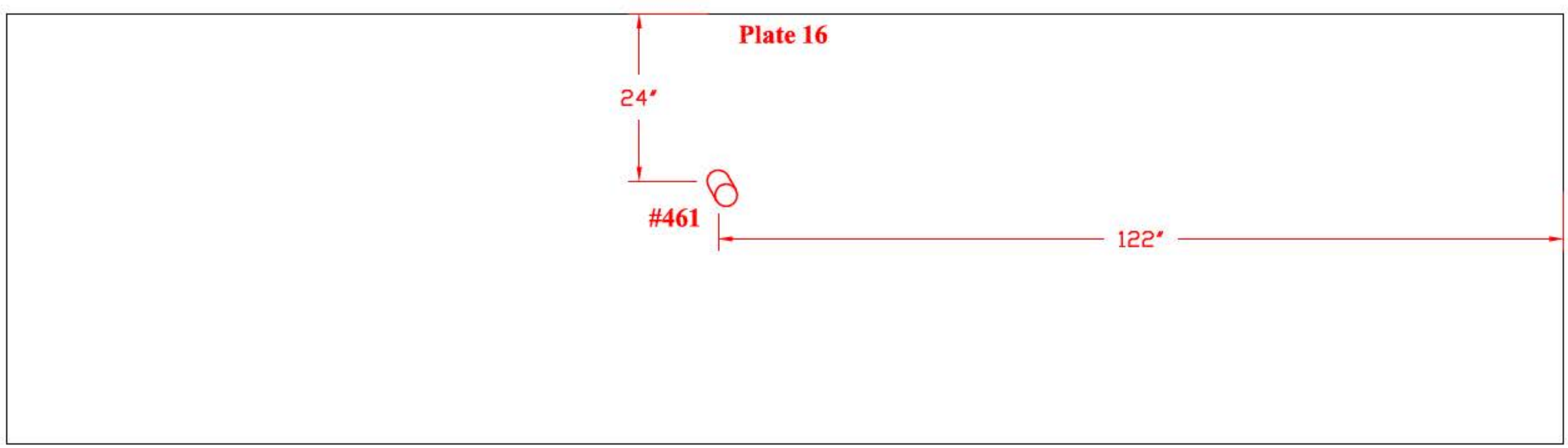


Tank Section: Barrel
Quadrant: D

Course: 12
Plate #: 16

Flaw # - Type - Remaining:

#461 - Grout Nozzle - 0.211"R



TANK # 20 - QUADRANT A

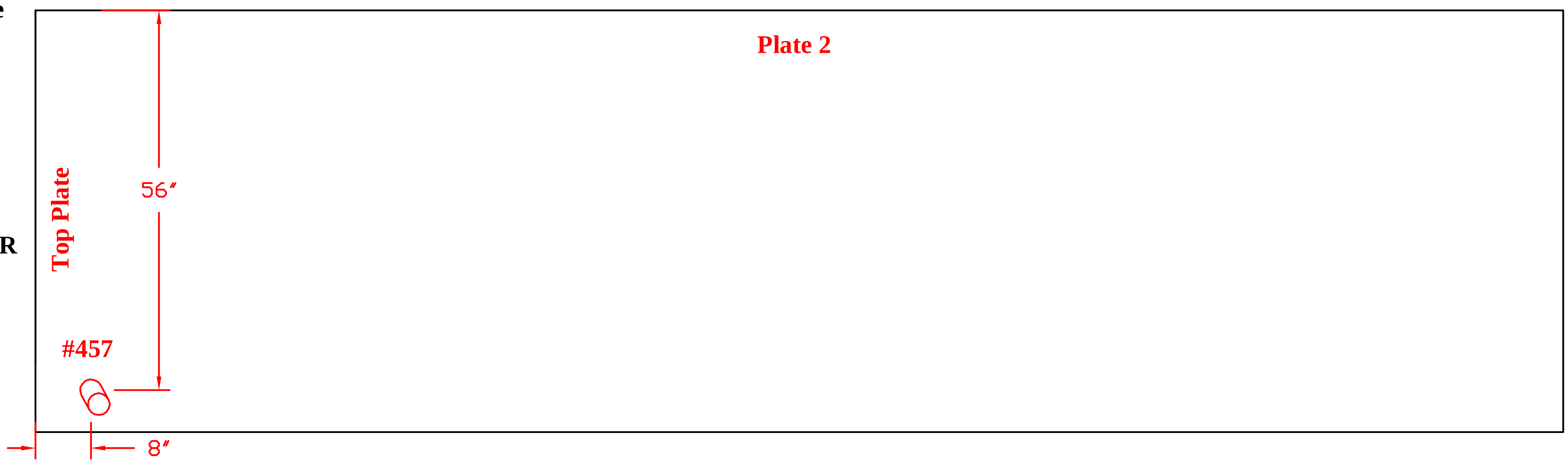
Nominal Plate Thickness: 0.250"

Tank Section: Lower Dome
Quadrant: A

Course: 4
Plate #: 2

Flaw # - Type - Remaining:

#457 - Grout Nozzle - 0.230"R

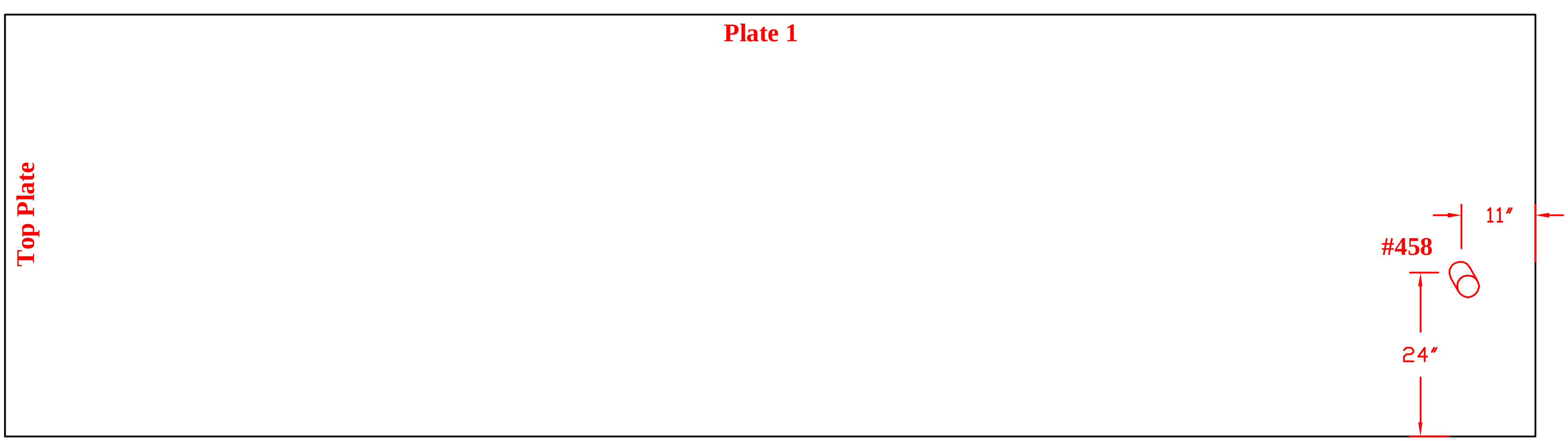


Tank Section: Lower Dome
Quadrant: A

Course: 3
Plate #: 1

Flaw # - Type - Remaining:

#458 - Grout Nozzle - 0.200"R



Drawing is not to scale

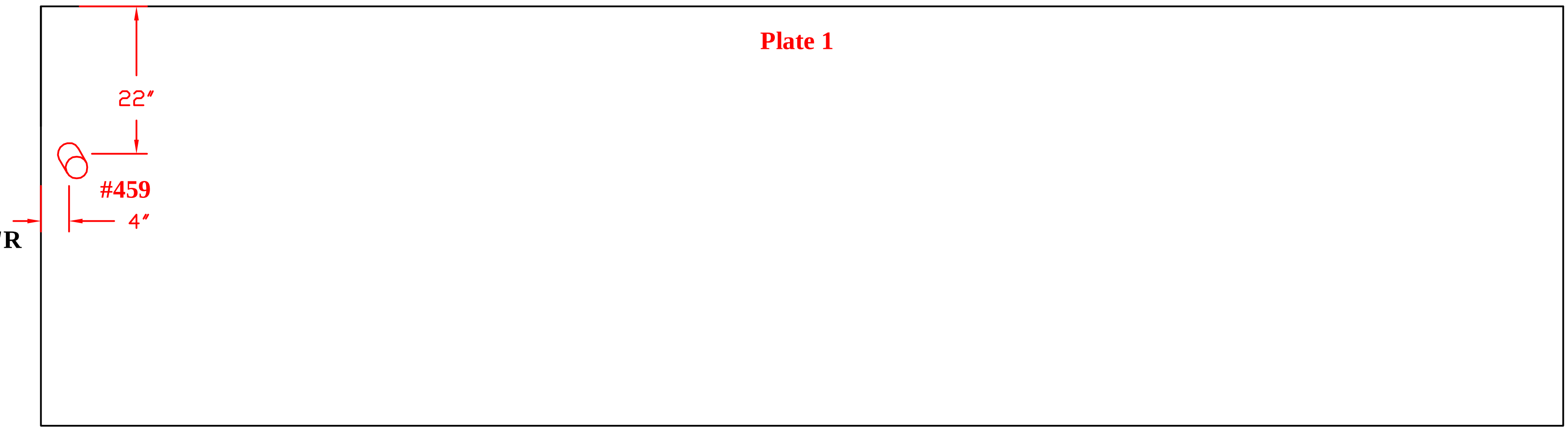
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: A

Course: 5
Plate #: 1

Flaw # - Type - Remaining:

#459 - Grout Nozzle - 0.220"R

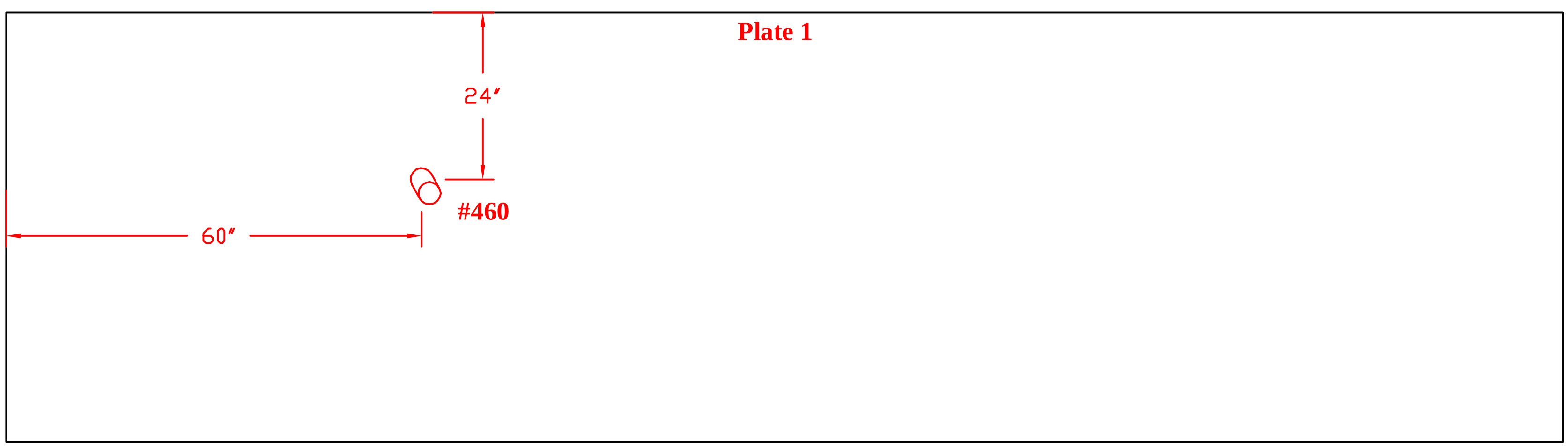


Tank Section: Barrel
Quadrant: A

Course: 1
Plate #: 1

Flaw # - Type - Remaining:

#460 - Grout Nozzle - 0.209"R



Drawing is not to scale

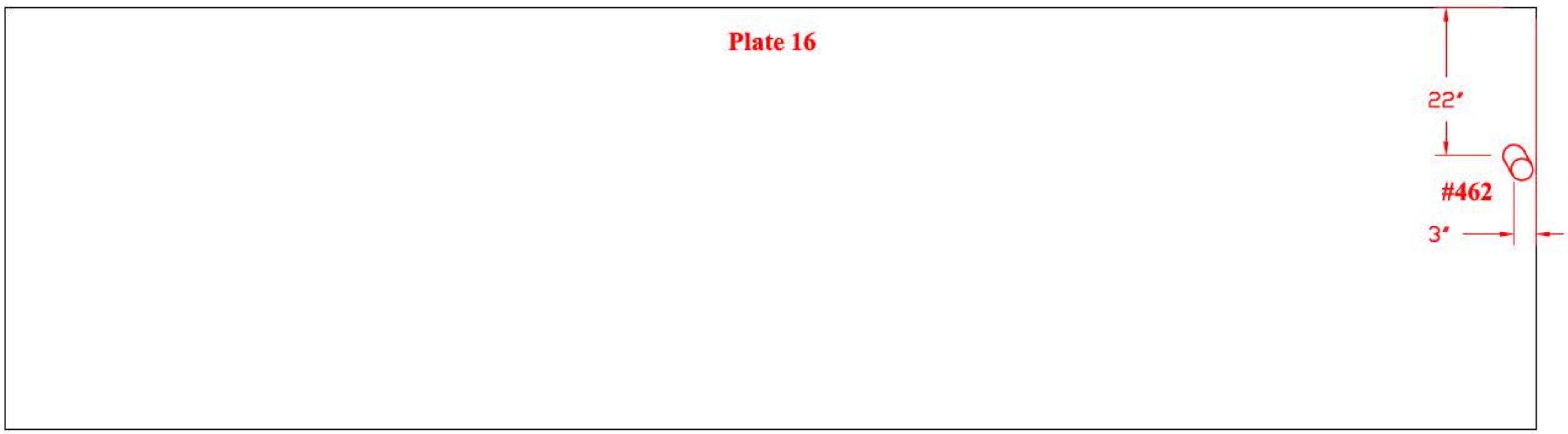
TANK # 20 - QUADRANT A
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: A

Course: 19
Plate #: 16

Flaw # - Type - Remaining:

#462 - Grout Nozzle - 0.216"R

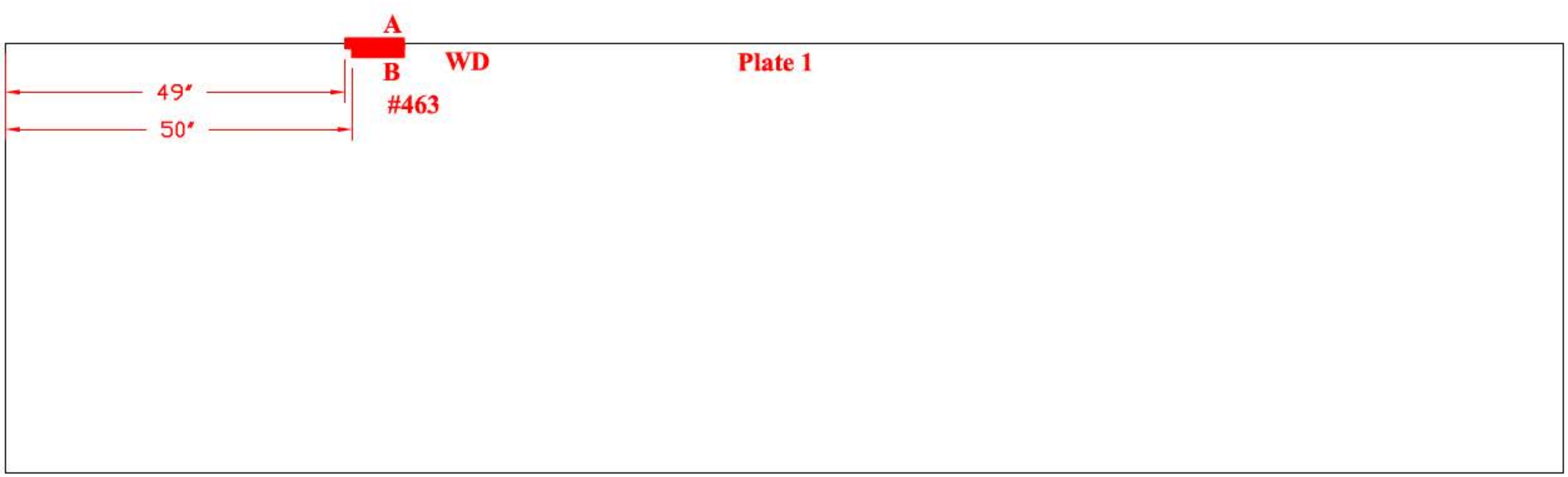


Tank Section: Barrel
Quadrant: A

Course: 26
Plate #: 1

Flaw # - Type - Remaining:

#463: A) LOF - 0.077"D 9"L
B) LOF - 0.088"D 8"L



TesTex
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TANK # 20 - QUADRANT A AND D

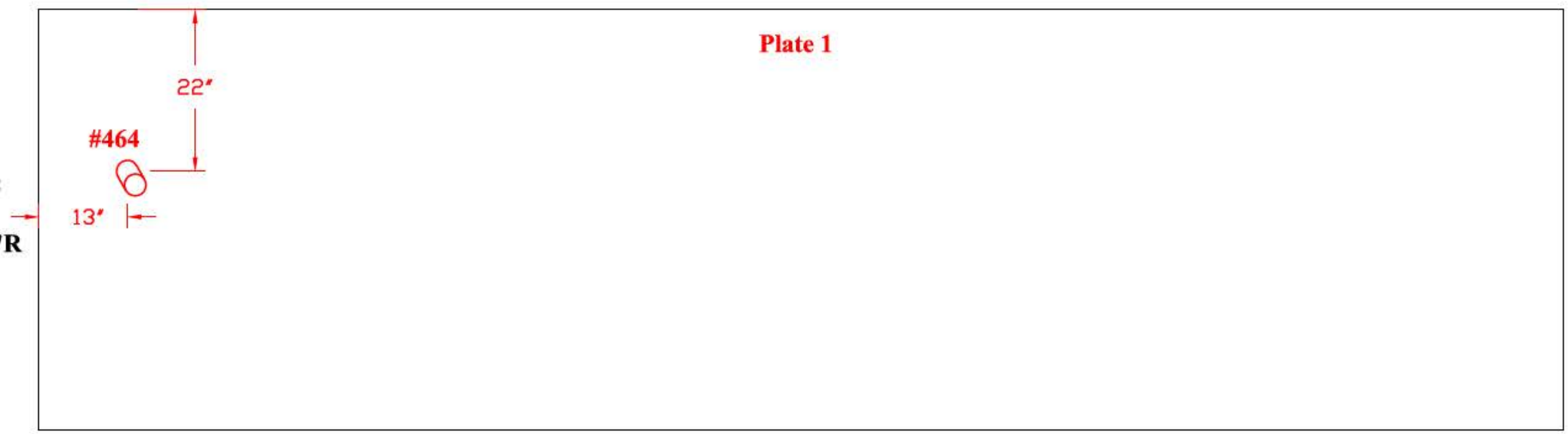
Nominal Plate Thickness: 0.250"

Tank Section: Barrel
Quadrant: A

Course: 27
Plate #: 1

Flaw # - Type - Remaining:

#464 - Grout Nozzle - 0.205"R

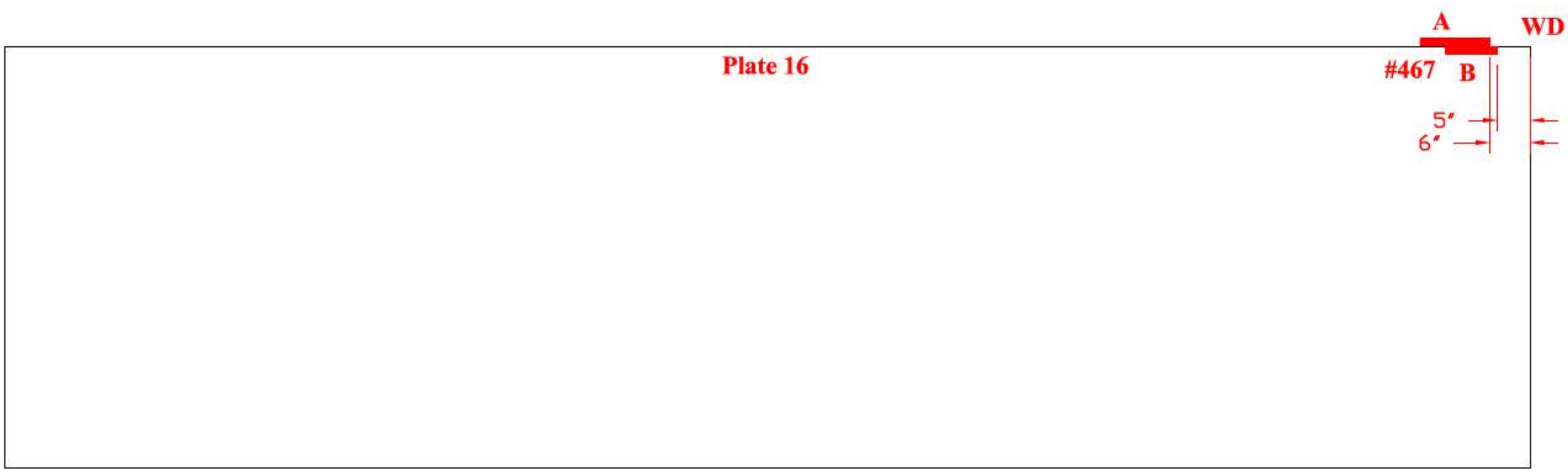


Tank Section: Barrel
Quadrant: D

Course: 26
Plate #: 16

Flaw # - Type - Remaining:

#467: A) LOF - 0.079"D 9"L
B) LOF - 0.083"D 8"L



Drawing is not to scale

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

www.testex-ndt.com

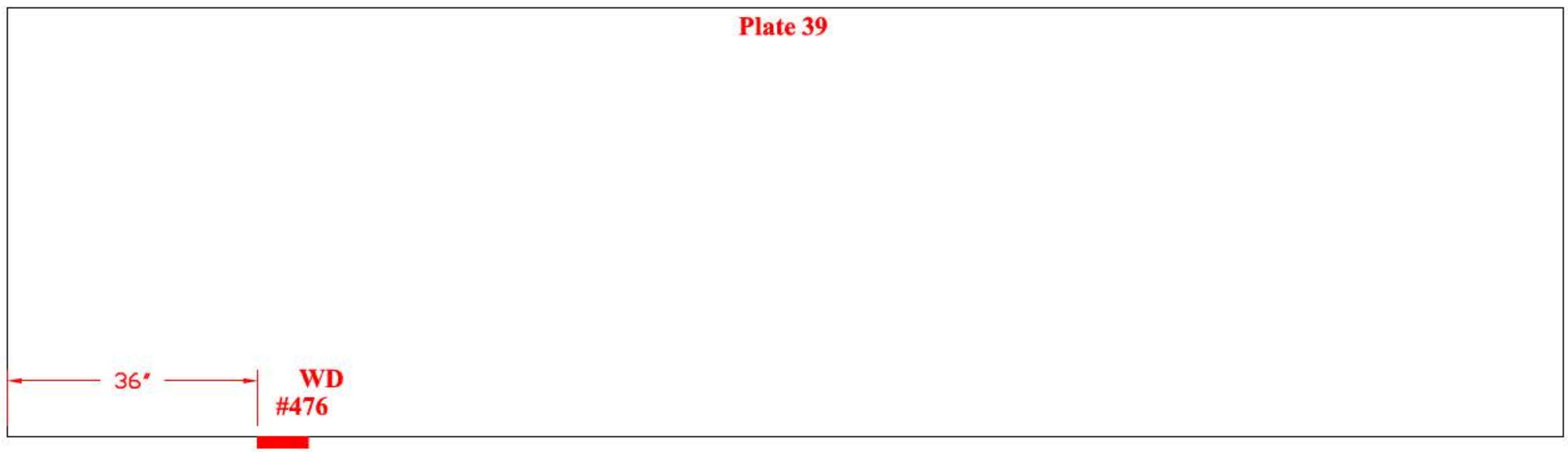
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Extension
Quadrant: D

Course: 4
Plate #: 39

Flaw # - Type - Remaining:

#476 - LOF - 0.120"D 6.5"L



TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

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TANK # 20 - QUADRANT A

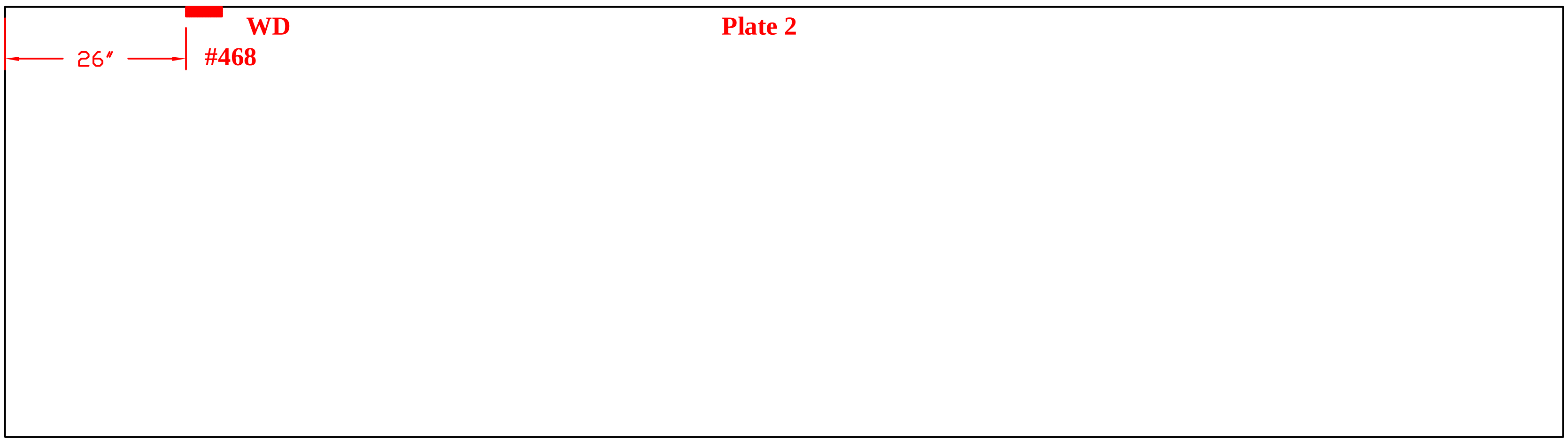
***Nominal Plate Thickness: 0.250"**

Tank Section: Catwalk
Quadrant: A

Course: 3
Plate #: 2

Flaw # - Type - Remaining:

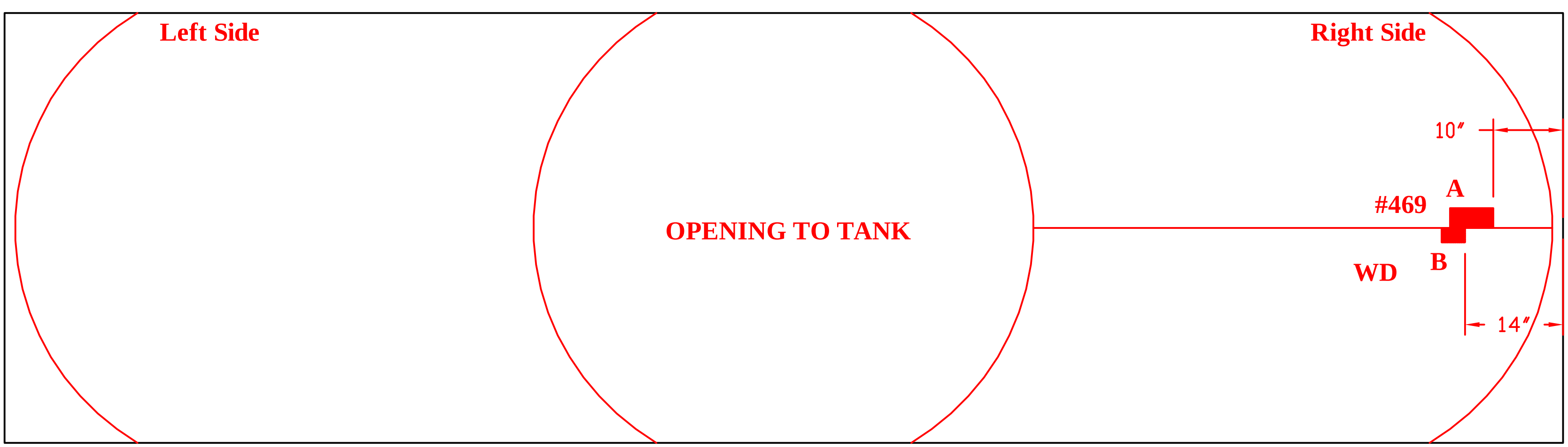
#468 - LOF - 0.077"D 1.5"L



Tank Section: Manway
Quadrant: A

Course: 3
Plate #:
Flaw # - Type - Remaining:

#469: A)LOF - 0.136"D 5"L
B)LOF- 0.239"D 0.075"L



Drawing is not to scale

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TANK # 20 - QUADRANT A

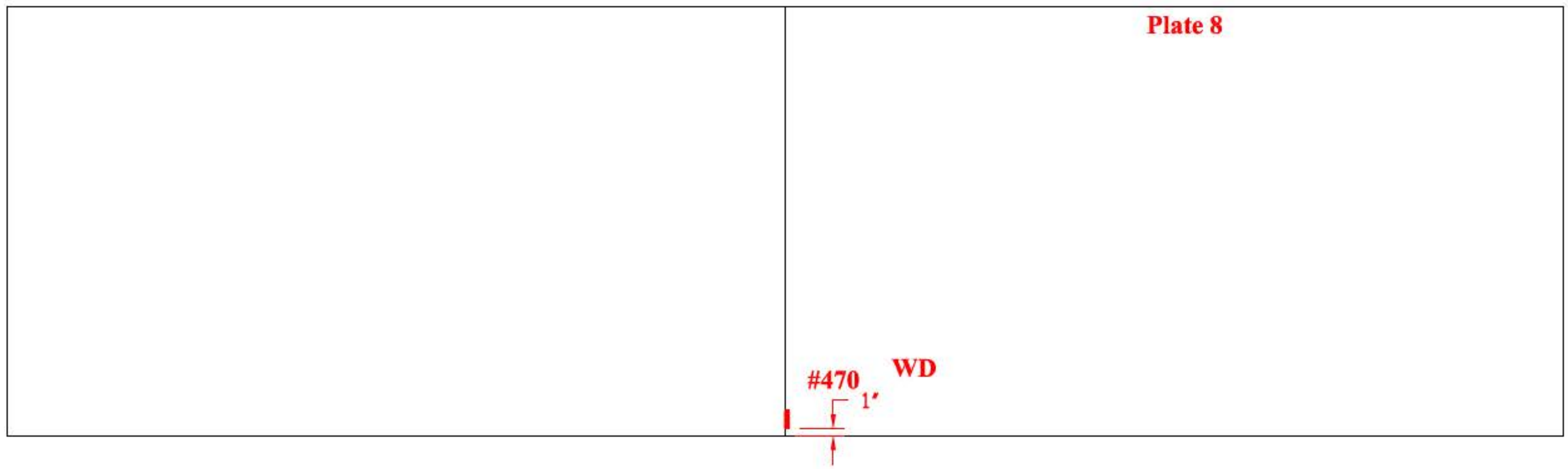
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A

Course: A
Plate #: 8

Flaw # - Type - Remaining:

#470 - LOF - 0.101"D 3"L



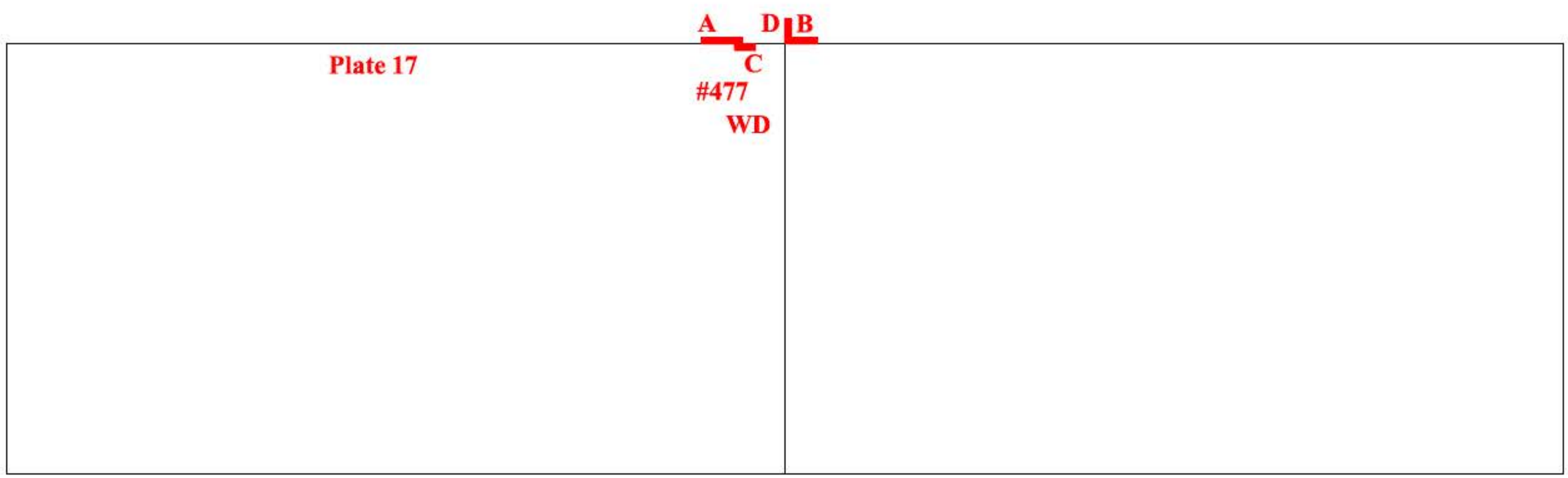
Tank Section: Upper Dome
Quadrant: A

Course: A
Plate #: 17

Flaw # - Type - Remaining:

#477/#358

A)LOF- 0.069"D 2.5"L
B)LOF- 0.184"D 3"L
C)LOF- 0.089"D 1.5"L
D)LOF- 0.184"D 1.5"L



Drawing is not to scale

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TANK # 20 - QUADRANT B

Nominal Plate Thickness: 0.250"

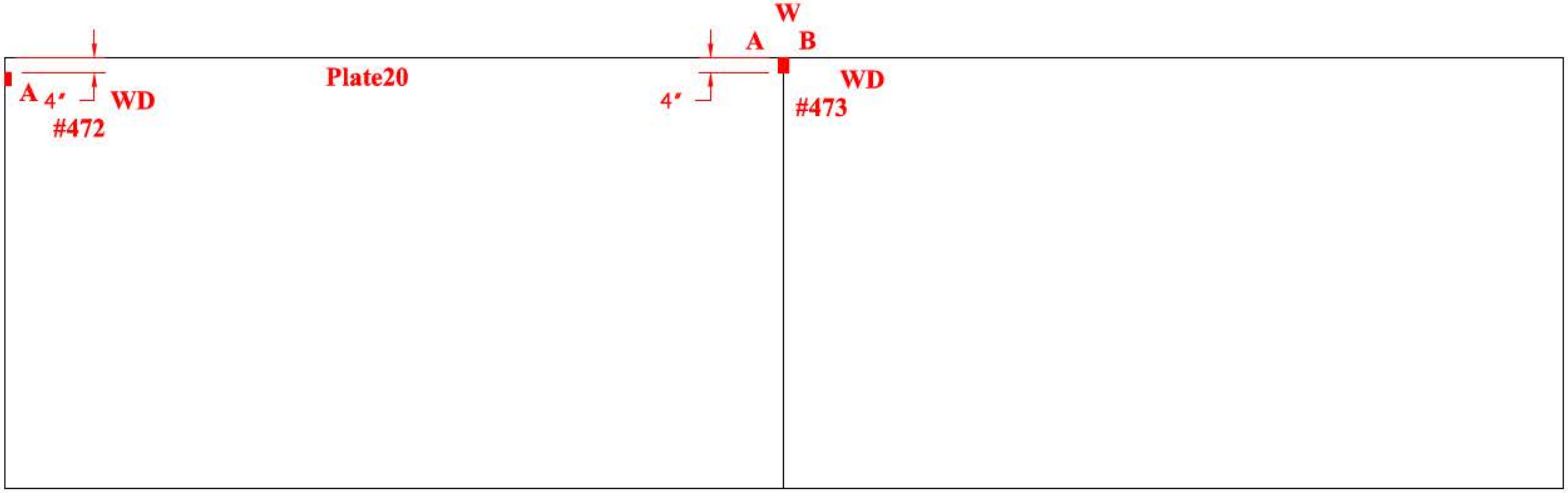
Tank Section: Upper Dome
Quadrant: B

Course: B
Plate #: 20

Flaw # - Type - Remaining:

#472 - LOF - 0.214"D 1.5"L

#473: A) LOF - 0.087"D 4"L
B) LOF - 0.127"D 4"L

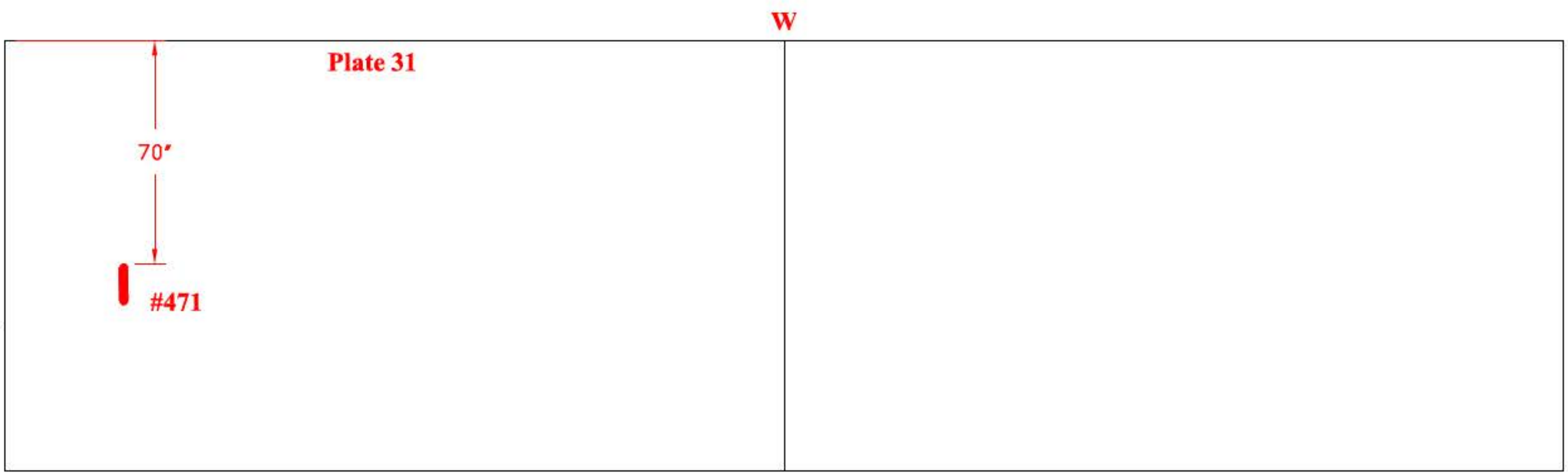


Tank Section: Upper Dome
Quadrant: B

Course: A
Plate #: 31

Flaw # - Type - Remaining:

#471
TW - BM - LOF - 0.071"D 3"L



Drawing is not to scale

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

TesTex
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TANK # 20 - QUADRANT A

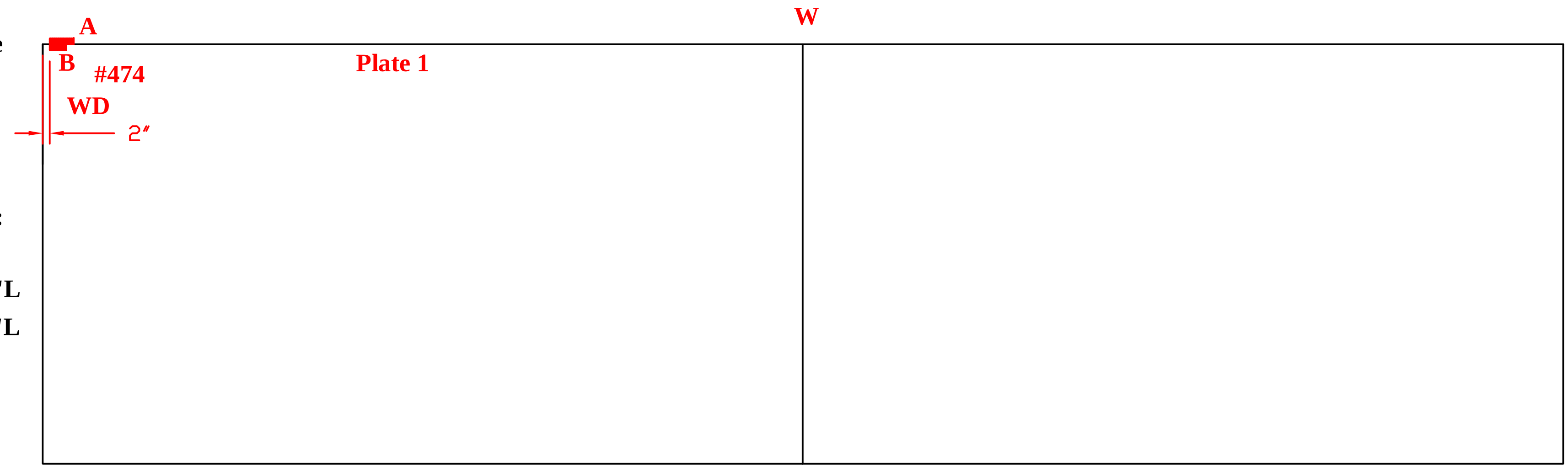
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: A

Course: C
Plate #: 1

Flaw # - Type - Remaining:

#474: A) LOF - 0.091"D 7"L
B) LOF - 0.103"D 5"L

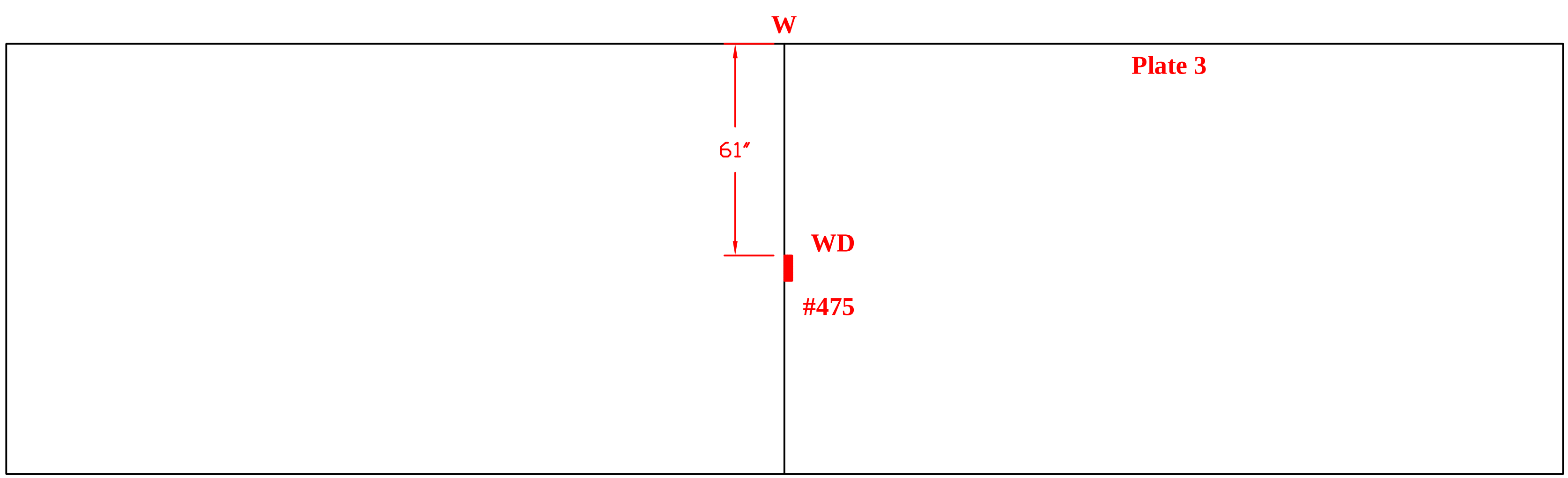


Tank Section: Upper Dome
Quadrant: A

Course: C
Plate #: 3

Flaw # - Type - Remaining:

#475: A) LOF - 0.138"D 3"L



Drawing is not to scale

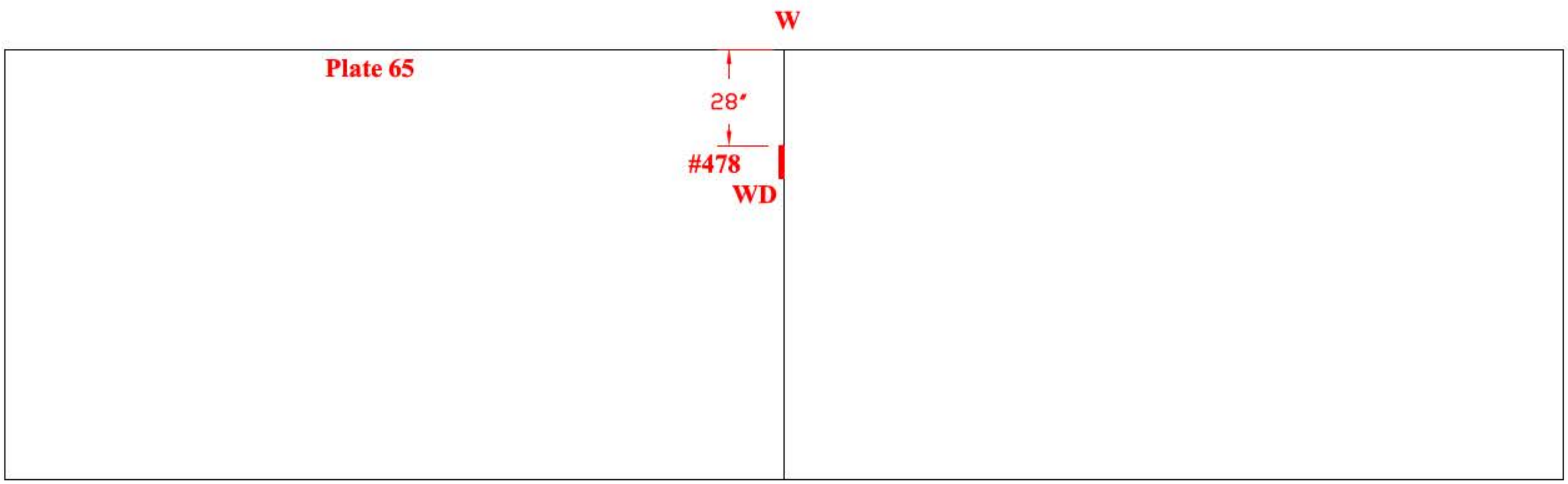
TANK # 20 - QUADRANT D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: A
Plate #: 65

Flaw # - Type - Remaining:

#478 - LOF/Porosity
- 0.179"D 8"L

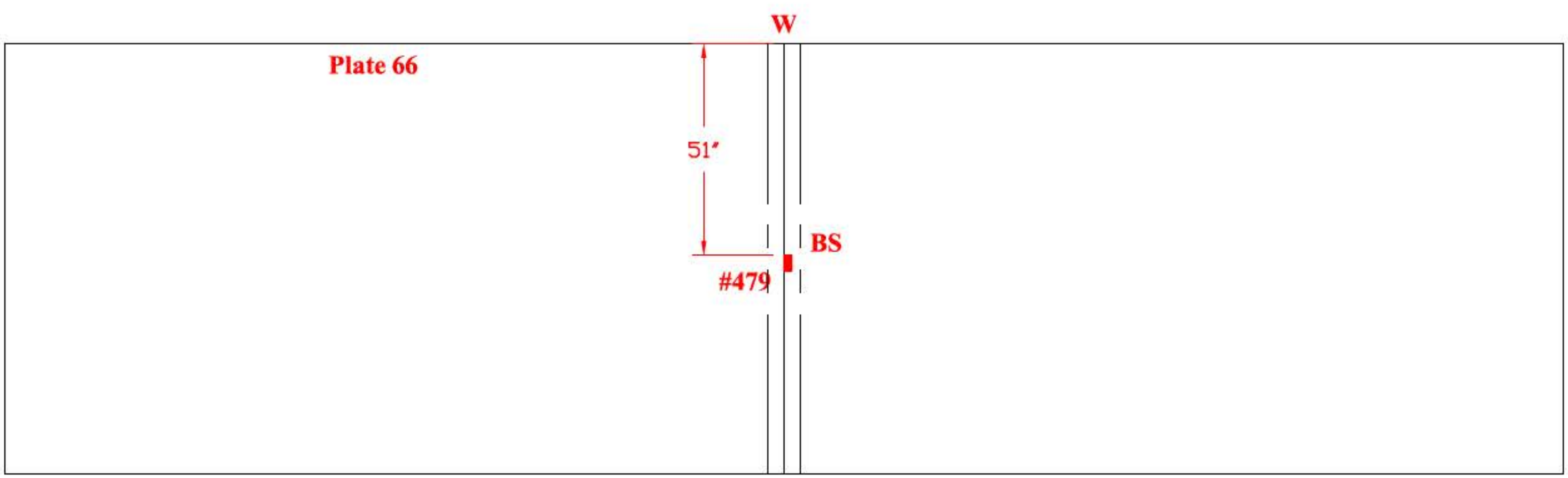


Tank Section: Upper Dome
Quadrant: D

Course: A
Plate #: 66

Flaw # - Type - Remaining:

#479 - Gouge(BS)
- 0.085"D 0.500"L



TesTex
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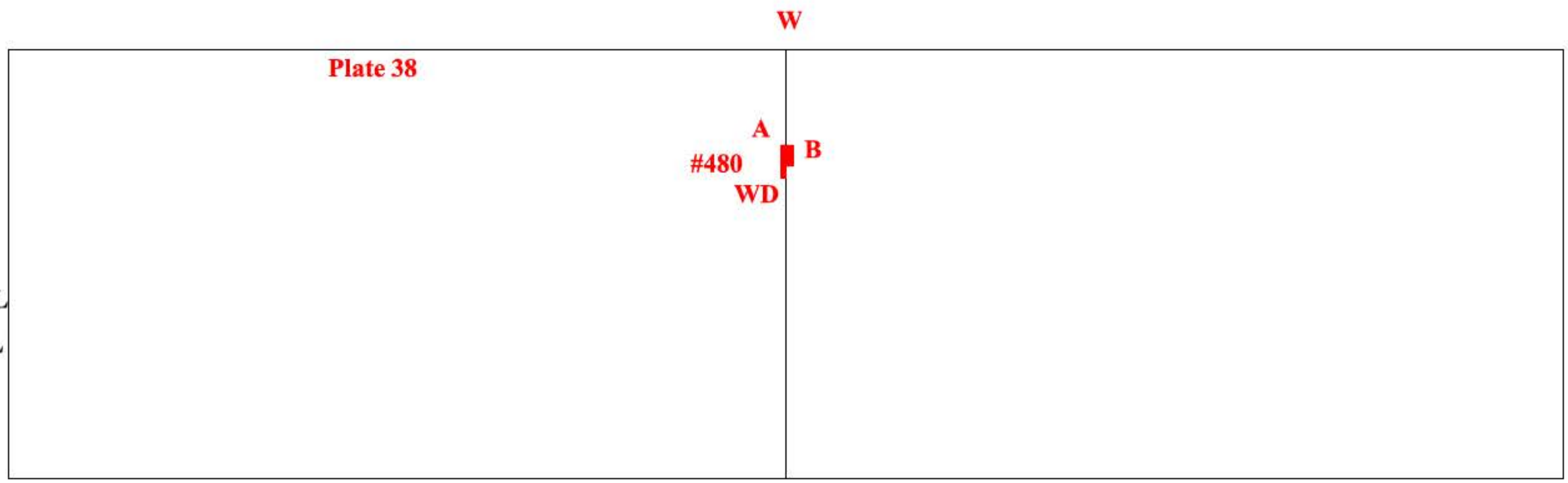
TANK # 20 - QUADRANT B AND D
Nominal Plate Thickness: 0.250"

Tank Section: Upper Dome
Quadrant: D

Course: C
Plate #: 38

Flaw # - Type - Remaining:

#480: A)LOF/Pit - 0.107"D 2"L
B)LOF/Pit - 0.212"D 1"L

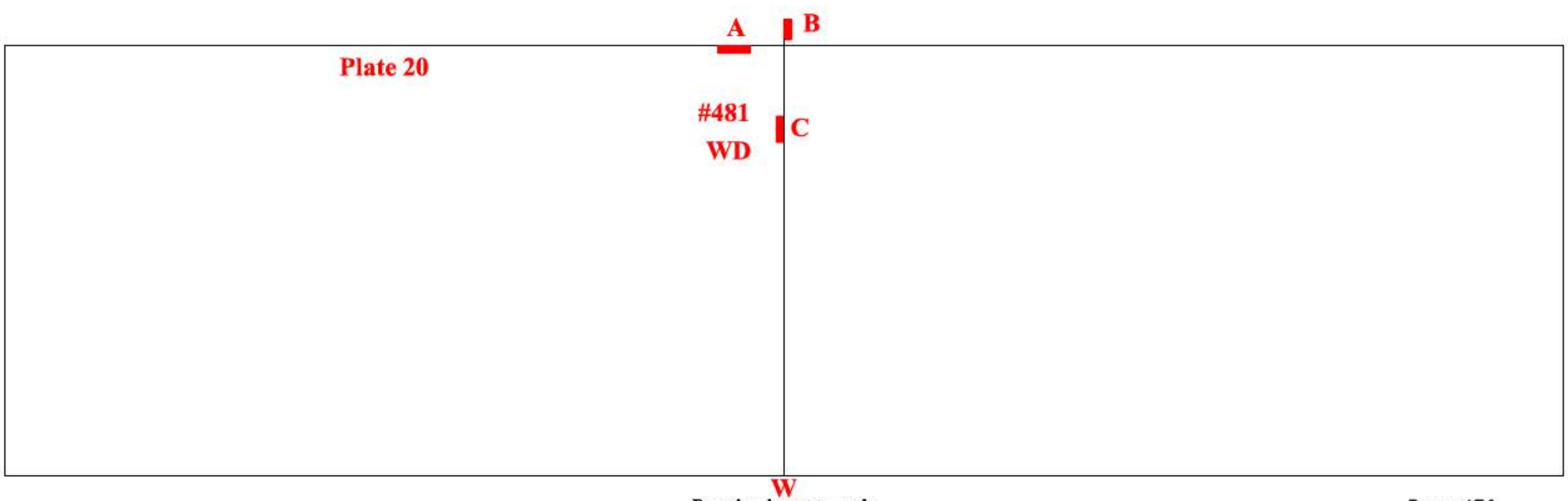


Tank Section: Upper Dome
Quadrant: B

Course: C
Plate #: 20

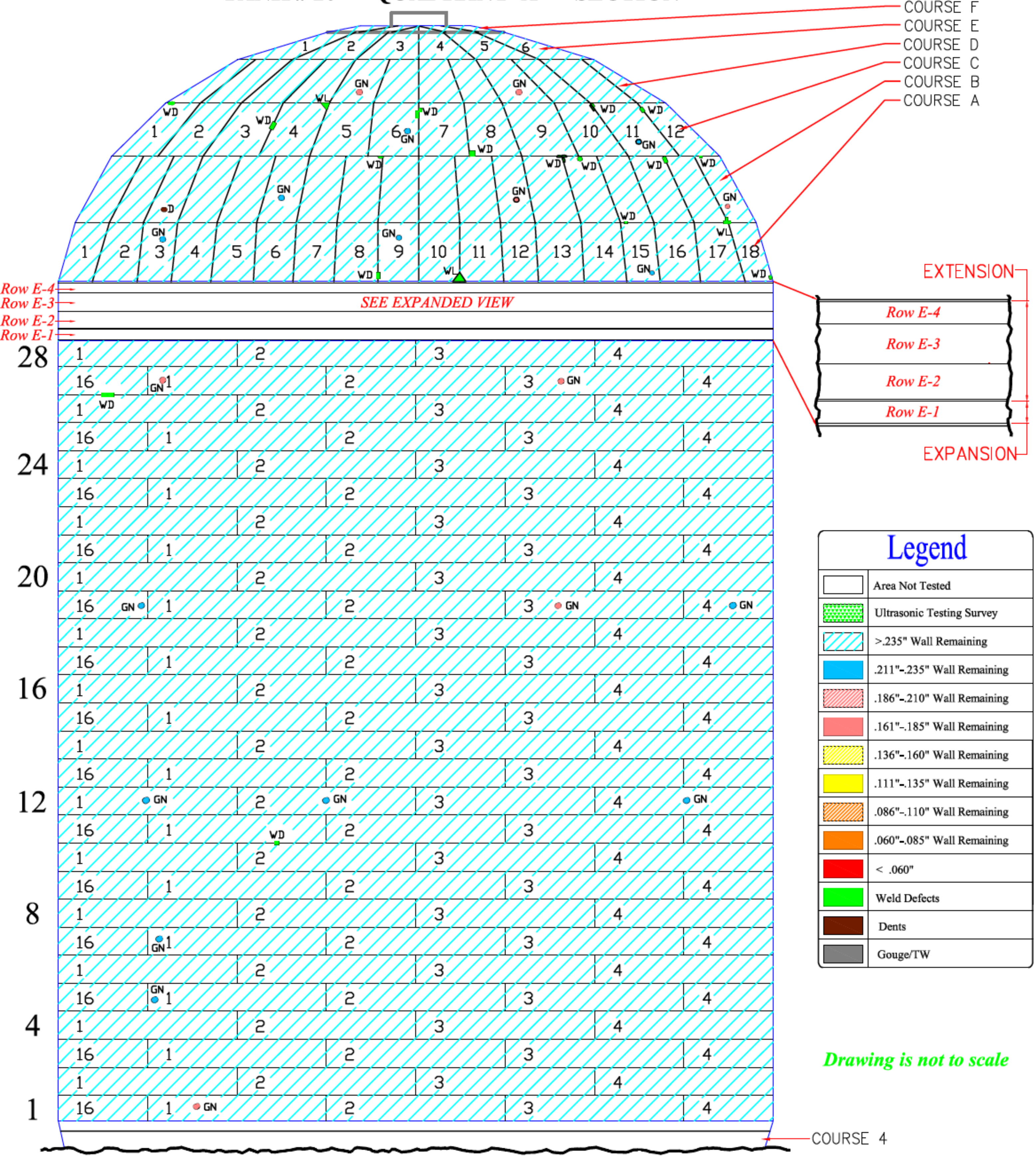
Flaw # - Type - Remaining:

#481: A) LOF - 0.112"D 5"L
B) LOF - 0.202"D 3"L
C) LOF - 0.087"D 6"L



Drawing is not to scale

TANK # 20 - QUADRANT A - SECTION

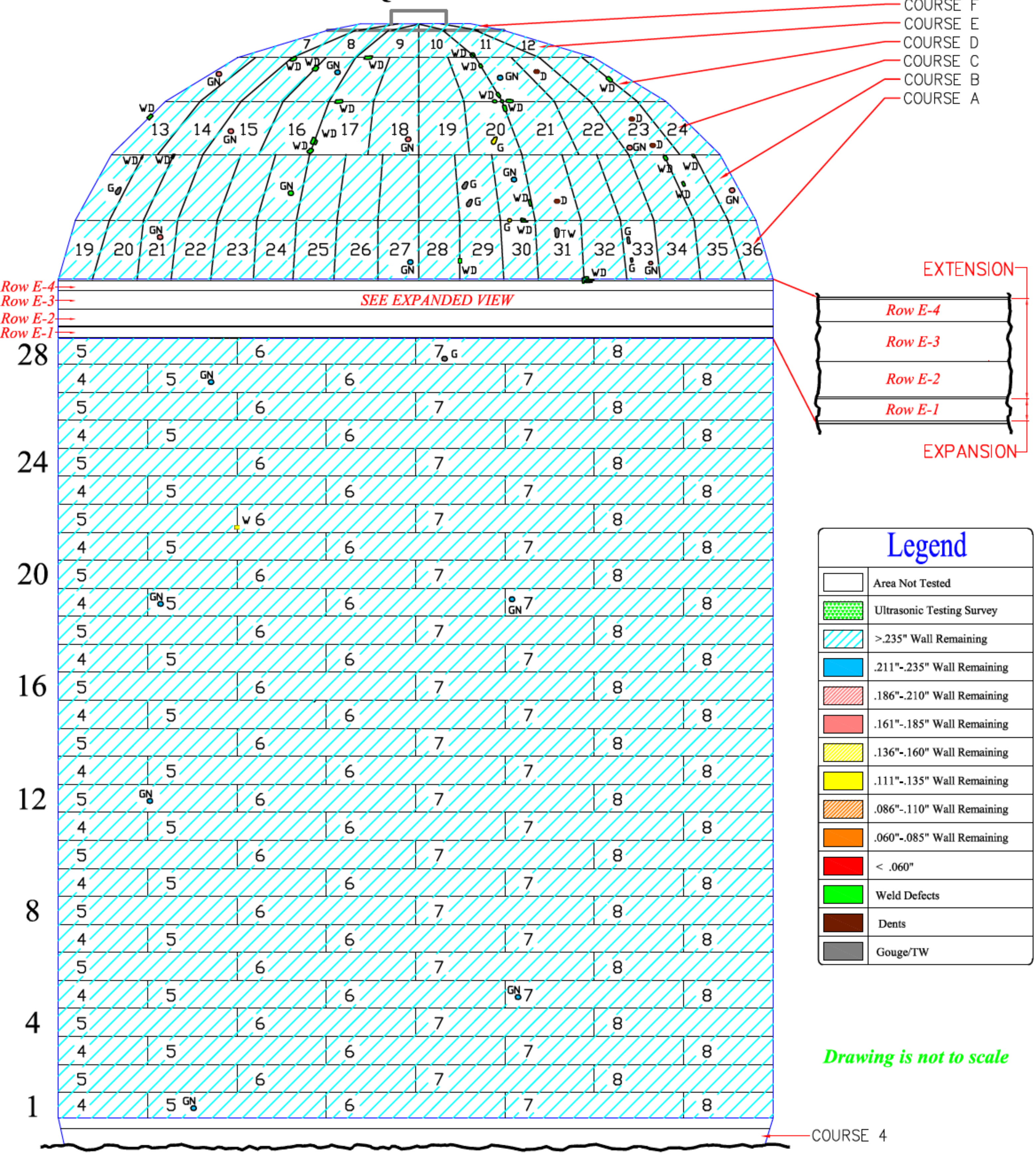


	Legend
	Area Not Tested
	Ultrasonic Testing Survey
	>.235" Wall Remaining
	.211"-.235" Wall Remaining
	.186"-.210" Wall Remaining
	.161"-.185" Wall Remaining
	.136"-.160" Wall Remaining
	.111"-.135" Wall Remaining
	.086"-.110" Wall Remaining
	.060"-.085" Wall Remaining
	< .060"
	Weld Defects
	Dents
	Gouge/TW

Drawing is not to scale

TesTex

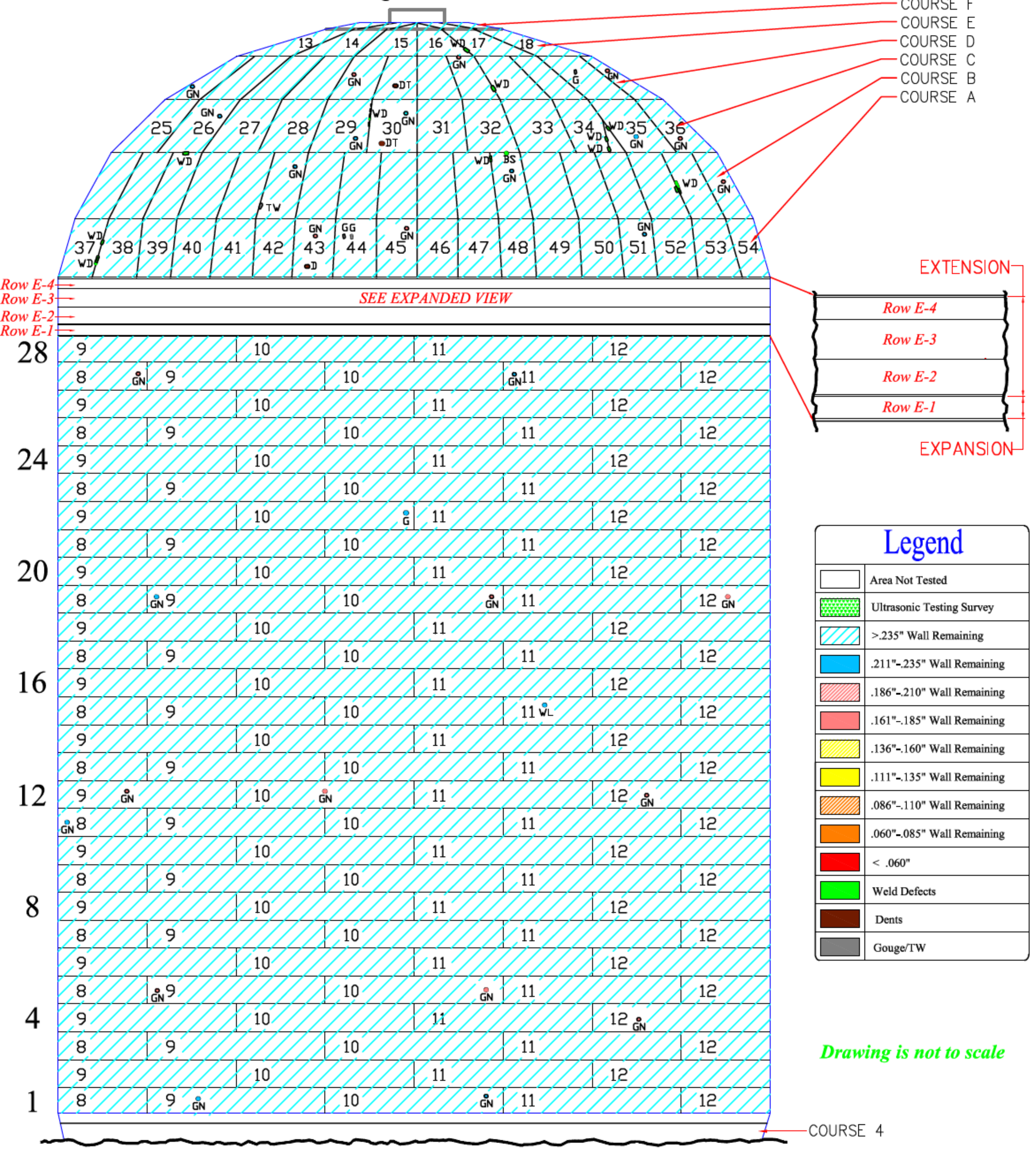
TANK # 20 - QUADRANT B - SECTION



Drawing is not to scale

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

TANK # 20 - QUADRANT C - SECTION

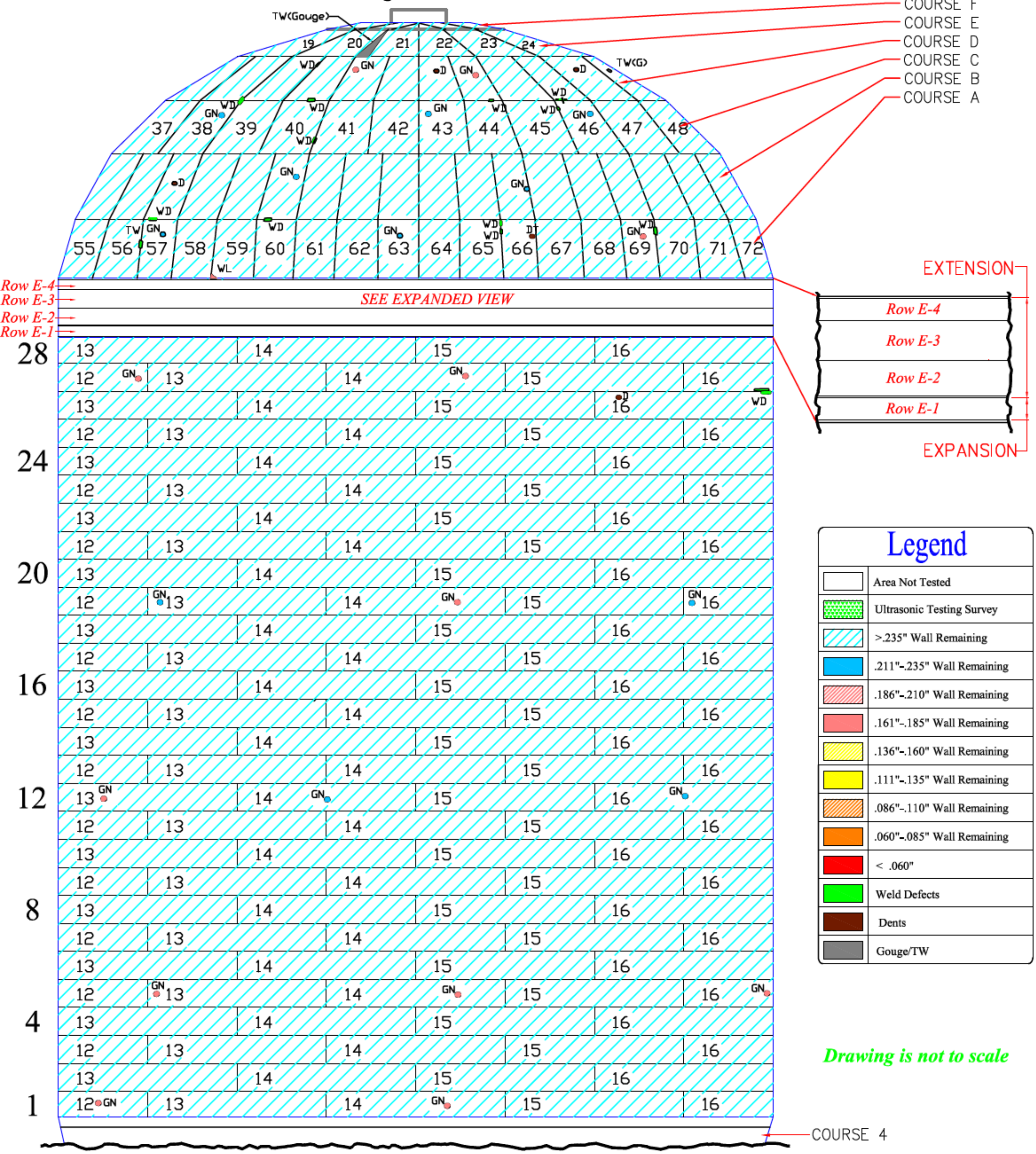


Legend	
	Area Not Tested
	Ultrasonic Testing Survey
	>.235" Wall Remaining
	.211"-.235" Wall Remaining
	.186"-.210" Wall Remaining
	.161"-.185" Wall Remaining
	.136"-.160" Wall Remaining
	.111"-.135" Wall Remaining
	.086"-.110" Wall Remaining
	.060"-.085" Wall Remaining
	< .060"
	Weld Defects
	Dents
	Gouge/TW

Drawing is not to scale

TesTex

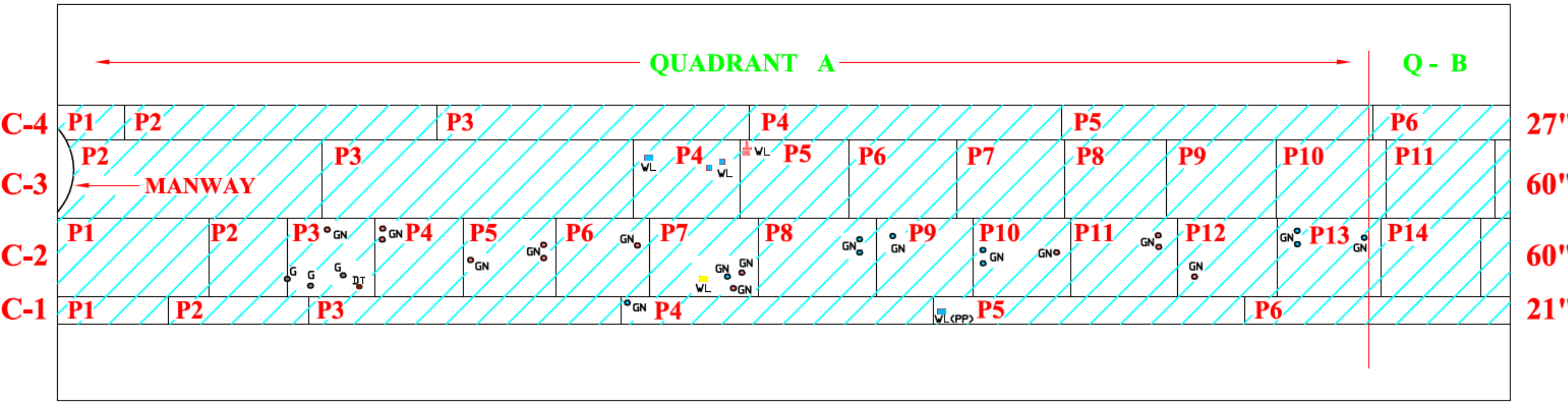
TANK # 20 - QUADRANT D - SECTION



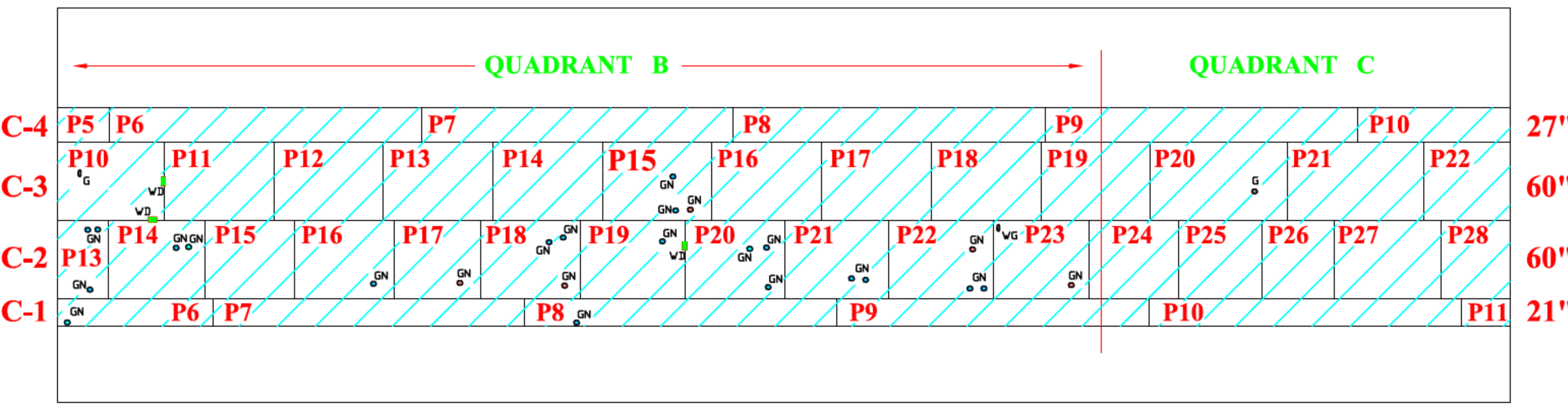
TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

TANK # 20 - QUADRANT A AND B EXTENSION

Nominal Plate Thickness: 0.250"



Legend		Area Not Tested		.211"-.235" Wall Remaining		.136"-.160" Wall Remaining		< .060" Wall Remaining		Gouge/TW
		Ultrasonic Testing Survey		.186"-.210" Wall Remaining		.086"-.110" Wall Remaining		Weld Defects		
		>.235" Wall Remaining		.161"-.185" Wall Remaining		.060"-.085" Wall Remaining		Dents		



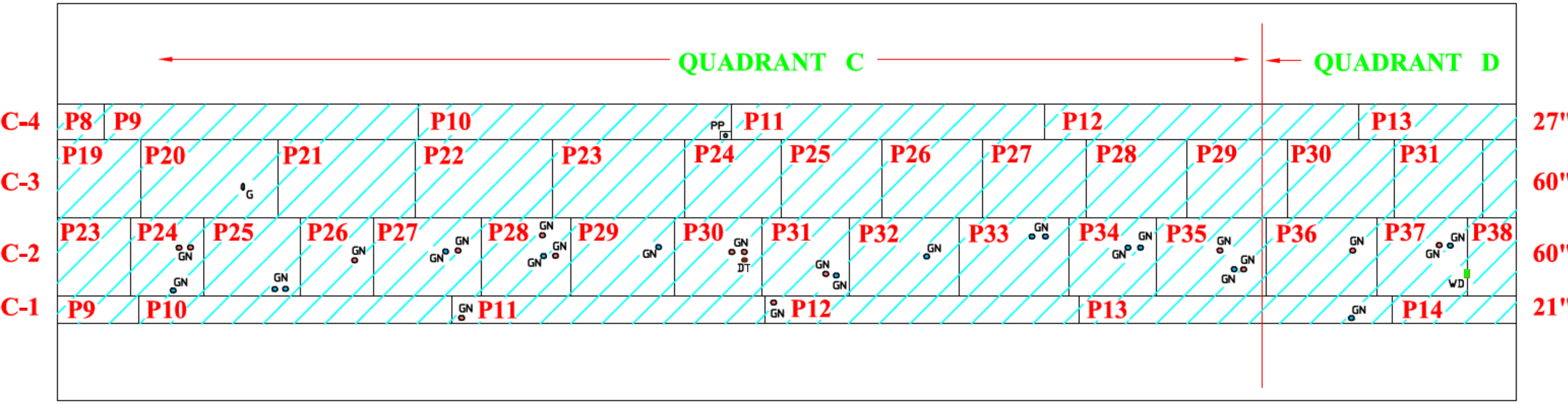
Drawing is not to scale

TANK MAPS
Dunkin & Bush, Inc.
Honolulu, HI

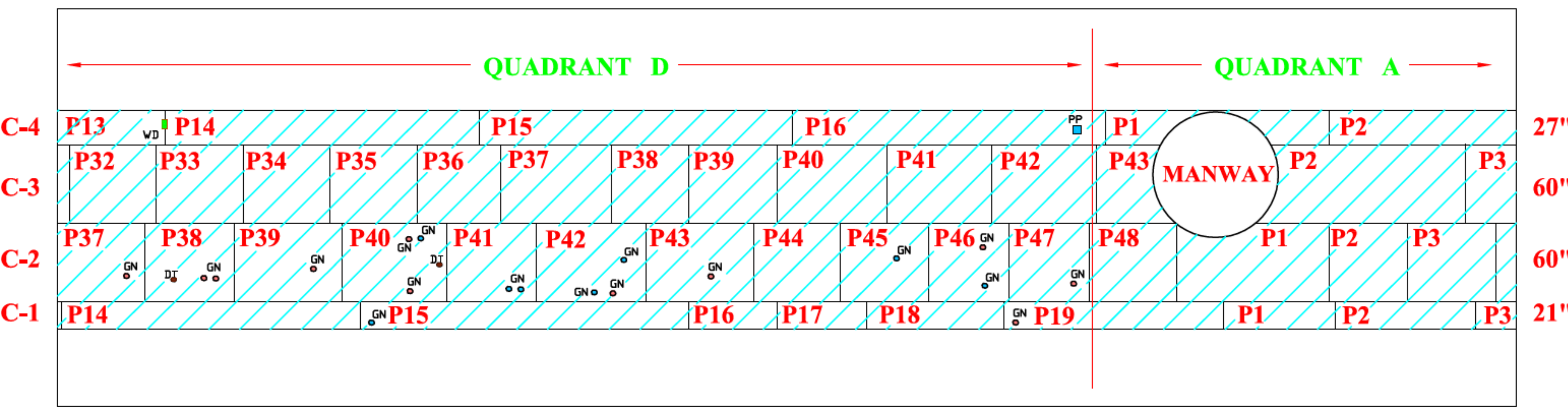
TANK # 20 - QUADRANT C AND D EXTENSION

**Nominal Plate Thickness: 0.250"*

Date Inspected/Confirmed:



Legend									
	Area Not Tested		.211"-.235" Wall Remaining		.136"-.160" Wall Remaining		< .060" Wall Remaining		Gouge/TW
	Ultrasonic Testing Survey		.186"-.210" Wall Remaining		.086"-.110" Wall Remaining		Weld Defects		
	>.235" Wall Remaining		.161"-.185" Wall Remaining		.060"-.085" Wall Remaining		Dents		



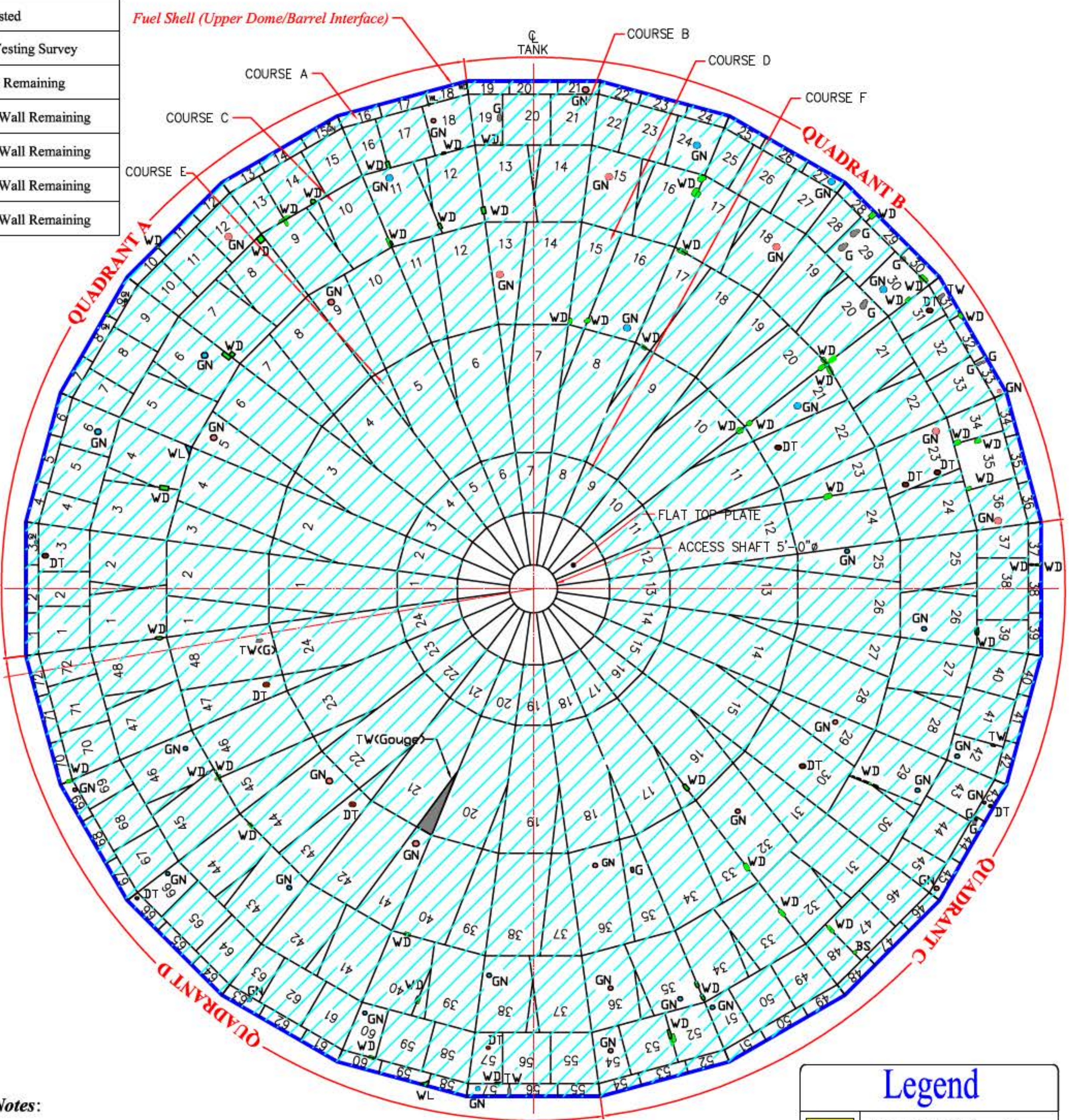
Drawing is not to scale

Tank Maps
Dunkin & Bush, Inc..
Honolulu, HI
Tank # 20 - Upper Dome Liner Plates

Legend

	Area Not Tested
	Ultrasonic Testing Survey
	>.235" Wall Remaining
	.211"-.235" Wall Remaining
	.186"-.210" Wall Remaining
	.161"-.185" Wall Remaining
	.136"-.160" Wall Remaining

TANK # 20 - UPPER DOME LINER PLATES



Drawing Notes:

1. Tank is divided into 4 quadrants (A-D).
2. Course A is comprised of 72 total plates.
3. Quadrant A is comprised of 18 plates (1-18).
4. Quadrant B is comprised of 18 plates (19-36).
5. Quadrant C is comprised of 18 plates (37-54).
6. Quadrant D is comprised of 18 plates (55-72).
7. This numbering convention begins with plate #1 being the first full plate to the left of the manway in plan view.

Legend

	.111"-.135" Wall Remaining
	.086"-.110" Wall Remaining
	.060"-.085" Wall Remaining
	< .060"
	Weld Defects
	Dents
	Gouge/TW

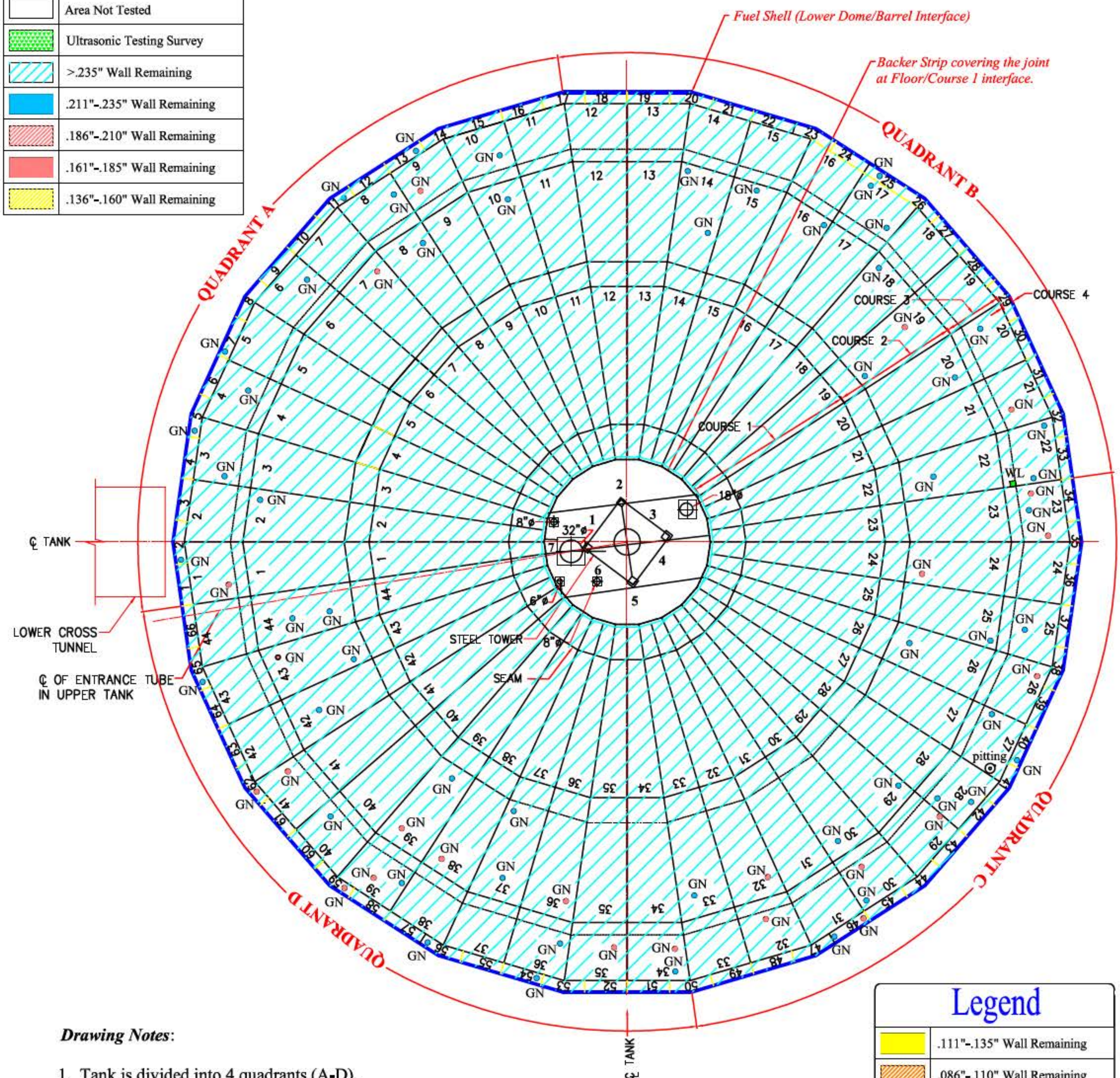
Drawing is not to scale

TesTex

Legend

(white)	Area Not Tested
(green dotted)	Ultrasonic Testing Survey
(cyan hatched)	>.235" Wall Remaining
(blue)	.211"-.235" Wall Remaining
(pink hatched)	.186"-.210" Wall Remaining
(pink)	.161"-.185" Wall Remaining
(yellow hatched)	.136"-.160" Wall Remaining

TANK # 20 - LOWER DOME LINER PLATES



Legend

(yellow)	.111"-.135" Wall Remaining
(orange hatched)	.086"-.110" Wall Remaining
(orange)	.060"-.085" Wall Remaining
(red)	< .060"
(green)	Weld Defects
(brown)	Dents
(gray)	Gouge/TW

Drawing Notes:

1. Tank is divided into 4 quadrants (A-D).
2. The floor plates are 0.500" NWT & all other plates are 0.250" NWT.
3. Course 1 is comprised of 44 total plates.
4. Quadrant A is comprised of 11 plates (1-11).
5. Quadrant B is comprised of 11 plates (12-22).
6. Quadrant C is comprised of 11 plates (23-33).
7. Quadrant D is comprised of 11 plates (34-44).
8. This numbering convention begins with plate #1 being the first plate of quadrant A.

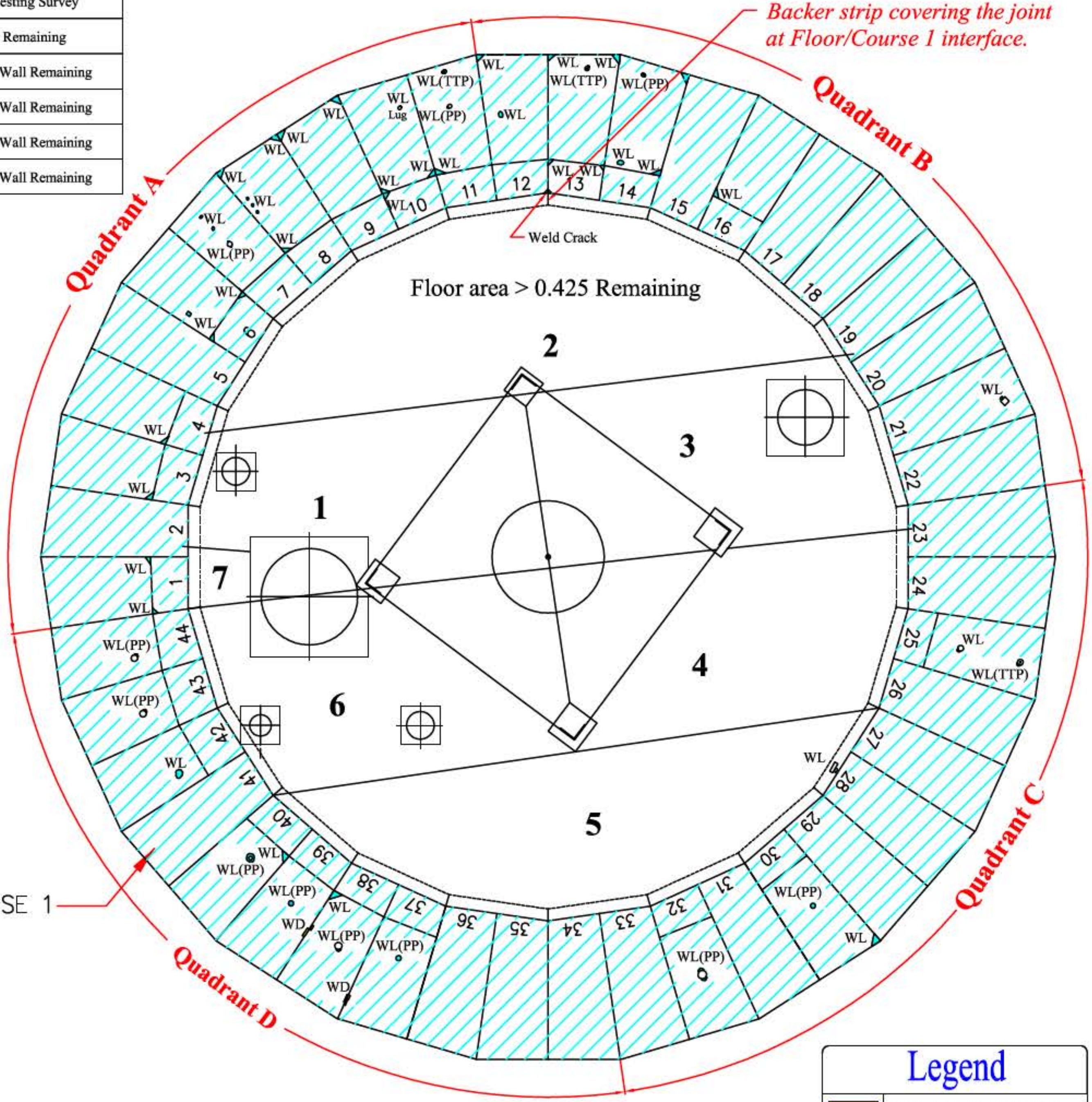
Drawing is not to scale

TesTex

Legend

	Area Not Tested
	Ultrasonic Testing Survey
	>.235" Wall Remaining
	.211"-.235" Wall Remaining
	.186"-.210" Wall Remaining
	.161"-.185" Wall Remaining
	.136"-.160" Wall Remaining

TANK # 20 - LOWER DOME



Legend

	.111"-.135" Wall Remaining
	.086"-.110" Wall Remaining
	.060"-.085" Wall Remaining
	< .060"
	Weld Defects
	Dents
	Gouge/TW

Drawing Notes:

1. Tank is divided into 4 quadrants (A-D).
2. Course 1 is comprised of 44 total plates.
3. Quadrant A is comprised of 11 plates (1-11).
4. Quadrant B is comprised of 11 plates (12-22).
5. Quadrant C is comprised of 11 plates (23-33).
6. Quadrant D is comprised of 11 plates (34-44).
7. This numbering convention begins with plate #1 being the first plate of quadrant A.

Drawing is not to scale

TANK MAPS
Dunkin and Bush, Inc.
Honolulu, HI
Tank #20 - 32" Fuel Pipe
Ultrasonic Testing Survey

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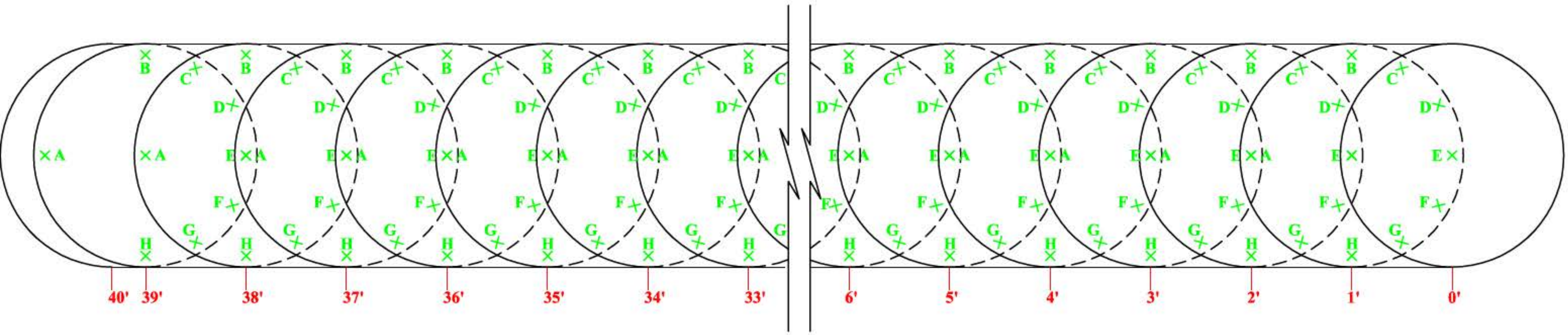
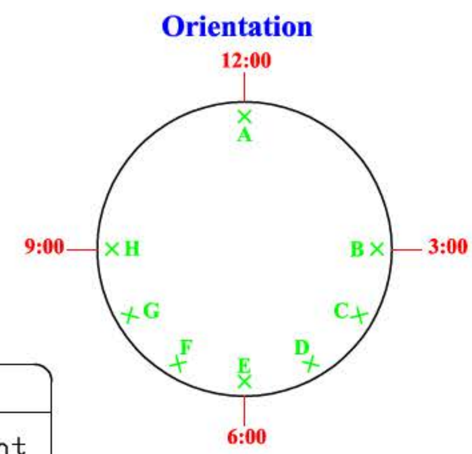
TANK #20 - 32" FUEL PIPE (U.T. Survey)





LEGEND	
×	Ultrasonic Testing Survey Point

Drawing is not to scale

TANK MAPS
Dunkin and Bush, Inc.
Honolulu, HI
Tank #20 - 32" Fuel Pipe
Ultrasonic Testing Survey

	A	B	C	D	E	F	G	H
1'	0.371"	0.377"	0.370"	0.380"	0.370"	0.373"	0.370"	0.370"
2'	0.374"	0.375"	0.370"	0.373"	0.372"	0.373"	0.373"	0.375"
3'	0.375"	0.377"	0.368"	0.377"	0.375"	0.281"	0.369"	0.373"
4'	0.372"	0.371"	0.377"	0.373"	0.369"	0.377"	0.393"	0.375"
5'	0.377"	0.417"	0.372"	0.392"	0.378"	0.363"	0.404"	0.385"
6'	0.430"	0.436"	0.416"{	0.388"	0.419"	0.428"	0.428"	0.415"
7'	0.431"	0.427"	0.428"	0.430"	0.429"	0.431"	0.425"	0.432"
8'	0.429"	0.431"	0.405"	0.425"	0.435"	0.427"	0.426"	0.428"
9'	0.446"	0.452"	0.458"	0.439"	0.448"	0.447"	0.414"	0.418"
10'	0.452"	0.428"	0.459"	0.440"	0.426"	0.416"	0.455"	0.443"
11'	0.420"	0.453"	0.417"	0.424"	0.448"	0.427"	0.449"	0.445"
12'	0.434"	0.419"	0.430"	0.422"	0.425"	0.451"	0.447"	0.431"
13'	0.421"	0.426"	0.445"	0.428"	0.451"	0.418"	0.423"	0.447"
14'	0.423"	0.426"	0.442"	0.411"	0.428"	0.430"	0.422"	0.440"
15'	0.425"	0.414"	0.442"	0.428"	0.438"	0.421"	0.419"	0.428"
16'	0.427"	0.421"	0.449"	0.413"	0.425"	0.452"	0.422"	0.449"
17'	0.431"	0.426"	0.437"	0.444"	0.428"	0.421"	0.448"	0.443"
18'	0.422"	0.423"	0.428"	0.445"	0.442"	0.420"	0.445"	0.436"
19'	0.444"	0.443"	0.419"	0.442"	0.420"	0.418"	0.442"	0.423"
20'	0.432"	0.430"	0.441"	0.447"	0.436"	0.435"	0.446"	0.452"
21'	0.434"	0.421"	0.420"	0.434"	0.416"	0.423"	0.445"	0.438"
22'	0.419"	0.424"	0.414"	0.436"	0.427"	0.430"	0.425"	0.417"
23'	0.426"	0.425"	0.421"	0.445"	0.420"	0.448"	0.423"	0.421"
24'	0.423"	0.419"	0.421"	0.428"	0.438"	0.419"	0.418"	0.423"
25'	0.387"	0.394"	0.402"	0.429"	0.402"	0.389"	0.380"	0.440"
26'	0.410"	0.409"	0.401"	0.441"	0.398"	0.389"	0.383"	0.433"
27'	0.390"	0.400"	0.423"	0.428"	0.390"	0.378"	0.416"	0.424"
28'	0.398"	0.400"	0.401"	0.426"	0.398"	0.399"	0.430"	0.425"
29'	0.390"	0.403"	0.422"	0.442"	0.430"	0.398"	0.390"	0.390"
30'	0.386"	0.400"	0.403"	0.450"	0.406"	0.397"	0.400"	0.385"
31'	0.383"	0.395"	0.396"	0.439"	0.411"	0.394"	0.380"	0.390"
32'	0.391"	0.398"	0.403"	0.400"	0.389"	0.385"	0.424"	0.400"
33'	0.387"	0.400"	0.403"	0.441"	0.406"	0.386"	0.378"	0.425"
34'	0.410"	0.399"	0.405"	0.427"	0.430"	0.414"	0.383"	0.420"
35'	0.399"	0.386"	0.395"	0.412"	0.388"	0.404"	0.390"	0.405"
36'	0.385"	0.416"	0.391"	0.400"	0.398"	0.385"	0.408"	0.404"
37'	0.381"	0.415"	0.414"	0.428"	0.398"	0.397"	0.393"	0.400"
38'	0.381"	0.383"	0.402"	0.428"	0.399"	0.418"	0.395"	0.395"
39'	0.388"	0.384"	0.408"	0.396"	0.407"	0.393"	0.435"	0.430"
40'	0.377"	0.386"	0.423"	0.408"	0.416"	0.399"	0.392"	0.395"
41'	0.386"	0.383"	0.418"	0.394"	0.422"	0.428"	0.422"	0.393"
42'	0.421"	0.408"	0.429"	0.401"	0.416"	0.409"	0.411"	0.416"
43'	0.416"	0.402"	0.399"	0.378"	0.427"	0.416"	0.417"	0.415"
44'	0.424"	0.409"	0.408"	0.390"	0.397"	0.435"	0.418"	0.421"
45'	0.416"	0.408"	0.425"	0.405"	0.402"	0.430"	0.407"	0.411"
46'	0.387"	0.389"	0.392"	0.423"	0.391"	0.409"	0.383"	0.373"
47'	0.379"	0.394"	0.395"	0.387"	0.391"	0.385"	0.383"	0.375"
48'	0.386"	0.389"	0.387"	0.385"	0.414"	0.381"	0.380"	0.411"
49'	0.418"	0.406"	0.395"	0.385"	0.389"	0.383"	0.381"	0.393"

4.0 PLATE TEST SUMMARY

Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
1	Lower Dome	A	1	1	Wall Loss (corner)	0.236
2	Lower Dome	A	1	1	Wall Loss (corner)	0.24
3	Lower Dome	A	1	3	Wall Loss (corner)	0.24
4	Lower Dome	A	1	4	Wall Loss (corner)	0.24
5	Lower Dome	A	1	6	Wall Loss (corner)	0.24
6	Lower Dome	A	1	6	Wall Loss (corner)	0.24
7	Lower Dome	A	1	6	Wall Loss	0.24
8	Lower Dome	A	1	7	Wall Loss (around PP)	0.24
9	Lower Dome	A	1	7	Wall Loss	0.24
10	Lower Dome	A	1	7	Wall Loss	0.241
11	Lower Dome	A	1	8	Wall Loss (corner)	0.24
12	Lower Dome	A	1	8	Wall Loss	0.239
13	Lower Dome	A	1	8	Wall Loss	0.241
14	Lower Dome	A	1	8	Wall Loss	0.242
15	Lower Dome	A	1	8	Wall Loss (corner)	0.24
16	Lower Dome	A	1	8	Wall Loss (corner)	0.237
17	Lower Dome	A	1	9	Wall Loss (corner)	.237/0.240
18	Lower Dome	A	1	10	Wall Loss (corner)	0.238
19	Lower Dome	A	1	10	Wall Loss (corner)	0.24
20	Lower Dome	A	1	10	Wall Loss (corner)	0.24
21	Lower Dome	A	1	10	Wall Loss (around Lug)	0.235
22	Lower Dome	A	1	11	Wall Loss (corner)	0.24
23	Lower Dome	A	1	11	Wall Loss (around PP)	0.237
24	Lower Dome	A	1	11	Wall Loss (around pipe plate)	0.237
25	Lower Dome	B	1	12	Wall Loss	0.242
26	Lower Dome	B	1	12	Wall Loss (corner)	0.237
27	Lower Dome	B	1	13	Wall Loss (corner)	0.234
28	Lower Dome	B	1	13	Wall Loss (corner)	0.228
29	Lower Dome	B	1	13	Wall Loss (corner)	0.24
30	Lower Dome	B	1	13	Wall Loss (around pipe plate)	0.24
31	Lower Dome	B	1	13	Wall Loss (corner)	0.24
32	Lower Dome	B	1	13	Wall Loss (corner)	0.239
33	Lower Dome	B	1	14	Wall Loss	0.24
34	Lower Dome	B	1	14	Wall Loss (corner)	0.235
35	Lower Dome	B	1	14	Wall Loss (around PP)	0.239
36	Lower Dome	B	1	14	Wall Loss (around pipe plate)	0.24
37	Lower Dome	B	1	14	Wall loss (corner)	0.24
38	Lower Dome	B	1	16	Wall Loss (corner)	0.24
39	Lower Dome	B	1	21	Wall Loss (around diamond pl.)	0.244
40	Lower Dome	C	1	25	Wall Loss (around PP)	0.243
41	Lower Dome	C	1	25	Wall Loss (around pipe plate)	0.241
42	Lower Dome	C	1	28	Wall Loss (around bracket)	0.238
43	Lower Dome	C	1	30	Wall loss (PP)	0.238
44	Lower Dome	C	1	30	Wall Loss (corner)	0.239
45	Lower Dome	C	1	32	Wall Loss (around PP)	.237-.240
46	Lower Dome	D	1	37	Wall loss (PP)	0.24
47	Lower Dome	D	1	37-38	LOF, LOF, LOF	.120, .189, .125
48	Lower Dome	D	1	38	Wall Loss (corner)	0.24

4.0 PLATE TEST SUMMARY

Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
49	Lower Dome	D	1	38	Wall Loss (around PP)	0.237
50	Lower Dome	D	1	38-39	LOF	0.089
51	Lower Dome	D	1	38-39	LOF	0.118
52	Lower Dome	D	1	39	Wall loss (PP)	0.23
53	Lower Dome	D	1	40	Wall Loss (corner)	0.24
54	Lower Dome	D	1	40	Wall Loss (around PP)	.238-.240
55	Lower Dome	D	1	42	Wall Loss	0.24
56	Lower Dome	D	1	43	Wall Loss (around PP)	0.24
57	Lower Dome	D	1	44	Wall Loss (around PP)	0.24
58	Lower Dome	D	2	43	Grout Nozzle	0.21
59	Lower Dome	D	2	42	Grout Nozzle	0.23
60	Lower Dome	D	2	41	Grout Nozzle	0.198
61	Lower Dome	D	2	39	Grout Nozzle	.208/. 218
62	Lower Dome	D	2	38	Grout Nozzle	0.208
63	Lower Dome	D	2	37	Grout Nozzle	0.228
64	Lower Dome	D	2	36	Grout Nozzle	0.209
65	Lower Dome	C	2	33	Grout Nozzle	0.22
66	Lower Dome	C	2	32	Grout Nozzle	0.207
67	Lower Dome	C	2	30	Grout Nozzle	0.22
68	Lower Dome	C	2	29	Grout Nozzle	0.212
69	Lower Dome	A	2	7	Grout Nozzle	0.2
70	Lower Dome	A	2	8	Grout Nozzle	0.22
71	Lower Dome	B	2	14	Grout Nozzle	0.212
72	Lower Dome	B	2	15	Grout Nozzle	0.22
73	Lower Dome	B	2	16	Grout Nozzle	0.215
74	Lower Dome	B	2	18	Grout Nozzle	0.211
75	Lower Dome	B	2	19	Grout Nozzle	0.208
76	Lower Dome	B	2	19	Grout Nozzle	0.224
77	Lower Dome	B	3	22	Grout Nozzle	0.23
78	Lower Dome	B	3	22	Grout Nozzle	0.23
79	Lower Dome	B	3	20	Grout Nozzle	0.224
80	Lower Dome	B	3	17	Grout Nozzle	0.212
81	Lower Dome	B	3	17	Grout Nozzle	0.22
82	Lower Dome	B	4	25	Grout Nozzle	0.225
83	Lower Dome	A	2	10	Grout Nozzle	0.236
84	Lower Dome	B	2	20	Grout Nozzle	0.21
85	Lower Dome	C	3	32	Grout Nozzle	0.207
86	Lower Dome	C	3	31	Grout Nozzle	0.199
87	Lower Dome	C	3	26	Grout Nozzle	0.216
88	Lower Dome	C	3	25	Grout Nozzle	0.211
89	Lower Dome	C	3	23	Grout Nozzle	.207/. 217
90	Lower Dome	C	2	23	Grout Nozzle	0.219
91	Lower Dome	C	2	24	Grout Nozzle	0.21
92	Lower Dome	C	2	25	Grout Nozzle	0.213
93	Lower Dome	C	3	28	Grout Nozzle	0.216
94	Lower Dome	C	3	26	Grout Nozzle	0.187
95	Lower Dome	B	4	31	Grout Nozzle	0.215
96	Lower Dome	B	3	22	Grout Nozzle	0.23

4.0 PLATE TEST SUMMARY

Dunkin and Bush, Inc

Honolulu, HI

Tank #20

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
97	Lower Dome	B	3	14	Grout Nozzle	0.22
98	Lower Dome	A	3	10	Grout Nozzle	0.219
99	Lower Dome	A	3	9	Grout Nozzle	0.198
100	Lower Dome	A	4	13	Grout Nozzle	0.219
101	Lower Dome	A	4	11	Grout Nozzle	0.222
102	Lower Dome	A	3	6	Grout Nozzle	0.223
104	Lower Dome	A	3	8	Grout Nozzle	0.23
105	Lower Dome	A	3	6	Grout Nozzle	0.213
106	Lower Dome	A	3	5	Grout Nozzle	0.222
107	Lower Dome	A	4	7	Grout Nozzle	0.214
108	Lower Dome	A	3	4	Grout Nozzle	0.215
109	Lower Dome	A	3	3	Grout Nozzle	0.224
110	Lower Dome	A	4	5	Grout Nozzle	0.22
111	Lower Dome	D	4	65	Grout Nozzle	0.228
112	Lower Dome	C	4	46	Grout Nozzle	0.201
113	Lower Dome	B	3	22	WL	0.232
114	Lower Dome	C	4	40	Grout Nozzle	0.212
115	Lower Dome	C	3	30	Grout Nozzles	0.228/. 207
116	Lower Dome	C	3	29	Grout Nozzle	0.21
117	Lower Dome	C	3	28	Grout Nozzle	0.216
118	Lower Dome	C	3	27	Pitting	0.233
119	Lower Dome	C	3	27	Grout Nozzle	0.205
120	Lower Dome	D	4	48	Grout Nozzle	0.211
121	Lower Dome	D	3	34	Grout Nozzle	0.2
122	Lower Dome	D	3	34	Grout Nozzle	0.215
123	Lower Dome	D	3	35	Grout Nozzle	0.2
124	Lower Dome	D	3	36	Grout Nozzle	0.219
125	Lower Dome	D	4	54	Grout Nozzle	0.212
126	Lower Dome	D	3	37	Grout Nozzle	0.213
126	Lower Dome	D	3	37	Grout Nozzle	0.213
127	Lower Dome	D	3	39	Grout Nozzle	0.204
128	Lower Dome	D	3	39	Grout Nozzle	0.212
129	Lower Dome	D	4	56	Grout Nozzle	0.213
130	Lower Dome	D	4	59	Grout Nozzle	0.207
131	Lower Dome	D	3	40	Grout Nozzle	0.212
132	Lower Dome	D	4	62	Grout Nozzle	0.205
133	Lower Dome	D	3	41	Grout Nozzle	0.21
134	Lower Dome	D	3	43	Grout Nozzle	0.224
135	Lower Dome	D	3	44	Grout Nozzle	0.228
136	Lower Dome	D	3	44	Grout Nozzle	0.224
137	Barrel	D	26	16	Dent	0.1
138	Barrel	D	5	16	Grout Nozzle	0.196
139	Barrel	D	19	16	Grout Nozzle	0.218
140	Barrel	A	12	2	Grout Nozzle	0.219
141	Barrel	A	19	3	Grout Nozzle	0.204
142	Barrel	D	12	14	Grout Nozzle	0.226
143	Barrel	A	27	3	Grout Nozzle	0.202

4.0 PLATE TEST SUMMARY

Dunkin and Bush, Inc.

Honolulu, HI

Tank #20

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
144	Barrel	D	1	14	Grout Nozzle	0.208
145	Barrel	D	5	14	Grout Nozzle	0.204
146	Barrel	A	11	1	LOF	0.157
147	Barrel	A	12	1	Grout Nozzle	0.23
148	Barrel	D	19	14	Grout Nozzle	0.21
149	Barrel	D	27	14	Grout Nozzle	0.207
150	Barrel	D	12	13	Grout Nozzle	0.202
151	Barrel	D	19	13a	Grout Nozzle	0.212
152	Barrel	A	19	4	Grout Nozzle	0.23
153	Barrel	A	C	4b	Grout Nozzle	0.224
154	Barrel	C	1	12	Grout Nozzle	0.204
155	Barrel	D	5	13	Grout Nozzle	0.207
156	Barrel	C	12	12	Grout Nozzle	0.21
157	Barrel	D	27	12	Grout Nozzle	0.204
158	Barrel	D	4	12	Grout Nozzle	0.197
159	Barrel	C	19	12	Grout Nozzle	0.197
160	Barrel	B	27	5	Grout Nozzle	0.221
161	Barrel	B	12	5	Grout Nozzle	0.221
162	Barrel	C	1	10	Grout Nozzle	0.212
163	Barrel	C	5	10	Grout Nozzle	0.204
164	Barrel	C	12	10	Grout Nozzle	0.207
165	Barrel	C	15	11	Low Spot	0.231
166	Barrel	C	23	10	Gouge	0.107 Deep
167	Barrel	C	19	10	Grout Nozzle	0.204
168	Barrel	A	12	4	Grout Nozzle	0.213
169	Barrel	A	1	5	Grout Nozzle	0.219
170	Barrel	A	19	5	Grout Nozzle	0.224
171	Barrel	A	17	4	NRI	N/A
172	Barrel	B	19	7	Grout Nozzle	0.229
173	Barrel	B	28	7	Gouge	0.140 Deep
174	Barrel	B	22	6	LOF, LOF	.113, .121
175	Barrel	B	5	7	Grout Nozzle	0.23
176	Barrel	C	27	11	Grout Nozzle	0.214
177	Barrel	C	12	9	Grout Nozzle	0.204
178	Barrel	C	1	9	Grout Nozzle	0.211
179	Barrel	C	5	9	Grout Nozzle	0.209
180	Barrel	B	27	8	Grout Nozzle	0.203
181	Barrel	C	12	8	Grout Nozzle	0.222
182	Barrel	C	19	9A	Grout Nozzle	0.213
180	Barrel	B	27	8	Grout Nozzle	0.203
181	Barrel	C	12	8	Grout Nozzle	0.222
182	Barrel	C	19	9A	Grout Nozzle	0.213
184	Extension	C	2	24	Grout Nozzle	0.207
185	Extension	C	2	24	Grout Nozzle	0.208
186	Extension	C	2	24	Grout Nozzle	0.22
187	Extension	C	2	25	Grout Nozzle	0.227
188	Extension	C	2	25	Grout Nozzle	0.223
189	Extension	C	2	26	Grout Nozzle	0.2

4.0 PLATE TEST SUMMARY

Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
190	Extension	C	2	27	Grout Nozzle	0.208
191	Extension	C	2	27	Grout Nozzle	0.217
192	Extension	C	2	28	Grout Nozzle	0.199
193	Extension	C	2	28	Grout Nozzle	0.2
194	Extension	C	2	28	Grout Nozzle	0.217
195	Extension	C	2	29	Grout Nozzle	0.21
196	Extension	C	2	30	Grout Nozzle	0.2
197	Extension	C	2	30	Grout Nozzle	0.192
198	Extension	C	2	30	Dent	0.200 Deep
199	Extension	C	2	31	Grout Nozzle	0.219
200	Extension	C	2	31	Grout Nozzle	0.204
201	Extension	C	2	32	Grout Nozzle	0.211
202	Extension	C	2	33	Grout Nozzle	0.211
203	Extension	C	2	33	Grout Nozzle	0.211
204	Extension	C	2	34	Grout Nozzle	0.214
205	Extension	C	2	34	Grout Nozzle	0.21
206	Extension	C	2	35	Grout Nozzle	0.195
207	Extension	C	2	35	Grout Nozzle	0.205
208	Extension	C	2	35	Grout Nozzle	0.213
209	Extension	D	2	36	Grout Nozzle	0.193
210	Extension	D	2	37	Grout Nozzle	0.213
211	Extension	D	2	37	Grout Nozzle	0.2
212	Extension	D	2	37	LOF	0.098
213	Exp Joint	B	1	11	Grout Nozzle	0.205
214	Exp Joint	C	1	12	Grout Nozzle	0.207
215	Extension	C	3	20	Gouge	.160 deep
216	Extension	C	4	10	Patch Plate	0.23
217	Barrel	B	5	8	Grout Nozzle	0.194
218	Barrel	B	19	8	Grout Nozzle	0.23
219	Barrel	B	27	8	LOF, LOF	.131, .137
220	Barrel	B	27	8	General Corrosion	0.23
221	Extension	A	2	3	Gouge	0.21
222	Exp Joint	A	1	4	Grout Nozzle	0.23
223	Exp Joint	A	1	5	Square Plate	0.23
224	Exp Joint	B	1	6	Grout Nozzle	0.236
225	Exp Joint	B	1	8	Grout Nozzle	0.232
226	Extension	B	2	23	Grout Nozzle	0.208
227	Extension	B	2	23	WG	0.127
228	Extension	B	2	22	Grout Nozzle	0.209
229	Extension	B	2	22	Grout Nozzle	0.229
230	Extension	B	2	23	Grout Nozzle	0.236
231	Extension	B	2	21	Grout Nozzle	0.226
232	Extension	B	2	21	Grout Nozzle	0.219
233	Extension	B	2	20	Grout Nozzle	0.224
234	Extension	B	2	20	Grout Nozzle	0.24
235	Extension	B	2	20	Grout Nozzle	0.219
236	Extension	B	2	18	Grout Nozzle	0.209
237	Extension	B	2	19	Grout Nozzle	0.212

4.0 PLATE TEST SUMMARY
Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
238	Exp Joint	D	1	19	Grout Nozzle	0.205
239	Exp Joint	C	1	13	Grout Nozzle	0.211
240	Exp Joint	D	1	15	Grout Nozzle	0.221
241	Extension	D	4	16	Patch Plate	0.225
242	Extension	D	2	47	Grout Nozzle	0.2
243	Extension	D	2	45	Grout Nozzle	0.211
244	Extension	D	2	46	Grout Nozzle	0.202
245	Extension	D	2	46	Grout Nozzle	0.211
246	Extension	D	2	43	Grout Nozzle	0.197
247	Extension	D	2	44	NRI	N/A
248	Extension	D	3	35	NRI	N/A
249	Extension	D	2	42	Grout Nozzle	0.212
250	Extension	D	2	42	Grout Nozzle	0.209
251	Extension	D	2	42	Grout Nozzle	0.215
252	Extension	D	2	40	Grout Nozzle	0.214
253	Extension	D	2	40	Grout Nozzle	0.21
254	Extension	D	2	40	Grout Nozzle	0.203
255	Extension	D	2	40	Dent	0.200 Deep
256	Extension	D	2	41	Grout Nozzle	0.212
257	Extension	D	2	41	Grout Nozzle	0.214
258	Extension	D	4	13	LOF	0.147
259	Extension	D	2	39	Grout Nozzle	0.2
260	Extension	D	2	37	Grout Nozzle	0.203
261	Extension	D	2	38	Grout Nozzle	0.209
262	Extension	D	2	38	Grout Nozzle	0.205
263	Extension	D	2	38	Dent	0.200 Deep
264	Upper Dome	D	A	54	Dent	0.200 Deep
265	Upper Dome	D	A	66	Dent	0.205 Deep
266	Upper Dome	D	A	56	TW (LOF), TW (LOF)	.092, .092
267	Extension	B	2	19	WP	.156 Deep
268	Extension	B	2	16	NRI	N/A
269	Extension	B	2	16	Grout Nozzle	0.212
270	Extension	B	2	17	Grout Nozzle	0.217
271	Extension	B	2	17	Grout Nozzle	0.215
272	Extension	B	2	17	Grout Nozzle	0.196
273	Extension	B	2	15	Grout Nozzle	0.217
274	Extension	B	2	15	Grout Nozzle	0.21
275	Extension	B	2	15	Grout Nozzle	0.219
276	Extension	B	3	10	Gouge	0.21
277	Extension	B	3	10	LOF, LOF	.152, .094
278	Extension	B	3	10	LOF, LOF	.206, .230
279	Extension	B	2	14	Grout Nozzle	0.237
280	Extension	B	2	14	Grout Nozzle	0.235
281	Extension	A	2	4	Grout Nozzle	0.208
282	Extension	A	2	4	Grout Nozzle	0.206
283	Extension	A	2	5	Grout Nozzle	0.195
284	Extension	A	2	5	Grout Nozzle	0.194
285	Extension	A	2	5	Grout Nozzle	0.208

4.0 PLATE TEST SUMMARY

Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
286	Extension	A	2	6	Grout Nozzle	0.198
287	Extension	A	2	8	Grout Nozzle	0.216
288	Extension	A	2	8	Grout Nozzle	0.215
289	Extension	A	2	10	Grout Nozzle	0.224
290	Extension	A	2	10	Grout Nozzle	0.228
291	Extension	A	2	10	Grout Nozzle	0.208
292	Extension	A	2	12	Grout Nozzle	0.21
293	Extension	A	2	7	Grout Nozzle	0.202
294	Extension	A	2	7	Grout Nozzle	0.219
295	Extension	A	2	7	Grout Nozzle	0.194
296	Extension	A	2	9	Grout Nozzle	0.218
297	Extension	A	2	11	Grout Nozzle	0.197
298	Extension	A	2	11	Grout Nozzle	0.208
299	Extension	B	2	13	Grout Nozzle	0.222
300	Extension	B	2	13	Grout Nozzle	0.219
301	Extension	B	2	13	Grout Nozzle	0.215
302	Upper Dome	D	A	57	LOF/Pit, LOF	.234, .144
303	Upper Dome	D	A	60	LOF	0.081
304	Upper Dome	D	A	59	WL	0.165
305	Upper Dome	D	A	69	LOF	0.127
306	Upper Dome	D	A	69	Grout Nozzle	0.2
307	Upper Dome	D	A	69	NRI	N/A
308	Upper Dome	D	A	57	Grout Nozzle	0.211
309	Upper Dome	D	A	63	Grout Nozzle	0.213
310	Upper Dome	C	A	45	Grout Nozzle	0.203
311	Upper Dome	C	A	51	Grout Nozzle	0.225
312	Upper Dome	C	A	37	LOF	0.115
313	Upper Dome	C	A	37	WP, LOF, WP, LOF	.213, .109, .194, .071
314	Upper Dome	C	A	44	LOF (BM), LOF (BM)	.100, .126
315	Upper Dome	C	A	43	Dent	.200 Deep
316	Upper Dome	A	A	39	Grout Nozzle	0.2
317	Upper Dome	A	A	39	Dent	.200 Deep
318	Upper Dome	A	A	15	Grout Nozzle	0.23
319	Upper Dome	A	A	21	Grout Nozzle	0.206
320	Upper Dome	A	A	8	NRI	N/A
321	Upper Dome	A	A	9	Grout Nozzle	0.217
322	Extension	A	3	4	Underside corrosion	0.22
323	Extension	A	3	4	Underside corrosion	0.22
324	Extension	A	3	4	Underside corrosion	0.235
325	Upper Dome	A	A	P10	Patch Plate	0.137
326	Upper Dome	A	A	P11	Patch Plate	0.198
327	Extension	A	2	3	Grout Nozzle	0.201
328	Extension	A	2	3	Dent	.160 deep
329	Extension	A	2	3	Arc Gouge	0.160 Deep
330	Extension	A	2	3	Arc Gouge	0.160 Deep
331	Extension	B	2	13	Grout Nozzle	0.222
332	Extension	B	2	13	Grout Nozzle	0.219
333	Extension	B	2	13	Grout Nozzle	0.215

4.0 PLATE TEST SUMMARY
Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
334	Extension	A	2	7	Underside corrosion	0.137
335	Extension	A	3	5	Underside corrosion	0.208
336	Upper Dome	C	B	36	Grout Nozzle	0.197
337	Upper Dome	C	B	42	TW (LOF)	0.14
338	Upper Dome	D	B	66	Grout Nozzle	0.217
339	Upper Dome	D	B	60	Grout Nozzle	0.218
340	Upper Dome	D	B	57	Dent	.200 Deep
341	Upper Dome	D	B	53	LOF, LOF, LOF	.083, .217, .064
342	Upper Dome	D	B	54	Grout Nozzle	0.206
343	Upper Dome	C	B	48	Grout Nozzle	0.212
344	Upper Dome	C	B	42	Grout Nozzle	0.212
345	Upper Dome	C	B	39	LOF	0.169
346	Upper Dome	C	B	47	LOF, LOF	.188, .221
347	Upper Dome	C	B	48	Hole (BS)	.244 Deep
348	Upper Dome	C	B	51	NRI	N/A
349	Upper Dome	B	B	31	Dent	.160 Deep
350	Upper Dome	B	B	24	Grout Nozzle	0.221
351	Upper Dome	B	B	29	Arc Gouge	0.160 Deep
352	Upper Dome	B	B	29	Arc Gouge	0.160 Deep
353	Upper Dome	B	B	19	Arc Gouge	0.160 Deep
354	Upper Dome	B	B	22	Pit (NRI)	N/A
355	Upper Dome	A	B	6	Grout Nozzle	0.214
356	Upper Dome	A	B	12	Grout Nozzle	0.21
357	Upper Dome	A	A	15	WP	0.062
359	Upper Dome	B	A	32	LOF, LOF, LOF, LOF, LOF	.206, .104, .214, .111, .110
360	Upper Dome	B	A	18	LOF	0.217
361	Upper Dome	B	A	33	Grout Nozzle	0.209
362	Upper Dome	B	A	33	TW (LOF)	0.134
363	Upper Dome	B	A	33	TW (LOF)	0.169
364	Upper Dome	B	B	30	LOF	0.117
365	Upper Dome	B	B	30	LOF	0.093
366	Upper Dome	B	B	30	LOF	0.115
367	Upper Dome	B	B	30	Gouge BS)	0.137
368	Upper Dome	B	B	30	Grout Nozzle	0.217
369	Upper Dome	B	A	29	WP (limited scan-interference)	.125 dia
370	Upper Dome	B	A	31	NRI	N/A
371	Extension	A	2	7	Grout Nozzle	0.202
372	Extension	A	2	7	Grout Nozzle	0.194
373	Extension	A	2	7	Grout Nozzle	0.219
374	Upper Dome	B	A	27	Grout Nozzle	0.214
375	Upper Dome	B	B	35	TW (LOF)	0.143
376	Upper Dome	A	C	4	Underside corrosion	0.23
377	Upper Dome	A	B	8	LOF	0.053
378	Upper Dome	A	C	8	LOF	0.132
379	Upper Dome	A	B	14	LOF, LOF, LOF	.156, .133, .205
380	Upper Dome	A	B	17	LOF	0.109
381	Upper Dome	A	B	18	WP (NRI)	.063 dia
382	Upper Dome	B	C	17	LOF, LOF	0.116, .073

4.0 PLATE TEST SUMMARY

Dunkin and Bush, Inc.
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Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
383	Upper Dome	B	C	17	LOF, LOF	.225, .223
384	Upper Dome	B	B	35	LOF	0.097
385	Upper Dome	B	B	35	LOF/Pit	0.106
386	Upper Dome	B	C	23	Grout Nozzle	0.18
387	Upper Dome	B	C	23	Dent	.250 deep
388	Upper Dome	B	C	23	Dent	.100 deep
389	Upper Dome	B	C	20	Gouge (BM)	.137 Deep
390	Upper Dome	B	C	18	Grout Nozzle	0.208
391	Upper Dome	A	C	11	Grout Nozzle	0.22
392	Upper Dome	A	B	14	LOF	0.207
393	Upper Dome	A	B	17	LOF	0.127
394	Upper Dome	D	C	46	LOF, LOF, LOF, LOF, WP, LOF	.090, .150, .097, .199, .125, .115
395	Upper Dome	D	C	46	LOF	0.23
396	Upper Dome	D	C	46	Grout Nozzle	0.212
397	Upper Dome	D	C	44	LOF	0.091
398	Upper Dome	D	C	38	Grout Nozzle	0.22
399	Upper Dome	D	C	43	Grout Nozzle	0.22
400	Upper Dome	D	C	43	NRI	N/A
401	Upper Dome	C	C	33	LOF	0.2
402	Upper Dome	D	C	35	Grout Nozzle	0.229
403	Upper Dome	C	C	30	Dent	.180 deep
404	Upper Dome	C	C	30	Grout Nozzle	0.218
405	Upper Dome	C	C	26	Grout Nozzle	0.218
406	Upper Dome	D	C	40	LOF/Pit	0.06
407	Upper Dome	C	C	34	LOF	0.1
408	Upper Dome	C	C	34	LOF, LOF	.131, .111
409	Upper Dome	A	C	13	LOF	0.089
410	Upper Dome	B	C	15	Grout Nozzle	0.19
411	Upper Dome	B	B	18	Grout Nozzle	0.21
412	Upper Dome	A	C	6	Grout Nozzle	0.225
413	Upper Dome	A	C	11	LOF, LOF	.229, .149
414	Upper Dome	A	C	6	LOF, LOF	.212, .229
415	Upper Dome	B	C	21	Gouge (BS),Pit (BS)	.132, .107
416	Upper Dome	A	C	12	WP	0.089
417	Upper Dome	C	C	29	LOF, G, LOF, LOF, LOF, G	.091, .115, .05, .106, .054, .16
418	Upper Dome	C	C	29	Grout Nozzle	0.236
419	Upper Dome	A	B	3	Dent	.200 deep
420	Upper Dome	A	A	3	Grout Nozzle	0.23
421	Upper Dome	D	D	48	TW (LOF)	0.082
422	Upper Dome	D	D	44	Grout Nozzle	0.2
423	Upper Dome	D	D	39	LOF, LOF	.106, .218
425	Upper Dome	D	D	41	Grout Nozzle	0.206
426	Upper Dome	C	D	35	Gouge (BM)	.244 Deep
427	Upper Dome	C	D	36	Grout Nozzle	0.2
428	Upper Dome	C	D	29	Grout Nozzle	0.204
429	Upper Dome	C	D	32	Grout Nozzle	0.205
430	Upper Dome	C	D	30	Dent	.200 deep
431	Upper Dome	D	D	25	Grout Nozzle	0.223

4.0 PLATE TEST SUMMARY
Dunkin and Bush, Inc.
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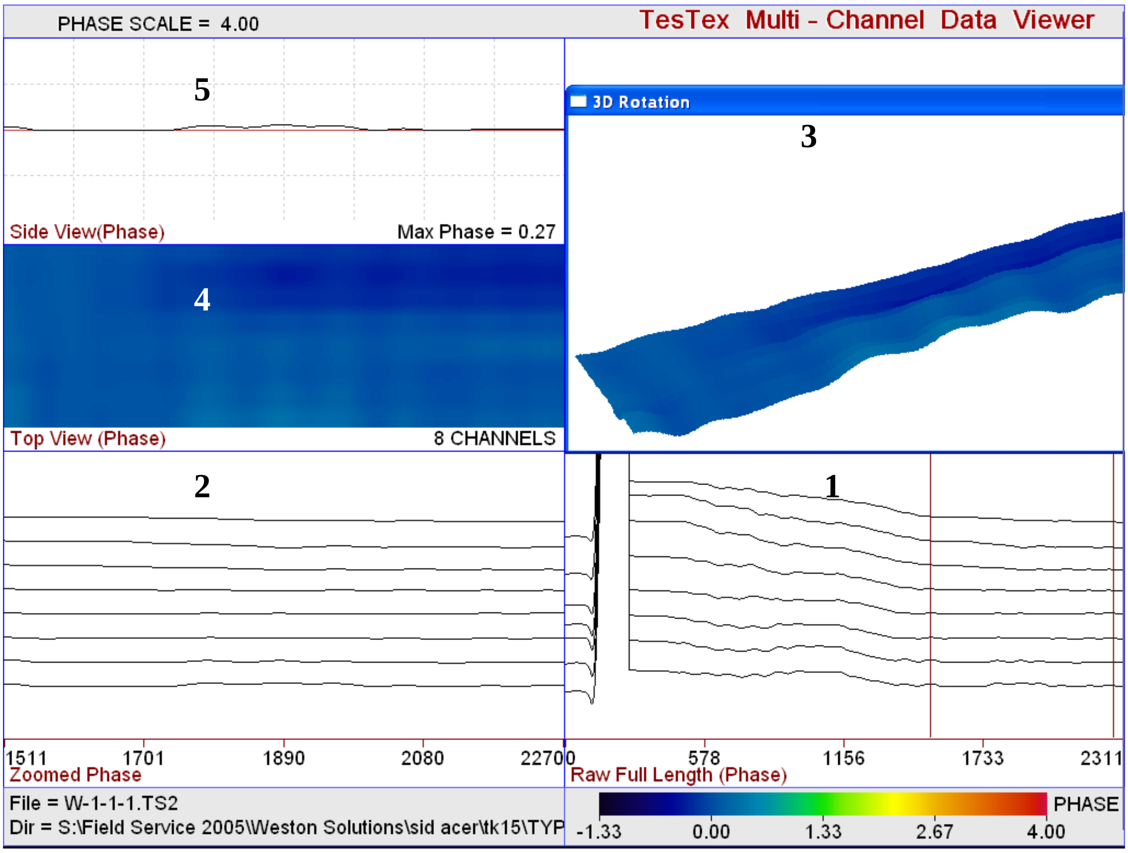
Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
432	Upper Dome	D	E	20	TW	0.09
433	Upper Dome	D	E	20	TW	0.077
434	Upper Dome	D	E	20	TW	0.09
435	Upper Dome	D	E	20	TW	0.075
436	Upper Dome	C	E	16	LOF	0.1
437	Upper Dome	B	D	16	LOF, LOF	.120, .067
438	Upper Dome	B	D	16	Grout Nozzle	0.22
439	Upper Dome	B	D	17	LOF	0.096
440	Upper Dome	A	C	6	Grout Nozzle	0.23
441	Upper Dome	B	D	24	LOF	0.11
442	Upper Dome	B	D	21	LOF	0.185
443	Upper Dome	A	D	9	Grout Nozzle	0.21
444	Upper Dome	A	D	5	Grout Nozzle	0.205
445	Upper Dome	B	D	13	Grout Nozzle	0.21
446	Upper Dome	B	D	22	Dent	.180 deep
447	Upper Dome	B	E	10	LOF, LOF	.193, .235
448	Upper Dome	B	D	21	Grout Nozzle	0.215
449	Upper Dome	B	D	21	LOF	0.214
450	Upper Dome	D	D	43	Dent	.190 deep
451	Upper Dome	D	C	40	LOF	0.085
452	Upper Dome	C	D	32	LOF	0.099
453	Upper Dome	D	D	32	LOF/Pit, LOF	.196, .101
454	Upper Dome	D	D	47	Dent	0.200 Deep
455	Upper Dome	B	D	15	LOF,LOF	.099, .117
456	Lower Dome	A	2	2	Grout Nozzle	0.212
457	Lower Dome	A	4	2	Grout Nozzle	0.23
458	Lower Dome	A	3	1	Grout Nozzle	0.2
459	Barrel	A	5	1	Grout Nozzle	0.22
460	Barrel	A	1	1	Grout Nozzle	0.209
461	Barrel	D	12	16	Grout Nozzle	0.211
462	Barrel	D	19	16	Grout Nozzle	0.216
463	Barrel	D	26	P1	LOF, LOF	.077, .088
464	Barrel	D	27	1	Grout Nozzle	0.205
465	Extension	A	C2	1	NRI	N/A
466	Barrel	D	26	16	NRI	N/A
467	Barrel	D	26	16	LOF, LOF	.079, .083
468	Catwalk	A	3	2	LOF	0.077
469	Manway	A	3	Manway	LOF, LOF	.136, .239
470	Upper Dome	A	A	8	LOF	0.101
471	Upper Dome	B	A	31	LOF	0.071
472	Upper Dome	B	B	20	LOF	0.214
473	Upper Dome	B	B	20	LOF, LOF	.087, .127
474	Upper Dome	A	C	1	LOF, LOF	.091, .103
475	Upper Dome	A	C	3	LOF	0.138
476	Extension	D	4	39	LOF	0.12
477	Upper Dome	A	A	17	LOF, LOF, LOF, LOF	.069, .184, .089, .184
478	Upper Dome	D	A	65	LOF/POR	0.179
479	Upper Dome	D	A	66	LOF	0.085

4.0 PLATE TEST SUMMARY

Dunkin and Bush, Inc.
Honolulu, HI
Tank #20

Flaw No.	Tank Section	Quad	Row / Course	Plate / Vertical Drop	Description of Flaw / Defect	Remaining Thickness/ Depth
480	Upper Dome	D	C	38	LOF/Pit, LOF/Pit	.107, .212
481	Upper Dome	B	C	20	LOF, LOF, LOF	.112, .202, .087
482	Lower Dome	B	1	12, 13	WELD CRACK	.75 Long

5.0 TYPICAL WAVEFORM
Dunkin and Bush, Inc.
Honolulu, HI
Tank #20



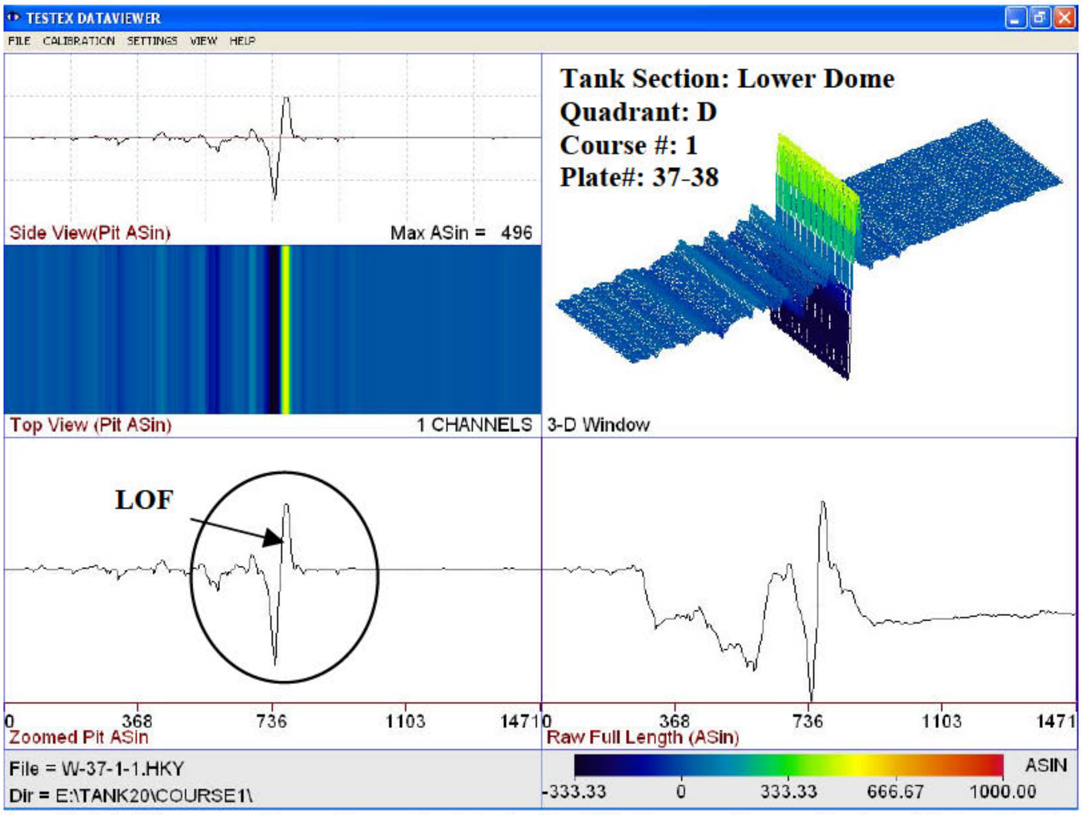
Shown above is a typical **TS-2000** waveform collected from the Barrel of Tank #15. This particular plate exhibits nominal wall thickness.

The **TS-2000** display has 5 windows to facilitate the interpretation of each plate. Window 1 shows raw data from the scanner before the signal is processed or filtered. Window 2 shows the raw data filtered and processed. Window 3 shows a 3-D view of the plate. Window 4 shows a topside view of the plate. Window shows the highest and lowest points of the plate baseline.

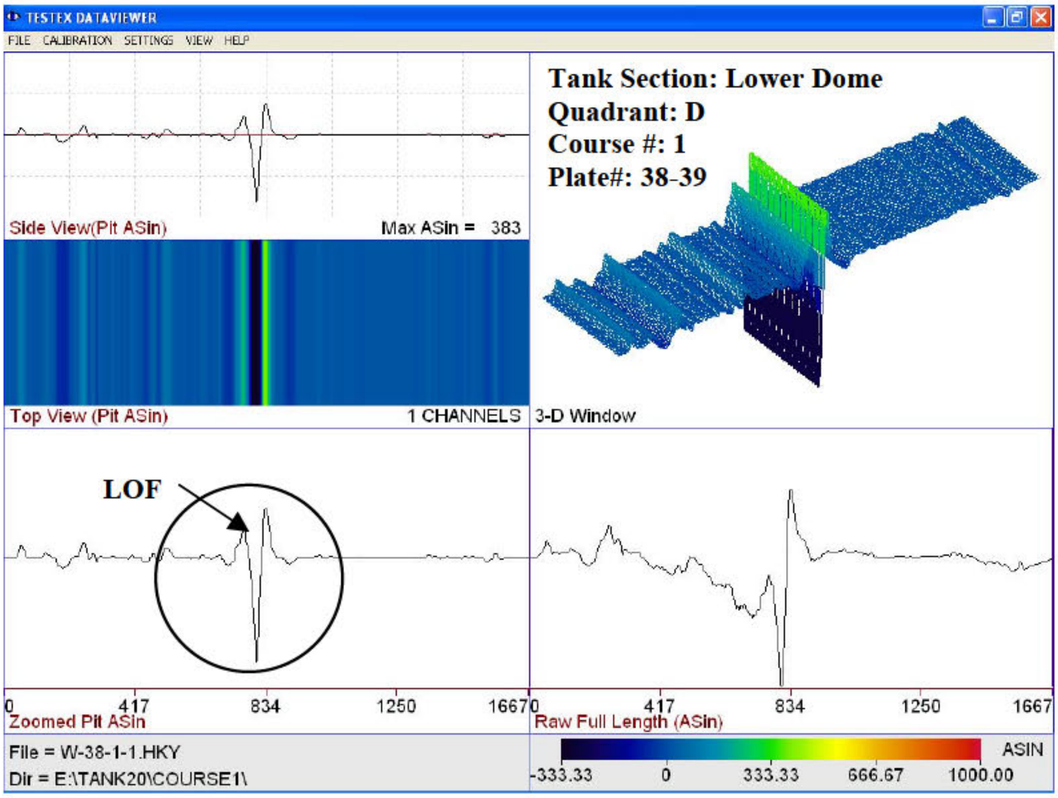
The **TS-2000** scanner is comprised of 8 sensors, which gives more sensitivity to pitting and cracking. A line in windows 1, 2, and 3 individually represents each sensor. Window 4 shows each sensor, and is color marked as it detects wall loss. Any rise in the waveform indicates wall loss. The magnitude of the response is given by a color, and is coded to the right of the waveform. From this color and comparing it to a calibration, a percent wall loss or wall remaining value can therefore be determined.

APPENDIX A – SAMPLE WAVEFORM

APPENDIX A – SAMPLE WAVEFORMS

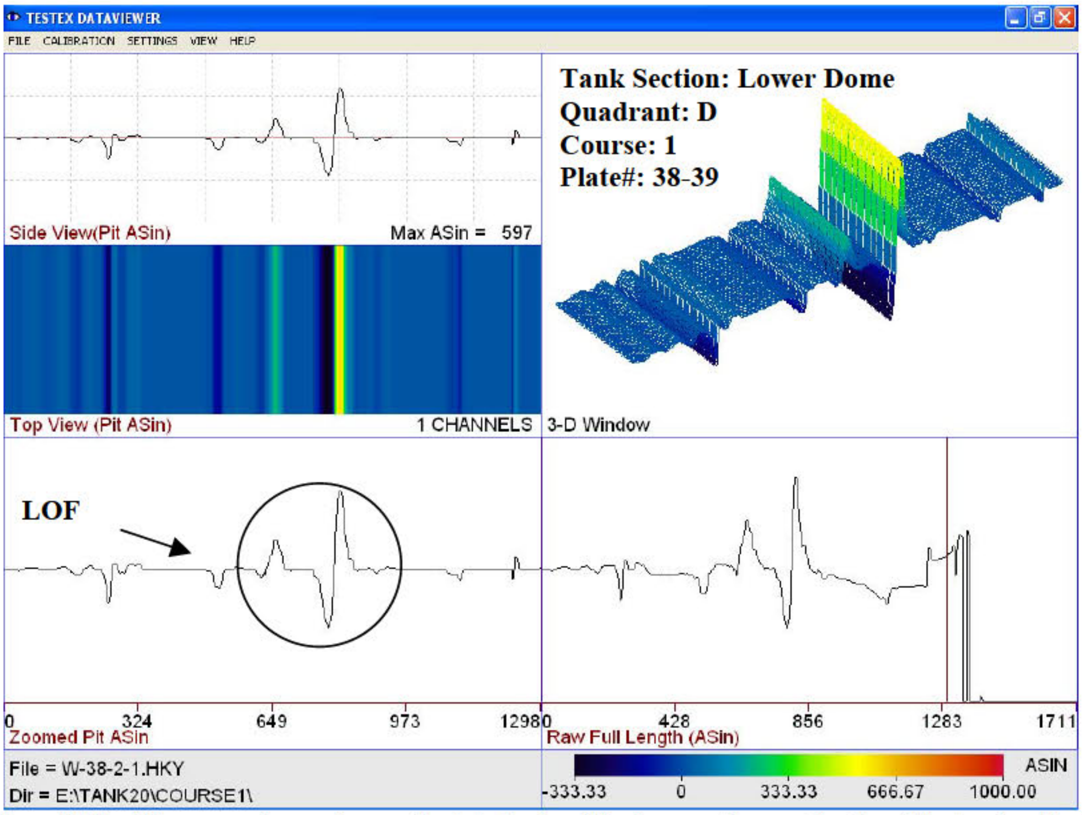


Flaw # 47: The waveform above depicts lack of fusion on the vertical weld at a depth of .120".

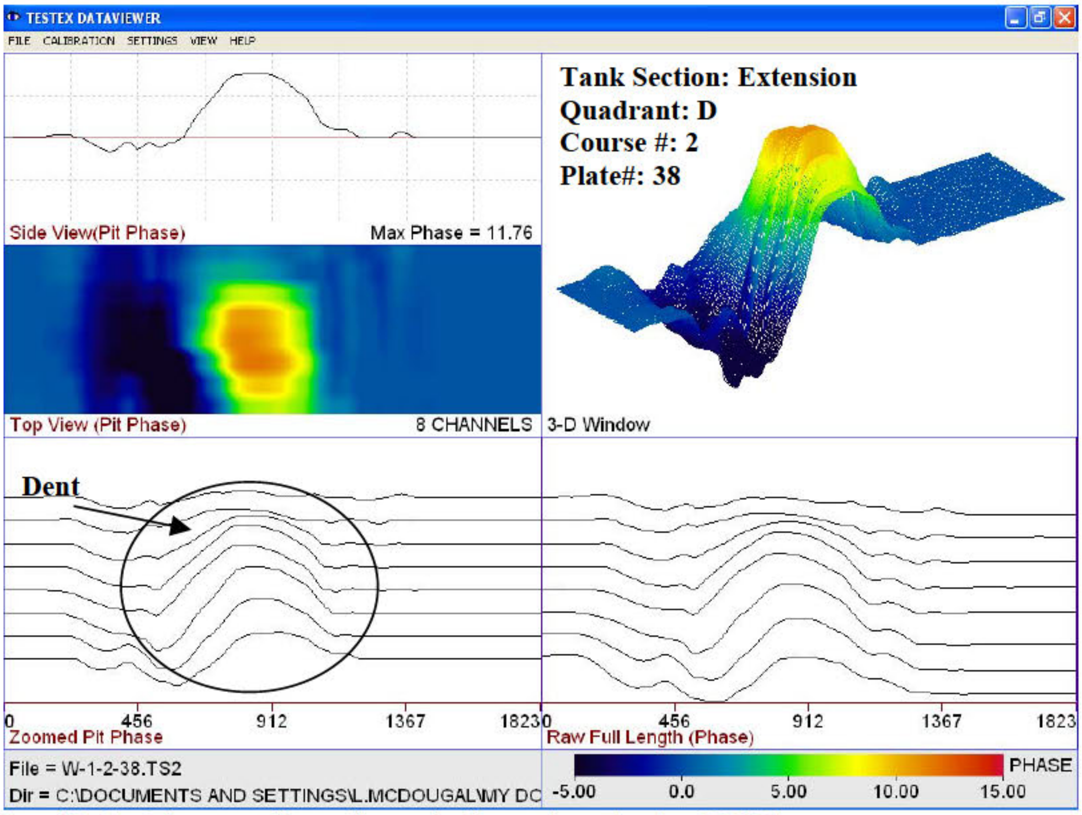


Flaw # 51: The waveform above depicts lack of fusion on the vertical weld at a depth of .118".

APPENDIX A – SAMPLE WAVEFORMS

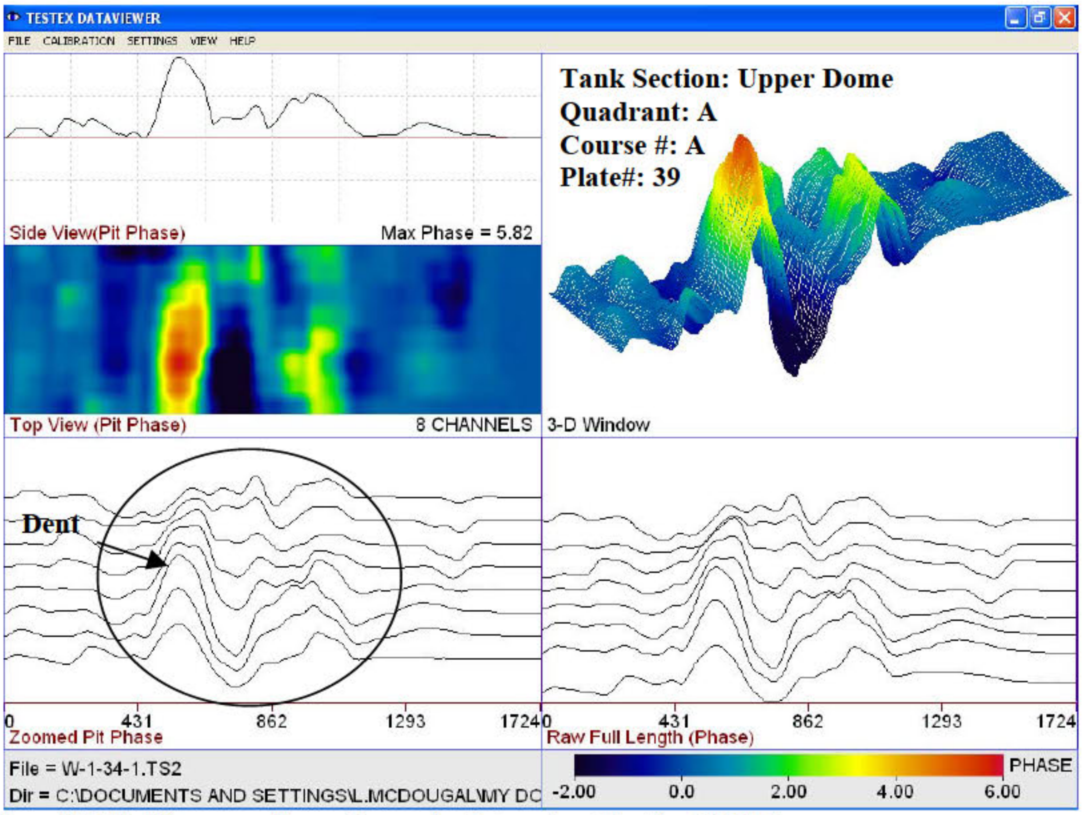


Flaw # 50: The waveform above depicts lack of fusion on the vertical weld at a depth of .089".

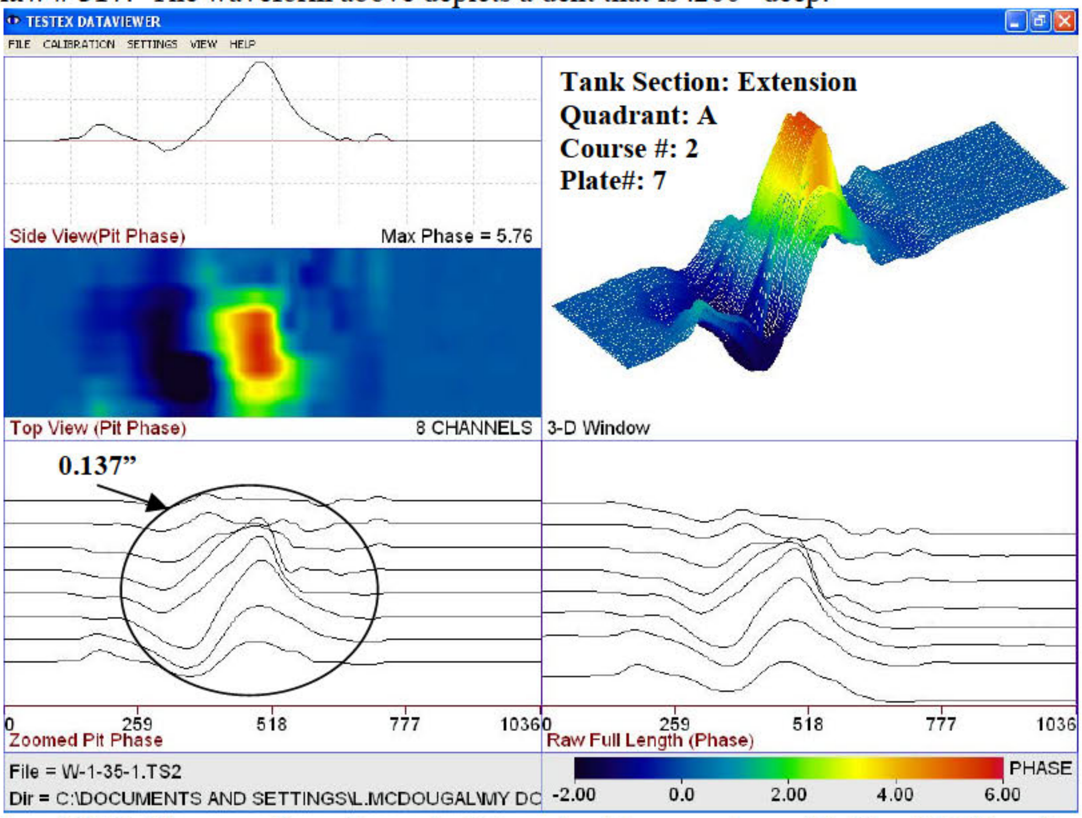


Flaw # 263: The waveform above depicts a dent that is .200" deep.

APPENDIX A – SAMPLE WAVEFORMS

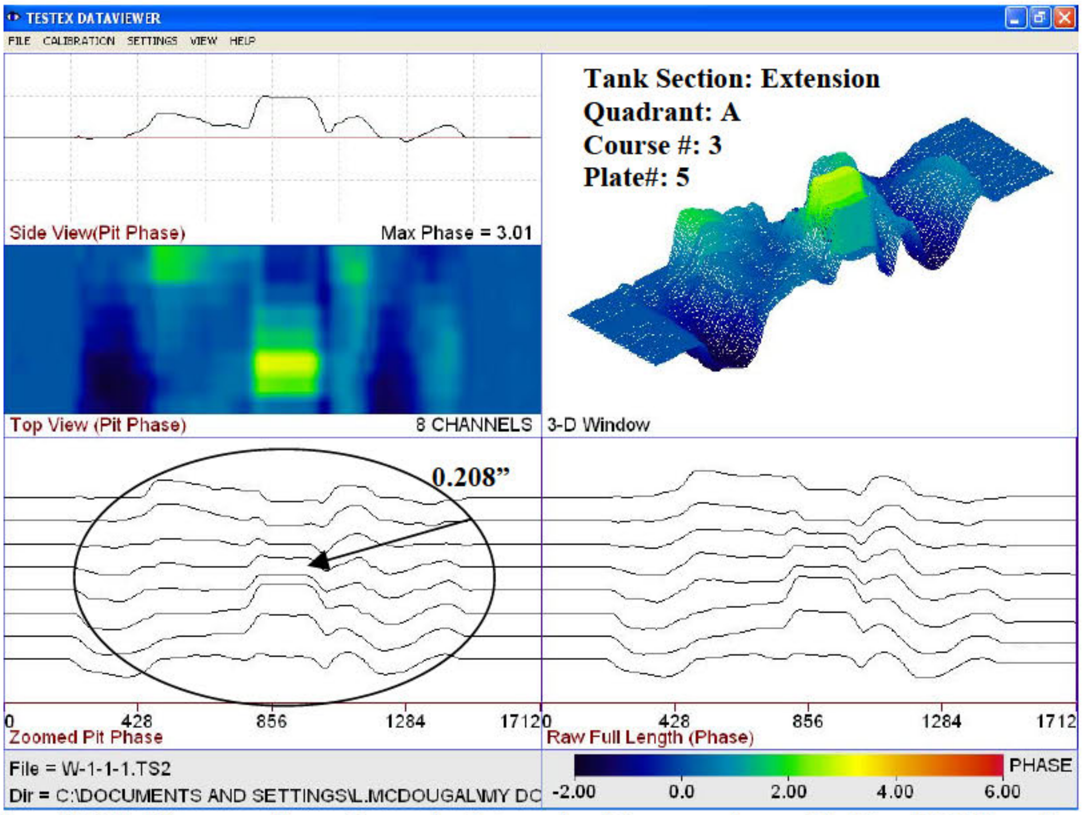


Flaw # 317: The waveform above depicts a dent that is .200" deep.

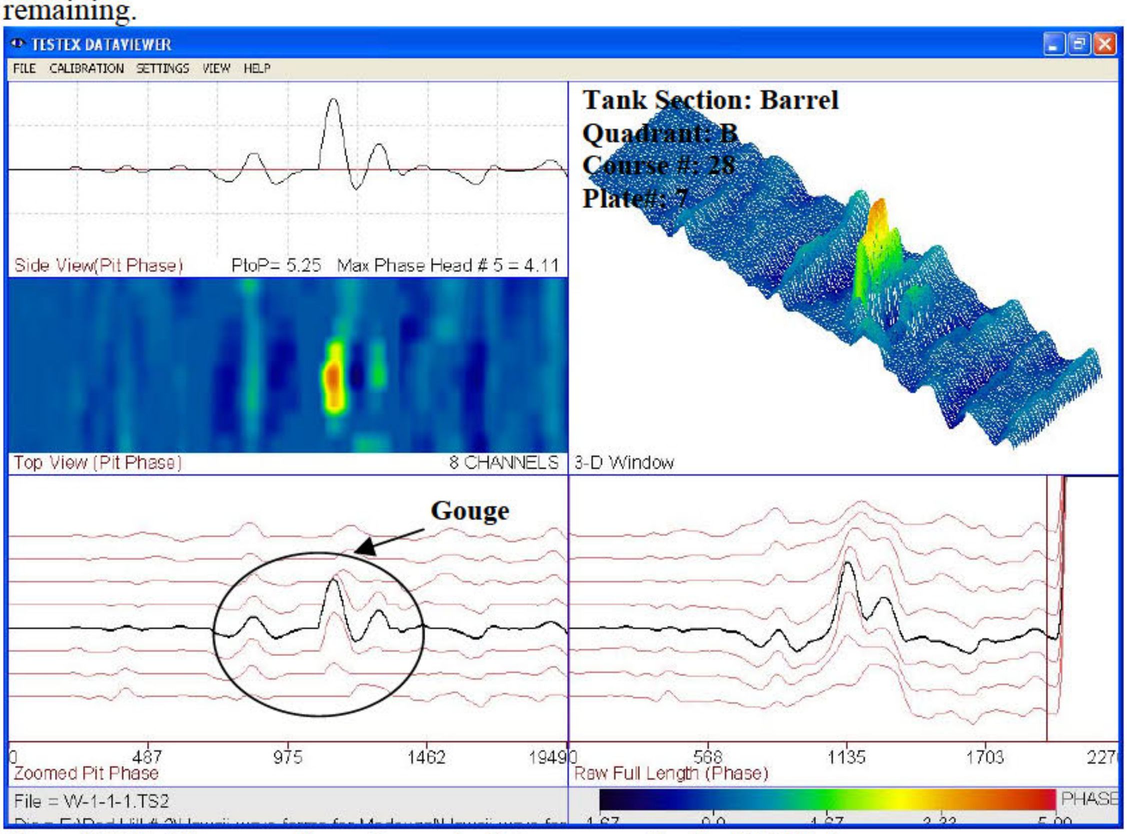


Flaw # 334: The waveform above depicts underside corrosion exhibiting 0.137" wall remaining.

APPENDIX A – SAMPLE WAVEFORMS

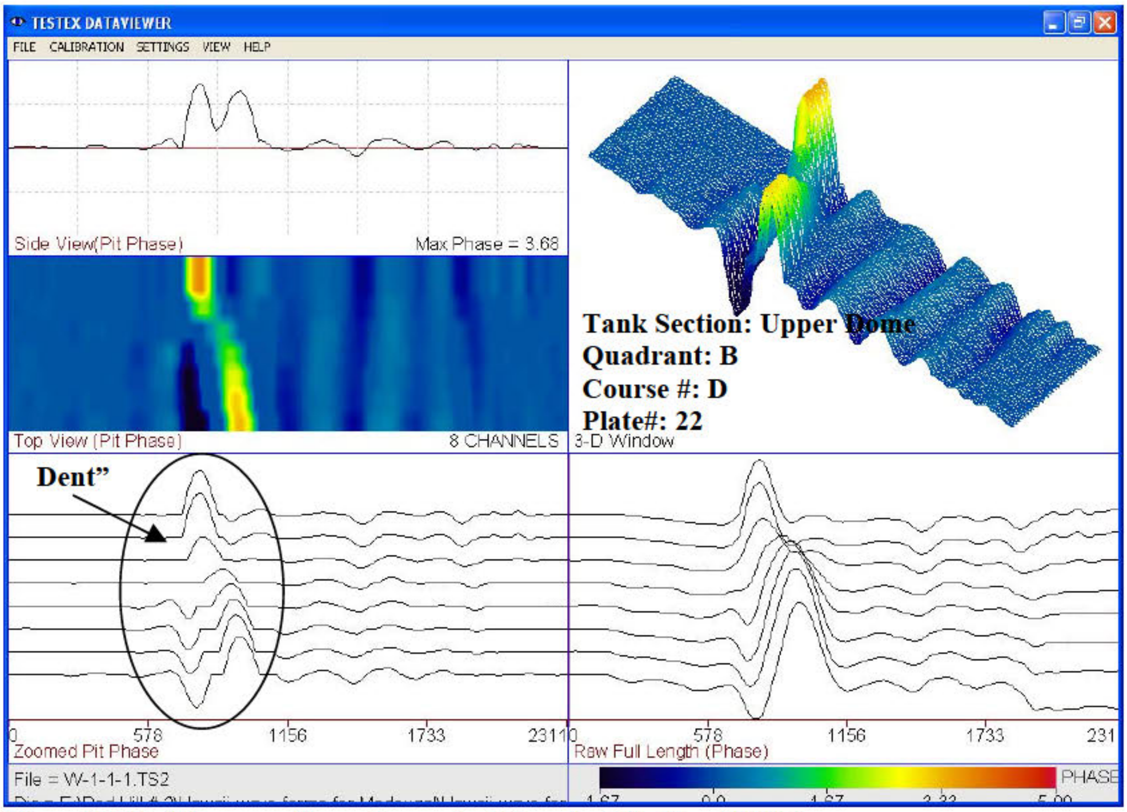


Flaw # 335: The waveform above depicts underside corrosion exhibiting 0.208" wall remaining.



Flaw # 173: The waveform above depicts a gouge that is 0.140" deep.

APPENDIX A – SAMPLE WAVEFORMS

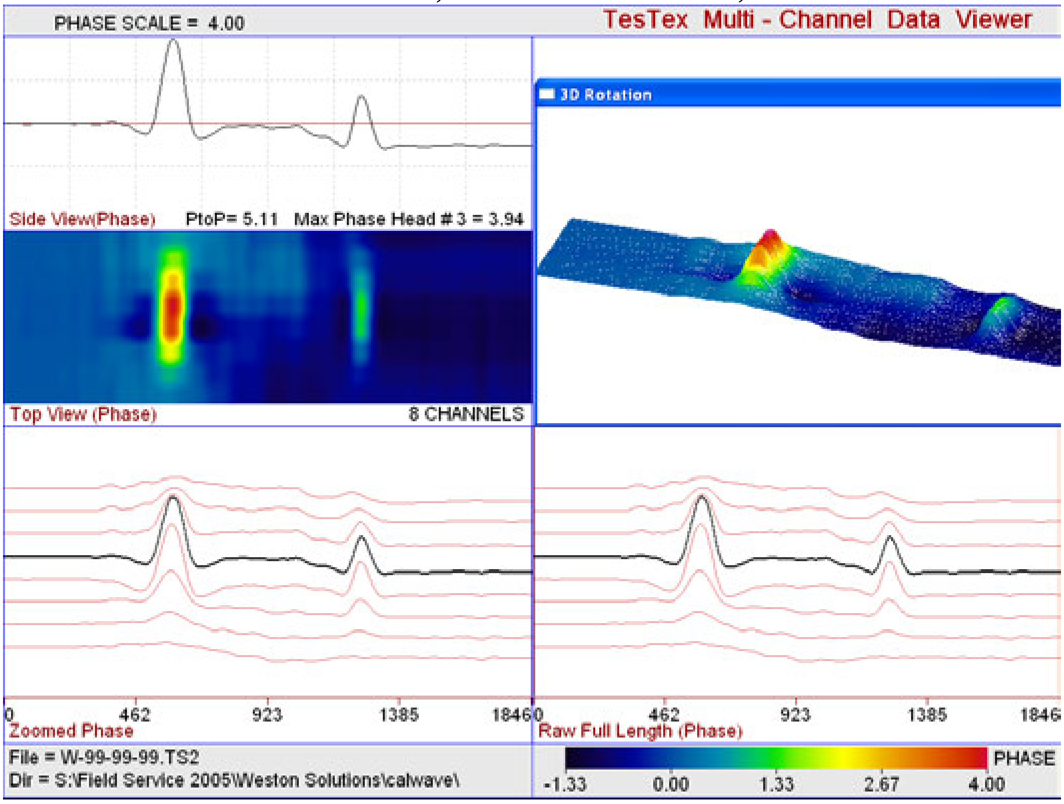


Flaw # 446: The waveform above depicts a dent that is .180" deep.

APPENDIX B – CALIBRATION

APPENDIX B – CALIBRATION

* Calibration Waveform: 5/16 Pits, 0.250" Wall Thickness, Carbon Steel Plate



*Calibration Table: 5/16 Pits, 0.250" Wall Thickness, Carbon Steel Plate

FREQ.: 10 Hz., PROBE#: 8.0" Scanner, FILE#: 99-99-99, DATE: 08/15/2008, UNIT#: TS-2000

% WL 1 = 30.00, PHASE 1 = 0.91, AMP 1 = 0.10 | *
% WL 2 = 60.00, PHASE 2 = 1.96, AMP 2 = 0.10 | * [QUADRATIC FIT]%

WALL LOSS	DELTA PHASE	DELTA LNA	WALL REMAINING
5.0	0.14	0.03	0.238
10.0	0.29	0.05	0.225
15.0	0.44	0.06	0.213
20.0	0.59	0.08	0.200
25.0	0.75	0.09	0.188
30.0	0.91	0.10	0.175
35.0	1.08	0.11	0.163
40.0	1.25	0.11	0.150
45.0	1.42	0.11	0.138
50.0	1.60	0.11	0.125
55.0	1.78	0.11	0.113
60.0	1.96	0.10	0.100
65.0	2.15	0.09	0.088
70.0	2.34	0.08	0.075

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

Principles of LFET

Low Frequency Electromagnetic Technique (LFET) was developed out of further research of Remote Field Electromagnetic Technique (RFET). The main difference of LFET is the placement of the sensors between the two poles of an electromagnetic driver.

With a low frequency AC driver signal of 3 to 40 Hz for carbon steel (see Figure 1), the driver signal fully penetrates the material being tested. When the scanner passes over an area with no defects, the magnetic fields are not distorted.

When the test material has a defect and the sensors are located above that defect, distortions in the magnetic field indicate presence of the flaw. LFET instruments measure this distortion as changes in phase and amplitude. Depth of the flaw is proportional to these phase and amplitude changes. Diameter of the defect is related to the number of sensors affected.

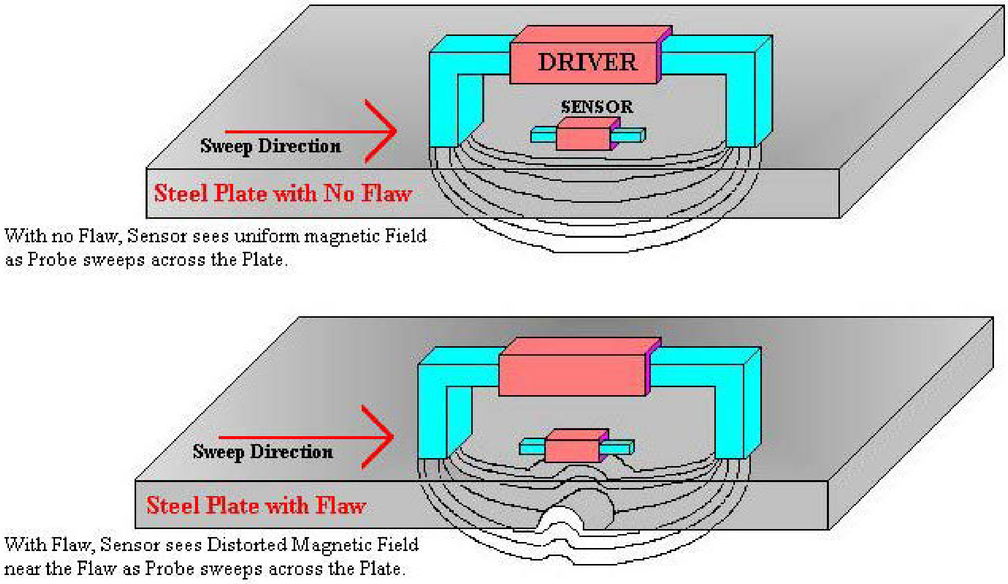


Figure 1.
Principles of Low Frequency Electromagnetic Technique (LFET)

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

Tank Floor Scanning Theory/Background

FALCON 2000 SYSTEM

The TesTex Tank Floor Inspection System consists of a sixteenth inch modular swath containing 32 probe heads. This configuration allows for a 100% coverage of the tank plate. The probe emits a very low frequency electromagnetic field which penetrates the tank floor. Any variation in the tank floor thickness will cause the electromagnetic field to change. These changes are very small, which makes it necessary to use digital signal processing to enhance the resulting signal. The resulting processed signal is in the form of phase and amplitude readings. Calibration tables are used to convert these signals into percentage wall loss values.

PROCEDURES

Each tank floor is mapped out by measuring the length, width, and orientation of the individual plates. The wall loss information for each plate is stored on a floppy disk.

SOFTWARE

The data acquisition module collects the plate data at a given sample rate. The menu-driven program provides for real-time display of phase, amplitude, and probe position across the plate. The x-y geometry of the plate, probe speed, and other details are also handled by the data acquisition module.

The data analysis and display module contain the calibration curves for wall thinning, volume losses, and pitting. His module correlates calibration standards information with the plant data for flaw sizing and evaluation. Several routines for digital the filtering, averaging techniques, background evaluation, curve fitting, and other useful signal processing techniques are also available. Up to 16 waveforms can be displayed simultaneously in the screen while “zooming” algorithms are used to easily examine small segments of the waveforms.

Plate Scanning Theory/Background

To test vertically/horizontally-oriented plates, the ***TS 2000*** scanner is placed on an unobstructed area on the topside of one of the plates. The equipment is then zeroed using the ***TS 2000 PLATE SCAN*** software’s auto-set function. This action also selects the right time constant, sets the gains of the internal amplifiers, and ensures that the data is displayed on the screen as it is being collected.

After zeroing, the scanner is moved to the beginning of the scan sweep area. The scanner is then gradually moved across the surface of the tube and data is collected via magnetic medium on the PC. The processing of the data occurs real-time and the data is stored as several waveforms and stored as several signal responses. Among these are phase and amplitude for each individual channel.

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

SYSTEM DESCRIPTION

ELECTRONICS: The digital system consists of function generators, power amplifiers, difference amplifiers, phase rotators, auto-zero phase shifters, A-to-D converters, digital controllers, etc. One of the key design objectives was to achieve as low a noise as possible. We detect phase changes to an accuracy of 1/10 of a degree and amplitude signals of a fraction of a microvolt. The ***TS 2000*** contains all the electronics and software for data acquisition. It contains an internal A-to-D converter, which connects to the PC through a serial port.

SOFTWARE: Consists of two modules

The data acquisition module collects the tube data at a given sample rate. The menu driven, user-oriented program provides for real-time display of phase, amplitude, and probe position in the tube. The row and column of the tube, probe speed, and other bookkeeping details are also handled by the data acquisition module.

The data analysis and display module contains the calibration curves for plate thinning, volume losses, pits, vibration/fret wear, and correlates the calibration standard information with the actual plant data for flaw sizing and evaluation. It has routines for digital filtering, averaging techniques, background evaluation, curve fitting, and other useful signal processing techniques. Up to three waveforms can be displayed simultaneously on the screen and the "zooming" algorithm enables the user to easily examine small segments of the waveform.

DETECTION ACCURACY

The ***TesTex, Inc.*** developed lock-in amplifier is capable of measuring very low level signals in the microvolt range and can measure small phase angle changes of a fraction of a degree, even in the presence of a considerable amount of noise. This system, when used in conjunction with the calibration standards: partial and through-wall pitting, gradual wall thinning. Hydrogen damage, etc. and their respective calibration curves, allows us to measure small gradual wall losses on the order of 10%, pits of diameter 0.062" (1.57mm), and vibration/fret wear of five volume percent.

Weld Scanning Theory/Background

TesTex, Inc. has developed a special electromagnetic probe based on the principle of achieving a “balanced field” for the probe. This probe is also very sensitive to small changes in electromagnetic field and the noise is significantly reduced by appropriate phase rotation of the horizontal and vertical component of the signal. A single element probe of this type was used to detect “surface and subsurface cracking” This probe was called Hawkeye and it is successfully used for testing cracks, welds, pipes, plates, etc.

The system works by PHASE ROTATING liftoff noise into the ACOS signal while leaving the CRACK signal in the ASIN waveform. Processing is used to reduce gradual changes in the waveform to make detection easier.

APPENDIX C – TEST METHODS/PROCEDURES AND EQUIPMENT DESCRIPTION

Ultrasonic Shear Wave (Angle Beam) Testing Description

The instrument used for Shear Wave or Angle Beam Testing is a simple pulse-echo flaw detector with A-Scan, receiving, and transmitting capabilities in which the user can size the length, depth, and distance of the flaw.

The primary reason for using shear waves is for the detection of discontinuities with geometries and orientations non-parallel to the testing surface. The Angle Beam technique is extensively used for weld testing at ½ step and full step distances. The frequency range specifically for weld testing with angle beam transducers is 1MHz to 5MHz. The most common Angle Beam contact transducers are designed to produce shear waves of 45, 60, and 70° in steel.

APPENDIX D – TANK INTERIOR PHOTOGRAPHS

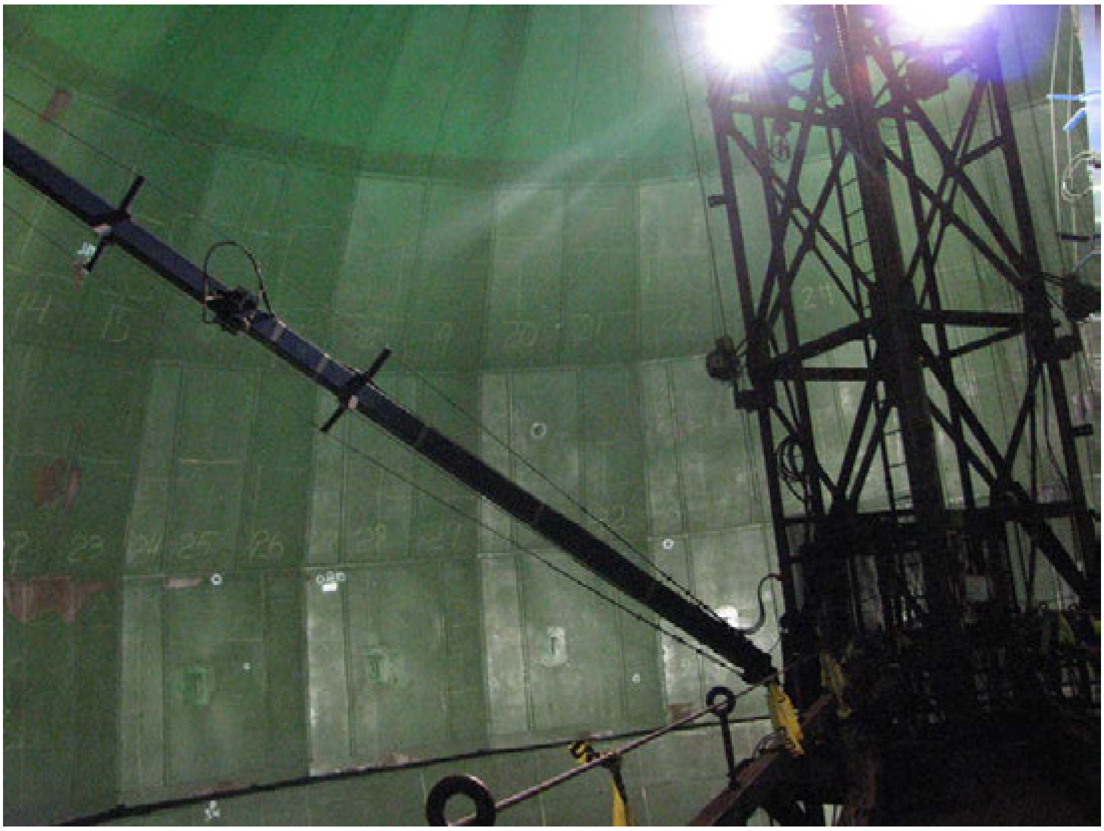
Note: Pictures in this section are from tank # 2. No pictures were taken in tank #20

APPENDIX D – TANK INTERIOR PHOTOGRAPHS

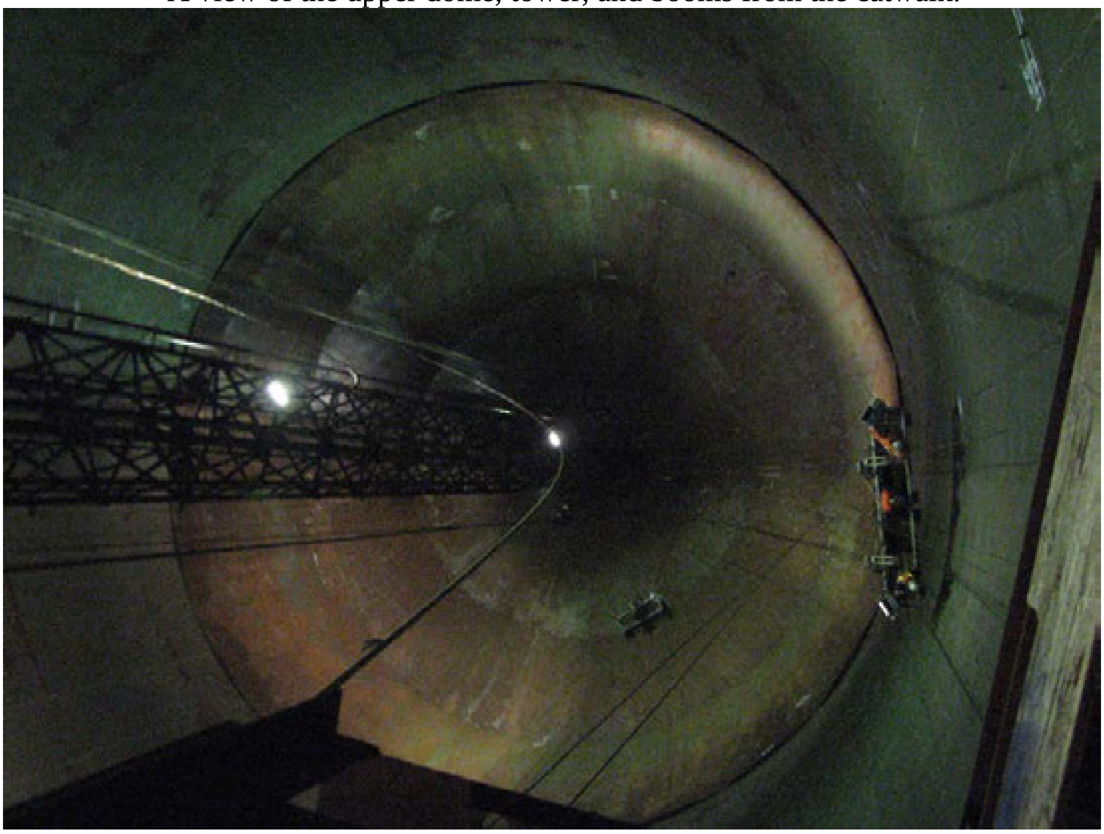
A view of the tunnel area around tank #2.

A view of the manway leading into tank #2.

APPENDIX D – TANK INTERIOR PHOTOGRAPHS

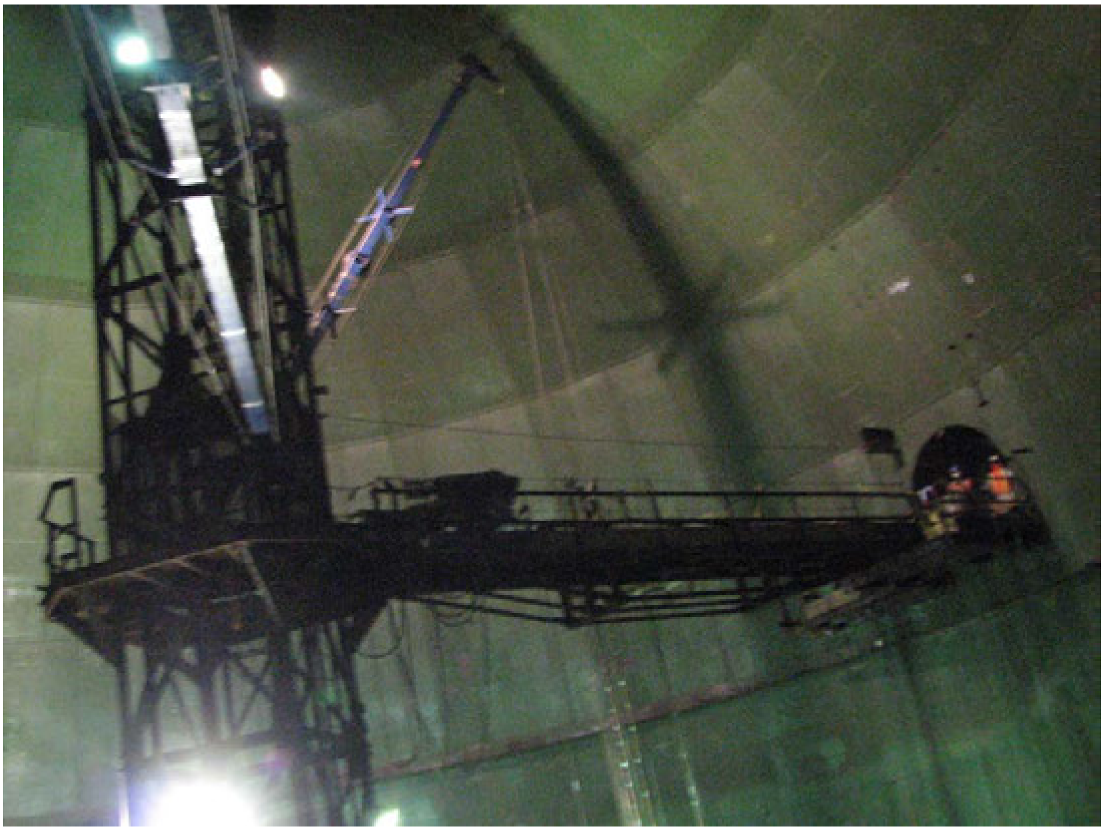


A view of the upper dome, tower, and booms from the catwalk.

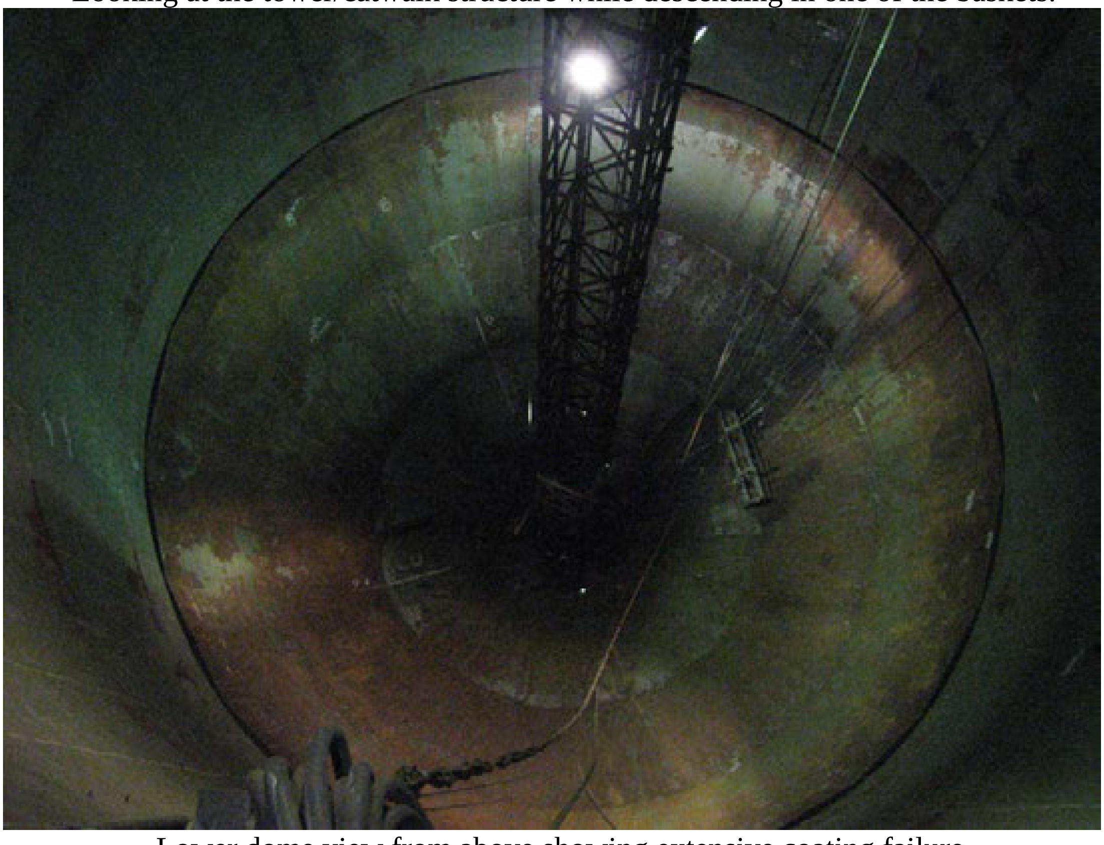


Looking down at the lower dome and the crew inspecting under the catwalk.

APPENDIX D – TANK INTERIOR PHOTOGRAPHS



Looking at the tower/catwalk structure while descending in one of the baskets.



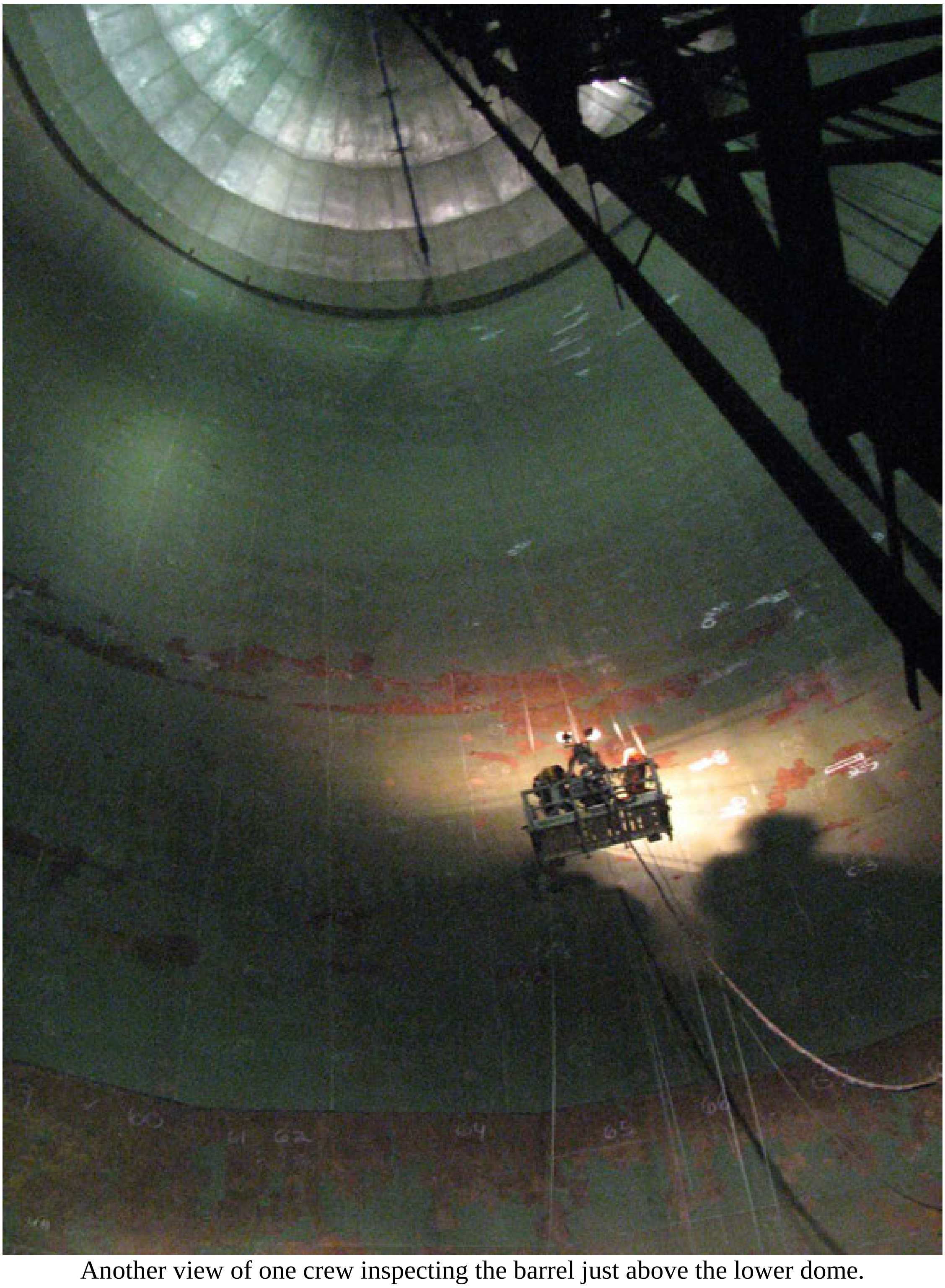
Lower dome view from above showing extensive coating failure.

APPENDIX D – TANK INTERIOR PHOTOGRAPHS

A view from the tank bottom of one of the teams scanning the barrel

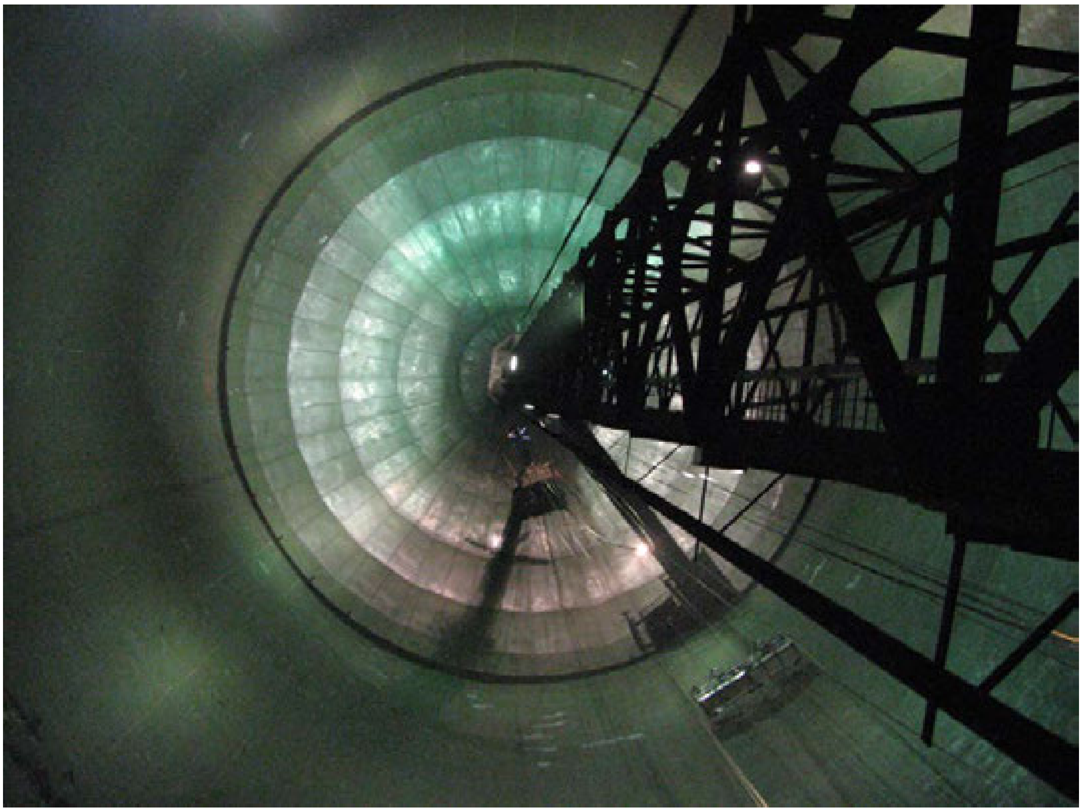
.
Picture showing part of the floor and lower dome

APPENDIX D – TANK INTERIOR PHOTOGRAPHS



Another view of one crew inspecting the barrel just above the lower dome.

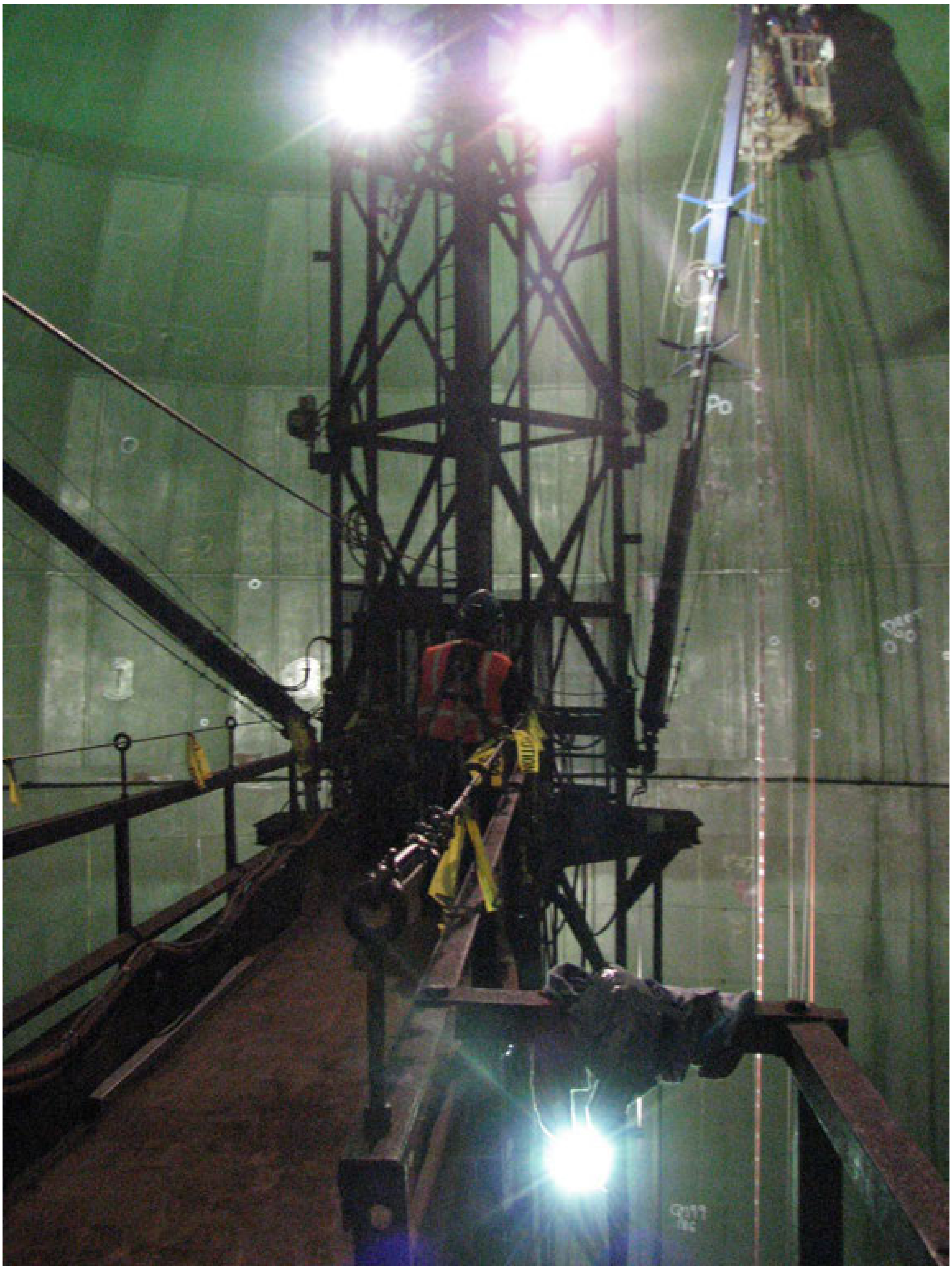
APPENDIX D – TANK INTERIOR PHOTOGRAPHS



Looking up from the floor at one crew inspecting the barrel under the catwalk and the other crew-inspecting course E of the upper dome.

A view of the very top of tank # 2 showing courses D, E, and F with a TesTex crew

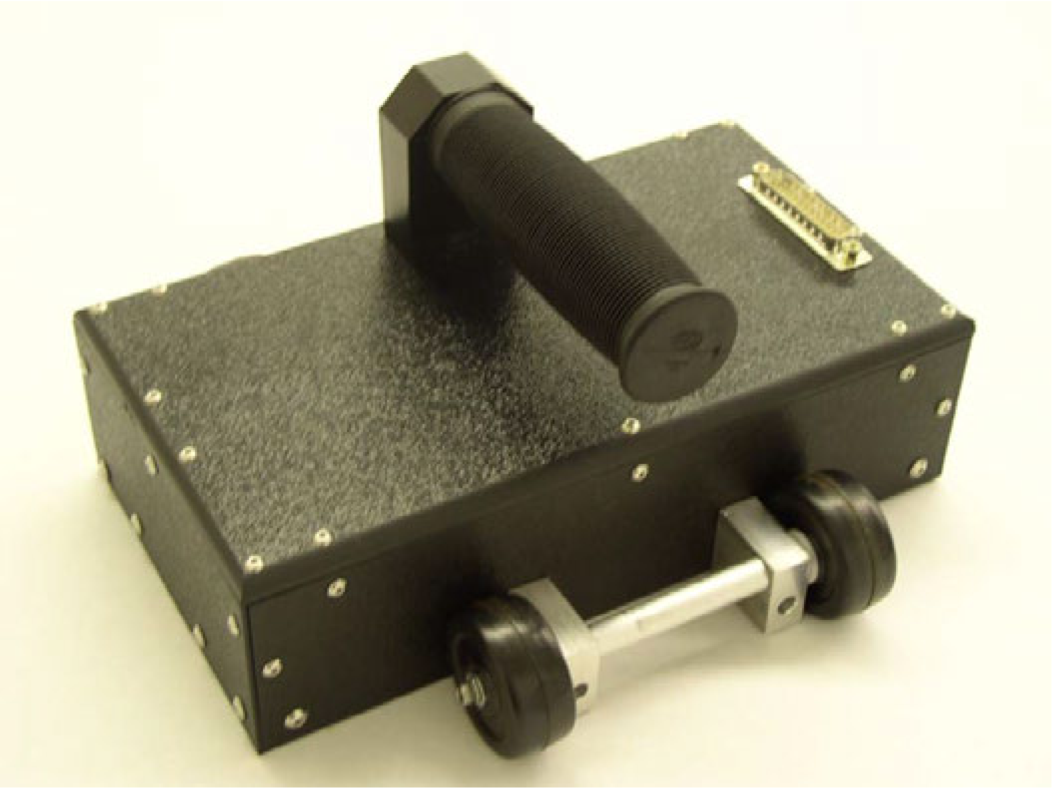
APPENDIX D – TANK INTERIOR PHOTOGRAPHS



A view just inside of tank #2 with a TesTex crew inspecting course D and E of the upper dome.

APPENDIX E – TESTEX EQUIPMENT

APPENDIX E – TESTEX EQUIPMENT



Above: A specially developed 8” wide hand scanner used for the majority of the surface scanning. Below: A TesTex crewmember using the hand scanner from one of the baskets.

APPENDIX E – TESTEX EQUIPMENT

Above: The Hawkeye Pencil Probe used for testing all welds in tank # 2. Below: A TesTex crewmember using the Hawkeye a weld from one of the baskets.

APPENDIX F – DEFECT AREA PHOTOGRAPHS AND REPORT

Baker Inspection Group, LLC

MAGNETIC PARTICLE INSPECTION REPORT [X] **LIQUID PENETRANT INSPECTION REPORT [ ]**

WE ASSUME NO RESPONSIBILITY FOR LOSSES OF ANY KIND DUE TO OUR INTERPRETATION OF THE QUALITY OF THE MATERIAL SUBMITTED. ALL DATA/INFORMATION WILL BE HELD CONFIDENTIAL.

CLIENT NAME Dunkin & Bush, Inc. **CLIENT PURCHASE ORDER NO.** ______ **DATE** 10-20-08

JOB LOCATION Red Hill, Hawaii, Tank # 20 **CLIENT JOB NO.** ______ **REPORT NO.** 102008-01 **BAKER JOB#** TesTex

M.T. MACHINE Parker Probe **MT PROCEDURE NO.:** NDT-003 **MT ACCEPTANCE STANDARD:** ASTM-Sect. VIII, Appendix 6

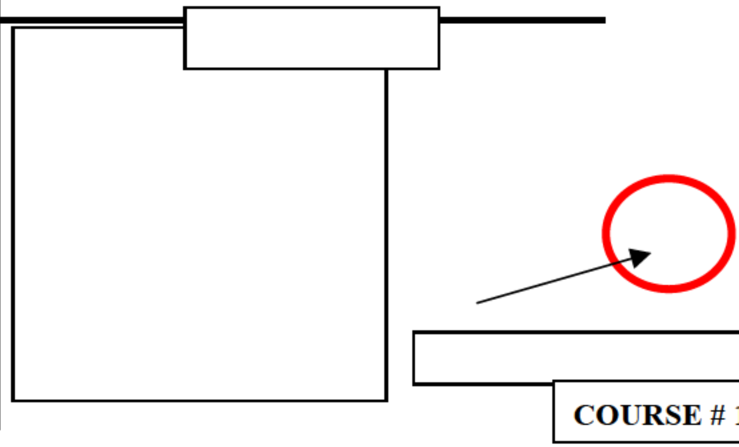
D.C. [ ] **A.C.** [X] **D.C. RECTIFIED** [ ] **YOKE** [X] **PRODS** [ ] **COIL** [ ] **CABLE** [ ] **CLAMP** [ ]

EQUIPMENT S/N# ______ **AMP SETTING** Fixed **DRY POWDER TYPE** 8A Red **WET SUSPENSION TYPE** N/A

PT [ ] **FPT** [ ] **PT PROCEDURE NO.:** N/A **PT ACCEPTANCE STANDARD:** N/A **LIGHTING** +100 FT/CND

PENE°/PART° N/A **MATL. CERT#: PENE.** N/A **CLNR.** N/A **DEVE.** N/A **MATERIAL TYPE/SPEC.** Carbon Steel

COMPONENT DESCRIPTION: Tank # 20 – Lower Dome Backer Strip Fillet Welds @ Floor/Course # 1 **THICKNESS** 0.250” **DIMENSIONS** Various

SPECIMEN, WELD, AND /OR PART NUMBER	AREA	SURFACE CONDITIONS	ACCEPT	REJECT	TYPE INDICATION	REMARKS:	TEST RESULTS: PHOTO: [ ] SKETCH: [ ]
Top & Bottom Backer Strip Fillet Welds. Backer Strip Splice Welds.						Note: Minor to moderate pitting of welds and base metal.	
Junction 1 to 5	Fillets & Splices	As Welded, Power Wire Brushed	X		NRI	NRI = No Reportable Indications at Time of Testing.	
Junction 12/13 Top Intersection.	Top Fillet	As Welded, Power Wire Brushed		X	Linear	¾” Linear Indication @ Junction. Weld Stop Creator Crack	
Junction 13 to 44	Fillets & Splices	As Welded, Power Wire Brushed	X		NRI	NRI = No Reportable Indications at Time of Testing.	

TECHNICIAN (1) Jeffrey Miller **ASNT LEVEL** II **TECHNICIAN (2)** N/A **ASNT LEVEL** N/A

CLIENT REVIEWER: ______ **DATE:** 10-20-08

Form No. NDE-121.QA

Baker Inspection Group, LLC

MAGNETIC PARTICLE INSPECTION REPORT [X]   **LIQUID PENETRANT INSPECTION REPORT [ ]**

CLIENT NAME Dunkin & Bush, Inc. **CLIENT PURCHASE ORDER NO.** ______ **DATE** 10-21-08

JOB LOCATION Red Hill, Hawaii, Tank # 20 **CLIENT JOB NO.** ______ **REPORT NO.** 102108-02 **BAKER JOB#** TesTex

M.T. MACHINE Parker Probe **MT PROCEDURE NO.:** NDT-003 **MT ACCEPTANCE STANDARD:** ASTM-Sect. VIII, Appendix 6

D.C. [ ] **A.C.** [X] **D.C. RECTIFIED** [ ] **YOKE** [X] **PRODS** [ ] **COIL** [ ] **CABLE** [ ] **CLAMP** [ ]

EQUIPMENT S/N# ______ **AMP SETTING** Fixed **DRY POWDER TYPE** 8A Red **WET SUSPENSION TYPE** N/A

PT [ ] **FPT** [ ] **PT PROCEDURE NO.:** N/A **PT ACCEPTANCE STANDARD:** N/A **LIGHTING** +100 FT/CND

PENE°/PART° N/A **MATL. CERT#: PENE.** N/A **CLNR.** N/A **DEVE.** N/A **MATERIAL TYPE/SPEC.** Carbon Steel

COMPONENT DESCRIPTION: Tank # 20 – Lower Dome Backer Strip Fillet Welds @ Floor/Course # 1 **THICKNESS** 0.250" **DIMENSIONS** Various

SPECIMEN, WELD, AND /OR PART NUMBER	AREA	SURFACE CONDITIONS	ACCEPT	REJECT	TYPE INDICATION	REMARKS:	TEST RESULTS: PHOTO: [ ] SKETCH: [ ]
Top & Bottom Backer Strip Fillet Welds. Backer Strip Splice Welds.							Note: Minor to moderate pitting of welds and base metal.
Junction 5 to 12	Fillets & Splices	As Welded, Power Wire Brushed	X		NRI	NRI = No Reportable Indications at Time of Testing.	

TECHNICIAN (1) Jeffrey Miller **ASNT LEVEL** II **TECHNICIAN (2)** N/A **ASNT LEVEL** N/A

CLIENT REVIEWER: ______ **DATE:** 10-21-08

APPENDIX G – SHEAR WAVE REPORT AND CALIBRATIONS

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

REPORT NO. ____________________ DATE: ____________

CLIENT: ____________________ JOB LOCATION: ____________________ JOB NO. ____________

CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

INST CAL. DATE ________ PROCEDURE _____ REV. ____ ACCEPTANCE STD. ____________ TEST SURFACE TEMP. ____ °F

MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________________ Y-Axis ____________________

SURFACE CONDITION ____

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________________ SNT-TC-1A LEVEL ________ DATE ____________

CLIENT REVIEW ____________________ DATE ____________ PAGE ____ OF ____

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

REPORT NO. ____________ DATE: ____________

CLIENT: ____________ JOB LOCATION: ____________ JOB NO. ____________

CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

INST CAL. DATE ________ PROCEDURE ______ REV. ____ ACCEPTANCE STD. ____________ TEST SURFACE TEMP. ____ °F

MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ____________

CLIENT REVIEW ____________ DATE ____________ PAGE ____ OF ____

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

REPORT NO. ____________ DATE: ____________

BAKER INSPECTION GROUP ASSUMES NO RESPONSIBILITY FOR LOSSES OF ANY KIND DUE TO OUR INTERPRETATION OF THE QUALITY OF MATERIAL SUBMITTED. ALL DATA IS HELD STRICTLY CONFIDENTIAL. (FORM No. 123R1 QA)

CLIENT: ____________ JOB LOCATION: ____________ JOB NO. ____________

CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

INST CAL. DATE ________ PROCEDURE _____ REV. ____ ACCEPTANCE STD. ____________ TEST SURFACE TEMP. ____ °F

MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ____________

CLIENT REVIEW ____________ DATE ____________ PAGE ____ OF ____

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

REPORT NO. ____________________ DATE: ____________

BAKER INSPECTION GROUP ASSUMES NO RESPONSIBILITY FOR LOSSES OF ANY KIND DUE TO OUR INTERPRETATION OF THE QUALITY OF MATERIAL SUBMITTED. ALL DATA IS HELD STRICTLY CONFIDENTIAL. (FORM No. 123R1 QA)

CLIENT: ____________ JOB LOCATION: ____________ JOB NO. ____________

CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

INST CAL. DATE ________ PROCEDURE ______ REV. ____ ACCEPTANCE STD. ____________ TEST SURFACE TEMP. ____ °F

MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ____________

CLIENT REVIEW ____________ DATE ____________ PAGE ____ OF ____

Baker Inspection Group

Baker Inspection Group, LLC

ASME FLAW ULTRASONIC INSPECTION REPORT

REPORT NO. ____________________ DATE: ____________

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CLIENT: ____________ JOB LOCATION: ____________ JOB NO. ____________

CLIENT PO# ____________ CLIENT JOB NO: ____________ INSTRUMENT TYPE/SN# ____________

INST CAL. DATE ________ PROCEDURE ______ REV. ____ ACCEPTANCE STD. ____________ TEST SURFACE TEMP. ____ °F

MATERIAL ____________ THICKNESS ______ in. or SCHEDULE ______ DIAMETER ______ in.

COMPONENT DESCRIPTION ____________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________ Y-Axis ____________

SURFACE CONDITION ____________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

SKETCH:

COMPONENT DRAWING NO.

TECHNICIAN ____________ SNT-TC-1A LEVEL ________ DATE ____________

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COMPONENT DESCRIPTION ____________________ TEST SURFACE ________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ____________________ Y-Axis ____________________

SURFACE CONDITION ____________________

PART NO. OR WELD NO.	IND. NO.	MAX. % DAC	SOUND (BEAM) PATH (in.)	LOC. (X) (in.)	POS. (Y) (in.)	CAL. SHEET ID	ANGLE DEG. & (DIR.)	COMMENTS & STATUS

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SURFACE CONDITION ____________

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SURFACE CONDITION ____________

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COMPONENT DESCRIPTION ______________ TEST SURFACE __________ TIME START _____ TIME STOP _____

0 REFERENCE: X-Axis ______________ Y-Axis ______________

SURFACE CONDITION ______________

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Attachment E

Spread sheet of data findings and repair recommendations

Red Hill Tank 20 API-653 Recommendation Summary

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation
1	Lower Dome	A	1	1	Wall Loss (corner)	0.236	Based on remaining thickness; No action is required
2	Lower Dome	A	1	1	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
3	Lower Dome	A	1	3	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
4	Lower Dome	A	1	4	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
5	Lower Dome	A	1	6	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
6	Lower Dome	A	1	6	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
7	Lower Dome	A	1	6	Wall Loss	0.240	Based on remaining thickness; No action is required
8	Lower Dome	A	1	7	Wall Loss (around PP)	0.240	Based on remaining thickness; No action is required
9	Lower Dome	A	1	7	Wall Loss	0.240	Based on remaining thickness; No action is required
10	Lower Dome	A	1	7	Wall Loss	0.241	Based on remaining thickness; No action is required
11	Lower Dome	A	1	8	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
12	Lower Dome	A	1	8	Wall Loss	0.239	Based on remaining thickness; No action is required
13	Lower Dome	A	1	8	Wall Loss	0.241	Based on remaining thickness; No action is required
14	Lower Dome	A	1	8	Wall Loss	0.242	Based on remaining thickness; No action is required
15	Lower Dome	A	1	8	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
16	Lower Dome	A	1	8	Wall Loss (corner)	0.237	Based on remaining thickness; No action is required
17A/B	Lower Dome	A	1	9	Wall Loss (corner)	0.237/0.240	Based on remaining thickness; No action is required
18	Lower Dome	A	1	10	Wall Loss (corner)	0.238	Based on remaining thickness; No action is required
19	Lower Dome	A	1	10	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
20	Lower Dome	A	1	10	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
21	Lower Dome	A	1	10	Wall Loss (around Lug)	0.235	Based on remaining thickness; No action is required
22	Lower Dome	A	1	11	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
23	Lower Dome	A	1	11	Wall Loss (around PP)	0.237	Based on remaining thickness; No action is required
24	Lower Dome	A	1	11	Wall Loss (around pipe plate)	0.237	Based on remaining thickness; No action is required
25	Lower Dome	B	1	12	Wall Loss	0.242	Based on remaining thickness; No action is required
26	Lower Dome	B	1	12	Wall Loss (corner)	0.237	Based on remaining thickness; No action is required
27	Lower Dome	B	1	13	Wall Loss (corner)	0.234	Based on remaining thickness; No action is required
28	Lower Dome	B	1	13	Wall Loss (corner)	0.228	Based on remaining thickness; No action is required
29	Lower Dome	B	1	13	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
30	Lower Dome	B	1	13	Wall Loss (around pipe plate)	0.240	Based on remaining thickness; No action is required
31	Lower Dome	B	1	13	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required
32	Lower Dome	B	1	13	Wall Loss (corner)	0.239	Based on remaining thickness; No action is required
33	Lower Dome	B	1	14	Wall Loss	0.240	Based on remaining thickness; No action is required

Red Hill Tank 20 API-653 Recommendation Summary

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation		
34	Lower Dome	B	1	14	Wall Loss (corner)	0.235	Based on remaining thickness; No action is required		
35	Lower Dome	B	1	14	Wall Loss (around PP)	0.239	Based on remaining thickness; No action is required		
36	Lower Dome	B	1	14	Wall Loss (around pipe plate)	0.240	Based on remaining thickness; No action is required		
37	Lower Dome	B	1	14	Wall loss (corner)	0.240	Based on remaining thickness; No action is required		
38	Lower Dome	B	1	16	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required		
39	Lower Dome	B	1	21	Wall Loss (around diamond pl.)	0.244	Based on remaining thickness; No action is required		
40	Lower Dome	C	1	25	Wall Loss (around PP)	0.243	Based on remaining thickness; No action is required		
41	Lower Dome	C	1	25	Wall Loss (around pipe plate)	0.241	Based on remaining thickness; No action is required		
42	Lower Dome	C	1	28	Wall Loss (around bracket)	0.238	Based on remaining thickness; No action is required		
43	Lower Dome	C	1	30	Wall loss (PP)	0.238	Based on remaining thickness; No action is required		
44	Lower Dome	C	1	30	Wall Loss (corner)	0.239	Based on remaining thickness; No action is required		
45	Lower Dome	C	1	32	Wall Loss (around PP)	.237-.240	Based on remaining thickness; No action is required		
46	Lower Dome	D	1	37	Wall loss (PP)	0.240	Based on remaining thickness; No action is required		
47	Lower Dome	D	1	37-38	Weld Defect	LOF	Repair by Welding		
48	Lower Dome	D	1	38	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required		
49	Lower Dome	D	1	38	Wall Loss (around PP)	0.237	Based on remaining thickness; No action is required		
50	Lower Dome	D	1	38-39	Weld Defect	LOF	Repair by Welding		
51	Lower Dome	D	1	38-39	Weld Defect	LOF	Repair by Welding		
52	Lower Dome	D	1	39	Wall loss (PP)	0.230	Based on remaining thickness; No action is required		
53	Lower Dome	D	1	40	Wall Loss (corner)	0.240	Based on remaining thickness; No action is required		
54	Lower Dome	D	1	40	Wall Loss (around PP)	.238-.240	Based on remaining thickness; No action is required		
55	Lower Dome	D	1	42	Wall Loss	0.240	Based on remaining thickness; No action is required		
56	Lower Dome	D	1	43	Wall Loss (around PP)	0.240	Based on remaining thickness; No action is required		
57	Lower Dome	D	1	44	Wall Loss (around PP)	0.240	Based on remaining thickness; No action is required		
58	Lower Dome	D	2	43	Grout Nozzle	0.210	Based on remaining thickness; No action is required		
59	Lower Dome	D	2	42	Grout Nozzle	0.230	Based on remaining thickness; No action is required		
60	Lower Dome	D	2	41	Grout Nozzle	0.198	Based on remaining thickness; No action is required		
61A/B	Lower Dome	D	2	39	Grout Nozzles	.208/.218	Based on remaining thickness; No action is required		
62	Lower Dome	D	2	38	Grout Nozzle	0.208	Based on remaining thickness; No action is required		
63	Lower Dome	D	2	37	Grout Nozzle	0.228	Based on remaining thickness; No action is required		
64	Lower Dome	D	2	36	Grout Nozzle	0.209	Based on remaining thickness; No action is required		
65	Lower Dome	C	2	33	Grout Nozzle	0.220	Based on remaining thickness; No action is required		
66	Lower Dome	C	2	32	Grout Nozzle	0.207	Based on remaining thickness; No action is required		
67	Lower Dome	C	2	30	Grout Nozzle	0.220	Based on remaining thickness; No action is required		

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation		
68	Lower Dome	C	2	29	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
69	Lower Dome	A	2	7	Grout Nozzle	0.200	Based on remaining thickness; No action is required		
70	Lower Dome	A	2	8	Grout Nozzle	0.220	Based on remaining thickness; No action is required		
71	Lower Dome	B	2	14	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
72	Lower Dome	B	2	15	Grout Nozzle	0.220	Based on remaining thickness; No action is required		
73	Lower Dome	B	2	16	Grout Nozzle	0.215	Based on remaining thickness; No action is required		
74	Lower Dome	B	2	18	Grout Nozzle	0.211	Based on remaining thickness; No action is required		
75	Lower Dome	B	2	19	Grout Nozzle	0.208	Based on remaining thickness; No action is required		
76	Lower Dome	B	2	19	Grout Nozzle	0.224	Based on remaining thickness; No action is required		
77	Lower Dome	B	3	22	Grout Nozzle	0.230	Based on remaining thickness; No action is required		
78	Lower Dome	B	3	22	Grout Nozzle	0.230	Based on remaining thickness; No action is required		
79	Lower Dome	B	3	20	Grout Nozzle	0.224	Based on remaining thickness; No action is required		
80	Lower Dome	B	3	17	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
81	Lower Dome	B	3	17	Grout Nozzle	0.220	Based on remaining thickness; No action is required		
82	Lower Dome	B	4	25	Grout Nozzle	0.225	Based on remaining thickness; No action is required		
83	Lower Dome	A	2	10	Grout Nozzle	0.236	Based on remaining thickness; No action is required		
84	Lower Dome	B	2	20	Grout Nozzle	0.210	Based on remaining thickness; No action is required		
85	Lower Dome	C	3	32	Grout Nozzle	0.207	Based on remaining thickness; No action is required		
86	Lower Dome	C	3	31	Grout Nozzle	0.199	Based on remaining thickness; No action is required		
87	Lower Dome	C	3	26	Grout Nozzle	0.216	Based on remaining thickness; No action is required		
88	Lower Dome	C	3	25	Grout Nozzle	0.211	Based on remaining thickness; No action is required		
89A/B	Lower Dome	C	3	23	Grout Nozzles	.207/.217	Based on remaining thickness; No action is required		
90	Lower Dome	C	2	23	Grout Nozzle	0.219	Based on remaining thickness; No action is required		
91	Lower Dome	C	2	24	Grout Nozzle	0.210	Based on remaining thickness; No action is required		
92	Lower Dome	C	2	25	Grout Nozzle	0.213	Based on remaining thickness; No action is required		
93	Lower Dome	C	3	28	Grout Nozzle	0.216	Based on remaining thickness; No action is required		
94	Lower Dome	C	3	26	Grout Nozzle	0.187	Based on remaining thickness; No action is required		
95	Lower Dome	B	4	31	Grout Nozzle	0.215	Based on remaining thickness; No action is required		
96	Lower Dome	B	3	22	Grout Nozzle	0.230	Based on remaining thickness; No action is required		
97	Lower Dome	B	3	14	Grout Nozzle	0.220	Based on remaining thickness; No action is required		
98	Lower Dome	A	3	10	Grout Nozzle	0.219	Based on remaining thickness; No action is required		
99	Lower Dome	A	3	9	Grout Nozzle	0.198	Based on remaining thickness; No action is required		
100	Lower Dome	A	4	13	Grout Nozzle	0.219	Based on remaining thickness; No action is required		
101	Lower Dome	A	4	11	Grout Nozzle	0.222	Based on remaining thickness; No action is required		
102	Lower Dome	A	3	6	Grout Nozzle	0.223	Based on remaining thickness; No action is required		

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Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation		
103	Lower Dome	A	3	6	Grout Nozzle	0.223	Based on remaining thickness; No action is required		
104	Lower Dome	A	3	8	Grout Nozzle	0.230	Based on remaining thickness; No action is required		
105	Lower Dome	A	3	6	Grout Nozzle	0.213	Based on remaining thickness; No action is required		
106	Lower Dome	A	3	5	Grout Nozzle	0.222	Based on remaining thickness; No action is required		
107	Lower Dome	A	4	7	Grout Nozzle	0.214	Based on remaining thickness; No action is required		
108	Lower Dome	A	3	4	Grout Nozzle	0.215	Based on remaining thickness; No action is required		
109	Lower Dome	A	3	5	Grout Nozzle	0.224	Based on remaining thickness; No action is required		
110	Lower Dome	A	4	5	Grout Nozzle	0.220	Based on remaining thickness; No action is required		
111	Lower Dome	D	4	65	Grout Nozzle	0.228	Based on remaining thickness; No action is required		
112	Lower Dome	C	4	46	Grout Nozzle	0.201	Based on remaining thickness; No action is required		
113	Lower Dome	B	3	22	Wall Loss	0.232	Based on remaining thickness; No action is required		
114	Lower Dome	C	4	40	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
115A/B	Lower Dome	C	3	30	Grout Nozzles	0.228/.207	Based on remaining thickness; No action is required		
116	Lower Dome	C	3	29	Grout Nozzle	0.210	Based on remaining thickness; No action is required		
117	Lower Dome	C	3	28	Grout Nozzle	0.216	Based on remaining thickness; No action is required		
118	Lower Dome	C	3	27	Pitting	0.233	Based on remaining thickness; No action is required		
119	Lower Dome	C	3	27	Grout Nozzle	0.205	Based on remaining thickness; No action is required		
120	Lower Dome	D	4	48	Grout Nozzle	0.211	Based on remaining thickness; No action is required		
121	Lower Dome	D	3	34	Grout Nozzle	0.200	Based on remaining thickness; No action is required		
122	Lower Dome	D	3	34	Grout Nozzle	0.215	Based on remaining thickness; No action is required		
123	Lower Dome	D	3	35	Grout Nozzle	0.200	Based on remaining thickness; No action is required		
124	Lower Dome	D	3	36	Grout Nozzle	0.219	Based on remaining thickness; No action is required		
125	Lower Dome	D	4	54	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
126	Lower Dome	D	3	37	Grout Nozzle	0.213	Based on remaining thickness; No action is required		
127	Lower Dome	D	3	39	Grout Nozzle	0.204	Based on remaining thickness; No action is required		
128	Lower Dome	D	3	39	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
129	Lower Dome	D	4	56	Grout Nozzle	0.213	Based on remaining thickness; No action is required		
130	Lower Dome	D	4	59	Grout Nozzle	0.207	Based on remaining thickness; No action is required		
131	Lower Dome	D	3	40	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
132	Lower Dome	D	4	62	Grout Nozzle	0.205	Based on remaining thickness; No action is required		
133	Lower Dome	D	3	41	Grout Nozzle	0.210	Based on remaining thickness; No action is required		
134	Lower Dome	D	3	43	Grout Nozzle	0.224	Based on remaining thickness; No action is required		
135	Lower Dome	D	3	44	Grout Nozzle	0.228	Based on remaining thickness; No action is required		
136	Lower Dome	D	3	44	Grout Nozzle	0.224	Based on remaining thickness; No action is required		
137	Barrel	D	26	16	Dent		No Action Required		

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Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation
138	Barrel	D	5	16	Grout Nozzle	0.196	Based on remaining thickness; No action is required
139	Barrel	D	19	16	Grout Nozzle	0.218	Based on remaining thickness; No action is required
140	Barrel	A	12	2	Grout Nozzle	0.219	Based on remaining thickness; No action is required
141	Barrel	A	12	3	Grout Nozzle	0.204	Based on remaining thickness; No action is required
142	Barrel	D	12	14	Grout Nozzle	0.138	Based on remaining thickness; No action is required
143	Barrel	A	27	3	Grout Nozzle	0.202	Based on remaining thickness; No action is required
144	Barrel	D	1	14	Grout Nozzle	0.208	Based on remaining thickness; No action is required
145	Barrel	D	5	14	Grout Nozzle	0.204	Based on remaining thickness; No action is required
146	Barrel	A	11	1	Weld Defect	LOF	Repair by Welding
147	Barrel	A	12	1	Grout Nozzle	0.230	Based on remaining thickness; No action is required
148	Barrel	D	19	14	Grout Nozzle	0.210	Based on remaining thickness; No action is required
149	Barrel	D	27	14	Grout Nozzle	0.207	Based on remaining thickness; No action is required
150	Barrel	D	12	13	Grout Nozzle	0.202	Based on remaining thickness; No action is required
151	Barrel	D	19	13a	Grout Nozzle	0.212	Based on remaining thickness; No action is required
152	Barrel	A	19	4	Grout Nozzle	0.230	Based on remaining thickness; No action is required
153	Barrel	A	C	4b	Grout Nozzle	0.224	Based on remaining thickness; No action is required
154	Barrel	C	1	12	Grout Nozzle	0.204	Based on remaining thickness; No action is required
155	Barrel	D	5	13	Grout Nozzle	0.207	Based on remaining thickness; No action is required
156	Barrel	C	12	12	Grout Nozzle	0.210	Based on remaining thickness; No action is required
157	Barrel	D	27	12	Grout Nozzle	0.204	Based on remaining thickness; No action is required
158	Barrel	D	4	12	Grout Nozzle	0.197	Based on remaining thickness; No action is required
159	Barrel	C	19	12	Grout Nozzle	0.197	Based on remaining thickness; No action is required
160	Barrel	B	27	5	Grout Nozzle	0.221	Based on remaining thickness; No action is required
161	Barrel	B	12	5	Grout Nozzle	0.221	Based on remaining thickness; No action is required
162	Barrel	C	1	10	Grout Nozzle	0.212	Based on remaining thickness; No action is required
163	Barrel	C	5	10	Grout Nozzle	0.204	Based on remaining thickness; No action is required
164	Barrel	C	12	10	Grout Nozzle	0.207	Based on remaining thickness; No action is required
165	Barrel	C	15	11	Pitting	0.231	Based on remaining thickness; No action is required
166	Barrel	C	23	10	Gouge		Repair by Welding
167	Barrel	C	19	10	Grout Nozzle	0.204	Based on remaining thickness; No action is required
168	Barrel	A	12	4	Grout Nozzle	0.213	Based on remaining thickness; No action is required
169	Barrel	A	1	5	Grout Nozzle	0.219	Based on remaining thickness; No action is required
170	Barrel	A	19	5	Grout Nozzle	0.224	Based on remaining thickness; No action is required
171	Barrel	A	17	4	NRI	NRI	
172	Barrel	B	19	7	Grout Nozzle	0.229	Based on remaining thickness; No action is required

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Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation
173	Barrel	B	28	7	Gouge		Repair by Welding
174	Barrel	B	22	6	Weld Defect	LOF	Repair by Welding
175	Barrel	B	5	7	Grout Nozzle	0.230	Based on remaining thickness; No action is required
176	Barrel	C	27	11	Grout Nozzle	0.214	Based on remaining thickness; No action is required
177	Barrel	C	12	9	Grout Nozzle	0.204	Based on remaining thickness; No action is required
178	Barrel	C	1	9	Grout Nozzle	0.211	Based on remaining thickness; No action is required
179	Barrel	C	5	9	Grout Nozzle	0.209	Based on remaining thickness; No action is required
180	Barrel	B	27	8	Grout Nozzle	0.203	Based on remaining thickness; No action is required
181	Barrel	C	12	8	Grout Nozzle	0.222	Based on remaining thickness; No action is required
182	Barrel	C	19	9A	Grout Nozzle	0.213	Based on remaining thickness; No action is required
183	Deleted from program						
184	Exp Joint	C	2	24	Grout Nozzle	0.207	Based on remaining thickness; No action is required
185	Exp Joint	C	2	24	Grout Nozzle	0.208	Based on remaining thickness; No action is required
186	Exp Joint	C	2	24	Grout Nozzle	0.220	Based on remaining thickness; No action is required
187	Exp Joint	C	2	25	Grout Nozzle	0.227	Based on remaining thickness; No action is required
188	Exp Joint	C	2	25	Grout Nozzle	0.223	Based on remaining thickness; No action is required
189	Exp Joint	C	2	26	Grout Nozzle	0.200	Based on remaining thickness; No action is required
190	Exp Joint	C	2	27	Grout Nozzle	0.208	Based on remaining thickness; No action is required
191	Exp Joint	C	2	27	Grout Nozzle	0.217	Based on remaining thickness; No action is required
192	Exp Joint	C	2	28	Grout Nozzle	0.199	Based on remaining thickness; No action is required
193	Exp Joint	C	2	28	Grout Nozzle	0.200	Based on remaining thickness; No action is required
194	Exp Joint	C	2	28	Grout Nozzle	0.217	Based on remaining thickness; No action is required
195	Exp Joint	C	2	29	Grout Nozzle	0.210	Based on remaining thickness; No action is required
196	Exp Joint	C	2	30	Grout Nozzle	0.200	Based on remaining thickness; No action is required
197	Exp Joint	C	2	30	Grout Nozzle	0.192	Based on remaining thickness; No action is required
198	Exp Joint	C	2	30	Dent		No Action Required
199	Exp Joint	C	2	31	Grout Nozzle	0.219	Based on remaining thickness; No action is required
200	Exp Joint	C	2	31	Grout Nozzle	0.204	Based on remaining thickness; No action is required
201	Exp Joint	C	2	32	Grout Nozzle	0.211	Based on remaining thickness; No action is required
202	Exp Joint	C	2	33	Grout Nozzle	0.211	Based on remaining thickness; No action is required
203	Exp Joint	C	2	33	Grout Nozzle	0.211	Based on remaining thickness; No action is required
204	Exp Joint	C	2	34	Grout Nozzle	0.214	Based on remaining thickness; No action is required
205	Exp Joint	C	2	34	Grout Nozzle	0.210	Based on remaining thickness; No action is required
206	Exp Joint	C	2	35	Grout Nozzle	0.195	Based on remaining thickness; No action is required
207	Exp Joint	C	2	35	Grout Nozzle	0.205	Based on remaining thickness; No action is required

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Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation
208	Exp Joint	C	2	35	Grout Nozzle	0.213	Based on remaining thickness; No action is required
209	Exp Joint	D	2	36	Grout Nozzle	0.193	Based on remaining thickness; No action is required
210	Exp Joint	D	2	37	Grout Nozzle	0.213	Based on remaining thickness; No action is required
211	Exp Joint	D	2	37	Grout Nozzle	0.200	Based on remaining thickness; No action is required
212	Exp Joint	D	2	37	Weld Defect	LOF	Repair by Welding
213	Exp Joint	B	1	11	Grout Nozzle	0.205	Based on remaining thickness; No action is required
214	Exp Joint	C	1	12	Grout Nozzle	0.207	Based on remaining thickness; No action is required
215	Exp Joint	C	3	20	Gouge		Repair by Welding
216	Exp Joint	C	4	10	Patch Plate	0.230	Based on remaining thickness; No action is required
217	Barrel	B	5	8	Grout Nozzle	0.194	Based on remaining thickness; No action is required
218	Barrel	B	19	8	Grout Nozzle	0.230	Based on remaining thickness; No action is required
219	Barrel	B	27	8	Weld Defect	LOF	Repair by Welding
220	Barrel	B	27	8	General Corrosion	0.230	Based on remaining thickness; No action is required
221	Exp Joint	A	2	3	Gouge		Repair by Welding
222	Exp Joint	A	1	4	Grout Nozzle	0.230	Based on remaining thickness; No action is required
223	Exp Joint	A	1	5	Square Plate	0.230	Based on remaining thickness; No action is required
224	Exp Joint	B	1	6	Grout Nozzle	0.236	Based on remaining thickness; No action is required
225	Exp Joint	B	1	8	Grout Nozzle	0.232	Based on remaining thickness; No action is required
226	Exp Joint	B	2	23	Grout Nozzle	0.208	Based on remaining thickness; No action is required
227	Exp Joint	B	2	23	Gouge		Repair by Welding
228	Exp Joint	B	2	22	Grout Nozzle	0.209	Based on remaining thickness; No action is required
229	Exp Joint	B	2	22	Grout Nozzle	0.229	Based on remaining thickness; No action is required
230	Exp Joint	B	2	22	Grout Nozzle	0.236	Based on remaining thickness; No action is required
231	Exp Joint	B	2	21	Grout Nozzle	0.226	Based on remaining thickness; No action is required
232	Exp Joint	B	2	21	Grout Nozzle	0.219	Based on remaining thickness; No action is required
233	Exp Joint	B	2	20	Grout Nozzle	0.224	Based on remaining thickness; No action is required
234	Exp Joint	B	2	20	Grout Nozzle	0.240	Based on remaining thickness; No action is required
235	Exp Joint	B	2	20	Grout Nozzle	0.219	Based on remaining thickness; No action is required
236	Exp Joint	B	2	18	Grout Nozzle	0.209	Based on remaining thickness; No action is required
237	Exp Joint	B	2	19	Grout Nozzle	0.212	Based on remaining thickness; No action is required
238	Exp Joint	D	1	19	Grout Nozzle	0.205	Based on remaining thickness; No action is required
239	Exp Joint	C	1	13	Grout Nozzle	0.211	Based on remaining thickness; No action is required
240	Exp Joint	D	1	15	Grout Nozzle	0.221	Based on remaining thickness; No action is required
241	Exp Joint	D	4	16	Patch Plate	0.225	Based on remaining thickness; No action is required
242	Exp Joint	D	2	47	Grout Nozzle	0.200	Based on remaining thickness; No action is required

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Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation		
243	Exp Joint	D	2	45	Grout Nozzle	0.211	Based on remaining thickness; No action is required		
244	Exp Joint	D	2	46	Grout Nozzle	0.202	Based on remaining thickness; No action is required		
245	Exp Joint	D	2	46	Grout Nozzle	0.211	Based on remaining thickness; No action is required		
246	Exp Joint	D	2	43	Grout Nozzle	0.197	Based on remaining thickness; No action is required		
247	Exp Joint	D	2	44	NRI	NRI			
248	Exp Joint	D	3	35	NRI	NRI			
249	Exp Joint	D	2	42	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
250	Exp Joint	D	2	42	Grout Nozzle	0.209	Based on remaining thickness; No action is required		
251	Exp Joint	D	2	42	Grout Nozzle	0.215	Based on remaining thickness; No action is required		
252	Exp Joint	D	2	40	Grout Nozzle	0.214	Based on remaining thickness; No action is required		
253	Exp Joint	D	2	40	Grout Nozzle	0.210	Based on remaining thickness; No action is required		
254	Exp Joint	D	2	40	Grout Nozzle	0.203	Based on remaining thickness; No action is required		
255	Exp Joint	D	2	40	Dent		No Action Required		
256	Exp Joint	D	2	41	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
257	Exp Joint	D	2	41	Grout Nozzle	0.214	Based on remaining thickness; No action is required		
258	Exp Joint	D	4	13	Weld Defect	LOF	Repair by Welding		
259	Exp Joint	D	2	39	Grout Nozzle	0.200	Based on remaining thickness; No action is required		
260	Exp Joint	D	2	37	Grout Nozzle	0.203	Based on remaining thickness; No action is required		
261	Exp Joint	D	2	38	Grout Nozzle	0.209	Based on remaining thickness; No action is required		
262	Exp Joint	D	2	38	Grout Nozzle	0.205	Based on remaining thickness; No action is required		
263	Exp Joint	D	2	38	Dent		No Action Required		
264	Upper Dome	D	A	54	Dent		No Action Required		
265	Upper Dome	D	A	66	Dent		No Action Required		
266	Upper Dome	D	A	56	Weld Defect	LOF	Repair by Welding		
267	Exp Joint	B	2	19	Weld Defect	Pitting	Repair by Welding		
268	Exp Joint	B	2	16	NRI	NRI			
269	Exp Joint	B	2	16	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
270	Exp Joint	B	2	17	Grout Nozzle	0.217	Based on remaining thickness; No action is required		
271	Exp Joint	B	2	17	Grout Nozzle	0.215	Based on remaining thickness; No action is required		
272	Exp Joint	B	2	17	Grout Nozzle	0.196	Based on remaining thickness; No action is required		
273	Exp Joint	B	2	15	Grout Nozzle	0.217	Based on remaining thickness; No action is required		
274	Exp Joint	B	2	15	Grout Nozzle	0.210	Based on remaining thickness; No action is required		
275	Exp Joint	B	2	15	Grout Nozzle	0.219	Based on remaining thickness; No action is required		
276	Exp Joint	B	3	10	Gouge		Repair by Welding		
277	Exp Joint	B	3	10	Weld Defect	LOF	Repair by Welding		

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Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation		
278	Exp Joint	B	3	10	Weld Defect	LOF	Repair by Welding		
279	Exp Joint	B	2	14	Grout Nozzle	0.237	Based on remaining thickness; No action is required		
280	Exp Joint	B	2	14	Grout Nozzle	0.235	Based on remaining thickness; No action is required		
281	Exp Joint	A	2	4	Grout Nozzle	0.208	Based on remaining thickness; No action is required		
282	Exp Joint	A	2	4	Grout Nozzle	0.206	Based on remaining thickness; No action is required		
283	Exp Joint	A	2	5	Grout Nozzle	0.195	Based on remaining thickness; No action is required		
284	Exp Joint	A	2	5	Grout Nozzle	0.194	Based on remaining thickness; No action is required		
285	Exp Joint	A	2	5	Grout Nozzle	0.208	Based on remaining thickness; No action is required		
286	Exp Joint	A	2	6	Grout Nozzle	0.198	Based on remaining thickness; No action is required		
287	Exp Joint	A	2	8	Grout Nozzle	0.216	Based on remaining thickness; No action is required		
288	Exp Joint	A	2	8	Grout Nozzle	0.215	Based on remaining thickness; No action is required		
289	Exp Joint	A	2	10	Grout Nozzle	0.224	Based on remaining thickness; No action is required		
290	Exp Joint	A	2	10	Grout Nozzle	0.228	Based on remaining thickness; No action is required		
291	Exp Joint	A	2	10	Grout Nozzle	0.208	Based on remaining thickness; No action is required		
292	Exp Joint	A	2	12	Grout Nozzle	0.210	Based on remaining thickness; No action is required		
293	Exp Joint	A	2	7	Grout Nozzle	0.202	Based on remaining thickness; No action is required		
294	Exp Joint	A	2	7	Grout Nozzle	0.219	Based on remaining thickness; No action is required		
295	Exp Joint	A	2	7	Grout Nozzle	0.194	Based on remaining thickness; No action is required		
296	Exp Joint	A	2	9	Grout Nozzle	0.218	Based on remaining thickness; No action is required		
297	Exp Joint	A	2	11	Grout Nozzle	0.197	Based on remaining thickness; No action is required		
298	Exp Joint	A	2	11	Grout Nozzle	0.208	Based on remaining thickness; No action is required		
299	Exp Joint	B	2	13	Grout Nozzle	0.222	Based on remaining thickness; No action is required		
300	Exp Joint	B	2	13	Grout Nozzle	0.219	Based on remaining thickness; No action is required		
301	Exp Joint	B	2	13	Grout Nozzle	0.215	Based on remaining thickness; No action is required		
302	Upper Dome	D	A	57	Weld Defect	LOF	Repair by Welding		
303	Upper Dome	D	A	60	Weld Defect	LOF	Repair by Welding		
304	Upper Dome	D	A	59	Loss of Wall	0.165	Repair by use of Lap Welded Patch		
305	Upper Dome	D	A	69	Weld Defect	LOF	Repair by Welding		
306	Upper Dome	D	A	69	Grout Nozzle	0.200	Based on remaining thickness; No action is required		
307	Upper Dome	D	A	69	NRI	NRI			
308	Upper Dome	D	A	57	Grout Nozzle	0.211	Based on remaining thickness; No action is required		
309	Upper Dome	D	A	63	Grout Nozzle	0.213	Based on remaining thickness; No action is required		
310	Upper Dome	C	A	45	Grout Nozzle	0.203	Based on remaining thickness; No action is required		
311	Upper Dome	C	A	51	Grout Nozzle	0.225	Based on remaining thickness; No action is required		
312	Upper Dome	C	A	37	Weld Defect	LOF	Repair by Welding		

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Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation		
313	Upper Dome	C	A	37	Weld Defect	LOF	Repair by Welding		
314	Upper Dome	C	A	44	Weld Defect	LOF	Repair by Welding		
315	Upper Dome	C	A	43	Dent		No Action Required		
316	Upper Dome	A	A	39	Grout Nozzle	0.200	Based on remaining thickness; No action is required		
317	Upper Dome	A	A	39	Dent		No Action Required		
318	Upper Dome	A	A	15	Grout Nozzle	0.230	Based on remaining thickness; No action is required		
319	Upper Dome	A	A	21	Grout Nozzle	0.206	Based on remaining thickness; No action is required		
320	Upper Dome	A	A	8	NRI	NRI			
321	Upper Dome	A	A	9	Grout Nozzle	0.217	Based on remaining thickness; No action is required		
322	Exp Joint	A	3	4	Underside corrosion	0.220	Based on remaining thickness; No action is required		
323	Exp Joint	A	3	4	Underside corrosion	0.230	Based on remaining thickness; No action is required		
324	Exp Joint	A	3	4	Underside corrosion	0.220	Based on remaining thickness; No action is required		
325	Upper Dome	A	A	P10	Wall Loss	0.137	Repair by use of Lap Welded Patch		
326	Upper Dome	A	A	P11	Patch Plate	0.198	Based on remaining thickness; No action is required		
327	Exp Joint	A	2	3	Grout Nozzle	0.201	Based on remaining thickness; No action is required		
328	Exp Joint	A	2	3	Dent		No Action Required		
329	Exp Joint	A	2	3	Arc Gouge	0.160	Repair by Welding		
330	Exp Joint	A	2	3	Arc Gouge	0.160	Repair by Welding		
331	Exp Joint	B	2	13	Grout Nozzle	0.222	Based on remaining thickness; No action is required		
332	Exp Joint	B	2	13	Grout Nozzle	0.219	Based on remaining thickness; No action is required		
333	Exp Joint	B	2	13	Grout Nozzle	0.215	Based on remaining thickness; No action is required		
334	Exp Joint	A	2	7	Underside corrosion	0.137	Repair by use of Lap Welded Patch		
335	Exp Joint	A	3	5	Underside corrosion	0.208	Based on remaining thickness; No action is required		
336	Upper Dome	C	B	36	Grout Nozzle	0.197	Based on remaining thickness; No action is required		
337	Upper Dome	C	B	42	Weld Defect	LOF	Repair by Welding		
338	Upper Dome	D	B	66	Grout Nozzle	0.217	Based on remaining thickness; No action is required		
339	Upper Dome	D	B	60	Grout Nozzle	0.218	Based on remaining thickness; No action is required		
340	Upper Dome	D	B	57	Dent		No Action Required		
341	Upper Dome	D	B	53	Weld Defect	LOF	Repair by Welding		
342	Upper Dome	D	B	54	Grout Nozzle	0.206	Based on remaining thickness; No action is required		
343	Upper Dome	C	B	48	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
344	Upper Dome	C	B	42	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
345	Upper Dome	C	B	39	Weld Defect	LOF	Repair by Welding		
346	Upper Dome	C	B	47	Weld Defect	LOF	Repair by Welding		
347	Upper Dome	C	B	48	Through Hole		Repair by Welding		

Red Hill Tank 20 API-653 Recommendation Summary

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation		
348	Upper Dome	C	B	51	NRI	NRI			
349	Upper Dome	B	B	31	Dent		No Action Required		
350	Upper Dome	B	B	24	Grout Nozzle	0.221	Based on remaining thickness; No action is required		
351	Upper Dome	B	B	29	Arc Gouge	0.160	Repair by Welding		
352	Upper Dome	B	B	29	Arc Gouge	0.160	Repair by Welding		
353	Upper Dome	B	B	19	Arc Gouge	0.160	Repair by Welding		
354	Upper Dome	B	B	22	NRI	NRI			
355	Upper Dome	A	B	6	Grout Nozzle	0.214	Based on remaining thickness; No action is required		
356	Upper Dome	A	B	12	Grout Nozzle	0.210	Based on remaining thickness; No action is required		
357	Upper Dome	A	A	15	Pitting	0.188	Based on remaining thickness; No action is required		
358	Upper Dome	A	B	16	Weld Defect	LOF	Repair by Welding		
359	Upper Dome	B	A	32	Weld Defect	LOF	Repair by Welding		
360	Upper Dome	B	A	18	Weld Defect	LOF	Repair by Welding		
361	Upper Dome	B	A	33	Grout Nozzle	0.209	Based on remaining thickness; No action is required		
362	Upper Dome	B	A	33	Weld Defect	LOF	Repair by Welding		
363	Upper Dome	B	A	33	Weld Defect	LOF	Repair by Welding		
364	Upper Dome	B	B	30	Weld Defect	LOF	Repair by Welding		
365	Upper Dome	B	B	30	Weld Defect	LOF	Repair by Welding		
366	Upper Dome	B	B	30	Weld Defect	LOF	Repair by Welding		
367	Upper Dome	B	B	30	Gouge	0.113	Repair by Welding		
368	Upper Dome	B	B	30	Grout Nozzle	0.217	Based on remaining thickness; No action is required		
369	Upper Dome	B	A	29	Pitting		Repair by Welding		
370	Upper Dome	B	A	31	NRI	NRI			
371	Exp Joint	A	2	7	Grout Nozzle	0.202	Based on remaining thickness; No action is required		
372	Exp Joint	A	2	7	Grout Nozzle	0.194	Based on remaining thickness; No action is required		
373	Exp Joint	A	2	7	Grout Nozzle	0.219	Based on remaining thickness; No action is required		
374	Upper Dome	B	A	27	Grout Nozzle	0.214	Based on remaining thickness; No action is required		
375	Upper Dome	B	A	35	Weld Defect	LOF	Repair by Welding		
376	Upper Dome	A	C	4	Wall Loss	0.230	Based on remaining thickness; No action is required		
377	Upper Dome	A	B	8	Weld Defect	LOF	Repair by Welding		
378	Upper Dome	A	C	8	Weld Defect	LOF	Repair by Welding		
379	Upper Dome	A	B	14	Weld Defect	LOF	Repair by Welding		
380	Upper Dome	A	B	17	Weld Defect	LOF	Repair by Welding		
381	Upper Dome	A	B	18	Weld Defect	LOF	Repair by Welding		
382	Upper Dome	B	C	17	Weld Defect	LOF	Repair by Welding		

Red Hill Tank 20 API-653 Recommendation Summary

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation
383	Upper Dome	B	C	17	Weld Defect	LOF	Repair by Welding
384	Upper Dome	B	B	35	Weld Defect	LOF	Repair by Welding
385	Upper Dome	B	B	35	Weld Defect	LOF	Repair by Welding
386	Upper Dome	B	C	23	Grout Nozzle	0.180	Based on remaining thickness; No action is required
387	Upper Dome	B	C	23	Dent		No Action Required
388	Upper Dome	B	C	23	Dent		No Action Required
389	Upper Dome	B	C	20	Gouge		Repair by Welding
390	Upper Dome	B	C	18	Grout Nozzle	0.208	Based on remaining thickness; No action is required
391	Upper Dome	A	C	11	Grout Nozzle	0.220	Based on remaining thickness; No action is required
392	Upper Dome	A	B	14	Weld Defect	LOF	Repair by Welding
393	Upper Dome	A	B	17	Weld Defect	LOF	Repair by Welding
394	Upper Dome	D	C	46	Weld Defect	LOF	Repair by Welding
395	Upper Dome	D	C	46	Weld Defect	LOF	Repair by Welding
396	Upper Dome	D	C	46	Grout Nozzle	0.212	Based on remaining thickness; No action is required
397	Upper Dome	D	C	44	Weld Defect	LOF	Repair by Welding
398	Upper Dome	D	C	38	Grout Nozzle	0.220	Based on remaining thickness; No action is required
399	Upper Dome	D	C	43	Grout Nozzle	0.220	Based on remaining thickness; No action is required
400	Upper Dome	D	C	43	NRI	NRI	
401	Upper Dome	C	C	33	Weld Defect	LOF	Repair by Welding
402	Upper Dome	D	C	35	Grout Nozzle	0.229	Based on remaining thickness; No action is required
403	Upper Dome	C	C	30	Dent		No Action Required
404	Upper Dome	C	C	30	Grout Nozzle	0.218	Based on remaining thickness; No action is required
405	Upper Dome	C	C	26	Grout Nozzle	0.218	Based on remaining thickness; No action is required
406	Upper Dome	C	C	40	Weld Defect	LOF	Repair by Welding
407	Upper Dome	C	C	34	Weld Defect	LOF	Repair by Welding
408	Upper Dome	C	C	34	Weld Defect	LOF	Repair by Welding
409	Upper Dome	A	C	13	Weld Defect	LOF	Repair by Welding
410	Upper Dome	B	C	15	Grout Nozzle	0.190	Based on remaining thickness; No action is required
411	Upper Dome	B	B	18	Grout Nozzle	0.210	Based on remaining thickness; No action is required
412	Upper Dome	A	C	6	Grout Nozzle	0.225	Based on remaining thickness; No action is required
413	Upper Dome	A	C	11	Weld Defect	LOF	Repair by Welding
414	Upper Dome	A	C	6	Weld Defect	LOF	Repair by Welding
415	Upper Dome	B	C	21	Gouge	0.113	Repair by Welding
416	Upper Dome	C	C	12	Pitting	0.161	Repair by Welding
417	Upper Dome	C	C	29	Weld Defect	LOF	Repair by Welding

Red Hill Tank 20 API-653 Recommendation Summary

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation
418	Upper Dome	A	C	29	Grout Nozzle	0.236	Based on remaining thickness; No action is required
419	Upper Dome	A	B	3	Dent		No Action Required
420	Upper Dome	A	A	3	Grout Nozzle	0.230	Based on remaining thickness; No action is required
421	Upper Dome	D	D	48	Weld Defect	LOF	Repair by Welding
422	Upper Dome	D	D	44	Grout Nozzle	0.200	Based on remaining thickness; No action is required
423	Upper Dome	D	D	39	Weld Defect	LOF	Repair by Welding
424	Deleted from program						
425	Upper Dome	D	D	41	Grout Nozzle	0.206	Based on remaining thickness; No action is required
426	Upper Dome	C	D	35	Gouge		Repair by Welding
427	Upper Dome	C	D	36	Grout Nozzle	0.200	Based on remaining thickness; No action is required
428	Upper Dome	C	D	29	Grout Nozzle	0.204	Based on remaining thickness; No action is required
429	Upper Dome	C	D	32	Grout Nozzle	0.205	Based on remaining thickness; No action is required
430	Upper Dome	C	D	30	Dent		No Action Required
431	Upper Dome	D	D	25	Grout Nozzle	0.223	Based on remaining thickness; No action is required
432	Upper Dome	D	E	20	Weld Defect	LOF	Repair by Welding
433	Upper Dome	D	E	20	Weld Defect	LOF	Repair by Welding
434	Upper Dome	D	E	20	Weld Defect	LOF	Repair by Welding
435	Upper Dome	D	E	20	Weld Defect	LOF	Repair by Welding
436	Upper Dome	C	E	16	Weld Defect	LOF	Repair by Welding
437	Upper Dome	B	D	16	Weld Defect	LOF	Repair by Welding
438	Upper Dome	B	D	16	Grout Nozzle	0.220	Based on remaining thickness; No action is required
439	Upper Dome	B	D	17	Weld Defect	LOF	Repair by Welding
440	Upper Dome	A	C	6	Grout Nozzle	0.230	Based on remaining thickness; No action is required
441	Upper Dome	B	D	24	Weld Defect	LOF	Repair by Welding
442	Upper Dome	B	D	21	Weld Defect	LOF	Repair by Welding
443	Upper Dome	A	D	9	Grout Nozzle	0.210	Based on remaining thickness; No action is required
444	Upper Dome	A	D	5	Grout Nozzle	0.205	Based on remaining thickness; No action is required
445	Upper Dome	B	D	13	Grout Nozzle	0.210	Based on remaining thickness; No action is required
446	Upper Dome	B	D	22	Dent		No Action Required
447	Upper Dome	B	E	10	Weld Defect	LOF	Repair by Welding
448	Upper Dome	B	D	21	Grout Nozzle	0.215	Based on remaining thickness; No action is required
449	Upper Dome	B	D	21	Weld Defect	LOF	Repair by Welding
450	Upper Dome	D	D	43	Dent		No Action Required
451	Upper Dome	C	C	40	Weld Defect	LOF	Repair by Welding
452	Upper Dome	C	D	32	Weld Defect	LOF	Repair by Welding

Red Hill Tank 20 API-653 Recommendation Summary

Flaw No.	Tank Section	Quad	Row/Course	Plate	Description of Flaw	R. Thickness	API-653 Recommendation		
453	Upper Dome	C	D	32	Weld Defect	LOF	Repair by Welding		
454	Upper Dome	D	D	47	Dent		No Action Required		
455	Upper Dome	B	D	15	Weld Defect	LOF	Repair by Welding		
456	Lower Dome	A	2	2	Grout Nozzle	0.212	Based on remaining thickness; No action is required		
457	Lower Dome	A	4	2	Grout Nozzle	0.230	Based on remaining thickness; No action is required		
458	Lower Dome	A	3	1	Grout Nozzle	0.200	Based on remaining thickness; No action is required		
459	Barrel	A	5	1	Grout Nozzle	0.220	Based on remaining thickness; No action is required		
460	Barrel	A	1	1	Grout Nozzle	0.209	Based on remaining thickness; No action is required		
461	Barrel	D	12	16	Grout Nozzle	0.211	Based on remaining thickness; No action is required		
462	Barrel	D	19	16	Grout Nozzle	0.216	Based on remaining thickness; No action is required		
463	Barrel	D	26	1	Weld Defect	LOF	Repair by Welding		
464	Barrel	D	27	1	Grout Nozzle	0.205	Based on remaining thickness; No action is required		
465	Extension	A	2	1	NRI				
466	Barrel	D	26	16	NRI				
467	Barrel	D	26	16	Weld Defect	LOF	Repair by Welding		
468	Catwalk	A	3	2	Weld Defect	LOF	Repair by Welding		
469	Manway	A	3		Weld Defect	LOF	Repair by Welding		
470	Upper Dome	A	A	8	Weld Defect	LOF	Repair by Welding		
471	Upper Dome	B	A	31	Weld Defect	LOF	Repair by Welding		
472	Upper Dome	B	B	20	Weld Defect	LOF	Repair by Welding		
473	Upper Dome	B	B	20	Weld Defect	LOF	Repair by Welding		
474	Upper Dome	A	C	1	Weld Defect	LOF	Repair by Welding		
475	Upper Dome	A	C	3	Weld Defect	LOF	Repair by Welding		
476	Extension	D	4	39	Weld Defect	LOF	Repair by Welding		
477	Upper Dome	A	A	17	Weld Defect	LOF	Repair by Welding		
478	Upper Dome	D	A	65	Weld Defect	LOF	Repair by Welding		
479	Upper Dome	D	A	66	Gouge	0.085	Repair by Welding		
480	Upper Dome	D	C	38	Weld Defect	LOF	Repair by Welding		
481	Upper Dome	B	C	20	Weld Defect	LOF	Repair by Welding		
482	**Lower Dome**	**B**	**1**	**13-Dec**	**Crack**	**Crack**	**Repair by Welding**		

Attachment F

Pressure test data

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 1 Oct 08

Tank No. 20 Pipe Line: 16" Pipe Line

Portion of Line Tested: ____________________

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable ✓ Retest Required NO

Procedure: Fill line with water and pressurize line to 150 psig, inspect all visible joints for leakage. Hold pressure for four hours and record pressure and temperature readings every ten minutes on the attached log.

Notes:
Abandon in Place per NFESC

D&B Test Witnessed By: [signature] 10-1-08

Shaw/Govt. Test Witnessed By: [signature] 10-1-08

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 20 Pipe Line: 16" Pipe Line

Date: 1 Oct 08

Start Time: 8:15 Ambient Temperature: 79

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	150	77°	
15 Minutes	150	77°	
30 Minutes	150	77°	
45 Minutes	150	77°	
60 Minutes	150	77°	
75 Minutes	150	77°	
90 Minutes	150	77°	
105 Minutes	150	77°	
120 Minutes	150	77°	
135 Minutes	150	77°	
150 Minutes	150	77°	
165 Minutes	148	77°	
180 Minutes	148	77°	
195 Minutes	148	77°	
210 Minutes	148	77°	
225 Minutes	148	77°	
240 Minutes	148	77°	

D&B Test Witnessed By: [signature] 10-1-08

Shaw/Govt. Test Witnessed By: [signature] 10-1-08

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 1 Oct 08

Tank No. 20 Pipe Line: Slop Line

Portion of Line Tested: ______________________

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable NO Retest Required ________

Procedure: Fill line with water and pressurize line to 150 psig, inspect all visible joints for leakage. Hold pressure for four hours and record pressure and temperature readings every ten minutes on the attached log.

Notes:
Failed.

D&B Test Witnessed By: [signature] 10-1-08

Shaw/Govt. Test Witnessed By: [signature] 10-1-08

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 20 Pipe Line: Slop Line

Date: 1 Oct 08

Start Time: 8:15 Ambient Temperature: 79

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	~~[illegible]~~ 150	77°	
15 Minutes	150	77°	
30 Minutes	148	77°	
45 Minutes	148	77°	
60 Minutes	146	77°	
75 Minutes	146	77°	
90 Minutes	146	77	
105 Minutes	144	77	
120 Minutes	144	77°	
135 Minutes	144	77°	
150 Minutes	142	77°	
165 Minutes	138	77°	
180 Minutes	142	77°	
195 Minutes	140	77°	
210 Minutes	140	77°	
225 Minutes	140	77°	
240 Minutes	140	77°	

D&B Test Witnessed By: [signature] 10-1-08

Shaw/Govt. Test Witnessed By:

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 1 Oct 08

Tank No. 20 Pipe Line: 6" Steam Line

Portion of Line Tested: ____

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable NO Retest Required ✓

Procedure: Fill line with water and pressurize line to 150 psig, inspect all visible joints for leakage. Hold pressure for four hours and record pressure and temperature readings every ten minutes on the attached log.

Notes:
Retest when Converted to Slop line.

D&B Test Witnessed By: [signature] 10-1-08

Shaw/Govt. Test Witnessed By: [signature] 10-1-08

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 20 Pipe Line: 6" Steam Line

Date: 1 Oct 08

Start Time: 8:15 Ambient Temperature: 79°

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	150	77°	
15 Minutes	150	77°	
30 Minutes	150	77°	
45 Minutes	150	77°	
60 Minutes	150	77°	
75 Minutes	150	77°	
90 Minutes	150	77°	
105 Minutes	150	77	
120 Minutes	150	77°	
135 Minutes	149	77°	
150 Minutes	148	77°	
165 Minutes	146	77°	
180 Minutes	144	77°	
195 Minutes	144	77°	
210 Minutes	143	77°	
225 Minutes	142	77°	
240 Minutes	142	77°	

D&B Test Witnessed By: [signature] 10-1-08

Shaw/Govt. Test Witnessed By: [signature] 10-1-08

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 1 Oct 08

Tank No. 20 Pipe Line: 8" Steam Line

Portion of Line Tested: ______

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable ✓ Retest Required ✓

Procedure: Fill line with water and pressurize line to 150 psig, inspect all visible joints for leakage. Hold pressure for four hours and record pressure and temperature readings every ten minutes on the attached log.

Notes:
After welding of New Sample tubes Retest Steam line.

D&B Test Witnessed By: [signature] 10-1-08

Shaw/Govt. Test Witnessed By: [signature] 10-1-08

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 20 Pipe Line: 8" Steam Line

Date: 1 Oct 08

Start Time: 8:15 Ambient Temperature: 79°

Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
Start of Test	150	77°	
15 Minutes	150	77°	
30 Minutes	150	77°	
45 Minutes	150	77°	
60 Minutes	150	77°	
75 Minutes	150	77°	
90 Minutes	150	77°	
105 Minutes	150	77°	
120 Minutes	150	77°	
135 Minutes	150	77°	
150 Minutes	150	77°	
165 Minutes	150	77°	
180 Minutes	150	77°	
195 Minutes	150	77°	
210 Minutes	149	77°	
225 Minutes	149	77°	
240 Minutes	149	77°	

D&B Test Witnessed By: [signature] 10-1-08

Shaw/Govt. Test Witnessed By: [signature] 10-1-08

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Hydrostatic Test per ASME B31.3

Date: 10·9·08

Tank No. 20 Pipe Line: 32" / Slop Line

Portion of Line Tested: 32" Pipe @ 60'

Pipe Material: Carbon Steel

Test Pressure: 150 psig

Test Time: 4 Hours

Test Results: Acceptable X Retest Required ______

Procedure: Step (1) ensure all lines have been emptied, (2) Cap/Blind each line (3) Fill line with water (4) Bleed line of all excess air (5) Pressurize line to 150 psig (6) Inspect line/blinds/cap & joints for leakage (7) If leaks are present repair as necessary (8) If no leaks hold pressure for four hours (9) Record pressure and temperature readings every ten minutes on appropriate log.

Notes:

D&B Representative: [signature]

Shaw CQC: [signature]

Dunkin & Bush, Inc.

Project No. N62472-03-C-1402
Pearl Harbor, Hawaii
Clean and Repair Red Hill Tanks 2 & 20

Cleaning Petroleum Tanks
Hydrostatic Test

Test Log Per ASME B31.3

Tank No. 20 Pipe Line: 32"

Date: 9 Oct 08

Start Time: 1245 Ambient Temperature: 79°

	Time	Pressure (psig)	Pipe Temp. (deg F)	Notes
1245	Start of Test	150	78°	
100	15 Minutes	150	78°	
115	30 Minutes	150	78°	
130	45 Minutes	150	"	
145	60 Minutes	150	"	
200	75 Minutes	150	78°	
215	90 Minutes	150	78°	
230	105 Minutes	150	78°	
245	120 Minutes	150	78°	
300	135 Minutes	150	78°	
315	150 Minutes	150	78°	
330	165 Minutes	150	78°	
345	180 Minutes	150	78°	
400	195 Minutes	150	78°	
415	210 Minutes	148	78°	
430	225 Minutes	148	78°	
445	240 Minutes	148	78°	

D&B Test Witnessed By: [signature]

Shaw/Govt. Test Witnessed By: [signature]

Dunkin & Bush, Inc.

ORDER FOR SUPPLIES OR SERVICES

1. CONTRACT/PURCH. ORDER/ AGREEMENT NO.	2. DELIVERY ORDER/ CALL NO.	3. DATE OF ORDER/CALL (YYYYMMMDD)	4. REQ./ PURCH. REQUEST NO.	5. PRIORITY
N62583-09-D-0132	0003	2010 Jan 13	ACQR1305421	

6. ISSUED BY CODE N62583
NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE RAQN0/NAVAL BASE VENTURA COUNTY
1205 MILL RD BLDG 850
PORT HUENEME CA 93043-4347

7. ADMINISTERED BY *(if other than 6)* CODE
SEE ITEM 6

8. DELIVERY FOB
[X] DESTINATION
[ ] OTHER
(See Schedule if other)

9. CONTRACTOR CODE 1KPK4 FACILITY
NAME AND ADDRESS
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZIE JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

10. DELIVER TO FOB POINT BY (Date) (YYYYMMMDD)
SEE SCHEDULE

11. MARK IF BUSINESS IS
[ ] SMALL
[ ] SMALL DISADVANTAGED
[ ] WOMEN-OWNED

12. DISCOUNT TERMS

13. MAIL INVOICES TO THE ADDRESS IN BLOCK
See Section G

14. SHIP TO CODE
SEE SCHEDULE

15. PAYMENT WILL BE MADE BY CODE S33150
DFAS CO STOCK FUND DIRECTORATE
ATTN: DFAS CO BVDFB
P. O. BOX 182317
COLUMBUS OH 43218-6254

MARK ALL PACKAGES AND PAPERS WITH IDENTIFICATION NUMBERS IN BLOCKS 1 AND 2.

16. TYPE OF ORDER

DELIVERY/ CALL	X	This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.
PURCHASE		Reference your quote dated Furnish the following on terms specified herein. REF:

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR | SIGNATURE | TYPED NAME AND TITLE | DATE SIGNED (YYYYMMMDD)

[ ] If this box is marked, supplier must sign Acceptance and return the following number of copies:

17. ACCOUNTING AND APPROPRIATION DATA/ LOCAL USE
See Schedule

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/ SERVICES	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	SEE SCHEDULE				

* If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.

24. UNITED STATES OF AMERICA
TEL: 805-982-6209
EMAIL: [redacted]
BY: [redacted]
[redacted]
CONTRACTING / ORDERING OFFICER

25. TOTAL $3,829,149.00
26. DIFFERENCES

27a. QUANTITY IN COLUMN 20 HAS BEEN
[ ] INSPECTED [ ] RECEIVED [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE | c. DATE (YYYYMMMDD) | d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE | 28. SHIP NO. | 29. DO VOUCHER NO. | 30. INITIALS

f. TELEPHONE NUMBER | g. E-MAIL ADDRESS | [ ] PARTIAL [ ] FINAL | 32. PAID BY | 33. AMOUNT VERIFIED CORRECT FOR

36. I certify this account is correct and proper for payment.
a. DATE (YYYYMMMDD) | b. SIGNATURE AND TITLE OF CERTIFYING OFFICER

31. PAYMENT [ ] COMPLETE [ ] PARTIAL [ ] FINAL
34. CHECK NUMBER
35. BILL OF LADING NO.

37. RECEIVED AT	38. RECEIVED BY	39. DATE RECEIVED (YYYYMMMDD)	40. TOTAL CONTAINERS	41. S/R ACCOUNT NO.	42. S/R VOUCHER NO.

Section B - Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
0001		[redacted]	Dollars, U.S.	$[redacted]	$3,829,149.00

Base Year
FFP
Contractor is to provide all labor, material and equipment necessary to perform the work as identified in the attached Statement of Work, Clean, Inspect, and Repair Storage Tanks 5 and 17 at FISC Pearl Harbor Red Hill Complex. Contractor proposal dated October 09, 2009 is accepted as proposed and incorporated by reference.

Wage Determination HI0800001, HI1, dated 9/25/2009 applies and was previously supplied.
FOB: Destination
PURCHASE REQUEST NUMBER: [redacted]

MAX NET AMT	$3,829,149.00

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
000101		UNDEFINED		UNDEFINED	$0.00

(b) (4) [redacted]

MAX NET AMT	$0.00

[redacted] $3,829,149.00

Section C - Descriptions and Specifications

STATEMENT OF WORK

Statement of Work
Clean, Inspect, and Repair Storage Tanks

Project Title: Clean, Inspect, and Repair Storage Tanks 5 and 17 at FISC Pearl Harbor Red Hill Complex, HI

Location: FISC Pearl Harbor Red Hill Complex, HI

Project Number: P-035940-09

Date: 10/9/09

Submitted By: David Walton

TABLE OF CONTENT

Location: **FISC Pearl Harbor Red Hill Complex, HI**
Project: **Clean, Inspect, and Repair Storage Tanks 5 and 17**

Statement of Work
Clean, Inspect, and Repair Storage Tanks

1.0 GENERAL

1.1 Scope

This Statement of Work defines the scope for cleaning, inspecting and repairing military storage tanks worldwide. Depending on tank type and/or history a complete out-of-service API 653 inspection, an in-service API 653 inspection, a modified API 653, or Steel Tank Institute (STI) inspection will be performed. Tank repairs under this scope shall include installation of tank gauging tubes (stilling wells) for all tanks over 30,000 gal. The repairs of deficiencies found during the inspection shall be an option to the contract. Site specific information including the type of inspection, the need for stilling wells and other applicable information is located in Section 2.0.

1.2 Requirements

The following are requirements that shall be followed unless stated otherwise in Section 2.0. Latest editions of all codes shall be used.

1.2.1 All work shall be performed in a safe and professional manner in accordance to applicable federal, state and local regulations.

1.2.2 Inspections and repairs shall be carried out in accordance to American Petroleum Institute (API) Standard 653, *Tank Inspection, Repair, Alteration And Reconstruction,* Steel Tank Institute (STI) SP001-00 *Standard for the Inspection of Aboveground Storage Tanks SP001*, and all amendments as supplemented by this statement of work. Types of inspections to be performed are specified in Section 2.0.

1.2.3 All coating work shall be performed by SPCC QP-1 certified contractors in accordance to UFGS 09970, 09971, and 09973.

1.2.4 The tank evaluation shall be performed by a qualified inspector or engineer, experienced in tank design, fabrication, repair, construction, inspection, operation and behavior. The inspection report shall be signed by the API 653 inspector and stamped and signed by a registered professional engineer familiar with the provisions of the API Standard 653.

2.0 SITE SPECIFIC INFORMATION

The following section is created for this specific location(s) for this proposal request. The rest of the scope of work shall be followed unless Section 2.0 states otherwise.

2.1 Tank Information

The facility identified above requires services for tanks 5 and 17. Relevant information for each tank can be found in Table 2.1 in Appendix A.

The Red Hill fuel storage tank complex is located on the Island of Oahu, Hawaii. The Red Hill fuel storage tank complex consists of multiple underground storage tanks constructed in 1942-1943. The Red Hill Tanks have a coated welded steel liner backed up by concrete which bears against the solid rock from which the tanks were carved. Each tank's nominal capacity is 302,000 barrels of JP-5. The configuration of these vertical cylindrical tanks is 100 feet in diameter and 250 feet in height. The tank is domed on the lower and upper ends. Access to the tanks is provided by an upper access tunnel 190 feet above the tank bottom and a lower access tunnel just below the tank bottom.

2.2 Inspections Due

Tank 5 – Modified API 653 Out of Service Inspection
Tank 17 – Modified API 653 Out of Service Inspection

2.3 Gauge Tubes (Stilling Wells)

No gauge tubes are required.

2.4 Anticipated Problems

None know at this time.

2.5 Government Furnished Information

Information is located in Appendix E.

2.5.1 History of Tank 5 & 17
2.5.2 Drawings of Tank 5 & 17.
2.5.3 Drawings of hydraulic boom and basket. This information is provided to the Contractor for the bidding purpose

2.6 Government Services Available to the Contractor

Table 2.2, lists the services, if any, the facility can provide to the contractor for purposes of completing the required tasks stated in this SOW.

Table 2.2. Government Services Available to the Contractor

	Yes/No	If Yes, limits on what the government can provide or accept.
Government will provide water for tank cleaning	Yes	
Government will accept residual fuel/ wash rinsates /sludge	Yes/No/No	
Government to provide electricity	Yes	Government can provide electricity inside the tunnel, but not outside for trailers.
Government will provide compressed air	No	
Government will install high legs for tanks with floating roofs	NA	
Other	The Government will provide train assistance in tunnel. See Section 2.10.7.	

2.7 Tank History

Tanks 5 & 17 were constructed in 1942 and 1943 respectively.

2.8 Base Access

In order for the contractor to gain access to the facility in a timely manner the following needs to be submitted.

2.8.1 Contractor Information

The information required to obtain base access shall be submitted to the NTR 14 calendar days prior to arrival:

2.8.1.1 Full Name with Middle Initial
2.8.1.2 SSN

2.8.1.3 Date of Birth
2.8.1.4 Citizenship
2.8.1.5 Driver's License with State of Issuance
2.8.1.6 Employer's Name, address, phone number
2.8.1.7 Planned arrival date and planned finish date for site personnel
2.8.1.8 Vehicle/Equipment make, model and year
2.8.1.9 Vehicle/Equipment type
2.8.1.10 Vehicle/Equipment tag number

If a rental car is used, the rental agreement shall be presented to Pass and Decal when access is required. A valid picture ID will need to be presented at the time of arrival.

2.8.2 **Special Security Measures**

Red Hill access will also need to be obtained. For this access the needed information is the same as 2.8.1, but a recent photo of each person is required. A digital photo is acceptable.

2.9 Scheduling

Initially the Contractor will be given one tank. (Tank 5) After the cleaning, inspection, recommendations and repairs have been made, the Contractor will be given the second tank. (Tank 5 must be returned to service prior to NOV 10) Contract modification negotiations and other contract administration will be done while the Contractor is working on the second tank.

2.10 Other

2.10.1 Hydrostatic pressure test the piping between the tanks' skin valves and the tank. These lines shall be tested to 1.5 MAWP for a minimum of four hours. There is approximately 20 ft of pipe per tank to test. Government will NOT accept inconclusive results. Contractor shall provide a pass or fail result.

2.10.2 Once the degassing of tank is completed, the Contractor shall notify the NTR to make arrangement with FISC to remove tank gauging and temperature sensing equipment from the tank. The Contractor shall maintain a vapor-free condition inside of the tank. The ventilation equipment shall be explosion proof and have an air rate of one tank volume change per hour.

2.10.3 Prior to any work inside of tank, replace any missing structural members to repair the tower and the access catwalk. The Contractor shall provide a separate cost estimate for any repair of the tower and the access catwalk. This shall be an option for Delivery Order modification. The Contractor shall provide structural integrity certification of the tower and the access walkway by a registered professional structural engineer.

2.10.4 The information of existing Government booms and baskets will be provided to the Contractor for their information only. The Government provided booms and baskets cannot be utilized for execution of the project.

2.10.5 Due to the unusual dimensions and configurations of the Red Hill Tanks and the requirement of cleaning and inspection of entire tank interior, the Contractor shall provide a detailed plan of engineering approach how to access all the steel plates of Tank 5 & 17 The plan shall be reviewed and approved by the Government as a part of the Work Plan. A brief discussion of this shall also be included in the bid proposals.

2.10.6 The Contractor shall thoroughly clean the tank including the center tower, catwalk structure, top & bottom domes, and the shell. All sludge, sediment, wash water and other deleterious material from the tank shall be removed and disposed of by the Contractor. For the bidding purposes, the Contractor shall estimate 20 barrels of sludge to be present in each tank. Assume minimal residual fuel is present.

2.10.7 The Government will provide train assistance to a maximum of four hours on any work day in the Lower Access Tunnel only. Train support shall only be provided during standard Government work hours of 8 am to 4 pm, Monday thru Friday. The Contractor shall notify the Government no less than one (1) day in advance of the time and location that the contractor requires the train support. All loading, unloading and securing of material onto flat beds shall be the Contractor's responsibility. Contractor retains responsibility for all items during Government transport.

2.10.8 The Contractor shall disconnect pipelines (two fuel lines and one slop line) connected to the tank bottom by removing double-block-and-bleed plug valves and/or ball valves and installing solid-plate blind flanges to prevent any flammable material entering from the tanks to the active pipelines. The skin valves to be removed are motor operated valves, and all electrical components shall be disengaged by a certified electrician before removing the valves from the pipelines. Upon completion of the inspection (post-repair inspection, if there is any repair done), the valves shall be installed back to the pipelines and the electrical components shall be restored for normal operating condition with new gaskets and bolts. The Contractor shall confirm the sizes of valves to remove at site-walk. Control system to be locked and tagged out by Government.

2.10.9 Inspection shall include assessments of upper dome, extension, under catwalk, entire course shells, lower dome, appurtenances, accessways, vents, and coatings. Upper & lower domes, shell, and all welds shall be 100% inspected. The Contractor shall propose type with recommendation why each inspection methods to be used in the inspection process. This shall be included in the bid proposals. Some example methods are Magnetic Flux Leakage (MFL), Low Frequency Electromagnetic Technique (LFET), Ultrasonic Thickness (UT) scanning, Eddie Current, Balance Field Electromagnetic Technique (BFET), etc. Contractor shall take every precaution not to damage the tank coating. The Contractor/inspector shall be responsible for any damage to interior tank coating during work.

2.10.10 Prior to starting work inside of the tanks, the Contractor shall install probe port covers of existing Mass Tank Gauging (MTG) system of Tank 5 & 17. These probe port covers shall be removed upon completion of post-repair inspection.

2.10.11 Inspection reports shall include detailed information about the recommend repairs and their locations. Each recommended repair shall be labeled and referenced in such as manner that the Government shall be capable of locating these deficiencies from the report. These locations shall also be identified and referenced on the actual tank.

2.10.12 Abrasive blasting is considered Hot Work.

2.11 Government Points of Contact (POC)

2.11.1 Contracting Officer

The Contracting Officer is:

[redacted]
Naval Facilities Engineering Command Southwest
Specialty Center Contracts Core, Code AQN00
151 36th Avenue, Suite 2 Port Hueneme, CA 93043-4438

Telephone (805) 982-2479
[redacted]

2.11.2 **Contracts Officer Representative**
The Contracts Officer Representative for this contract is:

[redacted]
Naval Facilities Engineering Service Center (NFESC), Code ESC 232
1100 23rd Avenue Port Hueneme, CA 93043
Telephone (805) 982-3597
[redacted]

2.11.3 **Naval Technical Representative (NTR)**
The NTR for this contract is:

TBD
Naval Facilities Engineering Service Center (NFESC), Code ESC 232
1100 23rd Avenue Port Hueneme, CA 93043
Telephone (805) 982-3595

3.0 REFERENCES

The work performed shall comply with all federal, state, and local regulations. In addition applicable, but not limited to, codes for this work include:

3.1 American Petroleum Institute (API)

3.1.1 API Recommended Practice 574, *Inspection Practices for Piping System Components,* Latest Edition.
3.1.2 API Recommended Practice 575, *Inspection of Atmospheric and Low-Pressure Storage Tanks,* Latest Edition.
3.1.3 API Standard 650, *Welded Steel Tanks for Oil Storage,* Latest Edition.
3.1.4 API Recommended Practice 651, *Cathodic Protection of Aboveground Petroleum Storage Tanks*, Latest Edition.
3.1.5 API Recommended Practice 652, *Lining of Aboveground Petroleum Storage Tanks,* Latest Edition.
3.1.6 API Standard 653, *Tank Inspection, Repair, Alteration and Reconstruction,* Latest Edition.
3.1.7 API/ANSI Standard 2015, *Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks*
3.1.8 API/ANSI RP 2016 *Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks*
3.1.9 API Standard 2550, *Measurement and Calibration of Upright Cylindrical Tanks*

3.2 American Society of Mechanical Engineers (ASME)

3.2.1 ASME B31.3, *Process Piping*, Latest Edition.
3.2.2 ASME B31.4, *Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids,* Latest Edition.
3.2.3 ASME IX,

3.3 Code of Federal Regulations (CFR)

3.3.1 29 CFR 1910, *Permit-Required Confined Spaces for General Industry*.
3.3.2 40 CFR 112, *Oil Pollution Prevention*.

3.4 Military Handbooks (MIL-HDBK)

3.4.1 MIL-HDBK 1022A, *Department of Defense Handbook: Petroleum Fuel Facilities,* 01 November 1999.
3.4.2 MIL-HDBK 201B, *Military Standardization Handbook: Petroleum Operations.*

3.5 National Association of Corrosion Engineers (NACE)

3.5.1 NACE Recommended Practice, RP0184-97, *Repair of Lining Systems*.

3.5.2 NACE Recommended Practice, RP0193, *External Cathodic Protection of On-Grade Metallic Storage Tank Bottoms.*

3.5.3 NACE Recommended Practice, RP0288-94, *Inspection of Linings on Steel and Concrete*.

3.6 National Fire Protection Association (NFPA)

3.6.1 NFPA-30, *Flammable and Combustible Liquids Code*.

3.7 Steel Tank Institute (STI)

3.7.1 STI SP001, *Standard for the Inspection of Aboveground Storage Tanks*.

3.8 Safety

3.8.1 EM 385-1-1, *U.S. Army Corps of Engineers Safety and Health Requirement, Appendix A Minimum Basic Outline for Accident Prevention, and paragraph 6*.

3.9 Unified Facilities Criteria (UFC)

3.9.1 UFC 3-460-01, *Petroleum Fuel Facilities*.

”

3.10 Unified Facilities Guide Specification (UFGS)

3.10.1 UFGS 09970, Epoxy/Fluoropolyurethane Interior Coating Of Welded Steel Petroleum Fuel Tank

3.10.2 UFGS 09971, Exterior Coating System for Welded Steel Petroleum Storage Tanks

3.10.3 UFGS 09973, Interior Coating System for Welded Steel Petroleum Storage Tanks

3.10.4 UFGS 01351, Safety, Health, and Emergency Response

3.10.5 UFGS 13205, Steel Tanks with Fixed Roofs

4.0 WORK REQUIREMENTS

Work shall be performed in compliance with applicable federal, state and local codes and regulations. This includes adherence to all military service regulations concerning safety, work quality and security.

4.1 Tank Cleaning

The tank(s) shall be professionally cleaned for personnel entry. The tank cleaning contractor shall coordinate all site work with the base POC and the designated Navy Technical Representative (NTR). The Contractor shall provide adequately trained personnel, necessary personal protective equipment (PPE) and conduct safety meetings in accordance to API 2015, 2016 and UFGS 01351.

4.1.1 **Tank Lockout/Tag-Out**

The contractor shall be responsible for ensuring the tanks are properly locked and tagged out and procedures shall be discussed with onsite personnel. Items for lockout/tag-out include: valves, pumps, motor starters, etc. Lockout/tag-out and shall also consist of installing skillets or temporarily replacing valves with blinds to prevent unauthorized fuel transfer into the tank.

4.1.2 **Residual Fuel, Sludge and Wash Rinsates**

The contractor shall be responsible for proper disposal of any residual fuel, sludge and/or wash rinsates, encountered during the tank cleaning if the facility cannot accept as stated in Section 2.0.

4.1.3 **Floating Roofs (if applicable)**

Unless otherwise stated in Appendix A of this SOW the base shall be responsible for installing the high level legs on tanks with floating roofs prior to performing the inspection. The Contractor shall make their best attempt to clean the interface between the floating roof and the tank shell and remove all fuel from floating roof seals.

4.1.4 **Safe for Entry/Inspection Certification**

A certified Marine Chemist or a certified Industrial Hygienist is to issue a Safe for Entry Permit after cleaning and before inspection and repairs.

4.2 Inspections

The type of inspection to be performed is identified in Section 2.0 for each tank. The inspector shall coordinate all site work with the designated Navy Technical Representative (NTR) and the base POC. The inspector shall arrive at the site with all testing equipment necessary to perform a thorough inspection. The inspector shall verify that all testing equipment is calibrated and in good working order and shall include proof in the inspection report. Facility personnel will be briefed on all inspection results before the inspectors leave.

4.2.1 In-Service API 653 Inspection of Aboveground Storage Tanks

This inspection shall be performed while the tank is still in service. The following shall be performed:

4.2.1.1 Non-Destructive Testing

4.2.1.1.1 Visual Inspection

Visually inspect the overall condition of the tank. This includes plates, corrosion, coating, welds, appurtenances, gauging, presence of cathodic protection, foundation, secondary containment, stairways, nozzles, grounding, etc.

4.2.1.1.2 Ultrasonic Thickness (UT) Measurements and Recording

Perform UT measurements of the tank shell, roof, and nozzles. UT measurements shall be taken around the first course and on the upper courses accessible by stairways. The UT reading will be used for documentation, shell/roof thickness acceptability, and if applicable, remaining life calculations.

4.2.1.2 Color Photographs

Color photographs shall be taken to document tank condition, discrepancies and overall construction.

4.2.1.3 API 653 Checklist in Appendix C

The appropriate API 653 Checklist in Appendix C shall be performed.

4.2.1.4 Mapping

As-built mapping shall be performed of shell and roof plate orientation. Stairways, appurtenances, manways, vents and other significant tank details shall also be included.

4.2.1.5 Settlement Survey and Evaluation

A shell and floor edge settlement survey shall be performed to identify edge settlement, differential settlement, and/or planar tilt. The results of the evaluation shall be discussed in the body of the report and the acceptability of these results shall also be made. A graphical representation of the settlement shall be included in the report. The tank will be accessed for out-of-roundness as well.

4.2.1.6 Coating

A coating assessment shall be made by the persons inspecting. The inspectors shall be familiar with military coatings, but if significant or complex coating issues are present the contractor shall provide a NACE certified coating inspector. The NACE inspector shall only be included at the request of the Contracting Officer. Dry Film Thickness (DFT) reading shall be taken at assessable tank locations (as applicable) to determine the average thickness readings of the internal/external shell, floor, and roof.

4.2.1.7 Secondary Containment

Visually inspect containment and assess the general secondary containment condition. Note the presence of cracks, settlement, and deterioration. Record condition and need for repairs is needed.

4.2.1.8 Tank Appurtenances

The tank nozzles, manways and other appurtenances shall be examined for adequacy and applicable standard compliance of wall thickness, reinforcement, weld spacing, and corrosion allowance. Tank accessories such as relief valves and level gauges shall be examined for general condition. Shell nozzles and reinforcements shall be ultrasonic thickness tested for determination of minimum required thicknesses, corrosion rates, and remaining life.

4.2.1.9 Level Alarms/Water Draw-Off/ATG Systems/Vents
Identify methods/systems for level alarms, water draw-off, ATG, and venting systems. Gather operability information from onsite personnel. General condition and system functionality shall be included in the report.

4.2.2 **Out-of-Service API 653 Inspection of Aboveground Storage Tanks**
This inspection shall be performed while the tank is out-of-service. The following shall be performed:

4.2.2.1 Non-Destructive Testing

4.2.2.1.1 Visual Inspection (VT)
Visually inspect the overall condition of the tank. This includes plates, roof underside, corrosion, coating, welds, appurtenances, gauging, presence of cathodic protection, foundation, secondary containment, stairways, nozzles, grounding, sumps, etc.

4.2.2.1.2 Ultrasonic Thickness (UT) Measurements and Recording
Perform UT measurements of the tank shell, floor, roof, and nozzles. UT measurements shall be taken around the first course and on the upper courses accessible by stairways. The UT reading will be used for documentation, shell/roof/floor thickness acceptability, and if applicable, remaining life calculations.

4.2.2.1.3 Magnetic Flux Leakage (MFL)
MFL floor scanning shall be performed on all accessible areas of the floor. Topside or bottom side corrosion indications shall be verified by VT and/or UT. In areas inaccessible by scanning, a sufficient number of UT readings shall be taken to gain a representation of the bottom underside condition.

4.2.2.1.4 Vacuum Box Testing (VBT)
On uncoated floors and shells, VBT all welds on the tank floor and internal shell to floor weld. If the floor is coated, the contactor should have the capability to perform VBT if needed.

4.2.2.2 Color Photographs
Color photographs shall be taken to document tank condition, discrepancies and overall construction.

4.2.2.3 API 653 Checklist in Appendix C
The appropriate API 653 Checklist in Appendix C shall be performed.

4.2.2.4 Mapping
As-built mapping shall be performed of shell, floor, and roof plate orientation. Stairways, appurtenances, manways, vents and other significant tank details shall also be included.

4.2.2.5 Settlement Survey and Evaluation
A shell and floor edge settlement survey shall be performed to identify edge settlement, differential settlement, and/or planar tilt. The results of the evaluation shall be discussed in the body of the report and the acceptability of these results shall also be made. A graphical representation of the settlement shall be included in the report. The tank will be accessed for out-of-roundness as well.

4.2.2.6 Coating
A coating assessment shall be made by the persons inspecting. The inspectors shall be familiar with military coatings, but if significant or complex coating issues are present the contractor shall provide a NACE certified coating inspector. The NACE inspector shall only be included at the request of the

Contracting Officer. Dry Film Thickness (DFT) reading shall be taken at assessable tank locations (as applicable) to determine the average thickness readings of the internal/external shell, floor, and roof.

4.2.2.7 Secondary Containment

Visually inspect containment and assess the general secondary containment condition. Note the presence of cracks, settlement, and deterioration. Record condition and need for repairs is needed.

4.2.2.8 Tank Appurtenances

The tank nozzles, manways and other appurtenances shall be examined for adequacy and applicable standard compliance of wall thickness, reinforcement, weld spacing, and corrosion allowance. Tank accessories such as relief valves and level gauges shall be examined for general condition. Shell nozzles and reinforcements shall be ultrasonic thickness tested for determination of minimum required thicknesses, corrosion rates, and remaining life.

4.2.2.9 Level Alarms/Water Draw-Off/ATG Systems/Vents

Identify methods/systems for level alarms, water draw-off, ATG, and venting systems. Gather operability information from onsite personnel. General condition and system functionality shall be included in the report.

4.2.3 **Modified API 653 Inspection**

This section includes all other tanks that do not fall under the API 653 definition of an Aboveground Storage Tank.

4.2.3.1 Field Erected Cut and Cover Tanks

As applicable, use Section 4.2.1.10 "Out-of-Service Inspection of Aboveground Storage Tanks" for inspection of cut and cover tanks. The following will also be performed:

4.2.3.1.1 UT scan four locations from the tank floor/shell weld to the tank roof. This will used for shell backside evaluation.

4.2.3.2 Horizontal Cyclical Welded Steel Underground Tanks (Section to be included at a later date.)

4.2.3.3 Shop Fabricated Aboveground Tanks (Section to be included at a later date.)

4.2.3.4 Other (Section to be included at a later date.)

4.2.4 **Steel Tank Institute Inspection**

STI SP001 shall be used as guidance on all storage tanks not in contact with the ground. These tanks are typically smaller shop fabricated in a horizontal position. The purpose of the inspection shall be to document the tank and secondary containment condition, and ensure is the tank is not leaking.

4.3 Tank Calibration (Strapping Charts)

Prepare two calibration tables for each tank specified in Section 2.0, one in English units and one in metric units. Both tables shall show the volume of the fuel for all liquid levels in the tank starting at the shell to bottom joint and going up to the level of the overflow. Tank calibration shall be in accordance with API 2003 "Manual of Petroleum Measurements Standards" for "critical measurement," API Standard 2550 "Measurement and Calibration of Upright Cylindrical Tanks" and in accordance with UFGS Specification 33 56 13.13, paragraph 3.4.1.d (Chapter 2.2D, Internal Electro-optical Distance Ranging Method (EODR) (using a theodolite with an electronic distance ranging device).)

The English units calibration table shall show the volume of the fuel in barrels of 42 gallon and the level in 1/16-inch increments. The metric unit calibration table shall show the volume of the fuel in cubic meters and the level of the fuel in 2.0 mm increments. The zero level shall be the bottom of the shell. The level of the bottom of the shell and the level of the overflows shall be identified on the calibration table (strapping chart). The table shall not include tank volume above the level of the overflows. Preparation of new calibration tables from API report information or by interpolation of existing tables shall not be permitted. The table shall be certified by a third party. The tables shall be include in the tank inspection report and in addition two laminated copies each of English and metric units provide shall be sent to the facility.

4.4 Tank Gauging Tubes (Stilling Wells)

The government is in the process of refining requirements for gauge tubes in all storage tanks. The standard design shall be used for the installation of the gauge tubes. Modification to any existing tubes shall be made if acceptable and feasible. All damaged coatings shall be repaired in accordance to UFGS 09770 and UFGS 09771.

4.4.1 Standard Design

The standard details shall be used for each tank identified in Section 2.0 and the Contractor shall make site specific adjustments as appropriate for each tank. The Contractor shall develop applicable details to retrofit identified tanks. Location of gauging tubes is critical for water and temperature sensing. Tubes shall be constructed of schedule 40 aluminum. Special considerations shall be made for unusual circumstances such as geodesic domes, very large or uncommonly shaped tanks, etc. These special circumstances will be addressed in Section 2.0.

4.4.2 Gauge Tube Requirements

The gauge tubes will need to provide the capability for the ATG system servo float, the temperature sensor (maybe included inside the ATG system gauge tube), and manual gauging.

4.5 Repairs

The Government shall have the option to modify the contract to include repairs identified during the inspection. This section shall include all repairs identified in the inspection, but shall not include tank gauge tubes that are in Section 4.4. If significant repairs are needed, the Government will require an API 653 inspector certify all repairs/NDT work. If repairs are deemed necessary, the government will submit a scope of work for repairs and request a modification to the existing contract. Once modification is awarded, the contractor shall prepare the following:

4.5.1 Work Plan

The Contractor shall prepare a Work Plan and it will be reviewed and approved before performing repairs to the tank(s). The Contractor shall have the option to amend the existing Work Plan or create a new plan. The Work Plan shall incorporate all Federal, State, and Local environmental regulations. The Repair Work Plan shall include all information requested in Section 5.2, but should also include the following if applicable:

4.5.1.1 Hydrostatic Testing Plan

If significant repairs are made, especially in the tank critical zone, the contractor may recommend a hydrostatic test be performed. The hydro test shall be performed in accordance to API Standard 653. Personnel performing the test shall be identified and documentation on qualifications shall be submitted.

4.5.1.2 Non-Destructive Testing (NDT)

The Contractor shall be responsible for performing all necessary NDT to prove the validity of repairs. NDT methods and technician qualification shall be chosen and applied according to API Standard 653.

4.5.2 Health and Safety Plan

The Health and Safety Plan for the repairs shall follow all the guidelines in Section 5.3.

4.5.3 Repair Certification Reports

A separate report shall be provided for each tank repaired. These reports will include thorough documentation all work performed. Hard copies of each tank shall be bind in plastic ring binding with a plastic sleeve inside to hold electronic copy of each report. NFESC will provide the cover and report number.

Repair Reports Shall Include:

4.5.3.1 Executive Summary
4.5.3.2 Suitability for Service Statement
4.5.3.3 Work Performed
4.5.3.4 Timeline

Appendices:
4.5.3.5 Documenting Photographs
4.5.3.6 Personnel Certifications
4.5.3.7 NDT Documentation
4.5.3.8 QC Documentation
4.5.3.9 Materials and Coating Data
4.5.3.10 As-built Drawings, if applicable
4.5.3.11 API 653 follow up inspection (if deemed necessary)

5.0 POST AWARD, PRE-WORK SUBMITTALS

Prior to the start of work, all submittals shall be reviewed and approved in accordance to Appendix xxx.

5.1 Schedule

After contract award, a projected schedule with dates of mobilization, major milestone and demobilization shall be submitted.

5.2 Work Plan

Provide a written plan for cleaning, inspecting and stilling well repairs for the requested storage tanks in Section 2.0. The work plan shall include the following:

5.2.1 Project Summary and Background

5.2.2 Detailed Schedule
This schedule shall have more detail the previous schedule required in Section 5.1.

5.2.3 Methodology
Provide details on the proposed methodology for completing the required work.

5.2.4 Execution Strategy
Provide strategy for execution. This should include incorporate the work methodology and schedule along with quality control, mobilization/demobilization, applicable permitting, etc.

5.2.5 Key Personnel and Subcontractors
Provide contact information for key personnel and subcontractors. Include brief description qualifications and responsibilities of all parties.

5.2.6 Materials and Equipment to be Used
Provide list materials and major equipment to be used. These items will need to be review and approved by the NTR. Material specification sheets shall be submitted in accordance to Appendix D.

5.2.7 Hazardous Waste Disposal
Provide a plan for proper identification, handling, storage, transportation and disposal of any anticipated hazardous material.

5.3 Health and Safety Plan (H&SP)

5.3.1 **General Work Safety**

The Contractor shall submit a Health & Safety Plan detailing such items as briefings, training, hazard control, general housekeeping, personal protective equipment, etc. Submit in accordance with EM 385-1-1 Appendix A Minimum Basic Outline for Accident Prevention. It is stressed the contractor shall perform all work in a safe manner and maintain all proper documentation. A complete hard copy of the H&SP shall be on-site at all times.

5.3.2 **Confined Space Plan**
Only a qualified person shall issue tank entry and confined space permits. Tank atmosphere shall be gas-freed and monitored in accordance with OSHA guidelines for oxygen content, flammable, and toxic vapors. API standard 2015 and 29 CFR 1910.146 shall also be followed.

5.3.3 **Hazardous Materials Handling**
Hazardous material handling shall be performed according to the manufacturer’s specifications and conform to all applicable federal, state, and local regulations. Personnel handling hazardous materials shall be properly trained and provided with any required personal protective equipment (PPE).

5.3.4 **Environmental Protection**
Preventative measures shall be addressed and followed to protect the environment from any work being performed. This section shall also discuss contingency plans to contain and clean up in the event a spill.

5.3.5 **Hot Work**
Hot work permits shall be obtained prior to any hot work being performed. Hot work procedures for both above the floor work and on the floor work shall be included in the H&SP as well as the Work Plan. The Contract shall obtain Hot Work permits from a Marine Chemist or Certified Industrial Hygienist and also the local base fire department. Hot work is defined as welding, cutting, etc. Abrasive blasting will be considered hot work unless stated otherwise in Section 2.9.

5.4 Personnel and Contractor Qualifications
Provide information on experience, training and licensing.

5.4.1 **Project Manager**
The Project Manager for this project shall have the technical and practical background in petroleum storage tank construction and inspection. This person shall be familiar with the applicable API, STI, and other Military standards and recommend practices. This person shall be knowable of appropriate NDE/NDT techniques and quality assurance of these practices.

5.4.2 **Site Manager**
The Site Manager for this project shall have the technical and practical background in petroleum storage tank construction and inspection. This person shall be familiar with the applicable API, STI, and other Military standards and recommend practices. This person shall be knowable of appropriate NDE/NDT techniques and quality assurance of these practices. The site manager will also ensure all persons onsite are abiding to all safety measures outlined in the Health and Safety Plan.

5.4.3 **Tank Cleaning Personnel**
Tank cleaning personnel shall be trained in all safety equipment and procedures needed to perform work. This shall include, but not be limited to confine space, hazardous material handling, hazardous atmosphere monitoring, fall protection, etc. All appropriate safety regulations and guidelines shall be followed.

5.4.4 **API 653 Inspectors**
The inspectors shall be experienced with various types of storage tanks. Inspectors shall be a certified in accordance with to API 653 Appendix D - Authorized Inspector Certification. Inspectors shall furnish proof of API certification.

5.4.5 **NDE/NDT Technicians**

All non-destructive examination (NDE) testing shall be conducted by personnel qualified to ASNT Level II in accordance with inspection company's procedures or by an ASNT Level I qualified individual under the direct supervision of an ASNT Level II or Level III. Technicians shall provide NDE/NDT qualifications.

5.4.6 **STI Inspectors**

Inspectors performing STI inspections shall be certified in accordance to STI SP001.

5.4.7 **Welders**

Welding Procedure Specification (WPS) and welders shall be qualified in accordance with Section IX of the ASME Code. Personnel performing welds shall be experienced with construction and repairs of petroleum storage tanks and pipelines.

5.4.8 **Coating Applicators**

All contractors and subcontractors that perform surface preparation and coating application shall be certified by the Society for Protective Coatings (formerly Steel Structure Painting Council) (SSPC) to the requirement of SSPC QP 1 prior to contract award, and shall remain certified while accomplishing any surface preparation or coating application. Contractors shall be familiar with military coatings and experienced with their application.

5.4.9 **National Association of Corrosion Engineers (NACE) Inspector – (**If applicable)

As an option, a tank coating inspection shall be performed by a certified NACE Level III Coatings Inspector in accordance with the National Association of Corrosion Engineers (NACE).

5.4.10 **Marine Chemist/Industrial Hygienist**

The Marine Chemist or Certified Industrial Hygienist shall be certified by the American Board of Industrial Hygiene.

5.4.11 **Tank Calibration Personnel**

Contractor shall provide the services of a specialty calibration organization to provide tank field measurements to produce tank calibration charts (strapping tables) and electronic data files for use by the ATG system.

5.5 Daily Reports

Daily reports shall be generated by the contractor for each work day while on site. Daily reports shall be emailed by 0900 the following work day to the NTR and all agreed upon parties. A daily report format is included in Appendix C.

5.6 Inspection Reports

5.6.1 Preliminary Reports

Upon completion of the field work, a preliminary report shall be communicated to the NFESC. This information will be utilized in determining whether repairs need to be accomplished prior to returning the tank(s) into service. Preliminary reports shall be submitted within 48 hours of completing each inspection.

As a minimum, preliminary inspection reports shall include:

- 5.6.1.1.1 Tank ID, location, and inspection date
- 5.6.1.1.2 Statement if tank is suitable for service or should be removed or reduced from service. If tank is unsuitable for service, a brief description of tank issue(s) shall be discussed.
- 5.6.1.1.3 Inspector(s) name, certification number, and date.

5.6.2 **Inspection Reports**

A separate report shall be provided for each tank inspected. Provide hardcopies of each report in plastic ring binding with a plastic sleeve inside to hold an electronic copy of each report. NFESC will provide the report covers with a report number.

Inspection Reports shall include:

5.6.2.1 Executive Summary

One page summary of the condition of the tank and basic recommendations for repairs

5.6.2.2 Suitability for Service Statement

This statement shall be a one page document with both the API 653 inspector's number and signature and the professional engineer's stamp and signature.

5.6.2.3 Tank History

The inspector shall establish a complete historical record of the entire tank. The records shall include as much information as possible including:

5.6.2.3.1 Nameplate Information
5.6.2.3.2 Products previously and presently stored in the tank.
5.6.2.3.3 List of previous inspections
5.6.2.3.4 List and describe any significant environmental (earthquake, hurricane, etc) or operational (over-pressure, vacuum, foundation settlement, etc) events.
5.6.2.3.5 List and describe any repairs or alterations performed (Include significant drawings, executive summaries from other repair reports, etc in the Report Appendix).
5.6.2.3.6 Other pertinent information and details.

5.6.2.4 Methodology

Detailed discussion on the actual methodology of how each component was inspected. This section includes type of inspection, equipment, and methods.

5.6.2.5 Findings

Detailed description of each component including containment, foundation, bottom, shell, appurtenances, access ways, floating roof/pan, and fixed roof. Provide discussion on all findings.

5.6.2.6 Recommendations

Recommendations shall be included in the report and broken into three categories. These categories are Mandatory, Near Future, and Long Term repairs.

5.6.2.6.1 Mandatory

Provide mandatory actions that need to be completed before the tank can be returned to service.

5.6.2.6.2 Near Future

Provide recommended actions that should be programmed for completion within 2-3 years. All recommendations shall be accompanied by a recommended completion date.

5.6.2.6.3 Long Term

Provide recommended actions that currently have no adverse affect on tank operability or integrity but should be monitored and/or performed to ensure long term continued service. All recommendations shall be accompanied by a recommended completion date.

5.6.2.7 Report Appendices

5.6.2.7.1 Data (UT, MFE, Settlement, Safe Fill Heights, etc)

Include all data collected during the inspection along with an interpretation and discussion of the data. Data will be in tabular form with tank locations.

5.6.2.7.2 API checklist in API 653 Appendix C

Include actual notes and readings taken by the field inspector including: tank history, visual checklist and definitive inspection results.

5.6.2.7.3 Drawings
As a minimum, the following drawings, if applicable, shall be included in the report: shell, roof, and floor plate orientation with appurtenances and other significant tank details.

5.6.2.7.4 Photographs
Color photographs with captions shall be included to document tank condition, discrepancies and overall construction.

5.6.2.7.5 Calculations
Provide calculations required by API 653. This includes determination of the minimum shell thickness, next inspection date, safe fill height, settlement, nozzle reinforcement requirements, and estimated remaining service life of shell, nozzles, roof and floor.

5.7 Project Certification Reports

A separate report shall be provided for each tank on this task order. These reports shall include thorough documentation of all work performed. This includes cleaning, inspection, repairs, stilling well installation, strapping charts, etc. Hard copies of each tank report shall be bound in plastic ring binding with a plastic sleeve inside to hold electronic copy of each report. NFESC will provide the cover and report number.

Project Certification Reports Shall Include:

5.7.1.1 Executive Summary
5.7.1.2 Suitability for Service Statement
5.7.1.3 Work Performed (Include all subcontractors, with contact information)
5.7.1.4 Timeline

Appendices:
5.7.1.5 Documenting Photographs
5.7.1.6 Personnel Certifications
5.7.1.7 NDE Documentation
5.7.1.8 Quality Control Documentation
5.7.1.9 Materials, Equipment Specifications, and Coating Data
5.7.1.10 As-built Drawings, if applicable
5.7.1.11 API 653 follow up inspection (if deemed necessary)
5.7.1.12 Hazardous Waste Manifest

5.8 Materials, Workmanship, Quality Control and Testing

5.8.1 The contractor shall provide materials, workmanship, quality control and testing in accordance with the Work Plan. (Refer to paragraph 5.2 above).

5.8.2 The Contractor shall provide shop drawings and material specification sheets of all materials and major equipment to be used in accordance with the Submittal Register (refer to paragraph 5.5 above). Shop drawings and material specification sheets shall be submitted in accordance with Appendix H for Government Review and Approval.

5.8.3 The contractor shall provide reports from all quality control and testing in accordance with the Submittal Register. These reports shall be submitted in accordance with Appendix H for Government Review and Approval.

5.9 Submittal Register

5.9.1 The Contractor shall prepare and submit the Submittal Register, "SUBMITTAL FORM, Jan 96", found in Appendix G of this SOW. Columns (a) thru (I) shall be completed by the Contractor for all submittals required.

5.9.2 The Contractor shall prepare and maintain the submittal register as the work progresses. The submittal register is to be included with all submittals with the appropriate columns filled-in. Additional information concerning the Submittal Register is may be found in UFGS 01 33 00.

5.9.3 The Submittal Register shall be submitted in accordance with Appendix H for Governmental Review and Approval.

5.9.4 No work is to start on-site prior to review and approval by the Government.

6.0 MEETINGS

6.1 Work Kickoff Meeting
A Work Kickoff meeting will be coordinated by NFESC to establish the responsibilities of each party involved, discussion of the schedule, and to ensure a mutual understanding of the scope.

6.2 Repair Kickoff Meeting (If applicable)
A Repair Kickoff Meeting shall be held if work outside the original scope is being performed. This does not apply stilling well installation. This meeting is to be conducted to establish each party's responsibilities and achieve consensus on the repairs scope.

6.3 Work Completion Walk Through
Upon completion of the required tasks a Work Completion Walk Through is to be conducted. The purpose of this meeting is to ensure that all the government's requirements and expectations have been successfully completed and the government will accept all work performed.

7.0 BID PROPOSAL REQUIREMENTS
The contractor bid proposals are to include the following:

7.1 Brief Work Plan
A brief statement of how the contractor plans to complete the required tasks.

7.2 Schedule
Provide a schedule which identifies major milestones along with projected start and end dates.

7.3 Project Personnel and Subcontractors
Provide the names and contact information for the planned project personnel and subcontractors.

7.4 Costs Proposal
Provide a cost proposal for entire project. As part of the proposal, costs for cleaning, inspecting, and repairing each tank shall be included. These broken out costs will be used for government information only and the project will not be de-scoped according to them.

APPENDIX A

TANK INFORMATION

Tank ID	**Site 1 Tank 5**	**Site 1 Tank 17**
Facility Number	332	344
Capacity (specify gal or bbls)	12,697,986 gal	12,712,392 gal
Tank configuration	UST Vertical	UST Vertical
Construction Date	1942	1943
Product	JP-8	JP-5
Diameter	100’	100’
Height	250’	250’
Tank Material	Concrete with Welded Steel liner	Concrete with Welded Steel liner
Type of roof (if applicable)	N/A	N/A
If floating, can facility have high legs installed?	N/A	N/A
Type and date of last coating application	N/A	N/A
Date of last cleaning	N/A	N/A
Date of last out-of-service (internal) API 653 inspection. Can inspection report be provided?	1982	1974?
Date of last in-service (external) API 653 inspection. Can report be provided?	N/A	N/A
How far can tank be drained down? Est remaining product in gal or inches		
Is sludge anticipated? Estimate amt.		
Can facility provide water for tank cleaning? Is there a limit?	Yes/No	Yes/No
Can facility accept oily water or sludge from the tank cleaning?	w/ EMD approval	w/ EMD approval
If so, how many gallons and/or drums? Is there any testing or other requirements?		
Maximum time tank can be down		
Sump Location (center or edge?)	Center	Center
Bottom (Flat, Cone-up, Cone-down)	Cone-down	Cone-down
ATG stilling wells? If so, what size & location? at center, off center, or edge of tank?		
Slotted or Non-slotted		
Manual gauging still well? If so, what size & location? at center, off center, or edge of tank?		
Slotted or Non-slotted		
Water probe stilling well? If so, what size & location? at center, off center, or edge of tank?		
Slotted or Non-slotted		
Center roof vent		
Known or anticipated problems with the tank? (ie level shutoffs, coating, water intrusion in secondary containment, etc.		
Please provide any information about scheduling. (ie how many tanks can be take out of service at a time, for how long, can tanks be staggered, etc)	1 tank per product	1 tank per product
Can drawings of the tank construction/orientation be provided?	yes	yes
Other Comments		

APPENDIX B

GAUGE TUBE STANDARD DESIGN

Attached electronic files

APPENDIX C

GOVERNMENT FURINISHED INFORMATION

APPENDIX D removed intentionally – incorporated by reference

APPENDIX E

DAILY REPORT FORMAT

DAILY PRODUCTION REPORTS

A Production Report is required for each day that work is performed on the tanks. Unless unusual circumstances arise, the Production Report should be limited to 1-2 pages. The report is informal and can consist of hand written notes on a standard form. The report shall account for each calendar day while on-site. The reporting of work shall be identified by terminology consistent with the statement of work. Contractor Production Reports are to be prepared, signed and dated by the contractor's on-site Project Supervisor and shall contain the following information:

1.0 Date of report, report number, name of contractor, Delivery Order Number, title and location of tasks, and Construction manager present.

2.0 Weather conditions in the morning and in the afternoon. Include temperature, wind, rain, fog, and humidity.

3.0 A list of contractor and subcontractor personnel on the work site, their trades, employer, work location, descriptions of work performed, and hours worked.

4.0 A list of contractor and subcontractor equipment on the work site, rented or owned, if rented-from who, location, description of work performed with equipment and hours the equipment was on-site, used, idle, and/or down for repair.

5.0 A list of job safety actions taken and safety inspection conducted. Indicate that safety requirements have been met including the results of the following:

- **5.1.** Was a job safety meeting held? (If YES, attach a copy of the meeting minutes.)
- **5.2.** Were there any lost time accidents? (If YES, attach a copy of the completed OSHA report.)
- **5.3.** Was crane/trenching/scaffold/high voltage electrical/ high work done? (If YES, attach a statements or checklist showing inspection performed.)
- **5.4.** Was hazardous material/waste released into the environment? (If YES, attach a description of what was released, how it was released, actions taken to contain/clean-up, people/organizations contacted, meetings held, and future actions to be taken.)
- **5.5.** A list of material received each day that is incorporated into the project.
- **5.6.** Include a " diameterRemarks" diameter Section in the report which will contain the following: pertinent information including problems encountered during work, delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, minutes of QC meeting and/or other meetings, and a record of visitors to the work site.

APPENDIX F

INSPECTION/REPAIR SUMMARY TEMPLATE

Tank Inspection Summary Sheet	
Tank Location	
Tank No. (plus previous identification)	
Facility Number	
Inspection Date(s)	
Tank Type	**(AST, UST, Vertical, Horizontal, In Contact w/ground, etc)**
Type of Inspection	**(In-Service, Out of Service, Modified, API, STI, Other, etc)**
Contract Number, Task Order	
Prime Contractor Name	
Inspector, Cert #, Inspection Company	
Manufacturer, Date, Design Standard	
Diameter	
Height/Safe Fill Height	
Product/Specific Gravity	
Design Pressure/Temperature	
Gross Capacity/Nominal Capacity	
Safe Fill Height	
GPS Latitude & Longitude	
Foundation Configuration	
Shell Configuration	(# of courses, heights of each, thickness, etc)
Floor Configuration	(annular ring, sketch plates, butt welded, lap welded, etc)
Roof (Fixed, Floating or both. Seal type)	
Cathodic Protection, if so what type	
Stilling Wells (Sizes, Applications)	
Last Inspection (type, date)	
Last Coated Internally (Product)	
Last Coated Externally (Product)	
Inspection Results	
Can tank be returned to service?	Yes / No (If No, explain)
Deficiencies identified as mandatory repairs	
Deficiencies identified as recommended repairs	
Deficiencies identified as long term repairs	
Next Scheduled Inspection (type, date)	
Upgrades / Repairs Made at this Time	Use second page if more space is needed
Tank Re-Calibration to 1/16 in	Yes / No (if Yes, when)
Stilling Wells	
Coating (specify system, location)	
Floor (including sump)	
Shell	
Vents / Appurtenances	

Secondary Containment	
Other:	
General Comments	

APPENDIX G

SUBMITTAL FORM

APPENDIX H

SUBMITTAL LIST, SCHEDULE, AND DISTRIBUTION

SUBMITTAL LIST, SCHEDULE, AND DISTRIBUTION

SUBMITTAL	SUBMITTAL SCHEDULE			DISTRIBUTION - NUMBER OF COPIES	
	DRAFT (WACA)	GOVT Review	FINAL (WAGR)	NFESC	SCAN
Schedule	2 weeks	1 week		EC	
Submittal Register	2 weeks	1 week	1 week		
Draft				EC	
Final				EC	
As Required				EC	
Work Plan					
Draft	3 weeks	2 weeks	1 week	EC	
Final				EC	
Quality Control, Testing Reports, etc	In Accordance with Submittal Register			EC	
Health And Safety Plan					
Draft	3 weeks	3 weeks	1 week	EC	
Final				EC	
Qualifications	2 weeks	1 week	-	EC	
Shop Drawings, Material Information, etc	In Accordance with Submittal Register			EC	
	DRAFT (WACO)	GOVT Review	FINAL (WAGR)		
API 653 Reports					
Preliminary	48 hrs	-	-	EC	
Draft	4 days	2 weeks	2 weeks	EC	
Final				4 HC w/ CD, 4 additional CDs	
Work Certification Report					
Draft	4 weeks after completion of field work	2 weeks	1 weeks	EC	
Final				4 HC w/ CD, 4 additional CDs	
Quality Control Daily Reports❸				EC	EC
Meeting Minutes❸,❹				EC	

NOTES:

WACA – Weeks after Contract Award, WACO – Weeks after Completion
GOVT Review – Number of weeks for Government review after receipt of submittal.
WAGR – Weeks after Government Review
EC = Electronic Copy, HC = Hard Copy
❸ - Daily reports shall be e-mailed daily, by 0900 local time, the following day.
❹ - Minutes of meetings shall be e-mailed no later than three (3) working days following each meeting.

APPENDIX I

PRE-CONSTRUCTION AGENDA

PRE-INSPECTION MEETING

[TANK XX]

[FACILITY, CITY, STATE]
[DD MONTH YYYY]

[time hrs]

AGENDA

- **NFESC OPENING REMARKS/BRIEF TEAM INTRODUCTIONS**

- **ROLES & RESPONSIBILITIES – PROJECT ORGANIZATION**

- **INSTALLATION SUPPORT – [FACILITY] / COORDINATION**

- **EXECUTION PLAN**

➢ Summary Project Scope
➢ Meetings
➢ Project Documentation - Submittals
➢ Quality Control – Corrective Actions

- **HEALTH & SAFETY**

- **WASTE MANAGEMENT/DISPOSAL PROCEDURES**

- **ACTION ITEMS (Specific Project Issues – Logistics – Scheduling)**

- **SITE WALK (as necessary)**

- **OFF-LINE DISCUSSIONS – Subcontractor Invoicing Procedures, procurements, etc.**

\- **- Adjourn - -**

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TEAM INTRODUCTIONS

NFESC – NTR (COTR and ROICC),
[FACILITY Personnel - (Opening Comments/Introductions)
Construction Team:
Prime: [Contractor's Name]
Tank Cleaning: [Name]
Tank Inspection: [Name]
Tank Repairs: [Name]

- **ROLES & RESPONSIBILITIES – PROJECT ORGANIZATION**

[Prime Contractor]
Project Manager, Construction Site Manager, Superior Industrial Maintenance Foreman, Procurement Manager, Contract Manager

[FACILITY]
Point(s) of Contact and Individual Roles

NFESC
COTR/ROICC, Assistant ROICC, CO

LINES of COMMUNICATION
Subcontractors → [Prime] → ROICC/AROICC → [FACILITY] → NFESC

- **INSTALLATION SUPPORT- COORDINATION**

- ☐ Security/Site Access (Base security force, escorts, contractor vehicle requirements, contractor personnel information requirements, material deliveries, etc.)
- ☐ [FACILITY] Fire Department
- ☐ [FACILITY] Environmental
- ☐ [FACILITY] Fuels Manager
- ☐ LB&B
- ☐ Hours of Operation (Monday – Friday 7am – 4 pm; Saturdays only with special permission/circumstances)
- ☐ Utility Coordination (Water, Fire hydrants, Electric, Telephone) with [FACILITY]
- ☐ Confined Space Entry Permits & Hot Work Permits (FACILITY and Fire Safety)
- ☐ Project Trailer/Facilities (break areas, portable toilets, restricted cell phone usage)
- ☐ Contractor Laydown Area(s)

- **EXECUTION PLAN**

  - ☐ **Summary Project Scope**

    - Discuss Inspection/Repair work to be performed and general sequence
    - Stilling Well installation
    - Schedule

  - ☐ **Meetings**

    - Daily Safety Tailgate Meetings
    - Weekly Construction Meetings w/FISC (if requested)
    - 50% Project Completion Meeting (after ?)
    - Pre-Final Completion Walk-Through Meeting (Develop punch list items)
    - Final Inspection/As-built Review Meeting (if necessary)

- ☐ **Project Documentation**

  - Construction Submittals (Material Approval Forms; Electronic review /Approval Process, Review and Approval Distribution)
  - Daily Production Reports
  - QC Inspection Checklists

- ☐ **Quality Control - Corrective Actions**

  - QC Field Inspections/Reports – Response/Corrective Action
  - Material Approval Submittal Process – [Prime/Sub] QC check of submittals
  - H&S Audits/H&S non-conformance observations

- **HEALTH & SAFETY**

Job-Specific Safety Topic:

☐ Site Health & Safety Officer –[Prime Contractor]
☐ Daily Tailgate Safety Meetings
☐ [Prime] H&S Inspections - Subcontractor PPE & Subcontractor H&S Contacts
☐ Traffic Plan – Barricades, specific routing requirements
☐ Daily Housekeeping at jobsite
☐ Hurricane Preparedness Plan
☐ Emergency / Incident Notification and Procedures – Route to Hospital

- **WASTE MANAGEMENT/DISPOSAL PROCEDURES**

☐ Wash water, PCW management / hydro test water management
☐ Coatings abatement: General waste manifest requirements, Notifications
☐ Material waste/general construction debris disposal

- **SPECIFIC PROJECT ISSUES – LOGISTICS – SCHEDULING**

☐ Tank Cleaning and API Inspections
☐ Initial hot work permit, subsequent hot work permits
☐ Finalize Design Repair package after API 653 Inspection
☐ Tank repair work – initial work and repairs mandated by specific design details

- **ACTION ITEMS**

<u>CLARIFICATIONS</u>

Clean, Inspect, and Repair Tanks 5 & 17
FISC, Pearl Harbor, HI

October 20, 2009

Clarifications #1

Question: 1. Paragraph 1.0 of the SOW states: "Tank repairs under this scope shall include installation of tank gauging tubes (stilling wells) for all tanks over 30,000 gal". However, Paragraph 2.3 sates: "Gauge Tubes (Stilling Wells) - No gauge tubes are required". Are gauge tubes required?

Response: No stilling wells on these tanks

Clean, Inspect, and Repair Tanks 5 & 17
FISC, Pearl Harbor, HI

Clarifications #2 (Revised)

November 16, 2009/November 19, 2009

Question: SOW 2.9 states that Tank 5 must be returned to service prior to Nov 10; please clarify this date

Response: November 2010

Question: SOW 2.10.1 (pressure test of piping) - Will pressure testing with nitrogen be permitted?

Response: No

Question: What is the maximum safe fill height for these tanks?

Response: Approximately 223 ft. 9 in.

Question: SOW 2.10.3 (structural engineer) - Does the PE need to be registered in Hawaii?

Response: No

Question: SOW 7.4 (costs proposal) - On what basis should we price the tank repair component that is requested?

Response: If there are no repairs identified for a given tank, you will not be able to price “repairs”. Proposal is to be based on the scope of work provided.

Section E - Inspection and Acceptance

INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted at:

CLIN	INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
0001	Destination	Government	Destination	Government
000101	Destination	Government	Destination	Government

Section F - Deliveries or Performance

DELIVERY INFORMATION

CLIN	DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
0001	31-MAR-2011	3,829,149	N/A FOB: Destination	
000101	31-MAR-2011		N/A FOB: Destination	

Section G - Contract Administration Data

ACCOUNTING AND APPROPRIATION DATA

[redacted]
AMOUNT: $3,829,149.00
[redacted]: $3,829,149.00

INVOICING INSTRUCTIONS

All invoices shall be submitted to NAVFAC_SW_SCCC_Invoices@navy.mil with a copy to [redacted]

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE: J	PAGE OF PAGES: 1 / 4		
2. AMENDMENT/MODIFICATION NO.: 01	3. EFFECTIVE DATE: 13-Jul-2010	4. REQUISITION/PURCHASE REQ. NO.: ACQR1305421	5. PROJECT NO.(If applicable)
6. ISSUED BY CODE N62583		7. ADMINISTERED BY (If other than item 6) CODE	

6. ISSUED BY: NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ00/NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4347

7. ADMINISTERED BY: **See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZIE JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.243-1 Changes
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

1. The purpose of this supplemental agreement is to add w ork as identified herein. Contractor proposals for Request for Information (RFI) #1, #2, and #3 dated June 11, and June 17, 2010 are accepted as proposed and incorporated by reference.

2. Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the w ork as herein revised.

3. All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) [redacted] / CONTRACT SPECIALIST TEL: 805-982-2479 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 13-Jul-2010

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $46,065.00 from $3,829,149.00 to $3,875,214.00.
The 'issued by' organization has changed from
NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE RAQN0/NAVAL BASE VENTURA COUNTY
1205 MILL RD BLDG 850
PORT HUENEME CA 93043-4347
to
NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ00/NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4347

The 'administered by' organization has changed from
NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE RAQN0/NAVAL BASE VENTURA COUNTY
1205 MILL RD BLDG 850
PORT HUENEME CA 93043-4347
to
NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ00/NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4347

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 46,065.00 from 3,829,149.00 to 3,875,214.00.
The total cost of this line item has increased by $46,065.00 from $3,829,149.00 to $3,875,214.00.

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-MAR-2011	3,829,149	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-APR-2011	3,875,214	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000101 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-MAR-2011		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-APR-2011		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $46,065.00 from $3,829,149.00 to $3,875,214.00.

SUBCLIN 000101:

[redacted] was increased by $46,065.00 from $3,829,149.00 to $3,875,214.00

(End of Summary of Changes)

The following items are applicable to this modification:

SECTION C - DESCRIPTIONS AND SPECIFICATIONS
ADDITIONAL WORK

RFI #1:

Remove sections from tower where booms connect, reinstall stairway sections when booms removed

RFI #2:

Remove elevator box/frame completely, not to be reinstalled and cut into pieces

RFI #3:

12” MOV valve removal and reinstallation
Isolation and draining of the main 32” header by others
Install lifting jack stands and hoist to remove the valve
Isolate power & disconnect MOV/install scaffolding
Drain piping section at valve branch piping to MOV valve
Unbolt MOV valve & transport to staging area outside
Reinstall valve after repairs are completed
Install new gaskets at valve flanges
Remove drain pump, lifting & scaffolding equipment
Inspect and clean area

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 | 5

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
02	28-Sep-2010	ACQR1305421	

6. ISSUED BY CODE N62583	7. ADMINISTERED BY (If other than item 6) CODE
NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE AQ00/NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4347	See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
WILLBROS GOVERNMENT SERVICES (U.S.), LLC ONZIE JONES 2087 E 71ST ST STE 101 TULSA OK 74136-5462		9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
	X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
CODE 1KPK4 FACILITY CODE	X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.243-1 Changes
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

1. The purpose of this supplemental agreement is to repair and inspect the 18" JP-5 pipeline in accordance w ith the attached Statement of Work. Contractor proposals dated September 21, 2010 and September 14, 2010 (includes option 1 price at ten times) are accepted as proposed and incorporated by reference.

2. Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the w ork as herein revised.

3. All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		[redacted] / CONTRACTS TEL: 805-982-2515 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 29-Sep-2010

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $335,492.07 from $3,875,214.00 to $4,210,706.07.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 335,492.07 from 3,875,214.00 to 4,210,706.07.
The total cost of this line item has increased by $335,492.07 from $3,875,214.00 to $4,210,706.07.

SUBCLIN 000101
The CLIN description has changed from Funding Placeholder to FUND ACRN AA.

SUBCLIN 000102 is added as follows:

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
000102		UNDEFINED		UNDEFINED	$0.00
	FUND ACRN AB [redacted]				
				MAX NET AMT	$0.00
	[redacted]				$335,492.07

SECTION E - INSPECTION AND ACCEPTANCE

The following Acceptance/Inspection Schedule was added for SUBCLIN 000102:

INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
Destination	Government	Destination	Government

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-APR-2011	3,875,214	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
10-JUN-2011	4,210,706.07	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000101 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-APR-2011		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
10-JUN-2011		N/A FOB: Destination	

The following Delivery Schedule item has been added to SUBCLIN 000102:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
10-JUN-2011		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $335,492.07 from $3,875,214.00 to $4,210,706.07.

SUBCLIN 000102:
Funding on SUBCLIN 000102 is initiated as follows:

[redacted]

[redacted]

[redacted] [redacted]

Increase: $335,492.07

Total: $335,492.07

Cost Code: [redacted]

(End of Summary of Changes)

The following items are applicable to this modification:

SECTION C - DESCRIPTIONS AND SPECIFICATIONS
ADDITIONAL WORK

Contract: N62583-09-D-0132/0003
Contractor: Willbros Government Services

Clean, Inspect, and Repair Red Hill Tanks 5 & 17
FISC Pearl Harbor

All repairs shall meet all requirements and provisions set forth from original DO.

1.0 Additive Repair Scope. In response to the weeping leak near the Gauger Station on the 18" JP-5 Fuel Line at Red Hill , Contractor shall provide:

1.1. This scope of work is only for the 18 inch JP-5 pipeline.

1.2. The length of the pipeline to be replaced is approximately 20 linear feet and extends between the Gauger Station and the bulkhead door that leads to Tanks 17 & 18 in the lower tunnel. Exact location to be specified by FISC.

1.3. The contractor furnished new 18" pipe shall be surface prepared, and have primer/intermediate coatings applied according to UFGS 09 97 13.27. The contractor is responsible to apply finish top coat under this work according to UFGS 09 97 13.27. All tie-in weld areas shall be properly surface prepped and three coats shall be applied according to UFGS 09 97 13.27. Coating contractor qualifications can be found in section 2.0.

1.4. The Government will drain the pipeline. However, the contractor should expect a certain degree of wicking of the fuel after cutting the existing pipeline. The contractor shall be responsible for collecting any fuel that may drip from the pipeline during the execution of this project. The contractor shall collect fuel in 55 gallon drums and move/dispose to the sump near the bulkhead separating the lower 16 tanks.

1.5. The government will provide train assistance to a maximum of four hours on any work day. Train support shall only be provided during standard Government work hours between 8 am to 4 pm. The train support will only be available between Adit 3 to Tank 15/16. All loading, unloading and securing material onto flat beds shall be contractor's responsibility. The contractor shall notify the government no less than three (3) days in advance of the time and location for the train support.

1.6. The Contractor shall provide a Work Plan that includes provisions for lock-out/tag-out of the pipeline system.

1.7. The contractor furnished new 18" pipe shall be ASTM Grade A106 or equivalent, hydrostatically tested, and results provided to NAVFAC ESC.

1.8. End points for the new section are to be butt-welded, no flanges. All welds shall be 100% radiographed.

1.9. Contractor shall be responsible for proper disposal of removed sections of piping and all associated materials.

2.0 Additive Coating Scope. In response to the weeping leak near the Gauger Station on the 18" JP-5 Fuel Line at Red Hill , Contractor shall provide:

2.1. Coating for approximately 24 linear feet of 18" JP-8 pipeline, including the new section of pipeline as mentioned in section 1.3. The pipeline shall be coated in accordance to UFGS 09 97 13.27.

2.2. Due to the fact that the Red Hill tunnel is a non permit required confined space, open abrasive blasting is not permitted, unless the contractor/coating subcontractor proposes secure containment for blasting process. Alternate means for stripping the pipeline in order to perform the repair shall be considered and subject to the approval of both FISC and NAVFAC ESC.

2.3. Minimum qualification requirement for coating contractor shall be SSPC QP-1 certified applicator and verifiable previous coating application experience. All relevant qualifications of coating contractor shall be submitted to the government for review and approval.

2.4. Level III inspector from a SSPC QP-5 certified coating inspection company shall be hired to perform blasting and coating application inspection. All qualification of the company and individual inspector shall be submitted to NAVFAC ESC for review and approval.

2.5. Disposal of used surface preparation material shall be done in accordance to all local, state and federal regulations. Per previous testing, lead is present in the current coating. Disposal shall be addressed in the contractor provided waste management plan as part of the Environmental Protection Plan.

3.0 OPTION A. Contractor shall bid this option, inclusive of all materials, subcontract, labor, markup, profit, *etc.* Contractor's proposal shall clearly separate the costs for this option. The intent of this option is to have a clearly defined cost for inspecting a single incidence of corrosion on the pipeline. Assume the coating contains lead and has a wrapping that contains Asbestos. The number of sections to be cleaned, inspected, and evaluated will be established by FSIC and NAVFAC ESC. The scope for this option involves the existing 18" JP-5 fuel pipeline from the section valves at Tanks 9 & 10 up to either the first flange or dresser coupling for each branch off the main header for each tank set up to 19 & 20:

3.1. Contractor shall remove approximately 4.5 ft^2 of coating from the pipeline by approved means in response to section 2.2 as listed above.

3.2. Contractor shall present the findings on the condition of the pipe, once the coating and corrosion is removed, to NAVAFAC ESC for repair consideration.

3.3. Contractor shall recoat the section as outlined in section 2.0 above.

4.0 Addenda for all previously submitted plans are acceptable.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 | 3

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
03	09-Nov-2010	ACQR1305421	

6. ISSUED BY CODE N62583	7. ADMINISTERED BY (If other than item 6) CODE
NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE AQ00/NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4347	See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
WILLBROS GOVERNMENT SERVICES (U.S.), LLC ONZIE JONES 2087 E 71ST ST STE 101 TULSA OK 74136-5462		9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
	X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
CODE 1KPK4 FACILITY CODE	X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: 52.243-1 Changes
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

1. The purpose of this supplemental agreement is to add w ork as identified in the attached Statement of Work. Contractor proposal dated October 14, 2010 is accepted as proposed and incorporated herein.

2. Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the w ork as herein revised.

3. All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		[redacted] / CONTRACT SPECIALIST TEL: 805-982-2479 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 10-Nov-2010

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $44,422.23 from $4,210,706.07 to $4,255,128.30.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 44,422.23 from 4,210,706.07 to 4,255,128.30.
The total cost of this line item has increased by $44,422.23 from $4,210,706.07 to $4,255,128.30.

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
10-JUN-2011	4,210,706.07	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
17-JUN-2011	4,255,128.30	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000101 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
10-JUN-2011		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
17-JUN-2011		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $44,422.23 from $4,210,706.07 to $4,255,128.30.

SUBCLIN 000101:

[redacted] was increased by $44,422.23 from $3,875,214.00 to $3,919,636.23

(End of Summary of Changes)

The following items are applicable to this modification:

SECTION C - DESCRIPTIONS AND SPECIFICATIONS
ADDITIONAL WORK

Contract: N62583-09-D-0132/0003
Contractor: Willbros Government Services

Clean, Inspect, and Repair Red Hill Tanks 5 & 17
FISC Pearl Harbor

All repairs shall meet all requirements and provisions set forth from original DO.

Additive Repair Scope:

Remove loose and disbonding paint from tank surgaces (shell, upper and lower domes) by high pressure washing .

Contractor Proposal/RFI 006 incorporated by reference.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	J	PAGE OF PAGES	1 | 3
2. AMENDMENT/MODIFICATION NO. 04	3. EFFECTIVE DATE 16-Dec-2010	4. REQUISITION/PURCHASE REQ. NO. ACQR1305421	5. PROJECT NO.(If applicable)
6. ISSUED BY CODE N62583		7. ADMINISTERED BY (If other than item 6) CODE	
NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE AQ00/NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4347		See Item 6	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZIE JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.243-1 Changes
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

1. The purpose of this supplemental agreement is to add w ork as identified in RFIs 16 and 17, dated November 30, 2010, and further identified herein. RFIs 16 and 17 are accepted as proposed w ith the exception of the option identified in RFI 16.

2. Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the w ork as herein revised.

3. All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) [redacted] / CONTRACT SPECIALIST TEL: 805-982-2479 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 21-Dec-2010

EXCEPTION TO SF 30
APPROVED BY OIRM 11-84

30-105-04

STANDARD FORM 30 (Rev. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $54,465.04 from $4,255,128.30 to $4,309,593.34.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 54,465.04 from 4,255,128.30 to 4,309,593.34.
The total cost of this line item has increased by $54,465.04 from $4,255,128.30 to $4,309,593.34.

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
17-JUN-2011	4,255,128.30	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011	4,309,593.34	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000101 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
17-JUN-2011		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011		N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000102 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
10-JUN-2011		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $54,465.04 from $4,255,128.30 to $4,309,593.34.

SUBCLIN 000102:

[redacted] [redacted] was increased by $54,465.04 from $335,492.07 to $389,957.11

(End of Summary of Changes)

The following items are applicable to this modification:

SECTION C - DESCRIPTIONS AND SPECIFICATIONS
<u>ADDITIONAL WORK</u>

RFI #16:

Remove two (2) 8” gate valves from the JP 5 pipeline branch piping section. Replace one (1) gate valve with an 8” double block and bleed valve. Install replacement/repaired valves.

RFI #17:

Remove two (2) foot section of the 18” NPS pipeline and valve

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE: J
PAGE OF PAGES: 1 | 3

2. AMENDMENT/MODIFICATION NO: 05
3. EFFECTIVE DATE: 12-Apr-2011
4. REQUISITION/PURCHASE REQ NO: ACQR1305421
5. PROJECT NO (If applicable):

6. ISSUED BY CODE N62583
NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ00/NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4347

7. ADMINISTERED BY (If other than item 6) CODE
See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZE JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

9A. AMENDMENT OF SOLICITATION NO.
9B. DATED (SEE ITEM 11)
X 10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
X 10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14 The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

X C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
FAR 52.243-1 Changes Fixed Cost

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

The purpose of this supplemental agreement is to add scope as indicated in Section C, increasing the total cost of the contract by $13,306.76 from $4,309,593.34 to $4,322,900.10. RFI #024 dated 29 March 2011 is accepted as proposed.

Acceptance of this modification by the Contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect

15A. NAME AND TITLE OF SIGNER (Type or print)

16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
[redacted] / CONTRACTS
TEL: 805-982-2515 EMAIL: [redacted]

15B. CONTRACTOR/OFFEROR
(Signature of person authorized to sign)

15C. DATE SIGNED

16B. UNITED STATES OF AMERICA
BY [redacted]
(Signature of Contracting Officer)

16C. DATE SIGNED 20-Apr-2011

EXCEPTION TO SF 30
APPROVED BY OIRM 11-84

30-105-04

STANDARD FORM 30 (Rev. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $13,306.76 from $4,309,593.34 to $4,322,900.10.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 13,306.76 from 4,309,593.34 to 4,322,900.10.
The total cost of this line item has increased by $13,306.76 from $4,309,593.34 to $4,322,900.10.

SUBCLIN 000103 is added as follows:

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
000103	[redacted] FFP [redacted] FOB: Destination	UNDEFINED		UNDEFINED	$0.00
				MAX NET AMT	$0.00
	[redacted]				$13,306.76

SECTION C – DESCRIPTIONS AND SPECIFICATIONS
ADDITIONAL WORK

RFI #24:

HAZARDOUS WASTE - LEAD CONTAMINATION

1) Test Wood Samples - per regulations
2) Cut wood to fit in DOT shipping drums
3) Subcontractor:
   a) Transport drums for disposal to regulated facility
   b) Disposal of wood - Lead contamination

SECTION E - INSPECTION AND ACCEPTANCE

The following Acceptance/Inspection Schedule was added for SUBCLIN 000103:

INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
Destination	Government	Destination	Government

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011	4,309,593.34	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011	4,322,900.10	N/A FOB: Destination	

The following Delivery Schedule item has been added to SUBCLIN 000103:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011	0	N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $13,306.76 from $4,309,593.34 to $4,322,900.10.

SUBCLIN 000103:
Funding on SUBCLIN 000103 is initiated as follows:

ACRN: AA

CIN: SP0600MR091630000103

Acctng Data: 97X4930 5CF0 01 25.1 SP0600MR091630 MREP CLIN (1001) S33150

Increase: $13,306.76

Total: $13,306.76

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT	1 CONTRACT ID CODE J	PAGE OF PAGES 1 | 3

2 AMENDMENT/MODIFICATION NO	3 EFFECTIVE DATE	4 REQUISITION/PURCHASE REQ NO	5 PROJECT NO (If applicable)
06	04-May-2011	ACQR1305421	

6 ISSUED BY CODE N62583	7 ADMINISTERED BY (If other than item 6) CODE
NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE AQ00/NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4347	**See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
WILLBROS GOVERNMENT SERVICES (U.S.), LLC ONZE JONES 2087 E 71ST ST STE 101 TULSA OK 74136-5462		9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
	X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
CODE 1KPK4 FACILITY CODE	X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14 The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.243-1 Changes Fixed Price
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

The purpose of this supplemental agreement is to add scope as indicated in the summary changes page 2, increasing the total cost of the contract by $80,203.75 from $4,322,900.10 to $4,403,103.85. RFI s # 13, 14, and 15 dated 19 November 2010 and RFI # 20 dated 04 January 2011 are accepted as proposed. The period of performance is extended from 30 June 2011 to 30 September 2011.

Acceptance of this modification by the Contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impace effect, and for delays and disruptions arising out of, or incidental to, the w ork as herein revised.

All other terms and conditions remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) [redacted] / CONTRACTS TEL: 805-982-2515 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 12-May-2011

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

The work performed under this modification shall be in accordance with the Contractor's RFIs dated 19 November 2010 and 04 January 2011 as follows.

1. RFI 13 – Install handrail extension on catwalk in Tank 17.
2. RFI 14 – Install permanent structural bolts in in tower structure.
3. RFI 15 – Remove the existing steel elevator from the tower section in Tank 17.
4. RFI 20 – Remove five (5) internal pipes for tower structure for boom access for Tank 17.

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $80,203.75 from $4,322,900.10 to $4,403,103.85.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 80,203.75 from 4,322,900.10 to 4,403,103.85.
The total cost of this line item has increased by $80,203.75 from $4,322,900.10 to $4,403,103.85.

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011	4,322,900.10	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-SEP-2011	4,403,103.85	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000101 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-SEP-2011		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $80,203.75 from $4,322,900.10 to $4,403,103.85.

SUBCLIN 000103:

[redacted]
was increased by $80,203.75 from $13,306.76 to $93,510.51

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT	1 CONTRACT ID CODE J	PAGE OF PAGES 1 / 4

2 AMENDMENT/MODIFICATION NO	3 EFFECTIVE DATE	4 REQUISITION/PURCHASE REQ NO	5 PROJECT NO (If applicable)
07	24-Aug-2011	ACQR1305421	

6 ISSUED BY CODE N62583	7 ADMINISTERED BY (If other than item 6) CODE
NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE AQ00/NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4347	**See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
WILLBROS GOVERNMENT SERVICES (U.S.), LLC ONZE JONES 2087 E 71ST ST STE 101 TULSA OK 74136-5462		9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
	X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
CODE 1KPK4 FACILITY CODE	X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14 The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 43.103 (a)(3)
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

SUBJ: N62583-09-D-0132, TASK ORDER 0003. CLEAN, INSPECT, AND REPAIR TANKS 5 AND 17, RED HILL, PEARL HARBOR, HI.

Description of this modification begins on Page 2.

Acceptance of this modification by the Contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) [redacted] / CONTRACTS TEL: 805-982-2515 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 26-Aug-2011

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

The following have been added by full text:

A. In accordance with contract clause 52.243-4 "Changes (JUN 2007)", as negotiated between the Contractor and the Government, the Contractor is hereby directed to provide all labor, materials, equipment, supervision, inspection, and related work necessary to perform the additional work as outlined in the following Contractor RFIs:

   a. RFI #05 dated 21 SEP 2010 – Paint Chips Handling and Disposal – Residual
      $47,029.35
   b. RFI #10 dated 19 NOV 2010 – Paint Chips Handling and Disposal – Hydroblast
      $72,648.87
   c. RFI #12 dated 19 NOV 2010 – Handrail Extension
      $4,685.00
   d. RFI #19 dated 03 JAN 2011 – Isolate Dresser Coupling
      $48,538.00
   e. RFI #21 dated 04 JAN 2011 – Remove Shell Channel Extensions – Boom Interference
      $32,283.85

   Total cost: $205, 185.07

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $205,185.07 from $4,403,103.85 to $4,608,288.92.
The 'Payment will be made by' organization has changed from
DFAS CO STOCK FUND DIRECTORATE
ATTN: DFAS CO BVDFB
P. O. BOX 182317
COLUMBUS OH 43218-6254
to
DFAS CLEVELAND
CLEVELAND NORFOLK ACCOUNTS PAYABLE
PO BOX 998022
CLEVELAND OH 44199-8022

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 205,185.07 from 4,403,103.85 to 4,608,288.92.
The total cost of this line item has increased by $205,185.07 from $4,403,103.85 to $4,608,288.92.

SUBCLIN 000104 is added as follows:

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000104	[redacted]				$0.00
				NET AMT	$0.00
	[redacted]				$205,185.07

SECTION E - INSPECTION AND ACCEPTANCE

The following Acceptance/Inspection Schedule was added for SUBCLIN 000104:

INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
N/A	N/A	N/A	Government

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-SEP-2011	4,403,103.85	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-OCT-2011	4,608,288.92	N/A FOB: Destination	

The following Delivery Schedule item has been added to SUBCLIN 000104:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 26-AUG-2011 TO 31-OCT-2011	N/A	N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $205,185.07 from $4,403,103.85 to $4,608,288.92.

SUBCLIN 000104:
Funding on SUBCLIN 000104 is initiated as follows:

[redacted]

[redacted]

[redacted] [redacted]

Increase: $205,185.07

Total: $205,185.07

Cost Code: [redacted]

The following have been added by full text:
MIPR NUMBER
MIPR NUMBER: [redacted]

LOA: [redacted]

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE: J	PAGE OF PAGES: 1 / 3		
2. AMENDMENT/MODIFICATION NO: 08	3. EFFECTIVE DATE: 21-Oct-2011	4. REQUISITION/PURCHASE REQ NO: ACQR1305421	5. PROJECT NO (If applicable)
6. ISSUED BY CODE N62583 NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE AQ00/NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4347		7. ADMINISTERED BY (If other than item 6) CODE See Item 6	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZE JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003

X 10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

X C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
FAR 43.103(a)(3)

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

The purpose of this no additional cost modification is to extend the period of performance by eight months, from 31 OCT 2011 to 29 JUN 2012.

Acceptance of this modification by the Contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) [redacted] / CONTRACTS TEL: 805-982-2515 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 27-Oct-2011

EXCEPTION TO SF 30
APPROVED BY OIRM 11-84

30-105-04

STANDARD FORM 30 (Rev. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-OCT-2011	4,608,288.92	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012	4,608,288.92	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000101 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-SEP-2011		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012		N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000102 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012		N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000103 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-JUN-2011	0	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012	0	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000104 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 26-AUG-2011 TO 31-OCT-2011	N/A	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 31-OCT-2011 TO 29-JUN-2012	N/A	N/A FOB: Destination	

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 | 19

2. AMENDMENT/MODIFICATION NO	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ NO	5. PROJECT NO (If applicable)
09	15-Dec-2011	ACQR1305421	

6. ISSUED BY CODE N62583

NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ00/NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4347

7. ADMINISTERED BY (If other than item 6) CODE

See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)

WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZIE JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 43.103(a)(3)
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Modification Control Number: [redacted]

The purpose of this supplemental modification is to increase the level of effort and to provide additional funding in order to perform all mandatory repairs on Tank 5 in accordance with the Statement of Work.

Acceptance of this modification by the Contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		[redacted] / CONTRACTS TEL: 805-982-2515 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 22-Dec-2011

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

The following have been added by full text:

In accordance with contract clause 52.243-4 “Changes (JUN 2007)”, as negotiated between the Contractor and the Government, the Contractor is hereby to provide all labor, materials, equipment, supervision, inspection, and related work necessary to perform the following additional work as provided in the Statement of Work and as outlined in the following Contractor RFIs:

RFI #07: Refurbish isolation and skin valves, dated 20 OCT 2010	$34,463.00
RFI #08: Install Datum Plate, dated 20 OCT 2010	$1,550.00
RFI #22: Immediate Repairs, dated 20 OCT 2010	$291,798.39
RFI #22: Short Term Repairs, dated 07 JAN 2011	$353,895.46
RFI #22: Long Term Repairs, dated 07 JAN 2011	$294,025.97
RFI #23: Preparation and Coating, dated 03 FEB 2011	$1,021,333.22
RFI #26: Remove and Replace Sample Lines, dated 31 MAR 2011	$51,806.72

Total Cost: $2,048,872.76

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $2,048,872.76 from $4,608,288.92 to $6,657,161.68.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 2,048,872.76 from 4,608,288.92 to 6,657,161.68.
The total cost of this line item has increased by $2,048,872.76 from $4,608,288.92 to $6,657,161.68.

SUBCLIN 000105 is added as follows:

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
000105	[redacted]	UNDEFINED		UNDEFINED	$0.00
				MAX NET AMT	$0.00
	[redacted]				$2,048,872.76

SECTION C - DESCRIPTIONS AND SPECIFICATIONS

The following have been added by full text:

<u>NEW TASKING</u>

STATEMENT OF WORK
ENGINEERING SERVICES
POST API 653 INSPECTION REPAIR OF RED HILL TANK 5
NAVSUP FLC PEARL HARBOR
PEARL HARBOR, OAHU, HAWAII

1.0 INTRODUCTION

1.1 LOCATION

The work is located at the Red Hill Underground Fuel Storage Facility, Naval Supply Fleet Logistics Center (NAVSUP FLC), Pearl Harbor, Hawaii.

1.2 DESCRIPTION OF WORK

The work includes all mandatory, short term, long term repairs recommended from the modified out of service API 653 inspection report for Red Hill Tank 5. Also included are the additional repairs listed in section 4.1.1. The major repair entails patch plate repairs and weld repairs of suspected thin spots, hollow spots, refurbish skin valves, and new coating system for lower dome. The Contractor shall provide all facilities, labor, transportation, equipment, tools, materials, incidentals, supervision and inspection necessary to perform the work.

1.3 FACILITY DESCRIPTION

The Red Hill Underground Fuel Storage Facility is located on the Island of Oahu, Hawaii. The Red Hill Underground Fuel Storage Facility consists of multiple underground storage tanks constructed in 1942-1943. The Red Hill Tanks have a coated welded steel liner backed up by concrete which bears against the solid rock from which the Tanks were carved. Each tank's nominal capacity is 302,000 barrels, and the entire facility is capable of holding up to 252 million gallons of three different products, JP-5, JP-8 and F-76. The facility is used to store fuel in support of military operation on Oahu, in the mid-Pacific area and other area as required. The configuration of these vertical cylindrical tanks is 100 feet in diameter and 250 feet in height. The tank is domed on the lower and upper ends. Access to the Tanks is provided by an upper access tunnel 190 feet above the tank bottoms and a lower access tunnel just below the tank bottoms. Both upper and lower access tunnels are located between the two rows of ten (10) tanks. The lower tunnel extends over three miles to Pumphouse 59 at Kuahua and contains three fuel lines. And there are three entrances to the Harbor Tunnel – at the Underground Pump House (Adit 1), at Makalapa Adit 2, and the Red Hill Complex Tankage (Adit 3, Adit 4 and Adit 5).

1.4 OPERATIONS

The Red Hill Tanks are under the control of NAVSUP FLC Pearl Harbor. NAVSUP FLC Pearl Harbor personnel perform operation, patrol, and maintenance of the Red Hill Facility including the tanks. NAVSUP FLC Pearl Harbor will provide personnel and equipment needed to operate the tanks when previously notified by the Contractor. At no time shall the Contractor operate the tanks or any other government equipment, unless given prior approval from the Government fuels manager.

1.5 BACKGROUND

Tank 5 was constructed in 1942. It was converted from storage of Navy Distillate to JP-5 in 1974. Last time cleaning was performed in 2010 and inspected under modified API 653 in Nov 2010.

2.0 SCOPE

2.1 GENERAL

The Contractor shall provide the necessary qualified personnel, equipment and materials to perform all of the following work concerning repair of Tank 5.

2.2 WORK TO BE ACCOMPLISHED

Work under this Contract includes API 653 recommended (immediate, short term, and long term) and other repairs for Red Hill Tank 5. This work shall include, but not be limited to:

a. Develop Work Plan, including detail coating plan, to perform the Work. An addendum to the current Work Plan is acceptable.
b. Develop and Submit submittals as required by the approved Work Plan
c. Develop Health and Safety Plan to perform the Work. An addendum to the current Health and Safety Plan is acceptable.
d. Develop Environmental Protection Plan which shall include Hazardous Waste Disposal Plan. An Addendum to the current Environmental Protection Plan is acceptable.
e. Perform required Work in accordance with the approved Work Plan. Detail of how to accomplish the work shall be determined by the Contractor, and the approved Work Plan shall include the sequence of work items to accomplish the work items listed on SOW.
f. Any repair recommended in the inspection report shall be performed.
g. Any additional repair as outlined further in section 4.0 shall be performed.
h. Post-repair inspection shall be performed to serviceability statement.

These tasks are further specified in paragraphs 4.0 and 5.0.

3.0 GOVERNMENT FURNISHED INFORMATION (GFI) AND MATERIALS (GFM)

3.1 GOVERNMENT FURNISHED INFORMATION

a. N/A

3.2 GOVERNMENT FURNISHED MATERIAL

a. N/A

4.0 ENGINEERING SERVICES

4.1 PRE ON-SITE WORK DOCUMENTATION

4.1.1 Work Plan

a. Prior to performing the cleaning/inspection to Tank 5, as listed in Paragraph 2.2, the Contractor shall prepare a Work Plan. The Work Plan shall include, but not limited to:

(1) Scope of Work & Procedures
(2) Detailed Work Schedule
(3) Subcontractors
(4) Responsibilities of all parties
(5) Required Permitting
(6) Applicable Unified Facilities Guide Specifications and API Standards and Recommended Practice (RP), to include, but not limited to:
    i. 01 11 00 (01110) Summary of Work
    ii. 01 14 00 (01140) Work Restrictions
    iii. 01 32 16.00 20 (01320) Construction Progress Documentation
    iv. 01 33 00 (01330) Submittal Procedures
    v. 01 45 00.00 20 (01450) Construction Quality Control
    vi. 01 35 29 (01525) Safety Requirements
    vii. 02 41 00 (02220) Demolition
    viii. 23 14 00 (15996) Commissioning of Fuel Facility Systems
    ix. 13219N Cleaning Petroleum Storage Tanks
    x. 09 07 13.15 Epoxy/Fluoropolyurethane Interior Coatings of Welded Steel Petroleum Fuel Tanks
    xi. 09 97 13.27 Exterior Coating of Steel Structures
    xii. API 650 Welded Steel Tanks for Oil Storage
    xiii. API 653 Tank Inspection, Repair, Alteration, and Reconstruction
    xiv. API 2015 Safe Entry and Cleaning of Petroleum Storage Tanks
    xv. API RP 2016 Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks
    xvi. API RP 651 Cathodic Protection of Aboveground Petroleum Storage Tanks
    xvii. SNT-TC-1A Personnel Qualification and Certification in Nondestructive Testing
    xviii. API MPMS Manual of Petroleum Measurement Standards Chapter 2 – Tank Calibration
    xix. NACE Recommended Practice, RP 0169 Control of External Corrosion on Underground or Submerged Metallic Piping Systems
    xx. NACE Recommended Practice, RP0184-97 Repair of Lining Systems
    xxi. NACE Recommended Practice, RP0193 External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms
    xxii. NACE Recommended Practice, RP0288-94, Inspection of Linings on Steel and Concrete

(7) Transportation of Material and Equipment (including to location of work)
(8) Mobilization and Demobilization

(9) Submittal Register

b. The Work Plan shall incorporate all Local, State, and Federal regulations.

c. Tank 5 has been remained empty since the last out-of-service API 653 inspection in November 2010. No cleaning is required. However, ventilation/degasing and gas free certification of Tank 5 prior to start any work inside of the tank shall be in accordance with API Standard 2015 and RP 2016 as required. The Contractor shall maintain a vapor-free condition throughout the project period, inside of the tank. Before tank repair operations begin and before workers enter the tank, the Contractors shall develop and implement written tank entry programs, including a Confined Space Program.

d. Perform following repairs in accordance to API 650, 653, UFGS 09 97 13.15 and UFC 3-460-03.

i. Perform welding repairs on 138 locations identified with weld flaws.
ii. Perform 6” patch plate repairs on 532 locations identified with holes, gouges, or pits.
iii. Perform 12” patch plate repairs on 36 locations identified with corrosion or pits.
iv. Perform 24” patch plate repairs on 3 locations identified with corrosion or pits.
v. Perform 20” x 37” patch plate repair at 1 location identified with corrosion or pits.
vi. Minimum preparation work shall be required for welding patch plates on all locations. After requested repairs, all required NDTs shall be performed, including vacuum box test and MT. NDE personnel shall be certified in accordance with ASME B31.3
vii. Remove and replace all interior and exterior sample lines. New interior sample tubes shall be installed along the tank center tower. The end of those sample tubes in the lower access tunnel shall be isolated with skin valves and be of similar configuration to the updated sampling systems on other tanks. The updated sampling stations shall include the installation of a funnel return system (provided by others). The new piping shall have pipe tracing, as-built documentation, and permanent labeling at the sample station. The system shall be hydrotested to 1.5 MAOP. All required NDT’s shall be performed after required repairs. NDE personnel shall be certified in accordance with ASME B31.3
viii. Install new datum plate with ½”-thick CS plate on the bottom of Tank 5. Dimension and location shall be determined at the site to accommodate the existing MTG probe and potential future automatic tank gauging system. All required NDTs shall be performed after required repairs. NDE personnel shall be certified in accordance with ASME B31.3
ix. Replace 6” slop line with new 4” flexible line from tank bottom to the isolation skin valve in lower access tunnel.
x. Clean, refurbish, and re-coat 20” Double Block and Bleed Valve. The valve shall be refurbished as required by Manufacturer standards. Once completed the valve shall be hydrotested to 1.5 times the flange class rating. Results shall be included in tank completion report and provided upon request.
xi. Clean, refurbish, and re-coat 12” Double Block and Bleed Valve. The valve shall be refurbished as required by Manufacturer standards. Once completed the valve shall be hydrotested to 1.5 times the flange class rating. Results shall be included in tank completion report and provided upon request.
xii. Clean, refurbish, and re-coat 6” Double Block and Bleed Valve. The valve shall be refurbished as required by Manufacturer standards. Once completed the valve shall be hydrotested to 1.5 times the flange class rating. Results shall be included in tank completion report and provided upon request.
xiii. Clean, refurbish, and re-coat 12” Ball Valve. The valve shall be refurbished as required by Manufacturer standards. Once completed the valve shall be hydrotested to 1.5 times the flange class rating. Results shall be included in tank completion report and provided upon request.
xiv. Remove existing coating from the lower to accommodate new coating system. The coating shall be removed and the surface to be prepared to minimum SSPC SP 10 level. Submit

documentation that the blaster is qualified by SSPC to the SSPC C-7 Dry Abrasive Blaster Qualification Program.

xv. Current coating samples shall be collected and tested for any hazardous content. Abrasive blasting procedure must be determined based on the test result.

xvi. New coating system shall be applied to lower dome up to 36” above the spring/expansion joint. Coating procedure shall be in accordance to UFGS 09 97 13.15. All coating material submittal shall be submitted to the government for review and approval prior to any issuance of purchase order. Minimum qualification requirements for coating contractor include SSPC QP-1 certification and verifiable previous coating application experience in steel tank with fluoropolyurethane coating material. All relevant qualifications of coating contractor shall be submitted to the government for review and approval.

xvii. Humidity control unit may not be required for this coating application. It is the Contractor’s responsibility to prove that the interior condition of Tank 5 can remain under the manufacturer’s recommended relative humidity level inside the tank.

xviii. Level III inspector from a SSPC QP-5 certified coating Inspection Company shall be hired to perform blasting and coating application inspection. All qualifications of the company and individual inspector shall be submitted to the government for review and approval.

xix. If conventional abrasive blasting method is employed, disposal of used abrasive blast material shall be done in accordance to all local, state and federal regulations. Disposal issue shall be addressed in waste management plan under Environmental Protection Plan.

xx. Abrasive blasting is considered as hot work. The contractor is responsible to obtain all necessary permits prior to any abrasive blasting work. Refer section 5.2 b

e. Center tower has been inspected by a licensed structural engineer and was repaired based on the structural engineer’s assessment recommendations. Inspection report and repair report shall be available upon request.

f. The Government will provide train assistance at their discretion to a maximum of four hours on any work day in the Lower Access Tunnel only. **Train support shall only be provided during standard Government work hours of 8 am to 4 pm, Monday thru Friday.** The Contractor shall notify the Government no less than one (1) day in advance of the time and location that the contractor requires the train support. All loading, unloading and securing of material onto flat beds shall be the Contractor’s responsibility. Contractor retains responsibility for all items during Government transport.

g. Any hazardous material collected shall be disposed of off-base. The Contractor is to provide a Hazardous Waste Manifest or Waste Shipment Record of all material removed from Tank 5 to on-base authority. A copy of the manifest or record shall be provided to Region Environmental on as necessary.

h. The Work Plan’s format shall be in accordance with paragraph 8.0 and submitted in accordance with paragraph 9.0 for Government Review and Approval.

i. No work is to start on-site prior to review and approval by the Government for this Document.

j. New strapping table will be prepared under previous clean/inspection contract.

k. Post repair inspection shall be performed by a certified API 653 inspector. Statement for serviceability shall be submitted in two working days after post repair inspection.

4.1.2 Health and Safety Plan

a. The Contractor shall submit a Health and Safety Plan detailing such items as briefings, training, hazard control, general housekeeping, protective equipment, etc.

b. The Health and Safety Plan shall be in accordance with EM 385-1-1, and follow the outline provided in Appendix A: Minimum Basic Outline for Accident Prevention.

c. The Health and Safety Plan shall incorporate the Safety Plans from all subcontractors.

d. The Heath and Safety Plan's format shall be in accordance with paragraph 8.0 and submitted in accordance with paragraph 9.0 for Government Review and Approval.

e. No work is to start on-site prior to review and approval by the Government for this Document.

4.1.3 Environmental Protection Plan and Hazardous Waste Disposal Plan

a. The Contractor shall submit a Environmental Protection Plan and Hazardous Waste Disposal Plan detailing such items as hazard control, storing, transporting,, disposal, spill prevention, containment, clean-up contingency measures, and etc.

b. The Hazardous Waste Disposal Plan shall comply with applicable requirements of Federal, State, and local hazardous waste regulations.

c. The Environmental Protection Plan and Heath and Safety Plan's format shall be in accordance with paragraph 8.0 and submitted in accordance with paragraph 9.0 for Government Review and Approval.

d. No work is to start on-site prior to review and approval by the Government for this Document.

4.2 POST ON-SITE WORK DOCUMENTATION

4.2.1 Construction Certification Report

a. The Contractor shall provide a written Construction Certification Report, detailing the following: inspection that was done, all applicable test records and reports, and list of all materials incorporated and records.

b. The Construction Certification report shall include all permits and reports required, NDT results, vendor purchased equipment certification (to include serial and model number), and all relevant maintenance manuals.

c. The Construction Certification Report shall also contain the as-built drawings indicating the locations and type of repair.

d. This Report shall be generated while the work is being performed. The Construction Certification Report's format shall be in accordance with paragraph 8.0 and submitted in accordance with paragraph 9.0 for Government Review.

5.0 ON-SITE SERVICES

5.1 CONSTRUCTION IMPLEMENTATION

a. The Contractor shall provide all equipment, personnel and material necessary, and perform the Work listed in paragraph 2.2, per the plans developed in paragraph 4.1.1, 4.1.2 and 4.1.3 above.

b. Prior to Demobilizing, the Contractor shall provide a statement certifying that the tanks can be placed back into active fuel service. The Contractor shall observe the tank being put back into service. The Contractor shall stand by until the fuel level reaches full capacity of tank. When the tanks are filled to their normal operating levels, the Contractor shall be responsible for weeps or operation of MOVs. The Contractor shall be responsible for any damage caused to the system due to debris left in the tank during inspection.

5.2 PERMITS

a. The Contractor shall obtain all Federal, State, Local, and EPA permits required for all work that is to be done on the Tanks.

b. The Contractor shall obtain a Hot Work Permit from Federal Fire Department for all Hot Work that is to be performed on the tanks. The FFD will require the Contractor to obtain the service of a Marine Chemist to certify the area for hot work. Contractor shall be responsible for his own fire watches. The contractor shall provide a fire watch for each hot work operation who will remain in clear view of the hot work at all time and close enough to provide emergency aid if needed. Sand blasting is considered hot work which requires a Marine Chemist to certify the areas before work is started.

NOTE: The Contractor shall identify permits required for all work that is planned on the tanks. Completed permits will have to be coordinated with FLC Pearl Harbor and/or local NAVFAC for a final determination.

5.3 SUBCONTRACTORS AND PERSONNEL

a. The Contractor shall employ professionally and technically qualified personnel to perform the tasks and ensure the quality of services meet the standards specified. The subcontractor shall have the following qualifications but not limited to;

- a. Successfully accomplished similar tank repair/coating work within in five years.
- b. Submit evidence that the Contractor/subcontractor's project manager, superintendent, foreman, quality control manager, and other key personnel have previous experience in similar work in tank reconstruction.

b. Non-destructive examination Inspector Qualifications: Submit certification that inspection and non-destructive testing personnel, including inspectors performing visual inspections, and qualified in accordance with the requirements of API 650 and ASNT SNT-TC-1A for Level II in the applicable non-destructive testing method. And AWS certified weld inspector, qualified in accordance with AWS QC 1, shall be considered qualified to perform visual inspections only, in lieu of an ASNT Level II visual inspector.

c. Furnish a list of contact personnel of the Contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in the previous lists.

d. The Contractor employees and representatives performing work under this contract are required to be United States citizens.

e. Identification badges, if required, will be furnished. The Contractor shall apply for and use the identification badges as directed. The Contractor shall immediately report instances of lost or stolen badges to the Contracting Officer. Refer section 5.4 Contractor Access and Use of Premises.

f. Change and/or substitution of subcontractor approved on the Work Plan during execution of the project shall be requested through the Contracting Officer with providing proper proof of qualification of new subcontractors.

5.4 INSTALLATION ACCESS (GENERAL) AND USE OF PREMISES

5.4.1 Contractor/Subcontractor Pass and ID Requirements

a. Each installation maintains specific pass / identification requirements. In general, installation access requests must be submitted to the NTR at least five (15) business days prior to arrival at Installation. Installation-specific Contractor / Subcontractor Pass and ID forms / information / requirements may be requested from the NTR. Contractor shall submit information for themselves and for their subcontractors. Contractor shall also be aware that additional Installation access regulations may be in effect for non-U.S. personnel and for use of rental vehicles or privately owned vehicles (POV's).

b. Contractor shall understand that the process to obtain passes or ID's for Contractor or subcontractor personnel is not within the purview of NAVFAC ESC and may take up to 30 days or longer depending on specific military installation requirements and/or the individual's nationality or background.

5.4.2 Base Access (JBPHH Specific)

a. Commander, Navy Installations Command (CNIC), has established the Navy Commercial Access Control System (NCACS), a standardized process for granting unescorted access privileges to vendors, contractors, suppliers and service providers not otherwise entitled to the issuance of a Common Access Card (CAC) who seek access to and can provide justification to enter Navy installations and facilities. Visiting vendors may obtain daily passes directly from the individual Navy installations by submitting identification credentials for verification and undergoing a criminal screening/ background check. Alternatively, if the vendor so chooses, it may voluntarily elect to obtain long-term credentials through enrollment, registration, background vetting, screening, issuance of credentials, and electronic validation of credentials at its own cost through a designated independent contractor NCACS service provider. Credentials will be issued every five years and access privileges will be reviewed/renewed on an annual basis. The costs incurred to obtain Navy installation access of any kind are not reimbursable, and the price(s) paid for obtaining long-term NCACS credentials will not be approved as a direct cost of this contract. Further information regarding NCACS can be found at http://cnic.navy.mil/CNIC_HQ_Site/index htm (under "Popular Links").

b. Normal process time for base access is approximately 4 weeks.

c. The contractor and the subcontractors may also be required to submit a signed personnel and vehicle access request form to a designated NAVFAC HI FEAD contract specialist along with transmittal letter, and copy of certificate of liability insurance

d. Any personnel request from out of the State of Hawaii shall be submitted in a separate request package, if requested by NAVFAC.

e. A NAVFAC ESC representative may not be available at all times to sponsoring the issuance of daily badges. Contractors must submit the requests for a daily badge at least one week in advance. The Government is not responsible for any resulting delays due to the lack of sponsorship for daily badges.

5.4.3 NAVSUP FLC/Red Hill Access

a. The contractor and the subcontractors shall submit a Contractor Verification System Form (CVS) to a designated Government Employee. The request shall include name, address, SS#, place of birth, and citizenship.

b. The contractor and the subcontractors will be notified to provide three other supporting documents, a completed SF85, SF85P, or SF86, fingerprints, and proof of US Citizenship, to the Designated

Security Office. Once there is confirmation of no issues with the fingerprints and an OPM investigation has begun processing, a temporary NAVSUP FLC access badge will be issued.

c. The SF85, SF85P, or SF86 will be processed by OPM with approximately 4 months of process time. A "No Determination" or "Unfavorable" result of the OPM investigation based off the SF85, SF85P, or SF86 could result in the revocation of the temporary NAVSUP FLC access badge. Revocation of such badge will further deny access to the NAVSUP FLC fuel facility.

d. Upon issuance of the NAVSUP FLC fuels access badge, the badge must be activated via the Supply Information System Analyst at NAVSUP FLC Pearl Harbor. For Red Hill access a recent photo of each person is required. A digital photo will be acceptable.

5.4.4 Restrictions

a. The Red Hill Underground Fuel Storage Facility is secured area for 24/7. All access gates to Red Hill are controlled by Base Security Force. The Contractor and the subcontractors shall obtain access to Red Hill through the procedure described in Section 5.4.2.

b. Work Hours: Regular working hours shall consist of a period established by the Contracting Officer between 0700 hours and 1600 hours, Monday through Friday, excluding Government holidays. Working outside regular working hours requires Contracting Officer approval. Working extended hours will be only authorized under task driven reasons.

5.4.5 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Provide written requests ten (10) calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress. During periods of darkness, the different parts of the work shall be lighted in a manner approved by the Contracting Officer.

5.4.6 Utility Cutovers and Interruptions

Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and Government holidays. Conform to procedures required in paragraph 5.5.3.

5.5 EQUIPMENT AND MATERIAL

5.5.1 List of Equipment and Materials

a. The contractor shall provide all equipment required to perform clean/inspection.

b. Materials shall be of US manufacture. **<u>NO FOREIGN</u>** materials will be used without prior notice to and approval from the Contracting Officer.

5.5.2 Shipment of Equipment and Materials

Contractor shall notify Installation at least three (3) days in advance regarding delivery of all materials and equipment. All shipping, loading, unloading and securing of materials and equipment shall be Contractor's responsibility. The contractor may utilize the area outside of Adits 3 and 4 for equipment laydown and onsite storage. Contractor retains responsibility for all items through project completion, including the security of all materials and equipment.

5.6 OTHER CONTROLS

5.6.1 Utilities

The Contractor shall provide all utilities, including power, compressed air and potable water.

5.6.2 Temporary Sanitary Facilities

Provide adequate sanitary conveniences of a type approved for the use of persons employed on the work, properly secluded from public observation, and maintained in such a manner as required and approved by the Contracting Officer. Maintain these conveniences at all times without nuisance. Upon completion of the work, remove the conveniences from the premises, leaving the premises clean and free from nuisance. Dispose of sewage through connection to a municipal, district, or station sanitary sewage system. Where such systems are not available, use chemical toilets or comparably effective units, and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Include provisions for pest control and elimination of odors.

5.6.3 Storage Areas

The contractor shall be responsible for security of his property.

5.6.4 Waste Disposal

Contractor shall be responsible for packaging, transporting, and disposing of all waste using an approved off-base waste disposal company. Contractor shall dispose of all waste as hazardous waste, unless appropriate testing shows that the waste can be disposed of as non-hazardous waste by other approved means. Hazardous waste shall be disposed according to Hazardous Waste Disposal Plan/Environmental Plan. The work site shall be kept clean of all debris and garbage.

Contractor shall manifest all waste and shall coordinate with the Installation’s environmental department, as required, to ensure that all waste is properly accounted for and disposed of.

5.6.5 Interruption of Vehicular Traffic

If during the performance of work, it becomes necessary to modify vehicular traffic patterns at any locations, notify the Contracting Officer at least15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan shall be in accordance with State and local. Make all notifications and obtain any permits required for modification to traffic movements outside Station's jurisdiction. Provide cones, signs, barricades, lights, or other traffic control devices and personnel required to control traffic. Do not use foil-backed material for temporary pavement marking because of its potential to conduct electricity during accidents involving downed power lines.

6.0 <u>MEETINGS</u>

6.1 GENERAL

a. The Contractor shall schedule and conduct the following meetings for the purpose of transferring information between the Contractor and Government personnel. These meetings will be at an agreed upon time (TBD) between the Government and the Contractor. The Contractor shall submit minutes of these meetings in accordance with paragraph 9.0.

b. The Contractor shall submit the following information for all personnel, one week prior to arriving on-site: Full Name with middle initial, SSN, Date of Birth, Driver’s License Number and State of Issuance, Company name, address, phone number, date of arrival, and date of departure. Anyone arriving at FLC

Pearl Harbor without submitting this information and who cannot produce a valid picture ID will not be allowed onto the facility.

6.2 SITE VISIT/WORK PLAN/QC PLAN MEETING

The Contractor shall conduct a site visit during the development of the Work Plan to obtain information required to complete the Work Plan. The QC Plan Meeting shall be included during this meeting. This site visit will be at FISC Pearl Harbor, HI.

6.3 PRECONSTRUCTION CONFERENCE AND QC COORDINATION AND MUTUAL UNDERSTANDING MEETING

TWO weeks prior to work commencement, a meeting with the Contracting Officer, FLC Pearl Harbor Fuel Manager and pertinent Government representatives will be held to discuss and develop a mutual understanding of administration of value engineering and safety programs, drawings, execution of the work, and schedules. In addition, the QC Manager will meet with the Government to present the QC program required by this Contract. Major subcontractors shall also attend. Location of this meeting will be at FLC Pearl Harbor, HI.

6.4 PROGRESS/QC MEETINGS

The QC Manager shall meet with the NTR and the FLC Pearl Harbor Fuel Manager on a regular (weekly) basis to discuss the progress and any other requirements during the on-site implementation phase of this Contract. The contractor shall also meet with the NTR and Fuel Manager at the conclusion of the work for the final QA walk-thru.

7.0 <u>GOVERNMENT POINTS OF CONTACT</u>

7.1 TITLES

Government technical points of contact include a Contracting Officer’s Representative (COR) and a Naval Technical Representative (NTR) appointed by the Contracting Officer (KO).

7.2 CONTRACTING OFFICER

The Contracting Officer for this contract is [redacted]

[redacted]
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ01/NAVAL BASE VENTURA COUNTY
1100 23RD AVE., BLDG. 1100
PORT HUENEME, CA 93043-4301
PHONE: (805) 982-2515, FAX: (805) 982-3015
E-MAIL: [redacted]

7.3 CONTRACT SPECIALIST

The Contract Specialist for this contract is [redacted]. Contractual Correspondence shall be sent to:

[redacted]
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ01/NAVAL BASE VENTURA COUNTY
1100 23RD AVE., BLDG. 1100

PORT HUENEME, CA 93043-4301
PHONE: (805) 982-2515, FAX: (805) 982-5234
EMAIL: [redacted]

7.4 CONTRACTING OFFICER'S REPRESENTATIVE

The COR for this contract is [redacted], NAVFAC ESC, PW54. The COR is responsible to the Contracting Officer for all matters requiring technical interface with the Contractor. All technical correspondence shall be addressed to:

NAVAL FACILITIES ENGINEERING SERVICE CENTER
1100 23RD AVE., BLDG. 1100
PORT HUENEME, CA 93043-4370
ATTN: [redacted] PW54
PHONE: (805) 982-1436, FAX: (805) 982-5388
E-MAIL: [redacted]

7.5 NTR

The NTR for this contract is [redacted], NAVFAC ESC, PW54. The NTR is the Naval Technical Representative and shall represent matters regarding technical interface with the Contractor on the jobsite.

NAVAL FACILITIES ENGINEERING SERVICE CENTER
1100 23RD AVENUE
PORT HUENEME, CA 93043-4370
ATTN: [redacted] PW54
PHONE: (805) 982-4992, FAX: (805) 982-5388
E-mail: [redacted]

8.0 <u>REPORT FORMAT</u>

8.1 CONTENTS

Reports shall provide a comprehensive description of work performed. Drawings, charts, illustrations, and other material needed to clarify the design shall be included. Calculations and computer output, if applicable, shall be included as appendices to the report.

Repair Certification Reports
This report will include thorough documentation all work performed. Hard copies of each tank shall be bind in plastic ring binding with a plastic sleeve inside to hold electronic copy of each report. NAVFAC ESC will provide the cover and report number.

Repair Reports Shall Include:

1.1.1.1 Executive Summary
1.1.1.2 Suitability for Service Statement
1.1.1.3 Work Performed
1.1.1.4 Timeline

Appendices:
1.1.1.5 Documenting Photographs
1.1.1.6 Personnel Certifications
1.1.1.7 NDT Documentation

1.1.1.8 QC Documentation
1.1.1.9 Materials and Coating Data
1.1.1.10 As-built Drawings
1.1.1.11 API 653 follow up inspection

8.2 QUALITY

Reports describing the work shall be clearly written, adequately detailed, well edited with no errors, and acceptable for release as a quality document. Draft reports shall be finished products requiring only technical changes after Government review.

8.3 COVER SHEET

The title/cover sheet shall be provided by the contractor. The cover and back of each final report shall be on white cover stock. All reports shall have clear plastic covers both front and back. The reports shall be spiral bound with black spines, or in 3-hole binders.

8.4 CD-ROM FORMAT

All reports are to be submitted on a CD-ROM, in addition to hard copies, in accordance with Paragraph 9.0. All documents on the CD-ROM are to be in an editable type format (i.e.: .doc, .xls, .dwg, etc.). Only scanned documents such as mill certs, x-ray reports, etc. are to be submitted as a .pdf file.

8.5 PROJECT NUMBERS

All reports and CD-ROMs are to include the DESC project numbers on the title sheet.

9.0 <u>SUBMITTAL SCHEDULE AND DISTRIBUTION</u>

All reports, documents, and drawings shall be delivered according to the list provided in Attachment #1.

10.0 <u>PERIOD OF PERFORMANCE</u>

The Period of Performance for this Contract is 20 weeks.

ATTACHMENT #1

SUBMITTAL LIST, SCHEDULE, AND DISTRIBUTION

SUBMITTAL LIST, SCHEDULE, AND DISTRIBUTION

SUBMITTAL	**SUBMITTAL SCHEDULE**			**DISTRIBUTION - NUMBER OF COPIES**		
	DRAFT (WACA)	GOVT Review	FINAL (WAGR)	Fuels ❷	NFESC ❷	DESC ❶
WORK PLAN	4	2				
DRAFT			2		EC	
FINAL					1/EC	
HEALTH AND SAFETY PLAN						
DRAFT	4	2			EC	
FINAL			1		1/EC	
ENVIORNMENTAL PROTECTION PLAN/HAZARDOUS WASTE DISPOSAL PLAN						
DRAFT	4	2			EC	
FINAL			1		1/EC	
CONSTRUCTION SUBMITTALS						
FINAL					4/ 4 CDs	
QUALITY CONTROL DAILY REPORTS❸		-	-	EC	EC	
MEETING MINUTES❸,❹		-	-		EC	

NOTES:
WACA – Weeks after Contract Award
GOVT Review – Number of weeks for Government review after receipt of submittal.
WAGR – Weeks after Government Review
❶ - Include 1 CD-ROM with each FINAL report
❷ - Include 2 CD-ROMs with each report
❸ - Daily reports shall be e-mailed daily, by 0900 HAST, the following day.
❹ - Minutes of meetings may be e-mailed. Minutes shall be submitted no later than three (3) working days following each meeting.

DISTRIBUTION LIST MAILING ADDRESSES:

NAVAL FACILITIES ENGINEERING SERVICE CENTER
1100 23RD AVENUE
PORT HUENEME, CA 93043-4370
ATTN: MR. JOHN BRITO, PW54
PHONE: (805) 982-4992, FAX: (805) 982-5388
E-mail: john.a.brito@navy.mil

SECTION E - INSPECTION AND ACCEPTANCE

The following Acceptance/Inspection Schedule was added for SUBCLIN 000105:

INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
N/A	N/A	N/A	Government

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012	4,608,288.92	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012	6,657,161.68	N/A FOB: Destination	

The following Delivery Schedule item has been added to SUBCLIN 000105:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $2,048,872.76 from $4,608,288.92 to $6,657,161.68.

SUBCLIN 000105:
Funding on SUBCLIN 000105 is initiated as follows:

[redacted]

[redacted]

[redacted] [redacted]

Increase: $2,048,872.76

Total: $2,048,872.76

Cost Code: [redacted]

The following have been added by full text:

MIPR NUMBER: [redacted] - BASIC
[redacted]
CONTRACT ACRN [redacted]

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 6

2. AMENDMENT/MODIFICATION NO	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ NO	5. PROJECT NO (If applicable)
10	28-Jun-2012	ACQR1305421	

6. ISSUED BY CODE N62583	7. ADMINISTERED BY (If other than item 6) CODE
NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE AQ00/NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4347	**See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZE JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 | FACILITY CODE

9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MOD. OF CONTRACT/ORDER NO.
N62583-09-D-0132-0003

X 10B. DATED (SEE ITEM 13)
13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.243-4
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

The purpose of this modification is to increase the level of effort in order to repair five locations on the JP-5 pipeline locationed at the Red Hill Underground Fuel Storage Facility at Pearl Harbor, HI; to provide additional funding in the amount of $194,658.53; and, to extend the period of performance by six months, from 29 JUN 2012 TO 31 DEC 2012.

Acceptance of this modification by the Contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		[redacted] / CONTRACTS TEL: 805-982-2515 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 29-Jun-2012

EXCEPTION TO SF 30
APPROVED BY OIRM 11-84

30-105-04

STANDARD FORM 30 (Rev. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $194,658.53 from $6,657,161.68 to $6,851,820.21.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 194,658.53 from 6,657,161.68 to 6,851,820.21.
The unit of issue has changed from Dollars, U.S. to Each.
The FSC code Y1PZ has been deleted.
The total cost of this line item has increased by $194,658.53 from $6,657,161.68 to $6,851,820.21.

SUBCLIN 000106 is added as follows:

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
000106		UNDEFINED		UNDEFINED	$0.00
	[redacted]				
				MAX NET AMT	$0.00
	[redacted]				$194,658.53

SECTION C - DESCRIPTIONS AND SPECIFICATIONS

The following have been added by full text:
SCOPE OF WORK

NAVFAC ESC SOW ADDENDUM

Contract: N62583-09-D-0132/0003
Contractor: Willbros Government Services

Clean, Inspect, and Repair Red Hill Tanks 5 & 17 NAVSUP FLC Pearl Harbor

All repairs shall meet all requirements and provisions set forth in the original basic award.

1.0 Additive Repair Scope. In response to the Inspection and Integrity Report provided by Willbros dated 10 FEB 2011, three locations were identified as requiring repairs. The contractor is requested to provide (reference RFI 25):

- 1.1. Repairs to locations as identified as Area A, B, C, E, and H in the previously mentioned Inspection and Integrity Report.
- 1.2. The length of the pipeline to be replaced at Areas A, B, and E is approximately 3-4 linear feet per location.
- 1.3. Areas C and H will be repaired sufficiently in order to provide a 20 year intended service an operational interval.
- 1.4. The Government will drain the pipeline. However, the contractor should expect a certain degree of wicking of the fuel after cutting the existing pipeline. The contractor shall be responsible for collecting any fuel that may drip from the pipeline during the execution of this project. The contractor shall collect fuel in 55 gallon drums and move/dispose to the sump near the bulkhead separating the lower 16 tanks.
- 1.5. The government may at its own discretion provide train assistance to a maximum of four hours on any work day. Train support shall only be provided during standard Government work hours between 8 am to 4 pm. The train support will only be available between Adit 3 to Tank 15/16. All loading, unloading and securing material onto flat beds shall be contractor’s responsibility. The contractor shall notify the government no less than three (3) days in advance of the time and location for the train support.
- 1.6. The Contractor shall provide a Work Plan that includes provisions for lock-out/tag-out of the pipeline system.
- 1.7. The contractor furnished new 18” pipe shall be ASTM Grade A106 or equivalent, hydrostatically tested, and results provided to NAVFAC ESC.
- 1.8. End points for the new section are to be butt-welded, no flanges. All welds shall be 100% radiographed.
- 1.9. Contractor shall be responsible for proper disposal of removed sections of piping and all associated materials.
- 1.10. The contractor shall be responsible for the removal and disposal of all coating material removed or disturbed during the repairs. The coating system can be assumed to be wrapped with Asbestos containing materials and coated with a Lead based paint. A Disposal, Containment, and Environmental plan shall be prepared and reviewed by NAVFAC ESC and HI.
- 1.11. Due to the fact that the Red Hill tunnel is a non-permit required confined space, open abrasive blasting is not permitted, unless the contractor/coating subcontractor proposes secure containment for blasting process. Alternate means for stripping the pipeline in order to perform the repair shall be considered and subject to the approval of both FLC and NAVFAC ESC.
- 1.12. Minimum qualification requirement for the coating removal contractor shall be SSPC QP-2 lead removal and shall provide verifiable previous lead removal experience. All relevant qualifications for the SSPC QP-2 contractor shall be submitted to NAVFAC ESC for review and approval.
- 1.13. The Asbestos removal contractor shall be certified in Asbestos abatement and removal. The contractor shall provide verifiable previous Asbestos abatement and removal experience. All qualifications of the company shall be submitted to NAVFAC ESC for review and approval.
- 1.14. Disposal of used surface preparation material shall be done in accordance to all local, state and federal regulations. Per previous testing, lead is present in the current coating. Disposal shall be addressed in the contractor provided waste management plan as part of the Environmental Protection Plan.

2.0 Addenda for all previously submitted plans are acceptable.

SECTION E - INSPECTION AND ACCEPTANCE

The following Acceptance/Inspection Schedule was added for SUBCLIN 000106:

INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
N/A	N/A	N/A	Government

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012	6,657,161.68	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-DEC-2012	6,851,820.21	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000101 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-DEC-2012		N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000102 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC

31-DEC-2012		N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000103 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012	0	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-DEC-2012	0	N/A FOB: Destination	

The following Delivery Schedule item for SUBCLIN 000105 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
29-JUN-2012		N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-DEC-2012		N/A FOB: Destination	

The following Delivery Schedule item has been added to SUBCLIN 000106:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-DEC-2012		N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $194,658.53 from $6,657,161.68 to $6,851,820.21.

SUBCLIN 000106:

Funding on SUBCLIN 000106 is initiated as follows:

[redacted]

[redacted]

Acctng Data: [redacted] [redacted]

Increase: $194,658.53

Total: $194,658.53

Cost Code: [redacted]

The following have been added by full text:

<u>MIPR NUMBER:</u>

MIPR#: [redacted] – BASIC
[redacted]
TASK ORDER ACRN: [redacted]
$194,658.53

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 / 5

2. AMENDMENT/MODIFICATION NO	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ NO	5. PROJECT NO (If applicable)
11	06-Aug-2012	ACQR1305421	

6. ISSUED BY CODE N62583	7. ADMINISTERED BY (If other than item 6) CODE
NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE AQ00/NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4347	See Item 6

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZE JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 43.103(A)
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

The purpose of this modification is to perform JP-5 pipeline repairs on tank 20 and remove a tell-tale system from tank 17. Removal of the tell-tale system is necessary to complete inspection of the tank.

Acceptance of this modification by the Contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		[redacted] / CONTRACTS TEL: 805-982-2515 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 06-Aug-2012

EXCEPTION TO SF 30
APPROVED BY OIRM 11-84

30-105-04

STANDARD FORM 30 (Rev. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $460,695.01 from $6,851,820.21 to $7,312,515.22.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 460,695.01 from 6,851,820.21 to 7,312,515.22.
The total cost of this line item has increased by $460,695.01 from $6,851,820.21 to $7,312,515.22.

SUBCLIN 000107 is added as follows:

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
000107		UNDEFINED		UNDEFINED	$0.00
	[redacted]				
				MAX NET AMT	$0.00
	[redacted]				$383,226.43

SECTION C - DESCRIPTIONS AND SPECIFICATIONS

The following have been added by full text:
SOW AMMENDMENT

Clean, Inspect, and Repair Red Hill Tanks 5 & 17
NAVSUP FLC Pearl Harbor

Prepared 10 JUL 2012

All repairs shall meet all requirements and provisions set forth in the original basic award.

1.0 Additive Repair Scope. While performing the previously awarded repairs to the JP-5 Pipeline an additional leak was discovered near Tank 20. As a result, the contractor is requested to provide (reference RFI 18):

1.1. Repair to the location identified by FLC and ESC on the JP-5 Pipeline that supplies Tank 20.

1.2. The length of the pipeline to be replaced is approximately 2 linear feet at the location.

1.3. The Government will drain the pipeline. However, the contractor should expect a certain degree of wicking of the fuel after cutting the existing pipeline. The contractor shall be responsible for collecting any fuel that may drip from the pipeline during the execution of this project. The contractor shall collect fuel in 55 gallon drums and move/dispose to the sump near the bulkhead separating the lower 16 tanks.

1.4. The government may at its own discretion provide train assistance to a maximum of four hours on any work day. Train support shall only be provided during standard Government work hours between 8 am to 4 pm. The train support will only be available between Adit 3 to Tank 15/16. All loading, unloading and securing material onto flat beds shall be contractor’s responsibility. The contractor shall notify the government no less than three (3) days in advance of the time and location for the train support.

1.5. The Contractor shall provide a Work Plan that includes provisions for lock-out/tag-out of the pipeline system.

1.6. The contractor furnished new 18” pipe shall be ASTM Grade A106 or equivalent, hydrostatically tested, and results provided to NAVFAC ESC.

1.7. End points for the new section are to be butt-welded, no flanges. All welds shall be 100% radiographed.

1.8. Contractor shall be responsible for proper disposal of removed sections of piping and all associated materials.

1.9. The contractor shall be responsible for the removal and disposal of all coating material removed or disturbed during the repairs. The coating system can be assumed to be wrapped with Asbestos containing materials and coated with a Lead based paint. A Disposal, Containment, and Environmental plan shall be prepared and reviewed by NAVFAC ESC.

1.10. The Due to the fact that the Red Hill tunnel is a non permit required confined space, open abrasive blasting is not permitted, unless the contractor/coating subcontractor proposes secure containment for blasting process. Alternate means for stripping the pipeline in order to perform the repair shall be considered and subject to the approval of both FLC and NAVFAC ESC.

1.11. Minimum qualification requirement for the coating removal contractor shall be SSPC QP-2 lead removal and shall provide verifiable previous lead removal experience. All relevant qualifications for the SSPC QP-2 contractor shall be submitted to NAVFAC ESC for review and approval.

1.12. The Asbestos removal contractor shall be certified in Asbestos abatement and removal. The contractor shall provide verifiable previous Asbestos abatement and removal experience. All qualifications of the company shall be submitted to NAVFAC ESC for review and approval.

1.13. Disposal of used surface preparation material shall be done in accordance to all local, state and federal regulations. Per previous testing, lead is present in the current coating. Disposal shall be addressed in the contractor provided waste management plan as part of the Environmental Protection Plan.

1.14. Addenda for all previously submitted plans are acceptable.

2.0 Additive Repair Scope. In preparation for the inspection of Tank 17 it was discovered that the abandoned tell-tale system was still in place. The tell-tale system will need to be removed in order to continue. The contractor is requested to provide (reference RFI 28):

2.1. Removal of the Tell-Tale system in its entirety (detailed below) and perform all repairs in conjunction with that removal in order to return the tank back to service provided no further repairs are identified during the Modified API 653 Inspection.

2.2. Remove approximately 1400 ft. of 2” pipe along shell and dome areas.

2.3. Remove approximately 1300 ft. of 1-1/2” pipe along shell and dome areas.

2.4. Remove piping used for support gussets within 1” off the shell at 8’ intervals.

2.5. Remove 44 U-Sections of piping along shell and dome areas.

2.6. Remove all ¾” pipe connections along lower tank dome.

2.7. Provide and weld new patch plates over 577 locations of wall penetrations.

2.8. Perform 100% NDE on new welds and repairs.

2.9. Contractor is responsible for all waste material disposal.

2.10. Repairs to the coating on the lower dome are to be considered under any repair RFI’s presented as a result of the inspection.

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-DEC-2012	6,851,820.21	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-DEC-2012	7,312,515.22	N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $460,695.01 from $6,851,820.21 to $7,312,515.22.

SUBCLIN 000102:

[redacted] [redacted] was increased by $77,468.58 from $389,957.11 to $467,425.69

SUBCLIN 000107:
Funding on SUBCLIN 000107 is initiated as follows:

[redacted]

[redacted]

Acctng Data: [redacted] [redacted]

Increase: $383,226.43

Total: $383,226.43

Cost Code: [redacted]

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 | 5

2. AMENDMENT/MODIFICATION NO	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ NO	5. PROJECT NO (If applicable)
12	15-Sep-2012	ACQR1305421	

6. ISSUED BY CODE N62583	7. ADMINISTERED BY (If other than item 6) CODE
NAVAL FACILITIES ENGINEERING COMMAND SPECIALTY CENTER ACQUISITIONS NAVFAC CODE AQ00/NAVAL BASE VENTURA COUNTY 1100 23RD AVE BLDG 1100 PORT HUENEME CA 93043-4347	**See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZ E JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.243-1 Changes - Fixed Price 52.243-4
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]

1. The purpose of this supplemental agreement is to add work as identified in the attached Statement of Work addendum. Contractor's proposal dated July 26, 2012 is accepted as proposed and incorporated by reference.

2. Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		[redacted] / CONTRACTS TEL: 805-982-2515 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 17-Sep-2012

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION SF 30 - BLOCK 14 CONTINUATION PAGE

The following have been added by full text:
SUMMARY OF CHANGES

In accordance with contract clause 52.243-4 “Changes (JUN 2007)”, as negotiated between the Contractor and the Government, the Contractor is hereby to provide all labor, materials, equipment, supervision, inspection, and related work necessary to perform the following additional work as provided in the Statement of Work and as outlined in the following Contractor RFI #30

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $146,735.35 from $7,312,515.22 to $7,459,250.57.

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0004 is added as follows:

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
0004 EXERCISED OPTION	POL Services FFP Contractor is to provide all labor, material and equipment necessary to perform the work as identified in the attached Statement of Work, Clean, Inspect, and Repair Storage Tanks 5 and 17 at FISC Pearl Harbor Red Hill Complex. Contractor proposal dated October 09, 2009 is accepted as proposed and incorporated by reference. Wage Determination HI0800001, HI1, dated 9/25/2009 applies and was previously supplied. FOB: Destination	[redacted]	Each	[redacted]	$146,735.35
				MAX NET AMT	$146,735.35

SUBCLIN 000401 is added as follows:

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000401	[redacted]				$0.00
				NET AMT	$0.00
	[redacted]				$146,735.35

SECTION C - DESCRIPTIONS AND SPECIFICATIONS

The following have been added by full text:
SOW ADDENDUM - MOD 12

NAVFAC ESC
SOW ADDENDUM

Contract: N62583-09-D-0132/0003
Contractor: Willbros Government Services, LLC

Clean, Inspect, and Repair Red Hill Tanks 5 & 17
NAVSUP FLC Pearl Harbor

Prepared 22 AUG 2012

All repairs shall meet all requirements and provisions set forth in the original basic award.

Additive Repair Scope. While performing the previously awarded inspection on Tank 17, a dust cloud formed and settled inside the tank. As a result, the contractor is requested to provide (reference RFI 30):
Clean Tank 17 in order to continue the previously awarded inspection.
Dust removal per OSHA and other applicable standards.
Dust removal shall be through the use of a qualified lead abatement contractor
Filtration for the rinsate to safely remove any solids.
Disposal of all rinsate and solids as a result of cleaning the tank.
All materials for disposal shall be considered hazardous waste unless test results prove otherwise.
All utilities except for water.
Upon completion the Tank shall be confirmed as safe for entry by an Industrial Hygienist or Marine Chemist.
Tank cleaning shall not detract from the current condition of the inspection mark-up inside the tank.
The Government may at its own discretion provide train assistance to a maximum of four hours on any work day. Train support shall only be provided during standard Government work hours between 8 am to 4 pm. The train support will only be available between ADIT 3 to Tank 15/16. All loading, unloading and securing material onto flat beds shall be contractor's responsibility. The contractor shall notify the government no less than three (3) days in advance of the time and location for the train support.

SECTION E - INSPECTION AND ACCEPTANCE

The following Acceptance/Inspection Schedule was added for CLIN 0004:

INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
Destination	Government	Destination	Government

The following Acceptance/Inspection Schedule was added for SUBCLIN 000401:

INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
N/A	N/A	N/A	Government

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule Item has been deleted from CLIN 0001:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-DEC-2012	7,312,515.22	N/A FOB: Destination	

The following Delivery Schedule item has been added to CLIN 0004:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 15-SEP-2012 TO 28-FEB-2013	N/A	N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $146,735.35 from $7,312,515.22 to $7,459,250.57.

SUBCLIN 000401:
Funding on SUBCLIN 000401 is initiated as follows:

[redacted]

[redacted]

Acctng Data: [redacted] [redacted]

Increase: $146,735.35

Total: $146,735.35

Cost Code: [redacted]

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	J
PAGE OF PAGES	1 of 3
2. AMENDMENT/MODIFICATION NO	13
3. EFFECTIVE DATE	19-Sep-2012
4. REQUISITION/PURCHASE REQ NO	ACQR1305421
5. PROJECT NO (If applicable)	
6. ISSUED BY CODE	N62583
7. ADMINISTERED BY (If other than item 6) CODE	

6. ISSUED BY
NAVAL FACILITIES ENG NEER NG COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ00/NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4347

7. ADMINISTERED BY: **See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
W LLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZ E JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003

X 10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14 The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified

12. ACCOUNTING AND APPROPRIATION DATA (If required)
See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

☐ A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

X B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

☐ C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

☐ D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [X] is not, ☐ is required to sign this document and return ______ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]
The purpose of this adminstrative mod is to correct the line of accounting for CLIN 004.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect

15A. NAME AND TITLE OF SIGNER (Type or print)

16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
[redacted] / CONTRACTS
TEL: 805-982-2515 EMAL: [redacted]

15B. CONTRACTOR/OFFEROR
(Signature of person authorized to sign)

15C. DATE SIGNED

16B. UNITED STATES OF AMERICA
BY [redacted]
(Signature of Contracting Officer)

16C. DATE SIGNED 19-Sep-2012

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION SF 30 - BLOCK 14 CONTINUATION PAGE

The following have been deleted:
SUMMARY OF CHANGES

SECTION B - SUPPLIES OR SERVICES AND PRICES

SUBCLIN 000401
The CLIN description has changed from ACRN AD to ACRN AH.

SUBCLIN 000402 is added as follows:

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
000402		UNDEFINED		UNDEFINED	$0.00

[redacted]

LOA as listed on funding doc:
[redacted]

FOB: Destination

MAX NET AMT	$0.00

[redacted] $146,735.35

SECTION E - INSPECTION AND ACCEPTANCE

The following Acceptance/Inspection Schedule was added for SUBCLIN 000402:

INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
N/A	N/A	N/A	Government

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

SUBCLIN 000401:

[redacted] [redacted] was decreased by $146,735.35 from $146,735.35 to $0.00

SUBCLIN 000402:
Funding on SUBCLIN 000402 is initiated as follows:

[redacted]

[redacted]

Acctng Data: [redacted] [redacted]

Increase: $146,735.35

Total: $146,735.35

Cost Code: [redacted]

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 / 7

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
14	06-Feb-2013	ACQR1305421	

6. ISSUED BY CODE N39430	7. ADMINISTERED BY (If other than item 6) CODE
NAVFAC EXWC CODE ACQ / NAVAL BASE VENTURA COUNTY 1100 23RD AVE. BLDG 1100 PORT HUENEME CA 93043-4301	**See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZIE JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

See Schedule

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52-243-4 CHANGES (JUN 2007)
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Modification Control Number: [redacted]

1. The purpose of this modification is to increase the level of effort in order to make additional repairs to Tank 5, including abrasive blast of weld seams, remove weld splatter, apply additional stripe coat within original scoped coating boundary; and, to extend the period of performance by one month, from 28 FEB 2013 to 31 MAR 2013. The work will be performed on Tank 5 located at the Redhill Complex - NAVSUP FLC Pearl Harbor, HI in accordance with the contractor's Coating Inspection Report (CIR), dated 13 NOV 2012 and the Scope of Work attached herein.

2. Acceptance of this modification by the Contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		[redacted] / CONTRACTS TEL: 805-982-2565 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		BY [redacted] (Signature of Contracting Officer)	04-Mar-2013

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION A - SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $594,540.83 from $7,459,250.57 to $8,053,791.40.
The 'issued by' organization has changed from
NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ00/NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4347
to
NAVFAC EXWC
CODE ACQ / NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4301

The 'administered by' organization has changed from
NAVAL FACILITIES ENGINEERING COMMAND
SPECIALTY CENTER ACQUISITIONS NAVFAC
CODE AQ00/NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4347
to
NAVFAC EXWC
CODE ACQ / NAVAL BASE VENTURA COUNTY
1100 23RD AVE BLDG 1100
PORT HUENEME CA 93043-4301

SECTION B - SUPPLIES OR SERVICES AND PRICES

CLIN 0001
The pricing detail quantity has increased by 594,540.83 from 7,312,515.22 to 7,907,056.05.
The total cost of this line item has increased by $594,540.83 from $7,312,515.22 to $7,907,056.05.

SUBCLIN 000106
The PROG code C20 has been added.

SUBCLIN 000107
The PROG code C20 has been added.

SUBCLIN 000401

The PROG code C20 has been added.
The NAICS code 237120 has been added.
The MDAP/MAIS Code 000 has been added.

SUBCLIN 000402
The PROG code C20 has been added.
The NAICS code 237120 has been added.
The MDAP/MAIS Code 000 has been added.

SECTION C - DESCRIPTIONS AND SPECIFICATIONS

The following have been added by full text:

SOW MOD 14

1. Tank 5:

1.1 Background

Tank 5 has been cleaned/inspected by Willbros under the subject Contract/Task Order. Prior to commencement of abrasive blasting/coating of the interior of the tank as originally scoped, Willbros submitted a coating inspection report (CIR) on 13 November 2012 that identified issues with weld quality and weld splatter around existing welds. The weld splatter could affect surface preparation for the coating application, and the weld profile requires an additional stripe coat. Recommendations for mitigating the situation were provided in the CIR.

1.2 Scope

Contractor is solicited to perform the following:

1. Abrasive blast existing coating at affected weld seams in the original scope's coating boundary to enable inspection of extent of weld spatter.
2. Inspect weld seams and quantify (approximately) linear feet requiring removal of weld spatter identified in the CIR.
3. Remove weld spatter sufficiently to meet surface preparation standards.
4. Apply one additional stripe coat to welds within original scoped coating boundary.

2. Requirements:

1. Abrasive blasting work to tank internal surfaces shall be done in accordance to original scope of work specifications unless stated otherwise in this modification.
2. All coating work shall be to original scope specifications.

3. Schedule

Currently Tank 5 is empty and out-of-service. Therefore, the work can commence as soon as the modifications to the Delivery Order are authorized by the Contracting Officer and all other Contract requirements are met.

Submittals:

1. All additional work requested in this modifications shall be addressed as either a modification or addendum to the existing Work Plan. All work shall be documented in final certification for the tank as required in the original scope of work.

2. Inspection results – Results of the inspection of 1.2.2 shall be documented and submitted to NAVFAC EXWC.
3. Contractor shall submit updated schedule on award.

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item has been added to CLIN 0001:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-MAR-2013	7,907,056.05	N/A FOB: Destination	

The following Delivery Schedule item for CLIN 0004 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 15-SEP-2012 TO 28-FEB-2013	N/A	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 15-SEP-2012 TO 31-MAR-2013	N/A	N/A FOB: Destination	

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $594,540.83 from $7,459,250.57 to $8,053,791.40.

SUBCLIN 000105:

[redacted] [redacted] was increased by $594,540.83 from $2,048,872.76 to $2,643,413.59

The following have been added by full text:

252.232-7003 ELECTRONIC SUBMISSION OF PAYMENT REQUESTS AND RECEIVING REPORTS (JUNE 2012)

(a) Definitions. As used in this clause–

(1) Contract financing payment and invoice payment have the meanings given in section 32.001 of the Federal Acquisition Regulation.

(2) Electronic form means any automated system that transmits information electronically from the initiating system to all affected systems. Facsimile, e-mail, and scanned documents are not acceptable electronic forms for submission of payment requests. However, scanned documents are acceptable when they are part of a submission of a payment request made using Wide Area WorkFlow (WAWF) or another electronic form authorized by the Contracting Officer.

(3) Payment request means any request for contract financing payment or invoice payment submitted by the Contractor under this contract.

(4) Receiving report means the data required by the clause at 252.246-7000, Material Inspection and Receiving Report.

(b) Except as provided in paragraph (c) of this clause, the Contractor shall submit payment requests and receiving reports using WAWF, in one of the following electronic formats that WAWF accepts: Electronic Data Interchange, Secure File Transfer Protocol, or World Wide Web input. Information regarding WAWF is available on the Internet at https://wawf.eb mil/.

(c) The Contractor may submit a payment request and receiving report using other than WAWF only when–

(1) The Contracting Officer administering the contract for payment has determined, in writing, that electronic submission would be unduly burdensome to the Contractor. In such cases, the Contractor shall include a copy of the Contracting Officer's determination with each request for payment;

(2) DoD makes payment for commercial transportation services provided under a Government rate tender or a contract for transportation services using a DoD-approved electronic third party payment system or other exempted vendor payment/invoicing system (e.g., PowerTrack, Transportation Financial Management System, and Cargo and Billing System);

(3) DoD makes payment for rendered health care services using the TRICARE Encounter Data System (TEDS) as the electronic format; or

(4) When the Governmentwide commercial purchase card is used as the method of payment, only submission of the receiving report in electronic form is required.

(d) The Contractor shall submit any non-electronic payment requests using the method or methods specified in Section G of the contract.

(e) In addition to the requirements of this clause, the Contractor shall meet the requirements of the appropriate payment clauses in this contract when submitting payments requests.

(End of clause)

252.232-7006 WIDE AREA WORKFLOW PAYMENT INSTRUCTIONS (JAN 2013) (DEVIATION)

(a) *Definitions.* As used in this clause—

“Department of Defense Activity Address Code (DoDAAC)” is a six position code that uniquely identifies a unit, activity, or organization.

“Document type” means the type of payment request or receiving report available for creation in Wide Area WorkFlow (WAWF).

“Local processing office (LPO)” is the office responsible for payment certification when payment certification is done external to the entitlement system.

(b) *Electronic invoicing*. The WAWF system is the method to electronically process vendor payment requests and receiving reports, as authorized by DFARS 252.232-7003, Electronic Submission of Payment Requests and Receiving Reports

(c) *WAWF access*. To access WAWF, the Contractor shall—

(1) Have a designated electronic business point of contact in the Central Contractor Registration at https://www.acquisition.gov; and

(2) Be registered to use WAWF at https://wawf.eb mil/ following the step-by-step procedures for self-registration available at this web site

(d) *WAWF training*. The Contractor should follow the training instructions of the WAWF Web-Based Training Course and use the Practice Training Site before submitting payment requests through WAWF. Both can be accessed by selecting the “Web Based Training” link on the WAWF home page at https://wawf.eb.mil/

(e) *WAWF methods of document submission.* Document submissions may be via web entry, Electronic Data Interchange, File Transfer Protocol, or PayWeb.

(1) To access PayWeb, the vendor may go to the following site: https://onronline.onr.navy.mil/payweb/

(2) For instructions on PayWeb payment request submission, please contact the office identified below:

(f) *WAWF payment instructions*. The Contractor must use the following information when submitting payment requests and receiving reports in WAWF for this contract/order:

(1) *Document type*. The Contractor shall use the following document type(s).

Navy Construction/Facilities Management Invoice

(2) *Inspection/acceptance location*. The Contractor shall select the following inspection/acceptance location(s) in WAWF, as specified by the contracting officer.

Inspection – N69218

Acceptance – N62583

(3) *Document routing*. The Contractor shall use the information in the Routing Data Table below only to fill in applicable fields in WAWF when creating payment requests and receiving reports in the system.

Routing Data Table

Field Name in WAWF	*Data to be entered in WAWF*
Pay Official DoDAAC	N68732
Issue By DoDAAC	N39430
Admin DoDAAC	N39430

Inspect By DoDAAC	N69218
Ship To Code	N69218
Ship From Code	N/A
Mark For Code	N/A
Service Approver (DoDAAC)	N62583
Service Acceptor (DoDAAC)	N62583
Accept at Other DoDAAC	N/A
LPO DoDAAC	N39430
DCAA Auditor DoDAAC	N/A
Other DoDAAC(s)	N/A

(4) *Payment request and supporting documentation.* The Contractor shall ensure a payment request includes appropriate contract line item and subline item descriptions of the work performed or supplies delivered, unit price/cost per unit, fee (if applicable), and all relevant back-up documentation, as defined in DFARS Appendix F, (*e.g*. timesheets) in support of each payment request.

(5) *WAWF email notifications*. The Contractor shall enter the e-mail address identified below in the "Send Additional Email Notifications" field of WAWF once a document is submitted in the system.

[redacted]

[redacted]

(g) *WAWF point of contact.*

(1) The Contractor may obtain clarification regarding invoicing in WAWF from the following contracting activity's WAWF point of contact.

[redacted]

(3) For technical WAWF help, contact the WAWF helpdesk at 866-618-5988.

(End of clause)

The following have been deleted:
<u>INVOICING INSTRUCTIONS</u>

(End of Summary of Changes)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE: J	PAGE OF PAGES: 1 of 2		
2. AMENDMENT/MODIFICATION NO.: 15	3. EFFECTIVE DATE: 21-Jun-2013	4. REQUISITION/PURCHASE REQ. NO.: ACQR1305421	5. PROJECT NO. (If applicable):
6. ISSUED BY CODE N39430 NAVFAC EXWC CODE ACQ / NAVAL BASE VENTURA COUNTY 1100 23RD AVE. BLDG 1100 PORT HUENEME CA 93043-4301		7. ADMINISTERED BY (If other than item 6) CODE See Item 6	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)
WILLBROS GOVERNMENT SERVICES (U.S.), LLC
ONZ E JONES
2087 E 71ST ST STE 101
TULSA OK 74136-5462

CODE 1KPK4 FACILITY CODE

	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	10A. MOD. OF CONTRACT/ORDER NO. N62583-09-D-0132-0003
X	10B. DATED (SEE ITEM 13) 13-Jan-2010

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:
(a) By completing Items 8 and 15, and returning ______ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: 52.249-10 Default (fixed priced construction)
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
Modification Control Number: [redacted]
Prepared by: [redacted]
The purpose of this modification is to extend the Period of Performance to 30 September 2014 at no additional cost to the government. All additional terms and conditions remain unchaged.

Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the w ork as herein revised.
Discrepancy

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) [redacted] / CONTRACTS TEL: 805-982-3927 EMAIL: [redacted]	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY [redacted] (Signature of Contracting Officer)	16C. DATE SIGNED 27-Jun-2013

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION F - DELIVERIES OR PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
31-MAR-2013	7,907,056.05	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
30-SEP-2014	7,907,056.05	N/A FOB: Destination	

The following Delivery Schedule item for CLIN 0004 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 15-SEP-2012 TO 31-MAR-2013	N/A	N/A FOB: Destination	

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 15-SEP-2012 TO 30-SEP-2014	N/A	N/A FOB: Destination	

(End of Summary of Changes)

Willbros Government Services ("WGS")

DAILY PRODUCTON REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE: Aug 05, 2010

CONTRACT #: WGS PROJECT #:	N 62583-09-D-0132/0003 54118	TITLE AND LOCATION: Tank 5 & 17	Redhill Complex – Pearl Harbor NAVSTA Pearl Harbor, HI	REPORT NO.:	54118
SITE MANAGER:	Reed Cavin		REPRESENTATIVE:	John Brito (NFESC – NTR)	
AM WEATHER:	Partly Cloudy / Rain	PM WEATHER: Partly Cloudy / Rain	MAX. TEMP: 85	MIN. TEMP:	72

WORK PERFORMED TODAY

Task

TK5 – Pressure washing tank internal surfaces. Some areas of paint blistering and disbanding are being removed during pressure washing.
TK 17 – Complete installation of temporary blinds and (LOTO) Lock out Tag out for upper level piping. Begin pressurizing and testing ventilation system for process degassing of TK 17. Repairing leaks found and identified.

WGS LABOR SITE SUMMARY

NAME	EMPLOYER	TRADE	TIME On Site	TIME Off Site	TOTAL HOURS
Reed Cavin	WGS	Site Manager / HSO			10
Jimmy Aka / Pat Collins / Mike Glandon	WGS	Laborer			30
Robert Chapman / Ivan M	WGS	Laborer			20
Ben Ly	WGS	Laborer / Asst HSO			10
Tim Anderson	WGS	Project Manager			10

JOB SAFETY

WAS A JOB SAFETY MEETING HELD THIS DATE? (If YES, attach copy of the meeting minutes)	X YES	NO	TOTAL WORK HOURS ON JOB SITE THIS DATE:	80
WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? (If YES, attach copy of completed OSHA report)	YES	X NO		
WAS CRANE/TRENCHING/SCAFFOLD/HV ELECTRICAL/HIGH WORK DONE? (If YES, attach statement or checklist showing inspection performed)	YES	X NO	CUMULATIVE TOTAL OF WORK HOURS FROM PREVIOUS REPORTS:	3384
WAS HAZARDOUS MATERIAL/WASTE RELEASED INTO THE ENVIRONMENT? (If YES, attach description of incident and proposed action)	YES	X NO	TOTAL WORK HOURS FROM START OF CONSTRUCTION:	3464

LIST SAFETY ACTIONS TAKEN TODAY / SAFETY INSPECTIONS CONDUCTED — Yes — SAFETY REQUIREMENTS HAVE BEEN MET.

No WGS safety issues were observed today. Proper PPE was utilized and all expected safety procedures followed. Federal Fire issued hot work permits for designated areas. WGS performed gas testing in relevant work areas.

EQUIPMENT / MATERIAL RECEIVED TODAY TO BE INCORPORATED INTO WORK

DESCRIPTION	QUANTITY	SHIPPING DOCUMENTS
Equipment & Consumables	1	On site

WGS CONSTRUCTION AND PLANT EQUIPMENT ON THE JOB SITE TODAY

DESCRIPTION	IDLE	RENTED /OWNED	QUANTITY	On Site HRS	Off Site HRS	TOTAL HOURS
Trucks / Vehicles / Golf Cart		O-3/R-2	5	10		10
Office Trailer & Conexes (2) & Hand Tools & Equipment		O	Lot	10		10
Booms & Jacking Stands		O	4	10		10
Air Compressors		R	2	10		10

SUBCONTRACTORS ONSITE TODAY

COMPANY	# OF PERSONNEL	WORK PERFORMED
Cel's Electric	2	Check equipment
Chemi Toi	1	Cleaning of portable toilet

REMARKS / UNRESOLVED ISSUES / ANY SCHEDULE IMPACTS / PROJECT DELAYS

ADIT 3 blower is down and temporary blowers are moving air towards elevator shaft. One of the upper blowers was off, air circulation was not flowing in TK 19 & 20 areas.

Reed Cavin	Tim Anderson	Aug 05, 2010
Printed Name	Signature	Date

CONTRACT ORDER NO.: N 62583-09-D-0132/0003 Tank 5 & 17	**CONTRACTOR QUALITY CONTROL REPORT** (ATTACH ADDITIONAL SHEETS)	REPORT NO.: 54118	DATE: Aug 05, 2010

PHASE	Y=YES, N=NO, SEE REMARKS; BLANK-NOT APPLICABLE		IDENTIFY DEFINABLE FEATURE OF WORK LOCATION AND LIST PERSONNEL PRESENT
PREPARATORY	THE PLANS AND SPECS HAVE BEEN REVIEWED	Y	Work Location: Tank 5 / ADIT 4 & 5 / Tank 17 Pre-Work Evaluation/Site Preparation: **TK 5** - LOTO of piping connections and tie-ins -Ventilation of Tank -Pressure washing -Moving and separating paint chips from the rinsate **TK 17** – -LOTO of piping connections and tie-ins -Begin testing ventilation system of Tank 17 -Repair leaks found and identified Personnel Present: Willbros Government Services – 8 Testex (NDT) – 0
	THE SUBMITTALS HAVE BEEN APPROVED.	Y	
	MATERIALS COMPLY WITH APPROVED SUBMITTALS.	Y	
	MATERIALS ARE STORED PROPERLY.	Y	
	PRELIMINARY WORK WAS DONE CORRECTLY.	Y	
	TESTING PLAN HAS BEEN REVIEWED.	Y	
	WORK METHOD AND SCHEDULE DISCUSSED	Y	

PHASE	Y=YES, N=NO, SEE REMARKS; BLANK-NOT APPLICABLE		Work Location & Task:	TESTING PERFORMED & WHO PERFORMED TEST
INITIAL	PRELIMINARY WORK WAS DONE CORRECTLY	Y	TK 5 - Pressure washing	- Gas Monitoring by WGS HSO
	SAMPLE HAS BEEN PREPARED / APPROVED.			
	WORKMANSHIP IS SATISFACTORY.	Y		
	TEST RESULTS ARE ACCEPTABLE.	Y		
	WORK IS IN COMPLIANCE WITH THE CONTRACT.	Y		

PHASE	Y=YES, N=NO, SEE REMARKS; BLANK-NOT APPLICABLE			TESTING PERFORMED & WHO PERFORMED TEST
FOLLOW UP	WORK COMPLIES WITH CONTRACT AS APPROVED IN INITIAL PHASE.			NONE
	NO REPAIRS OR REWORK NECESSARY			

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)	**REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)**
None were observed.	

Remarks:

Site visitors – John Brito and Robert Campbell

Areas on the tank's internal surfaces where paint or coating has blistered or disbanded is being exposed and removed during pressure washing. These chips, pieces or areas are being accumulated on the floor. The paint will be isolated, separated and put in drums for disposal.

ON BEHALF OF THE CONTRACTOR, I CERTIFY THIS REPORT IS COMPLETE AND CORRECT AND EQUIPMENT AND MATERIAL USED AND WORK PERFORMED DURING THIS REPORTING PERIOD IS IN COMPLIANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS TO THE BEST OF KNOWLEDGE EXCEPT IN THIS REPORT.

Reed Cavin	Tim Anderson	Aug 05, 2010
PRINT NAME OF SITE MANAGER	AUTHORIZED QC MANAGER AT SITE SIGNATURE	DATE

GOVERNMENT QUALITY ASSURANCE REPORT DATE

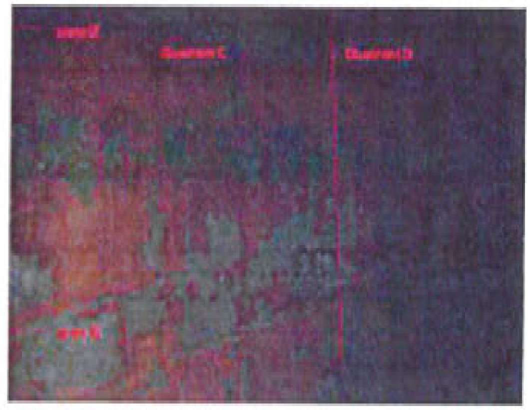
QUALITY ASSURANCE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONIS TO THE REPORT

PRINT NAME OF GOVERNMENT QA REPRESENTATIVE	GOVERNMENT QA REPRESENTATIVE	DATE

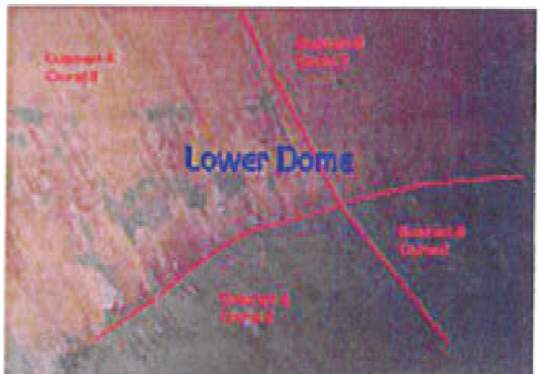
PROJECT TITLE
Clean, Inspect and Repair Fuel Tanks
Redhill Complex, Pearl Harbor HI

SITE PHOTOGRAPHS

Paint / Coating – Disbonded & blistered



Paint – Areas of deteriorated top coat removed after pressure washing.



Paint – Areas of deteriorated top coat removed after pressure washing.

Paint / Coating – Chips and pieces along the bottom after pressure washing.

Ventilation System – Area repaired where foam was installed for ducting. Metal sheeting installed and sealed for ventilation process.