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Naval Facilities Engineering Command
ENGINEERING SERVICE CENTER

Prepared for

NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING SERVICE CENTER
Port Hueneme, California

Technical Submittal for Project:

Project Title: CLEAN, INSPECT, AND REPAIR STORAGE TANKS 5 & 17
Location: PEARL NAVAL BASE – REDHILL COMPLEX, Pearl Harbor, HI
Task Order No.: N62583-09-D-0132/0003
WGS Project Number: 54118
Date: August 19, 2014

TANK 5 HYDROSTATIC TEST RESULTS FOR 18-INCH AND 32-INCH LINES

Submitted By:
Willbros Government Services, LLC
2087 E. 71st Street
Tulsa, OK 74136

Rev	Date	Description	Reviewed	Approved
A	8/19/2014	For Approval	TDA	RGG

1. WILLBROS CONCLUSIONS AND RECOMMENDATIONS

The preliminary report completed by Pipeline Petroleum Services, Inc. and issued to the Navy concluded that the both the 18-inch and 32-inch lines for Tank-5 at Red Hill passed the contract required volume correction calculations as set forth by the California State Fire Marshal's office. Pipeline Petroleum Services stated that the entire test was considered inconclusive in their opinion because each test failed the temperature – pressure evaluation and their thoughts were that there is trapped air into the system and that is why the system failed the temperature – pressure evaluation.

During Willbros review of the report prepared by Pipeline Petroleum Services, it was noted that during testing, the temperature probe in the tunnel recorded a 0.1 °F drop in temperature and the temperature probe in the tank recorded a 2.0 °F rise in temperature.

James Hagen the Project Manager for the Red Hill Tank-5 work informed us that there can easily be a 2.0 °F temperature change in the tank from the tunnel based on air movement from the ventilation system.

Based on the fact that the majority of these pipes are installed where the temperature of the tunnel would have more of an effect on the temperature – pressure evaluation than the area inside the tank, Willbros asked Pipeline Petroleum Services to re-run their calculations and re-evaluate their inconclusive opinion on the 18-inch and 32-inch lines for Tank-5 by removing the temperature recorded from the tank, in their temperature – pressure evaluation. Petroleum Pipeline Services did that and stated that their conclusions are the same as before. The 18-inch and 32-inch lines passed the volume correction calculations as set forth by the California State Fire Marshal's office but were inconclusive based on the temperature – pressure evaluation.

Willbros spoke to the management of Pipeline Petroleum Services about their conclusions and Pipeline Petroleum Services told Willbros that because of the scrutiny and liability that they would accept with passing these tests, they would not pass if there were any interpretations to be made.

Pipeline Petroleum Services recommendation was to perform a pneumatic test on the lines, to determine if their inconclusive evaluation was correct or not. Willbros was informed by the Navy that a pneumatic test would not be allowed.

Willbros then began analyzing the data supplied by Pipeline Petroleum Services, to determine if the tests were indeed inconclusive or an error was made.

Willbros performed an analysis of the data and determined the accuracy of the testing equipment to determine if the un-explained $\Delta P/\Delta T$ is within the accuracy of the testing equipment.

Based on the accuracy of the equipment used during the test and applying these accuracies to the test data, we feel that any test should be deemed acceptable if the unexplained pressure loss or gain that falls within ¼ degree.

Test ID Number: 14-332-02 had an unexplained pressure loss of (-3.2 +1.73) - 1.47 psig and is within ¼ degree ΔT accuracy of 3.57 psig.

Test ID Number 14-332-01A had an unexplained pressure loss of (-3.2 +1.63) -1.57 psig and is within ¼ degree ΔT accuracy of 5.104 psig.

Test ID Number 14-332-01B had an unexplained pressure loss of - 0.10 psig and is within ¼ degree ΔT accuracy of 5.104 psig.

Based on the fact that Pipeline Petroleum Services found that all tests passed the volume correction calculations established by the California State Fire Marshal's office and Willbros determined that all three test performed by Pipeline Petroleum Services falls within ¼ degree of the accuracy of the equipment, Willbros deems that the three tests passed and no test should be considered inconclusive.

It is Willbros recommendation that no further testing of these lines need to be conducted, until the next API 653 examination of Tank-5 is due.

Redhill Complex TK 5 Project - Pressure Test Log

Company: NAVFAC ESC		Redhill Complex - NAVSTA Pearl Harbor	Location:	Location: Project No.: 54118					Date: 2/23/2010 thru 6/4/2013 r3					
Equip. No. / Location	Test No.	Description	Test Media	Test Duration	ANSI Flg Class Rating	Design MAWP PSI	Oper Pressure PSI	Max Op MAOP PSI	PSV Set Pressure PSI	Req'd Test PSI @ 150% MAOP	Req'd Test PSI @ 110% PSV	High Test Press PSI Note (5)	Final Test Press PSI Note (1)(2)	Remarks
		Integrity Pressure Test												
TK5 - Redhill Complex	1	20" Inlet / 32" Internal Piping	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 11/06/10 Pass
TK5 - Redhill Complex	2	12" Inlet / 16" Internal Piping	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 11/02/10 Pass
TK5 - Redhill Complex	3	6" Slop Line / Drain	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/11/10 Fail
TK5 - Redhill Complex	4	Sample Line 1 - 10'	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/07/10 Fail
TK5 - Redhill Complex	5	Sample Line 2 - 75'	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/08/10 Fail
TK5 - Redhill Complex	6	Sample Line 3 - 135'	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/08/10 Fail
TK5 - Redhill Complex	7	Sample Line 4 - 190'	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/08/10 Fail
		Repair / New Piping - Pressure Test												
TK5 - Redhill Complex	8	4" Slop Line / Drain - Internal	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/19/12 Pass
TK5 - Redhill Complex	9	Sample Line 1 - 20' - Internal	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/19/12 Pass
TK5 - Redhill Complex	10	Sample Line 2 - 60' - Internal	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/22/12 Pass
TK5 - Redhill Complex	11	Sample Line 3 - 120' - Internal	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/22/12 Pass
TK5 - Redhill Complex	12	Sample Line 4 - 180' - Internal	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 10/23/12 Pass
TK5 - Redhill Complex	13	4" Slop Line / Drain - External	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 5/22/13 Pass
TK5 - Redhill Complex	14	Sample Lines & Header - External	Water	4hr	150#	Atmos (3)	0-100 (4)	100	N/A	150	N/A	N/A	150	Test 5/22/13 Pass
Checked By: Gene Humes / Doug Bayles				Approved By: T. Anderson					Date:					

Note(s) -
(1) - The final test pressure is the greater of the two (2) test requirements.
(2) - Ensure test gauge(s) are located and the pressure(s) are adjusted to compensate for any elevation static head pressure.
(3) - Atmospheric Design & Static Head Pressure
(4) - Due to Static Head
(5) - High test pressure >2000 PSI or as specified by the Test Engineer, will require special depressuring and reinspection for potential structural changes or damage.

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK 5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL	N/A
TEST PACK NUMBER TANK 5 FINAL HYDRO 4" DRAIN in CASING	DRAWING No. 54118-003-07-400s
SYSTEM NUMBER	7rC
MARK No. N/A	ISO No.
LINE No.	N/A
4" DRAIN LINE	
LINE SPECIFICATION CASING SECTION	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI
STRESS RELIEVED YES NO	INTERNAL LINING YES NO
ALL PRE- TEST NDE COMPLETE AND ACCEPTED SIGNATURE	DATE
MATERIAL RECORDS COMPLETE SIGNATURE	DATE
WELDING HISTORY RECORDS COMPLETE SIGNATURE	DATE
PRE-TEST INSPECTION FOREMAN SIGNATURE	DATE 10/19/12

WELDING OF PRESSURE PARTS COMPLETE	YES	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOUR	10/19/2012	85 F	12:23 PM	4:23 PM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

4" CASING DRAIN LINE PASSED TESTING GAUGE #: 16531 CALIBRATION: 06/07/2012

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	OCTOBER 19th, 2012	OCTOBER 19th, 2012

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	YES	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	OCTOBER 19th, 2012	OCTOBER 19th, 2012

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK 5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL	N/A
TEST PACK NUMBER. TANK 5 FINAL HYDRO EXTERNAL 4" DRAIN	DRAWING No. 54118-003-07-400s
SYSTEM NUMBER	1rC, 2rC, 3rC
MARK No.	ISO No.
LINE No.	N/A
4" DRAIN LINE	
LINE SPECIFICATION	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI
STRESS RELIEVED YES NO	INTERNAL LINING YES NO
ALL PRE- TEST NDE COMPLETE AND ACCEPTED SIGNATURE	DATE
MATERIAL RECORDS COMPLETE SIGNATURE	DATE
WELDING HISTORY RECORDS COMPLETE SIGNATURE	DATE
PRE-TEST INSPECTION FOREMAN SIGNATURE	DATE 5/22/13

WELDING OF PRESSURE PARTS COMPLETE	YES	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	5/22/13	85 F	12:01 PM	4:01 PM

COMMENTS--(TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

4" EXTERNAL DRAIN LINE PASSED TESTING GAUGE #: 8966699 CALIBRATION: 4/25/2013

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	MAY 22nd, 2013	MAY 22nd, 2013

POST HYDRO RESTORATION			
HYDRO BLOWN DOWN & DRY	YES	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	MAY 22nd, 2013	MAY 22nd, 2013

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK TK5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL - ASME B31.3	N/A
TEST PACK NUMBER. TANK 5 DRAIN PIPING	DRAWING No. NONE
SYSTEM NUMBER	
MARK No. N/A	ISO No.
LINE No.	N/A
INTEGRITY TEST 6" PIPING	N/A
LINE SPECIFICATION SLOP LINE	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI

STRESS RELIEVED ~~YES~~ NO INTERNAL LINING ~~YES~~ NO

ALL PRE- TEST NDE COMPLETE AND ACCEPTED SIGNATURE DATE

MATERIAL RECORDS COMPLETE SIGNATURE DATE

~~WELDING~~ HISTORY RECORDS COMPLETE SIGNATURE DATE

PRE-TEST INSPECTION FOREMAN SIGNATURE DATE

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	10/13/2010	73 F	8:23 AM	3:19 PM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

6" DRAIN PIPING LINE FAILED TESTING WOULDN'T MAINTAIN PRESSURE GAUGE #: 45-1279 #1 CALIBRATION:

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE	10/13/2010	10/13/2010

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE		

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK 5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL	N/A
TEST PACK NUMBER TANK 5 FINAL HYDRO CASING SAMPLE PIPING	DRAWING No. 54118-003-07-400s
SYSTEM NUMBER	7rC
MARK No. N/A	ISO No.
LINE No.	N/A
3/4" SAMPLE PIPING	N/A
LINE SPECIFICATION 20 FEET	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI

STRESS RELIEVED	YES NO	INTERNAL LINING	YES NO
ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE		DATE
MATERIAL RECORDS COMPLETE	SIGNATURE		DATE
WELDING HISTORY RECORDS COMPLETE	SIGNATURE		DATE
PRE-TEST INSPECTION	FOREMAN SIGNATURE		DATE 10/19/12
WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE				DATE
PRESSURE TEST DURATION 4 HOURS	DATE OF TEST 10/19/2012	AMBIENT TEMP. 85 F	START 7:25 AM	FINISH 11:25 AM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

3/4" SAMPLE PIPING 20' LINE PASSED TESTING GAUGE #: 16531 CALIBRATION: 6/7/2012

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	OCTOBER 19th, 2012	OCTOBER 19th, 2012

POST HYDRO RESTORATION			
HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	OCTOBER 19th, 2012	OCTOBER 19th, 2012

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT	N62583-09-D-0132/0003	LOCATION TANK 5	JOB NUMBER 54118
CONTRACTOR	WILLBROS GOVERNMENT SERVICES	P & ID No.	
SERVICE	NORMAL		N/A
TEST PACK NUMBER.	TANK 5 FINAL HYDRO CASING SAMPLE PIPING	DRAWING No.	54118-003-07-400s
SYSTEM NUMBER			7rC
MARK No	N/A	ISO No.	
LINE No.			N/A
	3/4" SAMPLE PIPING		N/A
LINE SPECIFICATION	120 FEET	TEST MEDIUM	WATER
DESIGN PRESSURE (MAWP)	100 PSI	TEST PRESSURE	150 PSI

STRESS RELIEVED	YES	NO	INTERNAL LINING	YES	NO
ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE		DATE		
MATERIAL RECORDS COMPLETE	SIGNATURE		DATE		
WELDING HISTORY RECORDS COMPLETE	SIGNATURE		DATE		
PRE-TEST INSPECTION	FOREMAN SIGNATURE		DATE	10/22/12	

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE		DATE		
PRESSURE TEST DURATION	4 HOURS	DATE OF TEST 10/22/2012	AMBIENT TEMP. 85 F	START 7:11 AM / FINISH 11:11 AM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

3/4" SAMPLE PIPING 120' LINE PASSED TESTING GAUGE #: 16531 CALIBRATION: 6/7/2012

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	OCTOBER 22nd, 2012	OCTOBER 22nd, 2012

POST HYDRO RESTORATION			
HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	OCTOBER 22nd, 2012	OCTOBER 22nd, 2012

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK 5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL	N/A
TEST PACK NUMBER. TANK 5 FINAL HYDRO CASING SAMPLE PIPING	DRAWING No. 54118-003-07-400s
SYSTEM NUMBER	7rC
MARK No. N/A	ISO No.
LINE No.	N/A
3/4" SAMPLE PIPING	N/A
LINE SPECIFICATION 60 FEET	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI

STRESS RELIEVED	YES	NO	INTERNAL LINING	YES	NO
ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE		DATE		
MATERIAL RECORDS COMPLETE	SIGNATURE		DATE		
WELDING HISTORY RECORDS COMPLETE	SIGNATURE		DATE		
PRE-TEST INSPECTION	FOREMAN SIGNATURE	Jeff Sebok	DATE	10/22/12	

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	10/22/2012	85 F	11:40 AM	3:40 PM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

3/4" SAMPLE PIPING 60' LINE PASSED TESTING GAUGE #: 16531 CALIBRATION: 6/7/2012

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	OCTOBER 22nd, 2012	OCTOBER 22nd, 2012

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	
DATE	OCTOBER 22nd, 2012	OCTOBER 22nd, 2012

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK 5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL	N/A
TEST PACK NUMBER TANK 5 FINAL HYDRO CASING SAMPLE PIPING	DRAWING No. 54118-003-07-400s
SYSTEM NUMBER	7rC
MARK No. N/A	ISO No.
LINE No.	N/A
3/4" SAMPLE PIPING	N/A
LINE SPECIFICATION 175 FEET	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI
STRESS RELIEVED YES NO	INTERNAL LINING YES NO
ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE DATE
MATERIAL RECORDS COMPLETE	SIGNATURE DATE
WELDING HISTORY RECORDS COMPLETE	SIGNATURE DATE
PRE-TEST INSPECTION FOREMAN	SIGNATURE DATE 10/23/12

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	10/23/2012	85 F	8:35 AM	12:35 PM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

3/4" SAMPLE PIPING 175' LINE PASSED TESTING GAUGE #: 16531 CALIBRATION: 6/7/2012

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	OCTOBER 23rd, 2012	OCTOBER 23rd, 2012

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	OCTOBER 23rd, 2012	OCTOBER 23rd, 2012

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK 5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No. N/A
SERVICE NORMAL	DRAWING No. 54118-003-07-400s
TEST PACK NUMBER TANK 5 FINAL HYDRO EXTERNAL SAMPLE PIPING	SYSTEM NUMBER 1rC, 2rC, 3rC
MARK No. N/A	ISO No. N/A
LINE No. 3/4" & 1" SAMPLE PIPING	N/A
LINE SPECIFICATION	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI

STRESS RELIEVED YES NO INTERNAL LINING YES NO

ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE	DATE
MATERIAL RECORDS COMPLETE	SIGNATURE	DATE
WELDING HISTORY RECORDS COMPLETE	SIGNATURE	DATE
PRE-TEST INSPECTION	FOREMAN SIGNATURE	DATE 5/22/13

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	5/22/13	85 F	7:51 AM	11:51 AM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

3/4" & 1" SAMPLE PIPING PASSED TESTING GAUGE #: 8966699 CALIBRATION: 4/25/2013

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	MAY 22ND, 2013	MAY 22ND, 2013

POST HYDRO RESTORATION			
HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS- JAMES HAGEN	WGS- JOHN SEBOK
SIGNATURE		
PRINT NAME	JAMES HAGEN	John Sebok
DATE	MAY 22ND, 2013	MAY 22ND, 2013

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK TK5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL - ASME B31.3	N/A
TEST PACK NUMBER. TANK 5 CASING SAMPLE PIPING	DRAWING No. NONE
SYSTEM NUMBER	
MARK No. N/A	ISO No.
LINE No.	N/A
INTEGRITY TEST 3/4" SAMPLE PIPING	N/A
LINE SPECIFICATION 10 FEET	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI
STRESS RELIEVED ~~YES~~ NO	INTERNAL LINING ~~YES~~ NO
ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE DATE
MATERIAL RECORDS COMPLETE	SIGNATURE DATE
~~WELDING HISTORY RECORDS COMPLETE~~	SIGNATURE DATE
PRE-TEST INSPECTION	FOREMAN SIGNATURE DATE

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	10/07/2010	72 F	8:05 AM	4:58 PM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

3/4" SAMPLE PIPING 10' LINE FAILED TESTING WOULDN'T MAINTAIN PRESSURE GAUGE #: 45-1279 #1 CALIBRATION

	Inspected by	Witnessed by
COMPANY	WGS- PAT COLLINS	WGS- REED CAVIN
SIGNATURE		
PRINT NAME		
DATE	10/07/2010	10/07/2010

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS- PAT COLLINS	WGS- REED CAVIN
SIGNATURE		
PRINT NAME		
DATE	10/07/2010	10/07/2010

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK TK5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL - ASME B31.3	N/A
TEST PACK NUMBER. TANK 5 CASING SAMPLE PIPING	DRAWING No. NONE
SYSTEM NUMBER	
MARK No. N/A	ISO No.
LINE No.	N/A
INTEGRITY TEST 3/4" SAMPLE PIPING	N/A
LINE SPECIFICATION 75FEET	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI
STRESS RELIEVED ~~YES~~ NO	INTERNAL LINING ~~YES~~ NO
ALL PRE- TEST NDE COMPLETE AND ACCEPTED SIGNATURE	DATE
MATERIAL RECORDS COMPLETE SIGNATURE	DATE
~~WELDING~~ HISTORY RECORDS COMPLETE SIGNATURE	DATE
PRE-TEST INSPECTION FOREMAN SIGNATURE	DATE

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	10/08/2010	71 F	7:58 AM	9:15 AM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

3/4" SAMPLE PIPING LINE FAILED TESTING WOULDNT MAINTAIN PRESSURE GAUGE #: 45-1279 #1 CALIBRATION

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE	10/08/2010	10/08/2010

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE		

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK TK5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL - ASME B31.3	N/A
TEST PACK NUMBER. TANK 5 CASING SAMPLE PIPING	DRAWING No. NONE
SYSTEM NUMBER	
MARK No. N/A	ISO No.
LINE No.	N/A
INTEGRITY TEST 3/4" SAMPLE PIPING	N/A
LINE SPECIFICATION 135 FEET	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI

STRESS RELIEVED ~~YES~~ NO INTERNAL LINING ~~YES~~ NO

ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE	DATE
MATERIAL RECORDS COMPLETE	SIGNATURE	DATE
~~WELDING~~ HISTORY RECORDS COMPLETE	SIGNATURE	DATE
PRE-TEST INSPECTION	FOREMAN SIGNATURE	DATE

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	10/08/2010	72 F	10:08 AM	12:05 AM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

3/4" SAMPLE PIPING LINE FAILED TESTING WOULDN'T MAINTAIN PRESSURE GAUGE #: 45-1279 #1 CALIBRATION

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE	10/08/2010	10/08/2010

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE		

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK TK5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL - ASME B31.3	N/A
TEST PACK NUMBER. TANK 5 CASING SAMPLE PIPING	DRAWING No. NONE
SYSTEM NUMBER	
MARK No. N/A	ISO No.
LINE No.	N/A
INTEGRITY TEST 3/4" SAMPLE PIPING	N/A
LINE SPECIFICATION 190 FEET	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI

STRESS RELIEVED ~~YES~~ NO INTERNAL LINING ~~YES~~ NO

ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE	DATE
MATERIAL RECORDS COMPLETE	SIGNATURE	DATE
~~WELDING~~ HISTORY RECORDS COMPLETE	SIGNATURE	DATE
PRE-TEST INSPECTION	FOREMAN SIGNATURE	DATE

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	10/08/2010	72 F	1:54 PM	4:21 PM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

3/4" SAMPLE PIPING LINE FAILED TESTING WOULDNT MAINTAIN PRESSURE GAUGE #: 45-1279 #1 CALIBRATION

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE	10/08/2010	10/08/2010

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE		

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK TK5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL - ASME B31.3	N/A
TEST PACK NUMBER. TANK 5 12"/16" INLETPIPING	DRAWING No. NONE
SYSTEM NUMBER	
MARK No. N/A	ISO No.
LINE No.	N/A
INTEGRITY TEST 12" / 16" INLET PIPING	N/A
LINE SPECIFICATION JP-8	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI

STRESS RELIEVED ~~YES~~ NO INTERNAL LINING ~~YES~~ NO

ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE	DATE
MATERIAL RECORDS COMPLETE	SIGNATURE	DATE
WELDING HISTORY RECORDS COMPLETE	SIGNATURE	DATE
PRE-TEST INSPECTION FOREMAN	SIGNATURE	DATE

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	11/02/2010	74 F	9:32 AM	3:17 PM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

PIPING PASSED TESTING GAUGE #: 45-1279 #1 CALIBRATION: 10/15/10

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE	11/02/2010	11/02/2010

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE		

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

Pressure Test Certificate

PROJECT N62583-09-D-0132/0003	LOCATION TANK TK5 JOB NUMBER 54118
CONTRACTOR WILLBROS GOVERNMENT SERVICES	P & ID No.
SERVICE NORMAL - ASME B31.3	N/A
TEST PACK NUMBER. TANK 5 20"/32" INLETPIPING	DRAWING No. NONE
SYSTEM NUMBER	
MARK No. N/A	ISO No.
LINE No.	N/A
INTEGRITY TEST 20"/32" INLET PIPING	N/A
LINE SPECIFICATION JP-8	TEST MEDIUM WATER
DESIGN PRESSURE (MAWP) 100 PSI	TEST PRESSURE 150 PSI
STRESS RELIEVED ~~YES~~ NO	INTERNAL LINING ~~YES~~ NO
ALL PRE- TEST NDE COMPLETE AND ACCEPTED	SIGNATURE DATE
MATERIAL RECORDS COMPLETE	SIGNATURE DATE
~~WELDING~~ HISTORY RECORDS COMPLETE	SIGNATURE DATE
PRE-TEST INSPECTION FOREMAN	SIGNATURE DATE

WELDING OF PRESSURE PARTS COMPLETE	N/A	SYSTEM FILLED AND PURGED OF AIR	YES
PROPER GASKETS, BOLTS AND BLINDS	YES	TEMPERATURE WITHIN SPECIFICATION	YES
TEMPORARY VENTS AND DRAINS INSPECTED	YES	HYDRO EQUIPMENT AND GAGES INSPECTED	YES
TEST PLUGS INSPECTED AND SECURED	YES	OPERATORS PROPERLY INSTRUCTED	YES
INSTUMENTATION BLOCKED OR REMOVED	YES	BARRACADES IN PLACE	YES
VALVES IN THE RIGHT POSITION (OPEN/CLOSED)	YES	AREA CLEARED OF PERSONEL	YES
TEST MEDIUM WITHIN SPECIFICATION	YES		

QUALITY CONTROL SIGNATURE DATE

PRESSURE TEST DURATION	DATE OF TEST	AMBIENT TEMP.	START	FINISH
4 HOURS	11/06/2010	74 F	8:10 AM	6:12 PM

COMMENTS (TO INCLUDE GAUGE NUMBER AND CALIBRATION DATE)

PIPING PASSED TESTING GAUGE #: 45-1279 #1 CALIBRATION: 10/15/10

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE	11/06/2010	11/06/2010

POST HYDRO RESTORATION

HYDRO BLOWN DOWN & DRY	N/A	CONTROL & CHECK VALVES INSTALLED	YES
HYDRO BLINDS PULLED	YES	HIGH POINT PLUGS SEAL WELDED & INSPECTED	N/A
PROPER GASKETS INSTALLED	YES	NDE ON PLUG SEAL WELDS COMPLETE	N/A
PROPER BOLTING & TIGHTNESS	YES	DRAIN / VENT VALVES CLOSED & PLUGGED	YES

	Inspected by	Witnessed by
COMPANY	WGS - Pat Collins	WGS - Reed Cavin
SIGNATURE		
PRINT NAME		
DATE		

Certificate of Calibration

Traceability/Job No
109320.001

Prepared For **WILLBROS GOVERNMENT SERVICES**
99-2500 HALWA VALLEY ST
AIEA, HI 96701

P.O. No: VERBAL CASEY/SALES
Data Reqd: Yes

Instrument Information

Inst Descrip: PRESSURE GAUGE
Manufacturer: ASHCROFT
Model: 45-1279SS-04L-400#
Serial No: 8966699
Cust ID No: 8966699
Accuracy: ± 0.5% F.S.
Remarks: SEE ATTACHED DATA SHEET.

Calibration Site: IN SHOP
Date Rec: 25-Apr-2013
Date of Cal: 25-Apr-2013
Next Cal Due: 25-Apr-2014
Procedure: S01491
Cal Result: PASS

As Received	As Left
IN TOLERANCE	IN TOLERANCE
OPERATIONAL	OPERATIONAL
	FULL CAL
	NOT ADJUSTED

Calibration Standards Used

ID No	Model No	Manufacturer	Description	Serial No	Cal Date	Cal Due
F436	ST-2H	HEISE	CALIBRATOR	S0055	25-Jan-2013	25-Jan-2014
F487	HQS-2	HEISE	PRESSURE MODULE	HQS-15614	05-Feb-2013	05-Feb-2014

Calibration Room Environment

Temperature: 70F/21.1C Relative Humidity: 49 % Barometric Pressure: N/A

This item meets published specifications. It has been calibrated using standards traceable to the National Institute of Standards and Technology. Alternatively, accuracies have been derived from accepted values of natural physical constants, or derived by the ratio type of self-calibration techniques. This certificate may be reproduced in full. Partial reproduction may be done only with written prior consent. All calibration activities are performed in compliance with ANSI/NCSL Z540.3-2006, ISO 10012, and MIL-STD-45662A.

FLW Service Corporation
5672 Bolsa Avenue
Huntington Beach, CA 92649
(800) 576-6308 Fax: (714) 622-2002

Issued On April 25, 2013 By:

Ygnacio Garcia, Technician

FLW Service Corporation
5672 Bolsa Avenue
Huntington Beach, CA 92649
Ph: 714-751-7512 Fax: 714-755-7332
http://www.flw.com

Job/Traceability #: 109320.001 **DATA REPORT** ID: 8966699

Date: 04/25/13

Unit of Measurement: PSI

Range: 0 to 400

UUT Accuracy: 0.5 % FS

UUT Resolution: 1 PSI

STANDARD READING PSI	*UUT AS FOUND* PSI	*ERROR* %		*UUT AS LEFT* PSI	*ERROR* %	
0	0	0.000	Pass	0	0.000	Pass
80	81	0.250	Pass	81	0.250	Pass
160	160	0.000	Pass	160	0.000	Pass
240	239	0.250	Pass	239	0.250	Pass
320	318	0.500	Pass	318	0.500	Pass
400	400	0.000	Pass	400	0.000	Pass
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Remarks: _____

Data Taken By: Ignacio Arreola

RD Technology of Hawaii
134 Nakolo Place
Honolulu, HI 96819
(808) 833-3499

Certificate of Calibration

Navy Lab Code 7RD

Willbros Government Services
Willbros Government Services
99-2500 Halawa Valley St.
Aiea HI 96701- (808) 352-0528

Ashcroft	0-300 PSI
Manufacturer	***Model***
16531	Pressure Gauge
Serial Number	***Description***
06/07/2012	112.776
Calibration Date	***Test Number***
06/07/2013	
Recalibration Due	***Asset Number***
NAVAIR 17-20MP-06	23 °C / 43 % RH
Instrument Accuracy / Procedure	***Temperature*** / ***Humidity***

RD Technology of Hawaii certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology within the limitations of the Institutes calibration services, or have been derived from accepted values of natural physical constants, or have been by the ratio type of self-calibration techniques. Our "Calibration System Requirements" is in compliance with ANSI/NCSL Z540-1 standards.

Calibration Standards Used:

Equip #	Manufacturer	Description	Model	Serial	Date Calibrated	Date Due
10,009	DH Instruments	Pressure Control Calibrator	PPC2 AF	190	04/24/2012	04/24/2013

In Tolerance	RD Technology of Hawaii / DB
Condition Received	***Certified By***
In Tolerance	
Condition Returned	

RD Technology of Hawaii
134 Nakolo Place
Honolulu, HI 96819
(808) 833-3499

Certificate of Calibration

Navy Lab Code 7RD

Willbros Government Services
Willbros Government Services
99-2500 Halawa Valley St.
Aiea HI 96701- (808) 352-0528

Ashcroft	0-300 PSI
Manufacturer	***Model***
16567	Pressure Gauge
Serial Number	***Description***
06/21/2012	112,896
Calibration Date	***Test Number***
06/21/2013	
Recalibration Due	***Asset Number***
NAVAIR 17-20MP-06	25 °C 45 % RH
Instrument Accuracy / Procedure	***Temperature*** ***Humidity***

RD Technology of Hawaii certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology within the limitations of the Institutes calibration services, or have been derived from accepted values of natural physical constants, or have been by the ratio type of self-calibration techniques. Our "Calibration System Requirements" is in compliance with ANSI/NCSL Z540-1 standards

Calibration Standards Used:

Equip #	Manufacturer	Description	Model	Serial	Date Calibrated	Date Due
10,009	DH Instruments	Pressure Control Calibrator	PPC2 AF	190	04/24/2012	04/24/2013

In Tolerance	RD Technology of Hawaii / DB
Condition Received	***Certified By***
In Tolerance	
Condition Returned	

Caltrol, Inc.
91-110 Hanua Street
Kapolei, HI 96701
Ph 808-487-7717
Fax 808-488-3343

Caltrol

Providing Solutions that People Trust

CALIBRATION CERTIFICATE

This is to certify that the following pressure instruments were checked at various pressure points for accuracy with a Keller LEO 1 Manometer SN: 14734, traceable to the National Institute of Standards and Technology, NIST and found to be within calibration specifications.

Date: October 15, 2010

Purchase order #: CC, Ann Manners

Customer: Willbros Government Services

Sale Order #: 398716

Ashcroft 45-1279SS-04L-300 0-300# PSI Gauge #2

Actual:	**Up scale reading:**	**Down scale reading:**
50 psig	49.5 psig	49.6 psig
100 psig	101.2 psig	101.2 psig
150 psig	152 psig	152 psig
200 psig	202.2 psig	202 psig
250 psig	252.2 psig	252.4 psig

Authorized Signature
Shaun Fergueson

Caltrol

Providing Solutions that People Trust

Caltrol, Inc.
91-110 Hanua Street
Kapolei, HI 96701
Ph 808-487-7717
Fax 808-488-3343

CALIBRATION CERTIFICATE

This is to certify that the following pressure instruments were checked at various pressure points for accuracy with a Keller LEO 1 Manometer SN: 14734, traceable to the National Institute of Standards and Technology, NIST and found to be within calibration specifications.

Date: October 15, 2010

Purchase order #: CC, Ann Manners

Customer: Willbros Government Services

Sale Order #: 398716

Ashcroft 45-1279SS-04L-300 0-300# PSI Gauge #1

Actual:	**Up scale reading:**	**Down scale reading:**
50 psig	50.5 psig	50.6 psig
100 psig	100.7 psig	100.2 psig
150 psig	151.2 psig	150.7 psig
200 psig	201.9 psig	202 psig
250 psig	251.9 psig	252.2 psig

Authorized Signature
Shaun Fergueson

Certificate of Calibration

Traceability Job No
108644.001

Prepared For: WILLBROS GOVERNMENT SERVICES
99-2500 HALWA VALLEY ST
AIEA, HI 96701

P.O. No: 54118-641/SALES
Data Reqd: Yes

Instrument Information

Inst Descrip: PRESSURE GAUGE
Manufacturer: ASHCROFT
Model: 45-1279SS-04L-300#
Serial No: 8966476
Cust ID No: 8966476
Accuracy: ± 0.5% F.S.
Remarks: SEE ATTACHED DATA SHEET

Calibration Site: IN SHOP
Date Rec: 15-Nov-2012
Date of Cal: 15-Nov-2012
Next Cal Due: 15-Nov-2013
Procedure: S01491
Cal Result: PASS

As Received	As Left
IN TOLERANCE	IN TOLERANCE
OPERATIONAL	OPERATIONAL
	FULL CAL
	NOT ADJUSTED

Calibration Standards Used

ID No	Model No	Manufacturer	Description	Serial No	Cal Date	Cal Due
F486	PTE-1/FM	HEISE	PRESSURE CALIBRATOR	9999	18-Jan-2012	18-Jan-2013
F447	HQS-2	HEISE	PRESSURE MODULE	HQS-29535	17-May-2012	17-May-2013

Calibration Room Environment

Temperature: 72F/22.2C Relative Humidity: 42 % Barometric Pressure: N/A

This item meets published specifications. It has been calibrated using standards traceable to the National Institute of Standards and Technology. Alternatively, accuracies have been derived from accepted values of natural physical constants, or derived by the ratio type of self-calibration techniques. This certificate may be reproduced in full. Partial reproduction may be done only with written prior consent. All calibration activities are performed in compliance with ANSI/NCSL Z540.3-2006, ISO 10012, and MIL-STD-45662A.

FLW Service Corporation
5672 Bolsa Avenue
Huntington Beach, CA 92649
(800) 576-6308 Fax: (714) 622-2002

Issued On November 15, 2012 By:

Ygnacio Garcia, Technician

FLW Service Corporation

5672 Bolsa Avenue
Huntington Beach, CA 92649
Ph: 714-751-7512 Fax: 714-755-7332
http://www.flw.com

Job/Traceability #: 108644.001 **DATA REPORT** ID: 8966476

Date: 11/15/12

Unit of Measurement: PSI

Range: 0 to 300

UUT Accuracy: 0.5 % FS

UUT Resolution: 0.1 PSI

STANDARD READING PSI	UUT AS FOUND PSI	ERROR %		UUT AS LEFT PSI	ERROR %	
0	0.0	0.000	Pass	0.0	0.000	Pass
60	60.1	0.033	Pass	60.1	0.033	Pass
120	120.0	0.000	Pass	120.0	0.000	Pass
180	180.0	0.000	Pass	180.0	0.000	Pass
240	240.0	0.000	Pass	240.0	0.000	Pass
300	300.0	0.000	Pass	300.0	0.000	Pass
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		.	.		.	.

Remarks: _____

Data Taken By: Yasmin Arcia

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	7 ADMINISTERED BY (If other than item 6)	CODE
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	N62583	See Item 6	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
WILLBROS GOVERNMENT SERVICES (U.S.), LLC [redacted] 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
	X	10B. DATED (SEE ITEM 13) 13-Jan-2010
CODE 1KPK4	FACILITY CODE	

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: brooksa12153

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)
	MARIA R. MILLER / CONTRACTS TEL: 805-982-2515 EMAIL: maria.miller@navy.mil

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)	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		UNDEFINED		UNDEFINED	$0.00

[redacted]
FOB: Destination

MAX NET AMT	$0.00
[redacted]	$2,048,872.76

SECTION C - DESCRIPTIONS AND SPECIFICATIONS

The following have been added by full text:

NEW TASKING

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 <u>ON-SITE SERVICES</u>

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. **NO FOREIGN** 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 MEETINGS

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 Ms. Maria Miller.

[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
[redacted]

7.3 CONTRACT SPECIALIST

The Contract Specialist for this contract is Andrea Brooks. 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
[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
[redacted], PW54
PHONE: (805) 982-1436, FAX: (805) 982-5388
[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
[redacted], PW54
PHONE: (805) 982-4992, FAX: (805) 982-5388
[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 SUBMITTAL SCHEDULE AND DISTRIBUTION

All reports, documents, and drawings shall be delivered according to the list provided in Attachment #1.

10.0 PERIOD OF PERFORMANCE

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
[redacted], PW54
PHONE: (805) 982-4992, FAX: (805) 982-5388
[redacted]

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]

Increase: $2,048,872.76

Total: $2,048,872.76

Cost Code: [redacted]

The following have been added by full text:

[redacted]

(End of Summary of Changes)

VISUAL INSPECTION & TESTING (VT) LEVEL II CERTIFICATION

THIS IS TO CERTIFY THAT:

Justin Kotry

HAS SUCCESSFULLY COMPLETED

Visual Inspection & Testing
(VT) Level II Technician / Competent Person

THE CANDIDATE HAS SUCCESSFULLY COMPLETED ALL OF THE REQUIREMENTS FOR API650/653 & ASNT SNT-TC-1A TRAINING.

WILLBROS

Corporate ASNT Lvl III
Willbros Government Services, LLC

2/29/2012
Date

PENETRANT TESTING (PT)
LEVEL II CERTIFICATION

THIS IS TO CERTIFY THAT:

Justin Kotry

HAS SUCCESSFULLY COMPLETED

Liquid Color Contrast Dye Penetrant Testing (PT) Level II Technician / Competent Person

THE CANDIDATE HAS SUCCESSFULLY COMPLETED ALL OF THE REQUIREMENTS FOR API 650/653 & ASNT SNT-TC-1A TRAINING.

WILLBROS

Corporate ASNT LvL III
Willbros Government Services, LLC

2/29/2012
Date

VISUAL INSPECTION & TESTING (VT) LEVEL II CERTIFICATION

THIS IS TO CERTIFY THAT:

Donald Clark

HAS SUCCESSFULLY COMPLETED

Visual Inspection & Testing
(VT) Level II Technician / Competent Person

THE CANDIDATE HAS SUCCESSFULLY COMPLETED ALL OF THE REQUIREMENTS FOR API650/653 & ASNT SNT-TC-1A TRAINING.

WILLBROS

Corporate ASNT Lvl III
Willbros Government Services, LLC

9/30/2011
Date

PENETRANT TESTING (PT)
LEVEL II CERTIFICATION

THIS IS TO CERTIFY THAT:

Donald Clark

HAS SUCCESSFULLY COMPLETED

Liquid Color Contrast Dye Penetrant Testing
(PT) Level II Technician / Competent Person

THE CANDIDATE HAS SUCCESSFULLY COMPLETED ALL OF THE REQUIREMENTS FOR API650/653 & ASNT SNT-TC-1A TRAINING.

WILLBROS

Corporate ASNT Lvl III
Willbros Government Services, LLC

9/30/2011
Date

PENETRANT TESTING (PT)
LEVEL II CERTIFICATION

THIS IS TO CERTIFY THAT:

Robert Chapman

HAS SUCCESSFULLY COMPLETED

Liquid Color Contrast Dye Penetrant Testing (PT) Level II Technician / Competent Person

THE CANDIDATE HAS SUCCESSFULLY COMPLETED ALL OF THE REQUIREMENTS FOR API650/653 & ASNT SNT-TC-1A TRAINING.

WILLBROS

Corporate ASNT Lvl III
Willbros Government Services, LLC

11/30/2010
Date

VISUAL INSPECTION & TESTING (VT) LEVEL II CERTIFICATION

THIS IS TO CERTIFY THAT:

Robert Chapman

HAS SUCCESSFULLY COMPLETED

Visual Inspection & Testing (VT) Level II Technician / Competent Person

THE CANDIDATE HAS SUCCESSFULLY COMPLETED ALL OF THE REQUIREMENTS FOR API 650/653 & ASNT SNT-TC-1A TRAINING.

WILLBROS

Corporate ASNT Lvl III
Willbros Government Services, LLC

10/29/2010
Date

WILLBROS GOVERNMENT SERVICES (U.S.), LLC

A WILLBROS COMPANY

APPENDIX B

PROJECT CHECKLIST
Tank Inspection Checklist
Section B-2

Rev	Date	Description	Reviewed	Approved
A	6/02/2011	Preliminary - For Approval	DB	TDA
B				
0				
1				
2				
3				

Willbros Government Services, LLC - Tank Inspection Checklist
Redhill Complex - TK 5 Pearl Harbor Naval Station, Oahu HI

	Tank Out-of-service Inspection Checklist		
	Item	**Completed X**	**Comments**
C.2.1	**Overview**		
a)	Check that tank has been cleaned, is gas free, and safe for entry.	X	
b)	Check that the tank is completely isolated from product lines, all electrical power, and steam lines.	X	
c)	Check that roof is adequately supported, including fixed roof structure and floating roof legs.	X	
d)	Check for presence of falling object hazards, such as corroded-through roof rafters, asphalt stalactites, and trapped hydrocarbons in unopened or plugged equipment or appurtenances, ledges, etc.	X	
e)	Inspect for slipping hazards on the bottom and roof decks.	X	
f)	Inspect structural welds on accessways and clips.	X	
g)	Check surfaces needing inspection for a heavy-scale buildup and check weld seams and oily surfaces where welding is to be done. Note areas needing more cleaning, including blasting.	X	
h)	Review cathodic protection potential readings.	NA	NA=Not applicable/accessible
C.2.2.	**Tank Exterior**	NA	NA=Not applicable/accessible
a)	Inspect appurtenances opened during cleaning such as lower floating swing sheave assemblies, nozzle interiors (after removal of valves).	NA	
b)	Hammer test or ultrasonically test he roof.	NA	
c)	Enter and inspect he floating roof pontoon compartments.	NA	
C.2.3.	**Bottom Interior Surface**		
a)	Using a flashlight held close to and parallel to the bottom plates, and using the bottom plate layout as a guide, visually inspect and hammer test the entire bottom.	X	See inspection report
b)	Measure the depth of pitting and describe the pitting appearance (sharp edged, lake type, dense, scattered, etc)	X	See inspection report
c)	Mark areas requiring patching or further inspection.	X	See inspection report
d)	Mark locations for turning coupons for inspection.	NA	
e)	Inspect all welds for corrosion and leaks, particularly he shell-to-bottom weld.	X	See inspection report
f)	Inspect sketch plates for corrosion.	X	See inspection report
g)	Check condition of internal sump, if applicable. Standing liquid should be removed from he sump to allow for complete inspection and vacuum testing of weld seams as appropriate. Sump bottom and sidewall plate and seams need to be evaluated for both product-side and soil-side corrosion.	NA	
h)	Locate and mark voids under the bottom.	X	See inspection report
i)	Record bottom data on a layout sketch using the existing bottom plates as a grid. List he number and sizes of patches required.	X	See inspection report
j)	Vacuum test the bottom lap welds.	NA	
k)	Hammer test or ultrasonically examine any slightly discolored spots or damp areas.	X	
l)	Check for reinforcing pads under all bottom attached clips, brackets, and supports.	X	
m)	Inspect floating roof leg pads for pitting or cutting, and excessive dimpling (indicating excessive loading).	NA	
n)	Check the column bases of fixed roof supports for adequate pads and restraining clips.	X	
o)	In earthquake Zones 3 and 4, check that roof supports are not welded down to the tank bottom, but are only restrained from horizontal movement.	X	
p)	Check area beneath swing line cable for indications of cable cutting or dragging.	NA	
q)	Mark old oil and air test connection for removal and patching.	NA	
r)	Identify and report low areas on the bottom that do not drain adequately.	X	
s)	Inspect coating for holes, disbonding, deterioration, and discoloration.	X	
C.2.4.	**Shell Seams and Plate**		
a)	On cone up bottoms, closely inspect and gauge the depth of metal loss on the lower 2 in. to 4 in. of the shell (area of standing water).	NA	
b)	Measure the depth of pitting on each course.	X	See inspection report

	Tank Out-of-service Inspection Checklist		
	Item	Completed X	Comments
c)	Inspect and es imate the amount of metal loss on the heads of rivets and bolts.	NA	NA=Not applicable/accessible
d)	Inspect shell-to-bottom riveted lap joints.	NA	NA=Not applicable/accessible
e)	Inspect for vertical grooving damage from seal assembly protrusions.	NA	NA=Not applicable/accessible
f)	Inspect existing protective coa ings for damage, deterioration, and disbonding.	X	See inspection report
g)	Check for areas of rubbing (indicating too much pressure by the seal assembly shoes or inadequate annular space).	NA	
h)	Visually inspect the shell plates and seams for indications of leakage.	X	See inspection report
i)	If the shell has riveted or bolted seams, record the leak locations by film or chart in case he locations are lost during surface preparation for painting.	NA	
j)	Measure annular space at 40-ft intervals.	NA	
k)	Survey the shell to check for roundness and plumb.	X	
C.2.5	**Shell-mounted Overflows**	NA	NA=Not applicable/accessible
a)	Inspect overflow for corrosion and adequate screening.	NA	
b)	Check location of overflow that it is not above any tank valves or equipment.	NA	
C.2.6	**Roof Interior Surface**		
C.2.6.1	**General**	NA	NA=Not applicable/accessible
a)	Visually inspect the underside surface of the roof plates for holes, scale buildup, and pitting.	NA	
b)	Hammer test or ultrasonically examine to check for thin areas, particularly in the vapor space of floating roofs and at edge of roof on cone roof tank.	NA	
c)	Check all clips, brackets, braces, etc., welded to he roof deck plate for welded reinforcing pads and see that they have not broken free.	NA	
d)	If no pad is present, penetrant test for cracking of he weld or deck plate.	NA	
e)	Inspect for protective coating for breaks, disbondment, and deterioration.	NA	
f)	Spark test the interior surface coating if recoating is not planned.	NA	
C.2.6.2	**C.2.6.2 Fixed Roof Support Structure**	NA	
a)	Inspect the support columns for thinning in the upper 2 ft.	NA	
b)	On API columns (two channels welded together) check for corrosion scale breaking the tack welds, unless the joint between he channels is completely seal welded.	NA	
c)	Check that the reinforcing pad on the bottom is seal-welded to the tank bottom wi h horizontal movement restraining clips welded to the pad.	NA	
d)	Determine if pipe column supports are concrete filled or open pipe. If open pipe, check for a drain opening in the bottom of the pipe.	NA	
e)	Inspect and gauge rafters for thinning, particularly near the center of the roof. Report metal loss.	NA	
f)	Check for loose or twisted rafters.	NA	
g)	Inspect girders for thinning and check that they are attached securely to the top of the columns.	NA	
h)	Report if the columns have cross bracing in the area between the low pump out of the top of the shell (for future internal floating roof installation).	NA	
i)	Inspect and report presence of any roof-mounted swing line bumpers.	NA	
j)	Photograph the roof structure if no rafter layout drawing exists.	NA	
C.2.7	**Fixed Roof Appurtenances**	NA	NA=Not applicable/accessible
C.2.7.1	**Inspection and Light Hatches**	NA	
a)	Inspect the hatches for corrosion, paint and coating failures, holes, and cover sealing.	NA	
b)	On loose covers, check for a safety chain in good condition.	NA	
c)	On light hatches over 30 in. across, check for safety rods.	NA	
d)	Inspect the condition of the gaskets on bold or latched down hatch covers.	NA	
C.2.7.2	**Staging Support Connection**	NA	
	Inspect the condition of the staging support for corrosion.	NA	
C.2.7.3	**Breathers and Vents**	NA	
a)	Inspect and service the breather.	NA	
b)	Inspect screens on vents and breathers.	NA	
C.2.7.4	**Emergency P/V Hatches**	NA	

Willbros Government Services, LLC - Tank Inspection Checklist
Redhill Complex - TK 5 Pearl Harbor Naval Station, Oahu HI

	Tank Out-of-service Inspection Checklist		
	Item	**Completed X**	**Comments**
a)	Inspect and service pressure/vacuum hatches. (Setting should be high enough to prevent chattering of breather during normal operation. See breather manufacturer's guide.)	NA	
b)	Inspect liquid seal hatches for corrosion and proper liquid level in the seal.	NA	
C.2.7.5	**Sample Hatch**	NA	
a)	Inspect sample hatch for corrosion.	NA	
b)	Check that the cover operates properly.	NA	
c)	If the tank has no gauge well, check for a hold-off distance marker and check measurement.	NA	
C.2.8	**Floating Roof**	NA	NA=Not applicable/accessible
C.2.8.1	**Roof Deck**	NA	
a)	Hammer test the area between roof rim and shell. (If access for hammer testing is inadequate, measure the distance from he bottom edge of he roof to the corroded area and then hammer test from inside the pontoon.)	NA	
b)	In sour water service, clean and test all deck plate weld seams for cracking unless the lower laps have been seal-welded.	NA	
c)	Check that either the roof drain is open or the drain plug in the roof is open in case of unexpected rain.	NA	
d)	On flat bottomed and cone bottom roof decks, check for a vapor dam around the periphery of the roof. The dam should be continuous without break to prevent escape of vapors to the seal area from under the center of he roof.	NA	
C.2.8.2	**Floating Roof Pontoons**	NA	
a)	Visually inspect each pontoon for liquid leakage.	NA	
b)	Run a light wire through the gooseneck vents on locked down inspection hatch covers to make sure they are open.	NA	
c)	Inspect lockdown latches on each cover.	NA	
d)	Check and report if each pontoon is:	NA	
1)	vapor tight (bulkhead seal welded on one side on bottom, sides, and top),	NA	
2)	liquid tight (seal-welded on bottom and sides only), or	NA	
3)	unacceptable (minimum acceptable condition is liquid tight).	NA	
C.2.8.3	**Floating Roof Cutouts**	NA	
a)	Inspect underside of cutouts for mechanical damage.	NA	
b)	Inspect welds for cracks.	NA	
c)	Inspect plate for thinning, pitting, and erosion.	NA	
d)	Measure mixer cutouts and record plate thickness for future mixer installation or replacement. Plate thickness _____ .	NA	
C.2.8.4	**Floating Roof Supports**	NA	
a)	Inspect fixed low and removable high floating roof legs for thinning.	NA	
b)	Inspect for notching at bottom of legs for drainage.	NA	
c)	Inspect for leg buckling or felling at bottom.	NA	
d)	Inspect pin hole in roof guide for tears.	NA	
e)	Check plumb of all legs.	NA	
f)	Inspect for adequate reinforcing gussets on all legs through a single portion of the roof.	NA	
g)	Inspect the area around the roof legs for cracking if there is no internal reinforcing pad or if the topside pad is not welded to the deck plate on the underside.	NA	
h)	Inspect the sealing system on the two-position legs and the vapor plugs in the fixed low leg for deterioration of he gaskets.	NA	
i)	On shell-mounted roof supports, check for adequate clearance based on he maximum floating roof movement as determined by the posi ion of the roof relative to he gauge well and/or counter-rotational device.	NA	
C.2.9	**Floating Roof Seal Assemblies**	NA	
C.2.9.1	**Primary Shoe Assembly**	NA	
a)	Remove four sections of foam log (foam-filled seals) for inspection on 90° locations.	NA	

	Tank Out-of-service Inspection Checklist		
	Item	Completed X	Comments
b)	Inspect hanger attachment to roof rim for thinning, bending, broken welds, and wear of pin holes.	NA	
c)	Inspect clips welded to roof rim for thinning.	NA	
d)	Shoes—inspect for hinning and holes in shoes.	NA	
e)	Inspect for bit-metal bolts, clips, and attachments.	NA	
f)	Seal fabric—inspect for deterioration, stiffening, holes, and tears in fabric.	NA	
g)	Measure length of fabric from top of shoe to roof rim, and check against maximum anticipated annular space as roof operates.	NA	
h)	Inspect any modification of shoes over shell nozzles, mixers, etc., for clearance.	NA	
i)	Inspect shoes for damage caused by striking shell nozzles, mixers, etc.	NA	
C.2.9.2	**Primary Toroidal Assembly**	NA	
a)	Inspect seal fabric for wear, deterioration, holes, and tears.	NA	
b)	Inspect hold-down system for buckling or bending.	NA	
c)	Inspect foam for liquid absorption and deterioration.	NA	
C.2.9.3	**Rim-mounted Secondaries**	NA	
a)	Inspect the rim-mounted bolting bar for corrosion and broken welds.	NA	
b)	Measure and chart seal-to-shell gaps.	NA	
c)	Visually inspect seam from below, looking for holes as evidenced by light.	NA	
d)	Inspect fabric for deterioration and stiffness.	NA	
e)	Inspect for mechanical damage, corrosion, and wear on tip in contact with shell.	NA	
f)	Inspect for contact with obstructions above top of shell.	NA	
C.2.10	**Floating Roof Appurtenances**	NA	
C.2.10.1	**Roof Manways**	NA	
a)	Inspect walls of manways for pit ing and thinning.	NA	
b)	On tanks with interface autogauges, check seal around gauge tape cable and guide wires through manway cover.	NA	
c)	Inspect cover gasket and bolts.	NA	
C.2.10.2	**Rim Vent**	NA	
a)	Check rim vent for pitting and holes.	NA	
b)	Check vent for condi ion of screen.	NA	
c)	On floating roof tanks where the environmental rules require closing off the vent, check he vent pipe for corrosion at the pipe-to-rim joint and check that the blinding is adequate.	NA	
C.2.10.3	**Vacuum Breaker, Breather Type**	NA	
a)	Service and check operation of breather valve.	NA	
b)	Check that nozzle pipe projects no more than 1/2 in. below roof deck.	NA	
C.2.10.4	**Vacuum Breaker, Mechanical Type**	NA	
	Inspect the stem for thinning. Measure how far the vacuum breaker cover is raised off he pipe when he roof is resting on high or low legs.	NA	
a)	On high legs: _____ .	NA	
b)	On low legs: _____ .	NA	
C.2.10.5	**Roof Drains: Open Systems, Including Emergency Drains**	NA	NA=Not applicable/accessible
a)	Check liquid level inside open roof drains for adequate freeboard. Report if there is insufficient distance between liquid level and top of drain.	NA	
b)	If tank comes under Air Quality Monitoring District rules, inspect the roof drain vapor plug.	NA	
c)	If emergency drain is not at the center of the roof, check that there are at least hree emergency drains.	NA	
C.2.10.6	**Closed Drain Systems: Drain Basins**	NA	NA=Not applicable/accessible
a)	Inspect for hinning and pitting.	NA	
b)	Inspect protective coating (topside).	NA	
c)	Inspect basin cover or screen for corrosion.	NA	
d)	Test operation of check valve.	NA	

	Tank Out-of-service Inspection Checklist		
	Item	**Completed X**	**Comments**
e)	Check for presence of check valve where bottom of basin is below product level.	NA	
f)	Inspect drain basin(s) to roof deck welds for cracking.	NA	
g)	Check drain basin(s) outlet pipe for adequate reinforcement to roof deck (including reinforcing pad).	NA	
C.2.10.7	**Closed Drain Systems: Fixed Drain Line on Tank Bottom**		
a)	Hammer test fixed drain line on tank bottom for thinning and scale/debris plugging.	X	
b)	Inspect supports and reinforcing pads for weld failures and corrosion.	X	
c)	Check that pipe is guided, not rigidly locked to support, to avoid tearing of tank bottom plate.	X	
C.2.10.8	**Closed Drain Systems: Flexible Pipe Drain**	NA	NA=Not applicable/accessible
a)	Inspect for damage to exterior of pipe.	NA	
b)	Check for obstructions that pipe could catch on.	NA	
c)	Inspect shields to protect pipe from snagging.	NA	
d)	Inspect results of hydrostatic test on flexible roof drain system.	NA	
C.2.10.9	**Closed Drain Systems: Articulated Joint Drain**	NA	NA=Not applicable/accessible
a)	Hammer test rigid pipe in flexible joint systems for thinning and scale/debris plugging.	NA	
b)	Inspect system for signs of bending or strain.	NA	
c)	Inspect results of system hydrostatic test.	NA	
d)	Inspect landing leg and pad.	NA	
C.2.10.10	**Autogauge System and Alarms**	NA	NA=Not applicable/accessible
a)	Check freedom of movement of tape through autogauge tape guide.	NA	
b)	Inspect sheaves for freedom of movement.	NA	
c)	Test operation checker.	NA	
d)	Inspect tape and tape cable for twisting and fraying.	NA	
e)	Test the tape's freedom of movement through guide sheaves and tape guide pipe.	NA	
f)	On open-top tanks, check that gate tapes with cables have no more than one foot of tape exposed with float at lowest point.	NA	
g)	Check float for leakage.	NA	
h)	Test float guide wire anchors for spring action by pulling on wire and releasing.	NA	
i)	Inspect floatwells in floating roofs for thinning and pitting of walls just above the liquid level.	NA	
j)	Check that the autogauge tape is firmly attached to the float.	NA	
k)	Inspect the tape cable and float guide wire fabric seals through the float well cover.	NA	
l)	Inspect the bottom guide wire attachment clip: inspect for a temporary weighted bar instead of a permanent welded down clip.	NA	
m)	Inspect board-type autogauge indicators for legibility and freedom of movement of indicator.	NA	
n)	Measure and record these distances to determine if seal damage will occur if tank is run over from:	NA	
1)	Shell top angle to underside of tape guide system.	NA	
2)	Liquid level on floating top to top of secondary seal.	NA	
o)	Identify floating roofs where the tape is connected directly to the roof.	NA	
p)	Overfill alarm: Inspect tank overfill prevention alarm switches for proper operation.	NA	
C.2.11	**Common Tank Appurtenances**		
C.2.11.1	**Gauge Well**	NA	NA=Not applicable/accessible
a)	Inspect gate well pipe for thinning at about two-thirds distance above the bottom: look for thinning at the edge of the slots.	NA	
b)	Check for corrosion on the pipe joint. Check that sample cords, weights, thermometers, etc., have been removed from the pipe.	NA	
c)	Check for cone at bottom end of pipe about one foot above he bottom.	NA	

	Tank Out-of-service Inspection Checklist		
	Item	Completed X	Comments
d)	Check condition of well washer pipe and that its flared end is directed at the near side of the hold off pad.	NA	
e)	Check that supports for gauge well are welded to pad or to shell and not directly to bottom plate.	NA	
f)	Check operation of gauge well cover.	NA	
g)	Check presence of a hold-off distance marker in well pipe and record hold-off distance. Hold-off distance _____ .	NA	
h)	Identify and report size and pipe schedule, and whether pipe is solid or slotted. Report slot size.	NA	
i)	Check that the hold-off distance plate is seal-welded to he bottom and hat any gauge well supports are welded to the plate and not directly to the bottom.	NA	
j)	Inspect vapor control float and cable.	NA	
k)	Check for presence and condition of gauge well washer.	NA	
l)	Check for bull plug or plate blind on gauge well washer valve.	NA	
m)	Inspect gauge well guide in floating roof for pitting and thinning.	NA	
n)	Inspect the guide rollers and sliding plates for freedom of movement.	NA	
o)	Inspect condition of gauge well pipe seal system.	NA	
p)	On black oil and diesel services: if gauge well is also used for sampling, check for presence of a thief- and gauge-type hatch to avoid spillage.	NA	
q)	Visually inspect inside of pipe for pipe weld protrusions which could catch or damage vapor control float.	NA	
C.2.11.2	**Sampling Systems: Roof Sample Hatches**	NA	NA=Not applicable/accessible
a)	Inspect roof-mounted sample hatches for reinforcing pads and cracking.	NA	
b)	Inspect cover for operation.	NA	
c)	For tanks complying with Air Quality Monitoring District rules, inspect sample hatch covers for adequate sealing.	NA	
d)	Check horizontal alignment of internal floating roof sample hatches under fixed roof hatches.	NA	
e)	Inspect the sealing system on the internal floating roof sample hatch cover.	NA	
f)	Inspect floating roof sample hatch cover recoil reel and rope.	NA	
C.2.11.3	**Shell Nozzles**		
a)	Inspect shell nozzles for thinning and pitting.	X	See inspection report
b)	Inspect hot tap nozzles for trimming of holes.	X	See inspection report
c)	Identify type of shell nozzles.	X	See inspection report
d)	Identify and describe internal piping, including elbow-up and elbow-down types.	X	See inspection report
C.2.11.4	**For Nozzles Extended Into the Tank**		
a)	Inspect pipe support pads welded to tank bottom.	X	See inspection report
b)	Inspect to see that pipe is free to move along support without strain or tearing action on bottom plate.	X	See inspection report
c)	Inspect nozzle valves for packing leaks and damaged flange faces.	X	See inspection report
d)	Inspect heater stream nozzle flanges and valves for wire cutting.	X	See inspection report
e)	Report which nozzles have thermal pressure relief bosses and valves.	X	See inspection report
f)	In internal elbow-down fill line nozzles, inspect the wear plate on the tank bottom.	X	See inspection report
g)	On elbow-up fill lines in floating roof tanks, check that opening is directed against underside of roof, not against vapor space. Inspect impact are for erosion.	X	See inspection report
C.2.11.5	**Diffusers and Air Rolling Systems**	NA	NA=Not applicable/accessible
a)	Inspect diffuser pipe for erosion and thinning.	NA	
b)	Check holes in diffuser for excessive wear and enlargement.	NA	
c)	Inspect diffuser supports for damage and corrosion.	NA	
d)	Check that diffuser supports restrain, not anchor, longitudinal line movement.	NA	
e)	Inspect air spiders on bottom of lube oil tanks for plugging and damaged or broken hreaded joints.	NA	
C.2.11.6	**Swing Lines**	NA	NA=Not applicable/accessible

	Tank Out-of-service Inspection Checklist		
	Item	Completed X	Comments
a)	Inspect flexible joint for cracks and leaks.	NA	
b)	Scribe the flexible joint across the two moving faces and raise end of swing line to check the joint's freedom of movement, indicated by separa ion of scribe marks.	NA	
c)	Check that flexible joints over 6 in. are supported.	NA	
d)	Inspect the swing pipe for deep pitting and weld corrosion.	NA	
e)	Loosen the vent plugs in the pontoons and listen for a vacuum. Lack of a vacuum indicates a leaking pontoon.	NA	
f)	Check the results of air test on pontoons during repairs.	NA	
g)	Inspect the pontoons for pitting.	NA	
h)	Inspect the pull-down cable connections to the swing.	NA	
i)	Inspect the condition of the bottom-mounted support, fixed roof limiting bumper, or shell-mounted limiting bumper for wood condition, weld and bolt corrosion, and seal welding to bottom or shell.	NA	
j)	Inspect safety hold-down chain for corrosion and weak links.	NA	
k)	Check that there is a welded reinforcing pad where the chain connects to the bottom.	NA	
l)	If the floa ing swing in a floating or internal floating roof tank does not have a limiting device preventing the swing from exceeding 60 degrees, measure and calculate the maximum angle possible with the roof on overflow. Max. angle on overflow _____ . (If the calculated angle exceeds 65 degrees, recommended installation of a limiting bracket.)	NA	
m)	Inspect pull-down cable for fraying.	NA	
n)	Inspect for hree cable clamps where cable attaches to end of swing line (single-reeved) or to roof assembly (double-reeved). Inspect sheaves for freedom of move-ment.	NA	
o)	Inspect winch opera ion and check the height indicator for legibility and accuracy.	NA	
p)	Inspect bottom-mounted sheave assembly at end of pontoon for freedom of rotation of sheave.	NA	
q)	Inspect shell-mounted lower sheave assembly for freedom of rotation of sheave, corrosion thinning, and pitting of sheave housing.	NA	
r)	Inspect upper sheave assembly for freedom of movement of sheave.	NA	
s)	Inspect the cable counterbalance assembly for corrosion and freedom of operation.	NA	
C.2.11.7	**Manway Heater Racks**	NA	NA=Not applicable/accessible
a)	Inspect the manway heater racks for broken welds and bending of the sliding rails.	NA	
b)	Measure and record the length of the heater and length of the track.	NA	
C.2.11.8	**Mixer Wear Plates and Deflector Stands**	NA	NA=Not applicable/accessible
a)	Inspect bottom and shell plates and deflector stands.	NA	
b)	Inspect for erosion and corrosion on the wear plates. Inspect for rigidity, structural soundness, corrosion, and erosion of deck plates and reinforcing pads that are seal-welded to the bottom under the deflector stand legs.	NA	
c)	Measure for propeller clearance between the bottom of deflector stand and roof when he roof is on low legs.	NA	
C.2.12	**Access Structures**		
C.2.12.1	**Handrails**	X	See inspection report
a)	Identify and report type (steel pipe, galvanized pipe, square tube, angle) and size of handrails.	X	
b)	Inspect for pitting and holes, paint failure.	X	
c)	Inspect attachment welds.	X	
d)	Identify cold joints and sharp edges. Inspect the handrails and midrails.	X	
e)	Inspect safety drop bar (or safety chain) for corrosion, func ioning, and leng h.	X	
f)	Inspect the handrail between the rolling ladder and the gaging platform for a hazard-ous opening when the floating roof is at its lowest level.	X	
C.2.12.2	**Platform Frame**	X	See inspection report
a)	Inspect frame for corrosion and paint failure.	X	

Willbros Government Services, LLC - Tank Inspection Checklist
Redhill Complex - TK 5 Pearl Harbor Naval Station, Oahu HI

	Tank Out-of-service Inspection Checklist		
	Item	**Completed** X	**Comments**
b)	Inspect the attachment of frame to supports and supports to tank for corrosion and weld failure.	X	
c)	Check reinforcing pads where supports are attached to shell or roof.	X	
d)	Inspect the surface that deck plate or grating rests on, for thinning and holes.	X	
e)	Check that flat-surface-to-flat-surface junctures are seal-welded.	X	
C.2.12.3	**Deck Plate and Grating**	X	See inspection report
a)	Inspect deck plate for corrosion-caused hinning or holes (not drain holes) and paint failure.	X	
b)	Inspect plate-to-frame weld for rust scale buildup.	X	
c)	Inspect gra ing for corrosion-caused thinning of bars and failure of welds.	X	
d)	Check grating tie down clips. Where grating has been retrofitted to replace plate,	X	
	measure the rise of the step below and above the grating surface and compare with other risers on the stairway.	X	
C.2.12.4	**Stairway Stringers**	NA	NA=Not applicable/accessible
a)	Inspect spiral stairway stringers for corrosion, paint failure, and weld failure. Inspect attachment of stairway treads to stringer.	NA	
b)	Inspect stairway supports to shell welds and reinforcing pads.	NA	
c)	Inspect steel support attachment to concrete base for corrosion.	NA	
C.2.12.5	**Rolling Ladder**	NA	NA=Not applicable/accessible
a)	Inspect rolling ladder stringers for corrosion.	NA	
b)	Identify and inspect ladder fixed rungs (square bar, round bar, angles) for weld attachment to stringers and corrosion, particularly where angle rungs are welded to stringers.	NA	
c)	Check for wear and corrosion where rolling ladder attaches to gaging platform.	NA	
d)	Inspect pivot bar for wear and secureness.	NA	
e)	Inspect operation of self-leveling stairway treads.	NA	
f)	Inspect for corrosion and wear on moving parts.	NA	
g)	Inspect rolling ladder wheels for freedom of movement, flat spots, and wear on axle.	NA	
h)	Inspect alignment of rolling ladder with roof rack.	NA	
i)	Inspect top surface of rolling ladder track for wear by wheels to assure at least 18 in. of unworn track (track long enough).	NA	
j)	Inspect rolling ladder track welds for corrosion.	NA	
k)	Inspect track supports on roof for reinforcing pads seal-welded to deck plate.	NA	
l)	Check by dimensioning, the maximum angle of the rolling ladder when the roof is on low legs.	NA	
m)	If rolling ladder track extends to within 5 ft of the edge of the roof on the far side, check for a handrail on the top of the shell on that side.	NA	
NOTES -			

FY-78 MILCON P-060, Repair Red Hill Fuel Storage Facility – Scope of Work

1. Basic repairs by contractor:
    a. Mobilize electrical power, compressed air, water, and tank ventilation/dehumidification equipment. Note: electric power supplied from Hawaiian Electric Co. (HECO) directly to contractor substation at Red Hill.
    b. Isolate tank(s) to be repaired from in-service tanks connected to the Red Hill tank vent system.
    c. Drain residual fuel from nozzle pipes, remove skin valves, and install blinds on skin valve nozzle flanges except for the low-point drain line (slop line) to isolate tank(s) to be repaired from the fuel piping system.
    d. Drain tank bottom residual fuel and waste oil via the slop line to the waste oil/oily waste Stilling Basin outside Adit 3. Transport waste oil/oily waste by tank truck from the Adit 3 Stilling Basin to the Waste Oil Reclamation Facility at the Naval Supply Center on the Pearl Harbor Naval Base.
    e. Ventilate tank to condition of gas-free safe for entry. Continue ventilation throughout work in tank.
    f. Remove the 8-foot diameter flanged dished head for access to tank from Upper Tunnel. Use extreme care in handling to avoid damage to the 72-bolt flange face. Store the dished head in a protected area.
    g. Install lighting adequate for initial tank cleaning.
    h. Working from the catwalk, wash down the catwalk, center tower, and tank walls.
    i. Drain tank wash water, and oily waste from tank bottom via the slop line. Water and oily waste to the Adit 3 Stilling Basin.
    j. Squeegee, shovel, and pump sludge from the tank bottom to the Lower Access Tunnel (LAT) and load it into 55-gallon drums. Load drums onto GFE rail flat cars and coordinate with Fuel Department Operations to use the government owned locomotive to tow the flat cars to Adit 3. Contractor unload the drums and dispose of sludge off-site In accordance with environmental regulations.
    k. Flush and drain all liquid and solid material from the slop line nozzle pipe, remove skin valve, and install blinds on nozzle flanges to isolate tank from slop piping system.
    l. Hydrostatically test all manually operated skin (gate-type) valves and repair gate, valve seat, and packing as necessary to meet leakage criteria. Rehab valve motor operator on first valve downstream of each skin valve.
    m. Install additional lighting in tank.
    n. Check center tower for missing/loose bolting and missing structural members, and replace/tighten as necessary.
    o. Rehab/replace the elevator cab locked in place in the center tower at the catwalk level, and install new cables, safety stops, counterweights, power climbers, etc. to make it operational in accordance with appropriate safety codes. Remove and dispose of wooden stopping rails in center tower.

p. Permanently install structural members to stiffen and strengthen the upper end of the center tower to accommodate rotating dome truss scaffold.
q. Install rotating dome truss scaffold to provide access to tank shell in Upper Dome of tank.
r. Install trolley rail just above spring line level to support hanging scaffold platforms for access to tank shell in Barrel and Lower Dome of tank.
s. Remove and dispose of tell-tale pipes and pipe supports from tank walls in the Upper Dome, Barrel, and Lower Dome, and weld patch plates over thru-shell holes. Remove and dispose of tell-tale jumper pipes and the collector ring in the Lower Dome and weld patch plates over thru-shell holes.
t. Remove and dispose of steam lines and supports from tank bottom, and seal openings at the tank bottom for the steam supply line and steam condensate return line.
u. Brush blast the entire tank shell to expose welds and remove most rust from plate surfaces. During sand blasting and tank shell coating operations, tank ventilation is exhausted to the LAT via the 32-inch dia. pipe nozzle and through an air filter bank.
v. Inspect all existing welds; and test, grind, re-weld, and/or patch leaks (and suspected leaks) as required. Test welds with MT and/or PT. All existing welds, repaired welds, and new patch plate welds tested with soap film and vacuum box.
w. Inspect all areas of tank shell plates; and test, grind, weld, and/or patch holes (and suspected holes) as required. Test welds with MT and/or PT. All welds tested with soap film and vacuum box.
x. Seal weld channels over all vertical and horizontal joints connecting shell plates in the Upper Dome. Test all new welds.
y. Install fuel sample lines from various levels on tank shell to the Lower Access Tunnel.
z. Hydrostatically test fuel nozzle pipes and slop line nozzle pipe from tank bottom to first flange in Lower Access Tunnel, and repair or in the case of the slop line, slip-line, as required.
aa. Sandblast tank shell to white metal, clean all surfaces of sandblast residue, treat with acid wash primer, and coat with NRL polyurethane coating system. Note: After sandblast to white metal, apply flame sprayed aluminum to circular 20-foot diameter bottom plate at center of Lower Dome and lower half of first course of sloping plates adjacent to circular bottom plate prior to application of polyurethane coating system.
bb. De-mobilize and close tank
    (1) Remove rotating boom truss.
    (2) Remove trolley rail and handing scaffold platforms.
    (3) Lock elevator cab in place in the center tower at the catwalk level and remove cables, counterweights, power climbers, etc.
    (4) Remove lights, electrical power, compressed air, water, and tank ventilation equipment.
    (5) Reinstall 8-foot diameter bolted dished head at entryway to tank with new gasket.
    (6) Remove blinds from tank skin valve nozzle flanges and install repaired skin valves.
    (7) Reconnect tank to Red Hill tank vent system.

2. Fill test /leak check by Naval Supply Center Fuel Department:
    a. Reinstall and calibrate Asteroid float/tape/telemeter/counterweight level gauging system. Gauging system measures fuel level to nearest 0.001-foot (approx. 0.005-foot = 1/16-inch).
    b. Refill tank with fuel.
        (1) Use "old" thermally stable fuel from another Red Hill tank as much as possible. Avoid using fuel from tanks that are exposed to the sun in the Upper and Middle Tanks Farms.
        (2) Transfer fuel slowly by gravity as much as possible to:
            (a) avoid pumping which adds energy (heat) to fuel, and
            (b) avoid cavitation which can entrain air in the fuel
        (3) Fill tank to maximum fill level, 235-feet for Tanks 1-4 and 242-feet for Tanks 5-16. At that level a 0.001-foot change in tank level equals a volume change of approx. 2.35 gallons. Use strapping table for Upper Dome to compute precise volume per 0.001-foot level change.
    c. Close and tighten skin valves.
    d. Monitor skin valves for leakage.
    e. Gauge tank for water, if any, accumulated at bottom of tank. Measure quantity of water/fuel drawn off tank bottom via low-point drain (slop) line.
    f. Monitor and record telemeter reading on each 8-hour shift 24/7.
    g. Plot telemeter reading (y-axis) versus time (x-axis).
        (1) A straight line plot, i.e. a constant level drop with time most likely indicates a leak from either a hole(s) in the tank shell or a leak through a skin valve.
        (2) A curved line plot asymptotic to x-axis indicates most likely indicates fuel shrinkage over time due to fuel cooling.
    h. If indicated by leak test monitoring data, remove fuel from tank in stages to bring fuel level below the level of the hole through the shell.
    i. If monitoring data indicates probable leakage, transfer all fuel out of tank via main fuel pipelines except for fuel/water/residue in tank bottom.
    j. Slack main fuel pipelines in Lower Access Tunnel and drain residual fuel in nozzle pipelines from tank bottom to skin valves into main fuel pipelines.
    k. Drain fuel/water/residue from tank bottom via slop line to another fuel tank or to Adit 3 slop tank depending on fuel quality.
    l. Pull up and secure gauge float as high as possible in the tank to get it out of the way and preclude damage during leak rework.

3. Leak search and rework by contractor:
    a. Mobilize electrical power, compressed air, water, and tank ventilation systems.
    b. Isolate tank from in-service tanks in Red Hill tank vent system.
    c. Insert blinds at skin valve nozzle flanges except for the low-point drain line (slop line) to isolate tank from fuel piping system.

d. Ventilate tank to gas-free safe for entry condition. Continue ventilation throughout work in tank.
e. Remove 8-foot diameter dished head for access to tank from Upper Tunnel.
f. Install lighting adequate for tank cleaning.
g. Working from the catwalk wash down center tower and tank walls.
h. Drain tank wash water and residual sludge from tank bottom via the slop line.
i. Drain all liquid and solid material from slop line nozzle pipe, and insert a blind on nozzle flange at skin valve to isolate tank from slop piping system.
j. Install additional lighting.
k. Install two pad mounts on opposite legs of center tower to attach and support two telescoping box booms.
l. Fabricate and install two telescoping box booms each with a hanging man basket to provide access to all areas of the tank shell except the tank shell located below the catwalk.
m. Install a hanging scaffold platform beneath the catwalk to access the portion of tank shell inaccessible from the telescoping box booms.
n. Inspect all welds for leaks (backseepage of fuel); and test, grind, re-weld, and/or patch leaks (and suspected leaks) as required. Test repaired and suspect welds with MT and PT. All welds re-tested with vacuum box.
o. Inspect all areas of tank shell plates for leaks (backseepage of fuel); and test, grind, weld, and/or patch holes (and suspected holes) as required. Test repaired and suspect welds with MT and PT. All welds re-tested with vacuum box.
p. Prepare surface and recoat all repaired areas.
q. If no leaks found in tank shell, hydrostatically re-test fuel nozzle pipes and slop line nozzle pipe from tank bottom to first flange in Lower Access Tunnel, and repair or in the case of the slop line, slip-line, as required.
r. De-mobilize and close tank
    (1) Remove two spider booms and man baskets.
    (2) Remove lights, electrical power, compressed air, water, and tank ventilation equipment.
    (3) Reinstall 8-foot diameter bolted dished head at entryway to tank with new gasket.
    (4) Remove insert blinds from nozzle flanges at skin valves.
    (5) Reconnect tank to Red Hill tank vent system.

4. Fill test /leak check by Naval Supply Center Fuel Department:

WILLBROS GOVERNMENT SERVICES

JOB NO.: 54118 PREPARED BY: TDA DATE: 1/27/2010 Rev 1

CLIENT NAME: NAVFAC CHECKED BY: GH SHEET: 1 OF 1

SUBJECT: Welding Procedure Specifications (WPS) & Procedure Qualification Record (PQR)

Material	P No.	Process	Consumable/ Rod	Required Position	Progression	WGS / InServ Weld Procedure	Remarks
(see P No.)	1	SMAW	7018	6G	↑ UP (ALL)	1-S-1	
(see P No.)	1	SMAW	E7024	1F	F	1-S-10	
(see P No.)	1	SMAW	5P (6010)	6G	↓DOWN(ALL)	1-S-6	
(see P No.)	1	SMAW	5P / 7018	6G	↑ UP (ALL)	1-S-4	
(see P No.)	1	GTAW/SMAW	ER70S / 7018	6G	ALL	1-TS-1	
(see P No.)	1	FCAW		1G/2G	ALL	1-F-1	

1. Per ASME IX Code Requirements.
2. System - Tanks, Piping & Pipe Attachments or Supports.

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Welding Procedure Specification (WPS)

WPS No.: 1-S-1 Date: 6/28/1994 Rev. No.: 0

Supporting PQR(s): P1-E-1

Weld Type: **Groove and fillet welds**

BASE METALS (QW-403)
P-No. 1 Thickness Range: 0.1875 in. to 1.5000 in.
to P-No. 1

PREHEAT (QW-406)		**POSTWELD HEAT TREATMENT** (QW-407)	
Minimum Preheat Temperature:	50 °F	PWHT Type:	No PWHT will be performed
Maximum Interpass Temperature:	500 °F	PWHT Temperature :	None °F
Preheat Maintenance:	None after weldment	PWHT Holding Time:	None

	1st Process		
Weld Process / Method	**SMAW / Manual**		
Weld Deposit Limit	0.0000 in. to 1.5000 in.		
POSITION (QW-405)			
Position of Joint	All Positions		
Weld Progression	Vertical up		
FILLER METAL (QW-404)			
AWS Classification	E7018		
SFA Spec. / F-No.	5.1 / 4		
A-No. or Chemical Composition	1		
Filler Metal Trade Name	n/r		
Pass Greater Than ½":	No		
Filler Metal Size (in.)	1/8	5/32	3/16
ELECTRICAL (QW-409)			
Welding Amperage Range	90-160	110-200	200-300
Welding Voltage Range	n/r	n/r	n/r
Travel Speed (in/min)	Var.	Var.	Var.
Max. Heat Input (J/in)	None		
Current Type and Polarity	DCEP (reverse)		
TECHNIQUE (QW-410)			
Peening	None		
Stringer or Weave Bead	Stringer and weave bead		

(1) No peening done with this procedure.
No pass greater than 1/2" allowed.
Preheat to 175F if "T" > 1" and C > 0.30%;To 200F if 1.25 < "T" <= 1.5"

INTEGRATED SERVICE COMPANY, L.L.C.

Welding Procedure Specification (WPS)

WPS No.: 1-S-1 Rev. No.: 0

JOINT DESIGN (QW-402)
Weld Type: Groove and fillet welds

Joint Type	Backing	Root Opening	Groove Angle	Root Face	Groove Radius
Single-V groove	no backing	3/16" max.	50 degree min.	1/8" max.	
Single-bevel groove	no backing	3/16" max.	45 degree min.	1/8" max.	
Single-V groove	gouged & back welded	1/4" max.	50 degree min.	3/16" max.	
Double-bevel groove	gouged & back welded	1/4" max.	45 degree min.	3/16" max.	
Double-V groove	gouged & back welded	1/4" max.	45 degree min.	3/16" max.	
Square groove	T-joint	1/32" max.			
Square groove	no backing	3/32" max.			

Fillet Welds: All (QW-451.4)
Retainers: None

See fabrication drawing.

WELD JOINT DESCRIPTIONS SHOWN ARE NOT INCLUSIVE OF ALL THOSE FOUND ON A JOB. WELD JOINT DESIGN REFERENCE IN AN ENGINEERING SPECIFICATION OR A DESIGN DRAWING SHALL TAKE PRECEDENCE OVER WELD JOINTS SHOWN IN THIS WPS.

Initial and Interpass Cleaning: With wire brush clean 1" both sides of weld joint.
Method of Back Gouging: Grind until all defects are removed.

Minimum preheat must be maintained during thermal cutting, tacking, and welding operations.
Welds shall be cleaned between each pass. When completed, remove all slag and projections.

We certify that the statements in this specification are correct and in accordance with the requirements of Section IX of the ASME Code.

By: David L Glaves — David S. Glaves — 6/28/1994 — Date — QC Manager

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Procedure Qualification Record (PQR)

PQR No.: P1-E-1 Date: 3/17/1975 WPS No.: 1-S-1

JOINT DESIGN (QW-402)
Weld Type: Groove weld
Groove Type: Single-V groove
Backing: Open butt, no back weld
Root Opening: 1/8 in. Root Face: 1/16 in.
Groove Angle: 60 °

BASE METALS (QW-403)
Specification Type and Grade:
SA-515, Grade 70 to SA-515, Grade 70
P-No. 1 Group No. 2 to P-No. 1 Group No. 2
Thickness (in.): 0.7500

PREHEAT (QW-406)
Minimum Preheat Temperature: 50 °F
Maximum Interpass Temperature: 500 °F
Preheat Maintenance: None after weldment

POSTWELD HEAT TREATMENT (QW-407)
Type: No PWHT performed
PWHT Temperature: None °F
PWHT Holding Time: None hr.

	1st Process		
Weld Process / Method	**SMAW / Manual**		
POSITION (QW-405)			
Position of Joint	3G - Vertical		
Weld Progression	Vertical up		
FILLER METAL (QW-404)			
AWS Classification	E7018		
SFA Spec. / F-No.	5.1 / 4		
A-No. or Chemical Composition	1		
Filler Metal Trade Name	n/r		
Weld Deposit 't' (in.)	0.7500		
Pass Greater Than ½":	No		
Filler Metal Size (in.)	1/8	5/32	-
ELECTRICAL (QW-409)			
Amperage Used	90-110	110-150	-
Voltage Used	20	22-23	-
Travel Speed (in/min)	4-9	4-9	-
Max. Heat Input (J/in)	None		
Current Type and Polarity	DCEP (reverse)		
TECHNIQUE (QW-410)			
Stringer or Weave Bead	Stringer and weave bead		

(1) Peening was not used with this weld test.
No Pass > 1/2" t.

INTEGRATED SERVICE COMPANY, L.L.C.

Procedure Qualification Record (PQR)

PQR No.: P1-E-1

Tensile Test (QW-150)

Specimen No.	Diameter (in.)	Area (in^2)	Ultimate Total Load (lb)	Ultimate Unit Stress (PSI)	Failure Type and Location
1	0.521	0.213	17100	80300	Weld metal
2	0.521	0.213	17400	81700	Weld metal

Guided Bend Tests (QW-160)

Type and Figure No.	Result	Type and Figure No.	Result
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory

Hardness Test - Brinell hardness

Location	Readings								
SA-515 HAZ	187	185	180						
Weld Metal	180	170	185						

Welder's Name: Herman Kohlmeyer I.D.: Stamp No.: K

PQR was done and welding of coupon was witnessed by: Cust-O-Fab Inc

Test conducted by: Metlab Testing Services Lab Test No.: P1-E-1

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

By: David Glaves 3/17/1975 QC Manager

David S. Glaves (Date)

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Welding Procedure Specification (WPS)

WPS No.: **1-S-10** Date: **7/30/2008** Rev. No.: **0**

Supporting PQR(s): 7024-A

Weld Type: **Groove and fillet welds**

BASE METALS (QW-403)
P-No. 1 Thickness Range: 0.0625 in. to 0.7500 in.
to P-No. 1

PREHEAT (QW-406)
Minimum Preheat Temperature: 60 °F
Maximum Interpass Temperature: 400 °F
Preheat Maintenance: None

POSTWELD HEAT TREATMENT (QW-407)
PWHT Type: No PWHT will be performed
PWHT Temperature : None °F
PWHT Holding Time: None

	1st Process		
Weld Process / Method	**SMAW / Manual**		
Weld Deposit Limit	0.7500 in. maximum		
POSITION (QW-405)			
Position of Joint	Flat only		
Weld Progression	N/A		
FILLER METAL (QW-404)			
AWS Classification	E7024		
SFA Spec. / F-No.	5.1 / 1		
A-No. or Chemical Composition	1		
Pass Greater Than ½":	No		
Filler Metal Size (in.)	5/32	3/16	1/4
ELECTRICAL (QW-409)			
Welding Amperage Range	170-240	220-300	260-350
Welding Voltage Range	n/r	n/r	n/r
Travel Speed (in/min)	Var.	Var.	Var.
Max. Heat Input (J/in)	None		
Current Type and Polarity	DCEP (reverse)		
TECHNIQUE (QW-410)			
Peening	None		
Stringer or Weave Bead	Stringer and weave bead		
Multiple / Single Pass (per side)	Multipass		

INTEGRATED SERVICE COMPANY, L.L.C.

Welding Procedure Specification (WPS)

WPS No.: 1-S-10 Rev. No.: 0

JOINT DESIGN (QW-402)
Weld Type: Groove and fillet welds

Joint Type	Backing	Root Opening	Groove Angle	Root Face	Groove Radius
Single-V groove	No backing	3/16" max	50 deg min	1/8" max	
Single bevel	No backing	3/16" max	45 deg min	1/8" max	
Single-V groove	Gouged & back welded	1/4" max	50 deg min	3/16" max	
Double bevel	Gouged & back welded	1/4" max	45 deg min	3/16" max	
Double-V groove	Gouged & back welded	1/4" max	45 deg min	3/16" max	
Square groove	T-joint	1/32" max			
Square groove	No backing	3/32" max			

Fillet Welds: All fillet sizes on all base metal thicknesses and all diameters.
Retainers: None

WELD JOINT DESCRIPTIONS SHOWN ARE NOT INCLUSIVE OF ALL THOSE FOUND ON A JOB. WELD JOINT DESIGN REFERENCE IN AN ENGINEERING SPECIFICATION OR A DESIGN DRAWING SHALL TAKE PRECEDENCE OVER WELD JOINTS SHOWN IN THIS WPS.

Initial and Interpass Cleaning: With wire brush clean 1 inch (25 mm) on both sides of weld joint
Method of Back Gouging: When required, grind until all defects are removed.

Minimum preheat must be maintained during thermal cutting, tacking, and welding operations.
Welds shall be cleaned between each pass. When completed, remove all slag and projections.

We certify that the statements in this specification are correct and in accordance with the requirements of Section IX of the ASME Code.

By: David Haas 7/30/2008 QC Process Manager
David Haas Date

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INTEGRATED SERVICE COMPANY, L.L.C.
1900 N. 161st. E. AVENUE
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Procedure Qualification Record (PQR)

PQR No.: 7024-A Date: 10/21/1987 WPS No.: 1-S-10

JOINT DESIGN (QW-402)
Weld Type: Groove weld
Groove Type: Single-V groove
Backing: Open butt, no back weld
Root Opening: 3/32 in. Root Face: 1/8 in.
Groove Angle: 60 °

BASE METALS (QW-403)
Specification Type and Grade:
SA-36 to SA-36
P-No. 1 Group No. 1 to P-No. 1 Group No. 1
Thickness (in.): 0.3750

PREHEAT (QW-406)
Minimum Preheat Temperature: 100 °F
Maximum Interpass Temperature: 400 °F
Preheat Maintenance: None after welding

POSTWELD HEAT TREATMENT (QW-407)
Type: No PWHT performed
PWHT Temperature: None °F
PWHT Holding Time: None hr.

	1st Process		
Weld Process / Method	**SMAW / Manual**		
POSITION (QW-405)			
Position of Joint	1G - Flat		
Weld Progression	N/A		
FILLER METAL (QW-404)			
AWS Classification	E7024		
SFA Spec. / F-No.	5.1 / 1		
A-No. or Chemical Composition	1		
Filler Metal Trade Name	n/r		
Weld Deposit 't' (in.)	0.3750		
Pass Greater Than ½":	No		
Filler Metal Size (in.)	1/8	5/32	3/16
ELECTRICAL (QW-409)			
Amperage Used	195	225	255
Voltage Used	24	27	28
Travel Speed (in/min)	3-5	5-7	6-8
Max. Heat Input (J/in)	None		
Current Type and Polarity	DCEP (reverse)		
TECHNIQUE (QW-410)			
Stringer or Weave Bead	Stringer and weave bead		

(1) Peening was not used with this weld test.

INTEGRATED SERVICE COMPANY, L.L.C.

Procedure Qualification Record (PQR)

PQR No.: 7024-A

Tensile Test (QW-150)

Specimen No.	Width (in.)	Thickness (in.)	Area (in^2)	Ultimate Total Load (lb)	Ultimate Unit Stress (PSI)	Failure Type and Location
1	1.000	0.375	0.375	28000	74700	Base metal
2	1.000	0.375	0.375	28000	74700	Base metal

Guided Bend Tests (QW-160)

Type and Figure No.	Result	Type and Figure No.	Result
QW-462.3(a) Face bend	Acceptable	QW-462.3(a) Root bend	Acceptable
QW-462.3(a) Face bend	Acceptable	QW-462.3(a) Root bend	Acceptable

Hardness Test - Brinell hardness

Location	Readings								
SA-36 BM	198	181	196						
SA-36 HAZ	188	182	190						
Weld metal	160	163	188						

Visual Examination: Satisfactory

Liquid Penetrant Test: Satisfactory

Added hardness, visual and penetrant results January 12, 2009.

Welder's Name: Charlie Wood I.D.: Stamp No.: A

PQR was done and welding of coupon was witnessed by: Cust-O-Fab

Test conducted by: Tulsa Testing and Insp. Lab Test No.: 7024-A

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

By: David S. Glaves (David S. Glaves) 10/21/1987 (Date) QC Manager

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Welding Procedure Specification (WPS)

WPS No.: 1-S-6 Date: 2/24/1999 Rev. No.: 2 Date: 7/16/1999

Supporting PQR(s): 99-010016-2

Weld Type: Groove and fillet welds

BASE METALS (QW-403)
P-No. 1 Thickness Range: 0.1875 in. to 0.8640 in.
to P-No. 1

PREHEAT (QW-406)
Minimum Preheat Temperature: 60 °F
Maximum Interpass Temperature: 550 °F
Preheat Maintenance: None after weldment

POSTWELD HEAT TREATMENT (QW-407)
PWHT Type: No PWHT will be performed
PWHT Temperature : None °F
PWHT Holding Time: None

	1st Process		
Weld Process / Method	**SMAW / Manual**		
Weld Deposit Limit	0.0000 in. to 0.2500 in.		
POSITION (QW-405)			
Position of Joint	All Positions		
Weld Progression	Any		
FILLER METAL (QW-404)			
AWS Classification	E6010		
SFA Spec. / F-No.	5.1 / 3		
A-No. or Chemical Composition	1		
Filler Metal Trade Name	n/r		
Pass Greater Than ½":	No		
Filler Metal Size (in.)	3/32	1/8	5/32
ELECTRICAL (QW-409)			
Welding Amperage Range	60-90	80-120	110-165
Welding Voltage Range	n/r	n/r	n/r
Travel Speed (in/min)	Var.	Var.	Var.
Max. Heat Input (J/in)	None		
Current Type and Polarity	DCEP (reverse)		
TECHNIQUE (QW-410)			
Peening	None		
Stringer or Weave Bead	Stringer and weave bead		

(1) No peening done with this procedure.
Revision 2: Progression.
Preheat to 175F if "T" > 1" and C > 0.30%; To 200F if 1.25" < "T" <= 1.5"

INTEGRATED SERVICE COMPANY, L.L.C.

Welding Procedure Specification (WPS)

WPS No.: 1-S-6 Rev. No.: 2

JOINT DESIGN (QW-402)
Weld Type: Groove and fillet welds

Joint Type	Backing	Root Opening	Groove Angle	Root Face	Groove Radius
Single-V groove	no backing	3/16" max.	50 degree min.	1/8" max.	
Single-bevel groove	no backing	3/16" max.	45 degree min.	1/8" max.	
Single-V groove	gouged & back welded	1/4" max.	50 degree min.	3/16" max.	
Double-bevel groove	gouged & back welded	1/4" max.	45 degree min.	3/16" max.	
Double-V groove	gouged & back welded	1/4" max.	45 degree min.	3/16" max.	
Square groove	T-joint	1/32" max.			
Square groove	no backing	3/32" max.			

Fillet Welds: All (QW-451.4)
Retainers: None

See fabrication drawing.

WELD JOINT DESCRIPTIONS SHOWN ARE NOT INCLUSIVE OF ALL THOSE FOUND ON A JOB. WELD JOINT DESIGN REFERENCE IN AN ENGINEERING SPECIFICATION OR A DESIGN DRAWING SHALL TAKE PRECEDENCE OVER WELD JOINTS SHOWN IN THIS WPS.

Initial and Interpass Cleaning: With wire brush clean 1" both sides of weld joint.
Method of Back Gouging: When required, grind until all defects are removed.

Minimum preheat must be maintained during thermal cutting, tacking, and welding operations.
Welds shall be cleaned between each pass. When completed, remove all slag and projections.

We certify that the statements in this specification are correct and in accordance with the requirements of Section IX of the ASME Code.

By: David S. Glaves 2/24/1999 QC Manager
David S. Glaves Date

INTEGRATED SERVICE COMPANY, L.L.C.
1900 N. 161st. E. AVENUE
TULSA, OKLAHOMA 74116

Procedure Qualification Record (PQR)

PQR No.: **99-010016-2** Date: **1/8/1999** WPS No.: **1-S-6**

JOINT DESIGN (QW-402)		**BASE METALS** (QW-403)	
Weld Type:	Groove weld	Specification Type and Grade:	
Groove Type:	Single-V groove	SA-106, Grade B	to SA-106, Grade B
Backing:	Open butt, no back weld	P-No. 1 Group No. 1	to P-No. 1 Group No. 1
Root Opening: 1/8 in.	Root Face: 1/16 in.	Thickness (in.): 0.4320	
Groove Angle: 75 °		Diameter (in.): 6.6250	
PREHEAT (QW-406)		**POSTWELD HEAT TREATMENT** (QW-407)	
Minimum Preheat Temperature:	60 °F	Type:	No PWHT performed
Maximum Interpass Temperature:	350 °F	PWHT Temperature:	None °F
Preheat Maintenance:	None	PWHT Holding Time:	None hr.

	1st Process	2nd Process
Weld Process / Method	**SMAW / Manual**	**SMAW / Manual**
POSITION (QW-405)		
Position of Joint	6G - 45 degree pipe	6G - 45 degree pipe
Weld Progression	Vertical up and down	Vertical up and down
FILLER METAL (QW-404)		
AWS Classification	E6010	E7018
SFA Spec. / F-No.	5.1 / 3	5.1 / 4
A-No. or Chemical Composition	1	1
Filler Metal Trade Name	n/r	n/r
Weld Deposit 't' (in.)	0.1250	0.3070
Pass Greater Than ½":	No	No
Filler Metal Size (in.)	3/32 | - | -	1/8 | - | -
ELECTRICAL (QW-409)		
Amperage Used	90 | - | -	100 | - | -
Voltage Used	23 | - | -	24 | - | -
Travel Speed (in/min)	Var. | - | -	Var. | - | -
Max. Heat Input (J/in)	None	None
Current Type and Polarity	DCEP (reverse)	DCEP (reverse)
TECHNIQUE (QW-410)		
Stringer or Weave Bead	Stringer bead	Stringer bead

(1) Peening was not used with this weld test.
Revised to define root pass progression up, fill passes down.

INTEGRATED SERVICE COMPANY, L.L.C.

Procedure Qualification Record (PQR)

PQR No.: **99-010016-2**

Tensile Test (QW-150)

Specimen No.	Width (in.)	Thickness (in.)	Area (in^2)	Ultimate Total Load (lb)	Ultimate Unit Stress (PSI)	Failure Type and Location
1	0.743	0.399	0.296	24110	81500	Ductile - BM
2	0.745	0.384	0.286	23890	83500	Ductile - BM

Guided Bend Tests (QW-160)

Type and Figure No.	Result	Type and Figure No.	Result
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory

Hardness Test - Brinell hardness

Location	Readings								
SA-106 BM	150	150	160						
SA-106 HAZ	185	185	190						
Weld Metal	190	190	185						

Welder's Name: Jesse Hobbs I.D.: Stamp No.: JH

PQR was done and welding of coupon was witnessed by: Cust-O-Fab Service Co.

Test conducted by: Sherry Laboratories Lab Test No.: 99-010016-2

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

By: David S. Glaves 1/8/1999 QC Manager

David S. Glaves — Date

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1900 N. 161st. E. AVENUE
TULSA, OKLAHOMA 74116

Welding Procedure Specification (WPS)

WPS No.: 1-S-4 Date: 1/8/1999 Rev. No.: 0

Supporting PQR(s): 99-010016-2

Weld Type: **Groove and fillet welds**

BASE METALS (QW-403)
P-No. 1 Thickness Range: 0.1875 in. to 0.8640 in.
to P-No. 1

PREHEAT (QW-406)		**POSTWELD HEAT TREATMENT** (QW-407)	
Minimum Preheat Temperature:	60 °F	PWHT Type:	No PWHT will be performed
Maximum Interpass Temperature:	350 °F	PWHT Temperature :	None °F
Preheat Maintenance:	None	PWHT Holding Time:	None

	1st Process			2nd Process		
Weld Process / Method	**SMAW / Manual**			**SMAW / Manual**		
Weld Deposit Limit	0.2500 in. maximum			0.6140 in. maximum		
POSITION (QW-405)						
Position of Joint	All Positions			All Positions		
Weld Progression	Any			Vertical up		
FILLER METAL (QW-404)						
AWS Classification	E6010			E7018		
SFA Spec. / F-No.	5.1 / 3			5.1 / 4		
A-No. or Chemical Composition	1			1		
Pass Greater Than ½":	No			No		
Filler Metal Size (in.)	3/32	1/8	5/32	3/32	1/8	5/32
ELECTRICAL (QW-409)						
Welding Amperage Range	60-90	80-120	110-165	70-110	90-160	130-220
Welding Voltage Range	n/r	n/r	n/r	n/r	n/r	n/r
Travel Speed (in/min)	Var.	Var.	Var.	Var.	Var.	Var.
Max. Heat Input (J/in)	None			None		
Current Type and Polarity	DCEP (reverse)			DCEP (reverse)		
TECHNIQUE (QW-410)						
Peening	None			None		
Stringer or Weave Bead	Stringer bead			Stringer bead		
Multiple / Single Pass (per side)	Multipass			Multipass		

INTEGRATED SERVICE COMPANY, L.L.C.

Welding Procedure Specification (WPS)

WPS No.: 1-S-4 Rev. No.: 0

JOINT DESIGN (QW-402)
Weld Type: Groove and fillet welds

Joint Type	Backing	Root Opening	Groove Angle	Root Face	Groove Radius
Single-V groove	No backing	3/16" max	50 deg min	1/8" max	
Single bevel	No backing	3/16" max	45 deg min	1/8" max	
Single-V groove	Gouged & back welded	1/4" max	50 deg min	3/16" max	
Double bevel	Gouged & back welded	1/4" max	45 deg min	3/16" max	
Double-V groove	Gouged & back welded	1/4" max	45 deg min	3/16" max	
Square groove	T-joint	1/32" max			
Square groove	No backing	3/32" max			

Fillet Welds: All fillet sizes on all base metal thicknesses and all diameters.
Retainers: None

WELD JOINT DESCRIPTIONS SHOWN ARE NOT INCLUSIVE OF ALL THOSE FOUND ON A JOB. WELD JOINT DESIGN REFERENCE IN AN ENGINEERING SPECIFICATION OR A DESIGN DRAWING SHALL TAKE PRECEDENCE OVER WELD JOINTS SHOWN IN THIS WPS.

Initial and Interpass Cleaning: With wire brush clean 1 inch (25 mm) on both sides of weld joint
Method of Back Gouging: When required, grind until all defects are removed.

Minimum preheat must be maintained during thermal cutting, tacking, and welding operations.
Welds shall be cleaned between each pass. When completed, remove all slag and projections.

We certify that the statements in this specification are correct and in accordance with the requirements of Section IX of the ASME Code.

By: David L. Glaves 1/8/1999 QC Manager
David S. Glaves Date

INTEGRATED SERVICE COMPANY, L.L.C.
1900 N. 161st. E. AVENUE
TULSA, OKLAHOMA 74116

Procedure Qualification Record (PQR)

PQR No.: 99-010016-2 Date: 1/8/1999 WPS No.: 1-S-4

JOINT DESIGN (QW-402)		**BASE METALS** (QW-403)	
Weld Type:	Groove weld	Specification Type and Grade:	
Groove Type:	Single-V groove	SA-106, Grade B	to SA-106, Grade B
Backing:	Open butt, no back weld	P-No. 1 Group No. 1	to P-No. 1 Group No. 1
Root Opening: 1/8 in.	Root Face: 1/16 in.	Thickness (in.): 0.4320	
Groove Angle: 75 °		Diameter (in.): 6.6250	
PREHEAT (QW-406)		**POSTWELD HEAT TREATMENT** (QW-407)	
Minimum Preheat Temperature:	60 °F	Type:	No PWHT performed
Maximum Interpass Temperature:	350 °F	PWHT Temperature:	None °F
Preheat Maintenance:	None	PWHT Holding Time:	None hr.

	1st Process **SMAW / Manual**	2nd Process **SMAW / Manual**
Weld Process / Method		
POSITION (QW-405)		
Position of Joint	6G - 45 degree pipe	6G - 45 degree pipe
Weld Progression	Vertical up and down	Vertical up and down
FILLER METAL (QW-404)		
AWS Classification	E6010	E7018
SFA Spec. / F-No.	5.1 / 3	5.1 / 4
A-No. or Chemical Composition	1	1
Filler Metal Trade Name	n/r	n/r
Weld Deposit 't' (in.)	0.1250	0.3070
Pass Greater Than ½":	No	No
Filler Metal Size (in.)	3/32 | - | -	1/8 | - | -
ELECTRICAL (QW-409)		
Amperage Used	90 | - | -	100 | - | -
Voltage Used	23 | - | -	24 | - | -
Travel Speed (in/min)	Var. | - | -	Var. | - | -
Max. Heat Input (J/in)	None	None
Current Type and Polarity	DCEP (reverse)	DCEP (reverse)
TECHNIQUE (QW-410)		
Stringer or Weave Bead	Stringer bead	Stringer bead

(1) Peening was not used with this weld test.
Revised to define root pass progression up, fill passes down.

INTEGRATED SERVICE COMPANY, L.L.C.

Procedure Qualification Record (PQR)

PQR No.: **99-010016-2**

Tensile Test (QW-150)

Specimen No.	Width (in.)	Thickness (in.)	Area (in^2)	Ultimate Total Load (lb)	Ultimate Unit Stress (PSI)	Failure Type and Location
1	0.743	0.399	0.296	24110	81500	Ductile - BM
2	0.745	0.384	0.286	23890	83500	Ductile - BM

Guided Bend Tests (QW-160)

Type and Figure No.	Result	Type and Figure No.	Result
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory

Hardness Test - Brinell hardness

Location	Readings								
SA-106 BM	150	150	160						
SA-106 HAZ	185	185	190						
Weld Metal	190	190	185						

Welder's Name: Jesse Hobbs I.D.: Stamp No.: JH

PQR was done and welding of coupon was witnessed by: Cust-O-Fab Service Co.

Test conducted by: Sherry Laboratories Lab Test No.: 99-010016-2

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

By: David S. Glaves 1/8/1999 QC Manager

David S. Glaves — Date

INTEGRATED SERVICE COMPANY, L.L.C.
1900 N. 161st. E. AVENUE
TULSA, OKLAHOMA 74116

Welding Procedure Specification (WPS)

WPS No.: 1-TS-1 Date: 7/20/1994 Rev. No.: 0

Supporting PQR(s): 92-159-1

Weld Type: Groove and fillet welds

BASE METALS (QW-403)
P-No. 1 Thickness Range: 0.1875 in. to 1.5000 in.
to P-No. 1

PREHEAT (QW-406)
Minimum Preheat Temperature: 200 °F
Maximum Interpass Temperature: 550 °F
Preheat Maintenance: None after weldment

POSTWELD HEAT TREATMENT (QW-407)
PWHT Type: No PWHT will be performed
PWHT Temperature : None °F
PWHT Holding Time: None

	1st Process			2nd Process		
Weld Process / Method	**GTAW / Manual**			**SMAW / Manual**		
Weld Deposit Limit	0.0000 in. to 0.3750 in.			0.0000 in. to 1.1250 in.		
POSITION (QW-405)						
Position of Joint	All Positions			All Positions		
Weld Progression	Any			Vertical up		
GAS (QW-408)						
Shielding Gas / CFH	100% Argon / 27-36					
Trailing Gas / CFH	None / -					
Backing Gas / CFH	None / -					
FILLER METAL (QW-404)						
AWS Classification	ER70S-2			E7018		
SFA Spec. / F-No.	5.18 / 6			5.1 / 4		
A-No. or Chemical Composition	1			1		
Filler Metal Trade Name	n/r			n/r		
Filler Metal Product Form	Bare (Solid)					
Consumable Insert	None					
Pass Greater Than ½":				No		
Filler Metal Size (in.)	1/16	3/32	1/8	5/32	3/16	7/32
ELECTRICAL (QW-409)						
Welding Amperage Range	70-150	80-180	130-275	130-220	200-300	250-350
Welding Voltage Range	n/r	n/r	n/r	n/r	n/r	n/r
Travel Speed (in/min)	Var.	Var.	Var.	Var.	Var.	Var.
Max. Heat Input (J/in)	None			None		
Current Type and Polarity	DCEN (straight)			DCEP (reverse)		
Tungsten Type / Size	EWTh-2 / 1/16" - 3/16"					
Pulsed Current	None					
TECHNIQUE (QW-410)						
Peening	None			None		
Stringer or Weave Bead	Stringer and weave bead			Stringer and weave bead		
Multiple / Single Pass (per side)	Multipass					
Nozzle / Gas Cup Size	# 5 to # 10					

(1) No peening done with this procedure.
No pass greater than 1/2" allowed.
Preheat to 200 Deg.F.for repairs.
Preheat to 175F if "T" > 1" and C > 0.30%;To 200F if 1.25 < "T" <= 1.5"

INTEGRATED SERVICE COMPANY, L.L.C.

Welding Procedure Specification (WPS)

WPS No.: 1-TS-1 Rev. No.: 0

JOINT DESIGN (QW-402)
Weld Type: Groove and fillet welds

Joint Type	Backing	Root Opening	Groove Angle	Root Face	Groove Radius
Single-V groove	no backing	3/16" max.	50 degree min.	1/8" max.	
Single-bevel groove	no backing	3/16" max.	45 degree min.	1/8" max.	
Single-V groove	gouged & back welded	1/4" max.	50 degree min.	3/16" max.	
Double-bevel groove	gouged & back welded	1/4" max.	45 degree min.	3/16" max.	
Double-V groove	gouged & back welded	1/4" max.	45 degree min.	3/16" max.	
Square groove	T-joint	1/32" max.			
Square groove	no backing	3/32" max.			

Fillet Welds: All (QW-451.4)
Retainers: None

See fabrication drawing.

WELD JOINT DESCRIPTIONS SHOWN ARE NOT INCLUSIVE OF ALL THOSE FOUND ON A JOB. WELD JOINT DESIGN REFERENCE IN AN ENGINEERING SPECIFICATION OR A DESIGN DRAWING SHALL TAKE PRECEDENCE OVER WELD JOINTS SHOWN IN THIS WPS.

Initial and Interpass Cleaning: With wire brush clean 1" both sides of weld joint.
Method of Back Gouging: Grind until all defects are removed.

Minimum preheat must be maintained during thermal cutting, tacking, and welding operations.
Welds shall be cleaned between each pass. When completed, remove all slag and projections.

We certify that the statements in this specification are correct and in accordance with the requirements of Section IX of the ASME Code.

By: David L Glaves — David S. Glaves — 7/20/1994 — Date — QC Manager

INSERV
INTEGRATED SERVICE COMPANY LLC
A WILLBROS COMPANY

INTEGRATED SERVICE COMPANY, L.L.C.
1900 N. 161st. E. AVENUE
TULSA, OKLAHOMA 74116

Procedure Qualification Record (PQR)

PQR No.: 92-159-1 Date: 1/10/1992 WPS No.: 1-TS-1

JOINT DESIGN (QW-402)
Weld Type: Groove weld
Groove Type: Single-V groove
Backing: Open butt, no back weld
Root Opening: 1/8 in. Root Face: 1/32 in.
Groove Angle: 60-70 °
None

BASE METALS (QW-403)
Specification Type and Grade:
SA-516, Grade 70 to SA-516, Grade 70
P-No. 1 Group No. 2 to P-No. 1 Group No. 2
Thickness (in.): 0.7500
None

PREHEAT (QW-406)
Minimum Preheat Temperature: 175 °F
Maximum Interpass Temperature: 450 °F
Preheat Maintenance: None after weldment
None

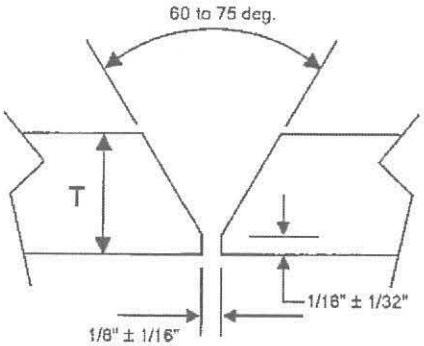
POSTWELD HEAT TREATMENT (QW-407)
Type: No PWHT performed
PWHT Temperature: None °F
PWHT Holding Time: None hr.
N/A

	1st Process **GTAW / Manual**			2nd Process **SMAW / Manual**		
Weld Process / Method						
POSITION (QW-405)						
Position of Joint	1G - Flat			1G - Flat		
Weld Progression	N/A			N/A		
Notes	None			None		
GAS (QW-408)						
Shielding Gas / CFH	100% Argon / 30					
Trailing Gas / CFH	None / -					
Backing Gas / CFH	None / -					
FILLER METAL (QW-404)						
AWS Classification	ER70S-2			E7018		
SFA Spec. / F-No.	5.18 / 6			5.1 / 4		
A-No. or Chemical Composition	1			1		
Filler Metal Trade Name	n/r			n/r		
Filler Metal Product Form	Bare (Solid)					
Consumable Insert	None					
GTAW Flux	N/A					
Weld Deposit 't' (in.)	0.1875			0.5625		
Pass Greater Than ½":				No		
Filler Metal Size (in.)	3/32	-	-	5/32	3/16	-
ELECTRICAL (QW-409)						
Amperage Used	120	-	-	175	225	-
Voltage Used	18	-	-	24	28	-
Travel Speed (in/min)	Var.	-	-	Var.	Var.	-
Max. Heat Input (J/in)	NR			NR		
Current Type and Polarity	DCEN (straight)			DCEP (reverse)		
Tungsten Type / Size	EWTh-2 / 1/8					
Pulsed Current	None					
TECHNIQUE (QW-410)						
Thermal Processes:	No			No		
Stringer or Weave Bead	Stringer bead			Stringer bead		
Multiple / Single Pass (per side)	Multipass			Multipass		
Nozzle / Gas Cup Size	# 8					

(1) (1) Peening was not used with this weld test.
(2) No Pass > 1/2" t.
10-20-08; corrected typo "No Thermal Processes".

(2) None

Joint Detail Image



SINGLE VEE GROOVE

INTEGRATED SERVICE COMPANY, L.L.C.

Procedure Qualification Record (PQR)

PQR No.: 92-159-1

Tensile Test (QW-150)

Specimen No.	Width (in.)	Thickness (in.)	Area (in^2)	Ultimate Total Load (lb)	Ultimate Unit Stress (PSI)	Failure Type and Location
1	0.754	0.760	0.573	43400	75700	Base metal
2	0.750	0.755	0.566	43000	76000	Base metal

Guided Bend Tests (QW-160)

Type and Figure No.	Result	Type and Figure No.	Result
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory

Hardness Test - Brinell hardness

Location	Readings								
SA-516 BM	140	156	146						
SA-516 HAZ	167	174	174						
Weld Metal	149	140	156						

Visual Examination: Satisfactory

None

Welder's Name: Paul Stokes I.D.: - Stamp No.: R

PQR was done and welding of coupon was witnessed by: Integrated Service Company LLC

Test conducted by: Metlab Testing Services Lab Test No.: 92-159-1

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

By: R.S.L
Roy Laird

1/10/1992
Date

MFG QC Manager

INTEGRATED SERVICE COMPANY, L.L.C.
1900 N. 161st. E. AVENUE
TULSA, OKLAHOMA 74116

Welding Procedure Specification (WPS)

WPS No.: 1-F-1 Date: 7/13/1994 Rev. No.: 0

Supporting PQR(s): 90-1884-6 ; 92-2474

Weld Type: **Groove and fillet welds**

BASE METALS (QW-403)
P-No. 1 Thickness Range: 0.0625 in. to 1.5000 in.
to P-No. 1

PREHEAT (QW-406)
Minimum Preheat Temperature: 50 °F
Maximum Interpass Temperature: 600 °F
Preheat Maintenance: None after weldment

POSTWELD HEAT TREATMENT (QW-407)
PWHT Type: No PWHT will be performed
PWHT Temperature : None °F
PWHT Holding Time: None

	1st Process		
Weld Process / Method	**FCAW / Semiautomatic**		
Weld Deposit Limit	0.0000 in. to 1.5000 in.		
POSITION (QW-405)			
Position of Joint	All Positions		
Weld Progression	Vertical up		
GAS (QW-408)			
Shielding Gas / CFH	75% Argon, 25% CO2 / 23-30		
Trailing Gas / CFH	None / -		
Backing Gas / CFH	None / -		
FILLER METAL (QW-404)			
AWS Classification	E71T-1		
SFA Spec. / F-No.	5.20 / 6		
A-No. or Chemical Composition	1		
Filler Metal Trade Name	n/r		
Filler Metal Product Form	Flux cored		
Supplemental Filler Metal	None		
Pass Greater Than ½":	No		
Filler Metal Size (in.)	0.035	0.045	1/16
ELECTRICAL (QW-409)			
Welding Amperage Range	120-200	170-270	225-300
Welding Voltage Range	19-24	22-26	25-28
Travel Speed (in/min)	Var.	Var.	Var.
Max. Heat Input (J/in)	None		
Current Type and Polarity	DCEP (reverse)		
Transfer Mode	Globular arc		
TECHNIQUE (QW-410)			
Peening	None		
Stringer or Weave Bead	Stringer and weave bead		
Multiple / Single Pass (per side)	Multipass		
Nozzle / Gas Cup Size	1/2"-3/4"		
Contact Tube to Work Distance	1/2"-1"		

(1) No peening done with this procedure.
No pass greater than 1/2" allowed.
Preheat to 175F if "T" > 1" and C > 0.30%;To 200F if 1.25 < "T" <= 1.5"

INTEGRATED SERVICE COMPANY, L.L.C.

Welding Procedure Specification (WPS)

WPS No.: 1-F-1 Rev. No.: 0

JOINT DESIGN (QW-402)
Weld Type: Groove and fillet welds

Joint Type	Backing	Root Opening	Groove Angle	Root Face	Groove Radius
Single-V groove	no backing	3/16" max.	50 degree min.	1/8" max.	
Single-bevel groove	no backing	3/16" max.	45 degree min.	1/8" max.	
Single-V groove	gouged & back welded	1/4" max.	50 degree min.	3/16" max.	
Double-bevel groove	gouged & back welded	1/4" max.	45 degree min.	3/16" max.	
Double-V groove	gouged & back welded	1/4" max.	45 degree min.	3/16" max.	
Square groove	T-joint	1/32" max.			
Square groove	no backing	3/32" max.			

Fillet Welds: All (QW-451.4)
Retainers: None

See fabrication drawing.

WELD JOINT DESCRIPTIONS SHOWN ARE NOT INCLUSIVE OF ALL THOSE FOUND ON A JOB. WELD JOINT DESIGN REFERENCE IN AN ENGINEERING SPECIFICATION OR A DESIGN DRAWING SHALL TAKE PRECEDENCE OVER WELD JOINTS SHOWN IN THIS WPS.

Initial and Interpass Cleaning: With wire brush clean 1" both sides of weld joint.
Method of Back Gouging: Grind until all defects are removed.

Minimum preheat must be maintained during thermal cutting, tacking, and welding operations.
Welds shall be cleaned between each pass. When completed, remove all slag and projections.

We certify that the statements in this specification are correct and in accordance with the requirements of Section IX of the ASME Code.

By: David S. Glaves 7/13/1994 QC Manager
David S. Glaves Date

INTEGRATED SERVICE COMPANY, L.L.C.
1900 N. 161st. E. AVENUE
TULSA, OKLAHOMA 74116

Procedure Qualification Record (PQR)

PQR No.: 90-1884-6 Date: 4/4/1990 WPS No.: 1-F-1

JOINT DESIGN (QW-402)
Weld Type: Groove weld
Groove Type: Single-V groove
Backing: Open butt, no back weld
Root Opening: 1/8 in. Root Face: 1/16 in.
Groove Angle: 60 °

BASE METALS (QW-403)
Specification Type and Grade:
SA-516, Grade 70 to SA-516, Grade 70
P-No. 1 Group No. 2 to P-No. 1 Group No. 2
Thickness (in.): 0.7500

PREHEAT (QW-406)
Minimum Preheat Temperature: 50 °F
Maximum Interpass Temperature: 400 °F
Preheat Maintenance: None after weldment

POSTWELD HEAT TREATMENT (QW-407)
Type: No PWHT performed
PWHT Temperature: None °F
PWHT Holding Time: None hr.

	1st Process **FCAW / Semiautomatic**
Weld Process / Method	
POSITION (QW-405)	
Position of Joint	1G - Flat
Weld Progression	N/A
GAS (QW-408)	
Shielding Gas / CFH	75% Argon, 25% CO2 / 25
Trailing Gas / CFH	None / -
Backing Gas / CFH	None / -
FILLER METAL (QW-404)	
AWS Classification	E71T-1
SFA Spec. / F-No.	5.20 / 6
A-No. or Chemical Composition	1
Filler Metal Trade Name	n/r
Filler Metal Product Form	Flux cored
Supplemental Filler Metal	None
Weld Deposit 't' (in.)	0.7500
Pass Greater Than ½":	No
Filler Metal Size (in.)	0.0450 | - | -
ELECTRICAL (QW-409)	
Amperage Used	200-225 | - | -
Voltage Used	20-24 | - | -
Travel Speed (in/min)	12-22 | - | -
Max. Heat Input (J/in)	27000
Current Type and Polarity	DCEP (reverse)
Transfer Mode	Globular arc
TECHNIQUE (QW-410)	
Stringer or Weave Bead	Stringer and weave bead
Multiple / Single Pass (per side)	Multipass
Nozzle / Gas Cup Size	5/8"
Contact Tube to Work Distance	1/2"-1"

(1) Peening was not used with this weld test.
No Pass > 1/2" t.
Added Impact Test per Lab#99-050033-1

INTEGRATED SERVICE COMPANY, L.L.C.

Procedure Qualification Record (PQR)

PQR No.: **90-1884-6**

Tensile Test (QW-150)

Specimen No.	Width (in.)	Thickness (in.)	Area (in^2)	Ultimate Total Load (lb)	Ultimate Unit Stress (PSI)	Failure Type and Location
1	0.982	0.760	0.746	66200	88700	Base metal
2	0.982	0.755	0.741	65500	88400	Base metal

Hardness Test - Vickers hardness

Location	Readings								
SA-516 BM	167	156	168	156	167	156			
SA-516 HAZ	174	170	170	173	170	173	175	170	168
Weld Metal	172	176	174	166	167	170	168	165	

Visual Examination: Satisfactory

Liquid Penetrant Test: Satisfactory

Deposit Chemistry:C=0.06,Mn=1.35,P=0.009,S=0.016,Si=0.58,Cu=0.01, Ni=0.05,Cr=0.03,Mo=0.02

No addition/deletion of supplemental filler metal or powder filler metal.

Vickers hardness test performed by Weeks Lab. 8-21-08 for Inserv.

Welder's Name: Ron Cody I.D.: Stamp No.: T

PQR was done and welding of coupon was witnessed by: Cust-O-Fab Inc

Test conducted by: Metlab Testing Services Lab Test No.: 90-1884-6

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

By: David S. Glaves 8/21/2008 QC Manager

David S. Glaves — Date

INTEGRATED SERVICE COMPANY, L.L.C.
1900 N. 161st. E. AVENUE
TULSA, OKLAHOMA 74116

Procedure Qualification Record (PQR)

PQR No.: 92-2474 Date: 4/22/1992 WPS No.: 1-F-1

JOINT DESIGN (QW-402)
Weld Type: Groove weld
Groove Type: Single-V groove
Backing: Open butt, no back weld
Root Opening: 1/8 in. Root Face: 1/16 in.
Groove Angle: 60 °

BASE METALS (QW-403)
Specification Type and Grade:
SA-516, Grade 70 to SA-516, Grade 70
P-No. 1 Group No. 2 to P-No. 1 Group No. 2
Thickness (in.): 0.3750

PREHEAT (QW-406)
Minimum Preheat Temperature: 60 °F
Maximum Interpass Temperature: 450 °F
Preheat Maintenance: None after weldment

POSTWELD HEAT TREATMENT (QW-407)
Type: No PWHT performed
PWHT Temperature: None °F
PWHT Holding Time: None hr.

	1st Process **FCAW / Semiautomatic**		
Weld Process / Method			
POSITION (QW-405)			
Position of Joint	1G - Flat		
Weld Progression	N/A		
GAS (QW-408)			
Shielding Gas / CFH	75% Argon, 25% CO2	/	25
Trailing Gas / CFH	None	/	-
Backing Gas / CFH	None	/	-
FILLER METAL (QW-404)			
AWS Classification	E71T-1		
SFA Spec. / F-No.	5.20	/	6
A-No. or Chemical Composition	1		
Filler Metal Trade Name	n/r		
Filler Metal Product Form	Flux cored		
Supplemental Filler Metal	None		
Weld Deposit 't' (in.)	0.3750		
Pass Greater Than ½":	No		
Filler Metal Size (in.)	0.0450	-	-
ELECTRICAL (QW-409)			
Amperage Used	170-270	-	-
Voltage Used	24-28	-	-
Travel Speed (in/min)	Var.	-	-
Max. Heat Input (J/in)	None		
Current Type and Polarity	DCEP (reverse)		
Transfer Mode	Globular arc		
TECHNIQUE (QW-410)			
Stringer or Weave Bead	Stringer and weave bead		
Multiple / Single Pass (per side)	Multipass		
Nozzle / Gas Cup Size	5/8"		
Contact Tube to Work Distance	1/2"-3/4"		

(1) Peening was not used with this weld test.
Revised to indicate globular arc FCAW transfer mode.

INTEGRATED SERVICE COMPANY, L.L.C.

Procedure Qualification Record (PQR)

PQR No.: 92-2474

Tensile Test (QW-150)

Specimen No.	Width (in.)	Thickness (in.)	Area (in^2)	Ultimate Total Load (lb)	Ultimate Unit Stress (PSI)	Failure Type and Location
1	0.758	0.354	0.268	23800	88800	Base metal
2	0.756	0.334	0.253	22400	88500	Base metal

Guided Bend Tests (QW-160)

Type and Figure No.	Result	Type and Figure No.	Result
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory

Hardness Test - Brinell hardness

Location	Readings								
SA-516 BM	156	170	159						
SA-516 HAZ	163	183	174						
Weld Metal	187	192	200						

Welder's Name: Rick Barbee I.D.: Stamp No.: YY

PQR was done and welding of coupon was witnessed by: Cust-O-Fab Inc

Test conducted by: Metlab Testing Services Lab Test No.: 92-2474

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

By: David S. Glaves 4/22/1992 QC Manager

David S. Glaves — Date