FINAL 2011 BIENNIAL INTEGRITY TESTING REPORT OF BULK FIELD CONSTRUCTED UNDERGROUND STORAGE TANK 4

JOINT BASE PEARL HARBOR – HICKAM / RED HILL, HAWAII

Prepared for:
Defense Logistics Agency Energy
Ft. Belvoir, Virginia

Prepared under:
NAVFAC Atlantic
Contract N62470-10-D-3000-0004

Submitted by:
Michael Baker Jr., Inc.
Virginia Beach, VA

Date:
6 APRIL 2011

Project: 119864
Task: 4.1.41

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LIST OF ABBREVIATIONS AND ACRONYMS

Baker	Michael Baker Jr., Inc.
BFCUST	Bulk Field-Constructed Underground Storage Tank
BMP	Best Management Practice
DLA	Defense Logistics Agency
gph	Gallons per hour
JB	Joint Base
MDLR	Minimum Detectable Leak Rate
MTC	Mass Technology Corporation
NAVFAC	Naval Facilities Engineering Command
PMMS	Precision Mass Measurement System
(P_D)	Probability of detection
(P_{FA})	Probability of false alarm
PSA	Product Surface Area
QA/QC	Quality Assurance/Quality Control

PROFESSIONAL ENGINEER CERTIFICATION:

Final 2011 Biennial Integrity Testing Report
Of Bulk Field Constructed Underground Storage Tank 4
Joint Base Pearl Harbor – Hickam / Red Hill, Hawaii

This report has been reviewed by a professional engineer and has been prepared in accordance with good engineering practices. Laboratory results, field notes, and supporting data have been reviewed and referenced correctly.

I hereby certify that I have examined this report and attest that it has been prepared in accordance with good engineering practices.

Engineer: Christopher D. Caputi, P.E.

Registration Number: 032382

State: Virginia

Date: 6 April 2011

EXECUTIVE SUMMARY

The scope of this project is to perform biennial integrity testing of Bulk Field Constructed Underground Storage Tank (BFCUST) 4 at Joint Base (JB) Pearl Harbor – Hickam / Red Hill, Hawaii. There are currently no regulations that outline test requirements for BFCUSTs at Red Hill. This test was performed as a Defense Logistics Agency (DLA) Energy best management practice (BMP).

BFCUST 4 was Mass Technology Corporation (MTC) integrity tested from 9 March to 17 March 2011 with no detectable leak above the test method's minimum detectable leak rate of 0.7 gallons per hour (gph) resulting in a passing test result.

BFCUST 4 should be retested on or before the biennial anniversary date of 17 March 2013.

1.0 INTRODUCTION

1.1 Purpose of Project

The Defense Logistics Agency (DLA) Energy contracted Michael Baker Jr., Inc. (Baker) through Naval Facilities Engineering Command (NAVFAC) Atlantic Contract N62470-10-D-3000-0004 to perform biennial integrity testing of Bulk Field Constructed Underground Storage Tank (BFCUST) 4 at Joint Base (JB) Pearl Harbor – Hickam / Red Hill, Hawaii. There are currently no regulations that outline test requirements for BFCUSTs at Red Hill. This test was performed as a DLA Energy best management practice (BMP).

1.2 Site Background and History

BFCUST 4 is 100 feet in diameter, 250 feet in height and has a capacity of 12,600,000 gallons of JP-8. The BFCUSTs at Red Hill are constructed within Red Hill and are accessible through an underground tunnel system. The top tunnel is located approximately 60 feet below the top section of the tank. The bottom tunnel is located at the same elevation as the tank's base. The issue / receipt and water drain pipelines are adjacent to the tank and immediately accessible from within the lower tunnel.

1.3 Historical Leak Detection Results

Historical records show that the last test performed on BFCUST 4 occurred in June 2009 with passing results.

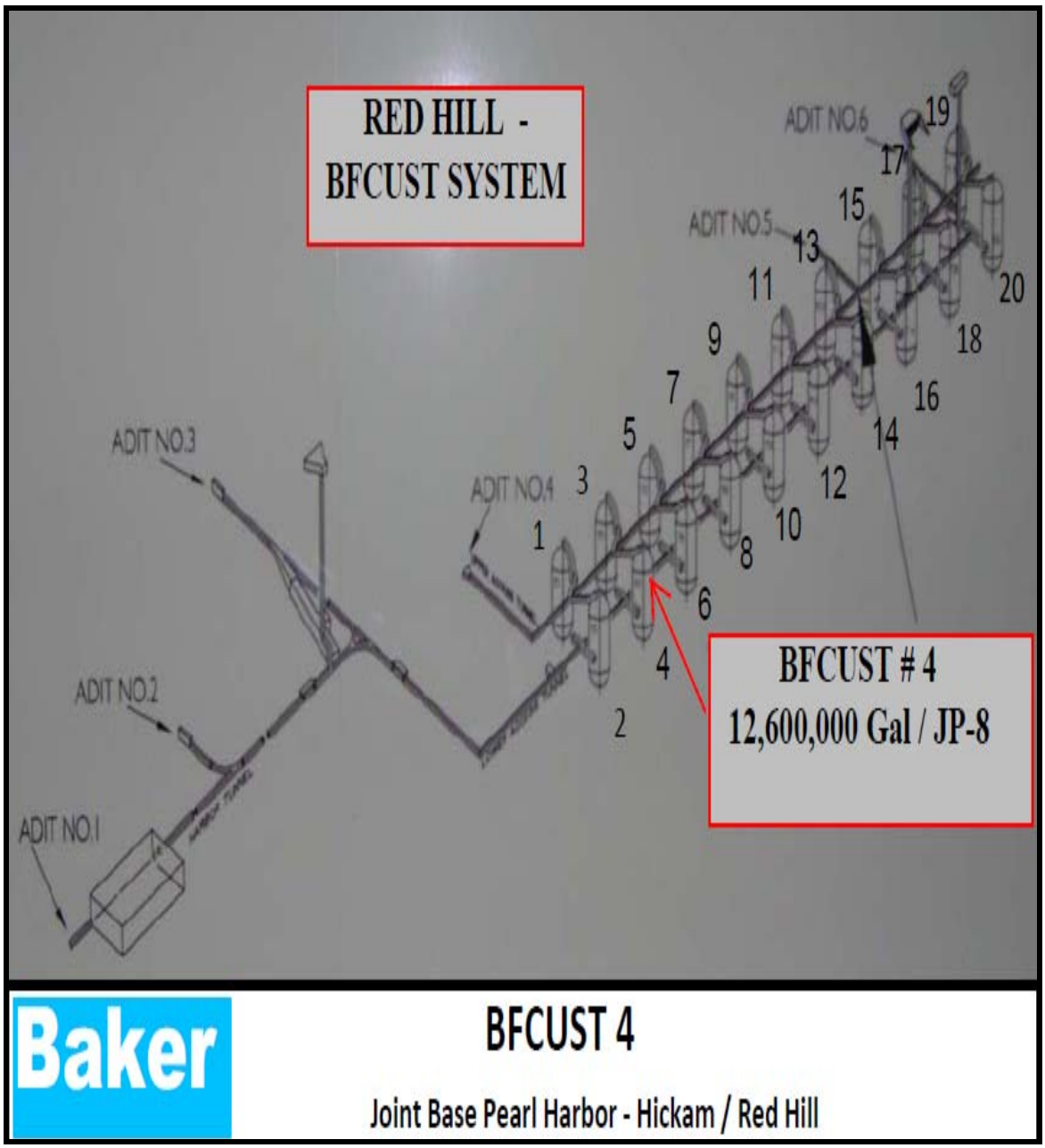
1.4 Project Scope

A Mass Technology Corporation (MTC) integrity test on BFCUST 14 was performed from 9 March to 17 March 2011. Table 1-1 provides a description of the system tested. Figure 1-1 provides a detail of the Red Hill system layout and location of BFCUST 4. Figures 1-2 and 1-3 provide photographs of typical top and bottom of tank access.

Table 1-1 Items Tested

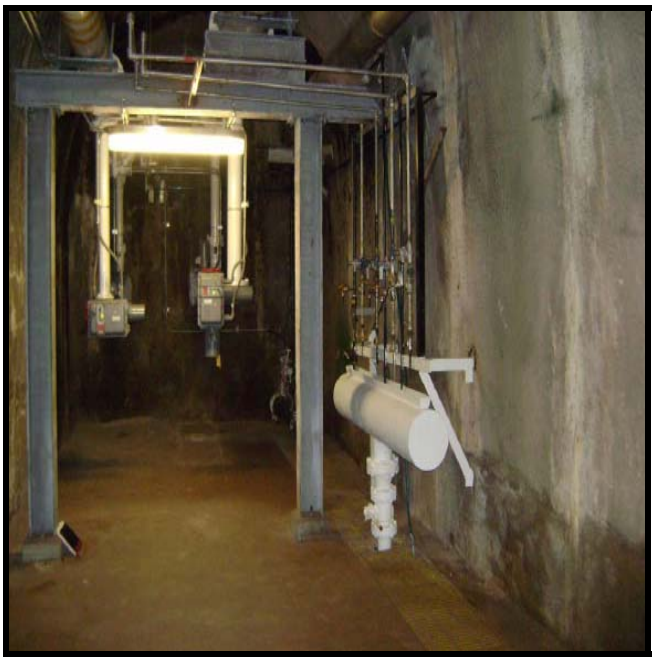
Designation	Product	Volume (Gallons)	Height (Feet)	Diameter (Feet)	Comments
BFCUST 4	JP-8	12,600,000	250	100	Product Level @ Test – 201 Feet

Figure 1-1: Red Hill – System Layout



(Source: Baker, 2009)

Figure 1-2: Typical Tank Bottom Access



(Source: Baker, 2009)

Figure 1-3: Typical Tank Top Access

(Source: Baker, 2009)

1.5 Project Team

Baker subcontracted MTC to perform the integrity testing. Oversight, coordination with facility fuels representatives, quality assurance/quality controls, and final report preparation and submission was provided by Baker personnel.

1.6 Qualifications of Testing Procedures Used

The testing procedures used were those defined as the MTC - Precision Mass Measurement Systems (PMMS) SIM-1000 / CBU-1000 (72 hour test) leak detection method. Determination of leakage was based on the criteria established in the Ken Wilcox Associates third party evaluation. The MTC - PMMS (72 hour test) is certified with a capability to detect leaks on a tank with a product surface area of 7,850 square feet at a rate of 0.35 gallons per hour (gph), a probability of detection of 95 percent, and probability of a false alarm of 5 percent. Due to the extreme height of the tank a total of 168 hours of testing was performed. This time frame included 48 hour stabilization and two 72 hour test periods. The two 72 hour tests were averaged to achieve a conservative minimal detectable leak rate (MDLR) of 0.7 gph.

The description of the National Work Group on Leak Detection Evaluations (NWGLDE, 2011) for MTC's - PMMS 72 hour test is provided below:

72 hour test 50,000 gallons or greater

Leak rate is proportional to product surface area (PSA).

For tanks with PSA of 14,200 ft², leak rate is 0.638 gph with P_D = 95% and P_{FA} = 5%.

For other tank sizes, leak rate equals [(PSA in ft² ÷ 14,200 ft²) x 0.638 gph].

Example:

For a tank with PSA = 20,000 ft²; leak rate = [(20,000 ft² ÷ 14,200 ft²) x 0.638 gph] = 0.898 gph.

2.0 INTEGRITY TESTING AND RESULTS

MTC's test report is provided in Appendix A. BFCUST 4 was integrity tested with no detectable leak above the test method's MDLR of 0.7 gph. Test results are listed in Table 2-1.

Table 2-1 Test Results

Designation	Product	Volume (Gallons)	Height (Feet)	Certified MDLR (gph)	Test Date	Result
BFCUST 4	JP-8	12,600,000	250	0.7	3/9 – 3/17/2011	Pass

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

BFCUST 4 **passed** the 2011 biennial integrity testing.

3.2 Recommendations

As a DLA BMP, BFCUST 4 should be retested on or before the biennial anniversary date of 17 March 2013.

4.0 REFERENCES

NWGLDE, 2011 Eighteenth Addition, 2011, List of Leak Detection Evaluations for Storage Tank Systems. January 2011.

APPENDIX A –

MASS TECHNOLOGY CORP TEST REPORT

Precision Leak Measurement Report
P.O. Box 1578
Kilgore, Texas 75662

FISC Red Hill
Pearl Harbor, HI

Project Manager – Mr. Mark Caldon

Site Supervisor – Alfred Thyrring

Scope of Work: Furnish all required management, labor, services, materials and equipment to perform the required annual tightness testing of Tank # 4 an underground fuel storage tank located at FISC Red Hill, Pearl Harbor, HI.

Report compiled by: Larry D. Speaks

Larry D. Speaks

Date: 03-25-2011

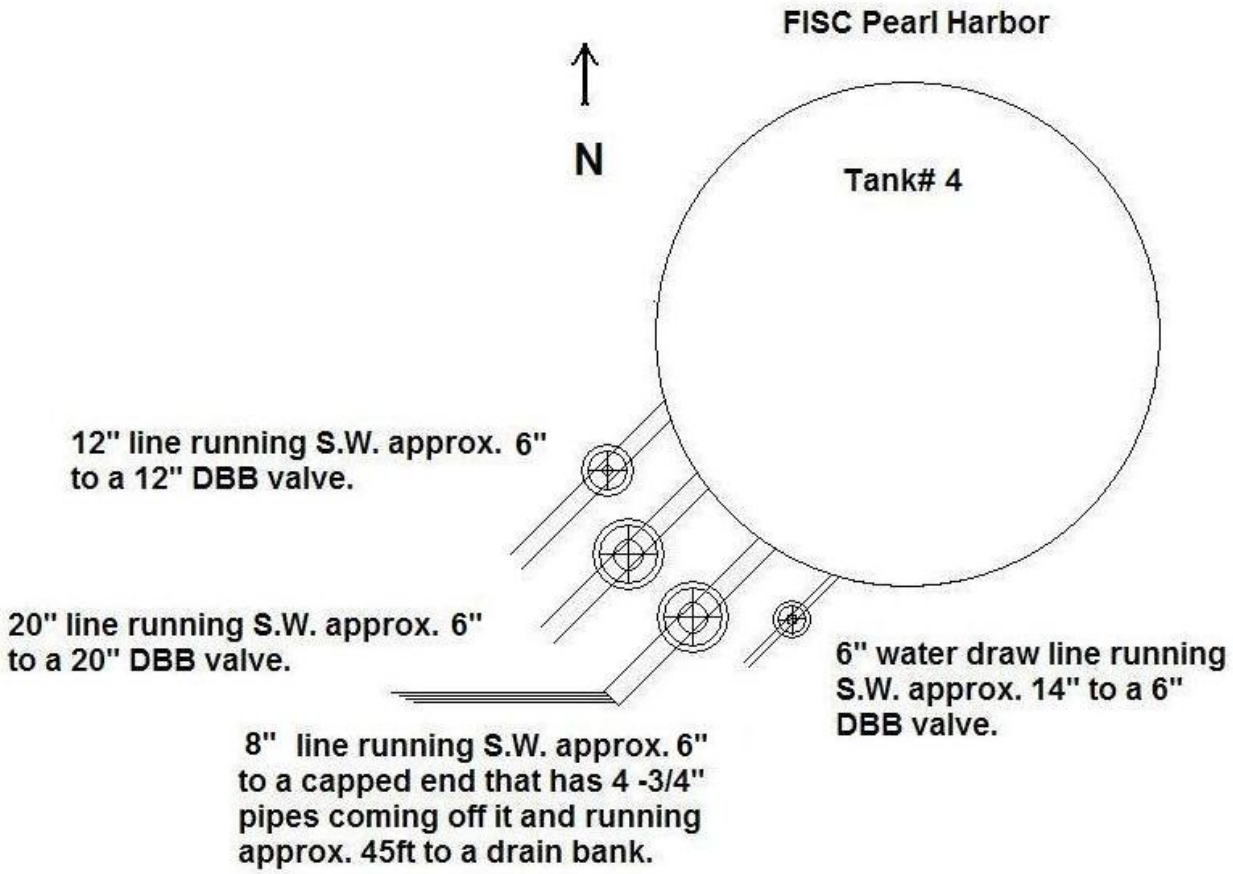
Summary

Testing of Tank # 4 a 12,600,000 gal underground storage tank located at FISC Red Hill, Pearl Harbor, Hawaii commenced March 9, 2011 and was completed March17, 2011. The tank was filled with JP-8 and a precision leak test was conducted. The result of that testing is that the tank system is determined to be tight to isolation. All tank valves were adequately secured such that no unusual readings were noted. Testing was performed using the Mass Technology Corporation protocols set out in the third party evaluations. All tank valves were adequately secured such that any fluid loss was isolated to leakage. Therefore, the containment integrity of the tank was not compromised and the test is considered conclusive.

Tank # 4: After 168 hours of testing the tank is certified to be tight.

Tank Data Tank # 4

Diameter:	100 ft.	Height:	250 ft.
Tank Type:	Vertical UST	Contents:	JP-8
Properties:	0.80 Specific Gravity	Product Level:	201 ft.
Start Date:	03-09-2011	Completion Date:	03-17-2011
Unit Operator:	Alfred Thyrring	Test Results:	Certified Tight



All dimensions, line locations, sizes and valve descriptions have been furnished by the facility operator.

Results

The fluid mass data was recorded over a 168-hour period. A linear regression of the recorded fluid mass data resulted in a leak rate detected below the minimum detection level of 0.7 gallons per hour. All tank valves were adequately secured such that any fluid loss was isolated to leakage. Therefore, the containment integrity of the tank was not compromised and the test is considered conclusive.

Tank # 4 is certified to be tight.