



2021 One-time Leak Detection Testing Report of 11 Sections of Petroleum Pipelines

Joint Base Pearl Harbor-Hickam, Hawaii



Prepared under:

NAVFAC Atlantic Contract

N62470-16-D-9007, Delivery Order N6247021F4013

Prepared for:

Defense Logistics Agency Energy and

**Naval Facilities Engineering Systems Command
Atlantic**

Prepared by:

Michael Baker International

Virginia Beach, Virginia

Date:

16 February 2021

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of 11 Sections of Petroleum Pipelines**

Joint Base Pearl Harbor-Hickam, Hawaii

Prepared for:

Defense Logistics Agency Energy

Fort Belvoir, Virginia

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PROFESSIONAL ENGINEER CERTIFICATION**2021 One-time Leak Detection Testing Report of 11 Sections of Petroleum Pipelines****Joint Base Pearl Harbor-Hickam,
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: 16 February 2021



EXECUTIVE SUMMARY

The scope of this project is to perform the one-time leak detection testing of 14 sections of petroleum pipelines associated with Valve Station (VS) 3 at Joint Base Pearl Harbor-Hickam, Hawaii. The leak detection testing was performed at the request of Naval Facilities Engineering Systems Command Atlantic and in accordance with the Defense Logistics Agency Energy Leak Detection Centrally Managed Program pollution prevention Best Management Practice.

Upon mobilization and system review, six sections of petroleum pipelines were combined into three sections of petroleum pipelines for testing purposes. Consequently, the final 2021 one-time leak detection testing event included 11 sections of petroleum pipelines.

The one-time leak detection testing of nine sections of petroleum pipelines was performed, by [REDACTED], between 14 and 19 January 2021, with no detectable leak above the test methods' minimum detectable leak rates (MDLRs), resulting in passing tests.

The one-time leak detection testing of one section of petroleum pipeline, Jet A Commercial Aviation Fuel with Military Additives (F-24) VS 3 to Hotel Pier Loop, was performed by [REDACTED] on 16 January 2021, resulting in a failing test due to suspected air in the pipeline. After purging additional air from the pipeline, the section was retested by [REDACTED] on 17 January 2021, with no detectable leak above the test method's MDLR, resulting in a passing test.

The one-time leak detection testing of the one remaining section of petroleum pipeline, Multiproduct (MP) Defuel VS 3 to VS 1C, was performed by [REDACTED] on 20 January 2021, resulting in a failing test due to suspected isolation issues. After skillets were installed by others, the section was retested by [REDACTED] on 23 January 2021, resulting in a failing test due to the leak rate exceeding the test method's MDLR. The MDLR for this section was 0.07 gallons per hour (rounded to the hundredth decimal place).

The environmental regulatory compliance of this site is the responsibility of the base and the service.

1.0 INTRODUCTION

1.1 Purpose of Project

In support of the Defense Logistics Agency (DLA) Energy, Naval Facilities Engineering Systems Command (NAVFAC) Atlantic contracted Michael Baker International (Michael Baker) through NAVFAC Atlantic Contract N62470-16-D-9007, Delivery Order N6247021F4013, to perform the one-time leak detection testing of 14 sections of petroleum pipelines associated with Valve Station (VS) 3 at Joint Base (JB) Pearl Harbor-Hickam, Hawaii. The leak detection testing was performed at the request of NAVFAC Atlantic and in accordance with the DLA Energy Leak Detection Centrally Managed Program (CMP) pollution prevention Best Management Practice.

1.2 Site Background and History

JB Pearl Harbor-Hickam is located on the island of Oahu, northwest of Honolulu, Hawaii. The fueling operations are under the command of Fleet Logistics Center Pearl Harbor. JB Pearl Harbor-Hickam has three primary bulk fuel facilities (Naval Station [NS] Pearl Harbor Facility, Hickam Air Field Facility, and the Red Hill Fuel Storage Complex). The pipelines in this report are associated with VS 3 at the NS Pearl Harbor Facility.

At the NS Pearl Harbor Facility, Jet A Commercial Aviation Fuel with Military Additives (F-24), Jet Propellant 5 (JP-5), and Marine Diesel (F-76) are received via tanker vessel at Hotel, Kilo, Mike, Bravo, and Sierra piers or off-base pipeline. The Kilo Pier and off-base pipeline are designated as Multiproduct (MP). The Kilo Pier is currently configured for the transfer of F-76. Fuel is stored in field-constructed aboveground storage tanks and issued to fueling piers and truck fill stands via aboveground and underground single-walled steel piping.

1.3 Historical Testing Results

This report documents the first time that leak detection testing has been performed on the 14 sections of petroleum pipelines associated with VS 3 under the DLA Energy Leak Detection CMP. These sections of

petroleum pipelines, except for MP Defuel VS 3 to VS 1C, are included in the annual static liquid pressure testing under the DLA Energy Leak Detection CMP.

1.4 Project Scope

The scope of this project is to perform one-time leak detection testing of 14 sections of petroleum pipelines at JB Pearl Harbor-Hickam, Hawaii. Upon mobilization and system review, six sections of petroleum pipelines were combined into three sections of petroleum pipelines for testing purposes. Retests were also performed on two sections of petroleum pipelines. Consequently, the final 2021 one-time leak detection testing event included 11 sections of petroleum pipelines.

Table 1-1 provides a project summary. Figure 1-1 provides an overview of JB Pearl Harbor-Hickam and Figures 1-2 and 1-3 provide overviews of the test sections.

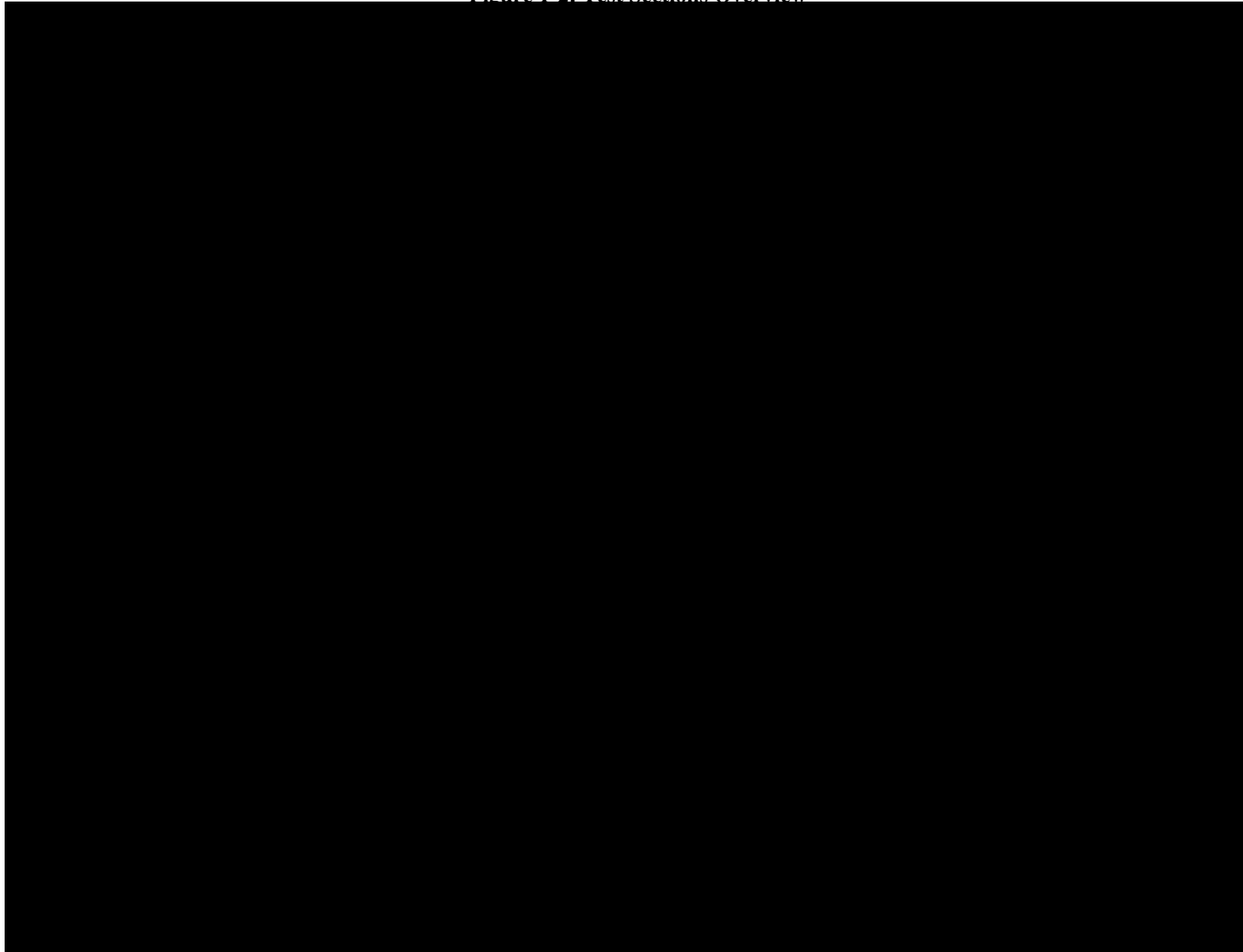
Table 1-1: Project Summary

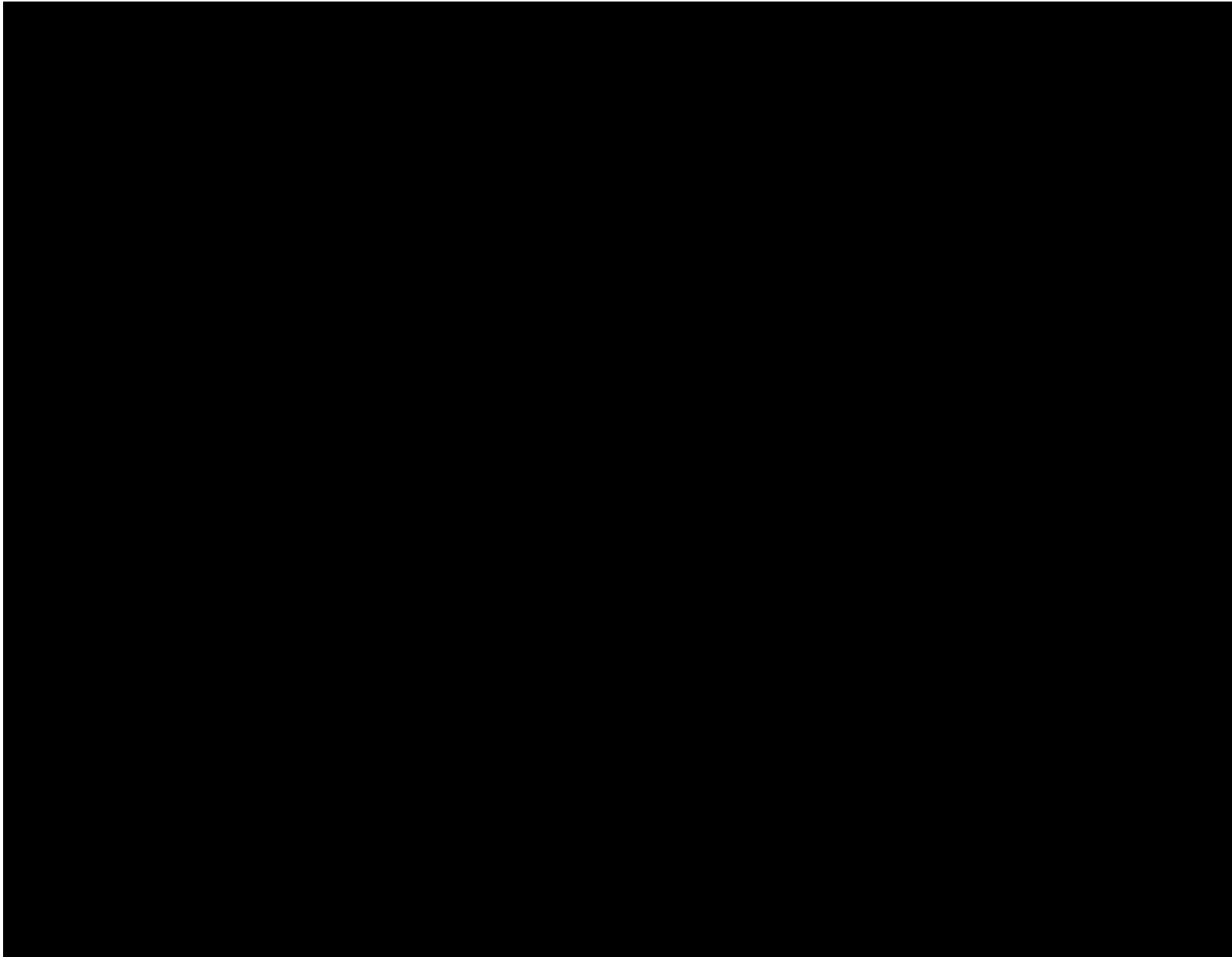
| Fuel System | Fuel System Asset | Leak Detection Test Section | Product | Diameter (Inches) | Length (Feet) | Volume (Gallons) |
|---|---|---|---------|-------------------|---------------|------------------|
| Transfer Pipelines | Hotel Pier to PH 59 (JP-5) (Inside and Outside Loop & Tank 55 Fill Line) | JP-5 VS 3 to VS 1C Outer | JP-5 | ■ | ■ | ■ |
| | | JP-5 VS 3 to VS 1C Inner | JP-5 | ■ | ■ | ■ |
| | | JP-5 VS 3 to Hotel Pier Loop ¹ | JP-5 | ■ | ■ | ■ |
| | Hotel Pier to PH 59 (F-24) (Inside and Outside Loop) | F-24 VS 3 to VS 1C Outer | F-24 | ■ | ■ | ■ |
| | | F-24 VS 3 to VS 1C Inner | F-24 | ■ | ■ | ■ |
| | | F-24 VS 3 to Hotel Pier Loop ^{1,2} | F-24 | ■ | ■ | ■ |
| | Hotel Pier to PH 59 (F-76) (Inside and Outside Loop) | F-76 VS 3 to VS 1C Outer | F-76 | ■ | ■ | ■ |
| | | F-76 VS 3 to VS 1C Inner | F-76 | ■ | ■ | ■ |
| | | F-76 VS 3 to Hotel Pier Loop ¹ | F-76 | ■ | ■ | ■ |
| | Kilo Pier | F-76 VS 3 to K116A | F-76 | ■ | ■ | ■ |
| | Defuel | MP Defuel VS 3 to VS 1C ² | MP | ■ | ■ | ■ |
| | Table Notes: | | | | | |
| 1. Originally test section was to be tested as two separate sections, terminating at the two isolation valves at the foot of the pier; however, due to isolation issues the sections were combined and included the Hotel Pier loop for each fuel type. | | | | | | |
| 2. Retest performed. | | | | | | |

Figure 1-1: JB Pearl Harbor-Hickam Overview



Figure 1-2: Test Sections Overview





1.5 Project Team

Michael Baker subcontracted [REDACTED] to perform the one-time leak detection testing and [REDACTED] to provide mechanical support. Field-testing oversight, coordination with facility fuel representatives, quality assurance/quality controls, and final report preparation and submission were provided by Michael Baker personnel.

1.6 Qualifications and Technical Approach

The leak detection testing in this report was performed at normal operating pressure or higher with a test method listed with the National Work Group on Leak Detection Evaluations as described below.

[REDACTED] is certified with a capability to detect leaks at a rate of 0.002 percent of the pipeline volume per hour, with a probability of detection (P_D) greater than 95 percent and a probability of a false alarm (P_{FA}) less than 5 percent. [REDACTED] was approved by third-party evaluation to test volumes between [REDACTED] gallons.

[REDACTED] is certified with a capability to detect leaks at a rate of 0.068 gallons per hour (gph) with a P_D of 95 percent and a P_{FA} of 5 percent. [REDACTED] was approved by third-party evaluation to test volumes equal to or less than [REDACTED].

[REDACTED] is certified with a capability to detect leaks at a rate of 0.00078 percent of the line volume per hour, with a P_D greater than 95 percent and a P_{FA} less than 5 percent. [REDACTED] was approved by third-party evaluation to test volumes between [REDACTED]. While capable of detecting 0.00078 percent of the line volume per hour, this leak detection method was limited in use to a minimum detectable leak rate (MDLR) of 0.49 gph to align with federal and state underground storage tank regulations.

2.0 TESTING RESULTS

The [REDACTED] test report is provided in Appendix A.

The one-time leak detection testing of nine sections of petroleum pipelines was performed, [REDACTED] between 14 and 19 January 2021, with no detectable leak above the test methods' MDLRs, resulting in passing tests.

The one-time leak detection testing of one section of petroleum pipeline, F-24 VS 3 to Hotel Pier Loop, was performed [REDACTED] on 16 January 2021, resulting in a failing test due to suspected air in the pipeline. After purging additional air from the pipeline, the section was retested [REDACTED] on 17 January 2021, with no detectable leak above the test method's MDLR, resulting in a passing test.

The one-time leak detection testing of the one remaining section of petroleum pipeline, MP Defuel VS 3 to VS 1C, was performed [REDACTED] on 20 January 2021, resulting in a failing test due to suspected isolation issues. After skillets were installed by others, the section was retested [REDACTED] on 23 January 2021, resulting in a failing test due to the leak rate exceeding the test method's MDLR. The MDLR for this section was 0.07 gph (rounded to the hundredth decimal place).

The results summary is listed in Table 2-1.

Table 2-1: Results Summary

| Fuel System | Fuel System Asset | Leak Detection Test Section | Volume (Gallons) | Reference Pressure ¹ (psi) | Test Method | MDLR ² (gph) | Test Date | Result |
|--------------------|---|------------------------------|------------------|---------------------------------------|-------------|-------------------------|-----------------|-------------------|
| Transfer Pipelines | Hotel Pier to PH 59 (JP-5) (Inside and Outside Loop & Tank 55 Fill Line) | JP-5 VS 3 to VS 1C Outer | ████ | ██ | █ | ██ | 14 January 2021 | Pass |
| | | JP-5 VS 3 to VS 1C Inner | ████ | ██ | █ | ██ | 14 January 2021 | Pass |
| | | JP-5 VS 3 to Hotel Pier Loop | ████ | ██ | █ | ██ | 15 January 2021 | Pass |
| | Hotel Pier to PH 59 (F-24) (Inside and Outside Loop) | F-24 VS 3 to VS 1C Outer | ████ | ██ | █ | ██ | 16 January 2021 | Pass |
| | | F-24 VS 3 to VS 1C Inner | ████ | ██ | █ | ██ | 16 January 2021 | Pass |
| | | F-24 VS 3 to Hotel Pier Loop | ████ | ██ | █ | ██ | 16 January 2021 | Fail ³ |
| | | | | | | | 17 January 2021 | Pass |
| | Hotel Pier to PH 59 (F-76) (Inside and Outside Loop) | F-76 VS 3 to VS 1C Outer | ████ | ██ | █ | ██ | 19 January 2021 | Pass |
| | | F-76 VS 3 to VS 1C Inner | ████ | ██ | █ | ██ | 19 January 2021 | Pass |
| | | F-76 VS 3 to Hotel Pier Loop | ████ | ██ | █ | ██ | 17 January 2021 | Pass |
| | Kilo Pier | F-76 VS 3 to K116A | ████ | ██ | █ | ██ | 19 January 2021 | Pass |
| | Defuel | MP Defuel VS 3 to VS 1C | ████ | ██ | █ | ██ | 20 January 2021 | Fail ⁴ |
| | | | ████ | ██ | █ | ██ | 23 January 2021 | Fail ⁶ |

Table Notes:

psi=pounds per square inch

1. Basis for reference pressure: vendor test methodology.
2. MDLR rounded to the hundredth decimal place.
3. Failed due to suspected air in the pipeline. Purged additional air from pipeline prior to retest.
4. Failed due to suspected isolation issue. Installed two 6-inch skillets prior to retest.
5. Length and volume decreased for retest due to skillet install removing some aboveground portions (~192-feet) of the test section.
6. Failed due to leak rate exceeding the MDLR.

3.0 CONCLUSIONS

Ten sections of petroleum pipelines passed the 2021 one-time leak detection testing.

One section of petroleum pipeline failed the 2021 one-time leak detection testing.

The environmental regulatory compliance of this site is the responsibility of the base and the service.

APPENDIX A



TEST REPORT

As required by 32 CFR 286.10, the following documents (pages 1 to 18) were sent to the contractor for its assessment of trade secrets, and commercial or financial information that is privileged or confidential. Once we receive their request for redactions and have had a chance to review their request, we will go back to the contractor to indicate what we intend to release. As long as the contractors do not bring a lawsuit to prevent release, we should have the redacted documents (pages 1 to 18) ready for release.

