2019 ONE-TIME STATIC LIQUID PRESSURE TESTING REPORT OF FOUR SECTIONS ((b) (3) (A) FEET) OF PETROLEUM PIER PIPELINES

JOINT BASE PEARL HARBOR - HICKAM, HAWAII

Prepared for:
Defense Logistics Agency Energy
Fort Belvoir, Virginia

Prepared under:
Naval Facilities Engineering Command Atlantic
Contract N62470-16-D-9007,
Delivery Order N6247019F4016

Submitted by:
Michael Baker International
Virginia Beach, Virginia

Date:
13 August 2019

Michael Baker
INTERNATIONAL

Project: 170482
Task: 4.2.3.1.B

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LIST OF ABBREVIATIONS AND ACRONYMS

33 CFR 156.170	Title 33 of the Code of Federal Regulations, Part 156, Section 170
ASME	American Society of Mechanical Engineers
DLA	Defense Logistics Agency
F-24	Jet A with military additives
F-76	Diesel Fuel Marine
JB	Joint Base
JP-5	Jet Propellant 5
MAWP	Maximum Allowable Working Pressure
Michael Baker	Michael Baker International
NAVFAC	Naval Facilities Engineering Command
PH	Pump House
[redacted]	[redacted]
psi	pounds per square inch
VC	Valve Chamber
VS	Valve Station

PROFESSIONAL ENGINEER CERTIFICATION

2019 One-Time Static Liquid Pressure Testing Report of Four Sections ([redacted] of Petroleum Pier 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: 13 August 2019

EXECUTIVE SUMMARY

The scope of this project is to perform one-time static liquid pressure testing of four sections ([redacted] of petroleum pier pipelines at Joint Base Pearl Harbor-Hickam, Hawaii. The testing of these four sections ([redacted] was performed out-of-cycle from the January 2019 annual static liquid pressure testing due to these sections being temporarily out-of-service for repairs. This one-time testing is to ensure that no leaks occur under a static liquid pressure of at least 1.5 times the maximum allowable working pressure as required in Title 33 of the Code of Federal Regulations, Part 156, Section 170 (33 CFR 156.170).

Upon mobilization and system review, the 2019 one-time static liquid pressure testing event was modified as follows:

- One test section - *Hotel Pier to Pump House (PH) 59 (JP-5) (Inside and Outside Loop and Tank 55 Fill Line)* ([redacted]
    - was permanently reduced by [redacted] due to a portion of the pipeline being removed from service;
    - was temporarily reduced by [redacted] due to the isolation of a flanged elbow.

Accordingly, the 2019 one-time static liquid pressure testing included four sections ([redacted] of petroleum pier pipelines at Joint Base Pearl Harbor-Hickam, Hawaii.

One-time static liquid pressure testing of *Hotel Pier to PH 59 (JP-5) (Inside and Outside Loop & Tank 55 Fill Line)* ([redacted] was performed, [redacted] on 5 June 2019, with product, for four hours. The test pressure was maintained for the test duration with adjustments made for thermal expansion and contraction with no reportable failures or other visible leaks, resulting in a passing test.

One-time static liquid pressure testing of the two combined sections, *Mike Pier* [redacted] and *Bravo Pier* [redacted] was performed, [redacted] on 12 June 2019, with product, for four hours. The test pressure was maintained for the test duration with adjustments made for thermal expansion and contraction with no reportable failures or other visible leaks, resulting in a passing test.

One-time static liquid pressure testing of *Sierra Pier* ([redacted] was performed, [redacted] on 14 June 2019, with product, for four hours. The test pressure was maintained for the test duration with adjustments made

for thermal expansion and contraction with no reportable failures or other visible leaks, resulting in a passing test.

In accordance with 33 CFR 156.170, the static liquid pressure testing of four sections ([redacted] of petroleum pier pipelines should be performed with the remaining three sections ([redacted] of petroleum pier pipelines, to align with the original testing anniversary date of 14 January 2020. The annual static liquid pressure testing of seven sections ([redacted] of petroleum pier pipelines must be initiated on or before the anniversary date of 14 January 2020 or not less than 30 days prior to the first transfer conducted past one year from 14 January 2019. The environmental regulatory compliance of this site is the responsibility of the base and the service.

1.0 INTRODUCTION

1.1 Purpose of Project

The Defense Logistics Agency (DLA) Energy contracted Michael Baker International (Michael Baker), through Naval Facilities Engineering Command (NAVFAC) Atlantic Contract N62470-16-D-9007, Delivery Order N6247019F4016 to perform one-time static liquid pressure testing of four sections ([redacted]) of petroleum pier pipelines at Joint Base (JB) Pearl Harbor-Hickam, Hawaii. This one-time testing is to ensure that no leaks occur under a static liquid pressure of at least 1.5 times the maximum allowable working pressure as required in Title 33 of the Code of Federal Regulations, Part 156, Section 170 (33 CFR 156.170). The applicable sections of this regulation are provided in Appendix A.

1.2 Site Background and History

JB Pearl Harbor-Hickam is located in the state of Hawaii on the south side of the Island of Oahu. Fueling operations are under the command of Fleet Logistics Center Pearl Harbor. Fuel is received and issued at five piers: Hotel, Kilo, Mike, Bravo, and Sierra.

Hotel Pier

(b) (3) (A) petroleum pipelines are located at the Hotel Pier for receipt and issue of Jet A with military additives (F-24), Jet Propellant 5 (JP-5), and diesel fuel marine (F-76). The (b) (3) (A) Hotel pier petroleum pipelines (b) (3) (A) [redacted] From VS-1C, the (b) (3) (A) Hotel pier pipelines (b) (3) (A) [redacted] of the Hotel Pier. From VS-3, the (b) (3) (A) Hotel pier pipelines (b) (3) (A) [redacted]. The JP-5 Hotel pier pipeline has an additional (b) (3) (A) [redacted].

Kilo Pier

The Kilo pier pipeline (b) (3) (A) [redacted]. The Kilo pier pipeline is designated as a multi-product pipeline with connections to the F-76, JP-5, and F-24 pipelines at VS-3. Kilo pier is currently configured for the transfer of F-76.

Mike and Bravo Piers

The Mike and Bravo Piers share a common F-76 pipeline that (b) (3) (A) [redacted]. The pipeline then (b) (3) (A) [redacted].

Sierra Pier

The Sierra Pier pipeline (b) (3) (A) [redacted] The Sierra Pier pipelines used for the transfer of F-76 and Fuel Oil Recovery.

1.3 Historical Pressure Testing Results

The 2018 annual static liquid pressure testing of seven sections ([redacted] of petroleum pier pipelines was performed, [redacted] between 17 January 2018 and 22 March 2018, with product, for four hours. The test pressure was maintained for the test duration with adjustments made for thermal expansion and contraction with no reportable failures or visible leaks, resulting in passed tests.

The 2019 annual static liquid pressure testing of three sections ([redacted] of petroleum pier pipelines was performed, [redacted], between 14 and 29 January 2019, with product, for four hours. The test pressure was maintained for the test duration with adjustments made for thermal expansion and contraction with no reportable failures or visible leaks, resulting in passed tests. The remaining four sections ([redacted] of petroleum pier pipelines were not tested in January 2019, due to being temporarily out-of-service for repairs.

1.4 Project Scope

The scope of this project is to perform one-time static liquid pressure testing of four sections ([redacted] of petroleum pier pipelines at Joint Base Pearl Harbor-Hickam, Hawaii.

Upon mobilization and system review, the 2019 one-time static liquid pressure testing event was modified as follows:

- One test section - *Hotel Pier to Pump House (PH) 59 (JP-5) (Inside and Outside Loop and Tank 55 Fill Line)* ([redacted]
    - was permanently reduced by [redacted] due to a portion of the pipeline being removed from service;
    - was temporarily reduced by [redacted] due to the isolation of a flanged elbow.

Accordingly, the 2019 one-time static liquid pressure testing included four sections ([redacted] of petroleum pier pipelines at Joint Base Pearl Harbor-Hickam, Hawaii.

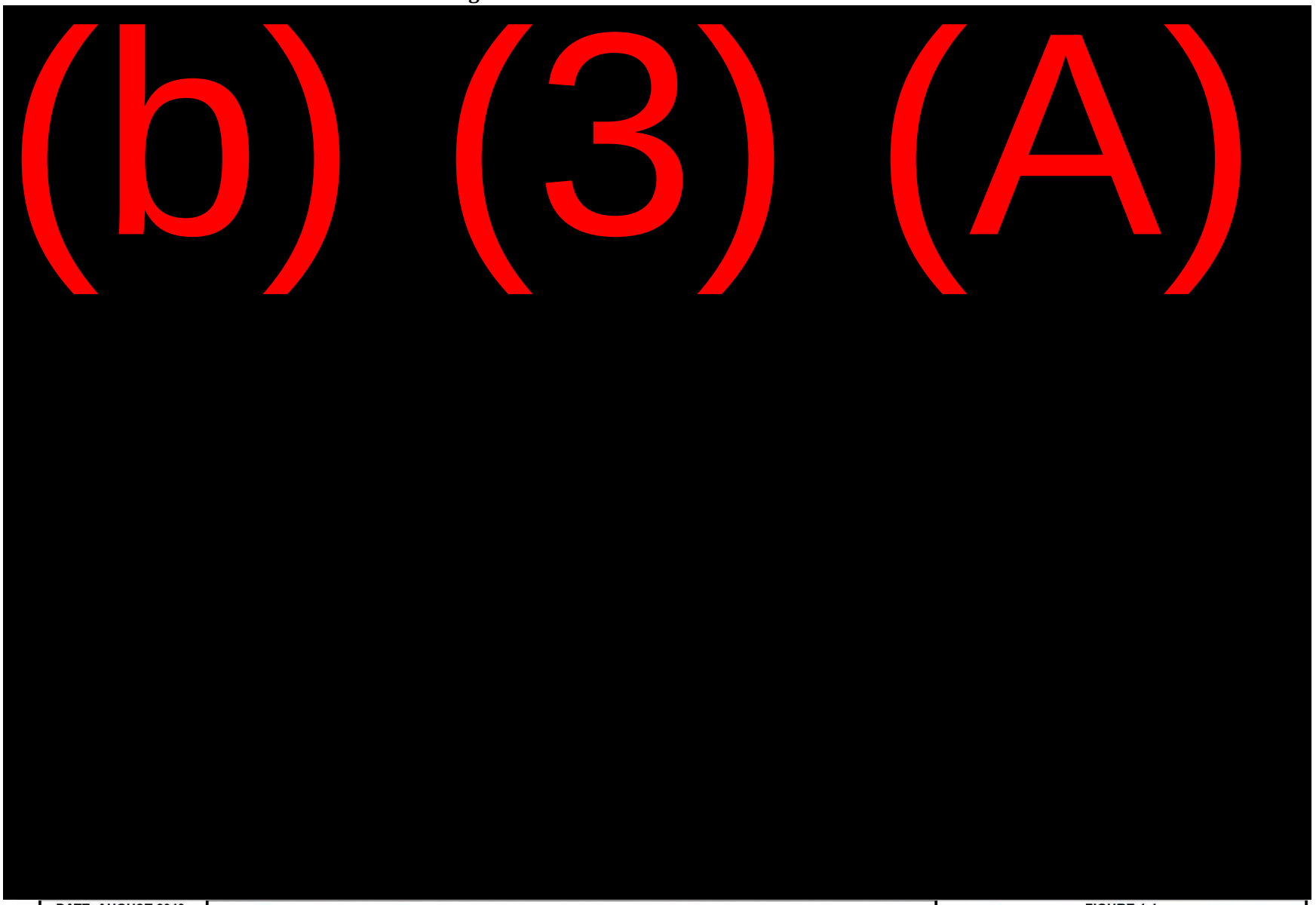
The testing of these four sections ([redacted] was performed out-of-cycle from the January 2019 annual static liquid pressure testing due to these pipelines being temporarily out-of-service for repairs. Table 1-1 provides a project summary. Figures 1-1 through 1-4 provide overviews of JB Pearl Harbor-Hickam and the Hotel, Mike, Bravo, and Sierra piers, respectively.

Exemption (b)(3)

Table 1-1: Project Summary

Fuel System	Designation	Product	Diameter (inches)	Length (feet)	Total Length (feet)	Volume (gallons)	Comments
Transfer Pipelines	Hotel Pier to PH 59 (JP-5) (Inside & Outside Loop & Tank 55 Fill Line)	JP-5	[redacted]	[redacted]	[redacted]	[redacted]	-Test section length permanently reduced by [redacted] due to a portion of pipeline removed from service. -Test section temporarily reduced by [redacted] due to isolation of a flanged elbow. -Two (2) [redacted] blind skillets required to isolate the flanged elbow at the Hotel Pier, between H-2 and H-3
	Mike Pier	F-76	[redacted]	[redacted]	[redacted]	[redacted]	Sections are combined and tested together
	Bravo Pier	F-76	[redacted]	[redacted]	[redacted]	[redacted]	
	Sierra Pier	F-76	[redacted]	[redacted]	[redacted]	[redacted]	Bled excessive air

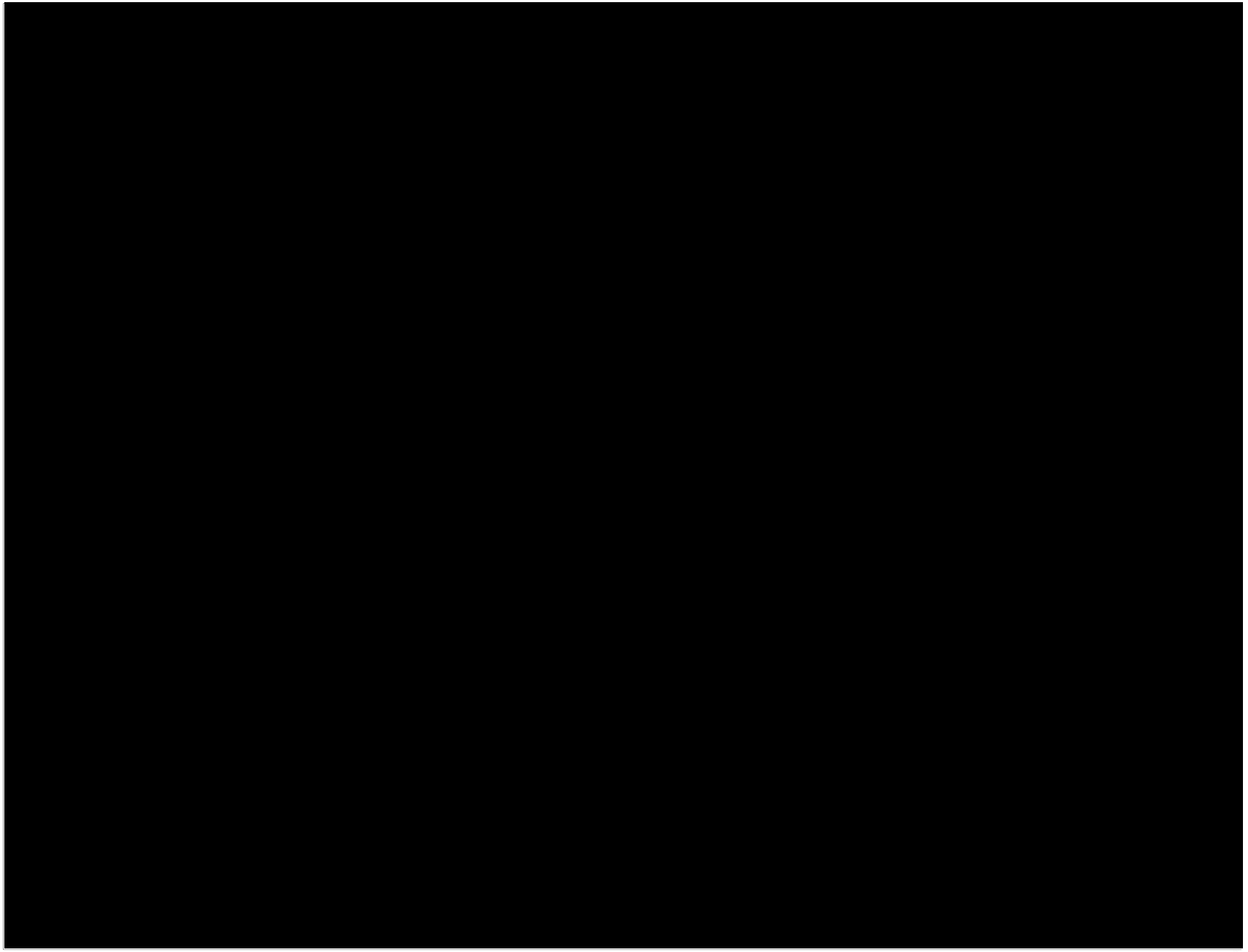
Figure 1-1: JB Pearl Harbor-Hickam Overview



DATE: AUGUST 2019 SCALE: NTS DGN / DWN / CHK BY: MC / JES / LB JOB: 170482 TASK: 4.2.3.1.B	Michael Baker INTERNATIONAL Michael Baker International Virginia Beach, Virginia	FIGURE 1-1 JB PEARL HARBOR - HICKAM OVERVIEW 2019 ONE-TIME STATIC LIQUID PRESSURE TESTING REPORT OF FOUR SECTIONS (b) (3) (A) OF PETROLEUM PIER PIPELINES JOINT BASE PEARL HARBOR - HICKAM, HAWAII

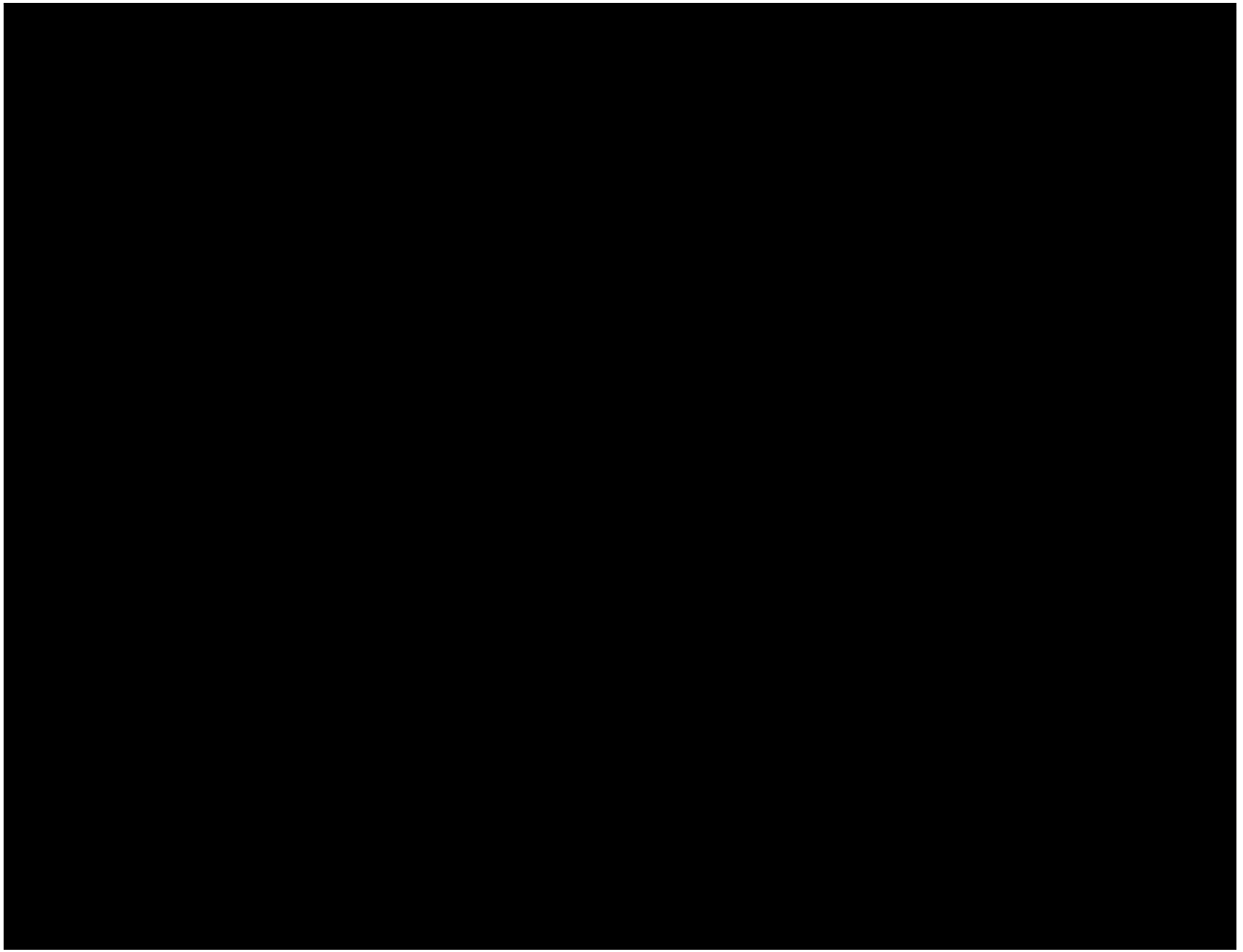
Exemption (b)(3)

Figure 1-2: Hotel Pier Overview



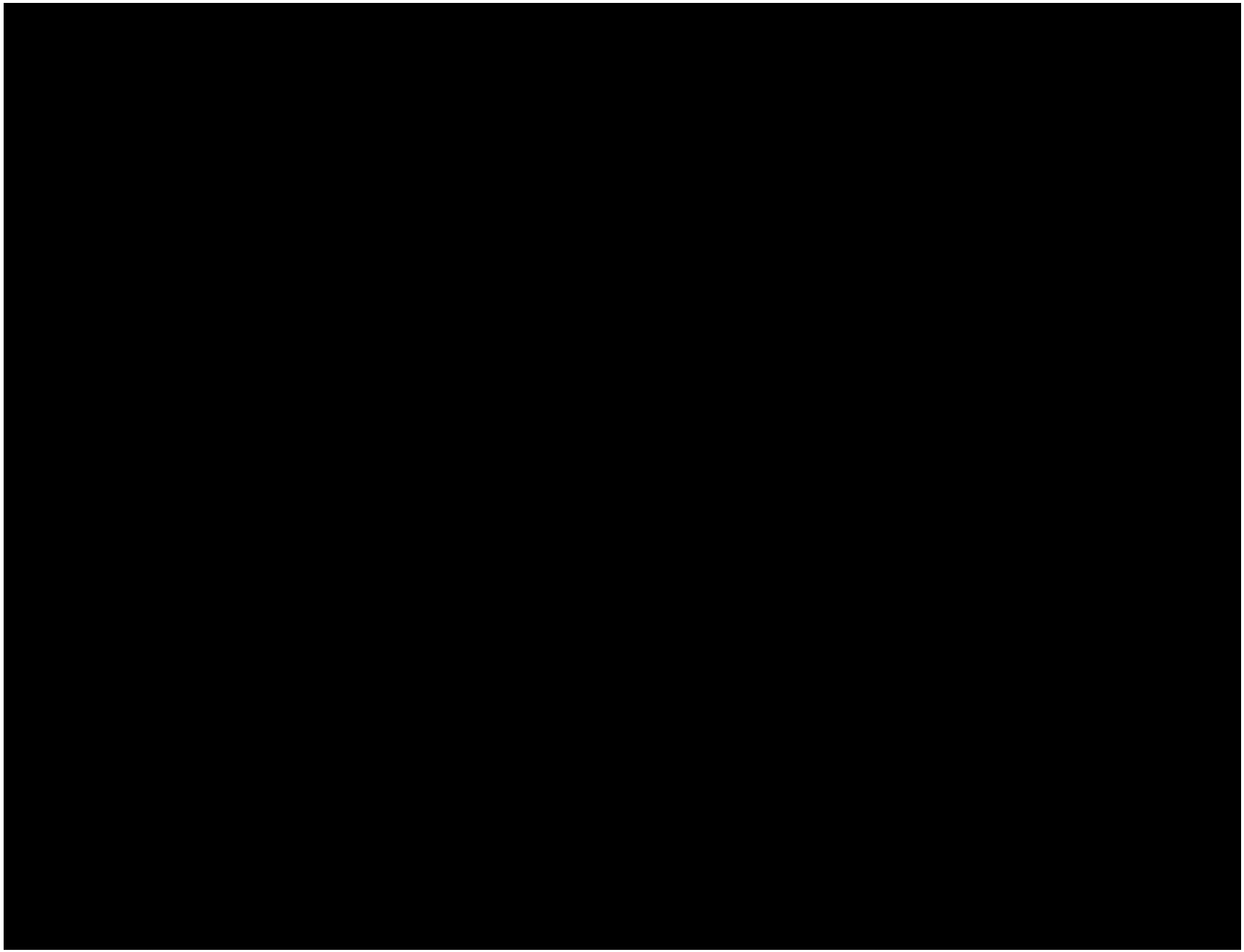
Exemption (b)(4)

Figure 1-3: Mike and Bravo Piers Overview



Exemption (b)(4)

Figure 1-4: Sierra Pier Overview



1.5 Project Team

Michael Baker subcontracted [redacted] to perform the static liquid pressure testing. Field-testing oversight, coordination with facility fuels representatives, quality assurance/quality controls, and final report preparation and submission were provided by Michael Baker personnel.

1.6 Qualifications of Tester and Testing Procedures Used

Testing was performed per the requirements of 33 CFR 156.170. The test equipment, inspections, procedures, and passing criteria used [redacted] are in conformance with the following:

- American Petroleum Institute Recommended Practice – 1110: Pressure Testing of Liquid Petroleum Pipelines.
- Title 49 CFR Part 195, Subpart E: Pressure Testing.
- California State Fire Marshal's Pressure Testing Requirements for Hazardous Liquid Pipelines.
- American Society of Mechanical Engineers (ASME) B31.3: Process Piping.
- ASME B31.4: Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids.

The equipment used to monitor the test and record test data was third-party calibrated by [redacted] Refer to Appendix B for calibration certificates included in the [redacted] test report.

The supervisor from [redacted] that was on site during testing has over 20 years of static liquid pressure testing experience with a working knowledge of the applicable regulations and test standards.

2.0 STATIC LIQUID PRESSURE TESTING AND RESULTS

The [redacted] test report is provided in Appendix B.

One-time static liquid pressure testing of *Hotel Pier to PH 59 (JP-5) (Inside and Outside Loop & Tank 55 Fill Line)* ([redacted]) was performed, [redacted] on 5 June 2019, with product, for four hours. The test pressure was maintained for the test duration with adjustments made for thermal expansion and contraction with no reportable failures or other visible leaks, resulting in a passing test.

One-time static liquid pressure testing of the two combined sections, *Mike Pier* ([redacted] and *Bravo Pier* ([redacted] was performed, [redacted] on 12 June 2019, with product, for four hours. The test pressure was maintained for the test duration with adjustments made for thermal expansion and contraction with no reportable failures or other visible leaks, resulting in a passing test.

One-time static liquid pressure testing of *Sierra Pier* ([redacted] was performed, [redacted] on 14 June 2019, with product, for four hours. The test pressure was maintained for the test duration with adjustments made for thermal expansion and contraction with no reportable failures or other visible leaks, resulting in a passing test.

The summary of results is listed in Table 2-1.

Exemption (b)(3)

Table 2-1: Results Summary

Fuel System	Designation	Product	Length (feet)	Volume (gallons)	Reference Pressure[1] (psi)	Test Date	Result	Comments
Transfer Pipelines	Hotel Pier to PH 59 (JP-5) (Inside and Outside Loop & Tank 55 Fill Line)	JP-5	[redacted]	[redacted]	[redacted]	5 June 2019	Pass	-Test section length permanently reduced by [redacted] due to a portion of pipeline removed from service. -Test section temporarily reduced by [redacted]t due to isolation of a flanged elbow. -Two (2) [redacted] blind skillets required to isolate the flanged elbow at the Hotel Pier, between H-2 and H-3
	Mike Pier	F-76	[redacted]	[redacted]	[redacted]	12 June 2019	Pass	Sections are combined and tested together
	Bravo Pier	F-76	[redacted]	[redacted]	[redacted]	12 June 2019	Pass	
	Sierra Pier	F-76	[redacted]	[redacted]	[redacted]	14 June 2019	Pass	Bled excessive air

Table Notes:
psi = pounds per square inch
1. Basis of reference pressure: 1.5 times the MAWP provided by base personnel.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

The four sections ([redacted] of petroleum pier pipelines passed the 2019 one-time static liquid pressure testing.

3.2 Recommendations

In accordance with 33 CFR 156.170, the static liquid pressure testing of four sections ([redacted] of petroleum pier pipelines should be performed with the remaining three sections ([redacted] of petroleum pier pipelines, to align with the original testing anniversary date of 14 January 2020. The annual static liquid pressure testing of seven sections ([redacted] of petroleum pier pipelines must be initiated on or before the anniversary date of 14 January 2020 or not less than 30 days prior to the first transfer conducted past one year from 14 January 2019. The environmental regulatory compliance of this site is the responsibility of the base and the service.

APPENDIX A

CITED REGULATIONS

under §§ 154.710 and 155.700 of this chapter, has filled out and signed the declaration of inspection form described in paragraph (c) of this section.

(b) No person in charge may sign the declaration of inspection unless he or she has determined by inspection, and indicated by initialling in the appropriate space on the declaration of inspection form, that the facility or vessel, as appropriate, meets § 156.120.

(c) The declaration of inspection may be in any form but must contain at least:

(1) The name or other identification of the transferring vessel or facility and the receiving vessel or facility;

(2) The address of the facility or location of the transfer operation if not at a facility;

(3) The date and time the transfer operation is started;

(4) A list of the requirements in § 156.120 with spaces on the form following each requirement for the person in charge of the vessel or facility to indicate by initialling that the requirement is met for the transfer operation; and

(5) A space for the date, time of signing, signature, and title of each person in charge during transfer operations on the transferring vessel or facility and a space for the date, time of signing, signature, and title of each person in charge during transfer operations on the receiving facility or vessel certifying that all tests and inspections have been completed and that they are both ready to begin transferring product; and

(6) The date and time the transfer operation is completed.

(d) The form for the declaration of inspection may incorporate the declaration-of-inspection requirements under 46 CFR 35.35–30.

(e) The vessel and facility persons in charge shall each have a signed copy of the declaration of inspection available for inspection by the COTP during the transfer operation.

(f) The operators of each vessel and facility engaged in the transfer operation shall retain a signed copy of the declaration of inspection on board the vessel or at the facility for at least 1 month from the date of signature.

[CGD 75–124, 45 FR 7177, Jan. 31, 1980, as amended by CGD 86–034, 55 FR 36256, Sept. 4, 1990; CGD 93–056, 61 FR 41461, Aug. 8, 1996]

§ 156.160 Supervision by person in charge.

(a) No person may connect or disconnect a hose, top off a tank, or engage in any other critical procedures during the transfer operation unless the person in charge, required by § 156.120(s), supervises that procedure.

(b) No person may start the flow of oil or hazardous material to or from a vessel unless instructed to do so by either person in charge.

(c) No person may transfer oil or hazardous material to or from a vessel unless each person in charge is in the immediate vicinity and immediately available to the transfer personnel.

[CGD 75–124, 45 FR 7177, Jan. 31, 1980, as amended by CGD 86–034, 55 FR 36256, Sept. 4, 1990]

§ 156.170 Equipment tests and inspections.

(a) Except as provided in paragraph (d) of this section, no person may use any equipment listed in paragraph (c) of this section for transfer operations unless the vessel or facility operator, as appropriate, tests and inspects the equipment in accordance with paragraphs (b), (c) and (f) of this section and the equipment is in the condition specified in paragraph (c) of this section.

(b) During any test or inspection required by this section, the entire external surface of the hose must be accessible.

(c) For the purpose of paragraph (a) of this section:

(1) Each nonmetallic transfer hose must:

(i) Have no unrepaired loose covers, kinks, bulges, soft spots or any other defect which would permit the discharge of oil or hazardous material through the hose material, and no gouges, cuts or slashes that penetrate the first layer of hose reinforcement as defined in § 156.120(i).

(ii) Have no external deterioration and, to the extent internal inspection

is possible with both ends of the hose open, no internal deterioration;

(iii) Not burst, bulge, leak, or abnormally distort under static liquid pressure at least 1½ times the maximum allowable working pressure; and

(iv) Hoses not meeting the requirements of paragraph (c)(1)(i) of this section may be acceptable after a static liquid pressure test is successfully completed in the presence of the COTP. The test medium is not required to be water.

(2) Each transfer system relief valve must open at or below the pressure at which it is set to open;

(3) Each pressure gauge must show pressure within 10 percent of the actual pressure;

(4) Each loading arm and each transfer pipe system, including each metallic hose, must not leak under static liquid pressure at least 1½ times the maximum allowable working pressure; and

(5) Each item of remote operating or indicating equipment, such as a remotely operated valve, tank level alarm, or emergency shutdown device, must perform its intended function.

(d) No person may use any hose in underwater service for transfer operations unless the operator of the vessel or facility has tested and inspected it in accordance with paragraph (c)(1) or (c)(4) of this section, as applicable.

(e) The test fluid used for the testing required by this section is limited to liquids that are compatible with the hose tube as recommended by the hose manufacturer.

(f) The frequency of the tests and inspections required by this section must be:

(1) For facilities, annually or not less than 30 days prior to the first transfer conducted past one year from the date of the last tests and inspections;

(2) For a facility in caretaker status, not less than 30 days prior to the first transfer after the facility is removed from caretaker status; and

(3) For vessels, annually or as part of the biennial and mid-period inspections.

(g) If a facility or vessel collects vapor emitted to or from a vessel cargo tank with a vapor control system, the system must not be used unless the following tests and inspections are satisfactorily completed:

(1) Each vapor hose, vapor collection arm, pressure or vacuum relief valve, and pressure sensor is tested and inspected in accordance with paragraphs (b), (c), and (f) of this section;

(2) Each remote operating or indicating device is tested for proper operation in accordance with paragraph (f) of this section;

(3) Each detonation arrester required by 33 CFR 154.2105, 154.2108(b), 154.2109, 154.2110, 154.2111, and 154.2204, or 46 CFR 39.4003, and each flame arrester required by 33 CFR 154.2103, 154.2105(j), and 154.2203 has been inspected internally within the last year, or sooner if operational experience has shown that frequent clogging or rapid deterioration is likely; and

(4) Each hydrocarbon and oxygen analyzer required by 33 CFR 154.2105(a) and (j), 154.2107(d) and (e), and 154.2110 or 46 CFR 39.4003 is calibrated:

(i) Within the previous two weeks, or

(ii) Within 24 hours prior to operation when the vapor control system is operated less frequently than once a week.

(h) Upon the request of the owner or operator, the COTP may approve alternative methods of compliance to the testing requirements of paragraph (c) of this section if the COTP determines that the alternative methods provide an equal level of protection.

(i) Notwithstanding the general provisions of 33 CFR 156.107(a) relating to the authority of the Captain of the Port to approve alternatives, the owner or operator may request the written approval of the Commandant (CG–ENG), U.S. Coast Guard, 2100 2nd St. SW., Stop 7126, Washington, DC 20593–7126, for alternative methods of compliance to the testing and inspection requirements of paragraph (g)(3) of this section. The Commandant (CG–ENG) will grant that written approval upon determination that the alternative methods provide an equivalent level of safety and protection from fire, explosion, and detonation. Criteria to consider when evaluating requests for alternative methods may include, but are not limited to: operating and inspection history, type of equipment, new

APPENDIX B

[redacted]

TEST REPORT

As required by 32 CFR 286.10, the following documents (pages 1 to 101) 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 101) ready for release.