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DELIVERY ORDER NO. 0018 PRESSURE TESTING REPORT

DESC PROJECT NO. RRD 01-13

Pressure Testing Completion Report

NAVSTA Roosevelt Roads, Puerto Rico

Project No: 065/07074-18

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PROJECT 065/07074-18 - PRESSURE TESTING COMPLETION REPORT

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ABBREVIATIONS

Abbreviation	Description
a.m.	ante meridian (before noon)
AC	alternating current
ACA	after contract award
ACI	American Concrete Institute
ACM	asbestos-containing-materials
A/E	architect engineer
AGM	above ground marker
AISC	American Institute of Steel Construction
AISI	American Institute of Steel and Iron
AMC	Air Mobility Command
ANSI	American National Standards Institute
API	American Petroleum Institute
ASA	American Standards Association
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
Bbl	barrel (42 gallons)
BOS	Base Operation Support
Bpd	barrels per day
Cf/min	cubic feet per minute
CAD	computer aided drafting
CDRL	contract data requirements lists
CFR	Code of Federal Regulations
COTR	Contracting Officer Technical Representative
CP	cathodic protection
CPAF	cost plus award feed
ºC	degrees Centigrade

Abbreviation	Description
DB&B	Double block and bleed
DC	direct current
DESC	Defense Energy Support Center
DFSP	Defense Fuel Support Point
DOD	Department of Defense
DOT	Department of Transportation
ECDET	East Coast Detachment
ECP	Entry Control Point
EPA	Environmental Protection Agency
ERD	Environmental review document
FAR	Federal Acquisition Regulation
FCCM	facilities capital cost of money
Ft.	feet (')
FISC	Fleet Industrial Supply Center
F76	diesel fuel
ºF	degrees Fahrenheit
Gal	Gallon
Gal/day	gallons per day
Gal/yr	gallons per year
Gpm	gallons per minute
ISA	Instrument Society of America
JP-5	jet propulsion fuel, grade 5
JP-8	jet propulsion fuel, grade 8
Lbs/hr	Pounds per hour
Lbs/yr	Pounds per year
Lf	Linear foot
MAOP	Maximum allowable operating pressure
MAWP	Maximum allowable working pressure

Abbreviation	Description
Mbbls	1000 barrels
MBTU	Millions of British Thermal Units
MCAS	Marine Corps Air Station
MF	Magnetic flux
MILCON	Military construction
MLD	Metal loss detection
N/A	Not applicable
NACE	National Association of Corrosion Engineers
NAS	Naval Air Station
NAVFAC	Naval Facilities
NAVFACCO	Naval Facilities Engineering Command Contracts Office, Washington, DC
NEC	National Electric Code
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NFESC	Naval Facility Engineering Services Center
NOB	Norfolk Operations Base
NTR/EIC	Naval Technical Representative/Engineer In Charge
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Act
P&ID	piping and instrument diagram
PCR	project completion report
PEP	project execution plan
p.m.	post meridian (after noon)
PEI	Petroleum Equipment Institute
PI	pipeline indicator
POL	petroleum, oil and lubricants
Psi	pounds per square inch
Psia	pounds per square inch, absolute

Abbreviation	Description
QSR	Quality Surveillance Representative
Psig	pounds per square inch, gauge
RVP	Reid vapor pressure
SF	square feet
SMYS	specified minimum yield strength
TVP	True vapor pressure
UT	ultrasonic testing

EXECUTIVE SUMMARY

Worley International Inc. (Worley) was tasked with the inspection by pressure testing of the POL pipelines at United States Naval Station Roosevelt Roads, Puerto Rico. The inspection was conducted during two mobilizations between July 08 and July 27, 2002 and October 28 and November 03, 2002. The pressure test inspections consisted of a four hour strength test on all exposed pipe sections and a subsequent four hour leak test for all test sections containing buried pipe. The tests were conducted by two engineers from Worley International (Worley), and support personnel from NAVSTA Roosevelt Roads Fuels and Fuels Management Contractor United Paradyne.

Initially, pressure testing was to be conducted in thirteen individual test sections. Two test sections were deleted from Worley's Scope of Work before pressure testing operations were initiated, one test section was terminated after initiation of pressure test due to leakage in valves and appurtenances, and one test section subdivided into two pressure test segments at the request of NAVSTA Roosevelt Roads Fuels. Of the remaining eleven test sections inspected, all passed the requirements as established by state and federal regulations; however, some of the systems contained drips, leaks in fittings and flanges, and other appurtenances which were documented and included in this report for further attention and review, but did not have a detrimental effect on the overall evaluation of the results. This report provides a discussion for the purpose of the pressure tests, submits the pressure test procedures, and includes an engineering assessment of the data. The pressure test results are summarized in Table 3.1.

1. INTRODUCTION

The Defense Energy Supply Center (DESC) under Naval Facilities Engineering Service Center (NFESC) Contract No. N47408-99-D-8014 tasked Worley International Inc. (Worley) to provide management, design and engineering services to conduct a Pipeline Integrity Assessment Program (PIAP). The objective of which is to assess the integrity and conduct periodic inspections of Petroleum, Oil and Lubricants (POL) pipelines worldwide. NFESC tasked Worley under Delivery Order No. 0018 of that contract to conduct inspections of the POL pipelines by conducting pressure tests in July, October and November 2002 at Naval Station Roosevelt Roads, Puerto Rico.

1.1 Purpose of Inspection

The basic objectives of the pipeline pressure testing were to:

- Establish the pressure carrying integrity components of the pipeline with respect to the Maximum Operating Pressure (MOP) that the pipeline was likely to experience in service. This was accomplished, in accordance with requirements established in 49 CFR 195;
- Establish the pressure carrying integrity of the components in the Marine Transfer Area (MTA) with respect to the maximum working pressure that the pipeline components are likely to experience in service, in accordance with requirements established in 33 CFR 156;
- Provide NAVSTA Roosevelt Roads fuels personnel a measure of confidence in the pipeline's ability to continue to safely operate up to certain maximum internal pressures.

The procedures implemented maximized the value of the pressure test to the pipeline operator by providing a documented and improved a level of certainty with respect to test segment leak assessment.

1.2 Legal Requirements For Pressure Testing

The pipelines at NAVSTA Roosevelt Roads are covered under the Code of Federal Regulations (CFR) Title 49, Part 195. The procedures set out in this document will provide pressure testing to satisfy the local operator and comply with applicable requirements of 49 CFR Part 195 and ASME Standard B31.4.

Military Handbook 1022 paragraph 12.12.1 states to "Conduct pipeline inspection in accordance with API RP 570." API RP 570 recommends that buried pipelines be leak tested every 5 to 15 years based on soil resistivity.

In addition, 49 CFR Part 195 documents the need to record the results of pressure testing and that test records should be maintained for the life of the facility tested.

33 CFR Part 156 requires annual testing of pipelines in a MTA, where MTA pipelines are defined as pipelines between the ship connection and the first valve inside the secondary containment area. The secondary containment area is defined in 40 CFR Part 112 as dykes/berms or retaining walls sufficiently impervious to contain oil, curbing, weirs/booms or other barriers, spill diversion ponds, etc. As several of the test segments identified in this document fall outside of the secondary containment, these were required to be tested in accordance with 33 CFR Part 156.

1.3 Description of Facilities and Test Sections

The Defense Fuel Supply Point pipeline system at NAVSTA Roosevelt Roads consists of fourteen (14) pipeline sections that transfer and distribute DFM and JP-5 throughout the base. The various pipeline sections were constructed of 3-inch, 4-inch, 6-inch, 8-inch, 10-inch, 12-inch, 16-inch, and 18-inch diameter pipe and included the following:

- Test Section 1 consisted of 16-inch (primary) and 12-inch (secondary) DFM pipelines on Pier 1 from General Twin Seal Double Block and Bleed Valve Nos. TFD-146 and TFD-147 that extended down Pier 1 and terminated at Camlock fittings attached to 4-inch General Twin Seal Double Block and Bleed Valve Nos. FP1-100, FP1-101, FP1-102, FP1-103, FP1-104, FP1-105, FP1-106 and FP1-107. This test section was comprised of approximately 375 feet of 16-inch, 364 feet of 12-inch, and 8 feet of 8-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.
- Test Section 2 consisted of a 16-inch JP-5 pipeline on Pier 1 from General Twin Seal Double Block and Bleed Valve No.TFJ-216 that extended down Pier 1 and terminated at Camlock fittings attached to 4-inch General Twin Seal Double Block and Bleed Valve Nos. FP1-108, FP1-109, FP1-110, FP1-111, FP1-112 and FP1-113. This test section was comprised of approximately 411 feet of 16-inch, 26 feet of 12-inch, and 7 feet of 8-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.
- Test Section 3 consisted of 16-inch (primary) and 12-inch (secondary) DFM pipelines on Pier 1A from General Twin Seal Double Block and Bleed Valve Nos. TFD-148 and TFD-149 that terminated at Pier 1 Loading Stations 1 through 6 8-inch General Twin Seal Double Block and Bleed Valve Nos. 103, 106, 113, 116, 124, 127, 133, 136, 142, 145, 153 and 156; 8-inch Stockham Gate Valve Nos. 104, 107, 114, 117, 125, 128, 134, 137, 143, 146, 154 and 157; and 8-inch Ball Valve Nos. 105, 108, 115, 118, 126, 129, 135, 138, 144, 147, 155 and 158. The 8-inch Stockham Gate Valve Nos. 161, 162, 163 and 164 located on Pier 1A were opened to allow interconnection of the 12-inch and 16-inch pipelines for pressure testing concurrently. This test section was comprised of approximately 2020 feet of 16-inch and 2600 feet of 12-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.

- Test Section 4 consisted of a 16-inch JP-5 pipeline on Pier 1A from General Twin Seal Double Block and Bleed Valve Number TFJ-217 that extended to the end of Pier 1A and terminated at Pier 1A 8-inch General Twin Seal Double Block and Bleed Valve Nos. 100, 110, 121, 130, 139 and 150; 8-inch Stockham Gate Valve Nos. 101, 111, 122, 131, 140 and 151; 8-inch Ball Valve Nos. 102, 112, 123, 132, 141 and 152; and Stockham Gate Valve Nos. 160 and 159. This test section was comprised of approximately 2020 of 16-inch and 580 feet of 12-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.
- Test Section 5 consisted of a 12-inch DFM pipeline on Pier 3 from General Twin Seal Double Block and Bleed Valve Nos. TFD-130, TFD-153 and TFD-131 at Pier 3 Pumping Station that terminated at the end of Pier 3 at Valve Number FP3-100, FP3-101, FP3-104, FP3-105, FP3-108, FP3-109, FP3-112, FP3-113, FP3-116, FP3-117, FP3-120, FP3-121, FP3-122, FP3-123, FP3-124, FP3-125, FP3-126, FP3-127, FP3-130, FP3-131, FP3-134, FP3-135, FP3-138, FP3-139, FP3-142, FP3-143, FP3-146 and FP3-147; and Pier 3 Pipe Trench Valve Nos. FP3-100, FP3-101, FP3-104, FP3-105, FP3-108, FP3-109, FP3-112, FP3-113, FP3-116, FP3-117, FP3-120, FP3-121, FP3-122, FP3-124, FP3-125, FP3-126, FP3-127, FP3-130, FP3-131, FP3-134, FP3-135, FP3-138, FP3-139, FP3-142, FP3-143, FP3-146 and FP3-147. **(DELETED FROM SCOPE)**
- Test Section 6 consisted of a 12-inch JP-5 pipeline on Pier 3 from General Twin Seal Double Block and Bleed Valve Nos. TFJ-214 and TFJ-237 at Pier 3 Pumping Station that terminated at the end of Pier 3 at Valve Number FP3-102, FP3-103, FP3-107, FP3-108, FP3-110, FP3-111, FP3-114, FP3-115, FP3-118, FP3-119, FP3-128, FP3-129, FP3-132, FP3-133, FP3-136, FP3-137, FP3-140, FP3-141, FP3-144 and FP3-145; and Pier 3 Pipe Trench Valve Nos. FP3-102, FP3-103, FP3-106, FP3-107, FP3-110, FP3-111, FP3-114, FP3-115, FP3-118, FP3-119, FP3-128, FP3-129, FP3-132, FP3-133, FP3-136, FP3-137, FP3-140, FP3-141, FP3-144 and FP3-145. **(DELETED FROM SCOPE)**
- Test Section 7 consisted of a 16-inch JP-5 pipeline from General Twin Seal Double Block and Bleed Valve No.TFJ-216 on Pier 1 and General Twin Seal Double Block and Bleed Valve No.TFJ-217 that traversed through Valve Pit No. 24 and terminated at a 12-inch General Twin Seal Double Block and Bleed Valve No.TFJ-213 attached to a 16-inch x 16-inch x 12-inch tee at Valve Pit No. 24. The pipeline continues from Valve Pit No. 24 to Pump House 1982 where the test section terminated at 12-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-157 and 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-160. This test section was comprised of approximately 1332 feet of 16-inch pipe, 3678 feet of 12-inch, and 3 feet of 8-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.

- Test Section 8-Primary consisted of a 12-inch DFM pipeline from 12-inch General Twin Seal Block and Bleed Valve No. PH-1982-156 and 10-inch General Twin Seal Block and Bleed Valve No. PH-1982-159 in the containment area of Pump House 1982, exited Pump House 1982 containment area as two 16-inch pipelines and swaged to two 12-inch pipelines before entering Valve Pit 56, traversed through Valve Pit No. 24 and swaged to a single 12-inch pipeline before entering Valve Pit No. 27 and terminated at Pier 1 16-inch General Twin Seal Block and Bleed Valve No. TFD-147 and Pier 1A 16-inch General Twin Seal Block and Bleed Valve No. TFD-149. In addition, at Valve Pit No. 56 a 6-inch take off terminated at 6-inch General Twin Seal Block and Bleed Valve No. TFD-128 and a 12-inch lateral pipeline at Valve Pit No.24 terminated at Pier 3 12-inch General Twin Seal Block and Bleed Valve No. TFD-131 and 4-inch General Twin Seal Block and Bleed Valve No. TFD-150. This test section was comprised of 345 feet of 16-inch and 5685 feet of 12-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.
- Test Section 8-Secondary consisted of a 12-inch DFM pipeline that terminated at Pier 1 General Twin Seal Block and Bleed Valve No. TFD-146 and Pier 1A General Twin Seal Block and Bleed Valve No. TFD-148, traversed to Pump House 466. At Pump House 466, one 12-inch section branched to Pier 3 and terminated at 12-inch General Twin Seal Block and Bleed Valve No. TFD-130 and 4-inch General Twin Seal Block and Bleed Valve No. TFD-151 and one 12-inch section terminated at Valve Pit No. 8 General Twin Seal Block and Bleed Valve No. TFD-144. This test section was comprised of 6085 feet of 12-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.
- Test Section 9 consisted of a 12-inch JP-5 pipeline that terminated at Valve Pit No. 9 General Twin Seal Double Block and Bleed Valve No. TFJ-140 traversed through Valve Pit No. 9 pig launcher to Pump House 1982 where it terminated at 12-inch General Twin Seal Block and Bleed Valve Nos. PH-1982-108 and PH-1982-109. Prior to the piping entering Pump House 1982 a 12-inch lateral branched to the 12-inch pig receiver at Pump House 1982 and terminated at 12-inch General Twin Seal Block and Bleed bypass Valve No. TFJ-231. This test section was comprised of approximately 24 feet 14-inch and 3473 feet of 12-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.
- Test Section 10 consisted of an 8-inch JP-5 pipeline that terminated at Valve Pit No. 9 General Twin Seal Block and Bleed Valve No. TFJ-139, traversed through Valve Pit No. 3 to Naval Station Roosevelt Roads Air Field and terminated at Ball Valve Nos. TFJ-153 and TFJ-154.This test section was comprised of approximately 6085 feet of 8-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.

- Test Section 11 consisted of 14-inch, 10-inch and 6-inch JP-5 pipelines that terminated at Ball Valve Nos. 164 and 170 located at Air Field Filter/Separators and traversed to Aircraft Refueling Pit No. 1 Station No. 1 and No. 2 Ball Valve Nos. AC1-103, AC1-105, AC1-106; AC1-200, AC1-202; Pit No. 2 Station No. 1 and No. 2 Ball Valve Nos. AC2-100, AC2-102, AC2-200, AC2-202, Pit No. 3 Station No. 1 and No. 2 Ball Valve Nos. AC3-100, AC3-102, AC3-200, AC3-202; Pit No. 4 Station No. 1 and No. 2 Ball Valve Nos. AC4-100, AC4-102, AC4-200, AC4-202. The pipelines were interconnected via a ½-inch hose connected at the Air Field Filter/Separators through 1-inch connections near Ball Valve Nos. 164 and 170. This test section was comprised of approximately 1274 feet of 14-inch, 329 feet of 10-inch and 793 feet of 6-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.
- Test Section 12 consisted of a 12-inch DFM pipeline from Tank 82, Tank 83, Tank 1080 and Tank 1082, traversed through Valve Pit No. 20 to Pump House 1982 where the 12-inch pipeline branched into two 16-inch suction headers in Pump House 1982. One 16-inch branch terminated at DFM-1 pump valve Nos. PH-1982-138, PH-1982-139, PH-1982-140, PH-1982-141, PH-1982-142, PH-1982-143; DFM-2 pump ball Valve Nos. PH-1982-144, PH-1982-145, PH-1982-146, PH-1982-147, PH-1982-148; DFM-3 pump ball valve Nos. PH-1982-150, PH-1982-151, PH-1982-152, PH-1982-153, PH-1982-154 and terminated at 12-inch General Twin Seal Double Block and Bleed Valve PH-1982-156 and 10-inch General Twin Seal Double Block and Bleed Valve PH-1982-159 in Pump House 1982 containment area. The two 16-inch suction headers traversed from Pump House 1982 and terminated at Tank 1995 General Twin Seal Double Block and Bleed Valve Nos. TFD-113, TFD-114 and TFD-115; Tank 1996 General Twin Seal Double Block and Bleed Valve Nos. TFD-118 and TFD-119; Tank 2436 General Twin Seal Double Block and Bleed Valves Nos. TFD-116 and TFD-117; and Valve Pit 8 General Twin Seal Double Block and Bleed Valve No. TFD-144. This test section was comprised of approximately 2758 feet of 16-inch pipe, 1548 feet of 12-inch, 86 feet of 10-inch, 27 feet of 8-inch and 5 feet of 6-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.
- Test Section 13 consisted of a 16-inch JP-5 pipeline from Pump House 1982 General Twin Seal Double Block and Bleed Valve Nos. PH-1982-101, PH-1982-102 and PH-1982-103, swaged to 18-inch and traversed to JP-5 Tank Farm. At JP-5 Tank Farm, the pipeline reduced to 16-inch and terminated at Tank 2270 General Twin Seal Double Block and Bleed Nos. TFJ-117, TFJ-118 and TFJ-119; Tank 2271 General Twin Seal Double Block and Bleed Valve Nos. TFJ-112, TFJ-114 and TFJ-115; Tank 2272 General Twin Seal Block and Bleed Valve N umbers TFJ-108, TFJ-110 and TFJ-111; Tank 2273 General Twin Seal Double Block and Bleed Valve Nos. TFJ-100, TFJ-102 and TFJ-103; Tank 2274 Double Block and Bleed Valve Nos. TFJ-104, TFJ-106 and TFJ-107, the 16-inch pipeline swaged to 12-inch and terminated at Valve Pit No. 9 General Twin Seal Double Block and Bleed Valve

Nos. TFJ-139 and TFD-140; Valve Pit No. 10 General Twin Seal Double Block and Bleed Valve Nos. TFJ-123, Tank 381 General Twin Seal Double Block and Bleed Valve Nos. TFJ-134, TFJ-135 and TFD-139. This test section was comprised of approximately 2240 feet of 18-inch, 4967 feet of 16-inch, 2833 feet of 12-inch, 81 feet of 8-inch, and 19 feet of 3-inch, Schedule 40, Grade B pipe with an ANSI rating of 150#.

2. PRESSURE TESTING

2.1 Pressure Test Procedures

Inspection services were conducted in accordance with the plans and procedures contained in the Contractor Report SSR-2683-E&U, "Preliminary Pressure Test Procedures, Defense Fuel Supply Point, NAVSTA Roosevelt Roads, Puerto Rico", dated December 2001. A four (4) hour strength test and four (4) hour leak test were conducted for pressure test section Nos. 7, 8-Primary, 8-Secondary, 9, 10, 12, and 13. A four (4) hour strength test was conducted for pressure test section Nos. 1, 2, 3, and 4. Pressure test section Nos. 5, 6 and 11 were deleted from the Scope of Work. The test pressure established was a minimum of 125% of the maximum allowable operating pressure (120 PSIG) calculated to be applied at the highest elevation point in the test segment and maintained for four (4) continuous hours at or above the minimum test pressure. For those pressure test segments not visually inspected for leakage during the pressure test, and additional four (4) hour test at 110% of the MAOP was conducted. All tests were recorded on a continuous chart with deadweight and temperature readings taken every fifteen (15) minutes for the duration of the four (4) hour strength test and every thirty (30) minutes during the four (4) hour leak test.

Closing the appropriate valve(s) at each termination point to isolate each test section commenced each pressure test. Each test section was then fitted with a test manifold consisting of fittings and hoses leading to the deadweight tester, chart recorder, bleed-off hose, pressure gauge, and pump discharge. A flow meter was placed in line to enable recording of the amounts of flow injected and withdrawn from the test section. NAVSTA Roosevelt Roads Fuels Pump House 1982 pumps were used to pressure the systems to centrifugal pump dead head pressure and air vented at all points (where possible). The pipeline pressure was then increased at a controlled rate with the NAVSTA Roosevelt Roads Fuels supplied Annovi Reverberi pressure pump and the recording of test data for the required four (4) or eight (8) hours commenced. Any leaks discovered were either repaired or a container placed under the leak to contain and measure the amount of DFM and or JP-5 lost during the pressure test period. Detailed procedures for each of the twelve (12) tests are included in Appendix C for reference.

2.2 Pressure Test Sections

The assigned Pressure Test Numbers and associated pipeline(s) for the fourteen tests are included in Table 2.1. Sketches of the pressures test segments are included in Appendix B.

Table 2.1 Pressure Test Sections				
Pressure Test No.	MAOP (PSIG)	Minimum Strength Test Pressure (PSIG)	Minimum Leak Test Pressure (PSIG)	Reference Drawings
1	120	155.0	N/A	SK-18-15-0101
2	120	152.0	N/A	SK-18-15-0102
3	120	150.0	N/A	SK-18-15-0103
4	120	150.7	N/A	SK-18-15-0104
5	Deleted	Deleted	Deleted	SK-18-15-0105 Sheets 1-2
6	Deleted	Deleted	Deleted	SK-18-15-0106 Sheets 1-2
7	120	163.0	170.0	SK-18-15-0107 Sheets 1-3
8-Primary	120	155.7	153.0	SK-18-15-0108 Sheets 1-4
8-Secondary	120	161.7	158.5	SK-18-15-0108 Sheets 1-4
9	120	161.8	162.8	SK-18-15-0109 Sheets 1-2
10	120	155.0	152.0	SK-18-15-0110 Sheets 1-2
11	Deleted	Deleted	Deleted	SK-18-15-0111
12	120	179.7	168.5	SK-18-15-0112 Sheets 1-3
13	120	204.0	188.0	SK-18-15-0109 Sheets 1-3

2.3 Pressure Test Fluid Specifications

Pressure testing was conducted using Diesel Fuel Marine (DFM) or JP-5 as the test mediums for the pipelines at United States Naval Station Roosevelt Roads Puerto Rico. The following are physical properties of DFM and JP-5:

Diesel Fuel Marine (DFM)

Specific Gravity (water = 1.0)	0.830 to 0.860 (39 API to 33 API)
Compressibility, 1/β	6.25 x 10-6 in³/psi to 6.36 x 10-6 in³/psi
Liquid Volumetric Expansion Coefficient, g	4.63 x 10-4 in./in./°F
Flash Point	140°F (closed cup method)

JP-5

Specific Gravity (water = 1.0)	0.788 to 0.845 (48 API to 36 API)
Compressibility, 1/β	6.25 x 10-6 in³/psi to 6.36 x 10-6 in³/psi
Liquid Volumetric Expansion Coefficient, g	5.0 x 10-4 in./in./°F
Flash Point	140°F (closed cup method)

2.4 Pressure Testing Activities and Sequence

The twelve pressure tests were conducted from July 8 to July 28, 2002 and from October 28, 2002 through November 3, 2002 and completed on the dates noted in Table 2.2. Refer to Appendix A for project testing schedule.

Table 2.2 Pressure Test Schedule

Pressure Test Section No.	Product Service	Pipeline Designation	Date Test Completed
1	DFM	Pier 1 to Shore Block Valves	July 20, 2002
2	JP-5	Pier 1 to Shore Block Valve	July 16, 2002
3	DFM	Pier 1A to Shore Block Valves	July 13, 2002
4	JP-5	Pier 1 to Shore Block Valve	July 17, 2002
5	DFM	Pier 3 to Pier 3 Pumping Station	Deleted
6	JP-5	Pier 3 to Pier 3 Pumping Station	Deleted
7	JP-5	PH 1982 to Pier 1 and Pier 1A Block Valves	October 30, 2002
8-Primary	DFM	Pier 1 and Pier 1A Shore Block Valves to VP27 to VP 24 to Pier 3 to VP 56 to PH 1982	July 11, 2002
8-Secondary	DFM	Pier 1 and Pier 1A Shore Block Valves to VP27 to PH 466 to VP 24 to Pier 3 to PH 1982	July 20, 2002
9	JP-5	Valve Pit No. 9 to PH 1982	July 23, 2002
10	JP-5	Valve Pit No. 9 to Airfield Filter/Separator	July 22, 2002
11	JP-5	Airfield Filter/Separators to Pantographs	Failed
12	DFM	PH 1982 to DFM Tank Farm (Tanks 82-83-1080-1082) and to DFM Tanks 1995-1996-2436	July 15, 2002
13	JP-5	PH 1982 to JP-5 Tank Farm (Tanks 2270, 2271, 2272, 2273 and 2274)	November 3, 2002

3. RESULTS AND RECOMMENDATIONS

Eleven of the twelve pipeline segments subjected to pressure testing passed the California State Fire Marshal's criteria for acceptance. The pressure test results are presented in Table 3.1. The recorded data for each completed pressure test as well as Pressure/Added Volume Plot, Pressure/Temperature vs. Time Plot, and Pressure/Temperature Calculations for the eleven (11) test sections is provided in Appendix C.

3.1 Test Assessment Methods

The pipeline test sections was assessed by one or more of the following methods:

- **Visual Inspection**

  Any exposed pipe, fittings and other appurtenances were visually inspected for evidence of leakage.

- **Pressure/Added Volume Plot**

  This is an approach to determine the air content in the pipeline during the initial pressurization to insure that the air content doesn't exceed 0.2% of the pipeline volume.

- **Pressure/Temperature vs. Time Plot**

  The pressure/time plot was evaluated for differences in exposed pipe and buried pipe temperatures that do not correspond or provide similar pressure readings recorded.

- **Pressure/Temperature Calculations**

  If the pressure/temperature assessment calculation resulted in a volumetric loss, which is not equal or greater than the "allowable" unaccountable volumetric loss, then the pressure test was considered acceptable. The change in volume was calculated by the following equation:

  Volumetric Change = (volume due to change in pressure) + (change in volume due to change in temperature) + (volume added) – (volume withdrawn).

3.2 Pressure Test Results

Pipeline pressure tests were performed in accordance with the requirements of the hydrostatic testing provisions of Chapter 5.5 of the California Government Code and Title 2, Division 3, Chapter 1, Article 5.5 of the California Code of Regulations, and the California State Fire Marshall's (CSFM) "Procedures for Hydrostatic Testing of Hazardous Liquid Pipelines in California" (October 1994 Edition). The acceptance or failure based on the California State Fire Marshall's test requirements for each segment is noted in Table 3.1.

The "Volume Change Calculations for Pipeline Pressure Test (calculated volume/pressure slope method)" involved calculating the theoretical volume change based on weighting factors, corrected temperature differences, test pressure difference, Kp (volume adjustment factor for pressure change), Kt (volume adjustment factor for temperature change) and fluid volume gain or loss.

A successful pressure test occurred when the net volume change was less than the CSFM allowable change. The results for the fourteen test sections are summarized below:

Table 3.1 Pressure Test Calculation Results

Test Number	Pipeline Designation	Minimum Test Pressure (PSIG)	Calculated Loss/Gain (Gallons/Hour)	Allowable Change (Gallons/Hour)	Pipeline Test Status
1	DFM	155.0	(4.08)	4.77	Passed
2	JP-5	152.0	(44.42)	4.49	Passed
3	DFM	150.0	(5.92)	8.66	Passed
4	JP-5	150.7	1.75	1.75	Passed
5	DFM	Deleted	Deleted	Deleted	Deleted
6	JP-5	Deleted	Deleted	Deleted	Deleted
7	JP-5	150.7	(37.28)	8.08	Passed
8-Primary	DFM	153.0	1.88	9.56	Passed
8-Secondary	DFM	161.7	(0.36)	9.53	Passed
9	JP-5	161.8	(10.8)	7.20	Passed
10	JP-5	155.0	(7.15)	7.94	Passed
11	JP-5	Failed	Failed	Failed	Failed
12	DFM	168.5	7.23	8.63	Passed
13	JP-5	188.0	14.32	15.17	Passed

3.3 Problems Encountered

3.3.1 Leakage

The following visual seeps and leaks of product through appurtenances, flanges, etc. were observed during the pressure testing activities:

- Pressure Test Number 1 (DFM Pipeline Segment from Pier 1 to Shore Block Valves TFD-146 and TFD-147)
    1. Visible leak in 12-inch DFM Primary blind flange at Pier 1 end. (Refer to Photograph No. 6.)
- Pressure Test Number 7 (JP-5 Pump House 1982 to Pier 1, Pier 1A and Pier 3)
    1. Visible leak in 16-inch flanged tee at Pump House 1982 containment area.
    2. Visible leak in 16-inch check valve flange gaskets at Pump House 1982 containment area.
- Pressure Test Number 8-Primary (VP 27 to VP 56, Pump House 1982, Pier 1, Pier 1A and Pier 3)
    1. 2-inch nipple on air eliminator at VP 24. (Refer to Photograph 16)
    2. Swagelok fitting leak on 12-inch General Twin Seal Double Block and Bleed at VP 24. (Refer to Photograph 16)
    3. 16-inch check valve arm seal leak at Pump House 1982.
- Pressure Test Number 11 (NAVSTA Airfield Filter/Separators to Pantographs)
    1. 1-1/2-inch Cla-Val Regulator on Lane 1 Pit No. 4.
    2. 4-inch Cla-Val Regulator on Lane 1 Pit No. 4.
    3. 1-inch Downcomer Velan Ball Valve HB 2000 on Lane 1 Pit No. 4.
    4. Two (2) 4-inch 150# Velan Ball on Lane 1 Pit No. 4.
    5. 1-inch threaded Velan Ball on Lane 1 Pit No. 4.
    6. 6-inch Control Valve Flange Gasket on Lane 1 Pit No. 2.
    7. 4-inch 150# Cla-Val Regulator on Lane 1 Pit No. 2.
    8. Two (2) 4-inch 150# Velan Ball on Lane 1 Pit No. 2.
    9. Three Joints on Pantograph on Lane 1 Pit No. 2.
    10. Two (2) 4-inch 150# Velan Ball (AC1-200 and AC1-202) on Lane 2 Pit No. 1.
    11. 4-inch Cla-Val Regulator on Lane 2 Pit No. 1.

- Pressure Test Number 12 (DFM PH 1982 to DFM Tanks 82-83-1080-1082 and DFM Tanks 1995-1996-2436)
    1. Leak in PH 1982 DFM-2 Pump Casing Seals.
    2. Leak in PH 1982 DFM-1 Pump Pressure Relief Flange Gasket. (Refer to Photograph No. 6)
    3. Leak in PH 1982 DFM-2 Pump Pressure Relief Flange Gasket. (Refer to Photograph No. 6)
- Pressure Test Number 13 (JP-5 PH 1982 to JP-5 Tanks 2270, 2271, 2272, 2273, 2274, 1084, 381 and Valve Pit No. 9)
    1. Leak in flange gasket at Tank 2270 reducing flange.
    2. Leak in flange gasket at Tank 2271 General Twin Seal Double Block and Bleed 16-inch Valve TFJ-113.
    3. Leak in flange gasket at Tank 2272 reducing flange.
    4. Leak in flange gasket at Tank 2273 valve flange.

3.3.2 Suspected Leak & Remedial Actions

A review of the results of Pressure Test No. 7 conducted on July 17, 2002 is presented as follows and Alpha Lead Detection Daily Reports are included in Appendix G:

NAVSTA Roosevelt Roads Fuels personnel started filling and initial pressuring of system with Pump House 1982 JP-5 centrifugal pump No. 2 from PH 1982 through VP 27 to Pier 1 General Twin Seal Block and Bleed Valve No. TFJ-215 and Pier 1A General Twin Seal Double Block and Bleed Valve No. TFJ-217 Pier and from VP 24 valve TFJ-154 to Pier 3 General Twin Seal Double Block and Bleed Valve Nos. TFJ-214 and TFJ-235.

At 8:25 AM, started pressuring the pipeline with 95 PSIG. At 8:52 AM, at test pressure requiring 57.2 gallons was pumped into the pipeline to pressure from 95.0 PSIG to 165.0 PSIG. A review of the Pressure versus Volume plot data indicates the dV/dP plot line remained consistent until 150 PSIG was obtained and a shift in the angle of the dV/dP line occurred.

Several leaks were observed in 16-inch flange gaskets in the Pump House 1982 retention area and leakage caught and measured during the test period. The cumulative amount of leakage was measured at 18 ounces (0.14 gallons) during the initial four-hour strength test. The 12-inch Valve Pit No. 24 valve was closed 1.95 hours into the pressure test after unexplained pressure degradation continued. After examination of all end points of the test during this initial 1.95 hours, it was discovered that Valve No. TFJ-215 at Pier 1A and Valve No. TFJ-217 at Pier 1

was in the open position, thus both Pier 1 and Pier 1A piping had been pressured and under test pressure.

As the ambient and exposed pipe temperatures continued to rise from 84.6 ºF to 90.1 ºF and 85.0 ºF to 96.0 ºF respectfully during this 1.95 hour period, the increasing ambient and exposed pipe temperature effects from the large amount of exposed Pier 1 and Pier 1A piping should have assisted in stabilizing, maintaining and increasing the test pressure even with the small volume of product lost through the flange gasket leaks that were observed.

A review of the test data revealed that the pressure decreased from 161.7 PSIG to 152.9 PSIG (8.8 PSIG) or 4.51 gal/hr during the 1.95 hour test period without any signs of improvement. At this point the 12-inch pipeline was isolated from the remainder of the test from Valve Box 24 to Pier 3 by closing the 12-inch valve TFJ-213 at VP 24. Calculations confirmed that during the 1.95-hour test period, the test had a calculated loss of 62.71 gallons that exceeded CSFM allowable of 5.92 gallons. During the next 2.05 hours or until the conclusion of the strength test, the pressure decreased from 152.9 PSIG to 150.7 PSIG (2.2 PSIG) or 1.07 gal/hr. As the decrease in pressure degradation changed dramatically from 4.51 gal/hr to 1.07 gal/hr after the 12-inch Pier 3 segment was isolated, it was concluded that the 12-inch section exhibited conditions that warranted further review at a later time.

On July 18, 2002 at 8:30 AM, the 12-inch valve TFJ-213 at Valve Pit No. 24 was opened. NAVSTA Roosevelt Roads Fuels personnel started repressuring the system with Pump House 1982 JP-5 centrifugal pump from VP 24 Valve TFJ-213 to Pier 3 General Twin Seal Double Block and Bleed Valve Nos. TFJ-214 and TFJ-235. Pier 3 pressure gauge was removed and a small amount of air was bleed at Pier 3 pressure gauge port. Valve TFJ-214 was closed and pressuring initiated from VP 24 Valve TFJ-213 to Pier 3 Valve Nos. TFJ-214 and TFJ-235. At 10:02 AM, test pressure of 161.5 PSIG was achieved. At 1:15 P.M., the test pressure was 151.7 PSIG. During the 3.21-hour test period, the pressure decreased from 161.5 PSIG to 151.7 PSIG (9.8 PSIG) or 3.05 gal/hr. The 3.05-gallon per hour loss compares similar to that observed on July 17, 2002 after accounting for the volume lost from the leaking 16-inch flange gaskets.

At 1:38 PM, the pressure was reduced from 151.7 PSIG to 75 PSIG and no volumes of air were observed during pressure reduction. At 2:45 PM, pressure increased to 76.7 PSIG. During this 1.11 period the pressure increased 1.7 PSIG. After this unexplained increase of pressure was observed, it was concluded that a high-pressure leak (150 PSIG) was contained in the section from VP 24 to Pier 3 that was not observed at low pressures (75 PSIG).

On August 16, 2002, Fuels personnel drained JP-5 from VP 24 to Pier 3. On August 20 to August 23, 2002, Alpha Leak Detection probed holes at twenty-foot intervals (Refer to Photograph No. 43) over the route of the 12-inch pipeline from Valve Pit 24 to Pier 3. On August 22 Alpha injected Sulphur Hexafluoride (SF_6) at Valve Pit No. 24 with nitrogen and received JP-5 at Pier 3. On August 23 vacuum trucks removed 12600 gallons of JP-5 from pipeline. On

August 24, an additional 4400 gallons of JP-5 was removed from the pipeline. On August 26, 2002 at 3:30 P.M., Alpha Leak Detection reinjected SF_6 and nitrogen and pressured the pipeline to 67 PSIG.

On August 27, the pipeline was pressured to 153 PSIG with nitrogen and probe holes were checked for indications of SF_6. On August 28 Alpha verified that no indication of SF_6 were located in any of the probe holes and that the pipeline pressure remained constant at 153 PSIG over a twenty four (24) hour period. After verification of test results, the pipeline was purged with nitrogen to purge nitrogen and SF_6 mixture and pipeline was pressured to 20 psig.

It is recommended that prior to returning the 12-inch pipeline segment from VP 24 valve TFJ-213 to Pier 3 General Twin Seal Double Block and Bleed Valves Nos. TFJ-214 and TFJ-235 to service, a four hour strength and four hour leak test should be conducted to ensure that leaks are not present.

4. POINTS OF CONTACT

Table 4.1 Points of Contact

Name	Organization	Position	Phone
Terri Regin	NFESC ECDET	COTR/NTR/EIC	(202) 433-5196 (202) 433-5089 FAX
Lt. Jose Feliz	NAVSTA Roosevelt Roads	Fuels Officer	(787) 865-3422 (787) 865-4122
Carlos Brown	NAVSTA Roosevelt Roads	Fuels Foreman	(787) 865-4080 (787) 865-4122
Dale England	Worley International	Project Engineer	(713) 933-1165 (713) 690-1981 FAX
Kirsten Glesne	Worley International	Pipeline Engineer	(713) 933-1129 (713) 690-1981 FAX
Bill Hinkle	Worley International	Structural Engineer	(713) 933-1110 (713) 690-1981 FAX
Victor Torres	United Paradyne	Liquid Fuels Maintenance	(787) 396-1821

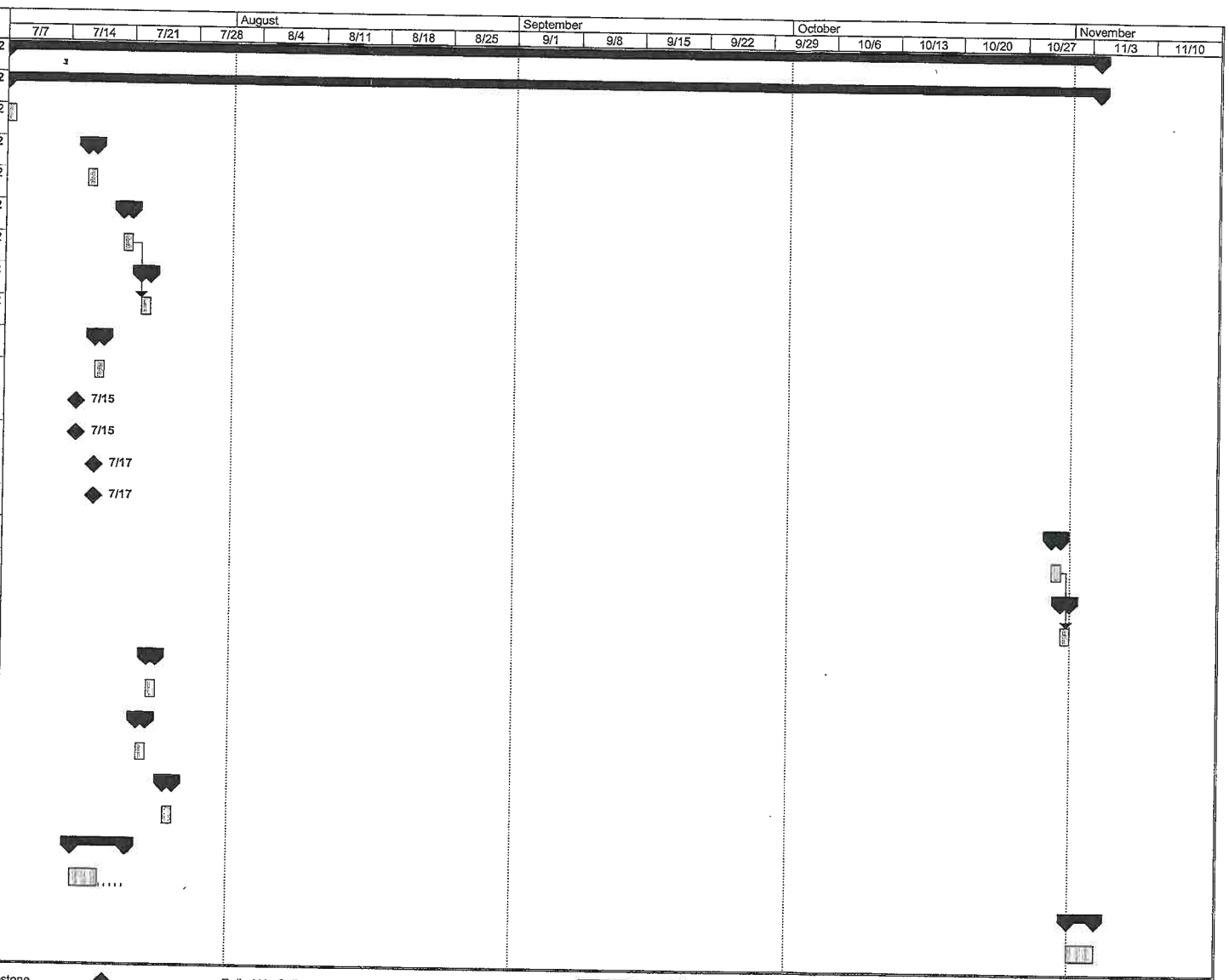
5. REFERENCES

Worley used the following references and NFESC supplied documents and publications listed below to form a part of this document to the extent referenced. The publications are referred to within the text by the basic designation only.

1. American Petroleum Institute, RP 1107 "Recommended Practice for Pipeline Maintenance Welding Practices", 3rd Edition, April 1991.
2. American Petroleum Institute, RP 1110 "Recommended Practice for Pressure Testing of Liquid Petroleum Pipelines", 3rd Edition, December 1991.
3. American National Standards Institute/American Society of Mechanical Engineers B31.4 "Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohols", 1992 Edition.
4. American National Standards Institute/National Fire Protection Association, NFPA 30 "Flammable and Combustible Liquids Code", August 1993.
5. Code of Federal Regulations, Part 33, Coast Guard, DOT, July 1, 1992 Edition.
6. Code of Federal Regulations, Part 49, Transportation of Hazardous Liquids by Pipeline, July 1, 1992 Edition.
7. California Pipeline Safety Act, as amended January 1, 1992.
8. Defense Fuel Supply Center, "Guidelines for Planning, Performing and Reporting Pipeline Integrity Assessments", September 1993.

Appendix A – Project Schedule

ID	Task Name	Duration	Start
1	**Roosevelt Roads Pressure Testing**	**90 days**	**Sun 7/7/02**
2	**On-site Pressure test**	**90 days**	**Sun 7/7/02**
3	Mobilization	1 day	Sun 7/7/02
4	**Test Section 1**	**1 day**	**Tue 7/16/02**
5	Perform Pressure Test	1 day	Tue 7/16/02
6	**Test Section 2**	**1 day**	**Sat 7/20/02**
7	Perform Pressure Test	1 day	Sat 7/20/02
8	**Test Section 3**	**1 day**	**Mon 7/22/02**
9	Perform Pressure Test	1 day	Mon 7/22/02
10	**Test Section 4**	**1 day**	**Wed 7/17/02**
11	Perform Pressure Test	1 day	Wed 7/17/02
12	**Test Section 5**	**0 days**	**Mon 7/15/02**
13	Deleted	0 days	Mon 7/15/02
14	**Test Section 6**	**0 days**	**Wed 7/17/02**
15	Deleted	0 days	Wed 7/17/02
16	**Test Section 7**	**1 day**	**Wed 10/30/02**
17	Perform Pressure Test	1 day	Wed 10/30/02
18	**Test Section 8**	**1 day**	**Thu 10/31/02**
19	Perform Pressure Test	1 day	Thu 10/31/02
20	**Test Section 9**	**1 day**	**Tue 7/23/02**
21	Perform Pressure Test	1 day	Tue 7/23/02
22	**Test Section 10**	**1 day**	**Mon 7/22/02**
23	Perform Pressure Test	1 day	Mon 7/22/02
24	**Test Section 11**	**1 day**	**Thu 7/25/02**
25	Failed	1 day	Thu 7/25/02
26	**Test Section 12**	**6 days**	**Mon 7/15/02**
27	Perform Pressure Test	3 days	Mon 7/15/02
28	**Test Section 13**	**3 days**	**Fri 11/1/02**
29	Perform Pressure Test	3 days	Fri 11/1/02



Project: NAVSTA Roosevelt Roads Te
Date: 7-15-02 to 11-03-02

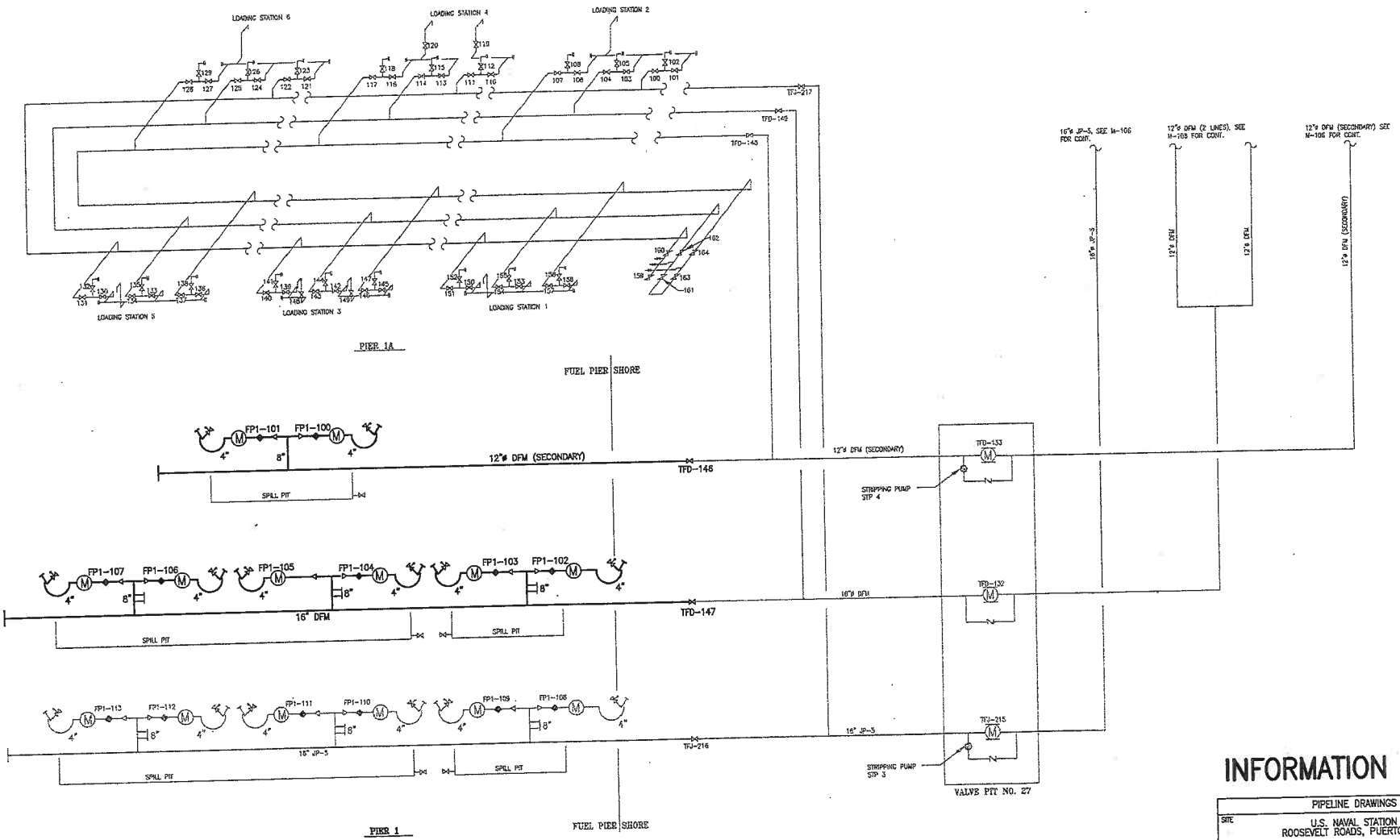
Task
Split
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Split
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary
External Milestone
Deadline

Appendix B – Sketches

Sketches

Sketch No.	Rev.	Title
SK-18-15-0101	0	Test Segment 1
SK-18-15-0102	0	Test Segment 2
SK-18-15-0103	0	Test Segment 3
SK-18-15-0104	0	Test Segment 4
SK-18-15-0105 Sheet 1 of 2 and Sheet 2 of 2	0	Test Segment 5
SK-18-15-0106 Sheet 1 of 2 and Sheet 2 of 2	0	Test Segment 6
SK-18-15-0107 Sheet 1 of 3, Sheet 2 of 3 and Sheet 3 of 3	0	Test Segment 7
SK-18-15-0108 Sheet 1 of 4 to Sheet 4 of 4	0	Test Segment 8 Primary
SK-18-15-0108 Sheet 1 of 4 to Sheet 4 of 4	0	Test Segment 8 Secondary
SK-18-15-0109 Sheet 1 of 2 and Sheet 2 of 2	0	Test Segment 9
SK-18-15-0110 Sheet 1 of 2 and Sheet 2 of 2	0	Test Segment 10
SK-18-15-0111	0	Test Segment 11
SK-18-15-0112 Sheet 1 of 2, Sheet 2 of 2 and Sheet 3 of 3	0	Test Segment 12
SK-18-15-0113 Sheet 1 of 3, Sheet 2 of 3 and Sheet 3 of 3	0	Test Segment 13

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



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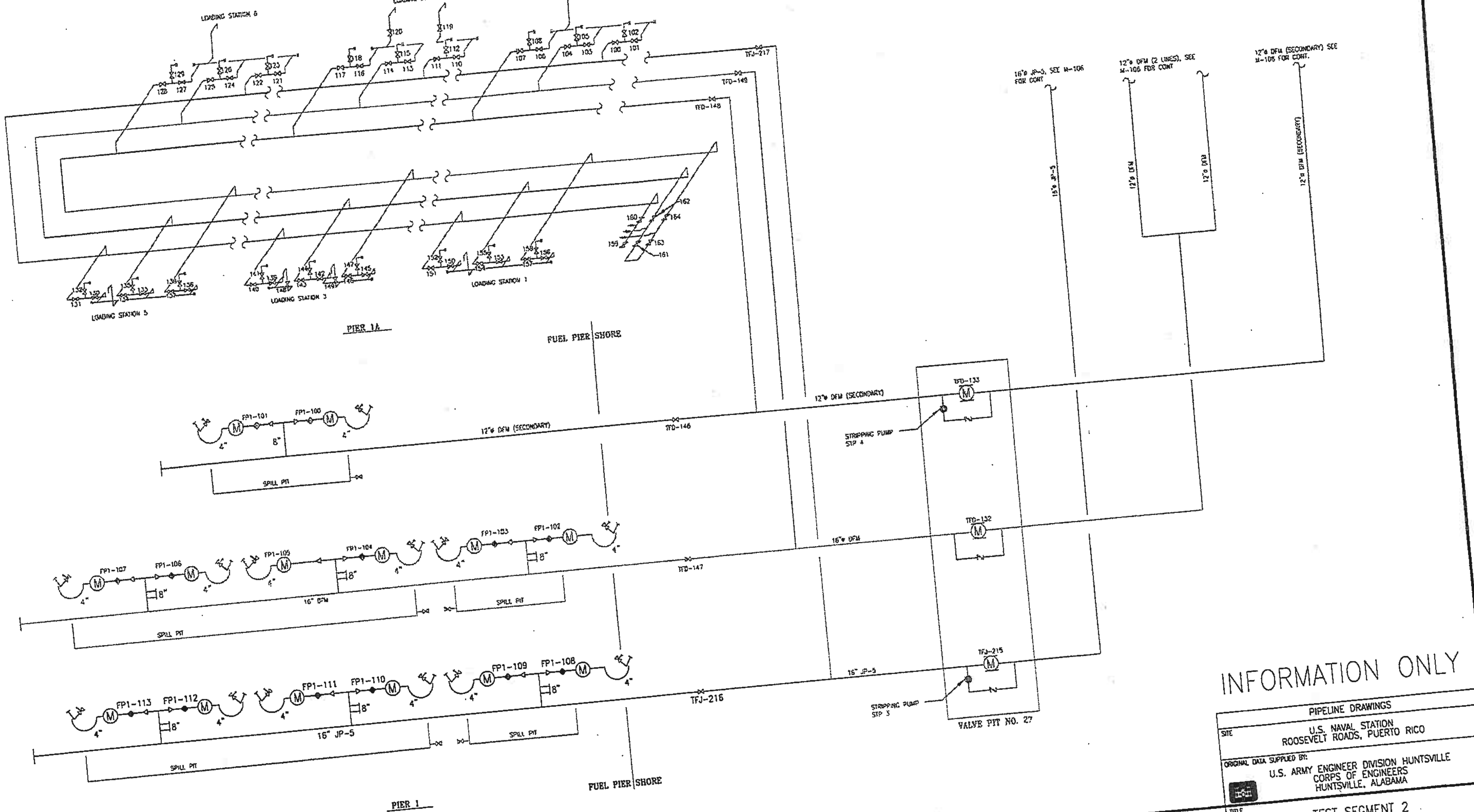

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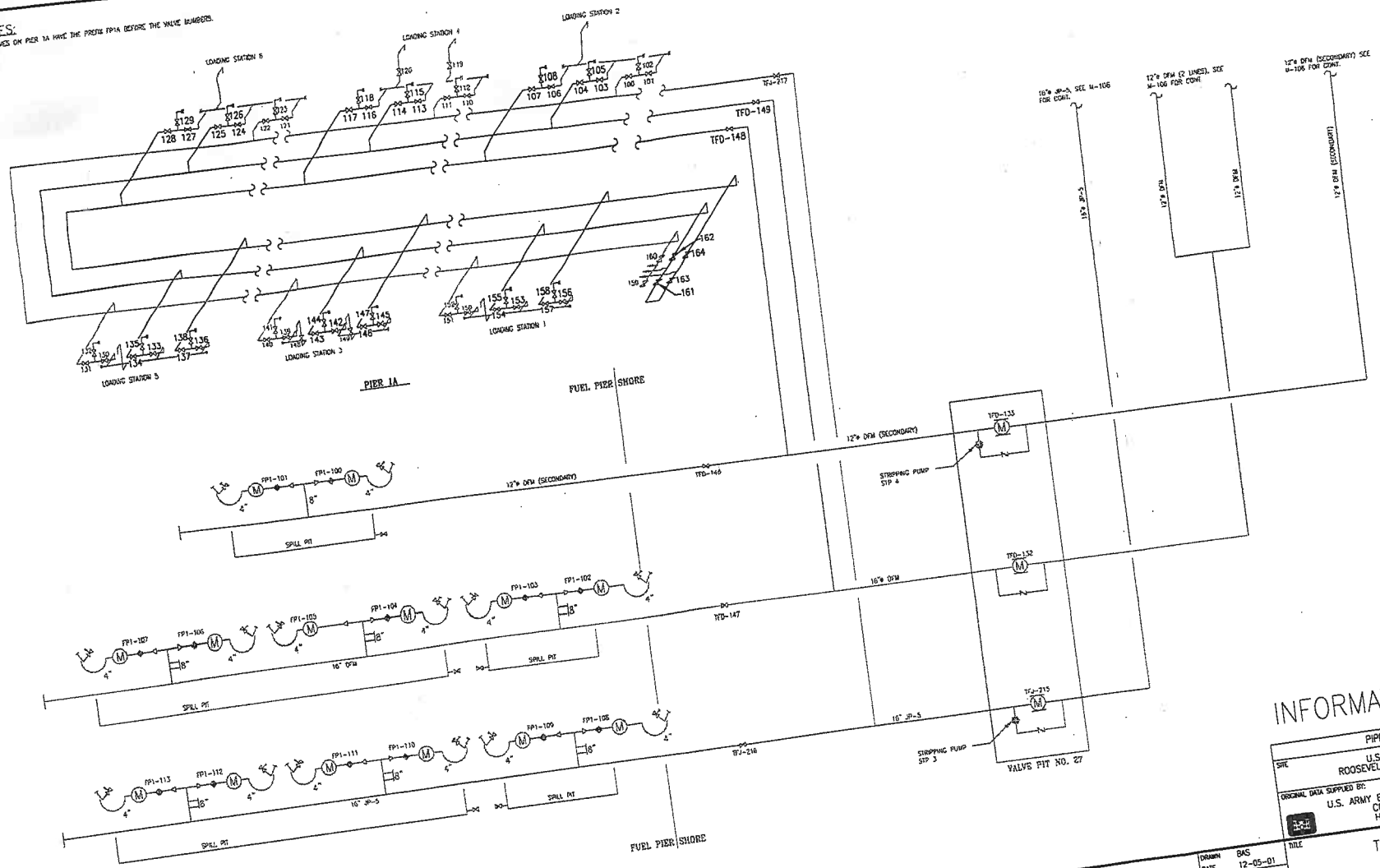

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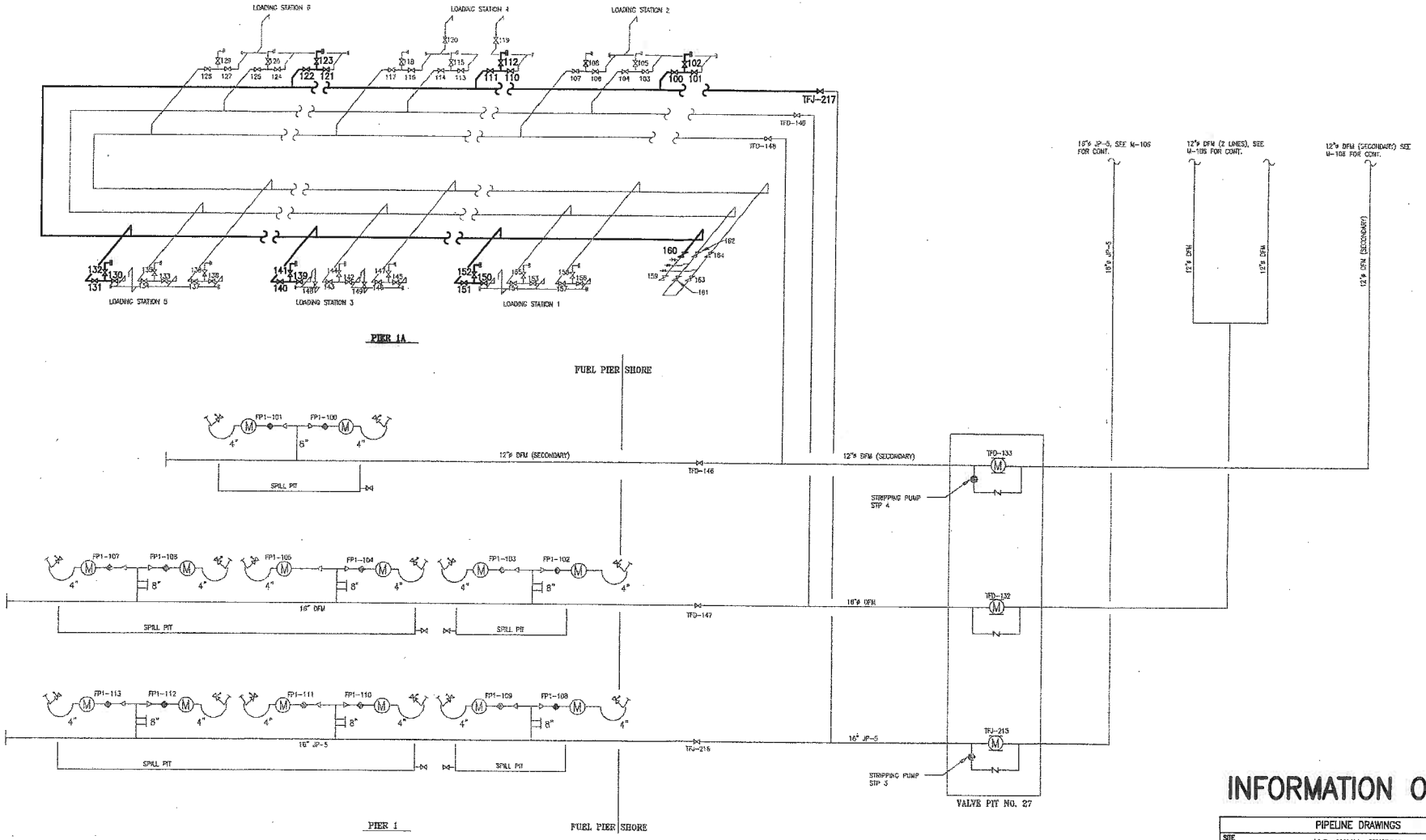

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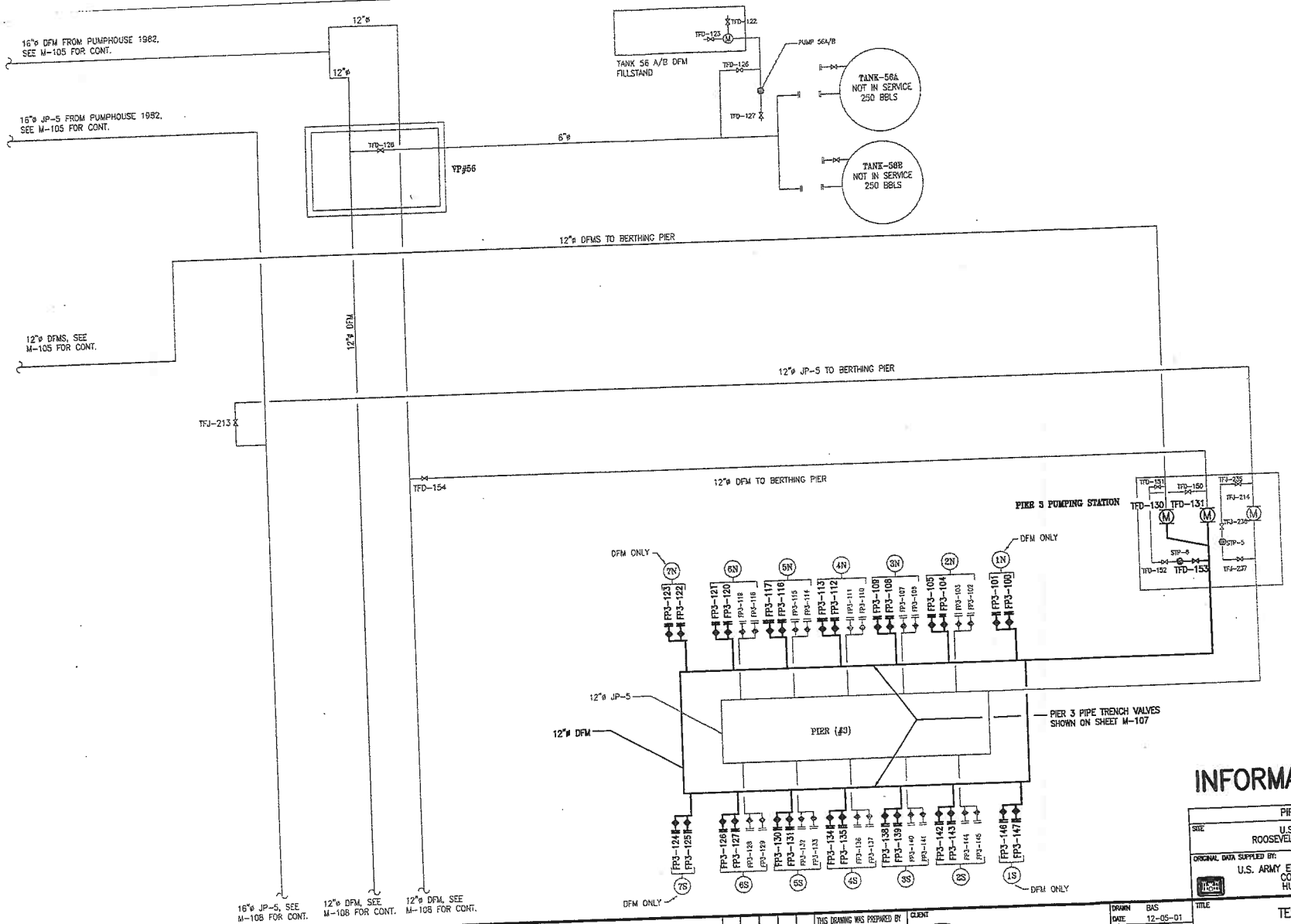

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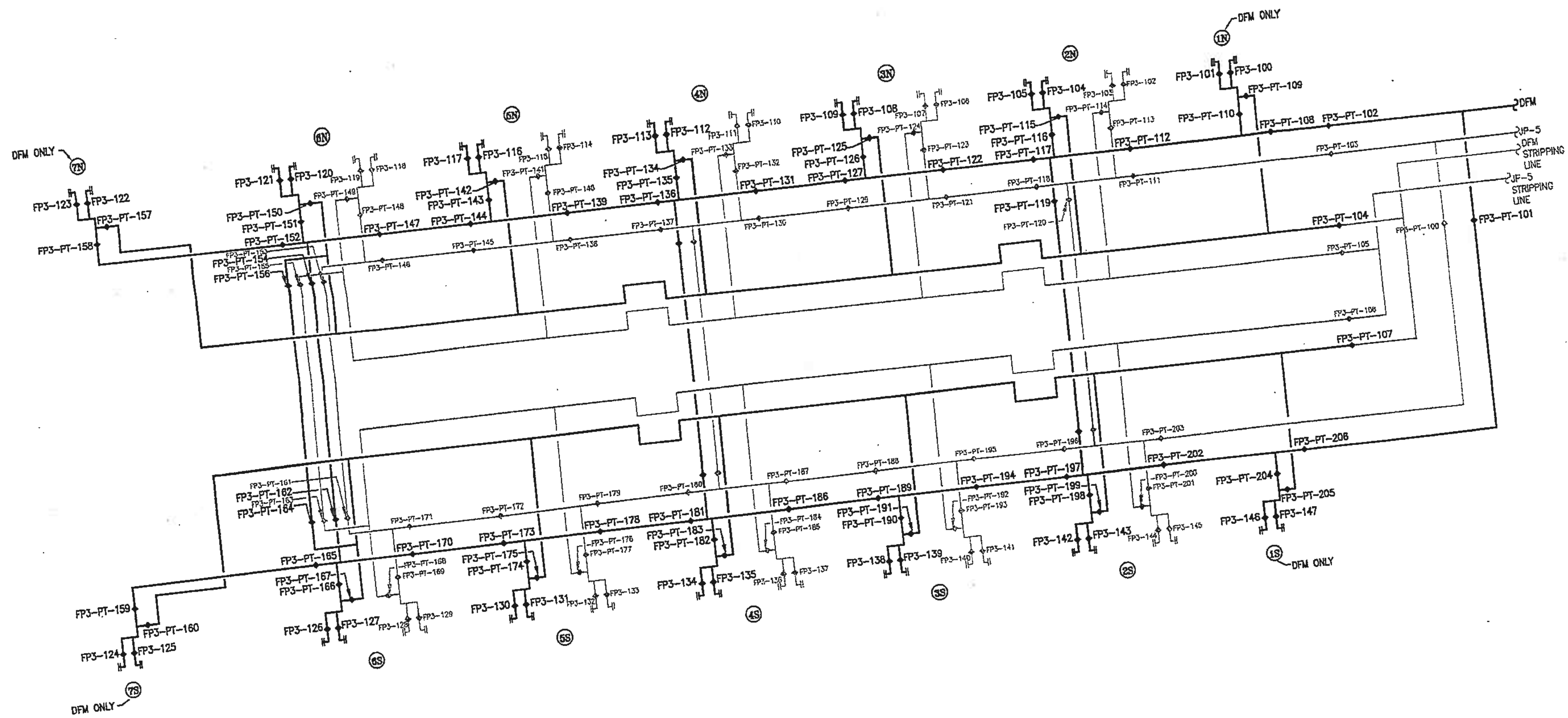

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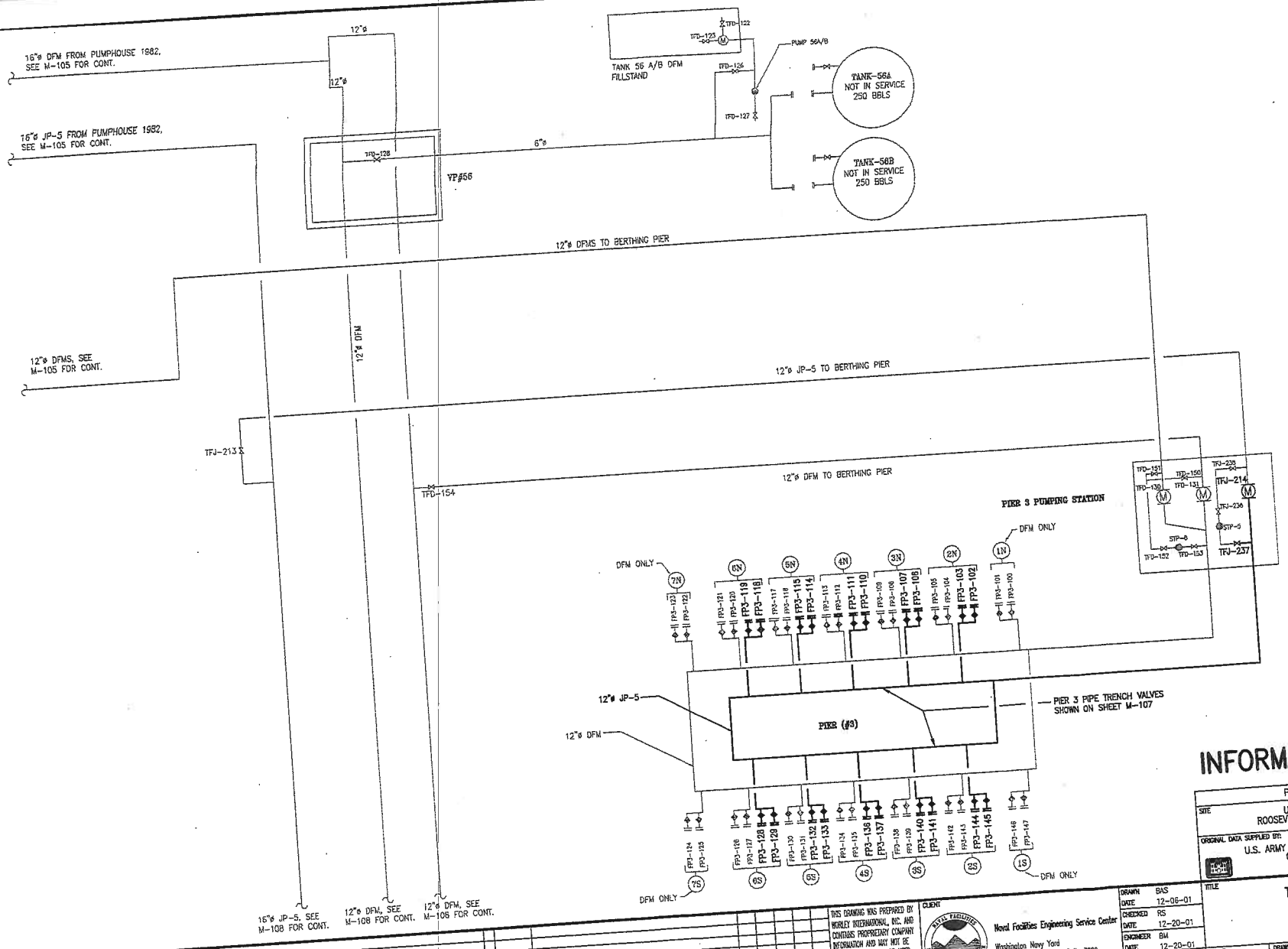

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TITLE: TEST SEGMENT 6 – SHEET 1 OF 2

SCALE: –

DRAWING NO: SR-18-15-0106

REV: 1

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LAST UPDATE: 06 NOV 2002 13:19
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CLIENT: Naval Facilities Engineering Service Center
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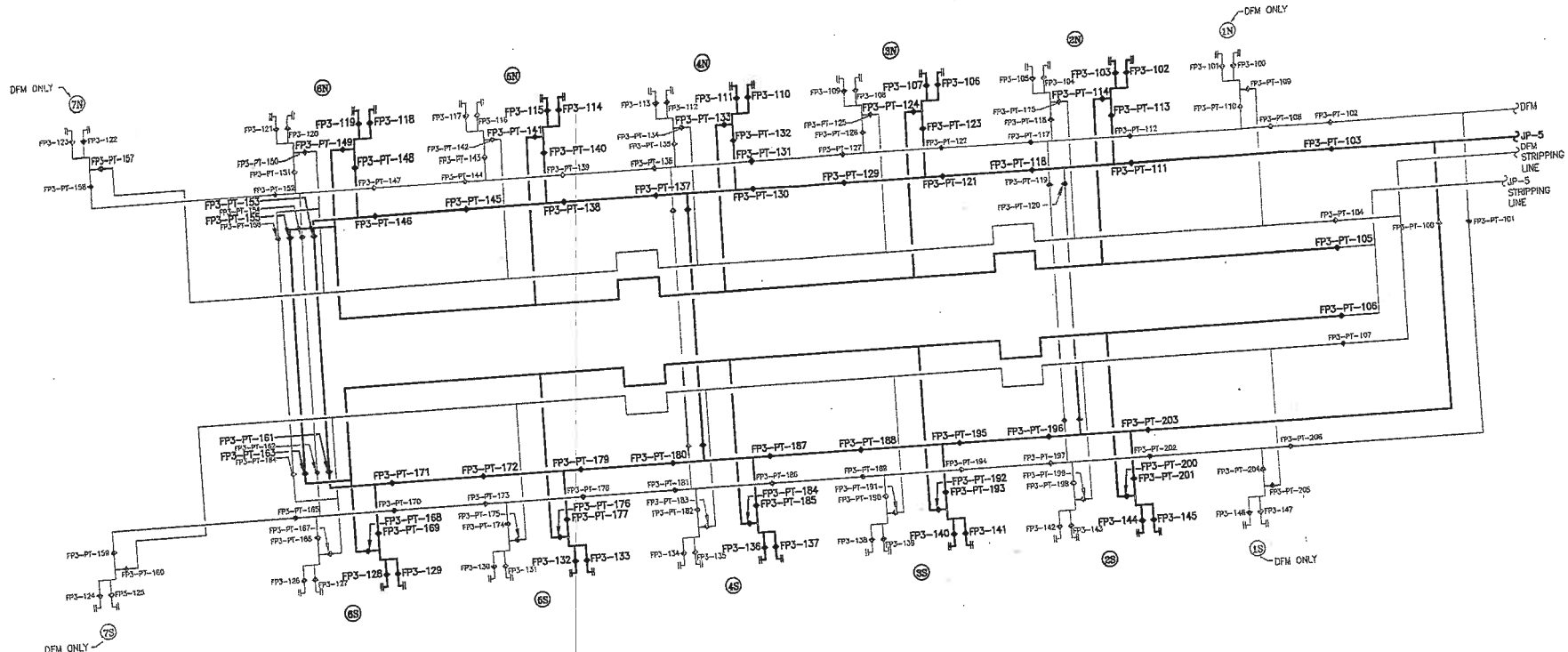

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TITLE: TEST SEGMENT 6 – SHEET 2 OF 2

SCALE: –

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FORM: MAP_D

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HOUSTON, TEXAS USA

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LAST UPDATE: 06 NOV 2002 13:22

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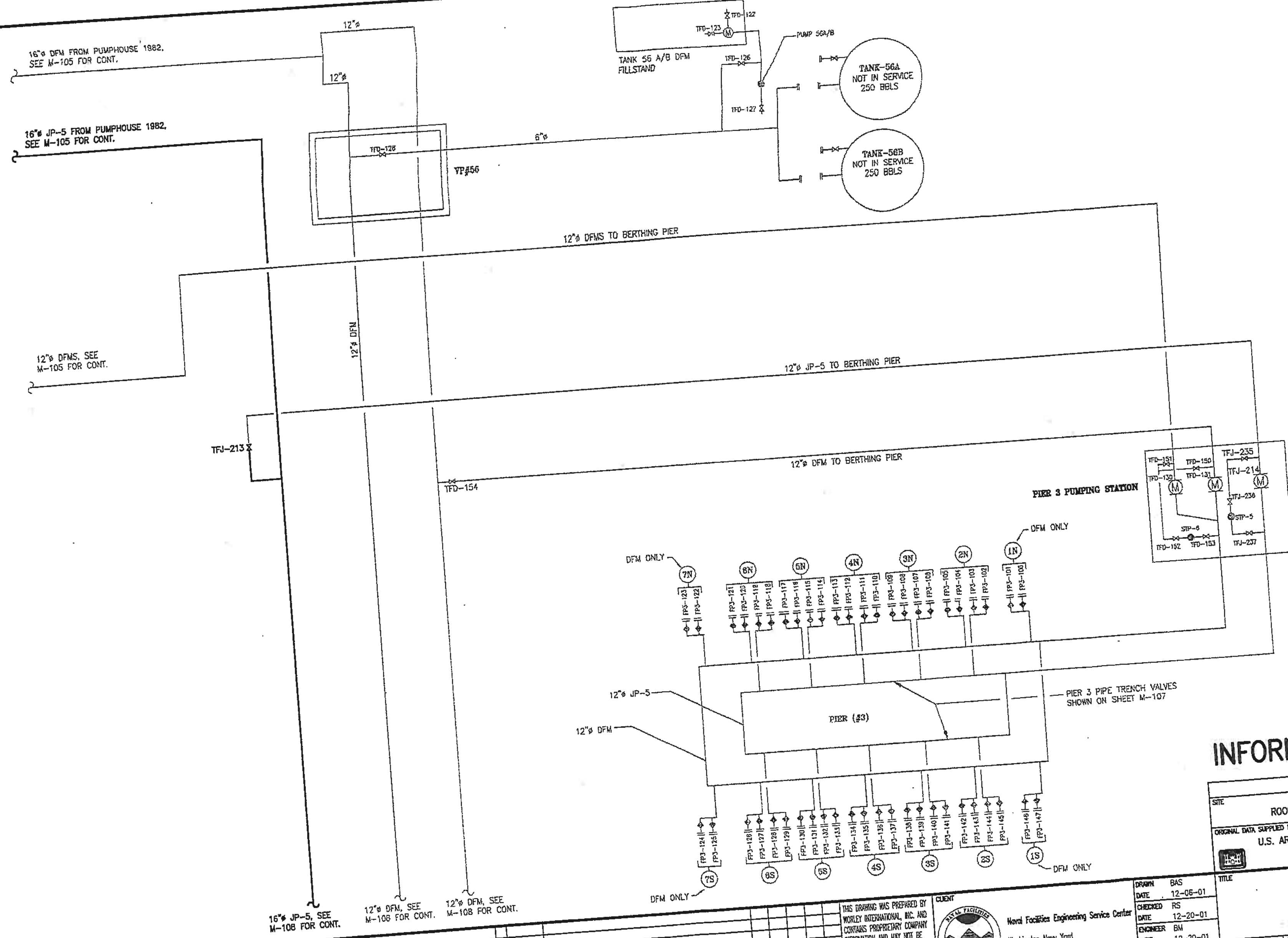
CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5065

DRAWN	BAS	
DATE	12-06-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

TITLE: TEST SEGMENT 7 – SHEET 1 OF 3

DRAWN	BAS
DATE	12-06-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

SCALE: –

DRAWING NO. SK-18-15-0107 REV 1

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

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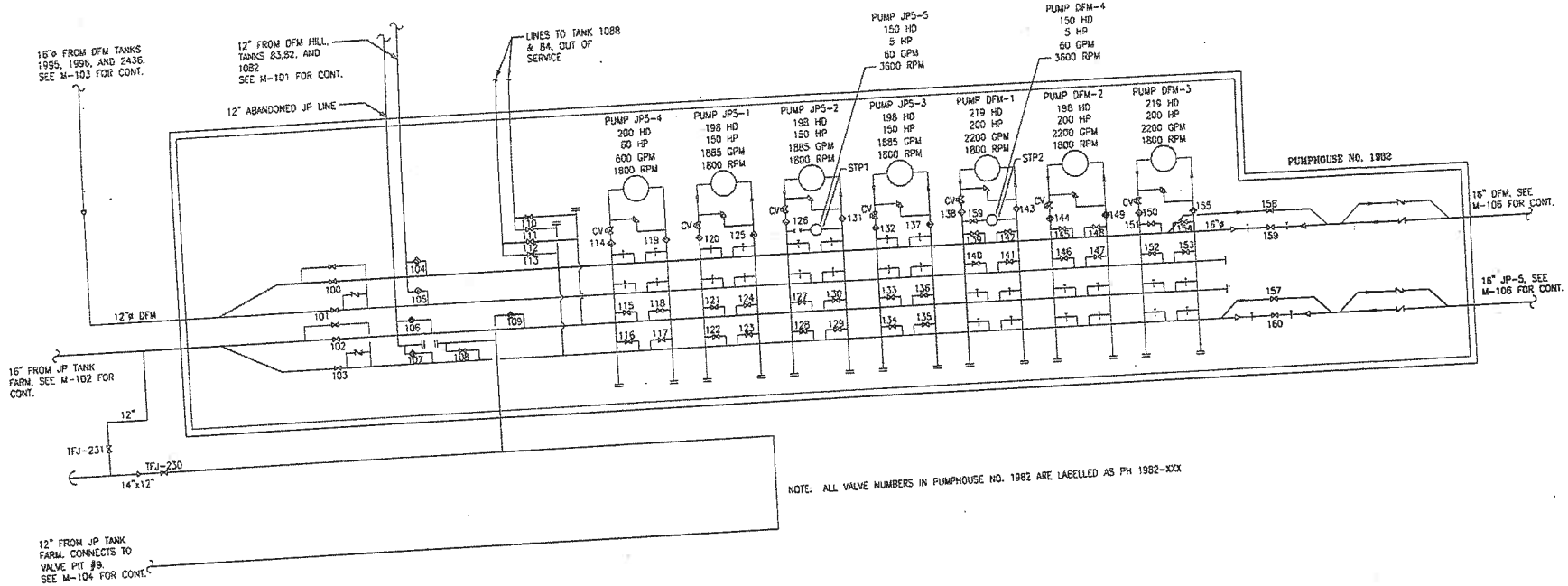
REV	DATE	REVISION	DRAWN	CHECK	ENG	APPR'L	CLIENT
1	11/06/02	GENERAL UPDATE					
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

REFERENCE DRAWINGS | DRAWING NUMBER

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	13:30	1B



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

TEST SEGMENT 7 – SHEET 2 OF 3

DRAWN BAS DATE 12-06-01
CHECKED RS DATE 12-20-01
ENGINEER BM DATE 12-20-01
APPROVED DAE DATE 12-20-01

SCALE -

DRAWING NO. SK-18-15-0107 REV 1

CLIENT: Naval Facilities Engineering Service Center, Washington Navy Yard, 1435 10th Street S.E., Suite 3000, Washington, DC 20374-5063

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV	CLIENT
1	11/06/02	GENERAL UPDATE	BAS	RS	BM	DAE	--
0	12-21-01	ISSUED AS FINAL					

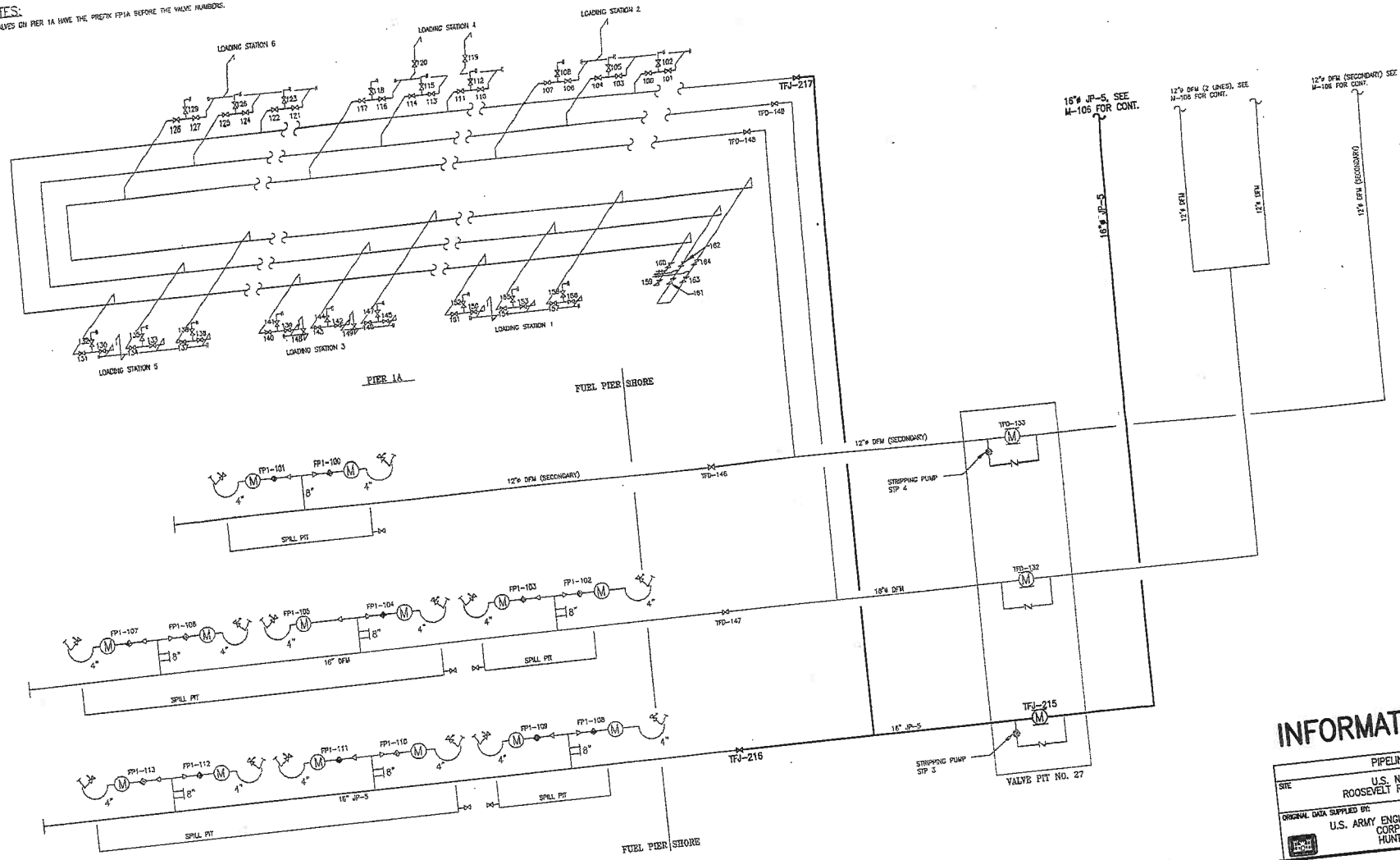
Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV	DRAWING NUMBER
065-07074	07 NOV 2002	07:45	1C.	

REFERENCE DRAWINGS

DESIGN FILE: N/A 07A\18\DRAWINGS\15\SK\18150107B.DWG PLC JY: MWHITE TIME: 07:44

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

TITLE: TEST SEGMENT 7 – SHEET 3 OF 3

SCALE: –

DRAWING NO: SK-18-15-0107

REV: 1

DRAWN	BAS
DATE	12-06-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E. Suite 3000
Washington, DC 20374-5063

DRAWN	CHECK	ENG	APPROV	CLIENT
BAS	RS	BM	–	–

REV	DATE	REVISION
1	11/06/02	GENERAL UPDATE
0	12-21-01	ISSUED AS FINAL

REFERENCE DRAWINGS

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV	DRAWING NUMBER
065-07074	06 NOV 2002	13:34	1A	

NOTES:
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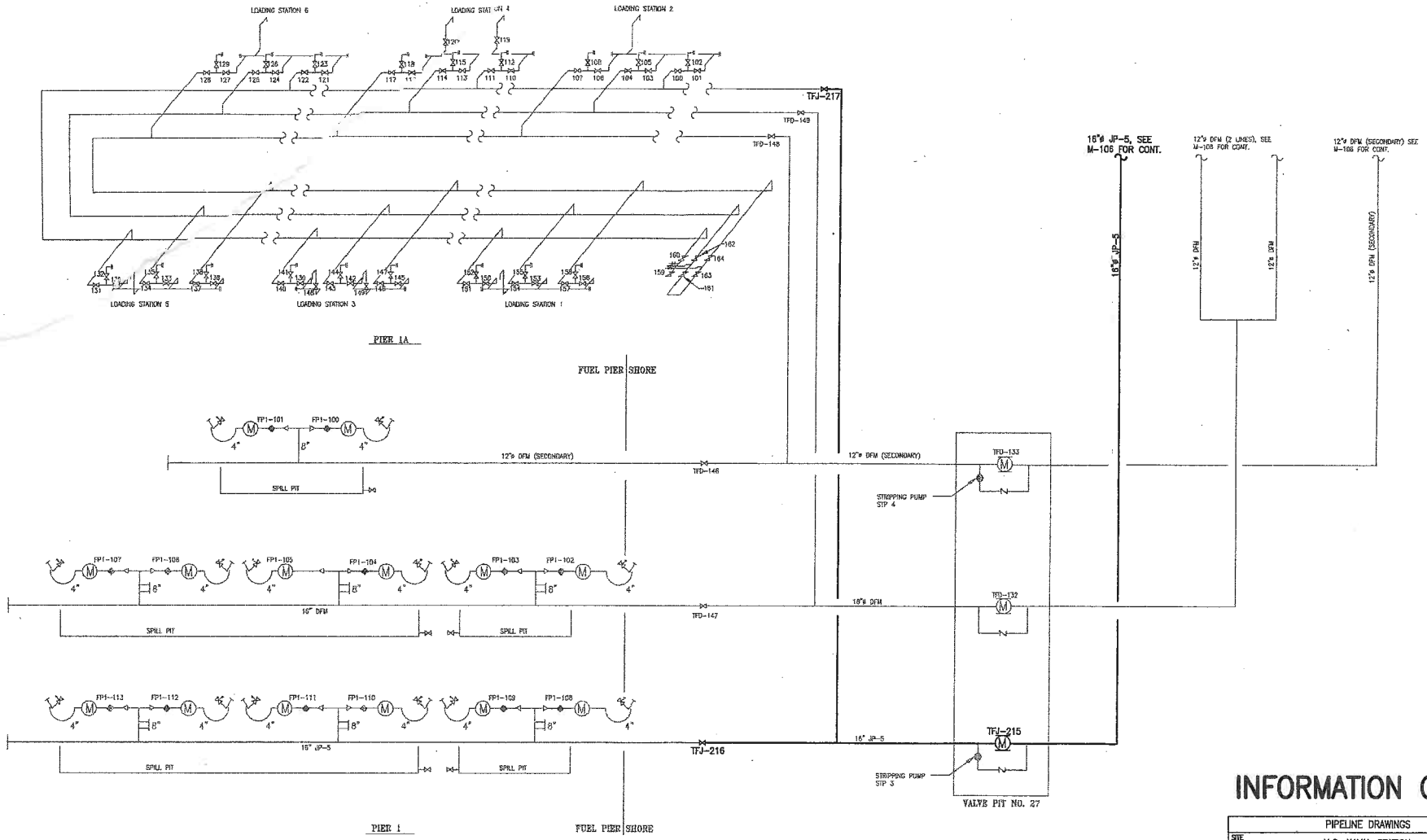


INFORMATION ONLY

PIPELINE DRAWINGS

SITE
U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		DIT REV
065-07074	06 NOV 2002	13:34	1A

DRAWING NUMBER

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROVE	CLIENT
1	11/06/02	GENERAL UPDATE	BAS	RS	BM	–	–
0	12-21-01	ISSUED AS FINAL					

REFERENCE DRAWINGS

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
1433 10th Street S.E., Suite 3000
Washington, DC 20374-5063

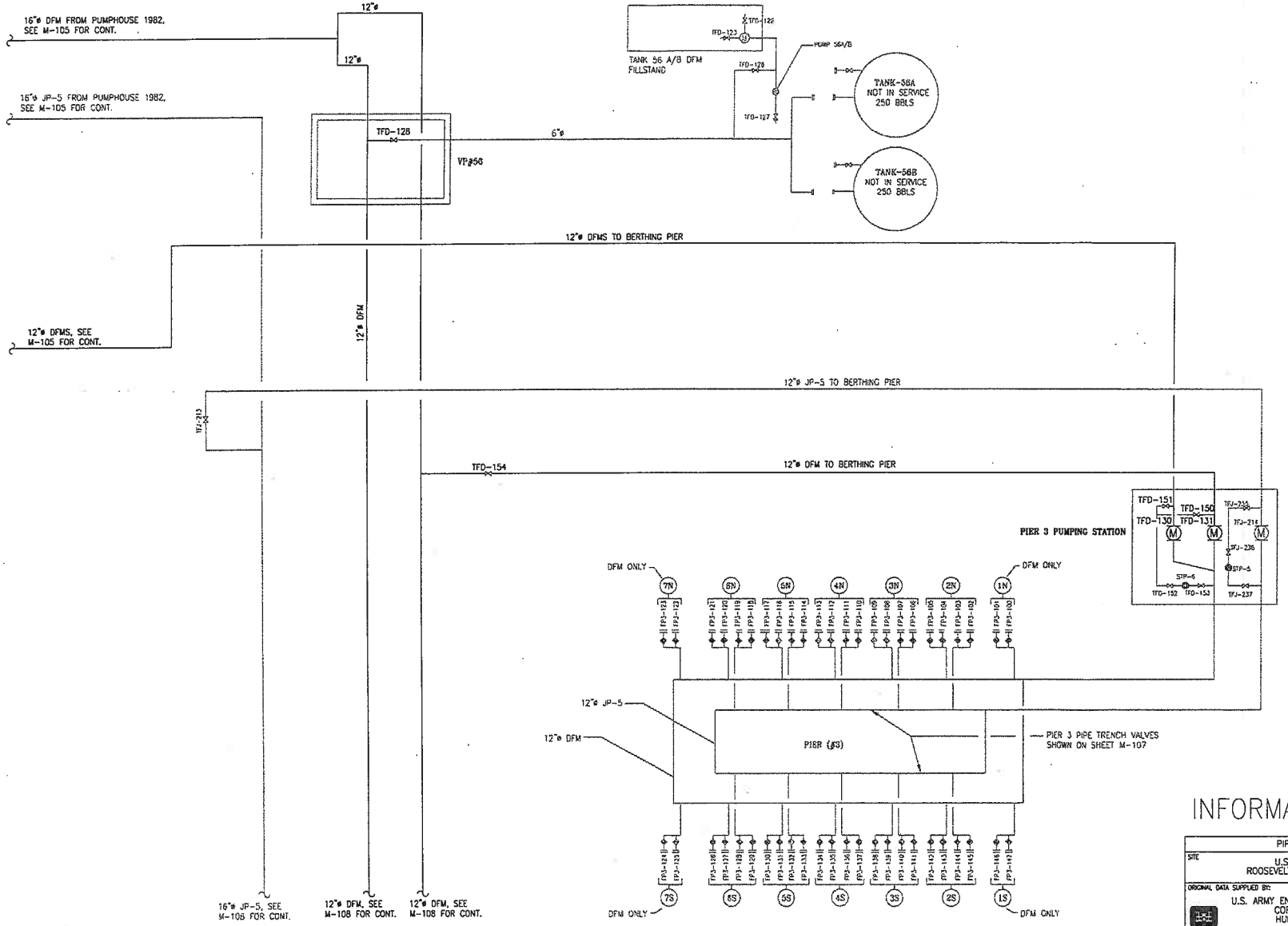
DRAWN	BAS	
DATE	12-06-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

TITLE
TEST SEGMENT 7
–
SHEET 3 OF 3

SCALE –

DRAWING NO. SK-18-15-0107

REV 1



INFORMATION ONLY

PIPELINE DRAWINGS	
SITE	U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO
ORIGINAL DATA SUPPLIED BY:	U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

Worley International Inc
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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	14:16	1C

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV.	CLIENT
1	11/06/02	GENERAL UPDATE					
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

REFERENCE DRAWINGS

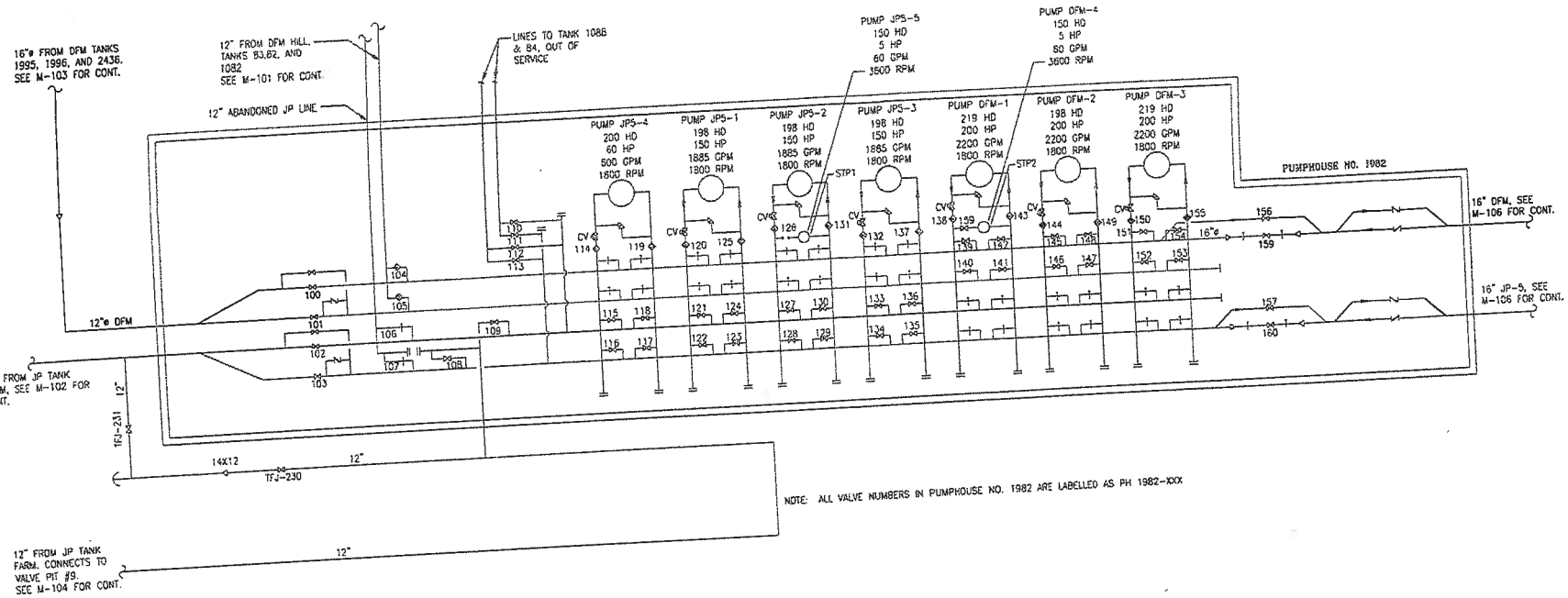
CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

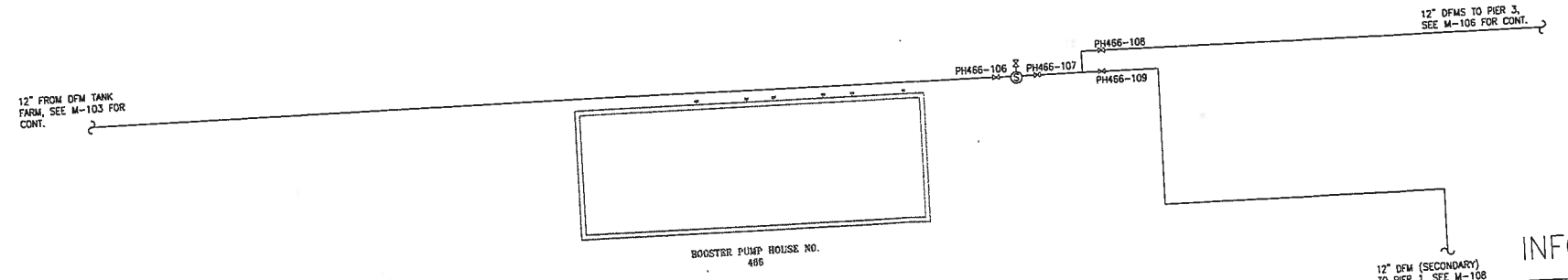
DRAWN	BAS
DATE	12-06-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE
TEST SEGMENT 8 – PRIMARY
–
SHEET 1 OF 4

SCALE	DRAWING NO.	REV
–	SK-18-15-0108	1

DESIGN FILE: N:\7074\18\DRAWINGS\15\SK18150108.DWG PU: MWHITE TIME: 14:16





INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

TITLE: TEST SEGMENT 8 - PRIMARY

SHEET 2 OF 4

SCALE: -

DRAWING NO. SK-18-15-0108

REV 1

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WORLEY PROJECT NUMBER 065-07074 | LAST UPDATE 06 NOV 2002 13:37 | INT REV 1C | DRAWING NUMBER

REFERENCE DRAWINGS

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV	CLIENT
1	11/06/02	GENERAL UPDATE	BAS	RS	BM	DAE	-
0	12-21-01	ISSUED AS FINAL					

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
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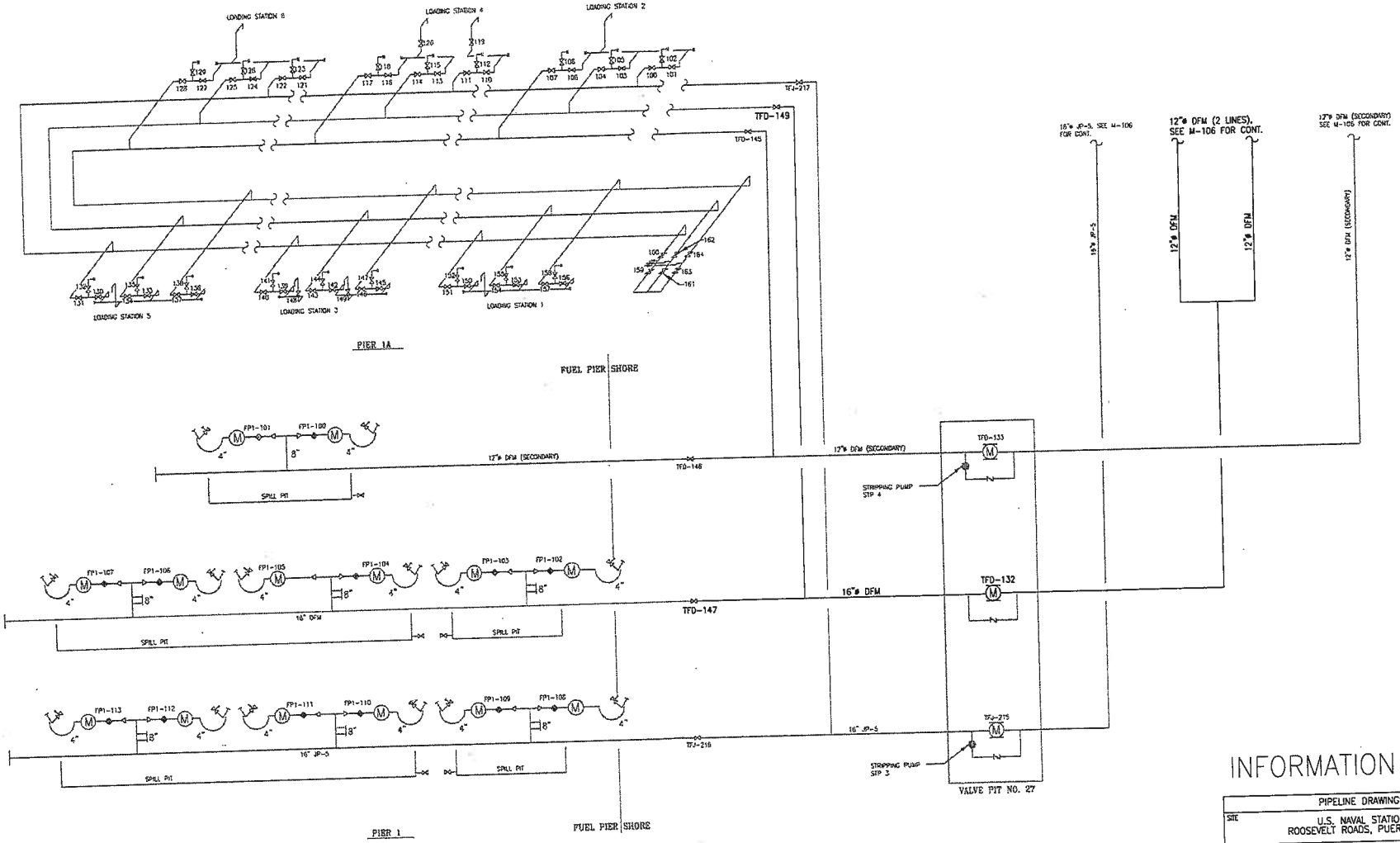
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

DESIGN FILE: N:\...07A\18\DRAWINGS\15\SK1815010BA.DWG PLO: MWHITE TIME: 13:37

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

TITLE: TEST SEGMENT 8 - PRIMARY - SHEET 3 OF 4

SCALE: -

DRAWING NO.: SK-18-15-0108

REV: 0

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER: 065-07074
LAST UPDATE: 06 NOV 2002 14:17
INT REV: 00
DRAWING NUMBER:
REFERENCE DRAWINGS:

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRV	CLIENT
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E. Suite 3000
Washington, DC 20374-5063

DRAWN	BAS	
DATE	12-07-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

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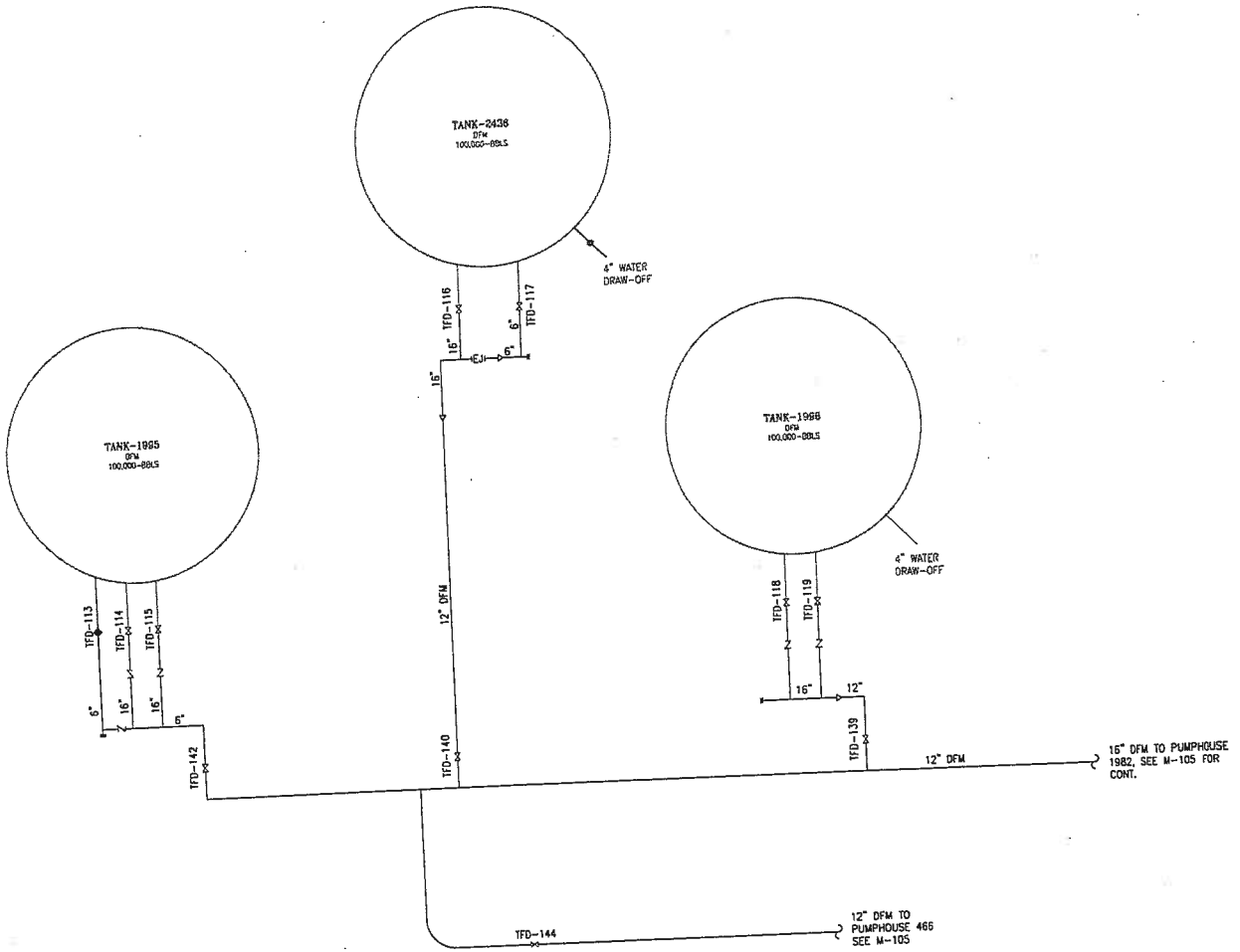


INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

TITLE: TEST SEGMENT 8 - PRIMARY

SHEET 4 OF 4.

SCALE: -

DRAWING NO.: SK-18-15-0108

REV: 0

DRAWN BAS 12-07-01
CHECKED RS 12-20-01
ENGINEER BM 12-20-01
APPROVED DAE 12-20-01

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1433 10th Street S.E. Suite 3000
Washington, DC 20374-5063

REV	DATE	REVISION	BAS	RS	BM	DAE	-
			DRAWN	CHECK	ENG	APPRVL	CLIENT
0	12-21-01	ISSUED AS FINAL					

REFERENCE DRAWINGS

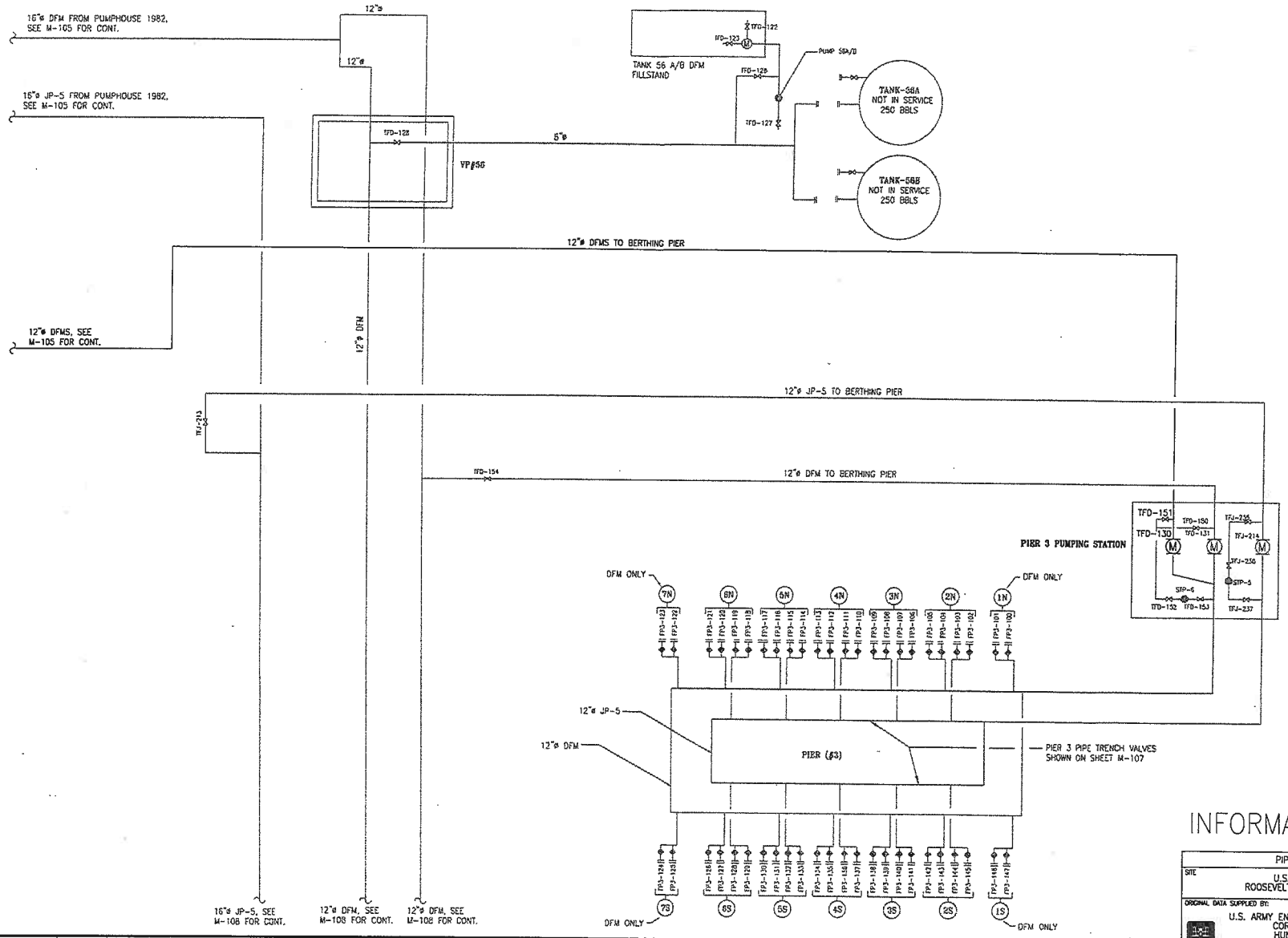
DRAWING NUMBER

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER: 065-07074
LAST UPDATE: 06 NOV 2002 14:18
NO REV: 00

DESIGN FILE: L:\7074\18\DRAWINGS\15\SK181501080.DWG
TIME: 14:18
BY: MWHITE

M-106



INFORMATION ONLY

PIPELINE DRAWINGS	
SITE	U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO
ORIGINAL DATA SUPPLIED BY:	U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		MT REV
065-07074	06 NOV 2002	14:16	1C

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV.	CLIENT
1	11/06/02	GENERAL UPDATE		BAS	RS	BM	DAE	-
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

REFERENCE DRAWINGS

DRAWING NUMBER

CLIENT

Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS	
DATE	12-06-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

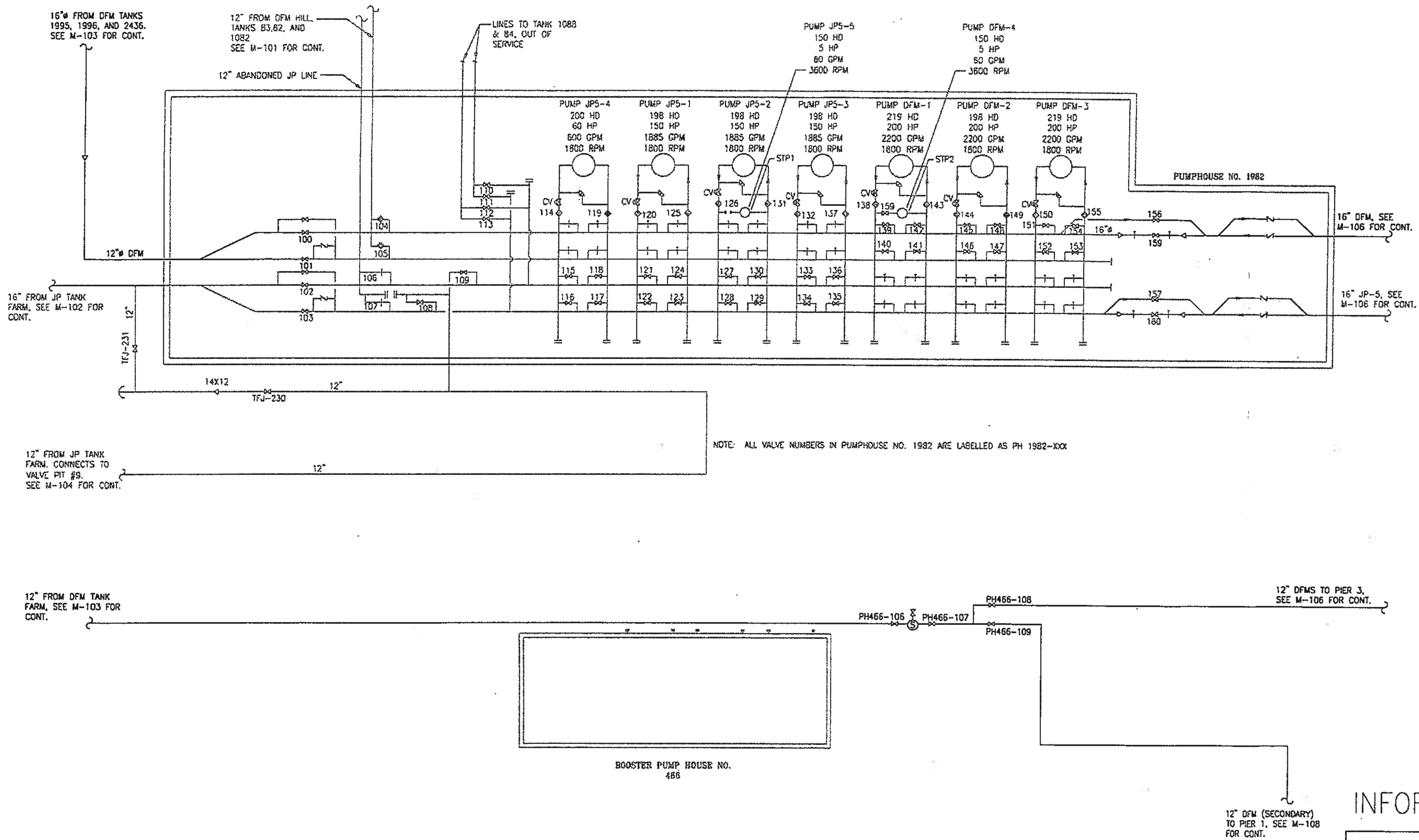
TITLE

TEST SEGMENT 8 - SECONDARY
-
SHEET 1 OF 4

SCALE	DRAWING NO.	REV
-	SK-18-15-0108	1

DESIGN FILE: N:\07A\18\DRAWINGS\15\SK181501080E.DWG TIME: 14:16 PLT: MWHITE

M-105



INFORMATION ONLY

	PIPELINE DRAWINGS
SITE	U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO
ORIGINAL DATA SUPPLIED BY:	U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA
TITLE	TEST SEGMENT 8 – SECONDARY – SHEET 2 OF 4
SCALE	-
DRAWING NO.	SK-18-15-0108
REV	1

DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
1	11/06/02	GENERAL UPDATE	MW	DBL	DBL	-	
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

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CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

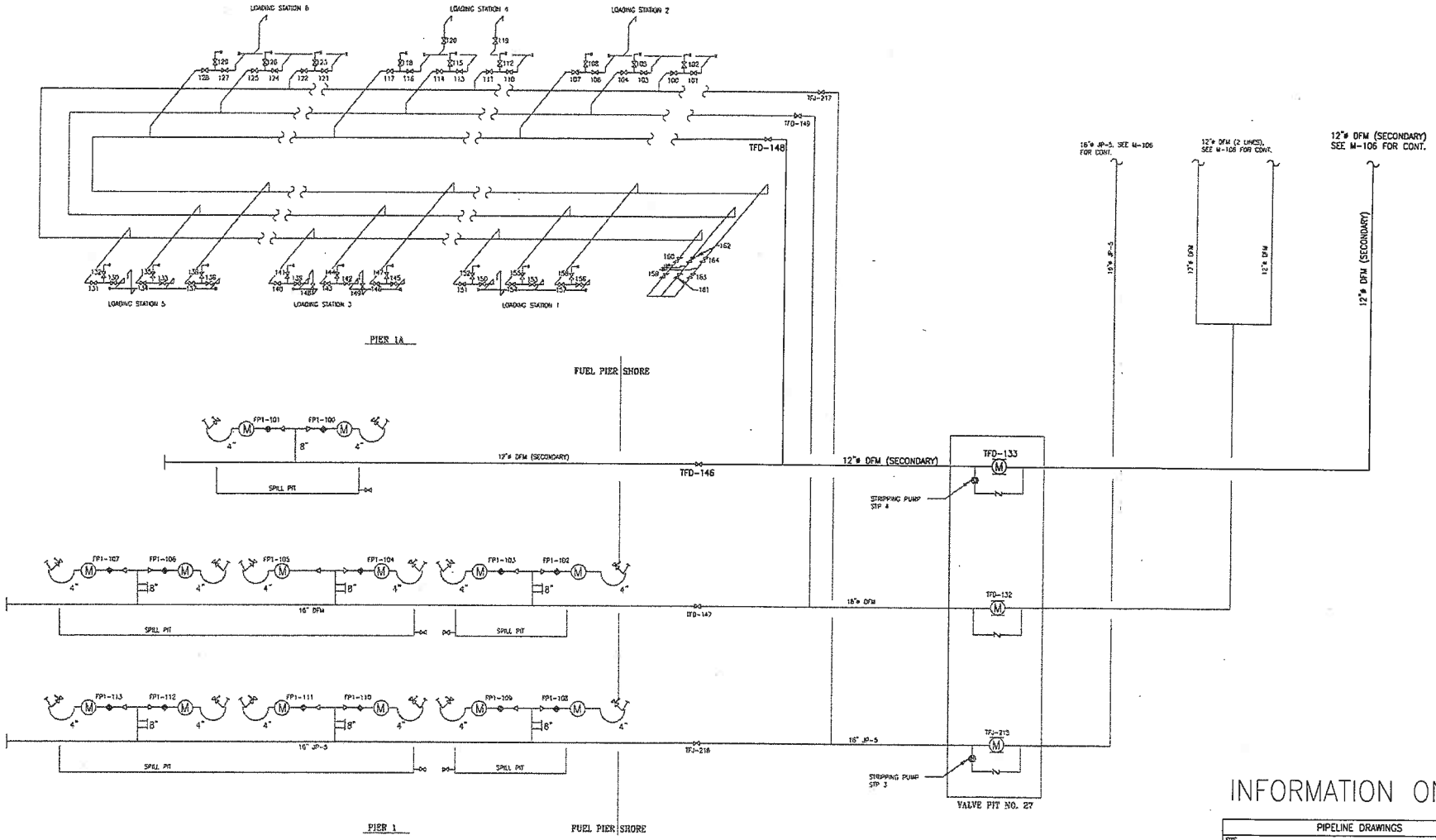
Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	13:37	1C

DESIGN FILE: N:\...\074\18\DRAWINGS\15\SK18150108B.DWG   TIME: 13:37   PLT   BY: MWHITE

M-108

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	14:17	00

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	BAS DRAWN	RS CHECK	BM ENG	DAE APPROV	– CLIENT
		0	12-21-01	ISSUED AS FINAL					

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS	DATE 12-07-01
CHECKED	RS	DATE 12-20-01
ENGINEER	BM	DATE 12-20-01
APPROVED	DAE	DATE 12-20-01

TITLE: TEST SEGMENT 8 – SECONDARY – SHEET 3 OF 4

SCALE: –

DRAWING NO: SK-18-15-0108

REV: 0

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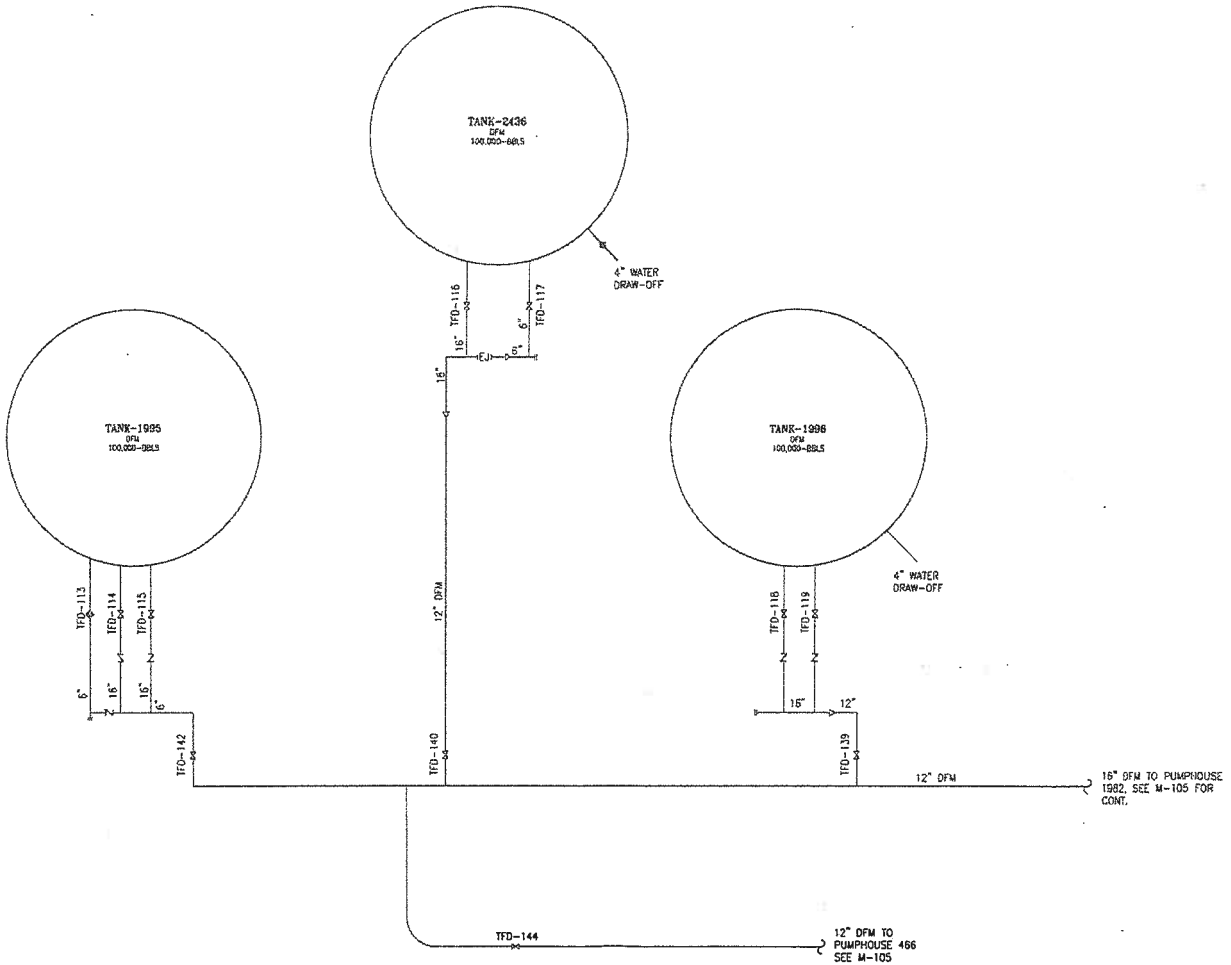


INFORMATION ONLY

	PIPELINE DRAWINGS
SITE	U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO
ORIGINAL DATA SUPPLIED BY:	U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

DESIGN FILE: N:\7074\18\DRAWINGS\15\SK18150108G.DWG TIME: 14:18 PL BY: MWHITE

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	14:18	A1

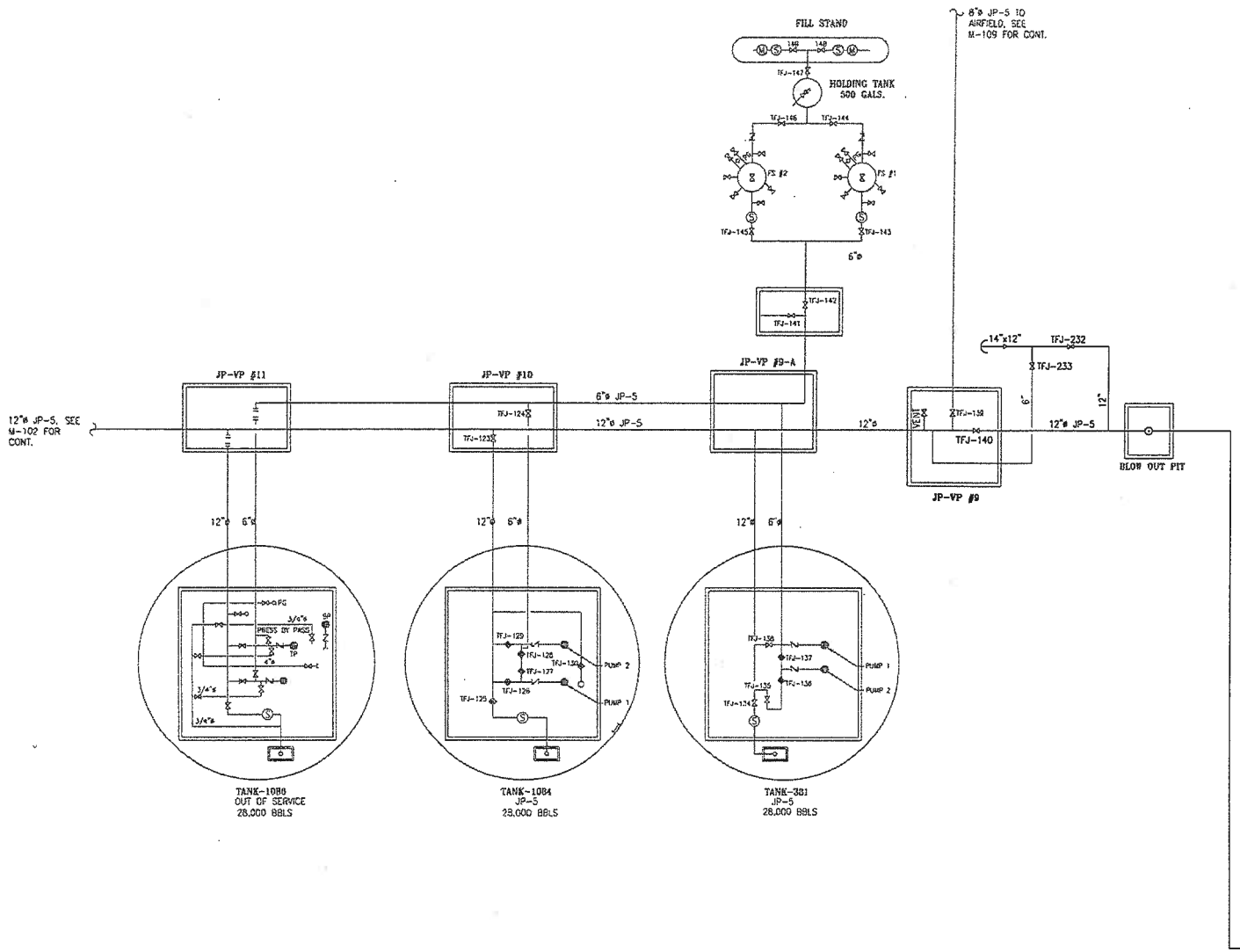
DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV.	CLIENT

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	SCA
DATE	12/06/02
CHECKED	
DATE	
ENGINEER	
DATE	
APPROVED	
DATE	

TITLE
TEST SEGMENT 8 - SECONDARY
–
SHEET 4 OF 4

SCALE	DRAWING NO.	REV
–	SK-18-15-0108	A



INFORMATION ONLY

PIPELINE DRAWINGS	
SITE	U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO
ORIGINAL DATA SUPPLIED BY:	U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	07 NOV 2002	07:54	1C

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV	CLIENT
1	11/06/02	GENERAL UPDATE					–
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

DRAWING NUMBER | REFERENCE DRAWINGS

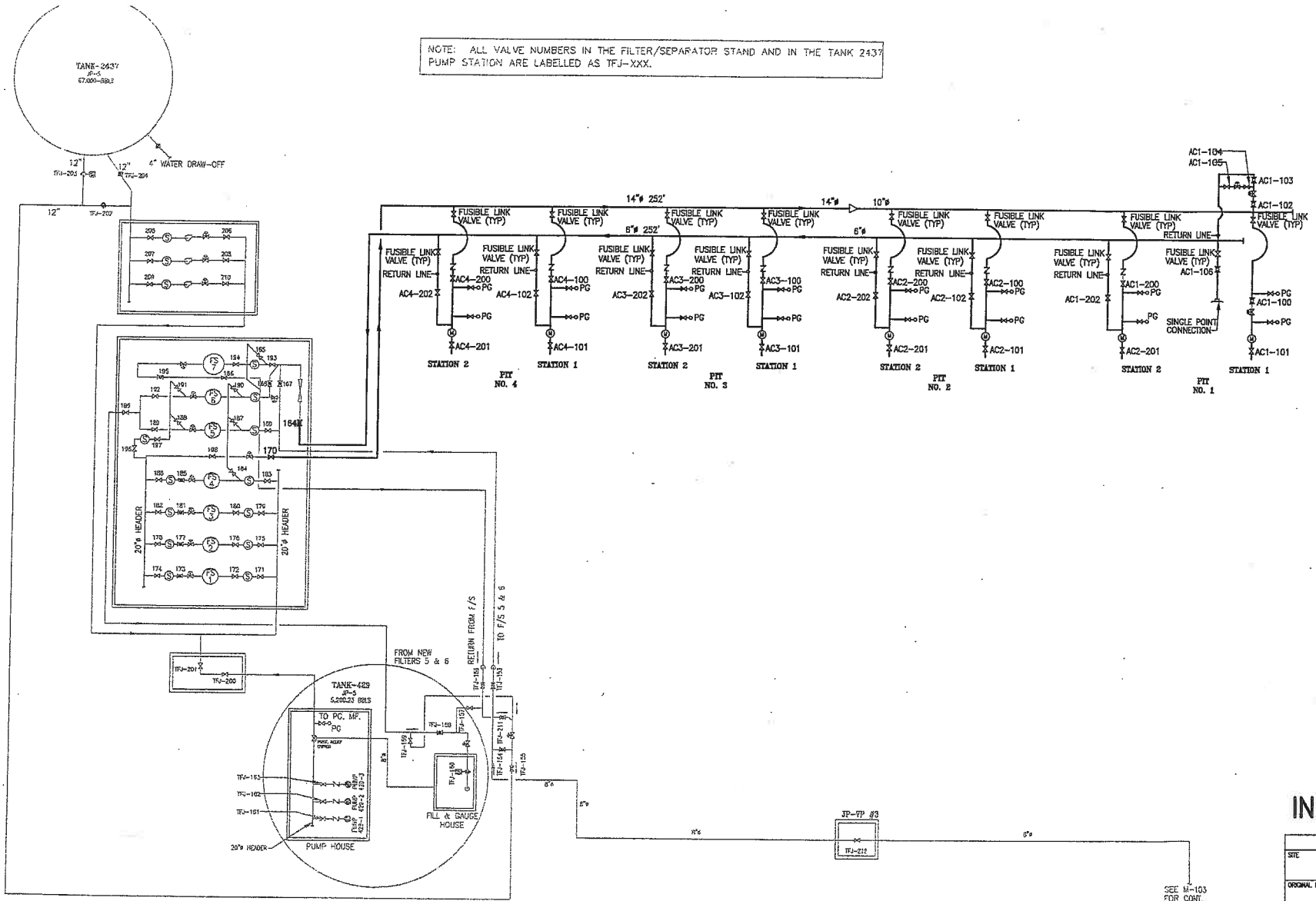
CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E. Suite 3000
Washington, DC 20374-5063

DRAWN	BAS	
DATE	12-07-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

TITLE: TEST SEGMENT 9 – SHEET 1 OF 2

SCALE	DRAWING NO.	REV
–	SK-18-15-0109	1

NOTE: ALL VALVE NUMBERS IN THE FILTER/SEPARATOR STAND AND IN THE TANK 2437 PUMP STATION ARE LABELLED AS TFJ-XXX.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

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HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	14:12	1A

DRAWING NUMBER

REFERENCE DRAWINGS

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV	CLIENT
1	11/06/02	GENERAL UPDATE	BAS	RS	BM	DAE	–
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS	
DATE	12-07-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

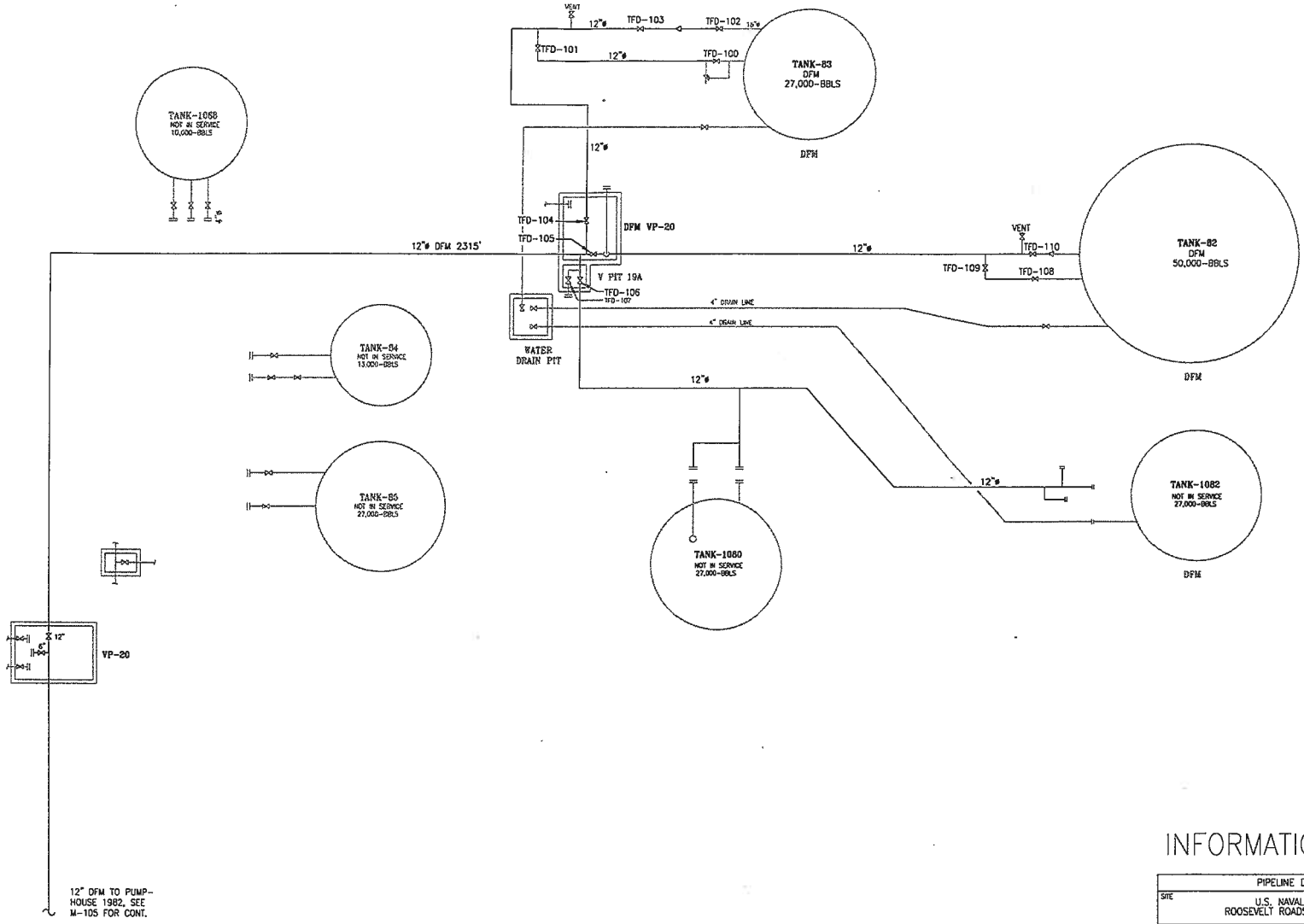
TITLE: TEST SEGMENT 11

SCALE: –

DRAWING NO. SK-18-15-0111

REV

M-101



INFORMATION ONLY

PIPELINE DRAWINGS	
SITE	U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO
ORIGINAL DATA SUPPLIED BY:	U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	20 DEC 2001	09:22	18

DRAWING NUMBER

REFERENCE DRAWINGS

REV	DATE	REVISION	DRAWN	CHK	ENG	APPRV	CLIENT
1	3-25-02	CHANGES PER SITE VISIT	CWK				
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	

CLIENT

Naval Facilities Engineering Service Center

Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE

TEST SEGMENT 12
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SHEET 1 OF 3

SCALE	DRAWING NO.	REV
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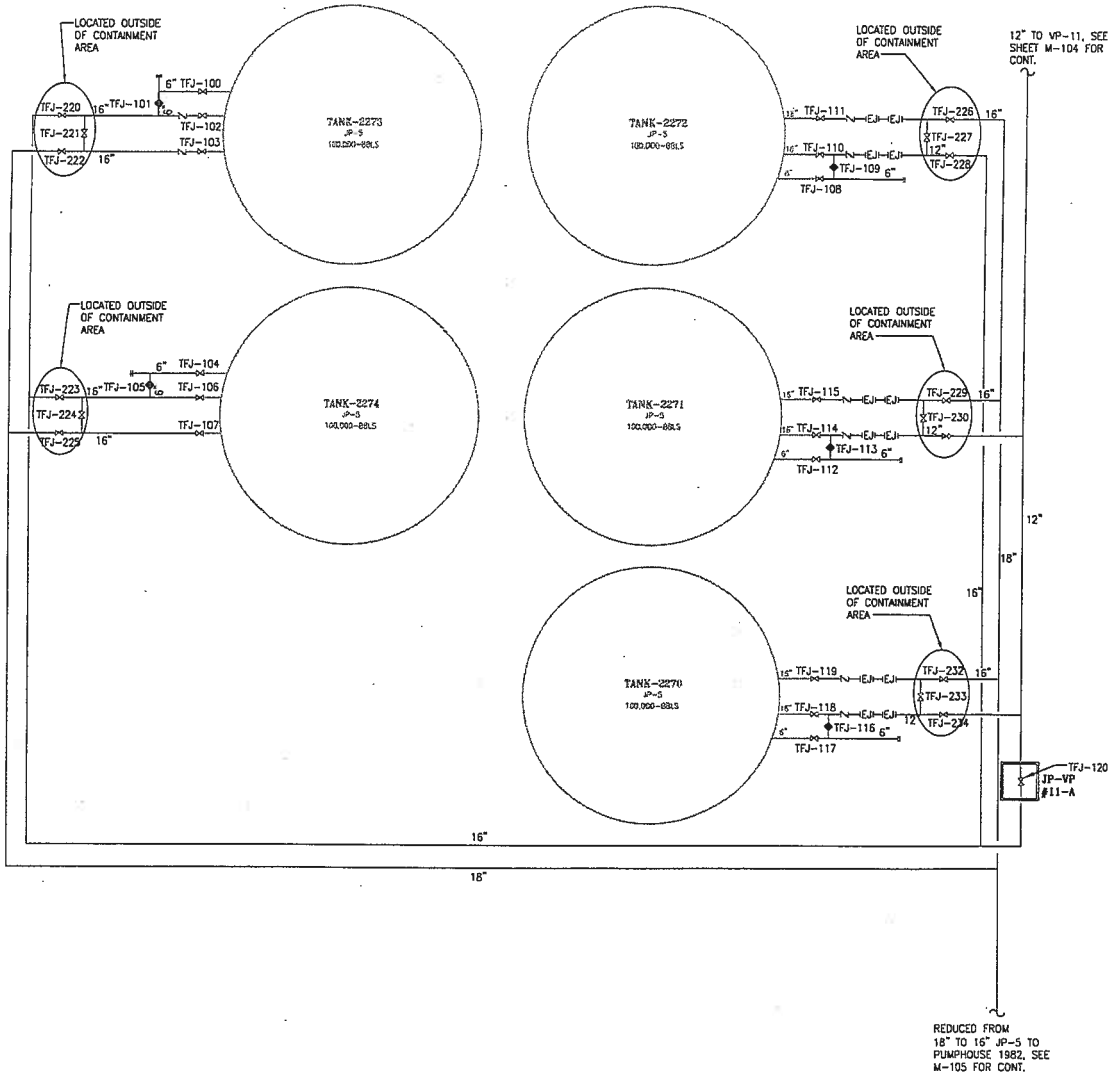

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HOUSTON, TEXAS USA

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065-07074	11 APR 2002	16:15	0D

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		0	12-21-01	ISSUED AS FINAL	BAS				

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Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

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PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

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TITLE: TEST SEGMENT 13 – SHEET 1 OF 3

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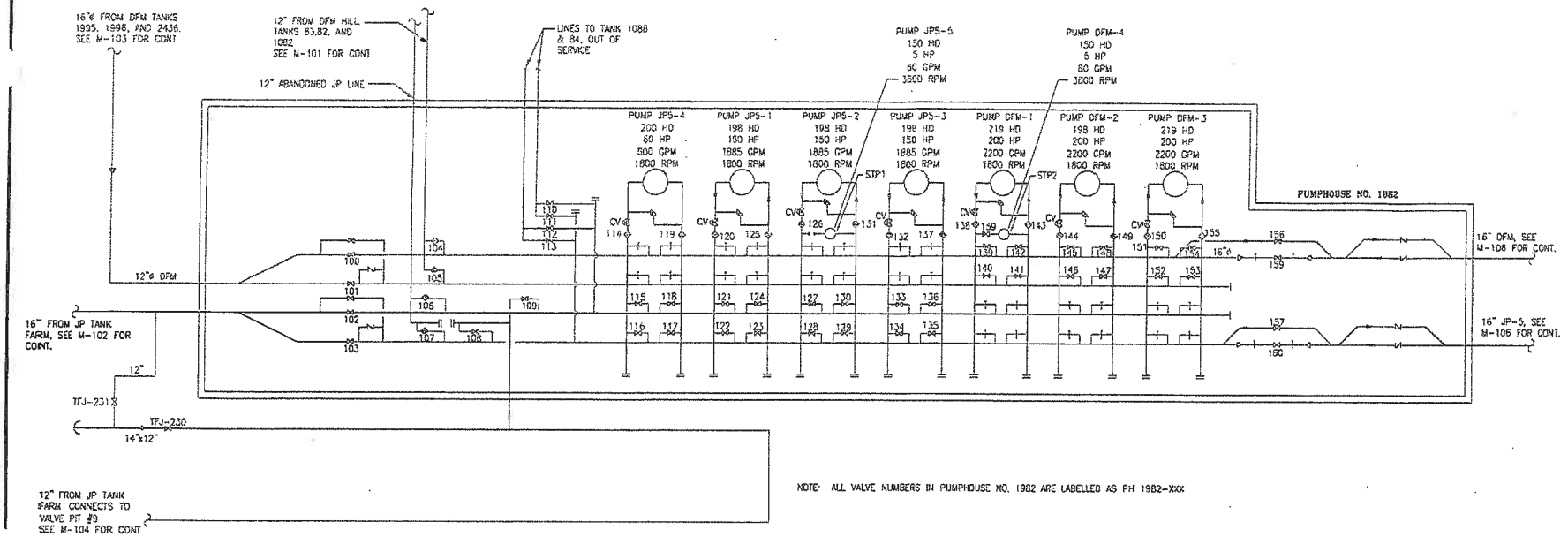

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PIPELINE DRAWINGS

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TITLE: TEST SEGMENT 13 – SHEET 2 OF 3

SCALE: –

DRAWING NO.: SK-18-15-0113

REV: 1

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WORLEY PROJECT NUMBER: 065-07074 | LAST UPDATE: 07 NOV 2002 08:42 | NO REV: 1C

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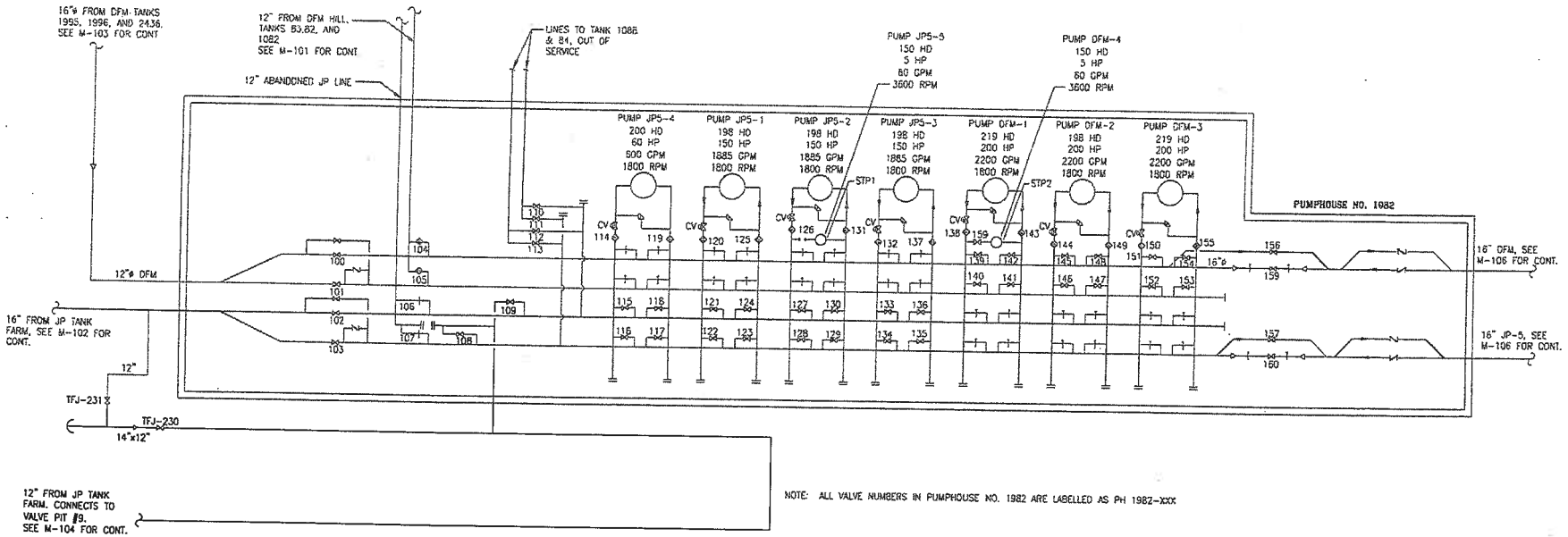
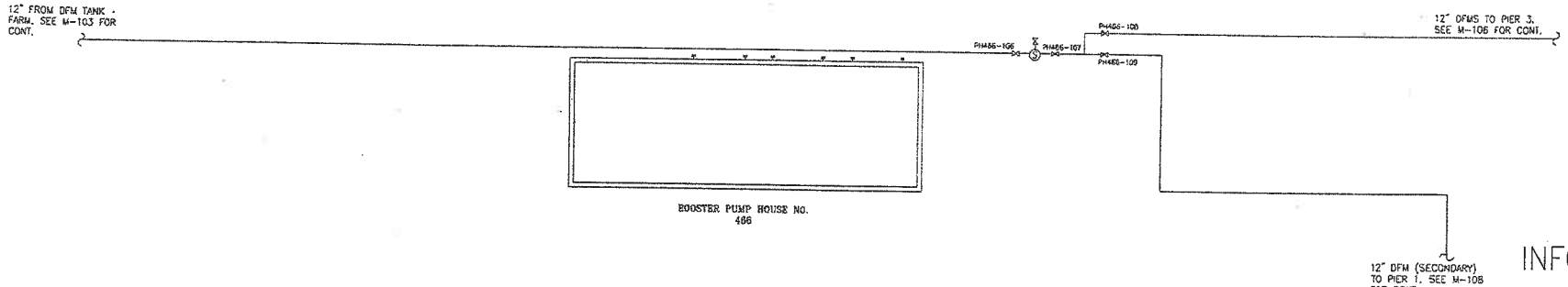


NOTE: ALL VALVE NUMBERS IN PUMPHOUSE NO. 1982 ARE LABELLED AS PH 1982-XXX



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		0	12-21-01	ISSUED AS FINAL

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TITLE: TEST SEGMENT 9 – SHEET 2 OF 2

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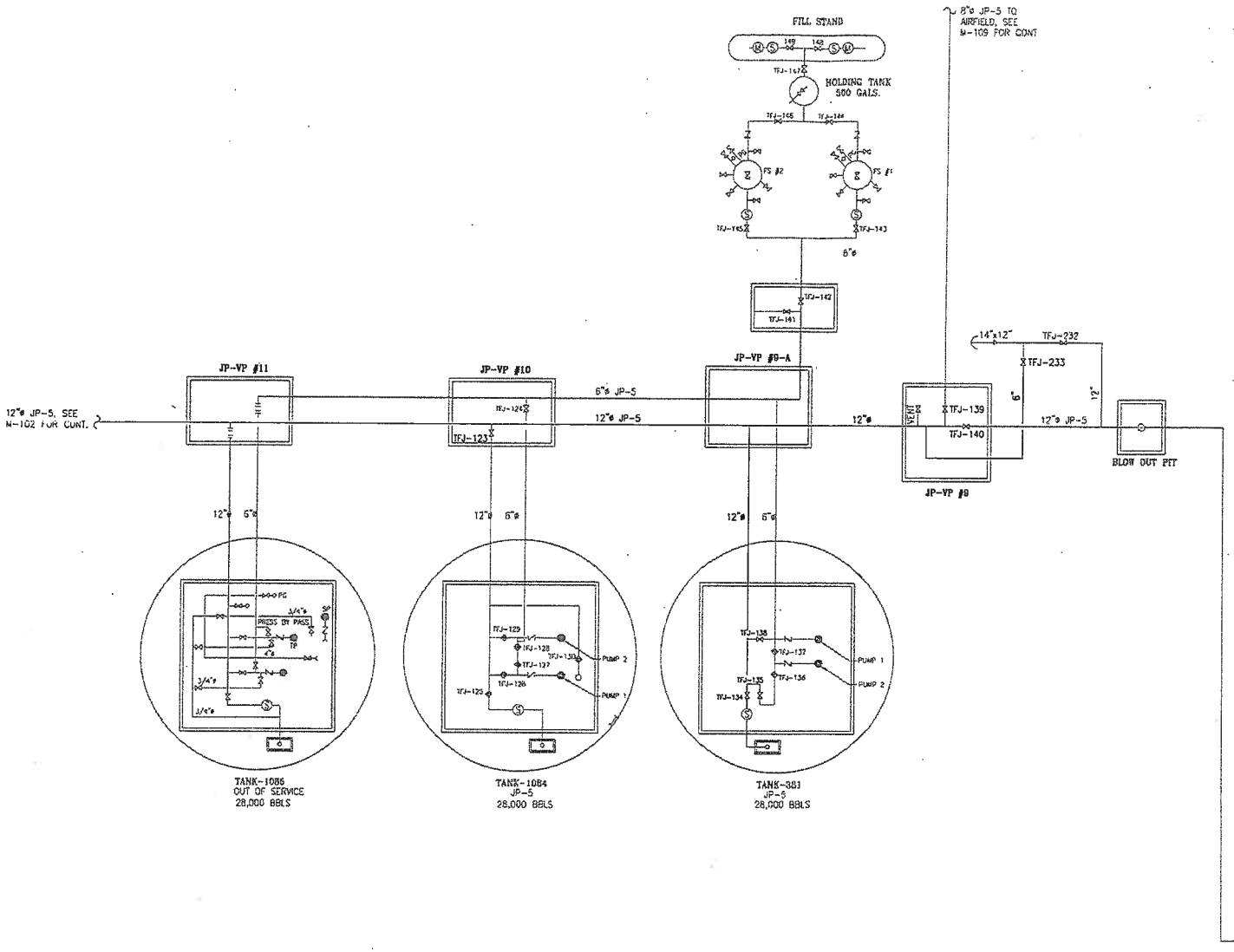

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
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TITLE
TEST SEGMENT 13
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SHEET 3 OF 3

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DRAWING NO.: SK-18-15-0113

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Appendix C – Pressure Test Procedures, Charts and Calculations

Test Procedures – Test #1: DFM Pipeline Segment from Pier 1 to Shore Block Valve Nos. TFD-146 and TFD-147

- Verified DFM pipelines were isolated by insuring the following:
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-147 (Refer to Photograph No. 1) on DFM-Primary pipeline was closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-146 on DFM-Secondary pipeline was closed;
  - 1-inch Apollo ball valves for 16-inch General Twin Seal Double Block and Bleed Double Block and Bleed Valve No. TFD-147 and 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-146 pressure relief bypass valving on shore side were closed;
  - 1-inch Apollo ball valve for 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-147 bypass pressure relief valving on pier side was opened;
  - 1-inch Apollo ball valves for 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-146 bypass pressure relief valving on pier side was opened;
  - 4-inch General Twin Seal Double Block and Bleed Valve No. FP1-100, FP1-101, FP1-102, FP1-103, FP1-104, FP1-105, FP1-106 and FP1-107 (Refer to Photographs No. 2, No. 3, No. 4 and No. 5) on Pier 1 were closed;
  - 2-inch Cla-Val air-eliminators vented and closed.
- Removed 1-inch pipe nipple and 1-inch check valve from pressure relief bypass piping at DFM-Secondary 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-146.
- Removed 1-inch pipe plug from pressure relief bypass piping on 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-147.
- Connected ½-inch jumper hose from test manifold on 12-inch DFM-Secondary pipeline to 16-inch DFM-Primary pipeline to transfer pressure.
- Installed test manifold in pressure relief piping 1-inch tee including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from the Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.
- Using the NAVSTA Roosevelt Roads Pump House 1982 pump DFM-1, pressured the system to approximately 30 psig and checked all exposed piping for leaks.

- Increased pressure at a controlled rate and recorded volume added at 10 psig intervals to 166.0 psig. On July 20, 2002 at 9:25 A.M, disengaged pump and started pressure test with 166.0 psig and recorded data for the required four (4) hours at fifteen (15) minute intervals. Pressure was maintained above a minimum pressure of 155.0 psig and below a maximum pressure of 196.0 psig during the four (4) hours by withdrawing 23.9 gallons of DFM from the pipeline and discharging to a storage container. A leak in a 16-inch DFM-Primary blind flange gasket (Refer to Photograph 6) at the end of Pier 1 was noted, but due to the location of the blind flange the amount of leakage of JP-5 could not be measured during the pressure test period.
- At 1:25 P.M after pressure test results were accepted, dismantled all pressure test equipment and insured all valves were returned to their original position prior to testing.

Test Procedures – Test #2: JP-5 Pipeline Segment from Pier 1 to Shore Block Valve No. TFJ-216

- Verified JP-5 pipeline was isolated by insuring the following:
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-216 (Refer to Photograph No. 12) on JP-5 pipeline was closed;
  - 1-inch ball valve for 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-216 bypass pressure relief valving on shore side was closed;
  - 1-inch ball valve for 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-216 bypass pressure relief valving on pier side was opened;
  - 4-inch General Twin Seal Double Block and Bleed Valve No. FP1-108, FP1-109, FP1-110, FP1-111, FP1-112 and FP1-113 (Refer to Photographs No. 7, No. 8 and No. 9) on Pier 1 were closed;
  - 2-inch Cla-Val air-eliminator vented and plugged;
  - 2-inch AOP Ball Valve was closed.
- Removed 1-inch plug from 1-inch tee installed with pressure relief bypass piping at 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-216.
- Installed test manifold in pressure relief piping 1-inch tee including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.
- Using the NAVSTA Roosevelt Roads Pump House 1982 JP-5-3 pump pressured the system to approximately 107.0 psig and checked all exposed piping for leaks.
- Increased pipeline pressure at a controlled rate and recorded volume at 10 psig intervals to 152.0 psig. On July 16, 2002 at 11:02 A.M., disengaged pump and started pressure test with 152 psig and recorded test data for the required four (4) hours at fifteen (15) minute intervals. Pressure was maintained above a minimum pressure of 152.0 psig and below a maximum pressure of 194.0 psig for four (4) hours by withdrawing 43.3 gallons of JP-5 from the pipeline and discharging to a storage container. There were no reported leaks and no measurable amount of any JP-5 lost during the pressure test period.
- After pressure test results were accepted at 3:02 P.M., dismantled all pressure test equipment and collected all fluid from leaks and insured all valves were returned to their original position prior to testing.

Test Procedures – Test #3: DFM Pipeline Segment from Pier 1A to Shore Block Valve Nos. TFD-148 and TFD-149

- Verified DFM pipelines were isolated by insuring the following:
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-149 on DFM primary pipeline and 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-148 (Refer to Photograph No. 10) on DFM secondary pipeline were closed;
  - 1-inch AOP ball valves for 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-149 bypass pressure relief valving were closed;
  - 1-inch Apollo ball valve for 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-148 bypass pressure relief valving on pier side was closed;
  - 1-inch ball valve for 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-149 bypass pressure relief valving on pier side was opened;
  - 8-inch General Twin Seal Double Block and Bleed Valve Nos. FP1A-103, FP1A-106, FP1A-113, FP1A- 116, FP1A-124, FP1A-127, FP1A-133, FP1A-136, FP1A-142, FP1A-145, FP1A-153 and FP1A-156 on Pier 1A were closed;
  - 8-inch WCB Figure 8V1019 Ball Valve No. FP1A-105, FP1A-108, FP1A-115, FP1A-118, FP1A-126, FP1A-129, FP1A-135, FP1A-138, FP1A-144, FP1A-147, FP1A-155 and FP1A-158 on Pier 1A were closed;
  - 8-inch Stockham Gate Valve No. FP1A-104, FP1A-107, FP1A-114, FP1A-117, FP1A-125, FP1A-128, FP1A-134, FP1A-137, FP1A-143, FP1A-146, FP1A-154 and FP1A-157 on Pier 1A were closed;
  - 8-inch Stockham Gate Valves No. FP1A-161, FP1A-162, FP1A-163 and FP1A-164 (Refer to Photograph No. 11) on Pier 1A were opened;
  - 2-inch Cla-Val air-eliminators were vented and closed;
  - 2-inch AOP Ball Valve on 2-inch Cla-Val air eliminator was closed.
- Removed 1-inch plug from 1-inch tee installed with pressure relief bypass piping at 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-148. (Refer to Photograph No. 13)
- Installed test manifold in pressure relief piping 1-inch tee including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.
- Using NAVSTA Roosevelt Roads Pump House 1982 pump DFM-1, pressured the system to approximately 135 psig. Thermal expansion increased pipeline pressure from 135 psig to 150.0 psig. On July 13, 2002 at 8:39 A.M., started pressure test with 150.0 psig and recorded test data for the required four (4) hours at fifteen (15) minute intervals.

- Pressure was maintained above a minimum pressure of 150.0 psig and below a maximum pressure of 190.0 psig for four (4) hours by withdrawing 137.3 gallons of DFM from the pipeline and discharging to a storage container. There were no reported leaks and no measured amount of any DFM lost during the pressure test period.
- At 12:39 P.M. after pressure test results were accepted, dismantled all pressure test equipment and collected all fluid from leaks and insured all valves were returned to their original position prior to testing.

Test Procedures – Test #4: JP-5 Pier 1A to Shore Block Valve No. TFD-217

- Verified JP-5 pipeline was isolated by insuring the following:
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-217 (Refer to Photograph No. 13) was opened;
  - 1-inch AOP ball valves for 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-217 bypass pressure relief valving were closed;
  - 8-inch General Twin Seal Double Block and Bleed Valve FP1A-100, FP1A-110, FP1A-121, FP1A-130, FP1A-139 and FP1A-150 on Pier 1A were closed;
  - 8-inch Stockham Gate Valve FP1A-101, FP1A-111, FP1A-122, FP1A-131, FP1A-140 and FP1A-151 on Pier 1A were closed;
  - 8-inch WCB Figure 8V1019 Ball Valve FP1A-102, FP1A-112, FP1A-123, FP1A-132, FP1A-141 and FP1A-152 on Pier 1A were closed;
  - 8-inch Stockham Gate Valve No. FP1A-159 and FP1A-160 on Pier 1A (Refer to Photograph No. 11) were closed;
  - 2-inch Cla-Val air-eliminator vented and plugged;
  - 2-inch AOP Ball Valve on Cla-Val Air Eliminator closed;
  - 16-inch Stockham Gate Valve No. TFD-215 at Valve Pit No. 27 was opened;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-213 (Refer to Photograph No. 16) at Valve Pit 24 was closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve PH-1982- 217 and 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-160 at Pump House 1982 were closed (Refer to Photograph No. 16).
- Removed 1/2-inch plug from 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-160 body bleed on test pressure side at Pump House 1982.
- Installed test manifold in 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-160 body bleed at Pump House 1982 including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.
- Using the NAVSTA Roosevelt Roads Pump House 1982 pump JP-5-3, pressured the system to approximately 95 psig and checked all exposed piping for leaks.
- Increased pipeline pressure at a controlled rate and recorded volume at 10 psig intervals to 161.7 psig. On October 10, 2002 at 7:55 A.M., disengaged pump and started pressure test with 164 psig and recorded test data for the required four (4) hours at fifteen (15) minute

intervals. Pressure was maintained above a minimum pressure of 150.7 psig and below a maximum pressure of 161.7 psig for four (4) hours.

- After pressure test results were accepted, dismantled all pressure test equipment and collected all fluid from leaks and insured all valves were returned to their original position prior to testing.

Test Procedures – Test #7: JP-5 Pump House 1982 to Pier 1 and Pier 1A

- Verified JP-5 pipelines were isolated by insuring the following:
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-216 (Refer to Photograph No. 1) on Pier 1 and 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-217 (Refer to Photograph No. 10) on Pier 1A JP-5 pipelines were closed;
  - 1-inch ball valves for 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-216 and TFJ-217 bypass pressure relief valving at Pier 1 and Pier 1A were closed;
  - 16-inch Walworth Gate Valve No. TFJ-215 at Valve Pit 27 was open;
  - 1-1/2-inch Saturn ball valves for VP 27 stripper pumps were closed,
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-213 (Refer to Photograph No. 16) at Valve Pit 24 was closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-157 and 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-160 at Pump House 1982 (Refer to Photograph No. 15) on JP-5 pipelines were closed;
  - 1-inch ball valve for 12-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-157 and 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-160 bypass pressure relief valving at Pump House 1982 were closed.
- Removed 1/2-inch plug from 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-160 body bleed on pressure side at Pump House 1982 containment area.
- Installed test manifold in 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-160 body bleed at Pump House 1982 containment area including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the FUELS transport truck.
- Using the NAVSTA Roosevelt Roads Pump House 1982 pump JP-5-3, pressured the system to approximately 95 psig and checked exposed piping for leaks.
- Increased pipeline pressure at a controlled rate and recorded volume at 10 psig intervals to 164 psig. On October 29, 2002 at 8:00 A.M., started pressure test with 164.0 psig recorded test data for the required eight (8) hours at fifteen (15) minute intervals for the initial four (4) hours and at thirty (30) minute intervals for the final four (4) hours. The pressure during the test period fluctuated above a minimum pressure of 150.7 psig and below a maximum pressure of 161.7 psig for the initial four (4) hours and above a minimum pressure of 144.7 psig and a maximum pressure of 150.7 psig for the final four (4) hours. Leaks of JP-5 were observed in the 16-inch check valve flanges, 16-inch tee flanges, and 16-inch check valve

stem packing (Refer to Photograph No. 40) at Pump House 1982 containment area during the pressure test period.

- At 4:00 P.M. after pressure test results were accepted, dismantled all pressure test equipment and collected all fluid from leaks and insured all valves were returned to their original position prior to testing.

Test Procedures – Test #8 DFM-Primary: VP 27 to VP 56, Pump House 1982, Pier 1, Pier 1A and Pier 3

- Verified DFM Primary pipelines were isolated by insuring the following:
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-147 on Pier 1 (Refer to Photograph No. 1) and 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-149 (Refer to Photograph No. 10) on DFM Primary pipelines were closed;
  - 1-inch Apollo ball valves for 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-147 and TFD-149 bypass pressure relief valving at Pier 1 and Pier 1A were closed;
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-132 (Refer to Photograph No. 18) at Valve Pit No. 27 was open;
  - 1-1/2-inch Xomox ball valves for VP No. 27 stripper pumps were closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-154 at Valve Pit No. 24 was open (Refer to Photograph No. 16);
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-131 (Refer to Photograph No. 14) at Pier 3 Pumping Station was closed;
  - 4-inch General Twin Seal Double Block and Bleed Valve No. TFD-150 (Refer to Photograph No. 14) at Pier 3 Pumping Station was closed;
  - 1-inch ball valves for 12-inch General Twin Seal Double Block and Bleed Valve TFD-131 and 4-inch General Twin Seal Double Block and Bleed Valve No. TFD-150 bypass pressure relief piping at Pier 3 Pumping Station were closed;
  - 6-inch General Twin Seal Double Block and Bleed Valve No. TFD-128 (Refer to Photograph No. 17) at Valve Pit 56 was closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-156 (Refer to Photograph No. 15) at Pump House 1982 containment area was closed;
  - 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-159 at Pump House 1982 containment area (Refer to Photograph No. 15) was closed;
  - 1-inch ball valves for 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-156 and 4-inch General Twin Seal Double Block and Bleed Valve No. TFD-150 bypass pressure relief piping at Pier 3 Pumping Station were closed.
- Removed 1/2-inch plug from 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-132 body bleed on pressure side at Valve Pit No. 27 (Refer to Photograph No. 18).
- Installed test manifold in 16-inch General Twin Seal Double Block and Bleed Valve body bleed at Valve Pit No. 27 including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and

suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.

- Using the NAVSTA Roosevelt Roads Pump House 1982 pump DFM-1, pressured the system to approximately 132.0 psig and checked all exposed piping for leaks. Leaks were observed at Valve Pit 24 General Twin Seal Block and Bleed Valve No. TFD-154 (Refer to Photograph No. 16) in the 2-inch threads of air eliminator piping and in the valve body bleed tubing connections.
- On July 11, 2002 at 10:30 A.M., disengaged pump and started pressuring test with 157.0 psig and recorded test data for the required eight (8) hours at fifteen (15) minute intervals for the initial four (4) hours and at thirty (30) minute intervals for the final four (4) hours. The pressure during the test period fluctuated above a minimum pressure of 155.7 psig and a maximum pressure of 157.0 psig for the initial four (4) hours and above a minimum pressure of 153.0 psig and a maximum pressure of 157.2 psig for the final four (4) hours.
- At 6:30 P.M. after pressure test results were accepted, dismantled all pressure test equipment and collected fluid from leaks and insured all valves were returned to their original position prior to testing.

Test Procedures – Test #8-Secondary: DFM VP 27 to VP 8, Pier 1, Pier 1A and Pier 3

- Verified DFM-Secondary pipelines were isolated by insuring the following:
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-146 on Pier 1 (Refer to Photograph No. 1) and 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-148 (Refer to Photograph No. 10) on DFM pipelines were closed;
  - 1-inch ball valves for 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-146 and TFD-148 bypass pressure relief valving at Pier 1 and Pier 1A were closed,
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-133 at Valve Pit 27 was opened,
  - 1-1/2-inch Xomox ball valves for VP 27 stripper pumps were closed,
  - 12-inch General Twin Seal Double Block and Bleed Valve No. PH-466-108 and 12-inch General Twin Seal Double Block and Bleed Valve No. PH-466-109 (Refer to Photograph No. 39) at Pump House 466 on DFM-Secondary pipelines were opened,
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-154 at Valve Pit 24 was opened (Refer to Photograph No. 16),
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-130 at Pier 3 Pumping Station was closed (Refer to Photograph No. 14),
  - 4-inch General Twin Seal Double Block and Bleed Valve No. TFD-151 at Pier 3 Pumping Station was closed (Refer to Photograph No. 14),
  - 1-inch ball valves for 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-130 and 4-inch General Twin Seal Double Block and Bleed Valve No. TFD-151 bypass pressure relief piping at Pier 3 Pumping Station were closed,
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-144 at Valve Pit 8 (Refer to Photograph No. 29) was closed.
- Removed 1/2-inch plug from 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-133 valve body bleed on pressure side at Valve Pit No. 27.
- Installed test manifold in 12-inch General Twin Seal Double Block and Bleed Valve body bleed at Valve Pit No. 27 including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.
- Using the NAVSTA Roosevelt Roads Pump House 1982 pump DFM-1, pressured the system to approximately 96.0 psig and checked all exposed piping for leaks.

- Increased pipeline pressure at a controlled rate and recorded volume at 10 psig intervals to 162.0 psig. On July 10, 2002 at 10:10 A.M., started pressure test with 162.0 psig and recorded test data for the required eight (8) hours at fifteen (15) minute intervals for the initial four (4) hours and at thirty (30) minute intervals for the final four (4) hours. The pressure during the test period fluctuated above a minimum pressure of 162.0 psig and a maximum pressure of 163.5 psig for the initial four (4) hours and above a minimum pressure of 158.5 psig and a maximum pressure of 163.5 psig for the final four (4) hours. There were no reported leaks and no measured amount of any DFM lost during the pressure test period.
- At 6:10 P.M. after pressure test results were accepted, dismantled all pressure test equipment and collected all fluid from leaks and insured all valves were returned to their original position prior to testing.

Test Procedures – Test #9: JP-5 Pipeline Segment from Valve Pit No. 9 to PH-1982

- Verified JP-5 pipeline was isolated by insuring the following:
  - 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-233 (Refer to Photograph No. 19) on Valve Pit No. 9 launcher was closed;
  - 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-233 ½-inch bypass pressure relief valving on Valve Pit No. 9 launcher was closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-140 (Refer to Photograph No. 19) in Valve Pit No. 9 was closed;
  - 1-inch ball valve for 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-140 bypass pressure relief valving on Valve Pit No. 9 was closed;
  - 12-inch temporary Gate Valve on Valve Pit No. 9 launcher was opened;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-108 and PH-1982-109 at Pump House 1982 were closed;
  - 1-inch ball valve for 12-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-108 and PH-1982-109 bypass pressure relief valving at Pump House 1982 were closed;
  - 12-inch temporary Gate Valve No. PH-1982-TFJ-230 (Refer to Photograph No. 20) on Pump House 1982 receiver was open;
  - 12-inch General Twin Seal Double Block and Bleed Valve No.TFJ-231 (Refer to Photograph No. 20) on Pump House 1982 receiver bypass was closed;
  - 1-inch ball valve for 12-inch General Twin Seal Double Block and Bleed Valve No.TFJ-231 bypass pressure relief valving on Pump House 1982 receiver bypass was closed.
- Removed 1-inch plug from 1-inch Apollo valve on Valve Pit No. 9 launcher barrel.
- Installed test manifold in 1-inch valve on Valve Pit No. 9 launcher barrel including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.
- Using the NAVSTA Roosevelt Roads tank 1084 pump JP-5-3, pressured the system to approximately 67.0 psig and checked all exposed piping for leaks.
- Increased pipeline pressure at a controlled rate up to 170.0 psig and recorded volume added every 10 psig. On July 23, 2002 at 8:43 A.M., started pressure test with 170 psig and recorded test data for the required eight (8) hours at fifteen (15) minute intervals for the initial four (4) hours and at thirty (30) minute intervals for the final four (4) hours.

- The pressure during the test period fluctuated above a minimum pressure of 161.8 psig and a maximum pressure of 170.0 psig for the initial four (4) hours and above a minimum pressure of 152.0 psig and a maximum pressure of 155.0 psig for the final four (4) hours. There were no reported leaks of any JP-5 lost during the pressure test period.
- At 4:43 P.M., after the pressure test results were accepted, dismantled all pressure test equipment and collected all fluid from leaks and insured all valves were returned to their original position prior to testing.

Test Procedures – Test #10: JP-5 Pipeline Segment from Valve Pit No. 9 to NAVSTA Airfield

- Verified JP-5 pipeline was isolated by insuring the following:
  - 8-inch General Twin Seal Double Block and Bleed Valve No. TFJ-139 (Refer to Photograph No. 21) in Valve Pit No. 9 was closed;
  - 8-inch General Twin Seal Double Block and Bleed Valve No. TFJ-139 pressure relief valving was closed;
  - 8-inch General Twin Seal Double Block and Bleed Valve No. TFJ-212 (Refer to Photograph No. 42) in Valve Pit No. 3 was opened;
  - 8-inch Ball Valve No. TFJ-153 at NAVSTA Roosevelt Roads Airfield was closed.
- Removed 1-inch pressure gauge in Valve Pit No. 9.
- Installed test manifold in 1-inch gauge ball valve on Valve Pit No. 9 including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.
- Using the NAVSTA Roosevelt Roads Tank 1084 JP-5 pump pressured the system to approximately 70.0 psig and checked all exposed piping for leaks.
- Increased pipeline pressure at a controlled rate and recorded volume added every 10 psig to 169.0 psig. On July 10, 2002 at 10:14 A.M., started pressure test with 169.0 psig and recorded test data for the required eight (8) hours at fifteen (15) minute intervals for the initial four (4) hours and thirty (30) minute intervals for the final four (4) hours. The pressure during the test period fluctuated above a minimum pressure of 155.0 psig and a maximum pressure of 169.0 psig for the initial four (4) hours and above a minimum pressure of 152.0 psig and a maximum pressure of 155.0 psig for the final four (4) hours. A leak was observed from the 1-inch ball valve gauge in Valve Pit No. 9 and three (3) ounces of JP-5 was collected.
- At 6:14 P.M. after pressure test results were accepted, dismantled all pressure test equipment and collected all fluid from leaks and insured all valves were returned to their original position prior to testing.

Test Procedures: Test #11- NAVSTA Airfield Filter/Separators to Pantographs Terminated)

- Verified JP-5 pipelines were isolated by insuring the following:
  - 12-inch Ball Valve No. TFJ-164 and TFJ-170 at Filter/Separators were closed;
  - 1-inch jumper hose was installed at Filter/Separator to transfer pressure;
  - Pit No. 1 Station No. 1 Valen Ball Valve No. AC1-100, AC1-103 and AC1-106 were closed;
  - Pit No. 1 Station No. 2 Valen Ball Valve No. AC1-200 and AC1-202 were closed;
  - Pit No. 2 Station No. 1 Valen Ball Valve No. AC2-100 and AC2-102 were closed;
  - Pit No. 2 Station No. 2 Valen Ball Valve No. AC2-200 and AC2-202 were closed;
  - Pit No. 3 Station No. 1 Valen Ball Valve No. AC3-100 and AC3-102 were closed;
  - Pit No. 3 Station No. 2 Valen Ball Valve No. AC3-200 and AC3-202 were closed;
  - Pit No. 4 Station No. 1 Valen Ball Valve No. AC4-100 and AC4-102 were closed;
  - Pit No. 4 Station No. 2 Valen Ball Valve No. AC4-200 and AC4-202 were closed.
- Installed test manifold in 1-inch ball valve located on pressure side of Ball Valve No. TFJ-170 at NAVSTA Airfield Filter/Separators including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the United Paradyne transport truck.
- Using NAVSTA Roosevelt Roads JP-5 pump pressured the system to approximately 5.0 psig.
- On July 25, 2002, increased pipeline pressure at a controlled rate up to 132 psig and recorded volume at 10 psig intervals. At 132.0 psig, started pressure test and recorded test data at fifteen (15) minute intervals. At 7:47 AM, repressured from 126 psig to 135 psig. At 8:37 AM, terminated pressure test with 137 psig due to leaks in Valen Ball Valves. Refer to Section 3.3.1 for List of Leaks.
- After cancellation of pressure test, dismantled all pressure test equipment and insured all valves were returned to their original position.

Test Procedures: Test #12- DFM PH 1982 to DFM Tanks 82-83-1080-1082 and DFM Tanks 1995-1996-2436.

- Verified DFM pipelines were isolated by insuring the following:
  - 12-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-156 and 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-159 (Refer to Photograph No. 15) on DFM pipelines at Pump House 1982 containment area were closed;
  - 1-inch ball valves for 12-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-156 and 10-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-159 bypass pressure relief valving at Pump House 1982 containment area were closed;
  - 12-inch Jamesbury Ball Valve No. PH-1982-105 in Pump House 1982 was closed;
  - 12-inch Jamesbury Ball Valve No. PH-1982-104 in Pump House 1982 was opened;
  - 8-inch Velan 150# Gate Valve No. PH-1982-139, PH-1982-140, PH-1982-141, PH-1982-142, PH-1982-145 and PH-1982-146 were closed;
  - 10-inch Velan 150# Gate Valve No. PH-1982-147, PH-1982-148, PH-1982-151, PH-1982-152, PH-1982-153 and PH-1982-154 were closed;
  - Pump House 1982 pump DFM-1 Jamesbury 8-inch Ball Valve No. PH-1982-138, Jamesbury 10-inch Ball Valve No. PH-1982-143 and PH-1982-159, Pump House 1982 pump DFM-2 Jamesbury 8-inch Ball Valve No. PH-1982-144 and Jamesbury 10-inch Ball Valve No. PH-1982-149, and Pump House 1982 pump DFM-3 Jamesbury 10-inch Ball Valve No. PH-1982-150 and Jamesbury 12-inch Ball Valve No. PH-1982-155 were closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. PH-1982-100 and PH-1982-101 at Pump House 1982 were opened;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-144 (Refer to Photograph No. 29) at Valve Pit 8 was closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-144 bypass pressure relief valving at VP 8 was closed;
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-120 and TFD-121 (Refer to Photograph No. 28) at Tank 2436 were closed;
  - 1-inch ball valves for 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-120 and TFD-121 at Tank 2436 bypass pressure relief piping were closed;
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-114 and TFD-115 (Refer to Photograph No. 26) at Tank 1995 were closed;

- 1-inch globe valves for 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-113, TFD-114 and TFD-115 Tank 1995 bypass pressure relief piping were closed;
- 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-118 and TFD-119 (Refer to Photograph No. 27) at Tank 1996 were closed;
- 1-inch ball valves for 16-inch General Twin Seal Double Block and Bleed ValveTFD-118 and TFD-119 Tank 1996 bypass pressure relief piping were closed;
- 3-2-inch 150# blind flanges and 1-6-inch 150# blind flange at Tank 1082 (Refer to Photograph No. 24) were installed;
- 3-12-inch 150# blind flanges and 1-6-inch 150# blind flange at Tank 1080 were installed;
- 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-108 and TFD-110 at Tank 82 (Refer to Photograph No. 22) were closed;
- 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-101 and 16-inch General Twin Seal Double Block and Bleed Valve No.TFD-102 (Refer to Photograph No. 23) at Tank 83 were closed;
- 12-inch and 6-inch General Twin Seal Double Block and Bleed Valves (Refer to Photograph No. 24) at Valve Pit 18 were opened;
- 12-inch Plug Valves No. TFD-104, TFD-105 and TFD-105 at Valve Pit 20 were opened;
- 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-144 at Valve Pit 8 (Refer to Photograph No. 29) was closed.

- Removed 1/2-inch plug from 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-100 body bleed connections at Pump House 1982.
- Installed test manifold in 12-inch General Twin Seal Double Block and Bleed Valve No. TFD-100 body bleed at Pump House 1982 including fittings and hoses for the deadweight tester, chart recorder, bleeder (to container), and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.
- Using the NAVSTA Roosevelt Roads Pump House 1982 pump DFM-1, pressured the system to approximately 140 psig and checked any exposed piping for leaks.
- On July 15, 2002 at 10:05 A.M., the pipeline pressure was increased at a controlled rate and recorded volume at 10 psig intervals to 185.0 psig. Test was started with 185.0 psig and recorded test data for the required eight (8) hours at fifteen (15) minute intervals for the initial four (4) hours and thirty (30) minute intervals for the final four (4) hours.

- The pressure during the test period fluctuated above a minimum pressure of 180.0 psig and a maximum pressure of 185.0 psig for the initial four (4) hours and above a minimum pressure of 168.5 psig and a maximum pressure of 179.7 psig for the final four (4) hours. There were reported leaks in Pump House 1982 DFM-2 pump casing seal and pumps DFM-1 and DFM-2 pressure relief flange gaskets totaling 5.93 gallons of DFM lost during the pressure test period.
- At 6:05 P.M., after the pressure test results were accepted, dismantled all pressure test equipment and collected all fluid from leaks and insured all valves were returned to their original position.

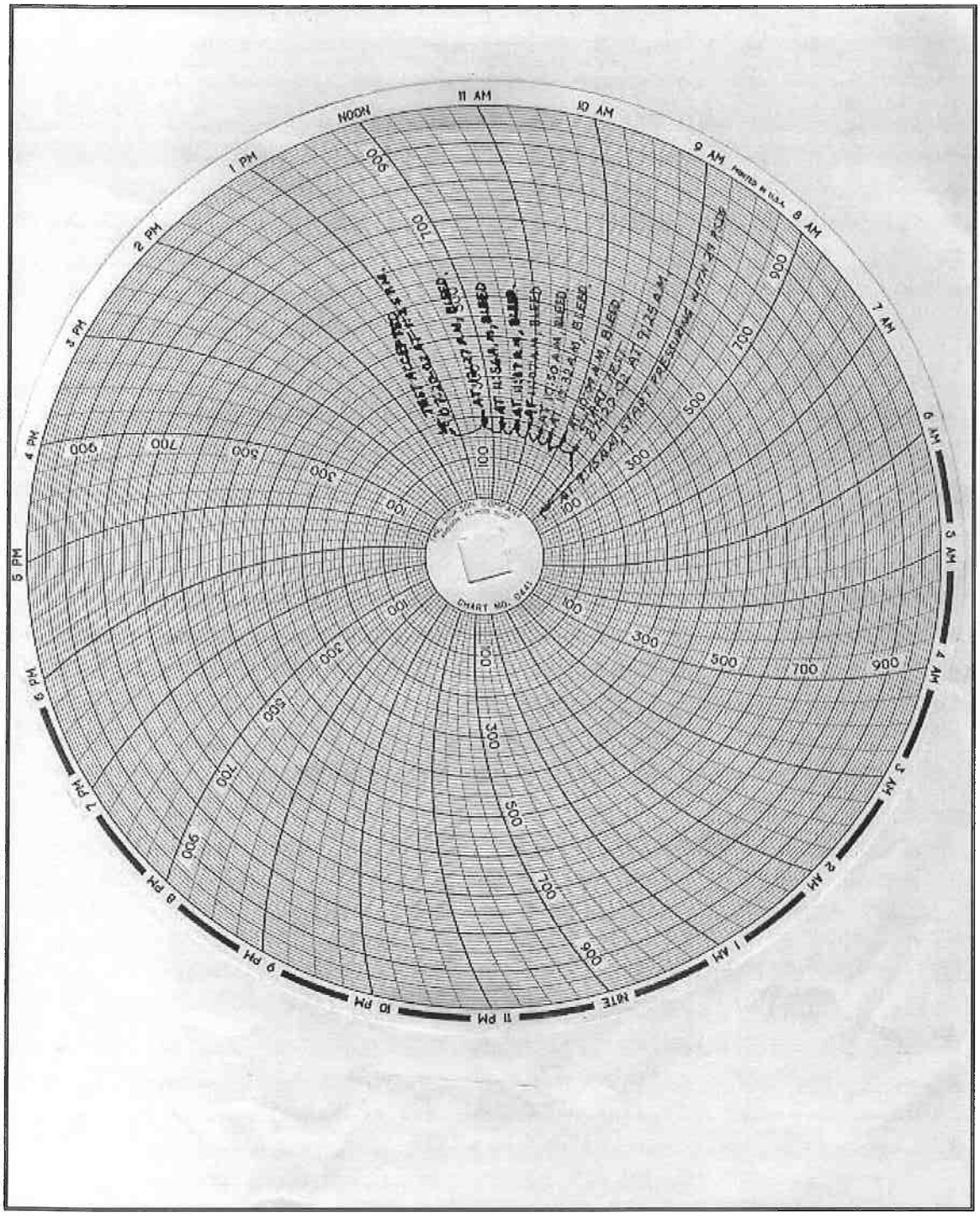
Test Procedures: Test #13- JP-5 PH 1982 to JP-5 Tanks 2270, 2271, 2272, 2273, 2274, 1084, 381 and Valve Pit No. 9

- Verified JP-5 pipelines were isolated by insuring the following:
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-156 and 8-inch General Twin Seal Double Block and Bleed Valve No. TFJ-139 (Refer to Photograph No. 21) on JP-5 pipeline at Valve Pit No. 9 were closed;
  - 1-inch ball valves for 12-inch General Twin Seal Double Block & Bleed Valve No. TFJ-156 and 8-inch General Twin Seal Double Block and Bleed Valve No. TFJ-139 (Refer to Photograph No. 21) bypass pressure relief valving at Valve Pit No. 9 were closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-123 in Valve (Refer to Photograph No. 33) Pit No. 10 was closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-134 and 6-inch General Twin Seal Double Block and Bleed Valve Nos. TFJ-135 and TFJ-138 (Refer to Photograph No. 32) at Tank 381 were closed;
  - ¾-inch Pressure Relief Valves at Tank 381 were closed;
  - 16-inch General Twin Seal Double Block and Bleed Valve No. 102 and 103 at Pump House 1982 were closed;
  - 1-inch ball valves for 12-inch General Twin Seal Double Block and Bleed No. 102 and 103 bypass pressure relief valving at Pump House 1982 were closed;
  - 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-231 at Pump House 1982 receiver was closed;
  - 1/2-inch ball valves for 8-inch General Twin Seal Twin Seal Double Block and Bleed Valve No. TFJ-231 pressure relief valving at Pump House 1982 receiver were closed;
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-118 and TFJ-119 (Refer to Photograph No. 34) at Tank 2270 were closed;
  - 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-117 (Refer to Photograph No. 34) at Tank 2270 was closed;
  - 1-inch ball valves for 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-118 and TFJ-119 and 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-117 (Refer to Photograph No. 34) bypass pressure relief valving at Tank 2270 were closed;
  - 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-112 (Refer to Photograph No. 35) at Tank 2271 was closed;
  - 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-114 and TFJ-115 (Refer to Photograph No. 35) at Tank 2271 was closed;

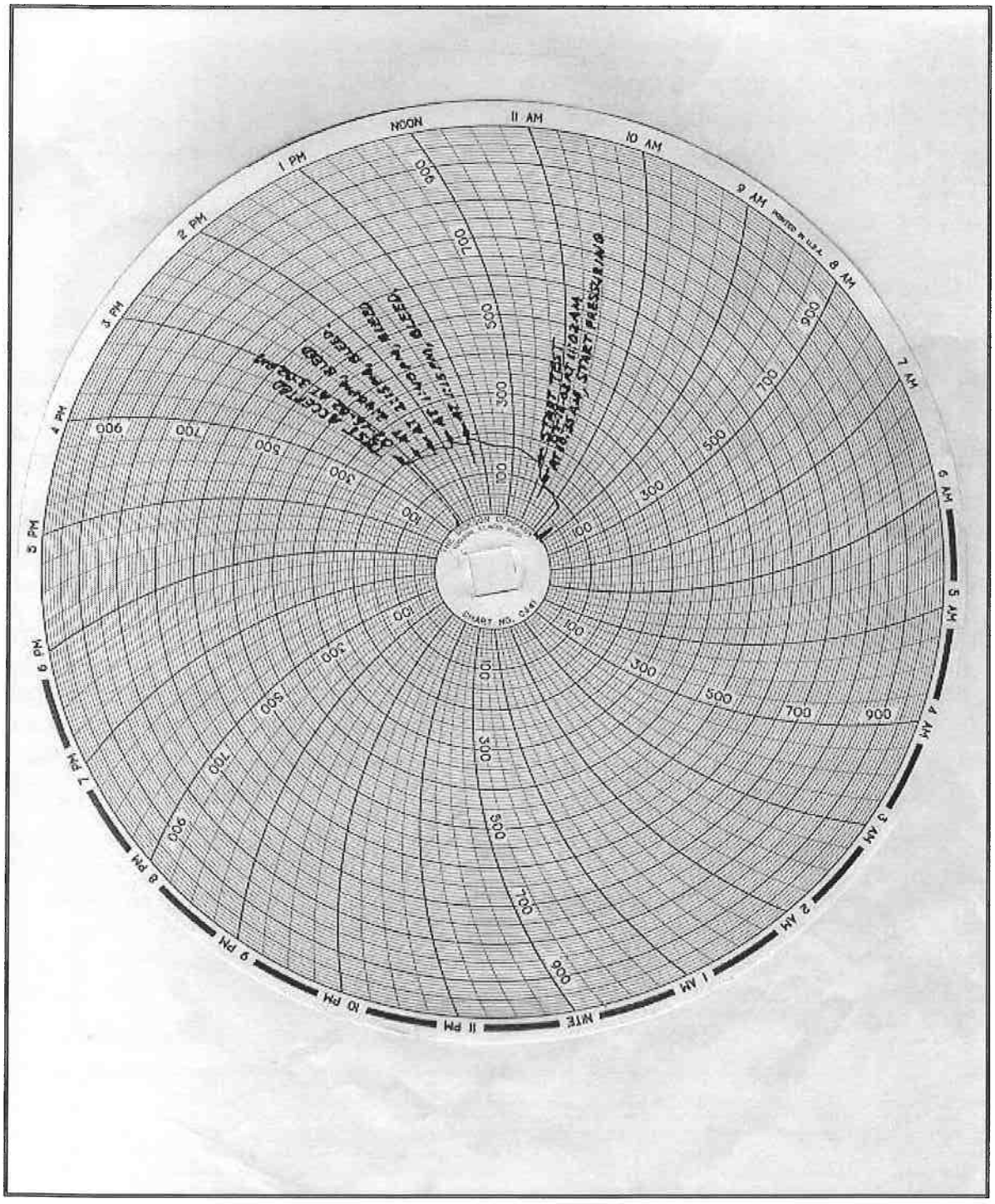
- 3/4-inch ball valves for 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-114 and TFJ-115 bypass pressure relief valving at Tank 2271 was closed;
- 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-110 and TFJ-111 (Refer to Photograph No. 36) at Tank 2272 were closed;
- 1-inch ball valves for 12-inch General Twin Seal Double Block and Bleed Valve No. TFJ-110 and TFJ-111 bypass pressure relief valving at Tank 2272 were closed;
- 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-108 (Refer to Photograph No. 36) at Tank 2272 was closed;
- 1-inch ball valves for 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-108 bypass pressure relief valving at Tank 2272 were closed;
- 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-102 and TFJ-103 (Refer to Photograph No. 37) at Tank 2273 were closed;
- 1-inch ball valves for 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-102 and TFJ-103 bypass pressure relief valving at Tank 2273 were closed;
- 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-100 (Refer to Photograph No. 37) at Tank 2273 was closed;
- 1-inch ball valves for 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-100 bypass pressure relief valving at Tank 2273 were closed;
- 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-106 and TFJ-107 (Refer to Photograph No. 38) at Tank 2274 were closed;
- 1-inch ball valves for 16-inch General Twin Seal Double Block and Bleed Valve No. TFJ-106 and TFJ-107 bypass pressure relief valving at Tank 2274 were closed;
- 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-104 (Refer to Photograph No. 38) at Tank 2274 was closed;
- 1-inch ball valves for 6-inch General Twin Seal Double Block and Bleed Valve No. TFJ-104 bypass pressure relief valving at Tank 2274 were closed;
- 12-inch Gate Valve at Valve Pit No. 11-A was opened.

- Removed 1/2-inch plug from 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-103 body bleed connection at Pump House 1982.
- Installed test manifold in 16-inch General Twin Seal Double Block and Bleed Valve No. TFD-103 body bleed at Pump House 1982 including fittings and hoses for the deadweight tester, chart recorder, and pump discharge. Verified that the pressure relief and suction from Annovi Reverberi pressure pump (Refer to Photograph 41) were connected to the Fuels transport truck.

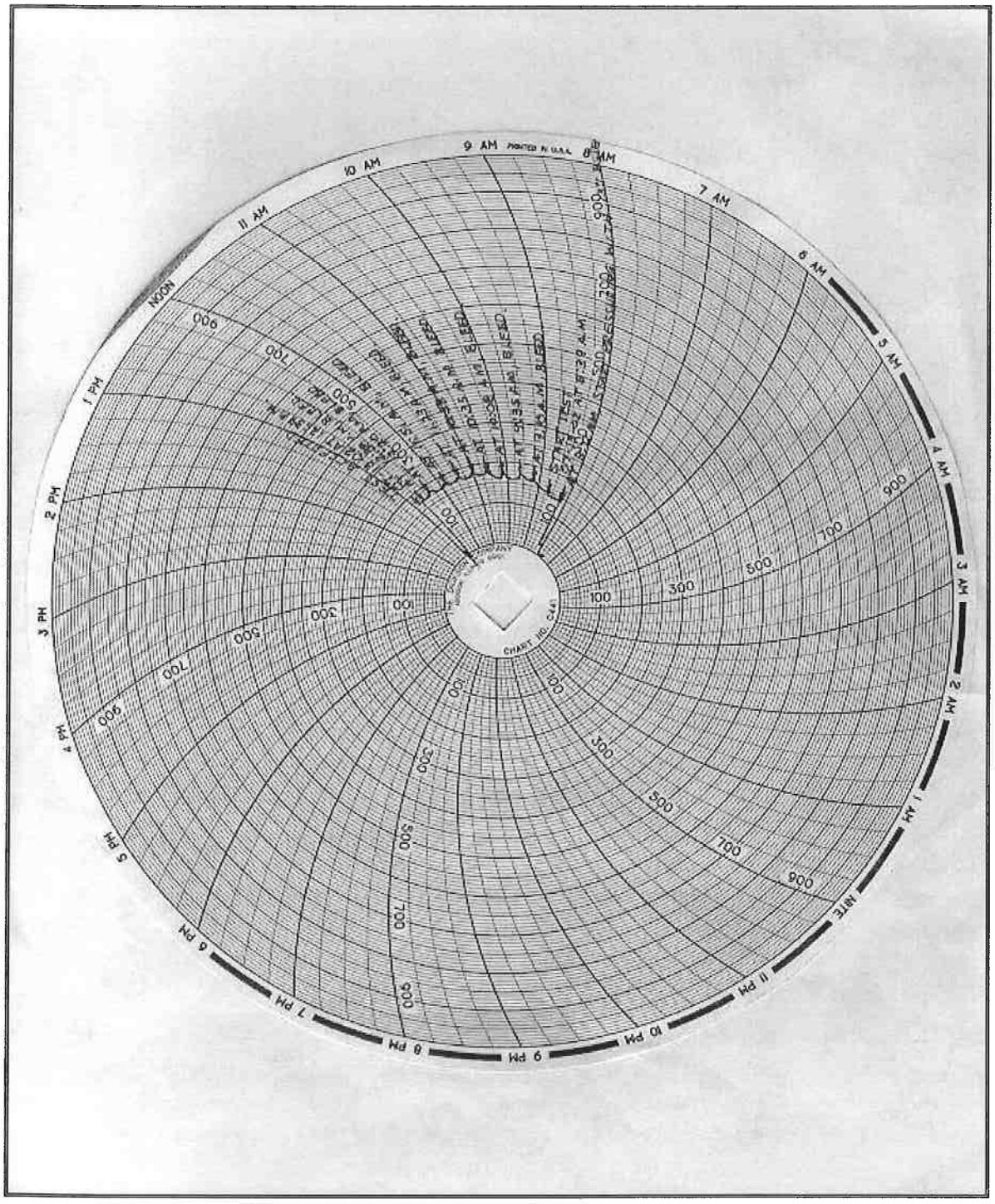
- Using the NAVSTA Roosevelt Roads Pump House 1982 JP-5 pump No. 2, circulate JP-5 through system from Tank 1084 pump to Tank 2273 to fill system and checked all exposed piping for leaks.
- Increased pipeline pressure at a controlled rate and recorded volume at 10 psig intervals to 224 psig. On November 03, 2002 at 7:50 A.M., started pressure test with 224 psig and recorded test data for the required eight (8) hours at fifteen (15) minute intervals for the first four (4) hours and at thirty (30) minute intervals for the final four (4) hours. The pressure during the test period fluctuated above a minimum pressure of 204 psig and a maximum pressure of 224 psig for the initial four (4) hours and above a minimum pressure of 188 psig and a maximum pressure of 212 psig for the final four (4) hours. The reported leaks were recorded in Section 3.3.1.
- At 3:50 P.M. after the pressure test results were accepted, dismantled all pressure test equipment and collected all fluid from leaks.



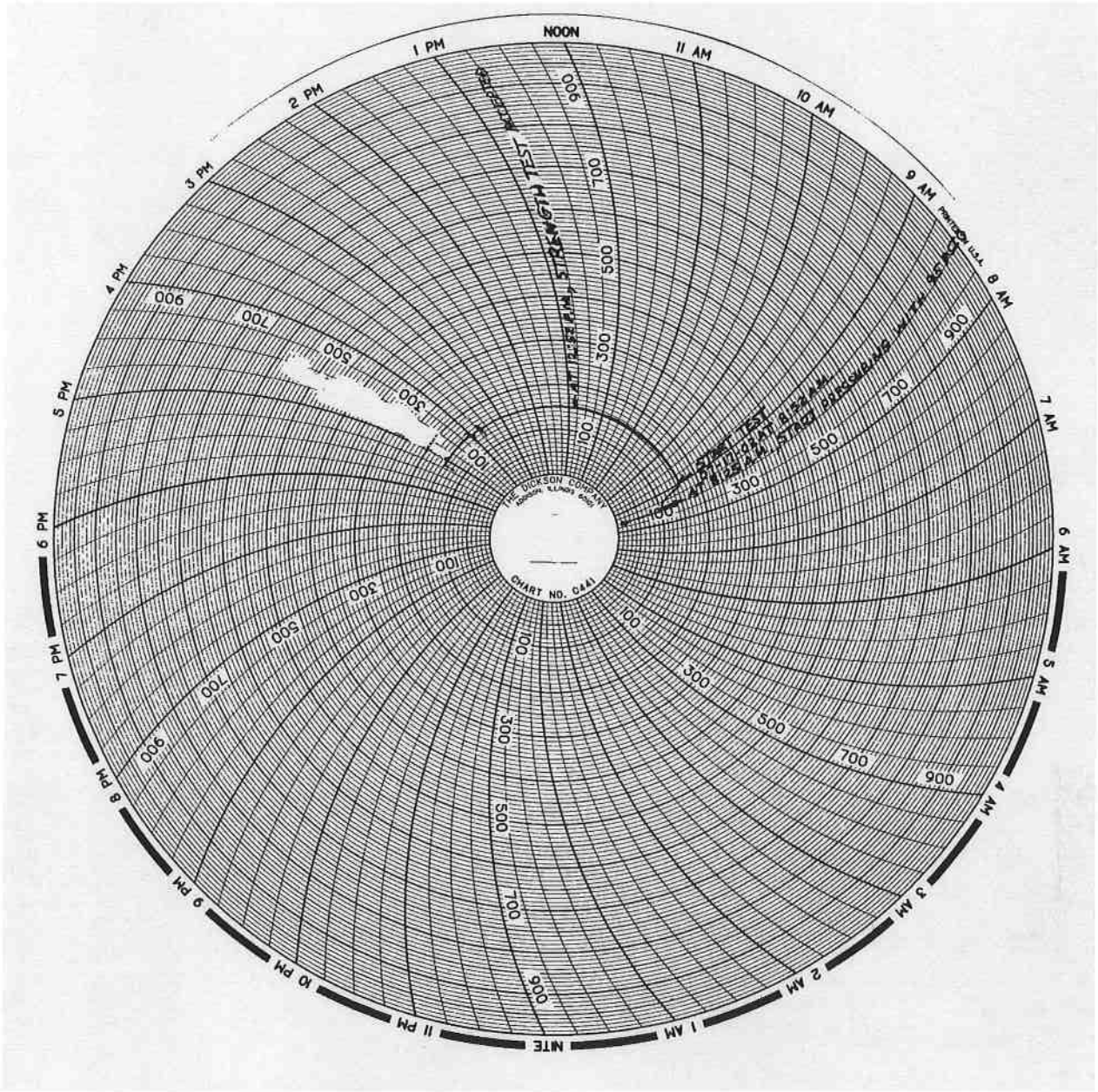
Pressure Test #1 Chart – DFM Pier 1 to Shore Block Valve



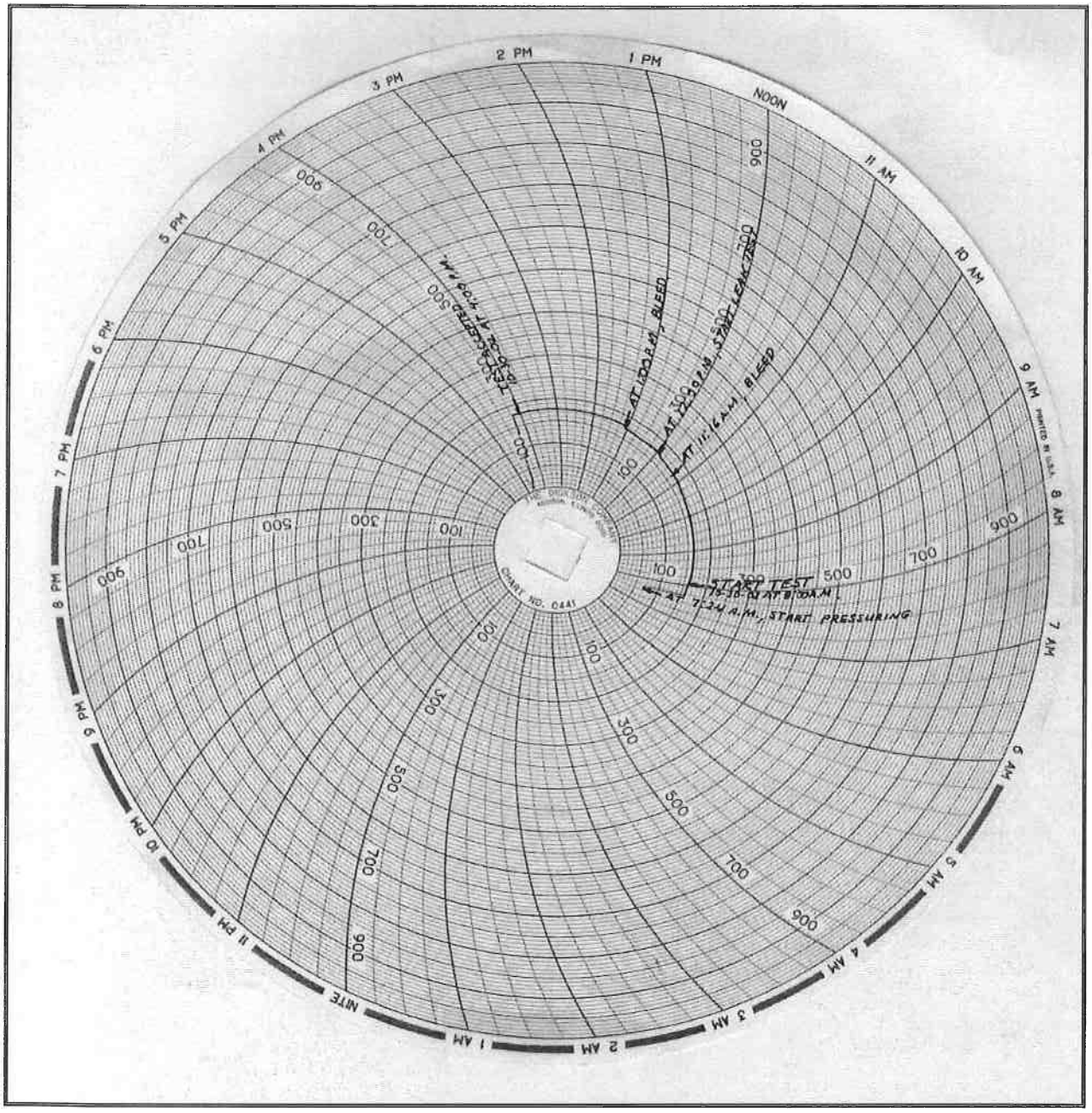
Pressure Test #2 Chart – JP-5 Pier 1 to Shore Block Valve



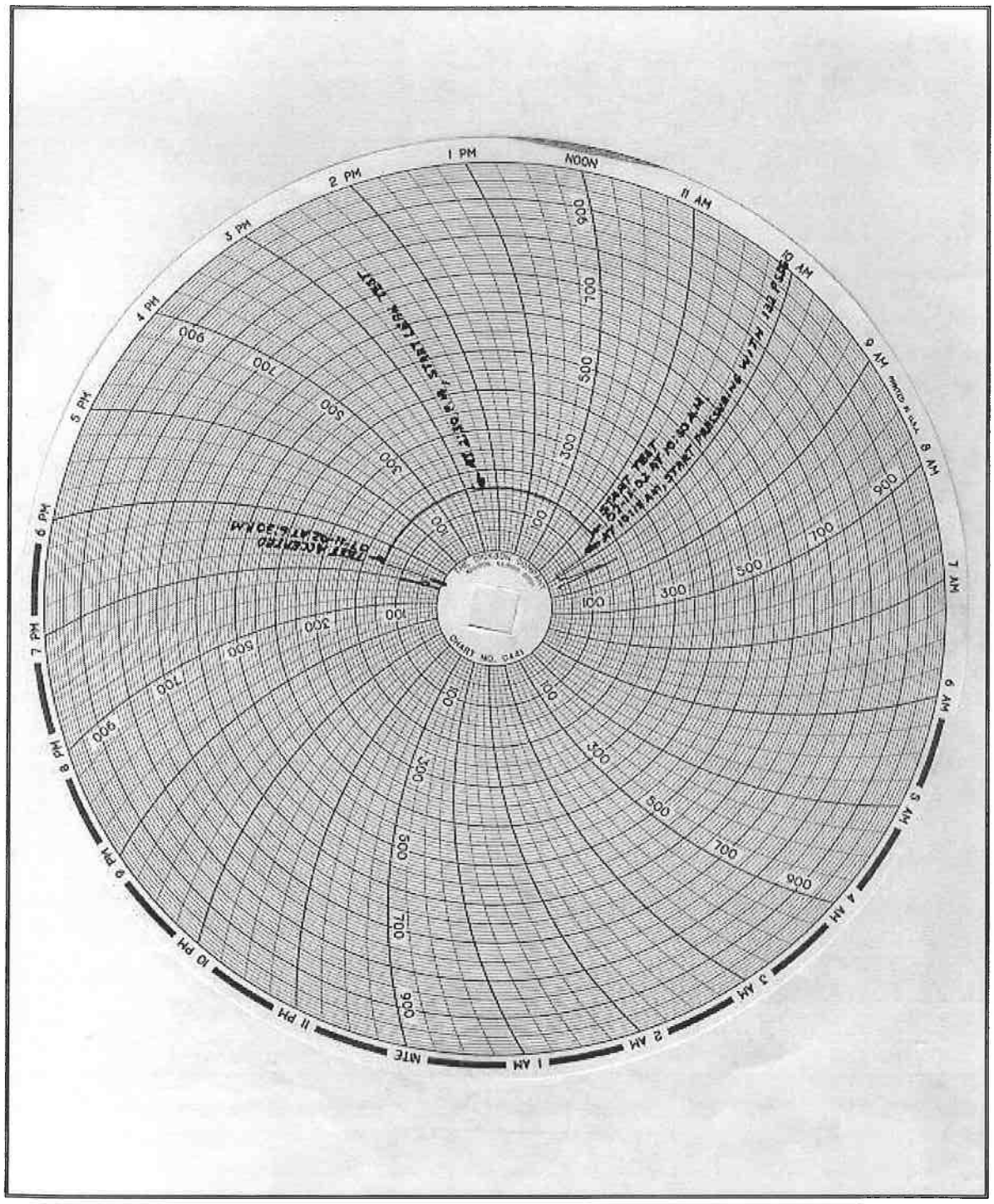
Pressure Test #3 Chart – DFM Pier 1A to Shore Block Valves



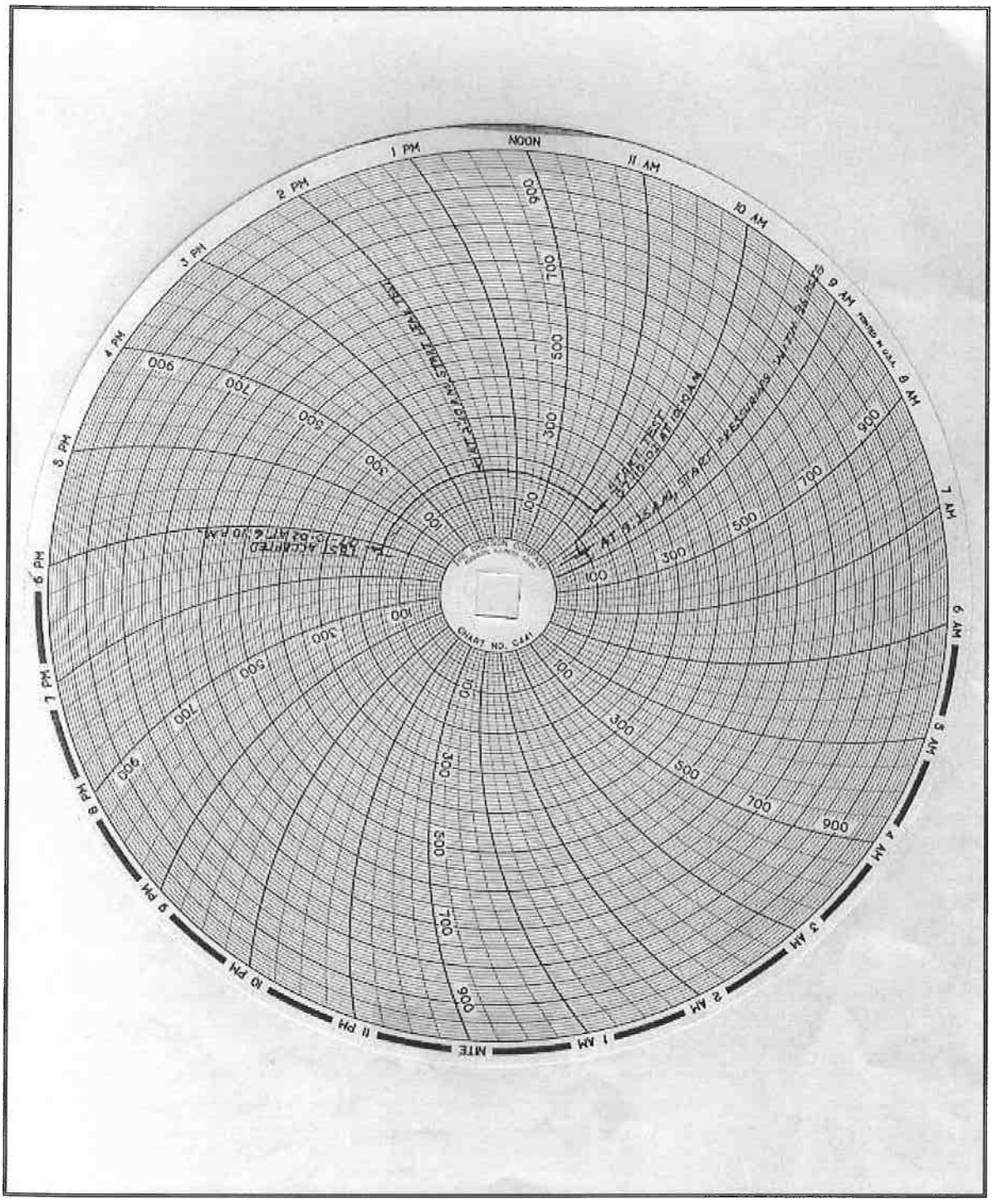
Pressure Test #4 Chart – JP-5 Pier 1A to Shore Block Valve



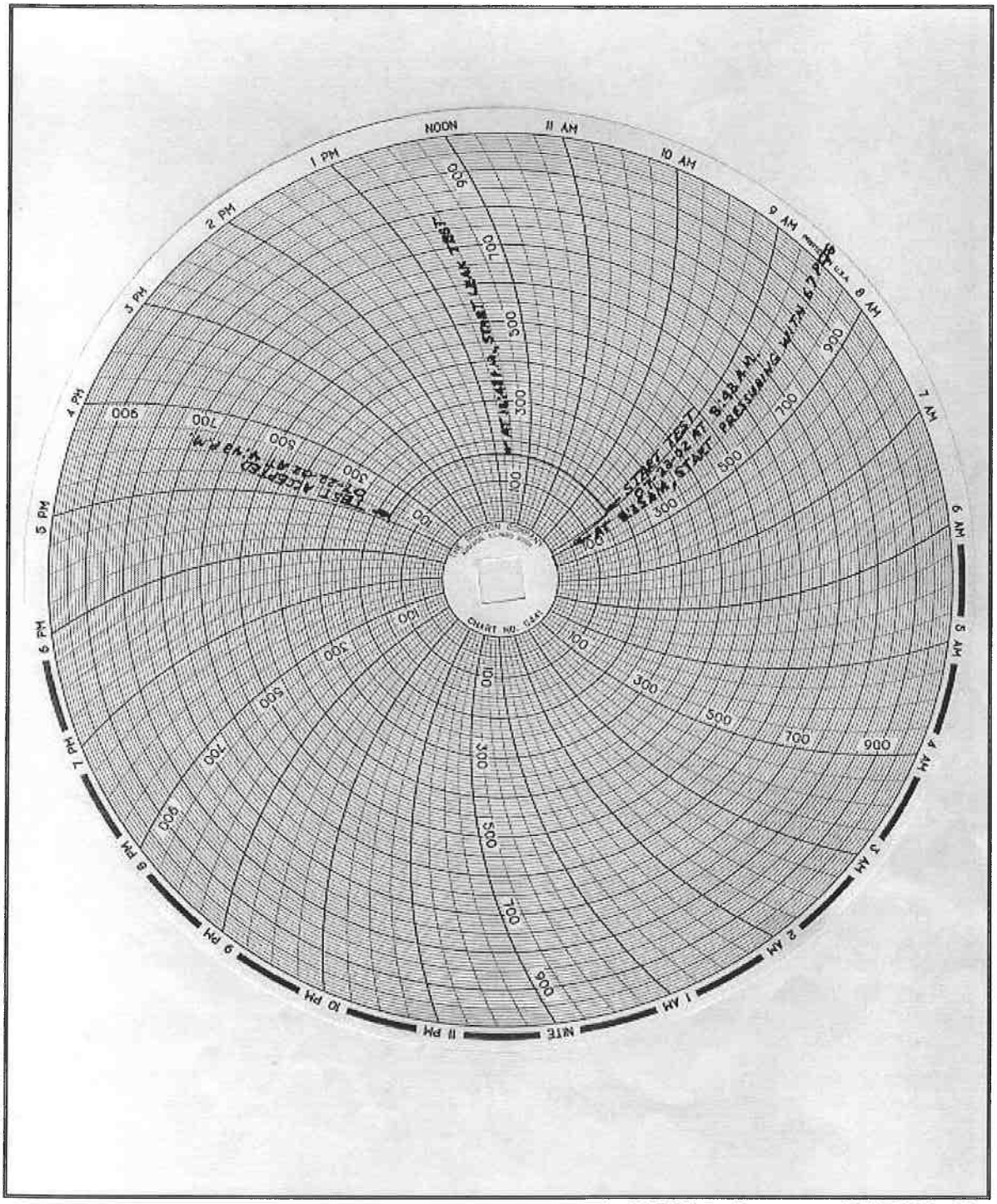
Pressure Test #7 Chart – JP-5 PH 1982 to Pier 1, Pier 1A and Pier 3



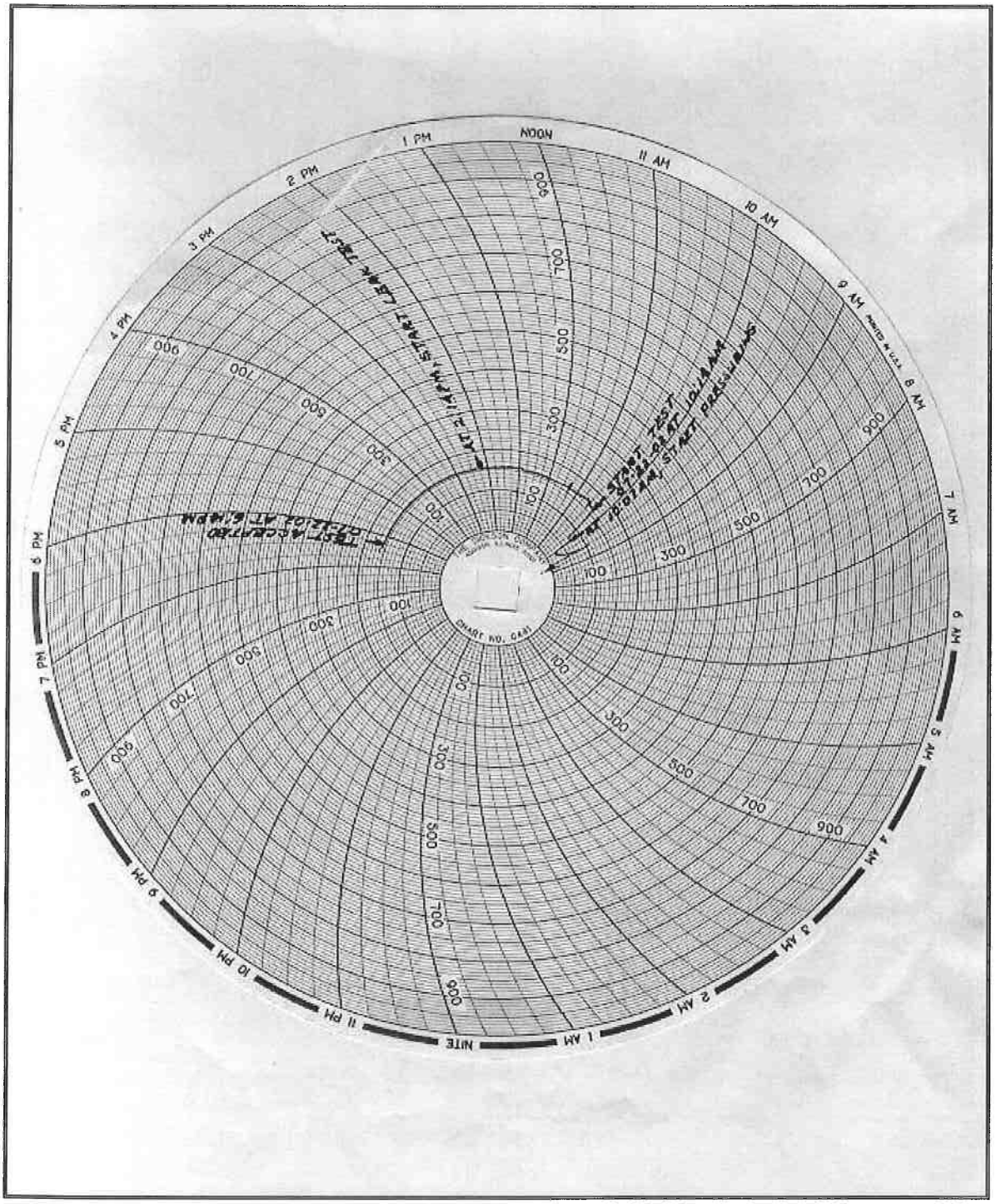
Pressure Test #8-Primary Chart – DFM Primary PH 1982 to Pier 1, 1A and Pier 3



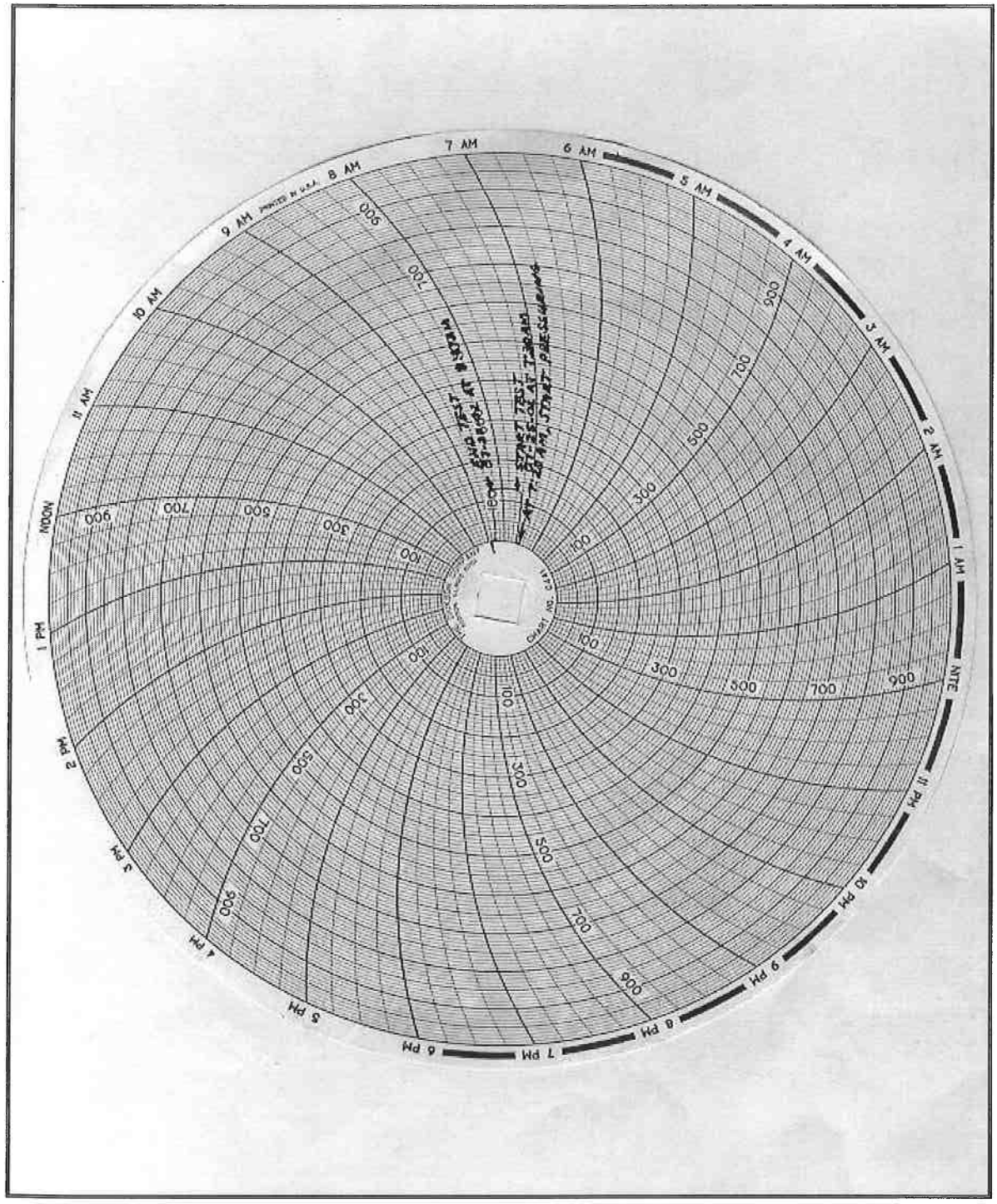
Pressure Test #8-Secondary Chart – DFM Secondary PH 1982 to Pier 1, 1A, PH 466 and Pier 3



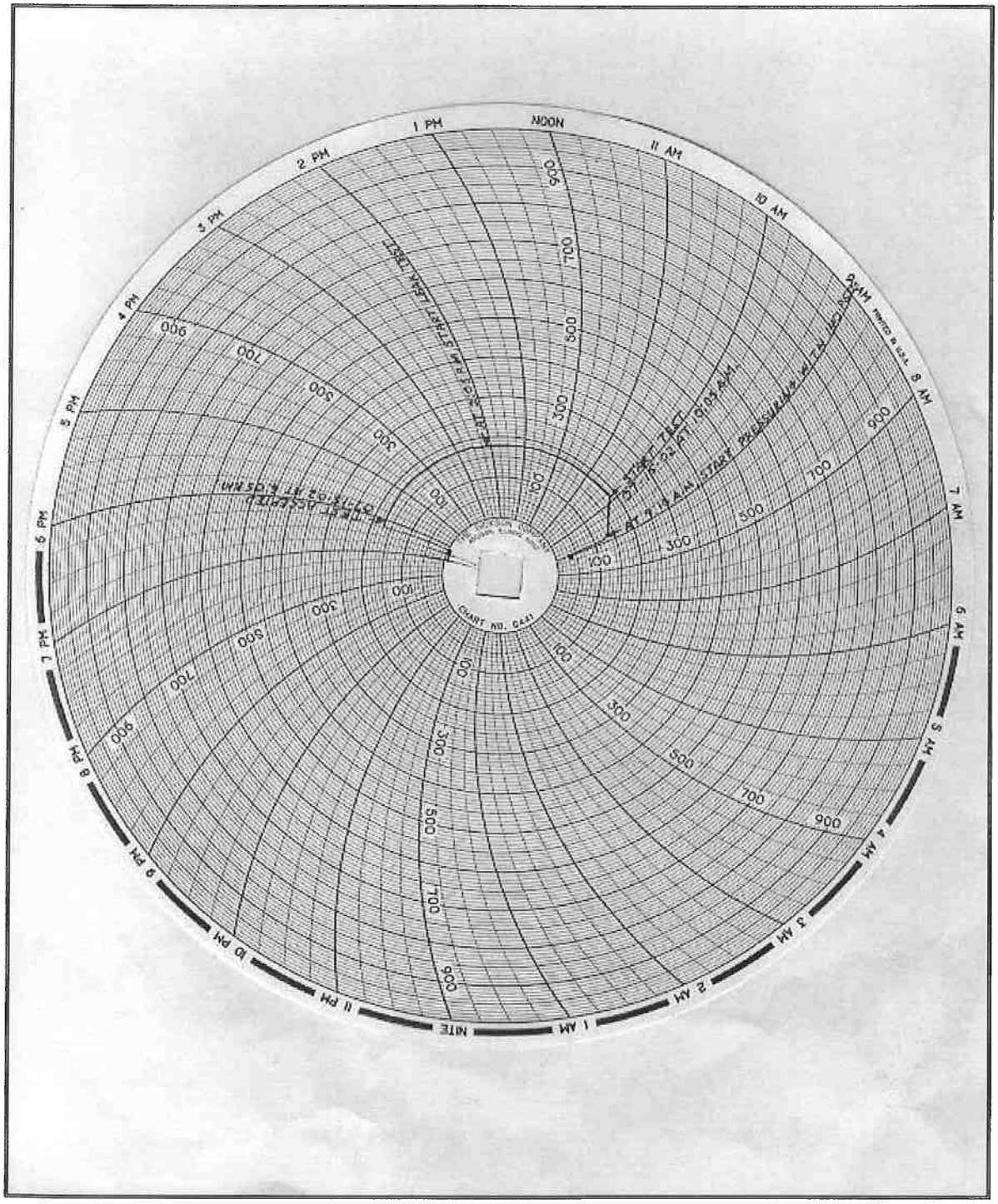
Pressure Test #9 Chart – JP-5 Valve Pit No. 9 to PH-1982



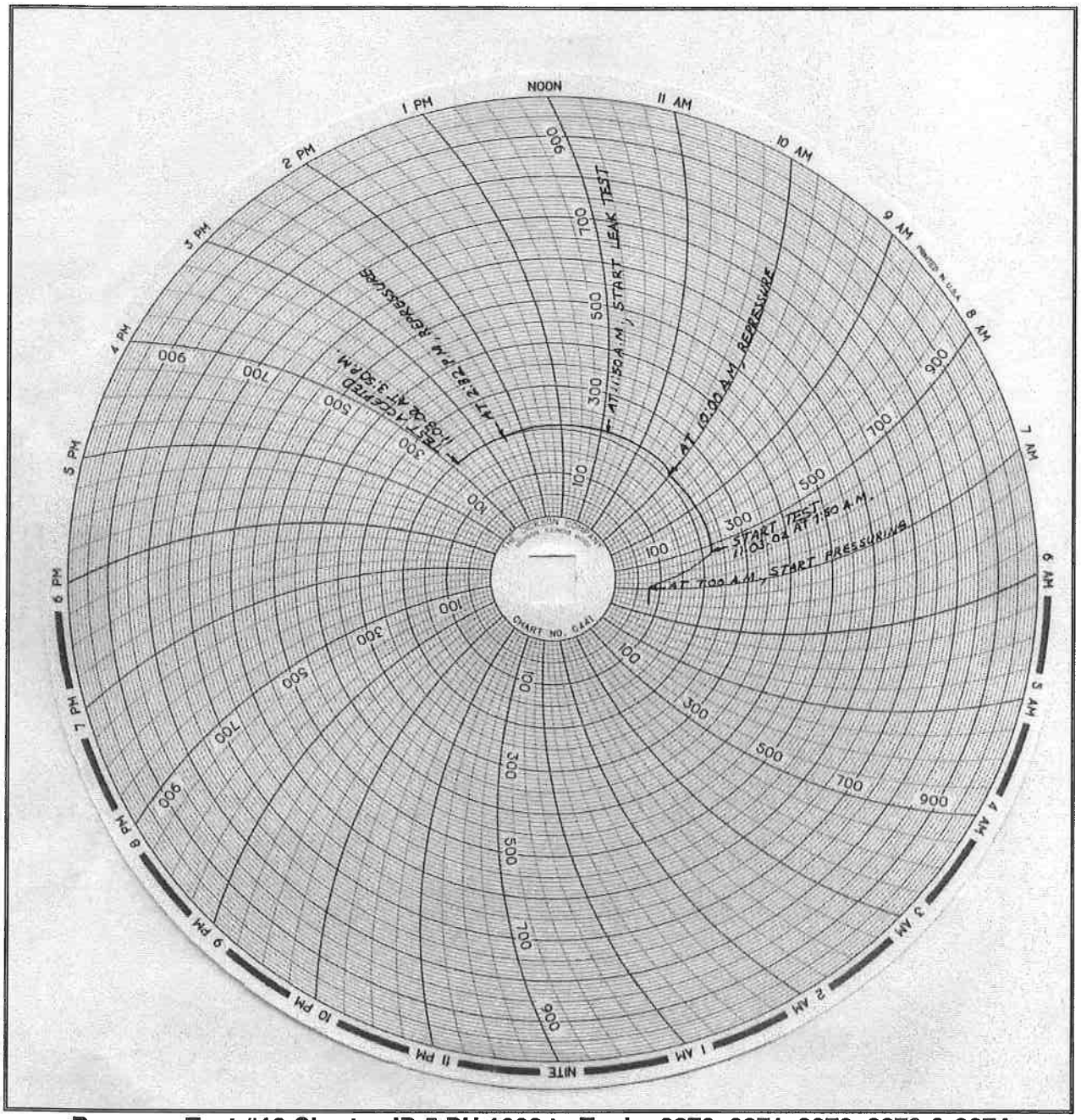
Pressure Test #10 Chart – JP-5 Valve Pit No. 9 to Airfield Filter/Separators



Pressure Test #10 Chart – NAVSTA Airfield Filter/Separators to Pantographs (Cancelled)



Pressure Test #12 Chart – DFM Tanks 82, 83, 1080 &1082 to PH 1982 to Tanks 1995, 1996 & 2436



Pressure Test #13 Chart – JP-5 PH 1982 to Tanks 2270, 2271, 2272, 2273 & 2274

Pressure Test Calculation Worksheet

Location:	Navsta Roosevelt Roads	Date:	7/20/2002
Segment Name:	Test Section 1 Pier 1 to Shore Block Valves	File:	

Segment Pipe Specification

Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft)			Volume (gal)	% Volume	
				Buried	Exposed	Total		Buried	Exposed
1	16	16.000	0.375		375	375	3558		62.2%
2	12	12.750	0.375		364	364	2139		37.4%
3	8	8.625	0.322		8	8	21		0.4%
Totals					747	747	5718		100.0%

Field Data

Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	166.0	177.0	11.0
Buried Temp.	deg F			
Exposed Temp.	deg F	89.1	97.1	8.0
Average Temp.	deg F	89.1	97.1	8.0
Volume Added	gal		-23.9	-23.90

Pipe Data

Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data

Property	Units	Value
Fluid		DFM
Fluid Density	lb/cu.ft.	53.05
Fluid Bulk Modulus	psi	161290
Co-eff. Vol. Expansion	1/F	4.63E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	7.53E-06	-4.44E-04	-3.47E-03	-12.330	0.433	58.88	0.027
2	7.25E-06	-4.44E-04	-3.47E-03	-7.417	0.331	61.19	0.016
3	7.01E-06	-4.44E-04	-3.47E-03	-0.072	0.005	63.25	0.000
Totals	7.42E-06	-4.44E-04	-3.47E-03	-19.819	4.769	59.76	0.042

Total Unaccountable Loss = Volume Added +dV = -4.08 gal (gain)

Total Unaccountable Loss allowed by CSFM= 4.77 gal

* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Navsta Roosevelt Roads	**Date:**	7/20/2002
Segment Name:	Test Section No. 1 Pier 1 to Shore Block Valves	**File:**	L:\7074.18(O) PM(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 1.xls]PTCW

Segment Pipe Specification					
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Length (ft) Exposed	Length (ft) Total	Volume (gal)
16	0.375		375	375	3558
12	0.375		364	364	2139
8	0.322		8	8	21

Signatures and Approvals

NFESC

Project Engineer: Dale A. England

Test Engineer: Dale A. England

Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Digital Thermometer	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika 332.54 0-600	8016788-2	7/12/2002

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
9:15 AM	29.0								Start Pressuring
9:25 AM	166.0	90.2		89.1					START TEST
9:42 AM	190.0	91.0		89.6					Bleed 2.5 gallons
9:43 AM	160.0	91.0		89.6					
10:09 AM	192.0	92.9		91.5					Bleed 3.13 gallons
10:10 AM	155.0	92.9		91.5					
10:32 AM	196.0	93.7		92.5					Bleed 3.47 gallons
10:33 AM	155.0	93.7		92.5					
10:50 AM	190.0	94.4		93.1					Bleed 2.96 gallons
10:51 AM	155.0	94.4		93.1					
11:07 AM	190.0	94.9		94.1					Bleed 2.96 gallons
11:08 AM	155.0	94.9		94.1					
11:37 AM	190.0	96.1		94.7					Bleed 2.96 gallons
11:38 AM	155.0	96.1		94.7					
11:56 AM	190.0	96.1		95.8					Bleed 2.96 gallons
11:57 AM	155.0	96.1		95.8					
12:27 PM	190.0	97.1		97.5					Bleed 2.96 gallons
12:28 PM	161.0	97.1		97.5					Overcast
12:45 PM	161.0	97.1		97.4					Overcast
1:00 PM	165.0	96.9		97.1					Overcast
1:15 PM	162.0	97.5		97.1					Overcast
1:25 PM	177.0	98.1		97.1					TEST ACCEPTED

Pressurization Log

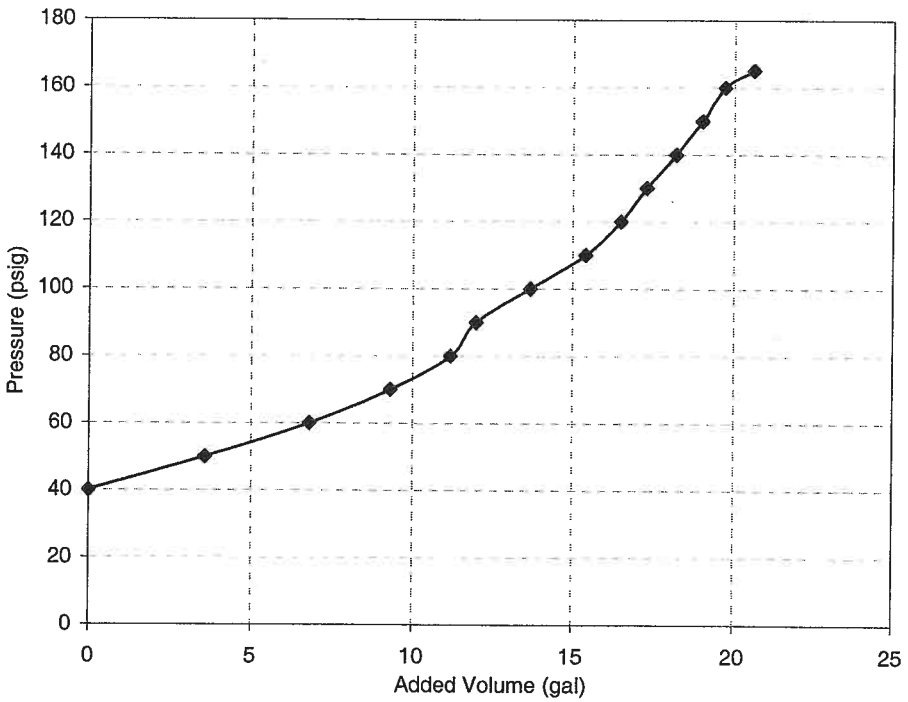
Location:	Navsta Roosevelt Roads	**Date:**	7/20/2002
Segment Name:	Test Section No. 1 Pier 1 to Shore Block Valves	**File:**	J:\7074\18\(3) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 1.xls]PL

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	Quantity	Unit	Value
16	0.375		375	375	3558	Buried Pipe Temperature	F	
12	0.375		364	364	2139	Exposed Pipe Temperature	F	89.1
8	0.322		8	8	21	Ambient Temperature	F	90.2
						Ground Temperature	F	
						Start Time	hr:min	9:15
						Finish Time	hr:min	9:45

Pressurization Log

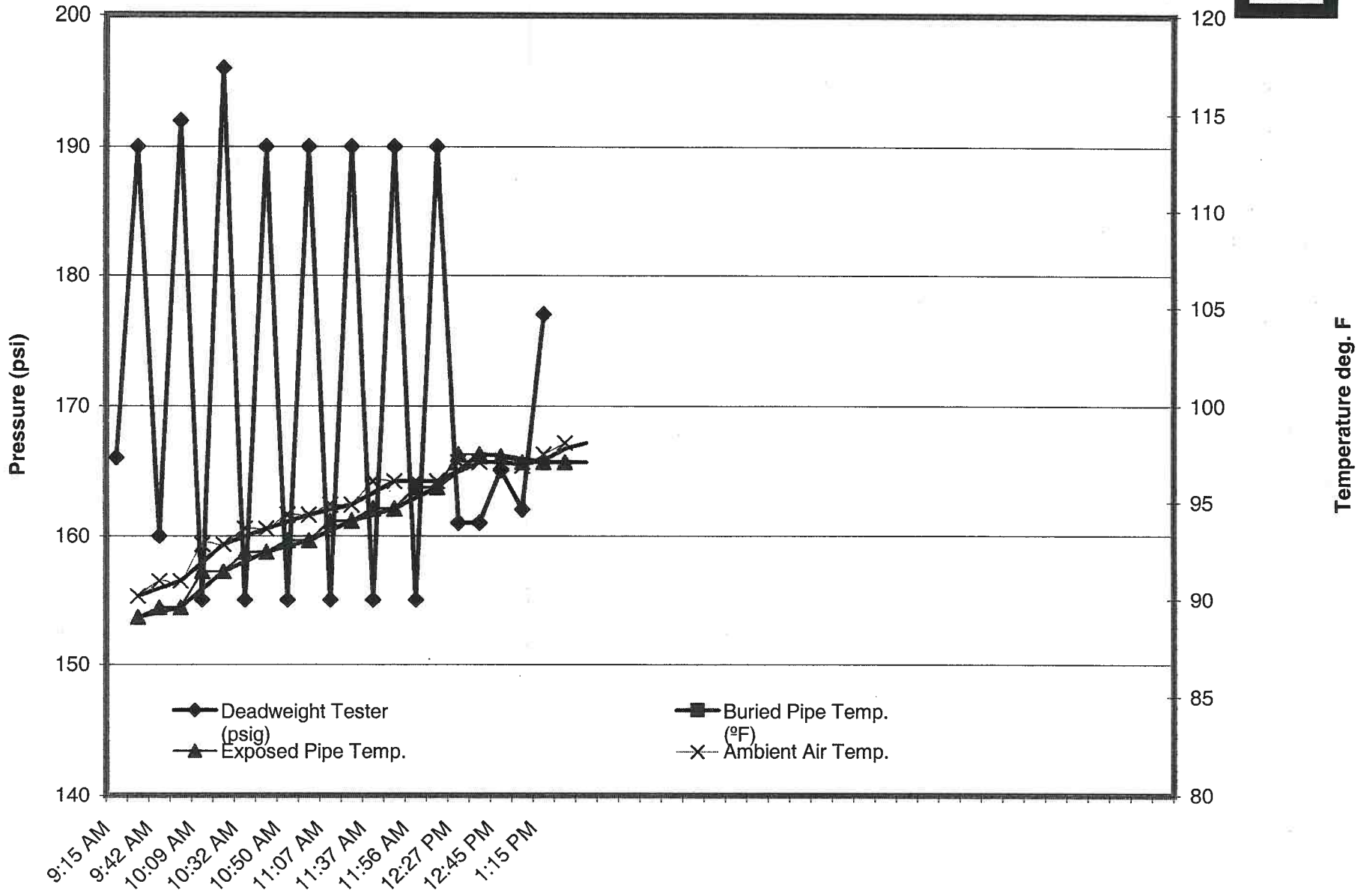
Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
29			
40	10	3.6	0.36
50	10	6.8	0.32
60	10	9.3	0.25
70	10	11.2	0.19
80	10	12.0	0.08
90	10	13.7	0.17
100	10	15.4	0.17
110	10	16.5	0.11
120	10	17.3	0.08
130	10	18.2	0.09
140	10	19.0	0.08
150	10	19.7	0.07
160	10	20.6	0.09
165	5	20.9	0.06

Pressurization Plot



Remarks

Pressure/Temperature/Time
Pressure Test Section No. 1



Pressure Test Calculation Worksheet

Location:	Navsta Roosevelt Roads	Date:	7/16/2002
Segment Name:	Test Section No. 2 Pier 1 to Shore Block Valves	File:	[illegible]

Segment Pipe Specification									
Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft)			Volume (gal)	% Volume	
				Buried	Exposed	Total		Buried	Exposed
1	16	16.000	0.500		411	411	3773		95.7%
2	12	12.750	0.375		26	26	153		3.9%
3	8	8.625	0.322		7	7	18		0.5%
Totals					444	444	3944		100.0%

Field Data				
Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	152.0	192.0	40.0
Buried Temp.	deg F			
Exposed Temp.	deg F	84.5	96.1	11.6
Average Temp.	deg F	84.5	96.1	11.6
Volume Added	gal		-43.3	-43.30

Pipe Data		
Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data		
Property	Units	Value
Fluid		JP-5
Fluid Density	lb/cu.ft.	53.04
Fluid Bulk Modulus	psi	217556
Co-eff. Vol. Expansion	1/F	5.00E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	5.58E-06	-4.81E-04	-5.35E-03	-20.188	0.467	86.12	0.021
2	5.64E-06	-4.81E-04	-5.35E-03	-0.817	0.024	85.12	0.001
3	5.41E-06	-4.81E-04	-5.36E-03	-0.097	0.004	88.84	0.000
Totals	5.58E-06	5.34E-06	2.85E-04	1.125	4.495	86.10	0.022

Total Unaccountable Loss = Volume Added +dV = -44.42 gal

Total Unaccountable Loss allowed by CSFM= 4.49 gal

* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Navsta Roosevelt Roads	Date:	7/16/2002
Segment Name:	Test Section No. 2 Pier 1 to Shore Block Valves	File:	L:\707418\(3) PM\(49) General Report\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 2.xls]PTCW

Segment Pipe Specification					
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)
16	0.500		411	411	3773
12	0.375		26	26	153
8	0.322		7	7	18

Signatures and Approvals
NFESC
Project Engineer: Dale A. England
Test Engineer: Dale A. England
Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Temperature Recorder	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika 332.54 0-600	8016788-2	7/12/2002

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
10:35 AM	107.0								Start Pressuring
11:02 AM	152.0	90.2		84.5					START TEST
11:30 AM	165.0	90.7		85.7					
11:45 AM	168.0	91.1		86.6					Slight Rain - Overcast
12:00 PM	166.0	91.5		89.1					
12:15 PM	167.0	95.6		92.3					
12:30 PM	168.3	98.9		94.6					
12:45 PM	180.0	101.3		95.8					
1:00 PM	190.0	102.4		97.6					
1:15 PM	191.0	100.5		97.2					Bleed 13.2 gallons
1:16 PM	160.0	99.9		96.1					
1:30 PM	183.0	99.4		95.4					
1:40 PM	191.0	99.1		95.1					Bleed 13.2 gallons
1:41 PM	160.0	99.1		95.1					
2:00 PM	173.0	100.4		95.3					
2:15 PM	194.0	100.7		95.6					Bleed 14.4 gallons
2:16 PM	160.0	101.2		95.8					
2:40 PM	191.0	101.9		95.9					Bleed 2.5 gallons
2:41 PM	185.0	102.1		95.9					
3:02 PM	192.0	102.3		96.1					TEST ACCEPTED

Pressurization Log

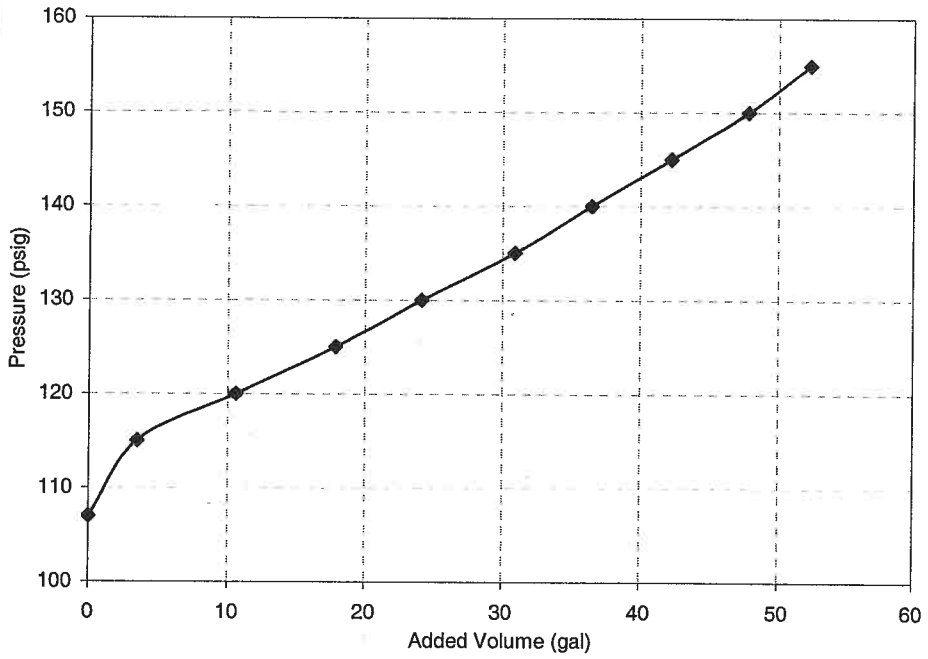
Location:	Navsta Roosevelt Roads	Date:	7/16/2002
Segment Name:	Test Section No. 2 Pier 1 to Shore Block Valves	File:	J:\7074\18\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 2.xls]PL

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	Quantity	Unit	Value
16	0.500		411	411	3773	Buried Pipe Temperature	F	
8	0.322		26	26	153	Exposed Pipe Temperature	F	84.5
8	0.322		7	7	18	Ambient Temperature	F	90.2
						Ground Temperature	F	
						Start Time	hr:min	10:35
						Finish Time	hr:min	11:02

Pressurization Log

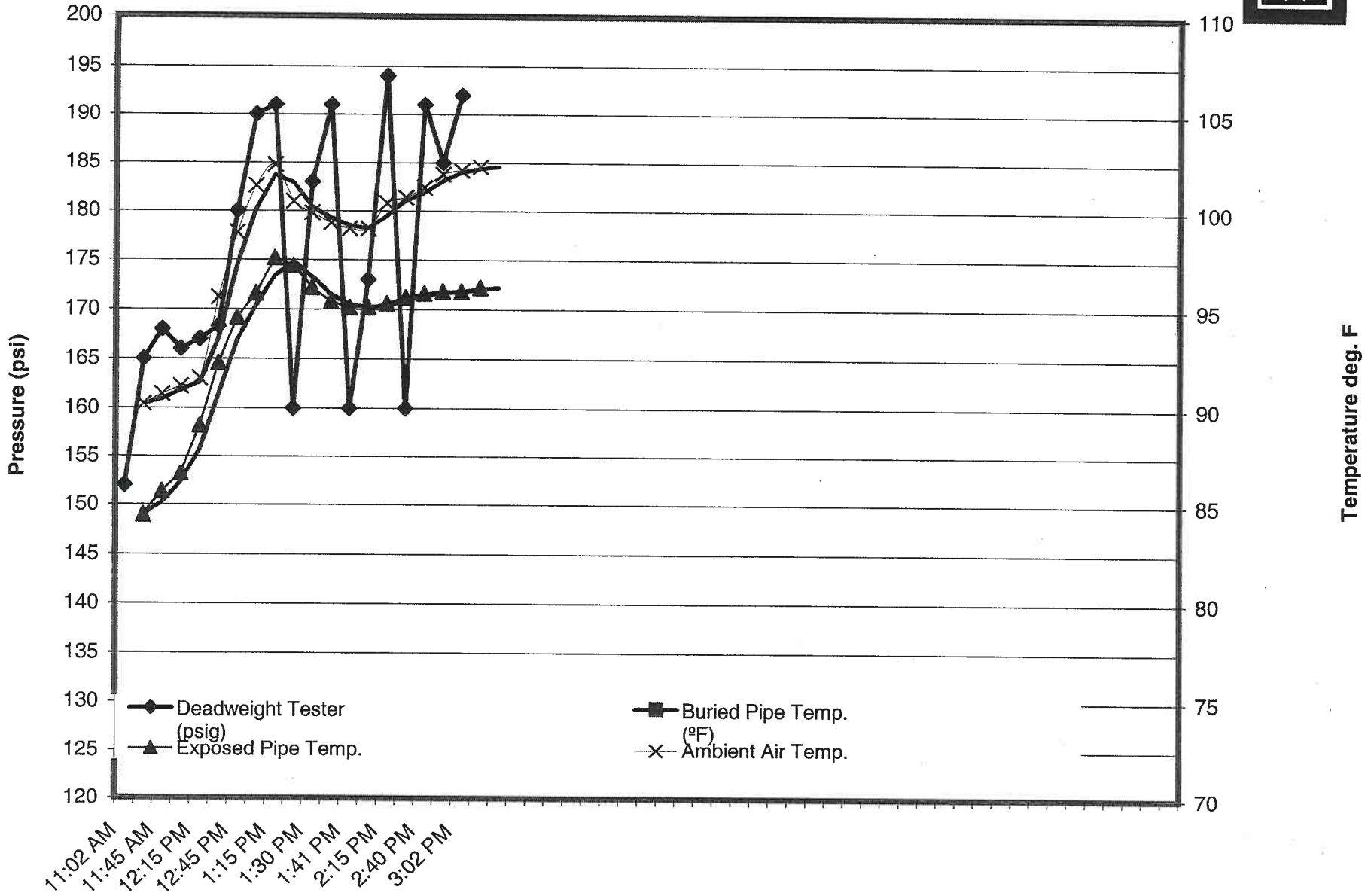
Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
107			
115	8	3.5	0.44
120	5	10.6	1.42
125	5	17.9	1.46
130	5	24.1	1.24
135	5	30.9	1.36
140	5	36.5	1.12
145	5	42.2	1.14
150	5	47.8	1.12
155	5	52.3	0.90

Pressurization Plot



Remarks

Pressure/Temperature/Time
Test Section No. 2



Pressure Test Calculation Worksheet

Location:	Navsta Roosevelt Roads	Date:	7/13/2002
Segment Name:	Test Section 3 Pier 1A to Shore Block Valves	File:	[illegible]

Segment Pipe Specification

Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft) Buried	Length (ft) Exposed	Length (ft) Total	Volume (gal)	% Volume Buried	% Volume Exposed
1	16	16.000	0.500		2020	2020	18544		54.8%
2	12	12.750	0.375		2600	2600	15276		45.2%
Totals					4620	4620	33819		100.0%

Field Data

Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	150.0	166.0	16.0
Buried Temp.	deg F			
Exposed Temp.	deg F	86.5	95.5	9.0
Average Temp.	deg F	86.5	95.5	9.0
Volume Added	gal		-137.3	-137.3

Pipe Data

Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data

Property	Units	Value
Fluid		DFM
Fluid Density	lb/cu.ft.	52.33
Fluid Bulk Modulus	psi	217556
Co-eff. Vol. Expansion	1/F	5.00E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	5.58E-06	-4.81E-04	-4.24E-03	-78.537	2.295	86.12	0.103
2	5.64E-06	-4.81E-04	-4.23E-03	-64.679	2.364	85.12	0.086
Totals	5.61E-06	-4.81E-04	-4.23E-03	-143.216	8.659	85.67	0.190

Total Unaccountable Loss = Volume Added +dV = 5.92 gal (gain)

Total Unaccountable Loss allowed by CSFM= 8.66 gal

* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Navsta Roosevelt Roads	**Date:**	7/13/2002
Segment Name:	Test Section 3 Pier 1A to Shore Block Valves	**File:**	L:\3707-A18\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. [illegible].xls]SLTDL

Segment Pipe Specification					
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)
16	0.500		2020	2020	18544
12	0.375		2600	2600	15276

Signatures and Approvals

NFESC

Project Engineer: Dale A. England

Test Engineer: Dale A. England

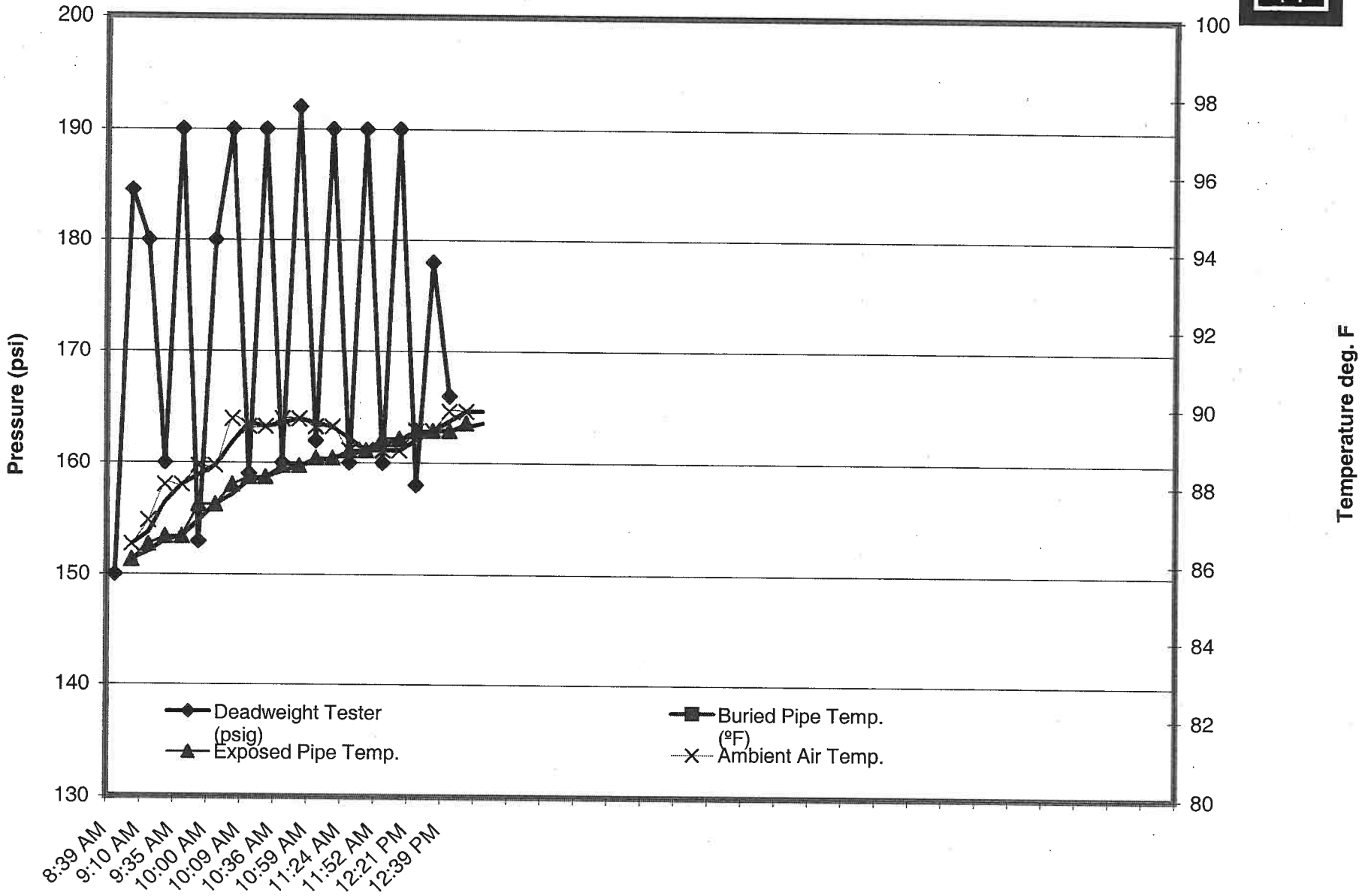
Test Engineer:

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Digital Thermometer	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika 332.54 0-600	8016788-2	7/12/2002

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
8:12 AM	137.0								Start Pressuring
8:39 AM	150.0	86.5		86.1					START TEST
8:55 AM	184.5	87.1		86.5					
9:10 AM	180.0	88.0		86.7					Bleed 11.3 gallons
9:11 AM	160.0	88.0		86.7					
9:35 AM	190.0	88.5		87.5					Bleed 19.4 gallons
9:36 AM	153.0	88.5		87.5					
10:00 AM	180.0	89.7		88.0					
10:08 AM	190.0	89.5		88.2					Bleed 17.4 gallons
10:09 AM	159.0	89.5		88.2					
10:35 AM	190.0	89.7		88.5					Bleed 16.2 gallons
10:36 AM	160.0	89.7		88.5					
10:58 AM	192.0	89.5		88.7					Bleed 15.8 gallons
10:59 AM	162.0	89.5		88.7					
11:23 AM	190.0	88.9		88.9					Bleed 16.2 gallons
11:24 AM	160.0	88.9		88.9					
11:51 AM	190.0	88.9		89.2					Bleed 16.2 gallons
11:52 AM	160.0	88.9		89.2					
12:20 PM	190.0	89.4		89.4					Bleed 18.0 gallons
12:21 PM	158.0	89.4		89.4					
12:38 PM	178.0	89.9		89.4					Bleed 6.8 gallons
12:39 PM	166.0	89.9		89.6					TEST ACCEPTED

Pressure/Temperature/Time
Pressure Test No. 3



Pressure Test Calculation Worksheet

Location:	Navsta Roosevelt Roads	**Date:**	7/17/2002
Segment Name:	Test Section No. 4	**File:**	L:\707418\(3) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 04.xls]PTCW

Segment Pipe Specification									
Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft)			Volume (gal)	% Volume	
				Buried	Exposed	Total		Buried	Exposed
1	16	16.000	0.500		2057	2057	18883		84.6%
2	12	12.750	0.375		583	583	3425		15.4%
3	10	10.750	0.365		3				
Totals					2643	2640	22309		100.0%

Field Data				
Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	161.7	150.7	-11.0
Buried Temp.	deg F			
Exposed Temp.	deg F	84.9	85.8	0.9
Average Temp.	deg F	84.9	85.8	0.9
Volume Added	gal			-4.00

Pipe Data		
Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data		
Property	Units	Value
Fluid		JP-5
Fluid Density	lb/cu.ft.	53.04
Fluid Bulk Modulus	psi	217556
Co-eff. Vol. Expansion	1/F	5.00E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	5.58E-06	-4.81E-04	-4.94E-04	-9.325	2.338	86.12	0.105
2	5.64E-06	-4.81E-04	-4.95E-04	-1.694	0.530	85.12	0.019
Totals	5.59E-06	-4.81E-04	-4.94E-04	-11.019	6.868	85.97	0.125

Total Unaccountable Loss = Volume Added +dV = 1.75 gal/hr

Total Unaccountable Loss allowed by CSFM= 1.75 gal/hr

* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Navsta Roosevelt Roads	Date:	7/17/2002
Segment Name:	Test Section No. 4	File:	L:\707618\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report Appendix C\[Test Section No. 04.xls]PTCW

Segment Pipe Specification					
Nom. Size (in.)	w.t (in.)	Length (ft)			Volume (gal)
		Buried	Exposed	Total	
16	0.500		2057	2057	18883
12	0.375		583	583	3425
10	0.365		3		

Signatures and Approvals

NFESC

Project Engineer: Dale A. England

Test Engineer: Dale A England

Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Temperature Recorder	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika 332.54 0-600	8016788-2	4/2/2001

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
8:25 AM	95.0								Start Pressuring
8:52 AM	161.7	84.6	84.9	85.0					START TEST
9:00 AM	159.8	84.6	84.9	86.2					Sunny
9:15 AM	158.7	84.6	84.9	85.5					
9:30 AM	157.0	84.9	85.1	85.9					
9:45 AM	156.7	86.5	85.1	87.0					
10:00 AM	155.7	86.5	85.3	87.1					
10:15 AM	154.8	87.3	85.3	87.5					
10:30 AM	153.9	88.6	85.4	88.1					
10:45 AM	153.0	89.2	85.4	88.5					
10:49 AM	152.9	90.1	85.4	88.9					Close VP 24 Valve to Pier 3
11:00 AM	152.7	90.8	85.5	89.0					
12:35 PM	152.7	91.2	85.5	89.5					
11:15 AM	152.5	91.8	85.5	89.9					
11:30 AM	152.5	92.4	85.6	90.3					
11:45 AM	151.8	93.4	85.6	93.6					
12:00 PM	151.7	94.9	85.6	94.3					
12:15 PM	151.7	95.6	85.7	94.7					
12:30 PM	151.0	96.8	85.7	95.8					
12:45 PM	150.7	98.3	85.7	96.2					18 Ounces JP-5 caught
12:52 PM	150.7	100.3	85.8	96.6					TEST ACCEPTED

Pressurization Log

Location:	Navsta Roosevelt Roads	**Date:**	7/17/2002
Segment Name:	Test Section No. 4	**File:**	L:\7074\18\(3) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 04.xls]PTCW

Segment Pipe Specification

Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)
16	0.500		2057	2057	18883
12	0.375		580	583	3425
10	0.365		3		

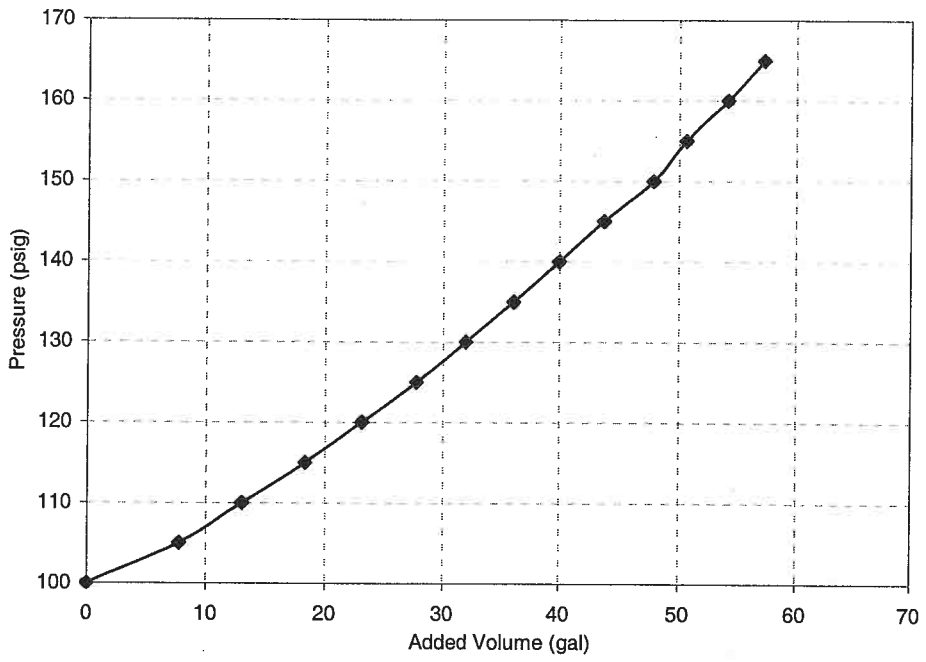
Conditions for Pressurization

Quantity	Unit	Value
Buried Pipe Temperature	F	84.9
Exposed Pipe Temperature	F	85
Ambient Temperature	F	84.6
Ground Temperature	F	
Start Time	hr:min	8:25
Finish Time	hr:min	8:52

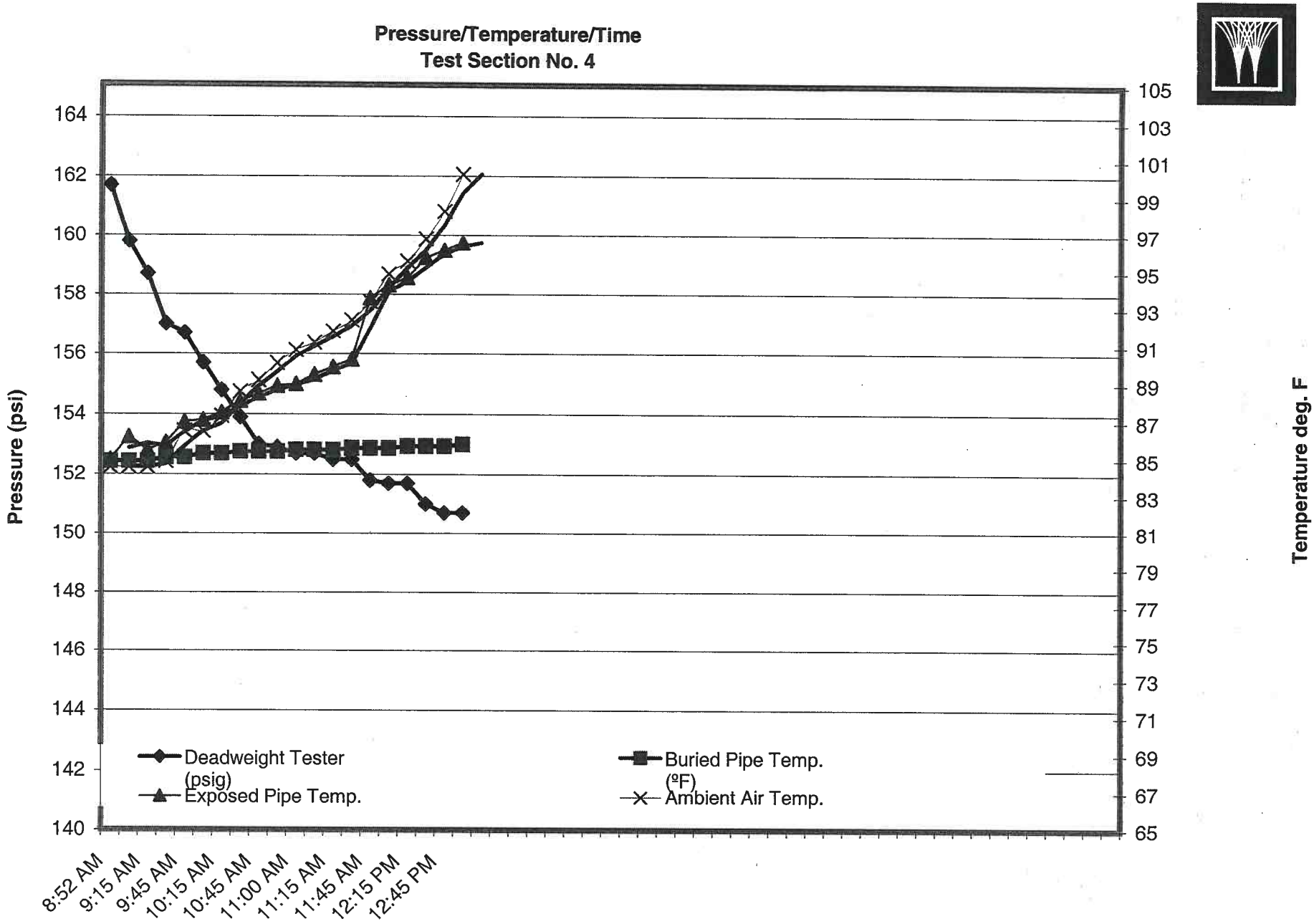
Pressurization Log

Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
100			
105	5	7.8	1.56
110	5	13.0	1.04
115	5	18.3	1.06
120	5	23.1	0.96
125	5	27.7	0.92
130	5	32.0	0.86
135	5	36.1	0.82
140	5	40.0	0.78
145	5	43.8	0.76
150	5	47.9	0.82
155	5	50.6	0.54
160	5	54.1	0.70
165	5	57.2	0.62

Pressurization Plot



Remarks


Pressure/Temperature/Time
Test Section No. 4
Pressure (psi)
Temperature deg. F
164
162
160
158
156
154
152
150
148
146
144
142
140
105
103
101
99
97
95
93
91
89
87
85
83
81
79
77
75
73
71
69
67
65
8:52 AM
9:15 AM
9:45 AM
10:15 AM
10:45 AM
11:00 AM
11:15 AM
11:45 AM
12:15 PM
12:45 PM
Deadweight Tester (psig)
Exposed Pipe Temp.
Buried Pipe Temp. (ºF)
Ambient Air Temp.

Pressure Test Calculation Worksheet

Location:	Navsta Roosevelt Roads	Date:	10/29/2002
Segment Name:	Test Section No. 7 PH 1982 to Pier 1 & 1A	File:	

Segment Pipe Specification

Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft)			Volume (gal)	% Volume	
				Buried	Exposed	Total		Buried	Exposed
1	16	16.000	0.406	1295	37	1332	12536	35.68%	1.02%
2	12	12.750	0.375	3675	3	3678	21609	63.21%	0.05%
3	10	10.750	0.365		3	3	12		0.04%
Totals				4970	43	5013	34158	98.9%	1.1%

Field Data

Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	174.0	170.0	-4.0
Buried Temp.	deg F	86.1	90.1	4.0
Exposed Temp.	deg F	87.3	87.2	-0.1
Average Temp.	deg F	87.3	85.1	-2.2
Volume Added	gal			-1.95

Pipe Data

Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data

Property	Units	Value
Fluid		JP-5
Fluid Density	lb/cu.ft.	53.04
Fluid Bulk Modulus	psi	217556
Co-eff. Vol. Expansion	1/F	5.00E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	5.82E-06	-4.81E-04	1.03E-03	12.960	1.533	82.53	0.073
2	5.64E-06	-4.81E-04	1.03E-03	22.355	3.344	85.12	0.122
3	5.50E-06	-4.81E-04	1.04E-03	0.013	0.002	87.43	0.000
Totals	5.71E-06	-4.81E-04	1.03E-03	35.328	8.879	84.17	0.195

Total Unaccountable Loss = Volume Added +dV = -37.28 gal

Total Unaccountable Loss allowed by CSFM= 8.88 gal

Strength and Leak Test Data Log

Location:	Navsta Roosevelt Roads	Date:	10/29/2002
Segment Name:	Test Section No. 7 PH 1982 to Pier 1 & 1A	File:	L\707418\(G) PM\(49) General Report\Puerto Rico Pressure Test Report\Appendix O\[Test Section No. 7.xls]PTCW

Segment Pipe Specification						Signatures and Approvals
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	NFESC
16	0.406	1295	18	1332	12536	Project Engineer Dale A. England
12	0.375	3675	3	3678	21609	Test Engineer Dale A. England
10	0.365		3	3	12	
						Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Temperature Recorder	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika 332.54 0-600	8016788-2	7/12/2002

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
7:24 AM	66.0								Start Pressuring
7:38 AM	166.0	80.7	82.2	80.5					At Test Pressure
7:55 AM	157.0	81.3	82.2	80.9					Repressure 0.9 Gallons
7:56 AM	167.0	81.3	82.2	80.9					
8:00 AM	167.0	82.0	82.2	81.1					START TEST
8:15 AM	164.0	82.5	82.2	81.5					
8:30 AM	164.0	81.9	82.3	81.5					
8:45 AM	163.0	82.9	82.3	82.1					
9:00 AM	164.0	82.7	82.5	82.3					
9:15 AM	164.0	83.3	82.5	82.7					
9:30 AM	165.0	83.4	82.7	83.3					
9:45 AM	166.0	83.6	83.0	83.6					
10:00 AM	167.0	84.6	83.3	83.8					
10:15 AM	168.0	84.9	83.6	84.1					
10:30 AM	169.0	85.4	83.8	84.7					
10:45 AM	170.0	85.9	84.1	85.2					
11:00 AM	172.0	85.4	84.7	84.9					
11:15 AM	173.0	86.7	84.9	85.5					Bleed 0.156 Gallons.
11:16 AM	171.0	86.7	84.9	85.5					
11:30 AM	172.0	86.7	85.1	85.7					
11:45 AM	173.0	86.8	85.4	85.9					
12:00 PM	174.0	87.3	86.1	86.5					START LEAK TEST
12:30 PM	174.0	86.4	85.9	86.5					
1:00 PM	175.0	86.7	87.3	87.3					Bleed 0.5 Gallons
1:01 PM	171.0	87.7	88.9	87.3					
1:30 PM	172.0	87.7	89.2	87.7					
2:00 PM	172.0	88.4	89.8	89.0					
2:30 PM	172.0	88.1	89.8	89.0					
3:30 PM	172.0	89.0	90.1	89.3					
4:00 PM	170.0	85.1	85.8	87.2					END TEST 1.95 Gallons caught

Pressurization Log

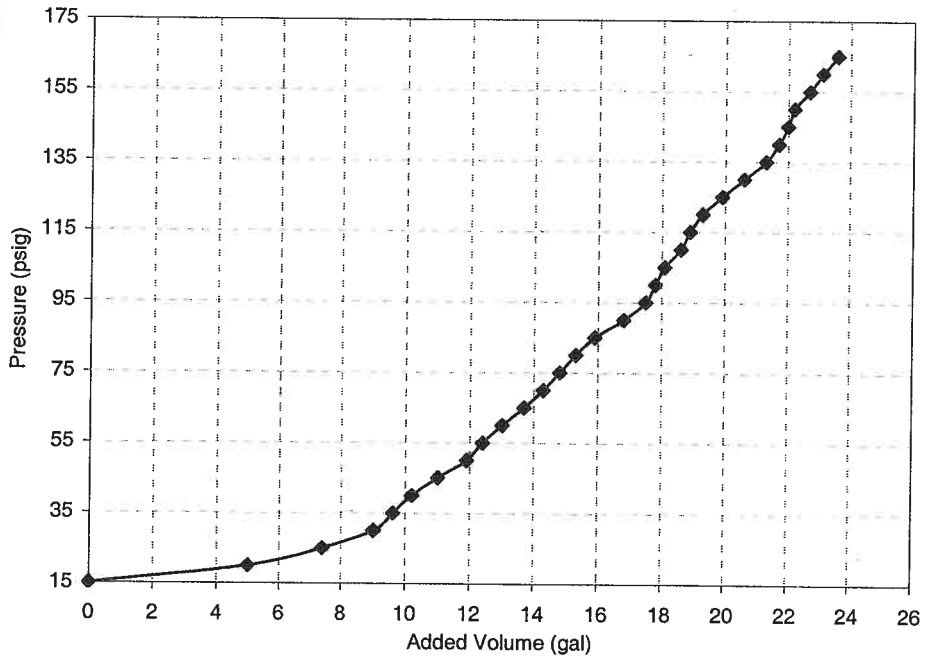
Location:	Navsta Roosevelt Roads	**Date:**	10/29/2002
Segment Name:	Test Section No. 7 PH 1982 to Pier 1 & 1A	**File:**	L:\7074\18\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 7.xls]PTCW

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	Quantity	Unit	Value
16	0.406	1295	18	1332	12536	Buried Pipe Temperature	F	84.9
12	0.375	3675	604	3678	21609	Exposed Pipe Temperature	F	85
10	0.365		3	3	12	Ambient Temperature	F	84.6
						Ground Temperature	F	
						Start Time	hr:min	10:50
						Finish Time	hr:min	11:05

Pressurization Log

Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
15			
20	5	5.0	1
25	5	7.4	0.48
30	5	9.0	0.32
35	5	9.6	0.12
40	5	10.2	0.12
45	5	11.0	0.16
50	5	11.9	0.18
55	5	12.4	0.10
60	5	13.0	0.12
65	5	13.7	0.14
70	5	14.3	0.12
75	5	14.8	0.10
80	5	15.3	0.10
85	5	15.9	0.12
90	5	16.8	0.18
95	5	17.5	0.14
100	5	17.8	0.06
105	5	18.1	0.06
110	5	18.6	0.10
115	5	18.9	0.06
120	5	19.3	0.08
125	5	19.9	0.12
130	5	20.6	0.14
135	5	21.3	0.14
140	5	21.7	0.08
145	5	22.0	0.06
150	5	22.2	0.04
155	5	22.7	0.10
160	5	23.1	0.08
165	5	23.6	0.10

Pressurization Plot



Remarks

Initial Pressuring conducted on 29 October 2002.

Pressurization Log

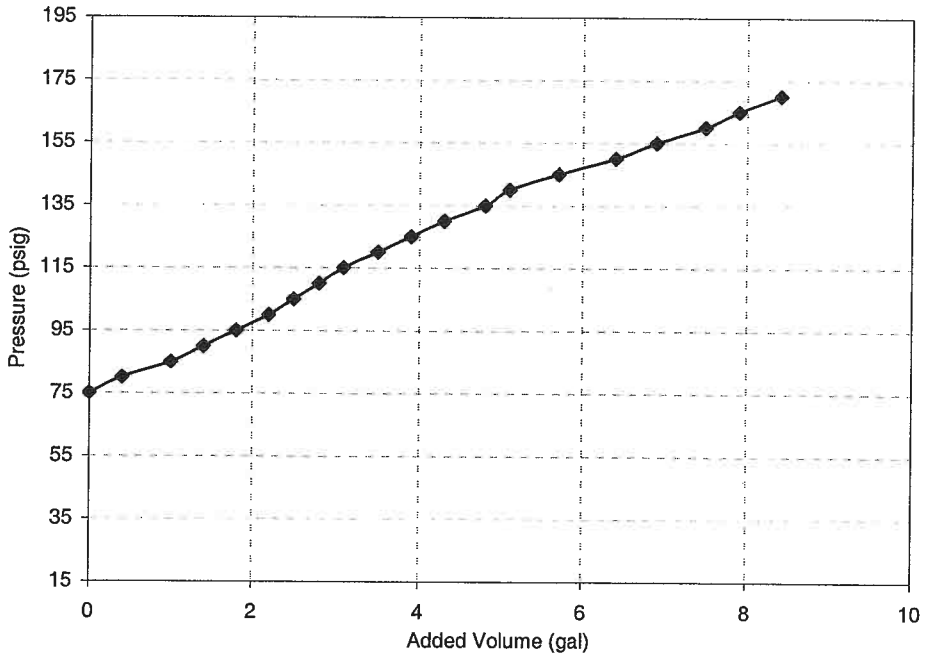
Location:	Navsta Roosevelt Roads	Date:	10/30/2002
Segment Name:	Test Section No. 7 PH 1982 to Pier 1 & 1A	File:	L:\7074\18\(G) PM\48) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 7.xls]PTCW

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	Quantity	Unit	Value
16	0.406	1295	18	1332	12536	Buried Pipe Temperature	F	84.9
12	0.375	3675	604	3678	21609	Exposed Pipe Temperature	F	85
10	0.365		3	3	12	Ambient Temperature	F	84.6
						Ground Temperature	F	
						Start Time	hr:min	10:50
						Finish Time	hr:min	11:05

Pressurization Log

Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
75			
80	5	0.4	0.08
85	5	1.0	0.12
90	5	1.4	0.08
95	5	1.8	0.08
100	5	2.2	0.08
105	5	2.5	0.06
110	5	2.8	0.06
115	5	3.1	0.06
120	5	3.5	0.08
125	5	3.9	0.08
130	5	4.3	0.08
135	5	4.8	0.10
140	5	5.1	0.06
145	5	5.7	0.12
150	5	6.4	0.14
155	5	6.9	0.10
160	5	7.5	0.12
165	5	7.9	0.08
170	5	8.4	0.10

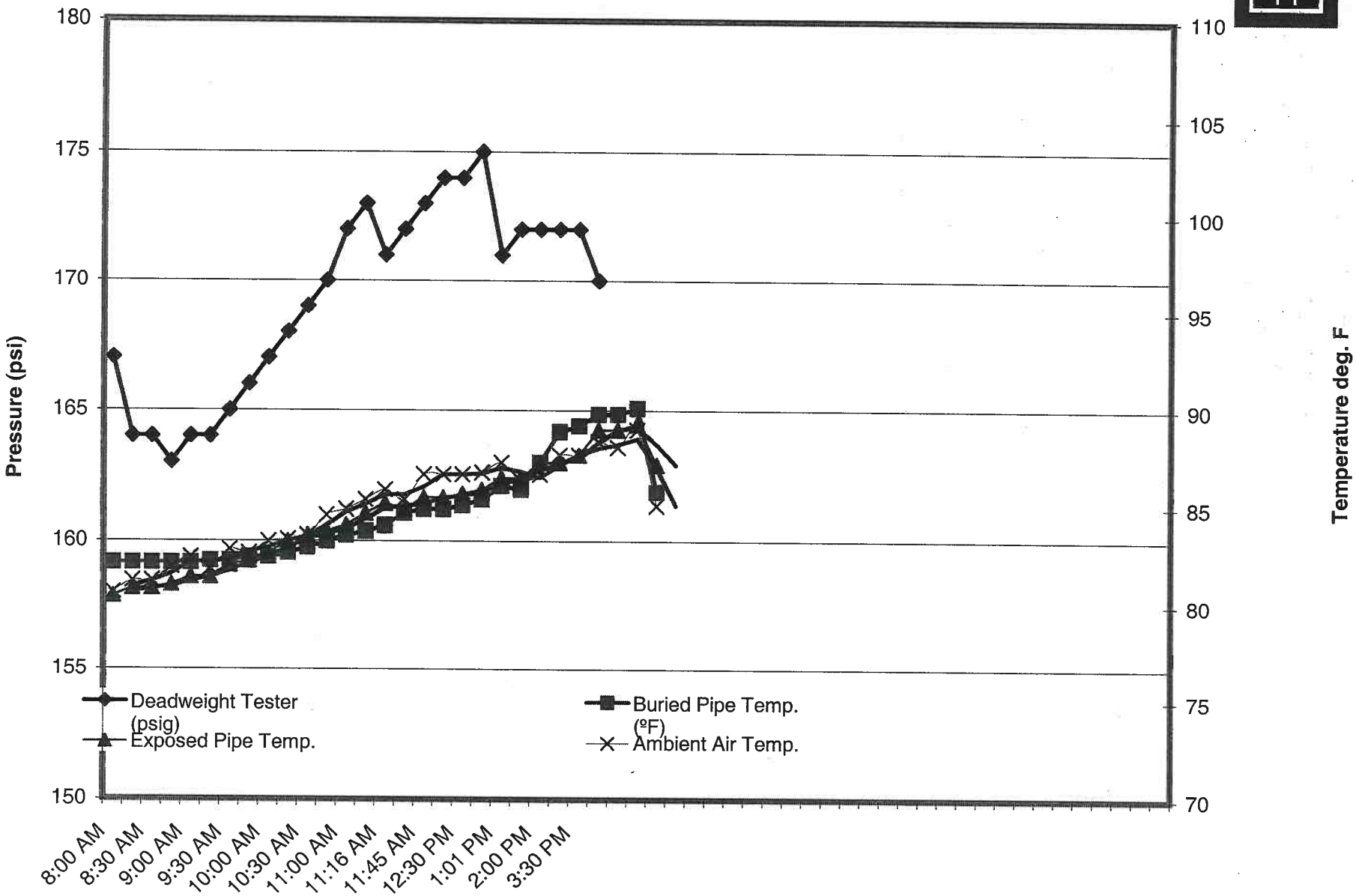
Pressurization Plot



Remarks

Initial Pressuring conducted on 29 October 2002.

Pressure/Temperature/Time
Test Section No. 7



Pressure Test Calculation Worksheet

Location:	Naval Station Roosevelt Roads	**Date:**	7/11/2002
Segment Name:	Test Section 8-DFM Primary	**File:**	L:\7074\18\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 08 Primary.xls]FL

Segment Pipe Specification

Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft) Buried	Length (ft) Exposed	Length (ft) Total	Volume (gal)	% Volume Buried	% Volume Exposed
1	16	16.000	0.500	315	30	345	3167	7.9%	0.8%
2	12	12.750	0.375	5685	5	5690	33430	91.3%	0.1%
Totals				6000	35	6035	36597	99.2%	0.8%

Field Data

Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	157.2	153.0	-4.2
Buried Temp.	deg F	89.7	89.6	-0.1
Exposed Temp.	deg F	95.2	89.3	-5.9
Average Temp.	deg F	89.7	89.4	-0.3
Volume Added	gal			

Pipe Data

Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data

Property	Units	Value
Fluid		DFM
Fluid Density	lb/cu.ft.	53.05
Fluid Bulk Modulus	psi	217556
Co-eff. Vol. Expansion	1/F	4.63E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	5.58E-06	-4.44E-04	1.30E-04	0.412	0.392	79.49	0.018
2	5.64E-06	-4.44E-04	1.30E-04	4.334	5.173	78.57	0.189
Totals	5.64E-06	8.01E-05	-5.14E-05	-1.880	9.565	78.65	0.206

Total Unaccountable Loss = Volume Added +dV = 1.88 gal (gain)
Total Unaccountable Loss allowed by CSFM= 9.56 gal
* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Naval Station Roosevelt Roads	**Date:**	7/11/2002
Segment Name:	Test Section 8 DFM-Primary	**File:**	L:\7074\18\(0) PM\(48) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 08-Primary.xls]PL

Segment Pipe Specification						Signatures and Approvals
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	NFESC
16	0.500	315	30	345	3167	Project Engineer Dale A. England
12	0.375	5685	5	5690	33430	Test Engineer Dale A. England
						Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Digital Thermometer	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika 332.54 0-600	8016788-2	7/12/2002

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
10:15 AM	132.0								Start Pressuring
10:30 AM	157.0	90.5	88.4	88.4					START TEST
10:45 AM	156.5	91.2	88.5	89.4					
11:00 AM	156.0	91.8	88.5	90.4					
11:15 AM	155.7	92.1	88.6	91.2					
11:30 AM	155.7	92.5	88.7	91.3					Sunny
11:45 AM	155.7	92.7	88.8	91.4					
12:00 PM	156.0	93.0	88.9	91.6					
12:15 PM	156.2	93.2	89.0	91.8					
12:30 PM	156.2	93.5	89.1	92.0					
12:45 PM	156.5	93.8	89.2	92.1					
1:00 PM	156.7	94.3	89.4	92.3					
1:15 PM	156.7	94.7	89.5	92.4					
1:30 PM	156.7	95.1	89.7	93.1					
1:45 PM	157.0	95.4	89.7	92.9					
2:00 PM	157.0	95.7	89.7	93.3					
2:15 PM	157.0	96.0	89.7	94.7					
2:30 PM	157.2	97.3	89.7	95.2					START LEAK TEST
3:00 PM	157.2	95.7	89.7	94.7					
3:30 PM	157.5	94.5	89.6	94.4					
4:00 PM	157.5	93.9	89.6	93.3					
4:30 PM	154.7	90.3	89.5	91.6					
5:00 PM	154.3	89.9	89.5	91.4					
5:30 PM	153.9	89.7	89.4	91.2					
6:00 PM	153.5	89.6	89.4	91.1					
6:30 PM	153.0	88.7	89.3	90.6					LEAK TEST ACCEPTED

Pressurization Log

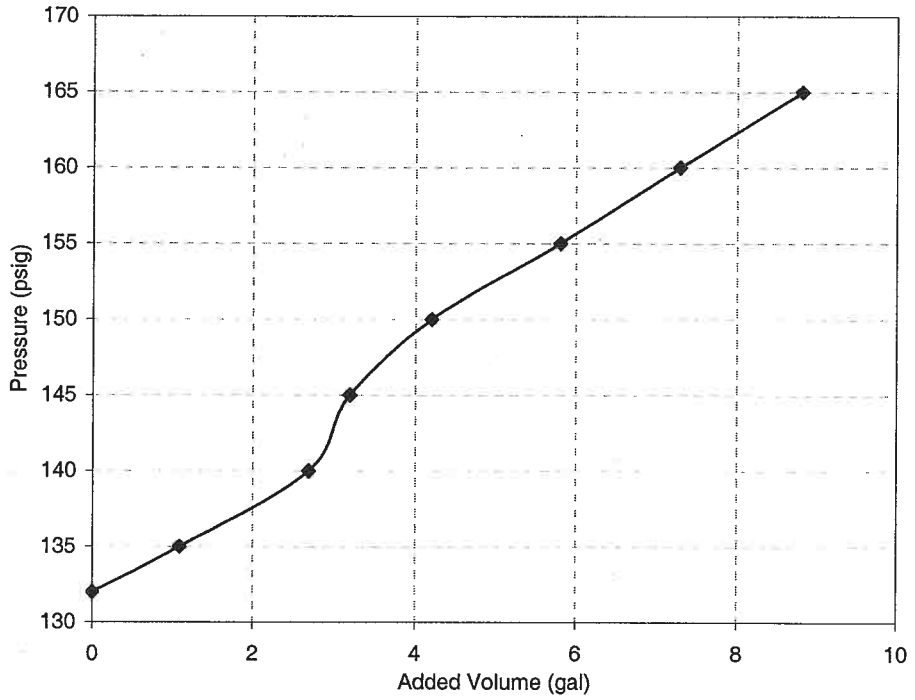
Location:	Naval Station Roosevelt Roads	**Date:**	7/11/2002
Segment Name:	Test Section No. 8 -DFM Primary	**File:**	L:\7074\18\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 08-Primary.xls]PL

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	Quantity	Unit	Value
16	0.500	315	30	345	3167	Buried Pipe Temperature	F	88.4
12	0.375	5685	5	5690	33430	Exposed Pipe Temperature	F	88.4
						Ambient Temperature	F	90.5
						Ground Temperature	F	88.4
						Start Time	hr:min	10:15
						Finish Time	hr:min	10:30

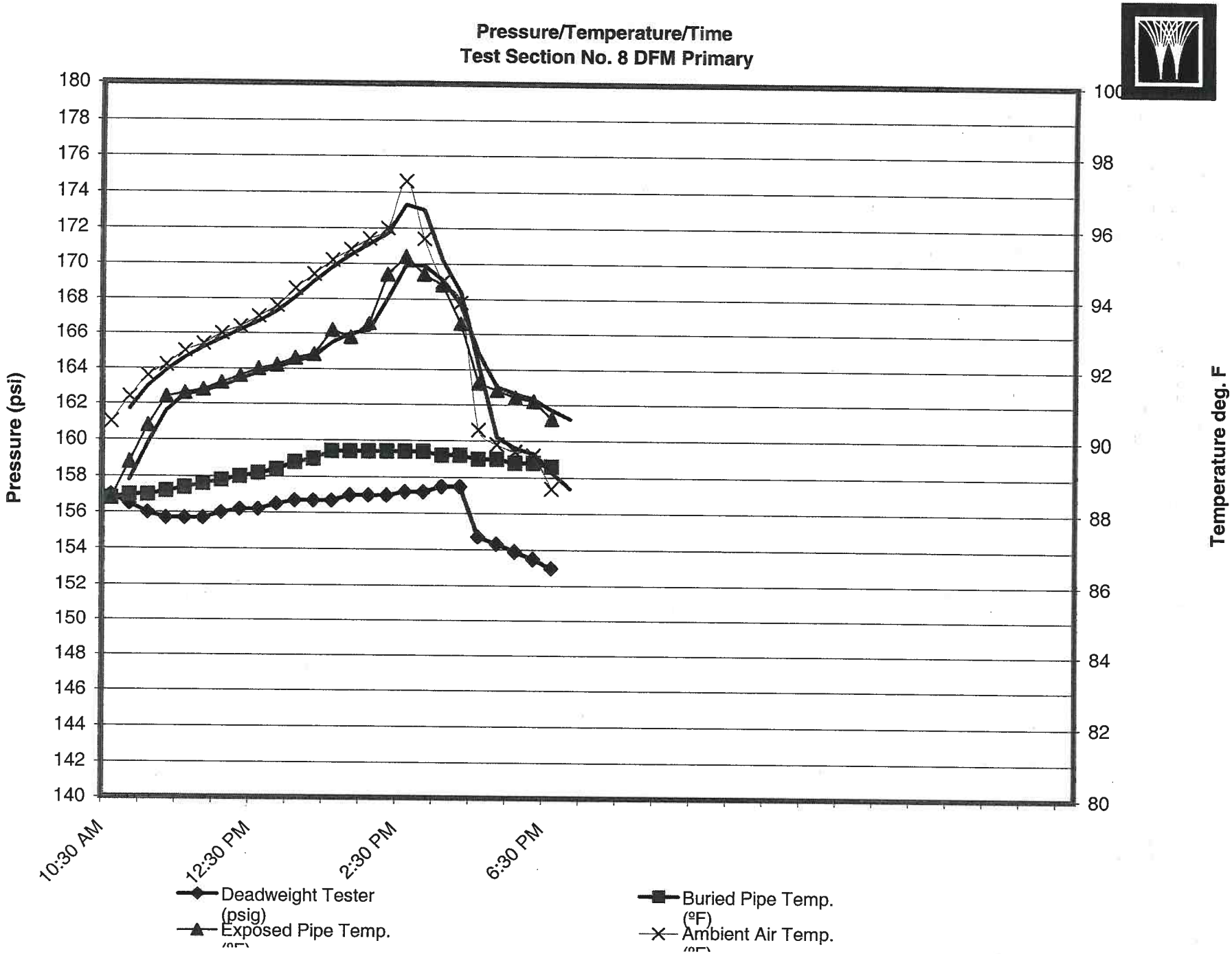
Pressurization Log

Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
132			
135	3	1.1	0.37
140	5	2.7	0.32
145	5	3.2	0.10
150	5	4.2	0.20
155	5	5.8	0.32
160	5	7.3	0.30
165	5	8.8	0.30

Pressurization Plot



Remarks


Pressure/Temperature/Time
Test Section No. 8 DFM Primary
Pressure (psi)
Temperature deg. F
180
178
176
174
172
170
168
166
164
162
160
158
156
154
152
150
148
146
144
142
140
100
98
96
94
92
90
88
86
84
82
80
10:30 AM
12:30 PM
2:30 PM
6:30 PM
Deadweight Tester (psig)
Exposed Pipe Temp. (ºF)
Buried Pipe Temp. (ºF)
Ambient Air Temp. (ºF)

Pressure Test Calculation Worksheet

Location:	Naval Station Roosevelt Roads	Date:	7/10/2002
Segment Name:	Test Section No. 8 DFM - Secondary	File:	

Segment Pipe Specification

Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft)			Volume (gal)	% Volume	
				Buried	Exposed	Total		Buried	Exposed
1	12	12.750	0.375	5950	135	6085	35751	97.8%	2.2%
Totals				5950	135	6085	35751	97.8%	2.2%

Field Data

Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	163.5	158.5	-5.0
Buried Temp.	deg F	88.5	88.5	
Exposed Temp.	deg F	93.9	89.2	-4.7
Average Temp.	deg F	88.6	88.5	-0.1
Volume Added	gal			

Pipe Data

Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data

Property	Units	Value
Fluid		DFM
Fluid Density	lb/cu.ft.	53.05
Fluid Bulk Modulus	psi	161290
Co-eff. Vol. Expansion	1/F	4.63E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	7.25E-06	-4.44E-04	1.00E-05	0.358	5.532	61.19	0.259
Totals	7.25E-06	-4.44E-04	1.00E-05	0.358	9.532	61.19	0.259

Total Unaccountable Loss = Volume Added +dV = -0.36 gal (gain)

Total Unaccountable Loss allowed by CSFM= 9.53 gal

* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Naval Station Roosevelt Roads	**Date:**	7/10/2002
Segment Name:	Test Section 8 DFM - Secondary	**File:**	L:\707418\(G) PM(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 08-Secondary.xls]STDL

Segment Pipe Specification						Signatures and Approvals
Nom. Size (in.)	w.t (in.)	Length (ft)			Volume (gal)	NFESC
		Buried	Exposed	Total		
12	0.375	5950	135	6085	35751	Project Engineer Dale A. England
						Test Engineer Dale A. England
						Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Digital Thermometer	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika 332.54 0-600	7021142	7/12/2002

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (ºF)	Buried Pipe Temp. (ºF)	Exposed Pipe Temp. (ºF)	Ground Temp. (ºF)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
9:25 AM	96.0								Start Pressuring
10:03 AM	136.0								Shut Down. Check for Leaks.
10:04 AM	136.0								Resume Pressuring
10:10 AM	162.0	89.1	87.5	90.3					START TEST
10:25 AM	161.7	90.1	87.5	90.7					
10:40 AM	161.7	90.1	87.5	91.5					Sunny
10:55 AM	161.7	90.4	87.5	91.0					
11:10 AM	161.7	90.6	87.5	91.2					
11:25 AM	161.7	90.7	87.5	91.3					
11:40 AM	161.7	90.9	87.5	91.4					
11:55 AM	161.8	91.2	87.5	91.6					
12:10 PM	161.9	91.4	87.5	91.8					
12:25 PM	162.0	91.6	87.5	91.9					
12:40 PM	162.0	91.9	87.7	92.2					
12:55 PM	162.0	92.2	87.9	92.4					
1:10 PM	162.5	92.5	88.1	92.7					
1:15 PM	162.5	92.9	88.1	92.9					
1:40 PM	163.0	93.1	88.2	93.2					
1:55 PM	163.5	93.3	88.3	93.7					
2:10 PM	163.5	92.9	88.5	93.9					START LEAK TEST
2:25 PM	163.5	93.3	88.5	94.5					
2:40 PM	163.5	93.3	88.5	94.5					
2:55 PM	163.2	94.5	88.5	94.9					
3:10 PM	163.2	95.9	88.5	95.4					
3:40 PM	163.0	97.1	88.5	96.9					
4:10 PM	162.7	93.5	88.5	94.5					
4:40 PM	161.7	93.9	88.5	93.6					
5:10 PM	160.7	92.5	88.5	91.9					
5:40 PM	158.7	90.8	88.5	90.7					
6:10 PM	158.5	89.7	88.5	89.2					TEST ACCEPTED

Pressurization Log

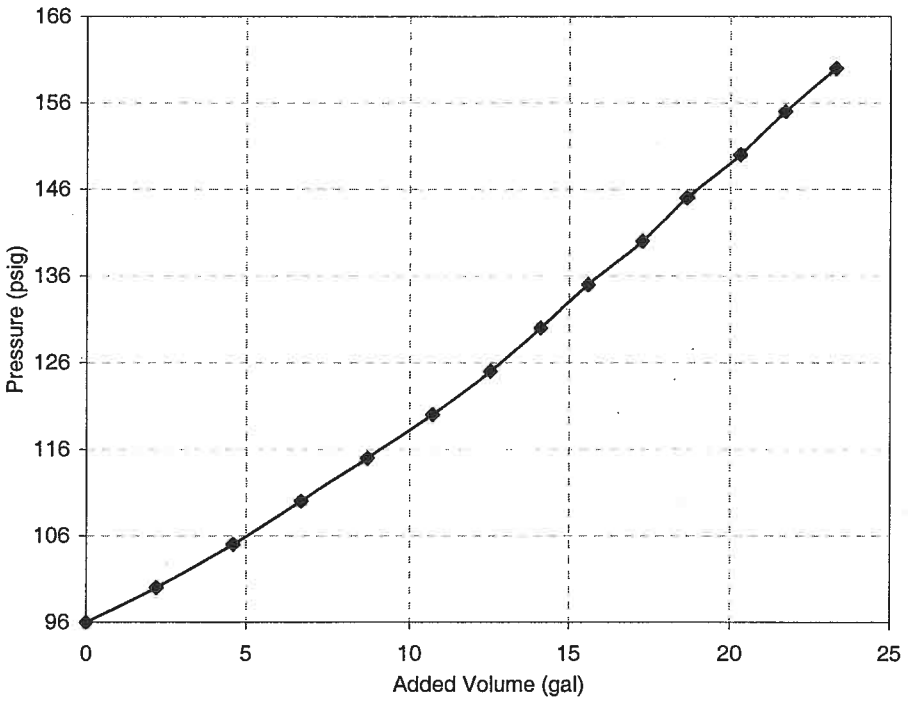
Location:	Naval Station Roosevelt Roads	**Date:**	7/10/2002
Segment Name:	Test Section No. 8 DFM - Secondary	**File:**	L:\7074\1#(0) PM\(48) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 08-Secondary.xls]SLTDL

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	Quantity	Unit	Value
12	0.375	5950	135	6085	35751	Buried Pipe Temperature	F	88.5
						Exposed Pipe Temperature	F	93.9
						Ambient Temperature	F	92.9
						Ground Temperature	F	
						Start Time	hr:min	9:25
						Finish Time	hr:min	10:10

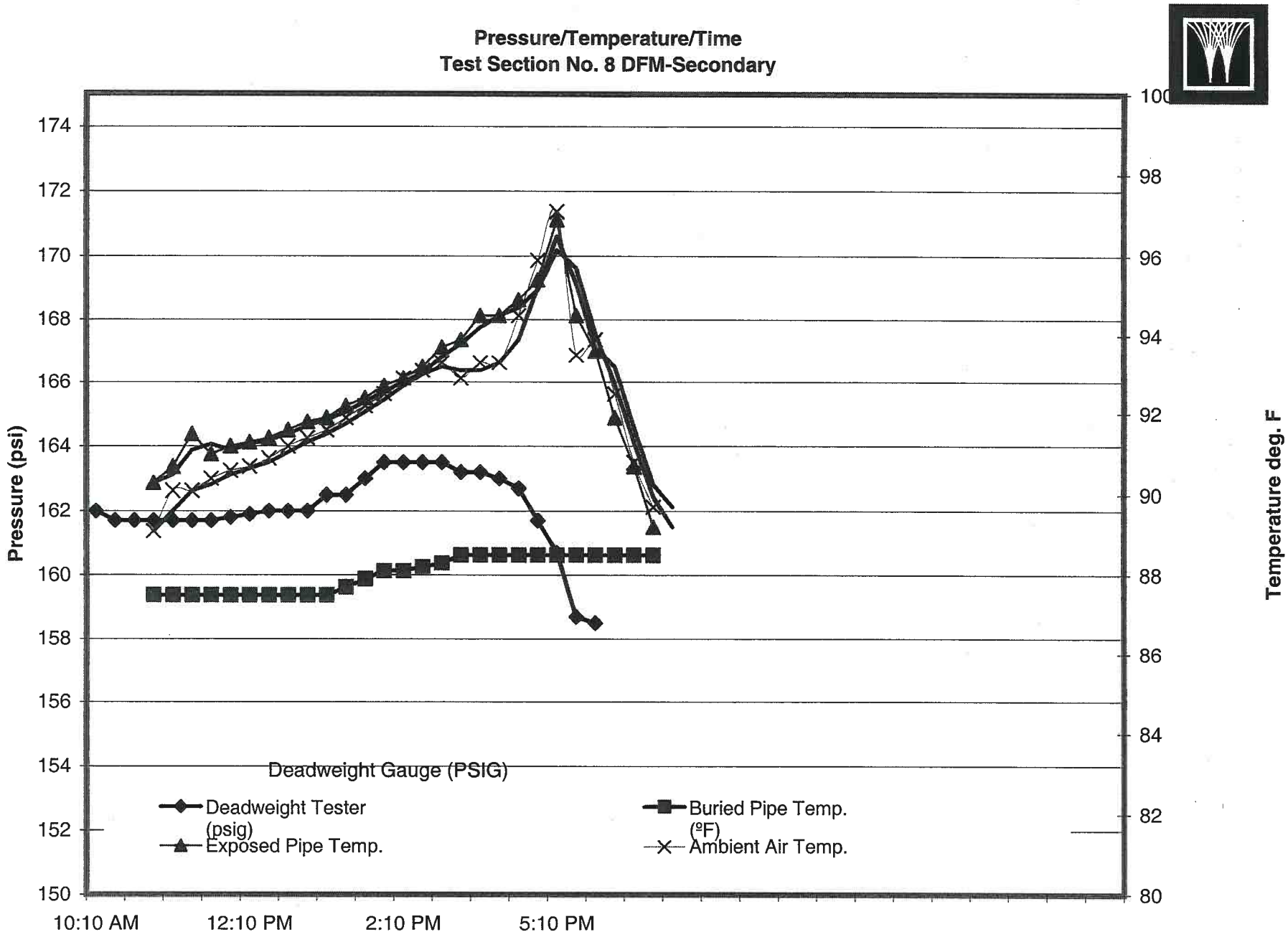
Pressurization Log

Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
96			
100	4	2.2	0.55
105	5	4.6	0.48
110	5	6.7	0.42
115	5	8.7	0.40
120	5	10.7	0.40
125	5	12.5	0.36
130	5	14.1	0.32
135	5	15.6	0.30
140	5	17.3	0.34
145	5	18.7	0.28
150	5	20.3	0.32
155	5	21.7	0.28
160	5	23.3	0.32

Pressurization Plot



Remarks


Pressure/Temperature/Time
Test Section No. 8 DFM-Secondary
Pressure (psi)
Temperature deg. F
174
172
170
168
166
164
162
160
158
156
154
152
150
100
98
96
94
92
90
88
86
84
82
80
10:10 AM
12:10 PM
2:10 PM
5:10 PM
Deadweight Gauge (PSIG)
Deadweight Tester (psig)
Exposed Pipe Temp.
Buried Pipe Temp. (ºF)
Ambient Air Temp.

Pressure Test Calculation Worksheet

Location:	Naval Station Roosevelt Roads	Date:	7/23/2002
Segment Name:	Test Section No. 9 VP #9 to PH 1982	File:	

Segment Pipe Specification

Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft) Buried	Exposed	Total	Volume (gal)	% Volume Buried	Exposed
1	12	12.750	0.322	66		66	395	1.9%	
2	12	12.750	0.375	3407	20	3427	20134	96.7%	0.6%
3	14	14.000	0.375		24	24	172		0.8%
Totals				3473	44	3517	20701	98.6%	1.4%

Field Data

Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	166.8	162.8	-4.0
Buried Temp.	deg F	90.5	90.3	-0.2
Exposed Temp.	deg F	93.5	88.3	-5.2
Average Temp.	deg F	90.5	89.4	-1.1
Volume Added	gal			

Pipe Data

Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data

Property	Units	Value
Fluid		JP-5
Fluid Density	lb/cu.ft.	52.33
Fluid Bulk Modulus	psi	217556
Co-eff. Vol. Expansion	1/F	5.00E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	5.83E-06	-4.81E-04	5.25E-04	0.207	0.061	82.45	0.002
2	5.64E-06	-4.81E-04	5.26E-04	10.593	3.115	85.12	0.114
3	5.75E-06	-4.81E-04	5.26E-04	0.090	0.024	83.51	0.001
Totals	5.65E-06	-4.76E-04	5.21E-04	10.795	7.200	85.06	0.117

Total Unaccountable Loss = Volume Added +dV = -10.80 gal (gain)

Total Unaccountable Loss allowed by CSFM= 7.20 gal

* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Naval Station Roosevelt Roads	**Date:**	7/23/2002
Segment Name:	Test Section No. 9 VP #9 to PH 1982	**File:**	L:\7074\18\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 9.xls]PTCW

Segment Pipe Specification						Signatures and Approvals
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	NFESC
12	0.322	66		66	395	Project Engineer: Dale A. England
12	0.375	3407	20	3427	20134	Test Engineer: Dale A. England
14	0.375		24	24	172	Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Digital Thermometer	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika	7021142	7/12/2002

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
8:35 AM	67.0								Start Pressuring
8:43 AM	170.0	87.7	89.0	86.4					START TEST
9:00 AM	165.7	88.1	89.3	87.1					Overcast
9:15 AM	163.5	88.4	89.6	87.7					Overcast
9:30 AM	162.0	88.8	89.6	88.4					Overcast
9:45 AM	161.8	89.9	89.7	89.5					Overcast
10:00 AM	161.8	90.5	89.9	90.0					Sunny
10:15 AM	161.8	91.1	90.0	89.3					
10:30 AM	161.8	91.7	90.0	90.0					
10:45 AM	162.0	91.4	90.1	90.3					
11:00 AM	162.2	92.5	90.2	90.2					
11:15 AM	163.5	93.4	90.2	91.7					
11:30 AM	163.8	92.7	90.3	90.7					
11:45 AM	164.8	93.9	90.3	91.7					
12:00 PM	164.8	94.5	90.3	91.8					
12:15 PM	165.5	95.6	90.4	93.1					
12:30 PM	166.5	96.0	90.4	93.5					
12:43 PM	166.8	95.3	90.5	93.5					START LEAK TEST
1:15 PM	167.8	94.9	90.5	90.7					Overcast
1:45 PM	167.8	95.5	90.4	90.8					
2:15 PM	167.8	94.5	90.4	89.5					
2:45 PM	166.8	93.4	90.4	89.5					
3:15 PM	166.0	93.3	90.3	89.6					
3:45 PM	164.8	95.1	90.3	90.6					
4:15 PM	163.8	94.7	90.3	90.5					
4:43 PM	162.8	92.5	90.3	88.3					LEAK TEST ACCEPTED

Pressurization Log

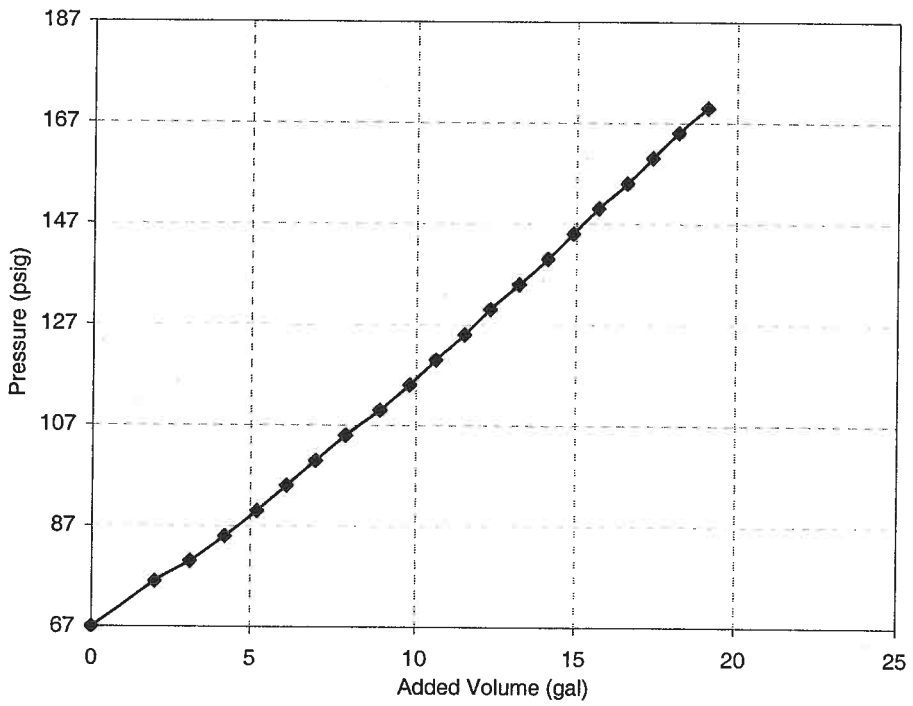
Location:	Naval Station Roosevelt Roads	**Date:**	7/23/2002
Segment Name:	Test Section No. 9 VP #9 to PH 1982	**File:**	L:\7074\18\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 9.xls]FTCW

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft)			Volume (gal)	Quantity	Unit	Value
		Buried	Exposed	Total				
12	0.322	66		66	395	Buried Pipe Temperature	F	
12	0.375	3407	20	3427	20134	Exposed Pipe Temperature	F	86.4
14	0.375		24	24	172	Ambient Temperature	F	88
						Ground Temperature	F	
						Start Time	hr:min	8:30
						Finish Time	hr:min	9:00

Pressurization Log

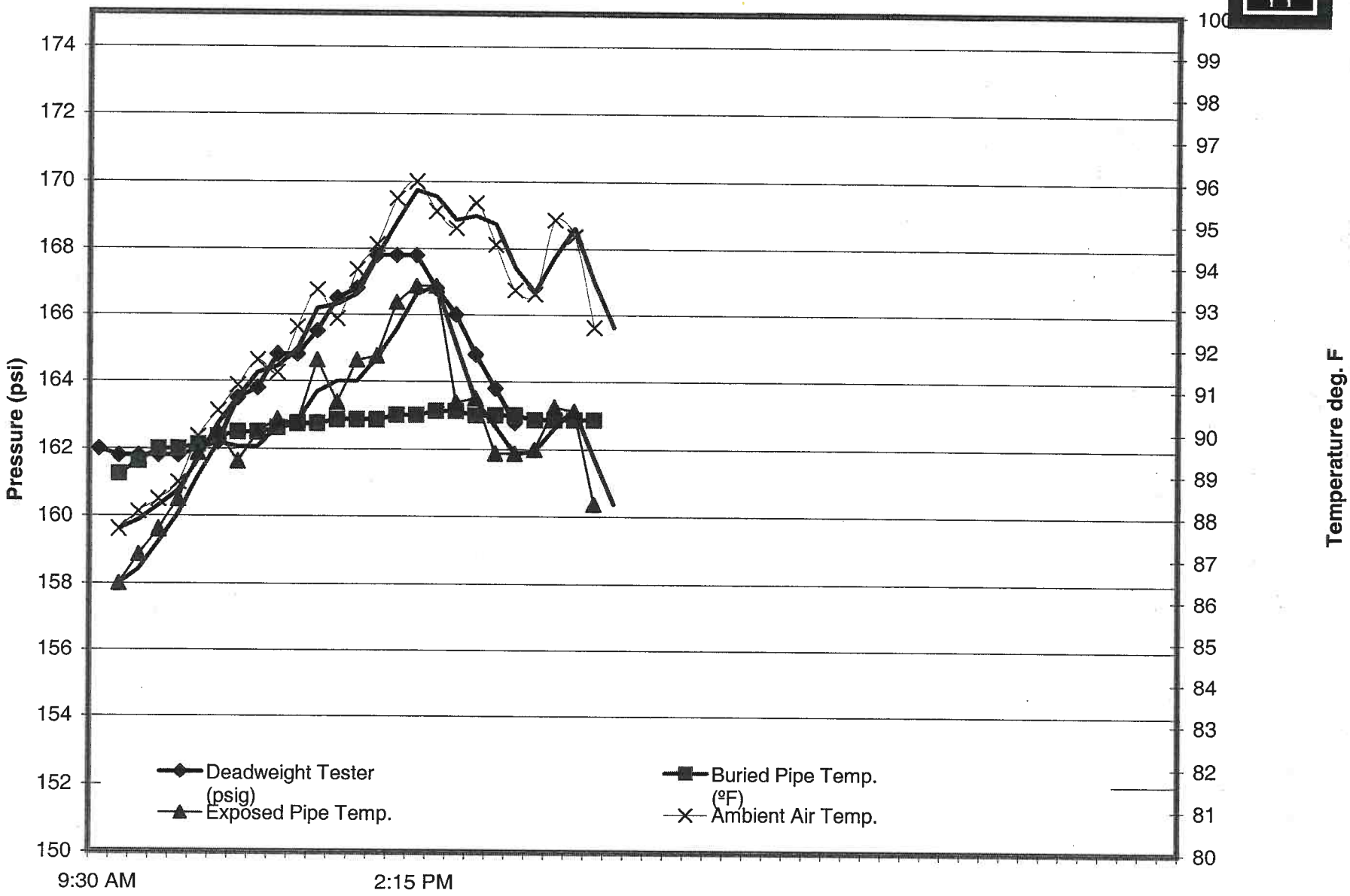
Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
67			
76	9	2.0	0.222
80	4	3.1	0.275
85	5	4.2	0.22
90	5	5.2	0.20
95	5	6.1	0.18
100	5	7.0	0.18
105	5	7.9	0.18
110	5	8.9	0.20
115	5	9.8	0.18
120	5	10.6	0.16
125	5	11.5	0.18
130	5	12.3	0.16
135	5	13.2	0.18
140	5	14.1	0.18
145	5	14.9	0.16
150	5	15.7	0.16
155	5	16.6	0.18
160	5	17.4	0.16
165	5	18.2	0.16
170	5	19.1	0.18

Pressurization Plot



Remarks

Pressure/Temperature/Time
Pressure Test Segment No. 9



Pressure Test Calculation Worksheet

Location:	Navsta Roosevelt Roads	Date:	7/10/2002
Segment Name:	Test Section No. 10 VP#9 to Airfield Filter/Separator	File:	[illegible]

Segment Pipe Specification

Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft)			Volume (gal)	% Volume	
				Buried	Exposed	Total		Buried	Exposed
1	8	8.625	0.322	6500	15	6515	16931	99.8%	0.2%
Totals				6500	15	6515	16931	99.8%	0.2%

Field Data

Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	155.0	152.0	-3.0
Buried Temp.	deg F	92.5	91.6	-0.9
Exposed Temp.	deg F	93.1	87.6	-5.5
Average Temp.	deg F	92.5	91.6	-0.9
Volume Added	gal		-0.02	-0.02

Pipe Data

Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data

Property	Units	Value
Fluid		JP-5
Fluid Density	lb/cu.ft.	52.33
Fluid Bulk Modulus	psi	217556
Co-eff. Vol. Expansion	1/F	5.00E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	5.41E-06	-4.81E-04	4.21E-04	7.133	3.939	88.84	0.092
Totals	5.41E-06	-4.81E-04	4.21E-04	7.133	7.939	88.84	0.092

Total Unaccountable Loss = Volume Added +dV = -7.15 gal (gain)

Total Unaccountable Loss allowed by CSFM= 7.94 gal

* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Navsta Roosevelt Roads	**Date:**	7/10/2002
Segment Name:	Test Section No. 10 VP #9 to Airfield Filter/Separator	**File:**	L:\5707.118\(C) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section 10.xls]PTCW

Segment Pipe Specification					
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Length (ft) Exposed	Length (ft) Total	Volume (gal)
8	0.322	6500	15	6515	16931

Signatures and Approvals

NFESC

Project Engineer: Dale A. England

Test Engineer: Dale A. England

Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Temperature Recorder	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika 332.54 0-600	8016788-2	4/2/2001

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
10:07 AM	70.0								Start Pressuring
10:14 AM	169.0	94.2	90.0	93.5					START STRENGTH TEST
10:30 AM	164.0	95.1	90.2	93.9					
10:45 AM	163.0	96.3	90.5	94.7					
11:00 AM	161.0	97.1	90.5	95.6					
11:15 AM	160.0	97.3	91.8	96.2					
11:30 AM	159.5	96.5	92.0	96.8					Sunny
11:45 AM	158.7	96.1	92.1	97.1					
12:00 PM	158.0	95.8	92.3	97.3					
12:15 PM	157.7	95.7	92.4	97.0					
12:30 PM	157.2	95.6	92.4	96.8					
12:45 PM	156.7	95.5	92.5	96.4					
1:00 PM	156.2	95.3	92.5	95.3					
1:15 PM	156.0	95.3	92.5	94.9					
1:30 PM	155.7	95.2	92.5	94.4					
1:45 PM	155.7	95.1	92.5	94.0					
2:00 PM	155.5	95.1	92.5	93.8					
2:14 PM	155.0	94.6	92.5	93.1					START LEAK TEST
2:45 PM	154.7	94.1	92.5	92.5					
3:15 PM	154.2	93.5	92.5	91.9					Leak in 1" Valve
3:45 PM	153.7	92.7	92.5	91.5					
4:15 PM	153.7	92.1	92.3	90.9					
4:45 PM	153.5	91.3	92.1	90.3					
5:15 PM	152.7	89.4	91.9	89.3					
5:45 PM	152.5	88.3	91.7	88.4					
6:14 PM	152.0	86.7	91.6	87.6			0.02		LEAK TEST ACCEPTED

Pressurization Log

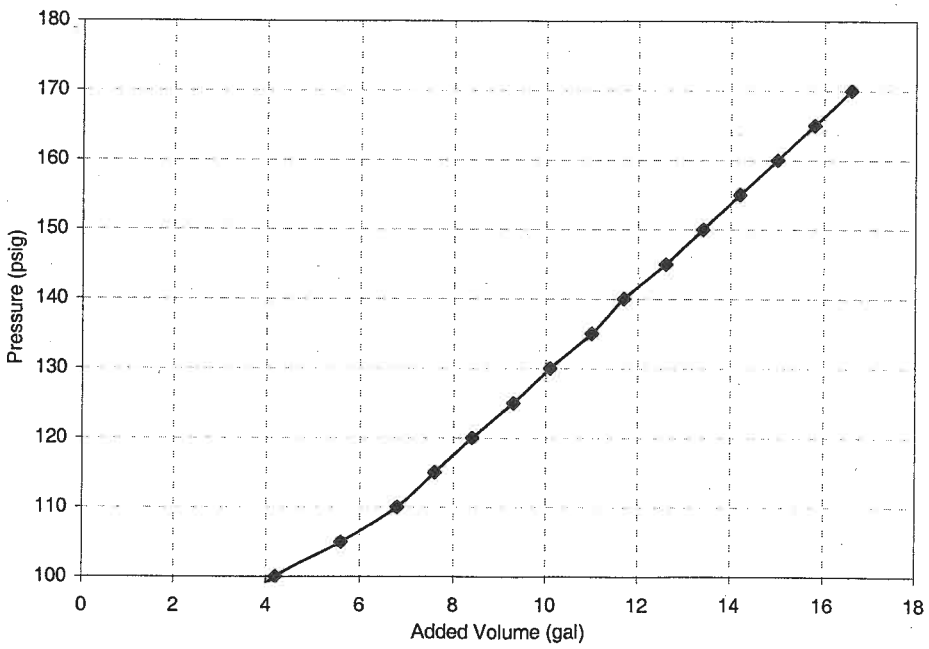
Location:	Navsta Roosevelt Roads	**Date:**	7/10/2002
Segment Name:	Test Section No. 10 VP #9 to Airfiled Filter/Separator	**File:**	L:\7074\18\(G) PM(48) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section 10.xls]PTCW

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	Quantity	Unit	Value
8	0.322	6500	15	6515	16931	Buried Pipe Temperature	F	90.5
						Exposed Pipe Temperature	F	95.6
						Ambient Temperature	F	97.1
						Ground Temperature	F	
						Start Time	hr:min	10:07
						Finish Time	hr:min	10:14

Pressurization Log

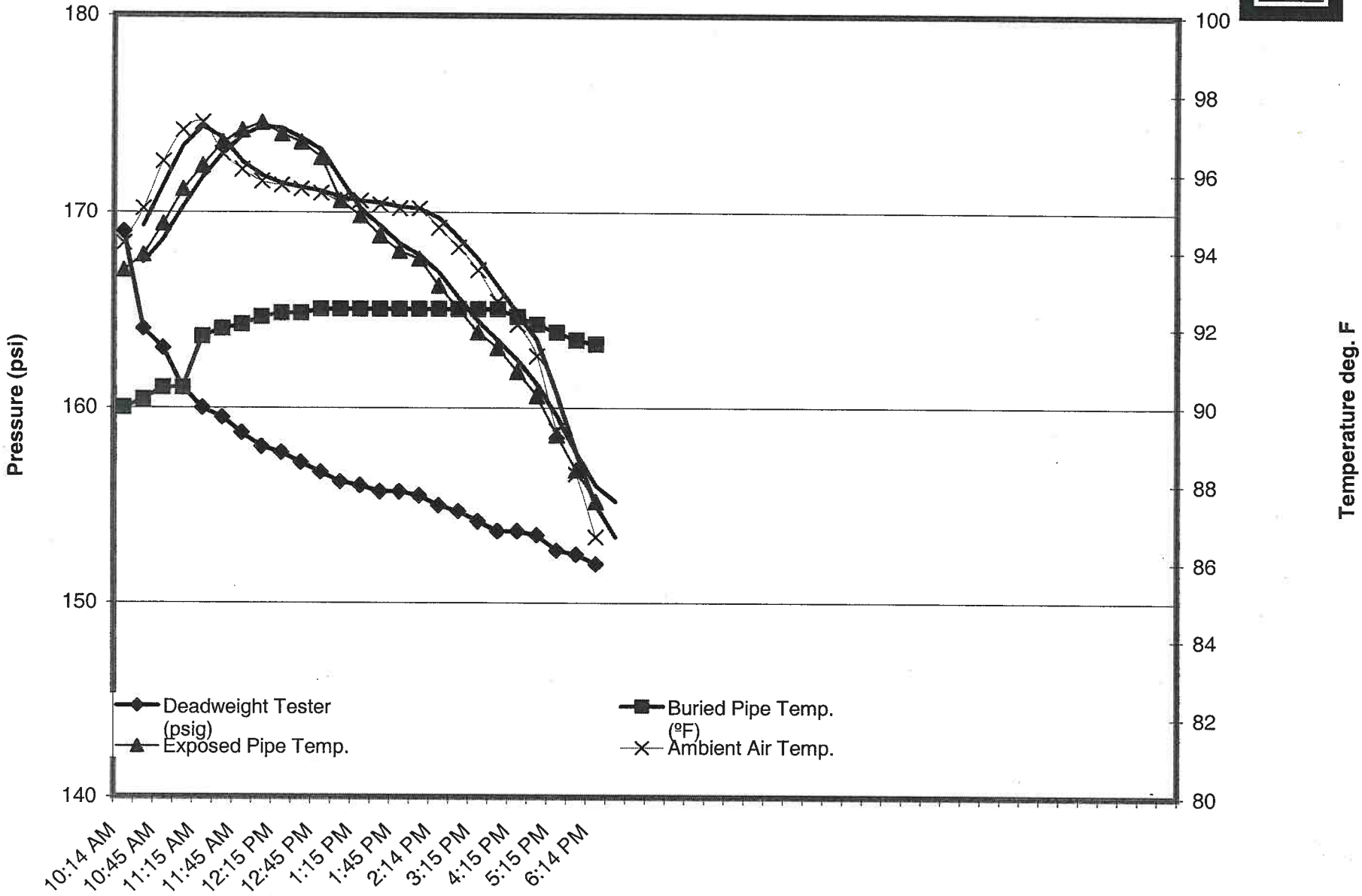
Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
70			
80	10	1.9	0.19
85	5	2.6	0.14
95	10	3.4	0.08
100	5	4.2	0.16
105	5	5.6	0.28
110	5	6.8	0.24
115	5	7.6	0.16
120	5	8.4	0.16
125	5	9.3	0.18
130	5	10.1	0.16
135	5	11.0	0.18
140	5	11.7	0.14
145	5	12.6	0.18
150	5	13.4	0.16
155	5	14.2	0.16
160	5	15.0	0.16
165	5	15.8	0.16
170	5	16.6	0.16

Pressurization Plot



Remarks

Pressure/Temperature/Time
Test Section No. 10



Pressure Test Calculation Worksheet

Location:	Navsta Roosevelt Roads	**Date:**	7/15/2002
Segment Name:	Test Section No. 12	**File:**	J:\7074\18(G) PM(48) General Reports\Puerto Rico Pressure Test Report\Appendix E\[Test Section 12.xls]SL TDL

Segment Pipe Specification									
Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft)			Volume (gal)	% Volume	
				Buried	Exposed	Total		Buried	Exposed
1	16	16.000	0.500	2245	513	2758	25318	59.1%	13.5%
2	12	12.750	0.375	1230	318	1548	9095	20.7%	5.4%
3	10	10.750	0.365		86	86	352		1.0%
4	8	8.625	0.322		27	27	70		0.2%
5	6	6.625	0.280		5	5	8		0.0%
Totals				3475	949	4424	34843	79.9%	20.1%

Field Data				
Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	179.5	168.5	-11.0
Buried Temp.	deg F	87.6	87.8	0.2
Exposed Temp.	deg F	90.3	91.9	1.6
Average Temp.	deg F	88.1	88.6	0.5
Volume Added	gal			-2.97

Pipe Data		
Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data		
Property	Units	Value
Fluid		DFM
Fluid Density	lb/cu.ft.	53.05
Fluid Bulk Modulus	psi	161290
Co-eff. Vol. Expansion	1/F	4.63E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	7.18E-06	-4.44E-04	-2.93E-04	-7.408	3.134	61.74	0.182
2	7.25E-06	-4.44E-04	-2.93E-04	-2.668	1.407	61.19	0.066
3	7.10E-06	-4.44E-04	-2.92E-04	-0.103	0.065	62.47	0.003
4	7.01E-06	-4.44E-04	-2.91E-04	-0.020	0.016	63.25	0.000
5	6.91E-06	-4.44E-04	-2.90E-04	-0.002	0.002	64.19	0.000
Totals	7.20E-06	-4.44E-04	-2.93E-04	-10.201	8.625	61.61	0.251

Total Unaccountable Loss = Volume Added +dV = 7.23 gal (gain)

Total Unaccountable Loss allowed by CSFM= 8.63 gal

* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Navsta Roosevelt Roads	**Date:**	7/15/2002
Segment Name:	Test Section No. 12	**File:**	J:\707A19(C) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section 12.xls]SLTDL

Segment Pipe Specification					
Nom. Size (in.)	w.t (in.)	Length (ft)			Volume (gal)
		Buried	Exposed	Total	
16	0.500	2245	513	2758	25318
12	0.375	1230	318	1548	9095
10	0.365		86	86	352
8	0.322		27	27	70
6	0.280		5	5	8

Signatures and Approvals

NFESC

Project Engineer: Dale A. England

Test Engineer: Dale A. England

Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Temperature Recorder	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika 332.54 0-600	8016788-2	4/2/2001

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
9:10 AM	140.0								Start Pressuring
10:05 AM	185.0	85.2	86.1	86.1					START STRENGTH TEST
10:20 AM	184.5	85.8	86.3	86.5					Overcast
10:35 AM	184.0	87.8	86.4	86.7					
10:50 AM	184.2	88.0	86.5	87.5					
11:05 AM	183.5	88.3	86.6	88.0					
11:20 AM	183.0	88.5	86.8	88.2					Sunny
11:35 AM	182.7	88.7	86.8	88.5					
11:50 AM	182.2	88.8	86.9	88.7					
12:05 PM	182.0	88.9	86.9	88.9					
12:20 PM	181.5	88.9	87.1	89.2					Sun
12:35 PM	181.0	89.4	87.1	89.4					
12:50 PM	181.0	89.9	87.3	89.6					
1:05 PM	180.7	90.2	87.4	89.9					
1:20 PM	180.2	90.3	87.5	89.9					
1:35 PM	180.2	90.8	87.5	90.1					
1:50 PM	180.0	89.8	87.5	90.1					Sun
2:05 PM	179.7	90.5	87.6	90.3					START LEAK TEST
2:35 PM	177.7	90.5	87.6	90.5					
3:05 PM	176.7	90.5	87.6	90.8					
3:35 PM	175.7	90.5	87.7	91.2					
4:05 PM	174.7	90.6	87.7	91.4					
4:35 PM	173.5	90.8	87.8	91.7					
5:05 PM	171.9	89.7	87.8	92.8					
5:35 PM	170.0	89.2	87.8	92.4					
6:05 PM	168.5	88.8	87.8	91.9			5.93		TEST ACCEPTED

Pressurization Log

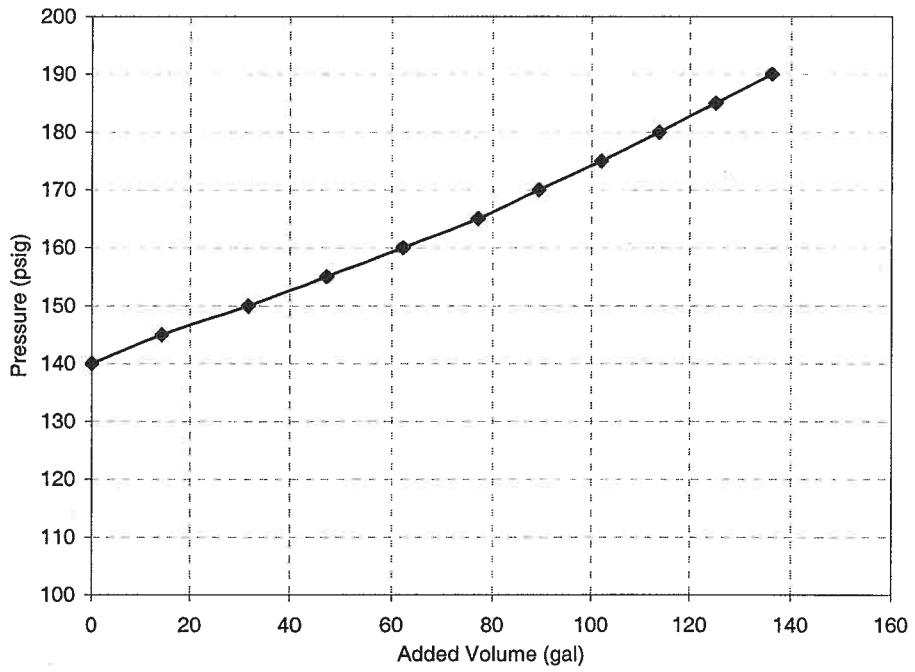
Location:	Navsta Roosevelt Roads	**Date:**	7/15/2002
Segment Name:	Test Section No. 12	**File:**	J:\7074\18\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section 12.xls]SLTDL

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	Quantity	Unit	Value
16	0.500	2245	513	2758	25318	Buried Pipe Temperature	F	86.1
12	0.375	1230	318	1548	9095	Exposed Pipe Temperature	F	86.1
10	0.365		86	86	352	Ambient Temperature	F	85.2
8	0.322		27	27	70	Ground Temperature	F	
6	0.280		5	5	8	Start Time	hr:min	9:10
						Finish Time	hr:min	10:05

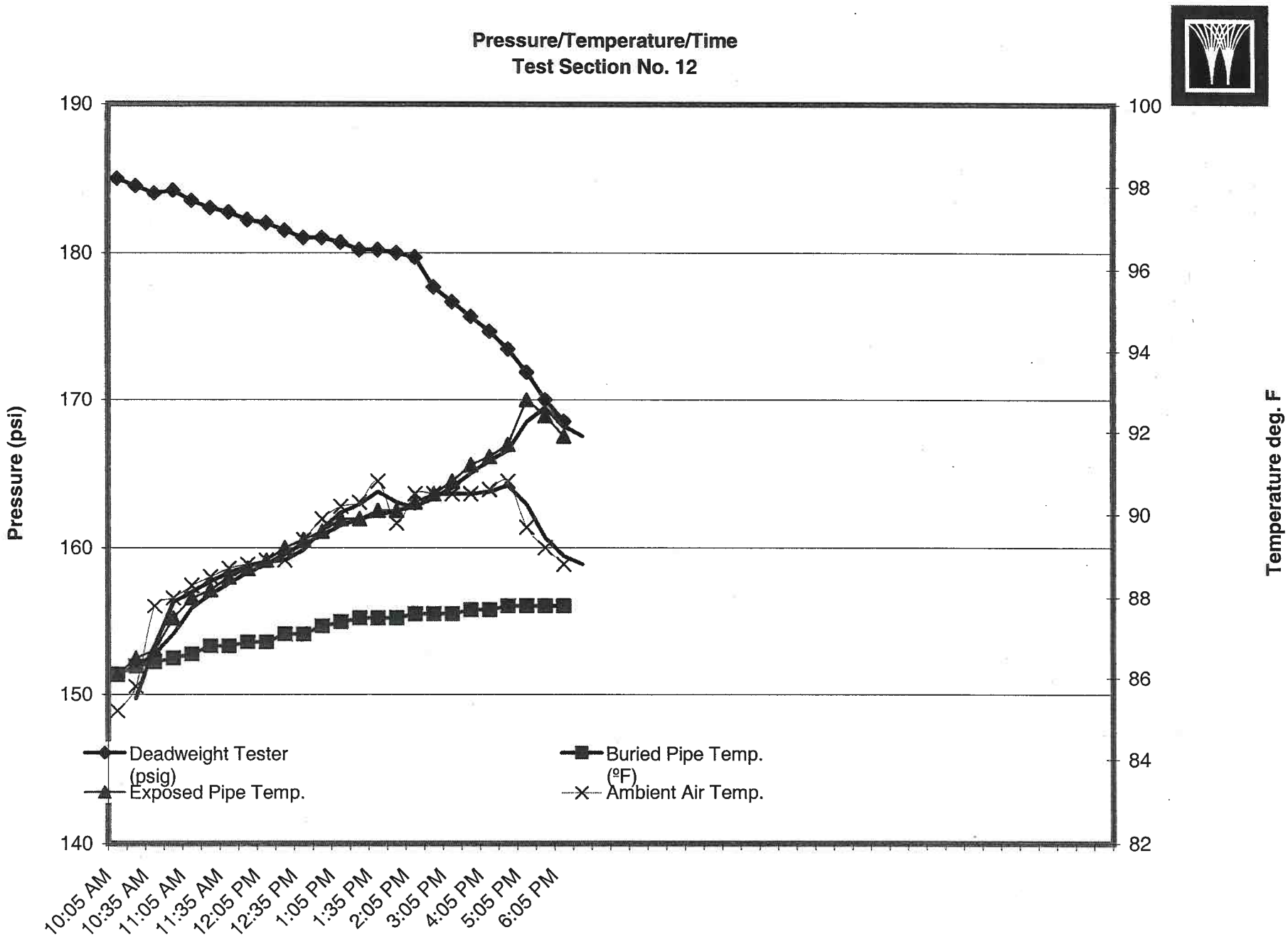
Pressurization Log

Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
140			
145	5	14.2	2.84
150	5	31.7	3.50
155	5	47.4	3.14
160	5	62.2	2.96
165	5	77.1	2.98
170	5	89.3	2.44
175	5	102.0	2.54
180	5	113.8	2.36
185	5	125.2	2.28
190	5	136.3	2.22

Pressurization Plot



Remarks


Pressure/Temperature/Time
Test Section No. 12
Pressure (psi)
190
180
170
160
150
140
Temperature deg. F
100
98
96
94
92
90
88
86
84
82
10:05 AM
10:35 AM
11:05 AM
11:35 AM
12:05 PM
12:35 PM
1:05 PM
1:35 PM
2:05 PM
3:05 PM
4:05 PM
5:05 PM
6:05 PM
Deadweight Tester (psig)
Exposed Pipe Temp.
Buried Pipe Temp. (ºF)
Ambient Air Temp.

Pressure Test Calculation Worksheet

Location:	Naval Station Roosevelt Roads	**Date:**	11/3/2002
Segment Name:	Test Section No. 13 PH 1982 to JP-5 Tank Farm	**File:**	J:\707A\18 (G) PMU(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 13-1.xls]PTCW

Segment Pipe Specification

Pipe Segment	Nominal Dia. (in.)	Outside Dia. (in.)	w.t. (in)	Length (ft)			Volume (gal)	% Volume	
				Buried	Exposed	Total		Buried	Exposed
1	12	12.750	0.322	2830	3	2833	16940	19.0%	0.0%
2	16	16.000	0.500	4666	301	4967	45597	48.1%	3.1%
3	18	18.000	0.500	2240		2240	26412	29.7%	
4	6	6.625	0.280		81	81	122		0.1%
5	3	3.500	0.216		19	19	7		0.0%
Totals				9736	404	10140	89078	96.7%	3.3%

Field Data

Property	Unit	Initial Value	Final Value	Change
Time	hr		4	4.0
Pressure	psig	212.0	188.0	-24.0
Buried Temp.	deg F	86.1	86.1	
Exposed Temp.	deg F	84.1	87.3	3.2
Average Temp.	deg F	86.0	86.1	0.1
Volume Added	gal			-2.25

Pipe Data

Property	Units	Value
Material		Carbon Steel
Youngs Modulus	psi	2.90E+07
Poissons Ratio		0.3
Co-eff. Thermal Expansion	1/F	6.50E-06

Fluid Data

Property	Units	Value
Fluid		JP-5
Fluid Density	lb/cu.ft.	52.33
Fluid Bulk Modulus	psi	217556
Co-eff. Vol. Expansion	1/F	5.00E-04

Pipe Segment	Kp	Kt	dV/V	dV (gal)	Allow* (gal)	dP/dT (psi/F)	dV/dP (gal/psi)
1	5.83E-06	-4.81E-04	-1.90E-04	-3.220	2.598	82.45	0.099
2	5.58E-06	-4.81E-04	-1.84E-04	-8.396	5.644	86.12	0.254
3	5.71E-06	-4.81E-04	-1.87E-04	-4.946	2.885	84.15	0.151
4	5.31E-06	-4.81E-04	-1.78E-04	-0.022	0.037	90.56	0.001
5	5.06E-06	-4.81E-04	-1.72E-04	-0.001	0.004	94.93	0.000
Totals	5.66E-06	-4.81E-04	-1.86E-04	-16.569	15.169	84.84	0.504

Total Unaccountable Loss = Volume Added +dV = 14.32 gal (gain)

Total Unaccountable Loss allowed by CSFM= 15.17 gal

* Sum includes an additional 1 gal/hr (of testing) allowance

Strength and Leak Test Data Log

Location:	Naval Station Roosevelt Roads	Date:	11/3/2002
Segment Name:	Test Section No. 13 PH 1982 to JP-5 Tank Farm	File:	L:\7074\18\(G) PM\(48) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 04.xls]PTCW

Segment Pipe Specification					
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)
12	0.322	2830	3	2833	16940
16	0.500	4666	301	4967	45597
18	0.500	2240		2240	26412
6	0.280		81	81	122
3	0.216		19	19	7

Signatures and Approvals

NFESC

Project Engineer: Dale A. England

Test Engineer: Dale A. England

Test Engineer

Equipment Calibration Data	Manufacturer/Model No.	Serial No.	Calibration Date
Deadweight Tester	Chandler Engineering / 23-1	25005	4/10/2001
Pressure Recorder	Dickson / PR8100PB24S	8114532	4/2/2001
Digital Thermometer	Fluke 52	7021142	4/2/2001
Pressure Gauge	Wika	7021142	7/12/2002

Test Data

Time	Deadweight Tester (psig)	Ambient Air Temp. (°F)	Buried Pipe Temp. (°F)	Exposed Pipe Temp. (°F)	Ground Temp. (°F)	Volume Added (gal)	Volume Removed (gal)	Gauge Pressure (psig)	Remarks (weather conditions or test activities)
6:20 AM	67.0								Start Pressuring
7:50 AM	224.0	81.2	81.2	81.7					START TEST
8:00 AM	222.0	82.3	81.3	81.7					Overcast
8:15 AM	219.0	82.4	81.4	81.9					Overcast
8:30 AM	215.0	82.4	81.5	81.9					
8:45 AM	213.0	83.5	81.7	82.3					
9:00 AM	210.0	83.7	81.9	82.3					
9:15 AM	209.0	83.7	81.9	82.5					
9:30 AM	207.0	84.7	82.1	82.9					
9:45 AM	205.0	85.1	82.4	83.1					
10:00 AM	204.0	85.1	82.5	83.3		10.9			Repressure
10:01 AM	220.0	85.1	82.5	83.5					
10:15 AM	219.0	85.7	82.7	83.3					
10:30 AM	218.0	85.0	82.9	83.5					
10:45 AM	217.0	86.2	83.0	83.3					Overcast
11:00 AM	215.0	85.6	83.3	83.3					
11:15 AM	214.0	86.2	83.4	83.7					
11:30 AM	213.0	86.3	83.5	84.1					
11:45 AM	212.0	85.5	83.8	84.1					
11:50 AM	212.0	85.6	83.9	84.1					START LEAK TEST
12:20 PM	207.0	89.4	85.9	87.0					
12:50 PM	204.0	88.3	85.5	86.5					
1:10 PM	202.0	86.6	86.3	86.5					
1:40 PM	197.0	86.6	87.7	86.5					
2:20 PM	193.0	88.0	88.3	87.2					
2:32 PM	192.0	88.1	88.7	87.2		5.5			Repressure
2:33 PM	200.0	87.9	88.7	87.2					
2:50 PM	196.0	87.9	89.0	87.3					
3:20 PM	192.0	86.0	89.2	87.5					
3:50 PM	188.0	86.1	89.5	87.3					LEAK TEST ACCEPTED

Pressurization Log

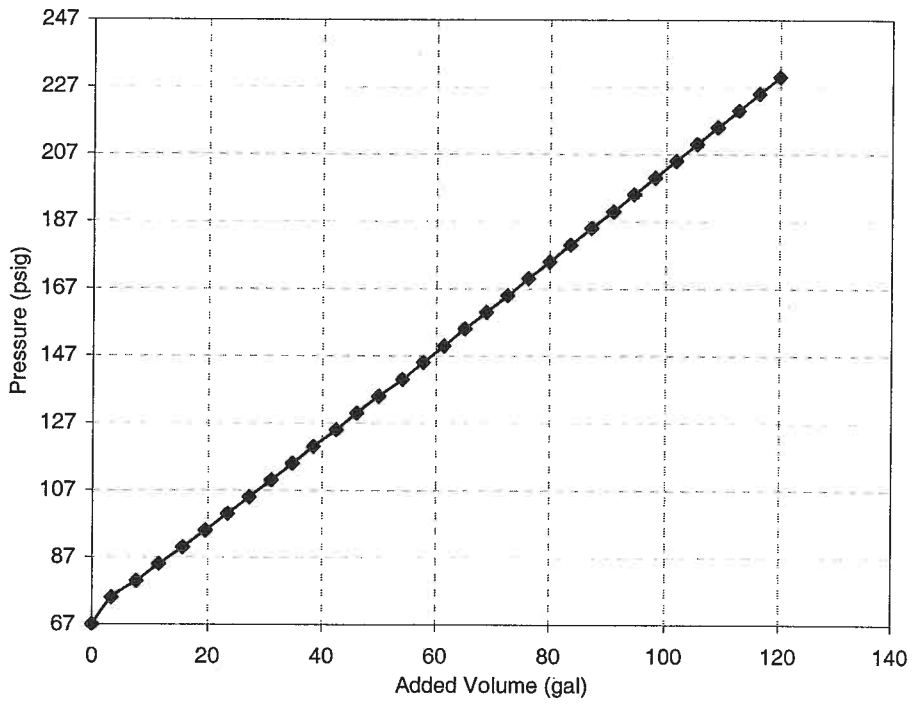
Location:	Naval Station Roosevelt Roads	**Date:**	11/3/2002
Segment Name:	Test Section No. 13 PH 1982 to JP-5 Tank Farm	**File:**	L:\70741\8\(G) PM\(49) General Reports\Puerto Rico Pressure Test Report\Appendix C\[Test Section No. 04.xls]PTCW

Segment Pipe Specification						Conditions for Pressurization		
Nom. Size (in.)	w.t (in.)	Length (ft) Buried	Exposed	Total	Volume (gal)	Quantity	Unit	Value
12	0.322	2830	3	2833	16940	Buried Pipe Temperature	F	81.2
16	0.500	4666	301	4967	45597	Exposed Pipe Temperature	F	81.7
18	0.500	2240		2240	26412	Ambient Temperature	F	81.2
6	0.280		81	81	122	Ground Temperature	F	
3	0.216		19	19	7	Start Time	hr:min	6:20
						Finish Time	hr:min	7:45

Pressurization Log

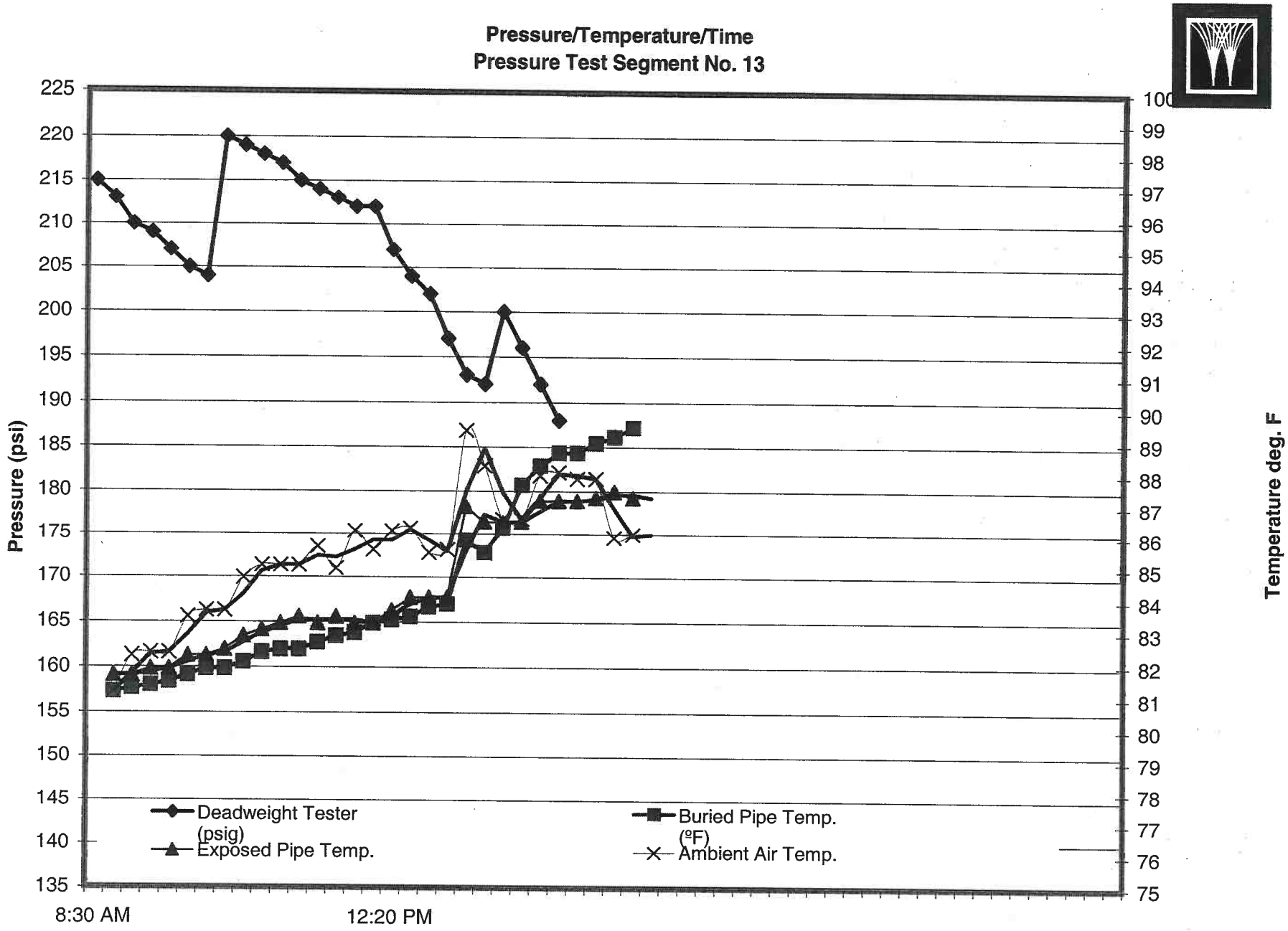
Deadwt. Tester (psig)	Change in Pressure (psi)	Volume Metered (gal)	dV/dP (gal/psi)
67			
75	8	3.4	0.43
80	5	7.7	0.86
85	5	11.6	0.78
90	5	15.7	0.82
95	5	19.6	0.78
100	5	23.4	0.76
105	5	27.2	0.76
110	5	31.0	0.76
115	5	34.7	0.74
120	5	38.4	0.74
125	5	42.4	0.80
130	5	46.0	0.72
135	5	49.8	0.76
140	5	54.0	0.84
145	5	57.7	0.74
150	5	61.4	0.74
155	5	65.1	0.74
160	5	68.8	0.74
165	5	72.5	0.74
170	5	76.2	0.74
175	5	79.9	0.74
180	5	83.6	0.74
185	5	87.2	0.72
190	5	90.9	0.74
195	5	94.5	0.72
200	5	98.1	0.72
205	5	101.8	0.74
210	5	105.4	0.72
215	5	109.1	0.74
220	5	112.7	0.72
225	5	116.3	0.72
230	5	119.9	0.72

Pressurization Plot



Remarks

At 6:20 A.M., start pressuring with 67 PSIG. At 7:45 A.M., end pressuring with 230 PSIG.


Pressure/Temperature/Time
Pressure Test Segment No. 13
Pressure (psi)
Temperature deg. F
225
220
215
210
205
200
195
190
185
180
175
170
165
160
155
150
145
140
135
100
99
98
97
96
95
94
93
92
91
90
89
88
87
86
85
84
83
82
81
80
79
78
77
76
75
8:30 AM
12:20 PM
Deadweight Tester (psig)
Exposed Pipe Temp.
Buried Pipe Temp. (ºF)
Ambient Air Temp.

Appendix D – Test Equipment Calibration Certificates

SCI

Standard Calibrations, Inc.

Electronic & Pneumatic Control System Specialist

Certificate of Calibration

For Instrument EG&G CHANDLER ENG. **Model** 23-1 **Serial Number** 25005

Description DEAD WEIGHT TESTER

Customer	OCSF	**ID Number**	053342	**Asset #**	
P.O. #	VISA	**Job ID**	12838-03	**Cert #**	053342:986892203
Notes					

Standard Calibrations, Inc. hereby certifies that...
the above described instrument was tested in accordance with all published specifications at the time of calibration specified below. Using standards whose accuracies are traceable to the National Institute of Standards and Technology (NIST) within the limitations of the Institute's calibration services, or have been derived from accepted values or physical constants, or have been derived by ratio or self calibration techniques. All calibration activities performed are in compliance with MIL-STD-45662A; ANSI/Z540-1-1994 and ISO 9002.

CALIBRATION INFORMATION

Received	**Cal Date**	04/10/01	**Temperature**	70.00°F	
INOPERATIVE	**Cal Due**	04/10/03	**Humidity**	50.00 %	
	Pass	Y	**Tech**	7	
	Cal Procedure	OOL			

Notes OOL CAL

STANDARDS USED FOR CALIBRATION

Asset	Mfg	Mod.	Description	Calibration Date	Due Date

Approved By: Michael Burton

Title Calibration Coordinator

SCI Chesapeake, VA 23320 Office 757-549-6534 Fax 757-549-0666
www.standardcal.com

File: rtcert01.rpt

CHANDLER ENGINEERING

ISO 9001 CERTIFIED

HYDRAULIC DEADWEIGHT TEST CERTIFICATE - 0.05% ACCURACY

Customer: STANDARD CALIBRATION
Address: 908 A VENTURES WAY
City, State, Country: CHESAPEAKE, VA
Sales Order Number: RA5833
Customer Order Number: N/A

Certificate Number: 10144
Calibration Date: April 10, 2001
Reference Temperature: 70° F

Calibration Procedure: MTE-2001

CALIBRATION STANDARDS					
Identification Number	Manufacturer	Description	Model Number	Serial Number	Exp. Date
620-051	Sartorius	Balance	1602	3310020	06/20/01
620-052	Sartorius	Balance	E55005	37010015	06/20/01
620-053	Sartorius	Balance	3862	3210003	06/20/01
620-055	Chandler Engineering	MFG. Transfer Standard	15-0006	620-055	03/16/02

Chandler Engineering certifies that the instrument listed below has been tested, calibrated (if necessary), and meets the criteria established in the referenced procedure. The standards used are traceable to the National Institute of Standards and Technology.

DWT Type: 23-001
Serial No: 25005
Press. Range: 5/1,000

Reference Height (in/cm): 3.17/7.9
Crossfloat Pressure (psi): 500.00
Gravity (cm/sec²): 980.665

Total Mass (grams): 6273.6
Calculated Piston Area (in²): 0.027662
Calculated Piston Area (cm²): 0.178456

Nominal Pressure (grams)	Bottom Tolerance	Top Tolerance	Mass Before Adj. (grams)	Pass/Fail (P/F)	Mass After Adj. (grams)	Pass/Fail (P/F)	Calculated Pressure (kPa)	Calculated Pressure (BAR)	Calculated Pressure (psi)
100A	1,254.2	1,254.6	1,254.5	P	1,254.5	P	689.35	6.89	99.98
100B	1,254.2	1,254.6	1,254.6	P	1,254.6	P	689.41	6.89	99.99
100C	1,254.2	1,254.6	1,254.5	P	1,254.5	P	689.35	6.89	99.98
100D	1,254.2	1,254.6	1,254.6	P	1,254.6	P	689.41	6.89	99.99
100E	1,254.2	1,254.6	1,254.6	P	1,254.6	P	689.41	6.89	99.99
100F	1,254.2	1,254.6	1,254.6	P	1,254.6	P	689.41	6.89	99.99
100G	1,254.2	1,254.6	1,254.5	P	1,254.5	P	689.35	6.89	99.98
100H	1,254.2	1,254.6	1,254.6	P	1,254.6	P	689.41	6.89	99.99
100I	1,254.2	1,254.6	1,254.6	P	1,254.6	P	689.41	6.89	99.99
20A	250.84	250.93	250.92	P	250.92	P	137.88	1.38	20.00
20B	250.84	250.93	250.93	P	250.93	P	137.89	1.38	20.00
20C	250.84	250.93	250.84	P	250.84	P	137.84	1.38	19.99
20D	250.84	250.93	250.91	P	250.91	P	137.88	1.38	20.00
10	125.42	125.46	125.45	P	125.45	P	68.94	0.69	10.00
5	62.708	62.733	62.719	P	62.719	P	34.46	0.34	5.00
2A	25.084	25.093	25.084	P	25.084	P	13.78	0.14	2.00
2B	25.084	25.093	25.084	P	25.084	P	13.78	0.14	2.00
1	12.542	12.546	12.543	P	12.543	P	6.89	0.07	1.00
Table Weight	62.708	62.733	62.718	P	62.718	P	34.46	0.34	5.00
Total Mass	6,267.0	6,277.0	6,273.6	P	6,273.6	P	3,447.38	34.47	500.00

Certified By:

CHANDLER ENGINEERING COMPANY L.L.C.
2001 N. INDIANWOOD AVE., BROKEN ARROW, OK 74012 USA
PHONE: (918) 250-7200 FAX: (918) 459-0185 www.chandlereng.com
e-mail address: chandler@chandlereng.com

MTE-3013a

Page 1 of 1

SCI

Standard Calibrations, Inc.

Electronic & Pneumatic Control System Specialist

Certificate of Calibration

For Instrument DICKSON **Model** PR8100PB24S **Serial Number** 8114532

Description PRESS. CHART RECORDER

Customer	OCSF	**ID Number**	11461-01	**Asset #**	
P.O. #	VISA	**Job ID**	12838-05	**Cert #**	10530-02:986244987
Notes					

Standard Calibrations, Inc. hereby certifies that...
the above described instrument was tested in accordance with all published specifications at the time of calibration specified below. Using standards whose accuracies are traceable to the National Institute of Standards and Technology (NIST) within the limitations of the Institute's calibration services, or have been derived from accepted values or physical constants, or have been derived by ratio or self calibration techniques. All calibration activities performed are in compliance with MIL-STD-45662A; ANSI/Z540-1-1994 and ISO 9002.

CALIBRATION INFORMATION

Received	**Cal Date**	04/02/01	**Temperature**	70.00°F	
IN TOLERANCE	**Cal Due**	10/02/01	**Humidity**	40.00 %	
	Pass	Y	**Tech**	4	
	Cal Procedure	17-20MP-06			

Notes

STANDARDS USED FOR CALIBRATION

Asset	Mfg	Mod.	Description	Calibration Date	Due Date
SC094	USG	NA	GA 1500PSI	10/16/2000	10/16/2001

Approved By: Michael R Butler

Title Calibration Coordinator

SCI Chesapeake, VA 23320 Office 757-549-6534 Fax 757-549-0666
www.standardcal.com

File: rlcert01.rpt

SCI

Standard Calibrations, Inc.

Electronic & Pneumatic Control System Specialist

Certificate of Calibration

For Instrument FLUKE **Model** 52 **Serial Number** 7021142

Description DMM

Customer	OCSF	**ID Number**	053340	**Asset #**	
P.O. #	VISA	**Job ID**	12838-01	**Cert #**	053340:986245606
Notes					

Standard Calibrations, Inc. hereby certifies that...
the above described instrument was tested in accordance with all published specifications at the time of calibration specified below. Using standards whose accuracies are traceable to the National Institute of Standards and Technology (NIST) within the limitations of the Institute's calibration services, or have been derived from accepted values or physical constants, or have been derived by ratio or self calibration techniques. All calibration activities performed are in compliance with MIL-STD-45662A; ANSI/Z540-1-1994 and ISO 9002.

CALIBRATION INFORMATION

Received	**Cal Date**	04/02/01	**Temperature**	70.00°F
IN TOLERANCE	**Cal Due**	04/02/02	**Humidity**	40.00 %
	Pass	Y	**Tech**	4
	Cal Procedure	17-20ST-132		

Notes

STANDARDS USED FOR CALIBRATION

Asset	Mfg	Mod.	Description	Calibration Date	Due Date
S628	FLUKE	5500A	CALIBRATOR	04/20/2000	04/20/2001
SC030	COLE PARMER	PSYCHRO-DYNE	ELECTRIC PSYCHROMETER	12/18/2000	12/18/2001

Approved By: Michael Burba

Title Calibration Coordinator

SCI Chesapeake, VA 23320 Office 757-549-6534 Fax 757-549-0666
www.standardcal.com

File: rtcert01.rpt

CALIBRATION CERTIFICATE

THERMOMETERS — KESSLER — HYDROMETERS

Mailing Address
P.O. Box 640 • Westbury, NY 11590
Plant Address
160 Hicks Street • Westbury, NY 11590
Website
http://www.kessler.thomasregister.com

KESSLER INSTRUMENTS, INC.
CALIBRATION SERVICES

Telephone
516-334-4063
Facsimile
516-334-2689
E-mail
KesslerUSA@aol.com

This is to certify that the instrument listed below has been certified in our calibration laboratory using the most sensitive constant temperature equipment available. This calibration has been performed against National Institute for Standards and Technology (formerly NBS) certified master instruments in accordance with the procedures outlined by ASTM E77-98 and NIST (NBS) special publication 250-23, Liquid-in-glass Thermometer Calibration Services. This calibration meets all requirements of ISO 9000.

TESTED FOR: WORLEY INT'L IN — ISO 9002 CERTIFIED CALIBRATION PERFORMED

THERMOMETER CAT# 1256-C ASTM 59F RANGE: 0/180F DIVISIONS: 1 DEG IMMERSION: TTL
Instrument serial number: 407192 Date certified: 04-19-2001
Marked: KESSLER RECALIBRATION RECOMMENDED 1 YEAR FROM ABOVE DATE

POINT(S) TESTED	READING OF THIS INSTRUMENT	CORRECTION
32.0F	32.0F	0.0F
80.0F	79.9F	0.1F
130.0F	129.7F	0.3F
180.0F	179.8F	0.2F

IF NO SIGN IS GIVEN ON THE CORRECTION, THE TRUE READING IS HIGHER THAN THE INDICATED READING.
IF THE SIGN GIVEN IS NEGATIVE, THE TRUE READING IS LOWER THAN THE INDICATED READING.
THE ABOVE READINGS WERE MADE UNDER 10X MAGNIFICATION AND RESOLVED TO THE NEAREST 0.1F
ESTIMATED UNCERTAINTIES IN THE ABOVE CORRECTIONS DO NOT EXCEED +/- 0.2F
FOR A DISCUSSION OF ACCURACIES ATTAINABLE WITH SUCH THERMOMETERS SEE NIST (NBS) SPECIAL PUBLICATION 250-23.
ALL TEMPERATURES IN THIS REPORT ARE BASED ON THE INTERNATIONAL TEMPERATURE SCALE OF 1990 (ITS-90)
PLEASE REFER TO ATTACHED SHEET FOR PROPER USAGE OF THIS THERMOMETER REGARDING IMMERSION.

SERIAL AND TEST NUMBERS OF KESSLER MADE, NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY CERTIFIED LIQUID-IN-GLASS THERMOMETERS REFERENCED IN CERTIFICATION OF THE INSTRUMENT LISTED ABOVE: (SHOWN AS STANDARD#,TEST#)

769543,217368 859417,259412-98 791544,220391 793592,236418

CALIBRATION TECHNICIAN: Barbara Plaza

KESSLER INSTRUMENTS, INC.

Ania Watala
Quality Control Manager
AW/AW

CERTIFIED

Test number 37819
Date completed:04-19-2001

Distributed by: KESSLER INC. OF TEXAS, 7135 W. Tidwell, Houston TX 77092
Phone (713) 895-8188 Fax (713) 895-8788

Appendix E – Equipment and Materials List

Equipment

Equipment	Supplier	Equipment	Supplier
Dead Weight Tester	NFESC	Fuel Bowser	Fuels
110v/220v Power Supply	NAVSTA RR	Clip Board	NFESC
Chart Recorder	NFESC	Misc. Fittings and Tools	NFESC
Pressure Pump	NFESC	Pipeline Locator	NFESC
Safety Gear	Individuals	Flexible Hose	NFESC
Thermometer (ambient)	NFESC	Thermocouples	NFESC
Pressure Gauges	NFESC	UT Measure	NFESC
Wheel and Tape Measure	NFESC	Generator	Worley

Expendables

Item	Supplier	Item	Supplier
POL Absorbent pads	NAVSTA RR	Gloves	NFESC
Office Supplies	NFESC	Safety Glasses	NFESC

NFESC Equipment Inventory

Inv ID	Component	Qty	Unit	Serial No.	Type
2	Metal Storage Box (Dayton)	1	Each		Support
3	Chair, Wooden Folding	1	Each		Support
5	Utility Bag (green)	1	Each		Support
6	Flash Light (6 Volt)	1	Each		Support
10	Bushings, 3/4-inch X 1/2-inch	14	Each	44244S	Fitting
11	Cup Measure	1	Each		Support
12	Tarp 5'X7'	2	Each		Support
13	Tape Measure - 100'	1	Each		Support
14	Hammer, 16 OZ	1	Each		Support
16	Pipe Nipple, 2-inch x 3-inch	1	Each	P/N: 62-6234	Fitting
17	Pipe Nipple, 2-inch x 6-inch	2	Each	P/N: 62-6283	Fitting

Inv ID	Component	Qty	Unit	Serial No.	Type
18	Plug, 1/2-inch	3	Each	P/N: 62-7364	Fitting
19	Caution Sign	1	Each		Support
20	Valve, ball 1/2-inch	2	Each		Fitting
21	Camlock Fitting 1-1/2-inch	3	Each		Fitting
22	Camlock Fitting 1-inch	3	Each		Fitting
23	Pressure Chart Recorder Model PR8111PB24S	1	Each	S/N: 8114532	Test
24	Valve, ball 1/4-inch	7	Each		Fitting
25	Pipe Wrench 8-inch	1	Each		Support
26	Flow Meter Model 548.400.DU53	1	Each	S/N: 9810154	Test
27	High Pressure Pump	1	Each		Support
28	Dead Weight Tester Model 23-001-J-B-T	1	Each	S/N: 25005	Test
29	Skillet, 8-inch	4	Each		Support
30	Skillet, 10-inch	4	Each		Support
31	Camlock fitting, 2-1/2-inch	3	Each		Fitting
32	Clamps, 18-inch	2	Each	P/N: 5842	Support
33	Clamps, 16-inch	2	Each	P/N: 5841	Support
34	Clamps, 14-inch	2	Each	P/N: 5840	Support
35	Clamps, 12-inch	2	Each	P/N: 2000	Support
36	Clamps, 8-inch, Clamps Viton	2	Each	P/N: 5836	Support
37	Plug, 1-inch HP	6	Each		Fitting
38	Pressure Regulator, 1/2-inch, 1200 psi	1	Each		Fitting
39	Tee, pipe Galvanized, 1/2-inch	6	Each		Fitting
40	Coupling, quick release 1/2-inch, female	2	Each	P/N: 5601-4-4S	Fitting
41	Coupling, quick release 3/4-inch, male	1	Each	P/N: 5602-4-4S	Fitting

Inv ID	Component	Qty	Unit	Serial No.	Type
42	Coupling, HP 1-1/2-inch	2	Each		Fitting
43	Coupling, HP 1-inch	6	Each		Fitting
44	Pipe Nipple, 1-inch	5	Each		Fitting
45	Pipe Nipple, 1/2-inch	25	Each		Fitting
46	Union, 1-inch	4	Each		Fitting
47	Coupling, Pipe HP 2-inch	4	Each		Fitting
48	Coupling, quick release, male	9	Each	P/N 5602-8-10S	Fitting
49	Caps, Pipe, HP, 1-inch	6	Each		Fitting
50	Coupling, quick release, female	7	Each	P/N 5601-8-10S	Fitting
51	Valve, ball 1/2-inch	4	Each	P/N: 65-6009	Fitting
52	Strainer, 1/2-inch	1	Each		Fitting
53	Coupling, quick release, male	2	Each	P/N: 5601-12-12S	Fitting
54	Coupling, quick release, female	2	Each	P/N: 5602-12-12S	Fitting
55	Plug, 1/4-inch galv., SQHD steel	1	Each		Fitting
56	Leak detection Ear w/ earphone	1	Each	#01624	Support
57	Oil, Tester 23-70	1	Each		Test
58	Elbow, 1"	1	Each		Fitting
59	Brush, Wire small	1	Each		Support
60	Hose assembly, 1/4" x 16'	1	Each		Fitting
61	Hose assembly, 3/4"x20'	1	Each		Fitting
62	Hose assembly, 1/2"x15'	5	Each		Fitting
63	Hose assembly, 1/2"x20'	2	Each		Fitting
64	Hard plastic shipping container	1	Each		Support

Inv ID	Component	Qty	Unit	Serial No.	Type
65	Coupling, 1/2"	4	Each		Fitting
66	Bushings, 2" x 1"	3	Each		Fitting
67	Bushings, 1" x 3/4"	2	Each		Fitting
68	Bushings, 1/4" x 1/2"	3	Each		Fitting
69	Bushings, brass, 1/2" x 1/4"	1	Each		Fitting
70	Pressure Relief, 1/2", 200 psi	1	Each	#101-303	Fitting
71	Check (swing) valve, 1/2"	1	Each		Fitting
72	Pipe Nipple, 3/8"	5	Each		Fitting
73	Thermometer Fluke, Series 51	1	Each	S/N: 6970129	Test
74	Thermometer Fluke, Series 51	1	Each	S/N: 6970130	Test
75	Thermometer Fluke, Series 52	1	Each	S/N: 7021142	Test
76	Thermometer, Fluke, Series 51	1	Each	S/N: 75340007	Test
77	Thermometer, Fluke, Series 51	1	Each	S/N: 75340008	Test
78	Thermometer Fluke, Series 52	1	Each	S/N: 74890020	Test
79	Pressure gauge, 0-600 psi	1	Each	S/N: 8016788-1	Test
80	Pressure gauge, 0-600 psi	1	Each	S/N: 8016788-2	Test
81	Pressure gauge, Test, 0-600	1	Each	ID: 22529	Test
82	First Aid Kit	1	Each		Support
83	Adjustable wrench, 10"	1	Each		Support
84	Adjustable wrench, 12"	1	Each		Support
85	Adjustable wrench, 18"	1	Each		Support
86	Pliers, Tongue & Groove	1	Each		Support
87	Wire Strippers	1	Each		Support
88	Pipe Wrench 18"	1	Each		Support
89	Skillet, 8" x 1/8"	2	Each		Support

Inv ID	Component	Qty	Unit	Serial No.	Type
90	Skillet, 6" x 1/8"	2	Each		Support
91	Pressure Relief valve, 1/2"	1	Each	101 to 400 psi	Test
92	Thermocouple Wire	1	Roll	Type K	Test
93	Valve, ball 1/4", w/ vent hoses	10	Each		Fitting

Appendix F – NAVSTA Roosevelt Roads Project Photographs

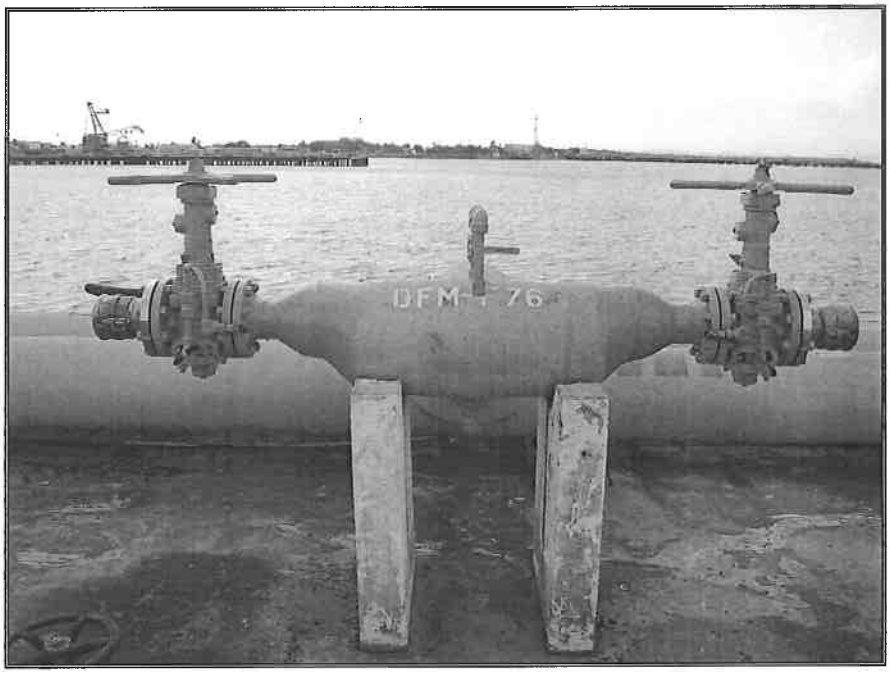
Photographs

Photograph No.	Description
1	Test No. 1 Pier 1 Test Location
2	Test No.1 DFM Valves FP1-102 and FP1-103
3	Test No. 1 DFM Valves FP1-104 and FP1-105
4	Test No. 1 DFM Valves FP1-100 and FP1-101
5	Test No. 1 DFM-Valves FP1-106 and FP1-107
6	Test No. 1 DFM Blind Flange Gasket Leak
7	Test No. 2 JP-5 Valves FP1-108 and FP1-109
8	Test No. 2 JP-5 Valves FP1-110 and FP1-111
9	Test No. 2 JP-5 Valves FP1-112 and FP1-113
10	Test No. 3 Pier 1A Test Location
11	Pier 1A Gate Valves 159, 160, 161, 162, 163 and 164
12	Pier 1 Shore Block Valves TFD-146, TFD-147 and TFJ-216
13	Pier 1A Shore Block Valves TFD-148, TFD-149 and TFJ-217
14	Test No. 7 and 8 Pier 3 Double Block and Bleed Valves
15	Test No. 7 PH 1982 Test Location
16	Pit 24 JP-5 Valve TFJ-213 and DFM Valve No.TFD-154
17	Test No. 8 Valve Pit 56 DFM Valve No.TFD-128
18	Test No. 8 DFM-Primary Test Location at Valve Pit 27
19	Test No. 9 Test Location
20	Test No. 9 PH 1982 JP-5 Valve No.TFJ-231
21	Test No. 10 Test Location
22	Test No. 12 DFM Tank 82
23	Test No. 12 DFM Tank 83
24	DFM Valve Pit No. 18

Photograph No.	Description
25	Test No. 12 DFM Tank 1082
26.	Test No. 12 DFM Tank 1995
27	Test No. 12 DFM Tank 1996
28	Test No. 12 DFM Tank 2436
29	Test No. 12 Valve Pit No. 8 DFM Valve No.TFD-144
30	Test No. 12 Pump Pressure Relief Gasket Leak
31	Test No. 13 JP-5 Test Location
32	Test No. 13 Tank 381 Valves TFJ-134, TFJ-135 and TFJ-138
33	Test No. 13 Valve Pit No. 10 JP-5 Valve No.TFJ-123
34	Test No. 13 JP-5 Tank 2270
35	Test No. 13 JP-5 Tank 2271
36	Test No. 13 JP-5 Tank 2272
37	Test No. 13 JP-5 Tank 2273
38	Test No. 13 JP-5 Tank 2274
39	Test No. 8 Secondary PH 466 Valve No. PH-466-108 and PH-466-109
40	PH 1982 Containment Area 16-Inch Tees and Check Valves
41	Annovi Reverberi Pressure Pump
42	Valve Pit No.3 Valve No.TFJ-212
43	Leak Detection Probe Holes
44	Nitrogen and SF_6 Injection for Leak Detection

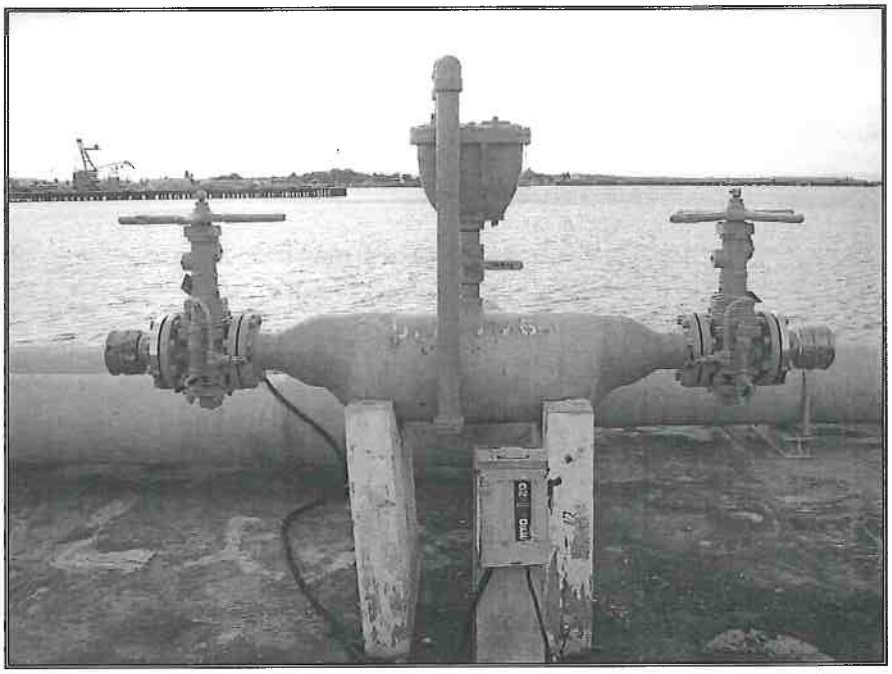
Photograph No. 1 – Test No. 1 Pier 1 Test Location

Photograph No. 2 – Test No. 1 DFM Valves FP1-102 and FP1-103



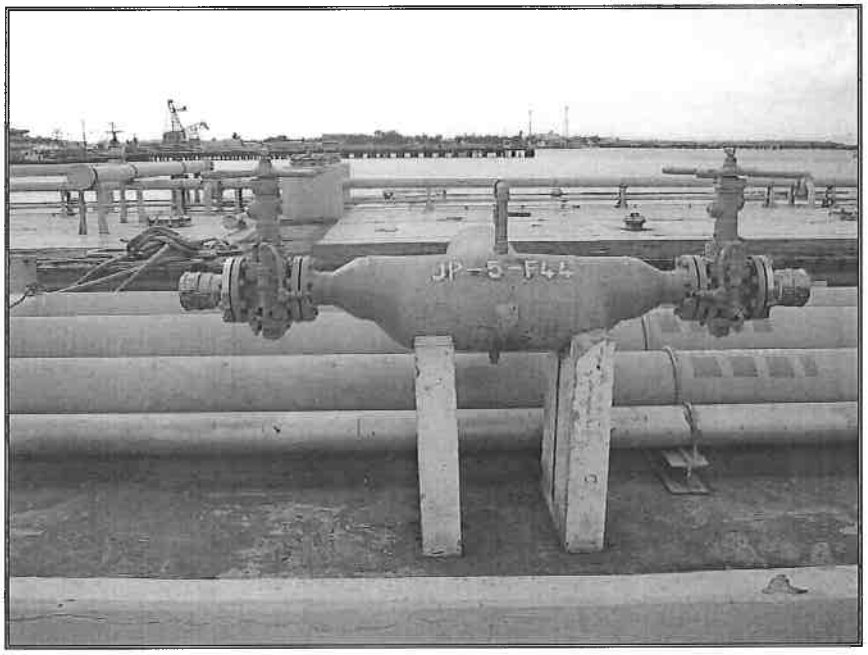
Photograph No. 3 – Test No. 1 DFM Valves FP1-104 and FP1-105

Photograph No. 4 –Test No. 1 DFM-S Valves FP1-100 and FP1-101



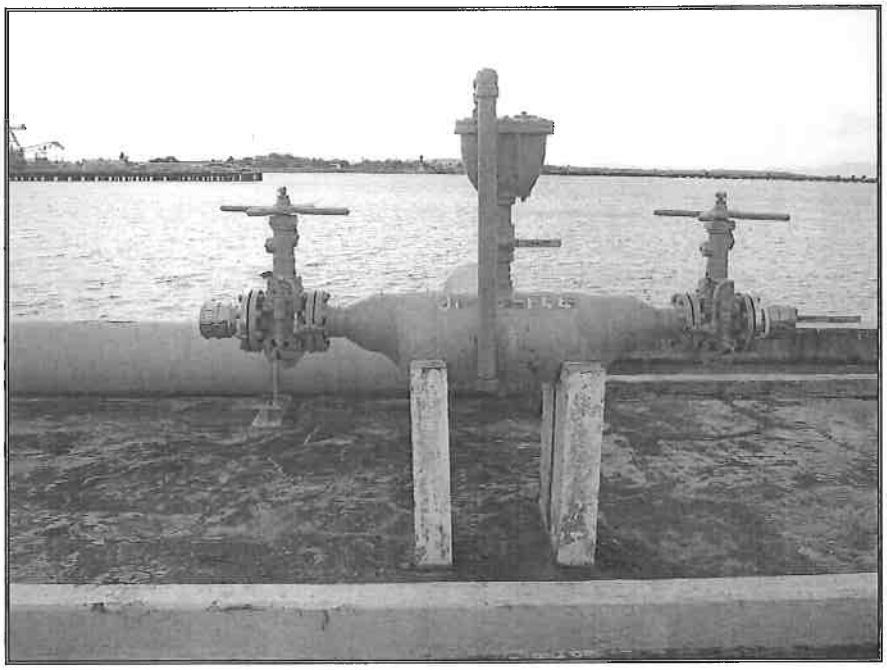
Photograph No. 5 – Test No. 1 DFM Valves FP1-106 and FP1-107

Photograph No. 6 – Test No. 1 DFM Blind Flange Gasket Leak

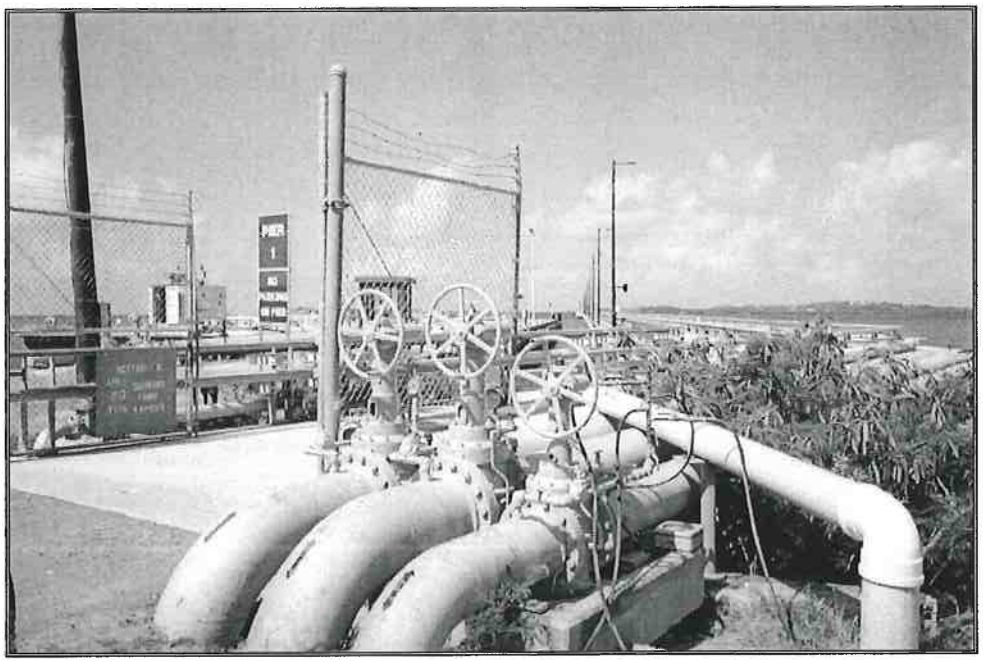


Photograph No. 7 –Test No. 2 JP-5 Valves FP1-108 and FP1-109

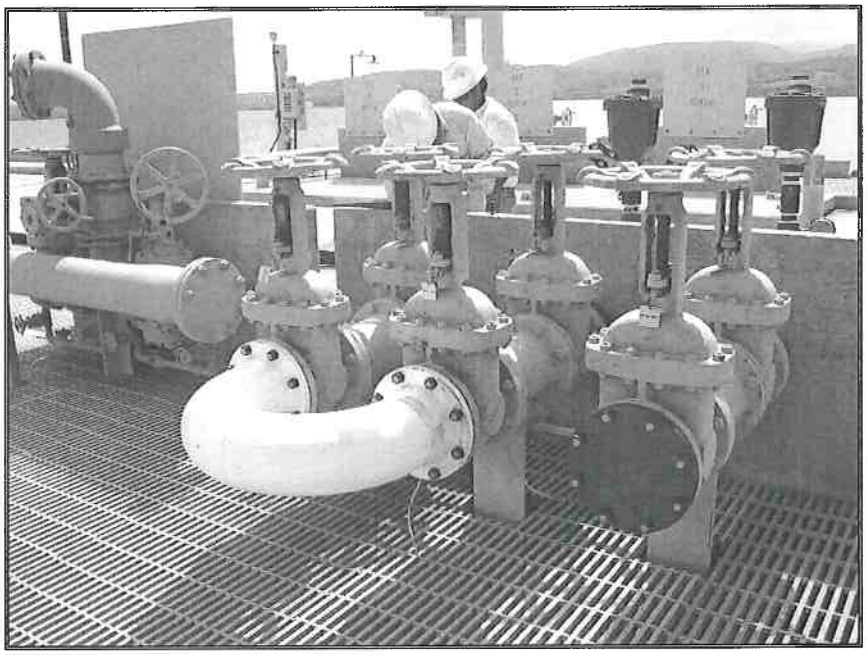
Photograph No. 8 – Test No. 2 JP-5 Valves FP1-110 and FP1-111



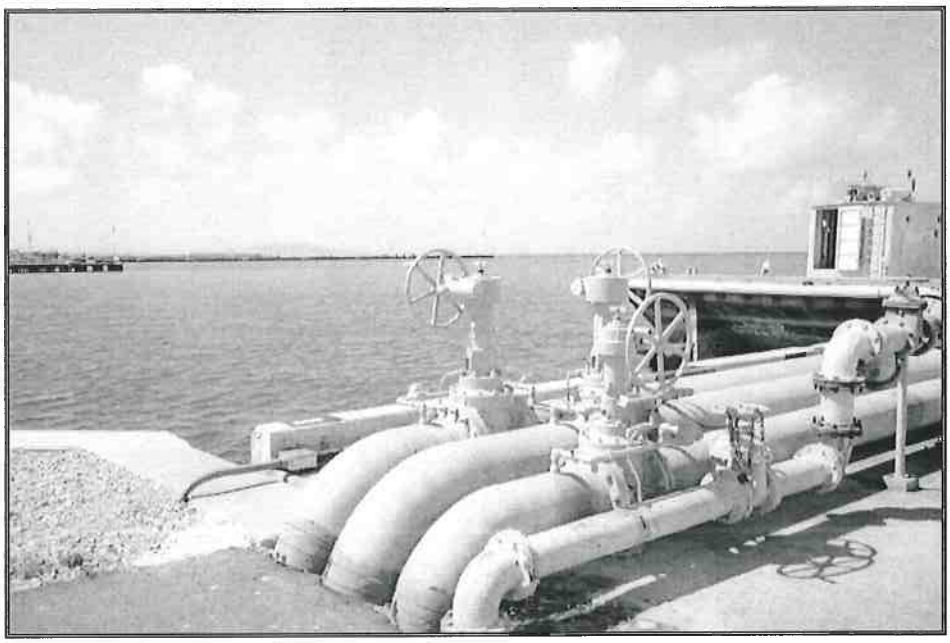
Photograph No. 9 – Test No. 2 JP-5 Valves FP1-112 and FP1-113



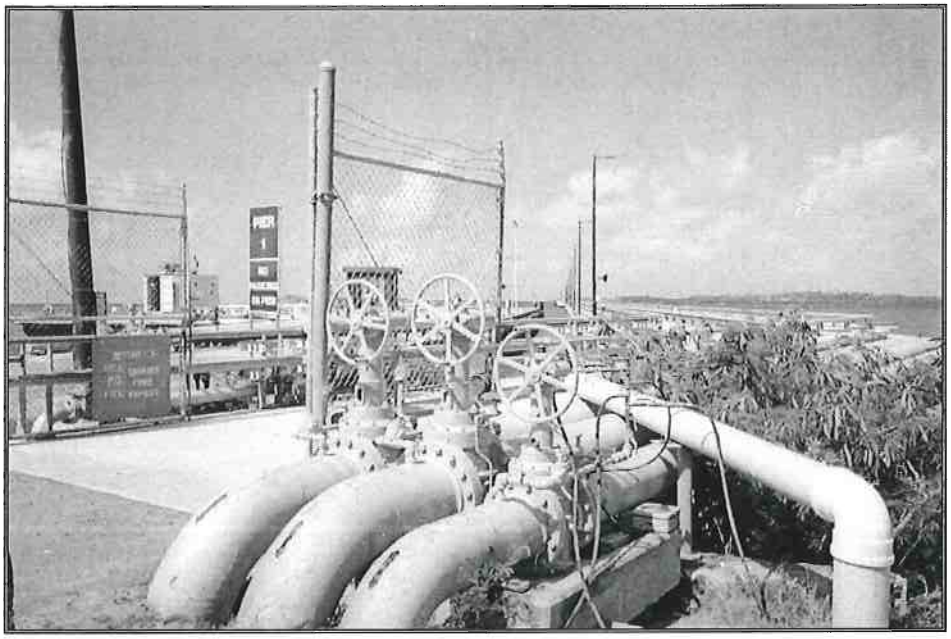
Photograph No. 10 – Test No. 3 Pier 1A Test Location



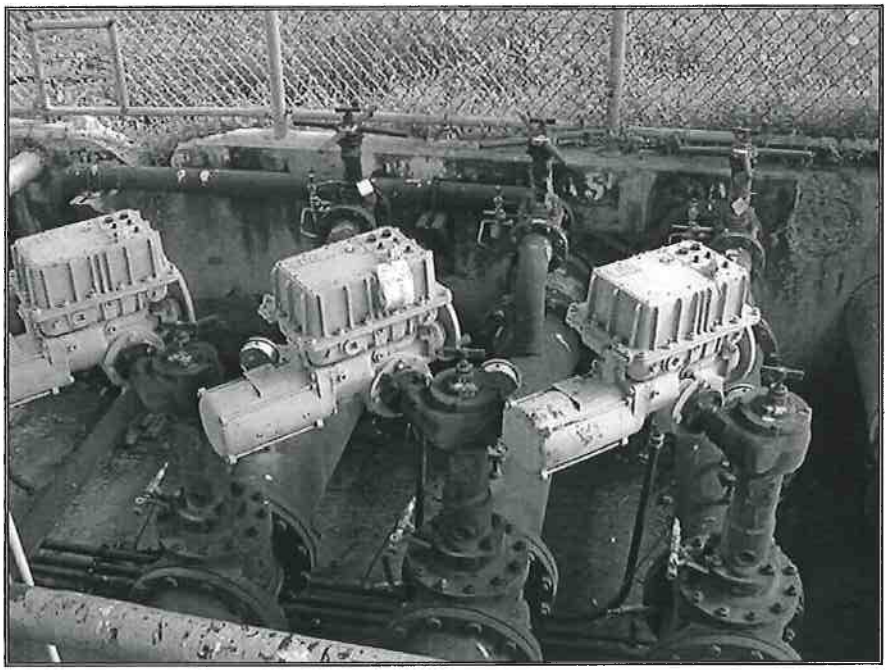
Photograph No. 11 – Pier 1A Gate Valves 159, 160, 161, 162, 163 and 164



Photograph No. 12 – Pier 1 Shore Block Valves TFD-146, TFD-147 and TFJ-216



Photograph No. 13 – Pier 1A Shore Block Valves TFD-148, TFD-149 and TFJ-217

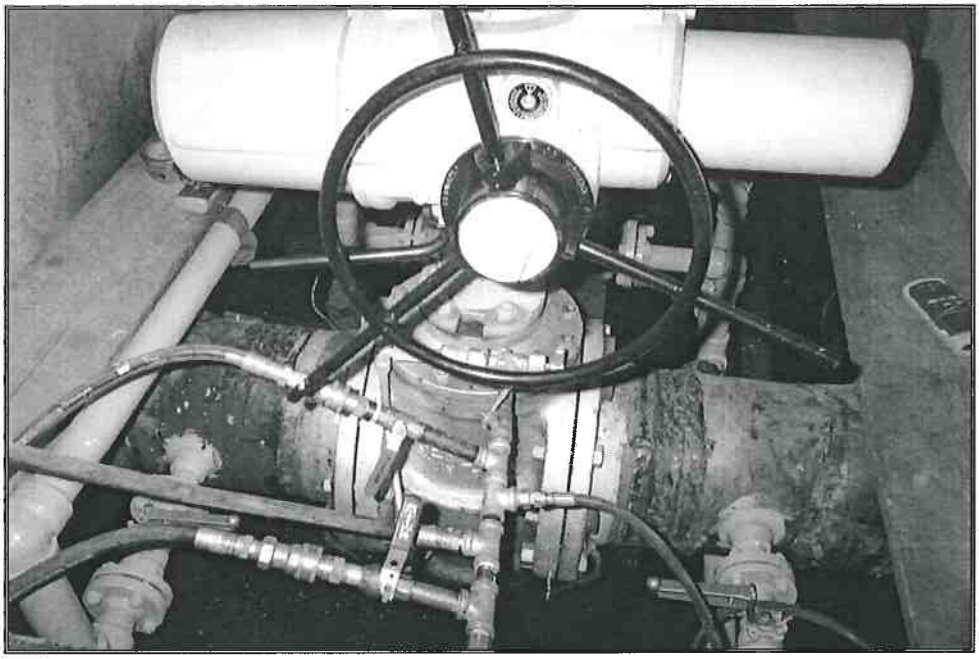


Photograph No. 14 – Test No. 7 and 8 Pier 3 Double Block and Bleed Valves

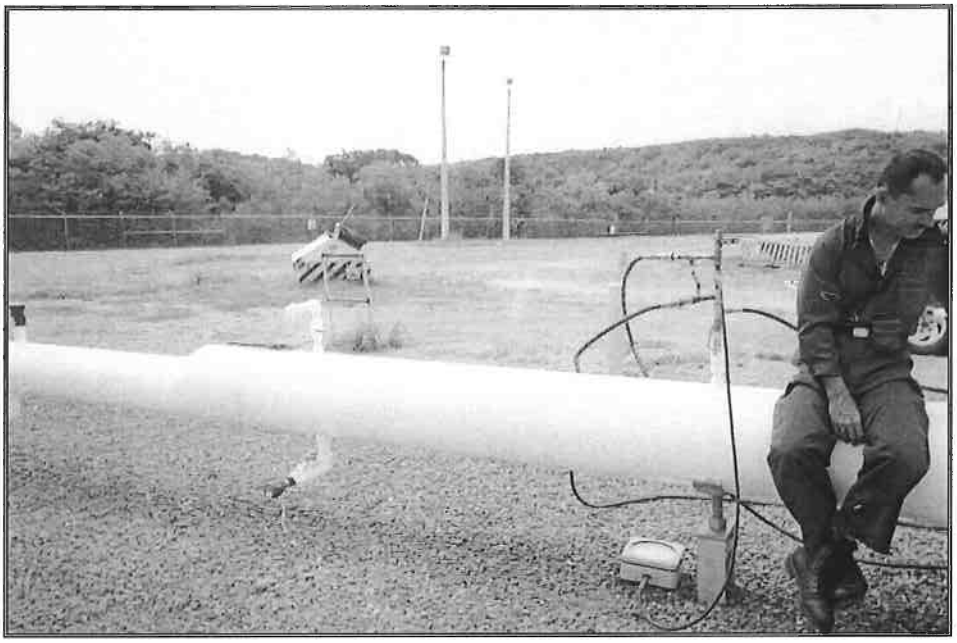
Photograph No. 15 – Test No. 7 PH-1982 Test Location

Photograph No. 16 –Pit 24 JP-5 Valve No.TFJ-213 and DFM Valve No.TFD-154

Photograph No. 17 –Test No. 8 Valve Pit 56 DFM Valve No.TFD-128



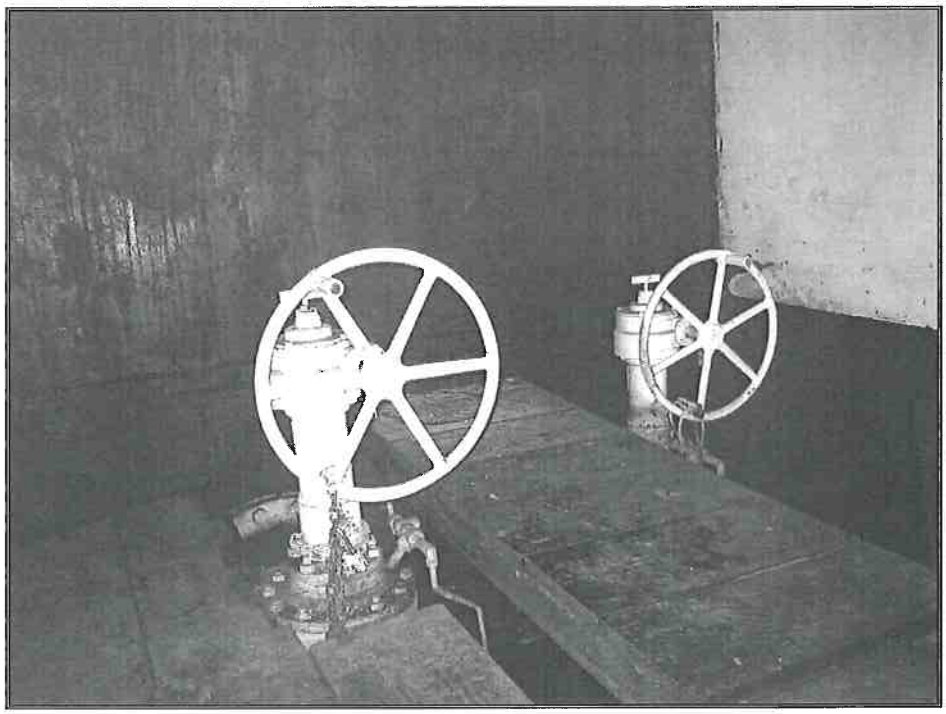
Photograph No. 18 – Test No. 8 DFM-Primary Test Location at VP 27



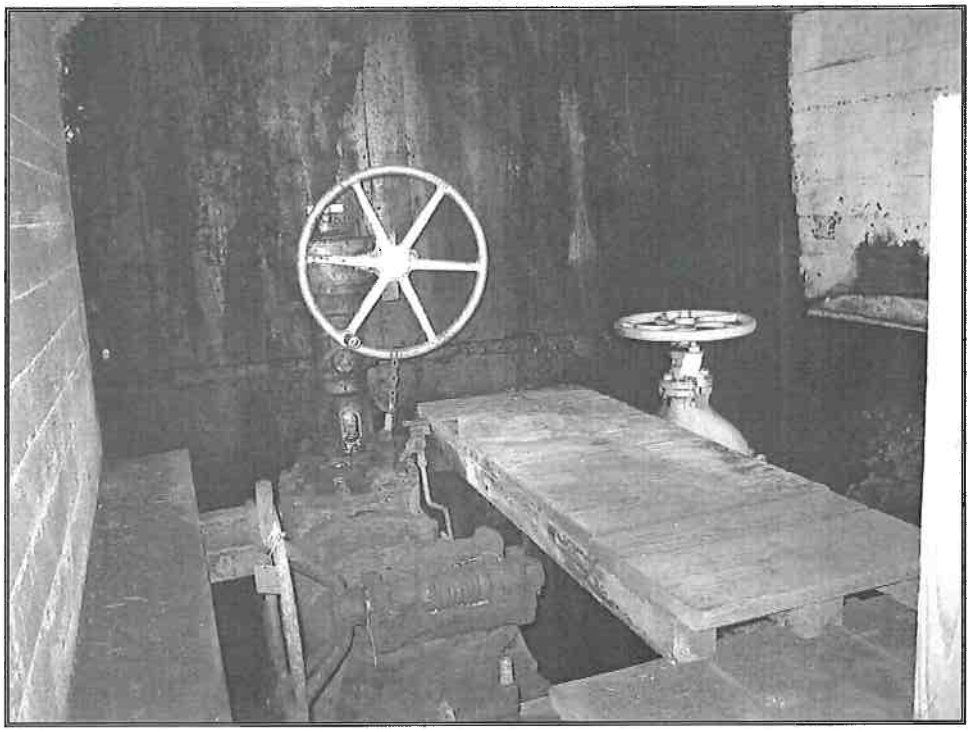
Photograph No. 19– Test No. 9 Test Location

Photograph No. 20– Test No. 9 PH 1982 JP-5 Valve No.TFJ-231

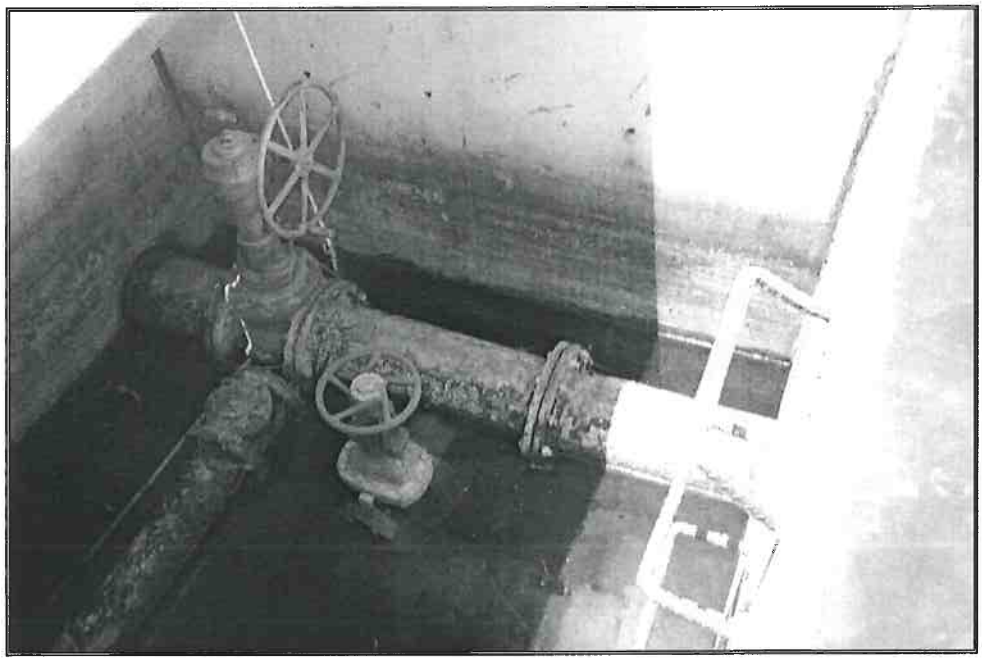
Photograph No. 21– Test No. 10 Test Location



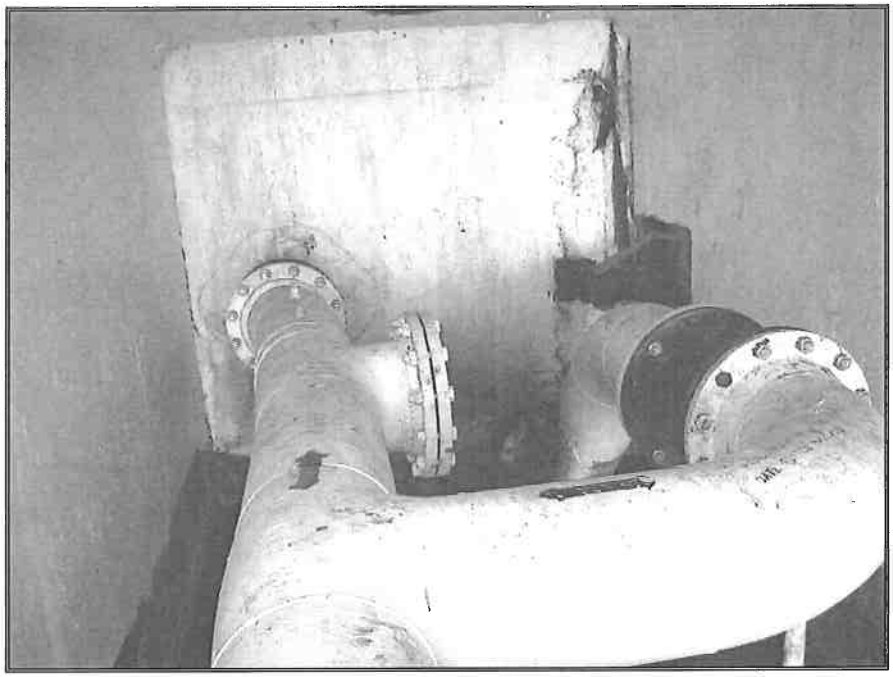
Photograph No. 22–Test No. 12 DFM Tank 82 Valves TFD-108 and TFD-110



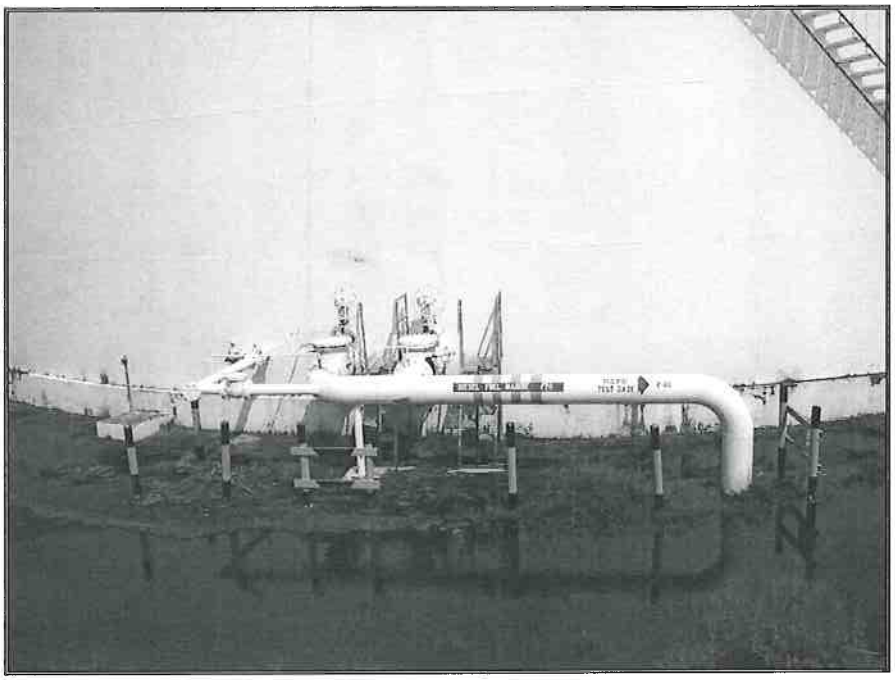
Photograph No. 23–Test No. 12 DFM Tank 83



Photograph No. 24–DFM Valve Pit No. 18

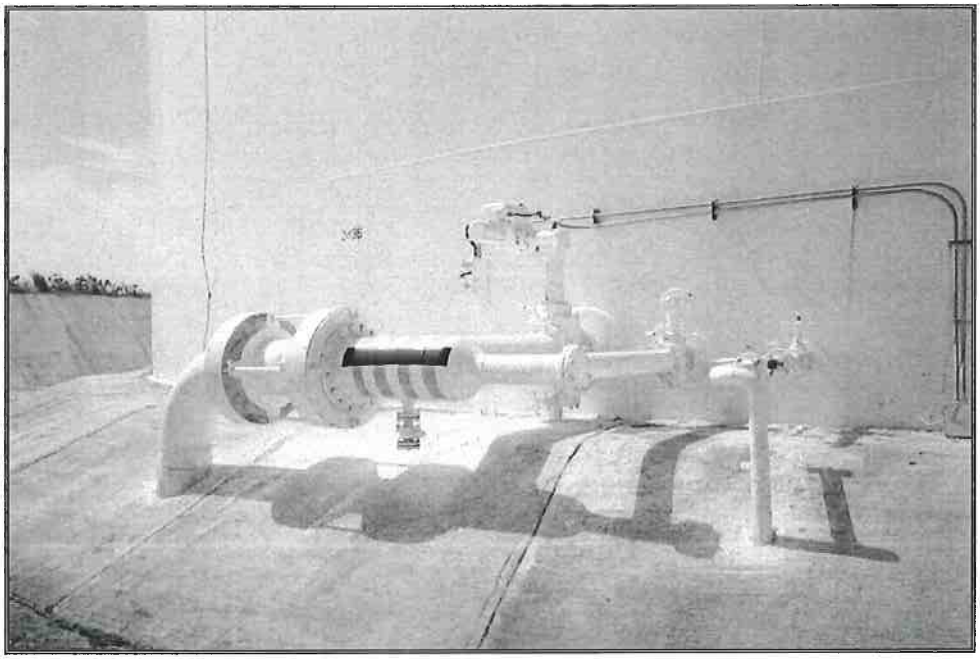


Photograph No. 25–Test No. 12 DFM Tank 1082

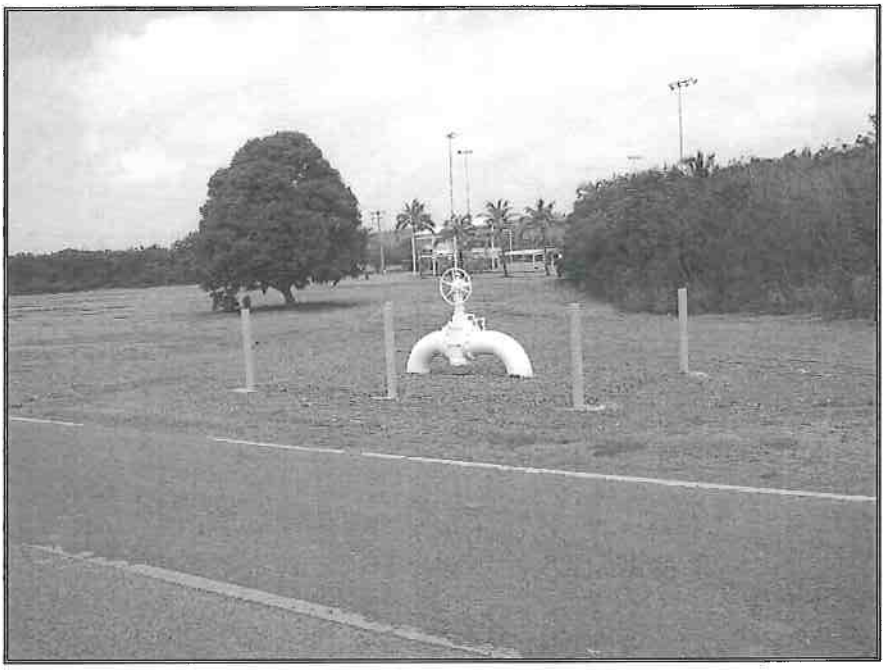


Photograph No. 26 Test No 12 DFM Tank 1995

Photograph No. 27 – Test No. 12 DFM Tank 1996

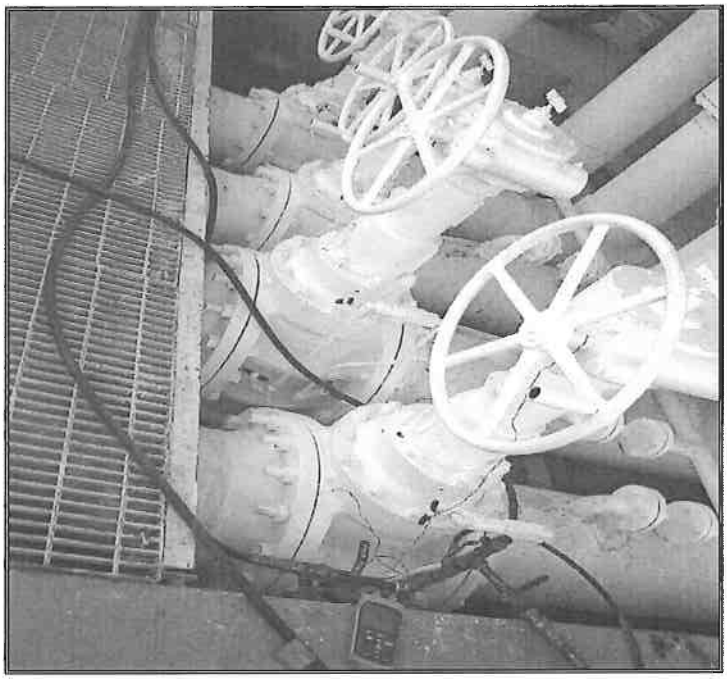


Photograph No. 28 –Test No. 12 DFM Tank 2436

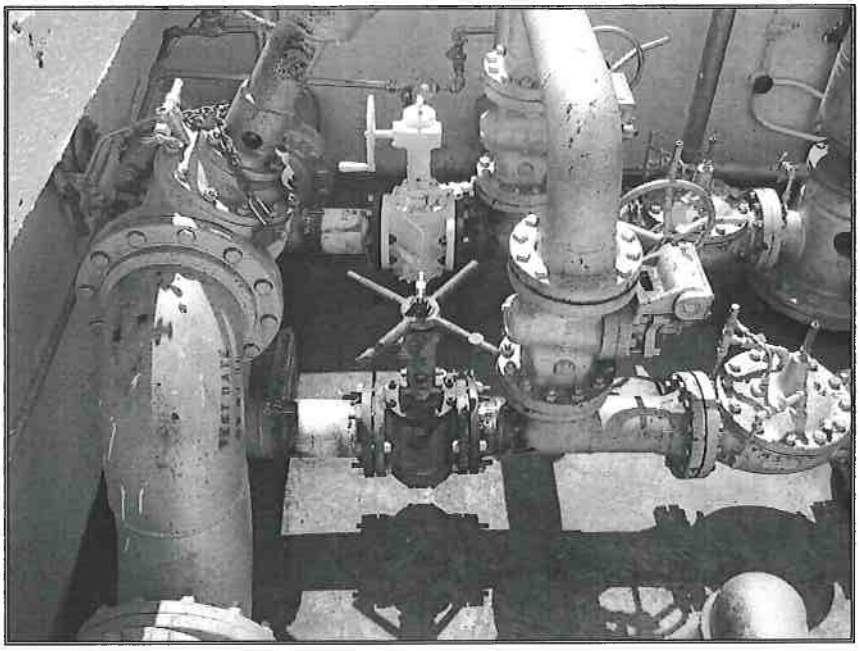


Photograph No. 29 –Test No. 12 Valve Pit No. 8 DFM Valve No.TFD-144

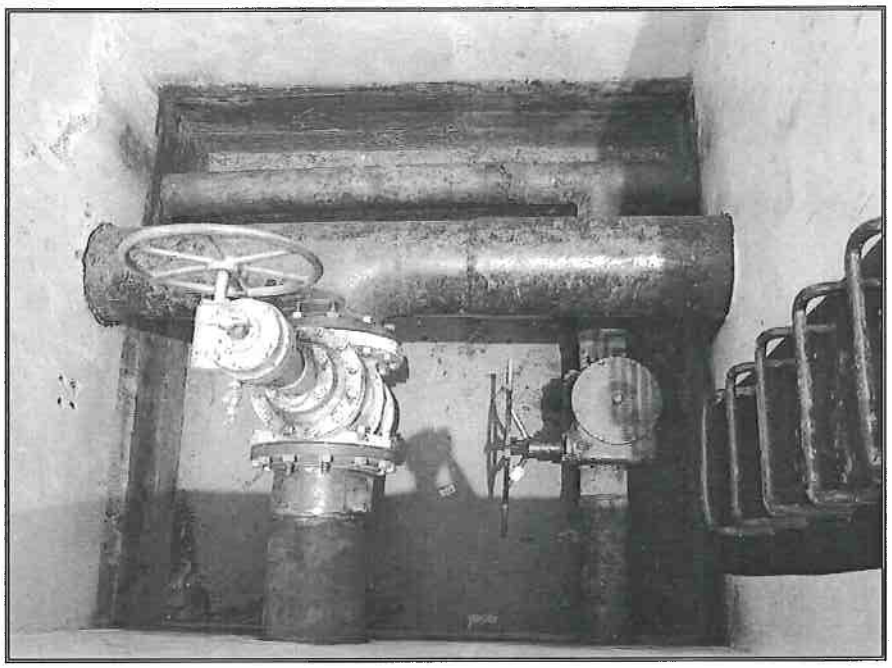
Photograph No. 30 – Test No. 12 Pump Pressure Relief Gasket Leak



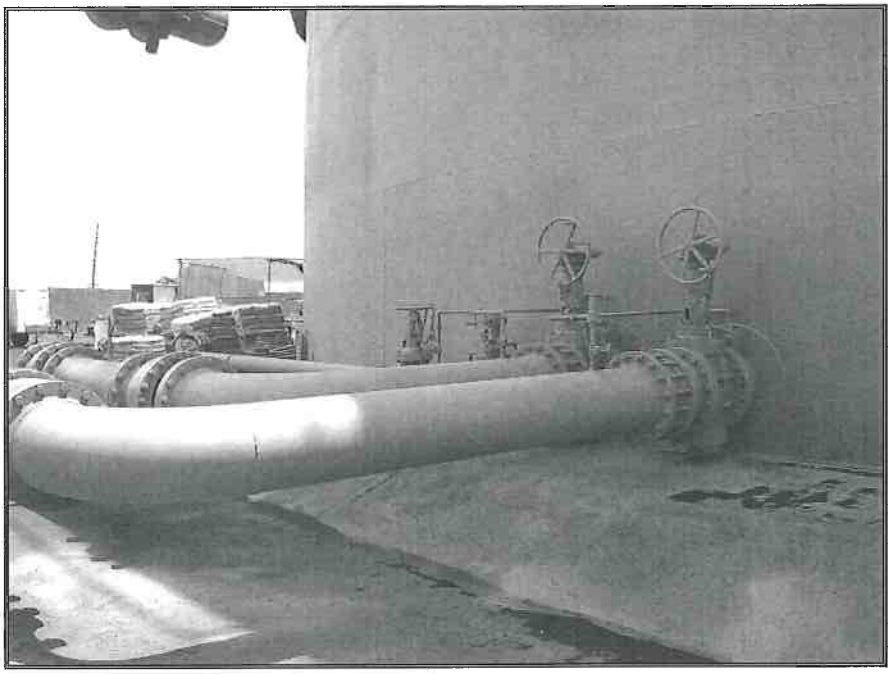
Test No. 31 Test No. 13 JP-5 Test Location



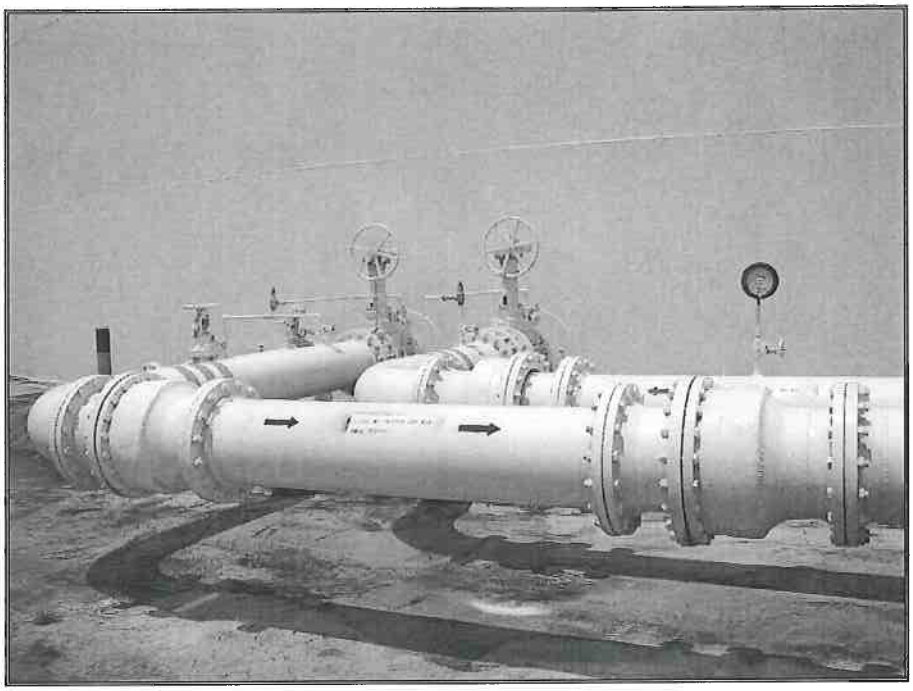
Photograph No. 32 –Test No. 13 Tank 381 Valves TFJ-134, TFJ-135 and TFJ-138



Photograph No. 33 –Test No. 13 Valve Pit No. 10 JP-5 Valve No.TFJ-123

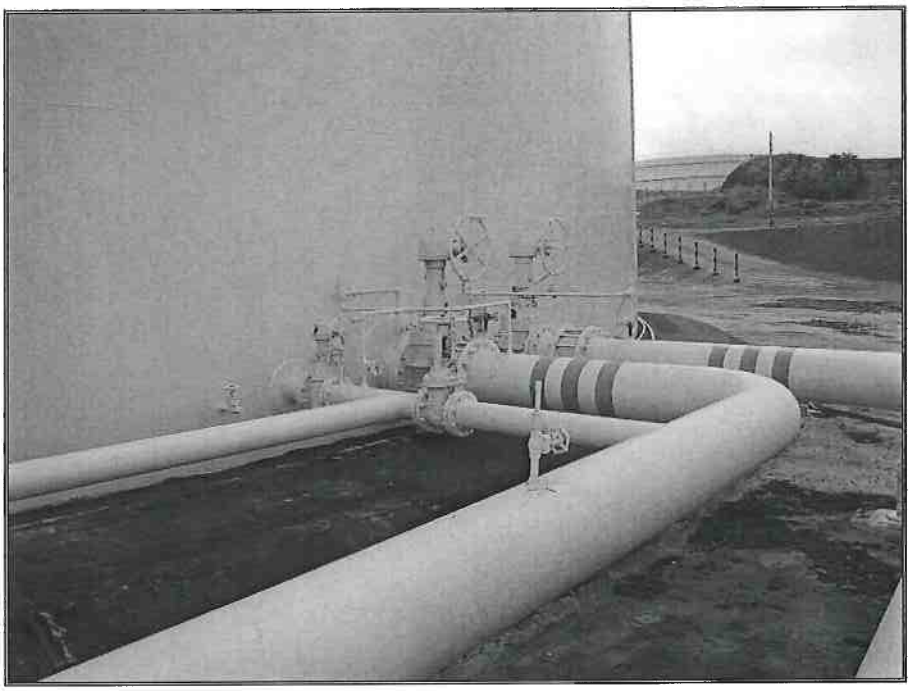


Photograph No. 34 – Test No. 13 JP-5 Tank 2270

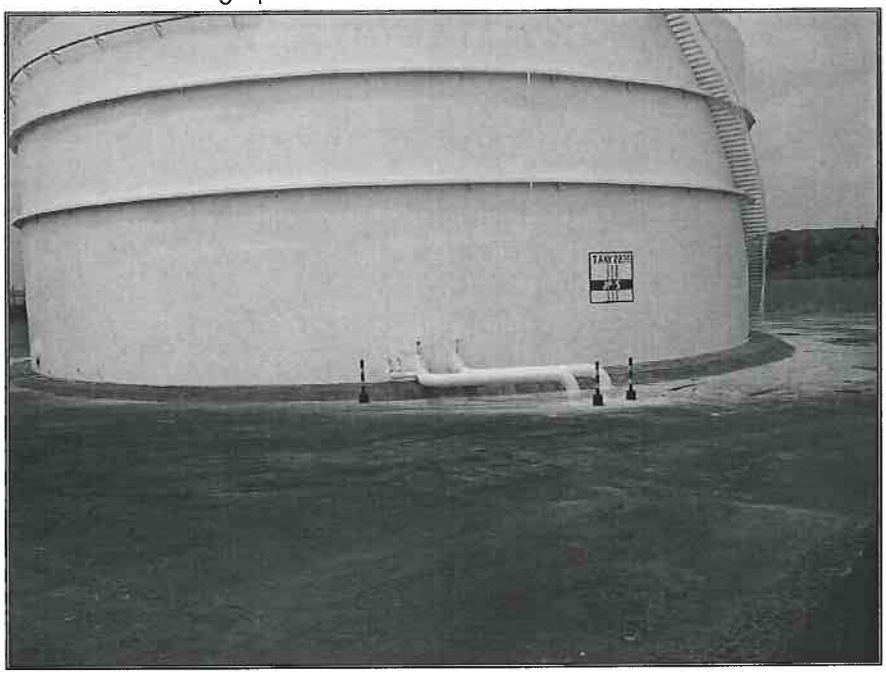


Photograph No. 35 – Test No. 13 JP-5 Tank 2271

Photograph No. 36 – Test No. 13 JP-5 Tank 2272

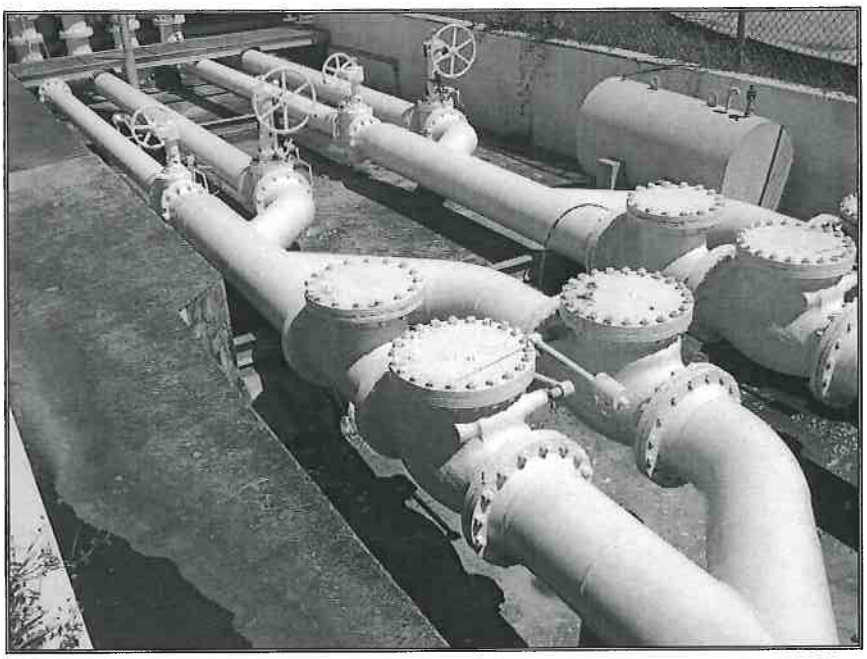


Photograph No. 37 – Test No. 13 JP-5 Tank 2273

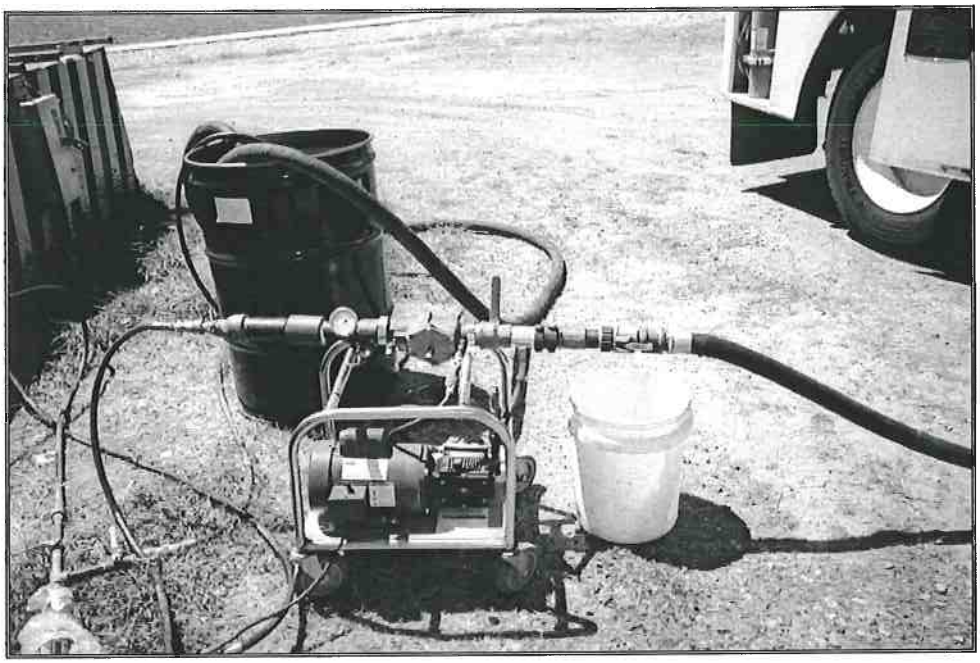


Photograph No. 38 – Test No. 13 JP-5 Tank 2274

Photograph No. 39 – Test No. 8-Secondary PH 466 Valve No. PH-466-108 and PH-466-109



Photograph No. 40 – PH 1982 Containment Area 16-Inch Tees and Check Valves



Photograph No. 41 – Annovi Reverberi Pressure Pump

Photograph No. 42 – Valve Pit No.3 Valve No.TFJ-212

Photograph No. 43 – Leak Detection Probe Holes

Photograph No. 44 – Nitrogen and SF6 Injection for Leak Detection

Appendix G – Alpha Leak Detection Records

Summary of Events for Worley International
Job #6161 in Puerto Rico
19-28 August 2002

19 August 2002

- Travel and purchase supplies.

20 August 2002

- Received site orientation and work permits
- Performed line location and began probing. Requested laborers to probe and rock drill as specified in Purchase Order due to ground conditions

21 August 2002

- Resumed line location. Two additional laborers arrived with jackhammer (not rock drill). Gave them instructions on how to probe.
- Receive delivery of nitrogen and argon cylinders.
- Probing continued to be difficult and time-consuming.

22 August 2002

- SF6 cylinder arrived at 7:00 a.m.
- Probers acquired drill and drilled holes.
- Lynn Thornton went to find welder to repair probe bars.
- At 2:53 p.m., Alpha technicians started to inject SF6 then nitrogen. Collins Albert and Kirsten Glesne went to the other end and found JP-5 coming out of pipeline. Shutdown and called in trucks to get JP-5 out of pipeline. Began to GPS pipeline. Two workers continued probing pipeline.

23 August 2002

- Vacuum truck arrived, started pushing JP-5 with N2. Probers continued probing pipeline. As of 12:00 p.m. have removed 9,000 gallons total.
- Kirsten Glesne showed Lynn Thornton what pipeline needed to be located. Also added more nitrogen to pipeline.
- At 4:00 pm 12,600 gallons had been retrieved from pipeline.

304 Meadow Lane
Kemah, TX 77565
www.alphaleak.com
Office (281) 334-5865
Fax (281) 334-7069

24 August 2002

- Vacuum truck arrived and started to retrieve more JP-5.
- At 3:00 p.m. estimated retrieve from pipeline was 17,000 gallons.
- Performed line location on 12" pipeline that was pigged and GPS data collected.

25 August 2002

- Performed line location and GPS all other pipelines as directed by Kirsten Glesne.

26 August 2002

- Connected SF6 and nitrogen to fill pipeline so we could test probe holes. We tried to remove more JP-5.
- Bled down to atmospheric pressure
- Began flow with SF6 and then added nitrogen. Had line starting to pressure up.
- At 3:30 p.m., Commander shut us down. We were at 67 psig on pipeline and as late as it was, he didn't want us to go over 70 psig. We then took leak guns and went over pipeline. No indications of leaks were found.

27 August 2002

- Hooked up and started to pressure up pipeline.
- At 6:00 p.m., reached 153 psig., Collins Albert and Lynn Thornton tested probe holes to check for leaks. No indications of SF6 were found.

28 August 2002

- Verified pressure on pipeline 153 psig. Lynn Thornton and Collins Albert started to test probe holes. No indications of SF6 were found.
- At 7:20 a.m., Kirsten Glesne arrived and verified pipeline pressure.
- Bled off pipeline, then purged line with nitrogen to displace SF6/nitrogen mixture.
- Installed new gaskets on flanges and checked for SF6. Pressured line to 20 psig. for nitrogen blanket on line.

ALPHA
Leak Detection and Pipeline Services

Job No.: 611

Job Record - Services

Client: [illegible] Date: 8/14/02

Contact Name: [illegible] Client Job No.: [illegible]

Job Description: [illegible]

Lead Technician: [illegible] Technicians: [illegible]

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF_6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	22	52	—	3	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem						
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ft.						
SF_6 Used: lbs.						
No. of Leaks Found:						
Other:						
Other:						
Other:						
Other:						
				Total $		

[illegible] 8/14/02

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Leak Detection and Pipeline Services

Job No.: [illegible]

Job Record - Services

Client: [illegible] Date: [illegible]

Contact Name: [illegible] Client Job No.: [illegible]

Job Description: [illegible]

Lead Technician: [illegible] Technicians: [illegible]

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF_6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	[illegible]	[illegible]	—	14.5	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem	2					
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ____ ft.						
SF_6 Used: ____ lbs.						
No. of Leaks Found:						
Other:						
Other:						
Other:						
Other:						
				Total $		

[illegible]
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Job No.: 61[illegible]

Job Record - Services

Client: [illegible] Inc
Date: 5/20/02

Contact Name: [illegible]
Client Job No.: 7074-13

Job Description: SF6 Leak Detection ([illegible])

Lead Technician: T Lynn Thornton
Technicians: [illegible]

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	6:30	5:30	1	10	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem [illegible] Two [illegible]	2					
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ___ ft.						
SF6 Used: ___ lbs.						
No. of Leaks Found:						
Other:						
Other:						
Other:						
Other:						
					Total $	

[signature]
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Leak Detection and Pipeline Services

Job No.: 616[illegible]

Job Record - Services

Client: Worley International Inc

Date: 8/2[illegible]/02

Contact Name: Kirsten Glenn

Client Job No.: 7074-[illegible]

Job Description: SF6 Leak Detection (Locating Pipeline [illegible])

Lead Technician: T. Lynn Thornton

Technicians: Collin Abbott

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	6 am	6 pm	1	11	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem for two men	2					
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ft.						
SF_6 Used: lbs.						
No. of Leaks Found:						
Other:						
Other:						
Other:						
Other:						
				Total $		

[signature]

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ALPHA
Leak Detection and Pipeline Services

Job No.: 61[illegible]1

Job Record - Services

Client: [illegible] Date: 8/22/02

Contact Name: [illegible] Client Job No.: [illegible]

Job Description: [illegible]

Lead Technician: [illegible] Technicians: [illegible]

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF_6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	[illegible]	[illegible]	1	[illegible]	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem [illegible]	2					
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ____ ft.						
SF_6 Used: ____ lbs.						
No. of Leaks Found:						
Other:						
Other:						
Other:						
Other:						
				Total $		

[illegible]
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Leak Detection and Pipeline Services

Job No.: 6161

Job Record - Services

Client: Worley International Inc **Date:** 8/23/02
Contact Name: Keith Glasse **Client Job No.:** 7074.18

Job Description: Adding N2 & [illegible] 305 [illegible] [illegible] [illegible] and 5?6 [illegible] leak station

Lead Technician: Lynn Thornton **Technicians:** Collins [illegible]

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF_6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	6 30	5 pm	1	10	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem for Two men	2					
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ft.						
SF_6 Used: lbs.						
No. of Leaks Found:						
Other:						
Other:						
Other:						
Other:						
				Total $		

K Glasse
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Leak Detection and Pipeline Services

Job No.: 6161

Job Record - Services

Client: [illegible] International Inc. **Date:** 8/24/02
Contact Name: Kristin Glover **Client Job No.:** 7074-[illegible]

Job Description: [illegible]

Lead Technician: T Lynn Thornton **Technicians:** Collins [illegible]

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF_6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	6:30	5:30	1	10	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem [illegible]	2					
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ____ ft.						
SF_6 Used: 115 lbs.	1					
No. of Leaks Found:						
Other: GPS	1					
Other:						
Other:						
Other:						
					Total $	

[signature] 8/28/02

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Leak Detection and Pipeline Services

Job No.: [illegible]

Job Record - Services

Client: Worley International Inc

Date: 8/25/02

Contact Name: [illegible]

Client Job No.: [illegible]

Job Description: Locate pipeline and GPS [illegible] [illegible]

Lead Technician: [illegible]

Technicians: [illegible]

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF_6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	8 00	6 00	—	10	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem for Two men	2					
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ft.						
SF_6 Used: lbs.						
No. of Leaks Found:						
Other: [illegible]	1					
Other:						
Other:						
Other:						
					Total $	

[signature]
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Leak Detection and Pipeline Services

Job No.: [illegible]

Job Record - Services

Client: Worley International [illegible]
Date: 8/26/02

Contact Name: [illegible]
Client Job No.: 7074 · 1[illegible]

Job Description: Finish Getting Fuel [illegible] Start [illegible] SF6 Leak Detection [illegible]

Lead Technician: T Lynn Thornton
Technicians: Collin[illegible]

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF_6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	6 30	5 30	—	11	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem for Two men	2					
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☑ Leak Detection Instrument ☐ Electronic Line Locator	1	[illegible]	5 [illegible]	—	1	No Charge
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ft.						
SF_6 Used: lbs.						
No. of Leaks Found:						
Other: [illegible]	9					
Other: [illegible]						
Other: [illegible]						
Other: [illegible]	1					
					Total $	

[signature]

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8/28/02
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ALPHA
Leak Detection and Pipeline Services

Job No.: 6161

Job Record - Services

Client: Worley International Inc **Date:** 8/27/02
Contact Name: Kirstin Glenn **Client Job No.:** 4074-18

Job Description: SF6 Leak Detection, N2 injection

Lead Technician: T Lynn Thornton **Technicians:** Collins Albert

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF_6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	6 30	7 30	—	13	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem For Two men	2					
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☒ Leak Detection Instrument ☐ Electronic Line Locator	1					
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ft.						
SF_6 Used: lbs.						
No. of Leaks Found:						
Other:						
Other:						
Other:						
Other:						
					Total $	

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Leak Detection and Pipeline Services

Job No.: 6161

Job Record - Services

Client: Worley International Inc   **Date:** 8/28/02

Contact Name: Kristen Glaze   **Client Job No.:** [illegible]

Job Description: SF6 Leak Detection, [illegible] [illegible]

Lead Technician: T Lynn Thornton   **Technicians:** Collin Abbott

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.	1	[illegible]	[illegible]		[illegible]	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem						
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ft.						
SF6 Used: lbs.						
No. of Leaks Found:						
Other: [illegible]						
Other:						
Other:						
Other:						
					Total $	

[signature]   8/28/02

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ALPHA
Leak Detection and Pipeline Services

Job No.: 616

Job Record - Services

Client: [illegible] Date: 8/29/02

Contact Name: [illegible] Client Job No.: [illegible]

Job Description: [illegible]

Lead Technician: Tyler Thornton Technicians: [illegible]

	Quantity	Time Start	Time Stop	Break	Hours	Amount ($)
Services						
Leak Detection – SF_6 Two technicians, one leak detection instrument, one electronic line locator, one GPS, & one vehicle.					4.5	
Leak Detection – Sonic Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Electronic Line Location Services Two technicians, one sonic leak detection instrument, one electronic line locator, & one vehicle.						
Pig-Tracking Services Two technicians, one line locator, one listening device, one notebook computer, one GPS, & one vehicle.						
Flame Ionization & Combustible Gas Leak Surveys Two technicians, one leak detection instrument, one GPS, & one vehicle.						
Additional Personnel / Equipment						
Technician:						
Senior Technician:						
Supervisor / Inspector / Boat Captain:						
Engineer / Superintendent:						
Per Diem						
Vehicle - ½ or ¾ ton pick-up:						
Vehicle - 4-wheel drive or one ton pick-up:						
Other: ☐ Leak Detection Instrument ☐ Electronic Line Locator						
Other: ☐ Pig-Tracking Transmitter ☐ Pig-Tracking Receiver						
Other: Trailer: ____ ft.						
SF_6 Used: ____ lbs.						
No. of Leaks Found:						
Other:						
Other:						
Other:						
Other:						
				Total $		

[illegible]
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8/29/02
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Appendix H – Daily Production Site Reports

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #1

Date:	Monday, July 08, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0800D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	2			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	9.5			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	0%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	Dale England & Bill Hinkle arrived at NAVSTARR at 8:00 AM after renting generator. At 9:20 AM obtained Contractor ID Cards. At 9:30 AM, discussed SOW with Jim Rice. Jim said that SOW for pressure testing had changed. New pressure testing schedule would test all DFM-S system first. Prepared test manifold, hoses, etc and connected to VP-27. At 4:30 PM, left NAVSTARR when notified that DFM-S system not ready until Tuesday 9 July.
Agreed Scope Changes:	
Problems / Areas of Concern:	Change to test DFM-S first. Jim Rice said that he was unaware that Worley would arrive on Monday. No preparation of DFM-S pipelines or personnel allocated. Fuels said that no personnel would be available after 3:30 PM each day to support testing. ** While reviewing test sections, discovered that 12" flange and 6" flanges in JP-5 Tank Farm Valve Pit 11 were leaking and pit bottom contained JP-5. Notified Jim Rice at 12:00 PM and he organized vacuum truck to suction JP-5. Jim Rice said that he would temporarily tighten flanges and Worley to install missing bolts and repair.
General Comments:	
Work Planned Next 24 Hours:	Pressure test DFM-S pipelines from Pier 1, 1A, 3 to PH 1982 to 82-83 to 1995, 1996.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #2

Date:	Tuesday July 09, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0801D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	2			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	9.5			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	0%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR. At 9:36 AM, instruments and manifold connected. At 9:39 AM, Fuels pressured from PH 1982 to 27 PSI using Tank 83. Secure PH 1982 valves. At 9:45 AM, start pressuring. At 10:15 AM, NFESC pump stopped. At 10:30 AM, repaired pump. No pressure increase evident. At 11:15 AM, Fuels pressured from PH 1982 to 70 PSIG. At 11:12 AM, pressure fell to 27 PSIG. At 11:15 AM, pressured from PH 1982 to 80 PSIG. Pressure fell to 27 PSIG. Removed Tank 82-83 line from test segment. At 11:45 AM, Fuels personnel to lunch. NFESC pump stopped after pumping 2 additional gallons. At 1:40 PM, Fuels pressured to 80 PSIG from PH 1982. At 2:00 PM, pressure to 27 PSIG. 27 PSIG is static head pressure. Received permission from Jim Rice to use Fuels pressure pump. Looked for connecting fittings to use Fuels pump until 2:45 PM. Fuels notifies that all fuel, vacuum truck and personnel would secure area at 3:00 PM. At 4:30 PM, off NAVSTARR.
Problems / Areas of Concern:	NFESC pump inoperable. Using Fuels pump. Unexplained pressure drop. All Teflon tape left in PH 466 missing. Fuels spent till 2:00 PM, attempting drain up of JP-5 pipeline to tighten VP 11 flange leaks. Will attempt repairs on 10 July
General Comments:	Plan to pressure system. Open individual tank valves to allow air to vent into tanks while running PH 1982 pump. Pressure pipeline in segments to rule in/rule out possible piping/ valving leaks. Obtained permission from Jim Rice to furnish personnel and fuel truck until 6:00 PM to support testing. Pigs for cleaning and gauging arrive NAVSTARR. Jim Rice informs that he will be on leave on 10 July. Mr. Brown stateside until 15 July.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #3

Date:	Wednesday July 10, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0802D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	2			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	12			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	10%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR. At 8:20 AM, pressure from PH 1982 to 95-96-466-Pier 1A and Pier 1 to 70 PSIG. At 8:25 AM, open PH 466 valve and include Pier 3 piping. At 8:34 AM, pressure pipeline system to 95 PSIG. At 8:39 AM, 96 PSIG at VP 27 (test site). Wait on 1-1/2" suction hose and tanker truck. At 9:10 AM, connected pump. Fuels pump would not start. Motor froze. At 9:25 AM, turned motor by hand and connected fuel truck to pump suction. Start pressuring with 96 PSIG. At 9:55 AM, shut down pressuring with 140 PSIG on gauge. Actual pressure 87 PSIG with friction pressure removed. At 10:03 AM, 136 PSIG on pipeline with 15.2 gallons injected. At 10:10 AM, start test with 162 PSIG from VP 27. At 2:10 PM, strength test accepted with 163.5 PSIG. At 6:10 PM, leak test accepted with 158.5 PSIG. Fuels bled pressure through PH 1982. Rigged down equipment. At 6:45 PM, left NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	NFESC pump inoperable. Using Fuels pump. Have to supply positive suction pressure to Fuels pump as Fuels pump will not pull own suction. Lt. Feliz denied any pressure testing on Saturday and Sunday.
General Comments:	Hot and Sunny. Storm expected on Friday 12 July.
Work Planned Next 24 Hours:	Pressure test DFM-Primary pipeline from Pier 1, 1A, 3 to PH 1982 to 1995, 1996.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #4

Date:	Thursday July 11, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0803D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	2			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	12			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	10%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR. At 7:30 AM, disconnected Test Manifold at VP27 and reinstalled from DFM-S to DFM-Primary. At 8:45 AM, open VP-27 Main Line Valve. At 9:22 AM, start pressuring from PH 1982 with 96 PSIG. At 9:38 AM, pressure at PH 1982. At 10:12 AM, repressured from PH 1982 to 140 PSIG. Shut PH 1982 valves. At 10:15 AM, start pressuring with Fuels pressure pump from 132 PSIG. At 10:29 AM, at test pressure with 157 PSIG and 8.8 gallons pumped. At 10:30 AM, start strength test with 157 PSIG. At 2:30 PM, strength test accepted with 157.2 PSIG and start leak test. At 6:30 PM, leak test accepted with 153.0 PSIG. At 7:00 PM, left NAVSTARR. ** Leaks to be repaired on new VP 24 valve 2" nipple on air eliminator and tubing fitting on body block and bleed. Outer seal on check valve movement arm dripping at PH 1982.
Agreed Scope Changes:	
Problems / Areas of Concern:	NFESC pump inoperable. Using Fuels pump. Lt. Feliz after discussion will allow one four hour test on Saturday. Schedule DFM Pier 1 test on Saturday 13 July.
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	Test from PH 1982 to 95-96 and 82-83.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORTCONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #5

Date:	Friday July 12, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0804D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	2			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	8.5			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	15%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR. At 8:30 AM, connected Test Manifold at PH 1982 to test 95-96 and 82-83 primary pipeline with 35 PSIG. At 8:32 AM, start pressuring. At 9:00 AM, 90 gallons pumped. At 9:30 AM, 176 gallons pumped. At 9:42 AM, shut down 1-1/2" suction hose gasket leaking. At 10:15 AM, 262 gallons pumped. At 11:00 AM, 383 gallons pumped. At 12:40 PM, 489 gallons pumped. At 12:55 PM, shut down closed 95-96 pipeline off. Pressure from 1982 to 82-83 to 142 PSIG. At 1:05 PM, open 95-96 valve pipeline system equalized to 134 PSIG. At 1:30 PM, could not start pressure test due to time that pressure test would complete. Also thunder and lightning on base. At 2:00 PM, rig down and move testing equipment to Pier 1A. At 3:30 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	NFESC pump inoperable. Using Fuels pump.
General Comments:	Early morning rain. Hot and Sunny.
Work Planned Next 24 Hours:	Test Pier 1A DFM-S and DFM-Primary Pipeline.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORTCONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #6

Date:	Saturday July 13, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0805D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	2			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	8			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	25%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR. At 7:25 AM, connected Test Manifold at Pier 1A to test DFM-Primary and DFM-Secondary. At 8:12 AM, 137 PSIG on pipeline system. Pressure pump would not pump. At 8:39 AM, sun brought pressure to test pressure of 150 PSIG. Bleed eight times during pressure test. At 12:39 PM, test accepted with 166 PSIG. At 1:00 PM, rigged down test equipment and moved to PH 1982. Rigged up to test PH 1982 to test 95-96 and 82-83 primary pipeline on Monday15 July. At 3:00 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	NFESC pump inoperable. Using Fuels pump.
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	None. Test PH 1982 to 82-83 and 95-96 pipelines on Monday 15 July.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORTCONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #7

Date:	Monday July 15, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0806D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	2			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	12			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	33%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR. At 7:25 AM, rigged up to test PH1982 to test 95-96 and 82-83 primary pipeline. At 8:30 AM, open pipeline segment with 34 PSIG. At 8:55 AM, pressure to 82-83 to 148 PSIG. Shut Tanks 95-96 valves. At 9:00 PM, open 95-96 134 PSIG when equalized. At 9:10 AM, start pressuring with 140 PSIG. At 10:05 AM, start pressure test with 185 PSIG. Leaks in Pressure Relief Pop Off Flange DFM Pump No. 1 & No. 2 in PH 1982. Leak in PH 1982 DFM Pump No. 2 Casing Seals. Estimated 95 ounces per hour. At 6:05 PM, leak test accepted with 168.5 PSIG. At 6:45 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	NFESC pump inoperable. Using Fuels pump.
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	Test JP-5 from PH 1982 to Pier1, Pi1A, Pier 3. No pigging scheduled for Tuesday 16 July and Wednesday 17July as Fuels must replenish Air Field JP-5 volume after repairing leaking flanges in Valve Pit 11.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #8

Date:	Tuesday 16, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0807D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	3			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	09			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	40%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England, Kirsten Glesne & Bill Hinkle arrived at NAVSTARR. At 9:05 AM, rigged up to pressure Pier 1A JP-5 pipeline from PH 1982. At 10:35 AM, start pressuring with 107 PSIG. At 11:02 AM, start pressure test with 152 PSIG. Bleed 4 times. At 3:02 PM test accepted with 192 PSIG. At 3:10 PM bleed system and FUELS pull suction from PH 1982. At 3:45 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	NFESC pump inoperable. Using Fuels pump.
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	Test JP-5 from PH 1982 to Pier 1, Pier 1A, Pier 3. Pigging scheduled for Thursday 18 July.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORTCONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #9

Date:	Wednesday July 17, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0808D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	3			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	10.5			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	40%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England, Kirsten Glesne & Bill Hinkle arrived at NAVSTARR. At 7:30 AM, close Pier 1, Pier 1A and Pier 3 valves. At 8:20 AM, fill and pressure pipeline system from PH 1982. At 8:25 AM, close 12" & 10" valves at PH 1982 with 95 PSIG. At 8:52 AM, start test with 161.7 PSIG. Four leaks observed in flanges of check valves and flange spools at PH 1982. At 10:49 AM, pipeline pressure at 153.0 PSIG. Suspect possible leak on 12" JP-5 pipeline from VP 24 Block Valve to Pier 3. Close VP 24 Valve to isolate Pier 3 pipeline from pressure test. At 11:00 AM, Pier 3 gauge reading 148 PSIG. At 4:52 PM, leak test accepted with 144.7 PSIG. Total of four flange leaks of 32 ounces caught during four hour leak test. At 5:30 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	Possible leak from JP-5 VP 24 Valve to Pier 3.
General Comments:	Hot and Sunny. Observed pressure from JP-5 VP 24 to Pier 3 for six hours at Pier 3 pump house. Pressure fell from 148 PSIG to 136 PSIG. Recommend at later date to refill vent air at Pier 3 Block Valve and repressure to test pressure and observe pressure trend.
Work Planned Next 24 Hours:	Pressure from VP 24 Block Valve to Pier 3 Pump House and observe pressure. Start pigging from 381 to PH 1982.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORTCONTRACTOR WORK SUMMARY – PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #10

Date:	Thursday July 18, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0809D
Project Title:	Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	3			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	9.5			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	40%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England, Kirsten Glesne & Bill Hinkle arrived at NAVSTARR. At 8:30 AM, open VP #24 block valve to Pier 3 Pump House. Remove gauge at Pier 3 Pump House. Bleed air. At 9:55 AM, start pressuring from VP 24 block valve to Pier 3 Pump House. At 10:02 AM, start pressure test with 161.5 PSIG. At 1:15 PM, pressure 151.7 PSIG. At 1:27 PM, bleed pressure to 87 PSIG. Waiting on Fuels to provide additional canisters to drain pressure. At 1:38 PM, pressure 75 PSIG. Pressure settling. At 2:03 PM, 76.5 PSIG on pipeline from VP 24 block valve to Pier 3 Pump House. At 2:45 PM, 76.7 PSIG on pipeline. Open VP 24 valve and terminated test. Moved instruments to 381 and set up to pressure test 8" pipeline to air field. At 4:30 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	Possible leak on 12" JP-5 from VP 24 Block Valve to Pier 3 Pump House.
General Comments:	Hot and Sunny. Pressure trending indicates a leak at test pressure of 150 PSIG from VP 24 to Pier 3 pump house.
Work Planned Next 24 Hours:	Pressure test 8" from VP 9 to Air Field.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING & PIGGING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #11

Date:	Friday July 19, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0810D
Project Title:	Pressure Testing and Pigging	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pigging			
Number of Staff on site:	3			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	9.5			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	55%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England, Kirsten Glesne & Bill Hinkle arrived at NAVSTARR. At 8:45 AM, bleed air. Fill launch barrel. At 9:00 AM, open trap gate valve. At 9:02 AM, launch polly pig. At 9:11 AM, passed blow off pit. At 9:19 AM, receive polly pig. At 10:16 AM, load polly brush pig. At 10:36 AM, open trap gate valve. At 10:38 am, launch polly brush pig. At 10:58 AM, receive polly brush pig. At 11:35 AM, load bidi brush pig. At 12:40 PM, open trap gate valve. At 12:42 PM, launch bidi gauge pig. At 12:54 PM, pig passed blow off pit. At 1:11PM, bidi-brush pig received. At 1:40 PM, load bidi-gauge pig. At 1:45 PM, open trap gate valve. At 1:47 PM, launch bidi-gauge pig. At 2:01 PM, pig passed blow off pig. At 2:12 PM, bidi-gauge pig received. At 4:30 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	None.
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	Pressure test 1DFM Primary & Secondary on Pier 1.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING & PIGGING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #12

Date:	Saturday July 20, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0811D
Project Title:	Pressure Testing and Pigging	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	2			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	8			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	66%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR. At 7:40 AM, open DFM-Primary line valve at VP 27 on Pier 1. At 8:45 AM, fill DFM-Primary & DFM-Secondary. At 9:15 AM, start pressuring with 29 PSIG. At 9:25 AM, start pressure test on DFM-Primary & DFM-Secondary on Pier 1 with 166 PSIG. Bleed pressure eight times during test. At 1:25 PM, pressure test accepted with 177 PSIG. At 2:45 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	Leak in DFM-Primary line blind flange at Pier 1 end.
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	Pressure test DFM Primary & Secondary on Pier 1.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING & PIGGING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #13

Date:	Monday July 22, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0812D
Project Title:	Pressure Testing and Pigging	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	3			
Work Location:	NAVSTA Fuels Depot			
Hours Worked Today:	12			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	77%			
Anticipated Completion Date:	August 05, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR. At 9:20 AM, open 8" valve in VP 9 to JP-5 pipeline. At 9:25 AM, pressure from Pump 1084 to Valve TFJ-153 to 70 PSIG and check valves at air field. Found Valve TFJ-153 open. Closed Valve TFJ-153. At 10:07 AM, start pressuring 8" pipeline with 70 PSIG from VP9 to Valve TFJ-153. At 10:14 AM, start pressure test on 8" pipeline with 169 PSIG. At 2:14 PM, completed strength test with 155.0 PSIG and started leak test. At 6:14 PM, completed leak test with 152.0 PSIG. Three ounces were collected in leak in 1" valve in VP 9. Leak test held for thirty minutes between 3:45 PM and 4:15 PM. At 6:45 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	Pressure test 12" JP-5 pipeline from VP 9 to PH 1982.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING & PIGGING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #14

Date:	Tuesday July 23, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0813D
Project Title:	Pressure Testing-Pigging	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1	#2		
Contractor Name:	Worley International Inc	Enduro Pipeline Services		
General Type of Work:	Pressure Testing	Pigging		
Number of Staff on site:	3	1		
Work Location:	NAVSTA Fuels Depot	NAVSTA Tank Farm 381		
Hours Worked Today:	10.5	3		
Job Safety Meeting:	**YES** / NO	**YES** / NO		
Lost Time Incident:	YES / **NO**	YES / **NO**		
Hazardous Material Release:	YES / **NO**	YES / **NO**		

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	88%	0%		
Anticipated Completion Date:	July 27, 2002	July 24, 2002		

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR. At 7:30 AM, open 12"receiver by pass valve bypass and fill 12" pipeline. At 7:45 AM, connect instruments to 12" launcher barrel. At 8:20 AM, Fuels truck arrives at 381 and pressure 12" pipeline using 1084 pump. At 8:35 AM, start pressuring with 67 PSIG. At 8:43 AM, start strength test with 170 PSIG. At 12:43 PM, strength test accepted with 166.8 PSIG and start leak test. At 4:43 PM, leak test accepted with 162.8 PSIG. At 5:30 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	None.
General Comments:	Overcast. Hot and Sunny.
Work Planned Next 24 Hours:	Run Enduro Ddl Tool from 381 Launcher to PH 1982 Receiver.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING & PIGGING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #15

Date:	Wednesday July 24, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G11-0814D
Project Title:	Pressure Testing and Pigging	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1	#2		
Contractor Name:	Worley International Inc	Enduro Pipeline Services		
General Type of Work:	Pigging	Pigging		
Number of Staff on site:	3	1		
Work Location:	NAVSTA Tank Farm 381	NAVSTA Tank Farm 381		
Hours Worked Today:	9.5	8		
Job Safety Meeting:	**YES** / NO	**YES** / NO		
Lost Time Incident:	YES / **NO**	YES / **NO**		
Hazardous Material Release:	YES / **NO**	YES / **NO**		

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	88%	100%		
Anticipated Completion Date:	July 27, 2002	July 24, 2002		

Summary of Work Completed:	At 7:00 AM, Dale England, Kirsten Glesne & Bill Hinkle arrived at NAVSTARR. At 8:15 AM, drain launcher barrel. At 8:30 AM, load Enduro Dummy tool. At 8:46 AM, fill launcher barrel. Circulate JP-5 to Tank 2273. At 8:51 AM, open launcher trap valve. At 8:53 AM, launch Enduro dummy tool. Close 6" kicker line. At 9:04 AM, Enduro dummy tool passed blow off pit. At 9:13 AM, receive Enduro dummy tool. At 9:25 AM, dummy tool removed with no damage. At 10:00 AM, drain launcher barrel. At 10:08 AM, load Enduro DDL tool. At 10:15 AM, fill launcher barrel. At 10:18 AM, start Pump 1084. At 10:20:00 AM, launch Enduro DDL tool. At 10:31 AM, Enduro DDL tool passed blow off pit. At 10:40:20 AM, receive Enduro DDL tool. At 2:30 PM, Enduro delivered final DDL report. At 4:30 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	None.
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	Pressure test from Pantographs to Air Field Filters on Flight Line.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY -- PRESSURE TESTING & PIGGING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #16

Date:	Thursday July 25, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0815D
Project Title:	Pressure Testing-Pigging	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	3			
Work Location:	Flight Line			
Hours Worked Today:	9.5			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	88%			
Anticipated Completion Date:	July 27, 2002			

Summary of Work Completed:	At 5:50 AM, Dale England & Bill Hinkle arrived at NAVSTARR Flight Line. A 6:00 AM, start rig up. At 7:20 AM, start pressuring with 5 PSIG. At 7:30 AM, start test from Flight Line Filters to Pantographs with 132 PSIG. At 7:47 AM, repressured from 126 PSIG to 135 PSIG. At 8:37 AM, test terminated with 137 PSIG due to leaks in Hot Pits. At 11:00 AM, off flight line. Rigged up instrumentation to 16" JP-5 DB & B Valve at PH 1982. Removed 3" valve and installed blind flanges at 381. At 4:00 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	Leaks in Cla-Val and Vallen Ball Valves caused cancellation of test.
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	Pressure test from PH 1982 to JP-5 Tank Farm.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT CONTRACTOR WORK SUMMARY – PRESSURE TESTING & PIGGING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #17

Date:	Friday July 26, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G44-0816D
Project Title:	Pressure Testing and Pigging	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1			
Contractor Name:	Worley International Inc			
General Type of Work:	Pressure Testing			
Number of Staff on site:	2			
Work Location:	PH 1982			
Hours Worked Today:	9.5			
Job Safety Meeting:	**YES** / NO			
Lost Time Incident:	YES / **NO**			
Hazardous Material Release:	YES / **NO**			

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2	#3	#4
Percentage of Work Complete:	88%			
Anticipated Completion Date:	July 27, 2002			

Summary of Work Completed:	At 7:00 AM, Dale England & Bill Hinkle arrived at NAVSTARR Flight Line. At 7:45 AM, open PH 1982 with 14 PSIG. At 8:29 AM, start pressuring from 1084. At 8:36 AM, 76 PSIG at PH 1982. At 8:50 AM, start pressuring with 75 PSIG. At 9:10 AM, pumped 51 gallons with no pressure gain. At 9:20 AM, discover 1084 valve open. Closed valve. At 9:30 AM, stopped after no pressure gain. With 102 gallons pumped. Open Tank 2272, 2271, 2273, and 2274 tank valves and filled piping with JP-5. At 10:15 AM, repressured system from Pump 1084. At 10:32 AM, 42 gallons pumped with 88 PSIG. At 11:24 AM, 94 PSIG with 164 gallons pumped. At 11:45 AM, pressure increasing on tank 2270. No blind flanges or skillet installed in valve. Decision to terminate pressure test. At 4:30 PM, leave NAVSTARR.
Agreed Scope Changes:	
Problems / Areas of Concern:	Leaks in Cla-Val and Vallen Ball Valves in Hot Pits caused cancellation of test.
General Comments:	Hot and Sunny.
Work Planned Next 24 Hours:	Install tubing on DB & B Valves.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT– CONSTURCTION AND PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #4

Date:	Monday, October 28, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G11-0849D
Project Title:	Construction and Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1	#2
Contractor Name:	Worley International Inc	Riviera Engineering
General Type of Work:	Project Engineer	Contractor
Number of Staff on site:	1	3
Work Location:	NAVSTA Fuels Depot	NAVSTA Fuels Depot
Hours Worked Today:	10	4
Job Safety Meeting:	**YES** / NO	**YES** / NO
Lost Time Incident:	YES / **NO**	YES / **NO**
Hazardous Material Release:	YES / **NO**	YES / **NO**

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2
Percentage of Work Complete:		
Anticipated Completion Date:	Nov 2, 2002	October 31, 2002

Summary of Work Completed:	Verified both barrels were empty. Removed both barrels and gate valves. Installed two new twin seal valves and blind flanges.
Agreed Scope Changes:	
Problems / Areas of Concern:	Contractor did not show up until 11:00 am and had no tools or crane. Used Fuels tools and borrowed crane from Relaible to remove and install valves. Welders will not be available until Wed to do welding. If they show up on Wednesday, will not cause overall delay in project as planning on pressure testing thru Thursday. If welders cannot be secured, qualified welder will be brought out from US to complete work.
General Comments:	
Work Planned Next 24 Hours:	Prepare JP-5 pipeline from PH 1982 to Pier 1 for pressure test and test if time permitting. Verify availability of welders. Verify as-built drawings.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT– CONSTURCTION AND PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #5

Date:	Tuesday, October 29, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G11-0850D
Project Title:	Construction and Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1
Contractor Name:	Worley International Inc
General Type of Work:	Project Engineer
Number of Staff on site:	2
Work Location:	NAVSTA Fuels Depot
Hours Worked Today:	10
Job Safety Meeting:	**YES** / NO
Lost Time Incident:	YES / **NO**
Hazardous Material Release:	YES / **NO**

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1
Percentage of Work Complete:	
Anticipated Completion Date:	Nov 1, 2002

Summary of Work Completed:	Rigged up necessary equipment for pressure testing of JP-5 pipeline from PH 1982 to Pier 1. Delay in getting equipment ready due to Mr. Brown not leaving orders for fuels personnel. Pressured pipeline to 130 psi around lunch and allowed to stabilized. Left pressured overnight. Hauled away trap barrels to be welded off site.
Agreed Scope Changes:	
Problems / Areas of Concern:	Tank 2270 could not be filled as previously discussed, as Mr. Brown was not in the office. This will delay pressure testing the 18-inch JP-5 pipeline until Thursday assuming the tank if filled and line circulated on Wednesday. Welding on trap barrels will be done off site. Barrels will be returned on Thursday for installation. If all goes well, all pressure testing and construction will be done on Thursday.
General Comments:	
Work Planned Next 24 Hours:	Pressure testing of JP-5 pipeline from PH 1982 to Pier 1. Filling of tank 2270 and circulating 18-inch pipeline to try and remove all air in pipeline.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT– CONSTURCTION AND PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #6

Date:	Wednesday, October 30, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G11-0851D
Project Title:	Construction and Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1
Contractor Name:	Worley International Inc
General Type of Work:	Project Engineer
Number of Staff on site:	2
Work Location:	NAVSTA Fuels Depot
Hours Worked Today:	10
Job Safety Meeting:	**YES** / NO
Lost Time Incident:	YES / **NO**
Hazardous Material Release:	YES / **NO**

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1
Percentage of Work Complete:	
Anticipated Completion Date:	Nov 1, 2002

Summary of Work Completed:	Completed pressure test on JP-5 pipeline from PH 1982 to Pier 1. Filled tank 2270 to prepare for pressure test. Observed fabrication of traps at contractors yard.
Agreed Scope Changes:	
Problems / Areas of Concern:	
General Comments:	
Work Planned Next 24 Hours:	Fill JP-5 12-inch pipeline. Pressure up 18-inch pipeline and bleed air into tanks. Pressure test 18-inch JP-5 pipeline from PH 1982 to JP-5 tanks. Install trap barrels and complete touch-up painting. Complete installation of pressure relief tubing on twin seal valves. If all goes as planned, project will be complete by end of business on Thursday.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT– CONSTURCTION AND PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #7

Date:	Thursday, October 31, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G11-0852D
Project Title:	Construction and Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1	#2
Contractor Name:	Worley International Inc	Riviera Engineering
General Type of Work:	Project Engineer	Contractor
Number of Staff on site:	2	3
Work Location:	NAVSTA Fuels Depot	NAVSTA Fuels Depot
Hours Worked Today:	11	8
Job Safety Meeting:	**YES** / NO	**YES** / NO
Lost Time Incident:	YES / **NO**	YES / **NO**
Hazardous Material Release:	YES / **NO**	YES / **NO**

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2
Percentage of Work Complete:		
Anticipated Completion Date:	Nov 2, 2002	Nov 1, 2002

Summary of Work Completed:	Pressured up 18-inch JP-5 pipeline to JP-5 hill. Bled air into tanks. Pressure did not hold. Installed cap in pressure relief line in tank 381. Re-pressured. Did not hold. Leak at tank 2273 flange may be potential cause. Relieved pressure from pipeline. Completed pressure relief tubing in tank farm and airfield. Installed both trap barrels and secured after crane and barrels showed up at 2:30.
Agreed Scope Changes:	
Problems / Areas of Concern:	Pressure test from PH 1982 to JP-5 hill is not holding. Replacement of gasket at tank 2273 may be problem, but air also believed to be in pipeline.
General Comments:	
Work Planned Next 24 Hours:	Pull back suction on JP-5 pipeline. Install new 16-inch gasket on tank 2273 valve. Tighten two additional flanges with small leaks. Pressure up JP-5 pipeline and relief air into tanks to assure flange no longer leaks. Pressure test JP-5 pipeline in Saturday.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT– CONSTURCTION AND PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #8

Date:	Friday, November 1, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G11-0854D
Project Title:	Construction and Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1	#2
Contractor Name:	Worley International Inc	Riviera Engineering
General Type of Work:	Project Engineer	Contractor
Number of Staff on site:	2	3
Work Location:	NAVSTA Fuels Depot	NAVSTA Fuels Depot
Hours Worked Today:	10	8
Job Safety Meeting:	**YES** / NO	**YES** / NO
Lost Time Incident:	YES / **NO**	YES / **NO**
Hazardous Material Release:	YES / **NO**	YES / **NO**

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1	#2
Percentage of Work Complete:		
Anticipated Completion Date:	Nov 2, 2002	Nov 1, 2002

Summary of Work Completed:	Assisted Fuels in installing a new 16-inch gasket on tank 2272 valve that leaked. Tightened dripping flanges on other tanks. Pumped from Tank 381 into 18-inch pipeline. Opened twin seal valves on all JP-5 tanks to bleed air into tank. Secured 18-inch pipeline and pipeline filled. Finished painting of all new piping.
Agreed Scope Changes:	
Problems / Areas of Concern:	
General Comments:	
Work Planned Next 24 Hours:	Pressure test 18-inch JP-5 pipeline from PH 1982 to JP-5 tanks. Pack-up test kit.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT– CONSTURCTION AND PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #9

Date:	Saturday, November 2, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G11-0855D
Project Title:	Construction and Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1
Contractor Name:	Worley International Inc
General Type of Work:	Project Engineer
Number of Staff on site:	2
Work Location:	NAVSTA Fuels Depot
Hours Worked Today:	10
Job Safety Meeting:	**YES** / NO
Lost Time Incident:	YES / **NO**
Hazardous Material Release:	YES / **NO**

NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1
Percentage of Work Complete:	
Anticipated Completion Date:	Nov 3, 2002

Summary of Work Completed:	When arrived in AM, 18-inch pipeline was believed to be packed with fuel. Pressure at PH 1982 only showed 23 psi indicating air was still in pipeline. After a great deal of discussion, convinced fuels that we needed to flow pipeline up the 18-inch pipeline from low point to high point. Turned on pumps in PH 1982 to flow from tank 2271 to tank 2274 down 12-inch and up 18-inch pipelines. Flowed for 45 minutes. Than closed tank 2274 to build pressure on 18-inch. Opened tanks valves on all 5 tanks while pumping to assure air was out of pipeline. Secured 18-in pipeline with approximately 80 psi at PH. Pressured up to 225 psi with test pump. Pressure was still dropping but at much slower rate. Verified previous leaks were not severe. Leak was noticed at JP-5 fill stand. Was determined that fuels personnel had opened 6-inch twin seal inside tank 381, without informing Worley. Secured 6-inch in tank 381 and pressure held at 160 psi at PH 1982. Too late in day to start test as overtime was not available. De-pressured fill stand line into buckets. De-pressured JP-5 18-inch into tank through by-pass to approximately 100 psi. Secured 18-inch pipeline.
Agreed Scope Changes:	
Problems / Areas of Concern:	
General Comments:	
Work Planned Next 24 Hours:	Pressure test 18-inch JP-5 pipeline from PH 1982 to JP-5 tanks. Pack-up test kit.

NAVAL FACILITIES ENGINEERING SERVICE CENTER

DAILY PRODUCTION SITE REPORT-- CONSTURCTION AND PRESSURE TESTING

NAVSTA ROOSEVELT ROADS, PUERTO RICO

CONTRACTOR WORK SUMMARY
SITE WORK DAY #10

Date:	Sunday, November 3, 2002	**Job No:**	065/07074-18
Delivery Order No:	7074-18	**Site Report No:**	707418-G11-0856D
Project Title:	Construction and Pressure Testing	**Work Location:**	Roosevelt Roads, Puerto Rico
COTR:	Terri Regin	**Contract No:**	N47408-99-D-8014

CONTRACTOR / SUBCONTRACTOR DETAILS:

Contractor Number:	#1
Contractor Name:	Worley International Inc
General Type of Work:	Project Engineer
Number of Staff on site:	2
Work Location:	NAVSTA Fuels Depot
Hours Worked Today:	10
Job Safety Meeting:	**YES** / NO
Lost Time Incident:	YES / **NO**
Hazardous Material Release:	YES / **NO**

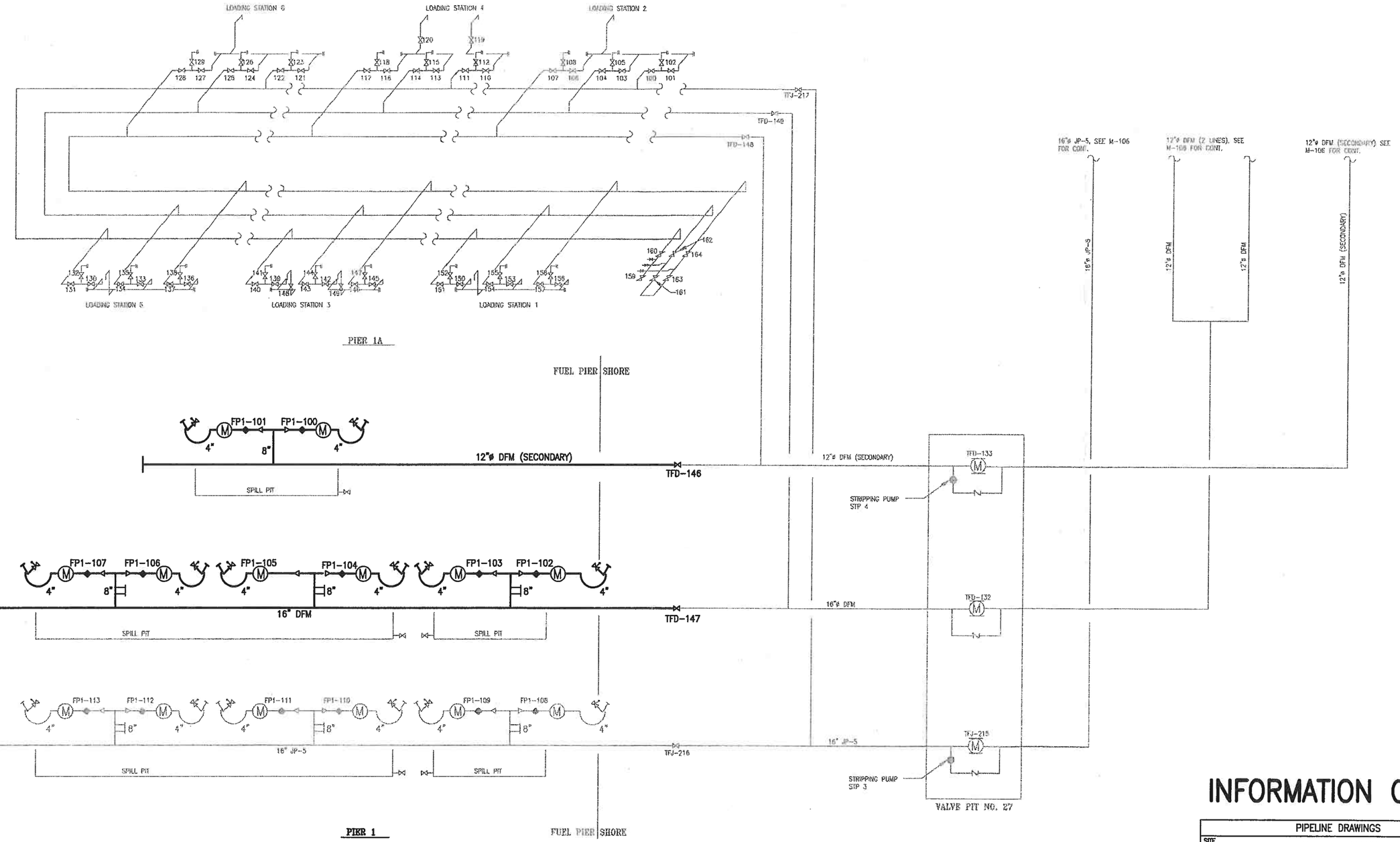
NOTE: "If yes, attach a copy of safety meeting minutes, a copy of the completed OSHA report, a full report of the incident, and/or a list of materials received."

CONTRACTOR / SUBCONRACTOR WORK SUMMARY:

Contractor Number:	#1
Percentage of Work Complete:	
Anticipated Completion Date:	Nov 3, 2002

Summary of Work Completed:	Pressured up JP-5 pipeline from PH 1982 to JP-5 tanks. Tested for 8 hours. Some drop in pressure still occurred, but within tolerance allowed. Released pressure on 18-inch pipeline and secured. Packed up pressure test kit for shipment.
Agreed Scope Changes:	
Problems / Areas of Concern:	
General Comments:	Site work for project is complete
Work Planned Next 24 Hours:	Deliver pressure test kit to supply office and fly home.

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	12:40	1B

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
1	11/06/02	GENERAL UPDATE	MW	MW	DAE	DAE	–
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

DRAWING NUMBER | REFERENCE DRAWINGS

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS	
DATE	12-05-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

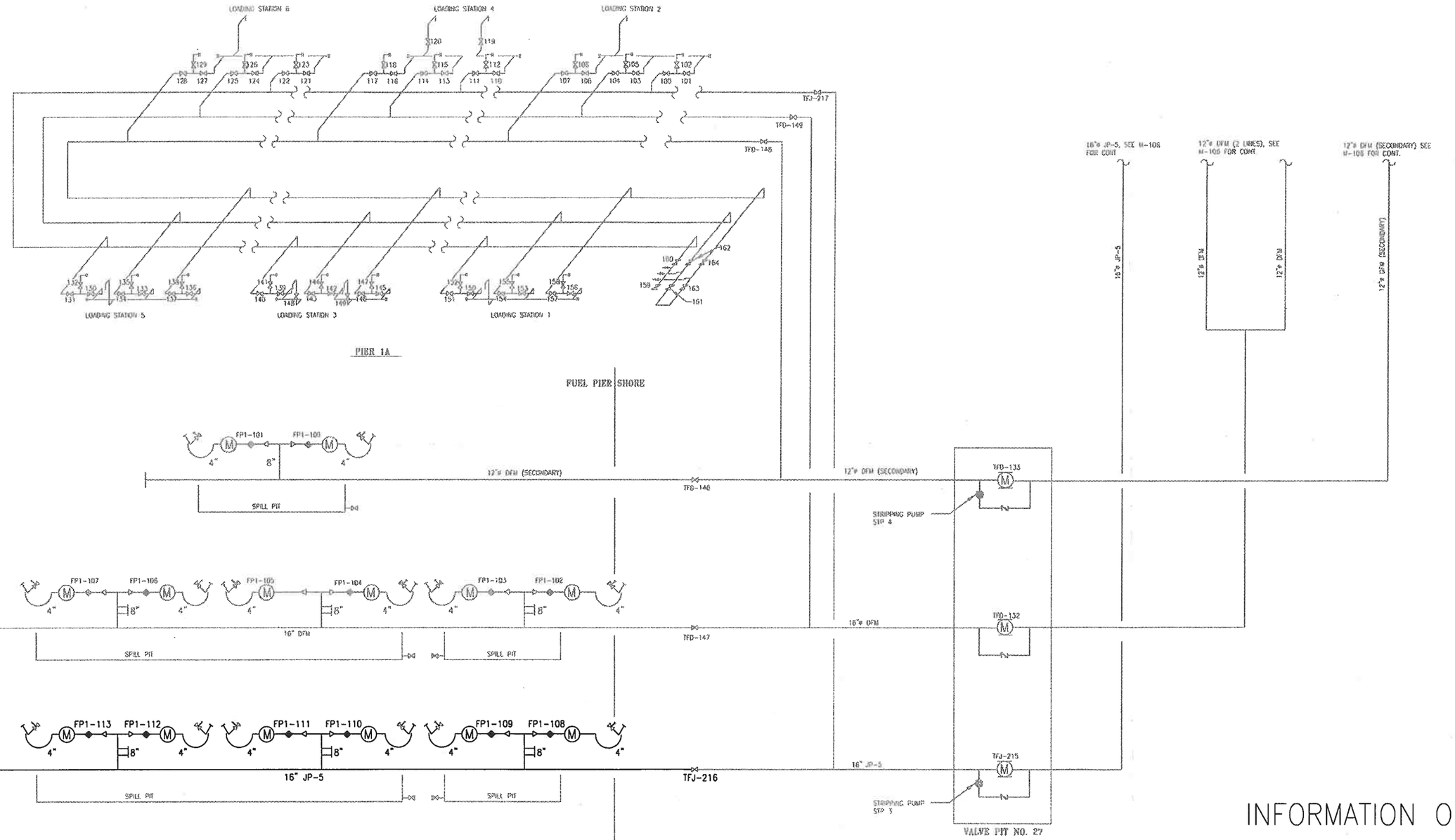
TITLE: TEST SEGMENT 1
–
–

SCALE: –
DRAWING NO.: SK-18-15-0101
REV: 1

FORM: NAVY_D

PLOT DATE: 06 NOV 02
TIME: 12:40
PLOTTED BY: MWHITE
DESIGN FILE: N:\074\18\DRAWINGS\15\SK18150101.DWG

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

Worley International Inc
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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	12:44	1D

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
		1	11/06/02	GENERAL UPDATE	MW		DAE	DAE	-
		0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-05-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

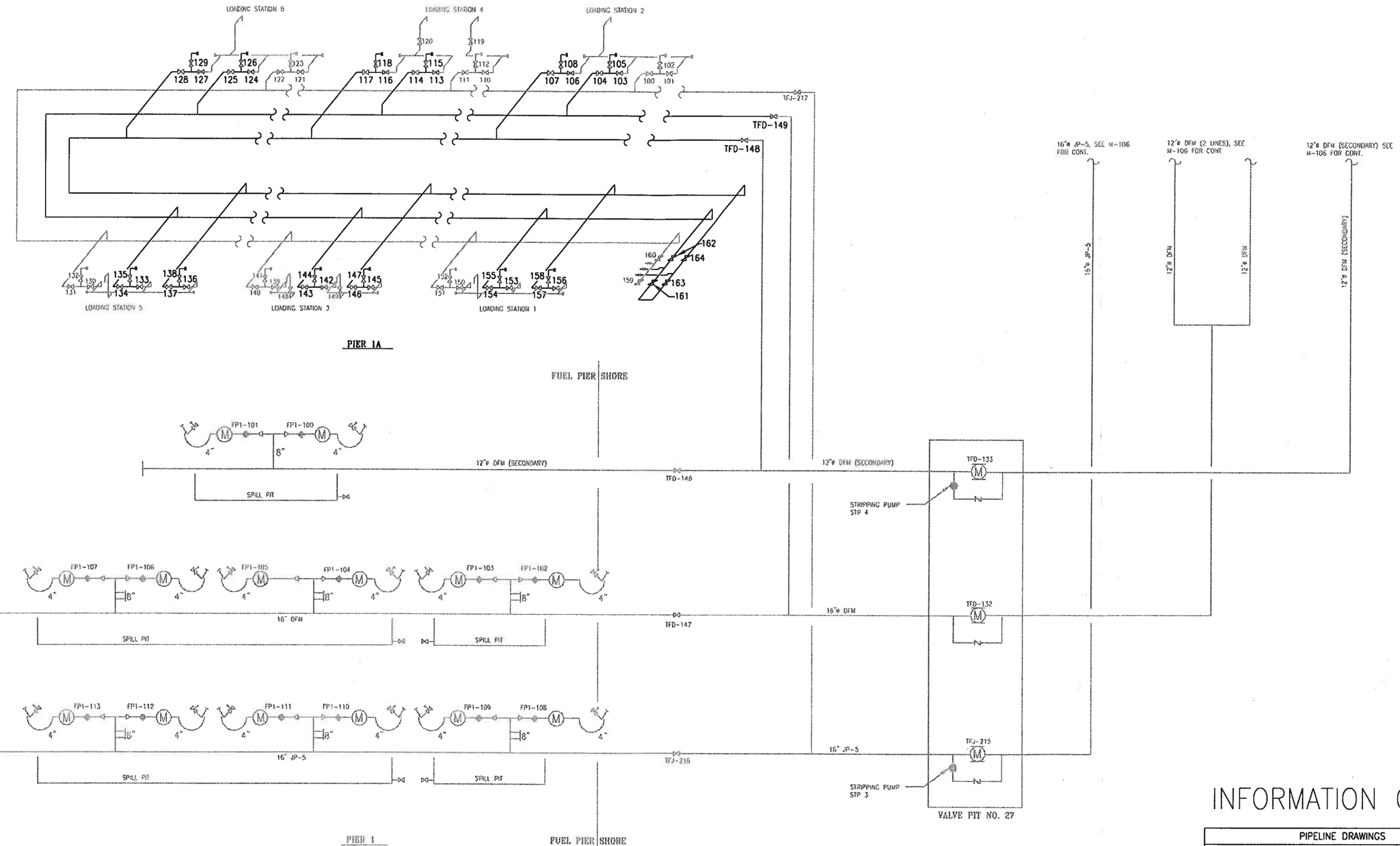
TITLE
TEST SEGMENT 2
-
-

SCALE: -
DRAWING NO.: SK-18-15-0102
REV: 1

FORM: WAY_D

PLOT DATE: 06 NOV 02
TIME: 12:44
BY: MWHITE
DESIGN FILE: N:\074\18\DRAWINGS\15\SK18150102.DWG

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

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WORLEY PROJECT NUMBER	LAST UPDATE	INT REV
065-07074	06 NOV 2002 12:47	0D

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG APPRV.	CLIENT
		0	12-21-01	ISSUED AS FINAL	BAS			

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Washington Navy Yard
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Washington, DC 20374-5063

DRAWN	BAS
DATE	12-05-01
CHECKED	
DATE	
ENGINEER	
DATE	
APPROVED	
DATE	

TITLE: TEST SEGMENT 3
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–

SCALE: –

DRAWING NO.: SK-18-15-0103

REV: 0

FORM: WW_D

PLOT DATE: 06 NOV 02 TIME: 12:47 PLL BY: MWHITE
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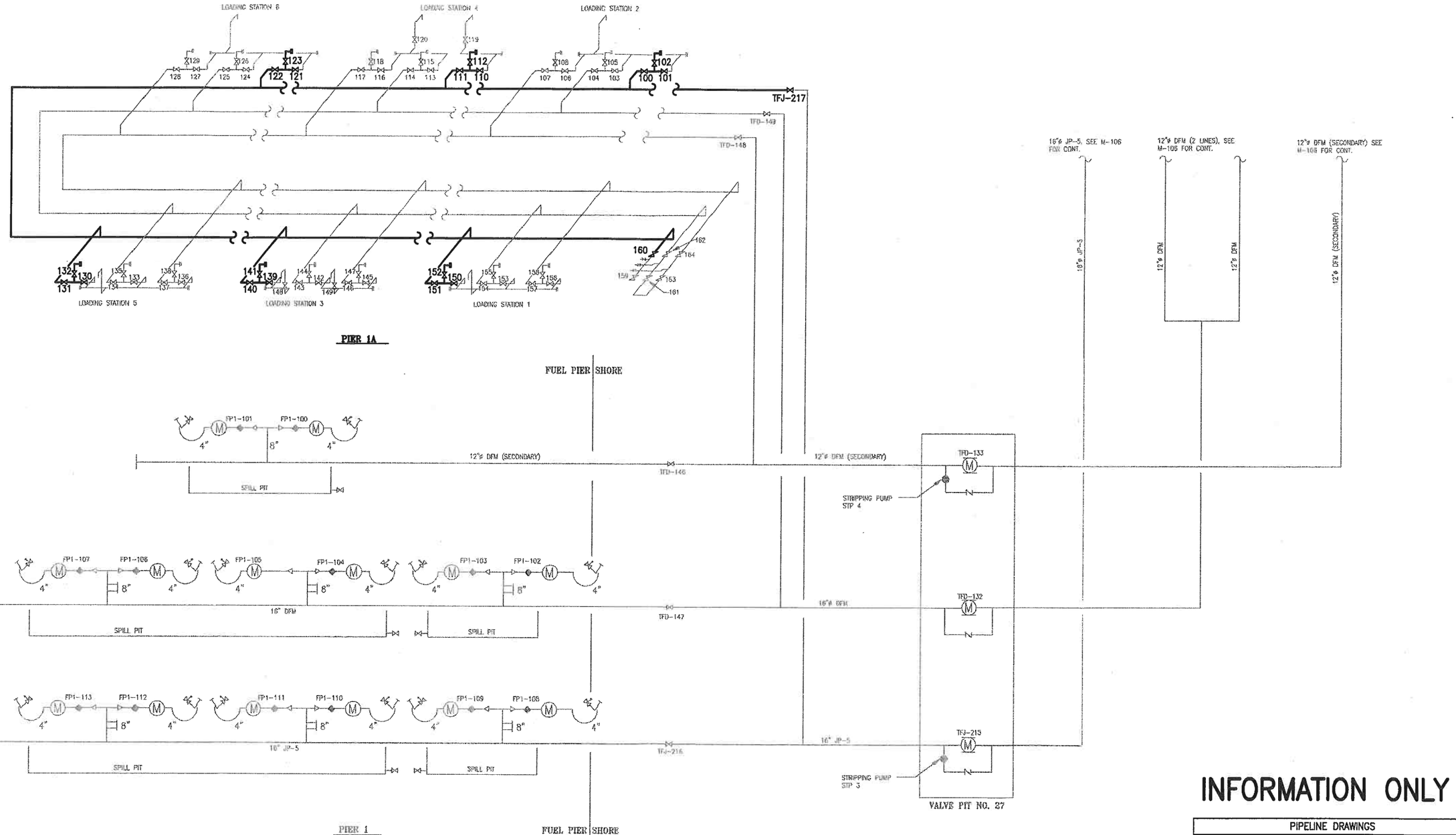
NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	12:49	1C

REV	DATE	REVISION
1	11/06/02	GENERAL UPDATE
0	12-21-01	ISSUED AS FINAL

DRAWN	CHECK	ENG	APPRVL	CLIENT
BAS	RS	BM	DAE	–

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Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-05-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE: TEST SEGMENT 4
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SCALE: –

DRAWING NO.: SK-18-15-0104

REV: 1

FORM: NAVF_D

PLOT DATE: 06 NOV 02 PLOT BY: MWHITE
TIME: 12:49
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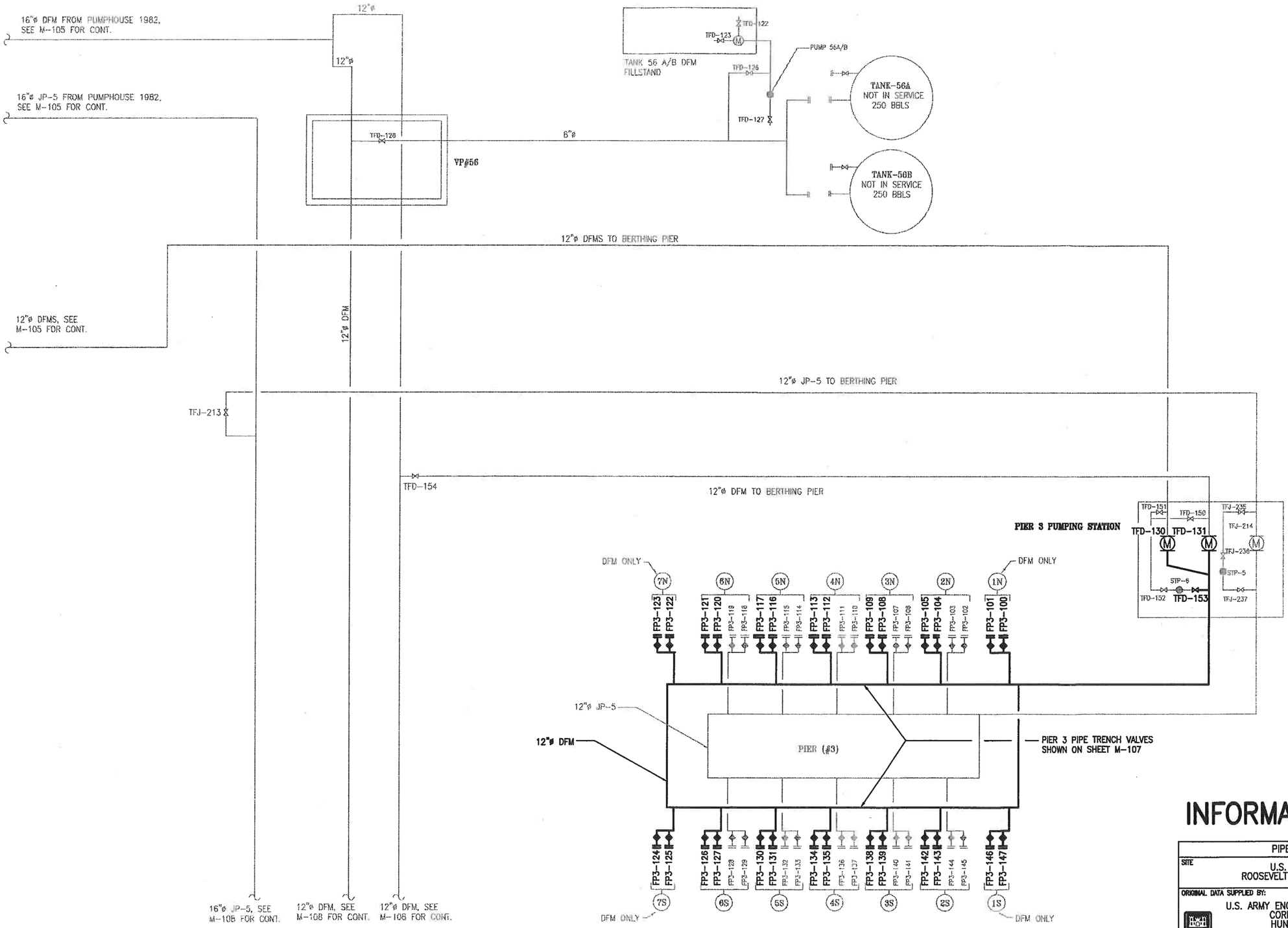

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PIPELINE DRAWINGS	
SITE	U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO
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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	13:11	1B

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
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		0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

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Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-05-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE
TEST SEGMENT 5
–
SHEET 1 OF 2

SCALE	DRAWING NO.	REV
–	SK-18-15-0105	1

FORM: NAVY_D

PLOT DATE: 06 NOV 02 TIME: 13:11 PI BY: MWHITE
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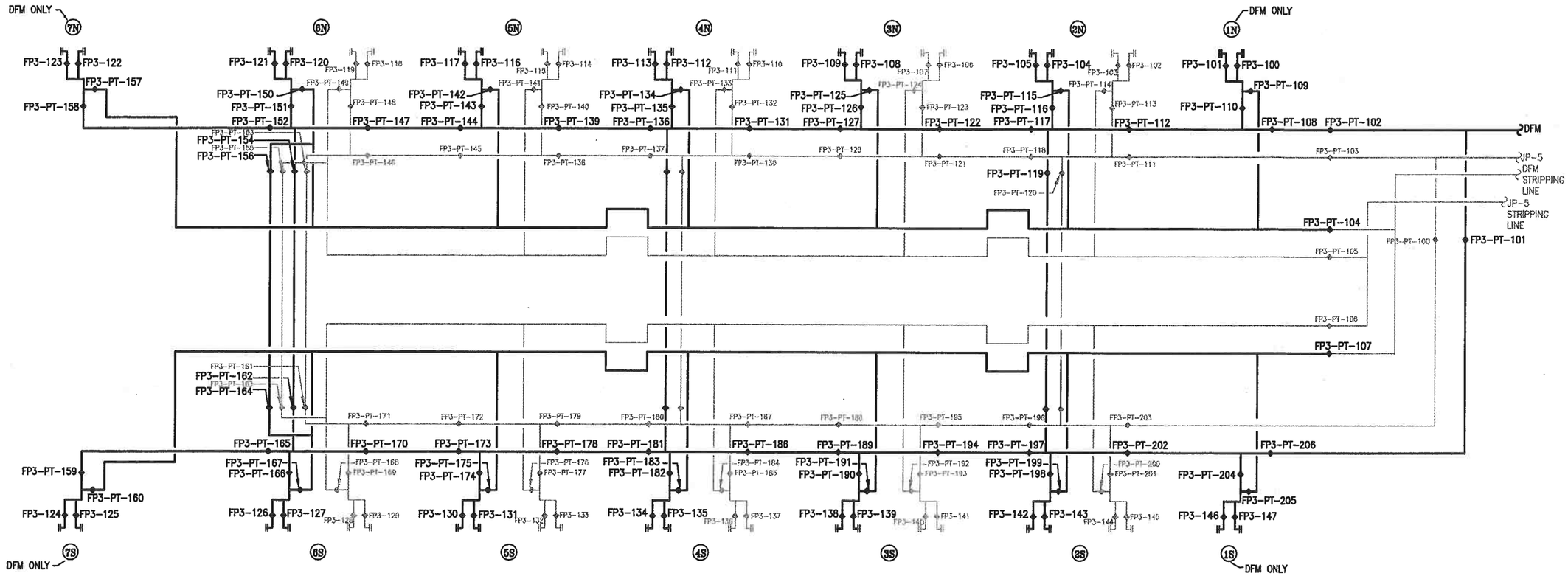

INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

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WORLEY PROJECT NUMBER	LAST UPDATE		BIT REV
065-07074	06 NOV 2002	13:13	0C

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
		0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	–	–

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Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-06-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE
TEST SEGMENT 5
–
SHEET 2 OF 2

SCALE	DRAWING NO.	REV
–	SK-18-15-0105	0

FORM: NAVY_D

PLOT DATE: 06 NOV 02 TIME: 13:13 BY: MWHITE PLC
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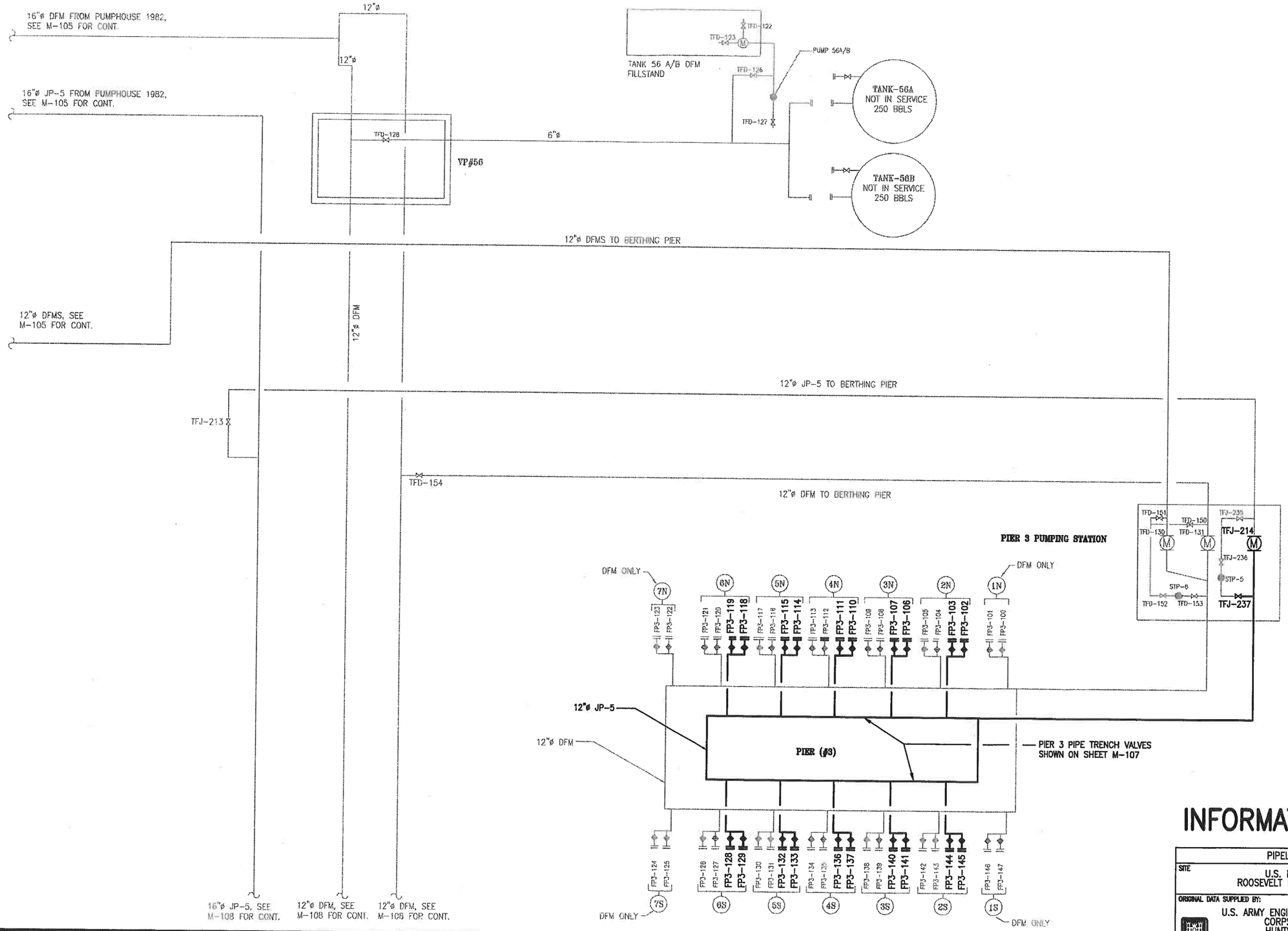

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PLOT DATE: 06 NOV 02
TIME: 13:20
BY: MWHITE
DESIGN FILE: N:\...274\18\DRAWINGS\15\SK18150106.DWG

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	13:19	1A

DRAWING NUMBER

REFERENCE DRAWINGS

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV.	CLIENT
1	11/06/02	GENERAL UPDATE	BAS	RS	BM	DAE	–
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

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Washington, DC 20374-5063

DRAWN	BAS
DATE	12-06-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

PIPELINE DRAWINGS

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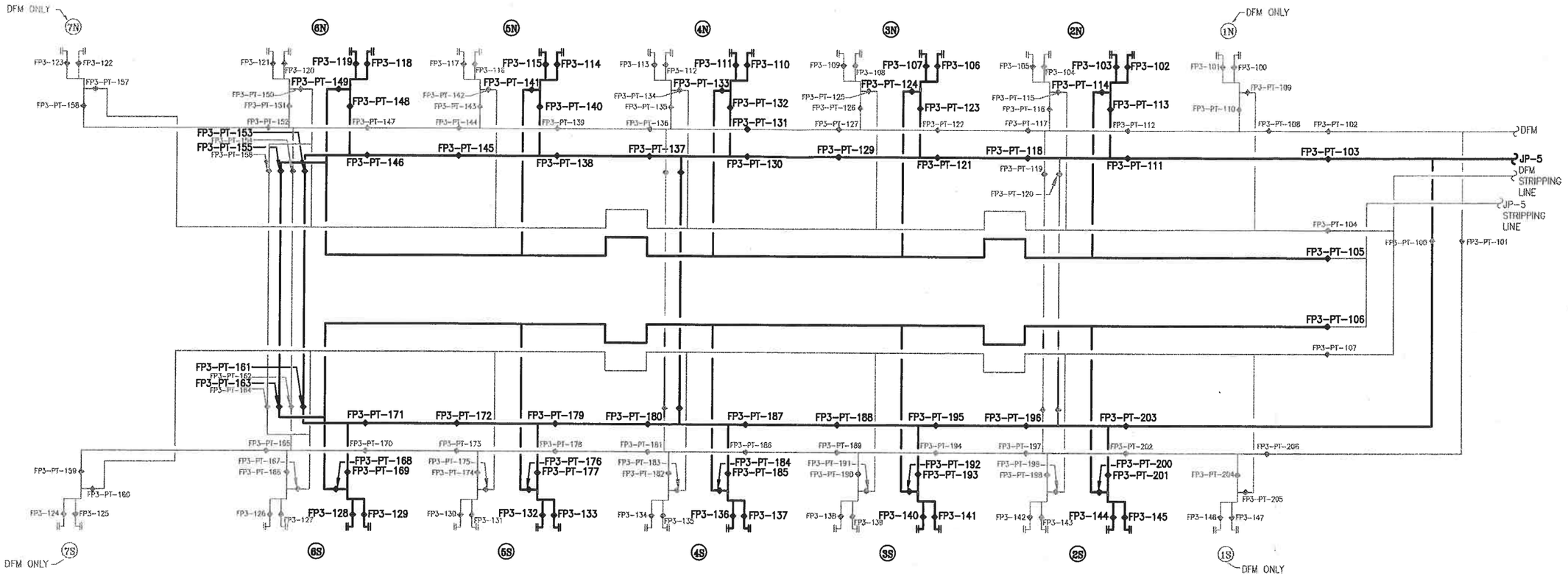
TITLE
TEST SEGMENT 6
–
SHEET 1 OF 2

SCALE –

DRAWING NO. SK-18-15-0106

REV 1

FORM: NAVY_D



INFORMATION ONLY

PLOT DATE: 06 NOV 02
TIME: 13:22
BY: MWHITE
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PIPELINE DRAWINGS	
SITE	U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO
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WORLEY PROJECT NUMBER	LAST UPDATE	INT REV
065-07074	06 NOV 2002 13:22	0C

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
		0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	–	–

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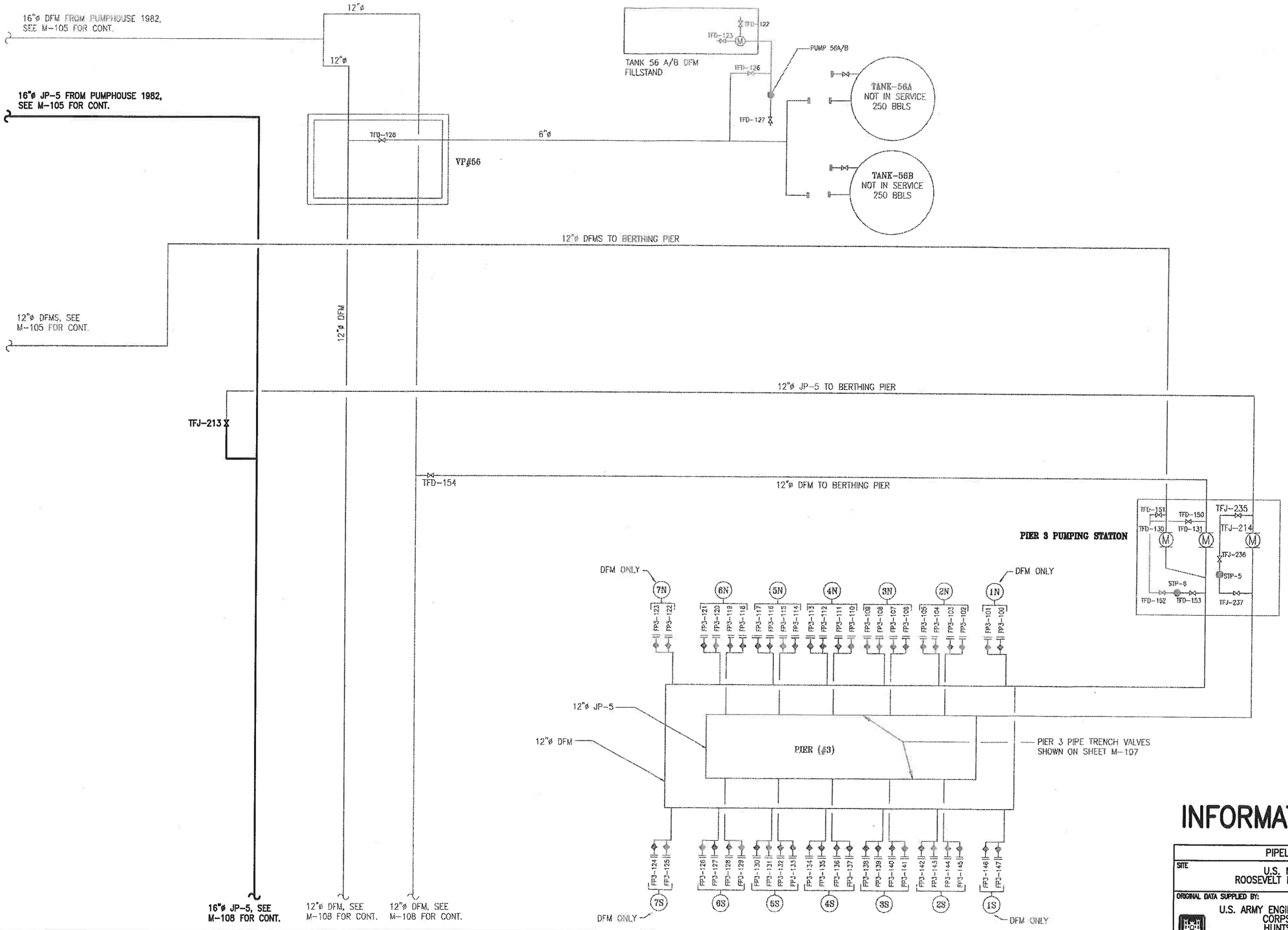
DRAWN	BAS
DATE	12-06-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE
TEST SEGMENT 6
–
SHEET 2 OF 2

SCALE	DRAWING NO.	REV
–	SK-18-15-0106	0

FORM: NAVY_D



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	13:30	1B

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRV.	CLIENT
		1	11/06/02	GENERAL UPDATE	MW	MW	DAE	DAE	–
		0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-06-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE: TEST SEGMENT 7 – SHEET 1 OF 3

SCALE: –

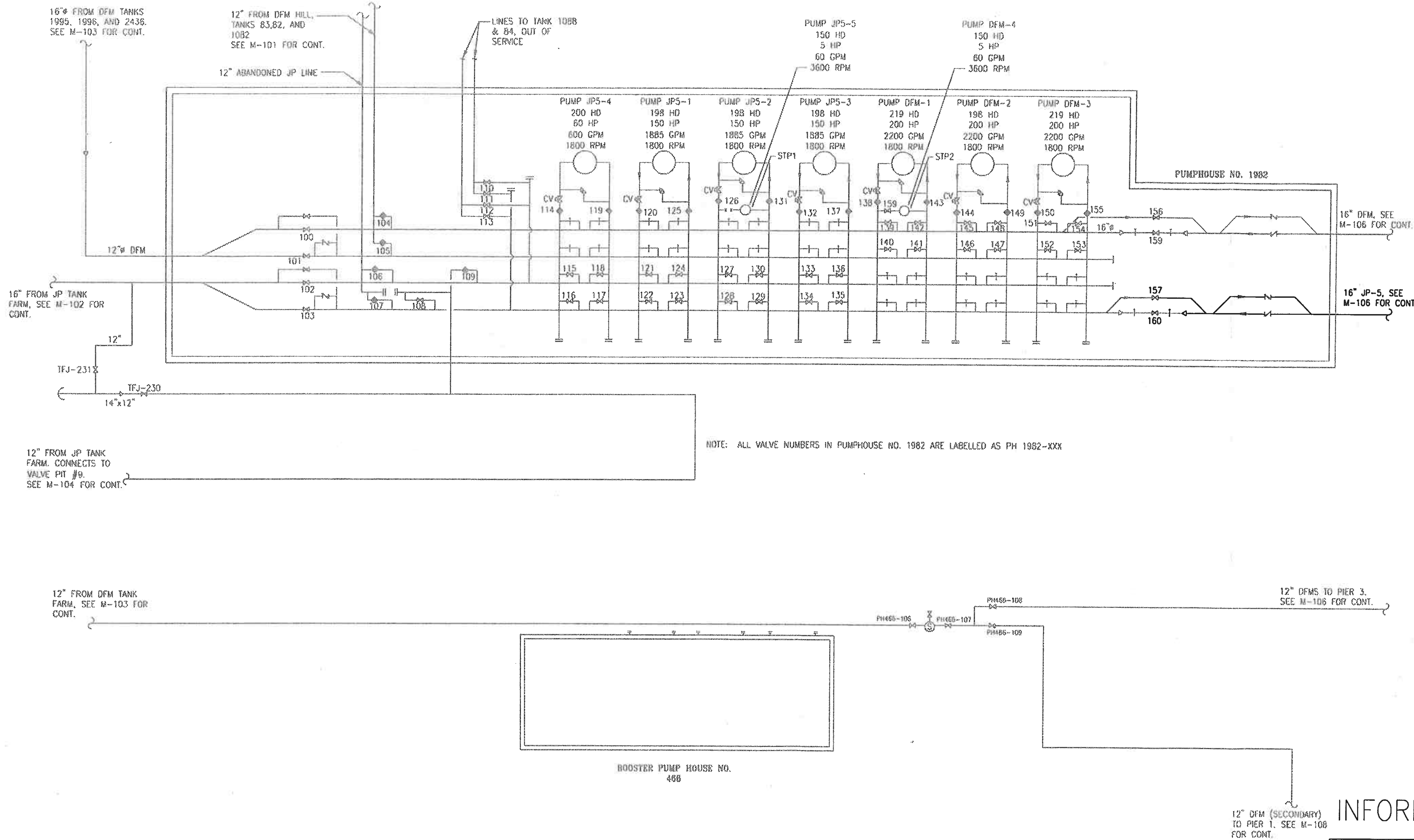
DRAWING NO.: SK-18-15-0107

REV: 1

FORM: NAVY_D

PLOT DATE: 06 NOV 02
PLOT TIME: 13:30
PLOT BY: MWHITE
DESIGN FILE: N:\074\18\DRAWINGS\15\SK18150107.DWG

M-105



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

PLOT DATE: 07 NOV 02 TIME: 07:44 PLC BY: MWHITE

DESIGN FILE: N:\074\18\DRAWINGS\15\SK18150107B.DWG

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	07 NOV 2002	07:45	1C

DRAWING NUMBER | REFERENCE DRAWINGS

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
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0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

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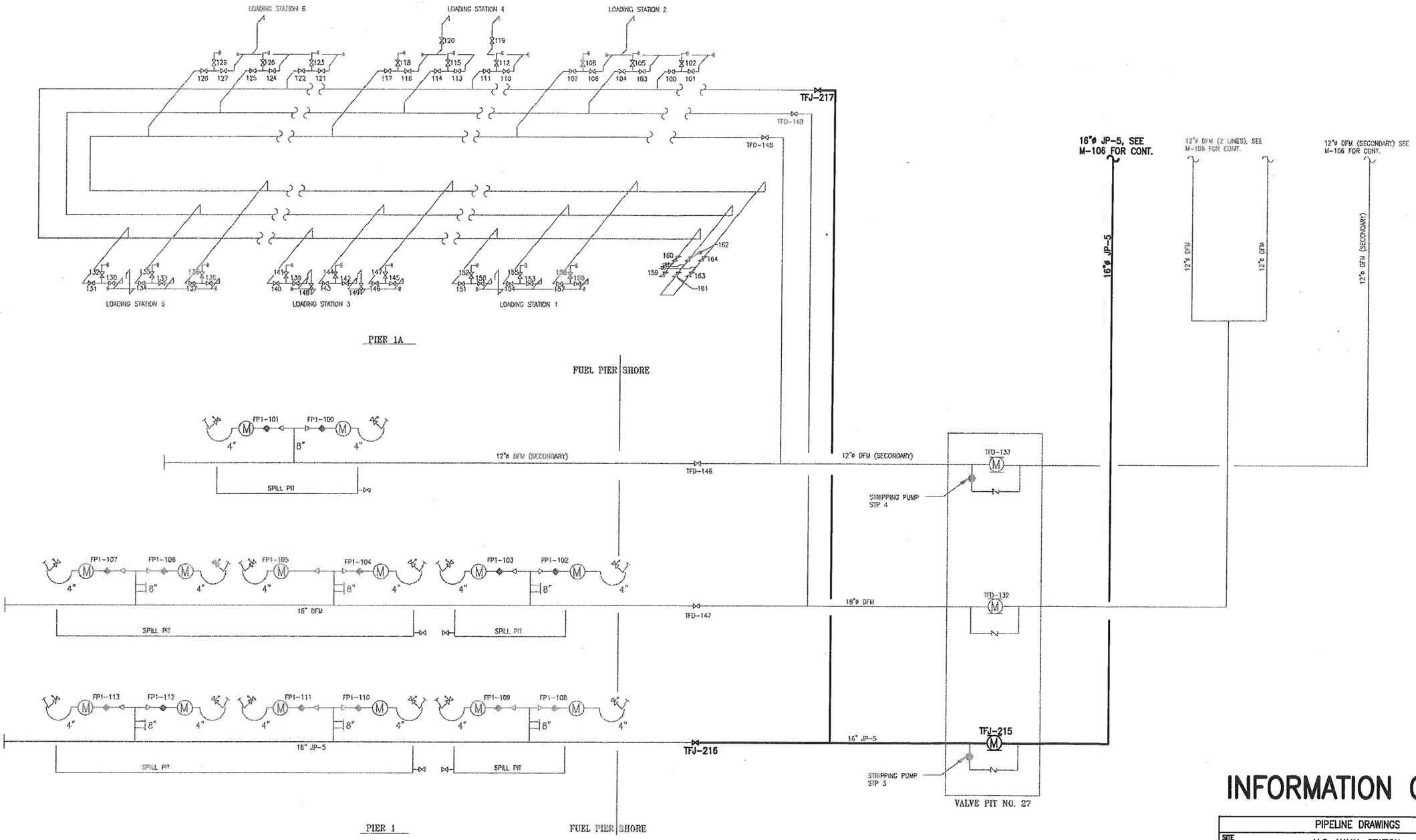
DRAWN	BAS
DATE	12-06-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE: TEST SEGMENT 7 - SHEET 2 OF 3

SCALE: - | DRAWING NO. SK-18-15-0107 | REV 1

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	13:34	1A

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
		1	11/06/02	GENERAL UPDATE	MW	MW	DAE	–	
		0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	–	–

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Naval Facilities Engineering Service Center
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DRAWN	BAS	
DATE	12-06-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

TITLE
TEST SEGMENT 7
–
SHEET 3 OF 3

SCALE: –
DRAWING NO.: SK-18-15-0107
REV: 1

FORM: NAVY_D

PLOT DATE: 06 NOV 02
TIME: 13:34
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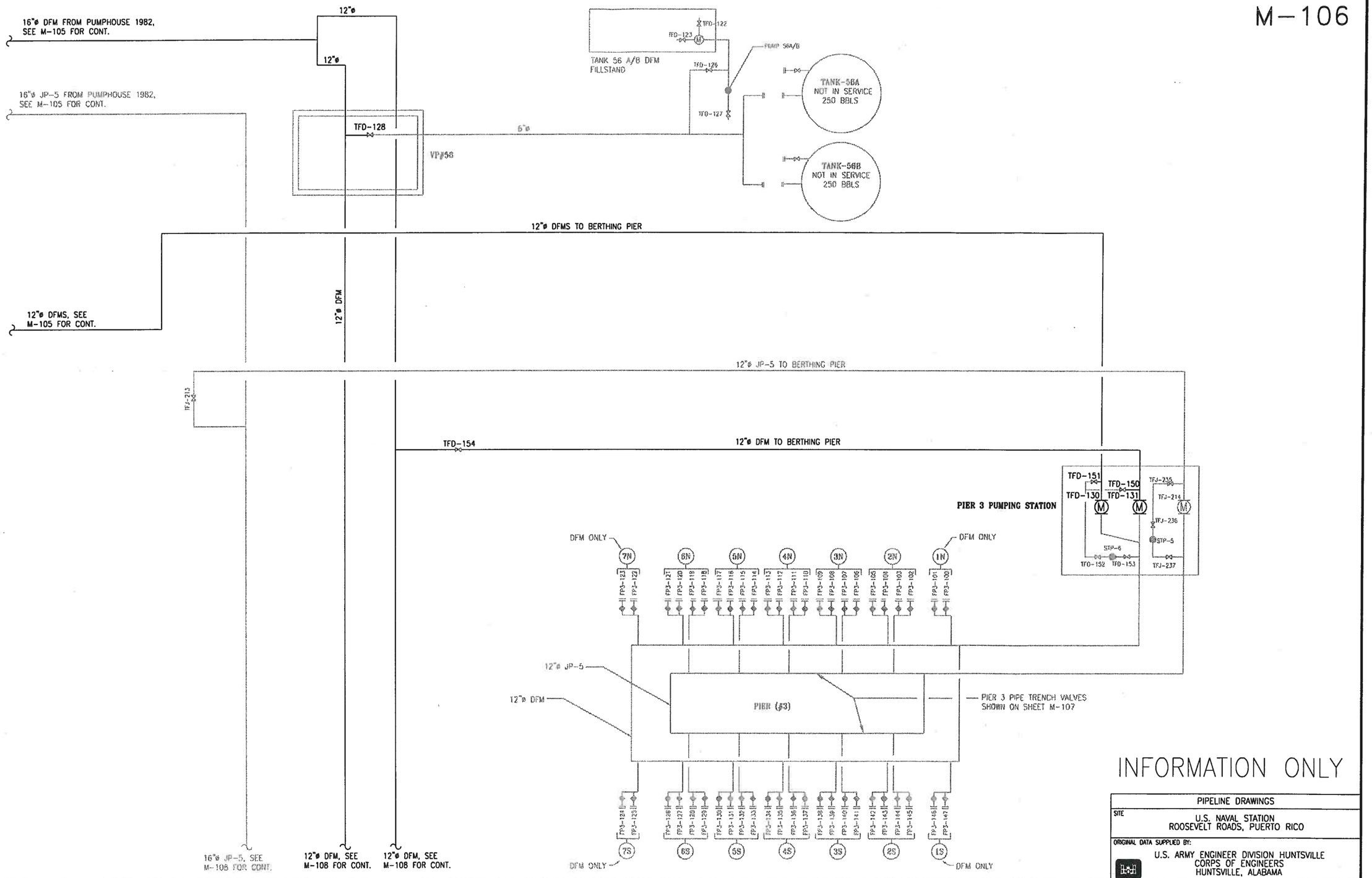

INFORMATION ONLY

PIPELINE DRAWINGS	
SITE	U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO
ORIGINAL DATA SUPPLIED BY:	U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	14:16	1C

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
1	11/06/02	GENERAL UPDATE					
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

DRAWING NUMBER | REFERENCE DRAWINGS

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
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Washington, DC 20374-5063

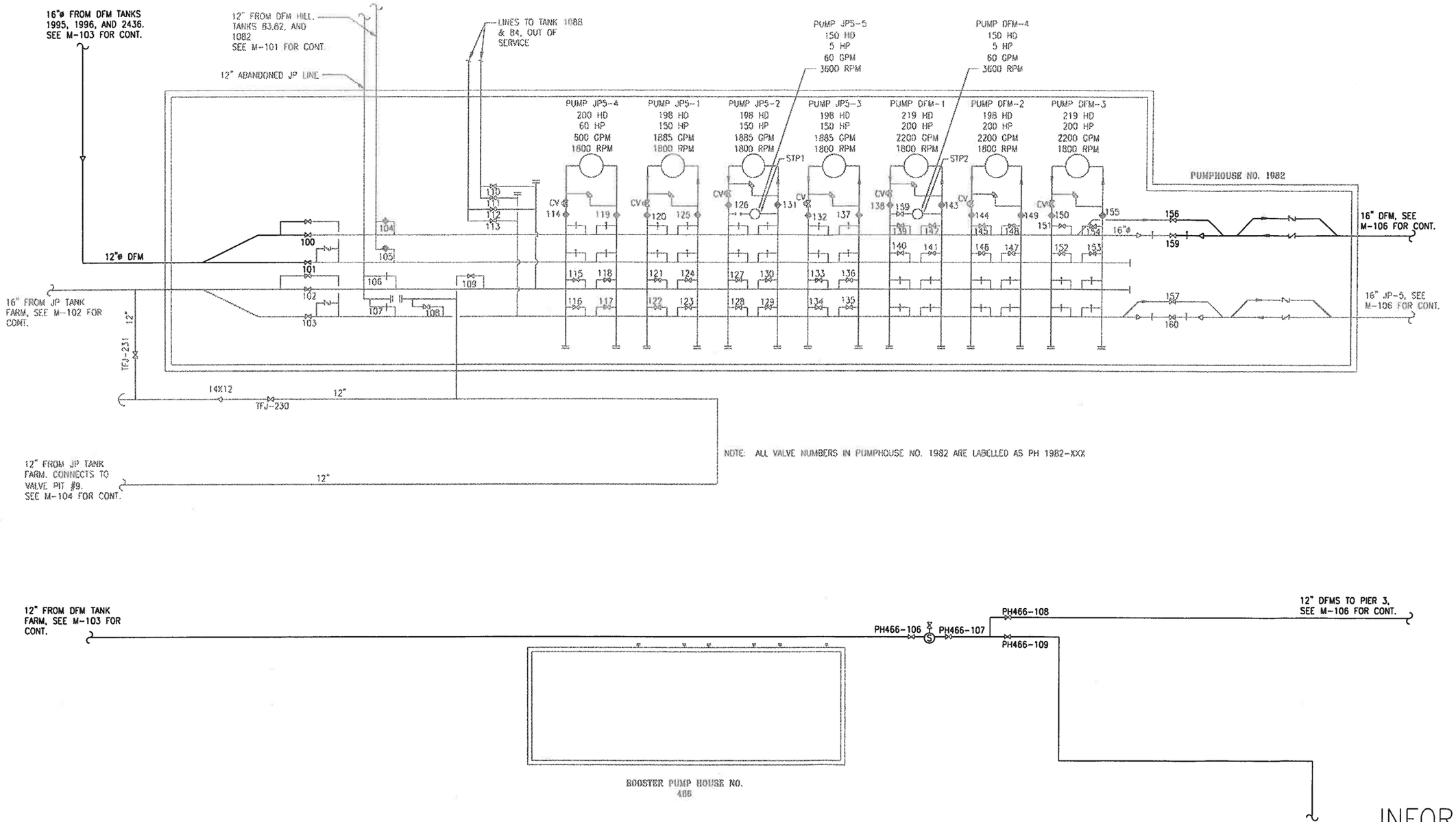
DRAWN	BAS
DATE	12-06-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE
TEST SEGMENT 8 - PRIMARY
-
SHEET 1 OF 4

SCALE	DRAWING NO.	REV
-	SK-18-15-0108	1

FORM: WWT_D

DESIGN FILE: N:\7074\18\DRAWINGS\15\SK18150108.DWG
PLOT DATE: 06 NOV 02 PL
TIME: 14:16 BY: MWHITE



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	13:37	1C

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV.	CLIENT
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0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

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Washington, DC 20374-5063

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DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE: TEST SEGMENT 8 - PRIMARY - SHEET 2 OF 4

SCALE: -

DRAWING NO.: SK-18-15-0108

REV: 1

FORM: WWF_0

PLOT DATE: 06 NOV 02
TIME: 13:37
DESIGN FILE: N:\...\J74\18\DRAWINGS\15\SK18150108A.DWG
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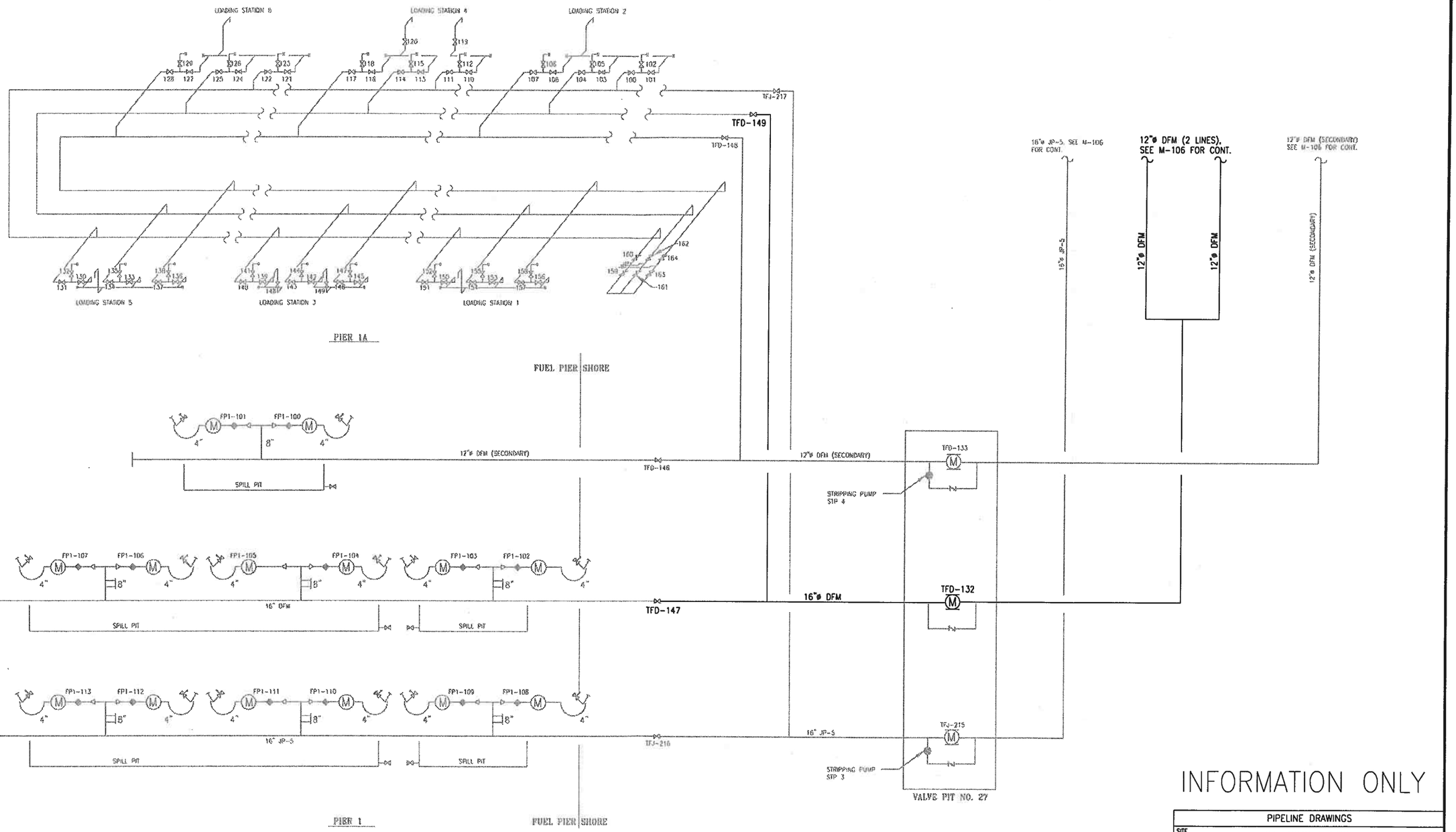
BY: MWHITE

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE
U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	14:17	0D

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	BAS DRAWN	RS CHECK	BM ENG	DAE APPRVL	– CLIENT
		0	12-21-01	ISSUED AS FINAL					

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DRAWN	BAS	
DATE	12-07-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

TITLE
TEST SEGMENT 8 – PRIMARY
–
SHEET 3 OF 4

SCALE –

DRAWING NO. SK-18-15-0108

REV 0

PLOT DATE: 06 NOV 02
TIME: 14:17
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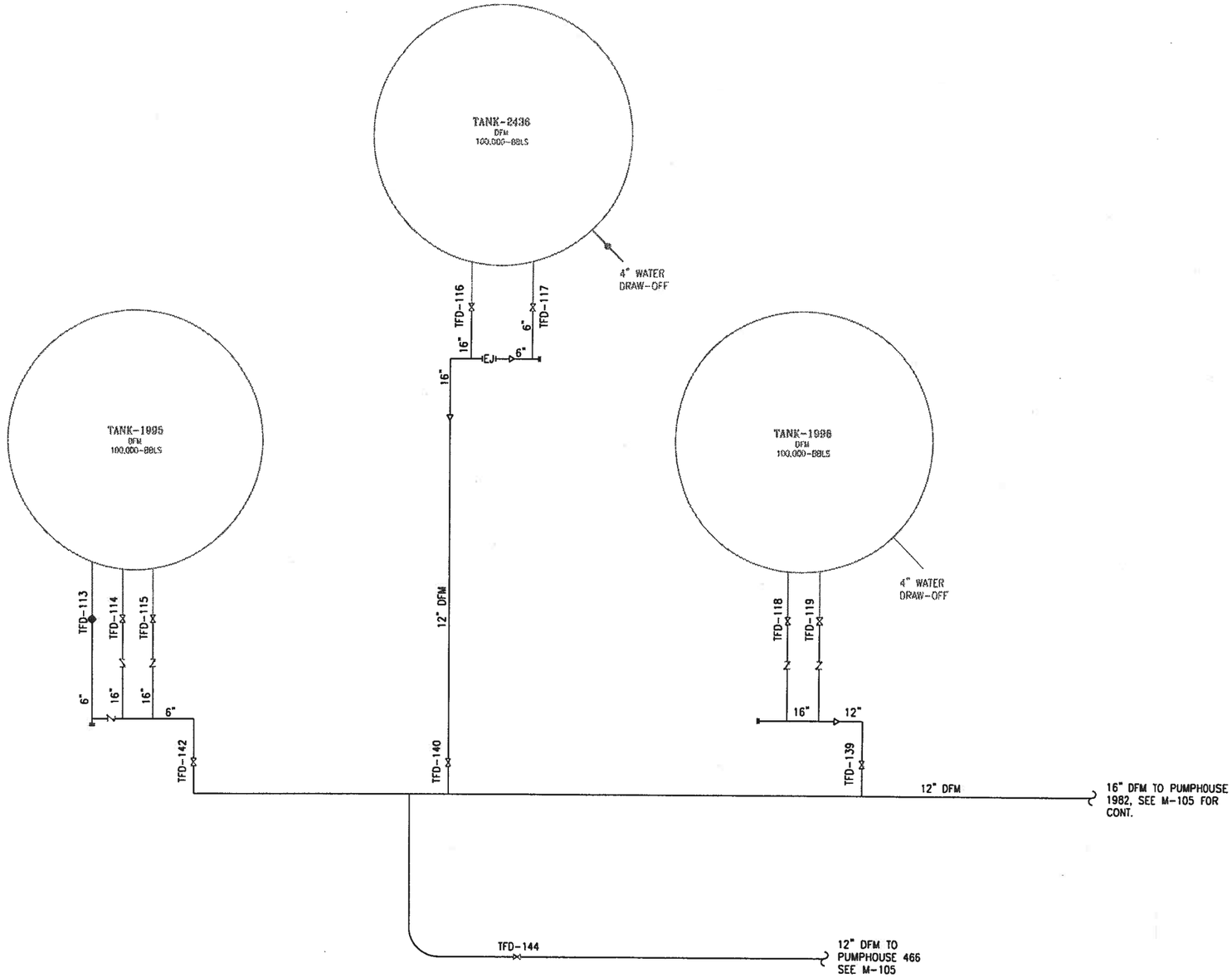
BY: MWHITE
DESIGN FILE: N:\...\074\18\DRAWINGS\15\SK18150108C.DWG



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
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WORLEY PROJECT NUMBER	LAST UPDATE	INT REV
065-07074	06 NOV 2002 14:18	00

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	BAS DRAWN	RS CHECK	BM ENG.	DAE APPRVL	- CLIENT
		0	12-21-01	ISSUED AS FINAL					

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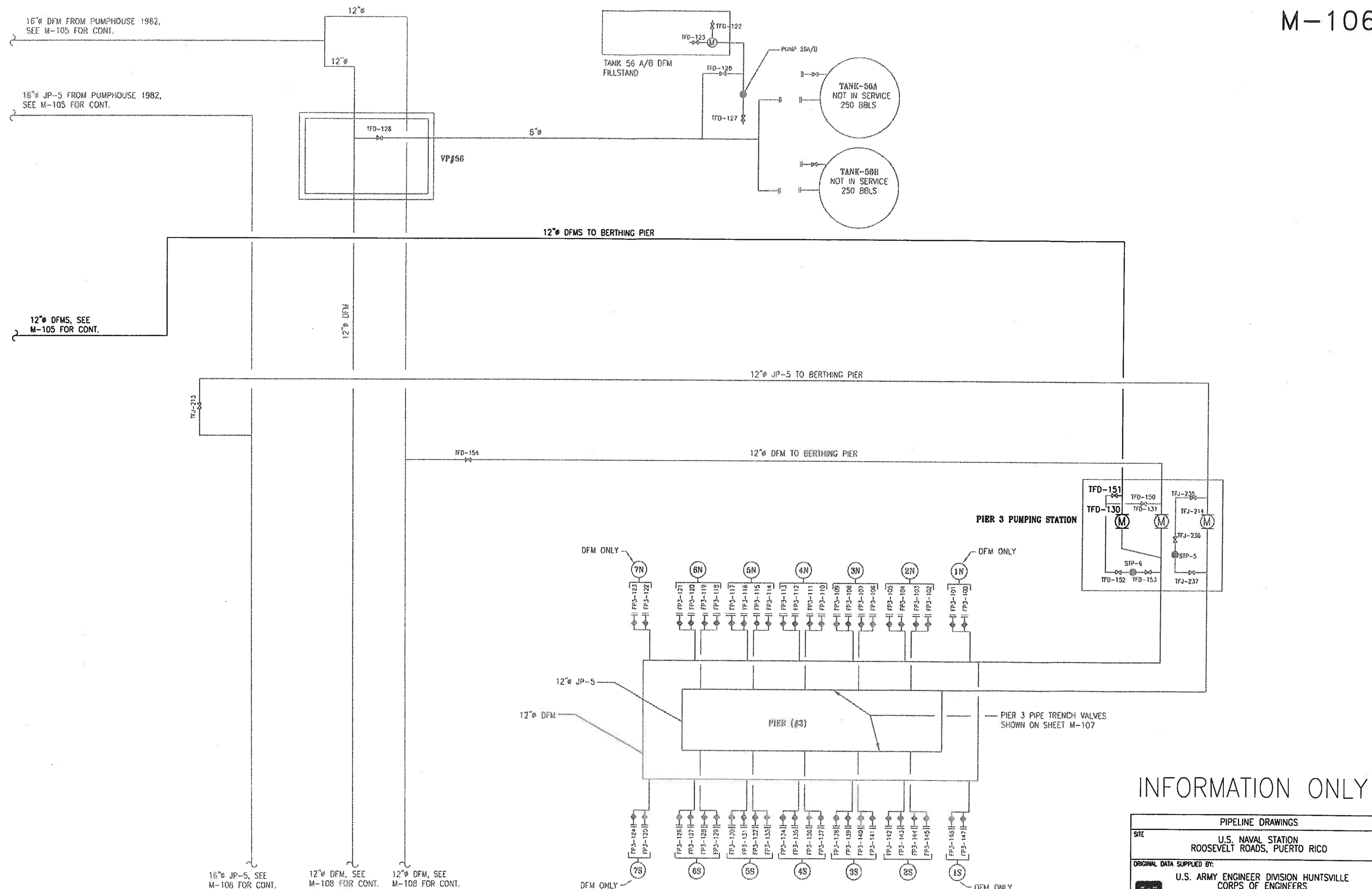
DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE: TEST SEGMENT 8 - PRIMARY
-
SHEET 4 OF 4.

SCALE: -

DRAWING NO.: SK-18-15-0108

REV: 0



INFORMATION ONLY

PLOT DATE: 06 NOV 02 TIME: 14:16 PLOTTED BY: MWHITE

DESIGN FILE: N:\074\18\DRAWINGS\15\SK18150108E.DWG

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WORLEY PROJECT NUMBER	LAST UPDATE	INT REV
065-07074	06 NOV 2002 14:16	1C

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
1	11/06/02	GENERAL UPDATE	MW				–
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

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1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS	
DATE	12-06-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

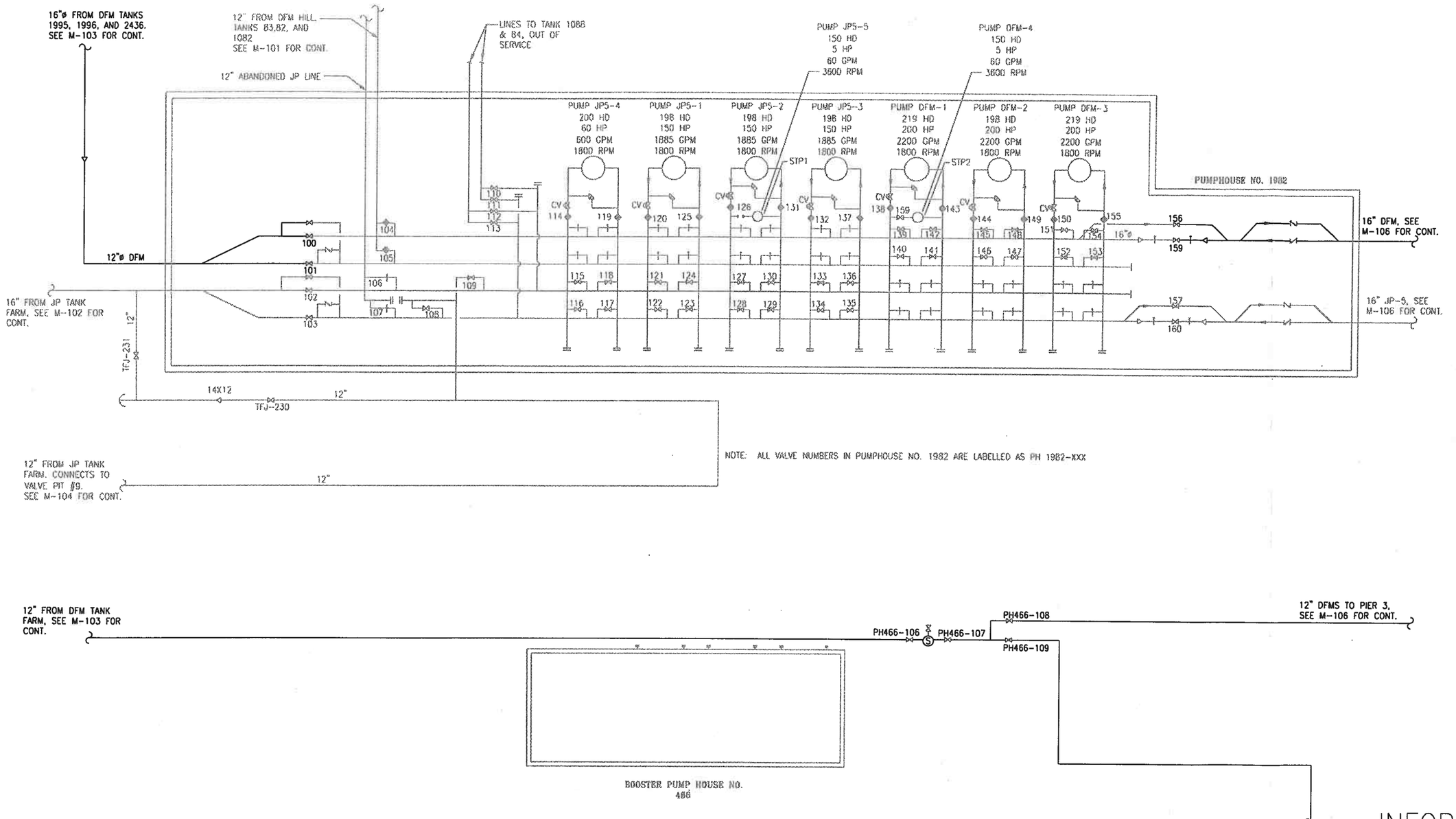
PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

TITLE: TEST SEGMENT 8 – SECONDARY
–
SHEET 1 OF 4

SCALE: –
DRAWING NO. SK-18-15-0108
REV 1



INFORMATION ONLY

PLOT DATE: 06 NOV 02
TIME: 13:37
BY: MWHITE
DESIGN FILE: N:\074\18\DRAWINGS\15\SK18150108B.DWG

		1	11/06/02	GENERAL UPDATE	MW		DAE	DAE	-		
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DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT		

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	13:37	1C

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

PIPELINE DRAWINGS

SITE
U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

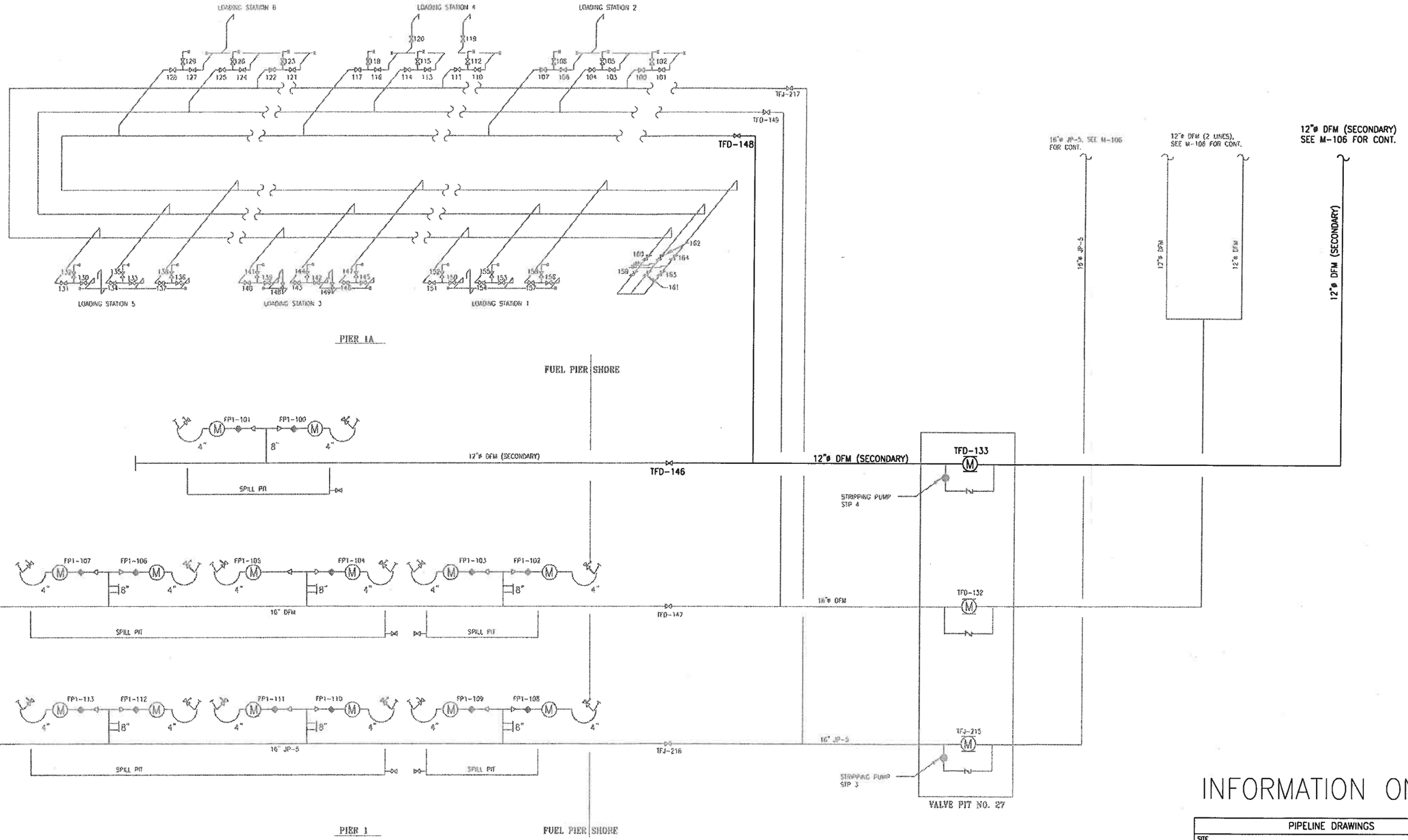
ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

TITLE
TEST SEGMENT 8 - SECONDARY
-
SHEET 2 OF 4

SCALE	DRAWING NO.	REV
-	SK-18-15-0108	1

FORM: BMP_0

NOTES:
ALL VALVES ON PIER 1A HAVE THE PREFIX FP1A BEFORE THE VALVE NUMBERS.



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

Worley International Inc
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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	14:17	0D

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	BAS DRAWN	RS CHECK	BM ENG	DAE APPRV.	– CLIENT
		0	12-21-01	ISSUED AS FINAL					

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

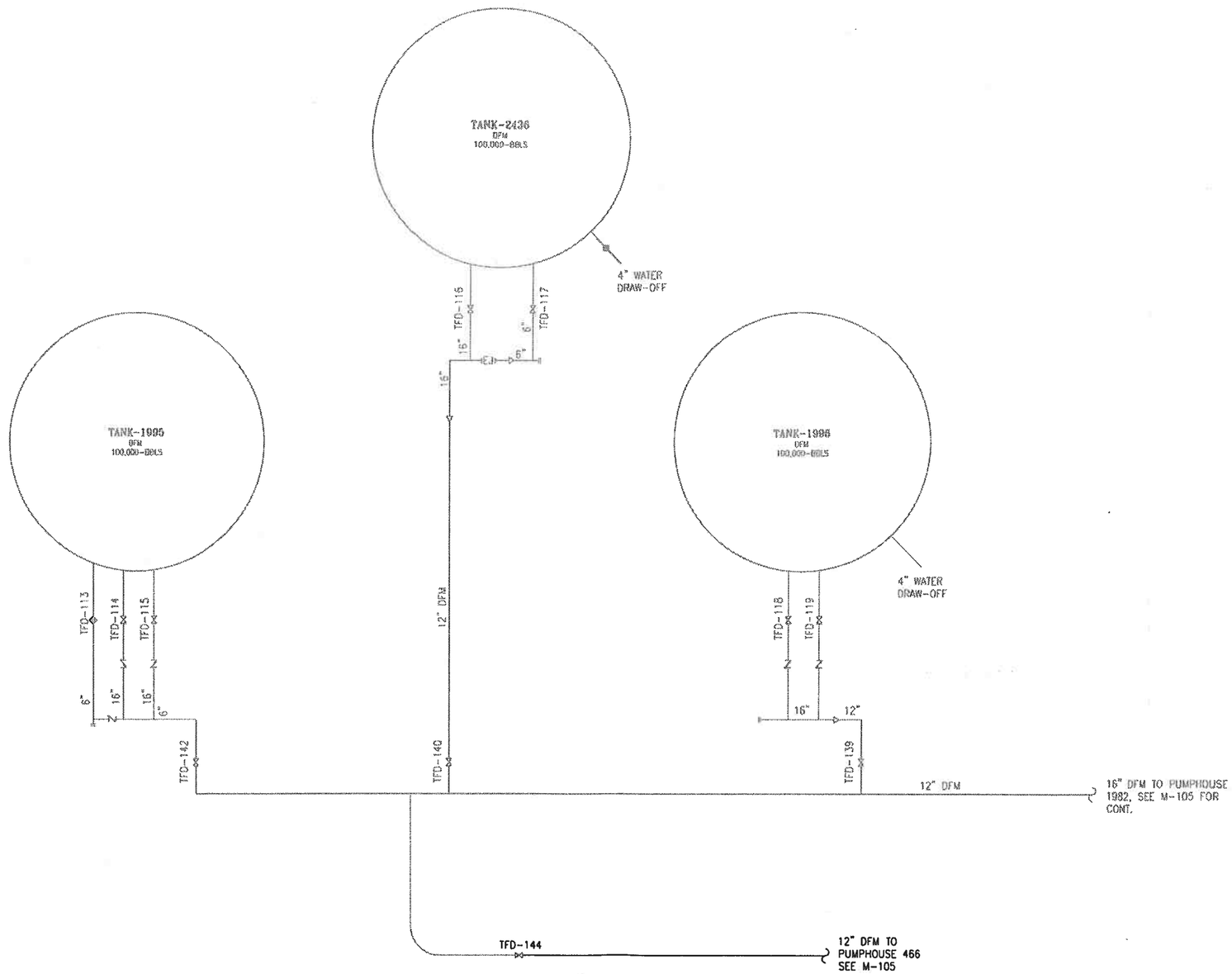
DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE
TEST SEGMENT 8 – SECONDARY
–
SHEET 3 OF 4

SCALE: –
DRAWING NO.: SK-18-15-0108
REV: 0

FORM: 1007_D

PLOT DATE: 06 NOV 02
TIME: 14:17
PLC
BY: MWHITE
DESIGN FILE: N:\074\18\DRAWINGS\15\SK18150108F.DWG



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	14:18	A1

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

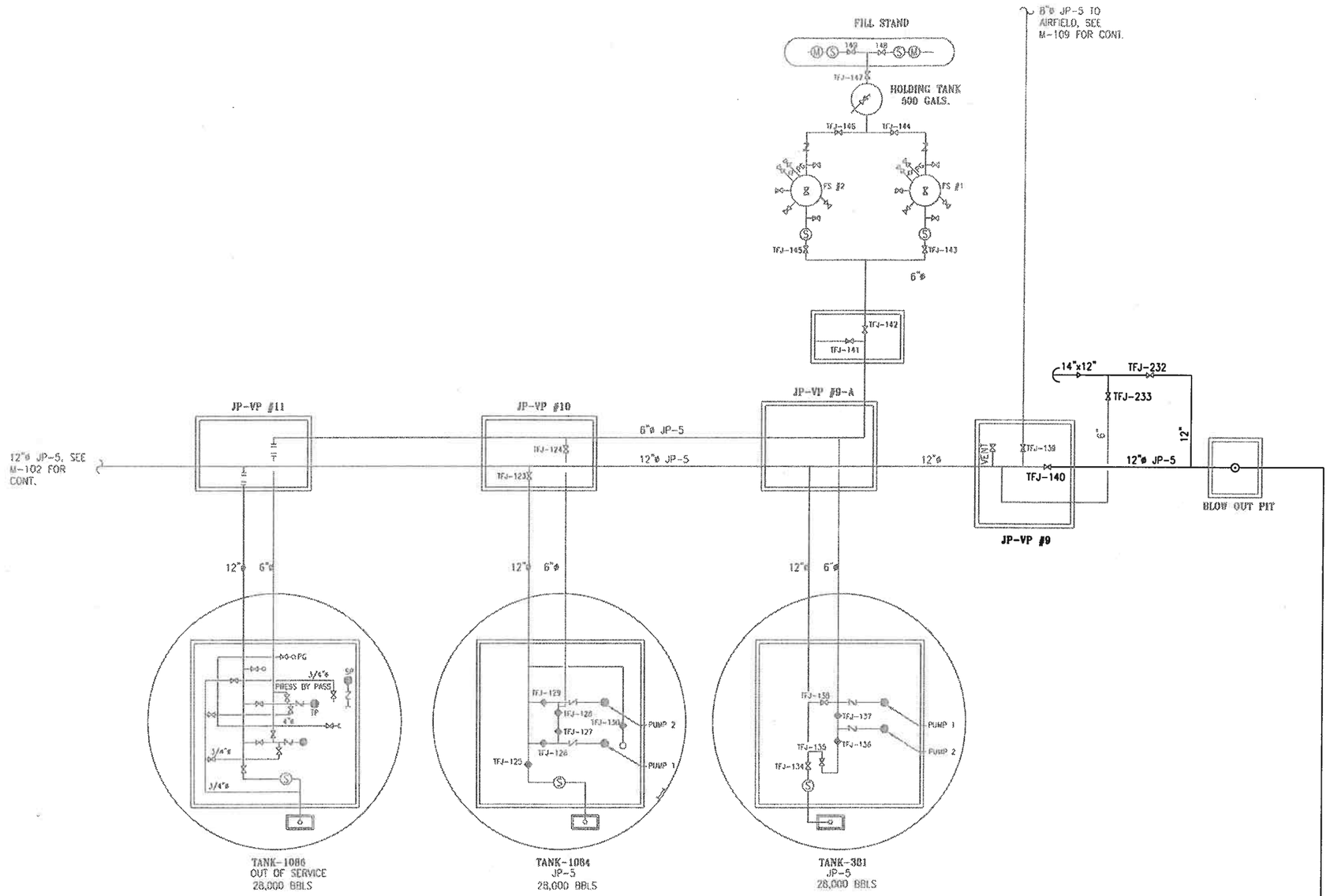
DRAWN	SCA
DATE	12/06/02
CHECKED	
DATE	
ENGINEER	
DATE	
APPROVED	
DATE	

TITLE: TEST SEGMENT 8 - SECONDARY
-
SHEET 4 OF 4

SCALE	DRAWING NO.	REV
-	SK-18-15-0108	A

FORM: WWY_D

DESIGN FILE: N: \7074\18\DRAWINGS\15\SK18150108G.DWG PL PLOT DATE: 06 NOV 02 TIME: 14:18 BY: MWHITE



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

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HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	07 NOV 2002	07:54	1C

DRAWING NUMBER	REFERENCE DRAWINGS

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
1	11/06/02	GENERAL UPDATE	MW		DMC	BAS	-
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

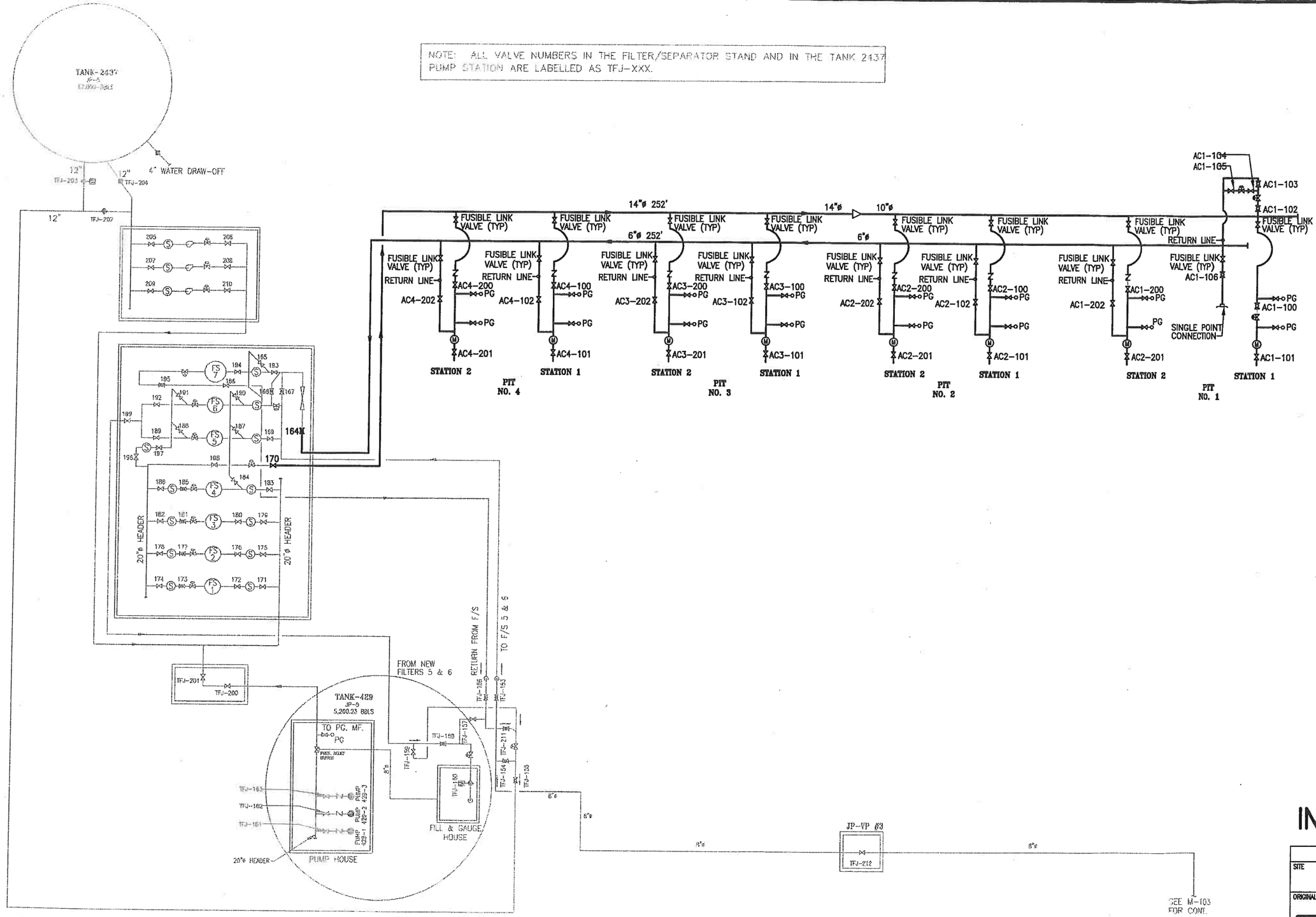
CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE: TEST SEGMENT 9
-
SHEET 1 OF 2

SCALE: -
DRAWING NO.: SK-18-15-0109
REV: 1

NOTE: ALL VALVE NUMBERS IN THE FILTER/SEPARATOR STAND AND IN THE TANK 2437 PUMP STATION ARE LABELLED AS TFJ-XXX.



INFORMATION ONLY

PLOT DATE: 06 NOV 02
TIME: 14:12
BY: MWHITE
DESIGN FILE: N:\...\074\18\DRAWINGS\15\SK18150111.DWG

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	06 NOV 2002	14:12	1A

DRAWING NUMBER

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
1	11/06/02	GENERAL UPDATE	MW	MW	DAE	DAE	–
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	–

REFERENCE DRAWINGS

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

PIPELINE DRAWINGS

SITE
U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

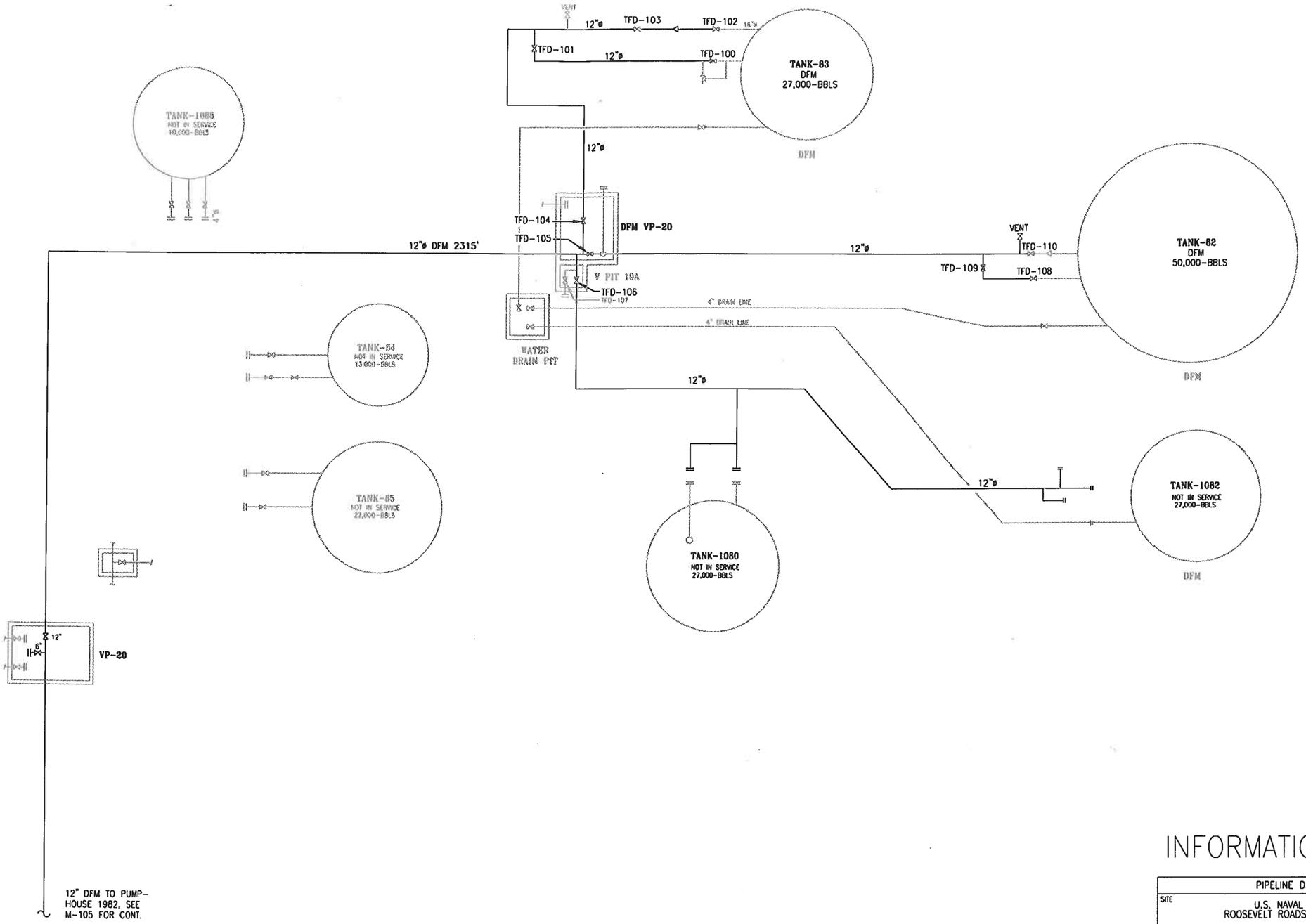
TITLE
TEST SEGMENT 11
–
–

SCALE –

DRAWING NO. SK-18-15-0111

REV 1

FORM: NAVY_D



INFORMATION ONLY

PIPELINE DRAWINGS

SITE
U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	20 DEC 2001	09:22	1B

DRAWING NUMBER

REFERENCE DRAWINGS

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRV.	CLIENT
1	3-25-02	CHANGES PER SITE VISIT	GWK				
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
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Washington, DC 20374-5063

DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

TITLE
TEST SEGMENT 12
–
SHEET 1 OF 3

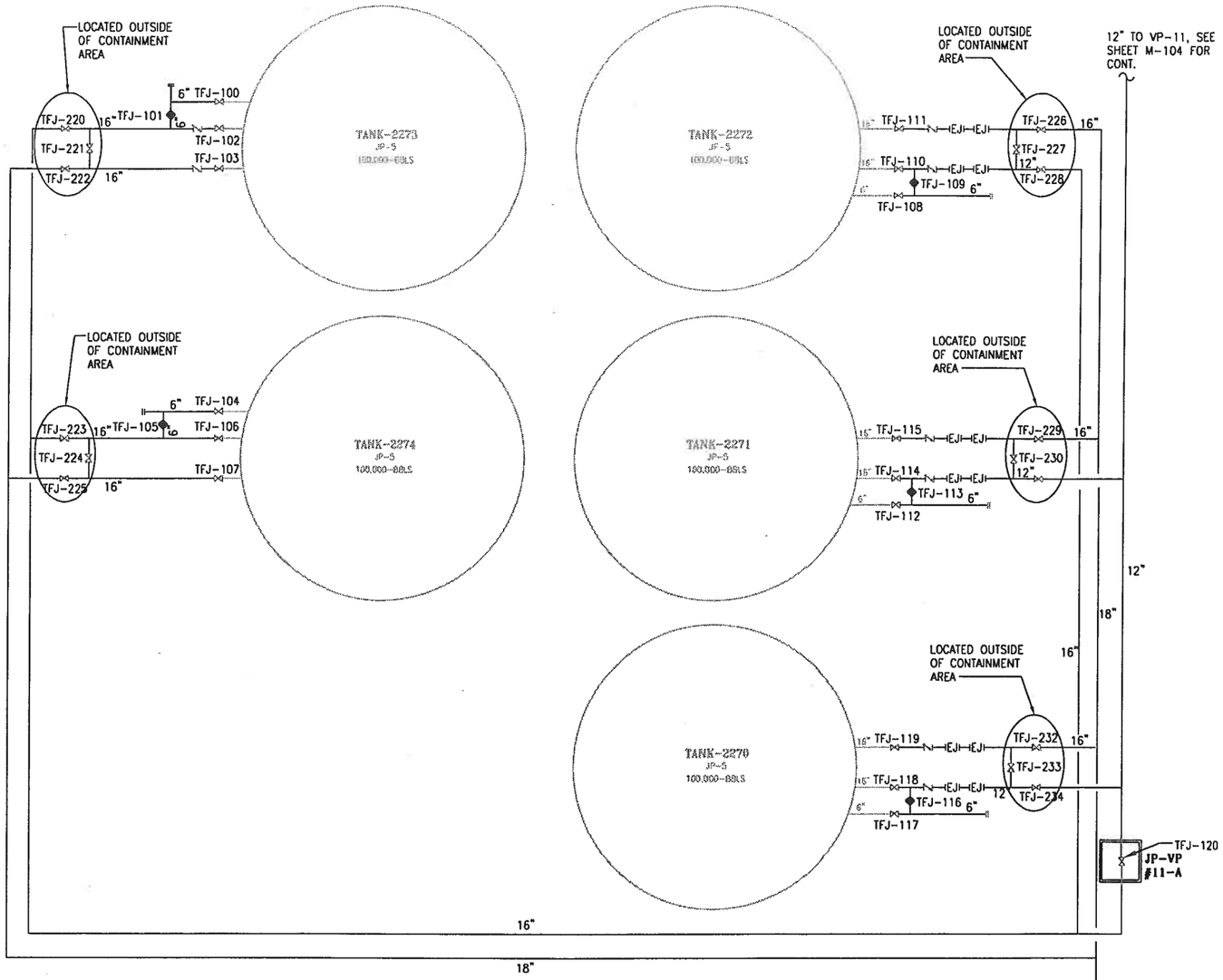
SCALE –

DRAWING NO. SK-18-15-0112

REV 1

FORM: WW_D

PLOT DATE: 01 APR 02
TIME: 14:07
PLOTTED BY: GKIMBRO
DESIGN FILE: N:\065307A\18\DRAWINGS\15\SK18150112.DWG



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

Worley International Inc
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WORLEY PROJECT NUMBER	LAST UPDATE	INT REV
065-07074	11 APR 2002 16:15	0D

DRAWING NUMBER	REFERENCE DRAWINGS

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRV.	CLIENT
0	12-21-01	ISSUED AS FINAL	BAS				

CLIENT: Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

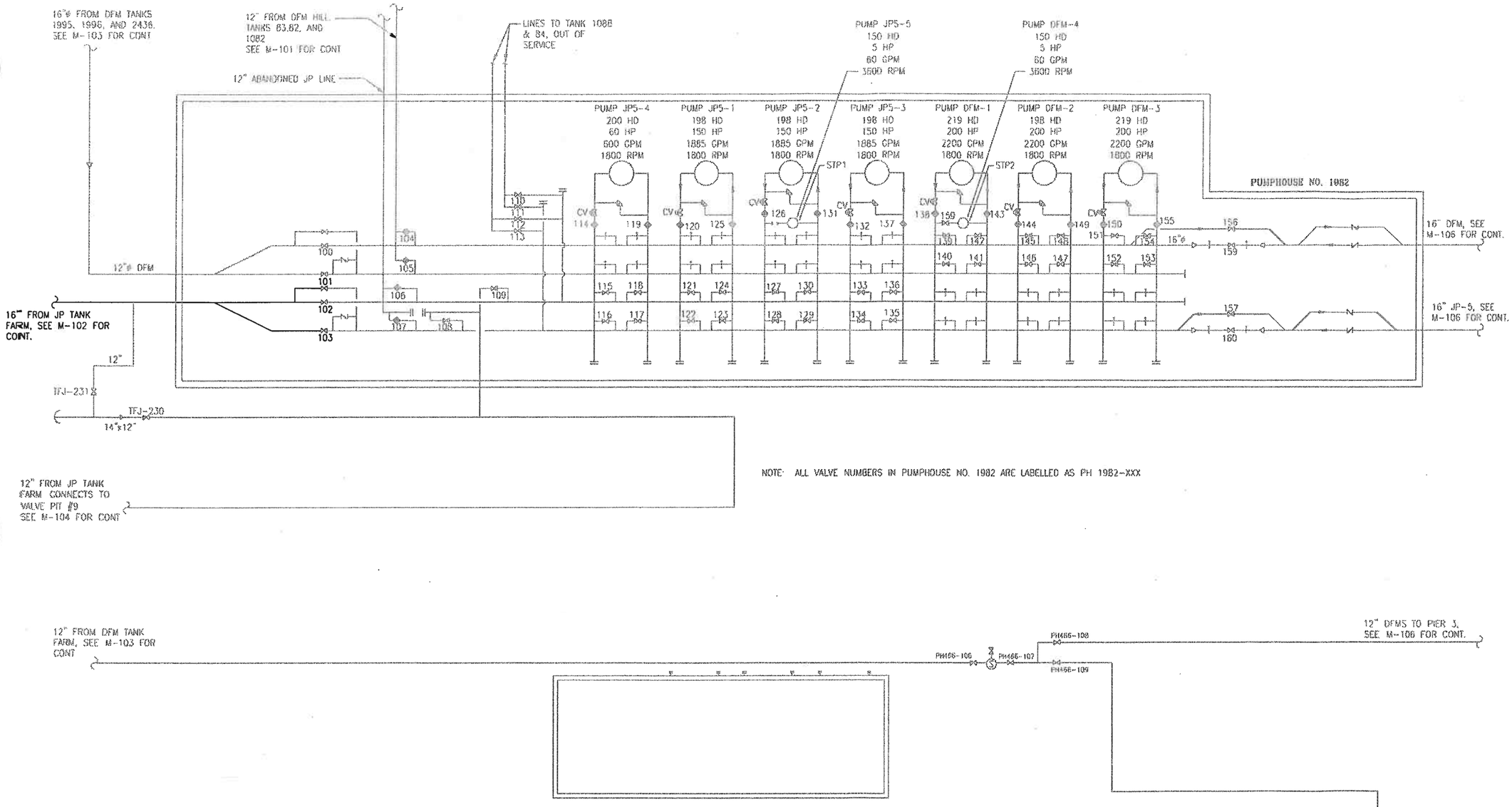
DRAWN	BAS
DATE	12-07-01
CHECKED	
DATE	
ENGINEER	
DATE	
APPROVED	
DATE	

TITLE: TEST SEGMENT 13 – SHEET 1 OF 3

SCALE	DRAWING NO.	REV
-	SK-18-15-0113	0

Form: WWY_0

PLOT DATE: 11 APR 02 TIME: 16:15 BY: RSTRANGE
DESIGN FILE: N: 7074\18\DRAWINGS\15\SK18150113.DWG



INFORMATION ONLY

PLOT DATE: 07 NOV 02
TIME: 08:42
BY: MWHITE
DESIGN FILE: N:\074\18\DRAWINGS\15\SK18150113B.DWG

Worley International Inc
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WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	07 NOV 2002	08:42	1C

DRAWING NUMBER	REFERENCE DRAWINGS	REV	DATE	REVISION	DRAWN	CHECK	ENG	APPROV.	CLIENT
		1	11/06/02	GENERAL UPDATE	MW				-
		0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS	
DATE	12-07-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

PIPELINE DRAWINGS

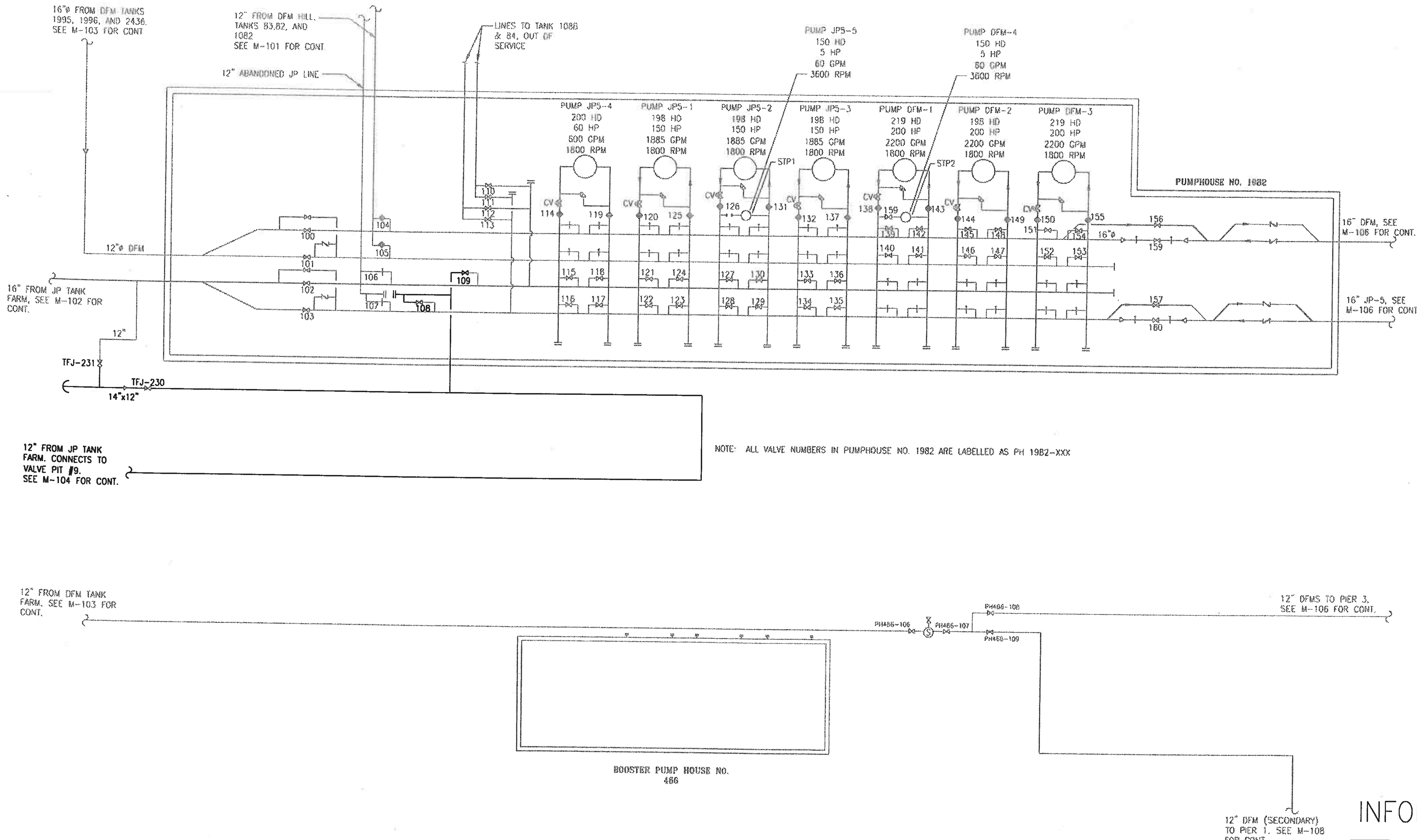
SITE
U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

TITLE
TEST SEGMENT 13
–
SHEET 2 OF 3

SCALE	DRAWING NO.	REV
-	SK-18-15-0113	1

FORM WWY_D



INFORMATION ONLY

PIPELINE DRAWINGS

SITE: U.S. NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY: U.S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		BIT REV
065-07074	07 NOV 2002	07:52	1D

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRVL	CLIENT
1	11/06/02	GENERAL UPDATE	MW		DAE	DAE	-
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

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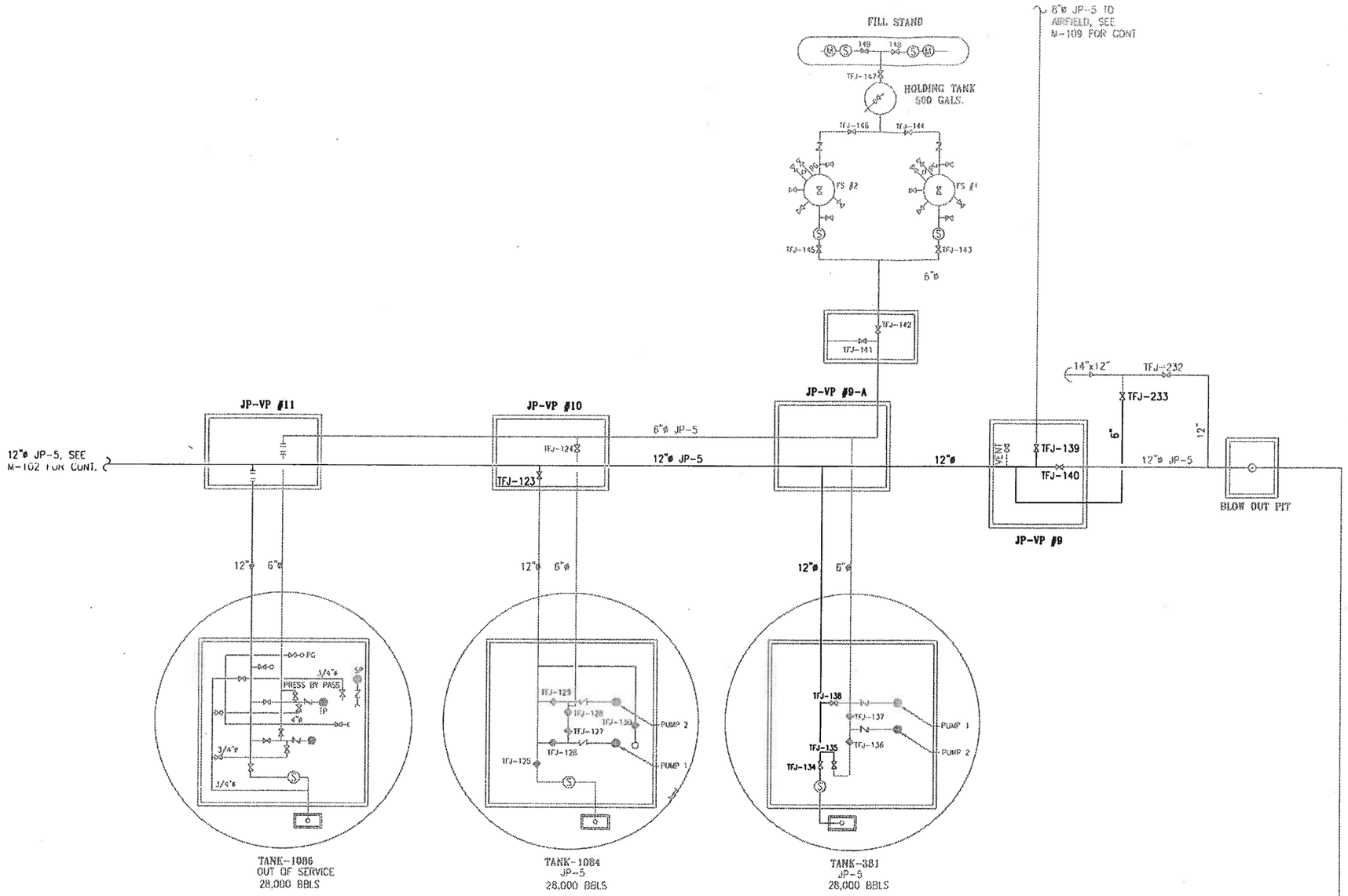
CLIENT: Naval Facilities Engineering Service Center, Washington Navy Yard, 1435 10th Street S.E., Suite 3000, Washington, DC 20374-5063

DRAWN	BAS	
DATE	12-07-01	
CHECKED	RS	
DATE	12-20-01	
ENGINEER	BM	
DATE	12-20-01	
APPROVED	DAE	
DATE	12-20-01	

TITLE: TEST SEGMENT 9 - SHEET 2 OF 2

SCALE: - | DRAWING NO. SK-18-15-0109 | REV 1

DESIGN FILE: N:\...074\18\DRAWINGS\15\SK18150109B.DWG
PLOT DATE: 07 NOV 02 TIME: 07:51
PLOTTED BY: MWHITE



INFORMATION ONLY

PLOT DATE: 07 NOV 02
TIME: 08:51
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BY: MWHITE
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Worley International Inc
HOUSTON, TEXAS USA

WORLEY PROJECT NUMBER	LAST UPDATE		INT REV
065-07074	07 NOV 2002	09:09	1C

DRAWING NUMBER

REFERENCE DRAWINGS

REV	DATE	REVISION	DRAWN	CHECK	ENG	APPRV	CLIENT
1	11/06/02	GENERAL UPDATE	MW				-
0	12-21-01	ISSUED AS FINAL	BAS	RS	BM	DAE	-

CLIENT
Naval Facilities Engineering Service Center
Washington Navy Yard
1435 10th Street S.E., Suite 3000
Washington, DC 20374-5063

DRAWN	BAS
DATE	12-07-01
CHECKED	RS
DATE	12-20-01
ENGINEER	BM
DATE	12-20-01
APPROVED	DAE
DATE	12-20-01

PIPELINE DRAWINGS

SITE
U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

ORIGINAL DATA SUPPLIED BY:
U.S. ARMY ENGINEER DIVISION HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

TITLE
TEST SEGMENT 13
-
SHEET 3 OF 3

SCALE	DRAWING NO.	REV
-	SK-18-15-0113	1

FORM: MWH_D