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NAS CECIL FIELD, FL
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VPS SURVEY OF 8 INCH JET FUEL PIPELINE NAS CECIL FIELD FL
9/21/1994
VETCO PIPELINE SERVICES

**NAVY PUBLIC WORKS CENTER JACKSONVILLE
ENGINEERING DEPARTMENT**

CODE 420
26 Sep 94

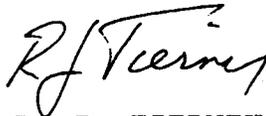
MEMORANDUM

From: Code 420
To: DISTRIBUTION

Subj: FUEL PIPELINE SURVEY - FINAL

Encl: (1) VSP SURVEY OF 8" JET FUEL PIPELINE

1. Enclosure (1) dated 21 September 1994 is forwarded for your information.



R. J. TIERNEY
MECH/ELEC DIVISION DIRECTOR

Distrib:

NAS Cecil Field Zone Manager (Code 510)
NAS Cecil Field Staff Civil Eng. (Code 333)
NAS Cecil Field Environmental (Code 2003B)
NAS Cecil Field Fuel Farm (Code 1951)
NAS Jacksonville Environmental (Code N3)

30/45 Days Award/Solicitation

AUG 2
SEP 26

VETCO PIPELINE SERVICES
REPORT TO
DEPARTMENT OF THE NAVY
OF
VPS SURVEY

8" JET FUEL PIPELINE

NAVAL AIR STATION JACKSONVILLE TO
NAVAL AIR STATION CECIL FIELD

September 21, 1994

CONTRACT N68931-94-C-8563, PIPELINE INSPECTION OF THE 8" JET FUEL PIPELINE

VPS JOB NO. X9442A

*Vetco Pipeline Services
1600 Brittmoore Road
Houston, Texas 77043*

VETCO PIPELINE SERVICES
REPORT TO
DEPARTMENT OF THE NAVY
OF
VPS SURVEY

8" JET FUEL PIPELINE

NAVAL AIR STATION JACKSONVILLE TO
NAVAL AIR STATION CECIL FIELD

VPS was engaged by the Department of the Navy to survey the 8" Jet Fuel Pipeline from Naval Air Station Jacksonville to Naval Air Station Cecil Field. The inspection covered approximately 14 miles of pipeline with a nominal wall thickness of .250".

VPS expresses its appreciation to the NAVY staff for their cooperation and the efforts which were extended during this project.

After careful examination of the information resulting from the VPS Survey, VPS is pleased to present the enclosed report.

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

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VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

I. VPS TOOL RUN REPORT

Sizing Run #1

Launch: 06:55 A.M. on August 9, 1994
Trap: 13:55 P.M. on August 9, 1994
Tool Condition: No tool damage, nominal cup wear

Instrumented Run #1

Launch: 07:16 A.M. on August 10, 1994
Trap: 14:12 P.M. on August 10, 1994
Tool Condition: No tool damage, nominal cup wear

The magnetic tape of the inspection run was reproduced on field logs at the job site. After viewing the field logs, it was decided the recorded information was acceptable for further processing in VPS' Houston, Texas facility.

Correlation Excavations

Dig Area 1

This correlation excavation area is located at odometer reading 6227.00 feet on Roll 1 of the survey logs. The pipe was exposed and the external bodywall revealed an area of rough surface with very slight and unmeasurable bodywall loss. This condition of a pipe is sometimes referred to as "orange peel" and the condition is attributed to originating during the pipe's fabrication process.

Dig Area 2

This correlation excavation area is located at odometer reading 72645.00 feet on Roll 5 of the survey logs. The pipe was exposed and the external bodywall revealed an area of rough surface with very slight and unmeasurable bodywall loss. The condition is the same as the dig area mentioned above.

Further comments on correlation excavation data and the grading of the signals on the survey logs are discussed herein on page 8 of this report.

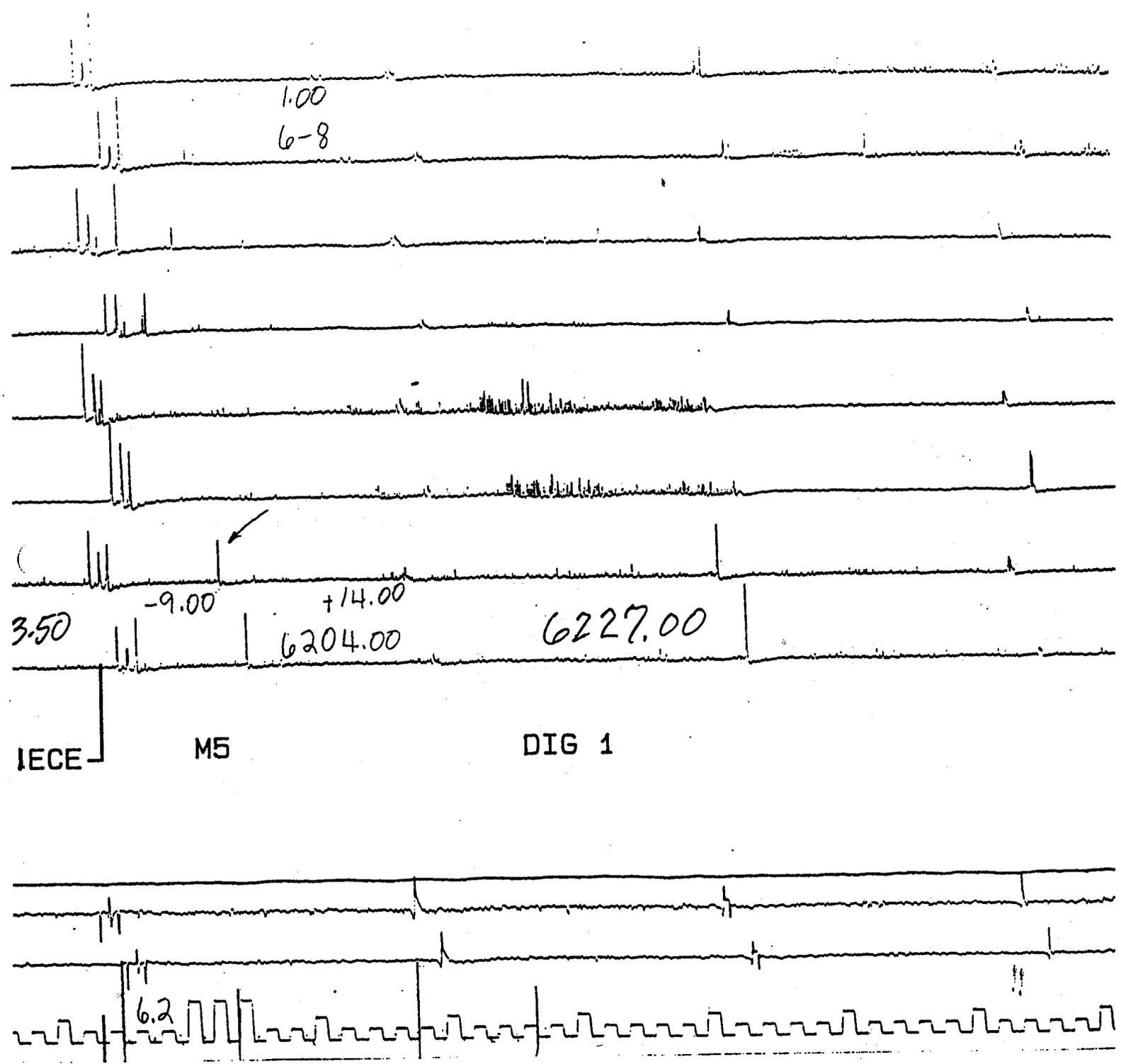


Figure 1

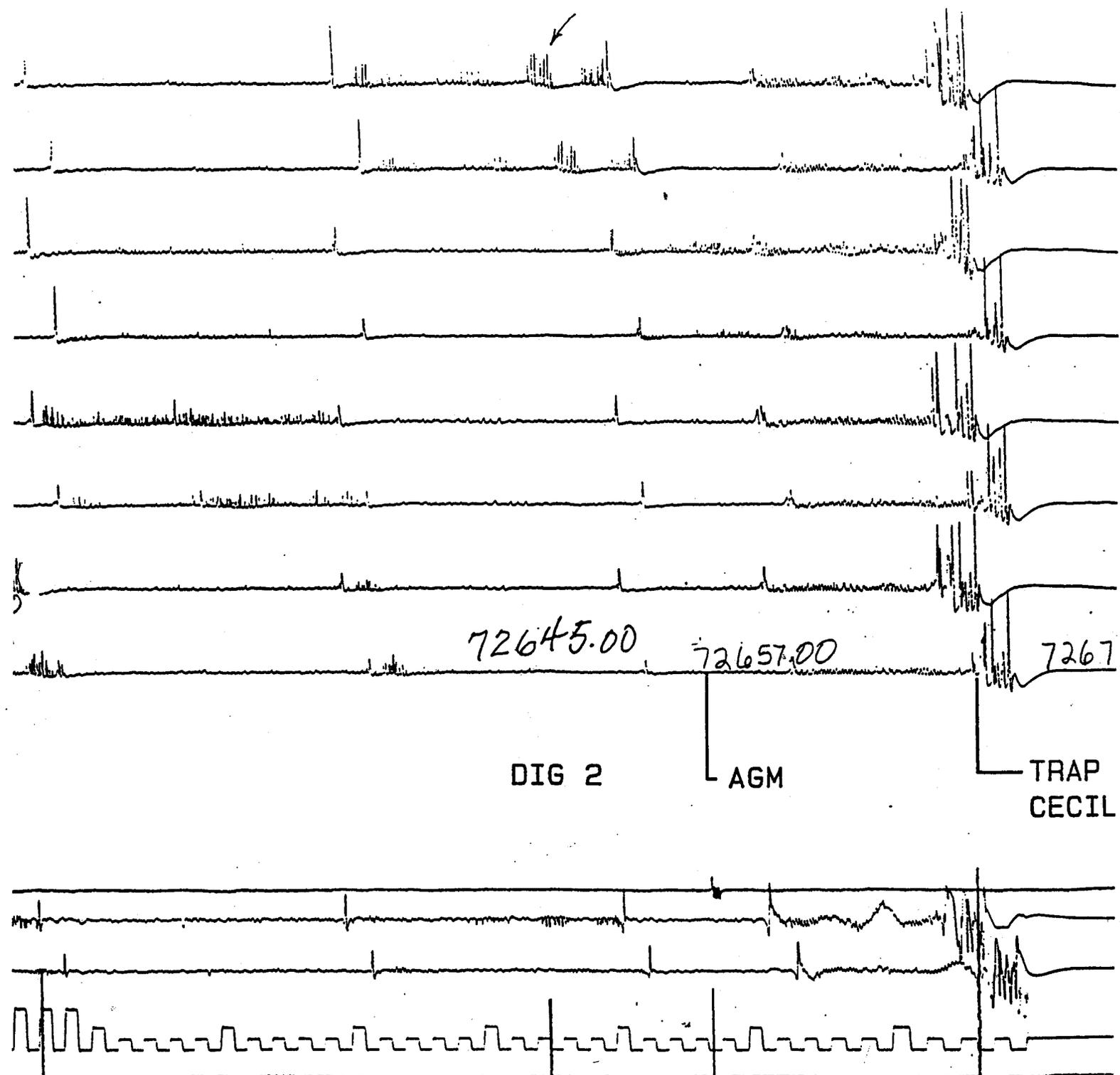


Figure 2

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

II. GENERAL DESCRIPTION OF VPS EQUIPMENT

1. General Principles

The VPS Tools are completely self-contained and operate on the principle of locating magnetic flux leakage created in the vicinity of magnetic anomalies as the instrumented tool passes through the pipeline.

2. The VPS Tool

The instrumented VPS Tool consists of four major elements: the drive section in the front, the battery section, the magnetizing/transducer sections, and the electronic amplifiers and recording systems in the rear of the tool. (See Figures 1 and 2)

Drive Section

The drive section is centered by polyurethane cups which enable a pressure differential to be built up, causing the tool to move through the pipeline.

Battery Section

All power supplies needed to energize the VPS tool during the run are located in the battery section which is centered by polyurethane cups.

Transducer Section

The two center sections have an adequate number of transducer shoes mounted in two offset rings so that close contact between the sensor systems and the inner surface of the pipeline is maintained throughout the inspection run. The sensors cover the entire circumference of the pipeline with considerable overlap of coverage. The sensor suspension provides a sufficient collapse factor to enable the tool to pass through localized reductions of the inside diameter without damage.

As the tool passes through the pipeline, an active magnetic flux field is induced into the pipe bodywall. Electronic signals are generated from the magnetic flux leakage caused by either internal or external anomalies in the pipe material. This flux leakage is detected by the leading and/or trailing group of sensors.

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

II. GENERAL DESCRIPTION OF VPS EQUIPMENT

Instrument Section

The instrument section houses the complete electronics system and the recording instruments where all signals are processed and stored on magnetic tape.

All four sections of the tool are linked by universal joints which provide free passage in normal pipeline bends down to a radius of 5D-90 degree bends.

3. Reproduce System

At the end of the inspection run the magnetic tape is removed from the tool. The reproduce system then recovers and processes the information that was stored on magnetic tape. That processed information is sent to a light beam oscillograph where it is transferred to paper so the interpreter has a visual format in which to review and interpret the inspection data.

4. Log Interpretation/Detection Capability

The resulting log is a record of the indications produced by the anomalies located in the pipeline during the VPS Tool Survey. The VPS Tool will detect internal or external surface anomalies, depending on the extent of bodywall penetration or deformation.

The types of anomalies which are detected are as follows:

- Corrosion Pitting
- Mechanical Damage
- Gouges, Dents, Mashes and Wrinkles
- Hardspots
- Buckles
- Mill Defects
- Grind Marks
- Hydrogen Blisters
- Circumferential Cracks
- Other Three-dimensional Imperfections

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

II. GENERAL DESCRIPTION OF VPS EQUIPMENT

In addition to corrosion and other types of defects, the log clearly indicates many other pipeline appurtenances which help to correlate the log with respect to locations along the pipeline. Depending on the mass of metal and proximity to pipe bodywall, the following are normally detected:

Girth Welds	Metal in Close Proximity
Valves	Spiral Welds
TEEs	Scraper Detectors
Transition Joints	Casings
Patches	Sleeves
Flanges	Clamps
Taps	Stoppie Fittings
Pup Joints	Weld Plus Ends
Anchors	

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

II. GENERAL DESCRIPTION OF VPS EQUIPMENT

The log from a 8" tool represents 12 channels of information which are used as follows:

- | | |
|------------|---|
| 8 channels | Main Detection Information
Shows three-dimensional magnetic anomalies. |
| 1 channel | Above Ground Marker
Provides information on Above Ground Markers (AGM). |
| 2 channels | Magnetic Marker Detection
Provides information on the beginning and ending of casings and wall thickness changes, valves, TEEs and many other appurtenances. |
| 1 channel | Odometer/Orientation Indicator
Each revolution of the odometer wheel is displayed on this channel and represents a specific pipeline distance traversed by the VPS Tool. The location of points of interest can be accurately determined using the number of odometer indications and applying accurate surface measurements along the pipeline from known locations such as Above Ground Markers (AGMs), magnets and valves. |

The increased amplitude odometer pulses display a signal representing the attitude of the tool with respect to its roll axis. This allows the interpreter to determine the circumferential location of recorded anomalies. The increased amplitude odometer pulses are used to display the accumulated pipeline distance in 100 feet increments. Also, this channel displays a semi-high pulse every ten feet of accumulated pipeline distance. This semi-high pulse is convenient for counting short distances along the survey log as may be required.

DESIGNS AND SPECIFICATIONS ARE
SUBJECT TO CHANGE WITHOUT NOTICE.
VEPCO PIPELINE SERVICES
ACCEPTS NO LIABILITY FOR THE USE
OF ANY INFORMATION CONTAINED ON
THIS SHEET.

VEPCO PIPELINE SERVICES 8" SZ DUAL TRANS W/TRACTOR TOOL

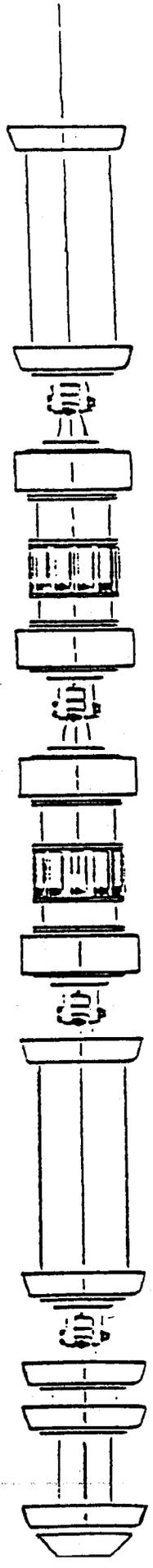
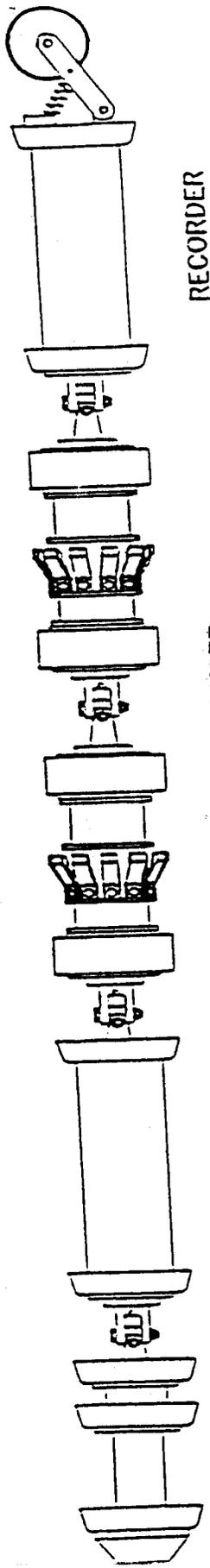


Figure 1

VETCO PIPELINE SERVICES
8" CORROSION SURVEY TOOL

NOTE: SPECIFICATIONS ARE
DIMENSION. SPECIFICATIONS ARE
SUBJECT TO CHANGE AT ANY TIME
WITHOUT PRIOR NOTIFICATION. VESI
ACCEPTS NO LIABILITY FOR THE USE
OF ANY INFORMATION CONTAINED ON
THIS SHEET.



RECORDER

TRANSDUCER

BATTERY

TRACTOR

Figure 2

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

III. LOG GRADING REPORT

The log grading procedure consists of the following steps:

- a. Locating and identifying all known magnet locations, Above Ground Markers (AGMs), valves and other pipeline appurtenances.
- b. Locating, interpreting, identifying, categorizing and classifying indications of magnetic anomalies, physical deformation, and various other pipeline conditions.
- c. Compiling all data and reporting.

Distance Referencing

All known magnets, Above Ground Markers (AGMs), valves, heavy wall sections, cased areas and other known appurtenances are identified on the log. The distances between the known locations are those provided by the Department of the Navy. VPS does not warrant the accuracy of these distances.

As previously described in the technical description section, the VPS Tool is equipped with a distance-measuring odometer wheel with its own recorded indicator channel on the log. The odometer channel on the log is indicating approximately every 1 foot of forward movement of the tool along the pipeline.

The accumulation of foreign materials on the outside circumference of an odometer wheel sometimes causes accuracy to vary slightly until the deposits are removed. In pipelines where excessive paraffin deposition is experienced, it is not uncommon for a thin build-up to occur on the circumference of the odometer wheel.

An electronic device built into the recorder system is counting the indications from this odometer circuit and is recording an event every 100 feet, or every 100-1 foot odometer indication. This event indication is also providing the information about the orientation of the tool at that location.

For convenience, the odometer/orientation event indications have been counted from the launch to the trap and are identified at each increased-amplitude event or every 100 feet of pipeline. When using the odometer/orientation event indications, always count or measure to the first indication in the set rather than to the middle or trailing indications.

WPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

III. LOG GRADING REPORT

Orientation Determination

As previously discussed, the bottom channel on the log is a combination odometer counter and orientation indicator. The increased amplitude odometer pulses are displayed on this channel of the log for each 100-foot odometer indication or every 100 feet of pipeline. By counting the number of increased amplitude odometer pulses displayed on this channel during each event, the rotation or orientation of the tool about its roll axis can be determined. For example, an indication with 1 increased amplitude odometer pulse would mean that sensor L1 is at approximately the 12:00 o'clock or top position. An indication with 5 increased amplitude odometer pulses would mean that sensor L3 is at approximately the 12:00 o'clock position. The following is a listing of the number of indications that may be displayed on the odometer/orientation channel of the log and the corresponding sensor number which is approximately in the 12:00 o'clock position at that instant.

Odometer/Orientation Indications	Sensor at 12:00 O'clock Position
1	L1
2	T1
3	L2
4	T2
5	L3
6	T3
7	L4
8	T4

WPS Survey Report to
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III. LOG GRADING REPORT

Identification and Classification Of Indications

Indications on the logs are located, interpreted, categorized into groups, graded and identified according to the type of indication, the signal amplitude, the number of channels affected and the duration of the signal. Log grading of defect indications is generally achieved through interpretation of correlation excavation results obtained from selected excavation sites, as well as experienced technical observation of log signal responses.

There were two correlation excavations performed on this 8" inspection survey. Correlation excavations are performed for the purpose of measuring metal loss on the pipe correlated to the anomalous signal located on the survey log. A grading criteria is then developed for categorizing the severity of all anomalous signals along the survey data.

The two excavations for this survey (previously mentioned on page 1 of this report) revealed only a roughness of the external bodywall with no measurable bodywall loss. Previously, another inspection company had inspected this same pipeline and the same phenomenon of anomalous signals was detected and reported by that inspection company.

Vetco Pipeline Services has endeavored to analyze and categorize the severity of metal loss on the current survey reported herein without calling attention to every event of the rough pipe signals on the log. From the survey data, the entire pipeline distance reveals rough pipe. Therefore, Vetco has, in its best faith opinion, identified only those anomalous signals which are most probable to be independent of the rough pipe signals and more indicative of metal loss originating via corrosive environment or otherwise man-induced into the pipe bodywall. In some instances, Vetco may have unintentionally identified particular metal loss signals which may yet be associated with the rough pipe phenomenon but have a different signal signature warranting a grade identification.

Vetco having obtained no exact correlation excavation data for metal loss outside of the rough pipe phenomenon, the inspection data was analyzed and categorized on a linear scale with respect to laboratory conditions of signal amplitude versus actual metal loss, internal or external.

NOTE: Due to pit configuration, magnetic flux leakage response characteristics and other variables, the signal heights of the magnetic anomalies on the logs may not always be proportionate to the actual bodywall loss or depth of penetration of the anomaly on the pipe. Thus, in some instances an inaccurate severity classification may be assigned to a given indication on the survey log.

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

III. LOG GRADING REPORT

Identification and Classification Of Indications (Cont'd)

The following categories have been established for grading this log:

Magnetic Anomalies

There are 214 occurrences of indications on the logs of a nature which, in the opinion of VPS, are representative of magnetic anomalies with an approximate depth of 0% to 25% bodywall penetration. Indications of this nature are labeled with an "L" on the logs. (See Figure 1)

There are 85 occurrences of indications on the logs of a nature which, in the opinion of VPS, are representative of magnetic anomalies with an approximate depth of 25% to 50% bodywall penetration. Indications of this nature are labeled with an "M" on the logs. (See Figure 2)

There are 23 occurrences of indications on the logs of a nature which, in the opinion of VPS, are representative of magnetic anomalies with an approximate depth of 50% or more bodywall penetration. Indications of this nature are labeled with an "S" on the logs. (See Figure 3)

Metal in Close Proximity

There are 25 occurrences of indications on the logs of a nature which, in the opinion of VPS, are representative of metal in close proximity to the pipe bodywall. Indications of this nature are labeled "MCP" on the logs. (See Figure 4)

General Comments

Grading of the logs has been done on a by-the-pipe-length basis and not by each individual anomaly. The worst condition in a length of pipe is used to place a grade on that length of pipe. For example, if a length of pipe is graded "S", there may be one or more "S" class anomalies in the length and there may also be a number of "M" class anomalies in the same length.

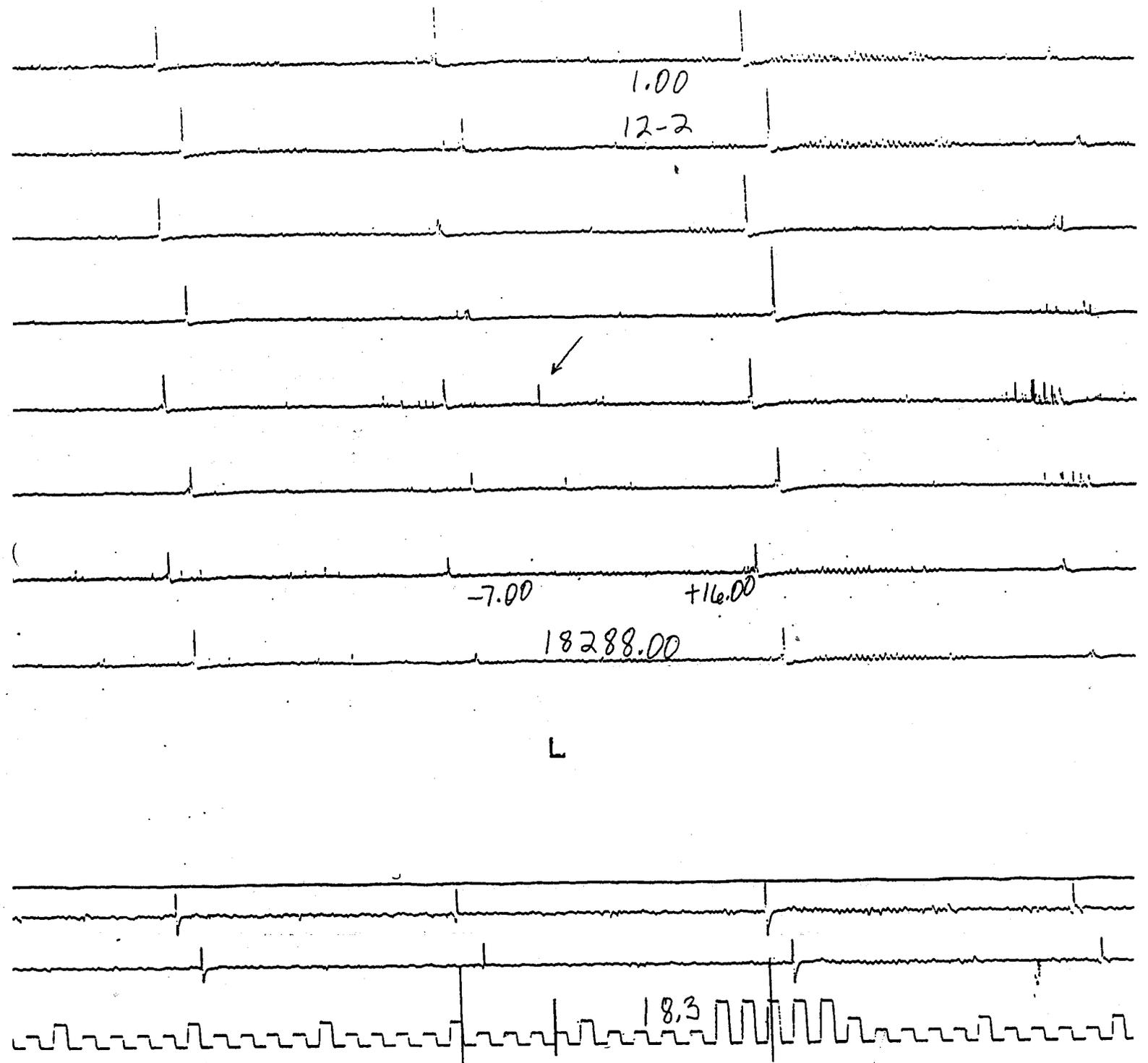
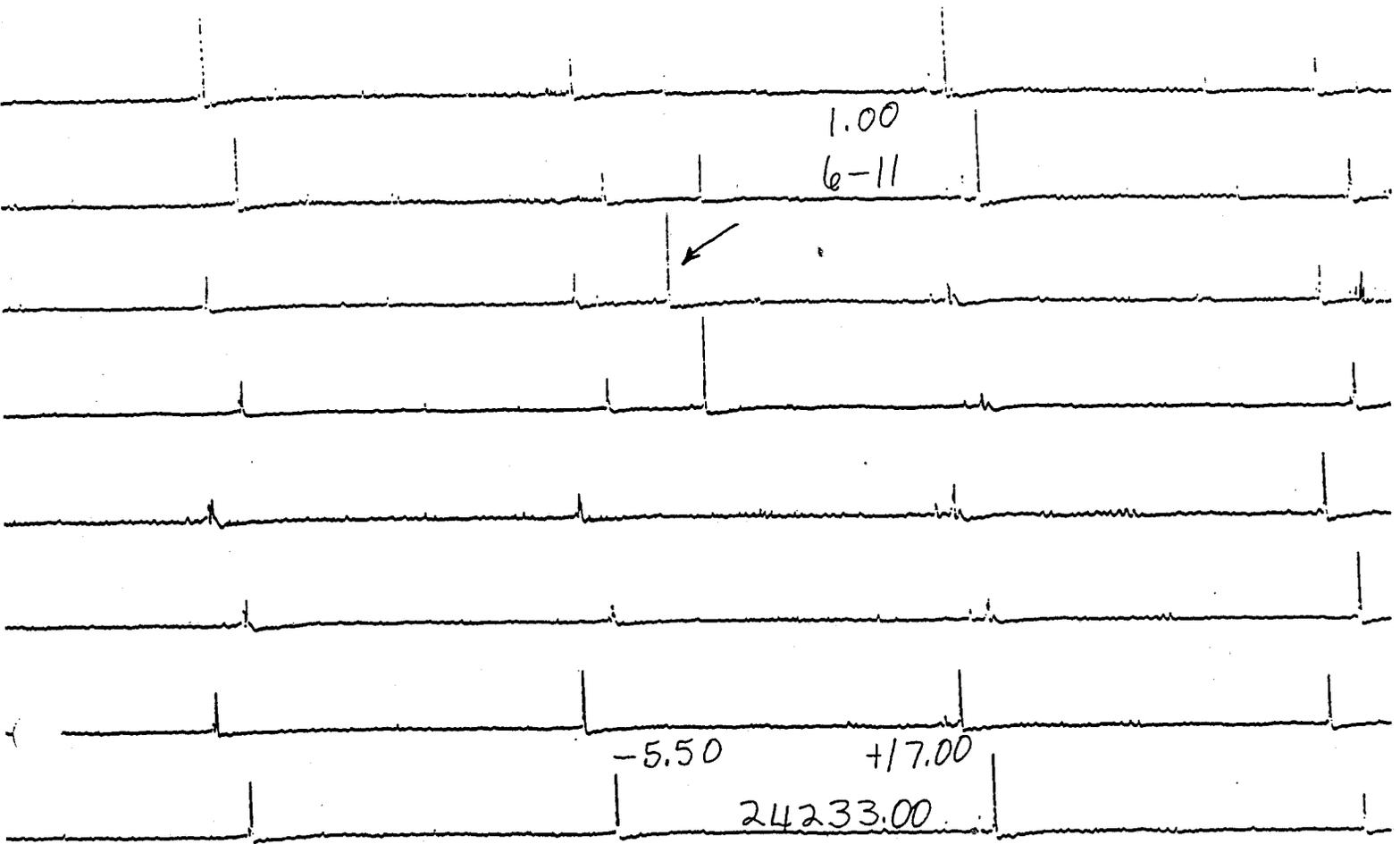


Figure 1



S10

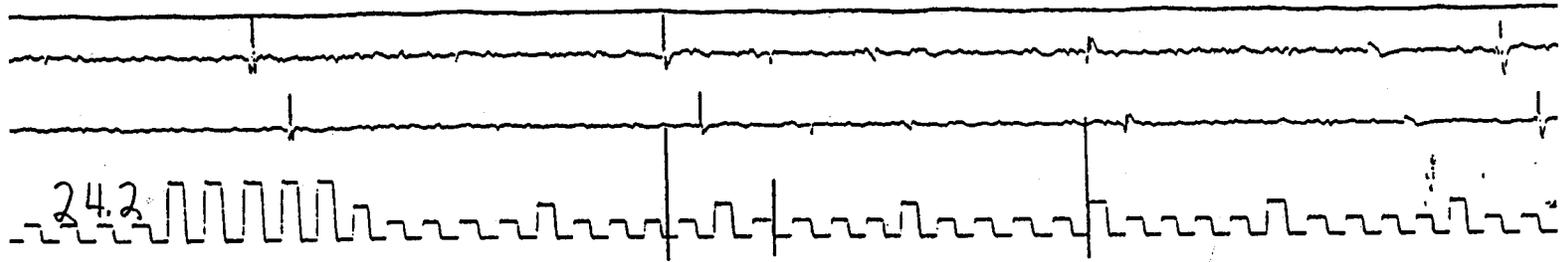
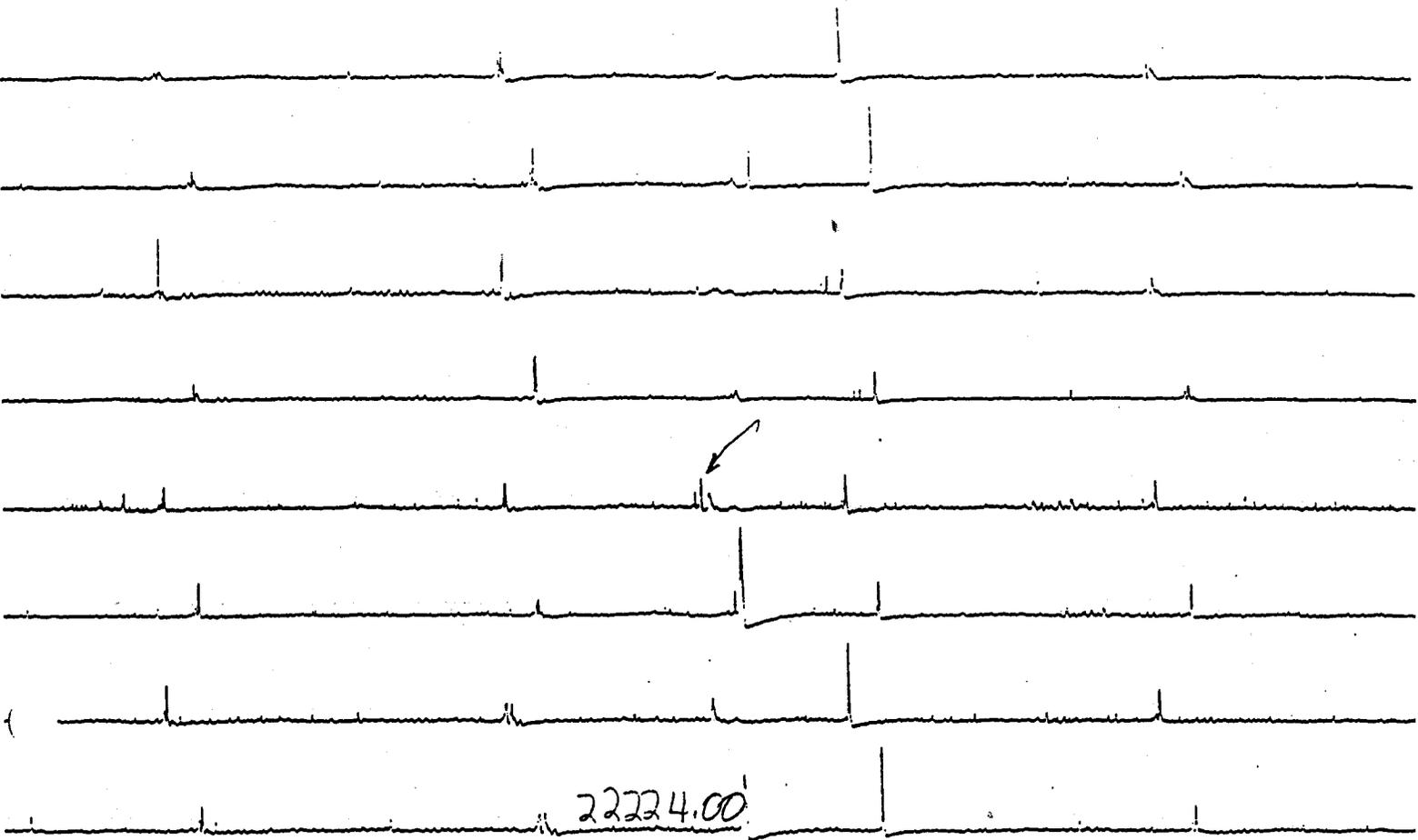


Figure 3



MCP

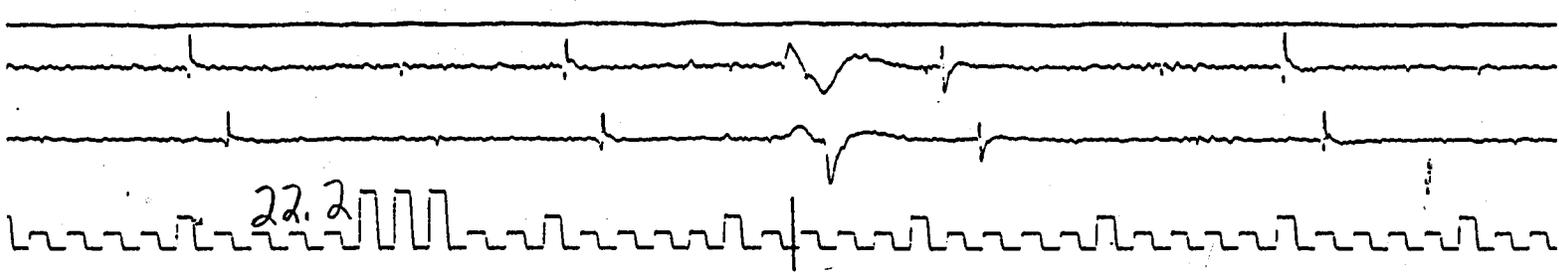


Figure 4

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

III. LOG GRADING REPORT

List of Known Locations

Roll # 1

LAUNCH
VALVE 1
VALVE 2
BEGIN CASING
END CASING

Roll # 2

VALVE 3
VALVE 4
VALVE 5
VALVE 6
VALVE 7
VALVE 8
VALVE 9

Roll # 3

VALVE 10
VALVE 11
VALVE 12
SPOOL

Roll # 4

VALVE 13
EXPANSION JOINT
VALVE 14

WPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

III. LOG GRADING REPORT

List of Known Locations

Roll # 5

**VALVE 15
TRAP**

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

III. LOG GRADING REPORT

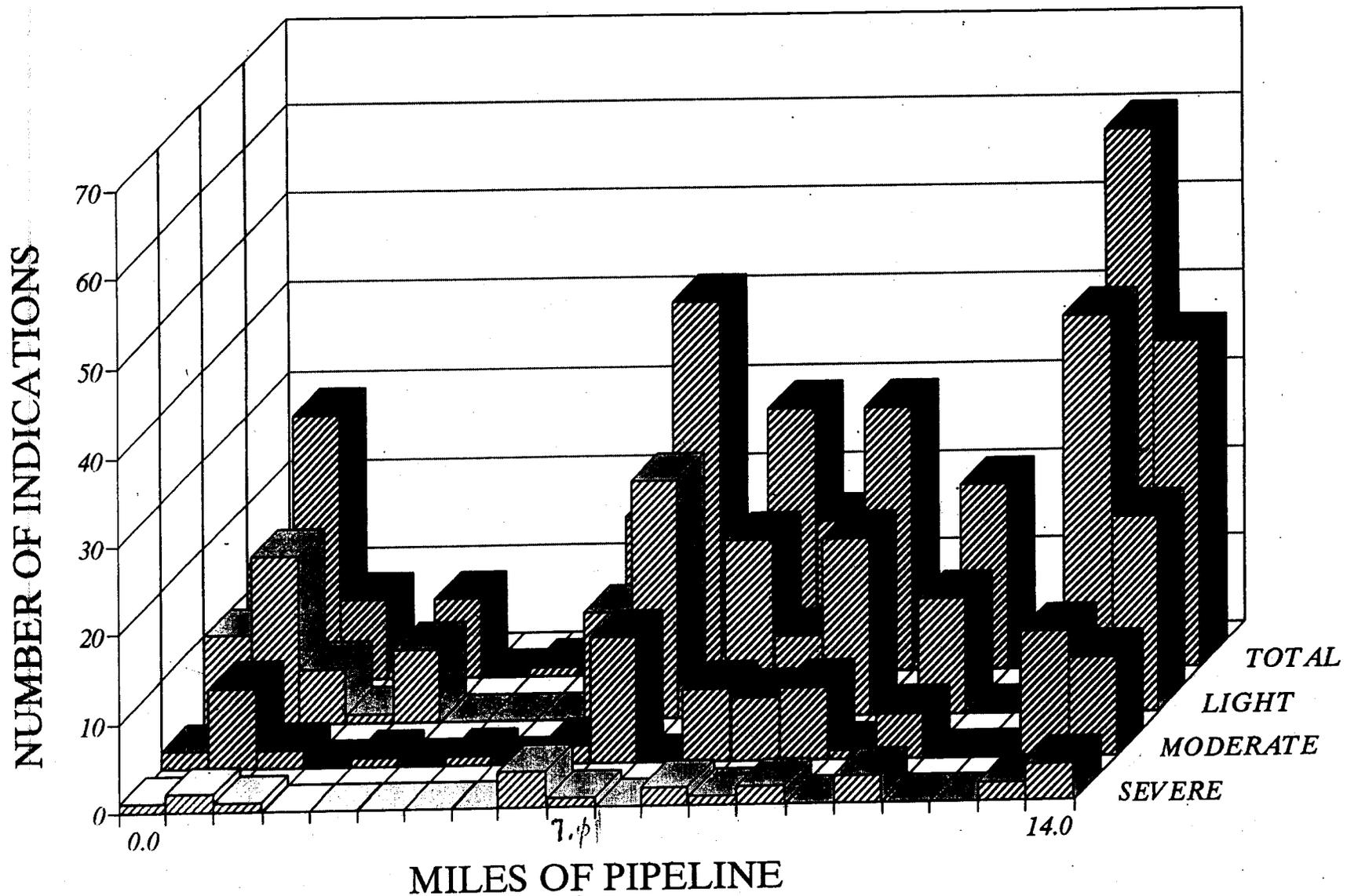
Rate of Occurrence

In an attempt to supply the Department of the Navy with an in-depth study of their pipeline, VPS has provided a rate of occurrence graph with light, moderate and severe magnetic anomalies plotted. The purpose for this graph is to provide a visual illustration of the bodywall loss occurrences along the pipeline distance, so that the Department of the Navy may be able to identify any patterns which may exist in their pipelines' corrosion maintenance program.

Each bar represents the number of indications found between two consecutive known locations (i.e., Magnets, AGMs, Valves). The bar labeled 'TOTAL' represents the composite total number of light, moderate and severe magnetic anomalies.

DENSITY GRAPH

JACKSONVILLE to CECIL FIELD



VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

IV. VPS SPREADSHEET

Key to VPS Spreadsheet Report

Pipeline Feature

Lists each known pipeline location and graded pipeline anomaly in order as they appear on the survey logs, starting at Launch to the Trap.

Odometer Index

Lists the VPS tool odometer reading at each listed known location and each graded pipeline anomaly.

Mile Post

Lists the calculated Mile Post location of each item listed in the "Pipeline Feature" column. The Mile Post calculation is determined by the inspection tool's odometer reading of feet traversed divided by 5280 feet per mile. The Mile Post calculation provided in this spreadsheet has no direct relationship with the pipeline operator's company station numbers.

Nearest Known Location

Lists four columns of information as follows:

Direction: Lists "upstream" or "downstream" with respect to direction the graded pipeline anomaly is to the nearest known location.

Reference Item: Lists the name of the nearest known location.

Station Number: Lists the station number of the known location, as provided by the customer.

Distance: Lists the distance in feet that the graded pipeline anomaly is to the listed known location. This distance is calculated by the VPS' tool odometer readings.

VPS Survey Report to
Department of the Navy
8" Jet Fuel Pipeline
Naval Air Station Jacksonville
to Naval Air Station Cecil Field

IV. VPS SPREADSHEET

Key to VPS Spreadsheet Report (cont'd)

Distance to Upstream and Downstream Welds

Lists the graded pipeline anomalies and distance from the upstream and downstream weld of the length of pipe that the anomaly is located. Note, there is only one graded anomaly per length of pipe; that grade being the worst indication of the length of pipe.

O'Clock

Lists the o'clock position of the graded anomaly's position on the pipeline.

Length Affected

Lists the approximate linear distance of anomaly affected pipe.

IMPORTANT NOTICE: If the anomaly is an isolated, single indication in the length of pipe, then standard procedure herein will list a minimum length affected distance of 1 (one) foot. If there are two or more indications or areas of anomaly affected pipe in the length of interest, then length affected will read something longer in length than 1 (one) foot. Prior to excavating, VPS strongly advises that the pipeline operator utilizing this report refer to the survey log visual format of the length of interest in order to best determine their excavation and repair parameters.

Joint Length

Lists the measured length of each length of pipe that contains a graded anomaly.

Department Of The Navy

IV. Vetco Pipeline Services - Spreadsheet Analysis

LINE: 8" Jet Fuel SECTION: Naval Air Sta. Jacksonville to Naval Air Sta. Cecil Field SURVEY DATE: August, 1994
UNITS IN FEET

PIPELINE FEATURE	ODOMETER INDEX	MILE POST	DIREC- TION	NEAREST KNOWN LOCATION		DISTANCE TO		O' CLOCK	LENGTH AFFECTED	JOINT LENGTH
				REFERENCE ITEM	STATION NUMBER	DISTANCE	UPSTRM WELD			
LAUNCH	26.00	0.00	*	LAUNCH		0.00	*	0.00	0.00	0.00
MCP	58.50	0.01	DNSTRM	LAUNCH		32.50		0.00	0.00	0.00
L	148.50	0.02	DNSTRM	LAUNCH		122.50		1.00	21.50	10-12 1.00 22.50
L	211.00	0.04	DNSTRM	LAUNCH		185.00		17.50	2.00	10-2 1.00 19.50
M1	214.00	0.04	DNSTRM	LAUNCH		188.00		1.00	12.50	12-3 2.00 13.50
S1	235.50	0.04	DNSTRM	LAUNCH		209.50		9.00	9.00	12-12 19.00 18.00
L	440.00	0.08	DNSTRM	LAUNCH		414.00		16.00	6.50	9-11 1.00 22.50
MCP	792.00	0.15	DNSTRM	LAUNCH		766.00		0.00	0.00	0.00 0.00
MCP	2404.00	0.45	UPSTRM	VALVE 1		2257.00		0.00	0.00	0.00 0.00
MCP	2748.50	0.52	UPSTRM	VALVE 1		1912.50		0.00	0.00	0.00 0.00
L	2882.00	0.54	UPSTRM	VALVE 1		1779.00		8.00	15.00	1-5 1.00 23.00
L	3214.00	0.60	UPSTRM	VALVE 1		1447.00		1.00	22.00	4-12 1.00 23.00
L	3465.00	0.65	UPSTRM	VALVE 1		1196.00		5.50	17.50	10-2 1.00 23.00
L	3736.00	0.70	UPSTRM	VALVE 1		925.00		22.50	1.00	6-2 1.00 23.50
L	4168.00	0.78	UPSTRM	VALVE 1		493.00		18.00	5.00	7-3 1.00 23.00
L	4332.00	0.82	UPSTRM	VALVE 1		329.00		22.00	1.00	10-12 1.00 23.00
L	4379.00	0.82	UPSTRM	VALVE 1		282.00		23.00	0.50	6-8 1.00 23.50
M2	4536.00	0.85	UPSTRM	VALVE 1		125.00		16.00	7.00	7-11 1.00 23.00
VALVE 1	4661.00	0.88	*	VALVE 1		0.00	*	0.00	0.00	0.00 0.00
M3	5539.50	1.04	DNSTRM	VALVE 1		878.50		12.50	10.00	7-2 1.00 22.50
S2	5647.00	1.06	DNSTRM	VALVE 1		986.00		17.00	5.00	10-12 1.00 22.00
L	5900.00	1.11	DNSTRM	VALVE 1		1239.00		3.00	17.50	10-6 2.00 20.50
L	6025.00	1.14	DNSTRM	VALVE 1		1364.00		1.00	18.00	1-5 1.00 19.00
M4	6094.00	1.15	DNSTRM	VALVE 1		1433.00		6.00	16.00	12-12 1.00 22.00
SPOOL PIECE	6193.50	1.17	DNSTRM	VALVE 1		1532.50		0.00	0.00	0.00 0.00
M5	6204.00	1.17	DNSTRM	VALVE 1		1543.00		9.00	14.00	6-8 1.00 23.00
DIG 1	6227.00	1.17	DNSTRM	VALVE 1		1566.00		0.00	0.00	0.00 0.00
L	6880.00	1.30	DNSTRM	VALVE 1		2219.00		21.50	1.00	1-3 1.00 22.50
L	7113.00	1.34	DNSTRM	VALVE 1		2452.00		1.00	22.00	3-5 1.00 23.00
MCP	7195.50	1.36	UPSTRM	VALVE 2		2389.50		0.00	0.00	0.00 0.00
M6	7252.00	1.37	UPSTRM	VALVE 2		2333.00		0.50	22.00	12-12 1.00 22.50
L	7344.50	1.39	UPSTRM	VALVE 2		2240.50		23.50	0.50	3-8 1.00 24.00

Department Of The Navy

IV. Vetco Pipeline Services - Spreadsheet Analysis

LINE: 8" Jet Fuel SECTION: Naval Air Sta. Jacksonville to Naval Air Sta. Cecil Field SURVEY DATE: August, 1994
UNITS IN FEET

PIPELINE FEATURE	ODOMETER INDEX	MILE POST	DIREC- TION	REFERENCE ITEM	NEAREST KNOWN LOCATION		DISTANCE TO		O' CLOCK	LENGTH AFFECTED	JOINT LENGTH
					STATION NUMBER	DISTANCE	UPSTRM WELD	DNSTRM WELD			
S3	7379.00	1.39	UPSTRM	VALVE 2		2206.00	13.00	9.50	9-11	1.00	22.50
M7	7389.00	1.39	UPSTRM	VALVE 2		2196.00	0.50	22.00	6-2	1.00	22.50
L	7564.00	1.43	UPSTRM	VALVE 2		2021.00	6.50	16.00	7-9	1.00	22.50
L	7945.00	1.50	UPSTRM	VALVE 2		1640.00	3.50	20.00	10-12	1.00	23.50
M8	8031.00	1.52	UPSTRM	VALVE 2		1554.00	21.50	1.00	4-6	1.00	22.50
L	8111.50	1.53	UPSTRM	VALVE 2		1473.50	9.00	13.50	12-12	1.00	22.50
L	8147.50	1.54	UPSTRM	VALVE 2		1437.50	22.50	1.00	6-8	1.00	23.50
M9	8503.50	1.61	UPSTRM	VALVE 2		1081.50	22.50	0.50	4-11	1.00	23.00
L	8538.50	1.61	UPSTRM	VALVE 2		1046.50	7.50	15.50	1-3	1.00	23.00
L	8571.50	1.62	UPSTRM	VALVE 2		1013.50	17.50	3.50	12-5	1.00	21.00
M10	8704.00	1.64	UPSTRM	VALVE 2		881.00	1.00	20.00	7-11	1.00	21.00
L	8741.50	1.65	UPSTRM	VALVE 2		843.50	17.50	5.50	12-12	1.00	23.00
L	8793.00	1.66	UPSTRM	VALVE 2		792.00	22.50	1.00	12-12	1.00	23.50
L	8837.50	1.67	UPSTRM	VALVE 2		747.50	1.00	20.50	3-9	1.00	21.50
L	8936.50	1.69	UPSTRM	VALVE 2		648.50	13.50	9.00	9-12	1.00	22.50
MCP	9007.00	1.70	UPSTRM	VALVE 2		578.00	0.00	0.00		0.00	0.00
M11	9051.00	1.71	UPSTRM	VALVE 2		534.00	20.50	1.00	12-2	1.00	21.50
L	9065.00	1.71	UPSTRM	VALVE 2		520.00	13.00	9.50	6-11	1.00	22.50
L	9112.50	1.72	UPSTRM	VALVE 2		472.50	19.50	4.00	9-5	1.00	23.50
L	9188.50	1.74	UPSTRM	VALVE 2		396.50	0.50	23.50	1-6	1.00	24.00
L	9383.50	1.77	UPSTRM	VALVE 2		201.50	4.50	17.50	10-12	1.00	22.00
VALVE 2	9585.00	1.81 *		VALVE 2		0.00 *	0.00	0.00 *		0.00	0.00
S4	10079.00	1.90	DNSTRM	VALVE 2		494.00	6.00	11.00	9-12	1.00	17.00
L	10201.00	1.93	DNSTRM	VALVE 2		616.00	13.00	7.50	1-5	1.00	20.50
L	10230.50	1.93	DNSTRM	VALVE 2		645.50	22.00	0.50	1-5	1.00	22.50
L	10276.00	1.94	DNSTRM	VALVE 2		691.00	1.00	22.50	12-12	1.00	23.50
M12	10308.00	1.95	DNSTRM	VALVE 2		723.00	9.50	14.00	1-3	1.00	23.50
L	10323.00	1.95	DNSTRM	VALVE 2		738.00	1.00	20.00	9-12	1.00	21.00
L	10982.00	2.08	UPSTRM	BEGIN CASING		416.00	22.50	1.00	12-2	1.00	23.50
L	11034.50	2.08	UPSTRM	BEGIN CASING		363.50	8.00	15.00	7-11	1.00	23.00
M13	11129.50	2.10	UPSTRM	BEGIN CASING		268.50	11.50	5.50	6-12	1.00	17.00
BEGIN CASING	11398.00	2.15 *		BEGIN CASING		0.00 *	0.00	0.00 *		0.00	0.00

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LINE: 8" Jet Fuel SECTION: Naval Air Sta. Jacksonville to Naval Air Sta. Cecil Field SURVEY DATE: August, 1994
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PIPELINE FEATURE	ODOMETER INDEX	MILE POST	DIREC- TION	REFERENCE ITEM	STATION NUMBER	DISTANCE	DISTANCE TO		O' CLOCK	LENGTH AFFECTED	JOINT LENGTH
							UPSTRM WELD	DNSTRM WELD			
L	11481.00	2.17	UPSTRM	END CASING		7.00	15.00	8.00	1-5	1.00	23.00
END CASING	11488.00	2.17	*	END CASING		0.00 *	0.00	0.00 *		0.00	0.00
L	11812.00	2.23	DNSTRM	END CASING		324.00	20.00	1.50	10-3	1.00	21.50
MCP	11858.00	2.24	DNSTRM	END CASING		370.00	0.00	0.00		0.00	0.00
L	11958.50	2.26	DNSTRM	END CASING		470.50	7.50	16.00	7-12	1.00	23.50
End Roll # 1	11974.50	2.26	DNSTRM	END CASING		486.50	0.00	0.00		0.00	0.00
Begin Roll # 2	11974.50	2.26	DNSTRM	END CASING		486.50	0.00	0.00		0.00	0.00
M14	12050.50	2.28	DNSTRM	END CASING		562.50	7.50	16.00	10-6	1.00	23.50
L	12267.50	2.32	DNSTRM	END CASING		779.50	15.50	7.50	1-5	1.00	23.00
L	12411.00	2.35	DNSTRM	END CASING		923.00	20.00	3.00	12-3	1.00	23.00
L	12649.00	2.39	DNSTRM	END CASING		1161.00	4.00	19.50	12-12	1.00	23.50
L	13017.00	2.46	UPSTRM	VALVE 3		1346.00	22.00	1.00	9-11	1.00	23.00
L	13449.50	2.54	UPSTRM	VALVE 3		913.50	18.00	5.00	9-11	1.00	23.00
L	13498.00	2.55	UPSTRM	VALVE 3		865.00	1.00	22.00	1-5	1.00	23.00
L	13860.00	2.62	UPSTRM	VALVE 3		503.00	0.00	0.00		0.00	0.00
BEGIN HEAVY WALL	13860.00	2.62	UPSTRM	VALVE 3		503.00	0.00	0.00		0.00	0.00
VALVE 3	14363.00	2.72	*	VALVE 3		0.00 *	0.00	0.00 *		0.00	0.00
VALVE 4	14367.00	2.72	*	VALVE 4		0.00 *	0.00	0.00 *		0.00	0.00
AGM	14393.00	2.72	DNSTRM	VALVE 4		26.00	0.00	0.00		0.00	0.00
M15	14738.00	2.79	DNSTRM	VALVE 4		371.00	30.00	9.00	10-3	2.00	39.00
VALVE 5	15751.00	2.98	*	VALVE 5		0.00 *	0.00	0.00 *		0.00	0.00
VALVE 6	15757.00	2.98	*	VALVE 6		0.00 *	0.00	0.00 *		0.00	0.00
END HEAVY WALL	16065.00	3.04	DNSTRM	VALVE 6		308.00	0.00	0.00		0.00	0.00
MCP	16423.00	3.11	DNSTRM	VALVE 6		666.00	0.00	0.00		0.00	0.00
S5	16436.00	3.11	DNSTRM	VALVE 6		679.00	6.50	16.00	12-5	1.00	22.50
L	16457.50	3.11	DNSTRM	VALVE 6		700.50	5.50	17.00	4-12	1.00	22.50
L	16593.00	3.14	DNSTRM	VALVE 6		836.00	3.00	18.50	1-3	1.00	21.50
M16	16853.50	3.19	DNSTRM	VALVE 6		1096.50	20.00	2.50	10-12	2.00	22.50
L	16980.00	3.21	DNSTRM	VALVE 6		1223.00	16.00	6.00	1-5	1.00	22.00
L	17164.00	3.25	DNSTRM	VALVE 6		1407.00	20.00	1.00	9-12	1.00	21.00
L	17183.00	3.25	DNSTRM	VALVE 6		1426.00	18.00	5.50	10-2	1.00	23.50
L	17331.50	3.28	DNSTRM	VALVE 6		1574.50	5.50	18.00	12-3	1.00	23.50
L	17822.00	3.37	UPSTRM	VALVE 7		1427.00	5.50	17.00	10-12	1.00	22.50

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LINE: 8" Jet Fuel SECTION: Naval Air Sta. Jacksonville to Naval Air Sta. Cecil Field SURVEY DATE: August, 1994
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PIPELINE FEATURE	ODOMETER INDEX	MILE POST	NEAREST KNOWN LOCATION		DISTANCE TO		O' CLOCK	LENGTH AFFECTED	JOINT LENGTH		
			DIREC- TION	REFERENCE ITEM	STATION NUMBER	DISTANCE				UPSTRM WELD	DNSTRM WELD
S6	17854.00	3.38	UPSTRM	VALVE 7		1395.00	15.00	8.50	9-11	1.00	23.50
L	18047.00	3.41	UPSTRM	VALVE 7		1202.00	13.50	6.50	12-2	1.00	20.00
L	18084.50	3.42	UPSTRM	VALVE 7		1164.50	12.50	8.50	12-2	1.00	21.00
L	18157.00	3.43	UPSTRM	VALVE 7		1092.00	2.00	21.00	3-6	1.00	23.00
L	18288.00	3.46	UPSTRM	VALVE 7		961.00	7.00	16.00	12-2	1.00	23.00
S7	18772.00	3.55	UPSTRM	VALVE 7		477.00	21.00	2.00	4-12	1.00	23.00
L	18997.00	3.59	UPSTRM	VALVE 7		252.00	21.00	2.00	3-5	1.00	23.00
M17	19127.00	3.62	UPSTRM	VALVE 7		122.00	16.00	7.00	10-2	1.00	23.00
MCP	19139.50	3.62	UPSTRM	VALVE 7		109.50	0.00	0.00		0.00	0.00
S8	19144.00	3.62	UPSTRM	VALVE 7		105.00	10.00	11.50	6-11	1.00	21.50
VALVE 7	19249.00	3.64 *		VALVE 7		0.00 *	0.00	0.00 *		0.00	0.00
M18	19264.50	3.64	DNSTRM	VALVE 7		15.50	15.50	7.50	6-11	1.00	23.00
L	19301.50	3.65	DNSTRM	VALVE 7		52.50	6.50	10.50	12-3	1.00	17.00
L	19453.00	3.68	DNSTRM	VALVE 7		204.00	6.00	15.00	10-12	1.00	21.00
L	19498.00	3.69	DNSTRM	VALVE 7		249.00	9.00	13.00	10-12	1.00	22.00
L	19573.50	3.70	DNSTRM	VALVE 7		324.50	20.50	2.50	10-12	1.00	23.00
L	19659.00	3.72	DNSTRM	VALVE 7		410.00	19.00	2.00	10-12	1.00	21.00
S9	19876.50	3.76	DNSTRM	VALVE 7		627.50	21.50	0.50	12-5	1.00	22.00
L	19899.00	3.76	DNSTRM	VALVE 7		650.00	3.50	19.50	3-6	1.00	23.00
L	19981.50	3.78	DNSTRM	VALVE 7		732.50	16.50	6.00	9-11	1.00	22.50
L	20128.00	3.81	DNSTRM	VALVE 7		879.00	5.00	15.00	10-12	1.00	20.00
L	20255.00	3.83	DNSTRM	VALVE 7		1006.00	3.00	20.50	10-12	1.00	23.50
M19	20287.00	3.84	DNSTRM	VALVE 7		1038.00	11.50	11.00	1-5	1.00	22.50
L	20364.00	3.85	DNSTRM	VALVE 7		1115.00	22.00	1.00	10-2	1.00	23.00
M20	20390.00	3.86	DNSTRM	VALVE 7		1141.00	2.00	18.50	9-2	1.00	20.50
L	20468.00	3.87	DNSTRM	VALVE 7		1219.00	15.00	6.00	9-12	1.00	21.00
L	20483.00	3.87	DNSTRM	VALVE 7		1234.00	9.00	14.00	7-9	1.00	23.00
L	20520.00	3.88	DNSTRM	VALVE 7		1271.00	1.00	22.00	1-3	1.00	23.00
L	20598.00	3.90	DNSTRM	VALVE 7		1349.00	10.50	13.00	10-2	1.00	23.50
M21	20752.00	3.93	DNSTRM	VALVE 7		1503.00	7.00	14.50	7-9	1.00	21.50
M22	20771.00	3.93	DNSTRM	VALVE 7		1522.00	4.50	18.00	10-12	1.00	22.50
M23	20793.00	3.93	DNSTRM	VALVE 7		1544.00	4.00	18.00	10-12	1.00	22.00

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PIPELINE FEATURE	ODOMETER INDEX	MILE POST	NEAREST KNOWN LOCATION		STATION NUMBER	DISTANCE	DISTANCE TO		O' CLOCK	LENGTH AFFECTED	JOINT LENGTH
			DIREC- TION	REFERENCE ITEM			UPSTRM WELD	DNSTRM WELD			
L	20842.50	3.94	DNSTRM	VALVE 7		1593.50	9.50	10.50	7-9	1.00	20.00
M24	21004.00	3.97	UPSTRM	VALVE 8		1754.00	19.50	3.50	9-2	1.00	23.00
L	21020.00	3.98	UPSTRM	VALVE 8		1738.00	12.50	11.00	4-6	1.00	23.50
L	21051.00	3.98	UPSTRM	VALVE 8		1707.00	20.00	3.00	6-11	1.00	23.00
L	21103.00	3.99	UPSTRM	VALVE 8		1655.00	7.00	15.00	12-2	1.00	22.00
L	21159.50	4.00	UPSTRM	VALVE 8		1598.50	17.50	3.50	3-5	1.00	21.00
M25	21181.00	4.01	UPSTRM	VALVE 8		1577.00	18.00	5.00	12-2	1.00	23.00
L	21342.00	4.04	UPSTRM	VALVE 8		1416.00	22.00	1.00	3-5	1.00	23.00
L	21369.00	4.04	UPSTRM	VALVE 8		1389.00	3.00	19.00	7-9	1.00	22.00
M26	21543.50	4.08	UPSTRM	VALVE 8		1214.50	17.00	6.50	12-2	1.00	23.50
M27	21567.00	4.08	UPSTRM	VALVE 8		1191.00	17.00	4.50	10-12	1.00	21.50
M28	21581.00	4.08	UPSTRM	VALVE 8		1177.00	9.50	14.00	7-9	1.00	23.50
L	21713.00	4.11	UPSTRM	VALVE 8		1045.00	7.00	16.00	3-6	1.00	23.00
L	21747.50	4.11	UPSTRM	VALVE 8		1010.50	18.50	5.00	10-2	1.00	23.50
M29	21762.00	4.12	UPSTRM	VALVE 8		996.00	9.50	14.00	9-2	1.00	23.50
L	21928.50	4.15	UPSTRM	VALVE 8		829.50	5.00	18.50	12-2	1.00	23.50
M30	22006.50	4.16	UPSTRM	VALVE 8		751.50	14.50	7.50	7-9	1.00	22.00
MCP	22224.00	4.20	UPSTRM	VALVE 8		534.00	0.00	0.00		0.00	0.00
L	22281.00	4.21	UPSTRM	VALVE 8		477.00	9.00	12.50	9-2	1.00	21.50
L	22496.50	4.26	UPSTRM	VALVE 8		261.50	2.50	18.50	10-3	1.00	21.00
M31	22527.50	4.26	UPSTRM	VALVE 8		230.50	12.50	9.00	1-5	1.00	21.50
L	22650.50	4.28	UPSTRM	VALVE 8		107.50	21.50	1.00	4-9	1.00	22.50
BEGIN HEAVY WALL	22664.00	4.29	UPSTRM	VALVE 8		94.00	0.00	0.00		0.00	0.00
VALVE 8	22758.00	4.31	*	VALVE 8		0.00 *	0.00	0.00 *		0.00	0.00
END HEAVY WALL	22967.50	4.34	UPSTRM	VALVE 9		71.50	0.00	0.00		0.00	0.00
L	23005.00	4.35	UPSTRM	VALVE 9		34.00	1.00	22.50	12-2	1.00	23.50
L	23031.00	4.36	UPSTRM	VALVE 9		8.00	3.50	3.00	6-8	1.00	6.50
VALVE 9	23039.00	4.36	*	VALVE 9		0.00 *	0.00	0.00 *		0.00	0.00
L	23050.50	4.36	DNSTRM	VALVE 9		11.50	8.00	9.00	4-8	1.00	17.00
L	23287.00	4.41	DNSTRM	VALVE 9		248.00	18.00	2.00	9-2	1.00	20.00
L	23325.00	4.41	DNSTRM	VALVE 9		286.00	15.50	6.50	12-3	1.00	22.00
M32	23438.00	4.43	DNSTRM	VALVE 9		399.00	16.00	7.00	4-9	1.00	23.00

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			DIREC- TION	REFERENCE ITEM	STATION NUMBER	DISTANCE	UPSTRM WELD				DNSTRM WELD
L	24159.50	4.57	DNSTRM	VALVE 9		1120.50	0.50	22.00	6-8	1.00	22.50
S10	24233.00	4.58	DNSTRM	VALVE 9		1194.00	5.50	17.00	6-11	1.00	22.50
L	24378.50	4.61	DNSTRM	VALVE 9		1339.50	8.50	5.50	10-12	1.00	14.00
L	24478.00	4.63	DNSTRM	VALVE 9		1439.00	15.50	5.00	12-2	1.00	20.50
L	24726.00	4.68	DNSTRM	VALVE 9		1687.00	1.00	21.00	10-6	1.00	22.00
L	24773.00	4.69	DNSTRM	VALVE 9		1734.00	4.50	6.00	1-3	1.00	10.50
M33	25081.50	4.75	DNSTRM	VALVE 9		2042.50	15.00	5.00	9-2	1.00	20.00
L	25194.50	4.77	DNSTRM	VALVE 9		2155.50	22.00	0.50	3-5	1.00	22.50
M34	25260.50	4.78	DNSTRM	VALVE 9		2221.50	22.00	0.50	3-8	1.00	22.50
L	25350.00	4.80	DNSTRM	VALVE 9		2311.00	1.00	22.00	12-2	1.00	23.00
L	25455.00	4.82	UPSTRM	VALVE 10		2245.00	14.00	7.00	1-3	1.00	21.00
L	25480.00	4.82	UPSTRM	VALVE 10		2220.00	18.00	3.50	12-2	1.00	21.50
L	25689.50	4.86	UPSTRM	VALVE 10		2010.50	1.50	22.00	4-8	1.00	23.50
L	25754.00	4.87	UPSTRM	VALVE 10		1946.00	21.00	2.00	9-11	1.00	23.00
M35	25772.50	4.88	UPSTRM	VALVE 10		1927.50	16.50	7.00	9-12	1.00	23.50
MCP	25838.50	4.89	UPSTRM	VALVE 10		1861.50	0.00	0.00		0.00	0.00
L	25868.00	4.89	UPSTRM	VALVE 10		1832.00	18.00	3.50	-3-8	1.00	21.50
MCP	26151.00	4.95	UPSTRM	VALVE 10		1549.00	0.00	0.00		0.00	0.00
M36	26182.00	4.95	UPSTRM	VALVE 10		1518.00	16.00	7.00	7-3	1.00	23.00
L	26197.00	4.96	UPSTRM	VALVE 10		1503.00	8.00	15.50	1-3	1.00	23.50
M37	26239.00	4.96	UPSTRM	VALVE 10		1461.00	5.00	17.00	10-12	1.00	22.00
L	26373.00	4.99	UPSTRM	VALVE 10		1327.00	7.00	16.00	7-9	1.00	23.00
L	26518.00	5.02	UPSTRM	VALVE 10		1182.00	15.00	9.00	6-11	1.00	24.00
M38	26601.50	5.03	UPSTRM	VALVE 10		1098.50	7.50	15.50	7-9	1.00	23.00
L	26656.00	5.04	UPSTRM	VALVE 10		1044.00	22.00	1.00	10-12	1.00	23.00
S11	26917.00	5.09	UPSTRM	VALVE 10		783.00	10.50	10.00	6-11	1.00	20.50
End Roll # 2	26973.00	5.10	UPSTRM	VALVE 10		727.00	0.00	0.00		0.00	0.00
Begin Roll # 3	26973.00	5.10	UPSTRM	VALVE 10		727.00	0.00	0.00		0.00	0.00
L	27178.50	5.14	UPSTRM	VALVE 10		521.50	0.50	22.50	12-12	1.00	23.00
M39	27411.00	5.19	UPSTRM	VALVE 10		289.00	9.50	13.00	1-3	1.00	22.50
VALVE 10	27700.00	5.24 *		VALVE 10		0.00 *	0.00	0.00 *		0.00	0.00
L	27729.50	5.25	DNSTRM	VALVE 10		29.50	5.50	17.50	10-12	1.00	23.00

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							UPSTRM WELD	DNSTRM WELD			
L	28111.00	5.32	DNSTRM	VALVE 10		411.00	6.50	15.00	6-11	1.00	21.50
M40	28137.00	5.32	DNSTRM	VALVE 10		437.00	11.00	11.00	12-2	1.00	22.00
L	28180.00	5.33	DNSTRM	VALVE 10		480.00	9.50	13.00	10-3	1.00	22.50
MCP	28236.00	5.34	DNSTRM	VALVE 10		536.00	0.00	0.00		0.00	0.00
M41	28419.00	5.38	DNSTRM	VALVE 10		719.00	0.50	22.50	7-11	1.00	23.00
L	28684.00	5.43	DNSTRM	VALVE 10		984.00	15.00	4.50	12-2	1.00	19.50
MCP	28790.00	5.45	DNSTRM	VALVE 10		1090.00	0.00	0.00		0.00	0.00
M42	28791.50	5.45	DNSTRM	VALVE 10		1091.50	11.50	9.50	4-6	1.00	21.00
MCP	28983.50	5.48	DNSTRM	VALVE 10		1283.50	0.00	0.00		0.00	0.00
L	29282.50	5.54	DNSTRM	VALVE 10		1582.50	8.50	14.50	6-9	1.00	23.00
M43	29978.00	5.67	DNSTRM	VALVE 10		2278.00	6.50	17.00	10-12	1.00	23.50
L	30048.00	5.69	DNSTRM	VALVE 10		2348.00	8.00	14.00	10-12	1.00	22.00
S12	30367.00	5.75	UPSTRM	VALVE 11		2390.00	17.00	6.50	1-6	1.00	23.50
L	30477.50	5.77	UPSTRM	VALVE 11		2279.50	12.00	10.50	9-11	1.00	22.50
M44	31138.50	5.89	UPSTRM	VALVE 11		1618.50	21.50	2.50	6-8	1.00	24.00
L	31323.50	5.93	UPSTRM	VALVE 11		1433.50	21.50	2.00	12-12	1.00	23.50
M45	31681.00	6.00	UPSTRM	VALVE 11		1076.00	18.00	5.00	7-9	1.00	23.00
L	32011.50	6.06	UPSTRM	VALVE 11		745.50	7.00	15.50	12-2	1.00	22.50
M46	32345.00	6.12	UPSTRM	VALVE 11		412.00	22.00	1.00	3-8	1.00	23.00
VALVE 11	32757.00	6.20 *		VALVE 11		0.00 *	0.00	0.00 *		0.00	0.00
M47	32918.50	6.23	DNSTRM	VALVE 11		161.50	22.00	1.00	4-6	1.00	23.00
L	33083.00	6.26	DNSTRM	VALVE 11		326.00	4.00	17.50	12-2	1.00	21.50
L	33122.00	6.27	DNSTRM	VALVE 11		365.00	2.00	19.50	12-2	1.00	21.50
M48	33458.00	6.33	DNSTRM	VALVE 11		701.00	3.00	20.50	1-5	1.00	23.50
M49	33489.00	6.34	DNSTRM	VALVE 11		732.00	10.50	10.50	9-11	1.00	21.00
L	33508.00	6.34	DNSTRM	VALVE 11		751.00	8.50	14.00	9-2	1.00	22.50
L	33552.00	6.35	DNSTRM	VALVE 11		795.00	8.50	13.50	6-9	1.00	22.00
L	33664.50	6.37	DNSTRM	VALVE 11		907.50	10.00	11.50	12-2	1.00	21.50
L	33696.50	6.38	DNSTRM	VALVE 11		939.50	20.50	2.00	3-8	1.00	22.50
L	33702.00	6.38	DNSTRM	VALVE 11		945.00	3.50	18.50	6-8	1.00	22.00
M50	33952.50	6.43	DNSTRM	VALVE 11		1195.50	18.00	3.50	10-3	1.00	21.50
M51	34185.00	6.47	DNSTRM	VALVE 11		1428.00	9.50	13.00	7-9	1.00	22.50

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PIPELINE FEATURE	ODOMETER INDEX	MILE POST	DIREC- TION	NEAREST KNOWN LOCATION			DISTANCE TO		O' CLOCK	LENGTH AFFECTED	JOINT LENGTH
				REFERENCE ITEM	STATION NUMBER	DISTANCE	UPSTRM WELD	DNSTRM WELD			
L	34354.00	6.50	DNSTRM	VALVE 11		1597.00	3.00	18.00	4-6	1.00	21.00
L	34438.50	6.52	DNSTRM	VALVE 11		1681.50	3.50	20.00	9-11	1.00	23.50
S13	34661.00	6.56	UPSTRM	VALVE 12		1793.00	21.00	0.50	4-6	1.00	21.50
M52	34662.00	6.56	UPSTRM	VALVE 12		1792.00	0.50	23.00	3-8	1.00	23.50
L	34835.00	6.59	UPSTRM	VALVE 12		1619.00	18.00	5.50	9-11	1.00	23.50
L	34854.00	6.60	UPSTRM	VALVE 12		1600.00	13.50	9.00	7-3	1.00	22.50
S14	34877.50	6.60	UPSTRM	VALVE 12		1576.50	14.50	7.50	7-9	1.00	22.00
M53	34997.00	6.62	UPSTRM	VALVE 12		1457.00	1.00	19.50	10-2	1.00	20.50
L	35295.00	6.68	UPSTRM	VALVE 12		1159.00	3.00	19.00	4-6	1.00	22.00
MCP	35347.00	6.69	UPSTRM	VALVE 12		1107.00	0.00	0.00		0.00	0.00
L	35480.00	6.71	UPSTRM	VALVE 12		974.00	7.50	14.50	10-12	1.00	22.00
L	35506.50	6.72	UPSTRM	VALVE 12		947.50	12.00	10.50	10-12	1.00	22.50
MCP	35540.00	6.73	UPSTRM	VALVE 12		914.00	0.00	0.00		0.00	0.00
L	35555.00	6.73	UPSTRM	VALVE 12		899.00	16.00	6.50	9-11	1.00	22.50
L	35687.00	6.75	UPSTRM	VALVE 12		767.00	10.50	12.50	9-11	1.00	23.00
L	35943.50	6.80	UPSTRM	VALVE 12		510.50	21.00	1.00	1-3	1.00	22.00
M54	35977.50	6.81	UPSTRM	VALVE 12		476.50	12.50	7.00	12-5	1.00	19.50
L	36093.00	6.83	UPSTRM	VALVE 12		361.00	21.00	0.50	4-6	1.00	21.50
L	36245.00	6.86	UPSTRM	VALVE 12		209.00	13.00	8.50	12-2	1.00	21.50
MCP	36281.00	6.87	UPSTRM	VALVE 12		173.00	0.00	0.00		0.00	0.00
L	36315.50	6.87	UPSTRM	VALVE 12		138.50	20.50	1.00	4-9	1.00	21.50
BEGIN HEAVY WALL	36420.00	6.89	UPSTRM	VALVE 12		34.00	0.00	0.00		0.00	0.00
VALVE 12	36454.00	6.90 *		VALVE 12		0.00 *	0.00	0.00 *		0.00	0.00
M55	36810.00	6.97	DNSTRM	VALVE 12		356.00	0.50	20.50	10-3	1.00	21.00
SPOOL	37385.00	7.08 *		SPOOL		0.00 *	0.00	0.00 *		0.00	0.00
END HEAVY WALL	37414.50	7.08	DNSTRM	SPOOL		29.50	0.00	0.00		0.00	0.00
S15	37415.00	7.08	DNSTRM	SPOOL		30.00	0.50	9.00	10-2	1.00	9.50
L	37457.00	7.09	DNSTRM	SPOOL		72.00	12.50	9.00	12-2	1.00	21.50
M56	37729.50	7.14	DNSTRM	SPOOL		344.50	19.50	4.00	12-2	1.00	23.50
MCP	37798.00	7.15	DNSTRM	SPOOL		413.00	0.00	0.00		0.00	0.00
L	37900.50	7.17	DNSTRM	SPOOL		515.50	7.50	5.00	10-12	1.00	12.50
BEGIN HEAVY WALL	37905.50	7.17	DNSTRM	SPOOL		520.50	0.00	0.00		0.00	0.00

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PIPELINE FEATURE	ODOMETER INDEX	MILE POST	DIREC- TION	NEAREST KNOWN LOCATION		DISTANCE TO		O' CLOCK	LENGTH AFFECTED	JOINT LENGTH
				REFERENCE ITEM	STATION NUMBER	UPSTRM WELD	DNSTRM WELD			
END HEAVY WALL	37917.00	7.18	DNSTRM	SPOOL	532.00	0.00	0.00		0.00	0.00
M57	38027.00	7.20	DNSTRM	SPOOL	642.00	5.50	17.00	3-5	1.00	22.50
L	38808.00	7.35	DNSTRM	SPOOL	1423.00	16.00	7.00	1-5	1.00	23.00
L	38885.00	7.36	DNSTRM	SPOOL	1500.00	3.00	16.50	1-5	1.00	19.50
L	39031.00	7.39	DNSTRM	SPOOL	1646.00	20.00	2.00	4-12	1.00	22.00
M58	39514.50	7.48	DNSTRM	SPOOL	2129.50	18.00	5.00	1-3	1.00	23.00
S16	39956.00	7.56	DNSTRM	SPOOL	2571.00	12.00	9.00	7-12	1.00	21.00
S17	40052.00	7.58	DNSTRM	SPOOL	2667.00	19.50	3.50	12-12	1.00	23.00
L	40178.00	7.60	DNSTRM	SPOOL	2793.00	7.50	15.50	4-12	1.00	23.00
L	40655.50	7.69	UPSTRM	VALVE 13	2329.50	13.50	9.50	7-9	1.00	23.00
L	40724.00	7.71	UPSTRM	VALVE 13	2261.00	14.50	8.00	7-9	1.00	22.50
M59	40882.00	7.74	UPSTRM	VALVE 13	2103.00	15.00	3.50	12-3	1.00	18.50
L	40921.00	7.75	UPSTRM	VALVE 13	2064.00	14.50	9.00	9-11	1.00	23.50
L	41408.00	7.84	UPSTRM	VALVE 13	1577.00	20.00	3.00	1-3	1.00	23.00
L	41919.50	7.93	UPSTRM	VALVE 13	1065.50	20.00	1.50	7-12	1.00	21.50
L	41980.50	7.95	UPSTRM	VALVE 13	1004.50	15.50	7.50	1-3	1.00	23.00
M60	42206.50	7.99	UPSTRM	VALVE 13	778.50	19.50	3.50	9-12	2.00	23.00
L	42322.50	8.01	UPSTRM	VALVE 13	662.50	19.00	4.00	3-6	1.00	23.00
End Roll # 3	42439.00	8.03	UPSTRM	VALVE 13	546.00	0.00	0.00		0.00	0.00
Begin Roll # 4	42439.00	8.03	UPSTRM	VALVE 13	546.00	0.00	0.00		0.00	0.00
BEGIN HEAVY WALL	42933.50	8.13	UPSTRM	VALVE 13	51.50	0.00	0.00		0.00	0.00
VALVE 13	42985.00	8.14 *		VALVE 13	0.00 *	0.00	0.00 *		0.00	0.00
EXPANSION JOINT	43199.00	8.18 *		EXPANSION JOINT	0.00 *	0.00	0.00 *		0.00	0.00
VALVE 14	43285.00	8.19 *		VALVE 14	0.00 *	0.00	0.00 *		0.00	0.00
END HEAVY WALL	43418.00	8.22	DNSTRM	VALVE 14	133.00	0.00	0.00		0.00	0.00
L	43570.00	8.25	DNSTRM	VALVE 14	285.00	13.00	10.00	7-9	1.00	23.00
MCP	44166.00	8.36	DNSTRM	VALVE 14	881.00	0.00	0.00		0.00	0.00
L	44261.50	8.38	DNSTRM	VALVE 14	976.50	22.50	0.50	12-12	1.00	23.00
L	44532.00	8.43	DNSTRM	VALVE 14	1247.00	15.00	4.00	3-5	1.00	19.00
M61	44823.00	8.48	DNSTRM	VALVE 14	1538.00	15.00	9.00	3-8	1.00	24.00
L	44965.00	8.51	DNSTRM	VALVE 14	1680.00	21.00	1.00	3-8	1.00	22.00
L	45092.50	8.54	DNSTRM	VALVE 14	1807.50	15.50	5.50	7-11	1.00	21.00

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			DIREC- TION	REFERENCE ITEM	STATION NUMBER	DISTANCE	UPSTRM WELD	DNSTRM WELD			
M62	45521.00	8.62	DNSTRM	VALVE 14		2236.00	21.00	1.00	6-11	1.00	22.00
L	45569.00	8.63	DNSTRM	VALVE 14		2284.00	1.00	22.00	1-3	1.00	23.00
L	45611.00	8.63	DNSTRM	VALVE 14		2326.00	0.50	23.00	4-9	1.00	23.50
M63	45702.50	8.65	DNSTRM	VALVE 14		2417.50	1.00	19.50	12-12	1.00	20.50
L	45742.00	8.66	DNSTRM	VALVE 14		2457.00	20.00	1.00	4-11	1.00	21.00
L	45966.00	8.70	DNSTRM	VALVE 14		2681.00	23.00	1.00	1-6	1.00	24.00
L	46009.00	8.71	DNSTRM	VALVE 14		2724.00	20.00	1.00	4-9	1.00	21.00
L	46263.50	8.76	DNSTRM	VALVE 14		2978.50	6.50	15.50	1-3	1.00	22.00
M64	46414.50	8.79	DNSTRM	VALVE 14		3129.50	1.00	21.00	1-5	1.00	22.00
M65	46563.00	8.81	DNSTRM	VALVE 14		3278.00	15.00	6.00	12-5	1.00	21.00
L	46693.00	8.84	DNSTRM	VALVE 14		3408.00	14.00	9.00	3-6	1.00	23.00
L	47272.00	8.95	DNSTRM	VALVE 14		3987.00	8.50	14.50	6-8	1.00	23.00
L	47439.50	8.98	DNSTRM	VALVE 14		4154.50	12.00	10.00	4-8	1.00	22.00
MCP	47528.00	9.00	DNSTRM	VALVE 14		4243.00	0.00	0.00		0.00	0.00
L	47674.00	9.02	DNSTRM	VALVE 14		4389.00	21.00	2.00	7-11	1.00	23.00
L	47872.50	9.06	DNSTRM	VALVE 14		4587.50	16.50	7.00	9-5	1.00	23.50
POSSIBLE SLEEVE	48263.50	9.14	DNSTRM	VALVE 14		4978.50	0.00	0.00		0.00	0.00
L	48270.00	9.14	DNSTRM	VALVE 14		4985.00	4.50	18.00	9-11	1.00	22.50
M66	48405.50	9.16	DNSTRM	VALVE 14		5120.50	3.50	18.50	12-5	1.00	22.00
L	48594.00	9.20	DNSTRM	VALVE 14		5309.00	12.00	10.00	9-12	1.00	22.00
L	48924.00	9.26	DNSTRM	VALVE 14		5639.00	21.00	2.50	4-6	1.00	23.50
L	49135.00	9.30	DNSTRM	VALVE 14		5850.00	7.00	17.00	9-11	1.00	24.00
L	49193.00	9.31	DNSTRM	VALVE 14		5908.00	17.50	5.00	4-6	1.00	22.50
MCP	49323.00	9.34	DNSTRM	VALVE 14		6038.00	0.00	0.00		0.00	0.00
S18	49492.00	9.37	DNSTRM	VALVE 14		6207.00	6.00	17.00	7-12	1.00	23.00
L	49764.00	9.42	DNSTRM	VALVE 14		6479.00	6.00	15.50	7-9	1.00	21.50
L	49917.00	9.45	DNSTRM	VALVE 14		6632.00	3.00	19.00	12-12	1.00	22.00
L	50553.00	9.57	DNSTRM	VALVE 14		7268.00	16.00	4.00	1-5	1.00	20.00
L	50731.50	9.60	DNSTRM	VALVE 14		7446.50	23.50	1.00	3-8	1.00	24.50
L	50773.50	9.61	DNSTRM	VALVE 14		7488.50	19.50	3.50	10-12	1.00	23.00
L	51357.00	9.72	UPSTRM	VALVE 15		6912.00	23.50	1.00	10-12	1.00	24.50
L	51715.50	9.79	UPSTRM	VALVE 15		6553.50	0.50	23.00	10-12	1.00	23.50

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			DIREC- TION	REFERENCE ITEM	STATION NUMBER	DISTANCE				UPSTRM WELD	DNSTRM WELD
MCP	51966.00	9.84	UPSTRM	VALVE 15		6303.00	0.00	0.00	0.00	0.00	
L	52005.00	9.84	UPSTRM	VALVE 15		6264.00	21.00	3.00	10-2	1.00	24.00
L	52131.00	9.87	UPSTRM	VALVE 15		6138.00	9.50	11.00	1-5	1.00	20.50
M67	52176.00	9.88	UPSTRM	VALVE 15		6093.00	11.00	9.00	10-2	1.00	20.00
M68	52212.00	9.88	UPSTRM	VALVE 15		6057.00	3.00	21.00	10-2	1.00	24.00
L	52531.50	9.94	UPSTRM	VALVE 15		5737.50	7.00	16.00	12-2	1.00	23.00
M69	52549.00	9.95	UPSTRM	VALVE 15		5720.00	1.50	18.00	12-2	1.00	19.50
L	53463.50	10.12	UPSTRM	VALVE 15		4805.50	6.50	15.50	6-8	1.00	22.00
L	53531.50	10.13	UPSTRM	VALVE 15		4737.50	7.50	15.50	12-12	1.00	23.00
L	53554.00	10.14	UPSTRM	VALVE 15		4715.00	7.00	16.00	9-11	1.00	23.00
L	53858.50	10.20	UPSTRM	VALVE 15		4410.50	0.50	20.00	3-5	1.00	20.50
L	54005.00	10.22	UPSTRM	VALVE 15		4264.00	16.00	7.00	4-9	1.00	23.00
L	54202.00	10.26	UPSTRM	VALVE 15		4067.00	20.00	3.00	10-3	1.00	23.00
M70	54655.00	10.35	UPSTRM	VALVE 15		3614.00	5.00	17.50	10-12	1.00	22.50
M71	54941.00	10.40	UPSTRM	VALVE 15		3328.00	20.00	2.50	6-8	1.00	22.50
M72	54987.00	10.41	UPSTRM	VALVE 15		3282.00	20.00	3.00	4-6	1.00	23.00
M73	55242.00	10.46	UPSTRM	VALVE 15		3027.00	2.00	21.00	6-8	1.00	23.00
L	55337.00	10.48	UPSTRM	VALVE 15		2932.00	6.50	13.50	4-6	2.00	20.00
L	55689.00	10.54	UPSTRM	VALVE 15		2580.00	15.50	7.00	12-2	1.00	22.50
L	56072.00	10.61	UPSTRM	VALVE 15		2197.00	9.50	14.00	7-11	1.00	23.50
M74	56184.00	10.64	UPSTRM	VALVE 15		2085.00	6.00	16.00	4-9	1.00	22.00
L	56688.00	10.73	UPSTRM	VALVE 15		1581.00	3.50	18.50	1-3	1.00	22.00
S19	56908.50	10.77	UPSTRM	VALVE 15		1360.50	16.00	6.00	12-5	1.00	22.00
L	56920.00	10.78	UPSTRM	VALVE 15		1349.00	5.50	18.00	6-9	1.00	23.50
L	57552.50	10.90	UPSTRM	VALVE 15		716.50	22.50	0.50	9-11	1.00	23.00
L	57578.00	10.90	UPSTRM	VALVE 15		691.00	1.50	21.00	3-5	1.00	22.50
L	57745.50	10.93	UPSTRM	VALVE 15		523.50	7.00	16.50	7-9	1.00	23.50
End Roll # 4	58176.00	11.01	UPSTRM	VALVE 15		93.00	0.00	0.00		0.00	0.00
Begin Roll # 5	58176.00	11.01	UPSTRM	VALVE 15		93.00	0.00	0.00		0.00	0.00
VALVE 15	58269.00	11.03	*	VALVE 15		0.00 *	0.00	0.00 *		0.00	0.00
M75	58472.50	11.07	DNSTRM	VALVE 15		203.50	2.50	20.00	12-5	1.00	22.50
S20	58565.50	11.09	DNSTRM	VALVE 15		296.50	8.50	13.00	7-12	1.00	21.50

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			DIREC- TION	REFERENCE ITEM	STATION NUMBER	DISTANCE	UPSTRM WELD				DNSTRM WELD
M76	58983.00	11.17	DNSTRM	VALVE 15		714.00	12.00	10.50	12-12	2.00	22.50
MCP	59415.00	11.25	DNSTRM	VALVE 15		1146.00	0.00	0.00		0.00	0.00
L	59559.50	11.28	DNSTRM	VALVE 15		1290.50	16.50	6.50	1-3	1.00	23.00
L	60328.50	11.42	DNSTRM	VALVE 15		2059.50	23.00	0.50	6-9	1.00	23.50
M77	60663.50	11.48	DNSTRM	VALVE 15		2394.50	15.50	5.00	9-12	1.00	20.50
M78	60875.00	11.52	DNSTRM	VALVE 15		2606.00	22.50	1.00	1-6	1.00	23.50
M79	61024.00	11.55	DNSTRM	VALVE 15		2755.00	10.00	13.00	3-8	1.00	23.00
L	61260.00	11.60	DNSTRM	VALVE 15		2991.00	18.00	6.00	4-6	1.00	24.00
S21	63296.00	11.98	DNSTRM	VALVE 15		5027.00	23.00	1.00	10-3	1.00	24.00
POSSIBLE SLEEVE	63297.00	11.98	DNSTRM	VALVE 15		5028.00	0.00	0.00		0.00	0.00
L	64081.50	12.13	DNSTRM	VALVE 15		5812.50	11.50	12.00	7-9	1.00	23.50
L	65530.00	12.41	UPSTRM	TRAP		7145.00	12.00	10.50	3-5	1.00	22.50
L	65608.00	12.42	UPSTRM	TRAP		7067.00	22.00	1.00	4-6	1.00	23.00
L	65955.50	12.49	UPSTRM	TRAP		6719.50	16.50	5.50	4-6	1.00	22.00
L	66431.00	12.58	UPSTRM	TRAP		6244.00	17.50	5.00	3-8	1.00	22.50
L	66789.00	12.64	UPSTRM	TRAP		5886.00	6.50	16.00	4-8	1.00	22.50
L	67328.50	12.75	UPSTRM	TRAP		5346.50	1.50	22.50	T2-2	1.00	24.00
M80	67466.00	12.77	UPSTRM	TRAP		5209.00	0.50	23.50	12-12	1.00	24.00
L	67916.00	12.86	UPSTRM	TRAP		4759.00	22.00	1.00	4-9	1.00	23.00
L	68109.00	12.89	UPSTRM	TRAP		4566.00	9.50	14.00	7-9	1.00	23.50
POSSIBLE SLEEVE	68458.50	12.96	UPSTRM	TRAP		4216.50	0.00	0.00		0.00	0.00
M81	68614.00	12.99	UPSTRM	TRAP		4061.00	19.00	4.00	9-11	1.00	23.00
L	68881.50	13.04	UPSTRM	TRAP		3793.50	14.00	9.50	12-2	1.00	23.50
L	68989.00	13.06	UPSTRM	TRAP		3686.00	3.50	17.00	4-6	1.00	20.50
L	69278.50	13.12	UPSTRM	TRAP		3396.50	0.50	21.00	10-12	1.00	21.50
M82	69434.50	13.15	UPSTRM	TRAP		3240.50	21.00	2.00	9-2	1.00	23.00
L	69702.00	13.20	UPSTRM	TRAP		2973.00	18.50	4.50	1-5	1.00	23.00
M83	69843.50	13.22	UPSTRM	TRAP		2831.50	4.00	18.00	3-5	1.00	22.00
L	70069.50	13.27	UPSTRM	TRAP		2605.50	1.50	22.00	6-9	1.00	23.50
L	70205.00	13.29	UPSTRM	TRAP		2470.00	21.00	2.00	10-12	1.00	23.00
M84	70295.00	13.31	UPSTRM	TRAP		2380.00	19.50	3.00	3-5	1.00	22.50
L	70490.50	13.35	UPSTRM	TRAP		2184.50	22.50	0.50	6-8	1.00	23.00

Department Of The Navy

IV. Vetco Pipeline Services - Spreadsheet Analysis

LINE: 8" Jet Fuel SECTION: Naval Air Sta. Jacksonville to Naval Air Sta. Cecil Field SURVEY DATE: August, 1994
 UNITS IN FEET

PIPELINE FEATURE	ODOMETER INDEX	MILE POST	DIREC- TION	NEAREST KNOWN LOCATION		DISTANCE TO		O' CLOCK	LENGTH AFFECTED	JOINT LENGTH	
				REFERENCE ITEM	STATION NUMBER	DISTANCE	UPSTRM WELD				DNSTRM WELD
L	70547.00	13.36	UPSTRM	TRAP		2128.00	10.00	13.00	9-11	1.00	23.00
M85	70581.00	13.36	UPSTRM	TRAP		2094.00	21.00	2.50	12-3	1.00	23.50
S22	70923.50	13.43	UPSTRM	TRAP		1751.50	1.00	22.50	12-12	1.00	23.50
MCP	71618.00	13.56	UPSTRM	TRAP		1057.00	0.00	0.00		0.00	0.00
S23	71657.50	13.57	UPSTRM	TRAP		1017.50	4.50	18.50	10-12	1.00	23.00
L	71783.50	13.59	UPSTRM	TRAP		891.50	17.00	6.00	1-3	1.00	23.00
L	72598.00	13.74	UPSTRM	TRAP		77.00	13.00	8.00	9-11	1.00	21.00
DIG 2	72645.00	13.75	UPSTRM	TRAP		30.00	0.00	0.00		0.00	0.00
AGM	72657.00	13.76	UPSTRM	TRAP		18.00	0.00	0.00		0.00	0.00
TRAP	72675.00	13.76 *		TRAP		0.00 *	0.00	0.00 *		0.00	0.00