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CLEANUP VERIFICATION ASSESSMENT REPORT FOR MCDONALD SITE NAS PENSACOLA FL

3/16/1994

NAVY PUBLIC WORKS CENTER

CLEANUP VERIFICATION ASSESSMENT REPORT

McDONALD'S SITE,
NAVAL AIR STATION
PENSACOLA, FLORIDA

PREPARED BY:

NAVY PUBLIC WORKS CENTER
BUILDING 3691, NAS PENSACOLA
PENSACOLA, FL 32508-6500

AUTHOR: GREG CAMPBELL, P.E.

MARCH 16, 1994

PREPARED FOR:

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON, SC 29418

LUIS VAZQUEZ, CODE 1843, ENGINEER-IN-CHARGE

Department of Environmental Protection

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Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

October 19, 1995

Mr. Byas Glover
Code 18410
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, South Carolina 29419-9010

RE: McDonald's Site, Naval Air Station Pensacola
FDEP #179202973

Dear Mr. Glover:

I have completed the technical review of the Cleanup Verification and Assessment Report Addendum and Monitoring Only Plan (MOP) dated April 1995 (received April 26, 1995), submitted for this site (McDonald's). Based upon my review, the enclosed Monitoring Only Plan Approval Order was signed by Mr. John M. Ruddell, Director of the Division of Waste Management.

If I can be of any further assistance with this matter, please contact me at (904) 921-9989.

Sincerely,

John W. Mitchell
Remedial Project Manager

cc: Bill Hill, Navy SouthDiv
Dean Spencer, NAS Pensacola
Ron Joyner, NAS Pensacola
Greg Campbell, NAS Pensacola
Jay Bassett, USEPA Region IV
Tom Moody, FDEP Northwest District

TJB TB JJC JJC ESN ESN

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Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Post Office Box 190010
North Charleston, South Carolina 29419-9010

RE: McDonald's Site, Naval Air Station Pensacola
DEP Facility No. 179202073

Dear Mr. Glover

The Bureau of Waste Cleanup has reviewed the Cleanup Verification Assessment Report Addendum and Monitoring Only Plan (MOP) dated April 1995 (received April 26, 1995), prepared and submitted by the Navy Public Works Center for this site. Pursuant to Rule 62-770.630(4), Florida Administrative Code (F.A.C.), the Department approves the "monitoring only" proposal. Pursuant to Rules 62-770.660 and 62-770.700(3), F.A.C., you are required to complete the monitoring program outlined below; the first sampling event should be performed within sixty (60) days of receipt of this Order, water level measurements should be made immediately prior to each sampling event, and the water level elevation information (summary table and flow map) and the analytical results (laboratory report, chain of custody, summary table and site map) should be submitted to the Department's Technical Review Section within sixty (60) days of sample collection:

Monitoring Wells	Parameters	Frequency	Duration
MW-1, MW-3, MW-4 and RC-1	VOAs, PAHs, and TRPH	Quarterly	One Year

If contaminant concentrations in the designated wells increase above the concentrations listed below, then the resampling/supplemental assessment described in Rule 62-770.660(6), F.A.C., should be performed. If the contaminant concentrations do not decrease below Rule 62-770.730(5), F.A.C., target cleanup levels (unless higher alternative site rehabilitation levels have been established) after the

(f) A statement of which rules or statutes each petitioner contends require reversal or modification of the Department's action or proposed action; and

(g) A statement of the relief sought by each petitioner, stating precisely the action each petitioner wants the Department to take with respect to the Department's action or proposed action.

This Approval Order is final and effective on the date of receipt of this Order unless a petition (or time extension) is filed in accordance with the preceding paragraphs. Upon the timely filing of a petition, this Order will not be effective until further order of the Department.

When the Order is final, any party to the Order has the right to seek judicial review of the Order pursuant to Section 120.68, F.S., by filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal, accompanied by the applicable filing fees, with the appropriate District Court of Appeal. The Notice of Appeal must be filed within thirty (30) days from the date the Final Order is filed with the Clerk of the Department.

The DEP Facility Number for this site is 179202073. Please use this identification on all future correspondence with the Department.

Any questions you may have on the technical aspects of this Approval Order should be directed to John Mitchell at (904) 921-9989. Contact with the above named person does not constitute a petition for administrative determination.

Sincerely,

John M. Ruddell

John M. Ruddell, Director
Division of Waste Management

JMR/jm

cc: Greg Campbell, Public Works, NAS Pensacola
Dean Spencer, Environmental, NAS Pensavola
Ron Joyner, Environmental, NAS Pensacola
Bill Hill, Navy SouthDiv
Jay Bassett, USEPA Region IV
Tom Moody, FDEP Northwest District

TJB TJB JJC JJC ESN ESN

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CLEANUP VERIFICATION ASSESSMENT REPORT

McDONALD'S SITE,
NAVAL AIR STATION
PENSACOLA, FLORIDA

PREPARED BY:

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Pensacola, Florida

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1.0 INTRODUCTION

McDonald's restaurant is located at the Naval Air Station (NAS), Pensacola Florida. NAS Pensacola is located on the western edge of Pensacola Bay on State Route 295 (See Figure 1-1).

The Navy Public Works Center (NPWC), Pensacola was funded by Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform additional groundwater monitoring to verify cleanup at the site and recommend what further action at the site is warranted. The groundwater analysis performed for this report warrants a Monitoring Only Plan (MOP) for the site. A summary of soil and groundwater analysis from past and present investigations, and a proposal for a Monitoring Only Plan (MOP) are presented herein.

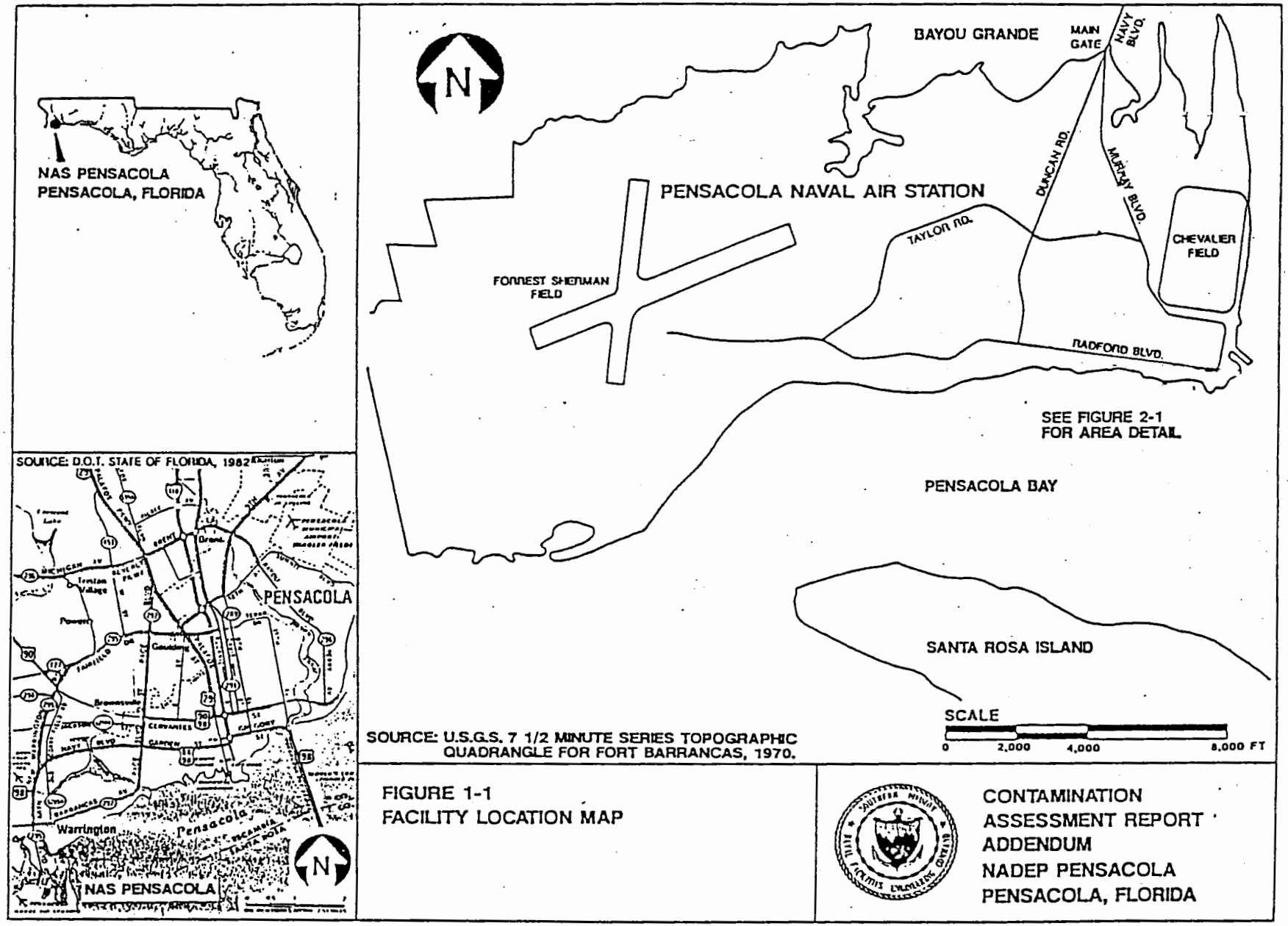


FIGURE 1-1
FACILITY LOCATION MAP

CONTAMINATION
ASSESSMENT REPORT
ADDENDUM
NADEP PENSACOLA
PENSACOLA, FLORIDA

2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION. McDonald's restaurant is located on the south end of the Naval Air Station, Pensacola approximately 230 feet north of the Pensacola Bay shoreline (See Figure 2-1). The McDonald's site is located just north of restaurant between the restaurant asphalt paved driveway and the south edge of Radford Boulevard (See Figure 2-1). Six monitoring wells (MW-1 through MW-6) were installed by Geraghty & MIller, Inc. (G&M) in 1986. Two monitoring wells (MW-7 and MW-8) were installed by PWC in January 1994. Upgradient monitoring well MW-5, which was located on Radford Road has been abandoned and paved over. The date MW-5 was abandoned is unknown. MW-6 was converted to a recovery well and a product recovery system installed by G&M in 1988. See Figure 2-2 for the location of monitoring wells.

2.2 SITE HISTORY. Site contamination occurred on October 23, 1986 when an 8-inch steel pipe that conveys aviation jet fuel (JP-5) along Radford Boulevard (See Figure 2-2) was reportedly punctured by an outside contractor working in the area. PWC excavated along the pipeline in the area of the leak and discovered a disintegrated plug in a tap in the JP-5 pipeline. The total volume of JP-5 lost was estimated to be 3000 gallons. Naval Supply Center personnel have since repaired the pipeline.

2.3 PREVIOUS INVESTIGATIONS. In November 1986, G&M conducted a groundwater investigation near the leak site that consisted of 15 borings. Six of these borings were converted to groundwater wells and groundwater samples were collected and analyzed for benzene, ethylbenzene, toluene, and xylene (BETX) and polynuclear aromatic hydrocarbons (PAHs). Free hydrocarbon product was found in one monitoring well (MW-6) at a thickness of 1.81 feet. No dissolved hydrocarbons were detected in any of the groundwater samples from the other monitoring wells (G&M, 1987).

G&M collected an additional set of groundwater samples from monitoring wells MW-1 through MW-5 on April 2, 1987. Laboratory analysis indicated that dissolved aromatic hydrocarbons were present in wells MW-1, MW-2, and MW-4 (G&M 1987). The sample from well MW-1 contained 1 part per billion (ppb) of benzene and 3 ppb of ethyl benzene; MW-2 contained 7 ppb of benzene and 6 ppb of ethyl benzene: and Mw-4 contained 2 ppb of benzene (G&M 1987).

A recovery system was installed in early 1988 under the supervision of G&M, Inc.. The recovery system consisted of an Ejector Systems, Inc. dual pump system located within the recovery well (MW-6) and a product recovery tank, control panel, and compressor enclosed by a wooden fence in from of McDonald's.

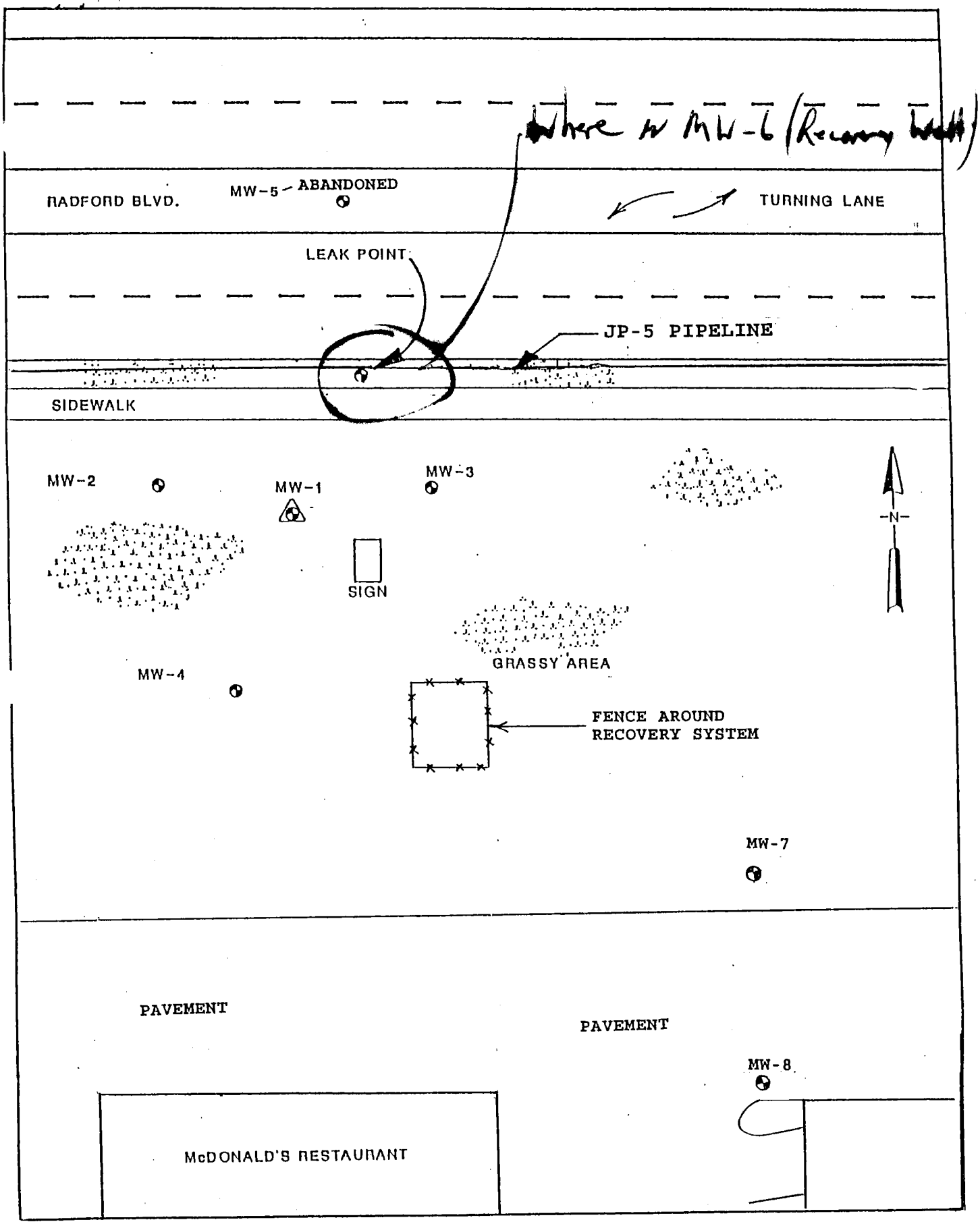


Figure 2-2. Monitoring Well Location Map

The amount of product recovered in the recovery system is unknown. E.C. Jordan's site investigation reported that between recovery system installation (early 1988) and November 1988 approximately 0.47 feet of product was measured in the recovery tank (E.C. Jordan, July 90). This equates to approximately 84 gallons of free product. The recovery system was operated and maintained by E.C. Jordan from October 1989 to March 1990. There are no records of the amount of total product recovered during this period.

E.C. Jordan sampled groundwater monitoring wells MW-1 through MW-4 on November 3, 1988, October 3, 1989 and March 22, 1990. The samples were analyzed by EPA Method 602 for BTEX and EPA Method 610 for PAH. A summary of the results for these sampling events are shown in Tables 2-1 through 2-3 (E.C. Jordan, July 90).

A review of Table 2-1 shows that monitoring well MW-1 exceeded the State Target Level for Total VOA, total xylene, acenaphthene, acenaphthylene, napthalene and 2,methylnaphthalene in the November 3, 1988 sampling event. The level of contaminants detected in the groundwater samples taken on November 3, 1988 from nonitoring wells MW-2, MW-3 and MW-4 were below the State Target Levels.

A review of Table 2-2 shows that benzene was detected above the State Target Level in the groundwater samples taken on October 3, 1989 from monitoring wells MW-1, MW-2 and MW-3. Levels of toluene and xylene detected in the groundwater samples taken on October 3, 1989 from monitoring well MW-1 exceeded the State Target Level for toluene and xylene. Levels of naphthalene, 1,methylnaphthalene and 2,methylnaphthalene detected in groundwater samples from monitoring wells MW-1, MW-2 and MW-3 were above their respective State Target Levels. Total VOA levels detected in groundwater samples taken on October 3, 1989 from monitoring wells MW-1 and MW-2 exceeded State Target Levels for Total VOA.

A review of Table 2-3 shows that levels of 1,methylnaphthalene, 2, methylnaphthalene detected in groundwater samples taken of March 22, 1990 from MW-3 exceeded the State Target Level for those compounds. Levels of total napththalenes, pyrene and naphthalene detected in groundwater samples taken on March 22, 1990 from monitoring well MW-1 exceeded the State Target Level for those compounds.

A meeting was held on 19 December 1990 between SOUTHNAVFACENGCOM, FDEP and the Corps of Engineers (Savannah District) representatives concerning the need for a soil investigation at the site. FDEP was concerned that the contaminated soils may be a contributing factor for groundwater contamination at the site. It was agreed at the meeting that the Navy would analyze the soil for contamination at the site utilizing an Organic Vapor Analyzer (OVA) instrument. It was agreed at the meeting that if no excess soils were encountered

TABLE 2-1
SUMMARY OF GROUNDWATER SAMPLE LABORATORY
ANALYSIS - NOVEMBER 3, 1988 SAMPLING EVENT

PARAMETER	STATE TARGET LEVEL	MW-1	MW-2	MW-3	MW-4
Ethylbenzene	50[1]	11	ND	ND	ND
Toluene	50[1]	6	ND	ND	ND
Total Xylenes	50[1]	72	ND	ND	ND
Acenaphthene	10[1]	20	ND	ND	ND
Acenaphthylene	10[1]	40	3	5	ND
Benzo(A)anthracene	10[1]	1	ND	ND	ND
Benzo(B)fluoranthene	10[1]	ND	ND	ND	18
Fluorene	10[1]	3	ND	ND	ND
Napthalene	10[1]	40	2	3	ND
Phenanthrene	10[1]	7	ND	ND	ND
1,Methylnaphthalene	10[1]	ND	ND	6	ND
2,Methylnaphthalene	10[1]	42	3	2	ND
Total VOA	50[1]	89	ND	ND	ND
Total Naphthalenes	100[1]	82	5	11	ND

TABLE 2-2
SUMMARY OF GROUNDWATER SAMPLE LABORATORY
ANALYSIS - OCTOBER 3, 1989 SAMPLING EVENT

PARAMETER	STATE TARGET LEVEL	MW-1	MW-2	MW-3	MW-4
Benzene	1[1]	48	32	4	ND
Ethylbenzene	50[1]	20	10	ND	ND
Toluene	50[1]	72	16	ND	ND
Xylene	50[1]	78	19	ND	ND
Naphthalene	10[1]	56	11	18	11
1,Methylnaphthalene	10[1]	19	17	19	ND
2,Methylnaphthalene	10[1]	24	12	26	ND
Total VOA	50[1]	218	77	4	ND
Total Naphthalenes	100[1]	99	40	63	11

TABLE 2-3
SUMMARY OF GROUNDWATER SAMPLE LABORATORY
ANALYSIS - MARCH 22, 1990 SAMPLING EVENT

PARAMETER	STATE TARGET LEVEL	MW-1	MW-2	MW-3	MW-4
Ethylbenzene	50[1]	2	ND	ND	ND
Toluene	50[1]	2	ND	ND	ND
Xylene	50[1]	24	ND	ND	ND
Acenaphthene	10[1]	10	ND	ND	ND
Anthracene	10[1]	4	ND	ND	ND
Chrysene	10[1]	2	ND	ND	ND
Fluorene	10[1]	2	ND	ND	ND
Napthalene	10[1]	82	ND	ND	ND
Phenanthrene	10[1]	7	ND	ND	ND
Pyrene	10[1]	13	ND	ND	ND
1,Methylnaphthalene	10[1]	139	17	19	ND
2,Methylnaphthalene	10[1]	132	12	26	ND
Total Naphthalenes	100[1]	353	29	45	ND
Total VOA	50[1]	28	ND	ND	ND

[1] State Target Level (FDEP 17-770, FAC)

NOTES: ND = Not Detected
Total VOA = Total volatile Organic Aromatics (the sum of benzene, ethylbenzene, xylene, tolune)
Concentrations are in parts per billion.

at the site the Navy could submit a Monitoring Only Plan. The Corps of Engineers, Savannah District, was contracted by SOUTHNAVFACENGCOM to perform the soil analysis. The Corps of Engineers, Savannah District, performed the soil analysis on May 22 through May 24, 1991 and found the soil at the site to not have excessive contamination (COE, Savannah District 91). A copy of the Corps of Engineers results is found in Appendix C.

A meeting was held on 16 September 1993 between SOUTHNAVFACENGCOM, NPWC Pensacola and FDEP concerning the need for additional groundwater sampling and analysis. In this meeting Navy and FDEP personnel agreed to the following:

(1) Two new groundwater monitoring wells would be installed at the site (One located in the vicinity where the maximum soil contamination was found by the Corps of Engineers report and one downgradient from this well location).

(2) The existing and new groundwater monitoring wells at the site will be sampled and analyzed for the kerosene analytical group in FDEP Rule 17-770.600(8)(b).

(3) If excessive groundwater contamination is not found then the Navy can submit a Monitoring Only Plan.

2.4 SITE HYDROGEOLOGY. Published data and logs of borings and wells in the area indicate that the uppermost unconsolidated sediments extend to a depth of up to 400 feet and comprise what is known as the "sand and gravel aquifer." This aquifer is underlain by the relatively impermeable Pensacola clay, below which lies the Floridan aquifer, consisting of a thick sequence of limestone and shale extending to a depth of about 1,700 feet. The sand and gravel aquifer consists of poorly-sorted, fine to coarse sands with gravel, and lenses of clay which range from a few inches to as much as 60 feet in thickness. The formation contains lensatic zones within the sand, known locally as "hardpan," which are cemented by iron oxide minerals (G&M, 1987).

Logs of test borings drilled at the NAS-Pensacola show that the surficial sands extend from ground surface to a depth of approximately 35 feet below msl, below which is an approximately 15-foot thick marine clay, the areal extent of which is uncertain. Underlying this clay unit is more sand with numerous clay lenses that vary in the depth and areal extent (G&M, 1987).

G&M reported the general shallow groundwater flow (average linear pore water velocity) is to the south toward Pensacola Bay at a rate

of 85 to 400 ft/yr, based on an assumed effective porosity of 0.20, a hydraulic gradient of 0.0035, and hydraulic conductivities of 13.3 to 62.4 ft/day (G&M, 1987). The sand and aquifer is classified as G-III and is the primary source of drinking water in the area. E.C. Jordan reported that the groundwater elevations they took on November 3, 1988 confirms the shallow groundwater flow direction is toward Pensacola Bay (E.C. Jordan, 1990). E.C. Jordan also reported that water table elevations indicated that the hydraulic gradient in the vicinity of the JP-5 spill is approximately 0.044, comparable to the value of 0.0035 derived by G&M during their November 1986 investigation (E.C. Jordan, 1990).

3.0 SUPPLEMENTAL GROUNDWATER ASSESSMENT RESULTS

3.1 METHODOLOGIES AND EQUIPMENT. All groundwater monitoring sampling and analysis work was performed by Law Environmental, Inc. of Pensacola, Florida. All methodologies and equipment used during the additional field investigation by Law Environmental, Inc. were in accordance with their FDEP approved Quality Assurance/Quality Control (QA/QC) Plan (FDEP QA approval # 90021G, revision 4).

3.1.1 Monitoring Well Construction. Two new monitoring wells were installed by Larry M. Jacobs and Associates on January 10, 1994. The monitoring wells were designated as MW-1 and MW-2 by Larry M. Jacobs and Associates. However, for purposes of this report the new monitoring wells will be designated as MW-7 and MW-8 since two existing wells are already numbered MW-1 and MW-2.

Both new wells were installed to a depth of 15 feet below land surface and constructed of 2-inch inside diameter, schedule 40, polyvinyl chloride casing (PVC) with flush-threaded joints and 12.5 feet of 0.010-inch machine -slotted screen. PVC well casing extends 2.5' from the top of the screen to the land surface. A silica sand filter pack was placed in the annular space to approximately 1.5 feet above the top of the screen. A 1-foot neat cement grount seal was then placed on top of the filter pack to land surface. A steel protective flush mounted manhole cover was installed to complete the well. The monitoring well is equipped with a locking cap and a padlock. The boring logs and well construction details for the two new wells are shown in Appendix A.

Existing monitoring wells MW-1 through MW-4 were constructed the same as the new wells except that a layer of bentonite pellets (0.5-feet thick) was placed in the annular space over the gravel pack and a 0.50-foot layer of neat cement grout placed in the annular space over the bentonite pellets to land surface.

3.1.2 Groundwater Sampling and Analyses. Groundwater samples were collected from monitoring wells MW-1, MW-2, MW-3, MW-4, MW-7 and MW-8 by Law Environmental, Inc. on February 1, 1994. All groundwater samples collected were analyzed for USEPA methods 418.1, 7000, 601, 602 and 610. Analytical results from this sampling event are presented in Appendix B.

3.2 GROUNDWATER ASSESSMENT RESULTS. Water level measurements were taken from each monitoring well prior to groundwater sampling on February 1, 1994. Top of casing elevations for the two new monitoring wells (MW-7 & MW-8) were surveyed by PWC Survey Branch on February 28, 1994. Top of casing elevations for the other monitoring wells were taken from the E.C. Jordan survey of November

1988 (E.C. Jordan, July 90). Water level measurements and elevations for each monitoring well is shown in Table 3-1. Water level elevations and groundwater flow direction are shown in Figure 3-1 which show the groundwater flow direction to be south toward the bay. The groundwater at the site has been consistently flowing toward the south as indicated from previous data generated by G&M and E.C. Jordan.

A summary of the total lead and Total Recoverable Petroleum Hydrocarbons (TRPH) concentrations detected in the groundwater samples collected on February 1, 1994 from monitoring wells MW-1, MW-2, MW-3, Mw-4, MW-7 and MW-8 are listed in Table 3-2. Total lead was detected in the groundwater samples taken from each of the monitoring wells. The detected concentrations (11, 7.9, 13, 8.8, 9.7 and 11 parts per billion [ppb], respectively) are below the State target level of 50 ppb for total lead. TRPH was detected at a concentration of 8,600 ppb in the groundwater sample collected from monitoring well MW-1. This was above the State target level of 5,000 ppb for TRPH. TRPH was not detected in the groundwater samples collected from monitoring wells MW-2, MW-3, MW-4, MW-7 and MW-8.

A summary of the volatile aromatic compound concentrations detected in the groundwater samples collected on February 1, 1994 from monitoring wells MW-1, MW-2, MW-3, MW-4, MW-7 and MW-8 are listed in Table 3-3. Ethylbenzene, xylenes (total) and Total Volatile Organic Aromatics (VOA) were detected in the groundwater sample collected from monitoring well MW-1. Ethylbenzene, xylenes (total) and Total VOA concentrations detected in monitoring well MW-1 were 5.3, 14 and 19.3 ppb, respectively and are below the State target level for these compounds. No volatile organic compounds were detected in monitoring wells MW-2, MW-3, MW-4, MW-7 and MW-8.

A summary of the polynuclear aromatic hydrocarbon (PAH) concentrations detected in the groundwater samples collected on February 1, 1994 from monitoring wells MW-1, MW-2, MW-3, MW-4, MW-7 and MW-8 are listed in Table 3-4. Total napthalenes, 1,methylnapthalene, 2, methylnapthalene and napthalene were detected in the groundwater samples collected from monitoring wells MW-1 and MW-4. The levels of PAH's found in monitoring well MW-1 exceeded the State Target Level whereas the levels detected in monitoring well MW-4 were below the State Target levels.

Free product in monitoring wells MW-1 through MW-4, MW-7 and MW-8 were measured by Law Environmental, Inc. on March 24, 1994. No free product was found present in these wells (See Appendix B).

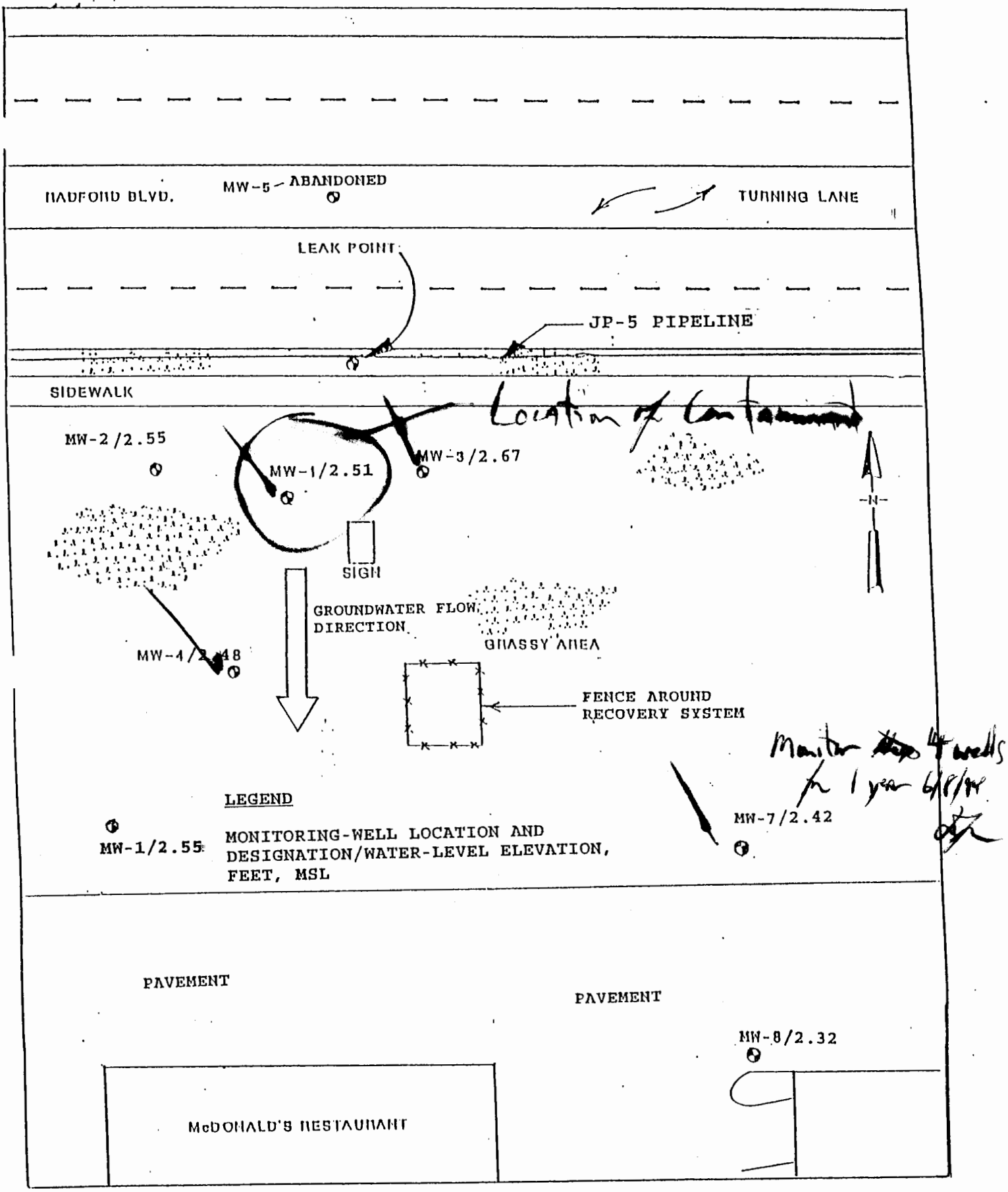


FIGURE 3-1. WATER LEVEL ELEVATIONS AND GROUNDWATER FLOW DIRECTION

TABLE 3-2
SUMMARY OF GROUNDWATER SAMPLE LABORATORY ANALYSIS
FOR LEAD AND TRPH

February 1, 1994

Parameter	State Target Level	MW-1	MW-2	MW-3	MW-4	MW-7	MW-8
Lead	50[1]	11	7.9	13	8.8	9.7	11
TRPH	5000[1]	8600	ND	ND	ND	ND	ND

TABLE 3-3
SUMMARY OF GROUNDWATER SAMPLE LABORATORY ANALYSIS
FOR VOLATILE AROMATIC COMPOUNDS

February 1, 1994

Parameter	State Target Level	MW-1	MW-2	MW-3	MW-4	MW-7	MW-8
Ethylbenzene	50[1]	5.3	ND	ND	ND	ND	ND
Xylenes (Total)	50[1]	14	ND	ND	ND	ND	ND
Total VOA	50[1]	19.3	ND	ND	ND	ND	ND

TABLE 3-4
SUMMARY OF GROUNDWATER SAMPLE LABORATORY ANALYSIS
FOR POLYNUCLEAR AROMATIC HYDROCARBONS

February 1, 1994

Parameter	State Target Level	MW-1	MW-2	MW-3	MW-4	MW-7	MW-8
1,Methylnapthalene	10[1]	58	ND	ND	5.2	ND	ND
2,Methylnapthalene	10[1]	37	ND	ND	3.2	ND	ND
Napthalene	10[1]	83	ND	ND	3.9	ND	ND
Total Napthalenes	100[1]	178	ND	ND	12.3	ND	ND

[1] State Target Level (FDEP 17-770, FAC)

NOTES: ND = Not Detected.
Total VOA = Total Volatile Organic Aromatics (the sum of benzene, ethylbenzene, xylene, toluene).
TRPH = Total Recoverable Petroleum Hydrocarbons.
Concentrations are in parts per billion.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS.

Based upon previous site investigations and the results of the additional field investigation, the following can be stated.

* Total VOA's were only detected in monitoring well MW-1 during the last two sampling events and are below the State Target Level of 50 ppb.

* The groundwater flow direction is to the south toward Pensacola Bay.

* No petroleum contaminants except lead were detected in downgradient monitoring wells MW-7 and MW-8 and it appears that the contaminants have not migrated from the site.

* Polynuclear Aromatic Hydrocarbons (PAH) and TRPH concentrations detected in groundwater well MW-1 exceeded the State Target Level.

* Lead was detected in the groundwater samples taken from each monitoring well and were below the State Target Level for lead.

* No free product was present in monitoring wells MW-1 through MW-4, MW-7 and MW-8.

* The areal extent of contamination appears to be restricted to the vicinity of monitoring well MW-1 and the contamination appears to be relatively small.

4.2 RECOMMENDATIONS.

Based on the findings and conclusions discussed above, a Monitoring Only Plan is recommended for the McDonald's site. It is recommended that four monitoring wells (MW-1, MW-3, MW-4 and MW-7) be sampled quarterly for a 1-year period according to FDEP Rule 17-770.660, FAC. The remaining wells are excluded from the monitoring plan because they are located away from the area of concern and the contaminants found in the groundwater samples from these wells were minimal.

Groundwater samples should be analyzed for volatile organic aromatic compounds by EPA method 602, polynuclear aromatic hydrocarbon compounds by EPA method 610, lead by EPA method 7000 and TRPH by EPA method 418.1. Volatile organic compound listed in EPA method 601 were excluded since these compounds were not detected in any monitoring wells samples collected during the investigation.

5.0 PROFESSIONAL REVIEW CERTIFICATION

The cleanup verification assessment contained in this report was prepared using sound, hydrogeologic principles and judgment. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned engineer should be notified to evaluate the effects of any additional information on the assessment described in this report. This Cleanup Verification Contamination Assessment Report was developed for the JP-5 pipeline leak located north of McDonald's at the Naval Air Station, Pensacola, Florida and should not be construed to apply to any other site.

Greg Campbell

Greg Campbell
Professional Engineer
P.E. No. 38572

5/3/94

Date

6.0 REFERENCES

Geraghty & Miller, Inc., January 1987, Evaluation of Hydrocarbons in Shallow Groundwater from Aviation Turbine Fuel (JP-5) Pipeline Leak at the NAS-Pensacola, Florida: Prepared for Southern Division, Naval facilities Engineering Command, Charleston, South Carolina.

E. C. Jordan Co., Engineers and Scientists, a Subsidiary of C-E Environmental, Inc., July 1990, Recovery System and Evaluation and Monitoring Report, Radford Boulevard JP-5 Spill Site, Naval Air Station, Pensacola, Florida: Prepared for Southern Division, Naval Facilities Engineering Command, Charleston, South Carolina.

U. S. Army Corps of Engineers, Savannah District, July 1991, Soil Boring and Gas Survey, Radford Boulevard (McDonald's) Site, Naval Air Station, Pensacola: Prepared for Herb Fraser, Southern Division, Naval Facilities Engineering Command.

APPENDIX A

SOIL BORING LOGS
AND
MONITORING WELL CONSTRUCTION DETAILS

FIGURE #1

Larry M. Jacobs & Associates, Inc.

Engineering Testing

328 EAST GADSDEN STREET • PENSACOLA, FLORIDA 32501 • 904/434-0846

LOG OF BORING

PROJECT:	NAS Pensacola McDonald's	**JOB NO.:**	94-500	**ELEVATION:**	N/A
BORING NO.:	MW-1, MW-2	**TYPE BORING:**	ASTM D1586	**DATUM:**	Existing Grade
LOCATION:	As Per Figure #1	**DATE:**	1/10/94	**GR. WATER:**	6' Below Datum at Time of Boring

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T. N_f	S.P.T. N_c	W.C. %	ATTERBERG LIMITS L.L.	ATTERBERG LIMITS P.L	UNIT WT pcf	% MINUS #200	SHEAR STRENGTH	Visual U/S
0		MW-1 (1) (2)										SM-SP
5		White sand							Casing / SCREEN			SP
10												
15												

(1) Brown/tan silty sand (0-6")
(2) Orange silty sand (Fill)
NOTE: Driller's field visual classification

2" DIAMETER MONITOR WELL CONSTRUCTION DETAILS

Casing: 0-2.5'
Screen (0.010"): 2.5'-15.0'
Neat Cement Grout: 0-1' (1 Bag)
Sand Pack: 1'-15' (6 Bags)
1 - 8" Flush Mounted Manhole Cover with Locking Cap

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T. N_f	S.P.T. N_c	W.C. %	ATTERBERG LIMITS L.L.	ATTERBERG LIMITS P.L	UNIT WT pcf	% MINUS #200	SHEAR STRENGTH	Visual U/S
0		MW-2 (1) Orange silty sand							Casing		SM--	ASPHALT
		White/tan sand										SP
5		White/brown stained sand							SCREEN			SP
10		White sand										SP
15												

(1) Ashpalt
NOTE: Driller's field visual classification

2" DAIMETER MONITOR WELL CONSTRUCTION DETAILS

Casing: 0-2.5'
Screen (0.010"): 2.5'-15.0'
Neat Cement Grout: 0-1' (1 Bag)
Sand Pack: 1'-15' (6 Bags)
1 - 8" Flush Mounted Manhole Cover with Locking Cap

APPENDIX B

LABORATORY ANALYTICAL DATA

Law Environmental, Inc.
Pensacola Branch
7215 Pine Forest Road
Pensacola, Florida 32526

February 9, 1994

Mr. Greg Campbell
NAS-PWC
Building 3691, Code 915.2
Pensacola, FL 32508
Clt. #21458

CALL #9018
STUB #4031-5940
JOB ORDER #1306209
ITEM #505
CONTRACT #N65114-93-A-0465

Dear: Mr. Campbell:

Below are the results of analysis of 8 samples received for examination on February 2, 1994:

Sample I.D. AA49969 Location code: NAS12
Purchase order number: 1306209 Location Description: MW-8
Sample collector: TABER
Sample collection date: 02/01/94 Time: 13:15
Lab submittal date: 02/02/94 Time: 12:27

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-TRPH by I.R. EPA 418.1	mg/L	Not Det	.53
2310-Furnace Dig. W. EPA 3020		Done	
Multicomponent analysis: 2310-Fur. Metals W. EPA 7000			
Lead	ug/L	11	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 601			
Bromodichloromethane	ug/L	Not detected	0.5
Bromoform	ug/L	Not detected	0.5
Bromomethane	ug/L	Not detected	0.9
Carbon tetrachloride	ug/L	Not detected	1.0
Chlorobenzene	ug/L	Not detected	0.4
Chloroethane	ug/L	Not detected	0.7
2-Chloroethylvinyl ether	ug/L	Not detected	5.0
Chloroform	ug/L	Not detected	0.8
Chloromethane	ug/L	Not detected	0.8
Dibromochloromethane	ug/L	Not detected	0.5
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Dichlorodifluoromethane	ug/L	Not detected	0.5
1,1-Dichloroethane	ug/L	Not detected	0.7
1,2-Dichloroethane	ug/L	Not detected	0.7
1,1-Dichloroethene	ug/L	Not detected	0.7
trans-1,2-Dichloroethene	ug/L	Not detected	0.7
1,2-Dichloropropane	ug/L	Not detected	0.5
cis-1,3-Dichloropropene	ug/L	Not detected	0.7
trans-1,3-Dichloropropene	ug/L	Not detected	0.5
Methylene chloride	ug/L	Not detected	5.0

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-VOA W. by GC EPA 601 (continued)			
1,1,2,2-Tetrachloroethane	ug/L	Not detected	0.6
Tetrachloroethene	ug/L	Not detected	0.4
1,1,1-Trichloroethane	ug/L	Not detected	1.0
1,1,2-Trichloroethane	ug/L	Not detected	0.8
Trichloroethene	ug/L	Not detected	0.9
Trichlorofluoromethane	ug/L	Not detected	0.8
Vinyl chloride	ug/L	Not detected	0.9
Ethylene dibromide	ug/L	Not detected	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 602			
Benzene	ug/L	Not detected	0.5
Chlorobenzene	ug/L	Not detected	0.4
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Ethylbenzene	ug/L	Not detected	0.5
Toluene	ug/L	Not detected	0.5
Xylenes (total)	ug/L	Not detected	1.0
Methyl tert-butyl ether	ug/L	Not detected	1.0
2323-LiqLiq Ext. EPA 3520 (FID)		Done	
Multicomponent analysis: 2321-PAH W. EPA 610			
Acenaphthene	ug/L	Not detected	1.0
Acenaphthylene	ug/L	Not detected	1.0
Anthracene	ug/L	Not detected	1.0
Benzo[a]anthracene	ug/L	Not detected	2.0
Benzo[b]fluoranthene	ug/L	Not detected	2.0
Benzo[k]fluoranthene	ug/L	Not detected	2.0
Benzo[ghi]perylene	ug/L	Not detected	1.0
Benzo[a]pyrene	ug/L	Not detected	1.0
Chrysene	ug/L	Not detected	2.0
Dibenzo[a,h]anthracene	ug/L	Not detected	1.0
Fluoranthene	ug/L	Not detected	1.0
Fluorene	ug/L	Not detected	1.0
Indeno[1,2,3-cd]pyrene	ug/L	Not detected	1.0
1-Methylnaphthalene	ug/L	Not detected	0.8
2-Methylnaphthalene	ug/L	Not detected	0.8
Naphthalene	ug/L	Not detected	1.0
Phenanthrene	ug/L	Not detected	1.0
Pyrene	ug/L	Not detected	1.0
2310-pH Water EPA 150.1	units	6.051	+/-
2301-Temperature EPA 170.1	Degree Celsius	20.5	
2301-Depth to Water	Feet	5.90	.10
2310-Specif. Conduct. EPA 9050	ohms	362	

Sample I.D. AA49970 Location code: NAS12
Purchase order number: 1306209 Project account code: 21458
Location Description: MW-7 Sample collector: TABER
Sample collection date: 02/01/94 Time: 13:30
Lab submittal date: 02/02/94 Time: 14:10

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-TRPH by I.R. EPA 418.1	mg/L	Not Det	.53
2310-Furnace Dig. W. EPA 3020		Done	
Multicomponent analysis: 2310-Fur. Metals W. EPA 7000			
Lead	ug/L	9.7	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 601			
Bromodichloromethane	ug/L	Not detected	0.5
Bromoform	ug/L	Not detected	0.5
Bromomethane	ug/L	Not detected	0.9
Carbon tetrachloride	ug/L	Not detected	1.0
Chlorobenzene	ug/L	Not detected	0.4
Chloroethane	ug/L	Not detected	0.7
2-Chloroethylvinyl ether	ug/L	Not detected	5.0
Chloroform	ug/L	Not detected	0.8
Chloromethane	ug/L	Not detected	0.8
Dibromochloromethane	ug/L	Not detected	0.5
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Dichlorodifluoromethane	ug/L	Not detected	0.5
1,1-Dichloroethane	ug/L	Not detected	0.7
1,2-Dichloroethane	ug/L	Not detected	0.7
1,1-Dichloroethene	ug/L	Not detected	0.7
trans-1,2-Dichloroethene	ug/L	Not detected	0.7
1,2-Dichloropropane	ug/L	Not detected	0.5
cis-1,3-Dichloropropene	ug/L	Not detected	0.7
trans-1,3-Dichloropropene	ug/L	Not detected	0.5
Methylene chloride	ug/L	Not detected	5.0
1,1,2,2-Tetrachloroethane	ug/L	Not detected	0.6
Tetrachloroethene	ug/L	Not detected	0.4
1,1,1-Trichloroethane	ug/L	Not detected	1.0
1,1,2-Trichloroethane	ug/L	Not detected	0.8
Trichloroethene	ug/L	Not detected	0.9
Trichlorofluoromethane	ug/L	Not detected	0.8
Vinyl chloride	ug/L	Not detected	0.9
Ethylene dibromide	ug/L	Not detected	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 602			
Benzene	ug/L	Not detected	0.5
Chlorobenzene	ug/L	Not detected	0.4
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Ethylbenzene	ug/L	Not detected	0.5
Toluene	ug/L	Not detected	0.5

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-VOA W. by GC EPA 602 (continued)			
Xylenes (total)	ug/L	Not detected	1.0
Methyl tert-butyl ether	ug/L	Not detected	1.0
2323-LiqLiq Ext. EPA 3520 (FID)		Done	
Multicomponent analysis: 2321-PAH W. EPA 610			
Acenaphthene	ug/L	Not detected	1.0
Acenaphthylene	ug/L	Not detected	1.0
Anthracene	ug/L	Not detected	1.0
Benzo[a]anthracene	ug/L	Not detected	2.0
Benzo[b]fluoranthene	ug/L	Not detected	2.0
Benzo[k]fluoranthene	ug/L	Not detected	2.0
Benzo[ghi]perylene	ug/L	Not detected	1.0
Benzo[a]pyrene	ug/L	Not detected	1.0
Chrysene	ug/L	Not detected	2.0
Dibenzo[a,h]anthracene	ug/L	Not detected	1.0
Fluoranthene	ug/L	Not detected	1.0
Fluorene	ug/L	Not detected	1.0
Indeno[1,2,3-cd]pyrene	ug/L	Not detected	1.0
1-Methylnaphthalene	ug/L	Not detected	0.8
2-Methylnaphthalene	ug/L	Not detected	0.8
Naphthalene	ug/L	Not detected	1.0
Phenanthrene	ug/L	Not detected	1.0
Pyrene	ug/L	Not detected	1.0
2310-pH Water EPA 150.1	units	6.239	+/-
2301-Temperature EPA 170.1	Degree Celsius	21.3	
2301-Depth to Water	Feet	5.80	.10
2310-Specif. Conduct. EPA 9050	ohms	357	

Sample I.D. AA49971 Location code: NAS12
Purchase order number: 1306209 Project account code: 21458
Location Description: MW-3 Sample collector: TABER
Sample collection date: 02/01/94 Time: 13:40
Lab submittal date: 02/02/94 Time: 14:10

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-TRPH by I.R. EPA 418.1	mg/L	Not Det	.50
2310-Furnace Dig. W. EPA 3020		Done	
Multicomponent analysis: 2310-Fur. Metals W. EPA 7000			
Lead	ug/L	13	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 601			
Bromodichloromethane	ug/L	Not detected	0.5
Bromoform	ug/L	Not detected	0.5
Bromomethane	ug/L	Not detected	0.9

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-VOA W. by GC EPA 601 (continued)			
Carbon tetrachloride	ug/L	Not detected	1.0
Chlorobenzene	ug/L	Not detected	0.4
Chloroethane	ug/L	Not detected	0.7
2-Chloroethylvinyl ether	ug/L	Not detected	5.0
Chloroform	ug/L	Not detected	0.8
Chloromethane	ug/L	Not detected	0.8
Dibromochloromethane	ug/L	Not detected	0.5
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Dichlorodifluoromethane	ug/L	Not detected	0.5
1,1-Dichloroethane	ug/L	Not detected	0.7
1,2-Dichloroethane	ug/L	Not detected	0.7
1,1-Dichloroethene	ug/L	Not detected	0.7
trans-1,2-Dichloroethene	ug/L	Not detected	0.7
1,2-Dichloropropane	ug/L	Not detected	0.5
cis-1,3-Dichloropropene	ug/L	Not detected	0.7
trans-1,3-Dichloropropene	ug/L	Not detected	0.5
Methylene chloride	ug/L	Not detected	5.0
1,1,2,2-Tetrachloroethane	ug/L	Not detected	0.6
Tetrachloroethene	ug/L	Not detected	0.4
1,1,1-Trichloroethane	ug/L	Not detected	1.0
1,1,2-Trichloroethane	ug/L	Not detected	0.8
Trichloroethene	ug/L	Not detected	0.9
Trichlorofluoromethane	ug/L	Not detected	0.8
Vinyl chloride	ug/L	Not detected	0.9
Ethylene dibromide	ug/L	Not detected	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 602			
Benzene	ug/L	Not detected	0.5
Chlorobenzene	ug/L	Not detected	0.4
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Ethylbenzene	ug/L	Not detected	0.5
Toluene	ug/L	Not detected	0.5
Xylenes (total)	ug/L	Not detected	1.0
Methyl tert-butyl ether	ug/L	Not detected	1.0
2323-LiqLiq Ext. EPA 3520 (FID)		Done	
Multicomponent analysis: 2321-PAH W. EPA 610			
Acenaphthene	ug/L	Not detected	1.0
Acenaphthylene	ug/L	Not detected	1.0
Anthracene	ug/L	Not detected	1.0
Benzo[a]anthracene	ug/L	Not detected	2.0
Benzo[b]fluoranthene	ug/L	Not detected	2.0
Benzo[k]fluoranthene	ug/L	Not detected	2.0
Benzo[ghi]perylene	ug/L	Not detected	1.0
Benzo[a]pyrene	ug/L	Not detected	1.0

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-PAH W. EPA 610 (continued)			
Chrysene	ug/L	Not detected	2.0
Dibenzo[a,h]anthracene	ug/L	Not detected	1.0
Fluoranthene	ug/L	Not detected	1.0
Fluorene	ug/L	Not detected	1.0
Indeno[1,2,3-cd]pyrene	ug/L	Not detected	1.0
1-Methylnaphthalene	ug/L	Not detected	0.8
2-Methylnaphthalene	ug/L	Not detected	0.8
Naphthalene	ug/L	Not detected	1.0
Phenanthrene	ug/L	Not detected	1.0
Pyrene	ug/L	Not detected	1.0
2310-pH Water EPA 150.1	units	6.269	+/-
2301-Temperature EPA 170.1	Degree Celsius	23.0	
2301-Depth to Water	Feet	8.00	.10
2310-Specif. Conduct. EPA 9050	ohms	372	

Sample I.D. AA49972
Purchase order number: 1306209
Location Description: MW-1
Sample collection date: 02/01/94
Lab submittal date: 02/02/94

Location code: NAS12
Project account code: 21458
Sample collector: TABER
Time: 13:50
Time: 14:10

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-TRPH by I.R. EPA 418.1	mg/L	8.6	.57
2310-Furnace Dig. W. EPA 3020		Done	
Multicomponent analysis: 2310-Fur. Metals W. EPA 7000			
Lead	ug/L	11	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 601			
Bromodichloromethane	ug/L	Not detected	0.5
Bromoform	ug/L	Not detected	0.5
Bromomethane	ug/L	Not detected	0.9
Carbon tetrachloride	ug/L	Not detected	1.0
Chlorobenzene	ug/L	Not detected	0.4
Chloroethane	ug/L	Not detected	0.7
2-Chloroethylvinyl ether	ug/L	Not detected	5.0
Chloroform	ug/L	Not detected	0.8
Chloromethane	ug/L	Not detected	0.8
Dibromochloromethane	ug/L	Not detected	0.5
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Dichlorodifluoromethane	ug/L	Not detected	0.5
1,1-Dichloroethane	ug/L	Not detected	0.7
1,2-Dichloroethane	ug/L	Not detected	0.7

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-VOA W. by GC EPA 601 (continued)			
1,1-Dichloroethene	ug/L	Not detected	0.7
trans-1,2-Dichloroethene	ug/L	Not detected	0.7
1,2-Dichloropropane	ug/L	Not detected	0.5
cis-1,3-Dichloropropene	ug/L	Not detected	0.7
trans-1,3-Dichloropropene	ug/L	Not detected	0.5
Methylene chloride	ug/L	Not detected	5.0
1,1,2,2-Tetrachloroethane	ug/L	Not detected	0.6
Tetrachloroethene	ug/L	Not detected	0.4
1,1,1-Trichloroethane	ug/L	Not detected	1.0
1,1,2-Trichloroethane	ug/L	Not detected	0.8
Trichloroethene	ug/L	Not detected	0.9
Trichlorofluoromethane	ug/L	Not detected	0.8
Vinyl chloride	ug/L	Not detected	0.9
Ethylene dibromide	ug/L	Not detected	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 602			
Benzene	ug/L	Not detected	0.5
Chlorobenzene	ug/L	Not detected	0.4
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Ethylbenzene	ug/L	5.3	0.5
Toluene	ug/L	Not detected	0.5
Xylenes (total)	ug/L	14	1.0
Methyl tert-butyl ether	ug/L	Not detected	1.0
2323-LiqLiq Ext. EPA 3520 (FID)		Done	
Multicomponent analysis: 2321-PAH W. EPA 610			
Acenaphthene	ug/L	Not detected	1.0
Acenaphthylene	ug/L	Not detected	1.0
Anthracene	ug/L	Not detected	1.0
Benzo[a]anthracene	ug/L	Not detected	2.0
Benzo[b]fluoranthene	ug/L	Not detected	2.0
Benzo[k]fluoranthene	ug/L	Not detected	2.0
Benzo[ghi]perylene	ug/L	Not detected	1.0
Benzo[a]pyrene	ug/L	Not detected	1.0
Chrysene	ug/L	Not detected	2.0
Dibenzo[a,h]anthracene	ug/L	Not detected	1.0
Fluoranthene	ug/L	Not detected	1.0
Fluorene	ug/L	Not detected	1.0
Indeno[1,2,3-cd]pyrene	ug/L	Not detected	1.0
1-Methylnaphthalene	ug/L	58	0.8
2-Methylnaphthalene	ug/L	37	0.8
Naphthalene	ug/L	83	1.0
Phenanthrene	ug/L	Not detected	1.0
Pyrene	ug/L	Not detected	1.0
2310-pH Water EPA 150.1	units	6.321	+/-
2301-Temperature EPA 170.1	Degree Celsius	23.1	
2301-Depth to Water	Feet	8.20	.10

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2310-Specif. Conduct. EPA 9050	ohms	279	

Sample I.D. AA49973
Purchase order number: 1306209
Location Description: MW-2
Sample collection date: 02/01/94
Lab submittal date: 02/02/94

Location code: NAS12
Project account code: 21458
Sample collector: TABER
Time: 14:05
Time: 14:10

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-TRPH by I.R. EPA 418.1	mg/L	Not Det	.53
2310-Furnace Dig. W. EPA 3020		Done	
Multicomponent analysis: 2310-Fur. Metals W. EPA 7000			
Lead	ug/L	7.9	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 601			
Bromodichloromethane	ug/L	Not detected	0.5
Bromoform	ug/L	Not detected	0.5
Bromomethane	ug/L	Not detected	0.9
Carbon tetrachloride	ug/L	Not detected	1.0
Chlorobenzene	ug/L	Not detected	0.4
Chloroethane	ug/L	Not detected	0.7
2-Chloroethylvinyl ether	ug/L	Not detected	5.0
Chloroform	ug/L	Not detected	0.8
Chloromethane	ug/L	Not detected	0.8
Dibromochloromethane	ug/L	Not detected	0.5
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Dichlorodifluoromethane	ug/L	Not detected	0.5
1,1-Dichloroethane	ug/L	Not detected	0.7
1,2-Dichloroethane	ug/L	Not detected	0.7
1,1-Dichloroethene	ug/L	Not detected	0.7
trans-1,2-Dichloroethene	ug/L	Not detected	0.7
1,2-Dichloropropane	ug/L	Not detected	0.5
cis-1,3-Dichloropropene	ug/L	Not detected	0.7
trans-1,3-Dichloropropene	ug/L	Not detected	0.5
Methylene chloride	ug/L	Not detected	5.0
1,1,2,2-Tetrachloroethane	ug/L	Not detected	0.6
Tetrachloroethene	ug/L	Not detected	0.4
1,1,1-Trichloroethane	ug/L	Not detected	1.0
1,1,2-Trichloroethane	ug/L	Not detected	0.8
Trichloroethene	ug/L	Not detected	0.9
Trichlorofluoromethane	ug/L	Not detected	0.8
Vinyl chloride	ug/L	Not detected	0.9
Ethylene dibromide	ug/L	Not detected	1.0

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-VOA W. by GC EPA 602			
Benzene	ug/L	Not detected	0.5
Chlorobenzene	ug/L	Not detected	0.4
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Ethylbenzene	ug/L	Not detected	0.5
Toluene	ug/L	Not detected	0.5
Xylenes (total)	ug/L	Not detected	1.0
Methyl tert-butyl ether	ug/L	Not detected	1.0
2323-LiqLiq Ext. EPA 3520 (FID)		Done	
Multicomponent analysis: 2321-PAH W. EPA 610			
Acenaphthene	ug/L	Not detected	1.0
Acenaphthylene	ug/L	Not detected	1.0
Anthracene	ug/L	Not detected	1.0
Benzo[a]anthracene	ug/L	Not detected	2.0
Benzo[b]fluoranthene	ug/L	Not detected	2.0
Benzo[k]fluoranthene	ug/L	Not detected	2.0
Benzo[ghi]perylene	ug/L	Not detected	1.0
Benzo[a]pyrene	ug/L	Not detected	1.0
Chrysene	ug/L	Not detected	2.0
Dibenzo[a,h]anthracene	ug/L	Not detected	1.0
Fluoranthene	ug/L	Not detected	1.0
Fluorene	ug/L	Not detected	1.0
Indeno[1,2,3-cd]pyrene	ug/L	Not detected	1.0
1-Methylnaphthalene	ug/L	Not detected	0.8
2-Methylnaphthalene	ug/L	Not detected	0.8
Naphthalene	ug/L	Not detected	1.0
Phenanthrene	ug/L	Not detected	1.0
Pyrene	ug/L	Not detected	1.0
2310-pH Water EPA 150.1	units	6.379	+/-
2301-Temperature EPA 170.1	Degree Celsius	22.7	
2301-Depth to Water	Feet	8.40	.10
2310-Specif. Conduct. EPA 9050	ohms	190	

Sample I.D. AA49974 Location code: NAS12
Purchase order number: 1306209 Project account code: 21458
Location Description: MW-4 Sample collector: TABER
Sample collection date: 02/01/94 Time: 14:15
Lab submittal date: 02/02/94 Time: 14:10

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-TRPH by I.R. EPA 418.1	mg/L	Not Det	.52
2310-Furnace Dig. W. EPA 3020		Done	

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2310-Fur. Metals W. EPA 7000			
Lead	ug/L	8.8	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 601			
Bromodichloromethane	ug/L	Not detected	0.5
Bromoform	ug/L	Not detected	0.5
Bromomethane	ug/L	Not detected	0.9
Carbon tetrachloride	ug/L	Not detected	1.0
Chlorobenzene	ug/L	Not detected	0.4
Chloroethane	ug/L	Not detected	0.7
2-Chloroethylvinyl ether	ug/L	Not detected	5.0
Chloroform	ug/L	Not detected	0.8
Chloromethane	ug/L	Not detected	0.8
Dibromochloromethane	ug/L	Not detected	0.5
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Dichlorodifluoromethane	ug/L	Not detected	0.5
1,1-Dichloroethane	ug/L	Not detected	0.7
1,2-Dichloroethane	ug/L	Not detected	0.7
1,1-Dichloroethene	ug/L	Not detected	0.7
trans-1,2-Dichloroethene	ug/L	Not detected	0.7
1,2-Dichloropropane	ug/L	Not detected	0.5
cis-1,3-Dichloropropene	ug/L	Not detected	0.7
trans-1,3-Dichloropropene	ug/L	Not detected	0.5
Methylene chloride	ug/L	Not detected	5.0
1,1,2,2-Tetrachloroethane	ug/L	Not detected	0.6
Tetrachloroethene	ug/L	Not detected	0.4
1,1,1-Trichloroethane	ug/L	Not detected	1.0
1,1,2-Trichloroethane	ug/L	Not detected	0.8
Trichloroethene	ug/L	Not detected	0.9
Trichlorofluoromethane	ug/L	Not detected	0.8
Vinyl chloride	ug/L	Not detected	0.9
Ethylene dibromide	ug/L	Not detected	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 602			
Benzene	ug/L	Not detected	0.5
Chlorobenzene	ug/L	Not detected	0.4
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Ethylbenzene	ug/L	Not detected	0.5
Toluene	ug/L	Not detected	0.5
Xylenes (total)	ug/L	Not detected	1.0
Methyl tert-butyl ether	ug/L	Not detected	1.0
2323-LiqLiq Ext. EPA 3520 (FID)		Done	
Multicomponent analysis: 2321-PAH W. EPA 610			
Acenaphthene	ug/L	Not detected	1.0

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-PAH W. EPA 610 (continued)			
Acenaphthylene	ug/L	Not detected	1.0
Anthracene	ug/L	Not detected	1.0
Benzo[a]anthracene	ug/L	Not detected	2.0
Benzo[b]fluoranthene	ug/L	Not detected	2.0
Benzo[k]fluoranthene	ug/L	Not detected	2.0
Benzo[ghi]perylene	ug/L	Not detected	1.0
Benzo[a]pyrene	ug/L	Not detected	1.0
Chrysene	ug/L	Not detected	2.0
Dibenzo[a,h]anthracene	ug/L	Not detected	1.0
Fluoranthene	ug/L	Not detected	1.0
Fluorene	ug/L	Not detected	1.0
Indeno[1,2,3-cd]pyrene	ug/L	Not detected	1.0
1-Methylnaphthalene	ug/L	5.2	0.8
2-Methylnaphthalene	ug/L	3.2	0.8
Naphthalene	ug/L	3.9	1.0
Phenanthrene	ug/L	Not detected	1.0
Pyrene	ug/L	Not detected	1.0
2310-pH Water EPA 150.1	units	6.394	+/-
2301-Temperature EPA 170.1	Degree Celsius	22.2	
2301-Depth to Water	Feet	7.90	.10
2310-Specif. Conduct. EPA 9050	ohms	344	

Sample I.D. AA49975 Location code: NAS12
Purchase order number: 1306209 Project account code: 21458
Location Description: Equipment Blank
Sample collector: TABER
Sample collection date: 02/01/94 Time: 14:20
Lab submittal date: 02/02/94 Time: 14:10

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-TRPH by I.R. EPA 418.1	mg/L	Not Det	.59
2310-Furnace Dig. W. EPA 3020		Done	
Multicomponent analysis: 2310-Fur. Metals W. EPA 7000			
Lead	ug/L	Not detected	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 601			
Bromodichloromethane	ug/L	Not detected	0.5
Bromoform	ug/L	Not detected	0.5
Bromomethane	ug/L	Not detected	0.9
Carbon tetrachloride	ug/L	Not detected	1.0
Chlorobenzene	ug/L	Not detected	0.4
Chloroethane	ug/L	Not detected	0.7
2-Chloroethylvinyl ether	ug/L	Not detected	5.0
Chloroform	ug/L	Not detected	0.8

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-VOA W. by GC EPA 601 (continued)			
Chloromethane	ug/L	Not detected	0.8
Dibromochloromethane	ug/L	Not detected	0.5
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Dichlorodifluoromethane	ug/L	Not detected	0.5
1,1-Dichloroethane	ug/L	Not detected	0.7
1,2-Dichloroethane	ug/L	Not detected	0.7
1,1-Dichloroethene	ug/L	Not detected	0.7
trans-1,2-Dichloroethene	ug/L	Not detected	0.7
1,2-Dichloropropane	ug/L	Not detected	0.5
cis-1,3-Dichloropropene	ug/L	Not detected	0.7
trans-1,3-Dichloropropene	ug/L	Not detected	0.5
Methylene chloride	ug/L	Not detected	5.0
1,1,2,2-Tetrachloroethane	ug/L	Not detected	0.6
Tetrachloroethene	ug/L	Not detected	0.4
1,1,1-Trichloroethane	ug/L	Not detected	1.0
1,1,2-Trichloroethane	ug/L	Not detected	0.8
Trichloroethene	ug/L	Not detected	0.9
Trichlorofluoromethane	ug/L	Not detected	0.8
Vinyl chloride	ug/L	Not detected	0.9
Ethylene dibromide	ug/L	Not detected	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 602			
Benzene	ug/L	Not detected	0.5
Chlorobenzene	ug/L	Not detected	0.4
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Ethylbenzene	ug/L	Not detected	0.5
Toluene	ug/L	Not detected	0.5
Xylenes (total)	ug/L	Not detected	1.0
Methyl tert-butyl ether	ug/L	Not detected	1.0
2323-LiqLiq Ext. EPA 3520 (FID)		Done	
Multicomponent analysis: 2321-PAH W. EPA 610			
Acenaphthene	ug/L	Not detected	1.0
Acenaphthylene	ug/L	Not detected	1.0
Anthracene	ug/L	Not detected	1.0
Benzo[a]anthracene	ug/L	Not detected	2.0
Benzo[b]fluoranthene	ug/L	Not detected	2.0
Benzo[k]fluoranthene	ug/L	Not detected	2.0
Benzo[ghi]perylene	ug/L	Not detected	1.0
Benzo[a]pyrene	ug/L	Not detected	1.0
Chrysene	ug/L	Not detected	2.0
Dibenzo[a,h]anthracene	ug/L	Not detected	1.0
Fluoranthene	ug/L	Not detected	1.0
Fluorene	ug/L	Not detected	1.0
Indeno[1,2,3-cd]pyrene	ug/L	Not detected	1.0

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-PAH W. EPA 610 (continued)			
1-Methylnaphthalene	ug/L	Not detected	0.8
2-Methylnaphthalene	ug/L	Not detected	0.8
Naphthalene	ug/L	Not detected	1.0
Phenanthrene	ug/L	Not detected	1.0
Pyrene	ug/L	Not detected	1.0
2310-pH Water EPA 150.1	units	8.917	+/-
2301-Temperature EPA 170.1	Degree Celsius	17.01	
2310-Specif. Conduct. EPA 9050	ohms	002	

Sample I.D. AA49976 Location code: NAS12
Purchase order number: 1306209 Project account code: 21458
Location Description: Trip Blank Sample collector: TABER
Sample collection date: 02/01/94
Lab submittal date: 02/02/94 Time: 14:10

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-VOA W. by GC EPA 602			
Benzene	ug/L	Not detected	0.5
Chlorobenzene	ug/L	Not detected	0.4
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Ethylbenzene	ug/L	Not detected	0.5
Toluene	ug/L	Not detected	0.5
Xylenes (total)	ug/L	Not detected	1.0
Methyl tert-butyl ether	ug/L	Not detected	1.0
Multicomponent analysis: 2321-VOA W. by GC EPA 601			
Bromodichloromethane	ug/L	Not detected	0.5
Bromoform	ug/L	Not detected	0.5
Bromomethane	ug/L	Not detected	0.9
Carbon tetrachloride	ug/L	Not detected	1.0
Chlorobenzene	ug/L	Not detected	0.4
Chloroethane	ug/L	Not detected	0.7
2-Chloroethylvinyl ether	ug/L	Not detected	5.0
Chloroform	ug/L	Not detected	0.8
Chloromethane	ug/L	Not detected	0.8
Dibromochloromethane	ug/L	Not detected	0.5
1,2-Dichlorobenzene	ug/L	Not detected	0.3
1,3-Dichlorobenzene	ug/L	Not detected	0.3
1,4-Dichlorobenzene	ug/L	Not detected	0.4
Dichlorodifluoromethane	ug/L	Not detected	0.5
1,1-Dichloroethane	ug/L	Not detected	0.7
1,2-Dichloroethane	ug/L	Not detected	0.7

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-VOA W. by GC EPA 601 (continued)			
1,1-Dichloroethene	ug/L	Not detected	0.7
trans-1,2-Dichloroethene	ug/L	Not detected	0.7
1,2-Dichloropropane	ug/L	Not detected	0.5
cis-1,3-Dichloropropene	ug/L	Not detected	0.7
trans-1,3-Dichloropropene	ug/L	Not detected	0.5
Methylene chloride	ug/L	Not detected	5.0
1,1,2,2-Tetrachloroethane	ug/L	Not detected	0.6
Tetrachloroethene	ug/L	Not detected	0.4
1,1,1-Trichloroethane	ug/L	Not detected	1.0
1,1,2-Trichloroethane	ug/L	Not detected	0.8
Trichloroethene	ug/L	Not detected	0.9
Trichlorofluoromethane	ug/L	Not detected	0.8
Vinyl chloride	ug/L	Not detected	0.9
Ethylene dibromide	ug/L	Not detected	1.0

Please advise should you have questions concerning these data.

Respectfully submitted,

D. Abbott for

James M.G. Tucci, Laboratory Manager

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

April 19, 1994

Mr. Greg Campbell
NAS-PWC
Building 3691, Code 915.2
Pensacola, FL 32508

Subject: Floating Product Detection

Dear Mr. Campbell:

Law Environmental has found no floating product in monitoring wells located at NAS-Pensacola McDonald's site.

If further assistance is needed, please feel free to contact myself at (904) 944-9772.

Sincerely,

LAW ENVIRONMENTAL NATIONAL LABORATORIES

Sharon L. Taber

Sharon L. Taber
Sample Receiving Supervisor

SLT/kas

Enclosure: Field Notes

LAW ENVIRONMENTAL, INC.
7216 PINE FOREST ROAD
PENSACOLA, FL 32526

904-944-9772
FAX 904-944-9463

ONE OF THE LAW COMPANIES

LAW ENVIRONMENTAL NATIONAL LABORATORIES
Daily Report of Field Activities

EMPLOYEES	PRINT NAME
Sampler	Nida Ginkel
Helper	Cindy Tucker
Helper	
Proj. Man.	
Fld. Supr.	

SUPPLIES	NO. USED
Bailers	
Sample Cont.	
Int. Probe	
Cond. Meter	
Pump	

ACCOUNTING FOR DAILY ACTIVITY BY ITEM	
Item	Desc. of Item
1.	Travel
2.	Project Prep.
3.	Set-Up/Field Prep
4.	Water Level
5.	Purging Mon. Well
6.	Sample Collection
7.	Decontamination
8.	Site Clean-Up
9.	Standby with Crew
10.	Meal Break
11.	
12.	
13.	
14.	
15.	

FROM	TO	ITEM#
5:00 AM	5:30 AM	
5:30 AM	6:00 AM	
6:00 AM	6:30 AM	
6:30 AM	7:00 AM	
7:00 AM	7:30 AM	
7:30 AM	8:00 AM	
8:00 AM	8:30 AM	
8:30 AM	9:00 AM	
9:00 AM	9:30 AM	1
9:30 AM	10:00 AM	9 3
10:00 AM	10:30 AM	4
10:30 AM	11:00 AM	4 1
11:00 AM	11:30 AM	1
11:30 AM	12:00 PM	
12:00 PM	12:30 PM	
12:30 PM	1:00 PM	
1:00 PM	1:30 PM	
1:30 PM	2:00 PM	
2:00 PM	2:30 PM	
2:30 PM	3:00 PM	
3:00 PM	3:30 PM	
3:30 PM	4:00 PM	
4:00 PM	4:30 PM	
4:30 PM	5:00 PM	
5:00 PM	5:30 PM	
5:30 PM	6:00 PM	
6:00 PM	6:30 PM	
6:30 PM	7:00 PM	
7:00 PM	7:30 PM	
7:30 PM	8:00 PM	
8:00 PM	8:30 PM	
8:30 PM	9:00 PM	
9:00 PM	9:30 PM	
9:30 PM	10:00 PM	
10:00 PM	10:30 PM	
10:30 PM	11:00 PM	
TOTAL HOURS		2.25

CLIENT: NAS-PWC Pensacola	DATE: 3/24/94
LOCATION: McDonalds	JOB #:

CHARGES:	
Supplies	
Fld. Serv. @ $35/Hr	$0
Miscellaneous	
TOTAL CHARGES:	$0

ADDITIONAL COMMENTS:

Client's Supervisor:

Field Sampling Information

Project Name NAS-PWC Pensacola Date 03/24/94

Project Number _____ Samplers Signature [signature]

Location McDonald's COC Number _____

Sample Station	Description of Sample	Well Depth / Water Level
MW-8	No odor	Well Depth 14.5' Water Level 2" well Result: 5.9 Date: 3/24/94 Time: 1000

Time of Collection 1000

Samples Collected Took Reading of well depth & water level - Using tape measure/water level indicator. Using a different weighted tape measure - put Kolor Kut Water Paste Indicator on one side of tape and carpenters chalk on other side. The difference in these two readings should give product depth. There was no difference in the readings, therefore no floating product detected using this method.

Weather Condition: Cloudy 70°F

Site Condition: Next to Parking Lot - Asphalt Area

M Well Condition: Normal

pH: _____ Conductivity: _____ Temperature: _____

Sample Station	Description of Sample	Well Depth / Water Level
MW-7	No Noticeable odor	Well Depth 14.5' Water Level 2" well Result: 5.9 Date: 3/24/94 Time: 1010

Time of Collection 1010

Samples Collected Took all Readings and did calculations the same way as described for MW-8 No Floating product detected.

Weather Condition: Cloudy 70°F

Site Condition: Next To Parking Lot - Grassy Area

M Well Condition: Normal

pH: _____ Conductivity: _____ Temperature: _____

Field Sampling Information

Project Name NAS-PWC Pensacola Date 3-24-94

Project Number _____ Samplers Signature [signature]

Location McDonald's COC Number _____

Sample Station	Description of Sample	Well depth 18.1' Water Level 2" Well
MW-3	No Noticeable Odor	Result: 8.1 Date: 3/24/94 Time: 1015

Time of Collection 1015

Samples Collected Took all Readings and did calculations the same ~~[illegible]~~ as described for MW-8 No Floating Producted detected.

Weather Condition: Cloudy 70°F
Site Condition: Next to Parking Lot - Grassy Area
M Well Condition: Normal
pH: _____ Conductivity: _____ Temperature: _____

Sample Station	Description of Sample	Well depth 14.5' Water Level 2" Well
MW-1	Strong Petroleum Odor	Result: 8.1 Date: 3-24-94 Time: 1020

Time of Collection 1020

Samples Collected Took all Readings ~~[illegible]~~ and did calculations the same as described for MW-8 No Floating Producted detected. Due to strong petroleum odor - collected a sample - let sample set for 15 minutes - Still No indication of floating product - No oily film on top of water.

Weather Condition: Cloudy 70°F
Site Condition: Next to Parking Lot - Grassy Area
M Well Condition: Normal
pH: _____ Conductivity: _____ Temperature: _____

Field Sampling Information

Project Name NAS-PWC Pensacola Date 03/24/94

Project Number _____ Samplers Signature [signature]

Location McDonald's COC Number _____

Sample Station	Description of Sample	Well Depth 15.5'	Water Level 2" well
MW-2	No Noticeable Odor	Result: 8.5 Date: 3/24/94	Time: 1045

Time of Collection 1045

Samples Collected Took all Readings and did calculation the same way as described for MW-8 No Floating Product detected

Weather Condition: 70°F Cloudy
Site Condition: Next to Parking Lot - Grassy Area
M Well Condition: Normal
pH: _____ Conductivity: _____ Temperature: _____

Sample Station	Description of Sample	Well Depth 13.2'	Water Level 2" well
MW-4	Slight Petroleum Odor	Result: 8.0 Date: 3-24-94	Time: 1053

Time of Collection 1053

Samples Collected Took all Readings and did calculations the same way as described for MW-8 No Floating product detected

Weather Condition: 70°F Cloudy
Site Condition: Next to Parking Lot - Grassy Area
M Well Condition: Normal.
pH: _____ Conductivity: _____ Temperature: _____

APPENDIX C

SOIL BORING AND ANALYSIS
PERFORMED BY
CORPS OF ENGINEERS, SAVANNAH DISTRICT
MAY 22-24 1991

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
P.O. BOX 889
SAVANNAH, GEORGIA 31402-0889

July 22, 1991

REPLY TO
ATTENTION OF:

Engineering Division

Mr. Herb Fraser
Southern Division
Naval Facilities Engineering Command
Post Office Box 10068
Charleston, South Carolina 29411-0068

Dear Mr. Fraser:

Attached is a report detailing the work performed by Savannah District, U.S. Army Corps of Engineers for Southern Division Naval Facilities Command at the McDonald's JP-5 spill site at Pensacola Naval Air Station on May 22 to May 24, 1991.

The results of this work indicate that the McDonalds' site does not have excessively contaminated soil, and the site is eligible for a monitoring only determination. The source of the contaminant has been abated and it appears that the remediation efforts have been successful.

If you have any questions, please contact Robert V. O'Kelley at 912/944-5676 or Earl F. Titcomb at 912/944-5300.

Sincerely,

for Carl R. Postlewate, P.E.
Chief, Engineering Division

Enclosures

NAVAL AIR STATION PENSACOLA
SOIL BORINGS AND GAS SURVEY
RADFORD BOULEVARD (McDonald's) SITE

1. INTRODUCTION AND BACKGROUND

A soil boring and soil gas survey of the area north of the McDonald's restaurant at Pensacola Naval Air Station was performed by Savannah District, U.S. Army Corps of Engineers for Southern Division, Naval Facilities Engineering Command. The objective of the study was to determine if residual soil contamination exists at the site which might contribute to ground-water contamination in the future. This area was the site of a JP-5 fuel pipeline spill south of Radford Boulevard in 1986. An estimated 3,000 gallons of JP-5 fuel were lost during this spill. Geraghty & Miller, Inc. performed an investigation of this spill in late 1986 and 1987 and installed six shallow ground-water monitoring wells. Later in 1988, a recovery system was installed and free product removed.

In late 1988 and 1989, E.C. Jordon performed an evaluation of the recovery system and found that the contamination of the ground water had spread from the original spill area. Later in December 1990, FDER indicated that additional studies be conducted to determine if residual soil contamination exists which might contribute to ground-water contamination in the future. Head space analysis was the suggested method of investigation. This investigation is considered to be the first phase which may or may not result in further work depending upon future testing of ground-water samples from the existing wells and Florida Department of Environmental Regulations response. The specific elements of this investigation include performing the soil borings and headspace analysis, and submittal of a follow-up report of field work with an analysis of data obtained and recommendations.

2. METHODOLOGY

Twenty-three shallow hand auger borings were made in the McDonald's area and samples were taken at approximate depths of 1, 3, and 5 feet for field headspace analysis with a Foxboro Century 128 OVA using the technique described in Florida DER Chapter 17-770.200 and DER " Guidelines for Assessment and Remediation of Petroleum Contaminated Soils". Where the OVA indicated the presence of organic vapors, a carbon filter was used to determine if the contaminant could be naturally occurring methane. The OVA was calibrated at least twice each day, in the morning and afternoon.

Previous studies by Geraghty and Miller Inc. had indicated a direction of ground-water flow to the southeast from the spill area. The initial borings were made in an east-west line five feet north of the curb line for the McDonald's restaurant (See Figure 1). It was believed that this would quickly determine if contamination had moved from the original spill area. The boring program then progressed either toward the spill area or to define the limits east-west and north of the spill site. All borings were backfilled using the soil removed during excavation. The backfill was placed in successive lifts and then tamped.

3. HEADSPACE ANALYSIS

The standard procedure was to advance the auger borings taking samples at 1', 3' and 5' depths. The soil was then placed in a pint size glass jar, filling approximately half of the jar. The top was then sealed with aluminum foil and the screw lid securely fastened. The samples were allowed to set a sufficient time for the temperature to equilibrate to the ambient temperature, approximately 80 degrees F. The screw lid was then removed and the OVA probe inserted through the foil.

4. SOIL GAS COLLAR MONITORING

In addition to the samples taken for headspace, the collar of each boring was monitored as the boring advanced. The collar is defined as the area where the boring intersects the ground surface at the top of the boring. The standard procedure was to insert the OVA probe into the hole and to shield the boring by hand from wind. This procedure generally will result in the earliest detection of volatile organic vapors and can be used to assist in determining at what depth the highest contamination is located.

5. RESULTS OF SOIL GAS BORINGS

The general location of the borings are shown in Figure 1. It was found as the work progressed, that much of the area between McDonalds and Radford Avenue contained rock and other debris which could not be penetrated with the hand auger. This area is shown by the dashed line on Figure 1. Within this area none of the borings were carried to the water table as planned but were refused at depths of 1.8 to 6.1 feet below ground surface. All borings were advanced to at least 1.8 feet. Although only one boring is shown at each of these refused locations, several attempts were generally made in an attempt to penetrate the debris at each boring. However, it became apparent that the entire area within the dashed line was disturbed, probably for a depth of up to six feet or more. Outside of the dashed line, all borings were taken either to or below the water table, which varies from 4.9 to 7.5 feet. Water levels (depths below ground surface) are shown in Table 1. The borings were generally left open for one or more hours after completion to allow the water levels to stabilize.

6. SOILS DESCRIPTION

All soils encountered were sands, silty (SM) or poorly graded (SP) being by far the dominant types. Typically, a thin soil (organic) layer about 0.3 feet thick was found overlying a brown to black or grey silty fine sand (SM) to a depth of 2 to 3 feet. Below this material, a light colored poorly graded, medium sand was found. Within the disturbed area, debris consisting of concrete, brick, shells; etc was found in a silty sand (SM) matrix. Occasional quartz gravel and black "clinkers" were also encountered.

7. WATER TABLE

Over half of the borings (13) encountered the water table. The depth to water varied from 4.3 feet at SG-6 to 7.5 feet at SG-23. Since no collar elevations were available, the gradient and direction of flow, as shown in the Geraghty and Miller report, could not be verified. No evidence of oil or free product was observed at the water table in the auger borings.

8. RESULTS OF HEADSPACE ANALYSIS AND SOIL GAS COLLAR MONITORING

Only two borings, SG-3 and SG-4, found any evidence of contamination, see Table 2. The contaminated zone, a dark grey silty sand (SM), was found to be at a depth of 1.0 to 2.0 feet below surface, and was about one to two feet thick. The maximum collar reading (300 ppm) was found at a depth of 1.3 feet in boring SG-3. The readings dropped to 20 to 30 ppm at a depth of 3.0 feet. The maximum collar reading in SG-4 was 100 ppm at a depth of 2.4 feet.

The collar reading dropped to 5 ppm at depths of 3.5 and 6.0 feet. In order to sample the most highly contaminated area for headspace analysis, additional jar samples were taken from holes offset 1 foot from the original holes (SG-3A and SG-4A). The results indicated that the soils were not excessively contaminated as the highest reading found was 47 ppm at a depth of 1.6 to 1.8 feet in SG-3A. The contaminated layer appears to be confined to the area between SG-3 and SG-4 and may either be related to past construction activities or may be naturally occurring. Borings drilled around this area found no evidence of contamination, and there is no evidence that this area is related to the spill area. A carbon filter was used during screening of the contaminated samples, but no discernable differences from the unfiltered samples was observed. This indicates that the contamination found is very likely to be methane.

OVA readings were made at the top of casing on previously installed monitoring wells MW-1 thru MW-4. These tests found no evidence of any organic vapor; all readings were zero. Since all of these wells are shown as being screened from a depth of about 2.5' below ground surface to a depth of approximately 15' below ground, the presence of highly volatile contaminants should have triggered a response by the OVA.

9. CONCLUSIONS

No excessively contaminated soils were encountered during this investigation. The only contaminated soils found, in SG-3, and SG-4, were not related to the 1986 spill and are very limited in area and depth. No evidence of free product was observed in any of the auger borings. A UST, not previously noted in earlier reports, is located in the area between borings SG-8 and SG-12 (See Figure 1). No evidence of leakage from this tank was observed in the nearby borings. There is debris buried throughout much of the area which prevented full penetration to the water table using a hand auger. Nevertheless there is no evidence of excessively contaminated soils remaining anywhere in the area studied. The lack of any OVA response, outside of that noted above, in either the present auger borings or at the top of casing at the existing monitoring wells support this conclusion.

10. RECOMMENDATION

The results of the present study indicate that the McDonald's site does not have excessively contaminated soil. Based on the previous studies and remediation activities, it appears that this site is eligible for a monitoring only determination. There are four existing ground-water monitoring wells in the spill area that could be used for the periodic testing of water quality. There appears to be only minimal risk to either the environment or personnel. The source of the contaminant has been abated, and it appears that the remediation efforts have been successful. This recommendation is in accordance with verbal guidance received from FDER on 19 Dec 1990. See memo of meeting attached.

Memorandum 20 Dec 90

From: Code 18232
To: File
Via: 1823 182

Subj: Minutes to Meeting at FDER on 19 December 1990, JP-5 Site, NAS Pensacola

Attendees	Organization
Dr. J. Crane	FDER Bureau of Waste Cleanup
John Albrecht	SOUTHNAVFAC Code 18232
Earl Titcomb	US Army Corps of Engineers
Cardwell Smith	US Army Corps of Engineers

Minutes

Recent comments from Dr. Crane were discussed, concerning the need for a soil investigation at the McDonald's site.

FDER is concerned that the contaminated soils may be a contributing factor for groundwater contamination at the site. Dr. Crane requested that a soils investigation be conducted to determine the extent and depth of soil contamination.

Mr. Albrecht stressed that this site was activity funded and funds were limited. As such, a head-space check was requested to determine the extent of contamination. This could likely be done by the Army Corps using hand augers and Organic Vapor Analysis (OVA) instrument in the field.

Dr. Crane stated that this method was accepted by FDER for distinguishing the limits of contamination for placement of wells. Typically the 50 ppm Total VOA limit is conservative for sites and any contaminated soil below that limit would naturally degrade on its own. For this site, field screening would be sufficient to determine the extent of work. There is no need for lab analysis at this time.

If there were no excessively contaminated soils on-site, a Monitoring Only Plan may be submitted, and should be submitted with the results.

If excessively contaminated soils are encountered, it may be necessary to excavate and treat or dispose of the soil in an appropriate manner. Following the excavation of soil, the site would be monitored for a year.

John Albrecht

TABLE 1

SUMMARY OF SOIL BORINGS
MAY 1991
PENSACOLA NAVAL AIR STATION
McDonald's JP-5 SPILL SITE

BORING	TOTAL DEPTH (FEET)	DEPTH TO WATER TABLE (FEET)	REFUSAL	CONTAMINATED
SG-1	5.3	4.8	NO	NO
2	6.5	5.9	NO	NO
3	5.3	5.2	NO	YES
4	6.0	5.8	NO	YES
5	6.0	5.9	NO	NO
6	5.4	4.3	NO	NO
7	5.0	4.5	NO	NO
8	6.5	6.3	NO	NO
9	6.5	5.9	NO	NO
10	1.5		YES	NO
11	6.0	5.3	NO	NO
12	6.0	5.0	NO	NO
13	2.5		YES	NO
14	6.1		YES	NO
15	2.6		YES	NO
16	1.8		YES	NO
17	1.8		YES	NO
18	2.6		YES	NO
19	1.8		YES	NO
20	1.9		YES	NO
21	4.2		YES	NO
22	4.1		YES	NO
23	7.6	7.5	NO	NO

TABLE 2

SOIL HEADSPACE ANALYSIS
PPM TOTAL HYDROCARBON
MAY 1991
PENSACOLA NAVAL AIR STATION
McDonald's JP-5 SPILL SITE

SOIL BORING	SAMPLED AT DEPTH OF 1 FOOT	3 FEET	5 FEET	7.5 FEET	PEAK COLLAR AT DEPTH *
SG-1	0	0	0		0
2	0	0			0
3	4	0	0		300/1.3'
3A**		47PPM AT 1.7 FEET			280/1.4'
4	0	1.6	0		100/2.0'
4A**		18PPM AT 2.1 FEET			95/2.0'
5	0	0	0		0
6	0	0	0		0
7	0	0	0		0
8	0	0	0		0
9	0	0	0		0
10					
11		0	0		0
12	0	0	0		0
13	0				0
14	0	0	0		0
15	0				0
16	0				0
17	0				0
18	0				0
19	0				0
20	0				0
21	0	0			0
22	0	0			0
23	0	0	0	0	0

* OVA reading in collar of soil boring, first number is in ppm and the second number is the depth in feet.

** These borings are each offset from SG-3 and SG-4 by one foot.

TABLE 3

CALIBRATION DATA FOR
OVA FOXBORO CENTURY 128
#A51836
PENNSACOLA NAVAL AIR STATION
McDonald's JP-5 SPILL SITE
PPM METHANE

DATE	TIME	STANDARD	READING
5/17/91		95	90
5/22/91	1030	95	90
5/22/91	1345	95	90
5/23/91	1320	95	100
5/23/91	1600	95	99
5/24/91	0830	95	86
5/24/91	1045	95	96

Hole No. SG1

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG1	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4.8 (depth)
7. THICKNESS OF OVERBURDEN 5.3	16. DATE HOLE: STARTED 5-22-91; COMPLETED 5-22-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 5.3	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	0		SM Dark brown-orange silty fine SAND.			W.L. 4.8', WATER LEVEL READING 1 HR. AFTER HOLE COMPLETED.
	1					
	2		SP Light tan to gray, poorly graded medium SAND.			
	3					
	4					
	5		Damp.			
			BOTTOM OF HOLE AT 5.3'			
	6					
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG2

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG2	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 5.9 (depth)
7. THICKNESS OF OVERBURDEN 6.5	16. DATE HOLE: STARTED 5-22-91; COMPLETED 5-22-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.5	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	0		SC Orange slightly clayey SAND.			
	1					
	2		SP Light tan medium SAND.			
	3					
	4					
	5					
			Damp.			
	6					
			BOTTOM OF HOLE AT 6.5'			
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG3

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3 1/8" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG3	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 5.2 (depth)
	16. DATE HOLE: STARTED 5-22-91; COMPLETED 5-22-91
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN 5.3	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB
9. TOTAL DEPTH OF HOLE 5.3	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SC Orange clayey SAND.			
	1		SM Dark gray fine silty SAND.			
	2		SP Light tan medium SAND. Fragments of asphalt.			
	3					
	4					
	5					
			BOTTOM OF HOLE AT 5.3'			
	6					
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG4

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG4	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 5.8 (depth)
7. THICKNESS OF OVERBURDEN 6.0	16. DATE HOLE: STARTED 5-22-91; COMPLETED 5-22-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–1.5		SM-SC Light to dark orange slightly silty and clayey medium SAND.			
	1.5–3		SM Dark gray silty fine SAND.			
	3–6		SP Light gray medium SAND. Damp.			
	6		BOTTOM OF HOLE AT 6.0'			

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG5

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3/2" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG5	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 5.9 (depth)
7. THICKNESS OF OVERBURDEN 6.0	16. DATE HOLE: STARTED 5-22-91; COMPLETED 5-22-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	0–1.5		SM Tan to orange medium SAND.			
	1.5–2.5		SM-SP Tan to orange medium SAND.			
	2.5–3.0		SM Dark gray medium SAND.			
	3.0–6.0		SP Light gray to white medium SAND.			
	6.0		BOTTOM OF HOLE AT 6.0'			

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG6

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG6	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4.3 (depth)
	16. DATE HOLE: STARTED 5-22-91; COMPLETED 5-22-91
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN 5.4	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB
9. TOTAL DEPTH OF HOLE 5.4	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–1		SM Dark gray silty SAND.			W.L. 4.3', WATER LEVEL READING 1.5 HRS. AFTER HOLE COMPLETED.
	1–2					
	2–3		SP Light gray to white silty SAND.			
	3–4					
	4–5		Very damp.			
	5–6		BOTTOM OF HOLE AT 5.4'			
	6–7					
	7–8		NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.			
	8–9					

Hole No. SG7

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG7	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 4.5 (depth)
7. THICKNESS OF OVERBURDEN 5.0	16. DATE HOLE: STARTED 5-22-91; COMPLETED 5-22-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 5.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–1.8		SM Dark gray silty fine SAND.			
	1.8–5.0		SP Light gray to white poorly graded SAND.			
	5		BOTTOM OF HOLE AT 5.0'			

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG8

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG8	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 3 — UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 6.3 (depth)
7. THICKNESS OF OVERBURDEN 6.5	16. DATE HOLE — STARTED 5-22-91 — COMPLETED 5-22-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.5	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM Light tan medium silty SAND.			W. L. 6.3', WATER LEVEL READING 1 HR. AFTER HOLE COMPLETED.
	1					
	2					
	3					
	4					
	5					
	6					
			BOTTOM OF HOLE AT 6.5'			
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG9

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3 1/2" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG9	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 5.9 (depth)
7. THICKNESS OF OVERBURDEN 6.5	16. DATE HOLE: STARTED 5-22-91; COMPLETED 5-22-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.5	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM Mixed brown and gray silty SAND.			W. L. 5.9', WATER LEVEL READING 0.5 HR. AFTER HOLE COMPLETED.
	1		Orange, fine.			
	2		SP Light gray, white silty fine SAND.			
	3					
	4					
	5					
			Gray, black, medium.			
	6					
			BOTTOM OF HOLE AT 6.5'			
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG10

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG10	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 0; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
7. THICKNESS OF OVERBURDEN 1.5	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 1.5	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH 0 b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SM Light brown, slightly silty fine to medium SAND.			REFUSAL
			BOTTOM OF HOLE AT 1.5' ABORTED HOLE AFTER FIVE ATTEMPTS AT THIS LOCATION. MOVED 5' SOUTHEAST STILL ENCOUNTERED CONCRETE FRAGMENTS.			
	2					
	3					
	4					
	5					
	6					
	7		NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.			
	8					
	9					

Hole No. SG11

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG11	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 5.3 (depth)
7. THICKNESS OF OVERBURDEN 6.0	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM Brown silty fine SAND.			
	1					
			Light brown, slightly silty, medium.			
	2					
	3					
	4		Several large rounded quartz gravel up to 2" long.			
	5					
	6		BOTTOM OF HOLE AT 6.0'			
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG12

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG12	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 5.0 (depth)
7. THICKNESS OF OVERBURDEN 6.0	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH 0 b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	X CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SM Brown SAND.			
	1					
			Light brown, slightly silty, medium grained.			
	2					
	3		Light tan, silty, poorly graded, some clay.			
	4					
	5					
	6		BOTTOM OF HOLE AT 6.0'			
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG13

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG13	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
7. THICKNESS OF OVERBURDEN 2.5	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 2.5	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM Light to medium tan, slightly silty, fine SAND.			
	1					
	2					REFUSAL
			BOTTOM OF HOLE AT 2.5'			CONCRETE FRAGMENTS
	3					
	4					
	5					
	6					
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG14

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3/4" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG14	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
7. THICKNESS OF OVERBURDEN 6.1	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.1	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM Light brown-gray silty fine SAND.			
	1					
	2		SP-SM Light tan, medium SAND.			
			Light orange.			
	3					
	4					
	5					
	6					REFUSAL
			BOTTOM OF HOLE AT 6.1'			
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG15

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG15	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
7. THICKNESS OF OVERBURDEN 2.6	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 2.6	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		GM Gray, brown, silty GRAVEL, shell.			
	1		SP-SM Light yellow SAND.			
	2					REFUSAL (GRAVEL)
			BOTTOM OF HOLE AT 2.5'			
	3					
	4					
	5					
	6					
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG16

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG16	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
7. THICKNESS OF OVERBURDEN 1.8	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 1.8	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		GM Gray silty GRAVEL, concrete rubble.			
	1					REFUSAL
	2		BOTTOM OF HOLE AT 1.8'			
	3					
	4					
	5					
	6					
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG17

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG17	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
7. THICKNESS OF OVERBURDEN 1.8	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 1.8	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH Ø b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		GM Silty SAND with rocks, concrete, etc.			REFUSAL
	2		BOTTOM OF HOLE AT 1.8'			ON PIPE ABOUT 1.3' FROM SIDEWALK
	3					
	4					
	5					
	6					
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG18

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG18	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
7. THICKNESS OF OVERBURDEN 2.6	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 2.6	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–1		SM Dark brown silty fine SAND.			
	1–2.6		SP-SM Light orange slightly silty medium SAND.			REFUSAL
			BOTTOM OF HOLE AT 2.6'			

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG19

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG19	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN 1.8	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB
9. TOTAL DEPTH OF HOLE 1.8	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		GM Gray to brown silty gravelly SAND.			REFUSAL
	1					
	2		BOTTOM OF HOLE AT 1.8'			
	3					
	4					
	5					
	6					
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG20

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG20	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
7. THICKNESS OF OVERBURDEN 1.9	16. DATE HOLE: STARTED 5-23-91; COMPLETED 5-23-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 1.9	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM Dark gray to brown gravelly silty SAND.			
	1					
	2		BOTTOM OF HOLE AT 1.9'			
	3					
	4					
	5					
	6					
	7					
	8					
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Hole No. SG21

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG21	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
7. THICKNESS OF OVERBURDEN 4.2	16. DATE HOLE: STARTED 5-24-91; COMPLETED 5-24-91
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 4.2	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH 0 b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SM Brown silty fine SAND.			
	2		SM-SP Light tan, medium silty SAND with occasional rounded quartz gravel, color lighter.			
	3		Orange to gray, poorly graded, occasional black clinkers and white rounded quartz.			
	4					REFUSAL
			BOTTOM OF HOLE AT 4.2'			
	5					
	6					
	7		NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.			
	8					
	9					

Hole No. SG22

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG22	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NOT ENCOUNTERED
	16. DATE HOLE: STARTED 5-24-91; COMPLETED 5-24-91
7. THICKNESS OF OVERBURDEN 4.1	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 4.1	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM Brown to yellow silty fine to medium SAND.			
	1					
	2					
			Refusal at 2.8'-waterline? moved 1'.			
	3		SP Gray poorly graded SAND.			
	4		BOTTOM OF HOLE AT 4.1'			
	5					
	6					
	7		NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.			
	8					
	9					

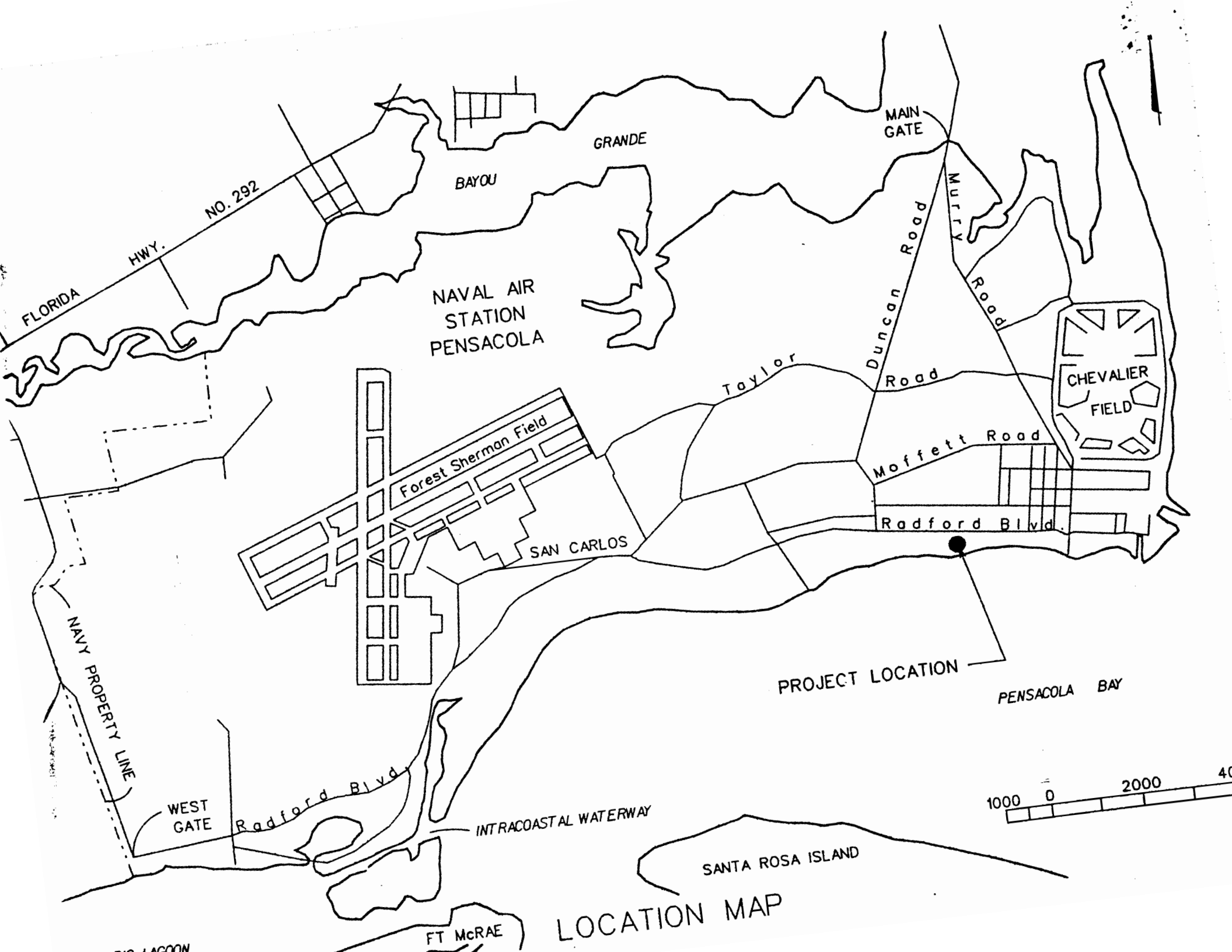
Hole No. SG23

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION PENSACOLA NAVAL AIR STATION	SHEET 1 OF 1 SHEETS

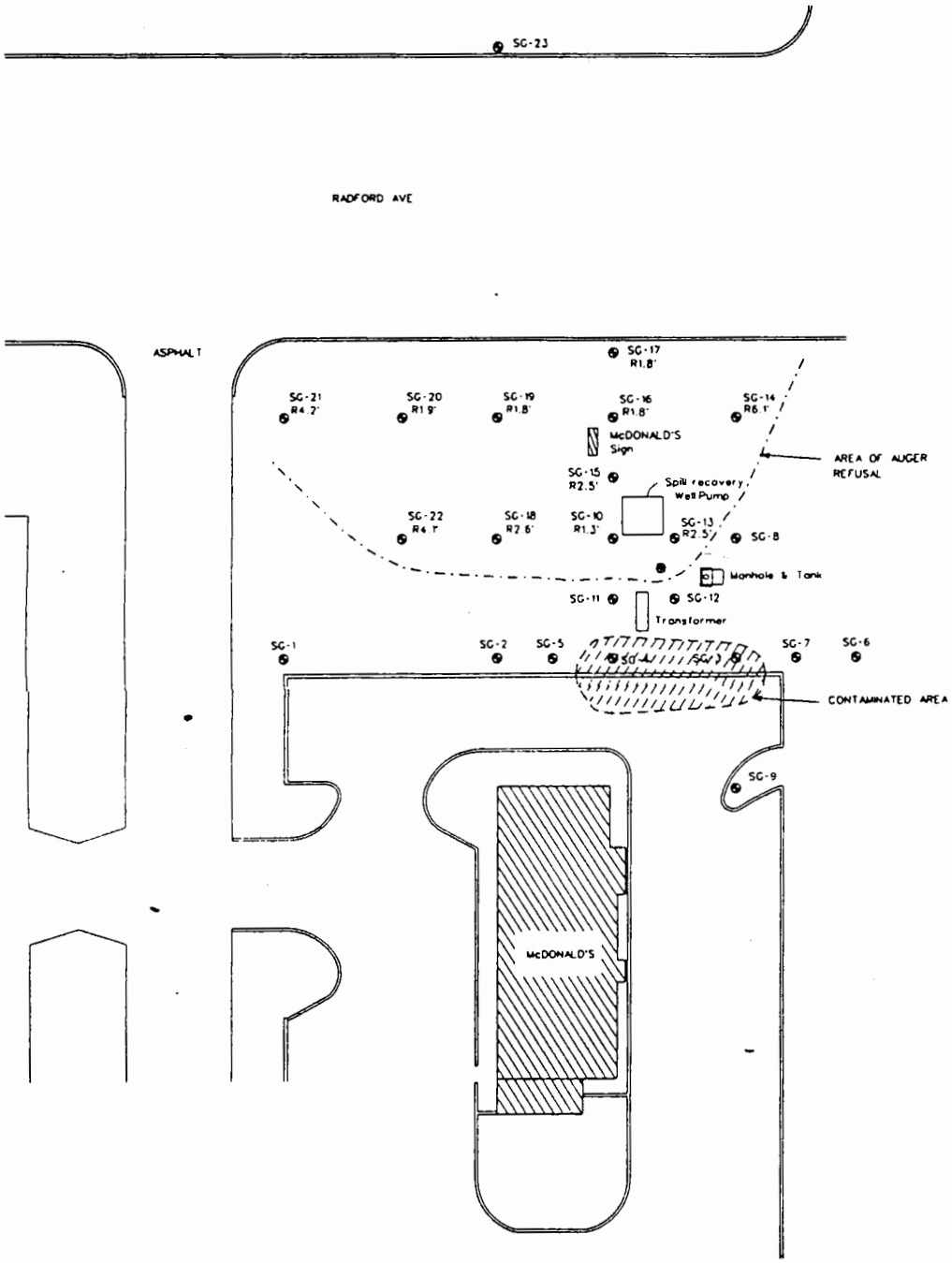
1. PROJECT MCDONALDS SITE-JP5 SPILL	10. SIZE AND TYPE OF BIT 3½" HAND AUGER
2. LOCATION (Coordinates or Station) SEE FIGURE 1	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) N/A
3. DRILLING AGENCY SAVANNAH DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL N/A
4. HOLE NO. (As shown on drawing title and file number) SG23	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4; UNDISTURBED 0
5. NAME OF DRILLER FRED MOSER/EARL F. TITCOMB	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 7.5 (depth)
	16. DATE HOLE: STARTED 5-24-91; COMPLETED 5-24-91
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN 7.6	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR EARL F. TITCOMB
9. TOTAL DEPTH OF HOLE 7.6	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM-SC Orange clayey SAND/brown to black silty SAND.			
	1					
	2		SP Gray poorly graded SAND.			
	3		White fine to medium.			
	4					
	5					
	6					
	7					
	8		BOTTOM OF HOLE AT 7.6'			
	9					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.



LOCATION MAP



N

LEGEND

AREA OF AUGER REFUSAL

CONTAMINATED AREA

OAK TREE

SG-1 SOIL GAS AUGER BORING

SG-13 R2.5' REFUSAL AT A DEPTH OF 2.5 FEET IN SOIL GAS AUGER BORING SG-13

SCALE: 1" = 30'

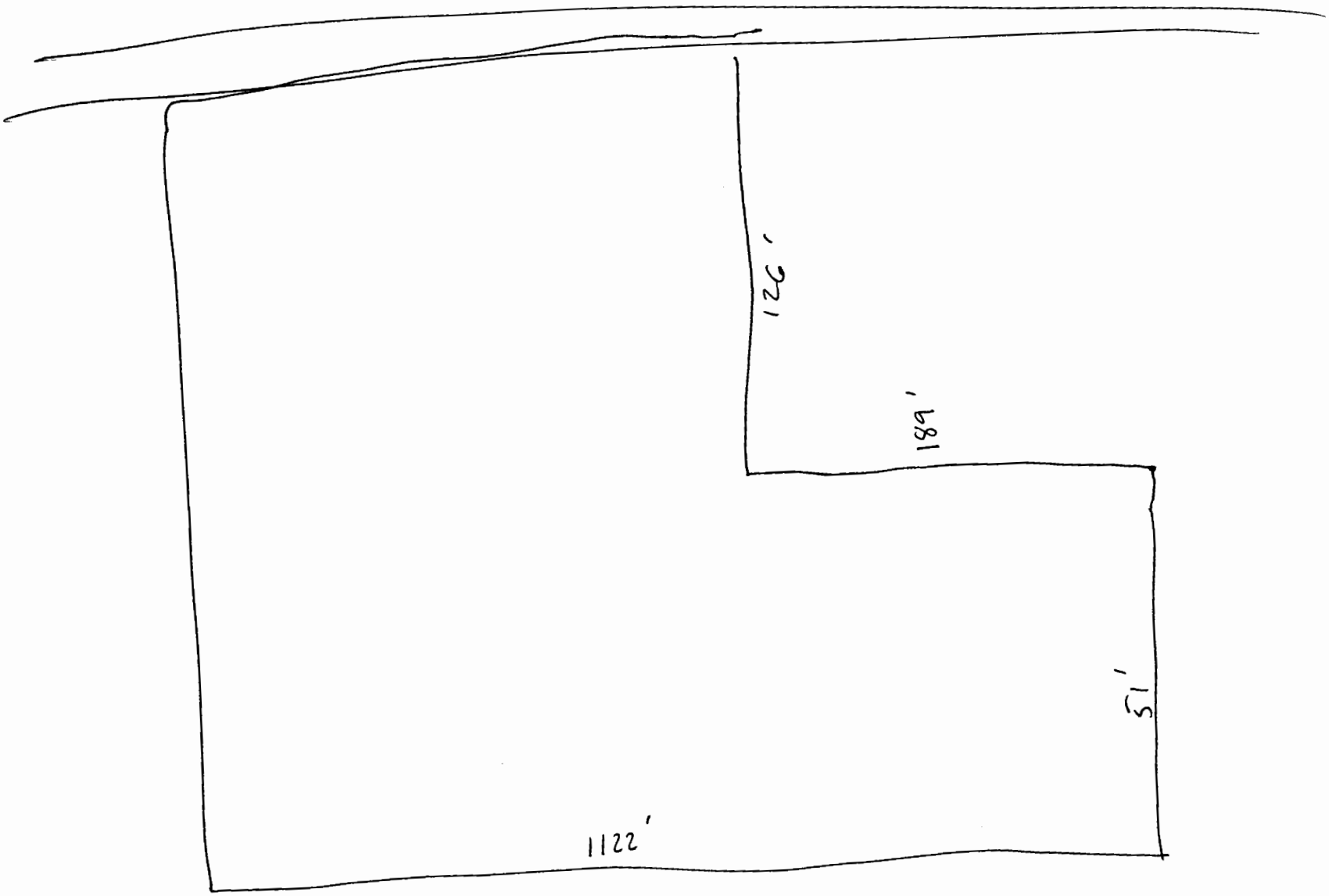
30' 0 30' 60'

McDONALD'S RESTAURANT

BORING PLAN

PENSACOLA FLORIDA

FIGURE 1

374
3
1122

42
3
126