FINDINGS FROM MONITOR-WELL INSTALLATION PROGRAM AT GAS HILL SITE, NAVAL AIR STATION JACKSONVILLE, FLORIDA

Prepared for

NAVAL FACILITIES ENGINEERING COMMAND
Southern Division
Charleston, South Carolina

Contract No. N62467-83-C-0353

JULY 1987

GERAGHTY & MILLER, INC.
Ground-Water Consultants

Geraghty & Miller, Inc.

375/9

FINDINGS FROM MONITOR-WELL INSTALLATION PROGRAM AT GAS HILL SITE, NAVAL AIR STATION JACKSONVILLE, FLORIDA

Prepared for

NAVAL FACILITIES ENGINEERING COMMAND
Southern Division
Charleston, South Carolina

Contract No. N62467-83-C-0353

July 1987

Prepared by

GERAGHTY & MILLER, INC.
Ground-Water Consultants
3820 Northdale Boulevard
Tampa, Florida 33624

GERAGHTY & MILLER, INC.
Ground-Water Consultants
Our 30th year

August 4, 1987

Mr. Sonny Chestnut
Code: 11433
Southern Division
Naval Facilities Engineering
Command
2155 Eagle Drive
Box 10068
Charleston, South Carolina 29411-0068

Dear Mr. Chestnut:

Please find enclosed fifteen copies of the report entitled "Findings from Monitor-Well Installation Program at Gas Hill Site, Naval Air Station, Jacksonville, Florida." If you have any questions, please do not hesitate to call us.

Sincerely,

GERAGHTY & MILLER, INC.

Michael O'Hagan
Michael O'Hagan
Staff Scientist

James J. Geraghty
James J. Geraghty
Principal

Enclosures
MOH/bjn
509/55
TO290GW5

Northdale Executive Center • 3820 Northdale Blvd., Suite 200A • Post Office Box 273630 • Tampa, FL 33688-3630 • (813) 961-1921

CONTENTS

FIGURES

TABLES

INTRODUCTION

This report summarizes the work performed under the Characterization Phase of the NACIP (Navy Assessment and Control of Installation Pollutants) program at the Gas Hill Site, Naval Air Station at Jacksonville, Florida (NAS-JAX). The investigation was conducted according to the Plan of Action submitted by Geraghty & Miller, Inc., (G&M) on July 24, 1986. The primary objectives of the plan were to delineate the extent of jet fuel (JP-5) in the subsurface around the Gas Hill facility and to determine ground-water flow direction and rate at the site.

BACKGROUND INFORMATION

Gas Hill, shown in Figure 1, is located in the northeast corner of NAS-JAX. The site contains 11 buried tanks for storage of jet fuel (JP-5) and aviation gasoline (AVGAS) used at NAS-JAX and Cecil Field Naval Air Station (Figure 2). The Naval Supply Center (NSC), a tenant at NAS-JAX, is responsible for the operation of the facility. In October 1982, fuel odors were noted near fuel tanks O and N, and further investigation in that area by NSC personnel revealed soil saturated with JP-5 and a layer of free JP-5 floating on the shallow water table. In 1983, G&M initiated a program to delineate the extent of JP-5 in the subsurface, which involved installation of soil borings and two monitor wells (GH-1 and GH-2). The results of the program are described in the 1983 G&M report entitled "Assessment of the Presence of Fuel in the Subsurface at Gas Hill, Jacksonville, Florida." Findings of that study are presented herein only to the extent that they bear on the more recent work.

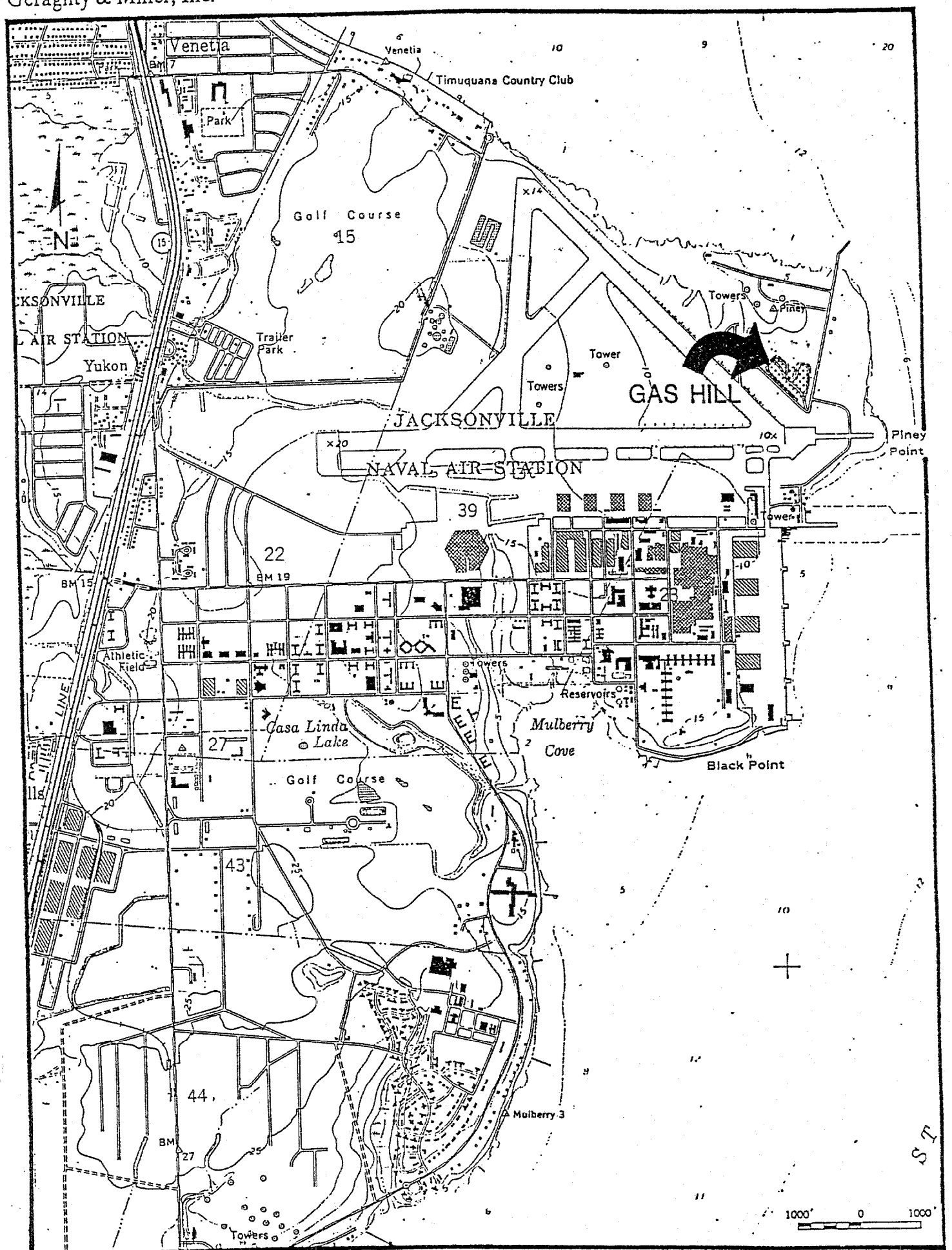


Figure 1. Location Map

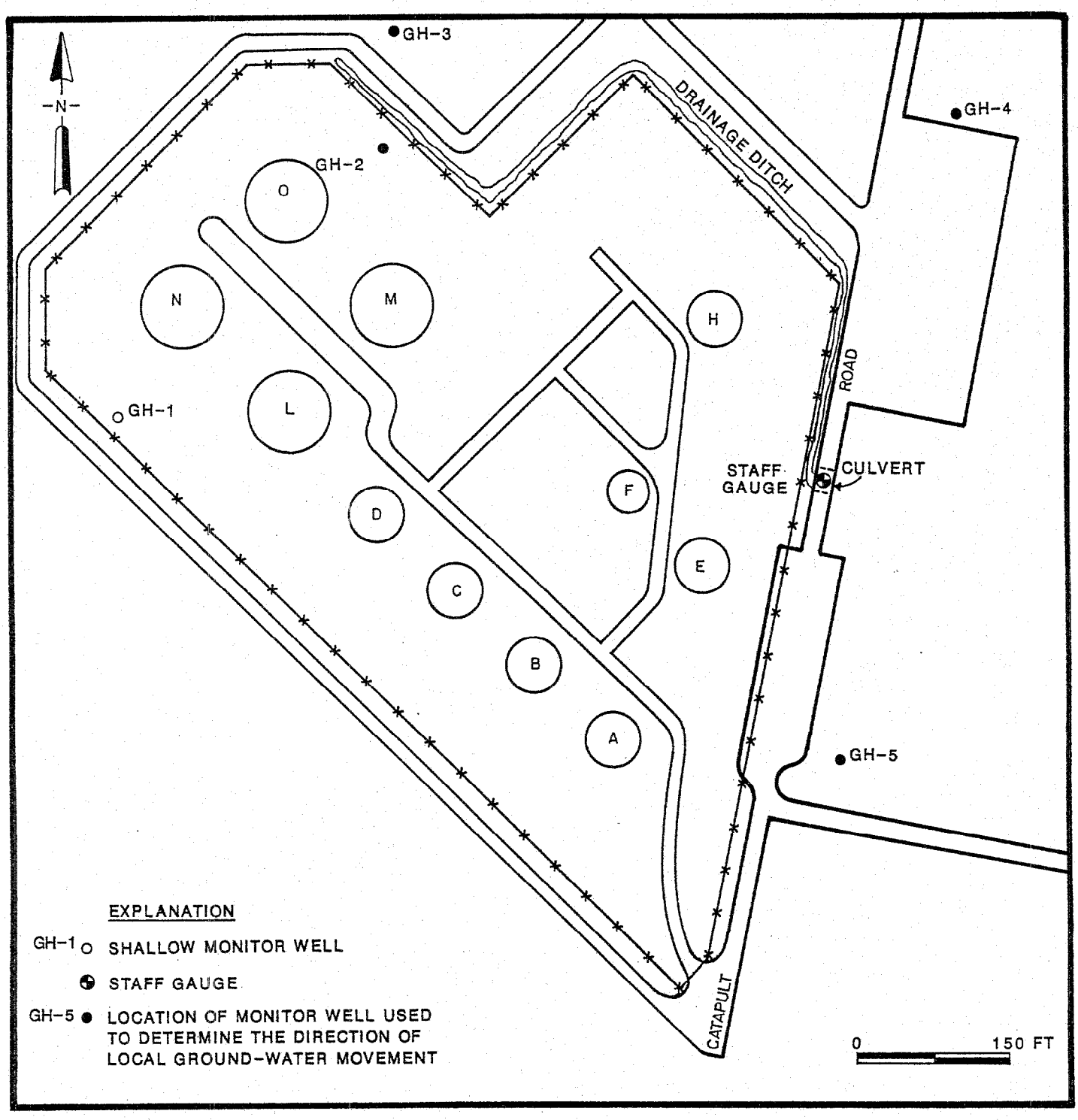


Figure 2. Monitor-Well Locations

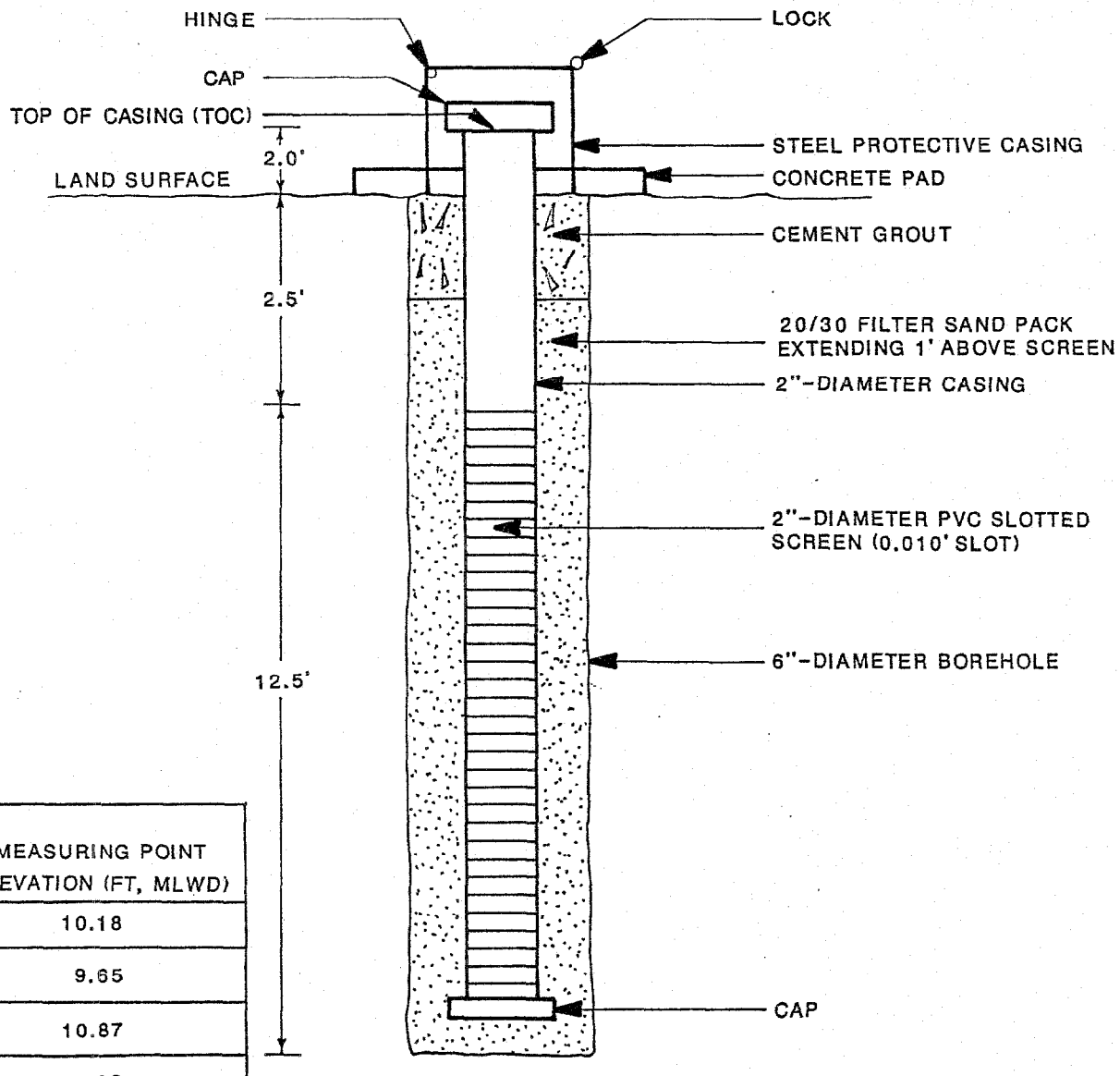
WORK PERFORMED

In July 1986, G&M performed a second field program at the Gas Hill area, consisting of monitor-well installation, ground-water sampling, and in-situ aquifer testing. The principal purposes of this program were to delineate the extent of JP-5 and purgeable aromatic compounds in the subsurface and to determine shallow ground-water flow direction and rate.

Monitor-Well Installation

One of the original monitor wells (GH-2) was deepened and three new monitor wells (GH-3, GH-4, and GH-5) were installed (Figure 2) during this study. The other original monitor well (GH-1) had been disturbed and therefore could not be utilized in the monitor-well network. Each of the new monitor wells was constructed in accordance with the schematic diagram shown in Figure 3.

The wells were installed using the hollow-stem auger drilling method. All augers, split-spoons, well casings, and well screens were steam cleaned at the beginning of the work and after each well installation. Initially, a 15-foot borehole was drilled at each designated monitor-well site to define the subsurface geology and the presence or absence of hydrocarbons. Lithologic logs prepared from continuous split-spoon samples collected from the boreholes are given in Appendix A. The borehole was then reamed to a nominal 6-inch



WELL	MEASURING POINT ELEVATION (FT, MLWD)
GH-2	10.18
GH-3	9.65
GH-4	10.87
GH-5	9.68

Figure 3. Monitor-Well Construction Details

diameter using hollow-stem augers, and a 12.5-foot slotted (0.010-inch) PVC well screen (2-inch-diameter) with attached 4.5-foot PVC riser pipe was inserted through the hollow-auger flytes. The screen and riser were joined by flush-threaded fittings. Silica sand (Standard Sand and Silica 20/30 sieve) was then gravity-fed between the auger flytes and the well casing to a height of approximately one foot above the top of the well screen. As the sand was fed into the annular space, the auger flytes (5-ft sections) were incrementally raised and removed. A neat cement grout seal was installed above the sand pack to the land surface. A concrete pad and locking protective cover were used to finish the well head (Figure 3). The well was developed for approximately one hour by alternately surging with a surge block and pumping until a sand-free discharge was obtained.

The elevation of the top of the PVC casing (water-level measuring point) of each monitor well was measured and referenced to the mean low water datum (MLWD) by a certified land surveyor. Additionally, a staff gauge was installed and referenced to MLWD in order to measure the surface-water elevation in the drainage ditch at the base of Gas Hill. Top of casing and ground-surface elevations and water-level measurements in the monitor wells on two separate dates are listed in Table 1. Figure 4 is a map of the site showing elevations of the ground-water levels in the monitor wells on July 29, 1986. A comparison of these water levels suggests

Table 1. Monitor-Well, Ground-Water, and Surface-Water Elevations, July 29, 1986, and September 19, 1986

Well Designation	Land Surface Elevation (ft, MLWD)[1/]	Measuring Point Elevation (ft, MLWD)	Water-Level Elevations (ft, MLWD) 7-29-86	9-19-86
GH-1[2/]	--	--	--	--
GH-2	8.43	10.18	7.58	7.88
GH-3	7.63	9.65	4.85	5.17
GH-4	8.48	10.87	3.10	4.39
GH-5	7.60	9.68	4.21	4.62
Staff Gauge[3/]		2.94	2.84	

1/ Feet above mean low water datum
2/ Not referenced to MLWD
3/ 5.85 feet above MLWD

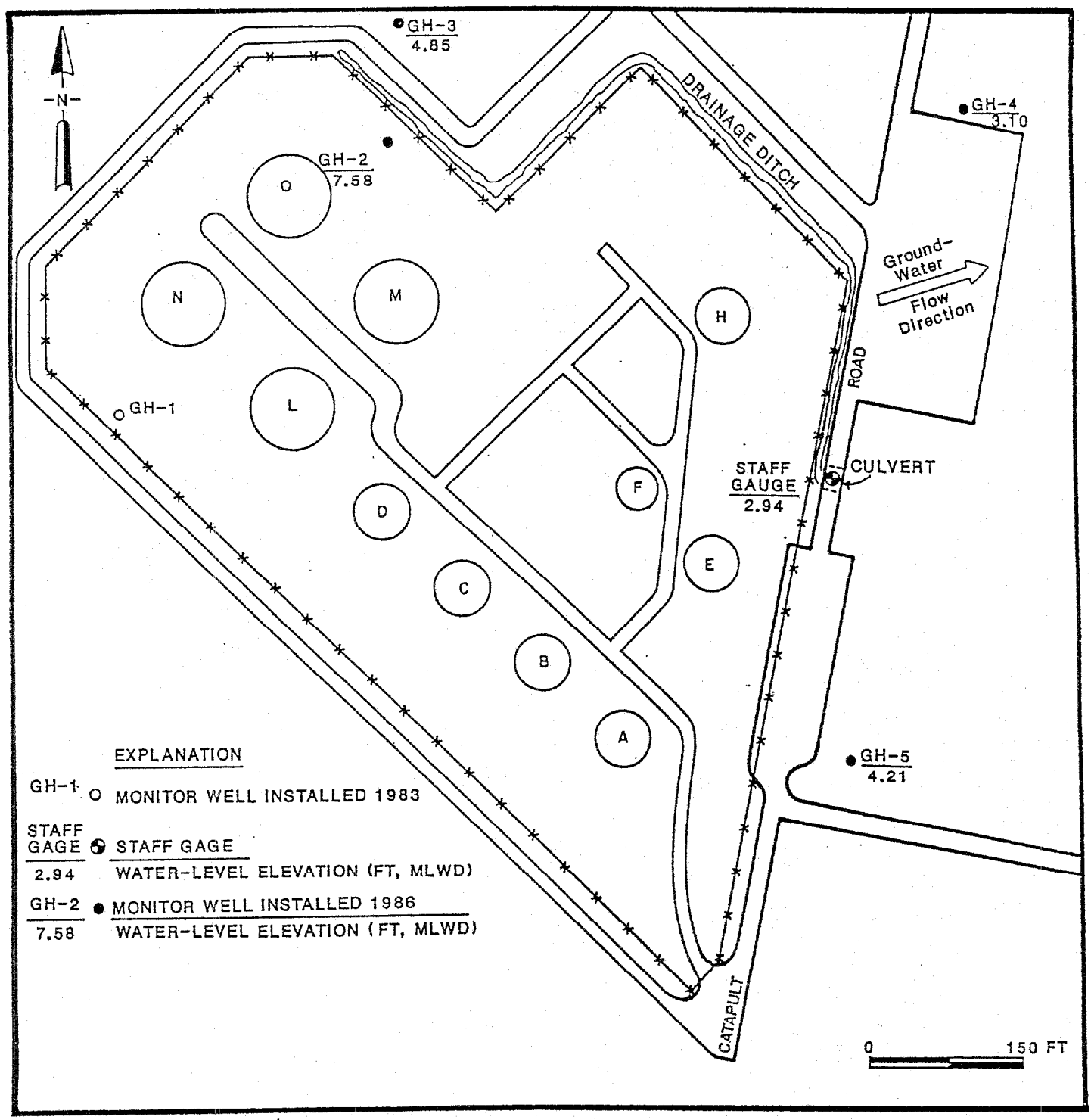


Figure 4. Monitor-Well Elevations, July 29, 1986

that movement of the shallow ground water is to the east-northeast toward the St. Johns River.

Slug Tests

In-situ hydraulic conductivity tests ("slug tests") conducted on monitor wells GH-3, GH-4, and GH-5 (Table 2) were analyzed by the method developed by Bouwer and Rice (1976). These tests showed conductivity values ranging from 7.8×10^{-6} feet per second (ft/sec) at GH-3 to 7.94×10^{-5} ft/sec at GH-5.

Shallow Ground-Water Quality

Monitor wells GH-3, GH-4, and GH-5 were sampled for polynuclear aromatic hydrocarbons (PNAs) and purgeable aromatic compounds on July 30, 1986. The ground-water samples were collected from the monitor wells by evacuating a minimum of eight standing well volumes using a peristaltic pump. A bottom-entry Teflon bailer was used to collect the samples for analysis. To prevent cross-contamination, the sampling equipment was thoroughly cleaned before sampling each well.

Field measurements of temperature, pH, and specific conductance of water samples were made at the time of sample collection. The results are listed in Table 3. The samples were stored on ice prior to delivery via air freight to a Florida Department of Environmental Regulation (FDER)

375/11

Table 2. Hydraulic Conductivities of the Shallow Sediments

WELL NUMBER	SCREENED INTERVAL (ft, bls)[1/]	HYDRAULIC CONDUCTIVITY K (ft/sec)[2/]	DESCRIPTION OF SEDIMENTS
GH-3	2.5 - 15.0	7.8×10^{-6}	Sands and intercalated sand and clay
GH-4	2.5 - 15.0	3.19×10^{-5}	Clayey sands and intercalated sand and clay
GH-5	2.5 - 15.0	7.94×10^{-5}	Clayey sands and sand

[1/] Feet below land surface
[2/] Feet per second

375/13

Table 3. Values of Geochemical Field Parameters in Ground-Water Samples, July 30, 1986

SAMPLE	TEMP (°C)	pH (Standard Units)	SPECIFIC CONDUCTANCE (Micromhos per centimeter)
GH-3-1	21.6	6.73	805
GH-4-1	21.6	6.69	1100
GH-5-1	26.1	7.06	350

approved laboratory for analyses of PNAs (EPA Method 625) and purgeable aromatics (EPA Method 602). The results of these analyses are presented in Appendix B. The laboratory results show that only one purgeable aromatic compound, benzene, was detected at one monitor well (GH-4) at a concentration of 55 parts per billion (ppb). Concentrations of all other reported compounds were below laboratory detection limits.

FINDINGS

Based on the findings from the 1983 G&M study and from the present investigation, no free hydrocarbons have been detected in the subsurface around the perimeter of Gas Hill. The small volume of free hydrocarbons originally detected at monitor well GH-2 during the 1983 G&M field program appear to have dissipated. A possible mechanism for this would be immobile saturation, where free hydrocarbons are adsorbed onto soil particles; the adsorbed hydrocarbons would be immobile and subject to biological and physical degradation (API, 1972).

Water-level measurements indicate that the shallow ground water at the Gas Hill site flows in an east-northeast direction toward the St. Johns River. The water table was found to be near the land surface, especially at the foot of Gas Hill. Based on experiences at other sites like Gas Hill where mounds of earth materials exist, there is a good possibility that a localized ground-water mound exists on the water table, so that movement of the ground water may be more or less radially away from the hill in places. For example, the water level in well GH-2 is almost three feet higher than that in nearby well GH-3, which suggests a mounding of the ground water near the base of the hill. As indicated by the water levels, the drainage ditch at the base of Gas Hill appears to receive a portion of its baseflow from surficial ground water.

Using the two extreme hydraulic conductivity values calculated from slug tests (7.8×10^{-6} ft/sec at GH-3 and 7.94×10^{-5} ft/sec at GH-5), together with an estimated hydraulic gradient of 0.003 ft/ft and an assumed effective porosity of 20 percent, the rate of ground-water flow at the site is calculated to be in the range of from 3.6 to 37 ft/year.

The lithologic logs in Appendix A show that sandy sediments occur in the subsurface to a depth ranging from 8.5 to 14 ft below land surface. Low-permeability, clayey sediments were present below this depth at three well locations (GH-2, GH-3, and GH-4).

Results of water-quality analyses showed that the ground water from monitor well GH-4 contained a relatively low concentration, 55 ppb, of benzene. Concentrations of PNAs and purgeable aromatics were below detection limits in ground water obtained from monitor wells GH-3 and GH-5. Specific conductance ranged from 350 to 1,100 umhos/cm (micromhos per centimeter), and pH ranged from 6.69 to 7.06 for all of the samples.

There is only one known well within one-quarter mile of the site at a distance of approximately 1,000 ft to the northeast. This well is identified as well No. 22 (presented in the Verification Study of NACIP) and reportedly not in use as of December 1985.

RECOMMENDATIONS

It is recommended that monitor well GH-4 be resampled for purgeable aromatic compounds (EPA Method 602) to confirm the presence of benzene. Exclusive of the recommended resampling, future work at this site will depend on findings presented in the Risk Assessment Study being performed for this site. The study report should be available by early fall 1987.

REFERENCES

American Petroleum Institute, 1972. The Migration of Petroleum Products in Soil and Ground Water: Principles and Countermeasures: Publication No. 4149, p 36.

Bouwer, H., and R. C. Rice, 1976. A Slug Test for Determining Hydraulic Conductivity at Unconfined Aquifers with Complete or Partially Penetrating Wells: Water Resources Research 12(3), pp. 423-428.

Geraghty & Miller, Inc., 1983. Assessment of the Presence of Fuel in the Subsurface at Gas Hill, Jacksonville, Florida: Consultant's report prepared for the Department of the Navy.

Geraghty & Miller, Inc., 1985. Verification Study: Assessment of Potential Ground-Water Pollution at the Naval Air Station-Jacksonville, Florida: Consultant's report prepared for the Department of the Navy.

APPENDIX A

Lithologic Logs

375/14

LITHOLOGIC LOG FOR MONITOR WELL GH-2

Description	Depth (ft)	Thickness (ft)
Original monitor well GH-2 removed and borehole augered to 8.0 feet.....	0.0 - 8.0	8.0
Sand, fine to medium-grained, angular, gray, grading to dark brown.....	8.0 - 8.5	0.5
Clay, sandy, very stiff, bluish-gray, moist with minor iron staining, interbedded with fine to medium-grained, clayey sand.....	8.5 - 15.0	6.5

LITHOLOGIC LOG FOR MONITOR WELL GH-3

Description	Depth (ft)	Thickness (ft)
Fill, sandy soil, with plant roots.....	0.0 - 1.0	1.0
Sand, fine to medium-grained, angular, gray.....	1.0 - 5.0	4.0
Sand, clayey, fine to medium-grained, angular, brown intercalated with clay, sandy, very stiff, bluish-gray, with occasional iron-staining.....	5.0 - 14.0	9.0
Clay, very stiff, bluish-gray, intercalated with sand, white.....	14.0 - 15.0	1.0

LITHOLOGIC LOG FOR MONITOR WELL GH-4

Description	Depth (ft)	Thickness (ft)
Sand, clayey, fine-grained, brown to white	0.0 - 3.0	3.0
Clay, stiff, brown, trace organics.....	3.0 - 3.5	0.5
Sand, clayey, fine to medium-grained, white to brown, with shells intercalated with clay, stiff, brown, with organics....	3.5 - 7.5	4.0
Sand, clayey, medium-grained, angular, gray.....	7.5 - 13.5	6.0
Clay, very stiff, bluish-gray; intercalated with sand laminations.....	13.5 - 15.5	2.0

LITHOLOGIC LOG FOR MONITOR WELL GH-5

Description	Depth (ft)	Thickness (ft)
Sand, fine to medium-grained, clayey, brown to white.....	0.0 - 4.0	4.0
Sand, fine to medium-grained, angular, gray	4.0 - 8.0	4.0
Sand, clayey, fine to medium-grained, angular, gray, occasional iron staining...	8.0 - 15.0	7.0

APPENDIX B

ANALYTICAL RESULTS

COMPUCHEM
LABORATORIES

ANALYTICAL REPORT OF DATA
SUBMITTED TO:

Mr. Mike O'Hagan
Geraghty & Miller, Inc.
14310 N. Dale Mabry Hwy.
Suite 200
Tampa, FL 33618

CHRONICLE

ITEM NO.	SAMPLE IDENTIFIER	COMPUCHEM® NUMBER	DATE SAMPLE RECEIVED	DATE PURGABLE AROMATICS ANALYZED	DATE XYLENES ANALYZED
1.	GH-3-1	94701	07/31/86	08/01/86	08/01/86
2.	GH-5-1	94705	07/31/86	08/01/86	08/01/86
3.	GH-4-1	94703	07/31/86	08/01/86	08/01/86
4.	FIELDBLANK	94707	07/31/86	08/01/86	08/01/86

COMPOUND LIST - VOLATILE PURGABLE AROMATICS

SAMPLE IDENTIFIER: GH-3-1
COMPUCHEM® SAMPLE NUMBER: 94701

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1V.	BENZENE	BDL	1.0
2V.	TOLUENE	BDL	1.0
3V.	ETHYLBENZENE	BDL	1.0
4V.	CHLOROBENZENE	BDL	1.0
5V.	1,4-DICHLOROBENZENE	BDL	1.0
6V.	1,3-DICHLOROBENZENE	BDL	1.0
7V.	1,2-DICHLOROBENZENE	BDL	1.0
8V.	TOTAL XYLENES	BDL	1.0

BDL=BELOW DETECTION LIMIT

COMPOUND LIST - VOLATILE PURGABLE AROMATICS

SAMPLE IDENTIFIER: GH-4-1
COMPUCHEM® SAMPLE NUMBER: 94703

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1V.	BENZENE	55	1.0
2V.	TOLUENE	BDL	1.0
3V.	ETHYLBENZENE	BDL	1.0
4V.	CHLOROBENZENE	BDL	1.0
5V.	1,4-DICHLOROBENZENE	BDL	1.0
6V.	1,3-DICHLOROBENZENE	BDL	1.0
7V.	1,2-DICHLOROBENZENE	BDL	1.0
8V.	TOTAL XYLENES	BDL	1.0

BDL=BELOW DETECTION LIMIT

COMPOUND LIST - VOLATILE PURGABLE AROMATICS

SAMPLE IDENTIFIER: GH-5-1
COMPUCHEM® SAMPLE NUMBER: 94705

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1V.	BENZENE	BDL	1.0
2V.	TOLUENE	BDL	1.0
3V.	ETHYLBENZENE	BDL	1.0
4V.	CHLOROBENZENE	BDL	1.0
5V.	1,4-DICHLOROBENZENE	BDL	1.0
6V.	1,3-DICHLOROBENZENE	BDL	1.0
7V.	1,2-DICHLOROBENZENE	BDL	1.0
8V.	TOTAL XYLENES	BDL	1.0

BDL=BELOW DETECTION LIMIT

COMPOUND LIST - VOLATILE PURGABLE AROMATICS

SAMPLE IDENTIFIER: FIELDBLANK
COMPUCHEM® SAMPLE NUMBER: 94707

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1V.	BENZENE	BDL	1.0
2V.	TOLUENE	BDL	1.0
3V.	ETHYLBENZENE	BDL	1.0
4V.	CHLOROBENZENE	BDL	1.0
5V.	1,4-DICHLOROBENZENE	BDL	1.0
6V.	1,3-DICHLOROBENZENE	BDL	1.0
7V.	1,2-DICHLOROBENZENE	BDL	1.0
8V.	TOTAL XYLENES		

BDL=BELOW DETECTION LIMIT

COMPUCHEM LABORATORIES

ANALYTICAL REPORT OF DATA
SUBMITTED TO:

Mr. Mike O'Hagan
Geraghty & Miller, Inc.
14310 N. Dale Mabry Hwy.
Suite 200
Tampa, FL 33618

CHRONICLE

ITEM NO.	SAMPLE IDENTIFIER	COMPUCHEM® NUMBER	DATE SAMPLE RECEIVED	DATE SAMPLE EXTRACTED	DATE BASE/NEUTRAL FRACTION ANALYZED
1.	GH-3-1	94702	07/31/86	08/01/86	08/05/86

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLES

SAMPLE IDENTIFIER: GH-3-1
COMPUCHEM® SAMPLE NUMBER: 94702

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1B.	NAPHTHALENE	BDL	10
2B.	2-CHLORONAPHTHALENE	BDL	10
3B.	ACENAPHTHYLENE	BDL	10
4B.	ACENAPHTHENE	BDL	10
5B.	FLUORENE	BDL	10
6B.	PHENANTHRENE	BDL	10
7B.	ANTHRACENE	BDL	10
8B.	FLUORANTHENE	BDL	10
9B.	PYRENE	BDL	10
10B.	BENZO(A)ANTHRACENE	BDL	10
11B.	CHRYSENE	BDL	10
12B.	BENZO(B)FLUORANTHENE	BDL	10
13B.	BENZO(K)FLUORANTHENE	BDL	10
14B.	BENZO(A)PYRENE	BDL	10
15B.	INDENO(1,2,3-C,D)PYRENE	BDL	10
16B.	DIBENZO(A,H)ANTHRACENE	BDL	10
17B.	BENZO(G,H,I)PERYLENE	BDL	10

Surrogates Recoveries - Introduced at the beginning of the extraction, surrogate standards are deuterated and/or select compounds that analytically mimic the response of certain analytes. Known concentrations of these surrogates are added to the sample and a percent recovery is calculated. This recovery acts as a barometer of extraction efficiency and analytical response for the individual sample.

	%Recovery	Control Range%
D_5-Nitrobenzene	71	(41-120)
2-Fluorobiphenyl	91	(44-119)
D_{14}-Terphenyl	85	(33-128)
D_{10}-Pyrene*	97	*

BDL=BELOW DETECTION LIMIT
*Advisory Surrogate; therefore no control range.

QUALITY CONTROL SUMMARY

SAMPLE IDENTIFIER: GH-3-1
COMPUCHEM® SAMPLE NUMBER: 94702

BASE/NEUTRAL

	NUMBER	ACCEPTANCE CRITERIA
Blank	94793	OK
Blank Spike	92602	OK
Sample Spike	92601	**
DFTPP*	DG860804A07	OK
Shift Standard	BJ860804B07	OK

*The tuning calibration compound, Decafluorotriphenylphosphine, is used for the base/neutral instruments.

**See Quality Assurance Notice

QUALITY ASSURANCE NOTICE
Matrix Spike#92601 Original#92600
Blank Spike#92602 Fraction: Base/Neutral

All spike/surrogate recoveries were not within acceptance criteria for the quality control matrix spike associated with this sample. To comply with the Oct. 26, 1984 revision of the Federal Register 600-series methodologies, a blank spike was analyzed with this batch of samples, and all spike and surrogate recovery criteria were met. In addition, surrogate recoveries in the original sample (used to prepare the matrix spike) were comparable to those in the matrix spike.

We have attributed the unacceptable recoveries to the matrix of the original sample, since recoveries in the blank and blank spike prepared in this batch were acceptable. We are reporting these associated sample data with reference to this notice.

data reviewer JG

date 01/21/87

COMPUCHEM LABORATORIES

ANALYTICAL REPORT OF DATA
SUBMITTED TO:

Mr. Mike O'Hagan
Geraghty & Miller, Inc.
14310 N. Dale Mabry Hwy.
Suite 200
Tampa, FL 33618

CHRONICLE

ITEM NO.	SAMPLE IDENTIFIER	COMPUCHEM® NUMBER	DATE SAMPLE RECEIVED	DATE SAMPLE EXTRACTED	DATE BASE/NEUTRAL FRACTION ANALYZED
1.	GH-4-1	94704	07/31/86	08/01/86	08/05/86

QUALITY CONTROL SUMMARY

SAMPLE IDENTIFIER: GH-4-1
COMPUCHEM® SAMPLE NUMBER: 94704

BASE/NEUTRAL

	NUMBER	ACCEPTANCE CRITERIA
Blank	94793	OK
Blank Spike	94602	OK
Sample Spike	92601	**
DFTPP*	DG860804A07	OK
Shift Standard	BJ860804B07	OK

*The tuning calibration compound, Decafluorotriphenylphosphine, is used for the base/neutral instruments.
**See Quality Assurance Notice

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLES

SAMPLE IDENTIFIER: GH-4-1
COMPUCHEM® SAMPLE NUMBER: 94704

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1B.	NAPHTHALENE	BDL	10
2B.	2-CHLORONAPHTHALENE	BDL	10
3B.	ACENAPHTHYLENE	BDL	10
4B.	ACENAPHTHENE	BDL	10
5B.	FLUORENE	BDL	10
6B.	PHENANTHRENE	BDL	10
7B.	ANTHRACENE	BDL	10
8B.	FLUORANTHENE	BDL	10
9B.	PYRENE	BDL	10
10B.	BENZO(A)ANTHRACENE	BDL	10
11B.	CHRYSENE	BDL	10
12B.	BENZO(B)FLUORANTHENE	BDL	10
13B.	BENZO(K)FLUORANTHENE	BDL	10
14B.	BENZO(A)PYRENE	BDL	10
15B.	INDENO(1,2,3-C,D)PYRENE	BDL	10
16B.	DIBENZO(A,H)ANTHRACENE	BDL	10
17B.	BENZO(G,H,I)PERYLENE	BDL	10

Surrogates Recoveries - Introduced at the beginning of the extraction, surrogate standards are deuterated and/or select compounds that analytically mimic the response of certain analytes. Known concentrations of these surrogates are added to the sample and a percent recovery is calculated. This recovery acts as a barometer of extraction efficiency and analytical response for the individual sample.

	%Recovery	Control Range%
D_5-Nitrobenzene	66	(41-120)
2-Fluorobiphenyl	81	(44-119)
D_{14}-Terphenyl	65	(33-128)
D_{10}-Pyrene*	77	*

BDL=BELOW DETECTION LIMIT
*Advisory Surrogate; therefore no control range

QUALITY ASSURANCE NOTICE
Matrix Spike#92601 Original#92600
Blank Spike#92602 Fraction: Base/Neutral

All spike/surrogate recoveries were not within acceptance criteria for the quality control matrix spike associated with this sample. To comply with the Oct. 26, 1984 revision of the Federal Register 600-series methodologies, a blank spike was analyzed with this batch of samples, and all spike and surrogate recovery criteria were met. In addition, surrogate recoveries in the original sample (used to prepare the matrix spike) were comparable to those in the matrix spike.

We have attributed the unacceptable recoveries to the matrix of the original sample, since recoveries in the blank and blank spike prepared in this batch were acceptable. We are reporting these associated sample data with reference to this notice.

data reviewer JG

date 01/21/87

COMPUCHEM LABORATORIES

ANALYTICAL REPORT OF DATA
SUBMITTED TO:

Mr. Mike O'Hagan
Geraghty & Miller, Inc.
14310 N. Dale Mabry Hwy.
Suite 200
Tampa, FL 33618

CHRONICLE

ITEM NO.	SAMPLE IDENTIFIER	COMPUCHEM® NUMBER	DATE SAMPLE RECEIVED	DATE SAMPLE EXTRACTED	DATE BASE/NEUTRAL FRACTION ANALYZED
1.	GH-5-1	94706	07/31/86	08/01/86	08/05/86

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLES

SAMPLE IDENTIFIER: GH-5-1
COMPUCHEM® SAMPLE NUMBER: 94706

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1B.	NAPHTHALENE	BDL	10
2B.	2-CHLORONAPHTHALENE	BDL	10
3B.	ACENAPHTHYLENE	BDL	10
4B.	ACENAPHTHENE	BDL	10
5B.	FLUORENE	BDL	10
6B.	PHENANTHRENE	BDL	10
7B.	ANTHRACENE	BDL	10
8B.	FLUORANTHENE	BDL	10
9B.	PYRENE	BDL	10
10B.	BENZO(A)ANTHRACENE	BDL	10
11B.	CHRYSENE	BDL	10
12B.	BENZO(B)FLUORANTHENE	BDL	10
13B.	BENZO(K)FLUORANTHENE	BDL	10
14B.	BENZO(A)PYRENE	BDL	10
15B.	INDENO(1,2,3-C,D)PYRENE	BDL	10
16B.	DIBENZO(A,H)ANTHRACENE	BDL	10
17B.	BENZO(G,H,I)PERYLENE	BDL	10

Surrogates Recoveries - Introduced at the beginning of the extraction, surrogate standards are deuterated and/or select compounds that analytically mimic the response of certain analytes. Known concentrations of these surrogates are added to the sample and a percent recovery is calculated. This recovery acts as a barometer of extraction efficiency and analytical response for the individual sample.

	%Recovery	Control Range%
D_5-Nitrobenzene	72	(41-120)
2-Fluorobiphenyl	86	(44-119)
D_{14}-Terphenyl	80	(33-128)
D_{10}-Pyrene*	93	*

BDL=BELOW DETECTION LIMIT
*Advisory Surrogate; therefore no control range

QUALITY CONTROL SUMMARY

SAMPLE IDENTIFIER: GH-5-1
COMPUCHEM® SAMPLE NUMBER: 94706

BASE/NEUTRAL

	NUMBER	ACCEPTANCE CRITERIA
Blank	94793	OK
Blank Spike	92602	OK
Sample Spike	92601	**
DFTPP*	DG860814A07	OK
Shift Standard	BJ860804B07	OK

*The tuning calibration compound, Decafluorotriphenylphosphine, is used for the base/neutral instruments.
**See Quality Assurance Notice