N00213.AR.000562
NAS KEY WEST
5090.3a

SITE ASSESSMENT REPORT FOR CAROLINE AND WILLIAM STREETS REVISION 2 WITH TRANSMITTAL LETTER NAS KEY WEST FL
7/22/2002
TETRA TECH NUS

TETRA TECH NUS, INC.

AIK-02-0232

July 22, 2002

Project Number HK 3958 *via U.S. Mail*

Byas Glover (Code 18410)
Department of the Navy
SOUTHDIV NAVFACENGCOM
P.O. Box 190010
North Charleston, South Carolina 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0153

Subject: Site Assessment Report for Caroline and William Streets, Rev. 2,
Naval Air Facility Key West, Florida

Dear Mr. Glover:

TtNUS is pleased to submit the enclosed change slip pages for the final Site Assessment Report for Caroline and William Streets, Rev. 2, Naval Air Facility (NAF) Key West, Florida. These pages were produced in response to comments made by the Florida Department of Environmental Protection on 11 July 2002. Please replace these pages in your copy of the Rev. 1 report. An electronic copy of the complete report (designated as Rev. 2) is enclosed for your convenience. The Rev. 2 report includes the modified text from the enclosed change pages. I am not expecting to receive any more comments on this report. An additional copy of the enclosed report is being provided to NAF Key West for their transmittal to City of Key West officials for their use.

Please call me at (803) 649-7963, extension 345, if you have any questions regarding the enclosed report.

Sincerely,

C. M. Bryan
Project Manager

CMB:spc

Enclosure

c: Ms. Debbie Wroblewski (Cover Letter Only)
Ms. T. Vaught, FDEP
File: 3958-7.4.2
Mr. R. Courtright, NAS Key West (2 copies)
Mr. M. Perry/File

900 Trail Ridge Road, Aiken, South Carolina 29803
Tel 803.649.7963 Fax 803.642.8454
www.tetratech.com

Site Assessment Report
for
Caroline and William Streets

Naval Air Facility
Key West, Florida

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0153

July 2002

Rev. 2
7/22/02

SITE ASSESSMENT REPORT

AT

CAROLINE AND WILLIAM STREETS

NAVAL AIR FACILITY
KEY WEST, FLORIDA

COMPREHENSIVE PERFORMANCE
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0153

July 2002

PREPARED UNDER THE SUPERVISION OF:

CHUCK BRYAN
TASK ORDER MANAGER
TETRA TECH NUS, INC.
AIKEN, SOUTH CAROLINA

APPROVED FOR SUBMITTAL BY:

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

PROFESSIONAL CERTIFICATION

Site Assessment Report
Caroline and William Street, Key West
Key West, Florida

This Site Assessment Report was prepared under the direct supervision of the undersigned geologist using geologic and hydrogeologic principles standard to the profession at the time the report was prepared. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of additional information on the assessment described in this report. This report was developed specifically for the referenced site and should not be construed to apply to any other site.

Gary A. Braganza, P.G.
Florida License No. PG-0001822

7/19/02
Date

TABLE OF CONTENTS

SECTION **PAGE**

ACRONYMS/ABBREVIATIONS VII
EXECUTIVE SUMMARY ES-1
1.0 SITE DESCRIPTION AND BACKGROUND INFORMATION 1-1
1.1 SITE LOCATION AND CONDITIONS 1-1
1.2 SITE HISTORY 1-1
1.3 REMEDIATION ACTIVITIES 1-1
2.0 SITE ASSESSMENT METHODOLOGY 2-1
2.1 QUALITY ASSURANCE 2-1
2.2 SOIL BORING PROGRAM 2-2
2.2.1 Soil Core Sampling 2-2
2.2.2 Soil Headspace Screening 2-2
2.3 SOIL SAMPLING PROGRAM 2-3
2.4 MONITORING WELL INSTALLATION PROGRAM 2-3
2.4.1 Monitoring Well Locations 2-3
2.4.2 Shallow Monitoring Well Installation 2-3
2.4.3 Monitoring Well Development 2-3
2.5 GROUNDWATER SAMPLING PROGRAM 2-4
2.5.1 DPT Groundwater Screening 2-4
2.5.2 Monitoring Well Sampling 2-4
2.5.3 Natural Attenuation Parameter Sampling 2-5
2.6 AQUIFER CHARACTERIZATION PROGRAM 2-5
2.6.1 Well Top-of-Casing Survey 2-5
2.6.2 Static Water Level Measurements 2-5
2.6.3 Tidal Study 2-5
3.0 GEOLOGY AND HYDROGEOLOGY 3-1
3.1 SITE STRATIGRAPHY 3-1
3.2 SITE HYDROGEOLOGY 3-2
3.2.1 Static Water Level and Groundwater Elevations 3-2
3.2.2 Groundwater Flow Direction 3-2
3.2.3 Water Table Gradient 3-2
3.2.4 Hydraulic Conductivity 3-3
3.2.5 Groundwater Velocity 3-4
3.2.6 Potable Water Supply Well Survey 3-4
3.2.7 Tidal Influence 3-5
3.3 SURFACE WATER 3-5
4.0 SITE ASSESSMENT RESULTS 4-1
4.1 SOIL ASSESSMENT RESULTS 4-1
4.1.1 DPT Headspace Screening 4-1
4.1.2 Laboratory Soil Sample Analysis 4-1
4.2 GROUNDWATER ASSESSMENT RESULTS 4-2
4.2.1 DPT Assessment 4-2
4.2.2 Monitoring Well Sampling 4-2
4.3 NATURAL ATTENUATION SAMPLING 4-3
5.0 SITE INVESTIGATION SUMMARY 5-1
5.1 SOURCE OF HYDROCARBONS 5-1
5.2 SITE CONDITIONS 5-1
5.3 SOURCE REMOVAL 5-1
5.4 SOIL ASSESSMENT 5-1
5.5 GROUNDWATER ASSESSMENT 5-2

TABLE OF CONTENTS (CONTINUED)

SECTION **PAGE**

6.0 CONCLUSIONS AND RECOMMENDATION 6-1
REFERENCES R-1

APPENDICES
APPENDIX A SOURCE REMOVAL REPORT A-1
APPENDIX B FIELD DATA FORMS B-1
APPENDIX C LABORATORY ANALYTICAL REPORTS C-1
APPENDIX D TIDAL STUDY DATA D-1
APPENDIX E SPECIFIC CAPACITY TESTS E-1

LIST OF TABLES

TABLE **PAGE**

2-1 Monitoring Well Construction Details 2-7
3-1 Groundwater Elevation Summary, VOAS and Other Organics 3-6
4-1 Soil Headspace Analytical Results 4-4
4-2 Summary of Fixed-base Laboratory Soil Analytical Results – Metals, Total Combustible Organics, and Total Solids 4-5
4-3 Mobile Laboratory Groundwater Analytical Summary 4-6
4-4 Summary of Fixed-base Laboratory Groundwater Analytical Results, VOAs and Other Organics 4-7
4-5 Natural Attenuation Parameters Summary 4-8

LIST OF FIGURES

FIGURE **PAGE**

1-1 Regional Map 1-3
1-2 USGS Quadrangle Map 1-4
1-3 Site Vicinity Map 1-5
2-1 Soil Sampling and DPT Borehole Locations 2-8
2-2 Monitoring Well Locations 2-9
2-3 Typical Shallow Monitoring Well Construction Map 2-10
3-1 Groundwater Elevation Contour Map – August 22, 2001 3-7
3-2 Groundwater Elevations Contour Map – November 11, 2001 3-8
4-1 Soil Headspace Analytical Results - July 18-19, 2001 4-9
4-2 Fixed-based Laboratory Soil Analytical Results 4-10
4-3 Mobile Laboratory Groundwater Analytical Results, Naphthalene (μg/L) 4-11
4-4 Fixed-based Analytical Results - November 22, 2001 4-12
4-5 Fixed-based Laboratory Groundwater Analytical Results - November 11, 2001 4-13
4-6 Natural Attenuation Parameters in Groundwater - November 8, 2001 4-14

ACRONYMS/ABBREVIATIONS

bls	below land surface
BTEX	benzene, toluene, ethylbenzene, xylenes
CompQAP	Comprehensive Quality Assurance Plan
DPT	Direct Push Technology
EDB	ethylene dibromide
EPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
FID	flame ionization detector
FKAA	Florida Keys Aqueduct Authority
FL-PRO	Florida petroleum residual organics
GAC	granular-activated carbon
GCTL	groundwater cleanup target level
ID	inside diameter
KAG	Kerosene Analytical Group
µg/l	micrograms per liter
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
ml	milliliter
msl	mean sea level
MTBE	methyl-tert butyl ether
NAF	Naval Air Facility
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbon
PE	polyethylene
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
SAR	Site Assessment Report
SCTL	Soil Cleanup Target Level
SOP	Standard Operating Procedure
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SWL	Static water level
TOC	Total Organic Carbon

TOX	Total Organic Halogen
TRPH	total recoverable petroleum hydrocarbon
TtNUS	Tetra Tech NUS, Inc.
VOA	volatile organic aromatic

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc., has been authorized by Southern Division, Naval Facilities Engineering Command to prepare a Site Assessment Report (SAR) for Naval Air Facility Key West. This SAR has been prepared to evaluate soil and groundwater conditions at the intersection of Caroline and William Streets in Key West, Florida, at the location of a fuel spill that occurred in 1997 due to a leak in a valve of an underground fuel pipeline.

Site Assessment Activities

- Reviewed available Navy documents to collect historical information about the site, evaluate public and private potable wells, locate utility line areas, locate nearby surface water bodies, and assess surface hydrology and drainage;
- Conducted a preliminary assessment of soil and groundwater in the intersection of Caroline and William Streets and the immediate vicinity using Direct Push Technology (DPT) methods;
- Installed one DPT boring to 30 feet to evaluate the deeper zones of the surficial aquifer;
- Collected saturated soil samples from three locations for laboratory analysis of volatile organics, polynuclear aromatic hydrocarbons, total recoverable petroleum hydrocarbons, total organic carbon, total organic halogens, and Resource Conservation and Recovery Act (RCRA) metals;
- Installed four shallow permanent monitoring wells to approximately 12 feet below land surface;
- Collected groundwater samples from the permanent monitoring wells for laboratory analysis of volatile organic aromatics, polynuclear aromatic hydrocarbons, ethylene dibromide, total recoverable petroleum hydrocarbons, and lead;
- Conducted a tidal study to evaluate the effects of tidal influences on the movement of groundwater at the site.

Conclusions

- Native soils in the vadose zone were not present, due to a high water table at the site. Asphalt and road fill material occurred to a depth of approximately 1 foot over the native oolitic limestone. Native soils, therefore, occurred only in the saturated zone. Soils samples were collected from the 1 to 2-foot interval.

- Concentrations of petroleum contaminants detected in the saturated soil samples collected were representative of conditions in the groundwater and were not compared to SCTLs.
- Free product was not observed during the assessment activities at the site.
- Concentrations of petroleum contaminants of concern in site groundwater were below the groundwater cleanup target levels, as specified in Chapter 62-777, F.A.C.

Recommendation

Based on the hydrogeological and chemical data presented in this SAR and the requirements of Chapter 62-770, F.A.C., Tetra Tech NUS, Inc., recommends that a No Further Action status be granted for the site.

1.0 SITE DESCRIPTION AND BACKGROUND INFORMATION

Tetra Tech NUS, Inc., (TtNUS) under contract to the Department of Navy, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), is submitting this Site Assessment Report (SAR) documenting the findings of the site assessment performed near the intersection of Caroline and William Streets in downtown Key West, Florida. This SAR was prepared on behalf of the Navy under Contract No. N62467-94-D-0888, Contract Task Order 0153, and summarizes environmental assessment activities conducted by TtNUS at Caroline and William Streets.

1.1 SITE LOCATION AND CONDITIONS

Key West is located in southern Monroe County, Florida, approximately 150 miles southwest of Miami. The intersection of Caroline and William Streets is located in downtown Key West (Figure 1-1). The site lies at latitude 24º 33.607' and longitude 81º 48.061' within the southern part of Section 25 in Township 67 South and Range 24 East, as shown on the Key West, Florida, U.S. Geologic Survey Quadrangle Map (Figure 1-2). The intersection is surrounded by retail establishments and is a heavily traveled tourist thoroughfare.

1.2 SITE HISTORY

Between 1968 and 1969, underground 8-inch and 10-inch diameter diesel/Bunker C fuel oil lines were constructed to transfer fuel oil between Naval Air Facility (NAF) Key West's fuel storage facility at Trumbo Point Fuel Farm and the fuel storage facility constructed on Tank Island (Figure 1-3). The lines were installed under downtown Key West streets. A section of the 10-inch line ran along Caroline Street and through the intersection of William Street. In 1985, this line was deactivated, while the 8-inch diesel/Bunker C line remained in service.

In 1997, Bechtel Environmental Inc. was contracted by SOUTHDIV to close and abandon NAF's underground fuel pipelines on both Key West and Boca Chica. Closure activities involved integrity testing to determine the presence of holes or leaks in the lines. On November 1, 1997, fuel appeared in the street at the intersection of Caroline and William Streets while the Bunker C Number 6 integrity test was being conducted. A high point vent valve that was not identified on the drawings was suspected to have leaked, and as a result, fuel seeped up through the asphalt and into the street.

1.3 REMEDIATION ACTIVITIES

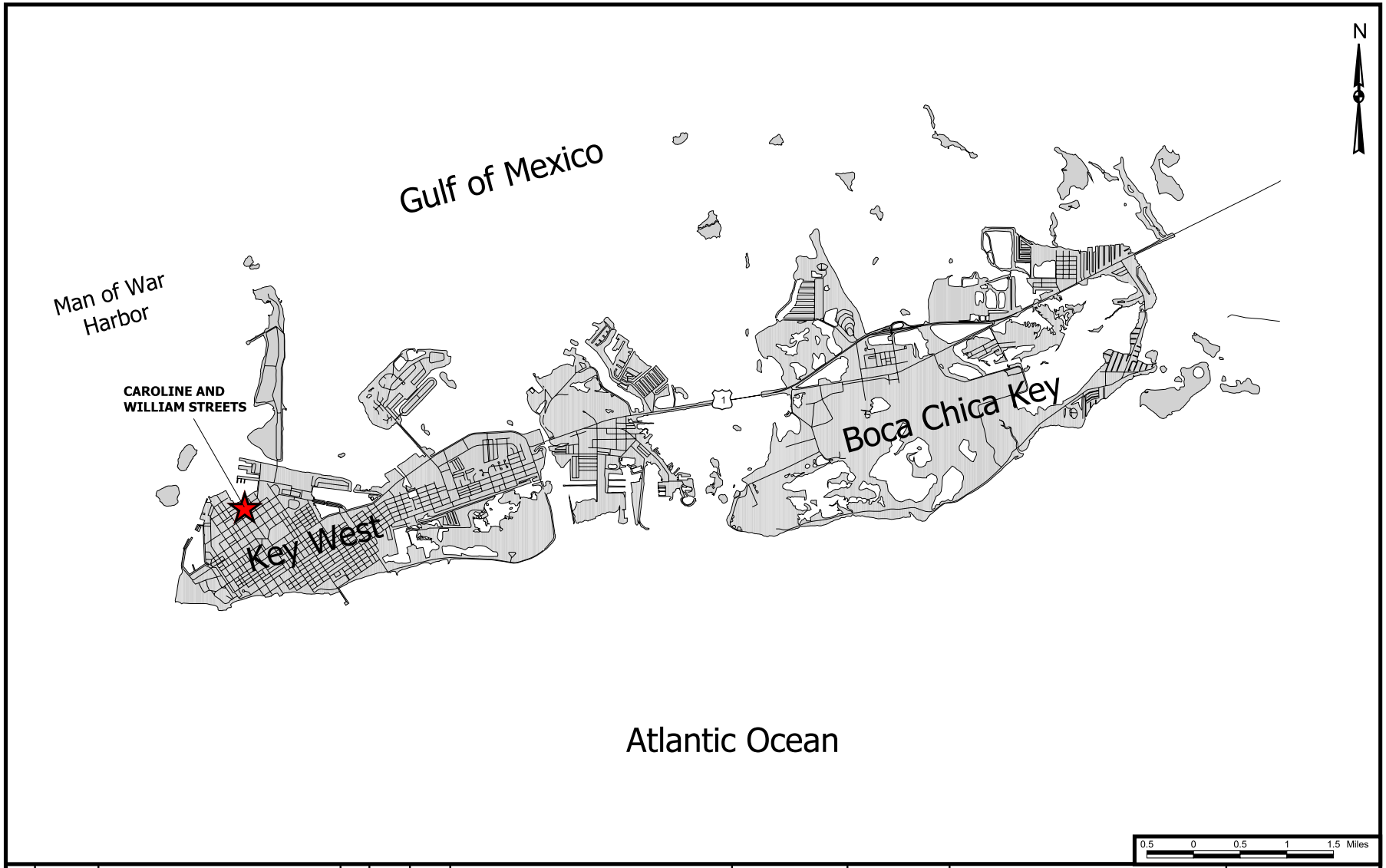
Bechtel and the Navy responded to the spill and performed emergency cleanup activities. Approximately 3,300 gallons of petroleum product were suspected to have been released. Approximately 3,000 gallons of product were recovered and 100 tons of contaminated soil were excavated and disposed. A Discharge

Reporting Form was filed with the Florida Department of Environmental Protection (FDEP) for the incident. The contaminated soil was excavated down to groundwater (approximately 2 to 3 feet below land surface [bls] at the time of excavation).

On December 18, 1997, during removal of a broken storm sewer line in the intersection of Caroline and William Streets, approximately 260 gallons of petroleum contact water and free product were recovered. In addition, approximately 25 tons of contaminated soils were excavated.

Between January 27 and 30, 1998, the intersection was again excavated to remove any remaining contaminated soils. The scope of the excavation was to be within the confines of the intersection and was not extended beyond the storm drain pipelines. All free product and groundwater encountered were also recovered with a vacuum truck. Approximately 550 gallons of petroleum contact water, 100 gallons of petroleum products, and 75 tons of contaminated soil were removed.

Following the incident, Bechtel prepared a Source Removal Report dated February 24, 1998 (Appendix A). The report includes laboratory results from samples collected from the excavations and the results of the headspace analysis. Soil manifests are also included in the 1998 report.



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
REGIONAL MAP
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1-1	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG1-1
DATE: 2/8/2002 BY: CM

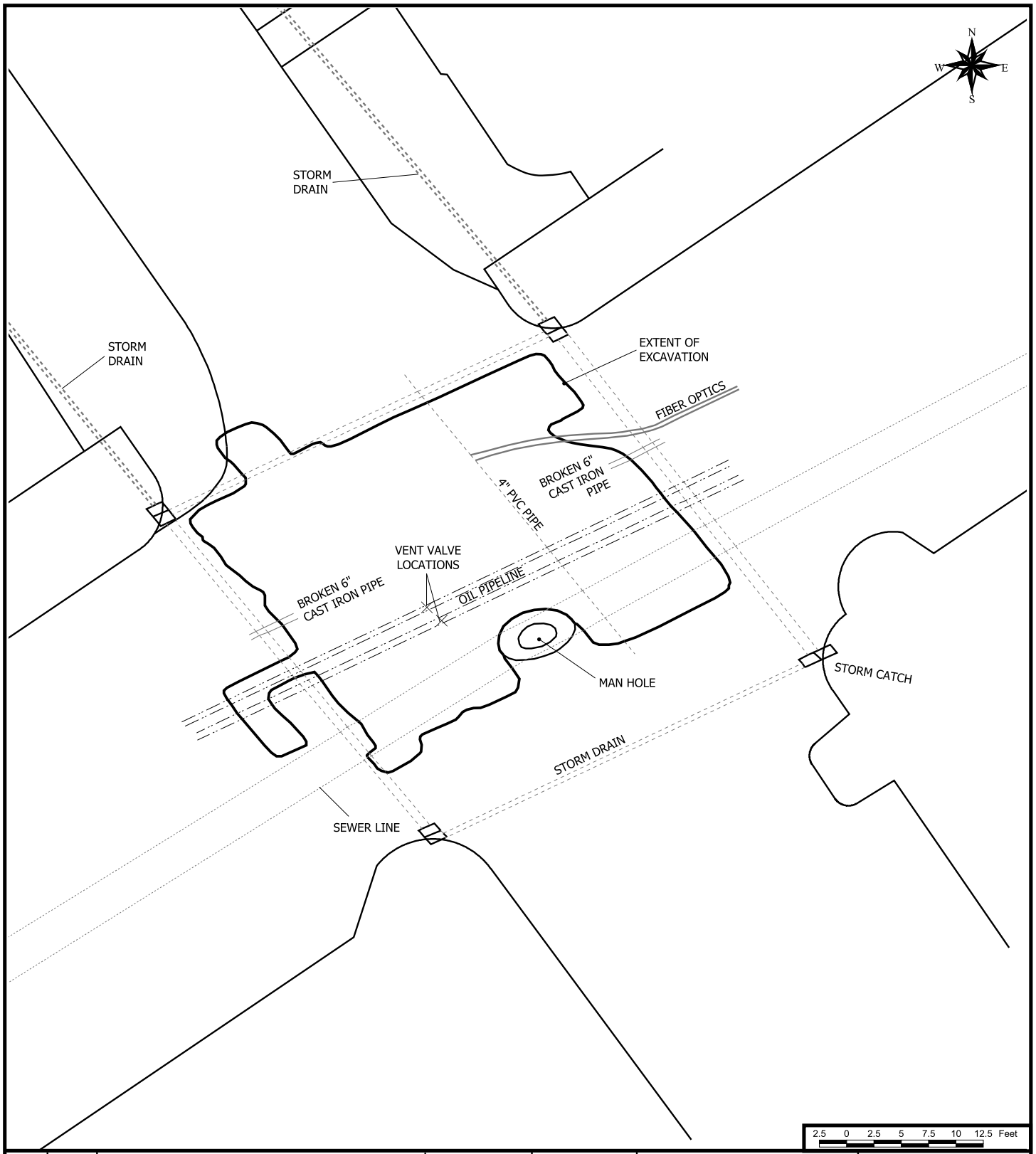
NO.	DATE	REVISIONS

DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
USGS QUADRANGLE MAP
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1-2	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG1-2
DATE: 2/8/2002 BY: CM



NO.	DATE	REVISIONS

DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
SITE VICINITY MAP
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1-3	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG1-3
DATE: 2/8/2002 BY: CM

2.0 SITE ASSESSMENT METHODOLOGY

Site assessment activities were conducted at Caroline and William Streets in 2001. A Direct Push Technology (DPT) investigation was conducted as the initial investigation to define the horizontal and vertical extent of contamination at the site. The borings were placed in the former excavation area and adjacent to areas west along Caroline Street and north along William Street that had elevated total recoverable petroleum hydrocarbons (TRPH) and headspace levels during the 1998 source removal event (Appendix A). Soil samples were collected during this investigation for laboratory analysis and headspace screening. Groundwater samples were collected for onsite laboratory analysis. After this initial investigation was completed, monitoring wells were installed at the site. Groundwater samples were collected for off-site laboratory analysis and evaluation of natural attenuation parameters. Data collected during the monitoring well elevation survey, static water level measurements, and tidal study, along with referenced specific capacity test data (conducted at a site in Boca Chica), were used to evaluate aquifer properties at the site. The results of the site assessment are discussed in Chapters 3.0 and 4.0.

2.1 QUALITY ASSURANCE

The site assessment investigation was conducted in accordance with the Standard Operating Procedures (SOP) prescribed by the FDEP Quality Assurance Section Document DER-001/92, and adopted by the TtNUS Comprehensive Quality Assurance Plan (CompQAP) Number 980038. Equipment used to advance the soil borings, install monitoring wells, and collect soil or groundwater samples was decontaminated prior to and following each use, according to TtNUS CompQAP. Rinse water generated during the decontamination of equipment was containerized in labeled 55-gallon drums, sampled, and removed for proper disposal. Organic vapor measurements were made with a Heath Porta-flame ionization detector (FID) II. Prior to each day's activities, the FID was field calibrated with 100-parts per million (ppm) methane in air span gas, in accordance with manufacturer directions.

Groundwater sampling activities were performed in accordance with the procedures prescribed in the FDEP Quality Assurance Section's Standard Operating Procedures for Laboratory Operations and Sample Collection Activities, (DER-001/92), adopted by the TtNUS CompQAP. Groundwater samples were collected in pre-preserved containers obtained from Katahdin Analytical Services. As part of the groundwater sampling event, quality control samples (i.e., equipment blanks and trip blanks) were prepared and submitted to the laboratory as required by the approved CompQAP. Sampling activities were documented in a site-specific field logbook and samples were transmitted under chain-of-custody protocols to the laboratory.

2.2 SOIL BORING PROGRAM

The soil screening investigation was conducted at Caroline and William Streets to evaluate the extent of petroleum impact on site soils previously detected in samples collected during the soil excavation in January 1998. The soil screening investigation was conducted by installing 18 soil borings (TW-1 through TW-18), using a hand auger. The hand-augered borings were completed prior to DPT installations at each location (Figure 2-1). Soil samples from the hand-augered borings were collected for headspace screening with an FID. During the DPT field investigation, each soil boring was advanced below the water table in order to collect groundwater samples for mobile laboratory screening. Groundwater screening activities are discussed in Section 2.5.1.

2.2.1 Soil Core Sampling

Soil borings for the preliminary assessment were advanced with a hand auger. Due to the high water table, groundwater occurred at approximately 0.50 to 0.75 feet bls during the investigation. Native soils (oolitic limestone) occurred at approximately 1 foot bls and were saturated. The material above the native soils consisted of asphalt, road base fill material, and crushed rock. Soil samples were not collected from the fill material, due to its proximity to the road surface and the increased potential of contamination from above. Unsaturated native soils, therefore, did not exist at the site during the assessment. The soil borings were advanced approximately 2 feet into the subsurface and saturated samples were collected in the 1- to 2-foot interval at each location. The site geologist logged the soil properties, including texture, color, and soil moisture for each soil core and noted whether staining or odors were present. Soil boring logs are provided in Appendix B.

2.2.2 Soil Headspace Screening

Soil samples were collected at the 1-to 2-foot interval from each location for headspace screening in accordance with the procedures outlined in Section 62-770.200, F.A.C. The samples were saturated; however, they represented the first occurrence of native soils in the subsurface. From the interval, two 16-ounce glass jars were half-filled with soil sample, sealed with aluminum foil, and labeled. The soil samples were allowed to equilibrate to ambient air temperature. The FID response to total headspace organic vapors was measured by inserting the FID probe through the foil sample cover and recording the highest instrument reading. If a positive response was observed when screening the first sample jar, a filtered instrument reading was made from the second soil sample jar. A granular-activated carbon (GAC) filter was attached to the instrument and a headspace organic vapor measurement was made from the second soil sample. The GAC filter adsorbs heavier organic vapors (such as petroleum hydrocarbons), but allows lighter, naturally occurring organic vapors (such as methane) to be detected by the FID. The filtered concentration was subtracted from the total vapor concentration to determine the corrected FID response.

2.3 SOIL SAMPLING PROGRAM

Three soil samples were collected from the 1 to 2 foot interval at the site for fixed-base laboratory analysis to confirm results of the headspace screening. Samples were collected from the borings with the highest FID readings. The samples were saturated and not representative of vadose zone soils. The Soil samples were analyzed for volatile organic aromatics (VOAs) by U.S. Environmental Protection Agency (EPA) Method 8021, polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8310, TRPH by the Florida petroleum residual organics (FL-PRO), Total Organic Carbon (TOC), Total Organic Halogens (TOX) and Resource Conservation and Recovery Act (RCRA) metals. The laboratory analytical report is included in Appendix C.

2.4 MONITORING WELL INSTALLATION PROGRAM

Following the DPT investigation, four shallow monitoring were installed at the site. These were used for groundwater sampling and collecting data to evaluate aquifer properties.

2.4.1 Monitoring Well Locations

Screening data obtained during the DPT investigation were evaluated to determine the optimum numbers and locations for the wells. Monitoring well placements were selected to provide spatial coverage around the area of the release (Figure 2-2).

2.4.2 Shallow Monitoring Well Installation

The monitoring well borings were drilled with a truck-mounted drill rig and 4.25-inch inside diameter (ID) hollow-stem augers. Each well was constructed of 2-inch-ID, flush-threaded, schedule 40 polyvinyl chloride (PVC) riser, and 0.010-inch-slot well screen with a 6-inch point cap. The shallow wells were installed to approximately 12 feet bls with a 10-foot screen in accordance with a FDEP Memo dated August 16, 1993 which states that installing the top of screen less than two feet bls is not recommended. The annulus around each well was filled to approximately 1 foot above the top of the screen with U.S. Standard Sieve size 20/30 silica sand, followed by a 0.5 foot 30/65 fine sand seal. The remainder of the annulus was grouted to the surface. Each well was secured with a locking, watertight cap within a steel, 8-inch-diameter steel manhole. The manhole was set in a 24-inch-square concrete apron finished slightly above grade. A typical shallow well installation is illustrated on Figure 2-3. Monitoring well construction details are summarized in Table 2-1 and the monitoring well completion diagrams are provided in Appendix B.

2.4.3 Monitoring Well Development

Each monitoring well was developed by using a diaphragm or centrifugal pump. The wells were developed until the purge water became clear and approximately 20 gallons had been removed. Development water

and soil cuttings from the site were stored in labeled 55-gallon drums and immediately removed offsite by Navy personnel for disposal.

2.5 GROUNDWATER SAMPLING PROGRAM

During site assessment activities, groundwater samples were collected from soil borings advanced during the DPT screening investigation and from monitoring wells. Groundwater samples collected during the DPT investigation were analyzed in an on-site mobile laboratory. Groundwater samples collected from the monitoring wells were submitted to an offsite laboratory to be analyzed for petroleum constituents. Selected groundwater samples were analyzed for natural attenuation parameters at the offsite laboratory.

2.5.1 DPT Groundwater Screening

The groundwater screening investigation was conducted at Caroline and William Streets to evaluate the extent of petroleum impact on site groundwater, as previously detected during soil excavation and screening activities conducted in 1998. The borings were placed in the excavation and along Caroline and William Streets, where elevated levels of TRPH and headspace readings were detected. During the preliminary assessment, 19 soil borings (TW-1 through TW-18 and TW7D) were advanced using DPT methods for collection of groundwater samples (Figure 2-1). Each soil boring was advanced approximately 5 to 6 feet into the water table to collect groundwater samples for mobile laboratory screening. Soil boring TW-7D was advanced to a depth of 30 feet to evaluate the deeper zone of the surficial aquifer.

Groundwater samples were collected from small-diameter temporary wells installed at each soil boring location. A length of polyethylene (PE) tubing was inserted to the bottom of the temporary well screen. The PE tubing was connected to a peristaltic pump and several screen volumes were removed from the temporary well to decrease the amount of suspended sediment in the groundwater samples. After sufficient purging, groundwater samples were collected by directing the peristaltic pump discharge directly into 40-milliliter (ml) vials.

Groundwater samples were delivered to the on-site mobile laboratory and analyzed for diesel range organics and the 8100 PAH list (EPA Method 8081A).

2.5.2 Monitoring Well Sampling

Samples were collected from site monitoring wells to evaluate groundwater quality in the shallow surficial aquifer in the vicinity of the fuel leak. These samples were collected using the low-flow quiescent purging and sampling method. New Teflon® tubing was installed in each well, for groundwater sampling. Approximately five well volumes were removed from each well using a peristaltic pump and Teflon® tubing. Temperature, pH, specific conductance, dissolved oxygen concentration, and sample turbidity were monitored while the wells were purged. The field measurements and well purge volumes were recorded

during well purging and at the time of sample collection. Groundwater sample log sheets are provided in Appendix B.

Groundwater samples were analyzed for the Kerosene Analytical Group (KAG), consisting of VOAs (EPA Method 8021B), PAHs (EPA Method 8310), ethylene dibromide (EDB) by EPA Method 504.1, TRPH (FL-PRO), and lead (EPA Method 239.2). The groundwater samples were placed on ice and shipped to Katahdin Analytical Services in Westbrook, Maine, for analysis. Groundwater laboratory analytical reports are presented in Appendix C.

2.5.3 Natural Attenuation Parameter Sampling

During the groundwater sampling event, additional samples were collected from selected monitoring wells to provide data to evaluate the potential for naturally occurring biodegradation of petroleum constituents at the site. These samples were analyzed for methane and anions. Laboratory data for natural attenuation parameters is included in Appendix C.

2.6 AQUIFER CHARACTERIZATION PROGRAM

Data were collected during the site investigation to evaluate the movement of groundwater at the site. Groundwater elevations were determined from static water level measurements and a well top-of-casing elevation survey.

2.6.1 Well Top-of-Casing Survey

A reference point was marked on the top of each monitoring well casing on the north side. The elevations of the reference points were surveyed to the nearest 0.01-foot by the surveyor, Frederick Hildebrandt, Key West, Florida. The field survey data is included in Appendix B.

2.6.2 Static Water Level Measurements

Depth-to-groundwater measurements were made in site monitoring wells during August and November 2001. Measurements were made from the reference points marked on the tops of well casings, using an electronic water level indicator. Static water level measurements were made to the nearest 0.01-foot. Groundwater elevations were calculated from the top-of-casing survey elevations and the static water level measurements.

2.6.3 Tidal Study

A tidal study was conducted at one monitoring well to determine the presence of tidal fluctuations in the area. Well CW-MW-03 was chosen because it is outside the former excavation area. The tidal study was

used to measure fluctuations in periodic rises and falls of surrounding waters to determine the impact on the surficial aquifer in the site vicinity.

Prior to conducting the test, the monitoring well was opened and allowed to equilibrate to ambient conditions. Once the well had stabilized, static water level was recorded and used to calculate the height of the water column in the well. A submersible data logger, the In-Situ MiniTroll, was then installed in the well and the water level was allowed to restabilize. The lead wire from the data logger was secured to the well to ensure that the data logger remained at a constant depth during the test. The data logger was connected to a computer to begin the test and start recording water levels in the well. It was programmed to record water levels every 20 seconds. The test was allowed to run for a period of 48 hours to ensure that any fluctuations would be recorded. The tidal study data and graphical representation are presented in Appendix D.

Water-level data recorded in monitoring well CW-MW-03 during the tidal study indicate the tidal cycle is semi-diurnal (two high tides and two low tides in a 24-hour period). The static water level recorded by the submersible data logger varied by greater than one foot during a single cycle. Results were consistent throughout the 48-hour test period. During low tides, static water levels recorded were at the highest elevation. Likewise, high tides produced the greatest depths to water, indicating that the groundwater fluctuation is approximately six to seven hours behind the tide cycle.

3.0 GEOLOGY AND HYDROGEOLOGY

Data collected during the site assessment were used to evaluate geologic and hydrogeologic conditions at the site that may influence the fate and transport of hydrocarbons released to the environment. Lithology and stratigraphy were described for the shallow surficial aquifer at the site. Aquifer properties evaluated as part of the site assessment included depth to groundwater and groundwater elevation, groundwater flow direction and gradient, and tidal influence in the area.

The lower Keys, which are within the southern geomorphic division of Florida, were formed during the Pliestocene Era. The Keys are known as the “Oolitic Keys”, a reference to the Oolitic Member of the Miami Limestone. The Oolitic Member consists of variably sandy, fossiliferous limestone composed primarily of ooids. The Oolitic Member is divided into two lithofacies: an ooid calcarenite and an oomoldic-recrystalline facies. The Key Largo Limestone underlies the Miami Limestone. The Key Largo Limestone is a light-gray to light-yellow coralline limestone comprised of coral heads encased in a matrix of calcarenite. In the Key West area, the Miami Limestone is approximately 27 feet thick and the Key Largo limestone is more than 270 feet thick (BRE, 1997).

The surficial aquifer system present in the lower Keys is an unconfined, porous, highly permeable solution-riddled unit, as described above. Rainfall recharge seeps quickly into the ocean and saltwater intrusion is common. The water table ranges in depth from less than 1 foot to approximately 2.5 feet below mean sea level (msl) and fluctuates diurnally due to tidal effects. The surficial aquifer is non-potable and is classified as low yield/poor quality.

Key West lies in the southeastern Coastal Plain physiographic province. A series of Pliestocene marine reefs controls the topography of the Coastal Plain in southern Florida (ABB-ES, 1995). The topography of Key West is generally flat. Average land surface elevations are less than 5 feet above msl. Drainage on the Key is toward the Atlantic Ocean and Gulf of Mexico, which completely surround the Key. Both bodies of water are classified as Class G-III Waters in the vicinity of the Florida Keys, meaning the groundwater has no reasonable potential as a future source of drinking water.

3.1 SITE STRATIGRAPHY

Interpretation of site lithology and stratigraphy was based on visual examination of soil cores collected from soil borings during the DPT investigation and drill cuttings observed during the monitoring well installation.

The site surface is asphalt, which is underlain by approximately 1 foot of road base fill material consisting of crushed limestone. Beneath the fill material are native sediments, composed predominantly of light-brown-to-beige-to-white, sandy, oolitic limestone with some shell fragments. The material ranges from moderately

consolidated to hard, and is moderately to highly weathered with intergranular and moldic porosity. This lithology extends to at least 12 feet bls, which was the maximum depth drilled during the investigation. Due to the homogeneity of the subsurface, no lithologic cross-section was constructed. Soil boring logs are included in Appendix B.

3.2 SITE HYDROGEOLOGY

Hydrogeologic data were collected during the site assessment to evaluate movement of groundwater in the shallow surficial aquifer at the site. Depth to groundwater and groundwater elevation were used to determine the groundwater flow direction and water table gradient at the site. Hydraulic conductivity and transmissivity for the shallow surficial aquifer were obtained from data of specific capacity tests conducted during a previous investigation on Boca Chica. Groundwater flow velocity at the site was estimated from the hydraulic conductivity and gradient data.

3.2.1 Static Water Level and Groundwater Elevations

Static water level (SWL) data were collected from site monitoring wells during two gauging events, on August 22 and November 8, 2001. SWL measurements in the shallow wells ranged from 1.59 to 1.94 feet on August 22 and from 0.75 to 1.24 feet on November 8, 2001 (Table 3-1).

The SWL data and the relative elevations from the well top-of-casing survey were used to determine a relative groundwater elevation at each well for the two gauging events (Table 3-1).

3.2.2 Groundwater Flow Direction

To evaluate the direction of groundwater flow at the site, the groundwater elevations were plotted on site maps for each gauging event (Figures 3-1 and 3-2). Groundwater elevation isocontours were calculated from the plotted data. Groundwater flow direction is predicted to be perpendicular to the elevation isocontours. Interpretation of data from the August 2001 gauging event indicated a south-southwest flow, while the November 2001 event indicated a flow due north (Figures 3-1 and 3-2). This pattern of groundwater movement is indicative of tidal influence on the surficial aquifer.

3.2.3 Water Table Gradient

The average horizontal groundwater gradient across the site was calculated for each gauging event from the groundwater elevations measured in shallow monitoring wells and the estimated groundwater flow direction.

The groundwater flow gradient was determined by using the following equation:

$$I = \frac{h_1 - h_2}{d}$$

Where:

I = the hydraulic gradient

h_1 = the water elevation at point 1, the highest value

h_2 = the water elevation at point 2, the lowest value

d = the horizontal distance between point 1 and point 2, parallel to the direction of groundwater flow

The highest and lowest groundwater elevation values measured in shallow monitoring wells during each gauging event were used to determine the difference in groundwater elevation across the site. The horizontal distance between the high and low groundwater elevation points was measured parallel to the estimated groundwater flow direction.

On August 22, 2001, the groundwater elevation in CW-MW02, 1.11 feet, was the highest value and the groundwater elevation in CW-MW04, 0.74 feet, was the lowest value. The horizontal distance parallel to groundwater flow was 33 feet. These data indicate an average hydraulic gradient of 0.0112 feet/foot.

On November 11, 2001, the groundwater elevation in CW-MW03, 1.93 feet, was the highest value and the groundwater elevation in CW-MW02, 1.75 feet, was the lowest value. The horizontal distance parallel to groundwater flow was 30 feet. These data indicate an average hydraulic gradient of 0.0060 feet/foot.

The arithmetic mean of the two calculated gradient values is 0.0086 feet/foot.

3.2.4 Hydraulic Conductivity

Hydraulic conductivity values for the site were obtained from specific capacity tests conducted at the Jet Engine Test Cell site (SWMU 9) located at the NAF on Boca Chica (ABB, 1994). The results from this location were considered suitable to use for the Caroline and William Streets site because the lithology and well construction details were similar. The hydraulic conductivity (K) in the test was calculated using the Bouwer and Rice (1976) and Bouwer (1989) methods for partially penetrating wells screened in unconfined aquifers. The average K value (calculated from the data collected from two wells) was estimated to be 0.72 ft/day. The specific capacity test data is presented in Appendix E.

3.2.5 Groundwater Velocity

Potential movement of groundwater at the site may be described in terms of transportation by natural flow in the saturated zone, while assuming that groundwater flow follows Darcy's Law. Darcy's Law may be expressed as:

$$V = \frac{(K \times I)}{n}$$

Where:

V = average seepage velocity
K = hydraulic conductivity
n = effective porosity
I = average hydraulic gradient

Data from soil borings advanced during the DPT investigation indicate that oolitic limestone is the typical lithology at the site. Review of standard literature suggests that a representative effective porosity for weathered to oolitic limestone is approximately 30 percent (Davis and Deweist, 1966).

Using a hydraulic conductivity of 0.72 feet/day, the mean hydraulic gradient of 0.0086 feet/foot, an inferred effective porosity value of 0.30, and Darcy's Law, the groundwater seepage velocity across the site was calculated at 0.0206 feet/day.

3.2.6 Potable Water Supply Well Survey

No freshwater public or registered domestic wells are in use on NAF Key West (ABB-ES, 1995). Some residences in Key West have wells that withdraw water from the surficial aquifer for non-potable uses. The Florida Keys Aqueduct Authority (FKAA) operates and maintains the Florida Keys Aqueduct, which supplies potable water to all of the Keys. This water is drawn from wells near Florida City in southeastern Dade County. It is pumped 130 miles through a water main that parallels U.S. Highway 1 and terminates in Key West. The Monroe County Health Department recognizes the public water supply as the only potable water source available in Key West.

Alternative sources of potable water and non-potable water used in the Keys include private cisterns, private wells utilizing reverse osmosis, home desalination systems, and bottled water. The number of people who may be using water from these alternative sources is unknown. The best estimate of the number of people using local groundwater for non-potable domestic purposes is less than 500.

3.2.7 Tidal Influence

The data collected during the tidal survey conducted on monitoring well CW-MW-03 revealed two tidal cycles during a 24-hour period. The cycle during the day had a fluctulation of 0.39 ft in water level, while the night cycle was 1.1 foot. This data suggests that there is a tidal influence on the surficial aquifer at the site. The data from the tidal survey is provided in Appendix D.

3.3 SURFACE WATER

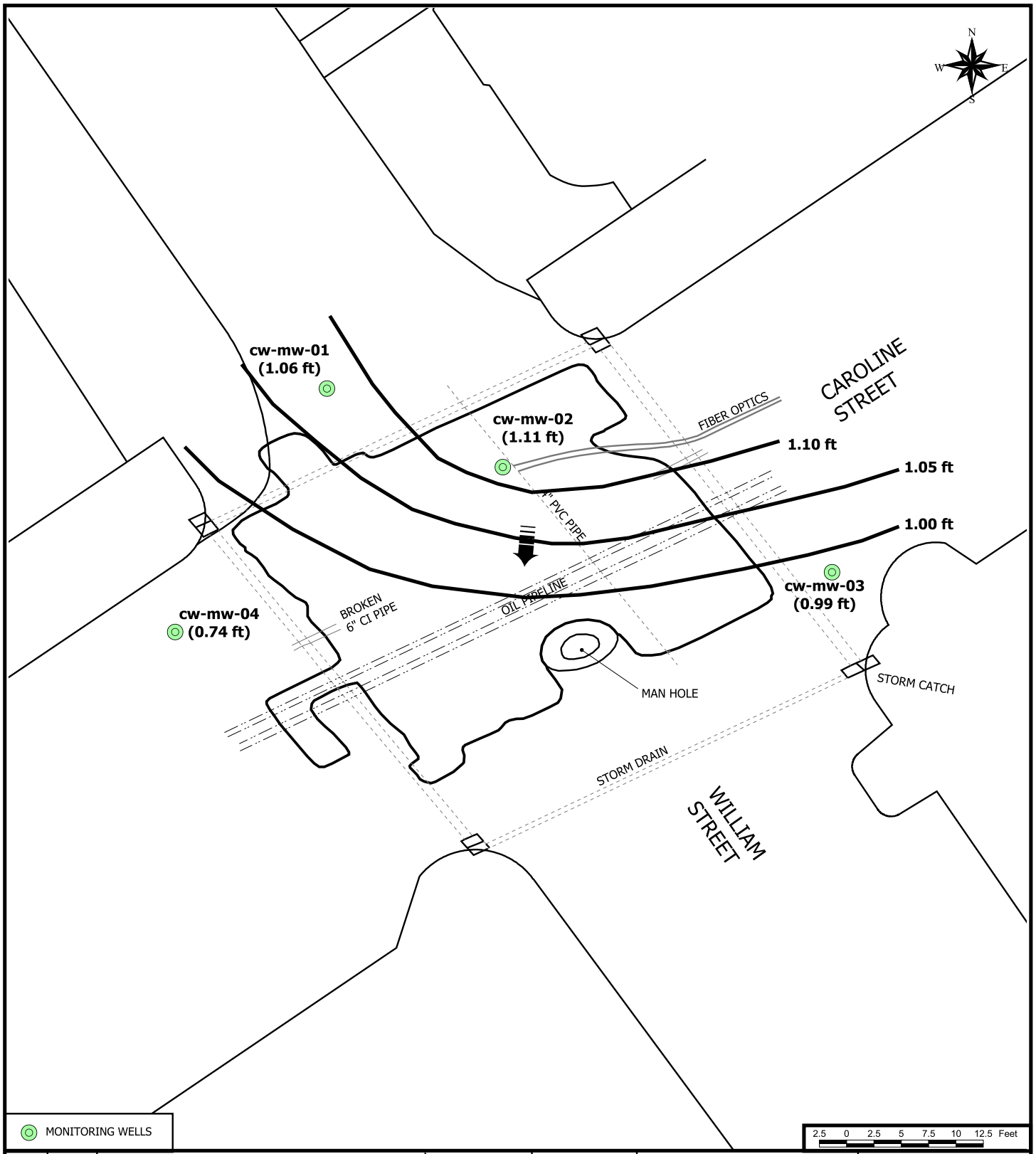
There are no naturally occurring surface water bodies in the immediate vicinity of the site. The Key West Bight is located approximately 500 feet to the north. Storm water drainage in the vicinity of the site occurs via the City of Key West sewer systems. Drainage grates are located on all four corners of the Caroline and William Streets intersection. Drainage in the area is poor and water collects on the surface after episodes of heavy rainfall, flooding the street.

TABLE 3-1

GROUNDWATER ELEVATION SUMMARY
VOAS AND OTHER ORGANICS
CAROLINE AND WILLIAM STREET SITE ASSESSMENT REPORT
NAVAL AIR FACILITY
KEY WEST, FLORIDA

Well No.	**CW-MW01**			**CW-MW02**			**CW-MW03**			**CW-MW04**		
Well Diameter	2 inch			2 inch			2 inch			2 inch		
Well Depth	12.00			12.00			12.00			12.00		
Screened Interval	2.00-12.00			2.00-12.00			2.00-12.00			2.00-12.00		
TOC Elevation	3.00			2.70			2.77			2.59		
Date	**ELEV**	**DTW**	**FP**	**ELEV**	**DTW**	**FP**	**ELEV**	**DTW**	**FP**	**ELEV**	**DTW**	**FP**
8/22/2001	1.06	1.94	ND	1.11	1.59	ND	0.99	1.78	ND	0.74	1.85	ND
11/8/2001	1.76	1.24	ND	1.75	0.95	ND	1.93	0.84	ND	1.84	0.75	ND

NOTES: Measurements in feet
TOC elevations surveyed 7/27/00 using arbitrary 20 ft. datum
TOC Top-of-Casing
ELEV elevation
DTW Dept to Water
FP Free Product thickness
ND Not Detected



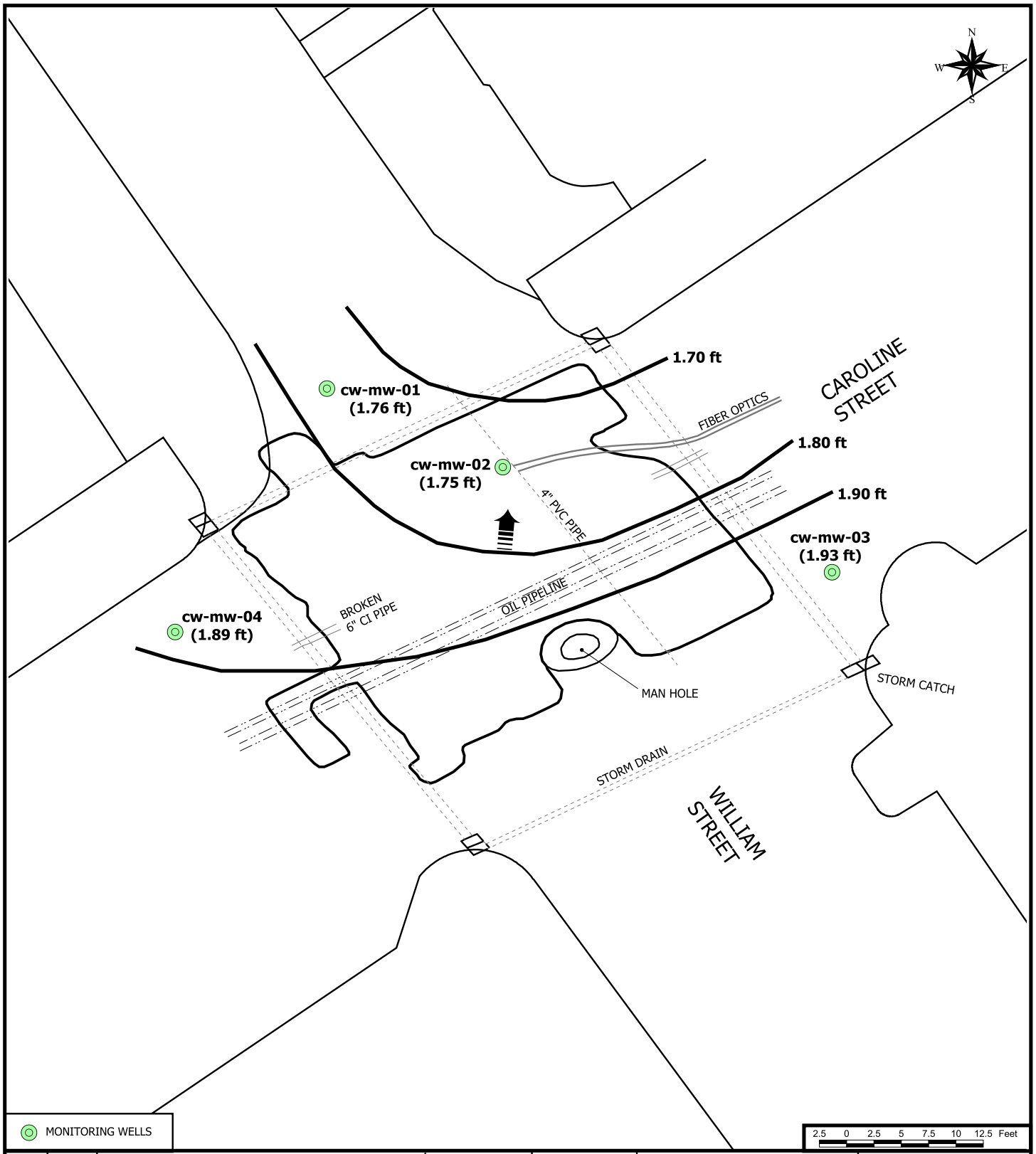
NO.	DATE	REVISIONS

DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
GROUNDWATER ELEVATION
CONTOUR MAP
AUGUST 22, 2001
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-1	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG 3-1
DATE: 2/8/2002 BY: CM



NO.	DATE	REVISIONS

DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
GROUNDWATER ELEVATIONS
CONTOUR MAP
NOVEMBER 11, 2001
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-2	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG 3-2
DATE: 2/8/2002 BY: CM

4.0 SITE ASSESSMENT RESULTS

Soil samples were collected at Caroline and William Streets for headspace screening and/or laboratory analysis. The headspace screening results collected from saturated samples were evaluated following the appropriate Section 62-770.200, F.A.C. guidelines. Since no vadose zone soils are present at the site the results of the saturated soil analyses were representative of groundwater concentration and a comparison to Florida Soil Cleanup Target Levels (SCTLs) was not considered appropriate. Groundwater samples were collected at Caroline and William Streets during the groundwater assessment. The results of groundwater analyses were compared to the Florida Groundwater Cleanup Target Levels (GCTLs) listed in Chapter 62-777, F.A.C. Table 1.

Natural attenuation parameters were measured from selected wells during the groundwater sampling event.

4.1 SOIL ASSESSMENT RESULTS

4.1.1 DPT Headspace Screening

A DPT investigation was conducted to estimate the extent of petroleum-impacted soil at the site. Native vadose zone soils do not exist at the site, due to a high water table; therefore, native soils (saturated) nearest to the surface (1-to 2-foot interval) were evaluated for headspace screening. A summary of soil organic vapor analyzer (OVA) screening results are presented in Table 4-1. Soil boring locations and vapor readings are depicted on Figure 4-1.

Soils with a significant headspace screening response (> 10 ppm) were encountered in two of the borings advanced during the DPT investigation. Headspace screening responses in excess of 50 ppm were not detected in any of the samples collected. (Figure 4-1).

4.1.2 Laboratory Soil Sample Analysis

During the DPT investigation, three saturated soil samples (CWKW-SS-SB03-001, CWKW-SS-SB04-001, and CWKW-SS-SB10-001) were collected for analysis by a fixed-based laboratory. The samples were collected from TW-03, TW-04, and TW-10, the three borings that exhibited the highest headspace screening results (Figure 4-1). The samples were analyzed for the KAG constituents, and TOC, TOX, and RCRA metals for soil disposal criteria. Laboratory analytical reports can be found in Appendix C.

TRPH was reported in saturated soil samples CWKW-SS-SB03-001, CWKW-SSSB04-001, and CWKW-SS-SB10-001 at levels of 1,300 milligrams per kilogram (mg/kg), 3,200 mg/kg, and 2,400 mg/kg, respectively. The PAH compounds acenaphthene, benzo(a)anthracene, benzo(a)pyrene, chrysene, and pyrene were detected in CWKW-SS-SB10-001. The metals arsenic, barium, cadmium, chromium, lead,

and mercury were also detected in the samples, Benzene, toluene, ethylbenzene, xylenes (BTEX) compounds and methyl-tert butyl ether (MTBE) were not detected in any of the samples collected. All detected saturated soil concentrations were reflective of groundwater concentrations at the site. A summary of the saturated soil analytical results is presented in Table 4-2.

4.2 GROUNDWATER ASSESSMENT RESULTS

4.2.1 DPT Assessment

Groundwater samples were collected from each soil boring advanced during the DPT investigation. Results of the investigation are depicted on Figure 4-3. Nineteen groundwater samples were collected and analyzed for PAH and diesel range organics by the mobile analytical laboratory (Table 4-3). One groundwater sample was collected from the deeper zone at 30 feet. A naphthalene detection was reported in TW-15 at a concentration of 56 parts per billion (ppb). PAH compounds and diesel range organics were not detected in any of the other samples collected.

4.2.2 Monitoring Well Sampling

Groundwater samples were collected from the four on-site shallow monitoring wells (CW-MW01 through CW-MW04) on August 22, 2001 (Figure 4-4) and November 8, 2001 (Figure 4-5). The samples were analyzed at an off-site laboratory for VOCs, PAHs, EDB, TRPH, and lead. The laboratory analytical reports can be found in Appendix C. Analytical results are summarized in Table 4-4. None of the compounds tested for exceeded their GCTLs, as defined in Chapter 62-777, F.A.C. Table 1.

During the August 22, 2001, sampling event, the PAH compound acenaphthene was detected in CW-MW01 and CW-MW02 at concentrations of 0.1 micrograms per liter (µg/l) and 0.5 µg/l, respectively. These concentrations were below the acenaphthene GCTL of 20 µg/l.

Naphthalene was detected in CW-MW-02 and CW-MW-04 at concentrations of 0.07 µg/l and 0.06 µg/l, respectively. These concentrations were below the naphthalene GCTL of 20 µg/l.

Other PAH constituents detected during the August 22 event were fluoranthene (0.05 µg/l) in CW-MW01 and 2-methylnaphthalene (0.2 µg/l) in CW-MW02. Both concentrations were below their respective GCTLs.

The volatile organic compounds benzene, ethylbenzene, and toluene were detected in CW-MW04 at concentrations of 1 µg/l, 0.7 µg/l, and 0.8 µg/l, respectively. MTBE was detected in CW-MW-01 and CW-MW-04 at concentrations of 0.4 µg/l and 0.8 µg/l, respectively. The benzene concentration is at the GCTL while the remainder of the reported concentrations were below their GCTLs.

TRPH was also detected in CW-MW-01 at a concentration of 770 µg/l. This concentration was below the GCTL of 5,000 µg/l for TRPH. TRPH was not detected in any of the other samples during the August 22 event.

During the November 8, 2001, sampling event, TRPH was detected in CW-MW01 (310 µg/l), CW-MW02 (170 µg/l), and CW-MW03 (150 µg/l). In addition, acenaphthene and MTBE were detected at concentrations of 0.1 µg/l and 0.6 µg/l, respectively in CW-MW02. These levels were all below their respective GCTLs. No other compounds tested for were detected in the samples collected during this event.

4.3 NATURAL ATTENUATION SAMPLING

Measurements of natural attenuation parameters were made for CW-MW03 during both 2001 sampling events and during the November 8, 2001 event for CW-MW04 (Table 4-5). The wells were sampled for the anions chloride, sulfate, nitrate, nitrite, and ortho-phosphate. A slight decrease in chloride and sulfate levels was detected in CW-MW03 from the August to November sampling events (8,000 to 6,200 milligrams per liter [mg/l] for chloride and 1,300 to 990 mg/l for sulfate). Nitrate, nitrite, and ortho-phosphate were not detected in any of the samples collected (Figure 4-6).

TABLE 4-1

**SOIL HEADSPACE ANALYTICAL RESULTS
CAROLINE AND WILLIAM STREETS – SITE ASSESSMENT REPORT
NAVAL AIR FACILITY
KEY WEST, FLORIDA**

SAMPLE				OVA SCREENING RESULTS			
LOCATION NO.	DATE COLLECTED	DEPTH TO WATER	SAMPLE INTERVAL (fbls)	TOTAL READING (ppm)	CARBON FILTERED (ppm)	NET READING (ppm)	COMMENTS
TW-1	7/18/2001	0.5-1.0	1-2	0	NS	0	
TW-2	7/18/2001	0.5-1.0	1-2	1	0	1	
TW-3	7/18/2001	0.5-1.0	1-2	15	0	15	
TW-4	7/18/2001	0.5-1.0	1-2	8	0	8	
TW-5	7/18/2001	0.5-1.0	1-2	0	NS	0	
TW-6	7/18/2001	0.5-1.0	1-2	2	0	2	brick at 0.5 feet
TW-7	7/18/2001	0.5-1.0	1-2	0	NS	0	
TW-8	7/19/2001	0.5-1.0	1-2	1	0	1	
TW-9	7/19/2001	0.5-1.0	1-2	1	0	1	
TW-10	7/19/2001	0.5-1.0	1-2	12	0	12	petroleum odor
TW-11	7/19/2001	0.5-1.0	1-2	2	0	2	
TW-12	7/19/2001	0.5-1.0	1-2	0	NS	0	
TW-13	7/19/2001	0.5-1.0	1-2	0	NS	0	
TW-14	7/19/2001	0.5-1.0	1-2	0	NS	0	
TW-15	7/19/2001	0.5-1.0	1-2	3	0	3	plant debris
TW-16	7/19/2001	0.5-1.0	1-2	0	NS	0	
TW-17	7/19/2001	0.5-1.0	1-2	0	NS	0	
TW-18	7/20/2001	0.5-1.0	1-2	6	0	6	

fbls = feet below land surface
ppm = parts per million
NS = not sampled

TABLE 4-4

**SUMMARY OF FIXED-BASE LABORATORY GROUNDWATER ANALYTICAL RESULTS
VOAS AND OTHER ORGANICS
CAROLINE AND WILLIAM STREETS SITE ASSESSMENT REPORT
NAVAL AIR FACILITY
KEY WEST, FLORIDA**

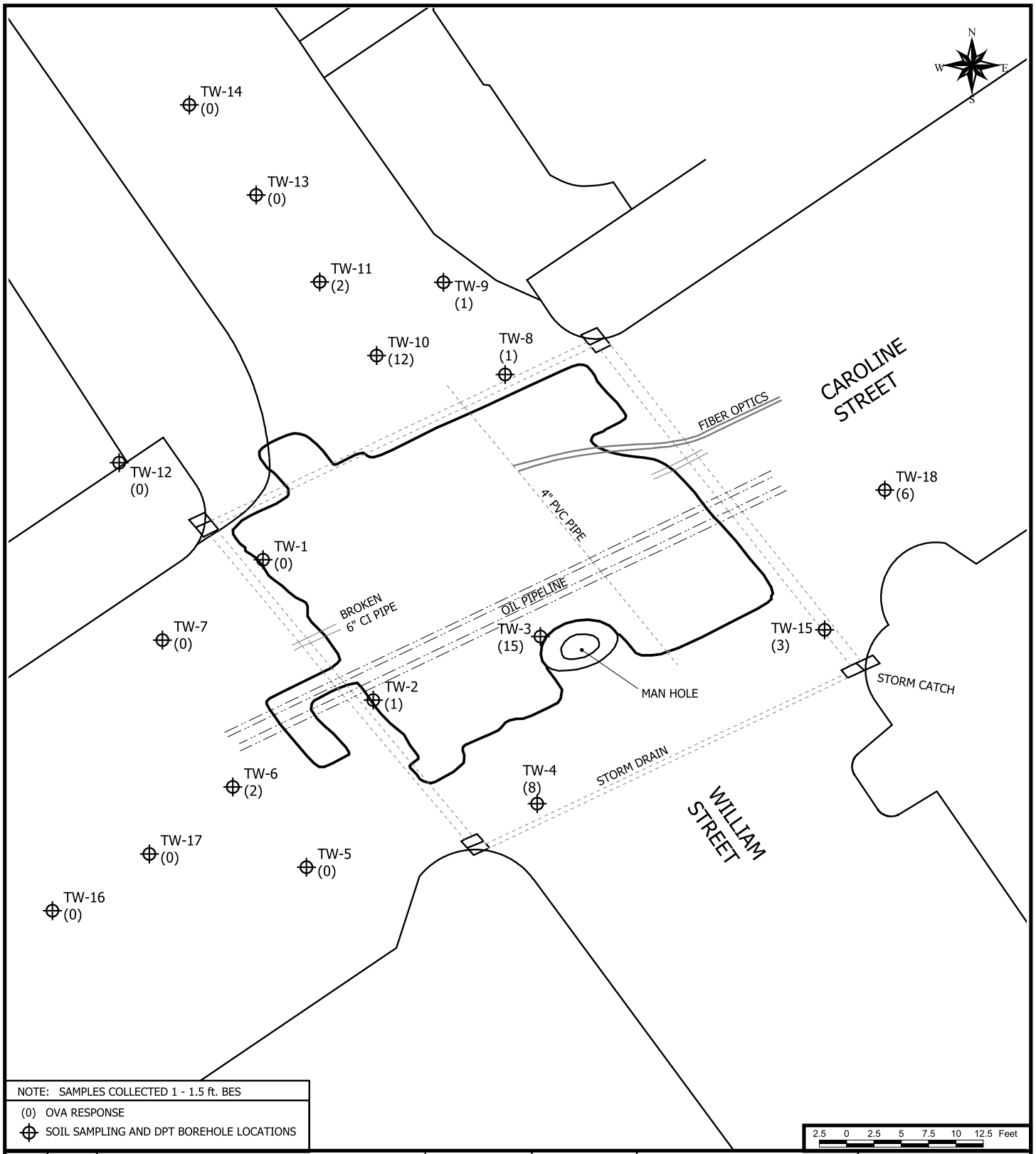
Sample ID	Date Collected	Benzene	Ethyl benzene	Toluene	Xylenes (total)	1,2-Dibromoethane (EDB)	MTBE	TRPH	Lead
GCTL(1)	N/A	1	30	40	20	0.020	50	5,000	15
CWKW-GW-MW01	8/22/2001	<1.0	<2.0	<2.0	<2.0	<0.020	**0.4J**	**770.00**	<5.0
	11/8/2001	<1.0	<2.0	<2.0	<2.0	<0.020	<1.0	**310J***	<5.0
CWKW-GW-MW02	8/22/2001	<1.0	<2.0	<2.0	<2.0	<0.020	**0.8J**	<0.01	<5.0
	11/8/2001	<1.0	<2.0	<2.0	<2.0	<0.020	**0.6J**	**170J***	<5.0
CWKW-GW-MW03	8/22/2001	<1.0	<2.0	<2.0	<2.0	<0.020	<1.0	<0.01	<5.0
	11/8/2001	<1.0	<2.0	<2.0	<2.0	<0.020	<1.0	**150J***	<5.0
CWKW-GW-MW04	8/22/2001	**1J**	**0.7J**	**0.8J**	<2.0	<0.020	<1.0	<0.01	<5.0

Values reported in micrograms per liter.
J = Estimated quantity below the practical quantitation limit and above the method detection limit
(1) Groundwater Cleanup Target Level, as defined by Chapter 62-777
* TPH (C8-C40)

TABLE 4-5

**NATURAL ATTENUATION PARAMETERS SUMMARY
CAROLINE AND WILLIAM STREETS SITE ASSESSMENT REPORT
NAVAL AIR FACILITY
KEY WEST, FLORIDA**

Measurements		Parameters		
Sample ID	**Date**	**Chloride (mg/l)**	**Sulfate (mg/l)**	**Methane (µg/l)**
CWKW-GW-MW03-001	8/22/2001	8000	1300	NS
	11/8/2001	6200	990	93.7
CWKW-GW-MW04-001	11/8/2001	11000	2000	NS



NOTE: SAMPLES COLLECTED 1 - 1.5 ft. BES

(0) OVA RESPONSE

SOIL SAMPLING AND DPT BOREHOLE LOCATIONS

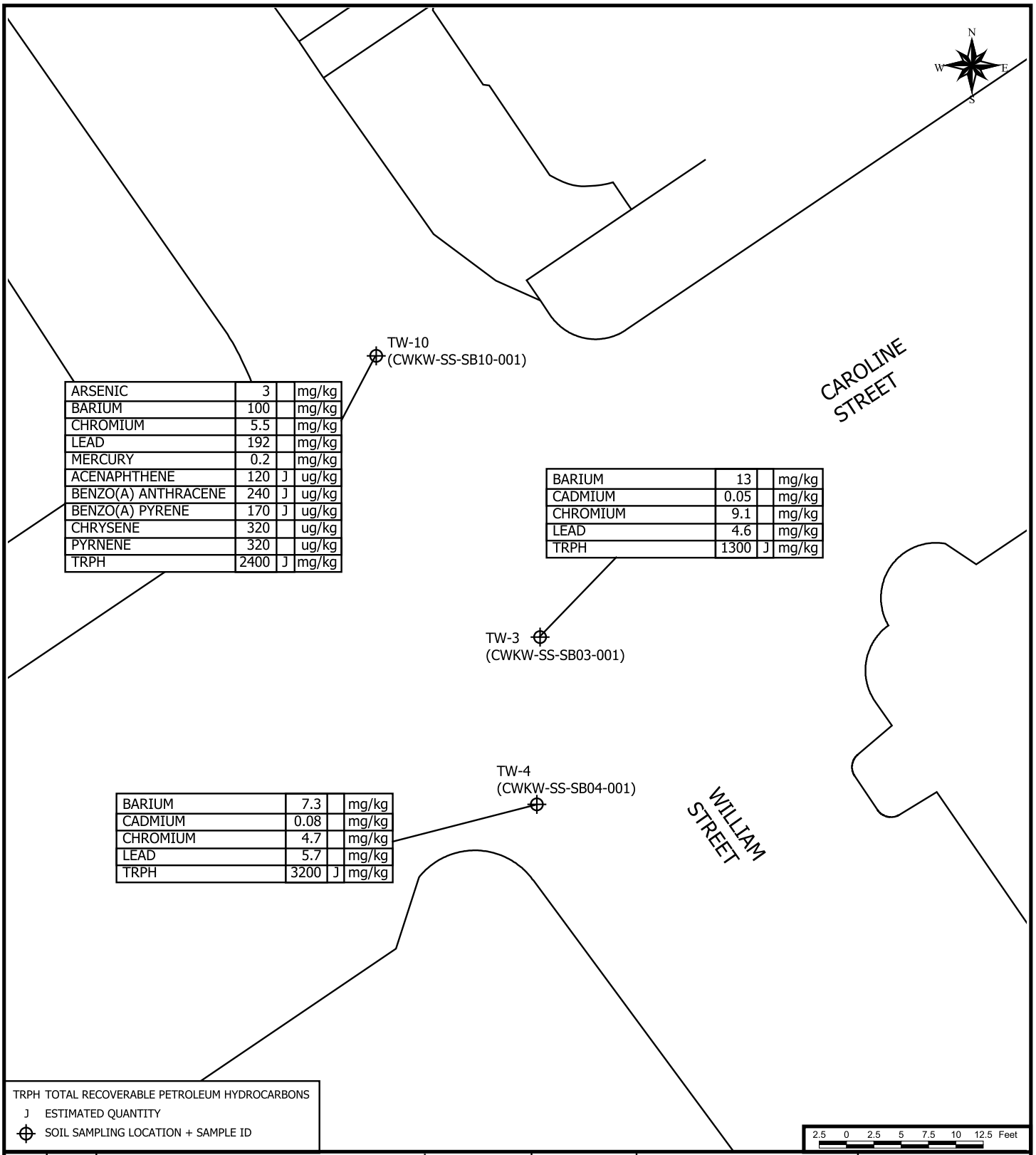
NO.	DATE	REVISIONS

DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
SOIL HEADSPACE
ANALYTICAL RESULTS
JULY 18 + 19, 2001
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 4-1	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG 4-1
DATE: 2/8/2002 BY: CM



ARSENIC	3		mg/kg
BARIUM	100		mg/kg
CHROMIUM	5.5		mg/kg
LEAD	192		mg/kg
MERCURY	0.2		mg/kg
ACENAPHTHENE	120	J	ug/kg
BENZO(A) ANTHRACENE	240	J	ug/kg
BENZO(A) PYRENE	170	J	ug/kg
CHRYSENE	320		ug/kg
PYRNENE	320		ug/kg
TRPH	2400	J	mg/kg

BARIUM	13		mg/kg
CADMIUM	0.05		mg/kg
CHROMIUM	9.1		mg/kg
LEAD	4.6		mg/kg
TRPH	1300	J	mg/kg

BARIUM	7.3		mg/kg
CADMIUM	0.08		mg/kg
CHROMIUM	4.7		mg/kg
LEAD	5.7		mg/kg
TRPH	3200	J	mg/kg

TRPH TOTAL RECOVERABLE PETROLEUM HYDROCARBONS
J ESTIMATED QUANTITY
SOIL SAMPLING LOCATION + SAMPLE ID

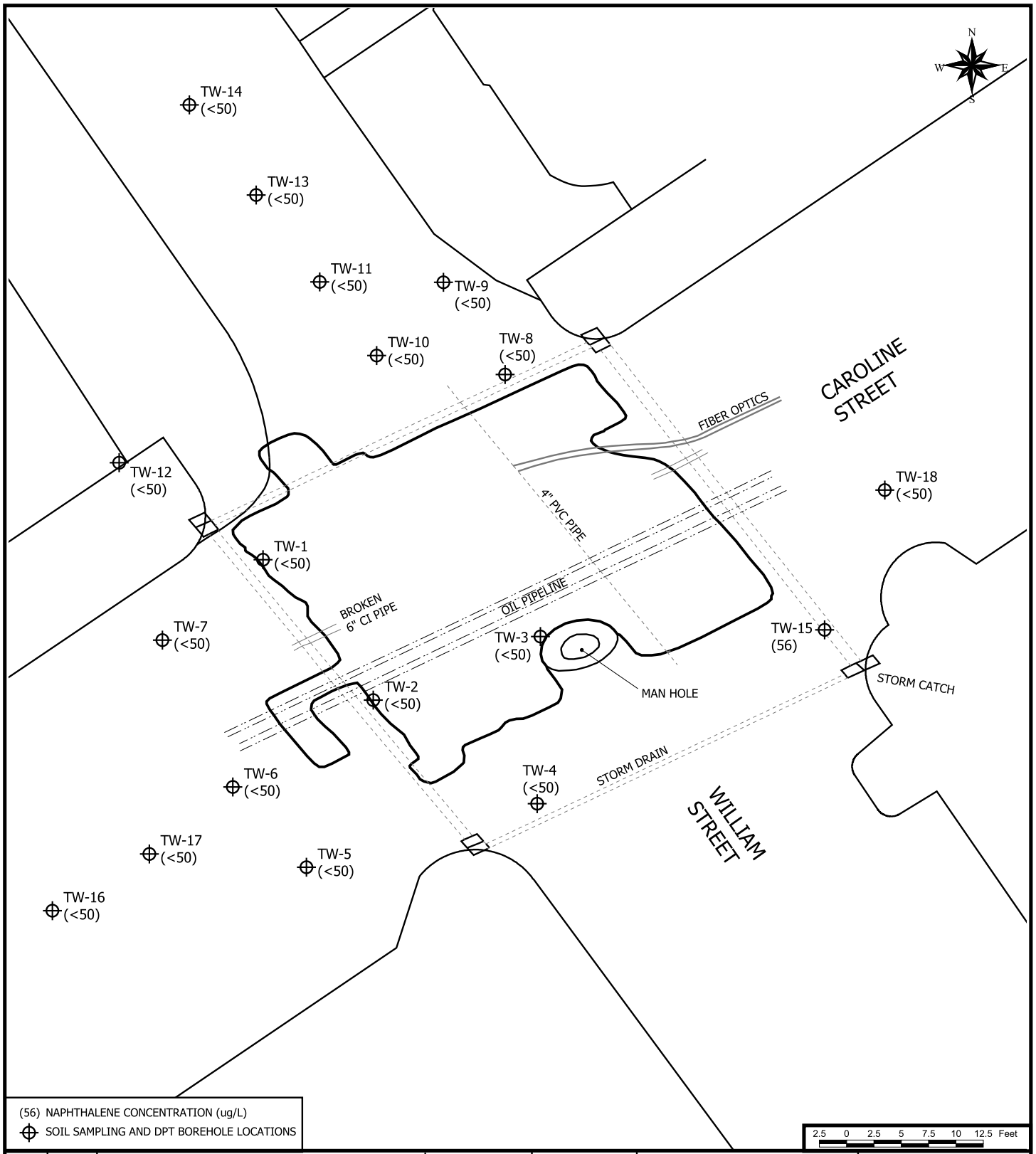
NO.	DATE	REVISIONS

DRAWN BY CM DATE 2/8/2002
CHECKED BY GB DATE 2/8/2002
COST/SCHED-AREA
SCALE AS NOTED

SITE ASSESSMENT REPORT
FIXED BASE LABORATORY
SOIL ANALYTICAL RESULTS
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958
APPROVED BY ____ DATE ____
APPROVED BY ____ DATE ____
DRAWING NO. FIGURE 4-2
REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG 4-2
DATE: 2/8/2002 BY: CM



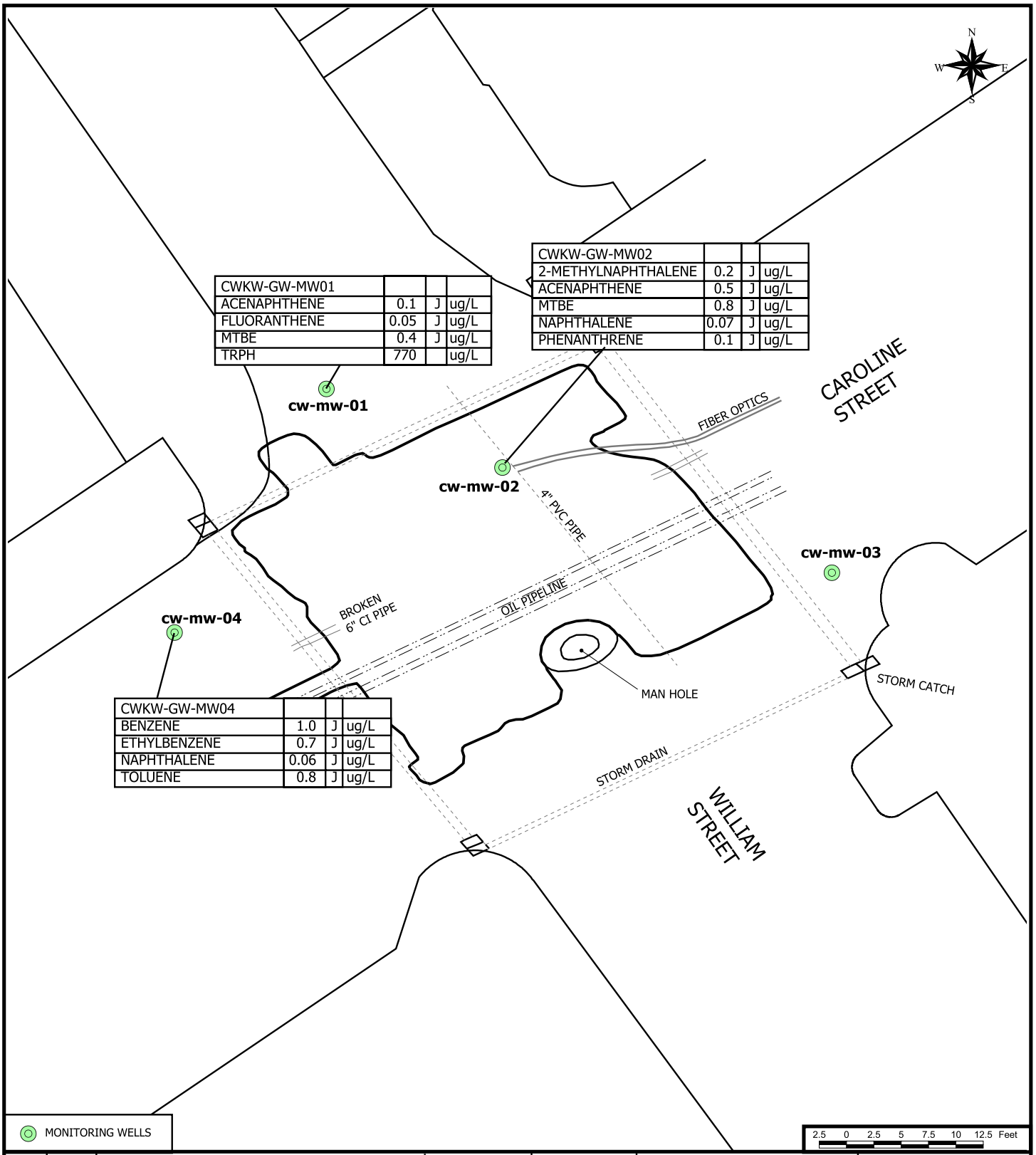
NO.	DATE	REVISIONS

DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
MOBILE LABORATORY GROUNDWATER
ANALYTICAL RESULTS
NAPHTHALENE (ug/L)
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 4-3	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG 4-3
DATE: 2/8/2002 BY: CM



NO.	DATE	REVISIONS

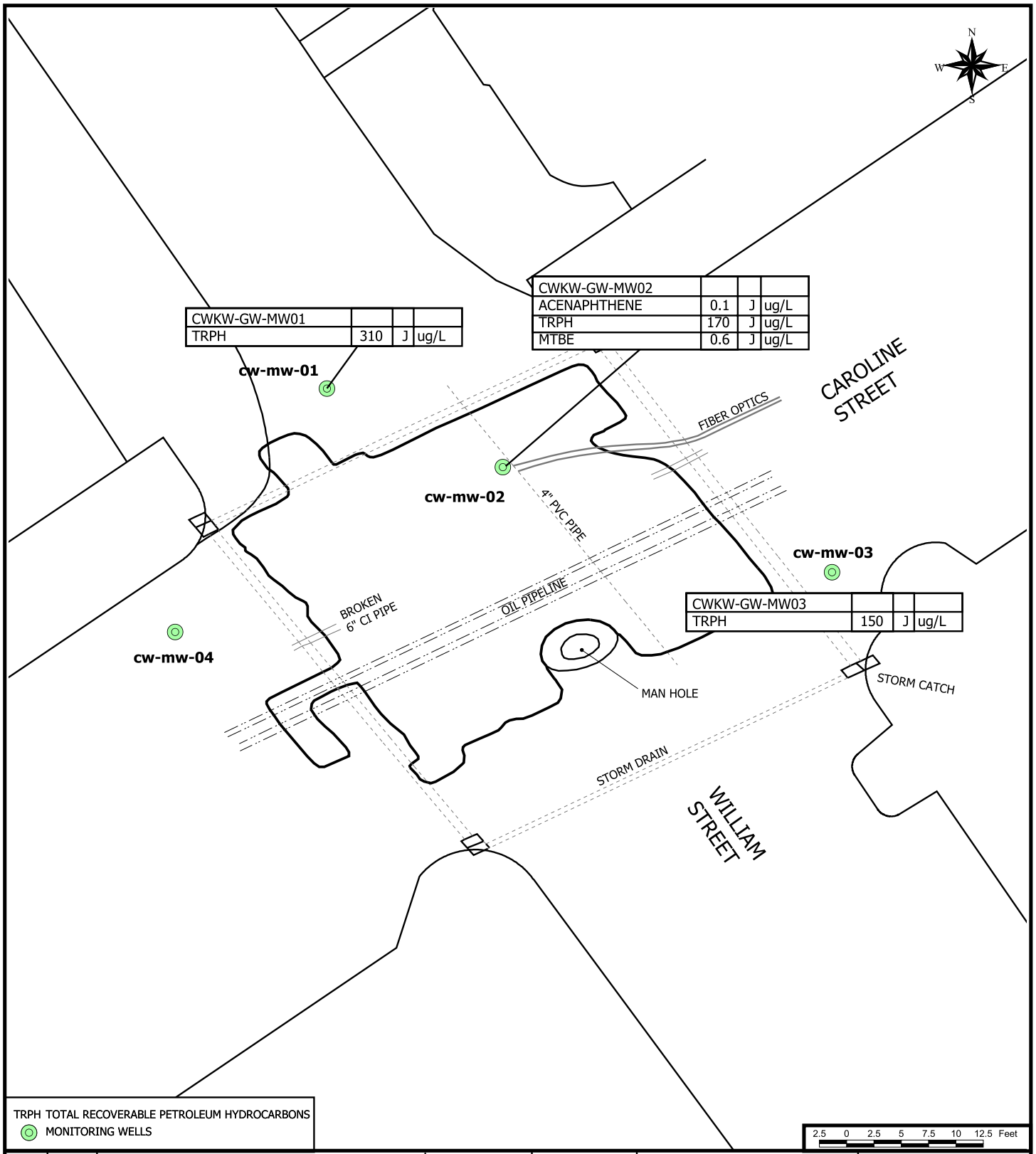
DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
FIXED BASE ANALYTICAL RESULTS
AUGUST 22, 2001
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 4-4	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG 4-4
DATE: 2/8/2002 BY: CM

Rev. 1
5/29/02



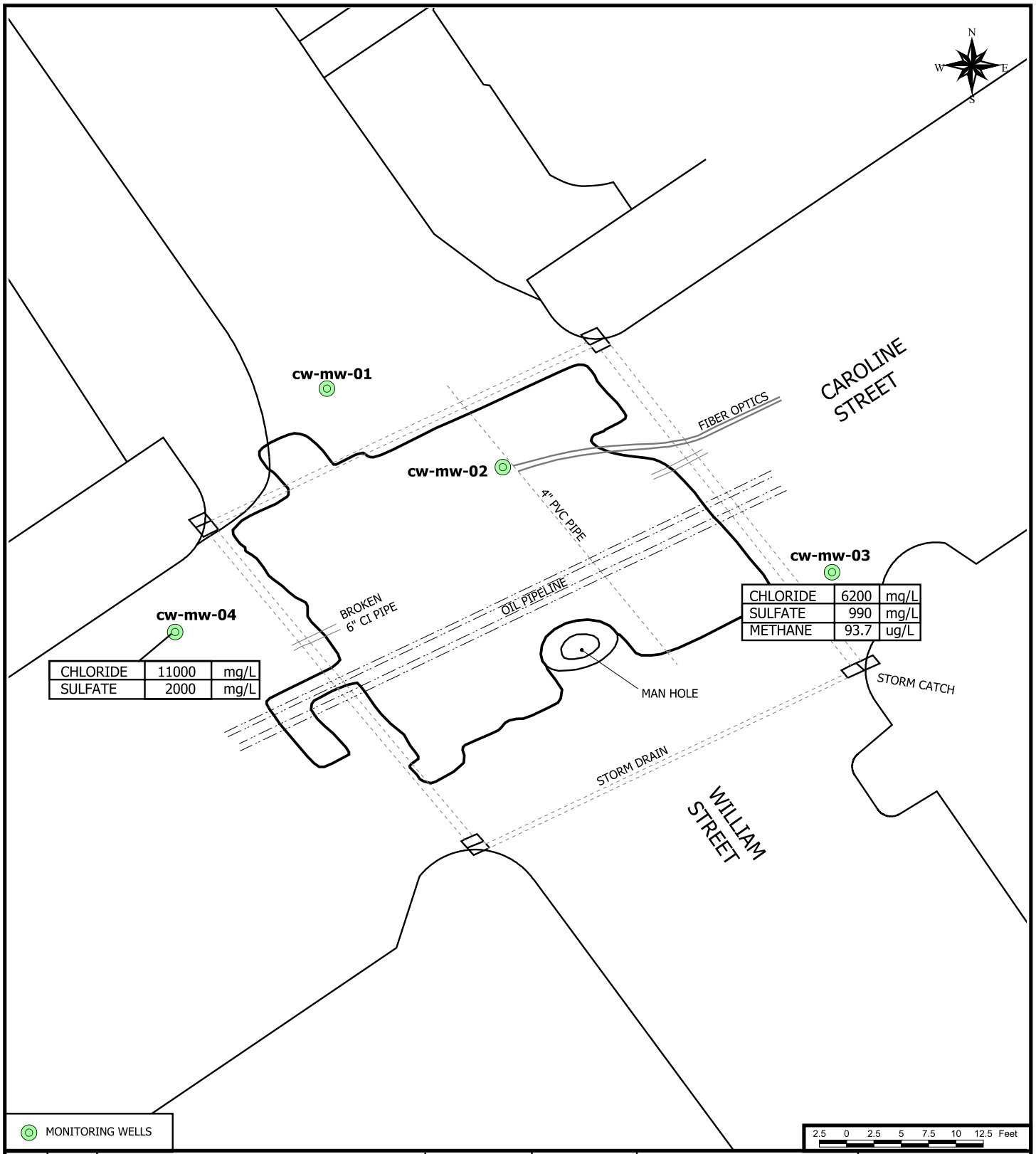
NO.	DATE	REVISIONS

DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
FIXED BASE LABORATORY
GROUNDWATER ANALYTICAL RESULTS
NOVEMBER 11, 2001
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 4-5	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG 4-5
DATE: 2/8/2002 BY: CM



NO.	DATE	REVISIONS

DRAWN BY CM	DATE 2/8/2002
CHECKED BY GB	DATE 2/8/2002
COST/SCHED-AREA	
SCALE AS NOTED	

SITE ASSESSMENT REPORT
NATURAL ATTENUATION PARAMETERS
IN GROUNDWATER
NOVEMBER 8, 2001
CAROLINE AND WILLIAM STREETS
NAVAL AIR FACILITY
KEY WEST, FLORIDA

CONTRACT NO. 3958	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 4-6	REV. 0

D:\GIS\NAS_KEY_WEST\CAROLINE_SAR.APR LAYOUT: FIG 4-6
DATE: 2/8/2002 BY: CM

5.0 SITE INVESTIGATION SUMMARY

The significant findings from each phase of site assessment activities are discussed below.

5.1 SOURCE OF HYDROCARBONS

A break in a vent valve of a 10-inch diesel/Bunker C fuel pipeline, present under the site, was identified as the source of the release of petroleum hydrocarbons to soil and groundwater at the site. The break occurred during a line integrity-testing event during pipeline closure activities. The vent was not identified on any drawings and the fuel seeped up through the asphalt and on to the surface of the road.

5.2 SITE CONDITIONS

The site is underlain by road base fill material to approximately 1 foot bls, beneath which is oolitic limestone of the shallow surficial aquifer to a depth of 12 feet. A vadose zone of native soils does not exist at the site, due to high water table elevations. Lithologies suggesting the presence of confining layers were not observed at the site. Depth to water in the surficial aquifer ranged from 1.59 to 1.94 feet during August 2001 and 0.75 feet to 1.24 feet during November 2001. Relative groundwater elevations were calculated from the SWL and top-of-casing elevation survey data. A tidal study at the site revealed the presence of a fluctuation in water levels of 0.39 and 1.1 foot during a 24-hour period. These data points were used to calculate the groundwater flow direction and water table gradient at the time of each gauging event. Groundwater flow at the site during the August event was to the south-southwest and to the north during the November event. The average groundwater gradient calculated for the site was 0.0086 feet/foot. Hydraulic conductivity values for the site were determined to be 0.72 feet per day from data obtained by specific capacity tests conducted during a site assessment at the NAF on Boca Chica. The groundwater flow velocity was calculated from gradient and hydraulic conductivity values, and is estimated at 0.0206 feet/day. No active potable water supply or irrigation wells occur on Key West.

5.3 SOURCE REMOVAL

Approximately 3,910 gallons of product and contaminated water were reportedly recovered from the site in 1997 and 1998. In addition, a total of 200 tons of petroleum-contaminated soil were excavated from the site during that time period. Laboratory and headspace analysis of samples collected from the walls of the excavations indicated elevated levels of hydrocarbons still present in the soil.

5.4 SOIL ASSESSMENT

Headspace analysis of the soil samples collected during the investigation did not exhibit levels of “excessively” contaminated soil. Petroleum hydrocarbons and metals were detected in the saturated soil

samples collected for laboratory analysis at the site which were representative of groundwater concentration. Vadose zone soils were not present at the site.

5.5 GROUNDWATER ASSESSMENT

Petroleum hydrocarbon concentrations were detected in all four wells during the two sampling events at the site; however, no GCTL exceedances were found. Results of the groundwater samples collected during the DPT investigation detected the presence of naphthalene in one location, but the level was below its GCTL. One DPT sample was collected at 30 feet bls to evaluate the deeper zones of the aquifer; no contaminants were detected in the sample.

6.0 CONCLUSIONS AND RECOMMENDATION

The conclusions, based on the data collected during the site assessment performed by TtNUS at Caroline and William Streets, are summarized as follows:

- The site is underlain by a surficial aquifer comprised of oolitic limestone. No confining layers were encountered within the upper 30 feet of the surficial aquifer.
- Vadose zone soils did not exist at the site at the time of the assessment. Headspace analysis was conducted in the 1- to 2-foot saturated zone nearest to the surface. The presence of excessively contaminated soils was not detected in that zone.
- The surficial aquifer is non-potable and is classified as groundwater of low yield/poor quality.
- The surficial aquifer in the site vicinity is tidally influenced.
- The direction of groundwater flow was to the south-southwest during one measurement and due north during another, suggesting a strong tidal influence. The surficial aquifer flows at a calculated velocity of 0.0206 feet/day.
- Contaminated soil has previously been excavated and removed where feasible, and no free product occurred at the site during assessment activities.
- The vertical and horizontal extent of contamination has been defined by the investigation.
- Concentrations of petroleum contaminants were detected in the saturated soil samples collected.
- Concentrations of petroleum contaminants of concern detected in the four monitoring wells were all at or below GCTLs.

Based on the hydrogeological and chemical data presented in this SAR, and supported by the criteria sited in Chapter 62-770, F.A.C., the site qualifies for No Further Action.

REFERENCES

ABB (ABB Environmental Services, Inc.), 1994. Contamination Assessment Report – Jet Engine Test Cell, Building A969, prepared for the Department of the Navy, Southern Division Naval Facilities Engineering Command, Tallahassee, Florida.

ABB (ABB Environmental Services, Inc.), 1995. Facility and Remedial Investigation NAF Key West, Workplan, Volume 1 and Sampling and Analysis Plan, Volume 2, prepared for SOUTHDIVNAVFACENGCOM, Tampa, Florida, December 1995.

Bouwer, H and Rice, R.C., 1976. A slug test for determining hydraulic conductivity of unconfined aquifer with completely or partially penetrating wells: Water Resource Research, V 12, No. 3, pp 423-428.

Bouwer, H and Rice, R.C., 1989. The Bouwer and Rice slug test-on update, Groundwater, V 27, No. 3, pp. 304-309.

BRE (Brown & Root Environmental), 1997. Supplemental RCRA Facility Investigation/Remedial Investigation Report for High-Priority Sites, Naval Air Station Key West, Florida, prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command, Aiken, SC, January.

Davis, S.N., and DeWeist, R.J.M., 1966. Hydrogeology: New York, John Wiley and Sons, Inc., p 463.

U.S. Geological Survey. Key West, FL, Quadrangle 1971, 7.5 minute series, Topographic Quadrangle Maps of Florida: scale 1:24,000.

APPENDIX A

SOURCE REMOVAL REPORT

324-000095
~~324-000089~~

Bechtel

Oak Ridge Corporate Center
151 Lafayette Drive
P.O. Box 350
Oak Ridge, Tennessee 37831-0350
Telephone: (423) 220-2000

FEB 25 1998

Mark Ewing, ROICC
NAS Key West
P. O Box 9007
Key West, FL 33040

SUBJECT: Bechtel Job No. 22567
Department of the Navy Contract No. N62467-93-D-0936
DO 0073, NAS KEY WEST, PIPELINE ABANDONMENT - SOURCE REMOVAL REPORTS
Subject Code: 7440

Dear Mr. Ewing:

Please find enclosed FDEP's *Source Removal Reports* for the work activities at Caroline and William Street intersection and the spill at Trumbo Point.

The only missing parts are the waste manifests and certifications of disposal. I spoke to Paul Camire on Monday, February 23, and he is coordinating the gathering of this information from Patsy Watson. Can you please get the information from him and attach them to the report?

Also, the report needs a Navy signature. Please send us a copy for our records after the reports have been signed and the manifests are attached.

If you have any questions or need additional information, please feel free to give me a call at (423) 220-2271.

Sincerely,

R. E. Hoekstra
Project Engineer

REH:dcm:LR1543
Enclosures: As stated

cc: B. Glover (SouthDiv) w/e
R. Demes (PW) w/e
P Camire (PW) w/e

Bechtel Environmental, Inc.

824 - 0089

BER Incident# _____

Source Removal Report

The Florida Dept. of Environmental Protection, Bureau of Emergency Response (BER), has created this form which may be used as a cleanup report for any type of discharge, including the cleanup of petroleum discharges under F.A.C. 62-770. BER requests that this form be used, as this form will allow quicker review and closure of the case. For petroleum discharges, the information contained herein must be provided to DEP within 60 days of soil/debris disposal, as required by FAC 62-770.300. Send the report and attachments to:

FDEP Bureau of Emergency Response, 2796 Overseas Highway, Suite 218, Marathon, FL 33050-4276, telephone 305/289-2310, fax 305/289-2337

Date of:	Material(s) Discharged:	Amount:
Incident: 11/1/97	PETROLEUM	UNKNOWN gallons
Cleanup Initiated: 11/1/97	"BUNKER C"	gallons
Cleanup Completed: 1/13/98		gallons

Location of Incident: INTERSECTION OF William & CAROLINE ST. Latitude: 24°33'30"

Nearest Town: Key West County: MONROE Longitude: 81°48'0"

Cause of Discharge: ☐ vehicle crash ☐ tank leak ☐ drum leak ☐ tank overfill ☑ pipe leak ☐ valve leak ☐

Environment Affected: ☑ soil ☑ storm drain ☐ impervious surface ☑ groundwater ☐ ditch ☐ wells nearby ☐ air ☐ surface water:

Responsible Party/Spiller:
Name: U.S. NAVY
Address: NAS Key West
City: Key West State: FL Zip: 33040
Contact: MARK Ewing Phone: 305-293-3626

Cleanup Contractor:
BECHTEL ENVIRON.
Contact: Robert Cohose
Phone: 1-423-220-2492

Method(s) of Cleanup: ☑ soil excavation ☑ vacuum truck ☐ booms ☐ skimmer ☐ absorbants ☐ neutralization ☐

Free Product Recovered: 3100 gallons
Free product disposal: ☐ incineration ☐ fuel blending ☐ wastewater treatment ☑ Recycle

Amount of Soil Removed: 100 ☐ cubic yds. ☑ tons ☐ lbs ☐ drums

Disposal method of soil: ☑ soil thermal treatment facility ☐ hazardous waste ☐ landfill ☐

Disposal method of any other debris: ☑ soil thermal treatment facility ☐ haz. waste ☐ landfill ☐

Dimensions of soil excavation: 24' x 28'

Depth to groundwater: 3' feet. How determined?: DEPTH of WATER IN EXCAVATION

Method/instrument to Screen Soil: ☑ OVA/FID (Org. Vapor Analyzer) ☐ PID (Photoionization Detector) ☐

Summary of Instrument Readings: (OVA: net result w/out methane)
highest reading observed: SEE ppm
highest reading after excavation: ATTACHED ppm
lowest reading after excavation: SKETCH & TABLE ppm

Comments:

Attach a copy of: scaled site drawing/map; table of instrument readings/depths; disposal manifests; lab reports of soil and waste analyses (with QA info); certificate of disposal (when available).

Certification: I certify that the above information and attachments are true and complete, to the best of my knowledge. I understand that submission of false information, or failure to comply with DEP's regulations, is a civil and criminal violation and may be grounds for enforcement action.

Print name: _____ Affiliation: SOUTHDIV NAVAL FACILITIES ENGINEERING COMMAND

Signature: _____ Date: 26 MAR 98

TABLE OF CONTENTS

1.0 SUMMARY OF EVENTS

2.0 FIGURE 1. LIMITS OF EXCAVATION

3.0 TABLE 1. HEADSPACE READINGS AND LAB RESULTS

4.0 FLORIDA PRO SAMPLE RESULTS

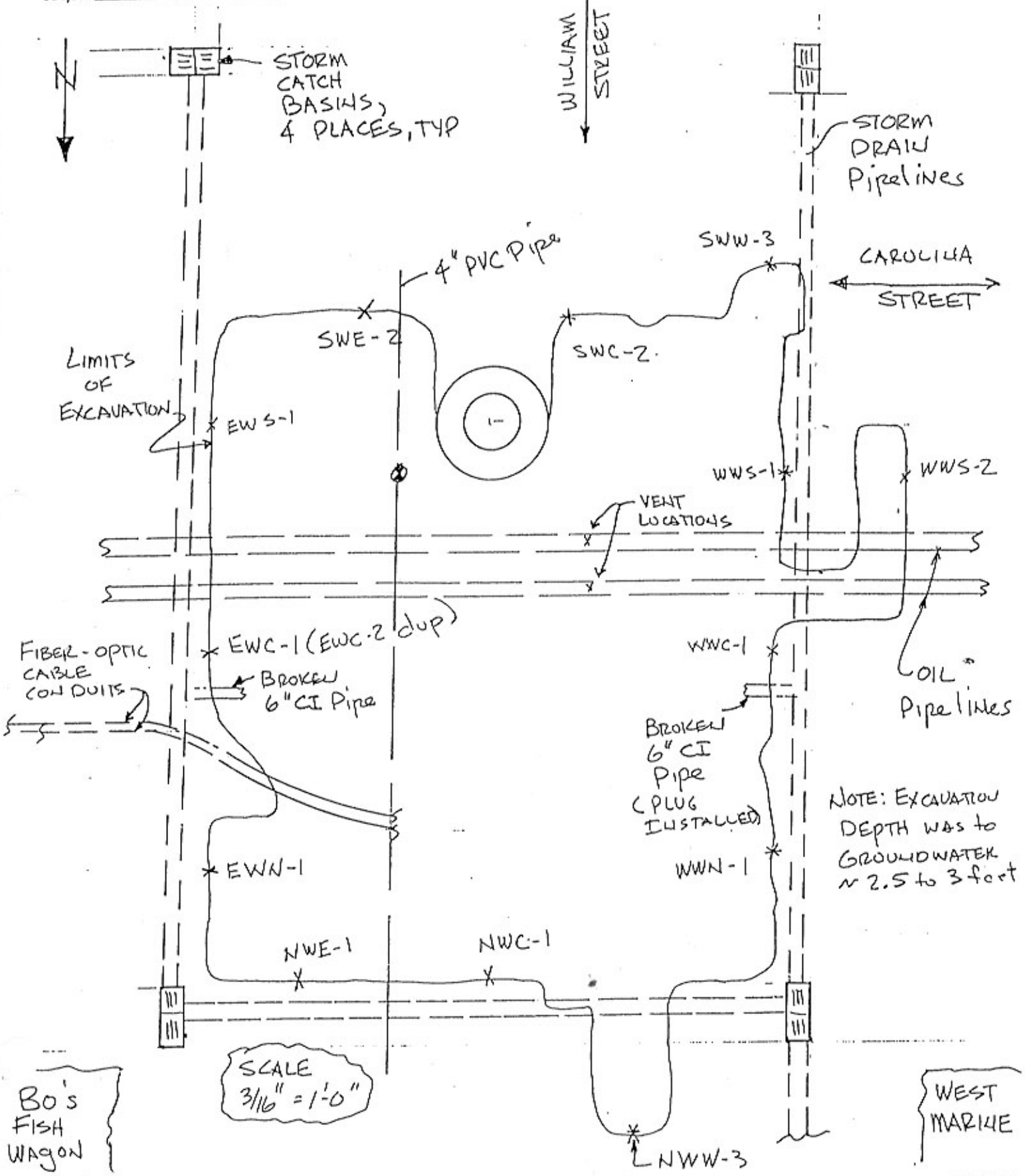
5.0 PREBURN SAMPLE RESULTS

6.0 WASTE MANIFESTS

Calculation Sheet 2.0 Figure 1. - Limits of Excavation

Bechtel

Originator	Date	Calc. No.	Rev. No.
Project	Job No.	Checked	Date
Subject			Sheet No.



1.0 CAROLINE and WILLIAM STREETS - SUMMARY of EVENTS

10/31/97
Oil appeared on the surface of the street at the Caroline and William Street intersection at about 10:00 PM.

11/1/97
It was suspected that the oil in the street was due to the pipeline abandonment project that the Navy was performing. Navy and Bechtel personnel were mobilized to the site and began cleanup. All street surfaces were cleaned up and an excavation was dug at the suspected source of the oil. A vacuum truck was used to recover approximately 3000 gallons of petroleum products and 3000 gallons of petroleum contact water. All emergency response activities were completed and traffic restored by 11:00 PM on 11/1/97.

12/18/97
Replaced broken storm lines in the intersection of Caroline and William Streets. Excavated a 4' by 5-6" hole in the center of the intersection for product recovery. Approximately 260 gallons of petroleum contact water and free product were recovered. Approximately 25 tons of contaminated soils were excavated.

1/27/98 through 1/30/98
The intersection of Caroline and William Streets was excavated to remove any remaining contaminated soils. The scope of the excavation was to be within the confines of the intersection and not to extend beyond the storm drain pipelines. Also any free product and ground water encountered were to be recovered with a vac truck. The soils were excavated as shown on the attached sketch. The depth of the excavation was to the top of the groundwater, approximately 2 to 3 feet below grade. Clean soil was reached on the south and west sides of the excavation. Clean soils was not reached in isolated areas on the north and east sides of the excavation as evidenced by the high headspace reading and high Florida PRO analytical results.

Approximately 550 gallons of petroleum contact water and 100 gallons of petroleum products were recovered from the excavation. Approximately 75 tons of contaminated soils were excavated.

TABLE 1. Headspace Readings and Lab Results Carolina and William Street Source Removal			
Sample ID	Headspace (ppm)	Headspace with Filter(ppm)	Florida PRO Results (ppm)
Applied Standard	50	50	340
NWE-1	1.3	0.2	32 I
NWC-1	0	0	30 I
NWW-3	1778	0	3000
WWN-1	39	0	22 I
WWC-1	0	0	NC
WWS-1	933	0	5000
WWS-2	507	0	NC
SWW-3	31	5	72
SWC-2	1.3	0.5	18 I
SWE-2	0.34	0	59
EWS-1	0	0	22 I
EWC-1	0.7	0	22 I
EWC-2 (duplicate of EWC-1)	NC	NC	34
EWN-1	7	0	64

NC - Not Collected

I - Analyte detected; value is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).

The shaded areas represent samples with detections above the applied standard.

4.0 FLORIDA PRO SAMPLE RESULTS

Environmental Conservation Laboratories
4810 Executive Park Court, Suite 211
Jacksonville, Florida 32216-6069
904 / 296-3007
Fax 904 / 296-6210

ENCO Laboratories

DHRS Certification No. E82277

CLIENT : Bechtel Environmental, Inc.
ADDRESS: NAS Jacksonville
P.O. Box 171
Jacksonville, FL 32215

REPORT # : JR8915
DATE SUBMITTED: January 30, 1998
DATE REPORTED : February 9, 1998

ATTENTION: Mr. Greg Olson

SAMPLE IDENTIFICATION

Samples submitted and
identified by client as:

NAS Key West

01/28/98

#1 - EWS-1 @ 18:50
#2 - EWC-1 @ 18:53
#3 - EWN-1 @ 19:00
#4 - EWC-2 @ 18:55
#5 - SWE-2 @ 19:45
#6 - SWC-2 @ 19:48
#7 - SWW-3 @ 19:53
#8 - NWE-1 @ 20:20
#9 - NWC-1 @ 20:26
#10 - NWW-3 @ 20:26
#11 - WWN-1 @ 20:40
#12 - WWS-1 @ 20:35

PROJECT MANAGER Scott D. Martin

ENCO LABORATORIES
REPORT # : JR8915
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

MISCELLANEOUS	METHOD	EWN-1	EWC-2	Units
Percent Solids	SM2540G	75	84	%
Date Analyzed		02/04/98	02/04/98	

FL METHOD FLPRO - PETROL. RESIDUAL ORG.	EWN-1	EWC-2	Units
Hydrocarbons (C8-C40)	64	34	mg/Kg
Surrogate:	% RECOV	% RECOV	LIMITS
o-Terphenyl	144	128	50-150
Date Extracted	02/05/98	02/05/98	
Date Analyzed	02/06/98	02/06/98	

DW = Analysis is reported on a "dry weight" basis.

ENCO LABORATORIES
REPORT # : JR8915
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

MISCELLANEOUS	METHOD	EWS-1	EWC-1	Units
Percent Solids	SM2540G	83	81	%
Date Analyzed		02/04/98	02/04/98	

FL METHOD FLPRO - PETROL. RESIDUAL ORG.	EWS-1	EWC-1	Units
Hydrocarbons (C8-C40)	22 I	22 I	mg/Kg
Surrogate:	% RECOV	% RECOV	LIMITS
o-Terphenyl	116	102	50-150
Date Extracted	02/05/98	02/05/98	
Date Analyzed	02/06/98	02/06/98	

I = Analyte detected; value is between the Method Detection Level (MDL) and the Practical Quantitation Level (PQL).
DW = Analysis is reported on a "dry weight" basis.

ENCO LABORATORIES
REPORT # : JR8915
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

MISCELLANEOUS	METHOD	SWE-2	SWC-2	Units
Percent Solids	SM2540G	87	84	%
Date Analyzed		02/04/98	02/04/98	

FL METHOD FLPRO - PETROL. RESIDUAL ORG.	SWE-2	SWC-2	Units
Hydrocarbons (C8-C40)	59	18 I	mg/Kg
Surrogate:	% RECOV	% RECOV	LIMITS
o-Terphenyl	106	108	50-150
Date Extracted	02/05/98	02/05/98	
Date Analyzed	02/06/98	02/06/98	

I = Analyte detected; value is between the Method Detection Level (MDL) and the Practical Quantitation Level (PQL).
DW = Analysis is reported on a "dry weight" basis.

ENCO LABORATORIES
REPORT # : JR8915
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

MISCELLANEOUS	METHOD	SWW-3	NWE-1	Units
Percent Solids	SM2540G	81	75	%
Date Analyzed		02/04/98	02/04/98	

FL METHOD FLPRO - PETROL. RESIDUAL ORG.	SWW-3	NWE-1	Units
Hydrocarbons (C8-C40)	72	32 I	mg/Kg
Surrogate:	% RECOV	% RECOV	LIMITS
o-Terphenyl	140	115	50-150
Date Extracted	02/05/98	02/05/98	
Date Analyzed	02/06/98	02/06/98	

I = Analyte detected; value is between the Method Detection Level (MDL) and the Practical Quantitation Level (PQL).
DW = Analysis is reported on a "dry weight" basis.

ENCO LABORATORIES
REPORT # : JR8915
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

MISCELLANEOUS	METHOD	NWC-1	NWW-3		Units
Percent Solids	SM2540G	84	79		%
Date Analyzed		02/04/98	02/04/98		

FL METHOD FLPRO - PETROL. RESIDUAL ORG.	NWC-1	NWW-3		Units
Hydrocarbons (C8-C40)	30 I	3000	D1	mg/Kg
Surrogate:	% RECOV	% RECOV		LIMITS
o-Terphenyl	106	*		50-150
Date Extracted	02/05/98	02/05/98		
Date Analyzed	02/06/98	02/06/98		

* = Surrogate recovery unavailable due to matrix interference.
I = Analyte detected; value is between the Method Detection Level (MDL) and the Practical Quantitation Level (PQL).
DW = Analysis is reported on a "dry weight" basis.
D1 = Analyte value determined from a 1:50 dilution.

ENCO LABORATORIES
REPORT # : JR8915
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

MISCELLANEOUS	METHOD	WWN-1	WWS-1		Units
Percent Solids	SM2540G	86	83		%
Date Analyzed		02/04/98	02/04/98		

FL METHOD FLPRO - PETROL. RESIDUAL ORG.	WWN-1	WWS-1		Units
Hydrocarbons (C8-C40)	22 I	5000	D1	mg/Kg
Surrogate:	% RECOV	% RECOV		LIMITS
o-Terphenyl	120	*		50-150
Date Extracted	02/05/98	02/05/98		
Date Analyzed	02/06/98	02/06/98		

* = Surrogate recovery unavailable due to matrix interference.
I = Analyte detected; value is between the Method Detection Level (MDL) and the Practical Quantitation Level (PQL).
DW = Analysis is reported on a "dry weight" basis.
D1 = Analyte value determined from a 1:50 dilution.

ENCO LABORATORIES
REPORT # : JR8915
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

FL METHOD FLPRO - PETROL. RESIDUAL ORG.	LAB BLANK	Units
Hydrocarbons (C8-C40)	6.6 U	mg/Kg
Surrogate:	% RECOV	LIMITS
o-Terphenyl	117	50-150
Date Extracted	02/05/98	
Date Analyzed	02/06/98	

U = Compound was analyzed for but not detected to the level shown.

ENCO LABORATORIES
REPORT # : JR8915
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

QUALITY CONTROL DATA

Parameter	% RECOVERY MS/MSD/LCS	ACCEPT LIMITS	% RPD MS/MSD	ACCEPT LIMITS
PETROL. RESIDUAL ORG. Hydrocarbons (C8-C40)	61/ 76/ 62	50-150	22	25

Environmental Conservation Laboratories Comprehensive QA Plan #960038

< = Less Than
MS = Matrix Spike
MSD = Matrix Spike Duplicate
LCS = Laboratory Control Standard
RPD = Relative Percent Difference

This report shall not be reproduced except in full, without the written approval of the laboratory. Results for these procedures apply only to the samples as submitted.

NAVY RAC CHAIN OF CUSTODY RECORD

Facility Name: NAS KEY WEST
Site Name: FAUNA ST & WILLIAMS ST. [illegible] PROJECT
Delivery Order No.:
Cooler/Crate No.:
Sampling Event:: FAUNA AND WILLIAMS STREETS EXPANSION

SEIR No.: N/A
COC Number:
Lab: ENCO LABS
Field Logbook No.:
Logbook Pg. No.:

Sampled by: Andrew M. Klemp Jr. (Print) / [signature] (Sign) — (Print) — (Sign)

Legend

SAMPLE TYPE

PSB	Preservative Blank	BLS	Blind Spike
FDP	Field Duplicate	BLB	Blind Blank
ENV	Environmental	PTS	Point Source
FDB	Field Blank	FRP	Field Replicate
GEO	Geotechnical Sample	RSB	Rinsate Blank
MXD	Matrix Spike Duplicate	SPL	Split
MXS	Matrix Spike	TRP	Trip Blank

MATRIX

AIR	Air	SBS	Subsurface Soil	PTW	Potable Water
FLO	Flora	SED	Sediment	SEP	Seeps
FAU	Fauna	SFS	Surface Soil	SOL	Solid
GWT	Groundwater	SFW	Surface Water	WWT	Waste Water
LCH	Leachate	SLG	Sludge	SLW	Solid Waste
OIL	Oil	SLW	Solid Waste	SST	Surface Water Storm Event
DIW	Deionized Water	OFW	Organic Free Water		
DFW	Deionized Organic Free Water				

QC LEVELS

C	Sample results and QC reported
D	Sample results, QC and raw data reported
E	Sample results, blanks, and calibration reported
S	Screening level analysis; sample results and QC as reported

Station ID	BEI Sample ID	Sample Type	Matrix Code	Collection Date/Time	Container ID	Preservative	Pay Item	Parameter	Priority	QC Code
CWE	EWS-1	ENV	SBS	11/20/98 1850	EWS-1	COOL 4°C	N/A	HE TPH	5-DAY	C
↓	EWC-1	↓	↓	1853	EWC-1	↓	↓	↓	↓	↓
↓	EWN-1	↓	↓	1900	EWN-1	↓	↓	↓	↓	↓
↓	EWC-2	FDP	↓	1855	EWC-2	↓	↓	↓	↓	↓
↓	SWE-2	ENV	↓	1945	SWE-2	↓	↓	↓	↓	↓
↓	SWC-2	↓	↓	1945	SWC-2	↓	↓	↓	↓	↓

RELINQUISHED BY	RECEIVED BY	DATE	TIME	REASON FOR TRANSFER
[signature]	[illegible]	11/20/98	[illegible]	TAKE TO FEDEX

COMMENTS/INSTRUCTIONS
BECHTEL JOB # 22507-324
1) SEE DATE
2) 2 of 2

CONTAMINATION	YES	NO
Radiological		X
Chemical DIESEL FUEL		X

Shipper: BECHTEL; BLDG. 10 TRUMAN ANNEX - NAS KEYWEST; KEY WEST, FL 33040.
Ship to: ENCO LABS - 4224 LAKELINE PARK CIRCLE, SUITE 214, JAX, FL 32216.
Airbill No. FEDEX 6109544724 Traffic Report No.

This package conforms to the conditions and limitations specified in 49 CFR 173.421 for excepted radioactive material, limited quantity, n.o.s. UN2910

O:\NAVY-RAC\COCR. NUM

NAVY RAC CHAIN OF CUSTODY RECORD

BECHTEL

Facility Name: NAS KEY WEST
Site Name: CAUSEWAY ST. & WILLIAMS ST. EXTENSION
Delivery Order No.: [illegible]
Cooler/Crate No.:
Sampling Event: CAUSEWAY & WILLIAMS STREETS EXTENSION

SEIR No.: N/A
COC Number:
Lab: ENCO LABS
Field Logbook No.:
Logbook Pg. No.:

Sampled by: Gregory M. Pyser, Jr. (Print) [signature] (Sign) (Print) (Sign)

Legend

SAMPLE TYPE

PSB	Preservative Blank	BLS	Blind Spike
FDP	Field Duplicate	BLB	Blind Blank
ENV	Environmental	PTS	Point Source
FDB	Field Blank	FRP	Field Replicate
GEO	Geotechnical Sample	RSB	Rinsate Blank
MXD	Matrix Spike Duplicate	SPL	Split
MXS	Matrix Spike	TRP	Trip Blank

MATRIX

AIR	Air	SBS	Subsurface Soil	PTW	Potable Water
FLO	Flora	SED	Sediment	SEP	Seeps
FAU	Fauna	SFS	Surface Soil	SOL	Solid
GWT	Groundwater	SFW	Surface Water	WWT	Waste Water
LCH	Leachate	SLG	Sludge	SLW	Solid Waste
OIL	Oil	SLW	Solid Waste	SST	Surface Water Storm Event
DIW	Deionized Water	OFW	Organic Free Water		
DFW	Deionized Organic Free Water				

QC LEVELS

C	Sample results and QC reported
D	Sample results, QC and raw data reported
E	Sample results, blanks, and calibration reported
S	Screening level analysis; sample results and QC as reported

Station ID	BEI Sample ID	Sample Type	Matrix Code	Collection Date/Time	Container ID	Preservative	Pay Item	Parameter	Priority	QC Code
CWE	SWW-3	ENV	SBS	1/28/95	SWW-3	COOL 4°C	N/A	FL-PRP	5-DAY	C
CWE	NWE-1	↓	↓	/2022	NWE-1	↓	↓	↓	↓	↓
↓	NWC-1	↓	↓	/2026	NWC-1	↓	↓	↓	↓	↓
↓	NWW-3	↓	↓	/2026	NWW-3	↓	↓	↓	↓	↓
↓	WWN-1	↓	↓	/2040	WWN-1	↓	↓	↓	↓	↓
↓	WWS-1	↓	↓	/2035	WWS-1	↓	↓	↓	↓	↓

RELINQUISHED BY	RECEIVED BY	DATE	TIME	REASON FOR TRANSFER
[illegible]	[illegible]	1/29/95	[illegible]	TAKE TO FEDEX

COMMENTS/INSTRUCTIONS
BECHTEL JOB # 23517-324
1) Send RR bills to NAS KEY WEST Adm
2) Fax RESULTS TO (305) 296-3347 (G

CONTAMINATION	YES	NO
Radiological		X
Chemical DIESEL Fuel		X

Shipper: [illegible] - FAX # [illegible] TOWNSEND AVENUE, NAS KEY WEST, FL 33040
Ship to: ENCO LABS, 9[illegible] [illegible] TAX CONSTANTINE, ZIP: JAX FL 32216
FEDEX
Airbill No. [illegible] Traffic Report No.

This package conforms to the conditions and limitations specified in 49 CFR 173.421 for excepted radioactive material, limited quantity, n.o.s. UN2910

O:\NAVY-RAC\COCR.NUM

5.0 PREBURN SAMPLE RESULTS

West Palm Beach, FL
Soil Recycling Facility

Magnum Environmental Services
SOIL DATA AND CERTIFICATION SHEET

Date: 2/9/98

Generator's Name: U.S. NAVY / NAS KEY WEST / COMMANDING OFFICER / PATSY MCNEILL
Mailing Address: PO BOX 9007, CODE 1883 PM
City: KEY WEST State: FL Zip: 33040
Contact Name: PATSY MCNEIL Phone: (305) 293-2583

Consultant/Engineering Firm:
Mailing Address:
City: State: Zip:
Contact: Phone:

Testing Laboratory: ENCO LABS
Contact: RICK CAMP Phone: (904) 296-3007

Sampling Procedure (attach additional sheet and maps)
☐ Samples taken in-situ ☒ Samples taken from stockpile

Site History: FUEL LINE LEAK AT THE INTERSECTION OF CAROLINE & WILLIAMS STREETS
Street Address: CAROLINE + WILLIAMS ST INTERSECTION
City: KEY WEST State: FL
Source of Contamination (UST, AST, Spill, Other): SEE ABOVE
Type of Contamination (Gas, Diesel, Waste Oil, etc.): PETROLEUM FUEL (BUNKER C)

Est. Quantity (Tons/Drums): 75 TONS

Classification:
☒ Nonhazardous
☐ Hazardous

Please check appropriate box below and attach all required analytical reports, including test methodologies used. Unless otherwise noted, composite samples should be collected with the following frequency: One (1) sample for 140 tons (100 cubic yards) or less; three (3) samples for 700 tons (500 cubic yards) or less; five (5) samples for 1400 tons (1000 cubic yards) or less; and one (1) additional sample for each additional 700 tons (500 cubic yards).

☒ I/We certify that the soil referenced herein is contaminated solely by virgin petroleum products from gasoline, diesel fuel, #2-6 fuel oils, jet fuel, or kerosene.

Attached is analytical data from a Florida state certified lab for the following:

1. Total Recoverable Petroleum Hydrocarbons (TRPH)
   - EPA Draft Method 9073 or
   - Petroleum Residual Organics FL-PRO
2. Volatile Aromatic Organics (BTEX)
   - EPA Methods 8020 or 8021
3. Volatile Organic Halocarbons (VOH)
   - EPA Methods 8010 or 8021
4. Total Metals
   - 8 RCRA metals (Arsenic, Barium, Chromium, Cadmium, Lead, Mercury, Selenium, Silver)
5. Additional tests as required

☐ I/We certify that the soil referenced herein is contaminated wholly or in part with non-virgin petroleum products, used oil, hydraulic oil, mineral oil, or some unknown source.

Attached is analytical data from a Florida state certified lab for the following:

1. Total Recoverable Petroleum hydrocarbons (TRPH)
   - EPA Draft Method 9073 or
   - Petroleum Residual Organics FL-PRO
2. Volatile Aromatic Organics (BTEX)
   - EPA Method 8020 or 8021
3. Volatile Organic Halocarbons (VOH)
   - EPA Method 8010 or 8021
4. Total Metals
   - 8 RCRA metals (Arsenic, Barium, Chromium, Cadmium, Lead, Mercury, Selenium, Silver)
5. Total Organic Halides (TOX)
   - EPA Methods 9020, 5050/92952, 5050/9253, 5050/9056
6. Polychlorinated Biphenyls (PCBs)
   - EPA Method 8080
7. Additional tests as required

No soils referenced herein may be delivered until the foregoing certificate is received and approved by Magnum, and Magnum issues manifests and assigns a delivery date. If any soils delivered to Magnum are found to be "hazardous waste" pursuant to federal or state regulations, Client shall be solely responsible for the removal of these soils from Magnum's facility. If Client fails to so remove such soils, Magnum, acting as Client's agent, may arrange for such removal at Client's expense.

"This is a complete and accurate description of the soil referenced herein; no deliberate or willful omissions have been made, and all known or suspected hazards have been disclosed herein. I/We further hereby certify that the soil is not "hazardous" as defined by U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA), state or local regulations, and that all samples have been taken according to a DEP approved Quality Assurance Plan. All required analytical reports are attached."

Generator's Signature: Michael J. Skinner
Print Name: MICHAEL J. SKINNER
Date: 2-9-98

Consultant's Signature:
Print Name:
Date:

TOTAL P.02

Environmental Conservation Laboratories
4810 Executive Park Court, Suite 211
Jacksonville, Florida 32216-6069
904 / 296-3007
Fax 904 / 296-6210

ENCO Laboratories

DHRS Certification No. E82277

CLIENT : Bechtel Environmental, Inc.
ADDRESS: NAS Jacksonville
P.O. Box 171
Jacksonville, FL 32215

REPORT # : JR9008
DATE SUBMITTED: February 7, 1998
DATE REPORTED : February 9, 1998

ATTENTION: Mr. Greg Olson

SAMPLE IDENTIFICATION

Samples submitted and
identified by client as:

NAS Key West

02/06/98

#1 - PB-1

PROJECT MANAGER _____
Scott D. Martin

ENCO LABORATORIES
REPORT # : JR9008
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

EPA METHOD 8010 - VOLATILE HALOCARBONS	PB-1		LAB BLANK	Units
Dichlorodifluoromethane	6.0 U	D1	1.0 U	µg/Kg
Chloromethane	12 U	D1	2.0 U	µg/Kg
Vinyl Chloride	6.0 U	D1	1.0 U	µg/Kg
Bromomethane	6.0 U	D1	1.0 U	µg/Kg
Chloroethane	12 U	D1	2.0 U	µg/Kg
Trichlorofluoromethane	12 U	D1	2.0 U	µg/Kg
1,1-Dichloroethene	6.0 U	D1	1.0 U	µg/Kg
Methylene Chloride	12 U	D1	2.0 I	µg/Kg
t-1,2-Dichloroethene	6.0 U	D1	1.0 U	µg/Kg
1,1-Dichloroethane	6.0 U	D1	1.0 U	µg/Kg
c-1,2-Dichloroethene	6.0 U	D1	1.0 U	µg/Kg
Chloroform	6.0 U	D1	1.0 U	µg/Kg
1,1,1-Trichloroethane	6.0 U	D1	1.0 U	µg/Kg
Carbon Tetrachloride	6.0 U	D1	1.0 U	µg/Kg
1,2-Dichloroethane	6.0 U	D1	1.0 U	µg/Kg
Trichloroethene	6.0 U	D1	1.0 U	µg/Kg
1,2-Dichloropropane	6.0 U	D1	1.0 U	µg/Kg
Bromodichloromethane	6.0 U	D1	1.0 U	µg/Kg
c-1,3-Dichloropropene	6.0 U	D1	1.0 U	µg/Kg
t-1,3-Dichloropropene	6.0 U	D1	1.0 U	µg/Kg
1,1,2-Trichloroethane	6.0 U	D1	1.0 U	µg/Kg
Tetrachloroethene	6.0 U	D1	1.0 U	µg/Kg
Dibromochloromethane	6.0 U	D1	1.0 U	µg/Kg
Chlorobenzene	6.0 U	D1	1.0 U	µg/Kg
Bromoform	6.0 U	D1	1.0 U	µg/Kg
1,1,2,2-Tetrachloroethane	6.0 U	D1	1.0 U	µg/Kg
1,3-Dichlorobenzene	6.0 U	D1	1.0 U	µg/Kg
1,4-Dichlorobenzene	6.0 U	D1	1.0 U	µg/Kg
1,2-Dichlorobenzene	6.0 U	D1	1.0 U	µg/Kg
Surrogate:	**% RECOV**		**% RECOV**	**LIMITS**
Bromofluorobenzene	100		95	30-153
Date Analyzed	02/08/98		02/08/98	

U = Compound was analyzed for but not detected to the level shown.
I = Analyte detected; value is between the Method Detection Level (MDL) and the Practical Quantitation Level (PQL).
DW = Analysis is reported on a "dry weight" basis.
D1 = Analyte value determined from a 1:5 dilution.

ENCO LABORATORIES
REPORT # : JR9008
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

EPA METHOD 8020 - VOLATILE AROMATICS	PB-1		LAB BLANK	Units
Methyl tert-butyl ether	12 U	D1	2.0 U	µg/Kg
Benzene	6.0 U	D1	1.0 U	µg/Kg
Toluene	6.0 U	D1	1.0 U	µg/Kg
Chlorobenzene	6.0 U	D1	1.0 U	µg/Kg
Ethylbenzene	6.0 U	D1	1.0 U	µg/Kg
m-Xylene & p-Xylene	6.0 U	D1	1.0 U	µg/Kg
o-Xylene	42	D1	1.0 U	µg/Kg
1,3-Dichlorobenzene	6.0 U	D1	1.0 U	µg/Kg
1,4-Dichlorobenzene	6.0 U	D1	1.0 U	µg/Kg
1,2-Dichlorobenzene	6.0 U	D1	1.0 U	µg/Kg
Surrogate:	% RECOV		% RECOV	LIMITS
Bromofluorobenzene	110		85	35-140
Date Analyzed	02/08/98		02/08/98	

MISCELLANEOUS	METHOD	PB-1	LAB BLANK	Units
Percent Solids	SM2540G	86	NR	%
Date Analyzed		02/09/98		

U = Compound was analyzed for but not detected to the level shown.
NR = Analysis not requested for this sample.
DW = Analysis is reported on a "dry weight" basis.
D1 = Analyte value determined from a 1:5 dilution.

ENCO LABORATORIES
REPORT # : JR9009
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

RESULTS OF ANALYSIS

TOTAL METALS	METHOD	PB-1	LAB BLANK	Units
Arsenic	6010	6.0	0.50 I	mg/Kg
Date Analyzed		02/09/98	02/09/98	
Barium	6010	700	20 U	mg/Kg
Date Analyzed		02/09/98	02/09/98	
Cadmium	6010	1.0 U	1.0 U	mg/Kg
Date Analyzed		02/09/98	02/09/98	
Chromium	6010	13	1.0 U	mg/Kg
Date Analyzed		02/09/98	02/09/98	
Lead	6010	100	1.0 U	mg/Kg
Date Analyzed		02/09/98	02/09/98	
Mercury	7471	0.11	0.010 U	mg/Kg
Date Analyzed		02/07/98	02/07/98	
Selenium	6010	2.0 U	2.0 U	mg/Kg
Date Analyzed		02/09/98	02/09/98	
Silver	6010	2.0 U	2.0 U	mg/Kg
Date Analyzed		02/09/98	02/09/98	

FL METHOD FLPRO - PETROL. RESIDUAL ORG.	PB-1	LAB BLANK	Units
Hydrocarbons (C8-C40)	1200 D2	3.3 U	mg/Kg
Surrogate:	% RECOV	% RECOV	LIMITS
o-Terphenyl	*	98	88-125
Date Extracted	02/08/98	02/08/98	
Date Analyzed	02/08/98	02/08/98	

* = Surrogate recovery unavailable due to matrix interference.
U = Compound was analyzed for but not detected to the level shown.
I = Analyte detected; value is between the Method Detection Level (MDL) and the Practical Quantitation Level (PQL).
DW = Analysis is reported on a "dry weight" basis.

ENCO LABORATORIES
REPORT # : JR9008
DATE REPORTED: February 9, 1998
PROJECT NAME : NAS Key West

QUALITY CONTROL DATA

Parameter	% RECOVERY MS/MSD/LCS	ACCEPT LIMITS	% RPD MS/MSD	ACCEPT LIMITS
EPA Method 8010				
Methylene Chloride	111/111/108	16-187	<1	27
Chloroform	108/109/ 97	50-153	<1	19
Carbon Tetrachloride	117/113/111	54-150	3	21
Trichloroethene	97/ 97/ 90	36-162	<1	26
Tetrachloroethene	111/106/ 98	56-148	5	21
Chlorobenzene	82/ 83/ 98	62-136	1	20
EPA Method 8020				
Benzene	84/ 93/ 93	53-143	10	20
Toluene	61/ 63/ 85	43-140	3	16
Ethylbenzene	*/ */ 88	39-133	*	16
o-Xylene	60/ 52/ 88	17-161	14	75
Total Metals				
Arsenic, 6010	95/ 92/ 95	67-118	3	12
Barium, 6010	99/ 97/ 98	70-120	2	16
Cadmium, 6010	96/ 95/ 96	69-119	1	12
Chromium, 6010	96/ 95/ 96	73-120	1	18
Lead, 6010	102/102/102	63-128	<1	26
Mercury, 7471	116/117/113	71-138	<1	13
Selenium, 6010	100/100/ 99	60-121	<1	14
Silver, 6010	100/ 96/ 97	69-118	4	10
PETROL. RESIDUAL ORG.				
Hydrocarbons (C8-C40)	104/112/ 82	50-150	7	0

Environmental Conservation Laboratories Comprehensive QA Plan #960038
* = MS/MSD/RPD unavailable due to high original sample concentration.
< = Less Than
MS = Matrix Spike
MSD = Matrix Spike Duplicate
LCS = Laboratory Control Standard
RPD = Relative Percent Difference

This report shall not be reproduced except in full, without the written approval of the laboratory. Results for these procedures apply only to the samples as submitted.

NAVY RAC CHAIN OF CUSTODY RECORD

Facility Name: NAS KEY WEST
Site Name: ALTONA ST. EXCAVATION
Delivery Order No.:
Cooler/Crate No.:
Sampling Event:: TAC-HOLD SAMPLING CAROLINE ST.

SEIR No.:
COC Number:
Lab: ENCO/AB
Field Logbook No.:
Logbook Pg. No.:

Sampled by: GREGORY M. CASON, JR. (Print) / [signature] (Sign) — (Print) — (Sign)

Legend

SAMPLE TYPE

PSB	Preservative Blank	BLS	Blind Spike
FDP	Field Duplicate	BLB	Blind Blank
ENV	Environmental	PTS	Point Source
FDB	Field Blank	FRP	Field Replicate
GEO	Geotechnical Sample	RSB	Rinsate Blank
MXD	Matrix Spike Duplicate	SPL	Split
MXS	Matrix Spike	TRP	Trip Blank

MATRIX

AIR	Air	SBS	Subsurface Soil	PTW	Potable Water
FLO	Flora	SED	Sediment	SEP	Seeps
FAU	Fauna	SFS	Surface Soil	SOL	Solid
GWT	Groundwater	SFW	Surface Water	WWT	Waste Water
LCH	Leachate	SLG	Sludge	SLW	Solid Waste
OIL	Oil	SLW	Solid Waste	SST	Surface Water Storm Event
DIW	Deionized Water	OFW	Organic Free Water		
DFW	Deionized Organic Free Water				

QC LEVELS

C	Sample results and QC reported
D	Sample results, QC and raw data reported
E	Sample results, blanks, and calibration reported
S	Screening level analysis; sample results and QC as reported

Station ID	BEI Sample ID	Sample Type	Matrix Code	Collection Date/Time	Container ID	Preservative	Pay Item	Parameter	Priority	QC Code
CS-SP	PB-1	ENV	SBS	2/5/96/0955	PB-1-01	COLD	N/A	8010/8020	24 HOURS	C
CS-ST	PB-1	ENV	SBS	/0959	PB-1-02	↓	↓	FLTRO	↓	↓
CS-SP	PB-1	ENV	SBS	↓ /1002	PB-1-03	↓	↓	RCRA 8	↓	↓
2/6/96	[signature]			DATE						

RELINQUISHED BY	RECEIVED BY	DATE	TIME	REASON FOR TRANSFER
[signature]	FEDEX	2/6/96	1200 HR	SHIP TO LAB FOR ANALYSIS

COMMENTS/INSTRUCTIONS
BECHTEL JOB # 22567-324

CONTAMINATION	YES	NO
Radiological		X
Chemical PETROLEUM	X	

Shipper: BEI; BATTELLE TECHNOLOGY HANAX; NAS KEY WEST; KEY WEST, FL 33040
Ship to: ENCO LAB; 4710 EXECUTIVE PARK COURT; SUITE 211; JAX, FL 32216

Airbill No. FEDEX # 8019533357 97 Traffic Report No.

This package conforms to the conditions and limitations specified in 49 CFR 173.421 for excepted radioactive material, limited quantity, n.o.s. UN2910

O:\NAVY-RAC\COCR.NUM

6.0 WASTE MANIFESTS

Shippe

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrie

ived, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consi (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the o destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, a portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed her law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted

TO: (Mail or street address of consignee for purposes of notification only.)

Consignee: MAGNUM ENVIRONMENTAL SVC.

Street: 1280 N.E. 48TH STREET

Destination: POMPANO, FL Zip: 33064

Route:

FROM:

Shipper: Naval A.

Street: Truman A.

Origin: Bldg. 112 Key

Delivering Carrier

Trailer Initial/Number

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group
01		Petroleum Soil Other			

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $

Subject to shipment is k without recc consignor sha The carrie shipment wit other lawful ch

the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight". ts. – where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. e agreed or declared value of the property is hereby ecifically stated by the shipper to be not exceeding _____ per _____

his is to certify that the above-named materials are properly classified, described, packaged, marked and beled, and are in proper condition for transportation according to the applicable regulations of the Department Transportation.

Per _____

PLACARDS REQUIRED

PLA SUP

SPECIAL INSTRUCTIONS:

PER: Naval Air Station

PER: Michael A. McNeil DATE: 1-29-92

CARRIER: MAGNUM ENV

PER: _____

EMERGENCY RESPONSE TELEPHONE NUMBER: (9

Monitored at all times the Hazardous Material is i

Permanent post office address of shipper

Manifest

Generator and/or Consultant

Date of Shipment: 9/11/93

Generator's Name and Billing Address
Commanding Office
NAS Key West
PO Box 9007, Code
Key West, FL 3304

Consultant's Name and Billing Addres
Bechtel
Building 112, PO
Truman Annex
Key West, FL 3304

Generation Site (Transport from): (nam
NAS Key West
Corner of Carolir

Key West, FL 000C

Designated Facility (Transport to): (nai
TTS/Magnum Enviro
9401 Fairgrounds

West Palm Beach,

Transporter Name and Mailing Addres
Soil Tech
14400 962nd Avenu

Miami, FL 33016

Description of Soil	Moistu
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10 10 - 2 20% -
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10 10 - 2 20% -

List any exception to items listed above:

Generator's and/or consultant's cer Sheet completed and certified by m any way.

Print or Type Name: Phillip Whiting

Transporter

Transporter's certification: I/We a condition as when received. I/We without off-loading, adding to, sub

Print or Type Name: Silvio O.

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt

Print or Type Name: Rebecca Piche

MAGNUM THERMAL REMEDIATION FACILITY
Non-Hazardous Soils

Manifest

Manifest #

Date of Shipment	Responsible for Payment:	Transporter Truck #:	Facility #:	Given by:	Load #
2/11/98		519			

Generator's Name and Billing Address: NAS Key West, PO Box 9007, Code 1823 PM, Key West, FL 33040 USA	Generator's Phone #: 2583	Generator's US EPA ID No.
	Person to Contact: [illegible]	
	FAX#:	Customer Account Number with TPS:
Consultant's Name and Billing Address: Building 112, PO Box 1518, Truman Annex, Key West, FL 33040 USA	Consultant's Phone #: 0449	
	Person to Contact: [illegible]	
	FAX#: (305) 296-3347	Customer Account Number with TPS:
Generation Site (Transport from): (name & address) NAS Key West, Corner of Caroline and Williams Street, Key West, FL 00000 USA	Site Phone #:	BTEX Levels
	Person to Contact:	TPH Levels
	FAX#:	AVG. Levels
Designated Facility (Transport to): (name & address) TPS/Magnum Environmental, 9401 Fairgrounds Road, West Palm Beach, FL 33411 USA	Facility Phone #: (561) 791-2006	Facility Permit Numbers
	Person to Contact: [illegible]	
	FAX#: (561) 791-0082	
Transporter Name and Mailing Address: 14400 10th Avenue, Miami, FL 33016 USA	Transporter's Phone #: 2362	Transporter's US EPA ID No.:
	Person to Contact: [illegible]	Transporter's DOT No.:
	FAX#: (305) [illegible]	Customer Account Number with TPS:

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					

List any exception to items listed above:

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Generator and/or Consultant

Print or Type Name: Phillip Williams — Generator ☐ Consultant ☐ — Signature and date: Phillip Williams — Month 2 Day 11 Year 98

Transporter

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: — Signature and date: — Month 2 Day 11 Year 98

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: Rebecca Piche — Signature and date:

GENERATOR / CONSULTANT'S COPY

MAGNUM THERMAL REMEDIATION FACILITY
Non-Hazardous Soils

Manifest

Manifest #

Date of Shipment:	Responsible for Payment:	Transporter Truck #:	Facility #:	Given by:	Load #
2/11/98	Consultant	92	505	00273	002

Generator and/or Consultant

Generator's Name and Billing Address: Consultant Pmt Center NAS Key West PO Box 9007: Code 1823 PM Key West FL 33040 USA	Generator's Phone #: (305) 292-2583 Person to Contact: Patsy McNeil FAX#:	Generator's US EPA ID No. Customer Account Number with TPS: NASKEYW
Consultant's Name and Billing Address: Brechtel Building 112, PO Box 1518 Truman Annex Key West, FL 33040 USA	Consultant's Phone #: (305) 304-0449 Person to Contact: Evan Moore FAX#: (305) 296-3347	Customer Account Number with TPS: EB098XX
Generation Site (Transport from): *(name & address)* NAS Key West Corner of Caroline and Williams Str Key West, FL 00000 USA	Site Phone #: Person to Contact: FAX#:	BTEX Levels TPH Levels AVG. Levels
Designated Facility (Transport to): *(name & address)* TPS/Magnum Environmental 9401 Fairgrounds Road West Palm Beach, FL 33411 USA	Facility Phone #: (561) 791-2006 Person to Contact: Bryan Garnant FAX#: (561) 791-0087	Facility Permit Numbers
Transporter Name and Mailing Address: Lopez Pan 14400 102nd Avenue Miami, FL 33016 USA	Transporter's Phone #: (305) 828-3362 Person to Contact: Raymond Mr Jales FAX#: (305) 828-9954	Transporter's US EPA ID No.: Transporter's DOT No.: Customer Account Number with TPS:

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					

List any exception to items listed above:

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name: Philip Williams Generator ☑ Consultant ☐ Signature and date: Philip Williams Month 2 Day 11 Year 98

Transporter

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: [illegible] Signature and date: [illegible] Month 2 Day 11 Year 98

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: Rebecca Piche Signature and date:

Please Print or Type

GENERATOR / CONSULTANT'S COPY

MAGNUM THERMAL REMEDIATION FACILITY
Non-Hazardous Soils

Manifest

Date of Shipment	Responsible for Payment:	Transporter Truck #:	Facility #:	Given by:	Load #
2/11/98	Consultant	511	005	00273	005

Generator and/or Consultant

Generator's Name and Billing Address: Commanding Officer, NAS Key West, PO Box 9007, Code 1883 PM, Key West, FL 33040 USA	Generator's Phone #: (305) 293-2583	Generator's US EPA ID No.
	Person to Contact: Patsy McNail	
	FAX#:	Customer Account Number with TPS: WASCETR
Consultant's Name and Billing Address: Bechtel, Building 112, PO Box 1518, Truman Annex, Key West, FL 33040 USA	Consultant's Phone #: (305) 294-0440	
	Person to Contact: [illegible]	
	FAX#: (305) 296-3347	Customer Account Number with TPS: BEC90XX
Generation Site (Transport from): *(name & address)* NAS Key West, Corner of Caroline and Williams Str[illegible], Key West, FL 00000 USA	Site Phone #:	BTEX Levels
	Person to Contact:	TPH Levels
	FAX#:	AVG. Levels
Designated Facility (Transport to): *(name & address)* TPS/Magnum Environmental, 9401 Fairgrounds Road, West Palm Beach, FL 33411 USA	Facility Phone #: (561) 791-2000	Facility Permit Numbers
	Person to Contact: [illegible]	
	FAX#: (561) 791-0082	
Transporter Name and Mailing Address: BART Tech, 14400 192nd Avenue, Miami, FL 33016 USA	Transporter's Phone #: (305) 525-2352	Transporter's US EPA ID No.:
	Person to Contact: Ramona Nijates	Transporter's DOT No.:
	FAX#: (305) 829-9254	Customer Account Number with TPS: (3272XX)

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					

List any exception to items listed above:

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name: Phillip Williams — Generator ☒ Consultant ☐ — Signature and date: Phillip Williams — Month 2 Day 11 Year 98

Transporter

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: — Signature and date: — Month 2 Day 11 Year 98

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: Kelsey Piche — Signature and date:

GENERATOR / CONSULTANT'S COPY

MAGNUM THERMAL REMEDIATION FACILITY
Non-Hazardous Soils

Manifest

Date of Shipment:	Responsible for Payment:	Transporter Truck #:	Facility #:	Given by:	Load #
2/11/98	Consultant	300	305	00273	003

Generator and/or Consultant

Generator's Name and Billing Address: Commanding Officer, NAS Key West, PO Box 9007, Code 1883 PM, Key West, FL 33040 USA	Generator's Phone #: (305) 292-2583	Generator's US EPA ID No.
	Person to Contact: Patsy McNeil	
	FAX#:	Customer Account Number with TPS: NASKEYW
Consultant's Name and Billing Address: Bechtel, Building 112, PO Box 1518, Truman Annex, Key West, FL 33040 USA	Consultant's Phone #: (305) 304-0449	
	Person to Contact: Sean Moore	
	FAX#: (305) 296 1347	Customer Account Number with TPS: E689BXX
Generation Site (Transport from): *(name & address)* NAS Key West, Corner of Caroline and Williams Str., Key West, FL 00000 USA	Site Phone #:	BTEX Levels
	Person to Contact:	TPH Levels
	FAX#:	AVG. Levels
Designated Facility (Transport to): *(name & address)* TPS/Magnum Environmental, 9401 Fairgrounds Road, West Palm Beach, FL 33411 USA	Facility Phone #: (561) 791-2006	Facility Permit Numbers
	Person to Contact: Brian Barnard	
	FAX#: (561) 791-0082	
Transporter Name and Mailing Address: Soil Tech, 14400 102nd Avenue, Miami FL 33016 USA	Transporter's Phone #: (305) 828-2362	Transporter's US EPA ID No.:
	Person to Contact: Ramond Mijares	Transporter's DOT No.:
	FAX#: (305) 828-0254	Customer Account Number with TPS:

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					

List any exception to items listed above:

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name: Phillip Williams — Generator ☒ Consultant ☐ — Signature and date: Phillip Williams — Month 2 Day 11 Year 98

Transporter

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: [illegible] — Signature and date: — Month — Day — Year

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: Rebecca Piche — Signature and date:

GENERATOR / CONSULTANT'S COPY

MAGNUM THERMAL REMEDIATION FACILITY
Non-Hazardous Soils

Manifest

Manifest #

Date of Shipment:	Responsible for Payment:	Transporter Truck #:	Facility #:	Generator:	Load #
2/11/98		341			

Generator's Name and Billing Address: NAS Key West PO Box 9001, Code 1883 PM Key West, FL 33040 USA	Generator's Phone #: 2583 Person to Contact: Patsy McNeil FAX#:	Generator's US EPA ID No. Customer Account Number with TPS:
Consultant's Name and Billing Address: Bechtel Building 112, PO Box 1518 Truman Annex Key West, FL 33040 USA	Consultant's Phone #: (305) 294-0419 Person to Contact: [illegible] FAX (305) 296-3347	 Customer Account Number with TPS:
Generation Site (Transport from): *(name & address)* NAS Key West Corner of Caroline and Williams Str[illegible] Key West, FL 00000 USA	Site Phone #: Person to Contact: FAX#:	BTEX Levels TPH Levels AVG. Levels
Designated Facility (Transport to): *(name & address)* TPS/Magnum Environmental 9401 Fairgrounds Road West Palm Beach, FL 33411 USA	Facility Phone #: (561) 791-2066 Person to Contact: Brian Bernard FAX (561) 791-0282	Facility Permit Numbers
Transporter Name and Mailing Address: Dade Paint 14400 102nd Avenue Miami, FL 33016 USA	Transporter's Phone #: 2362 Person to Contact: Ramond Mijares FAX (305) 928-0254	Transporter's US EPA ID No.: Transporter's DOT No.: Customer Account Number with TPS:

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					

List any exception to items listed above:

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Generator and/or Consultant

Print or Type Name: Phillip Williams — Generator ☒ Consultant ☐ — Signature and date: Phillip Williams — Month 2 Day 11 Year 98

Transporter

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: — Signature and date: — Month 2 Day 11 Year 98

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: Rebecca Piche — Signature and date:

GENERATOR / CONSULTANT'S COPY

MAGNUM THERMAL REMEDIATION FACILITY
Non-Hazardous Soils

Date of Shipment:	Responsible for Payment:	Transporter Truck #:	Facility #:	Given by:	Load #
	Consultant	341	305	00273	007

Generator and/or Consultant

Generator's Name and Billing Address: Commanding Officer, NAS Key West, PO Box 9007 Code 1803 PM, Key West, FL 33040 USA	Generator's Phone #: (305) 293 2583 Person to Contact: Patsy McNeil FAX#:	Generator's US EPA ID No. Customer Account Number with TPS: NASKEYW
Consultant's Name and Billing Address: Bechtel, Building 112, PO Box 1518, Truman Annex, Key West, FL 33040 USA	Consultant's Phone #: (305) 304 0449 Person to Contact: Stan Moore FAX#: (305) 296 3347	Customer Account Number with TPS: E6898XX
Generation Site (Transport from): *(name & address)* NAS Key West, Corner of Caroline and Williams Street, Key West, FL 00000 USA	Site Phone #: Person to Contact: FAX#:	BTEX Levels TPH Levels AVG. Levels
Designated Facility (Transport to): *(name & address)* TPS/Magnum Environmental, 9401 Fairgrounds Road, West Palm Beach, FL 33411 USA	Facility Phone #: (561)791 2006 Person to Contact: Brian Barnard FAX#: (561)791-0082	Facility Permit Numbers
Transporter Name and Mailing Address: Soil Tech, 14400 102nd Avenue, Miami, FL 33015 USA	Transporter's Phone #: (305) 828 2362 Person to Contact: Ramond Mijares FAX#: (305) 828 0254	Transporter's US EPA ID No.: Transporter's DOT No.: Customer Account Number with TPS: 1773XX

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					

List any exception to items listed above:

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name:	Generator ☐ Consultant ☐	Signature and date:	Month	Day	Year
Philip Williams		Philip Williams	2	12	96

Transporter

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name:	Signature and date:	Month	Day	Year

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name:	Signature and date:
Rebecca Piche	

GENERATOR / CONSULTANT'S COPY

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Document No. 07214

2. Page 1 of 1

MAC-POMPANO SCH., FL

3. Generator's Name and Mailing Address Naval Air Station Truman Annex Bldg. 112 Key West Fl 33040

COUNTY MONROE

4. Generator's Phone (305-) 296-8910

5. Transporter 1 Company Name: MAGNUM ENVIRONMENTAL SVC

6. US EPA ID Number: F L D 9 8 4 2 6 7 1 0

A. Transporter's Phone: 954-785-2320

7. Transporter 2 Company Name

8. US EPA ID Number

B. Transporter's Phone

9. Designated Facility Name and Site Address
MAGNUM ENVIRONMENTAL SVC.
1280 N.E. 48TH STREET
POMPANO, FL 33064

10. US EPA ID Number: F L D 9 8 4 2 6 7 1 0

C. Facility's Phone: 954-785-2320

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. COMBUSTIBLE LIQUID, N.O.S. 1993, PG III (DIESEL OIL)				
b.				
c. NON HAZARDOUS LIQUID, N.O.S. NON REGULATED (CONTAINS: oily waste water)	0001	T	0006.25	G
d. NON HAZARDOUS SOLID, N.O.S. NON REGULATED (CONTAINS:)				

D. Additional Descriptions for Materials Listed Above
11a) COMBUSTIBLE LIQUID, EXCEPTION § 173.150 GUIDE # 128

E. Handling Codes for Wastes Listed Above
11a
11b
11c
11d

15. Special Handling Instructions and Additional Information

(954) 785-2320

CHLORIDE SCREENING METHOD
LESS THAN 1000 PPM HALOGEN BEARER
LESS THAN 1000 PPM DEXSIL KIT

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name: Patricia A. McNeill
Signature: Patricia A. McNeill
Month 01 Day 23 Year 98

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Edwin Lielgoth
Signature:
Month 01 Day 27 Year 98

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.
MAGNUM ENVIRONMENTAL SVC.

Printed/Typed Name
Signature
Month Day Year

GENERATOR'S COPY

THIS MEMORANDUM or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper's No. BIL-1- 01662

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

received, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)	FROM:
Consignee MAGNUM ENVIRONMENTAL SVC.	Shipper
Street 1280 N. E. 48TH STREET	Street
Destination POMPANO, FL Zip 33068	Origin Zip
Route:	

Delivering Carrier	Trailer Initial/Number	U.S. DOT Hazmat Reg. Number

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column
001	XX	GASOLINE MIXTURE	3	UN1203	II				
		CONTAMINATED UNUSED PRODUCT							
		FOR RECOVERY							

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight". Note. – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED

PLACARDS SUPPLIED ☐ YES ☐ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE:

SPECIAL INSTRUCTIONS:

SHIPPER: [illegible] PER: mike [illegible] DATE: 12/15/97

CARRIER: MAGNUM ENVIRONMENTAL SVC. PER: [illegible] DATE: 12/15/97

EMERGENCY RESPONSE TELEPHONE NUMBER: (800) 235-0189

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604).

Permanent post office address of shipper

29-BLS-C4 (Rev. 6/95)

THIS MEMORANDUM is an acknowledgement that a bill of lading has been issued and is not the Original Bill of Lading, not a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper's No. MES-1- 01360

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

eived, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)

Consignee: MAGNUM ENVIRONMENTAL SVC.

Street: 1280 N.E. 48TH STREET

Destination: POMPANO, FL Zip: 33064

Route:

FROM:

Shipper: NAVAL AIR STATION KEY WEST

Street: BOCA CHICA, ENV.

Origin: Key West Fl. Zip: 33040

Delivering Carrier

Trailer Initial/Number: X 1443

U.S. DOT Hazmat Reg. Number

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column
24	X	[illegible]	3	[illegible]	[illegible]	[illegible]		[illegible]	

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight". Note. – where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED

PLACARDS SUPPLIED ☐ YES ☐ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE: [illegible]

SPECIAL INSTRUCTIONS:

SHIPPER: RAS Key West

PER: Mike Benner DATE: 1-27-98

CARRIER: MAGNUM ENVIRONMENTAL SVC.

PER: [illegible] DATE: 1-27-98

EMERGENCY RESPONSE TELEPHONE NUMBER: (954) 785-2320

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604).

Permanent post office address of shipper

29-BLS-C4 (Rev. 6/95)

V-2

MAGNUM INC.

orkorder No: J1972374-0035 Cust ID: E6898 Document No: 310

BILLING INFORMATION Terms: COD-CHECK Sched. Date: 12/15/97 Sched. Time: 08:00 Salesman: 8117 Customer PO:	Div : 1 Tech #: DON J Tech #: Tech #: Trk # : 34/V-3

Date Billed
BECHTEL CONSTRUCTION
PO BOX 1518

KEYWEST FL 33041
Phone: (305) 296-8910

SITE INFORMATION
NAVAL AIR STATION
TRUMBO PT
FUELING STATION
KEYWEST FL 33041

GENERATOR INFORMATION
NAVAL AIR STATION
TRUMAN ANNEX
FUELING STATION
KEYWEST FL 33041
Contact:

****

• • DIRECTIONS • •

PUMP OUT PCW FROM TANK

****

Location	Product	Approval #	Code
FRAC TANK	PCW (PETROLEUM CONTACT WATER)		02300

Description of work completed

Pump & DISPOSE OF 4700 GALS PCW

Item	Description	Qty	Cost

Manifest #: 01162 Manifest #: ________ Manifest #: ________

Upon completion of the job performed this area should be signed as acknowledgement of acceptance.

[signature]
Owner/Agent of the Owner

THIS SHIPPING ORDER must be legibly filled in, in ink, in indelible pencil, or in Carbon, and retained by the Agent

Shipper's No. BIL-1- 01661

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

ceived, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)	FROM:
Consignee MAGNUM ENVIRONMENTAL SVC.	Shipper Naval air station
Street 1280 N. E. 48TH STREET	Street Trumbo Pt
Destination POMPANO, FL Zip 33068	Origin Key West Fla Zip 33041
Route:	

Delivering Carrier	Trailer Initial/Number	U.S. DOT Hazmat Reg. Number
	V-2	

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column
	XX	GASOLINE MIXTURE	3	UN1203	II	04000	G		
001-TT		CONTAMINATED UNUSED PRODUCT							
		FOR RECOVERY							

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight". Note. – where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED Flammable

PLACARDS SUPPLIED ☒ YES ☐ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE: [signature]

SPECIAL INSTRUCTIONS:

SHIPPER: Naval air station

PER: [signature] DATE: 12-15-97

CARRIER: MAGNUM ENVIRONMENTAL SVC.

PER: [signature] DATE: 12-15-97

EMERGENCY RESPONSE TELEPHONE NUMBER: (800) 235-0189

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604).

Permanent post office address of shipper

29-BLS-C4 (Rev. 6/95)

Agent must detach and retain this Shipping Order and must sign the Original Bill of Lading

/v.3

MAGNUM INC.

Workorder No: J1972374-0034 Cust ID: E6898 Document No: 309

BILLING INFORMATION		Date Billed
Terms: COD-CHECK	Div : 1	BECHTEL CONSTRUCTION
Sched. Date: 12/15/97	Tech #: Sk	PO BOX 1518
Sched. Time: 08:00	Tech #:	
Salesman: S117	Tech #:	KEYWEST FL 33041
Customer PO:	Trk # : 36	Phone: (305) 296-8910

SITE INFORMATION	GENERATOR INFORMATION
NAVAL AIR STATION	NAVAL AIR STATION
TRUMBO PT	TRUMAN ANNEX
FUELING STATION	FUELING STATION
KEYWEST FL 33041	KEYWEST FL 33041
	Contact:

****

. . DIRECTIONS . .

GO TO BACK GATE OF FUEL FARM, IF NO ONE IS ONE SITE, START PUMPING PCW FROM FRAC TANK, APPROX. 9,300 GALLON. SOMEONE WILL BE ON SITE TO SIGN BETWEEN 8:30 - 9:00

****

Location	Product	Approval #	Code
FRAC TANK	PCW (PETROLEUM CONTACT WATER)		02300

Description of work completed

Pump from frac Tank 4000 gals

Item	Description	Qty	Cost

Manifest #: 01661 Manifest #: _____ Manifest #: _____

completion of the job performed this area should be signed as acknowledge-
...of acceptance.

Mike Stones

Owner/Agent of the Owner

98027

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. FL2.1.7.0.0.2.4.4.7.3 | Manifest Document No. 05835 | 2. Page 1 of 1 | MAC-1-POMPANO SCH., FL

3. Generator's Name and Mailing Address: Tank farm, Novo Gas Station, Tubo Pt. Cooling Station, Key West, Mo. 33040

COUNTY Monroe

4. Generator's Phone (305) 293 2583

5. Transporter 1 Company Name: MAGNUM ENVIRONMENTAL SVC.
6. US EPA ID Number: F.L.D.9.8.4.2.5.2.4.1.0
A. Transporter's Phone: 954-785-2320

7. Transporter 2 Company Name:
8. US EPA ID Number:
B. Transporter's Phone:

9. Designated Facility Name and Site Address: MAGNUM ENVIRONMENTAL SVC. 1280 N.E. 48TH STREET POMPANO, FL 33064
10. US EPA ID Number: F.L.D.9.8.4.2.5.2.4.1.0
C. Facility's Phone: 954-785-2320

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. COMBUSTIBLE LIQUID N.O.S. 1993, PG III (USED OIL)				
b.				
c. NON HAZARDOUS LIQUID, N.O.S. NON REGULATED (CONTAINS: [illegible])	0.1	DR	000.55	G
d. NON HAZARDOUS SOLID, N.O.S. NON REGULATED (CONTAINS: Absorbents)	0.9	DR	00 ~~155~~	P

D. Additional Descriptions for Materials Listed Above
11a) COMBUSTIBLE LIQUID, EXCEPTION § 173.150 GUIDE # 123

E. Handling Codes for Wastes Listed Above
11a
11b
11c
11d

15. Special Handling Instructions and Additional Information
(954) 785-2320
CHLORIDE SCREENING METHOD
LESS THAN 1000 PPM HALOGEN BREEDER
LESS THAN 1000 PPM DEXSIL KIT

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year
James Marquez	James Marquez	1.2	1.1	97

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Alton R. Hummel	Alton R. Hummel	1.2	1.1	97

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.
MAGNUM ENVIRONMENTAL SVC.

Printed/Typed Name	Signature	Month	Day	Year

GENERATOR

TRANSPORTER

FACILITY

GENERATOR'S COPY

98-11

MAGNUM INC.

Workorder No: J1972374-0033	Cust ID: E6898	Document No: 224

BILLING INFORMATION		Date Billed
Terms: COD-CHECK	Div : 1	BECHTEL CONSTRUCTION
Sched. Date: 12/11/97	Tech #: Alan	PO BOX 1518
Sched. Time:	Tech #:	
Salesman: S117	Tech #:	KEYWEST FL 33041
Customer PO:	Trk # : 26	Phone: (305) 296-8910

SITE INFORMATION	GENERATOR INFORMATION
NAVAL AIR STATION	NAVAL AIR STATION
TRUMBO PT	TRUMAN ANNEX
FUELING STATION	FUELING STATION
KEYWEST FL 33041	KEYWEST FL 33041
	Contact:

****

• • DIRECTIONS • •

PUMP OUT ~~6-7 DRUMS OF PETROLEUM CONTAMINATED~~ ABSORBENTS

****

Location	Product	Approval #	Code
	SLUDGES		06200

Description of work completed

pick up and dispose of ~~3~~ 6 Drums used Absorbents 1 Drum petroleum contaminated waters

Item	Description	Qty	Cost

Manifest #: ______ Manifest #: ______ Manifest #: ______

Upon completion of the job performed this area should be signed as acknowledgement of acceptance.

[signature]

Owner/Agent of the Owner

Took Test 98-11

Date of Shipment:	Responsible for Payment:	Transporter Truck #:	Facility #:	Given by:	Load #
	Generator	28	J05	00198 MMiles 98024	0021

Generator and/or Consultant

Generator's Name and Billing Address: Key West Naval Air Station Key West, FL 00000 USA	Generator's Phone #: 305 293 2583 Person to Contact: Patsy McNeill FAX#: 305 293 3542	Generator's US EPA ID No. FL2170024473 Customer Account Number with TPS: KEYWNAS
Consultant's Name and Billing Address: Magnum Environmental Div 1 1280 NE 48th Street Pompano Beach, FL 33064 USA	Consultant's Phone #: (954) 785-2320 Person to Contact: Dennis Williams FAX#:	Customer Account Number with TPS: C1657XX
Generation Site (Transport from): *(name & address)* Key West Naval Air Station Fueling Station Key West , FL 00000 USA	Site Phone #: 305 293 2583 Person to Contact: Patsy McNeill FAX#: 305 293 3542	BTEX Levels TPH Levels AVG. Levels
Designated Facility (Transport to): *(name & address)* TPS/Magnum Environmental 9401 Fairgrounds Road West Palm Beach, FL 33411 USA	Facility Phone #: (561)791-2006 Person to Contact: Brian Barnard FAX#: (561)791-0082	Facility Permit Numbers
Transporter Name and Mailing Address: Soil Tech 14400 102nd Avenue Miami, FL 33016 USA	Transporter's Phone #: (305) 828-2362 Person to Contact: Ramond Mijares FAX#: (305) 828-9254	Transporter's US EPA ID No.: Transporter's DOT No.: Customer Account Number with TPS: C1773XX

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☒	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☒	24 Tons	Petroleum contaminated soil			
Sand ☐ Organic ☐ Clay ☐ Other ☒	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☒					

List any exception to items listed above:

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name: James Marquez Generator ☒ Consultant ☐ Signature and date: Month 12 Day 11 Year 97

Transporter

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: Ruben Cabrales Signature and date: Month 12 Day 11 Year 97

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: Rebecca Piche Signature and date:

MAGNUM FACILITY COPY

Non-Hazardous Soils

Date of Shipment:	Responsible for Payment:	Transporter Truck #:	Facility #:	Given by:	Load #
	Generator	36	J05	00198 Manifest 99925	001

Generator's Name and Billing Address:
Key West Naval Air Station
Trumbo Point
Key West, FL 00000 USA

Generator's Phone #:
Person to Contact: 2583
Betsy McNeill
FAX#:
Generator's US EPA ID No.: FL2170024413
Customer Account Number with TPS: KEYWNAS

Consultant's Name and Billing Address:
Magnum Environmental Div 1
1280 NE 48th Street
Pompano Beach, FL 33064 USA

Consultant's Phone #: 2542
(954) 785-2320
Person to Contact:
Dennis Williams
FAX#:
Customer Account Number with TPS: C1657XX

Generation Site (Transport from): (name & address)
Key West Naval Air Station
Fueling Station
Trumbo Point
Key West, FL 00000 USA

Site Phone #:
Person to Contact: 2583
Betsy McNeill
FAX#:
BTEX Levels
TPH Levels
AVG. Levels

Designated Facility (Transport to): (name & address)
TPS/Magnum Environmental
9401 Fairgrounds Road
West Palm Beach, FL 33411 USA

Facility Phone #: 2542
(561)791-2006
Person to Contact:
Brian Barnard
FAX#:
(561)791-0082
Facility Permit Numbers

Transporter Name and Mailing Address:
Soil Tech
14400 102nd Avenue
Miami, FL 33016 USA

Transporter's Phone #:
(305) 828-2362
Person to Contact:
Ramond Mijares
FAX#:
(305) 828-9254
Transporter's US EPA ID No.:
Transporter's DOT No.:
Customer Account Number with TPS: C1773XX

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐	~~24~~	Petroleum Contaminated Soil			
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐	24				

List any exception to items listed above:

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name: Generator ☐ Consultant ☐ Signature and date: Month 12 Day 11 Year 97

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: Orr. H. Sizel Signature and date: Month 12 Day 11 Year 97

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: Rebecca Piche Signature and date:

Generator and/or Consultant — Transporter — Recycling Facility

MAGNUM FACILITY COPY

Non-Hazardous Soils

Date of Shipment:	Responsible for Payment:	Transporter Truck #:	Facility #:	Given by:	Load #
	Generator	245	J05	00198 98026	003

Generator's Name and Billing Address: Key West Naval Air Station Trumbo Point Key West, FL 00000 USA	Generator's Phone #: 305 293 2583 Person to Contact: Patsy McNeill FAX#: 305 293 2542	Generator's US EPA ID No.: FL2170024473 Customer Account Number with TPS: KEYWNAS
Consultant's Name and Billing Address: Magnum Environmental Div 1 1280 NE 48th Street Pompano Beach, FL 33064 USA	Consultant's Phone #: (954) 785-2320 Person to Contact: Dennis Williams FAX#:	Customer Account Number with TPS: C1657XX
Generation Site (Transport from): *(name & address)* Key West Naval Air Station Fueling Station Trumbo Point Key West, FL 00000 USA	Site Phone #: 305 293 2583 Person to Contact: Patsy McNeil FAX#: 293 2542	BTEX Levels TPH Levels AVG. Levels
Designated Facility (Transport to): *(name & address)* TPS/Magnum Environmental 9401 Fairgrounds Road West Palm Beach, FL 33411 USA	Facility Phone #: (561)791-2006 Person to Contact: Brian Barnard FAX#: (561)791-0082	Facility Permit Numbers
Transporter Name and Mailing Address: Soil Tech 14400 102nd Avenue Miami, FL 33016 USA	Transporter's Phone #: (305) 828-2362 Person to Contact: Ramond Mijares FAX#: (305) 828-9254	Transporter's US EPA ID No.: Transporter's DOT No.: Customer Account Number with TPS: C1773XX

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐	[illegible]	[illegible]	0	0	0
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐	0	0 0 0	0	0	0

List any exception to items listed above:

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils described in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name: James Marquez ALFREDO CONDE Generator ☒ Consultant ☐ Signature and date: [signature] Month 12 Day 11 Year 97

Transporter's certification: I/We acknowledge receipt of the soil described above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that this soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: ALFREDO CONDE Signature and date: [signature] Month 12 Day 11 Year 97

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: Rebecca Piche Signature and date:

Generator and/or Consultant — Transporter — Recycling Facility

MAGNUM FACILITY COPY

THIS MEMORANDUM or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper's No. MES-1- 01256

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

Received, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)	FROM:
Consignee MAGNUM ENVIRONMENTAL SVC.	Shipper Naval Air Station
Street 1280 N.E. 48TH STREET	Street Boca Chica
Destination POMPANO, FL Zip 33064	Origin Key West Fl. Zip 33041
Route:	

Delivering Carrier	Trailer Initial/Number	U.S. DOT Hazmat Reg. Number

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column
TT 001		Aviation Fuel/Water Mix	3 UN	1863	III	4500	6		

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is 'carrier's or shipper's weight'.
Note. – where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED

PLACARDS SUPPLIED ☐ YES ☐ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE:

SPECIAL INSTRUCTIONS:

PER: Naval Air Station DATE: 11-17-97

Permanent post office address of shipper

CARRIER: MAGNUM ENVIRONMENTAL SVC.

PER: _____ DATE: 11-17-97

EMERGENCY RESPONSE TELEPHONE NUMBER: (954) 785-2320

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604).

29-BLS-C4 (Rev. 6/95)

MAGNUM INC.

Workorder No: J1972374-0029 Cust ID: E6898 Document No: 50

BILLING INFORMATION	Div : 1	Date Billed
Terms: COD-CHECK	Tech #: DON J	BECHTEL CONSTRUCTION
Sched. Date: 11/17/97	Tech #:	PO BOX 1518
Sched. Time: 09:00	Tech #:	
Salesman: S117	Trk #: 34.V.2	KEYWEST FL 33041
Customer PO:		Phone: (305) 296-8910

SITE INFORMATION
NAVAL AIR STATION
TRUMAN ANNEX
KEYWEST FL 33041

GENERATOR INFORMATION
NAVAL AIR STATION
TRUMAN ANNEX
KEYWEST FL 33041
Contact:

****

. . DIRECTIONS . .

PUMP OUT FRAC TANK

****

Location	Product	Approval #	Code
ARRIVE 9:00		DEPART 1:30	

Description of work completed

MP & DISPOSE OF 1000 GALS PCW'S TROMBO POINT

PUMP & DISPOSE OF 3500 GALS PCW'S BOMA CHICA

Item	Description	Qty	Cost

Manifest #: ① 01250 Manifest #: ② 00631 Manifest #: ______

Upon completion of the job performed this area should be signed as acknowledgement of acceptance.

[signature]
Owner/Agent of the Owner

THIS MEMORANDUM is an acknowledgement that a Bill of Lading has been issued and is not the Original Bill of Lading, not a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper's No. MES-1- 00631

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

received, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)	FROM:
Consignee MAGNUM ENVIRONMENTAL SVC.	Shipper
Street 1280 N.E. 48TH STREET	Street
Destination POMPANO, FL Zip 33064	Origin Zip
Route:	

Delivering Carrier	Trailer Initial/Number	U.S. DOT Hazmat Reg. Number

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight". Note. – where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Charges Advanced $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED

PLACARDS SUPPLIED ☐ YES ☑ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE:

SPECIAL INSTRUCTIONS:

SHIPPER: [illegible] DATE: [illegible]

PER: [illegible]

Permanent post office address of shipper

CARRIER: MAGNUM ENVIRONMENTAL SVC.

PER: [illegible] DATE: [illegible]

EMERGENCY RESPONSE TELEPHONE NUMBER: (954) 785-2320

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604).

29-BLS-C4 (Rev. 6/95)

THIS MEMORANDUM is an acknowledgment that a bill of lading has been issued and is not the original bill of lading nor any copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper's No. MES-1- 01257

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

received, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)	FROM:
Consignee MAGNUM ENVIRONMENTAL SVC.	Shipper [illegible]
Street 1280 N.E. 48TH STREET	Street [illegible]
Destination POMPANO, FL Zip 33064	Origin [illegible] Zip [illegible]
Route:	

Delivering Carrier	Trailer Initial/Number	U.S. DOT Hazmat Reg. Number
	[illegible]	

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column
001		[illegible]		[illegible]					

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight". Note. - where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Charges Advanced $ _____

FREIGHT CHARGES ☐ Prepaid ☐ Collect

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED: FLAMMABLE

PLACARDS SUPPLIED: ☐ YES ☒ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE:

SPECIAL INSTRUCTIONS:

SHIPPER: [illegible]

PER: [signature] DATE: [illegible]

CARRIER: MAGNUM ENVIRONMENTAL SVC.

PER: [illegible] DATE: [illegible]

EMERGENCY RESPONSE TELEPHONE NUMBER: (954) 785-2320

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604).

Permanent post office address of shipper

29-BLS-C4 (Rev. 6/95)

MAGNUM INC.

orkorder No: J1972374-0028   Cust ID: E6898   Document No: 49

BILLING INFORMATION	Div : 1	Date Billed
Terms: COD-CHECK	Tech #: 46 Bill	BECHTEL CONSTRUCTION
Sched. Date: 11/17/97	Tech #:	PO BOX 1518
Sched. Time: 09:00	Tech #:	
Salesman: 8117	Trk #: 44 V-3	KEYWEST FL 33041
Customer PO:		Phone: (305) 296-8910

SITE INFORMATION
NAVAL AIR STATION
TRUMAN ANNEX
KEYWEST FL 33041

GENERATOR INFORMATION
NAVAL AIR STATION
~~TRUMAN ANNEX~~ Boca Chica
KEYWEST FL 33041
Contact:

****

• • DIRECTIONS • •

PUMP OUT FRAC TANK

****

Location	Product	Approval #	Code

Description of work completed

Arival 9:00 AM Depart 11:30 AM
Pumped & Disposed of 4500 Gals of PCW's
Boca Chica

Item	Description	Qty	Cost

Manifest #: NF5-1-01256-4506   Manifest #: ________   Manifest #: ________

Upon completion of the job performed this area should be signed as acknowledgement of acceptance.

[signature]
Owner/Agent of the Owner

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. N/A	Manifest Document No. 04389	2. Page 1 of 1	MAG-1-

3. Generator's Name and Mailing Address: Naval Air Station, Truman Annex 3 Bldg. U.S. Key West Fl

4. Generator's Phone ( )

COUNTY: Monroe

5. Transporter 1 Company Name	6. US EPA ID Number	A. Transporter's Phone
MAGNUM ENVIRONMENTAL SVC.	F.L.D.9.8.4.2.6.2.4.1.0	(954) 785-2320
7. Transporter 2 Company Name	8. US EPA ID Number	B. Transporter's Phone
9. Designated Facility Name and Site Address	10. US EPA ID Number	C. Facility's Phone
MAGNUM ENVIRONMENTAL SVC. 1280 N.E. 48TH STREET POMPANO, FL 33064	F.L.D.9.8.4.2.6.2.4.1.0	(954) 785-2320

GENERATOR

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. COMBUSTIBLE LIQUID N.O.S. N.A. 1993, PG III (USED OIL)				
b.				
c. NON HAZARDOUS LIQUID, N.O.S. NON REGULATED (CONTAINS: Oily water-auto)	001	T.F	03200	G
d. NON HAZARDOUS SOLID, N.O.S. NON REGULATED (CONTAINS:)				

D. Additional Descriptions for Materials Listed Above

11a) COMBUSTIBLE LIQUID, EXCEPTION § 173.150 GUIDE #128

E. Handling Codes for Wastes Listed Above
11a
11b
11c 120 A
11d

15. Special Handling Instructions and Additional Information

(954) 785-2320

CHLORIDE SCREENING METHOD
LESS THAN 1000 PPM HALOGEN BEEPER
LESS THAN 1000 PPM DEXSIL KIT

Phillip Williams Phillip Williams

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year
X	X	11	13	97

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Edwin Delgado	Edwin Delgado	11	13	97

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

MAGNUM ENVIRONMENTAL SVC.

Printed/Typed Name	Signature	Month	Day	Year

GENERATOR'S COPY

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N/A

Manifest Document No. 03746

2. Page 1 of 1

MAG-1

3. Generator's Name and Mailing Address
Naval Air Station
Truman Annex 3 Bldg 113
Key West Fl.

4. Generator's Phone ( )

COUNTY Monroe

5. Transporter 1 Company Name
MAGNUM ENVIRONMENTAL SVC.

6. US EPA ID Number
F.L.D.9.8.4.2.6.2.4.1.0

A. Transporter's Phone
(954) 785-2320

7. Transporter 2 Company Name

8. US EPA ID Number

B. Transporter's Phone

9. Designated Facility Name and Site Address
MAGNUM ENVIRONMENTAL SVC.
1280 N.E. 48TH STREET
POMPANO, FL 33064

10. US EPA ID Number
F.L.D.9.8.4.2.6.2.4.1.0

C. Facility's Phone
(954) 785-2320

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. COMBUSTIBLE LIQUID N.O.S. N.A. 1993, PG III (USED OIL)				
b.				
c. NON HAZARDOUS LIQUID, N.O.S. NON REGULATED (CONTAINS: only water with)	001	T.T	0320	G
d. NON HAZARDOUS SOLID, N.O.S. NON REGULATED (CONTAINS:)				

D. Additional Descriptions for Materials Listed Above
11a) COMBUSTIBLE LIQUID, EXCEPTION § 173.150 GUIDE #128

E. Handling Codes for Wastes Listed Above
11a
11b
11c 120 G
11d

15. Special Handling Instructions and Additional Information
(954) 785-2320
CHLORIDE SCREENING METHOD
LESS THAN 1000 PPM HALOGEN BEEPER
LESS THAN 1000 PPM DEXSIL KIT

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year
x Philip Williams	x Philip Williams	11	13	97

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Edwin Delgado / F.D. FRED CHIDSEY		11	13	97

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.
MAGNUM ENVIRONMENTAL SVC.

Printed/Typed Name	Signature	Month	Day	Year

GENERATOR'S COPY

THIS SHIPPING ORDER must be legibly filled in, in Ink, in Indelible Pencil, or in Carbon, and retained by the Agent

Shipper's No. MES-1- 01250

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

ived, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)	FROM:
Consignee MAGNUM ENVIRONMENTAL SVC.	Shipper Naval Air Station
Street 1280 N.E. 48TH STREET	Street ~~Truman Annex~~ Trumbo Point
Destination POMPANO, FL Zip 33064	Origin Keywest Fl. Zip 33041
Route:	

Delivering Carrier	Trailer Initial/Number	U.S. DOT Hazmat Reg. Number

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column
TT 001		Aviation Fuel / Water Mix	3	1863	III	4000	G		

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight". Note. – where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED YES

PLACARDS SUPPLIED ☐ YES ☒ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE: [signature]

SPECIAL INSTRUCTIONS:

SHIPPER: Naval Air Station

PER: Patricia A. McNeill DATE: 11-12-97

CARRIER: MAGNUM ENVIRONMENTAL SVC.

PER: [signature] DATE: 11-12-97

EMERGENCY RESPONSE TELEPHONE NUMBER: (954) 785-2320

Permanent post office address of shipper

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604).

29-BLS-C4 (Rev. 6/95)

Agent must detach and retain this Shipping Order and must sign the Original Bill of Lading.

MAGNUM INC.

Workorder No: J1972374-0026   Cust ID: E6898   Document No: 18

ILLING INFORMATION		Date Billed
Terms: COD-CHECK	Div : 1	BECHTEL CONSTRUCTION
Sched. Date: 11/12/97	Tech #: 46 Bill	PO BOX 1518
Sched. Time: 08:00	Tech #:	
Salesman: S117	Tech #:	KEYWEST FL 33041
Customer PO:	Trk # : 44 V-3	Phone: (305) 296-8910

SITE INFORMATION
NAVAL AIR STATION
TRUMAN ANNEX
KEYWEST FL 33041

GENERATOR INFORMATION
NAVAL AIR STATION
TRUMAN ANNEX
KEYWEST FL 33041
Contact:

****

• • DIRECTIONS • •

PUMP OUT FRAC TANK

****

Location	Product	Approval #	Code

Description of work completed

Pumped & Disposed of 4000 Gals of P.C.W.
Stand by 10:15 AM till 12:50 pm

Item	Description	Qty	Cost

Manifest #: MES-1-01250-4000 Manifest #: ________ Manifest #: ________

Upon completion of the job performed this area should be signed as acknowledgement of acceptance.

Patricia A. McNeil
Owner/Agent of the Owner

THIS SHIPPING ORDER Carbon, and retained by the Agent

Shipper's No. MES-1- 01248

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

Received, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)	FROM:
Consignee MAGNUM ENVIRONMENTAL SVC.	Shipper Naval air station
Street 1280 N.E. 48TH STREET	Street Trumbo Point
Destination POMPANO, FL Zip 33064	Origin Key West Fla Zip 33041
Route:	

Delivering Carrier	Trailer Initial/Number V-2	U.S. DOT Hazmat Reg. Number

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column
001-TT		aviation fuel / water mix	3	1863	3	04000	G		

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $ _____

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight". Note. – where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED Hernandez PLACARDS SUPPLIED ☑ YES ☐ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE: [signature]

SPECIAL INSTRUCTIONS:

PER: Naval air station
PER: Patricia A. McNeill DATE: 11-12-97

CARRIER: MAGNUM ENVIRONMENTAL SVC.
PER: [signature] DATE: 11-12-97

EMERGENCY RESPONSE TELEPHONE NUMBER: (954) 785-2320

Permanent post office address of shipper

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604).

29-BLS-C4 (Rev. 6/95)

Agent must detach and retain this Shipping Order and must sign the Original Bill of Lading.

MAGNUM INC.

Workorder No: J1972374-0025. Cust ID: E6898 Document No: 17

BILLING INFORMATION		Date Billed
Terms: COD-CHECK	Div : 1	BECHTEL CONSTRUCTION
Sched. Date: 11/12/97	Tech #: Frank	PO BOX 1518
Sched. Time: 08:00	Tech #:	
Salesman: S117	Tech #:	KEYWEST FL 33041
Customer PO:	Trk # : 36-V-2	Phone: (305) 296-8910

SITE INFORMATION
NAVAL AIR STATION
TRUMAN ANNEX
KEYWEST FL 33041

GENERATOR INFORMATION
NAVAL AIR STATION
TRUMAN ANNEX
KEYWEST FL 33041
Contact:

****

• • DIRECTIONS • •

PUMP OUT FRAC TANK

****

Location	Product	Approval #	Code

Description of work completed

Pump out frac tank 1 load @ 4000 gals
Stand By 10:15am — 12:50pm

Item	Description	Qty	Cost

Manifest #: 01248 Manifest #: ____ Manifest #: ____

Upon completion of the job performed this area should be signed as acknowledgement of acceptance.

Patricia A. McNeill
Owner/Agent of the Owner

THIS SHIPPING ORDER Carbon, and retained by the Agent

Shipper's No. MES-1- 01243

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

ived, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date _____ from _____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)	FROM:
Consignee MAGNUM ENVIRONMENTAL SVC.	Shipper Naval air station
Street 1280 N.E. 48TH STREET	Street Truman Point
Destination POMPANO, FL Zip 33064	Origin Key West Fla Zip
Route:	

Delivering Carrier	Trailer Initial/Number	U.S. DOT Hazmat Reg. Number
	V-2	

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column
001-T		aviation fuel / Water MIX	3	1863	3	04500	G		

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight". Note. – where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby _____ per _____ specifically stated by the shipper to be not exceeding _____

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED Flammable PLACARDS SUPPLIED ☑ YES ☐ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE: [signature]

SPECIAL INSTRUCTIONS:

SHIPPER: Naval air station

PER: James J Mulqueen DATE: 11-7-97

Permanent post office address of shipper

CARRIER: MAGNUM ENVIRONMENTAL SVC.

PER: [signature] DATE: 11-7-97

EMERGENCY RESPONSE TELEPHONE NUMBER: (954) 785-2320

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604)

29-BLS-C4 (Rev. 6/95)

Agent must detach and retain this Shipping Order and must sign the Original Bill of Ladi

MAGNUM INC.

rkorder No: J1972562-0002 Cust ID: E6577 Document No: 7

BILLING INFORMATION
Terms: 2%-15, NET 30
Sched. Date: 11/07/97
Sched. Time:
Salesman: S117
Customer PO:4096

Div : 1
Tech #: Ted
Tech #:
Tech #:
Trk # : 56/V.2

Date Billed
FLOWMORE SERVICES
PO BOX 692085-300
ATTN: ACCTS PAYABLE
HOUSTON TX 77269
Phone: (281) 351-7979

SITE INFORMATION
NAVAL AIR STATION
TRUMAN POINT
KEY WEST FL 00000

GENERATOR INFORMATION
NAVAL AIR STATION
TRUMAN POINT
KEY WEST FL 00000
Contact:

. . DIRECTIONS . .

PUMP OUT PRODUCT FROM FRAC TANK - STICK TANK FOR FUEL - TAKE FUEL, PUMP OVER TOP. TRUMBO POINT - GO LEFT FOLLOW TO END TAKE RIGHT AND THEN QUICK LEFT - SEE FUEL FARM

Location	Product	Approval #	Code

Description of work completed

Pump out fuel from frac tank 4500 gals aviation fuel/water.

Item	Description	Qty	Cost

Manifest #: 01243 Manifest #: _____ Manifest #: _____

Upon completion of the job performed this area should be signed as acknowledgement of acceptance.

James J Mahoney
Owner/Agent of the Owner

THIS MEMORANDUM ... or duplicate, covering the property named herein, and is intended solely for filing or record.

Shipper's No. MES-1- 01262

(Carrier) MAGNUM ENVIRONMENTAL SVC. SCAC. _____ Carrier's No. FLD-984-262-410

...eived, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at _____, date 11-18-97 from FMC Tanker

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)

Consignee: MAGNUM ENVIRONMENTAL SVC.

Street: 1280 N.E. 48TH STREET

Destination: POMPANO, FL. Zip: 33064

Route:

FROM:

Shipper: NAVAL AIR STATION

Street: TRUMAN POINT / BOCA CHICA

Origin: BOCA CHICA, FL. Zip:

Delivering Carrier

Trailer Initial/Number: 33-436

U.S. DOT Hazmat Reg. Number

No. of packages	HM	Description of articles, special marks, and exceptions	Hazard Class	I.D. Number	Packing Group	*Weight (subject to correction)	Class or rate	Labels required (or exemption)	Check column
001 T.L.	X	J.P. 5 Mixture Petroleum Contact Waters.	3	1863	III	1,270	G		
		2300							

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is 'carrier's or shipper's weight'. Note. – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per _____

PLACARDS REQUIRED: Yes

PLACARDS SUPPLIED: ☐ YES ☒ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE: [signature]

SPECIAL INSTRUCTIONS:

SHIPPER: NAVAL AIR STATION

PER: [signature] DATE: 11-18-97

CARRIER: MAGNUM ENVIRONMENTAL SVC.

PER: [signature] DATE: 11-18-97

EMERGENCY RESPONSE TELEPHONE NUMBER: (954) 785-2320

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (§172.604).

Permanent post office address of shipper

29-BLS-C4 (Rev. 6/95)

MAGNUM INC.

orkorder No: J1972562-0003 Cust ID: E6577 Document No: 12

BILLING INFORMATION Terms: 2%-15, Net 30 Sched. Date: 11/18/97 Sched. Time: Salesman: S117 Customer PO:	Div : 1 Tech #: AL Tech #: Toby Tech #: Trk # : 53436
Date Billed FLOWMORE SERVICES PO BOX 692085-300 ATTN: ACCTS PAYABLE HOUSTON TX 77269 Phone: (281) 351-7979	

SITE INFORMATION
NAVAL AIR STATION
TRUMAN POINT
KEY WEST FL 00000

GENERATOR INFORMATION
NAVAL AIR STATION
TRUMAN POINT
KEY WEST FL 00000
Contact:

****

• • DIRECTIONS • •

PUMP OUT AND PRESSURE WASH 2 FRAC TANKS. CALL BECHTEL AT 305/296-9910 WHEN YOU LEAVE KEY WEST WITH ETA TO BOCA CHICA

****

Location	Product	Approval #	Code
FRAC TANKS	PCW (PETROLEUM CONTACT WATER)		02300

Description of work completed

3 HR Travel. Start. 1315 pm End 2 HR. min. Removed and Dispose of 1278 Gal Petroleum Contact water from #1 Frac Tank. Pressure washed Clean. used 1 Gal. of Degreaser. (#1 Removal Fee)

Item	Description	Qty	Cost

Manifest #: 01262 Manifest #: _____ Manifest #: _____

Upon completion of the job performed this area should be signed as acknowledgement of acceptance.

Owner/Agent of the Owner

APPENDIX B

FIELD DATA FORMS

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Carolina/Cool/Hanes St
Project No.: 13855

[ ] Domestic Well Data
[✓] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: [illegible]-MW1-09
Sample Location: MW
Sampled By:
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 10/08/2009	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2	H_2S	Fe +2
Time: 1000										
Method: P. Pump	Clear	7.52	23.4	30.8	80.0					

PURGE DATA

Date: 8-22-09	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity
Method: P. Pump	Initial	7.54	~~305~~ 24.4	30.5	173.1	13.45	1.5
Monitor Reading (ppm):	1	7.50	~~309~~ 23.4	30.9	96.1	13.4	1.5
Well Casing Diameter: 2.0	2	7.52	23.3	30.8	81.6	13.50	1.5
Well Casing Material: PVC	3	7.52	23.4	30.8	80.0	13.55	1.5
Total Well Depth (TD): 12.4							
Static Water Level (WL): 1.94							
One Casing Volume(gal/L): 1.67							
Start Purge (hrs): 08:25							
End Purge (hrs): 0930							
Total Purge Time (min): 55							
Total Vol. Purged (gal/L): 5.0							

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Carolina Williams St
Project No.: 13955

[ ] Domestic Well Data
[✓] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: CWILLIAM-GW-MW2-0
Sample Location: MW2
Sampled By: SI
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2	H_2S	Fe +2
Date: 8-22-01										
Time: 11:55										
Method: P-Pump	Clear	7.2	38.6	31.3	28.0					

PURGE DATA

	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity
Date: 8-22-01							
Method: P. Pump	Initial	7.17	46.1	30.0	2210	9.40	2.6
Monitor Reading (ppm):	1	7.19	37.3	31.6	44.4	9.48	2.4
Well Casing Diameter: 2.0	2	7.20	39.0	31.3	28.3	9.51	2.4
Well Casing Material: PVC	3	7.20	38.6	31.3	28.0	9.50	2.4
Total Well Depth (TD): 12.4							
Static Water Level (WL): 1.59							
One Casing Volume(gal/L): 1.70							
Start Purge (hrs): 1040							
End Purge (hrs): 1140							
Total Purge Time (min): 60							
Total Vol. Purged (gal/L): 5.1							

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Carline/Gaillard St
Project No.: N 3452

[ ] Domestic Well Data
[✓] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: GW-BW-GW-MW3-001
Sample Location: MW 3
Sampled By: SV
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 8-22-9	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2	H_2S	Fe +2
Time: 1400										
Method: P-Pump	milky	7.50	18.9	29.9	124.0					

PURGE DATA

Date: 8-22-01	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity			
Method: P-Pump	Initial	7.43	16.3	30.1	238.1	13.35	1.0			
Monitor Reading (ppm):	1	7.54	17.6	29.9	145.2	15.30	1.0			
Well Casing Diameter: 2.0	2	7.52	17.3	29.9	120.2	15.63	1.0			
Well Casing Material: PVC	3	7.50	18.9	29.9	124.0	15.52	1.0			
Total Well Depth (TD): 12.4										
Static Water Level (WL): 6.78										
One Casing Volume(gal/L): 1.7										
Start Purge (hrs): 1245										
End Purge (hrs): 1345										
Total Purge Time (min): 60										
Total Vol. Purged (gal/L): 5.1										

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.: CWISW-GW-DUP1-001	

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Carline/Williams St
Project No.: A3859

[ ] Domestic Well Data
[Y] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: CWKW 6W MW4 W
Sample Location: MW4
Sampled By: SV
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 082201	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2	H_2S	Fe +2
Time: 0600 0710										
Method: PAM Pump	milky	7.34	39.1	30.6	672.2	10.75	2.		1	

PURGE DATA

Date: 8-22-01	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity
Method: PAM Pump	Initial	7.29	41.2	30.1	704.0	10.63	2.7
Monitor Reading (ppm):	1	7.33	38.9	30.6	680.3	10.71	2.7
Well Casing Diameter: 2.0	2	7.34	39.0	30.6	671.5	10.73	2.7
Well Casing Material: PVC	3	7.34	39.1	30.6	672.2	10.75	2.7
Total Well Depth (TD): 12.4							
Static Water Level (WL): 1.85							
One Casing Volume(gal/L): 1.68							
Start Purge (hrs): 0600							
End Purge (hrs): 0700							
Total Purge Time (min): 60							
Total Vol. Purged (gal/L): 5.5							

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Carding + Willow St
Project No.: 3659

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: CWKW-GW-MW03-002
Sample Location: MW03
Sampled By: GB
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 11/8/01	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2	H_2S	Fe +2
Time: 10:00										
Method: low flow	clear	7.30	14.9	29.41	25.3	0.23	0.9	N/A	N/A	N/A

PURGE DATA

Date: 11/8/01	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	ORP		
Method: Peristaltic	Initial	7.31	13.8	29.41	75.6	1.88	0.8	-84		
Monitor Reading (ppm):	1	7.29	14.9	29.42	61.6	0.59	0.9	-102		
Well Casing Diameter: 2.0	2	7.30	14.9	29.48	49.3	0.28	0.9	-108		
Well Casing Material: PVC	3	7.31	15.0	29.43	38.6	0.22	0.9	-112		
Total Well Depth (TD): 12.0		7.31	14.9	29.42	25.6	0.22	0.9	-110		
Static Water Level (WL):		7.30	14.9	29.42	25.2	0.22	0.9	-111		
One Casing Volume(gal/L):		7.30	14.9	29.41	25.3	0.23	0.9	-111		
Start Purge (hrs): 9:10										
End Purge (hrs): 10:00										
Total Purge Time (min): 50										
Total Vol. Purged (gal/L): 5.0										

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
8260			
EDB			
PAH			
TRPH			
Lead			
Anions			
Methane	4/4	4/40ml vials	

OBSERVATIONS / NOTES

Circle If Applicable:

MS/MSD	Duplicate ID No.: CWKW-GW-DUP1-002

Signature(s): Gary Burgess

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Caroline + William St
Project No.: 3859

[ ] Domestic Well Data
[✓] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: CWKW-GW-MW04-002
Sample Location: MW 04
Sampled By: SB
C.O.C. No.:
Type of Sample:
[✓] Low Concentration
[ ] High Concentration

SAMPLING DATA

	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2	H_2S	Fe +2
Date: 11/8/01										
Time: 8:50										
Method: Peristaltic	clear	7.55	27.6	30.61	21.5	0.00	1.7	N/A	N/A	N/A

PURGE DATA

	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	ORP		
Date: 11/8/01										
Method: Peristaltic	Initial	7.28	25.2	30.72	76.2	1.2	1.6%	-171		
Monitor Reading (ppm):	1	7.44	27.7	30.75	44.8	0.00	1.7	-219		
Well Casing Diameter: 2"	2	7.49	28.3	30.64	32.6	0.00	1.8	-238		
Well Casing Material: PVC	3	7.52	27.4	30.64	26.1	0.00	1.7	-241		
Total Well Depth (TD): 12.40		7.54	27.6	30.62	21.7	0.00	1.7	-245		
Static Water Level (WL):		7.54	27.5	30.62	21.5	0.00	1.7	-244		
One Casing Volume(gal/L):		7.55	27.6	30.61	21.5	0.00	1.7	-242		
Start Purge (hrs): 7:45										
End Purge (hrs): 8:45										
Total Purge Time (min): 60										
Total Vol. Purged (gal/L): 5.0										

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
8260		3 40 ml V.	
EDB	H	2	
PAH	—	2	
TRPH	HCl.	2	
Lead		1	
Anions		1	

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Gary Burgess

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Caroline + William St.
Project No.: 3258

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: CWKW-GW-MW01-002
Sample Location: CW-MW01
Sampled By: GB
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2 ORP	H_2S	Fe +2
Date: 11/8/01										
Time: 7:45										
Method: Peristaltic pump	clear	7.40	31.1	29.1	22.4	1.45	0.9	-134		

PURGE DATA

Date: 11/8/01	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	ORP		
Method: Peristaltic pump	Initial	7.35	27.6	28.6	65.8	1.21	0.5	-142		
Monitor Reading (ppm):	1	7.41	28.0	28.8	35.4	1.44	0.6	-141		
Well Casing Diameter: 2"	2	7.43	30.2	28.9	30.6	1.44	0.6	-146		
Well Casing Material: PVC	3	7.42	31.1	28.9	22.2	1.56	0.8	-143		
Total Well Depth (TD): ≈20.		7.41	31.2	29.1	22.4	1.56	0.8	-135		
Static Water Level (WL): 1.24		7.41	31.2	29.0	22.4	1.48	0.9	-136		
One Casing Volume(gal/L):		7.42	31.1	29.1	22.6	1.62	0.9	-136		
Start Purge (hrs): 6:50		7.40	31.1	29.1	22.4	1.45	0.9	-134		
End Purge (hrs): 9:40										
Total Purge Time (min): 50										
Total Vol. Purged (gal/L): 5										

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
8260			
EDB			
PAH			
TRPH			
Lead			

OBSERVATIONS / NOTES

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Gary Burgess

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Caroline + William St
Project No.: 3958

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: CWKW-GW-MW02-002
Sample Location: CW-MW03
Sampled By: GB
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 11/8/01	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2	H_2S	Fe +2
Time: 6:30										
Method: Peristaltic low flow	clear	7.41	20.6	28.47	24.5	0.41	2.1	N/C	N/C	N/C

PURGE DATA

Date: 11/8/01	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	ORP		
Method: Peristaltic	Initial	7.35	20.5	28.20	80.4	1.20	1.8	-121		
Monitor Reading (ppm):	1	7.42	21.6	28.44	53.2	0.98	2.0	-156		
Well Casing Diameter: 2"	2	7.40	21.5	28.41	28.1	0.95	2.1	-165		
Well Casing Material: PVC	3	7.41	21.4	28.45	25.6	0.45	2.0	-172		
Total Well Depth (TD): ≈12.0		7.40	20.7	28.46	24.7	0.41	2.0	-170		
Static Water Level (WL): 0.95		7.41	20.6	28.46	24.5	0.42	2.0	-175		
One Casing Volume(gal/L):		7.41	20.6	28.47	24.5	0.41	2.1	-175		
Start Purge (hrs): 5:25										
End Purge (hrs): 6:30										
Total Purge Time (min): 1:05										
Total Vol. Purged (gal/L): ≈5.0										

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
8260		3	✓
EDB		2	✓
PAH		2	✓
TRPH		2	✓
Lead		1	✓
Anions		1	✓

OBSERVATIONS / NOTES

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Gary Burger

BORING LOG

PROJECT NAME: Caroline + William St.
PROJECT NUMBER: 3859
DRILLING COMPANY: US Drilling
DRILLING RIG: CME

BORING NUMBER: CW-MW01
DATE: 8/8/01
GEOLOGIST: Gary Bruce
DRILLER: Mark Tanes

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1			1ft			Asphalt, fill material						
							Limestone, beige		moist	Ø	Ø	Ø	Ø
							to white, moderately		saturated.				
							consolidate, oolitic,						
	5						high porosity, minor			Ø	Ø	Ø	Ø
							shell fragments						
							↓						
										Ø	Ø	Ø	Ø
	10									Ø	Ø	Ø	Ø
	12												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ____ Well I.D. #: CW-MW01

BORING LOG

PROJECT NAME: Caroline + William St
PROJECT NUMBER: 3859
DRILLING COMPANY: US Drilling
DRILLING RIG: CME

BORING NUMBER: MW02
DATE: 8/8/01
GEOLOGIST: Gary Bragg Jr
DRILLER: Mark James

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1			1ft			Asphalt, road fill material						
							limestone, beige			Ø	Ø	Ø	Ø
							oolitic, highly porous						
							moderately consolidated						
	5									Ø	Ø	Ø	Ø
										Ø	Ø	Ø	Ø
	10									Ø	Ø	Ø	Ø
	12												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: CW-MW02

PROJECT NAME: Cardine + Willian St
PROJECT NUMBER: 3859
DRILLING COMPANY: US Drilling
DRILLING RIG: CME

BORING NUMBER: CW-MW03
DATE: 8/8/01
GEOLOGIST: Gary Bragg Jr
DRILLER:

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1						Asphalt, fill material			Ø	Ø	Ø	Ø
							Limestone, beige to						
							off white, oolitic,			Ø	Ø	Ø	Ø
							highly porous, few						
	5						shell fragments			Ø	Ø	Ø	Ø
							↓						
	10									Ø	Ø	Ø	Ø
	12												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ✓ No ____ Well I.D. #: CW-MW03

PROJECT NAME: Cardie + William St
PROJECT NUMBER: 3859
DRILLING COMPANY: U.S. Drilling
DRILLING RIG: CME

BORING NUMBER: MW04
DATE: 8/8/01
GEOLOGIST: Gary Bingham
DRILLER: Mark Jones

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1						Asphalt, fill material						
							limestone, beige,		moist	Ø	Ø	Ø	Ø
							oolitic, very porous,						
							moderately consolidated						
	5						minor shell fragments			Ø	Ø	Ø	Ø
							sandy						
										Ø	Ø	Ø	Ø
	10									Ø	Ø	Ø	Ø
	12												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: Caroline + William St
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI - Dilly
DRILLING RIG: Hand auger

BORING NUMBER: TW-01
DATE: 7/18/01
GEOLOGIST: Gary Pungey Jr
DRILLER: Josh Darland

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, fill material						
							crushed limestone,		moist				
							unsorted						
	1						Limestone, beige, oolitic		saturated	Ø	Ø	Ø	Ø
	2						moderately consolidated						
							sandy, few shell						
							fragments						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

PROJECT NUMBER: 3859
DRILLING COMPANY: ATI Drilling
DRILLING RIG: Hand auger

DATE: 7/18/01
GEOLOGIST: GB
DRILLER: Josh Dorland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, fill material						
							unsorted, pebbles + cobbles						
	1						Limestone, beige		saturated	1	0	0	0
							sandy, moderately						
	2						consolidated						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Caroline + William St.
Project No.: 3258

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: CWKW-GW-MW01-002
Sample Location: CW-MW01
Sampled By: GB
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2 ORP	H_2S	Fe +2
Date: 11/8/01										
Time: 7:45										
Method: Peristaltic pump	clear	7.40	31.1	29.1	22.4	1.45	0.9	-134		

PURGE DATA

Date: 11/8/01	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	ORP		
Method: Peristaltic pump	Initial	7.35	27.6	28.6	65.8	1.21	0.5	-142		
Monitor Reading (ppm):	1	7.41	28.0	28.8	35.4	1.44	0.6	-141		
Well Casing Diameter: 2"	2	7.43	30.2	28.9	30.6	1.44	0.6	-146		
Well Casing Material: PVC	3	7.42	31.1	28.9	22.2	1.56	0.8	-143		
Total Well Depth (TD): ≈20.		7.41	31.2	29.1	22.4	1.56	0.8	-135		
Static Water Level (WL): 1.24		7.41	31.2	29.0	22.4	1.48	0.9	-136		
One Casing Volume(gal/L):		7.42	31.1	29.1	22.6	1.62	0.9	-136		
Start Purge (hrs): 6:50		7.40	31.1	29.1	22.4	1.45	0.9	-134		
End Purge (hrs): 9:40										
Total Purge Time (min): 50										
Total Vol. Purged (gal/L): 5										

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
8260			
EDB			
PAH			
TRPH			
Lead			

OBSERVATIONS / NOTES

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Gary Burgess

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Caroline + William St
Project No.: 3958

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: CWKW-GW-MW02-002
Sample Location: CW-MW03
Sampled By: GB
C.O.C. No.:
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: 11/8/01	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO (mg/L) Meter	DO (mg/L) Titration	CO_2	H_2S	Fe +2
Time: 6:30										
Method: Peristaltic low flow	clear	7.41	20.6	28.47	24.5	0.41	2.1	N/C	N/C	N/C

PURGE DATA

Date: 11/8/01	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	ORP		
Method: Peristaltic	Initial	7.35	20.5	28.20	80.4	1.20	1.8	-121		
Monitor Reading (ppm):	1	7.42	21.6	28.44	53.2	0.98	2.0	-156		
Well Casing Diameter: 2"	2	7.40	21.5	28.41	28.1	0.95	2.1	-165		
Well Casing Material: PVC	3	7.41	21.4	28.45	25.6	0.45	2.0	-172		
Total Well Depth (TD): ≈12.0		7.40	20.7	28.46	24.7	0.41	2.0	-170		
Static Water Level (WL): 0.95		7.41	20.6	28.46	24.5	0.42	2.0	-175		
One Casing Volume(gal/L):		7.41	20.6	28.47	24.5	0.41	2.1	-175		
Start Purge (hrs): 5:25										
End Purge (hrs): 6:30										
Total Purge Time (min): 1:05										
Total Vol. Purged (gal/L): ≈5.0										

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
8260		3	✓
EDB		2	✓
PAH		2	✓
TRPH		2	✓
Lead		1	✓
Anions		1	✓

OBSERVATIONS / NOTES

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Gary Burger

BORING LOG

PROJECT NAME: C+W St, Key West
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI Drilling
DRILLING RIG: Hand Auger

BORING NUMBER: TW-05
DATE: 7/18/01
GEOLOGIST: GB
DRILLER: JD

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, fill material						
							pebbles + cobbles						
							unsorted						
	1						Limestone, beige,		saturated				
	2						oolitic, moderately						
							consolidated, porous						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

BORING LOG

PROJECT NAME: C+W St.
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG: Hand Auger

BORING NUMBER: TW-06
DATE: 1/18/01
GEOLOGIST: SB
DRILLER: JD

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, road base fill material, pebbles + cobbles, unconsolidated						
	1						limestone, beige oolitic, shell fragments very porous.			2	ϕ	ϕ	ϕ
	2												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): ϕ

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: Cardinal + Wilbur St
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG: Hand Auger

BORING NUMBER: TW-07
DATE: 7/18/01
GEOLOGIST: GB
DRILLER: JD

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, brick-red sandstone, fill material						
	1						limestone, beige oolitic, moldic porous			ϕ	ϕ	ϕ	ϕ
	2												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ___ No ___ Well I.D. #: ___

PROJECT NAME: C+W 3P
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG: CME

BORING NUMBER: TW-08
DATE: 7/19/01
GEOLOGIST: SB
DRILLER: JD

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, fill material crushed limestone pebbles + cobbles.			1	Ø	Ø	Ø
	1						Limestone, beige oolitic, sandy with few shell fragments		saturated.				
	2												

When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes _____ No _____ Well I.D. #: _____

BORING LOG

PROJECT NAME: G+W Sf
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG:

BORING NUMBER: TW-09
DATE: 7/19/01
GEOLOGIST: GB
DRILLER: JD.

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Drifter BZ**
	0						Asphalt, road fill material, unsorted pebbles + cobbles.			1	Ø	Ø	Ø
	1						Limestone, beige oolitic, porous moderately consolidated		saturated				
	2												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ___ No X Well I.D. #:

BORING LOG

PROJECT NAME: C+W at Key West
PROJECT NUMBER: 38559
DRILLING COMPANY: ATI
DRILLING RIG: Hand Auger

BORING NUMBER: TW-10
DATE: 7/19/01
GEOLOGIST: GB
DRILLER: JD

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, fill material poorly sorted mix of cobbles, pebbles + other material.						
	1						Limestone, beige		Diesel odor.	12	4	8	6
	2						oolitic, porous. sandy w/ shell fragments						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ___ No ___ Well I.D. #: ___

PROJECT NAME: C+W sf, Key West
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG: Hand Auger

BORING NUMBER: TW-11
DATE: 7/19/01
GEOLOGIST: GB
DRILLER: JD

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, fill material crushed limestone, pebbles + cobbles.						
	1			1			Limestone, beige oolitic, vuggy porosity sandy, moderately consolidated			2	ϕ	ϕ	ϕ
	2												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

PROJECT NAME: CrW, Key West
PROJECT NUMBER: 3595
DRILLING COMPANY: AT1
DRILLING RIG:

BORING NUMBER: TW-12
DATE: 7/19/01
GEOLOGIST: SB
DRILLER:

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, fill material						
							unsorted cobbles + pebbles						
	1						Limestone, beige			Ø	Ø	Ø	Ø
							oolitic, porous						
	2						moderately consolidated						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: C+W St, Key West
PROJECT NUMBER: 3659
DRILLING COMPANY: ATI
DRILLING RIG:

BORING NUMBER: TW-13
DATE: 7/19/01
GEOLOGIST: GB
DRILLER: JD

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, road base fill material, crushed limestone, pebbles + cobbles		moist	Ø	Ø	Ø	Ø
	1						Limestone, beige		saturated				
	2						oolitic, sandy, porous, moderately consolidated						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): Ø

Converted to Well: Yes ___ No X Well I.D. #:

BORING LOG

PROJECT NAME: Ct W St, Key West
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG: Hand Auger
BORING NUMBER: TW-14
DATE: 7/19/01
GEOLOGIST: GB
DRILLER: JD

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0						Asphalt, road base fill material, pebbles + cobbles.			Ø	Ø	Ø	Ø
	1						Limestone, beige oolitic, porous, few shell fragments						
	2												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ___ No ___ Well I.D. #: ___

BORING LOG

PROJECT NAME: C+W, Key West
PROJECT NUMBER: 38559
DRILLING COMPANY: AJI
DRILLING RIG:

BORING NUMBER: TW-15
DATE: 7/19/01
GEOLOGIST: GB
DRILLER: JD

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID*10 Reading (ppm): Sample	Sampler BZ	Borehole**	Drifter BZ**
	0						Asphalt, road base fill material, pebbles + cobbles.		plant debris				
	1			1			Limestone, beige oolitic, moderately consolidated, sandy			3	4	4	4
	2												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #:

BORING LOG

PROJECT NAME: C+W st, Key West
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG:

BORING NUMBER: TW-16
DATE: 7/19/01
GEOLOGIST: KB
DRILLER: JD

Sample No. and Type or RQD	Depth (Ft) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	MQX10 Reading (ppm): Sample	Sampler BZ	Borehole**	Drifter BZ**
			0				Asphalt, road base						
							fill material						
							pebbles + cobbles						
			1	1			Limestone, beige			Ø	Ø	Ø	Ø
			2				oolitic, porous						
							shell fragments +						
							sandy						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: C+W st, Key West
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG:

BORING NUMBER: TW-16
DATE: 7/19/01
GEOLOGIST: KB
DRILLER: JD

Sample No. and Type or RQD	Depth (Ft) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	MQX10 Reading (ppm): Sample	Sampler BZ	Borehole**	Drifter BZ**
			0				Asphalt, road base						
							fill material						
							pebbles + cobbles						
			1	1			Limestone, beige			Ø	Ø	Ø	Ø
			2				oolitic, porous						
							shell fragments +						
							sandy						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: C + W St, Key West
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG: Hand Auger
BORING NUMBER: TW-17
DATE: 7/19/01
GEOLOGIST: GB
DRILLER: JD

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
			0				Asphalt, fill material - road base - pebbles:						
			1				limestone, beige oolitic, porous:			Ø	Ø	Ø	Ø
			2				few shell fragments very sandy						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ____ Well I.D. #: ____

PROJECT NAME: Cut W, Key West
PROJECT NUMBER: 3859
DRILLING COMPANY: ATI
DRILLING RIG: Hand Auger

BORING NUMBER: TW-18
DATE: 7/20/01
GEOLOGIST: SB
DRILLER: JD

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Drifter BZ**
			0				Asphalt, road base fill material, pebbles + cobbles-consolidated limestone, beige oolitic, moderately consolidated, sandy w/ shell fragments			6	0	0	4
			1										
			2										

When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

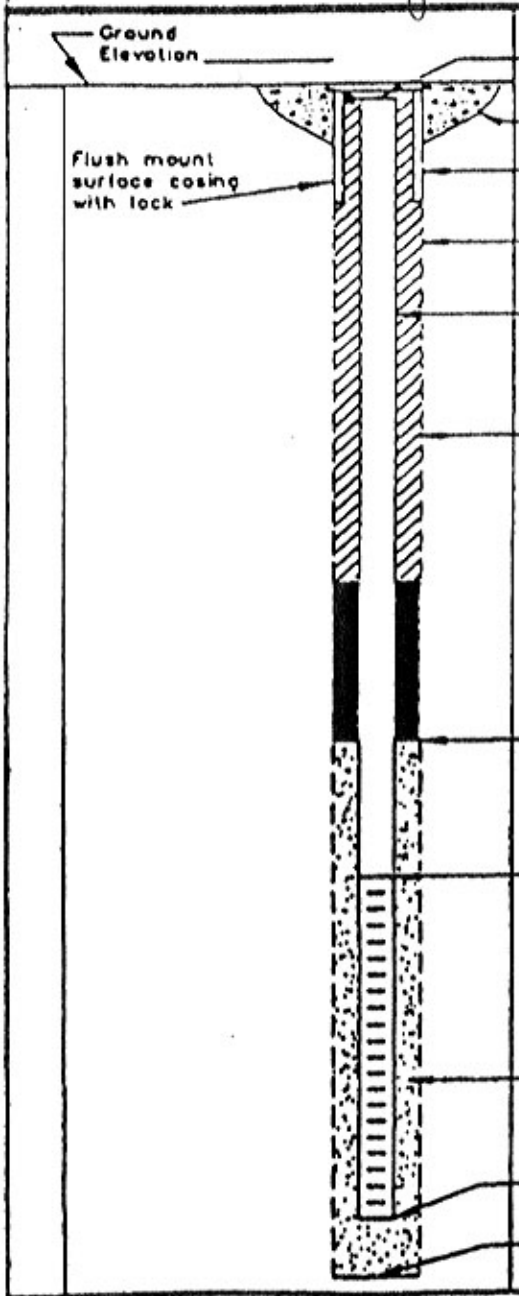
BORING NO.: _____

MONITORING WELL SHEET

PROJECT Caroline + William St
PROJECT NO. 3859
ELEVATION N/A
FIELD GEOLOGIST Barry Burgess

LOCATION Key West
BORING CW-MW01
DATE 8/8/01

DRILLER US Drilling
DRILLING METHOD HSA
DEVELOPMENT METHOD Centrifugal pump



ELEVATION TOP OF RISER: 0 ft.

TYPE OF SURFACE SEAL: Portland cement.

TYPE OF PROTECTIVE CASING: Lock down manhole.

I.D. OF PROTECTIVE CASING: 8"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: 30/65 fine Sand Seal + Portland grout mix

DEPTH/ELEVATION TOP OF SAND: 1 ft.

DEPTH/ELEVATION TOP OF SCREEN: 2 ft.

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.01 X 10

TYPE OF SAND PACK: 20/30 Silica Sand

DIAMETER OF HOLE IN BEDROCK: 8"

DEPTH/ELEVATION BOTTOM OF SCREEN: 12 ft.

DEPTH/ELEVATION BOTTOM OF SAND: 12 ft.

DEPTH/ELEVATION BOTTOM OF HOLE: 12 ft.

BACKFILL MATERIAL BELOW SAND: _____

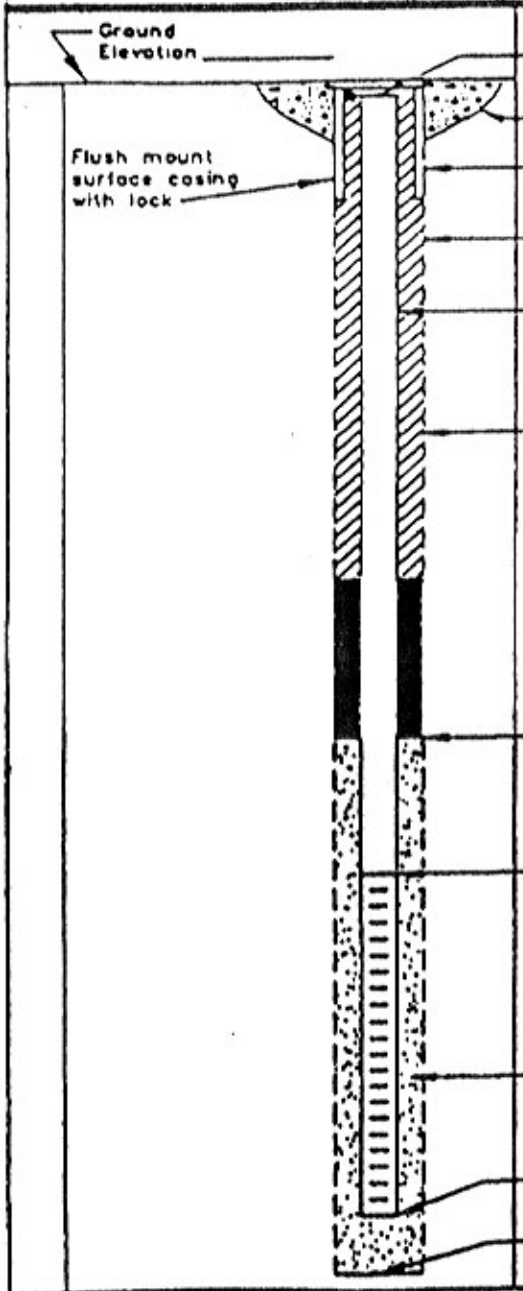
BORING NO.: _____

MONITORING WELL SHEET

PROJECT Caroline + William St
PROJECT NO. 3859
ELEVATION N/A
FIELD GEOLOGIST Gary Pr

LOCATION Key West
BORING CW MW02
DATE 8/8/01

DRILLER US Drilling
DRILLING METHOD HSA
DEVELOPMENT METHOD Centrifugal pump



ELEVATION TOP OF RISER: 0 ft

TYPE OF SURFACE SEAL: Portland cement

TYPE OF PROTECTIVE CASING: steel manhole

I.D. OF PROTECTIVE CASING: 8"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Portland grout / 30/65 fine sand seal.

DEPTH/ELEVATION TOP OF SAND: 1 ft

DEPTH/ELEVATION TOP OF SCREEN: 2 ft

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.01 x 10 ft

TYPE OF SAND PACK: 20/30 Silica Sand.

DIAMETER OF HOLE IN BEDROCK: 8"

DEPTH/ELEVATION BOTTOM OF SCREEN: 12 ft

DEPTH/ELEVATION BOTTOM OF SAND: 12 ft

DEPTH/ELEVATION BOTTOM OF HOLE: 12 ft

BACKFILL MATERIAL BELOW SAND: _____

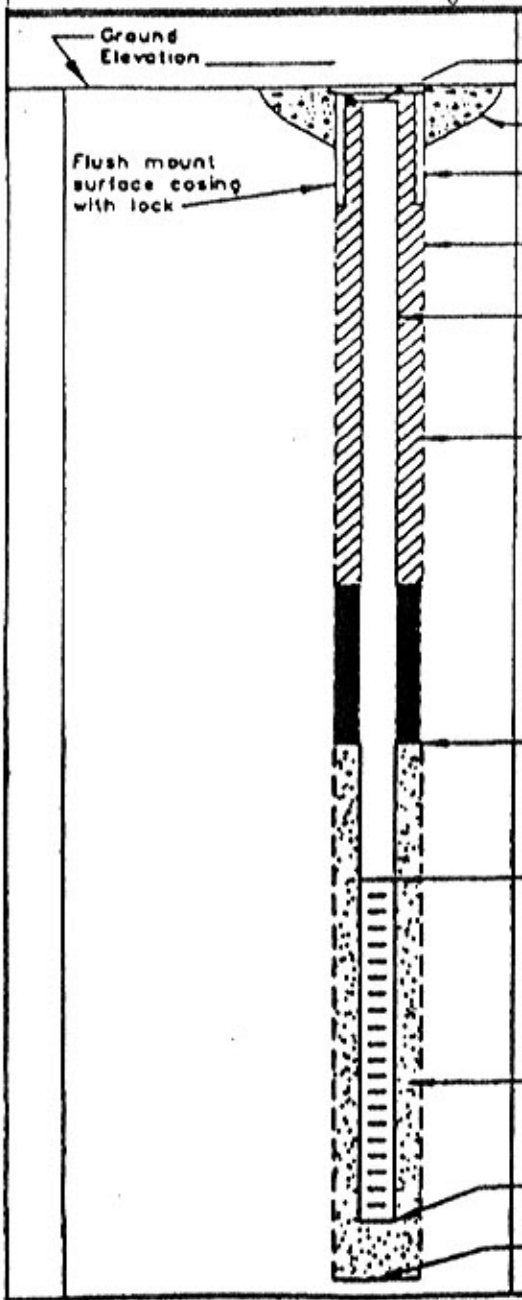
BORING NO.: _____

MONITORING WELL SHEET

PROJECT: Caroline + William St
PROJECT NO.: 3859
ELEVATION: N/A
FIELD GEOLOGIST: Barry Burgess

LOCATION: Key West
BORING: Cuft MW03
DATE: 8/8/01

DRILLER: US Drilling
DRILLING METHOD: HSA
DEVELOPMENT METHOD: Centrifugal pump



ELEVATION TOP OF RISER: 0 ft

TYPE OF SURFACE SEAL: Portland cement

TYPE OF PROTECTIVE CASING: steel manhole lock down

I.D. OF PROTECTIVE CASING: 6"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Portland/grout mix
30/65 fine sand seal

DEPTH/ELEVATION TOP OF SAND: 1 ft

DEPTH/ELEVATION TOP OF SCREEN: 2 ft

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.01 x 10 ft

TYPE OF SAND PACK: 20/30 Silica Sand

DIAMETER OF HOLE IN BEDROCK: 8"

DEPTH/ELEVATION BOTTOM OF SCREEN: 12 ft

DEPTH/ELEVATION BOTTOM OF SAND: 12 ft

DEPTH/ELEVATION BOTTOM OF HOLE: 12 ft

BACKFILL MATERIAL BELOW SAND: _____

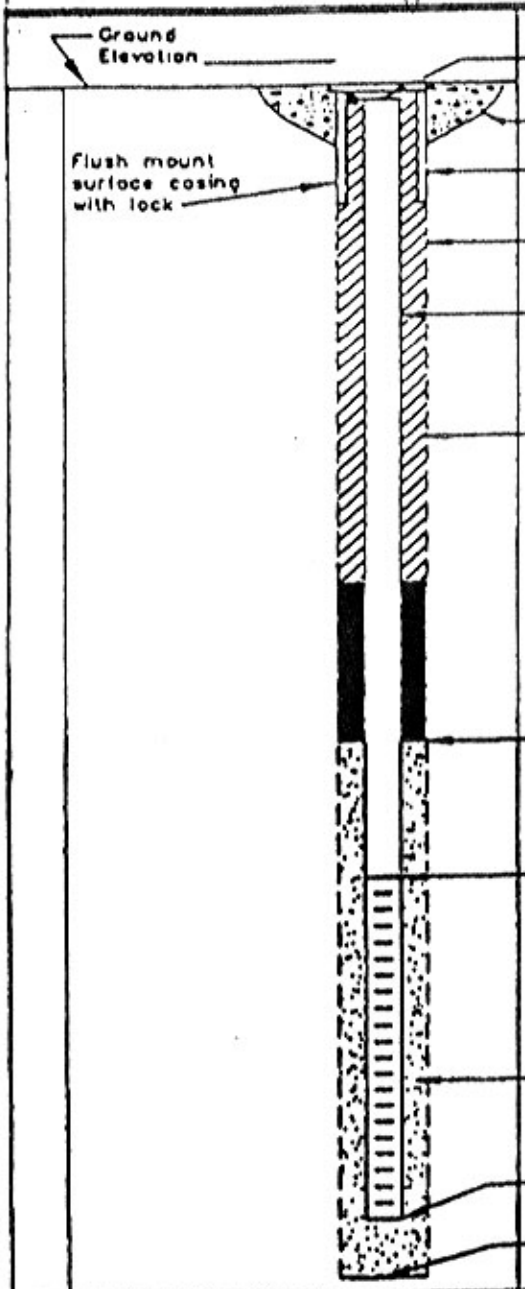
BORING NO.: _____

MONITORING WELL SHEET

PROJECT: Caroline + William St
PROJECT NO.: 3859
ELEVATION: N/A
FIELD GEOLOGIST: Gary Burgess

LOCATION: Key West
BORING: GW-MW04
DATE: 8/8/01

DRILLER: US Drilling
DRILLING METHOD: HSA
DEVELOPMENT METHOD: Centrifugal pump



ELEVATION TOP OF RISER: 0 ft.

TYPE OF SURFACE SEAL: Portland cement

TYPE OF PROTECTIVE CASING: 8" steel manhole

I.D. OF PROTECTIVE CASING: 8"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Portland/grout mix. 30/65 fine sand seal.

DEPTH/ELEVATION TOP OF SAND: 1 ft.

DEPTH/ELEVATION TOP OF SCREEN: 2 ft.

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.01 x 10 ft

TYPE OF SAND PACK: 20/30 Silica sand

DIAMETER OF HOLE IN BEDROCK: 8"

DEPTH/ELEVATION BOTTOM OF SCREEN: 12 ft.

DEPTH/ELEVATION BOTTOM OF SAND: 12 ft.

DEPTH/ELEVATION BOTTOM OF HOLE: 12 ft.

BACKFILL MATERIAL BELOW SAND: _____

APPENDIX C

LABORATORY ANALYTICAL REPORTS

KB LABS, INC.
6821 Southwest Archer Road
Gainesville, Florida 32608

telephone (352) 367-0073
fax (352) 367-0074
e-mail: kblabs@gator.net

August 7, 2001

Chuck Bryan
Tetra Tech NUS
900 Trail Ridge Road
Aiken, SC 29803

RE: CTO153
Key West, Florida

Dear Mr. Bryan:

Enclosed is the final report of the on-site analysis performed by KB Labs, Inc. at the above referenced site. Samples were collected and analyzed from July 17 to 21, 2001. Included are the final analytical results, a brief project narrative, a table listing quality control results, and sample chain-of-custody forms. This information will also be sent electronically. This data package consists of thirteen (13) pages, including this cover letter.

KB Labs is approved as a mobile laboratory for volatiles analyses and operates under an FDEP approved Comprehensive Quality Assurance Plan (CompQAP #980029 Revision 3). All data for the site referenced above were determined in accordance with published procedures under Test Methods for Evaluating Solid Waste (EPA SW-846, Update III Revised May 1997), unless otherwise stated in our CompQAP under method modifications. Unless otherwise indicated on the quality control narrative accompanying the data report, the quality assurance and quality control procedures performed in conjunction with analysis of groundwater samples demonstrated that the reported data met our CompQAP requirements for accuracy and precision.

If you have any questions, please do not hesitate to call me or Todd Romero, Director of Operations, at (352) 367-0073.

Sincerely,

Chris Horrell
Data Specialist
KB Labs, Inc.

"KB Labs is a small, woman-owned business enterprise."

KB LABS, INC.
6821 Southwest Archer Road
Gainesville, Florida 32608

telephone (352) 367-0073
fax (352) 367-0074

PROJECT NARRATIVE

Client: Tetra Tech NUS (TtNUS)	**Driller/Sampler:** TtNUS	**Analyst:** Mark Mathews
Site CTO153, Key West, Florida	**KB Labs Project Manager:** Kelly Bergdoll	**KB Labs Project No:**
Onsite Dates: 7/17/01-7/21/01	**Client Project Manager:** Chuck Bryan	**Matrix:** Water

Project Scope

From July 18, 2001 to July 21, 2001, a total of nineteen (19) water samples were collected at the Caroline Street site (CTO153), in Key West, FL. The samples were analyzed in the KB Labs mobile facility. The samples were analyzed for diesel and for the 8100 PAH list: naphthalene, acenaphthalene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(ghi)perylene.

Analytical Procedure

All water samples were extracted using SW846 Method 3535. The semi-volatile compounds are extracted from a two hundred milliliter (200 mL) aliquot of sample. Solid phase extraction is used, and the semi-volatile compounds are collected in hexane.

All samples were analyzed using SW846 Method 8081A. The extracted samples were analyzed on a GC with an ECD. The individual analyte responses are measured against corresponding analyte calibration standard responses.

Analytical Results

Laboratory results were provided to the client on an as-completed or next-day basis. Final results of the on-site analyses are provided both on diskette (or by email) and hardcopy. The data produced and reported in the field has been reviewed and approved for this final report by a KB Labs Data Specialist.

Quality Control (QC) Data

Surrogate Recoveries – Tables 1 lists the daily analytical sequence and percent recovery results for the surrogate compound, which was added to all analyses. One (1) surrogate compound was added to each analysis in order to continually monitor general method performance.

Matrix Spike Recoveries – Tables 2.1-2.2 list the percent recovery results for matrix spike samples. A known amount of each target compound was added to selected field samples and to laboratory reagent water in order to monitor the performance of each of the target compounds in the actual matrix and in laboratory reagent water.

Due to insufficient sample volume, only one matrix spike duplicate could be performed. A sample duplicate was extracted, however no samples had analyte levels high enough to provide a measurable duplicate.

Method Blanks – Daily analysis of laboratory reagent extractions was performed in order to monitor the cleanliness of the analytical system.

Signature: _____
Title: Data Specialist

Date: August 7, 2001

"KB Labs is a small, woman-owned business enterprise."

KB LABS, INC.

Table 1: Analytical Run Sequence/Surrogate Percent Recoveries

Client: Tetra Tech NUS (TtNUS)	**Driller/Sampler:** TtNUS	**Analyst:** Mark Mathews
Site: CTO153, Key West, FL	**KB Labs Project Manager:** Kelly Bergdoll	**KB Labs Project No:**
On-site Dates: 07/17/01-07/21/01	**Client Project Manager:** Chuck Bryan	**Matrix:** Water

Sample ID	Analysis Date	*Control Limits>>*	S1* *70-130*	Comment
PAH 10	7/17/2001		100	
Alkane	7/17/2001		NA	
Hexane	7/17/2001		NA	
PAH 1	7/17/2001		70	
PAH 2	7/17/2001		90	
PAH 10	7/17/2001		107	
PAH 40	7/17/2001		100	
MB PAH	7/17/2001		66	S1 low
Spike PAH Clean Target 4 u/ml	7/17/2001		73	
Spike PAH Uncl Target 10 ug/ml	7/17/2001		115	
Diesel 20	7/17/2001		99	
Diesel 40	7/17/2001		100	
Diesel 100	7/17/2001		103	
Diesel 200	7/17/2001		99	
Diesel 400	7/17/2001		100	
MB Diesel 071701	7/17/2001		96	
SPIKE 071701 Target 100	7/17/2001		88	
Diesel 100	7/18/2001		103	
Diesel 100	7/18/2001		105	
PAH 10	7/18/2001		109	
SB-1 CTO153 Diesel Ext	7/18/2001		102	
MB 071801	7/18/2001		95	
MB 071801 rerun	7/18/2001		89	
SP Diesel 071801	7/18/2001		90	
SB-2 CT0153 Diesel Ext	7/18/2001		87	
SB-3 CTO1053 Diesel Ext	7/18/2001		90	
SB-4 CTO1053 Diesel Ext	7/18/2001		91	
SB-5 CTO1053 Diesel Ext	7/18/2001		91	
SB-6 CTO1053 Diesel Ext	7/18/2001		95	
SB-7 CTO1053 Diesel Ext	7/18/2001		90	
SB-7D CTO1053 Diesel Ext	7/18/2001		93	
MS SB-1 CTO153 Diesel Ext	7/18/2001		88	
Dup SB-2 CTO1053 Diesel Ext	7/18/2001		93	
Diesel 100	7/18/2001		99	
PAH 10	7/18/2001		110	
MB PAH 071801	7/18/2001		95	
SP PAH 071801	7/18/2001		94	
SB -1 CTO1053 (PAH ext)	7/18/2001		94	
SB -2 CTO1053 (PAH ext)	7/18/2001		105	
SB -3 CT01053 (PAH ext)	7/18/2001		85	
SB -4 CT1053 (PAH ext)	7/18/2001		86	
SB -5 CTO1053 (PAH ext)	7/18/2001		71	
SB -6 CTO1053(PAH ext)	7/18/2001		97	
SB -7 CTO1053 (PAH ext)	7/18/2001		82	
SB -7D CTO1053 (PAH ext)	7/18/2001		78	
MS SB-1 CTO1053 (PAH ext)	7/18/2001		82	

* Surrogate Compound

S1 = 2-fluorobiphenyl

Signature: Ch. H 9

Title: Data Specialist

Date: August 7, 2001

KB LABS, INC.

Table 1 (cont): Analytical Run Sequence/Surrogate Percent Recoveries

Client: Tetra Tech NUS (TtNUS)	**Driller/Sampler:** TtNUS	**Analyst:** Mark Mathews
Site: CTO153, Key West, FL	**KB Labs Project Manager:** Kelly Bergdoll	**KB Labs Project No:**
On-site Dates: 07/17/01-07/21/01	**Client Project Manager:** Chuck Bryan	**Matrix:** Water

Sample ID	Analysis Date	*Control Limits>>*	S1* *87-110*	Comment
dup SB -2 CTO1053 (PAH ext)	7/18/2001		90	
PAH 10	7/18/2001		124	
PAH 1 ug/ml Hex	7/19/2001		100	
PAH 10 ug/ml Hex	7/19/2001		100	
PAH 20 ug/ml Hex	7/19/2001		100	
Diesel 100	7/19/2001		108	
MB 071901 Diesel Ext	7/19/2001		115	
SP Diesel 071901	7/19/2001		120	
SP PAH 071901	7/19/2001		121	
SB-10 CT0153 071901 Diesel Ex	7/19/2001		93	
SB-8 CT0153 071901 Diesel Ext	7/19/2001		88	
MS SB-8 CTO153 Diesel Ext	7/19/2001		91	
SB-11 CT0153 071901 Diesel Ext	7/19/2001		84	
SB-12 CTO153 071901 Diesel Ex	7/19/2001		90	
SB-13 CTO153 071901 Diesel E	7/19/2001		90	
MSD SB-8 CT0153 Diesel Ext	7/19/2001		96	
SB-9 CT0153 071901 Diesel Ext	7/19/2001		95	
Diesel 100	7/19/2001		108	
PAH 10 Hexane	7/19/2001		104	
MB 071801 Diesel Ext	7/19/2001		98	
SP 071801 Diesel Ext	7/19/2001		100	
SB-1 CTO153 071801 Diesel Ext	7/19/2001		98	
SB-2 CTO153 071801 Diesel Ext	7/19/2001		89	
SB-3 CTO153 071801 Diesel Ext	7/19/2001		92	
SB-4 CTO153 071801 Diesel Ext	7/19/2001		98	
SB-5 CTO153 071801 Diesel Ext	7/19/2001		90	
SB-6 CTO153 071801 Diesel Ext	7/19/2001		90	
SB-7 CTO153 071801 Diesel Ext	7/19/2001		89	
SB-7D CTO153 071801 Diesel E	7/19/2001		84	
MS SB-1 CTO153 071801	7/19/2001		94	
dup SB-2 CT0153 071801	7/19/2001		90	
PAH 10 Hexane	7/19/2001		107	
Diesel 100	7/20/2001		98	
PAH 10 Hex	7/20/2001		107	
MB 072001 Diesel Ext	7/20/2001		117	
LCS1 Diesel 072001 Diesel Ext	7/20/2001		105	
LCS1 PAH 072001 Diesel Ext	7/20/2001		105	
SB-14 CT0153 072001	7/20/2001		101	
SB-15 CT0154 072001	7/20/2001		86	
SB-16 CT0153 072001	7/20/2001		85	
SB-17 CTO53	7/20/2001		95	
MS SB-17 CT0531	7/20/2001		91	
Diesel 100	7/20/2001		104	
PAH 10	7/20/2001		104	
Diesel 100	7/21/2001		86	
Diesel 100	7/21/2001		90	

* Surrogate Compound

S1 = 2-fluorobiphenyl

Signature: Cl. H 91

Title: Data Specialist

Date: August 7, 2001

KB LABS, INC.

Table 1 (cont): Analytical Run Sequence/Surrogate Percent Recoveries

Client: Tetra Tech NUS (TtNUS)	**Driller/Sampler:** TtNUS	**Analyst:** Mark Mathews
Site: CTO153, Key West, FL	**KB Labs Project Manager:** Kelly Bergdoll	**KB Labs Project No:**
On-site Dates: 07/17/01-07/21/01	**Client Project Manager:** Chuck Bryan	**Matrix:** Water

Sample ID	Analysis Date	*Control Limits>>*	S1* *87-110*	Comment
PAH 10 Hex	7/21/2001		85	
MB 072101 Diesel Ext	7/21/2001		78	
LCS1 Diesel 072101 Diesel Ext	7/21/2001		66	S1 low
LCS1 PAH 072101 Diesel Ext	7/21/2001		126	
SB-18 CT0153 072101	7/21/2001		72	
Diesel 100	7/21/2001		88	
PAH 10	7/21/2001		89	

* Surrogate Compound

S1 = 2-fluorobiphenyl

Signature: Ch. Ha

Title: Data Specialist

Date: August 7, 2001

KB LABS, INC.
6821 Southwest Archer Road
Gainesville, Florida 32608

telephone (352) 367-0073
fax (352) 367-0074

Table 2.1: Matrix Spike Percent Recoveries (Analytes 1 to 10)

Client: Tetra Tech (TtNUS)	**Driller/Sampler:** TtNUS	**Analyst:** Mark Mathews
Site: CTO153, Key West, Jacksonville, Florida	**KB Labs Project Manager:** Kelly Bergdoll	**KB Labs Project No:**
On-site Dates: 07/17/01/01-07/21/01	**Client Project Manager:** Chuck Bryan	**Matrix:** Water

Spike Compounds * > >	Analyte1	Analyte2	Analyte3	Analyte4	Analyte5	Analyte6	Analyte7	Analyte8	Analyte9	Analyte10	Comment
Control Limits ** > >	*70-142*	*69-92*	*79-103*	*84-111*	*87-119*	*87-129*	*81-116*	*68-123*	*71-108*	*65-121*	
Station/Sample ID:											
TW-1 ms	149	95	83	78	69	59	34	53	52	46	Analyte 1,2 high; Analytes 4-10 low
TW-8 ms	NA	94	88	93	88	81	45	72	72	68	Analyte2 high; Analytes 6,7 low
TW-8 msd	76	75	89	94	93	87	82	75	78	68	ms not spiked for diesel
RPD		22	1	1	6	7	58	4	8	0	RPD high for Analytes 2,7
TW-17 ms	67	74	75	78	73	65	59	56	55	53	Analytes 1,3-10 low

** Control limits based on MDL recoveries.

* Spike Compounds

Analyte1 = diesel
Analyte2 = naphthalene
Analyte3 = acenaphthalene
Analyte4 = acenaphthene
Analyte5 = fluorene
Analyte6 = phenanthrene
Analyte7 = anthracene
Analyte8 = fluoranthene
Analyte9 = pyrene
Analyte10 = benzo(a)anthracene

Signature: Chi H

Title: Data Specialist

Date: August 7, 2001

KB LABS, INC.
6821 Southwest Archer Road
Gainesville, Florida 32608

telephone (352) 367-0073
fax (352) 367-0074

Table 2.2: Matrix Spike Percent Recoveries (Analytes 11 to 17)

Client: Tetra Tech (TtNUS)	**Driller/Sampler:** TtNUS	**Analyst:** Mark Mathews
Site: CTO153, Key West, Jacksonville, Florida	**KB Labs Project Manager:** Kelly Bergdoll	**KB Labs Project No:**
On-site Dates: 07/17/01/01-07/21/01	**Client Project Manager:** Chuck Bryan	**Matrix:** Water

Spike Compounds * >> *Control Limits* ** >> Station/Sample ID:	Analyte11 *60-112*	Analyte12 *68-119*	Analyte13 *71-109*	Analyte14 *65-124*	Analyte15 *63-123*	Analyte16 *42-82*	Analyte17 *68-116*	Comment
TW-1 ms	48	43	43	41	40	35	39	Analytes 11-17 low
TW-8 ms	72	70	70	67	68	63	67	Analytes 13,17 low
TW-8 msd	69	60	63	64	57	60	57	Analytes 12-15,17 low
RPD	4	15	11	5	18	5	16	
TW-17 ms	52	51	50	52	48	46	48	Analytes 11-15,17 low

** Control limits based on MDL recoveries.

* Spike Compounds

Analyte11 = chrysene
Analyte12 = benzo(b)fluoranthene
Analyte13 = benzo(k)fluoranthene
Analyte14 = benzo(a)pyrene
Analyte15 = dibenzo(a,h)anthracene
Analyte16 = indeno(1,2,3-cd)pyrene
Analyte17 = benzo(ghi)perylene

Signature: Cl. H

Title: Data Specialist

Date: August 7, 2001

Prepared for: Tetra Tech NUS

KB LABS, INC.

Final Data Report

CTO153, Key West, FL

	TW-1 CTO153	TW-2 CTO153	TW-3 CTO153	TW-4 CTO153	TW-5 CTO153	TW-6 CTO153	TW-7 CTO153	TW-7D CTO153	TW-8 CTO153	TW-9 CTO153	TW-10 CTO153
Diesel	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
naphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
acenaphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
fluorene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
phenanthrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(a)anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
chrysene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(k)afluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(a)pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
dibenzo(a,h)anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
indeno(1,2,3-cd)pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(ghi)perylene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

All units mg/L

Prepared for: Tetra Tech NUS

KB LABS, INC.

Final Data Report

CTO153, Key West, FL

	TW-11 CTO153	TW-12 CTO153	TW-13 CTO153	TW-14 CTO153	TW-15 CTO153	TW-16 CTO153	TW-17 CTO153	TW-18 CTO153
Diesel	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
naphthalene	<0.05	<0.05	<0.05	<0.05	0.056	<0.05	<0.05	<0.05
acenaphthalene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
fluorene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
phenanthrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(a)anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
chrysene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(k)afluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(a)pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
dibenzo(a,h)anthracene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
indeno(1,2,3-cd)pyrene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
benzo(ghi)perylene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

All units mg/L

KB LABS, INC.
Mobile Laboratory Services

CHAIN-OF-CUSTODY RECORD

6821 SW Archer Road
Gainesville, FL 32608
TEL (352) 367-0073
FAX (352) 367-0074

FOR LAB USE ONLY

PROJECT NAME: Key West / CTO153

SITE NAME & ADDRESS: Caroline St. Key West, FL

SAMPLERS: ~~(Signature)~~ CAN Field
ATI

CONTACT PERSON: Gary Braganza

BATCH # (Lab Use Only)

PRESERVATION
C Chilled
H HCL
Ot Other (see Remarks)

SAMPLE FIELD ID. NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION / NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	IDENTIFY PARAMETERS DESIRED AND NO. OF CONTAINERS: VOLATILES	dro	pah				Lab I.D. Number
SB-1	9/18/01	9:00		✓	CTO 153	W	1		✓	✓				
2	↓	9:30		↓	↓	↓	↓		↓	↓				
3		9:45												
4		10:10												
5		10:30												
6		11:45												
7		12:45												
7D	↓	12:15		↓	↓	↓	↓		↓	↓				

Precleaned Containers Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Remarks and Observations
[signature]	7/18/01 9:20am			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	
		[signature]	7/18/01 12:00	

Matrix Types S Soil SW Surface Water GW Ground Water SG Soil Gas

KB LABS, INC.
Mobile Laboratory Services

CHAIN-OF-CUSTODY RECORD

6821 SW Archer Road
Gainesville, FL 32608
TEL (352) 367-0073
FAX (352) 367-0074

FOR LAB USE ONLY

PROJECT NAME

SITE NAME & ADDRESS: CTO153 Caroline St. Key West

SAMPLERS: ~~(Signature)~~ ATI

CONTACT PERSON: Gary Braganza

~~BATCH # (Lab Use Only)~~

PRESERVATION: C Chilled; H HCL; Ot Other (see Remarks)

SAMPLE FIELD ID. NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION / NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	VOLATILES	DRO	PAH			Lab I.D. Number
~~CTO153~~ SB8	7/19/01	9:00		✓	CTO 153	W	2		✓	✓			
9		9:30					1						
10		10:45					1						
11		11:45					1						
12		12:30					1						
13		13:15					1						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Preceaned Containers Relinquished by: (Signature)	7/19/01 9:00		
Relinquished by: (Signature)		Received by: (Signature)	7/19/01 14:00

Remarks and Observations

Matrix Types: S Soil; SW Surface Water; GW Ground Water; SG Soil Gas

KB LABS, INC.
Mobile Laboratory Services

CHAIN-OF-CUSTODY RECORD

6821 SW Archer Road
Gainesville, FL 32608
TEL (352) 367-0073
FAX (352) 367-0074

FOR LAB USE ONLY

PROJECT NAME:

SITE NAME & ADDRESS: Caroline St. CTO 153

SAMPLERS: *(Signature)*

CONTACT PERSON: Gary

BATCH # (Lab Use Only)

PRESERVATION: C Chilled; H HCL; Ot Other (see Remarks)

SAMPLE FIELD ID. NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION / NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	IDENTIFY PARAMETERS DESIRED AND NO. OF CONTAINERS: VOLATILES	DRO	PAH			Lab I.D. Number
SB-14	9/20/01	8:30		✓	CTO 153	W	1		✓	✓			
15	↓	9:30		↓	↓	↓	↓		↓	↓			
16	↓	9:55		↓	↓	↓	↓		↓	↓			
17	↓	10:15		↓	↓	↓	↓		↓	↓			

Precleaned Containers Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Date / Time	Remarks and Observations
	9/20/01 9:30			
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Date / Time	
			11/00 9:30	

Matrix Types S Soil SW Surface Water GW Ground Water SG Soil Gas

KB LABS, INC.
Mobile Laboratory Services

CHAIN-OF-CUSTODY RECORD

6821 SW Archer Road
Gainesville, FL 32608
TEL (352) 367-0073
FAX (352) 367-0074

FOR LAB USE ONLY

PROJECT NAME: THUS

SITE NAME & ADDRESS: CTO 153 Cardine St. Key West

SAMPLERS: (Signature) ATI

CONTACT PERSON: GARY

BATCH # (Lab Use Only)

PRESERVATION
C Chilled
H HCL
Ot Other (see Remarks)

SAMPLE FIELD ID. NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION / NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	IDENTIFY PARAMETERS DESIRED AND NO. OF CONTAINERS: VOLATILES	DRO	PPH				Lab I.D. Number
SB-18	7/21/01	10:15		✓	CTO 153	W	1		✓	✓				

Preserved Containers Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Remarks and Observations
	7/21/01 11:00			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	
			7/21/01 11:00	

Matrix Types S Soil SW Surface Water GW Ground Water SG Soil Gas

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**C. BRYAN**	**DATE:**	**OCTOBER 15, 2001**
FROM:	**CATHERINE NORONHA**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION–LEAD**
CTO-153 NAS KEY WEST
SAMPLE DELIVERY GROUP (SDG) – WR2929

SAMPLES: 6/Aqueous/

CWKW-GW-DUP1-001	CWKW-GW-MW01-001
CWKW-GW-MW02-001	CWKW-GW-MW03-001
CWKW-GW-MW04-001	CWKW-GW-MW03-001

Overview

The sample set for CTO 159, NSWC CRANE, SDG WR5912, consists of six (6) aqueous environmental samples. One rinse blank pair (RB7110101) is included in this SDG.

All samples were analyzed for TAL metals and tin. The samples were collected by TetraTech NUS on August 22, 2001 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. Lead analyzed using SW 846 method 6010B. Chlorides and Sulfate analyses were conducted using EPA method 300. Nitrate and Nitrite analyses were conducted using EPA 353.2.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Recoveries
  • Laboratory Blank Analyses
* • Field Duplicate Results
* • Detection Limits

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Lead	2.56 µg/L	7.68 µg/L

An action level of 5X the maximum concentration were used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration when evaluation for blank contamination. Positive results less than the action level reported for lead is qualified "U" as a result of blank contamination.

Executive Summary

Laboratory Performance: Several analytes were present in the laboratory method/preparation blanks.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994 and the NFESC document entitled "Navy IRCDQM" (September 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Catherine Noronha

Tetra Tech NUS
Catherine Noronha
Environmental Scientist

TetraTech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

CTO1 NAS KEY WEST
WATER DATA
KAS
SDG: WR2929

SAMPLE NUMBER:	CWKW-GW-DUP1-001			CWKW-GW-MW01-001			CWKW-GW-MW02-001			CWKW-GW-MW03-001		
SAMPLE DATE:	08/22/01			08/22/01			08/22/01			08/22/01		
LABORATORY ID:	WR2929-004			WR2929-001			WR2929-002			WR2929-005		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:	CWKW-GW-MW01-001											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	1.5	U		1.5	U		1.5	U		1.5	U	

CTO15. .AS KEY WEST
WATER DATA
KAS
SDG: WR2929

SAMPLE NUMBER:	CWKW-GW-MW03-001			
SAMPLE DATE:	08/22/01	/ /	/ /	/ /
LABORATORY ID:	WR2929-5			
QC_TYPE:	NORMAL			
% SOLIDS:	0.0 %	100.0 %	100.0 %	100.0 %
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
MISCELLANEOUS PARAMETERS												
CHLORIDE(MG/L)	8000											
NITRATE(MG/L)	0.05	U										
NITRITE(MG/L)	0.05	U										
PHOSPHATE(MG/L)	0.1	U										
SULFATE(MG/L)	1300											

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**C. BRYAN**	**DATE:**	**OCTOBER 15, 2001**
FROM:	**ANGELA M. SCHEETZ**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – SELECT METALS, TCO, TOX, TS**
CTO-007 NAS KEY WEST
SAMPLE DELIVERY GROUP (SDG) – NASKW17

SAMPLES: 3/Solid/

CWKW-SS-SB03-001 CWKW-SS-SB04-001
CWKW-SS-SB10-001

Overview

The sample set for CTO 007, NAS Key West, SDG NASKW17, consists of three (3) solid environmental samples. No field duplicate pairs are included in this SDG.

All samples were analyzed for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. The samples were also analyzed for total combustable organics (TCO), total organic halides (TOX), total solids (TS). The samples were collected by TetraTech NUS on July 18 and 19, 2001 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. Metals analyses, with the exception of mercury, were conducted using SW 846 method 6010B. Mercury analyses were conducted using SW 846 method 7470A. TCO analyses was conducted using ASTM D2974-87. TOX analyses were conducted by SW 846 method 9023. Total percent solids analyses was conducted using CLP SOW 788.

These data were evaluated based on the following parameters:

* • Data Completeness
• Holding Times
* • Calibration Recoveries
• Laboratory Blank Analyses
* • Detection Limits

* - All quality control criteria were met for this parameter.

Holding Times

Total organic halides exceeded the 28-day holding time by 4-5 days. The nondetected results were qualified as estimated, UJ.

Laboratory Blank Analyses

The following contaminants were detected in the laboratory method / preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Arsenic	2.95 µg/L	1.475 mg/Kg
Barium(1)	0.061 mg/Kg	0.305 mg/Kg
Lead(1)	0.277 mg/Kg	1.385 mg/Kg
Mercury	0.04 µg/L	0.033 mg/Kg
Silver	1.24 µg/L	0.62 mg/Kg

(1) – Maximum concentration was detected in the preparation blank.

An action level of 5X the maximum concentration were used to evaluate the sample data for blank contamination. Sample aliquot, percent solids, and dilution factors, if applicable, were taken into consideration when evaluation for blank contamination. Positive results less than the action level reported for arsenic, mercury, and silver were qualified "U" as a result of blank contamination.

Notes

The chain-of-custody has TOC listed, however the laboratory reported results for TCO. The laboratory was contacted and confirmed that TCO was correct according to the Statement of Work along with the project manager.

Executive Summary

Laboratory Performance: Several analytes were present in the laboratory method/preparation blanks. TOX was qualified due to holding time exceedance.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994 and the NFESC document entitled "Navy IRCDQM" (September 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Angela M Scheetz

Tetra Tech NUS
Angela M. Scheetz
Environmental Scientist

Kelly A Carper for

TetraTech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED LABORATORY RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

CTO0(NAS KEY WEST
SOIL DA. A
KAS
SDG: NASKW17

SAMPLE NUMBER:	CWKW-SS-SB03-001	CWKW-SS-SB04-001	CWKW-SS-SB10-001	
SAMPLE DATE:	07/18/01	07/18/01	07/19/01	/ /
LABORATORY ID:	WR2525-001	WR2525-002	WR2553-001	
QC_TYPE:	NORMAL	NORMAL	NORMAL	
% SOLIDS:	89.6 %	89.8 %	86.1 %	100.0 %
UNITS:	MG/KG	MG/KG	MG/KG	
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ARSENIC	1.1	U	A	0.80	U	A	3.0					
BARIUM	13.0			7.3			100					
CADMIUM	0.05			0.08			0.31	U				
CHROMIUM	9.1			4.7			5.5					
LEAD	4.6			5.7			192					
MERCURY	0.01	U	A	0.02	U	A	0.20					
SELENIUM	0.33	U		0.33	U		0.34	U				
SILVER	0.11	U		0.12	U	A	0.22	U	A			

CTO0(IAS KEY WEST
SOIL DA I A
KAS
SDG: NASKW17

SAMPLE NUMBER:	CWKW-SS-SB03-001			CWKW-SS-SB04-001			CWKW-SS-SB10-001					
SAMPLE DATE:	07/18/01			07/18/01			07/19/01			/ /		
LABORATORY ID:	107125-001-01			107125-002-01			107125-003-01					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	90.0 %			90.0 %			86.0 %			100.0 %		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
MISCELLANEOUS PARAMETERS												
TOTAL COMBUSTABLE ORGANICS(% AS)	79			84			79					
TOTAL ORGANIC HALIDES(MG/KG)	49	UJ	H	48	UJ	H	49	UJ	H			
TOTAL SOLIDS(%)	90			90			86					

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**MR. C. BRYAN**	**DATE:**	**OCTOBER 15, 2001**
FROM:	**ANGELA SCHEETZ**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION- VOA/PAH/TPH**
CTO 007, NAS KEY WEST
SDG NASKW17

SAMPLES: 3/Soil/

CWKW-SS-SB03-001 CWKW-SS-SB04-001 CWKW-SS-SB10-001

2/Aqueous/

TRIP BLANK-071801 TRIP BLANK-071901

OVERVIEW

The sample set for CTO 007, NAS Key West, SDG NASKW17 consists of three (3) environmental soil samples and two (2) trip blanks. All samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs). The soil samples were also analyzed for polynuclear aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH). No field duplicate pairs were included in this SDG.

The samples were collected by TetraTech NUS on July 18, and 19, 2001 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Methods 8260B, 3550, and FL-PRO analytical and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

* • Data completeness
* • Holding times
• Initial and continuing calibration
• Laboratory method and field quality control blank results
• Surrogate spike recoveries
* • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified Analytical results are presented in Appendix A.

The text of this report is formulated to address only gross noncompliances resulting in the rejection of data and the elimination of false positives.

Volatile

Initial and/or continuing calibration relative response factors (RRFs) fell below the 0.05 quality control limit for acrolein and 2-chloroethyl vinyl ether associated with samples the soil samples. Only nondetected results were reported for the aforementioned compounds and these were rejected (UR) in all samples.

An initial and continuing calibration RRF fell below the 0.05 quality control limit for acrolein associated with TRIP BLANK-071801. The nondetected results was rejected (UR).

An initial calibration percent relative standard deviation exceeded the 50% quality control limit for methylene chloride on 07/09/01 at 15:12 associated with TRIP BLANK-071801. The positive result in this sample was qualified as estimated, J.

There were additional initial and continuing calibration noncompliances (%RSDs, %Ds), however, these noncompliances did not warrant qualification, as only limited data review is being performed.

The following compounds were detected in the method blank:

Compound	Maximum Concentration	Blank Action Level
Methylene Chloride	4.0 μg/Kg	40 μg/Kg

Sample aliquot, percent solids, and dilution factors were taken into consideration when applying the blank action levels. Positive results for methylene chloride below the blank action level were qualified as nondetected, U. Quality control samples were not qualified due to blank contamination.

Surrogate percent recoveries fell below quality control limits in sample CWKW-SS-SB03-001. The sample was re-analyzed with similar recoveries. These noncompliances did not warrant qualification, as only limited data review is being performed.

PAH

Due to sample matrix effects, samples CWKW-SS-SB03-001, CWKW-SS-SB04-001, and CWKW-SS-SB10-001 were analyzed and reported at dilutions of 28X, 110X, and 12X respectively. This accounts for the elevated reporting limits for these samples.

Surrogate recoveries exceeded the quality control limits in sample CWKW-SS-SB10-001. These noncompliances did not warrant qualification, as only limited data review is being performed.

TPH

The following compound was detected in the method blank:

Compound	Maximum Concentration	Blank Action Level
TPH	6.3 mg/Kg	31.5 mg/Kg

Sample aliquot, percent solids, and dilution factors were taken into consideration when applying the blank action levels. No qualifications were made on this basis since the reported results exceeded the action level.

The presence of TPH in the method blank is indicative of poor laboratory quality control. Because all samples contain TPH, the results are estimated, J, due to potential laboratory contamination. Sample

CWKW-SS-SB04-001 was not qualified as nondetected because the sample concentration is over 100X greater than the reporting limit.

Additional Comments

Positive results below the reporting limit (RL) were qualified as estimated, J, due to uncertainty near the detection limit.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Several volatile compounds failed to meet initial and continuing calibration acceptance criteria. Several compounds were detected in laboratory method blanks.

Other Factors Affecting Data Quality: None

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines. The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Angela Scheetz
Tetra Tech NUS

Angela Scheetz
Chemist/Data Validator

for
TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
N01 = Internal Standard Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

CTO00 AS KEY WEST
SOIL DATA
KAS
SDG: NASKW17

SAMPLE NUMBER:	CWKW-SS-SB03-001			CWKW-SS-SB04-001			CWKW-SS-SB10-001					
SAMPLE DATE:	07/18/01			07/18/01			07/19/01			/ /		
LABORATORY ID:	WR2525-1			WR2525-2			WR2553-1					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	89.6 %			89.8 %			86.1 %			100.0 %		
UNITS:	UG/KG			UG/KG			UG/KG					
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1-TRICHLOROETHANE	6	U		6	U		6	U				
1,1,2,2-TETRACHLOROETHANE	6	U		6	U		6	U				
1,1,2-TRICHLOROETHANE	6	U		6	U		6	U				
1,1-DICHLOROETHANE	6	U		6	U		6	U				
1,1-DICHLOROETHENE	6	U		6	U		6	U				
1,2-DICHLOROETHANE	6	U		6	U		6	U				
1,2-DICHLOROPROPANE	6	U		6	U		6	U				
1,3-DICHLOROPROPENE	6	U		6	U		6	U				
2-CHLOROETHYL VINYL ETHER	12	UR	C	13	UR	C	12	UR	C			
ACROLEIN	60	UR	C	65	UR	C	60	UR	C			
ACRYLONITRILE	60	U		65	U		60	U				
BENZENE	6	U		6	U		6	U				
BROMODICHLOROMETHANE	6	U		6	U		6	U				
BROMOFORM	6	U		6	U		6	U				
BROMOMETHANE	12	U		13	U		12	U				
CARBON TETRACHLORIDE	6	U		6	U		6	U				
CHLOROBENZENE	6	U		6	U		6	U				
CHLORODIBROMOMETHANE	6	U		6	U		6	U				
CHLOROETHANE	12	U		13	U		12	U				
CHLOROFORM	6	U		6	U		6	U				
CHLOROMETHANE	12	U		13	U		12	U				
ETHYLBENZENE	6	U		6	U		6	U				
METHYL TERT-BUTYL ETHER	2	U		3	U		2	U				
METHYLENE CHLORIDE	11	U	A	15	U	A	29	U	A			
TETRACHLOROETHENE	6	U		6	U		6	U				
TOLUENE	6	U		6	U		6	U				
TOTAL XYLENES	6	U		6	U		6	U				
TRANS-1,2-DICHLOROETHENE	6	U		6	U		6	U				
TRICHLOROETHENE	6	U		6	U		6	U				
VINYL CHLORIDE	12	U		13	U		12	U				

CTO007 AS KEY WEST
WATER DATA
KAS
SDG: NASKW17

SAMPLE NUMBER:	TRIP BLANK-071801			TRIP BLANK-071901			/ /			/ /		
SAMPLE DATE:	07/18/01			07/19/01								
LABORATORY ID:	WR2525-3			WR2553-2								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1-TRICHLOROETHANE	1	U		1	U							
1,1,2,2-TETRACHLOROETHANE	1	U		1	U							
1,1,2-TRICHLOROETHANE	1	U		1	U							
1,1-DICHLOROETHANE	1	U		1	U							
1,1-DICHLOROETHENE	1	U		1	U							
1,2-DICHLOROETHANE	1	U		1	U							
1,2-DICHLOROPROPANE	1	U		1	U							
1,3-DICHLOROPROPENE	2	U		2	U							
2-CHLOROETHYL VINYL ETHER	10	U		10	U							
ACROLEIN	5	UR	C	5	U							
ACRYLONITRILE	50	U		50	U							
BENZENE	1	U		1	U							
BROMODICHLOROMETHANE	1	U		1	U							
BROMOFORM	1	U		1	U							
BROMOMETHANE	2	U		2	U							
CARBON TETRACHLORIDE	1	U		1	U							
CHLOROBENZENE	1	U		1	U							
CHLORODIBROMOMETHANE	1	U		1	U							
CHLOROETHANE	2	U		2	U							
CHLOROFORM	1	U		1	U							
CHLOROMETHANE	2	U		2	U							
ETHYLBENZENE	1	U		1	U							
METHYL TERT-BUTYL ETHER	2	U		2	U							
METHYLENE CHLORIDE	1	J	C	1								
TETRACHLOROETHENE	1	U		1	U							
TOLUENE	1	U		1	U							
TOTAL XYLENES	5	U		5	U							
TRANS-1,2-DICHLOROETHENE	1	U		1	U							
TRICHLOROETHENE	1	U		1	U							
VINYL CHLORIDE	2	U		2	U							

CTO00. AS KEY WEST
SOIL DATA
KAS
SDG: NASKW17

SAMPLE NUMBER:	CWKW-SS-SB03-001			CWKW-SS-SB04-001			CWKW-SS-SB10-001				
SAMPLE DATE:	07/18/01			07/18/01			07/19/01			/ /	
LABORATORY ID:	WR2525-1			WR2525-2			WR2553-1				
QC_TYPE:	NORMAL			NORMAL			NORMAL				
% SOLIDS:	90.0 %			90.0 %			86.0 %			100.0 %	
UNITS:	UG/KG			UG/KG			UG/KG				
FIELD DUPLICATE OF:											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	560	U		2200	U		240	U				
2-METHYLNAPHTHALENE	560	U		2200	U		240	U				
ACENAPHTHENE	560	U		2200	U		120	J	P			
ACENAPHTHYLENE	560	U		2200	U		240	U				
ANTHRACENE	560	U		2200	U		240	U				
BENZO(A)ANTHRACENE	560	U		2200	U		240	J	P			
BENZO(A)PYRENE	560	U		2200	U		170	J	P			
BENZO(B)FLUORANTHENE	560	U		2200	U		240	U				
BENZO(G,H,I)PERYLENE	560	U		2200	U		240	U				
BENZO(K)FLUORANTHENE	560	U		2200	U		240	U				
CHRYSENE	560	U		2200	U		320					
DIBENZO(A,H)ANTHRACENE	560	U		2200	U		240	U				
FLUORANTHENE	560	U		2200	U		240	U				
FLUORENE	560	U		2200	U		240	U				
INDENO(1,2,3-CD)PYRENE	560	U		2200	U		240	U				
NAPHTHALENE	560	U		2200	U		240	U				
PHENANTHRENE	560	U		2200	U		240	U				
PYRENE	560	U		2200	U		320					

CTO007 AS KEY WEST
SOIL DATA
KAS
SDG: NASKW17

SAMPLE NUMBER:	CWKW-SS-SB03-001			CWKW-SS-SB04-001			CWKW-SS-SB10-001					
SAMPLE DATE:	07/18/01			07/18/01			07/19/01			/ /		
LABORATORY ID:	WR2525-1			WR2525-2			WR2553-1					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	90.0 %			90.0 %			86.0 %			100.0 %		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
TOTAL PETROLEUM HYDROCARBONS(MG/KG)	1300	J	A	3200	J	A	2400	J	A			

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**MR. C. BRYAN**	**DATE:**	**OCTOBER 22, 2001**
FROM:	**ANGELA SCHEETZ**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION- VOA/PAH/TPH**
CTO 153, NAS KEY WEST
SDG WR2929

SAMPLES: 6/Aqueous/

CWKW-GW-DUP1-001	CWKW-GW-MW01-001	CWKW-GW-MW02-001
CWKW-GW-MW03-001	CWKW-GW-MW04-001	TRIP BLANK-082201

OVERVIEW

The sample set for CTO 153, NAS Key West, SDG WR2929 consists of five (5) environmental aqueous samples and one (1) trip blank. All samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs). The environmental samples were also analyzed for ethylene dibromide (EDB), polynuclear aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH). One field duplicate pair was included in this SDG, (CWKW-GW-DUP1-01 / CWKW-GW-MW01-01).

The samples were collected by TetraTech NUS on August 22, 2001 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Methods 8260B, 8270B, EPA 504.1, and FL-PRO analytical and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

- * Data completeness
- * Holding times
- Initial and continuing calibration
- * Laboratory method and field quality control blank results
- * Surrogate spike recoveries
- * Detection Limits
- * Field duplicate results

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified Analytical results are presented in Appendix A.

The text of this report is formulated to address only gross noncompliances resulting in the rejection of data and the elimination of false positives.

Volatile

Initial and continuing calibration relative response factor (RRF) fell below the 0.05 quality control limit for acrolein. Only nondetected results were reported for the aforementioned compound and these were rejected (UR) in all samples.

There were additional initial and continuing calibration noncompliances (%RSDs, %Ds), however, these

noncompliances did not warrant qualification, as only limited data review is being performed.

EDB

EDB was not reported for the trip blank.

PAH

Accept data as reported.

TPH

Accept data as reported.

Additional Comments

Positive results below the reporting limit (RL) were qualified as estimated, J, due to uncertainty near the detection limit.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Several volatile compounds failed to meet initial and continuing calibration acceptance criteria.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines. The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Angela Scheetz
Tetra Tech NUS

Angela Scheetz
Chemist/Data Validator

Tetra Tech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
N01 = Internal Standard Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

CTO1! NAS KEY WEST
WATER DATA
KAS
SDG: WR2929

SAMPLE NUMBER:	CWKW-GW-DUP1-001			CWKW-GW-MW01-001			CWKW-GW-MW02-001			CWKW-GW-MW03-001		
SAMPLE DATE:	08/22/01			08/22/01			08/22/01			08/22/01		
LABORATORY ID:	-WR2929-4			WR2929-1			WR2929-2			WR2929-5		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:	CSKW-GW-MW01-001											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
1,1,1-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2,2-TETRACHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHENE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE	0.02	U		0.02	U		0.02	U		0.02	U	
1,2-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROPROPANE	1	U		1	U		1	U		1	U	
1,3-DICHLOROPROPENE	2	U		2	U		2	U		2	U	
2-CHLOROETHYL VINYL ETHER	10	U		10	U		10	U		10	U	
ACROLEIN	5	UR	C	5	UR	C	5	UR	C	5	UR	C
ACRYLONITRILE	50	U		50	U		50	U		50	U	
BENZENE	1	U		1	U		1	U		1	U	
BROMODICHLOROMETHANE	1	U		1	U		1	U		1	U	
BROMOFORM	1	U		1	U		1	U		1	U	
BROMOMETHANE	2	U		2	U		2	U		2	U	
CARBON TETRACHLORIDE	1	U		1	U		1	U		1	U	
CHLOROBENZENE	1	U		1	U		1	U		1	U	
CHLORODIBROMOMETHANE	1	U		1	U		1	U		1	U	
CHLOROETHANE	2	U		2	U		2	U		2	U	
CHLOROFORM	1	U		1	U		1	U		1	U	
CHLOROMETHANE	2	U		2	U		2	U		2	U	
ETHYLBENZENE	1	U		1	U		1	U		1	U	
METHYL TERT-BUTYL ETHER	2	U		0.4	J	P	0.8	J	P	2	U	
METHYLENE CHLORIDE	1	U		1	U		1	U		1	U	
TETRACHLOROETHENE	1	U		1	U		1	U		1	U	
TOLUENE	1	U		1	U		1	U		1	U	
TOTAL XYLENES	5	U		5	U		5	U		5	U	
TRANS-1,2-DICHLOROETHENE	1	U		1	U		1	U		1	U	
TRICHLOROETHENE	1	U		1	U		1	U		1	U	
VINYL CHLORIDE	1	U		1	U		1	U		1	U	

CTO1' NAS KEY WEST
WATER DATA
KAS
SDG: WR2929

SAMPLE NUMBER:	CWKW-GW-MW04-001			TRIP BLANK-082201								
SAMPLE DATE:	08/22/01			08/15/01			/ /			/ /		
LABORATORY ID:	WR2929-3			WR2929-6								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
1,1,1-TRICHLOROETHANE	1	U		1	U							
1,1,2,2-TETRACHLOROETHANE	1	U		1	U							
1,1,2-TRICHLOROETHANE	1	U		1	U							
1,1-DICHLOROETHANE	1	U		1	U							
1,1-DICHLOROETHENE	1	U		1	U							
1,2-DIBROMOETHANE	0.02	U										
1,2-DICHLOROETHANE	1	U		1	U							
1,2-DICHLOROPROPANE	1	U		1	U							
1,3-DICHLOROPROPENE	2	U		2	U							
2-CHLOROETHYL VINYL ETHER	10	U		10	U							
ACROLEIN	5	UR	C	5	UR	C						
ACRYLONITRILE	50	U		50	U							
BENZENE	1	J	P	1	U							
BROMODICHLOROMETHANE	1	U		1	U							
BROMOFORM	1	U		1	U							
BROMOMETHANE	2	U		2	U							
CARBON TETRACHLORIDE	1	U		1	U							
CHLOROBENZENE	1	U		1	U							
CHLORODIBROMOMETHANE	1	U		1	U							
CHLOROETHANE	2	U		2	U							
CHLOROFORM	1	U		1	U							
CHLOROMETHANE	2	U		2	U							
ETHYLBENZENE	0.7	J	P	1	U							
METHYL TERT-BUTYL ETHER	2	U		2	U							
METHYLENE CHLORIDE	1	U		1	U							
TETRACHLOROETHENE	1	U		1	U							
TOLUENE	0.8	J	P	1	U							
TOTAL XYLENES	5	U		5	U							
TRANS-1,2-DICHLOROETHENE	1	U		1	U							
TRICHLOROETHENE	1	U		1	U							
VINYL CHLORIDE	1	U		1	U							

CTO15 IAS KEY WEST
WATER DATA
KAS
SDG: WR2929

SAMPLE NUMBER:	CWKW-GW-DUP1-001	CWKW-GW-MW01-001	CWKW-GW-MW02-001	CWKW-GW-MW03-001
SAMPLE DATE:	08/22/01	08/22/01	08/22/01	08/22/01
LABORATORY ID:	WR2929-4	WR2929-1	WR2929-2	WR2929-5
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:	CSKW-GW-MW01-001			

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
2-METHYLNAPHTHALENE	0.2	U		0.2	U		0.2	J	P	0.2	U	
ACENAPHTHENE	0.2	U		0.1	J	P	0.5			0.2	U	
ACENAPHTHYLENE	0.2	U		0.2	U		0.2	U		0.2	U	
ANTHRACENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(A)ANTHRACENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(A)PYRENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(B)FLUORANTHENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(G,H,I)PERYLENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(K)FLUORANTHENE	0.2	U		0.2	U		0.2	U		0.2	U	
CHRYSENE	0.2	U		0.2	U		0.2	U		0.2	U	
DIBENZO(A,H)ANTHRACENE	0.2	U		0.2	U		0.2	U		0.2	U	
FLUORANTHENE	0.2	U		0.05	J	P	0.2	U		0.2	U	
FLUORENE	0.2	U		0.2	U		0.2	U		0.2	U	
INDENO(1,2,3-CD)PYRENE	0.2	U		0.2	U		0.2	U		0.2	U	
NAPHTHALENE	0.2	U		0.2	U		0.07	J	P	0.2	U	
PHENANTHRENE	0.2	U		0.2	U		0.1	J	P	0.2	U	
PYRENE	0.2	U		0.2	U		0.2	U		0.2	U	

CTO15 'AS KEY WEST
WATER DATA
KAS
SDG: WR2929

SAMPLE NUMBER:	CWKW-GW-MW04-001											
SAMPLE DATE:	08/22/01			/ /			/ /			/ /		
LABORATORY ID:	WR2929-3											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
2-METHYLNAPHTHALENE	0.2	U										
ACENAPHTHENE	0.2	U										
ACENAPHTHYLENE	0.2	U										
ANTHRACENE	0.2	U										
BENZO(A)ANTHRACENE	0.2	U										
BENZO(A)PYRENE	0.2	U										
BENZO(B)FLUORANTHENE	0.2	U										
BENZO(G,H,I)PERYLENE	0.2	U										
BENZO(K)FLUORANTHENE	0.2	U										
CHRYSENE	0.2	U										
DIBENZO(A,H)ANTHRACENE	0.2	U										
FLUORANTHENE	0.2	U										
FLUORENE	0.2	U										
INDENO(1,2,3-CD)PYRENE	0.2	U										
NAPHTHALENE	0.06	J	P									
PHENANTHRENE	0.2	U										
PYRENE	0.2	U										

CTO1! IAS KEY WEST
WATER DATA
KAS
SDG: WR2929

SAMPLE NUMBER:	CWKW-GW-DUP1-001			CWKW-GW-MW01-001			CWKW-GW-MW02-001			CWKW-GW-MW03-001		
SAMPLE DATE:	08/22/01			08/22/01			08/22/01			08/22/01		
LABORATORY ID:	WR2929-4			WR2929-1			WR2929-2			WR2929-5		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:	CSKW-GW-MW01-001											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
TOTAL PETROLEUM HYDROCARBONS	500	U		770			500	U		500	U	

CTO1! IAS KEY WEST
WATER DATA
KAS
SDG: WR2929

SAMPLE NUMBER:	CWKW-GW-MW04-001			
SAMPLE DATE:	08/22/01	/ /	/ /	/ /
LABORATORY ID:	WR2929-3			
QC_TYPE:	NORMAL			
% SOLIDS:	0.0 %	100.0 %	100.0 %	100.0 %
UNITS:	UG/L			
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
TOTAL PETROLEUM HYDROCARBONS	500	U										

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**C. BRYAN**	**DATE:**	**FEBRUARY 12, 2002**
FROM:	**ERIN M. FAUST** **REBEKAH A. HAYNIE**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – LEAD AND MISCELLANEOUS PARAMETERS**
CTO-153 NAS KEY WEST
SAMPLE DELIVERY GROUP (SDG) – WR3803

SAMPLES: 5/Aqueous/

CWKW-GW-DUP1-002 CWKW-GW-MW01-002
CWKW-GW-MW02-002 CWKW-GW-MW03-002
CWKW-GW-MW04-002

Overview

The sample set for CTO 153, Key West, SDG WR3803, consists of five (5) aqueous environmental samples. There is one (1) field duplicate pair (CWKW-GW-DUP1-002 / CWKW-GW-MW03-002) included in this SDG.

All of the samples were analyzed for lead, while two, CWKW-GW-MW03-002 and CWKW-GW-MW04-002, were additionally analyzed for chloride, nitrate, nitrite, phosphate, and sulfate. The samples were collected by Tetra Tech NUS, Inc. on November 8, 2001 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. Lead analyses were conducted using SW 846 method 6010B. Analyses for chloride and sulfate were conducted using SW 846 method 300. Nitrate and nitrite were analyzed using EPA method 353.2 and phosphate was analyzed by EPA method 365.2.

All lead analyses were conducted using Inductively Coupled Plasma (ICP) methodologies.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Recoveries
• Laboratory Blank Analyses
* • Field Duplicate Results
* • Detection Limits

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminant was detected in the preparation blank at the following maximum concentration:

Analyte	Maximum Concentration	Action Level
Lead[1]	2.86 µg/L	14.3 µg/L

[1] Maximum concentration present in an aqueous preparation blank.

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration when evaluating for blank contamination. All sample results for lead were not detectable at the instrument detection limit. As a result, data was not qualified.

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", August 1993 and February 1994 and the NFESC document entitled "Navy IRCDQM" (September 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Erin M. Faust
Environmental Scientist

Tetra Tech NUS
Rebekah A. Haynie
Environmental Scientist

TetraTech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
N01 = Internal Standard Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

CTO: NAS KEY WEST
WATER DATA
KAS
SDG: WR3803

SAMPLE NUMBER:	CWKW-GW-DUP1-002			CWKW-GW-MW01-002			CWKW-GW-MW02-002			CWKW-GW-MW03-002		
SAMPLE DATE:	11/08/01			11/08/01			11/08/01			11/08/01		
LABORATORY ID:	WR3803-3			WR3803-1			WR3803-2			WR3803-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:	CWKW-GW-MW03-002											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	1.48	U		1.48	U		1.48	U		1.48	U	

CTO1 NAS KEY WEST
WATER DATA
KAS
SDG: WR3803

SAMPLE NUMBER:	CWKW-GW-MW04-002			
SAMPLE DATE:	11/08/01	/ /	/ /	/ /
LABORATORY ID:	WR3803-5			
QC_TYPE:	NORMAL			
% SOLIDS:	0.0 %	100.0 %	100.0 %	100.0 %
UNITS:	UG/L			
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	1.48	U										

CTO1 NAS KEY WEST
WATER DATA
KAS
SDG: WR3803

SAMPLE NUMBER:	CWKW-GW-MW03-002			CWKW-GW-MW04-002								
SAMPLE DATE:	11/08/01			11/08/01			/ /			/ /		
LABORATORY ID:	WR3803-4			WR3803-5								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
MISCELLANEOUS PARAMETERS												
CHLORIDE(MG/L)	6200			11000								
NITRATE(MG/L)	0.05	U		0.05	U							
NITRITE(MG/L)	0.05	U		0.05	U							
PHOSPHATE(MG/L)	0.10	U		0.10	U							
SULFATE(MG/L)	990			2000								

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**MR. C. BRYAN**	**DATE:**	**FEBRUARY 12, 2002**
FROM:	**BERNARD F SPADA III**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION- VOA/PAH/PET**
CTO 153, NAS KEY WEST
SDG WR3803

SAMPLES: 6/Aqueous

CWKW-GW-DUP1-002*	CWKW-GW-MW01-002*
CWKW-GW-MW02-002*	CWKW-GW-MW03-002*
CWKW-GW-MW04-002*	CWKW-GW-TBLK-002

OVERVIEW

The sample set for CTO 153, NAS Key West, SDG WR3803 consists of four (4) environmental aqueous samples, one (1) sample duplicate, and one (1) trip blank. All samples were analyzed for volatile organic compounds (VOC) by Method SW-846 8260B. The samples designated with an asterisk (*) were also analyzed for polynuclear aromatic hydrocarbons (PAH), ethylene dibromide, and petroleum (PET) by Methods SW-846 8270B, EPA 504.1 and Florida Pro respectively.

The samples were collected by TetraTech NUS on November 8, 2001 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Methods 8260B, 8270B, EPA 504.1 and Florida Pro analytical and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

* • Data completeness
* • Holding times
• Initial and continuing calibration
• Laboratory method and field quality control blank results
* • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified Analytical results are presented in Appendix A.

The text of this report is formulated to address only gross noncompliances resulting in the rejection of data and the elimination of false positives.

Volatile Organic Compounds

The initial calibration average RRF exceeded the acceptance limits for acrolein. All associated non-detects were qualified as rejected (UR).

2-chloroethylvinyl ether had a <10% recovery in the MS/MSD samples. The associated non-detect for 2-chloroethylvinyl ether was qualified as rejected (UR).

The following compounds were detected in the method blank:

Compound	Maximum Concentration	Blank Action Level
Methylene Chloride	12.0 µg/L	120 µg/L
Chloroform	0.6 µg/L	3.0 µg/L

Sample aliquot and dilution factors were taken into consideration when applying the blank action levels. Positive results for methylene chloride below the blank action level were qualified as nondetected, U. Quality control samples were not qualified due to blank contamination.

Several samples had internal standards recovery that exceeded the acceptance limits. No action was taken based on this due to a limited review being performed.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Qualifications were made based on calibration noncompliance, MS/MSD noncompliance, and method blank contamination.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines. The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Bernard F. Spada III

Tetra Tech NUS

Bernard F. Spada III
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's r < 0.995
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
N01 = Internal Standard Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning r < 0.995 (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

CTO · NAS KEY WEST
WATER DATA
KAS
SDG: WR3803

SAMPLE NUMBER:	CWKW-GW-DUP1-002			CWKW-GW-MW01-002			CWKW-GW-MW02-002			CWKW-GW-MW03-002		
SAMPLE DATE:	11/08/01			11/08/01			11/08/01			11/08/01		
LABORATORY ID:	WR3803-3			WR3803-1			WR3803-2			WR3803-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:	CWKW-GW-MW03-002											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2,2-TETRACHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHENE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE	0.02	U		0.02	U		0.02	U		0.02	U	
1,2-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROPROPANE	1	U		1	U		1	U		1	U	
2-CHLOROETHYL VINYL ETHER	10	U		10	UR	D	10	U		10	U	
ACROLEIN	5	UR	C	5	UR	C	5	UR	C	5	UR	C
ACRYLONITRILE	50	U		50	U		50	U		50	U	
BENZENE	1	U		1	U		1	U		1	U	
BROMODICHLOROMETHANE	1	U		1	U		1	U		1	U	
BROMOFORM	1	U		1	U		1	U		1	U	
BROMOMETHANE	2	U		2	U		2	U		2	U	
CARBON TETRACHLORIDE	1	U		1	U		1	U		1	U	
CHLOROBENZENE	1	U		1	U		1	U		1	U	
CHLORODIBROMOMETHANE	1	U		1	U		1	U		1	U	
CHLOROETHANE	2	U		2	U		2	U		2	U	
CHLOROFORM	1	U		1	U		1	U		1	U	
CHLOROMETHANE	2	U		2	U		2	U		2	U	
ETHYLBENZENE	1	U		1	U		1	U		1	U	
METHYL TERT-BUTYL ETHER	2	U		2	U		0.6	J	P	2	U	
METHYLENE CHLORIDE	1	U		1	U		1	U		1	U	
TETRACHLOROETHENE	1	U		1	U		1	U		1	U	
TOLUENE	1	U		1	U		1	U		1	U	
TOTAL XYLENES	5	U		5	U		5	U		5	U	
TRANS-1,2-DICHLOROETHENE	1	U		1	U		1	U		1	U	
TRANS-1,3-DICHLOROPROPENE	1	U		1	U		1	U		1	U	
TRICHLOROETHENE	1	U		1	U		1	U		1	U	
VINYL CHLORIDE	1	U		1	U		1	U		1	U	

CTO' ·NAS KEY WEST
WATER DATA
KAS
SDG: WR3803

SAMPLE NUMBER:	CWKW-GW-MW04-002	CWKW-GW-TBLK-002		
SAMPLE DATE:	11/08/01	11/08/01	/ /	/ /
LABORATORY ID:	WR3803-5	WR3803-6		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	0.0 %	0.0 %	100.0 %	100.0 %
UNITS:	UG/L	UG/L		
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1-TRICHLOROETHANE	1	U		1	U							
1,1,2,2-TETRACHLOROETHANE	1	U		1	U							
1,1,2-TRICHLOROETHANE	1	U		1	U							
1,1-DICHLOROETHANE	1	U		1	U							
1,1-DICHLOROETHENE	1	U		1	U							
1,2-DIBROMOETHANE	0.02	U										
1,2-DICHLOROETHANE	1	U		1	U							
1,2-DICHLOROPROPANE	1	U		1	U							
2-CHLOROETHYL VINYL ETHER	10	U		10	U							
ACROLEIN	5	UR	C	5	U							
ACRYLONITRILE	50	U		50	U							
BENZENE	1	U		1	U							
BROMODICHLOROMETHANE	1	U		1	U							
BROMOFORM	1	U		1	U							
BROMOMETHANE	2	U		2	U							
CARBON TETRACHLORIDE	1	U		1	U							
CHLOROBENZENE	1	U		1	U							
CHLORODIBROMOMETHANE	1	U		1	U							
CHLOROETHANE	2	U		2	U							
CHLOROFORM	1	U		1	U							
CHLOROMETHANE	2	U		2	U							
ETHYLBENZENE	1	U		1	U							
METHYL TERT-BUTYL ETHER	2	U		2	U							
METHYLENE CHLORIDE	1	U		2	U	A						
TETRACHLOROETHENE	1	U		0.9	J	P						
TOLUENE	1	U		1	U							
TOTAL XYLENES	5	U		5	U							
TRANS-1,2-DICHLOROETHENE	1	U		1	U							
TRANS-1,3-DICHLOROPROPENE	1	U		1	U							
TRICHLOROETHENE	1	U		1	U							
VINYL CHLORIDE	1	U		1	U							

CTO· ·NAS KEY WEST
WATER DATA
KAS
SDG: WR3803

SAMPLE NUMBER:	CWKW-GW-DUP1-002			CWKW-GW-MW01-002			CWKW-GW-MW02-002			CWKW-GW-MW03-002		
SAMPLE DATE:	11/08/01			11/08/01			11/08/01			11/08/01		
LABORATORY ID:	WR3803-3			WR3803-1			WR3803-2			WR3803-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:	CWKW-GW-MW03-002											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	0.2	U		0.2	U		0.2	U		0.2	U	
2-METHYLNAPHTHALENE	0.2	U		0.2	U		0.2	U		0.2	U	
ACENAPHTHENE	0.2	U		0.2	U		0.1	J	P	0.2	U	
ACENAPHTHYLENE	0.2	U		0.2	U		0.2	U		0.2	U	
ANTHRACENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(A)ANTHRACENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(A)PYRENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(B)FLUORANTHENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(G,H,I)PERYLENE	0.2	U		0.2	U		0.2	U		0.2	U	
BENZO(K)FLUORANTHENE	0.2	U		0.2	U		0.2	U		0.2	U	
CHRYSENE	0.2	U		0.2	U		0.2	U		0.2	U	
DIBENZO(A,H)ANTHRACENE	0.2	U		0.2	U		0.2	U		0.2	U	
FLUORANTHENE	0.2	U		0.2	U		0.2	U		0.2	U	
FLUORENE	0.2	U		0.2	U		0.2	U		0.2	U	
INDENO(1,2,3-CD)PYRENE	0.2	U		0.2	U		0.2	U		0.2	U	
NAPHTHALENE	0.2	U		0.2	U		0.2	U		0.2	U	
PHENANTHRENE	0.2	U		0.2	U		0.2	U		0.2	U	
PYRENE	0.2	U		0.2	U		0.2	U		0.2	U	

CTO: NAS KEY WEST
WATER DATA
KAS
SDG: WR3803

SAMPLE NUMBER:	CWKW-GW-MW04-002											
SAMPLE DATE:	11/08/01			/ /			/ /			/ /		
LABORATORY ID:	WR3803-5											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	0.2	U										
2-METHYLNAPHTHALENE	0.2	U										
ACENAPHTHENE	0.2	U										
ACENAPHTHYLENE	0.2	U										
ANTHRACENE	0.2	U										
BENZO(A)ANTHRACENE	0.2	U										
BENZO(A)PYRENE	0.2	U										
BENZO(B)FLUORANTHENE	0.2	U										
BENZO(G,H,I)PERYLENE	0.2	U										
BENZO(K)FLUORANTHENE	0.2	U										
CHRYSENE	0.2	U										
DIBENZO(A,H)ANTHRACENE	0.2	U										
FLUORANTHENE	0.2	U										
FLUORENE	0.2	U										
INDENO(1,2,3-CD)PYRENE	0.2	U										
NAPHTHALENE	0.2	U										
PHENANTHRENE	0.2	U										
PYRENE	0.2	U										

CTO: NAS KEY WEST
WATER DATA
KAS
SDG: WR3803

SAMPLE NUMBER:	CWKW-GW-DUP1-002	CWKW-GW-MW01-002	CWKW-GW-MW02-002	CWKW-GW-MW03-002
SAMPLE DATE:	11/08/01	11/08/01	11/08/01	11/08/01
LABORATORY ID:	WR3803-3	WR3803-1	WR3803-2	WR3803-4
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:	CWKW-GW-MW03-002			

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
PETROLEUM HYDROCARBONS												
TPH (C8-C40)	500	U		310	J	P	170	J	P	150	J	P

CTO NAS KEY WEST
WATER DATA
KAS
SDG: WR3803

SAMPLE NUMBER:	CWKW-GW-MW04-002											
SAMPLE DATE:	11/08/01			/ /			/ /			/ /		
LABORATORY ID:	WR3803-5											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
PETROLEUM HYDROCARBONS												
TPH (C8-C40)	500	U										

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**MR. C. BRYAN**	**DATE:**	**FEBRUARY 12, 2002**
FROM:	**BERNARD F SPADA III**	**COPIES:**	**DV FILE**
SUBJECT:	**ORGANIC DATA VALIDATION- OVG CTO 153, NAS KEY WEST SDG TTN30**		
SAMPLES:	1/Aqueous CWKW-GW-MW03-001		

OVERVIEW

The sample set for CTO 153, NAS Key West, SDG TTN30 consists of one (1) environmental aqueous sample. The sample was analyzed for methane (OVG) by Method WA1.02.

The samples were collected by TetraTech NUS on November 8, 2001 and analyzed by Vaportech Services. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. The data contained in this SDG were validated with regard to the following parameters:

* • Data completeness
* • Holding times
* • Initial and continuing calibration
* • Laboratory method and field quality control blank results
* • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified Analytical results are presented in Appendix A.

The text of this report is formulated to address only gross noncompliances resulting in the rejection of data and the elimination of false positives.

Organic Volatile Gasses

None.

EXECUTIVE SUMMARY

Laboratory Performance Issues: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines. The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Bernard F. Spada III

Tetra Tech NUS

Bernard F. Spada III
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

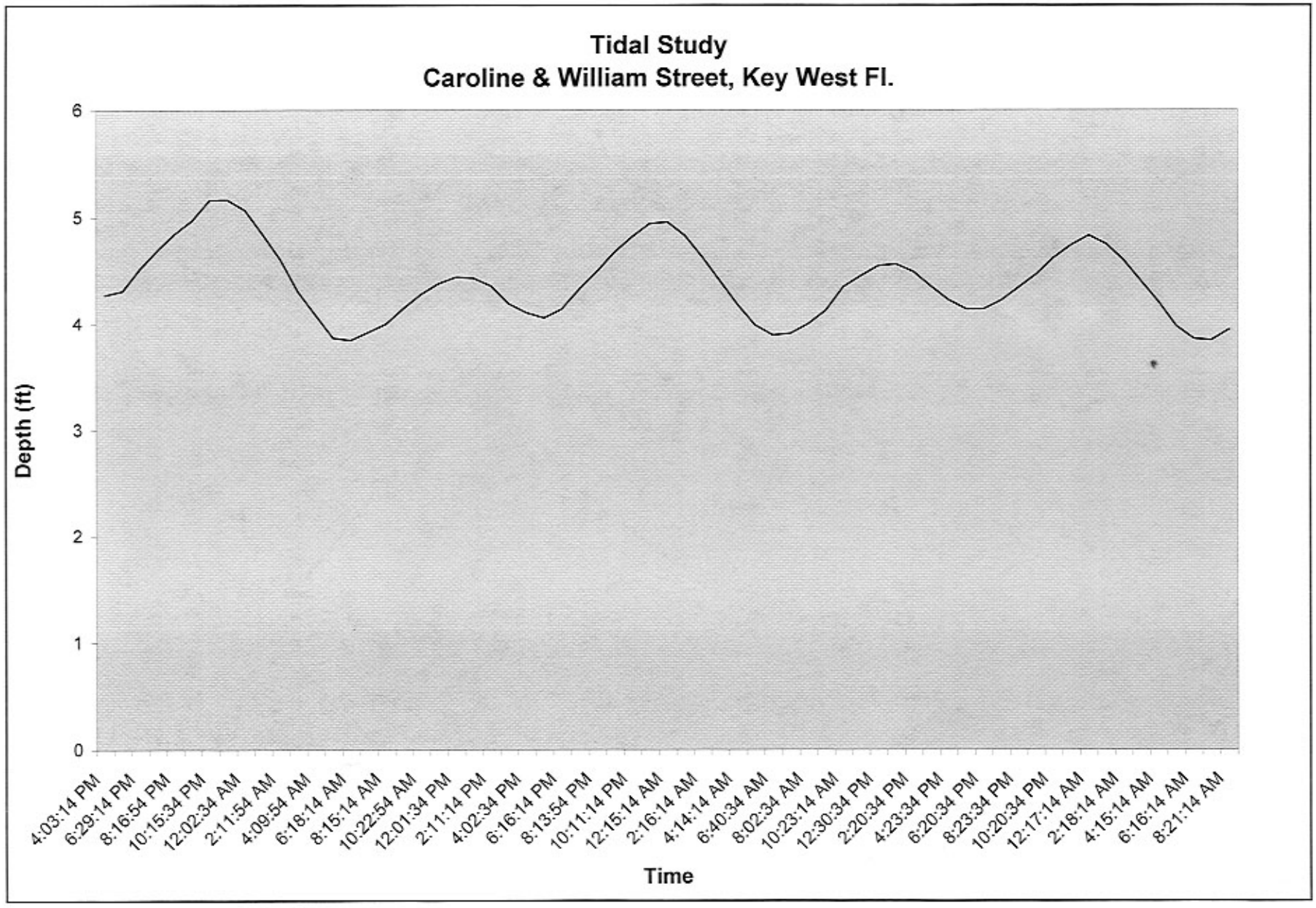
CTO -NAS KEY WEST
WATER DATA
VAPORTECH
SDG: TTN30

SAMPLE NUMBER:	CWKW-GW-MW03-001			
SAMPLE DATE:	11/08/01	/ /	/ /	/ /
LABORATORY ID:	CWKW-GW-MW03-			
QC_TYPE:	NORMAL			
% SOLIDS:	0.0 %	100.0 %	100.0 %	100.0 %
UNITS:	UG/L			
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
DISSOLVED GASES												
METHANE	93.7											

APPENDIX D

TIDAL STUDY DATA


Tidal Study
Caroline & William Street, Key West Fl.
Depth (ft)
6
5
4
3
2
1
0
4:03:14 PM
6:29:14 PM
8:16:54 PM
10:15:34 PM
12:02:34 AM
2:11:54 AM
4:09:54 AM
6:18:14 AM
8:15:14 AM
10:22:54 AM
12:01:34 PM
2:11:14 PM
4:02:34 PM
6:16:14 PM
8:13:54 PM
10:11:14 PM
12:15:14 AM
2:16:14 AM
4:14:14 AM
6:40:34 AM
8:02:34 AM
10:23:14 AM
12:30:34 PM
2:20:34 PM
4:23:34 PM
6:20:34 PM
8:23:34 PM
10:20:34 PM
12:17:14 AM
2:18:14 AM
4:15:14 AM
6:16:14 AM
8:21:14 AM
Time

In-Situ Inc. MiniTroll Pro

Report generated: 1/17/2002 19:07:32
Report from file: C:\WIN-SITU\Data\SN06589 2002-01-14 160254 Test #1.bin
DataMgr Version 3.71

Serial number: 6589
Firmware Version 3.01
Unit name:

Test name: Test #1

Test defined on: 1/14/2002 16:02:46
Test started on: 1/14/2002 16:02:54
Test stopped on: 1/17/2002 8:47:11
Test extracted on: N/A

Data gathered using Linear testing
Time between d Minutes.
Number of data 11653

TOTAL DATA SAI 11653

Channel number [1]
Measurement typ Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement typ Pressure
Channel name: Pressure
Sensor Range: 100 PSI.
Specific gravity: 1

Date	Time	ET (min)	Chan[1] Fahrenheit	Chan[2] Feet H2O
1/14/2002	16:02	0	79.21	4.267
1/14/2002	16:03	0.3333	79.19	4.274
1/14/2002	16:03	0.6667	79.19	4.274
1/14/2002	16:03	1	79.17	4.275
1/14/2002	16:04	1.3333	79.17	4.275
1/14/2002	16:04	1.6667	79.14	4.276
1/14/2002	16:04	2	79.14	4.276
1/14/2002	16:05	2.3333	79.14	4.276
1/14/2002	16:05	2.6667	79.12	4.276
1/14/2002	16:05	3	79.12	4.276
1/14/2002	16:06	3.3333	79.1	4.277
1/14/2002	16:06	3.6667	79.1	4.277
1/14/2002	16:06	4	79.1	4.271
1/14/2002	16:07	4.3333	79.1	4.277

Date	Time	ET (min)	Fahrenheit	Feet H2O
1/14/2002	16:07	4.6667	79.1	4.277
1/14/2002	16:07	5	79.07	4.278
1/14/2002	16:08	5.3333	79.07	4.278
1/14/2002	16:08	5.6667	79.07	4.278
1/14/2002	16:08	6	79.07	4.271
1/14/2002	16:09	6.3333	79.07	4.278
1/14/2002	16:09	6.6667	79.05	4.272
1/14/2002	16:09	7	79.05	4.278
1/14/2002	16:10	7.3333	79.05	4.278
1/14/2002	16:10	7.6667	79.05	4.272
1/14/2002	16:10	8	79.05	4.272
1/14/2002	16:11	8.3333	79.05	4.272
1/14/2002	16:11	8.6667	79.05	4.272
1/14/2002	16:11	9	79.05	4.272
1/14/2002	16:12	9.3333	79.05	4.272
1/14/2002	16:12	9.6667	79.05	4.272
1/14/2002	16:12	10	79.07	4.271
1/14/2002	16:13	10.3333	79.05	4.272
1/14/2002	16:13	10.6667	79.07	4.271
1/14/2002	16:13	11	79.07	4.278
1/14/2002	16:14	11.3333	79.07	4.278
1/14/2002	16:14	11.6667	79.07	4.271
1/14/2002	16:14	12	79.07	4.271
1/14/2002	16:15	12.3333	79.07	4.278
1/14/2002	16:15	12.6667	79.1	4.277
1/14/2002	16:15	13	79.1	4.271
1/14/2002	16:16	13.3333	79.1	4.277
1/14/2002	16:16	13.6667	79.1	4.277
1/14/2002	16:16	14	79.1	4.271
1/14/2002	16:17	14.3333	79.07	4.278
1/14/2002	16:17	14.6667	79.07	4.278
1/14/2002	16:17	15	79.07	4.278
1/14/2002	16:18	15.3333	79.07	4.278
1/14/2002	16:18	15.6667	79.05	4.272
1/14/2002	16:18	16	79.05	4.278
1/14/2002	16:19	16.3333	79.05	4.272
1/14/2002	16:19	16.6667	79.05	4.272
1/14/2002	16:19	17	79.07	4.278
1/14/2002	16:20	17.3333	79.07	4.271
1/14/2002	16:20	17.6667	79.07	4.278
1/14/2002	16:20	18	79.07	4.271
1/14/2002	16:21	18.3333	79.07	4.278
1/14/2002	16:21	18.6667	79.07	4.284
1/14/2002	16:21	19	79.1	4.271
1/14/2002	16:22	19.3333	79.1	4.271
1/14/2002	16:22	19.6667	79.1	4.277
1/14/2002	16:22	20	79.1	4.277
1/14/2002	16:23	20.3333	79.1	4.277
1/14/2002	16:23	20.6667	79.1	4.271
1/14/2002	16:23	21	79.1	4.271
1/14/2002	16:24	21.3333	79.1	4.271

Date	Time	ET (min)	Fahrenheit	Feet H2O
1/14/2002	16:24	21.6667	79.1	4.277
1/14/2002	16:24	22	79.1	4.271
1/14/2002	16:25	22.3333	79.1	4.271
1/14/2002	16:25	22.6667	79.1	4.277
1/14/2002	16:25	23	79.1	4.277
1/14/2002	16:26	23.3333	79.1	4.271
1/14/2002	16:26	23.6667	79.1	4.277
1/14/2002	16:26	24	79.1	4.277
1/14/2002	16:27	24.3333	79.1	4.277
1/14/2002	16:27	24.6667	79.1	4.277
1/14/2002	16:27	25	79.1	4.277
1/14/2002	16:28	25.3333	79.1	4.277
1/14/2002	16:28	25.6667	79.1	4.277
1/14/2002	16:28	26	79.1	4.277
1/14/2002	16:29	26.3333	79.1	4.277
1/14/2002	16:29	26.6667	79.1	4.277
1/14/2002	16:29	27	79.12	4.276
1/14/2002	16:30	27.3333	79.12	4.283
1/14/2002	16:30	27.6667	79.12	4.276
1/14/2002	16:30	28	79.12	4.276
1/14/2002	16:31	28.3333	79.14	4.276
1/14/2002	16:31	28.6667	79.12	4.276
1/14/2002	16:31	29	79.12	4.283
1/14/2002	16:32	29.3333	79.1	4.277
1/14/2002	16:32	29.6667	79.1	4.284
1/14/2002	16:32	30	79.1	4.284
1/14/2002	16:33	30.3333	79.1	4.277
1/14/2002	16:33	30.6667	79.1	4.284
1/14/2002	16:33	31	79.1	4.284
1/14/2002	16:34	31.3333	79.1	4.284
1/14/2002	16:34	31.6667	79.1	4.284
1/14/2002	16:34	32	79.07	4.278
1/14/2002	16:35	32.3333	79.07	4.284
1/14/2002	16:35	32.6667	79.07	4.284
1/14/2002	16:35	33	79.07	4.284
1/14/2002	16:36	33.3333	79.07	4.284
1/14/2002	16:36	33.6667	79.07	4.284
1/14/2002	16:36	34	79.07	4.284
1/14/2002	16:37	34.3333	79.07	4.284
1/14/2002	16:37	34.6667	79.07	4.284
1/14/2002	16:37	35	79.07	4.284
1/14/2002	16:38	35.3333	79.07	4.284
1/14/2002	16:38	35.6667	79.07	4.284
1/14/2002	16:38	36	79.07	4.284
1/14/2002	16:39	36.3333	79.07	4.291
1/14/2002	16:39	36.6667	79.07	4.291
1/14/2002	16:39	37	79.07	4.284
1/14/2002	16:40	37.3333	79.07	4.284
1/14/2002	16:40	37.6667	79.07	4.291
1/14/2002	16:40	38	79.1	4.29
1/14/2002	16:41	38.3333	79.1	4.29

1/15/2002 0:09	486.3333	80.46	5.058
1/15/2002 0:09	486.6667	80.46	5.058
1/15/2002 0:09	487	80.46	5.058
1/15/2002 0:10	487.3333	80.46	5.058
1/15/2002 0:10	487.6667	80.46	5.051
1/15/2002 0:10	488	80.46	5.058
1/15/2002 0:11	488.3333	80.46	5.058
1/15/2002 0:11	488.6667	80.46	5.058
1/15/2002 0:11	489	80.46	5.058
1/15/2002 0:12	489.3333	80.46	5.058
1/15/2002 0:12	489.6667	80.46	5.058
1/15/2002 0:12	490	80.46	5.051
1/15/2002 0:13	490.3333	80.46	5.051
1/15/2002 0:13	490.6667	80.46	5.058
1/15/2002 0:13	491	80.46	5.051
1/15/2002 0:14	491.3333	80.46	5.058
1/15/2002 0:14	491.6667	80.46	5.051
1/15/2002 0:14	492	80.46	5.051
1/15/2002 0:15	492.3333	80.46	5.051
1/15/2002 0:15	492.6667	80.46	5.044
1/15/2002 0:15	493	80.46	5.051
1/15/2002 0:16	493.3333	80.46	5.051
1/15/2002 0:16	493.6667	80.46	5.051
1/15/2002 0:16	494	80.46	5.051
1/15/2002 0:17	494.3333	80.46	5.051
1/15/2002 0:17	494.6667	80.46	5.044
1/15/2002 0:17	495	80.46	5.044
1/15/2002 0:18	495.3333	80.46	5.044
1/15/2002 0:18	495.6667	80.46	5.038
1/15/2002 0:18	496	80.46	5.044
1/15/2002 0:19	496.3333	80.46	5.044
1/15/2002 0:19	496.6667	80.46	5.038
1/15/2002 0:19	497	80.46	5.038
1/15/2002 0:20	497.3333	80.46	5.044
1/15/2002 0:20	497.6667	80.46	5.038
1/15/2002 0:20	498	80.46	5.038
1/15/2002 0:21	498.3333	80.46	5.038
1/15/2002 0:21	498.6667	80.46	5.038
1/15/2002 0:21	499	80.46	5.038
1/15/2002 0:22	499.3333	80.46	5.038
1/15/2002 0:22	499.6667	80.46	5.038
1/15/2002 0:22	500	80.46	5.031
1/15/2002 0:23	500.3333	80.46	5.031
1/15/2002 0:23	500.6667	80.46	5.031
1/15/2002 0:23	501	80.46	5.031
1/15/2002 0:24	501.3333	80.46	5.031
1/15/2002 0:24	501.6667	80.46	5.031
1/15/2002 0:24	502	80.46	5.031
1/15/2002 0:25	502.3333	80.46	5.031
1/15/2002 0:25	502.6667	80.46	5.025
1/15/2002 0:25	503	80.46	5.031
1/15/2002 0:26	503.3333	80.46	5.025

1/15/2002 0:26	503.6667	80.46	5.025
1/15/2002 0:26	504	80.46	5.025
1/15/2002 0:27	504.3333	80.46	5.018
1/15/2002 0:27	504.6667	80.46	5.025
1/15/2002 0:27	505	80.46	5.025
1/15/2002 0:28	505.3333	80.46	5.018
1/15/2002 0:28	505.6667	80.46	5.018
1/15/2002 0:28	506	80.46	5.018
1/15/2002 0:29	506.3333	80.46	5.018
1/15/2002 0:29	506.6667	80.46	5.018
1/15/2002 0:29	507	80.46	5.018
1/15/2002 0:30	507.3333	80.46	5.018
1/15/2002 0:30	507.6667	80.46	5.018
1/15/2002 0:30	508	80.44	5.012
1/15/2002 0:31	508.3333	80.46	5.012
1/15/2002 0:31	508.6667	80.46	5.012
1/15/2002 0:31	509	80.44	5.012
1/15/2002 0:32	509.3333	80.44	5.012
1/15/2002 0:32	509.6667	80.44	5.012
1/15/2002 0:32	510	80.44	5.012
1/15/2002 0:33	510.3333	80.44	5.006
1/15/2002 0:33	510.6667	80.44	5.006
1/15/2002 0:33	511	80.44	5.006
1/15/2002 0:34	511.3333	80.44	5.006
1/15/2002 0:34	511.6667	80.44	5.006
1/15/2002 0:34	512	80.44	4.999
1/15/2002 0:35	512.3333	80.44	5.006
1/15/2002 0:35	512.6667	80.44	4.999
1/15/2002 0:35	513	80.44	4.999
1/15/2002 0:36	513.3333	80.44	4.999
1/15/2002 0:36	513.6667	80.44	4.993
1/15/2002 0:36	514	80.44	4.993
1/15/2002 0:37	514.3333	80.44	4.993
1/15/2002 0:37	514.6667	80.44	4.993
1/15/2002 0:37	515	80.44	4.993
1/15/2002 0:38	515.3333	80.44	4.993
1/15/2002 0:38	515.6667	80.44	4.993
1/15/2002 0:38	516	80.44	4.986
1/15/2002 0:39	516.3333	80.44	4.986
1/15/2002 0:39	516.6667	80.42	4.987
1/15/2002 0:39	517	80.44	4.986
1/15/2002 0:40	517.3333	80.44	4.986
1/15/2002 0:40	517.6667	80.44	4.979
1/15/2002 0:40	518	80.42	4.98
1/15/2002 0:41	518.3333	80.44	4.979
1/15/2002 0:41	518.6667	80.42	4.98
1/15/2002 0:41	519	80.42	4.974
1/15/2002 0:42	519.3333	80.44	4.979
1/15/2002 0:42	519.6667	80.42	4.974
1/15/2002 0:42	520	80.42	4.974
1/15/2002 0:43	520.3333	80.42	4.974
1/15/2002 0:43	520.6667	80.42	4.974

1/15/2002 0:43	521	80.42	4.974
1/15/2002 0:44	521.3333	80.42	4.967
1/15/2002 0:44	521.6667	80.42	4.967
1/15/2002 0:44	522	80.42	4.967
1/15/2002 0:45	522.3333	80.42	4.967
1/15/2002 0:45	522.6667	80.42	4.967
1/15/2002 0:45	523	80.42	4.967
1/15/2002 0:46	523.3333	80.42	4.96
1/15/2002 0:46	523.6667	80.42	4.96
1/15/2002 0:46	524	80.42	4.96
1/15/2002 0:47	524.3333	80.42	4.96
1/15/2002 0:47	524.6667	80.42	4.954
1/15/2002 0:47	525	80.42	4.954
1/15/2002 0:48	525.3333	80.42	4.954
1/15/2002 0:48	525.6667	80.39	4.955
1/15/2002 0:48	526	80.42	4.954
1/15/2002 0:49	526.3333	80.42	4.947
1/15/2002 0:49	526.6667	80.39	4.948
1/15/2002 0:49	527	80.39	4.948
1/15/2002 0:50	527.3333	80.39	4.948
1/15/2002 0:50	527.6667	80.39	4.941
1/15/2002 0:50	528	80.39	4.941
1/15/2002 0:51	528.3333	80.39	4.935
1/15/2002 0:51	528.6667	80.39	4.941
1/15/2002 0:51	529	80.39	4.935
1/15/2002 0:52	529.3333	80.39	4.935
1/15/2002 0:52	529.6667	80.39	4.935
1/15/2002 0:52	530	80.39	4.928
1/15/2002 0:53	530.3333	80.39	4.928
1/15/2002 0:53	530.6667	80.39	4.928
1/15/2002 0:53	531	80.39	4.928
1/15/2002 0:54	531.3333	80.39	4.928
1/15/2002 0:54	531.6667	80.39	4.922
1/15/2002 0:54	532	80.39	4.922
1/15/2002 0:55	532.3333	80.39	4.922
1/15/2002 0:55	532.6667	80.39	4.922
1/15/2002 0:55	533	80.39	4.922
1/15/2002 0:56	533.3333	80.39	4.915
1/15/2002 0:56	533.6667	80.37	4.916
1/15/2002 0:56	534	80.37	4.916
1/15/2002 0:57	534.3333	80.37	4.916
1/15/2002 0:57	534.6667	80.37	4.916
1/15/2002 0:57	535	80.37	4.909
1/15/2002 0:58	535.3333	80.37	4.909
1/15/2002 0:58	535.6667	80.37	4.909
1/15/2002 0:58	536	80.37	4.909
1/15/2002 0:59	536.3333	80.37	4.903
1/15/2002 0:59	536.6667	80.37	4.903
1/15/2002 0:59	537	80.37	4.903
1/15/2002 1:00	537.3333	80.37	4.903
1/15/2002 1:00	537.6667	80.37	4.903
1/15/2002 1:00	538	80.37	4.896

1/15/2002 1:01	538.3333	80.37	4.896
1/15/2002 1:01	538.6667	80.37	4.896
1/15/2002 1:01	539	80.37	4.896
1/15/2002 1:02	539.3333	80.37	4.896
1/15/2002 1:02	539.6667	80.37	4.896
1/15/2002 1:02	540	80.37	4.89
1/15/2002 1:03	540.3333	80.35	4.89
1/15/2002 1:03	540.6667	80.37	4.89
1/15/2002 1:03	541	80.37	4.89
1/15/2002 1:04	541.3333	80.35	4.884
1/15/2002 1:04	541.6667	80.35	4.884
1/15/2002 1:04	542	80.35	4.884
1/15/2002 1:05	542.3333	80.35	4.884
1/15/2002 1:05	542.6667	80.35	4.877
1/15/2002 1:05	543	80.35	4.877
1/15/2002 1:06	543.3333	80.35	4.877
1/15/2002 1:06	543.6667	80.35	4.877
1/15/2002 1:06	544	80.35	4.871
1/15/2002 1:07	544.3333	80.35	4.877
1/15/2002 1:07	544.6667	80.35	4.871
1/15/2002 1:07	545	80.35	4.871
1/15/2002 1:08	545.3333	80.35	4.871
1/15/2002 1:08	545.6667	80.35	4.871
1/15/2002 1:08	546	80.35	4.871
1/15/2002 1:09	546.3333	80.35	4.864
1/15/2002 1:09	546.6667	80.35	4.864
1/15/2002 1:09	547	80.35	4.864
1/15/2002 1:10	547.3333	80.35	4.864
1/15/2002 1:10	547.6667	80.35	4.864
1/15/2002 1:10	548	80.35	4.864
1/15/2002 1:11	548.3333	80.35	4.864
1/15/2002 1:11	548.6667	80.35	4.864
1/15/2002 1:11	549	80.35	4.857
1/15/2002 1:12	549.3333	80.35	4.857
1/15/2002 1:12	549.6667	80.33	4.858
1/15/2002 1:12	550	80.35	4.857
1/15/2002 1:13	550.3333	80.35	4.857
1/15/2002 1:13	550.6667	80.35	4.857
1/15/2002 1:13	551	80.35	4.851
1/15/2002 1:14	551.3333	80.35	4.851
1/15/2002 1:14	551.6667	80.35	4.857
1/15/2002 1:14	552	80.33	4.852
1/15/2002 1:15	552.3333	80.35	4.851
1/15/2002 1:15	552.6667	80.33	4.852
1/15/2002 1:15	553	80.33	4.852
1/15/2002 1:16	553.3333	80.33	4.852
1/15/2002 1:16	553.6667	80.33	4.845
1/15/2002 1:16	554	80.33	4.845
1/15/2002 1:17	554.3333	80.33	4.845
1/15/2002 1:17	554.6667	80.33	4.838
1/15/2002 1:17	555	80.33	4.838
1/15/2002 1:18	555.3333	80.33	4.838

1/16/2002 7:55	2393	79.17	3.98
1/16/2002 7:56	2393.333	79.17	3.98
1/16/2002 7:56	2393.667	79.17	3.973
1/16/2002 7:56	2394	79.17	3.98
1/16/2002 7:57	2394.333	79.17	3.98
1/16/2002 7:57	2394.667	79.17	3.986
1/16/2002 7:57	2395	79.17	3.98
1/16/2002 7:58	2395.333	79.17	3.98
1/16/2002 7:58	2395.667	79.17	3.986
1/16/2002 7:58	2396	79.17	3.986
1/16/2002 7:59	2396.333	79.17	3.986
1/16/2002 7:59	2396.667	79.17	3.986
1/16/2002 7:59	2397	79.17	3.986
1/16/2002 8:00	2397.333	79.17	3.986
1/16/2002 8:00	2397.667	79.17	3.993
1/16/2002 8:00	2398	79.17	3.986
1/16/2002 8:01	2398.333	79.17	3.993
1/16/2002 8:01	2398.667	79.17	3.993
1/16/2002 8:01	2399	79.17	3.993
1/16/2002 8:02	2399.333	79.17	3.993
1/16/2002 8:02	2399.667	79.17	3.999
1/16/2002 8:02	2400	79.17	3.999
1/16/2002 8:03	2400.333	79.17	3.999
1/16/2002 8:03	2400.667	79.17	3.999
1/16/2002 8:03	2401	79.17	3.999
1/16/2002 8:04	2401.333	79.17	4.006
1/16/2002 8:04	2401.667	79.17	4.006
1/16/2002 8:04	2402	79.14	4
1/16/2002 8:05	2402.333	79.14	4.013
1/16/2002 8:05	2402.667	79.17	4.006
1/16/2002 8:05	2403	79.14	4.007
1/16/2002 8:06	2403.333	79.14	4.007
1/16/2002 8:06	2403.667	79.14	4.007
1/16/2002 8:06	2404	79.14	4.007
1/16/2002 8:07	2404.333	79.14	4.007
1/16/2002 8:07	2404.667	79.14	4.013
1/16/2002 8:07	2405	79.14	4.013
1/16/2002 8:08	2405.333	79.14	4.013
1/16/2002 8:08	2405.667	79.14	4.013
1/16/2002 8:08	2406	79.14	4.013
1/16/2002 8:09	2406.333	79.14	4.013
1/16/2002 8:09	2406.667	79.14	4.013
1/16/2002 8:09	2407	79.14	4.013
1/16/2002 8:10	2407.333	79.14	4.02
1/16/2002 8:10	2407.667	79.14	4.02
1/16/2002 8:10	2408	79.14	4.02
1/16/2002 8:11	2408.333	79.14	4.02
1/16/2002 8:11	2408.667	79.14	4.02
1/16/2002 8:11	2409	79.14	4.02
1/16/2002 8:12	2409.333	79.14	4.02
1/16/2002 8:12	2409.667	79.14	4.02
1/16/2002 8:12	2410	79.17	4.013

1/16/2002 8:13	2410.333	79.17	4.019
1/16/2002 8:13	2410.667	79.17	4.019
1/16/2002 8:13	2411	79.17	4.019
1/16/2002 8:14	2411.333	79.17	4.019
1/16/2002 8:14	2411.667	79.17	4.019
1/16/2002 8:14	2412	79.17	4.019
1/16/2002 8:15	2412.333	79.14	4.02
1/16/2002 8:15	2412.667	79.14	4.026
1/16/2002 8:15	2413	79.14	4.026
1/16/2002 8:16	2413.333	79.17	4.026
1/16/2002 8:16	2413.667	79.14	4.026
1/16/2002 8:16	2414	79.14	4.026
1/16/2002 8:17	2414.333	79.14	4.026
1/16/2002 8:17	2414.667	79.17	4.026
1/16/2002 8:17	2415	79.17	4.026
1/16/2002 8:18	2415.333	79.17	4.032
1/16/2002 8:18	2415.667	79.14	4.026
1/16/2002 8:18	2416	79.14	4.026
1/16/2002 8:19	2416.333	79.14	4.026
1/16/2002 8:19	2416.667	79.14	4.026
1/16/2002 8:19	2417	79.14	4.033
1/16/2002 8:20	2417.333	79.14	4.033
1/16/2002 8:20	2417.667	79.14	4.033
1/16/2002 8:20	2418	79.14	4.033
1/16/2002 8:21	2418.333	79.14	4.039
1/16/2002 8:21	2418.667	79.14	4.039
1/16/2002 8:21	2419	79.14	4.039
1/16/2002 8:22	2419.333	79.12	4.04
1/16/2002 8:22	2419.667	79.12	4.04
1/16/2002 8:22	2420	79.12	4.047
1/16/2002 8:23	2420.333	79.12	4.04
1/16/2002 8:23	2420.667	79.12	4.047
1/16/2002 8:23	2421	79.12	4.047
1/16/2002 8:24	2421.333	79.12	4.047
1/16/2002 8:24	2421.667	79.12	4.047
1/16/2002 8:24	2422	79.12	4.047
1/16/2002 8:25	2422.333	79.12	4.053
1/16/2002 8:25	2422.667	79.12	4.047
1/16/2002 8:25	2423	79.1	4.047
1/16/2002 8:26	2423.333	79.12	4.047
1/16/2002 8:26	2423.667	79.12	4.047
1/16/2002 8:26	2424	79.12	4.047
1/16/2002 8:27	2424.333	79.12	4.047
1/16/2002 8:27	2424.667	79.12	4.047
1/16/2002 8:27	2425	79.1	4.047
1/16/2002 8:28	2425.333	79.1	4.047
1/16/2002 8:28	2425.667	79.1	4.047
1/16/2002 8:28	2426	79.1	4.047
1/16/2002 8:29	2426.333	79.1	4.047
1/16/2002 8:29	2426.667	79.1	4.054
1/16/2002 8:29	2427	79.1	4.047
1/16/2002 8:30	2427.333	79.1	4.047

1/16/2002 8:30	2427.667	79.1	4.054
1/16/2002 8:30	2428	79.1	4.054
1/16/2002 8:31	2428.333	79.07	4.048
1/16/2002 8:31	2428.667	79.07	4.055
1/16/2002 8:31	2429	79.07	4.048
1/16/2002 8:32	2429.333	79.07	4.055
1/16/2002 8:32	2429.667	79.07	4.055
1/16/2002 8:32	2430	79.07	4.055
1/16/2002 8:33	2430.333	79.07	4.055
1/16/2002 8:33	2430.667	79.07	4.055
1/16/2002 8:33	2431	79.1	4.054
1/16/2002 8:34	2431.333	79.1	4.054
1/16/2002 8:34	2431.667	79.1	4.054
1/16/2002 8:34	2432	79.1	4.054
1/16/2002 8:35	2432.333	79.1	4.054
1/16/2002 8:35	2432.667	79.1	4.054
1/16/2002 8:35	2433	79.1	4.054
1/16/2002 8:36	2433.333	79.1	4.054
1/16/2002 8:36	2433.667	79.1	4.054
1/16/2002 8:36	2434	79.1	4.054
1/16/2002 8:37	2434.333	79.1	4.054
1/16/2002 8:37	2434.667	79.1	4.054
1/16/2002 8:37	2435	79.1	4.047
1/16/2002 8:38	2435.333	79.1	4.054
1/16/2002 8:38	2435.667	79.1	4.054
1/16/2002 8:38	2436	79.12	4.053
1/16/2002 8:39	2436.333	79.12	4.053
1/16/2002 8:39	2436.667	79.12	4.053
1/16/2002 8:39	2437	79.12	4.053
1/16/2002 8:40	2437.333	79.12	4.06
1/16/2002 8:40	2437.667	79.12	4.06
1/16/2002 8:40	2438	79.12	4.053
1/16/2002 8:41	2438.333	79.12	4.053
1/16/2002 8:41	2438.667	79.12	4.053
1/16/2002 8:41	2439	79.12	4.06
1/16/2002 8:42	2439.333	79.12	4.053
1/16/2002 8:42	2439.667	79.12	4.06
1/16/2002 8:42	2440	79.1	4.054
1/16/2002 8:43	2440.333	79.12	4.053
1/16/2002 8:43	2440.667	79.1	4.054
1/16/2002 8:43	2441	79.1	4.06
1/16/2002 8:44	2441.333	79.1	4.06
1/16/2002 8:44	2441.667	79.1	4.06
1/16/2002 8:44	2442	79.1	4.06
1/16/2002 8:45	2442.333	79.12	4.06
1/16/2002 8:45	2442.667	79.12	4.06
1/16/2002 8:45	2443	79.1	4.06
1/16/2002 8:46	2443.333	79.1	4.06
1/16/2002 8:46	2443.667	79.1	4.06
1/16/2002 8:46	2444	79.1	4.067
1/16/2002 8:47	2444.333	79.1	4.06
1/16/2002 8:47	2444.667	79.1	4.06

1/16/2002 8:47	2445	79.1	4.06
1/16/2002 8:48	2445.333	79.1	4.067
1/16/2002 8:48	2445.667	79.1	4.06
1/16/2002 8:48	2446	79.1	4.067
1/16/2002 8:49	2446.333	79.1	4.067
1/16/2002 8:49	2446.667	79.1	4.067
1/16/2002 8:49	2447	79.1	4.067
1/16/2002 8:50	2447.333	79.1	4.067
1/16/2002 8:50	2447.667	79.1	4.067
1/16/2002 8:50	2448	79.1	4.074
1/16/2002 8:51	2448.333	79.1	4.074
1/16/2002 8:51	2448.667	79.1	4.067
1/16/2002 8:51	2449	79.1	4.074
1/16/2002 8:52	2449.333	79.1	4.08
1/16/2002 8:52	2449.667	79.1	4.074
1/16/2002 8:52	2450	79.1	4.074
1/16/2002 8:53	2450.333	79.07	4.081
1/16/2002 8:53	2450.667	79.07	4.074
1/16/2002 8:53	2451	79.07	4.081
1/16/2002 8:54	2451.333	79.07	4.081
1/16/2002 8:54	2451.667	79.07	4.081
1/16/2002 8:54	2452	79.07	4.087
1/16/2002 8:55	2452.333	79.07	4.081
1/16/2002 8:55	2452.667	79.07	4.094
1/16/2002 8:55	2453	79.07	4.087
1/16/2002 8:56	2453.333	79.07	4.087
1/16/2002 8:56	2453.667	79.07	4.087
1/16/2002 8:56	2454	79.07	4.094
1/16/2002 8:57	2454.333	79.07	4.087
1/16/2002 8:57	2454.667	79.07	4.094
1/16/2002 8:57	2455	79.07	4.094
1/16/2002 8:58	2455.333	79.07	4.094
1/16/2002 8:58	2455.667	79.07	4.094
1/16/2002 8:58	2456	79.07	4.094
1/16/2002 8:59	2456.333	79.07	4.101
1/16/2002 8:59	2456.667	79.07	4.101
1/16/2002 8:59	2457	79.07	4.101
1/16/2002 9:00	2457.333	79.07	4.101
1/16/2002 9:00	2457.667	79.07	4.101
1/16/2002 9:00	2458	79.07	4.101
1/16/2002 9:01	2458.333	79.1	4.106
1/16/2002 9:01	2458.667	79.1	4.106
1/16/2002 9:01	2459	79.1	4.106
1/16/2002 9:02	2459.333	79.1	4.106
1/16/2002 9:02	2459.667	79.1	4.1
1/16/2002 9:02	2460	79.1	4.106
1/16/2002 9:03	2460.333	79.1	4.106
1/16/2002 9:03	2460.667	79.12	4.106
1/16/2002 9:03	2461	79.12	4.112
1/16/2002 9:04	2461.333	79.12	4.112
1/16/2002 9:04	2461.667	79.12	4.106
1/16/2002 9:04	2462	79.12	4.112

APPENDIX E

SPECIFIC CAPACITY TESTS

Aquifer Parameter Calculations

Hydraulic gradient

Water table elevations recorded on October 20, 1993, were used to calculate hydraulic gradients at the site. The hydraulic gradient was calculated by subtracting the difference in groundwater elevation (in feet) between two points, along a line oriented perpendicular to equipotential lines (see Figure 5-1). The elevation difference was divided by the horizontal distance between the two points to obtain a resulting gradient in feet per foot (ft/ft). Traverses were made perpendicular to equipotential contour lines from monitoring wells MW-10 to MW-17, from monitoring wells MW-9 to MW-17, and from monitoring wells MW-10 to MW-13 (see Figure 5-1), to calculate an average hydraulic gradient. For each traverse, the hydraulic gradient was calculated as follows:

$$i = (h_1 - h_2) / d \qquad (1)$$

where

i = hydraulic gradient (ft/ft);
h_1 = water table elevation, upgradient (feet);
h_2 = water table elevation, downgradient (feet); and
d = horizontal distance (feet) between h_1 and h_2 along a flow line.

Hydraulic gradients calculated in this manner vary from 1.4×10^{-3} ft/ft to 1.8×10^{-3} ft/ft. The average calculated hydraulic gradient at the site is 1.6×10^{-3} ft/ft.

Hydraulic conductivity

Hydraulic conductivity (K) from slug test data was calculated following the methods of Bouwer and Rice (1976) and Bouwer (1989) for partially penetrating wells screened in unconfined aquifers. The following well information was used to calculate the hydraulic conductivity:

- radius of well casing (r_c),
- r_w = radius of borehole (r_c plus radius of the sand pack surrounding the well screen),
- length of screened interval below the water table (L_e),
- effective well radius (r_e),
- depth of well below the water table (L_w),
- depth to confining unit or bottom of aquifer below the static water table (H), and
- plot of time versus the logarithm of y, where y is the difference between the static water level outside the well and the water level inside the well.

Figure D-1 is a well diagram depicting the aquifer and well parameters of interest. Calculations were made assuming that $L_w < H$. K was calculated as follows:

$$K = [R_c^2 \ln(\frac{r_e}{r_w}) - 2L_e] \; [\frac{1}{t} \ln(\frac{y_o}{y_t})] \qquad (2)$$

where

y_0 = y at time zero, and
y_t = y at time t.

The effective well radius, r_e, and the term $[(1/t)\ln(y_0/y_t)]$ were derived by using the computer program AQTESOLV™ (Geraghty & Miller, 1989). This computer program follows procedures and assumptions outlined by Bouwer (1989).

Slug test graphs are attached at the end of this appendix. Values of y were calculated for a particular time, t, and plotted on the graph. The computer program selects a "best-fit" line through the data points by linear regression along a "straight-line" portion of the graph. The slope of the "best-fit" line is used to calculate the hydraulic conductivity, K.

Two slug tests each were performed inside monitoring well MW-2 and one slug test was performed inside monitoring well MW-5. K is reported in feet per minute (ft/min) on the slug test graphs and was recalculated to feet per day (ft/day). The average K from the data collected from monitoring well MW-2 is 8.6×10^{-1} ft/day. K calculated from the data collected from monitoring well MW-5 is 5.7×10^{-1} ft/day. The average K value from the data collected from both monitoring wells is 7.2×10^{-1} ft/day.

Average pore water velocity

Estimates of average pore water velocity were obtained using the following formula:

$$V = (K*I)/n \qquad (3)$$

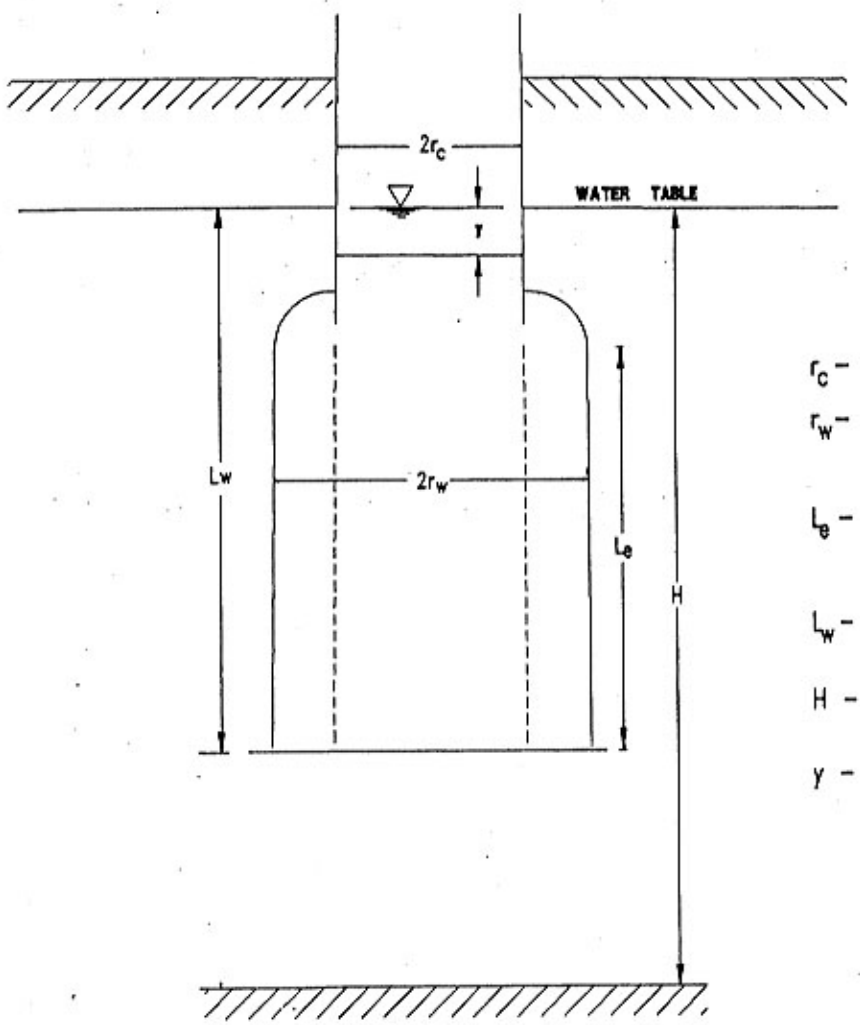
where

V = seepage velocity in ft/day,
K = hydraulic conductivity in ft/day,
i = hydraulic gradient, and
n = estimated porosity.

Assuming an estimated porosity of 30 percent for weathered to oolitic limestone (Davis and Deweist, 1966), an average hydraulic gradient of 1.6×10^{-3} ft/ft, and an average hydraulic conductivity of 7.2×10^{-1} ft/day, the average pore water velocity is calculated as follows:

$$V = (7.2 \times 10^{-1} \text{ ft/day} * 1.6 \times 10^{-3} \text{ ft/ft}) / 0.30$$

$$V = 3.8 \times 10^{-3} \text{ ft/day.}$$



r_c – Radius of well

r_w – Radius of well + total thickness of the sand/gravel pack

L_e – Length of screened interval below the water table

L_w – Depth of well below water table

H – Depth to confining unit below the water table

y – Difference between static water level outside well and water level inside well

FIGURE D-1
DEFINITIONS OF SLUG TEST PARAMETERS (From Bouwer, 1989)

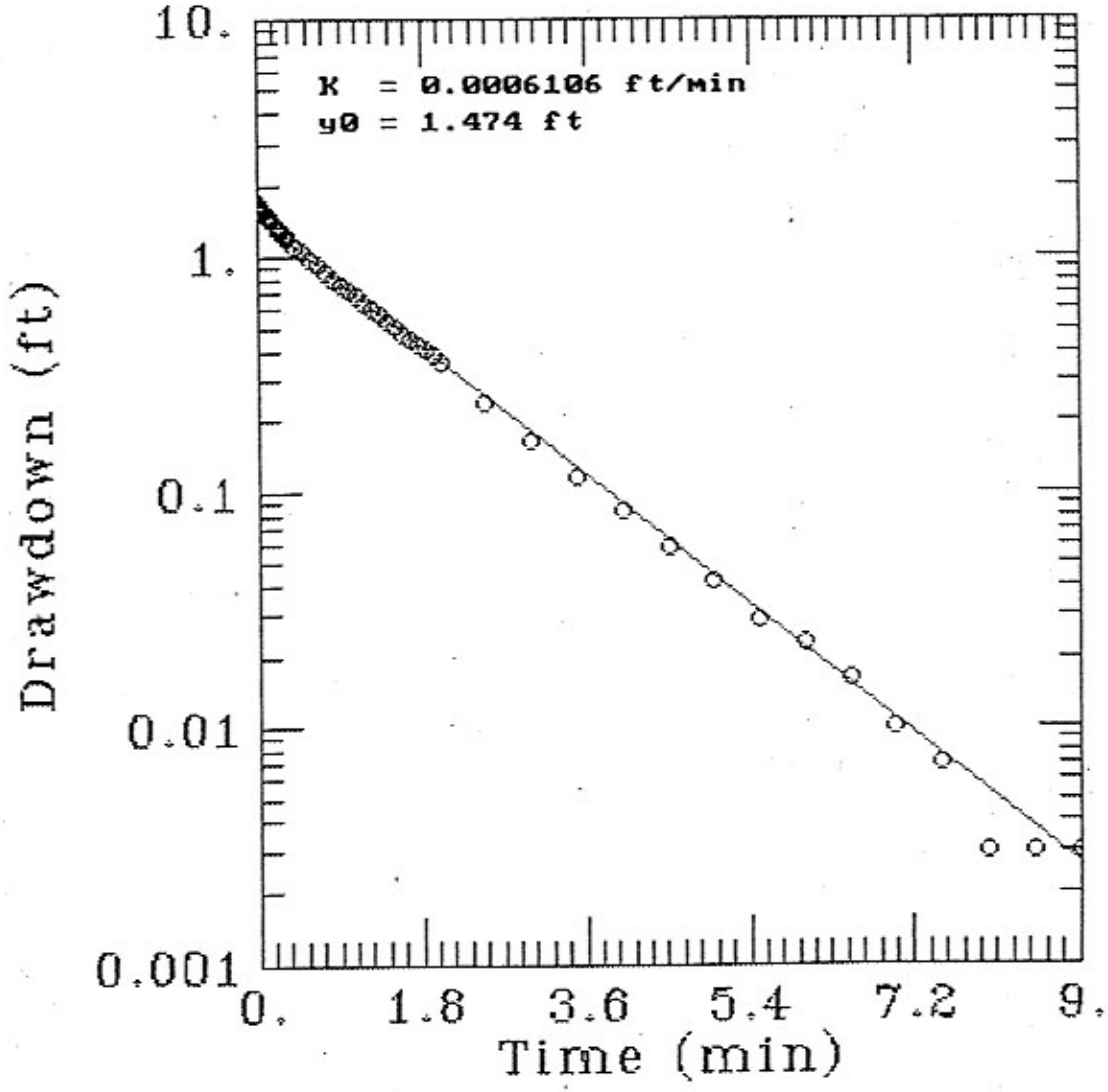
KEYWEST/D-1/KGP/06/22/93

CONTAMINATION ASSESSMENT REPORT
JET ENGINE TEST CELL

BUILDING A-969
NAS KEY WEST,
KEYWEST, FLORIDA

SLUG TEST GRAPHS

KYW-JTC-MW2 RUN#1

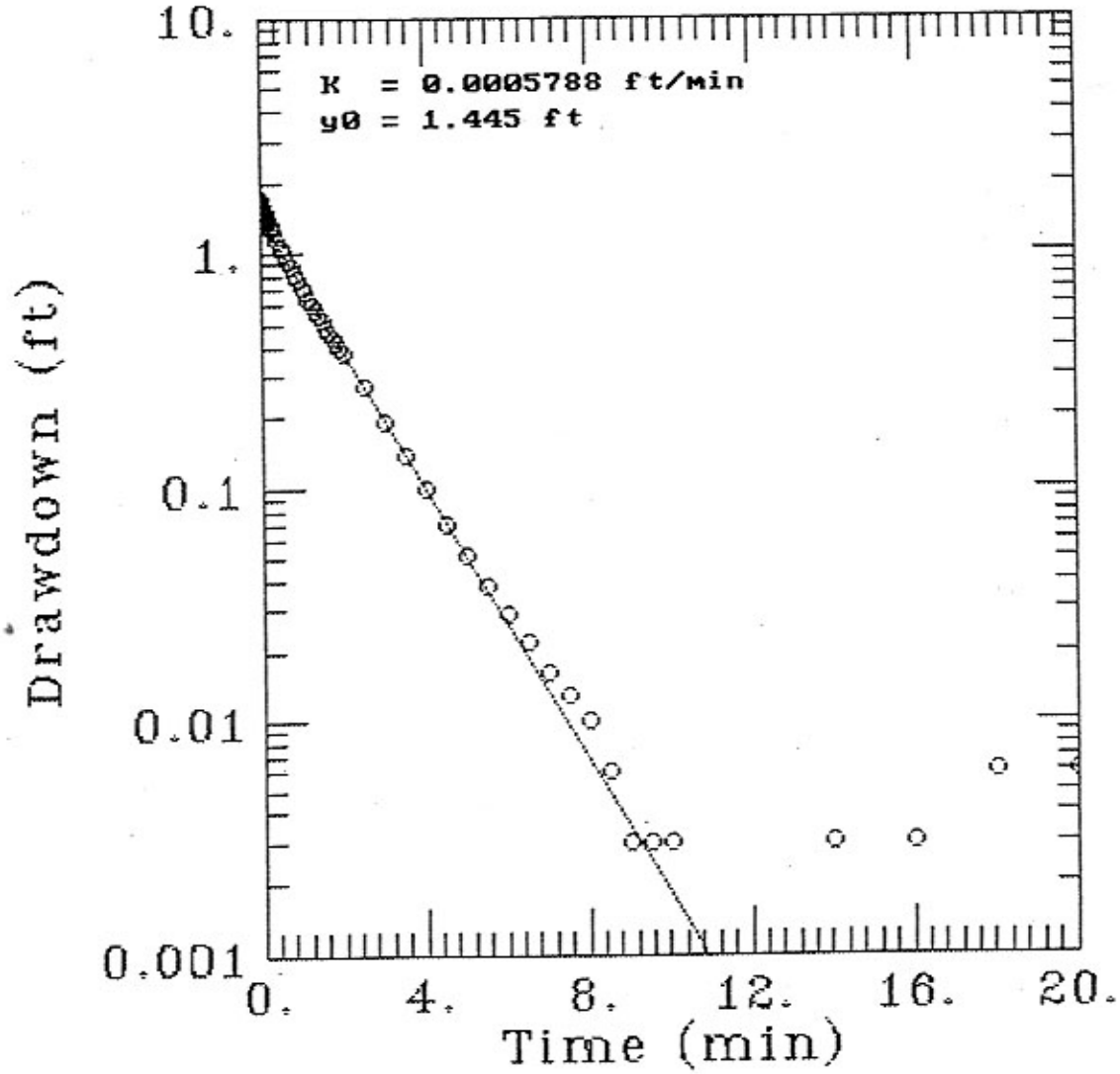


AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

KYW-JTC-MW2 RUN#2

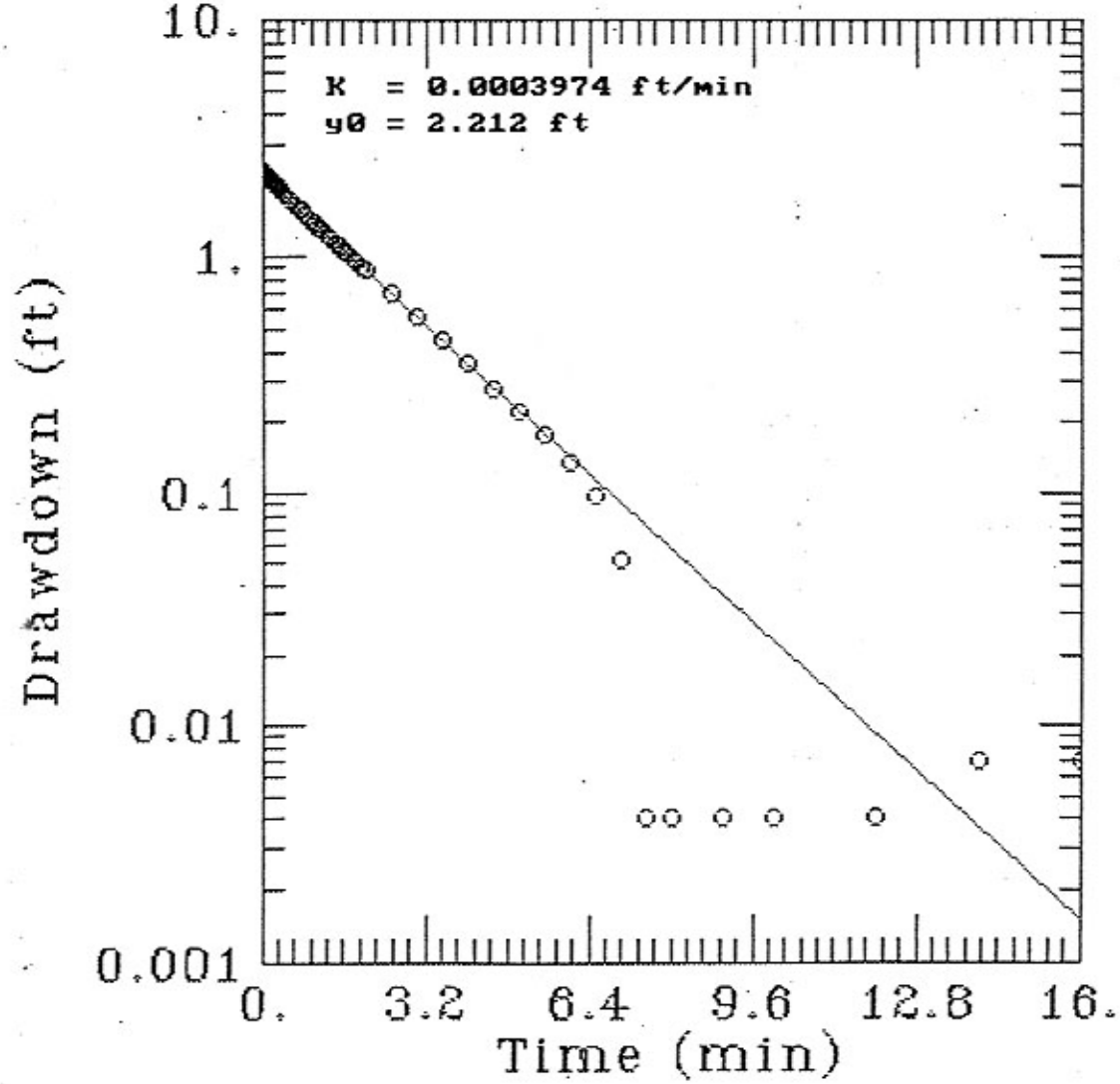


AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

KYW-JTC-MW5 RUN#1



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group