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SECOND QUARTER GROUNDWATER MONITORING PLAN LETTER REPORT FOR BOCA CHICA FLYING CLUB UNDERGROUND STORAGE TANK SITE 9 NAS KEY WEST FL
2/7/2000
TETRA TECH NUS

0395-7.2.2

TETRA TECH NUS, INC.
794 S. Military Trail ■ Deerfield Beach, Florida 33442
(954) 570-5885 ■ FAX (954) 570-5974 ■ www.tetratech.com

TtNUS/DFB-99/1027/0395-7.2.3

February 7, 2000

Project Number 0395

Jorge R. Caspary, P.G.
Remedial Project Manager
Technical Review/Federal Facilities
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Reference: **Clean Contract No. N62467-94-D0888**
Contract Task Order No. 0110

Subject: **Second Quarter Groundwater Monitoring Plan Letter Report**
Flying Club UST Site 9, Naval Air Station,
Key West, Florida

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit the Groundwater Monitoring Report for the referenced Contract Task Order (CTO). This report has been prepared for the U.S. Navy Southern Division Naval Facilities Engineering Command under CTO-110, for the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N62467-94-D-0888.

Monitoring Objectives. The objective of the quarterly groundwater monitoring program at UST Site 9 is to evaluate the contaminant plume stability until cleanup levels are achieved. The monitoring program is presented in the Remedial Action Plan (RAP) for Flying Club Site (UST Site 9), Naval Air Station, Key West, (August 1997). According to the RAP, the groundwater samples will be analyzed for the parameters listed in the Chapter 62-770, FAC, kerosene analytical group.

The groundwater at the site is classified as a G-III aquifer (McKenzie, 1990). As a result of this classification, the FDEP Groundwater Cleanup Target Levels (GCTLs) for groundwater of low yield/poor quality, as prescribed by Chapter 62-770, are the appropriate GCTLs.

First Quarterly Monitoring. Activities and results from the first quarter of free product monitoring and first quarter groundwater sampling event at UST Site 9, are detailed in the first quarter monitoring report submitted to the FDEP on December 15, 1999.

SECOND QUARTER MONITORING

On November 24, 1999, TtNUS personnel collected groundwater samples from four UST Site 9 monitoring wells (KYW-A-127-MW5, KYW-A-127-MW6, KYW-A-127-MW12, and KYW-A-127-MW21). A duplicate groundwater sample and an equipment blank sample were also collected for laboratory analysis. All sampling activities were conducted in accordance with TtNUS', FDEP approved CompQAP #980038.

Immediately prior to the collection of the groundwater samples, water level and product measurements were recorded from each site monitoring well. Free phase petroleum product was not detected in any

Q A Record

monitoring wells during this event. The water level data was used to determine purge volumes. In addition, depth-to-water measurements and top of casing elevations were used to calculate groundwater elevations. Based on these elevations, the groundwater was flowing primarily to the south-southwest at the time of sampling. A potentiometric surface map is included as Figure 1, Attachment A. Depth to water measurements, top of casing elevations, and groundwater elevation data are provided in Table 1, Attachment B.

Following collection of the groundwater samples, the sample bottles were packed on ice and shipped via overnight transport to PC&B Environmental Laboratories in Oviedo, Florida. The groundwater samples were analyzed for the parameters listed in the kerosene analytical group. The analytical results for the first quarterly groundwater sampling event are summarized in Table 2, Attachment B. A copy of the laboratory report is provided in Attachment C.

Volatile organic aromatics (VOA) concentrations were detected in the samples collected from KYW-A-127-MW6. The detected VOA compounds were benzene, toluene, ethylbenzene, xylenes, n-butylbenzene, sec-butylbenzene, isopropylbenzene, p-isopropyltoluene, n-propylbenzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. Benzene was detected in KYW-A-127-MW6 at a concentration of 21 µg/L. Toluene and ethylbenzene were also detected in KYW-A-127-MW6 at concentrations of 5 µg/L and 93.6 µg/L respectively.

Benzene concentrations were above FDEP GCTLs established for the groundwater in the samples collected from KYW-A-127-MW6. Toluene and xylene concentrations were below the FDEP GCTLs. Other VOAs detected in the groundwater samples collected from UST Site 9 do not have established FDEP GCTLs listed.

Naphthalene (including 1-Methyl naphthalene and 2-Methyl naphthalene) was the only Polynuclear Aromatic Hydrocarbon (PAH) detected the groundwater samples collected during the sampling event. Naphthalene was detected at a concentration of 105 µg/L in KYW-A-127-MW6. It was also detected in the duplicate blank. The naphthalene concentration in KYW-A-127-MW6 was below the FDEP GCTLs established for the site.

Lead was detected in KYW-A-127-MW6 at concentrations of 9 µg/L. Total Recoverable Petroleum Hydrocarbons (TRPH) concentrations were also detected in KYW-A-127-MW6 at a concentration of 0.4 mg/l. Lead and TRPH concentrations were below their respective GCTLs for the site. Ethylene dibromide (EDB) concentrations were not detected in any of the groundwater samples collected.

Conclusions. Dissolved petroleum compounds were detected in one of the site wells, KYW-A-127-MW6. Benzene was the only compound present that exceeded FDEP GCTLs. Additional monitoring data would be required to make any further conclusions concerning the natural attenuation of benzene in groundwater.

Recommendations. Based on the results of this sampling event, TtNUS recommends that future monitoring at UST Site 9 include the following analyses:

USEPA 8021 for VOAs
USEPA Method 610/8100 for PAHs
Florida Petroleum Range Organics for TRPH
EPA 504 for EDB
EPA 6010 for Lead

Per the recommendation of the FDEP, groundwater from select monitoring wells will be analyzed for natural attenuation parameters during the next two quarters. The next quarterly sampling event is scheduled for March. If you have any questions with regard to this submittal, please contact the undersigned at (954) 570-5885.

Very truly yours,

Rick Ofsanko
Task Order Manager

Gary Braganza, P.G.
Florida License No. 1822

RO/gb

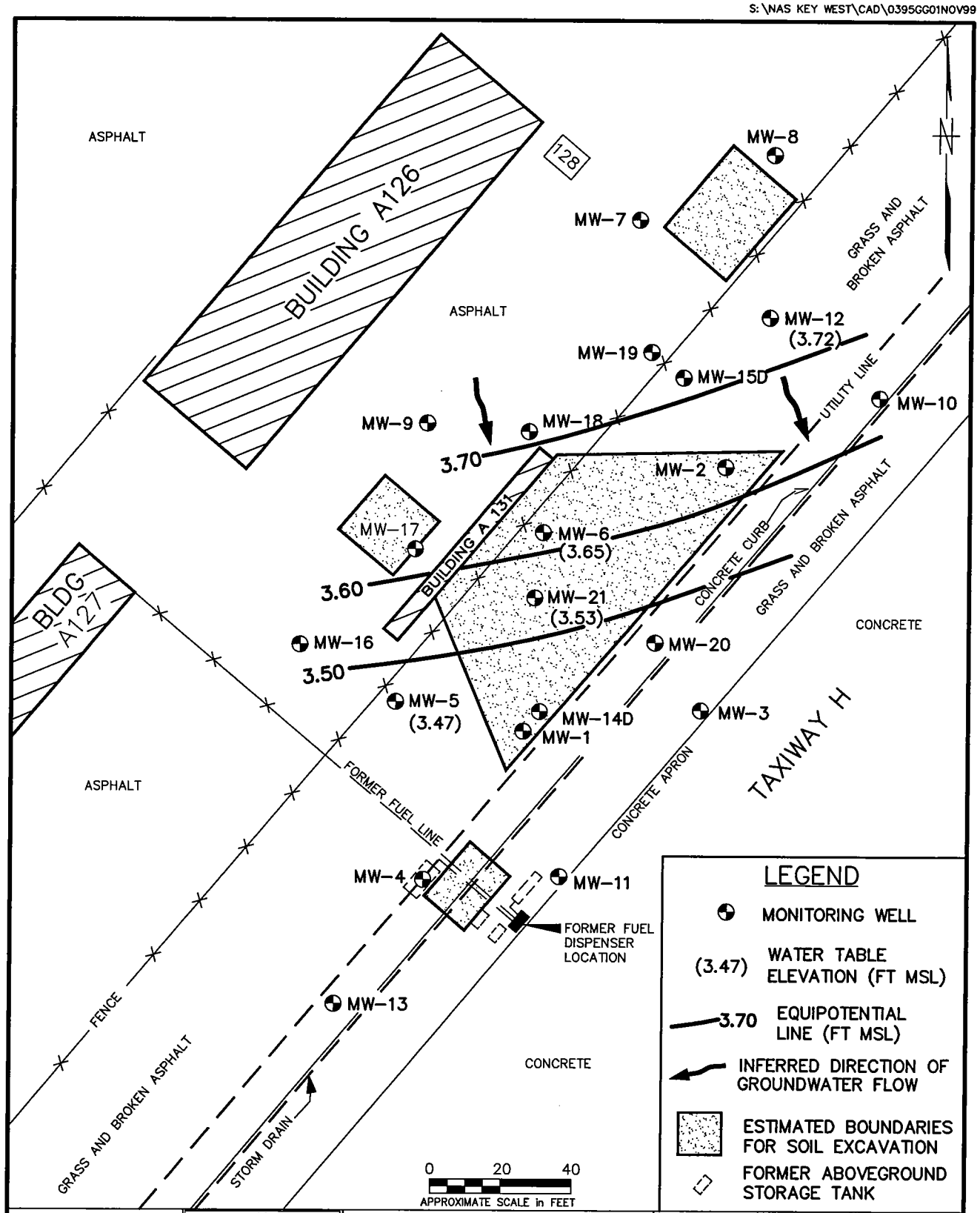
Enclosures

c: B. Glover, SDIV
P. Williams, NAS Key West
M. Perry / file, TtNUS

ATTACHMENT A

Q A Record

S:\NAS KEY WEST\CAD\0395GG01NOV99



DRAWN BY LLK DATE 9/30/99	DEPARTMENT OF THE NAVY SOUTHERN DIV FACILITIES ENGINEERING COMD	POTENTIOMETRIC SURFACE MAP NOVEMBER 24, 1999 FLYING CLUB SITE, BLDG A-127 NAVAL AIR STATION KEY WEST, FLORIDA	CONTRACT NO. 0395
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 REV. 0

FORM CADD NO. SDIV_AV.DWG – REV 0 – 1/20/98

ATTACHMENT B

TABLE 1
TOP OF CASING ELEVATIONS, WATER TABLE ELEVATIONS, AND TOTAL DEPTHS
Flying Club UST Site 9
Naval Air Station, Key West, Florida

Well ID	Total Depth	Top of Casing Elevation[1]	August 22, 1999		November 24, 1999			
			Groundwater Level	Groundwater Elevation	Groundwater Level	Groundwater Elevation		
KYW-A-127-MW-5	12.88	10.00	6.43	3.57	6.53	3.47		
KYW-A-127-MW-6	13.00	9.07	5.35	3.72	5.42	3.65		
KYW-A-127-MW-12	12.45	9.68	5.83	3.85	5.96	3.72		
KYW-A-127-MW-21	12.97	8.96	5.34	3.62	5.43	3.53		

NOTES:
[1] Top of casing and groundwater elevations are relative to an arbitrary site reference elevation of 10 feet.
All measurements reported in feet.

TABLE 2
GROUNDWATER MONITORING WELL ANALYTICAL SUMMARY
UST Site 9, NAS Key West, Florida

Sample Location	Date	Benzene	Ethyl benzene	Isopropyl benzene	Toluene	Total Xylenes	Naph-thalene	TRPH	Lead
Cleanup Target Level(1)		10	300	0.8	400	200	200	50	150
KYW-A-127-MW-5	8/22/99	<1	<1	<1	<1	<1	<5	<0.1	<3
	11/24/99	<1	<1	<1	<1	<1	<1	<.01	<3
KYW-A-127-MW-6	8/22/99	82.5	755	130	15	10	245.0	1.6	77
	11/24/99	21.7	96.3	23.1	5.0	29.3	105	0.4	9
KYW-A-127-MW-12	8/22/99	<1	<1	<1	<1	<1	<5	<0.1	<3
	11/24/99	<1	<1	<1	<1	<1	<1	<0.1	<3
KYW-A-127-MW-21	8/22/99	1.9	40	27.6	<1	<1	58	1.6	9
	11/24/99	<1	<1	<1	<1	<1	<1	<0.1	<3
KYW-A-127-DUP (MW-21)	8/22/99	1.5	32.3	27.1	<1	<1	53	<0.1	10
KYW-A-127-DUP (MW-6)	11/24/99	22.1	97.4	24.3	5.0	31.3	130	0.4	<3

NOTES:

(1)Groundwater cleanup target levels as specified in Table VIII of Chapter 62-770, Florida Administrative Code.

TRPH = total recoverable petroleum hydrocarbons.

Concentrations reported in micrograms per liter for all chemicals except TRPH. TRPH is reported in milligrams per liter.

ATTACHMENT C

PC&B Environmental Laboratories, Inc.

210 Park Road, Oviedo, Florida 32765
Phone: 407-359-7194 Fax: 407-359-7197

12-07-1999

Rick Ofsanko
Tetra Tech NUS, Inc.
794 S. Military Trail
Deerfield Beach, FL 33442-

Dear Rick Ofsanko:

Enclosed are the results of the analysis of your samples received 11/27/1999.

Our laboratory is certified by the Florida DHRS (Lab #E83239) and operates under an FDEP approved Comprehensive Quality Assurance Plan (#900134G). Unless otherwise noted, all results are reported as received. All data were determined in accordance with published procedures (EPA-600/4-79-020), Methods for Chemical Analysis of Water and Wastes, Revised March 1983, or later and/or Standard Methods for the examination of Water and Wastewater, 18th Edition 1989, or later and/or Test Methods for Evaluating Solid Waste (EPA-SW-846, Revised January 1995, or later), unless stated otherwise in our CompQapp under method modifications.

If you have any questions, please do not hesitate to give me a call.

Sincerely,

Beckie J. Burdick
Laboratory Manager

PC&B Environmental Laboratories, Inc.

210 Park Road, Oviedo, Florida 32765
Phone: 407-359-7194 Fax: 407-359-7197

Client : Tetra Tech NUS, Inc.
794 S. Military Trail
Deerfield Beach, FL 33442-

Contact : Rick Ofsanko
Phone : (954) 570-5885

Laboratory Reference Number : 99110224

Project Name : Key West UST Site 9
Project Number :

Chain of Custody : 19181

Laboratory ID	Matrix	Client ID	Status	Date/Time Sampled	
99110224-1	Water	KYW-A-127-MW5	RUN	11/24/1999	11:00
99110224-2	Water	KYW-A-127-MW6	RUN	11/24/1999	12:05
99110224-3	Water	KYW-A-127-MW12	RUN	11/24/1999	12:55
99110224-4	Water	KYW-A-127-MW21	RUN	11/24/1999	13:10
99110224-5	Water	KYW-A-127-DUP	RUN	11/24/1999	
99110224-6	Water	EQ BLK	RUN	11/24/1999	12:35

Number	Parameter	Description
6	EPA 504	EDB/DBCP
6	FL-PRO	Petroleum Hydrocarbons
6	EPA 610/8100	Polynuclear Aromatic Hydrocarbons
6	EPA 8021	Volatile Organics
6	EPA 6010	Lead by ICAP

PC&B Environmental Laboratories, Inc.

210 Park Road
Oviedo, FL 32765
407-359-7194 - (FAX) 359-7197

Case Narrative

Rick Ofsanko
Tetra Tech NUS, Inc.
794 S. Military Trail
Deerfield Beach, FL 33442-

CASE NARRATIVE for Work Order: 99110224
Project Number:
Project Name: Key West UST Site 9

This Case Narrative is a summary of events and/or problems encountered with this Work Order.

For samples requesting EPA 601/602/8010/8020/8021 analysis, the GCMS method EPA 624/8260 was substituted in order to generate the highest quality data possible at no additional cost.

Definition of Flags

DL	=	No surrogate result due to dilution or matrix interference.
J	=	Estimated Value, value not accurate.
L	=	Off-scale high. Actual value is greater than value given.
Q	=	Sample held beyond the accepted holding time.
T	=	Value reported is less than the laboratory method detection limit.
V	=	Analyte was both detected in the method blank and sample.

PC&B Environmental Laboratories, Inc.
210 Park Road
Oviedo, FL 32765
PHONE: 407-359-7194
FAX: 359-7197

Volatile Organics

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: EPA 8021

Lab Reference Number	99110224-1	99110224-2	99110224-3	99110224-4	99110224-5
Client Sample ID	KYW-A-127-MW5	KYW-A-127-MW6	KYW-A-127-MW12	KYW-A-127-MW21	KYW-A-127-DUP
Date Sampled	11/24/1999	11/24/1999	11/24/1999	11/24/1999	11/24/1999
Date Extracted	11/30/1999	12/01/1999	11/30/1999	12/01/1999	12/01/1999
Date Analyzed	11/30/1999	12/01/1999	11/30/1999	12/01/1999	12/01/1999
Sample Matrix (as Received)	Water	Water	Water	Water	Water
Analysis Confirmed	GCMS	GCMS	GCMS	GCMS	GCMS
Dilution Factor	1	1	1	1	1
Result Units	ug/l	ug/l	ug/l	ug/l	ug/l
Benzene	1.0 U	21.7	1.0 U	1.0 U	22.1
Bromobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromochloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
n-Butylbenzene	1.0 U	5.3	1.0 U	1.0 U	5.7
sec-Butylbenzene	1.0 U	2.8	1.0 U	1.0 U	3.2
tert-Butylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Chlorotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chlorotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dichlorodifluoromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichloropropene (cis)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichloropropene (trans)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	96.3	1.0 U	1.0 U	97.4
Hexachlorobutadiene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	1.0 U	23.1	1.0 U	1.0 U	24.3
p-Isopropyltoluene	1.0 U	14.7	1.0 U	1.0 U	15.7
Methylene chloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Naphthalene	1.0 U	105	1.0 U	1.0 U	130
n-Propylbenzene	1.0 U	16.2	1.0 U	1.0 U	17.4
Styrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	5.0	1.0 U	1.0 U	5.0
1,2,3-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,3-Trichloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	1.0 U	7.4	1.0 U	1.0 U	8.0

PC&B Environmental Laboratories, Inc.
210 Park Road
Oviedo, FL 32765
PHONE: 407-359-7194
FAX: 359-7197

Volatile Organics

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: EPA 8021

Lab Reference Number	99110224-1	99110224-2	99110224-3	99110224-4	99110224-5
Client Sample ID	KYW-A-127-MW5	KYW-A-127-MW6	KYW-A-127-MW12	KYW-A-127-MW21	KYW-A-127-DUP
Date Sampled	11/24/1999	11/24/1999	11/24/1999	11/24/1999	11/24/1999
Date Extracted	11/30/1999	12/01/1999	11/30/1999	12/01/1999	12/01/1999
Date Analyzed	11/30/1999	12/01/1999	11/30/1999	12/01/1999	12/01/1999
Sample Matrix (as Received)	Water	Water	Water	Water	Water
Analysis Confirmed	GCMS	GCMS	GCMS	GCMS	GCMS
Dilution Factor	1	1	1	1	1
Result Units	ug/l	ug/l	ug/l	ug/l	ug/l
1,3,5-Trimethylbenzene	1.0 U	21.0	1.0 U	1.0 U	22.8
Vinyl chloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MTBE	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	1.0 U	3.9	1.0 U	1.0 U	4.1
m-Xylene	1.0 U	12.7	1.0 U	1.0 U	13.6
p-Xylene	1.0 U	12.7	1.0 U	1.0 U	13.6
(Surr) 1,2-Dichloroethane-d4 (%)	96	115	102	107	112
(Surr) Toluene-d8 (%)	100	102	102	98	101
(Surr) 4-Bromofluorobenzene (%)	101	105	107	101	103

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : _____

PC&B Environmental Laboratories, Inc.
210 Park Road
Oviedo, FL 32765
PHONE: 407-359-7194
FAX: 359-7197

Volatile Organics

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: EPA 8021

Lab Reference Number	99110224-6	
Client Sample ID	EQ BLK	
Date Sampled	11/24/1999	
Date Extracted	12/01/1999	
Date Analyzed	12/01/1999	
Sample Matrix (as Received)	Water	
Analysis Confirmed	GCMS	
Dilution Factor	1	
Result Units	ug/l	
Benzene	1.0	U
Bromobenzene	1.0	U
Bromochloromethane	1.0	U
Bromodichloromethane	5.3	
Bromoform	1.0	U
Bromomethane	1.0	U
n-Butylbenzene	1.0	U
sec-Butylbenzene	1.0	U
tert-Butylbenzene	1.0	U
Carbon tetrachloride	1.0	U
Chlorobenzene	1.0	U
Chloroethane	1.0	U
Chloroform	55.3	
Chloromethane	1.0	U
2-Chlorotoluene	1.0	U
4-Chlorotoluene	1.0	U
Dibromochloromethane	1.0	U
1,2-Dibromoethane	1.0	U
Dibromomethane	1.0	U
1,2-Dichlorobenzene	1.0	U
1,3-Dichlorobenzene	1.0	U
1,4-Dichlorobenzene	1.0	U
Dichlorodifluoromethane	1.0	U
1,1-Dichloroethane	1.0	U
1,2-Dichloroethane	1.0	U
1,1-Dichloroethene	1.0	U
cis-1,2-Dichloroethene	1.0	U
trans-1,2-Dichloroethene	1.0	U
1,2-Dichloropropane	1.0	U
1,3-Dichloropropane	1.0	U
2,2-Dichloropropane	1.0	U
1,1-Dichloropropene	1.0	U
1,3-Dichloropropene (cis)	1.0	U
1,3-Dichloropropene (trans)	1.0	U
Ethylbenzene	1.0	U
Hexachlorobutadiene	1.0	U
Isopropylbenzene	1.0	U
p-Isopropyltoluene	1.0	U
Methylene chloride	1.0	U
Naphthalene	1.0	U
n-Propylbenzene	1.0	U
Styrene	1.0	U
1,1,1,2-Tetrachloroethane	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U
Tetrachloroethene	1.0	U
Toluene	1.0	U
1,2,3-Trichlorobenzene	1.0	U
1,2,4-Trichlorobenzene	1.0	U
1,1,1-Trichloroethane	1.0	U
1,1,2-Trichloroethane	1.0	U
Trichloroethene	1.0	U
Trichlorofluoromethane	1.0	U
1,2,3-Trichloropropane	1.0	U
1,2,4-Trimethylbenzene	1.0	U
1,3,5-Trimethylbenzene	1.0	U

PC&B Environmental Laboratories, Inc.
210 Park Road
Oviedo, FL 32765
PHONE: 407-359-7194
FAX: 359-7197

Volatile Organics

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: EPA 8021

Lab Reference Number	99110224-6	
Client Sample ID	EQ BLK	
Date Sampled	11/24/1999	
Date Extracted	12/01/1999	
Date Analyzed	12/01/1999	
Sample Matrix (as Received)	Water	
Analysis Confirmed	GCMS	
Dilution Factor	1	
Result Units	ug/l	
Vinyl chloride	1.0	U
MTBE	5.0	U
o-Xylene	1.0	U
m-Xylene	1.0	U
p-Xylene	1.0	U
(Surr) 1,2-Dichloroethane-d4 (%)	90	
(Surr) Toluene-d8 (%)	101	
(Surr) 4-Bromofluorobenzene (%)	88	

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : _____

Quality Control Report for Spike Analysis

Volatile Organics

Matrix: Water
Lab Sample ID: 99110228-1
QC Batch ID: 9912MS1001
Spike Units: ug/l

Analysis Date: 12/01/1999
Preparation Date: 12/01/1999
Method: EPA 8021
Analyst: LN

Analyte	Spike Amount	Sample Result	Spike Result	Percent Recovery	Lower Control Limit	Upper Control Limit
Benzene	50.0	0.0	52.0	104	**57**	**146**
Carbon tetrachloride	50.0	0.0	54.0	108	**67**	**135**
Chlorobenzene	50.0	0.0	50.0	100	**67**	**128**
1,4-Dichlorobenzene	50.0	0.0	49.0	98	**72**	**134**
1,1-Dichloroethene	50.0	0.0	56.0	112	**60**	**125**
Ethylbenzene	50.0	0.0	50.0	100	**75**	**127**
Toluene	50.0	0.0	53.0	106	**64**	**131**
Trichloroethene	50.0	0.0	54.0	108	**75**	**122**
m-Xylene	50.0	0.0	50.0	100	**68**	**133**

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PHONE: 407-359-7194
FAX: 359-7197

Polynuclear Aromatic Hydrocarb

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: EPA 610/8100

Lab Reference Number	99110224-1	99110224-2	99110224-3	99110224-4	99110224-5
Client Sample ID	KYW-A-127-MW5	KYW-A-127-MW6	KYW-A-127-MW12	KYW-A-127-MW21	KYW-A-127-DUP
Date Sampled	11/24/1999	11/24/1999	11/24/1999	11/24/1999	11/24/1999
Date Extracted	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999
Date Analyzed	12/02/1999	12/02/1999	12/02/1999	12/02/1999	12/02/1999
Sample Matrix (as Received)	Water	Water	Water	Water	Water
Analysis Confirmed	No	No	No	No	No
Dilution Factor	1	1	1	1	1
Result Units	ug/l	ug/l	ug/l	ug/l	ug/l
Acenaphthene	5 U	5 U	5 U	5 U	5 U
Acenaphthylene	5 U	5 U	5 U	5 U	5 U
Anthracene	5 U	5 U	5 U	5 U	5 U
Benzo(a)anthracene	5 U	5 U	5 U	5 U	5 U
Benzo(a)pyrene	5 U	5 U	5 U	5 U	5 U
Benzo(b)fluoranthene	5 U	5 U	5 U	5 U	5 U
Benzo(ghi)perylene	5 U	5 U	5 U	5 U	5 U
Benzo(k)fluoranthene	5 U	5 U	5 U	5 U	5 U
Chrysene	5 U	5 U	5 U	5 U	5 U
Dibenzo(ah)anthracene	5 U	5 U	5 U	5 U	5 U
Fluoranthene	5 U	5 U	5 U	5 U	5 U
Fluorene	5 U	5 U	5 U	5 U	5 U
Indeno(123-cd)pyrene	5 U	5 U	5 U	5 U	5 U
Naphthalene	5 U	46	5 U	5 U	58
1-Methyl naphthalene	5 U	8	5 U	5 U	10
2-Methyl naphthalene	5 U	10	5 U	5 U	21
Phenanthrene	5 U	5 U	5 U	5 U	5 U
Pyrene	5 U	5 U	5 U	5 U	5 U
(Surr) 2-Fluorobiphenyl (%)	74	69	74	75	78

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by :

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210 Park Road
Oviedo, FL 32765
PHONE: 407-359-7194
FAX: 359-7197

Polynuclear Aromatic Hydrocarb

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: EPA 610/8100

Lab Reference Number	99110224-6	
Client Sample ID	EQ BLK	
Date Sampled	11/24/1999	
Date Extracted	11/30/1999	
Date Analyzed	12/02/1999	
Sample Matrix (as Received)	Water	
Analysis Confirmed	No	
Dilution Factor	1	
Result Units	ug/l	
Acenaphthene	5	U
Acenaphthylene	5	U
Anthracene	5	U
Benzo(a)anthracene	5	U
Benzo(a)pyrene	5	U
Benzo(b)fluoranthene	5	U
Benzo(ghi)perylene	5	U
Benzo(k)fluoranthene	5	U
Chrysene	5	U
Dibenzo(ah)anthracene	5	U
Fluoranthene	5	U
Fluorene	5	U
Indeno(123-cd)pyrene	5	U
Naphthalene	5	U
1-Methyl naphthalene	5	U
2-Methyl naphthalene	5	U
Phenanthrene	5	U
Pyrene	5	U
(Surr) 2-Fluorobiphenyl (%)	68	

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : _____

Quality Control Report for Spike/Spike Duplicate Analysis

Polynuclear Aromatic Hydrocarbons

Matrix: Water
Lab Sample ID: 9911228-1
QC Batch ID: 9911PAH110
Spike Units: ug/l

Analysis Date: 12/01/1999
Preparation Date: 11/30/1999
Method: EPA 610
Analyst: RM

Analyte	Spike Amount	Sample Result	Spike Result	Spike Percent Recovery	MSD Result	MSD Percent Recovery	RPD
(Surr) 2-Fluorobiphenyl	100	0	83	83	82	82	1
Acenaphthene	50	0	38	76	39	78	3
Acenaphthylene	50	0	38	76	38	76	0
Anthracene	50	0	41	82	43	86	5
Benzo(a)anthracene	50	0	40	80	40	80	0
Benzo(a)pyrene	50	0	41	82	41	82	0
Benzo(b)fluoranthene	50	0	42	84	40	80	5
Benzo(ghi)perylene	50	0	45	90	45	90	0
Benzo(k)fluoranthene	50	0	44	88	45	90	2
Chrysene	50	0	41	82	42	84	2
Dibenzo(ah)anthracene	50	0	49	98	49	98	0
Fluoranthene	50	0	40	80	40	80	0
Fluorene	50	0	39	78	39	78	0
Indeno(123-cd)pyrene	50	0	49	98	49	98	0
Naphthalene	50	0	36	72	37	74	3
Phenanthrene	50	0	39	78	39	78	0
Pyrene	50	0	40	80	40	80	0

Quality Control Limits

Analyte	Lower Limit	Upper Limit	RPD
SS_2-Fluorobiphenyl	47	115	10
Acenaphthene	56	123	13
Acenaphthylene	46	101	16
Anthracene	62	126	11
Benzo(a)anthracene	43	121	18
Benzo(a)pyrene	49	113	18
Benzo(b)fluoranthene	46	120	15
Benzo(ghi)perylene	37	113	24
Benzo(k)fluoranthene	47	125	15
Chrysene	47	114	23
Dibenzo(ah)anthracene	40	118	17
Fluoranthene	52	111	15
Fluorene	46	108	16
Indeno(123-cd)pyrene	39	117	20
Naphthalene	40	115	14
Phenanthrene	47	125	14
Pyrene	54	111	15

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210 Park Road
Oviedo, FL 32765
PHONE: 407-359-7194
FAX: 359-7197

Petroleum Hydrocarbons

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: FL-PRO

Lab Reference Number	99110224-1	99110224-2	99110224-3	99110224-4	99110224-5
Client Sample ID	KYW-A-127-MW5	KYW-A-127-MW6	KYW-A-127-MW12	KYW-A-127-MW21	KYW-A-127-DUP
Date Sampled	11/24/1999	11/24/1999	11/24/1999	11/24/1999	11/24/1999
Date Extracted	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999
Date Analyzed	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999
Sample Matrix (as Received)	Water	Water	Water	Water	Water
Analysis Confirmed	No	No	No	No	No
Dilution Factor	1	1	1	1	1
Result Units	mg/l	mg/l	mg/l	mg/l	mg/l
Total PHS	0.1 U	0.4	0.1 U	0.1 U	0.4
(Surr) C-39 (%)	61	79	68	61	68

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : _____

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210 Park Road
Oviedo, FL 32765
PHONE: 407-359-7194
FAX: 359-7197

Petroleum Hydrocarbons

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: FL-PRO

Lab Reference Number	99110224-6	
Client Sample ID	EQ BLK	
Date Sampled	11/24/1999	
Date Extracted	11/30/1999	
Date Analyzed	11/30/1999	
Sample Matrix (as Received)	Water	
Analysis Confirmed	No	
Dilution Factor	1	
Result Units	mg/l	
Total PHS	0.1	U
(Surr) C-39 (%)	93	

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : _____

Quality Control Report for Spike/Spike Duplicate Analysis

Petroleum Hydrocarbons

Matrix: Water
Lab Sample ID: 9911178-1
QC Batch ID: 9911FLRO112
Spike Units: mg/l

Analysis Date: 11/30/1999
Preparation Date: 11/30/1999
Method: FL-PRO
Analyst: RM

Analyte	Spike Amount	Sample Result	Spike Result	Spike Percent Recovery	MSD Result	MSD Percent Recovery	RPD
(Surr) C-39	100.0	0.0	99.0	99	86.0	86	14
Total PHS	50.0	0.0	30.0	60	29.0	58	3

Quality Control Limits

Analyte	Lower Limit	Upper Limit	RPD
SS_C-39	7	139	30
Total PHS	57	110	11

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Oviedo, FL 32765
PHONE: 407-359-7194
FAX: 359-7197

EDB/DBCP

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: EPA 504

Lab Reference Number	99110224-1	99110224-2	99110224-3	99110224-4	99110224-5
Client Sample ID	KYW-A-127-MW5	KYW-A-127-MW6	KYW-A-127-MW12	KYW-A-127-MW21	KYW-A-127-DUP
Date Sampled	11/24/1999	11/24/1999	11/24/1999	11/24/1999	11/24/1999
Date Extracted	12/01/1999	12/01/1999	12/01/1999	12/01/1999	12/01/1999
Date Analyzed	12/01/1999	12/01/1999	12/01/1999	12/01/1999	12/01/1999
Sample Matrix (as Received)	Water	Water	Water	Water	Water
Analysis Confirmed	No	No	No	No	No
Dilution Factor	1	1	1	1	1
Result Units	ug/l	ug/l	ug/l	ug/l	ug/l
Ethylene dibromide (EDB)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dibromo-3-chloropropane	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by :

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210 Park Road
Oviedo, FL 32765
PHONE: 407-359-7194
FAX: 359-7197

EDB/DBCP

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999
ANALYTICAL PROTOCOL: EPA 504

Lab Reference Number	99110224-6	
Client Sample ID	EQ BLK	
Date Sampled	11/24/1999	
Date Extracted	12/01/1999	
Date Analyzed	12/01/1999	
Sample Matrix (as Received)	Water	
Analysis Confirmed	No	
Dilution Factor	1	
Result Units	ug/l	
Ethylene dibromide (EDB)	0.02	U
1,2-Dibromo-3-chloropropane	0.1	U

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : _____

Quality Control Report for Spike/Spike Duplicate Analysis

EDB/DBCP

Matrix: Water
Lab Sample ID: 9911224-4
QC Batch ID: 9912EDB001
Spike Units: ug/l

Analysis Date: 12/01/1999
Preparation Date: 12/01/1999
Method: EPA 504
Analyst: RM

Analyte	Spike Amount	Sample Result	Spike Result	Spike Percent Recovery	MSD Result	MSD Percent Recovery	RPD
Ethylene dibromide (EDB)	1.00	0.00	0.84	84	0.90	90	7
1,2-Dibromo-3-chloropropane	1.0	0.0	1.0	100	0.9	90	11

Quality Control Limits

Analyte	Lower Limit	Upper Limit	RPD
Ethylene dibromide (EDB)	48	135	16
1,2-Dibromo-3-chloropropane	43	134	17

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PHONE: 407-359-7194

Report of Analysis

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999

Lab Reference Number			99110224-1	99110224-2	99110224-3	99110224-4	99110224-5
Client Sample ID			KYW-A-127-MW5	KYW-A-127-MW6	KYW-A-127-MW12	KYW-A-127-MW21	KYW-A-127-DUP
Date Sampled			11/24/1999	11/24/1999	11/24/1999	11/24/1999	11/24/1999
Sample Matrix (as Received)			Water	Water	Water	Water	Water
EPA 6010	Lead, Total	ug/l	3 U	9	3 U	3 U	3 U

U = Undetected. The value preceeding the 'U' is the MDL for the analyte. Results reported on a Wet Weight basis.

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Reviewed by :

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210 Park Road
Oviedo, FL 32765
PHONE: 407-359-7194

Report of Analysis

CLIENT NAME: Tetra Tech NUS, Inc.
PROJECT NAME: Key West UST Site 9
PROJECT NUMBER:
DATE RECEIVED: 11/27/1999

Lab Reference Number			99110224-6
Client Sample ID			EQ BLK
Date Sampled			11/24/1999
Sample Matrix (as Received)			Water
EPA 6010	Lead, Total	ug/l	3 U

U = Undetected. The value preceeding the 'U' is the MDL for the analyte. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : _____

Quality Control Report for Spike Analysis

INORGANICS

Analyte		Spike Amount	Sample Result	Spike Result	Percent Recovery	Lower Control Limit	Upper Control Limit
Method: EPA 6010	QC Batch: 9911RC203	Sample ID: 9911224-2	Date Prep: 11/30/1999		Date Anal: 11/30/1999	Analyst: GG	
Lead, Total		100 ug/l	9	93	84	**78**	**120**

19181

PC&B Environmental

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Chain of Custody

Work Order: 9911 0224

Date: 11/26/99 Page 1 of 1

COMPANY: TETRA TECH NUS
ADDRESS: 794 S. MILITARY TRAIL
DEERFIELD BEACH, FL
SAMPLED BY: GARY BRAGANZA SIGN: [signature]
PHONE: (954) 570-5885 FAX: (954) 570-5974

ANALYSIS REQUESTED

#	SAMPLE ID	DATE/TIME	MATRIX: AIR	WATER	SLUDGE	SOIL/SOLID	ORG. LIQUID	FL-PRO	EPA 504	EPA 8021	EPA 6010	EPA 610/8100											Number of Containers
								PRESERVATION															
1	KYW-A-127-MW5	11/24 11:00		X				1	2	2	1	1											7
2	KYW-A-127-MW6	12:05						1	2	2	1	1											7
3	KYW-A-127-MW12	12:55						1	2	2	1	1											7
4	KYW-A-127-MW21	13:10						1	2	2	1	1											7
5	KYW-A-127-DUP							1	2	2	1	1											7
6	EQ BLK	12:35						1	2	2	1	1											7
7																							
8																							
9																							
10																							
11																							
12																							
13																							42

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1: [signature]	11/26 16:00	1: [signature]	11/27/99 10:30
2:		2:	
3:		3:	

SPECIAL INSTRUCTIONS/COMMENTS:

QUOTE/CONTRACT #:

PROJECT INFORMATION

PROJECT NAME: KEY WEST UST SITE 9.
PROJECT #:
SITE ADDRESS: KEY WEST
PROJECT MANAGER: RICK OFSANKO

SAMPLE RECEIPT

Total # of Containers	42
Chain of Custody Seals	
Recv'd in Good Condition	
PO #:	

INVOICE TO:
(IF DIFFERENT FROM ABOVE)

WHITE: Project File YELLOW: Laboratory PINK: Sampler