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AIR SPARGING/SOIL VAPOR EXTRACTION TREATABILITY STUDY REPORT FOR
BUILDING 189 SECOND QUARTER WITH TRANSMITTAL LETTER NAS KEY WEST FL
1/19/2001
TETRA TECH NUS



TETRA TECH NUS, INC.

AIK-01-0009

January 19, 2001

Project Number HK 7846

via Electronic 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. 059

Subject: Air Sparging/Soil Vapor Extraction Treatability Study Report for Building 189,
Rev. 0, Second Quarter
Naval Air Station Key West, Florida

Dear Mr. Glover:

TtNUS is pleased to submit the enclosed PDF file for the Second Quarter of the Air Sparging/Soil Vapor Extraction Treatability Study Report for Building 189, Rev. 0, Naval Air Station Key West, Florida. At your request, a copy of this final report is being distributed to the Florida Department of Environmental Protection FDEP for their review and comment or concurrence. I am planning on receiving comments or concurrence on this document from FDEP within the next 30 days.

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)
Mr. Jorge Caspary, FDEP
File: 7846-7.3.3

Mr. R. Courtright, NAS Key West
Mr. M. Perry/File

**AIR SPARGING/SOIL VAPOR EXTRACTION
TREATABILITY STUDY REPORT**

**for
BUILDING 189
(SECOND QUARTER)**

**Naval Air Station
Key West, Florida**



**Southern Division
Naval Facilities Engineering Command**

Contract Number N62467-94-D-0888

Contract Task Order 059

January 2001

Revision 0

**AIR SPARGING/SOIL VAPOR EXTRACTION
TREATABILITY STUDY REPORT
FOR
BUILDING 189**

(SECOND QUARTER)

**NAVAL AIR STATION
KEY WEST, FLORIDA**

**COMPREHENSIVE LONG-TERM
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 0059**

JANUARY 2001

PREPARED UNDER THE SUPERVISION OF:

**CHUCK BRYAN
TASK ORDER MANAGER
TETRA TECH NUS, INC.
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APPROVED FOR SUBMITTAL BY:



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

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ACRONYMS

AS	air sparging
AS/SVE	Air Sparging/Soil Vapor Extraction
BTEX	benzene, toluene, ethylbenzene, and total xylenes
cfm	cubic feet per minute
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CTO	Contract Task Order
EPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
GCTL	Groundwater Contaminant Target Levels
KAG	Kerosene Analytical Group
mg/m ³	milligram per cubic meter
MW	monitoring well
MOP	monitoring only plan
ppmv	part per million volume
PVC	polyvinyl chloride
TRPH	total recoverable petroleum hydrocarbons
TiNUS	Tetra Tech NUS, Inc.
VES	Vapor Extraction System
VEW	vapor extraction well
VOC	Volatile Organic Compounds

1.0 TREATABILITY STUDY REPORT

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit the Air Sparging/Soil Vapor Extraction (AS/SVE) Treatability Study 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-059, under the authority of the Comprehensive Long-Term Environmental Action, Navy (CLEAN) Contract Number N62467-94-D-0888.

1.1 SITE HISTORY OVERVIEW

Building 189 is adjacent to the eastern seawall of the turning basin, which was formerly used to dock naval vessels. During reconstruction of the wharf in 1989, a north-to-south-oriented Bunker C fuel oil pipeline was discovered approximately 25 feet west of Building 189. The fuel line was broken prior to or during wharf reconstruction activities.

A contamination assessment was conducted in February 1992 and a report (ABB-ES, 1992) submitted to the Florida Department of Environmental Protection (FDEP). The report recommended a monitoring only plan (MOP) for the site. However, since free product was present in the wells at the site, FDEP required that the product be manually removed. Supplemental field investigations were conducted at the site to identify petroleum contaminants and their likely sources. A total of 17 soil borings, 12 shallow monitoring wells (MWs), and 1 deep MW were advanced at the site. In addition, one sediment sample was collected. Free product was observed in two MWs. The free product was a viscous, tarry substance that resembled Bunker C fuel. Total recoverable petroleum hydrocarbons (TRPH) and pyrene were the only contaminants detected in the groundwater samples collected (ABB-ES, 1993).

In 1998, TtNUS implemented a MOP at the site. Six wells were sampled for parameters of the Kerosene Analytical Group (KAG). By the end of the sixth quarter of sampling, petroleum hydrocarbon levels in the wells sampled were below Groundwater Cleanup Target Levels (GCTLs) for the site; however, free product was still present in MW-2. The product, Bunker C fuel oil, could not be recovered any further because its viscous nature prevented it from entering the bailer.

1.2 MONITORING OBJECTIVES

In May 2000, an AS/SVE Treatability Study was initiated at the site to remediate residual hydrocarbon contaminants in the soil and groundwater (TtNUS, 2000). The study was conducted in two phases:

- Phase I involved a short-term test to evaluate the effectiveness of the system, over-drilling, and removal of MW-2, including soils in the immediate vicinity of the well.
- Phase II is a long-term evaluation of the Treatability Study and involves monitoring of the system's effectiveness for a period of one year.

The objective of Phase II is to remediate free product in groundwater in the vicinity of former MW-2 to undetectable levels, and to remediate TRPH concentrations in the soil to a level below the Soil Cleanup Target Level for Leachability Based on Groundwater Criteria (Chapter 62-777, F.A.C.). A site map showing the approximate areal extent of soil and free product contamination is presented in Figure 1-1.

1.3 SYSTEM DESCRIPTION

The remediation system design incorporates soil vapor extraction with air sparging (AS) to remove hydrocarbon contaminants from the soil and groundwater. AS is achieved by a Roots-Dresser 5-horsepower injection blower that is capable of providing 56 cubic feet per minute (cfm) at 12 pounds per square inch. Two 2-inch-diameter AS wells (AS-1 and AS-2), installed to the north and south of former MW-2, are used as injection points. The wells were constructed of 2-inch-diameter schedule 40 polyvinyl chloride (PVC) pipe with 18 feet of riser pipe and 2 feet of screen. The screen was placed at an interval of 18 to 20 feet, to ensure a depth of approximately 12 feet below the top of water table. Air is transferred between the blower and injection wells by 2-inch-diameter above-ground schedule 40 PVC pipes. These pipes are connected to the blowers with 2-inch hoses equipped with quick-disconnect camlocks.

Vapor extraction for the soil remediation portion of the system is provided by a Rotron 5-horsepower blower capable of 14 inches of mercury at 52 cfm. The vapor extraction well (VEW) VEW-1 was placed in the former location of MW-2 and between the two AS wells. It is constructed of 5-inch-diameter schedule 40 PVC pipe with 1 foot of riser and approximately 12 feet of screen. The screened interval was placed above and below the water table, which occurs between 5 and 6 feet. This allows for extracting vapors from the soil in the vadose zone and provides a collection point for the recovery of free product at and below the water table. The VEW is also attached to the blower via a 2-inch PVC pipe. Prior to entering the blower, the moisture in the vapor stream is treated by a Rotron moisture separator. The condensate is automatically transferred to a knock-out tank with a Myers 0.5-horsepower motor. The vapors then pass through a series of carbon treatment drums before being discharged into the atmosphere. A permit for the AS/SVE system was not required because gas emissions were evaluated during Phase I of the study and levels of Volatile Organic Compounds (VOCs) did not exceed the 13.7 lbs/day limit of the U.S. Environmental Protection Agency (EPA) Office of Solid Waste and Emergency Response Directive 9355.0-28. A site map showing the system layout is presented in Figure 1-2.

1.4 MONTHLY MONITORING

To monitor the effectiveness of the system, air/vapor samples were collected from the Vapor Extraction System (VES). TtNUS personnel visited the site on September 13, October 5, and November 2, 2000, to collect air samples. Samples were collected from the sampling ports located before (influent) and after (effluent) the carbon canisters to evaluate the effectiveness of the carbon treatment. All sampling activities were conducted in accordance with the FDEP-approved TtNUS Comp QAP #980038.

Following collection, the air samples were shipped via overnight transport to Envirodyne Laboratories in Boca Raton, Florida. They were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and TRPH by EPA Method TO-14. The analytical results of the first and second quarterly air sampling events are summarized in Table 1-1. Copies of the laboratory reports are provided in Appendix A.

Analytical results indicate that BTEX and TRPH concentrations were detected in air samples collected during each monthly sampling event from both the influent and effluent samples. Total BTEX effluent concentrations were 0.10 milligrams per cubic meter (mg/m^3) for the samples collected during September and October and below detection limits for the sample collected in November. Total BTEX concentrations for influent samples in September, October, and November were $0.23 \text{ mg}/\text{m}^3$, $0.09 \text{ mg}/\text{m}^3$, and $0.14 \text{ mg}/\text{m}^3$, respectively. TRPH was detected during each sampling event of the quarter and ranged in concentration from 9.6 part per million volume (ppmv) to 2.0 ppmv in the effluent sample and 26 to 2.1 ppmv in the influent sample. The highest BTEX and TRPH concentrations were detected during the September sampling event. Total BTEX and TRPH concentrations were similar to levels detected during the previous quarterly sampling event. The total emissions for the quarter did not, however, exceed the 13.7 pounds-per-day FDEP limit. Mass vapor emissions calculations for the highest effluent concentrations detected during the quarter are presented in Table 1-2.

1.4.1 Free Product Monitoring

During the monthly visits, wells VEW-1, AS-1, AS-2, and the observation well (OW-1) were gauged for the presence of free product. No free product was detected during the quarter.

1.5 AS/SVE SYSTEM OPERATIONS

The remedial system has operated effectively during the entire quarter. TtNUS performed routine operation and maintenance during monthly site visits. The system operated continuously during the three-month period, with no down time.

1.6 CONCLUSIONS AND RECOMMENDATIONS

Total BTEX and TRPH continued to be detected at low levels during the second quarter. Total emissions did not exceed the 13.7 pounds-per-day limit allowed by the FDEP. Overall, the system ran efficiently during the quarter and no down time was experienced.

Based on the continued low-level detections in the influent and effluent vapor samples and the absence of free product in any of the wells, FDEP concurred with the Navy's recommendation that the long term AS/SVE study be terminated at the end of the second quarter. The results indicate that only minor concentrations of residual hydrocarbons are present in the soil and should be eliminated over time by natural attenuation processes. TtNUS recommends sampling of the source well (VEW-1) and one perimeter well (MW-01) for an additional two quarters. In addition, wells VEW-1, AS-1, AS-2, and OW-1 will be monitored for free product. If levels are below regulatory limits for two consecutive quarters, a no further action status will be requested for the site.

TABLE 1-2
MASS VAPOR EMISSIONS CALCULATIONS
NAVAL AIR STATION
KEY WEST, FLORIDA

PARAMETER	EFFLUENT RESULT ($\mu\text{g}/\text{m}^3$)[*]
Benzene	0
Toluene	40
Ethylbenzene	0
Total Xylenes	60
Methyl-tert-butyl-ether	0
TRPH	9600
$\mu\text{g}/\text{m}^3$ of total (detectable) VOCs>>>	9700.0
$\mu\text{g}/\text{ft}^3$ of total (detectable) VOCs>>>	274.67
$\text{ft}^3/\text{min. (cfm)}$ out of the carbon >>>	52
$\mu\text{g}/\text{min}$ out of the carbon >>>	14283
minutes per day (24 hrs.)	1440
$\mu\text{g}/\text{day}$ >>>	2.06E+07
pounds/day	0.05
pounds/month based on 30 days>>	1.36

* Only detectable results are used in calculations

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

$\mu\text{g}/\text{ft}^3$ = micrograms per cubic foot

REFERENCES

ABB-ES (Environmental Services, Inc.), 1992. Contamination Assessment Report, Truman Annex Berthing Wharf Building 189, Naval Air Station Key West, Florida, prepared for Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina, February.

ABB-ES (Environmental Services, Inc.), 1993. Contamination Assessment Report Addendum, Electric Power Plant, Building 103, Truman Annex, Naval Air Station Key West, Florida, prepared for Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina.

TtNUS, (Tetra Tech NUS, Inc.), 2000. Air Sparging/Vapor Extraction Treatability Study Work Plan for Building 189, Truman Annex, Naval Air Station Key West, Key West, Florida, prepared for Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina, May.

APPENDIX A
LABORATORY REPORTS AND CHAIN OF CUSTODY RECORDS

Envirodyne Inc.

4805 N.W. 2nd Avenue
Boca Raton, FL 33431
561-989-5225

Tetra-Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, FL 33442

November 11, 2000
Report: 2000/11052
Sample No: 2000/11052- 1

Attention: Gary Braganza

Project: N7846 NAS Key West B-189
Key West, FL

SAMPLE ID: B189-110200-VEFF-06

Collected by: Skip Vaillancourt

Collected on: 11/02/00

Received on: 11/03/00

Date of Analysis: 11/03/00

TO-14 BTEX/TRPH

PARAMETER	RESULT	DL UNITS	ANALYST
Benzene	BDL	0.01 ppmv	SPH
Ethylbenzene	BDL	0.01 ppmv	SPH
Methyl-tert-butyl-ether	BDL	0.01 ppmv	SPH
Toluene	BDL	0.01 ppmv	SPH
Xylenes, Total	BDL	0.01 ppmv	SPH
Total BTEX	BDL	ppmv	SPH
Total Petroleum Hydrocarbons	3.9	0.1 ppmv	SPH
Benzene	BDL	0.03 mg/m3	SPH
Ethylbenzene	BDL	0.05 mg/m3	SPH
Methyl-tert-butyl-ether	BDL	0.04 mg/m3	SPH
Toluene	BDL	0.04 mg/m3	SPH
Xylenes, Total	BDL	0.05 mg/m3	SPH
Total BTEX	BDL	mg/m3	SPH

Envirodyne Inc.

4805 N.W. 2nd Avenue
Boca Raton, FL 33431
561-989-5225

Tetra-Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, FL 33442

November 11, 2000
Report: 2000/11052
Sample No: 2000/11052- 2

Attention: Gary Braganza

Project: N7846 NAS Key West B-189
Key West, FL

SAMPLE ID: B189-110200-VINF-06

Collected by: Skip Vaillancourt

Collected on: 11/02/00

Received on: 11/03/00

Date of Analysis: 11/03/00

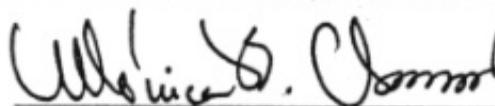
TO-14 BTEX/TRPH

PARAMETER	RESULT	DL UNITS	ANALYST
Benzene	0.01	0.01 ppmv	SPH
Ethylbenzene	BDL	0.01 ppmv	SPH
Methyl-tert-butyl-ether	BDL	0.01 ppmv	SPH
Toluene	0.01	0.01 ppmv	SPH
Xylenes, Total	0.01	0.01 ppmv	SPH
Total BTEX	0.03	ppmv	SPH
Total Petroleum Hydrocarbons	5.6	0.1 ppmv	SPH
Benzene	0.04	0.03 mg/m3	SPH
Ethylbenzene	BDL	0.05 mg/m3	SPH
Methyl-tert-butyl-ether	BDL	0.04 mg/m3	SPH
Toluene	0.04	0.04 mg/m3	SPH
Xylenes, Total	0.06	0.05 mg/m3	SPH
Total BTEX	0.14	mg/m3	SPH

Analysis contained herein conform to EPA and DEP approved methods per Envirodyne Comprehensive Quality Assurance Plan No. 890041. Additional Laboratory Certification numbers: E86006, 84269, E83079, E86240, South Carolina 96022. All relevant quality assurance samples were within specified control limits unless otherwise stated.



Project Manager



Quality Assurance Director

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

4805 NW 2nd Avenue • Boca Raton, FL 33431
(561) 989-5225 • Fax (561) 989-5204

PROJECT NUMBER 07846	PROJECT NAME MAS Key West B-189	P.O. NUMBER 07846 P34(52)	SAMPLE TYPE NV	PRESERVATIVE / / / / / / / / / /
PROJECT LOCATION Key West FL		ANALYSES REQUESTED SOLID / LIQUID / AIR / NON-AQUEOUS LIQUID TD-15 (BTEX + TPH)		
CLIENT NAME Retia Fed	CLIENT ADDRESS			
PHONE 954 570 5885 FAX		NO. OF CONTAINERS RUSH TAT (SURCHARGE) <input checked="" type="checkbox"/> DUE DATE:		
SAMPLE INFORMATION				

NUMBER	DATE	TIME	IDENTIFICATION	SOLID	LIQUID	AIR	NON-AQUEOUS LIQUID	TD-15	BTEX	TPH	NO. OF CONTAINERS	REMARKS
1	11/2/00	1500	B189-110200-VTGF-06		Y						1	
2	11/2/00	1515	B189-110200-VIHF-06		Y						1	
3												
4												
5												
6												
7												
8												
9												
10												

SAMPLE COLLECTED BY Skip Kilgus	ARE THESE SAMPLES LISTED OR CHARACTERISTIC HAZARDOUS WASTE? <input type="checkbox"/> YES <input type="checkbox"/> NO						2		TOTAL OF ALL CONTAINERS	
SEND REPORT TO (PERSON) Gary Bruscia	ARE THESE SAMPLES FROM <input type="checkbox"/> PETROLEUM <input type="checkbox"/> DRY CLEANER OR <input type="checkbox"/> OTHER SITE?									
SAMPLES CONDITION In test	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME				
LOG NUMBER 200/11052	1			2	11/1/00	1700				
	3	11/2/00	1600	4	11/3/00	11:00				
	5			6						

Envirodyne Inc.

4805 N.W. 2nd Avenue
Boca Raton, FL 33431
561-989-5225

Tetra-Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, FL 33442

October 18, 2000
Report: 2000/10068
Sample No: 2000/10068- 1

Attention: Gary Braganza

Project: N7846 Truman Annex Building 189
Key West, FL

SAMPLE ID: B189-100500-VEFF-05

Collected by: Steve Jackson

Collected on: 10/05/00
Received on: 10/06/00

Date of Analysis: 10/06/00

TO-14 BTEX/TRPH

PARAMETER	RESULT	DL UNITS	ANALYST
Benzene	BDL	0.01 ppmv	SPH
Ethylbenzene	BDL	0.01 ppmv	SPH
Methyl-tert-butyl-ether	BDL	0.01 ppmv	SPH
Toluene	0.01	0.01 ppmv	SPH
Xylenes, Total	0.01	0.01 ppmv	SPH
Total BTEX	0.02	ppmv	SPH
Total Petroleum Hydrocarbons	2.0	0.1 ppmv	SPH
Benzene	BDL	0.03 mg/m3	SPH
Ethylbenzene	BDL	0.05 mg/m3	SPH
Methyl-tert-butyl-ether	BDL	0.04 mg/m3	SPH
Toluene	0.05	0.04 mg/m3	SPH
Xylenes, Total	0.05	0.05 mg/m3	SPH
Total BTEX	0.10	mg/m3	SPH

Envirodyne Inc.

4805 N.W. 2nd Avenue
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561-989-5225

Tetra-Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, FL 33442

October 18, 2000
Report: 2000/10068
Sample No: 2000/10068- 2

Attention: Gary Braganza

Project: N7846 Truman Annex Building 189
Key West, FL

SAMPLE ID: B189-100500-VINF-05

Collected by: Steve Jackson

Collected on: 10/05/00

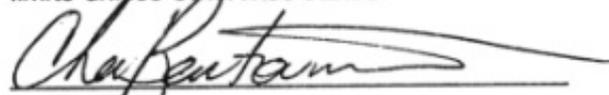
Received on: 10/06/00

Date of Analysis: 10/06/00

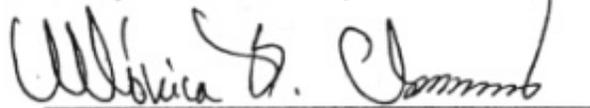
TO-14 BTEX/TRPH

PARAMETER	RESULT	DL UNITS	ANALYST
Benzene	BDL	0.01 ppmv	SPH
Ethylbenzene	BDL	0.01 ppmv	SPH
Methyl-tert-butyl-ether	BDL	0.01 ppmv	SPH
Toluene	0.01	0.01 ppmv	SPH
Xylenes, Total	0.01	0.01 ppmv	SPH
Total BTEX	0.02	ppmv	SPH
Total Petroleum Hydrocarbons	2.1	0.1 ppmv	SPH
Benzene	BDL	0.03 mg/m3	SPH
Ethylbenzene	BDL	0.05 mg/m3	SPH
Methyl-tert-butyl-ether	BDL	0.04 mg/m3	SPH
Toluene	0.05	0.04 mg/m3	SPH
Xylenes, Total	0.06	0.05 +g/m3	SPH
Total BTEX	0.09	mg/m3	SPH

Analysis contained herein conform to EPA and DEP approved methods per Envirodyne Comprehensive Quality Assurance Plan No. 890041. Additional Laboratory Certification numbers: E86006, 84269, E83079, E86240, South Carolina 96022. All relevant quality assurance samples were within specified control limits unless otherwise stated.



Project Manager



Quality Assurance Director

Envirodyne Inc.

4805 N.W. 2nd Avenue
Boca Raton, FL 33431
561-989-5225

Tetra-Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, FL 33442

September 27, 2000
Report: 2000\09207
Sample No: 2000\09207- 1

Attention: Steve Jackson

Project: N7846 NAS Key West
Key West, FL

SAMPLE ID: B189-091300-VEFF-04

Collected by: Skip Vaillancourt

Collected on: 09/13/00

Received on: 09/14/00

Date of Analysis: 09/14/00

TO-14 BTEX/TRPH

PARAMETER	RESULT	DL UNITS	ANALYST
Benzene	BDL	0.01 ppmv	SPH
Ethylbenzene	BDL	0.01 ppmv	SPH
Methyl-tert-butyl-ether	BDL	0.01 ppmv	SPH
Toluene	0.01	0.01 ppmv	SPH
Xylenes, Total	0.01	0.01 ppmv	SPH
Total BTEX	0.02	ppmv	SPH
Total Petroleum Hydrocarbons	9.6	0.1 ppmv	SPH
Benzene	BDL	0.03 mg/m3	SPH
Ethylbenzene	BDL	0.05 mg/m3	SPH
Methyl-tert-butyl-ether	BDL	0.04 mg/m3	SPH
Toluene	0.04	0.04 mg/m3	SPH
Xylenes, Total	0.06	0.05 mg/m3	SPH
Total BTEX	0.10	mg/m3	SPH

Envirodyne Inc.

4805 N.W. 2nd Avenue
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561-989-5225

Tetra-Tech NUS, Inc.
794 South Military Trail
Deerfield Beach, FL 33442

September 27, 2000
Report: 2000\09207
Sample No: 2000\09207- 2

Attention: Steve Jackson

Project: N7846 NAS Key West
Key West, FL

SAMPLE ID: B189-091300-VINF-04

Collected by: Skip Vaillancourt

Collected on: 09/13/00
Received on: 09/14/00

Date of Analysis: 09/15/00

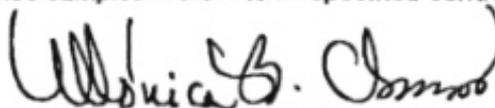
TO-14 BTEX/TRPH

PARAMETER	RESULT	DL UNITS	ANALYST
Benzene	0.01	0.01 ppmv	SPH
Ethylbenzene	BDL	0.01 ppmv	SPH
Methyl-tert-butyl-ether	BDL	0.01 ppmv	SPH
Toluene	0.02	0.01 ppmv	SPH
Xylenes, Total	0.02	0.01 ppmv	SPH
Total BTEX	0.05	ppmv	SPH
Total Petroleum Hydrocarbons	26	0.1 ppmv	SPH
Benzene	0.04	0.03 mg/m3	SPH
Ethylbenzene	BDL	0.05 mg/m3	SPH
Methyl-tert-butyl-ether	BDL	0.04 mg/m3	SPH
Toluene	0.08	0.04 mg/m3	SPH
Xylenes, Total	0.11	0.05 mg/m3	SPH
Total BTEX	0.23	mg/m3	SPH

Analysis contained herein conform to EPA and DEP approved methods per Envirodyne Comprehensive Quality Assurance Plan No. 890041. Additional Laboratory Certification numbers: E86006, 84269, E83079, E86240, South Carolina 96022. All relevant quality assurance samples were within specified control limits unless otherwise stated.



Project Manager



Quality Assurance Director

CHAIN OF CUSTODY RECORD
AND
ANALYSIS REQUEST

4805 NW 2nd Avenue • Boca Raton, FL 33431
(561) 989-5225 • Fax (561) 989-5204

PROJECT NUMBER <i>N7846</i>	PROJECT NAME <i>NAS Key West</i>	P.O. NUMBER <i>N7846 3455</i>	SAMPLE TYPE <i>NA</i>	PRESERVATIVE			
PROJECT LOCATION <i>Key West FL</i>		SOLID LIQUID AIR NON-AQUEOUS LIQUID <i>TD-14</i>		ANALYSES REQUESTED			
CLIENT NAME <i>Tetra Tech</i>	CLIENT ADDRESS			NO. OF CONTAINERS		RUSH TAT (SURCHARGE) <input type="checkbox"/>	
PHONE <i>954 570 5888 FAX</i>				DUE DATE:			

SAMPLE INFORMATION															
NUMBER	DATE	TIME	IDENTIFICATION	SOLID	LIQUID	AIR	NON-AQUEOUS LIQUID								REMARKS
1	9/13/00	1400	R189-091300-VEFF-04		X		✓								
2	9/13/00	1410	R189-091300-VINE-04		X		✓								
3															
4															
5															
6															
7															
8															
9															
10															

SAMPLE COLLECTED BY <i>Steve Valtancich</i>					TOTAL OF ALL CONTAINERS				
SEND REPORT TO (PERSON) <i>Steve Jackson</i>	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME			
SAMPLES CONDITION <i>Intact</i>	1 <i>[Signature]</i>			2 <i>[Signature]</i>	9/13/00	16:00			
LOG NUMBER <i>2000/09207</i>	3 <i>[Signature]</i>	9/14/00	17:05	4 <i>Brad White</i>	9/14/00	10:00			
	5			6					

09-28-2004 11:15AM FROM-ENVIRODYNE 561-989-5204 T-689 P 004/004 F-284