SWMU 15 Soil Investigation Results

Oceana Naval Air Station

PREPARED FOR: Jim Harris/LANTDIV

PREPARED BY: Don Martinson/WDC-FGL

COPIES: D. Dronfield/WDC-FGL

DATE: May 9, 1996

Introduction

CH2M HILL completed a field investigation designed to delineate the horizontal extent of soil contamination at SWMU 15 and facilitate design of the corrective action program. This technical memorandum presents the technical approach, field activities, and analytical results of the investigation. Analytical results from the field laboratory and the fixed laboratory are presented together in Table 1. The analytical data received from the fixed laboratory are included as Attachment 1.

Technical Approach

The risk assessment completed as part of the CMS Draft Final Report in March 1996 determined that the preliminary remediation goal (PRG) for benzene in soil was 91 ppb. This concentration was derived by considering several factors, including the industrial exposure scenario and a soil leaching model.

The CMS report included recommendations for soil stockpiling and bioremediation as the corrective action for the SWMU 15 soils. The report also contains an isoconcentration map of benzene and total BTEX soil concentrations. In order to determine a more exact definition of the boundary of soil requiring excavation, additional soil sampling was required. The objective of this March 1996 soil sampling was to close any data gaps and complete delineation of the horizontal extent of subsurface soil contamination.

Field Activities

In order to meet the objectives of the soil investigation, CH2M HILL created a radial sampling pattern centered about the highest BTEX soil concentrations. Figure 1 shows the geoprobe soil sampling locations. On March 12, 1996, Target Environmental Services (Target) conducted a soil survey at SWMU 15 under the direction of a field representative from CH2M HILL. A total of 27 soil samples were collected and analyzed on location for BTEX. Of the 27 soil samples analyzed, 22 were collected from the approximate 4-foot depth and 5 samples from the 1-2 foot depth. Some additional samples were collected but not analyzed if they were observed to be saturated with petroleum compounds.

To collect the soil samples, a truck-mounted hydraulic probe was used to advance a 24-inch steel sampling tube. The sampling tube was equipped with an acetate liner and piston stop

tip. Immediately above the required sampling depth, the piston stop tip was released and the sampling tube was driven an additional 2 feet. This 2-foot drive allowed soil to enter the sampling tube. The sampling tube, with the acetate liner inside, was then removed from the ground, and the acetate liner was prepared for submission to the mobile laboratory. The acetate liner was trimmed, capped at the ends to prevent volatilization, labeled, and relinquished to Target's laboratory for analysis.

The 24-inch long stainless-steel sampling tube was thoroughly decontaminated between sampling intervals and geoprobe locations. The sampling tube was decontaminated by washing with an alconox solution, rinsing with distilled water, and allowing to air dry prior to reuse. In addition to decontaminating the steel sampling rods, a new acetate liner was used for the collection of each soil sample. All geoprobe boring locations were backfilled with bentonite and the surface repaired upon completion of the sampling. The geoprobe report from Target is given in Attachment 1.

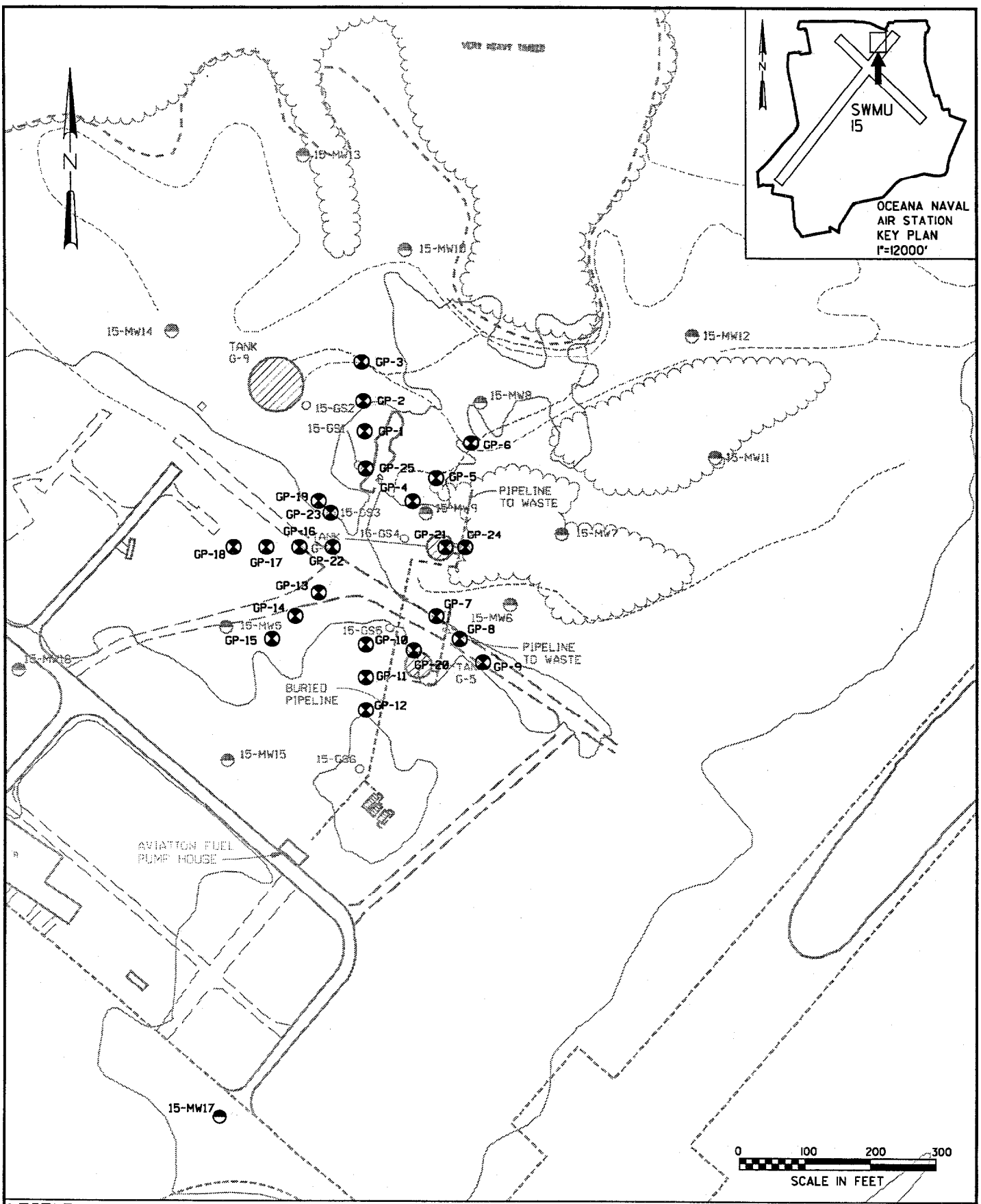
Seven soil samples were split in the field and sent to the CH2MHILL laboratory for BTEX analysis.

Analytical Results

Analytical results from the field laboratory and the fixed laboratory are presented together in Table 1. The 1-2 foot depth samples are designated with the letter "A". The analytical data received from the fixed laboratory are included as Attachment 2. The PRGs for BTEX in soil are presented in Table 2 along with the highest concentration detected by compound.

Figure 2 is an isoconcentration contour map for benzene at approximately 4-foot depth that incorporates the existing data and the data acquired during the March 1996 field investigation. The highest benzene concentration (7,050 ppb) was detected in GP-21. Elevated concentrations exceeding the PRG for benzene were detected in GP-5 (4,170ppb), GP-7A and GP-7 (2,410ppb, and 1,420ppb), GP-13A and GP-13 (1,490ppb, and 2,370ppb), GP-14 (510 ppb), and GP-22 (410ppb). The concentrations at these locations are similar to the benzene isoconcentration contours mapped for the CMS Report with several exceptions. For instance, the benzene concentration in the northern and southern areas of the plume are substantially smaller than the CMS estimate. The elevated benzene concentrations in GP-5 and GP-14 translate into a lateral extent of benzene contamination greater than the extent originally estimated in contouring. The area to be remediated (i.e. within the benzene concentration limit of 100ppb) is approximately 1.3 acres.

Soil samples at the 1-2 foot depth had concentrations similar to the 4-foot depth. The split data in the fixed laboratory were similar to the field laboratory measurements for all compounds except toluene. Toluene was much higher in the field laboratory than in the fixed laboratory. However, even the high toluene concentrations from the field laboratory were not above the toluene PRG.



LEGEND

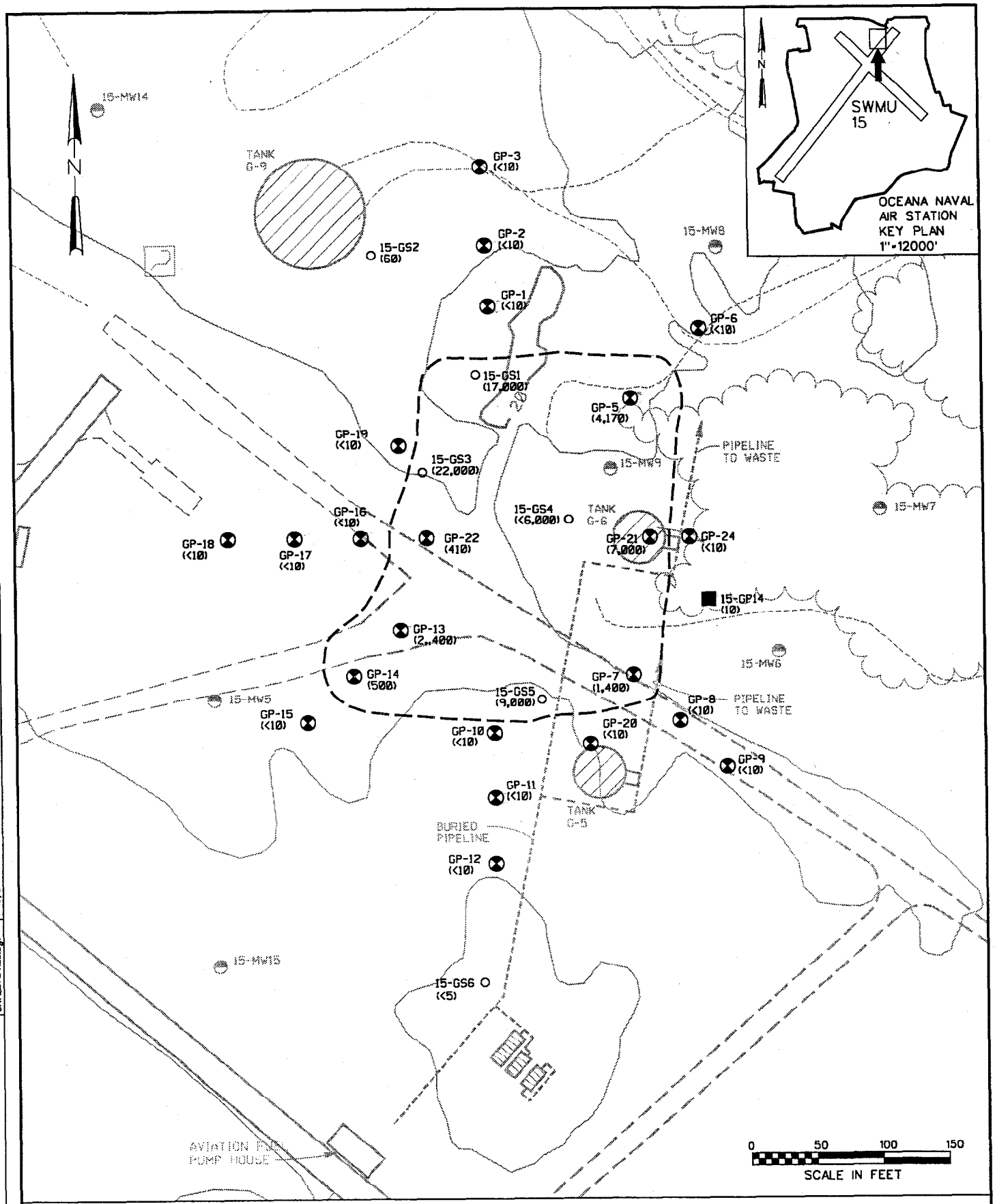
- PREDESIGN SOIL SAMPLING LOCATION
- CMS SHALLOW MONITORING WELL
- RFI SHALLOW MONITORING WELL
- RFI SOIL SAMPLING LOCATION

Figure 1
SOIL SAMPLING LOCATIONS
AT SWMU 15
MARCH 1996

CH2MHILL

368q1544.dgn
12-APR-1996

ONAS0368sit1.tx	J, 51-59	
ONAS0368bdr.dgn	J-4, 60-63	
ONAS8721192.dgn	1-49, 51-63	
ONASpc21192.dgn	1-59	
ONAS8721189.dgn	1-49, 51-59	
ONASpc21189.dgn	1-59	
ONAS0368qwe15.dgn	1-63	
ONASpc24192.dgn	1-59	
ONAS8724192.dgn	1-46, 51-59	
ONAS8724189.dgn	1-46, 51-59	
ONASpc24189.dgn	1-59	
ONASpc21192.dgn	1-59	
ONASpc21189.dgn	1-59	
ONAS8721189.dgn	1-49, 51-59	



LEGEND

- PREDESIGN SOIL SAMPLING LOCATION
- CMS SHALLOW MONITORING WELL
- RFI SHALLOW MONITORING WELL
- RFI SOIL SAMPLING LOCATION
- GEOPROBE SOIL SAMPLE
- ISOCONCENTRATION CONTOUR OF 100 ppb BENZENE

NOTES:

1. ALL SOIL SAMPLES ARE FROM APPROXIMATELY 4 FT DEPTH.
2. CONCENTRATIONS OF BENZENE ARE IN ppb.

Figure 2
BENZENE CONCENTRATIONS IN SOIL SAMPLES AT SWMU 15 MARCH 1996

CH2MHILL

ONAS0368sil1.dgn	1-51-59	
ONAS0368bdr.dgn	3-4, 60-63	
ONAS3721192.dgn	1-49, 51-63	
ONASpc21192.dgn	1-59	
ONAS3724192.dgn	1-49, 51-59	
ONASpc24192.dgn	1-59	
ONAS3724189.dgn	1-49, 51-59	
ONASpc24189.dgn	1-59	
ONAS368qwe15.dgn	1-63	
ONASpc21189.dgn	1-59	
ONAS3721189.dgn	1-49, 51-59	

368q1545.dgn
09-MAY-1996

Table 1

Concentrations in Soil Samples at SWMU 15

(all concentrations are in ppb)

Sample Number	Benzene	Toluene	Ethylbenzene	Xylenes
GP-1	<10	<10	<10	<10
GP-2	<10/1.4	<10/<1.4	<10/<1.4	<10<1.4
GP-3	<10	<10	<10	<10
GP-5A	85	9,840	120	390
GP-5	4,170	78,100	4,700	32,700
GP-6	<10	<10	<10	<10
GP-7A	2,410	68,100	9,750	71,500
GP-7	1,420/670	13,100/<340	1,730/6,000	11,500/29,000
GP-8	<10	<10	<10	<10
GP-9	<10	<10	<10	<10
GP-10	<10	<10	<10	<10
GP-11	<10/<1.3	<10/<1.3	<10/<1.3	<10/<1.3
GP-12	<10	<10	<10	<10
GP-13A	1,490	12,800	1,850	11,600
GP-13	2,370	49,600	7,930	51,400
GP-14	510/420	12,300/<330	2,360/2,200	13,500/9,600
GP-15	<10	<10	<10	<10
GP-16	<10/<1.3	<10/<1.3	<10/<1.3	<10/<1.3
GP-17A	<10	<10	<10	<10
GP-17	<10	<10	<10	<10
GP-18	<10	<10	<10	<10
GP-19	<10	<10	<10	<10
GP-20	<10	<10	<10	<10
GP-21A	<10	<10	<10	<10
GP-21	7,050	126,000	16,900	84,400
GP-22	410/<320	7,670/<320	1,400/2,200	8,460/8,900
GP-24	<10	1,760	<10	<10

Fixed laboratory split sample analyses are given after "/" symbol for each sample. All other samples analyses are from the field laboratory.

Table 2

BTEX Concentrations and PRGs

Compound	Preliminaly Remediation Goal (ppb)	Highest Concentration (ppb)	Number of Locations Exceeding PRG in March
Benzene	91	7,050	6
Toluene	8,345,082	126,000	0
Ethylbenzene	13,241	16,900	1
Total Xylenes	1,172,983	84,400	0

Notes:

1. The preliminary remediation goals were established during the CMS
2. The highest concentrations are from the field laboratory

Attachment 1

SOIL DATA

OCEANA NAVAL AIR STATION
VIRGINIA BEACH, VA

PREPARED FOR

CH2M HILL
625 HERNDON PARKWAY
HERNDON, VA 22090-5416

PREPARED BY

TARGET ENVIRONMENTAL SERVICES, INC.
9180 RUMSEY ROAD
COLUMBIA, MARYLAND 21045
(410) 992-6622

MARCH 1996

Introduction

On March 12th, 1996, **TARGET Environmental Services, Inc. (TARGET)** conducted a soil survey at the Oceana Naval Air Station, located in Virginia Beach, Virginia. Under the direction of **CH2M HILL**, a total of 37 soil samples were collected and 27 were analyzed at the site. The sample locations were marked by the on-site **CH2M HILL** representative. Sample specific details are recorded in the accompanying copy of the field notes and chain-of-custody documentation.

Sample Collection

To collect the soil samples, a truck-mounted hydraulic probe was used to advance a 24" or 48" long, steel sampling tube (equipped with an acetate liner and a piston stop tip) attached to connected 3-foot sections of narrow diameter threaded steel casing down to the sampling depth. The piston stop was then released and the pipe driven an additional 2 or 4 feet, allowing soil to enter the sampling tube. The sampling tube was retrieved, and the liner containing the soil core was removed from the casing. The liner was trimmed, capped at the ends, labeled and relinquished to **TARGET**'s laboratory for analysis.

The sampling tube was decontaminated by washing with a solution of Liquinox/distilled water, rinsing with distilled water and drying with clean paper towels or allowing to air dry prior to reuse. A new liner was used for the collection of each soil sample. All sampling holes were backfilled with bentonite and the surface repaired with like material upon completion of the sampling.

Sample Analysis

The soil samples collected during the field phase of the survey were analyzed according to EPA Method 8020 on a gas chromatograph equipped with a photoionization detector (GC/PID). Analytes selected for standardization were benzene, toluene, ethylbenzene, meta-/para-xylene and ortho-xylene.

The GC/PID was calibrated using a 5-point instrument-response curve and injection of known concentrations of the target analytes. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples, and their average calibration factors were used to calculate the analyte concentrations.

Soil samples were prepared by adding chlorobenzene surrogate and 5.0 ml freon to 5.0 grams of sample. After shaking the vial for 2 minutes the vial was sonicated in a water bath for 10 minutes and allowed to settle. A syringe was then used to extract 3 µl of the remaining freon from the sample for chromatographic injection.

The tabulated results of the laboratory analysis of the soil samples are listed in milligrams per kilogram (mg/kg, equivalent to ppm) in Table 1. The xylenes concentrations reported in the data table are the sum of the m-, p-, and o-xylene concentrations for each sample.

Laboratory QA/QC Samples

Prior to each day's analytical activities, laboratory method blanks were prepared and analyzed as described above. A laboratory duplicate analysis was performed on every twentieth sample or one per day, whichever is greater. The results of these laboratory QA/QC analyses are provided in Table 1.

TABLE 1

ANALYTE CONCENTRATIONS IN SOILS VIA EPA METHOD 8020

SAMPLE NUMBER	DATE ANALYZED	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES
THEORETICAL DETECTION LIMIT		13 ug/kg	12 ug/kg	20 ug/kg	12 ug/kg
SOIL BLANK	3/12/96	ND	ND	ND	ND
GP-1	3/12/96	ND	ND	ND	ND
GP-2	3/12/96	ND	ND	ND	ND
GP-3	3/12/96	ND	ND	ND	ND
GP-5A	3/12/96	0.085	9.84	0.12	0.39
GP-5	3/12/96	4.17	78.1	4.70	32.7
GP-6	3/12/96	ND	ND	ND	ND
GP-7A	3/12/96	2.41	68.1	9.75	71.5
GP-7	3/12/96	1.42	13.1	1.73	11.5
GP-8	3/12/96	ND	ND	ND	ND
GP-9	3/12/96	ND	ND	ND	ND
GP-10	3/12/96	ND	ND	ND	ND
GP-11	3/12/96	ND	ND	ND	ND
GP-12	3/12/96	ND	ND	ND	ND
GP-13A	3/12/96	1.49	12.8	1.85	11.6
GP-13	3/12/96	2.37	49.6	7.93	51.4
GP-14	3/12/96	0.51	12.3	2.36	13.5
GP-15	3/12/96	ND	ND	ND	ND
GP-16	3/12/96	ND	ND	ND	ND
GP-17A	3/12/96	ND	ND	ND	ND
GP-17	3/12/96	ND	ND	ND	ND
GP-18	3/12/96	ND	ND	ND	ND
GP-19	3/12/96	ND	ND	ND	ND
GP-20	3/12/96	ND	ND	ND	ND
GP-21A	3/12/96	ND	ND	ND	ND
GP-21	3/12/96	7.05	126	16.9	84.4
GP-22	3/12/96	0.41	7.67	1.40	8.46
GP-24	3/12/96	ND	1.76	ND	ND
GP-1 DUP	3/12/96	ND	ND	ND	ND
GP-20 DUP	3/12/96	ND	ND	ND	ND

"ND" INDICATES NO ANALYTE DETECTED AT THE DETECTION LIMITS

Analyst: ERIK S. HERREMA
Reviewed by: _____

JOB CODE: CHH006

DATE: 3-12-96

SAMPLE NUMBER	AREA: GENERAL: WOODS	FIELD	LANDSCAPED/PLANTER	PAVED OR GRAVEL LOT	ROAD	INSIDE BLDG.	EXCAVATION	OTHER	AREA: SPECIAL: UST	AST	PUMPS/LINES	GROUND STAINS	DRUMS	JUNK/REFUSE	CONIFERS	SURFACE: MATERIAL: VEGETATION	SOIL	GRAVEL	ASPHALT	CONCRETE	SUBSURFACE: COMPOSITION: ORGANICS	CLAY	SILT	SAND	GRAVEL	FILL	MOISTURE: DRY	DAMP	WET	PROBE INFO.: DECON PROBE	4" S.S. PROBE	POST RUN TUBING	DEPTH	TYPE: ROTARY HAMMER	SLIDE HAMMER/DRIVE ROD	HYDRAULIC PROBE	SOIL GAS SAMPLE	WATER SAMPLE	SOIL SAMPLE	OTHER	ADDITIONAL OBSERVATIONS (WRITTEN DESCRIPTION OF SAMPLE LOCATIONS)
GP-4	X	X														X					X	X					X						3-5			X		X		
GP-5	X	X														X					X	X					X						3-5			X		X		
GP-1	X	X														X					X	X					X						3-5			X		X		
GP-2	X	X														X					X	X					X						3-5			X		X		duplicate sample collected
GP-3	X	X														X					X	X					X						3-5			X		X		duplicate sample collected

ADDITIONAL NOTES:

JOB CODE: CHH066

DATE: 3-12-96

SAMPLE NUMBER	AREA: GENERAL: WOODS	FIELD	LANDSCAPED/PLANTER	PAVED OR GRAVEL LOT	ROAD	INSIDE BLDG.	EXCAVATION	OTHER	AREA: SPECIAL: UST	AST	PUMPS/LINES	GROUND STAINS	DRUMS	JUNK/REFUSE	CONIFERS	SURFACE: MATERIAL: VEGETATION	SOIL	GRAVEL	ASPHALT	CONCRETE	SUBSURFACE: COMPOSITION: ORGANICS	CLAY	SILT	SAND	GRAVEL	FILL	MOISTURE: DRY	DAMP	WET	PROBE INFO.: DECON PROBE	4" S.S. PROBE	POST RUN TUBING	DEPTH	TYPE: ROTARY HAMMER	SLIDE HAMMER/DRIVE ROD	HYDRAULIC PROBE	SOIL GAS SAMPLE	WATER SAMPLE	SOIL SAMPLE	OTHER	ADDITIONAL OBSERVATIONS (WRITTEN DESCRIPTION OF SAMPLE LOCATIONS)
GP-16	X														X						X						X						3.5			X			X		Duplicate Sample Collected
GP-17	X														X						X						X						3.5			X			X		
GP-18	X														X						X						X						3.5			X			X		
GP-7	X														X						X						X						3.5			X			X		Duplicate Sample Collected
GP-8	X														X						X						X						3.5			X			X		

ADDITIONAL NOTES:

JOB CODE: CH4006

DATE: 3-12-96

SAMPLE NUMBER	AREA: GENERAL: WOODS	FIELD	LANDSCAPED/PLANTER	PAVED OR GRAVEL LOT	ROAD	INSIDE BLDG.	EXCAVATION	OTHER	AREA: SPECIAL: UST	AST	PUMPS/LINES	GROUND STAINS	DRUMS	JUNK/REFUSE	CONIFERS	SURFACE: MATERIAL: VEGETATION	SOIL	GRAVEL	ASPHALT	CONCRETE	SUBSURFACE: COMPOSITION: ORGANICS	CLAY	SILT	SAND	GRAVEL	FILL	MOISTURE: DRY	DAMP	WET	PROBE INFO.: DECON PROBE	4' S.S. PROBE	POST RUN TUBING	DEPTH	TYPE: ROTARY HAMMER	SLIDE HAMMER/DRIVE ROD	HYDRAULIC PROBE	SOIL GAS SAMPLE	WATER SAMPLE	SOIL SAMPLE	OTHER	ADDITIONAL OBSERVATIONS (WRITTEN DESCRIPTION OF SAMPLE LOCATIONS)
GP-9	X	X														X					X						X						3.5			X			X		
GP-13	X															X					X						X						3.5			X			X		
GP-14	X															X					X						X						3.5			X			X		Duplicate Sample Collected
GP-15	X															X					X						X						3.5			X			X		
GP-10	X															X					X						X						3.5			X			X		

ADDITIONAL NOTES:

JOB CODE: CH1006

DATE: 3/12/96

SAMPLE NUMBER	AREA: GENERAL: WOODS	FIELD	LANDSCAPED/PLANTER	PAVED OR GRAVEL LOT	ROAD	INSIDE BLDG.	EXCAVATION	OTHER	AREA: SPECIAL: UST	AST	PUMPS/LINES	GROUND STAINS	DRUMS	JUNK/REFUSE	CONIFERS	SURFACE: MATERIAL: VEGETATION	SOIL	GRAVEL	ASPHALT	CONCRETE	SUBSURFACE: COMPOSITION: ORGANICS	CLAY	SILT	SAND	GRAVEL	FILL	MOISTURE: DRY	DAMP	WET	PROBE INFO.: DECON PROBE	4' S.S. PROBE	POST RUN TUBING	DEPTH	TYPE: ROTARY HAMMER	SLIDE HAMMER/DRIVE ROD	HYDRAULIC PROBE	SOIL GAS SAMPLE	WATER SAMPLE	SOIL SAMPLE	OTHER	ADDITIONAL OBSERVATIONS (WRITTEN DESCRIPTION OF SAMPLE LOCATIONS)
GP-11	X	X														X					X						X						3.5			X		X			Duplicate Sample Collected
GP-12	X															X					X						X						3.5			X		X			
GP-6	X															X					X						X						3.5			X		X			
GP-19	X															X					X						X						3.5			X		X			
GP-22	X															X					X						X						3.5			X		X			Duplicate Sample Collected

ADDITIONAL NOTES:

JOB CODE: CHH006

DATE: 3-12-96

SAMPLE NUMBER	AREA: GENERAL: WOODS	FIELD	LANDSCAPED/PLANTER	PAVED OR GRAVEL LOT	ROAD	INSIDE BLDG.	EXCAVATION	OTHER	AREA: SPECIAL: UST	AST	PUMPS/LINES	GROUND STAINS	DRUMS	JUNK/REFUSE	CONIFERS	SURFACE: MATERIAL: VEGETATION	SOIL	GRAVEL	ASPHALT	CONCRETE	SUBSURFACE: COMPOSITION: ORGANICS	CLAY	SILT	SAND	GRAVEL	FILL	MOISTURE: DRY	DAMP	WET	PROBE INFO.: DECON PROBE	4' S.S. PROBE	POST RUN TUBING	DEPTH	TYPE: ROTARY HAMMER	SLIDE HAMMER/DRIVE ROD	HYDRAULIC PROBE	SOIL GAS SAMPLE	WATER SAMPLE	SOIL SAMPLE	OTHER	ADDITIONAL OBSERVATIONS (WRITTEN DESCRIPTION OF SAMPLE LOCATIONS)
GP-17 A	X															X					X						X						1-3			X		X			
GP-13-A	X															X					X						X						1-3			X		X			
GP-5 A	X															X					X						X						1-3			X		X			
GP-21	X															X					X						X						~~1-5~~ 41			X		X			MACRO CORE
GP-21A	X															X					X						X						21			X		X			MACRO CORE

ADDITIONAL NOTES:

JOB CODE: CH1006

DATE: 3-12-96

SAMPLE NUMBER	AREA: GENERAL: WOODS	FIELD	LANDSCAPED/PLANTER	PAVED OR GRAVEL LOT	ROAD	INSIDE BLDG.	EXCAVATION	OTHER	AREA: SPECIAL: UST	AST	PUMPS/LINES	GROUND STAINS	DRUMS	JUNK/REFUSE	CONIFERS	SURFACE: MATERIAL: VEGETATION	SOIL	GRAVEL	ASPHALT	CONCRETE	SUBSURFACE: COMPOSITION: ORGANICS	CLAY	SILT	SAND	GRAVEL	FILL	MOISTURE: DRY	DAMP	WET	PROBE INFO: DECON PROBE	4' S.S. PROBE	POST RUN TUBING	DEPTH	TYPE: ROTARY HAMMER	SLIDE HAMMER/DRIVE ROD	HYDRAULIC PROBE	SOIL GAS SAMPLE	WATER SAMPLE	SOIL SAMPLE	OTHER	ADDITIONAL OBSERVATIONS (WRITTEN DESCRIPTION OF SAMPLE LOCATIONS)
GP-20	X	X														X					X						X						3-5			X			X		
GP-7A	X	X														X					X						X						15-25			X			X		
GP-23	X	X														X					X						X						0-4'			X			X		MACRO CORE
GP-24	X	X														X					X						X						3-5			X			X		
GP-25	X	X														X					X						X						3-5			X			X		

ADDITIONAL NOTES:

Attachment 2

METHOD: 8020A(MOD)
PURGEABLE AROMATICS

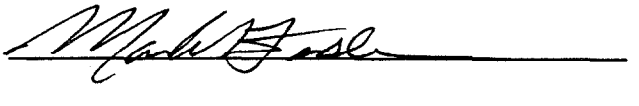
Client: Federal Contract Group
Project: Oceana Naval Air Station
Client Sample ID: GP-2
Sample Matrix: Soil
% Moisture: 27
Dilution Factor: 1.0

Lab Sample ID: RB183001
Date Sampled: 03/12/96
Date Received: 03/14/96
Date Extracted: N/A
Date Analyzed: 03/16/96

Compound	Reporting Limit	Sample Result	Units
Benzene	1.4	U	ug/Kg
Toluene	1.4	U	ug/Kg
Ethylbenzene	1.4	U	ug/Kg
Xylenes (total)	1.4	U	ug/Kg
Fluorobenzene-SS		99	% rec.

U = Not detected above the reporting limit.
SS = Surrogate Standard reported as percent recovery.

Comments: Results reported on dry-weight basis.

Approved by: 

FORM I

kdl.040

Quality Analytical Laboratories Inc.
5090 Caterpillar Road, Redding, CA 96003-1412
916 244-5227
Fax No. 916 244-4109

METHOD: 8020A(MOD)
PURGEABLE AROMATICS

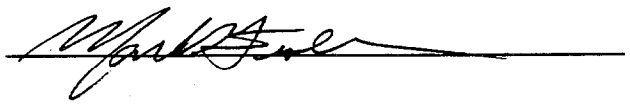
Client: Federal Contract Group
Project: Oceana Naval Air Station
Client Sample ID: GP-7
Sample Matrix: Soil Extract
% Moisture: 27
Dilution Factor: 1.0

Lab Sample ID: RB183002
Date Sampled: 03/12/96
Date Received: 03/14/96
Date Extracted: 03/17/96
Date Analyzed: 03/17/96

Compound	Reporting Limit	Sample Result	Units
Benzene	340	670	ug/Kg
Toluene	340	U	ug/Kg
Ethylbenzene	340	6000	ug/Kg
Xylenes (total)	340	29000	ug/Kg
Fluorobenzene-SS		103	% rec.
aaa-Trifluorotoluene-SS		124	% rec.

U = Not detected above the reporting limit.
SS = Surrogate Standard reported as percent recovery.

Comments: Results reported on dry-weight basis.

Approved by: 

FORM I

kdl.040

Quality Analytical Laboratories Inc.
5090 Caterpillar Road, Redding, CA 96003-1412
916 244-5227
Fax No. 916 244-4109

METHOD: 8020A(MOD)
PURGEABLE AROMATICS

Client: Federal Contract Group
Project: Oceana Naval Air Station
Client Sample ID: GP-16
Sample Matrix: Soil
% Moisture: 22
Dilution Factor: 1.0

Lab Sample ID: RB183003
Date Sampled: 03/12/96
Date Received: 03/14/96
Date Extracted: N/A
Date Analyzed: 03/16/96

Compound	Reporting Limit	Sample Result	Units
Benzene	1.3	U	ug/Kg
Toluene	1.3	U	ug/Kg
Ethylbenzene	1.3	U	ug/Kg
Xylenes (total)	1.3	U	ug/Kg
Fluorobenzene-SS		98	% rec.

U = Not detected above the reporting limit.
SS = Surrogate Standard reported as percent recovery.

Comments: Results reported on dry-weight basis.

Approved by: _____

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Quality Analytical Laboratories Inc.
5090 Caterpillar Road, Redding, CA 96003-1412
916 244-5227
Fax No. 916 244-4109

METHOD: 8020A(MOD)
PURGEABLE AROMATICS

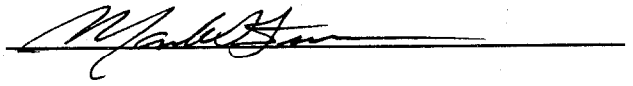
Client: Federal Contract Group
Project: Oceana Naval Air Station
Client Sample ID: GP-14
Sample Matrix: Soil Extract
% Moisture: 24
Dilution Factor: 1.0

Lab Sample ID: RB183004
Date Sampled: 03/12/96
Date Received: 03/14/96
Date Extracted: 03/17/96
Date Analyzed: 03/17/96

Compound	Reporting Limit	Sample Result	Units
Benzene	330	420	ug/Kg
Toluene	330	U	ug/Kg
Ethylbenzene	330	2200	ug/Kg
Xylenes (total)	330	9600	ug/Kg
Fluorobenzene-SS		101	% rec.
aaa-Trifluorotoluene-SS		102	% rec.

U = Not detected above the reporting limit.
SS = Surrogate Standard reported as percent recovery.

Comments: Results reported on dry-weight basis.

Approved by: 

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Quality Analytical Laboratories Inc.
5090 Caterpillar Road, Redding, CA 96003-1412
916 244-5227
Fax No. 916 244-4109

METHOD: 8020A(MOD)
PURGEABLE AROMATICS

Client: Federal Contract Group
Project: Oceana Naval Air Station
Client Sample ID: GP-11
Sample Matrix: Soil
% Moisture: 21
Dilution Factor: 1.0

Lab Sample ID: RB183005
Date Sampled: 03/12/96
Date Received: 03/14/96
Date Extracted: N/A
Date Analyzed: 03/16/96

Compound	Reporting Limit	Sample Result	Units
Benzene	1.3	U	ug/Kg
Toluene	1.3	U	ug/Kg
Ethylbenzene	1.3	U	ug/Kg
Xylenes (total)	1.3	U	ug/Kg
Fluorobenzene-SS		124	% rec.

U = Not detected above the reporting limit.
SS = Surrogate Standard reported as percent recovery.

Comments: Results reported on dry-weight basis.

Approved by: _____

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916 244-5227
Fax No. 916 244-4109

METHOD: 8020A(MOD)
PURGEABLE AROMATICS

Client: Federal Contract Group
Project: Oceana Naval Air Station
Client Sample ID: GP-22
Sample Matrix: Soil Extract
% Moisture: 21
Dilution Factor: 1.0

Lab Sample ID: RB183006
Date Sampled: 03/12/96
Date Received: 03/14/96
Date Extracted: 03/17/96
Date Analyzed: 03/17/96

Compound	Reporting Limit	Sample Result	Units
Benzene	320	U	ug/Kg
Toluene	320	U	ug/Kg
Ethylbenzene	320	2200	ug/Kg
Xylenes (total)	320	8900	ug/Kg
Fluorobenzene-SS		104	% rec.
aaa-Trifluorotoluene-SS		106	% rec.

U = Not detected above the reporting limit.
SS = Surrogate Standard reported as percent recovery.

Comments: Results reported on dry-weight basis.

Approved by: _____

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916 244-5227
Fax No. 916 244-4109

METHOD: 8020A(MOD)
PURGEABLE AROMATICS

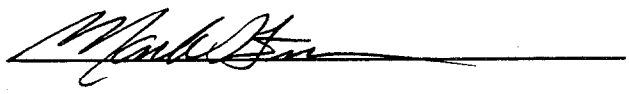
Client: Federal Contract Group
Project: Oceana Naval Air Station
Client Sample ID: GP-30 (GP-22 Duplicate)
Sample Matrix: Soil Extract
% Moisture: 19
Dilution Factor: 1.0

Lab Sample ID: RB183007
Date Sampled: 03/12/96
Date Received: 03/14/96
Date Extracted: 03/17/96
Date Analyzed: 03/17/96

Compound	Reporting Limit	Sample Result	Units
Benzene	310	320	ug/Kg
Toluene	310	U	ug/Kg
Ethylbenzene	310	6300	ug/Kg
Xylenes (total)	310	26000	ug/Kg
Fluorobenzene-SS		105	% rec.
aaa-Trifluorotoluene-SS		132	% rec.

U = Not detected above the reporting limit.
SS = Surrogate Standard reported as percent recovery.

Comments: Results reported on dry-weight basis.

Approved by: 

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Fax No. 916 244-4109

METHOD: 8020A(MOD)
PURGEABLE AROMATICS

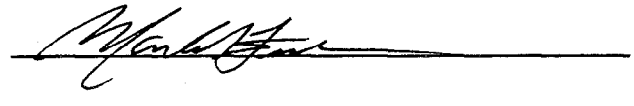
Client: Federal Contract Group
Project: Oceana Naval Air Station
Client Sample ID: TB-3-12
Sample Matrix: Water
Dilution Factor: 1.0

Lab Sample ID: RB183008
Date Sampled: 03/12/96
Date Received: 03/14/96
Date Extracted: N/A
Date Analyzed: 03/17/96

Compound	Reporting Limit	Sample Result	Units
Benzene	1.0	U	ug/L
Toluene	1.0	U	ug/L
Ethylbenzene	1.0	U	ug/L
Xylenes (total)	1.0	U	ug/L
Fluorobenzene-SS		97	% rec.

U = Not detected above the reporting limit.
SS = Surrogate Standard reported as percent recovery.

Comments:

Approved by: 

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