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Versar INC.

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SITE SUMMARY FOR DRONE WASHDOWN AREA, ROOSEVELT ROADS (SITE NO. 8)

Prepared for:

Atlantic Division
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Versar Job No. 5295.3

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SITE SUMMARY FOR DRONE WASHDOWN AREA, ROOSEVELT ROADS (Site No. 8)

INTRODUCTION

The U.S. Naval Facilities Engineering Command (NAVFACENGCOM), Atlantic Division has contracted Versar, Inc. to provide environmental services to the Naval Station (NAVSTA) Roosevelt Roads, Puerto Rico. As part of these services, Versar has prepared site summaries for Site 8, Drone Washdown Area, and other sites at NAVSTA Roosevelt Roads. This site summary has been developed based on the findings of the Initial Assessment Study (IAS) prepared by Greenleaf/Telesca (1986) and Confirmation Study prepared by Environmental Science and Engineering (1988).

This site summary has been prepared to highlight the results of previous investigations, briefly discuss fate and transport potential of site contaminants, and determine the need for further investigation, if warranted. If no further action is required for the protection of human health and the environment, the summary is intended to serve as part of the Navy's decision document to support the no action alternative.

BACKGROUND

The drone washdown area (Figure 1) is located at Building 860 (Aerial Target Systems Department). The drones were launched from Cabras Island at the eastern entrance to Roosevelt Roads Harbor. Drones that were not destroyed during the presentation were recovered by helicopter in the Pasaje de Vieques (Vieques Passage) for reuse and returned to Building 860. This operation had been active since about 1961. Between 1961 and 1969, the Aerial Target Systems Activity averaged 125 presentations per year, totaling about 1,000 presentations. Since a contractor received this task in 1969, approximately 4,000 presentations have been conducted, brining the total to approximately 5,000 presentations over a 20-year period.

After each presentation, the outside of the drone was washed with fresh water to remove the saltwater and marker dye, and any remaining fuel was removed from the fuel tank. This was done outside Building 860, where the fuel and waste water were disposed of in a drainage ditch which flows into a mangrove swamp and eventually into the harbor. From about 1960 to mid-1970s all residual fuels (JP-4 and JP-5) contained in the used drones were disposed of in this ditch. During this estimated 15-year period, about 2,500 presentations occurred. Estimating one to two gallons of unused fuel per drone, about 2,500 to 5,000 gallons of JP-4 and JP-5 fuel were disposed of in the unlined earthen drainage ditch. An undetermined amount of oil was also routinely disposed of in this ditch.

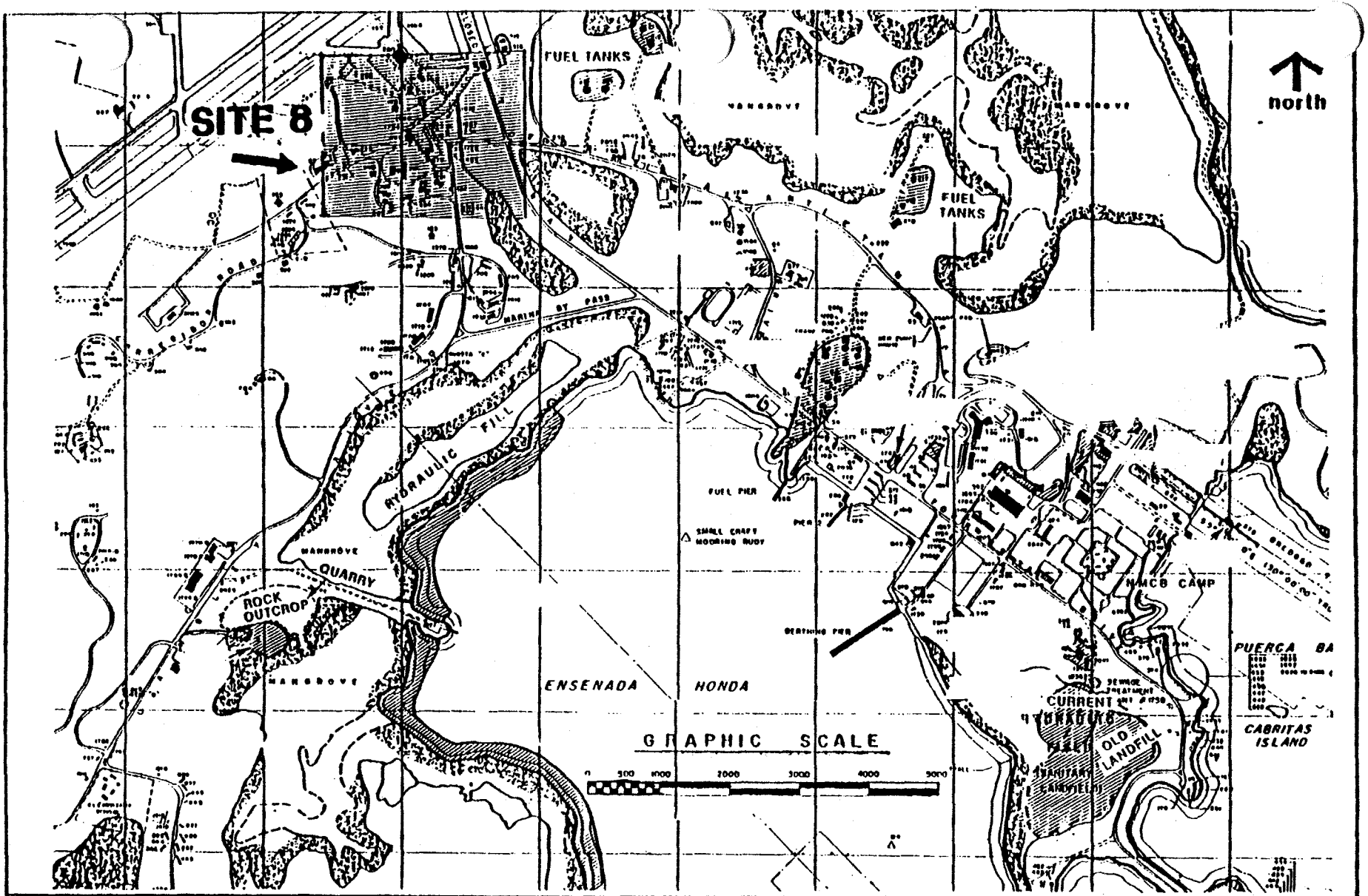


FIGURE 1
LOCATION OF SITE 8, DRONE WASHDOWN AREA

U.S. NAVAL COMPLEX
PUERTO RICO

The drainage system flows through mangrove areas to Ensenada Honda. Movement of contaminants from this site would be primarily by surface flow. Ensenada Honda is a feeding and breeding ground for the endangered West Indian Manatee and four species of sea turtles. The mangrove areas contain potential receptors such as the endangered yellow-shouldered blackbird and is an important habitat for small fishes and other food organisms.

JP-4 is sufficiently volatile that explosive mixtures with air can be present at most ground storage conditions and many flight conditions. JP-5 is the least volatile of all turbine fuels. Both fuels contain aromatic hydrocarbons, but for military jet fuels, the limit is 25 percent by volume in order to limit smoke and coke formation. Sulfur content of jet fuels is limited to a maximum of 0.3 percent by weight.

The presence of aromatic compounds such as benzene, ethylbenzene, toluene, and xylenes in JP-4 is likely since the fuel has a distillation range of 150-500°F. The boiling points of benzene and toluene are 176.2°F and 231.1°F, respectively; for the 0-, m-, and p-xylenes, boiling points are 291.9°, 282.4°, and 281.1°F respectively. However, it is not possible for JP-5, with an initial boiling point of 350°F to contain more than traces of any of these volatile organic compounds.

One would not expect to find more than incidental traces of lead in jet fuels, since lead-containing or other octane improving compounds have no function in jet turbine engines or their fuels.

Virtually all hydrocarbon compounds of the types found in crude petroleum are biodegradable, although the rates of biodegradation vary with molecule size and structure. Most hydrocarbons are metabolized in animal bodies, including humans. Therefore, bioaccumulation of hydrocarbons in food chains is not to be expected.

In the mid-1970s an underground oil separator was constructed outside Building 860 to prevent any fuel or oil from the drone washdown procedure from entering the drainage ditch and storm sewer system. A tank truck (1,500-gallon capacity) was used to siphon the fuel from the oil separator. Any fuel or oil removed directly from the drones was temporarily stored in this tank truck prior to disposition. Until about 1982 the tank truck was emptied by the Public Works Department and the contents were disposed of on a monthly basis; after this time, the tank was normally emptied every three or four months. Until about 1983, the oil separator would overflow into the adjacent storm sewer system during periods of heavy rainfall. This problem was corrected by the installation of a valve on the pipe between the separator and storm sewer which, if closed, could stop the flow of oil into the storm sewer.

CONFIRMATION STUDY

A Confirmation Study was recommended for this site based on the conclusions of the IAS. During the Confirmation Study, surface water and composite sediment and soil samples were collected for identification of potential contamination on two occasions. Samples were analyzed for volatile organic compounds, lead, and oil and grease.

Samples were taken upstream and downstream of the probable entry point of the drone washdown fluids into the drainage ditches north, south, and southeast of the site. Three samples were taken from each point in ditch bottom, at 0- to 6-inch depth, and composited. Sampling of the soil around Building 860 was also necessary to determine the extent of contamination. Sampling at Building 229 established background levels existing from normal airfield operations.

RESULTS

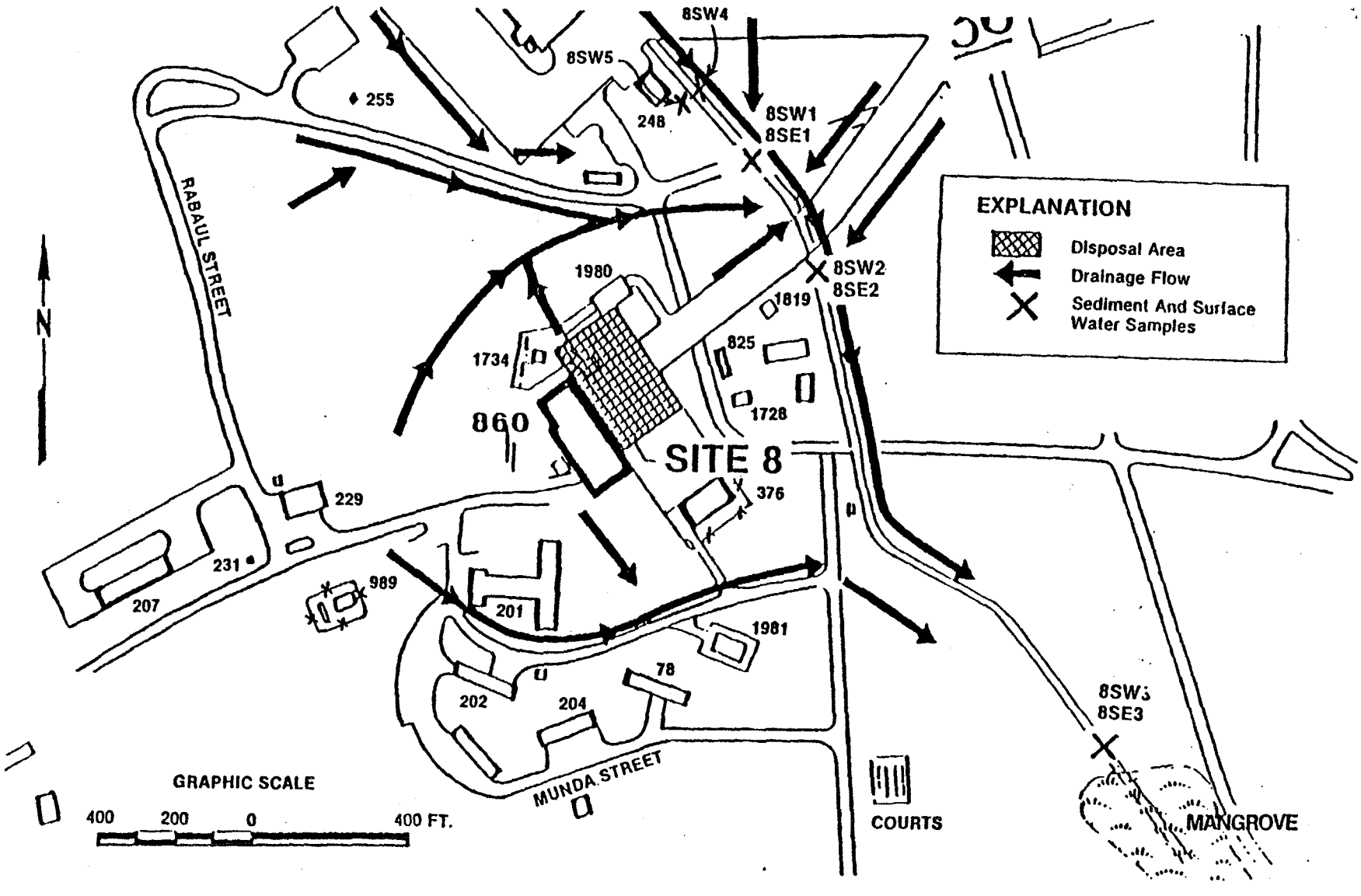
Sampling locations for Rounds 1 and 2 are shown on Figure 2. Surface water and sediment sample locations 8SW1/8SE1 through 8SW3/8SE3 were the same for both Rounds 1 and 2, but two additional surface water samples (8SW4 and 8SW5) were collected during Round 2. Soil sample location 8S1A was sampled only during Round 1, as a background sample.

Table 1 provides concentration data for Rounds 1 and 2 sediment samples, as well as the Round 1 soil sample. Lead, and oil and grease were detected in the sediment and soil samples. The Round 2 oil and grease levels were greatly reduced from Round 1, and lead levels were low during both Rounds 1 and 2. The reduction in concentration between Rounds 1 and 2 may indicate natural degradation of the petroleum compounds or result from the natural heterogenaity of the soil and sediment matrices.

Concentration data for Rounds 1 and 2 surface water samples are presented in Table 1. In contrast to the oil and grease levels found in Round 1 surface water samples, no oil and grease were detected in any of the Round 2 surface water samples. However, low levels of some organic compounds were detected in sample 8SW01.

CONCLUSION

The only constituent of concern that was detected in the soil and sediment samples collected at Site 8 at elevated levels was oil and grease. Lead concentrations were below or near the lower range of naturally occurring concentrations. Elevated oil and grease concentrations were detected at sample station 8SE1, which is upstream of a point in the drainage ditch could be affected by the drone washdown area, indicating that oily water



SOURCES: NEESA, 1984b; ESE, 1985.

FIGURE 2
ROUNDS 1 AND 2 SAMPLING LOCATIONS AT SITE 8, DRONE WASHDOWN

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

TABLE 1

NAVSTA ROOSEVELT ROADS CONFIRMATION STUDY, ROUNDS 1 AND 2 SEDIMENT SOIL, AND SURFACE WATER SAMPLING RESULTS, SITE 8, DRONE WASHDOWN

	Round 1			Round 2			Chemical Toxicity Parameter: Toxicity Data	AIC mg/kg/day	Designated levels in a solid (ug/g)	Threshhold Limit Concentrations (ug/g)	Element Concentration Ranges in Soils (ug/g)
SEDIMENT											
Sample Number:	8SE1	8SE2	8SE3	8SE01	8SE02	8SE03					
Lead (ug/g, dry)	28.8	--	43.4	14.0	14.6	26.1	Oral TDLo (wmn) = 450 mg/kg/6y	0.001400	500	1000	<10 - 700
Oil & Grease (mg/kg)	4740	787	1670	247	69	306	NR	NR	NR	NR	NR
SOIL											
Sample Number:	8S1A										
Lead (ug/g, dry)	6.70						Oral TDLo (wmn) = 450 mg/kg/6y	0.001400	500	1000	<10 - 700
Oil & Grease (mg/kg)	8.21						NR	NR	NR	NR	NR

-- = Not Detected.
N/A = Not Analyzed
NR = Not Reported
TDLo = Toxic Dose Low
wmn = Woman
AIC = Chronic Acceptable Intake values for noncarcinogenic effects.
Designated Levels in a Solid = Designated levels in a solid to protect ground water at an average site in California.
Threshold Limit Concentrations = Hazardous Waste Total Threshold Limit Concentrations. Disposal of wastes exceeding these values is restricted in California.

Constituent	Round 1 Concentrations			Round 2 Concentrations					Chemical Toxicity Parameters: Toxicity Data	AIC mg/kg/day	RCRA MCL (ug/L)	MCL (ug/L)	AWQC (ug/L)	PRDOH MCL (ug/L)
SURFACE WATER														
Sample Number:	8SW1	8SW2	8SW3	8SW01	8SW02	8SW03	8SW04	8SW05						
Oil & Grease (ug/L)	5	102	98	--	--	--	--	--	NR	NR	NR	NR	NR	NR
Benzene (ug/L)	--	--	--	1.1	--	--	--	--	Oral LD50 (rat) = 2800 ug/kg	NR	NR	NR	0.66	5.0
Trichloroethene (ug/L)	--	--	--	1.1	--	--	--	--	Oral LD50 (mus) = 2402 mg/kg	NR	NR	NR	NR	NR
Trichlorofluoromethane (ug/L)	--	--	--	3.6	--	--	--	--	INH. TC50 (hmn) = 50000 ppm/30M	NR	NR	NR	NR	NR

-- = Not Detected.
NR = Not Reported.
LD50 = Lethal Dose Fifty
TC50 = Toxic Concentration Fifty
hmn = Human
mus = Mouse
INH = Inhalation
AIC = Chronic Acceptable Intake values for noncarcinogenic effects.
RCRA MCL = RCRA Maximum Concentration Limits.
MCL = Maximum Contaminant Levels of National Primary Drinking Water Standards; (s) = National Secondary Drinking Water Standards.
AWQC = Ambient Water Quality Criteria is associated with 10-6 cancer risks; (FCC) Fresh Chronic Criteria; (+) Hardness Dependent - 100 mg/L used.
PRDOH MCL = Puerto Rico Department of Health Maximum Contaminant Levels for drinking water.

Source: ESE, 1988

may be entering the drainage ditch on a irregular basis from the hangar area (Building 200) upstream from station 8SE1.

The surface water data indicates the sporadic presence of low levels of oil and grease and volatile organic compounds that may have originated from fuel or degreasing solvents. However, similar to the findings discussed for the sediment data, the surface water data indicates that the constituents of concern are emanating from the hangar area (Building 200). Although there are no drinking water standards or other environmental standards established for oil and grease in aqueous media, a useful standard which may be employed is the 50 mg/l Puerto Rico EQB standard for total recoverable petroleum hydrocarbons (TRPH) established for UST-related ground-water remediation. From an analytical chemistry standpoint, TRPH analysis may be viewed as a subset of oil and grease analysis. Oil and grease analysis measures the same organic compounds as TRPH, but also includes heavier compounds as well. In this respect, TRPH concentrations are typically much less than oil and grease concentrations obtained from a representative split of any given sample. The action-level for TRPH of 50 mg/l is roughly half of the highest concentration of oil and grease obtained at Site No. 8 during Round 1 (102 mg/l) Hydrocarbons were not detected in surface water in Round 2. Using oil and grease analyses, these data suggest that the hydrocarbons detected in Round 1 were the result of a recent release from Building 200 and not from a source related to the drone washdown area. The concentrations of benzene detected (1.1 µg/l) is well below the MCL (5 µg/l). Because the constituent levels detected are below applicable or relevant and appropriate environmental standards, no additional monitoring is recommended for Site 8.

It was noted that small quantities of lead were found in some sediment or soil samples. It is probable that the lead is coming from hangar grease rather than from drone area activities because used hangar grease is often contaminated with lead from alloying components in certain types of engine bearings. An additional source of lead could be from chippings or sand-blasted particles of oil-based paint.

Hazardous material management practices for Building No. 200 were reviewed and deficiencies were corrected. ESE (1988) recommended that oil and grease emanating from the hangar area should be handled as a separate site. The oil/water separator system for Site No. 8 appears to be operating effectively. Versar concurs that activities related to the drone washdown area are no longer impacting the surrounding drainage ditch, and that the concentrations of contaminants detected warrant no further investigations or remedial action.

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REFERENCES

Environmental Science and Engineering, 1988. Confirmation Study to Determine Possible Dispersion and Migration of Specific Chemicals. U.S. Naval Station Roosevelt Roads, Puerto Rico, and U.S. Naval Ammunition Facility Viques: prepared for Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia. (Navy Contract No. N62470-85B-7972).

Greenleaf/Telesca Planners, Engineers, and Architects. 1986. Initial Assessment Study, Naval Station Roosevelt Roads, Puerto Rico: prepared in conjunction with Ecology and Environment, Inc. for U.S. Naval Energy and Environmental Support Activity (Navy Contract No. N62474-82C-C357).

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APPENDIX

ANALYTICAL RESULTS (ESE, 1988)

ENVIRONMENTAL SCIENCE & ENGINEERING 05/12/86 STATUS: FINAL PAGE# 1

PROJECT NUMBER 85275 3000 PROJECT NAME PUERTO RICO CONFIRMATION STUDY
FIELD GROUP PRSWI PROJECT MANAGER RUSS BOWEN
PRWI LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS	UNITS	STORET # METHOD	8SW1 PRSWI 14	8SW2 PRSWI 15	8SW3 PRSWI 16
DATE			01/05/86	01/09/86	01/09/86
TIME			09:45	10:30	11:00
BENZENE		34030	<0.20	<0.26	<0.25
	UG/L	10			
BROMODICHLOROMETHANE		32101	<0.55	<0.57	<0.56
	UG/L	10			
BROMOFORM		32104	<1.1	<1.2	<1.1
	UG/L	10			
BROMOMETHANE		34413	<1.0	<1.1	<1.1
	UG/L	10			
CARBON TETRACHLORIDE		32102	<0.86	<0.90	<0.87
	UG/L	10			
CHLOROBENZENE		34301	<0.39	<0.41	<0.40
	UG/L	10			
CHLOROETHANE		34311	<1.4	<1.5	<1.4
	UG/L	10			
2-CHL'ETH'VINYLETHER		34576	<0.99	<1.0	<1.0
	UG/L	10			
CHLOROFORM		32106	<0.45	<0.47	<0.45
	UG/L	10			
CHLOROMETHANE		34418	<3.3	<3.5	<3.4
	UG/L	10			
DIBROMOCHLOROMETHANE		32105	<0.792	<0.828	<0.805
	UG/L	10			
1,1-DICHLOROETHANE		34496	<0.32	<0.32	<0.32
	UG/L	10			
1,2-DICHLOROETHANE		34531	<0.82	<0.86	<0.83
	UG/L	10			
1,1-DICHLOROETHYLENE		34501	<0.91	<0.95	<0.92
	UG/L	10			
T-1,2-DICHLOROETHENE		34546	<0.91	<0.95	<0.92
	UG/L	10			
1,2-DICHLOROPROPANE		34541	<0.51	<0.54	<0.52
	UG/L	10			
CIS-1,3-DICH'PROPENE		34704	<0.38	<0.39	<0.38
	UG/L	10			
T-1,3-DICHL'PROPENE		34699	<1.1	<1.1	<1.1
	UG/L	10			
ETHYLBENZENE		34371	<0.97	<1.0	<0.99
	UG/L	10			
METHYLENE CHLORIDE		34423	<3.6	<1.9	<0.60
	UG/L	10			

ENVIRONMENTAL SCIENCE & ENGINEERING 05/12/86 STATUS: FINAL PAGE# 2

PROJECT NUMBER 85275 3000
FIELD GROUP PRSWI
PRWI

PROJECT NAME PUERTO RICO CONFIRMATION STUDY
PROJECT MANAGER RUSS BOWEN
LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	BSW1 PRSWI 14	BSW2 PRSWI 15	BSW3 PRSWI 16
DATE		01/09/86	01/09/86	01/09/86
TIME		09:45	10:30	11:00
1,1,2,2-TE'CH'ETHANE UG/L	34516 10	<0.47	<0.50	<0.48
TOLUENE UG/L	34010 10	<0.38	<0.38	<0.38
1,1,1-TRICHL'ETHANE UG/L	34506 10	<0.93	<0.98	<0.95
1,1,2-TRICHL'ETHANE UG/L	34511 10	<0.88	<0.92	<0.90
TRICHLOROETHENE UG/L	39180 10	<0.90	<0.94	<0.92
TRICHL'FLUOROMETHANE UG/L	34488 10	<0.76	<0.80	<0.78
VINYL CHLORIDE UG/L	39175 10	<0.92	<0.97	<0.94
1,2-DIBR'ETHANE(EDB) UG/L	77651 0	<0.010	<0.010	<0.010
M-XYLENE UG/L	98553 10	<0.69	<0.72	<0.70
OIL&GR,IR MG/L	560 0	5	102	98
LEAD,TOTAL UG/L	1051 0	<24.0	<24.0	<24.0
METHYL ETHYL KETONE UG/L	81595 10	<3.8	<6.7	<3.9
METHYL ISOBUT'KETONE UG/L	81596 10	<0.47	<0.47	<0.47
O-AND/OR-P XYLENE UG/L	98554 10	<0.73	<0.76	<0.74
DICHLOROBENZENE,T. UG/L	81524 10	<0.6	<0.6	<0.6
TETRACHLOROETHENE UG/L	34475 10	<1.3	<1.4	<1.3

ENVIRONMENTAL SCIENCE & ENGINEERING 05/12/86 STATUS: FINAL PAGE# 1

PROJECT NUMBER 85275 3000 PROJECT NAME PUERTO RICO CONFIRMATION STUDY
FIELD GROUP PRSE1 PROJECT MANAGER RUSS BOWEN
PRS3 LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS	UNITS	STORET # METHOD	BSE1 PRSE1 17	BSE2 PRSE1 18	BSE3 PRSE1 19
DATE			01/09/86	01/09/86	01/09/86
TIME			09:45	10:30	11:00
BENZENE	UG/G-DRY	98699 10	<0.14	<0.10	<0.15
BROMODICHLOROMETHANE	UG/G-DRY	98783 10	<0.30	<0.21	<0.33
BROMOFORM	UG/G-DRY	98784 10	<0.65	<0.45	<0.71
BROMOMETHANE	UG/G-DRY	98785 10	<0.61	<0.42	<0.67
CARBON TETRACHLORIDE	UG/G-DRY	98680 10	<0.50	<0.35	<0.55
CHLOROBENZENE	UG/G-DRY	98681 10	<0.24	<0.16	<0.26
CHLOROETHANE	UG/G-DRY	98786 10	<0.81	<0.56	<0.90
2-CHLOROETHYLVINYLETHER	UG/G-DRY	98796 10	<0.65	<0.45	<0.72
CHLOROFORM	UG/G-DRY	98682 10	<0.266	<0.185	<0.293
CHLOROMETHANE	UG/G-DRY	98787 10	<0.50	<0.35	<0.55
DIBROMOCHLOROMETHANE	UG/G-DRY	98788 10	<0.50	<0.35	<0.55
1,1-DICHLOROETHANE	UG/G-DRY	98683 10	<0.24	<0.16	<0.26
1,2-DICHLOROETHANE	UG/G-DRY	98684 10	<0.47	<0.32	<0.51
1,1-DICHLOROETHENE	UG/G-DRY	98769 10	<0.53	<0.36	<0.58
TRANS-1,2-DICHLOROETHENE	UG/G-DRY	98687 10	<0.49	<0.34	<0.53
1,2-DICHLOROPROPANE	UG/G-DRY	98790 10	<0.33	<0.23	<0.36
CIS-1,3-DICHLOROPROPENE	UG/G-DRY	98791 10	<0.22	<0.24	<0.24
TRANS-1,3-DICHLOROPROPENE	UG/G-DRY	98792 10	<0.59	<0.40	<0.64
ETHYLBENZENE	UG/G-DRY	98688 10	<0.53	<0.37	<0.59
METHYLENE CHLORIDE	UG/G-DRY	98689 10	<0.48	<0.34	<0.51

PROJECT NUMBER 85275 3000 PROJECT NAME PUERTO RICO CONFIRMATION STUDY
FIELD GROUP PRSE1 PROJECT MANAGER RUSS BOWEN
PRS3 LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS	UNITS	STORET # METHOD	8SE1 PRSE1 17	8SE2 PRSE1 18	8SE3 PRSE1 19
DATE			01/09/86	01/09/86	01/09/86
TIME			09:45	10:30	11:00
1,1,2,2-TETRACHLOROETHANE	UG/G-DRY	98793 10	<0.29	<0.20	<0.32
TETRACHLOROETHENE	UG/G-DRY	98690 10	<0.77	<0.53	<0.85
TOLUENE	UG/G-DRY	98691 10	<0.24	<0.17	<0.26
1,1,1-TRICHLOROETHANE	UG/G-DRY	98692 10	<0.50	<0.35	<0.55
1,1,2-TRICHLOROETHANE	UG/G-DRY	98693 10	<0.56	<0.38	<0.61
TRICHLOROETHENE	UG/G-DRY	98694 10	<0.53	<0.37	<0.58
TRICHLOROFLUOROMETHANE	UG/G-DRY	98794 10	<0.43	<0.30	<0.47
VINYL CHLORIDE	UG/G-DRY	98795 10	<0.50	<0.35	<0.55
1,2-DIBROMOETHANE (EDB)	MG/KG-DRY	98798 0	<0.004	<0.003	<0.004
M-XYLENE	MG/KG-DRY	90799 10	<0.42	<0.29	<0.46
O,P-XYLENE	MG/KG-DRY	98800 10	<0.42	<0.29	<0.46
OIL&GR,IR,SED	UG/G- DRY	561 0	4740	787	1670
LEAD,SED	UG/G-DRY	1052 0	28.8	<3.77	43.4
MOISTURE	%WET WT	70320 0	50.3	29.0	53.2
METHYL ETHYL KETONE	UG/G-DRY	98801 10	<4.6	<4.1	<6.2
MIBK	UG/G-DRY	98696 10	<0.60	<0.42	<0.66
DICHLOROBENZENE,TOTAL	UG/G-DRY	98803 10	<0.39	<0.27	<0.43

PROJECT NUMBER 85275 3000 PROJECT NAME PUERTO RICO CONFIRMATION STUDY
FIELD GROUP PRS01 PROJECT MANAGER R. BOWEN
PRS3 LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS	UNITS	STORET # METHOD	85IA PRS01 32
DATE			01/09/86
TIME			09:00
BENZENE		98699	<0.09
	UG/G-DRY	10	
BROMODICHLOROMETHANE		98783	<0.19
	UG/G-DRY	10	
BROMOFORM		98784	<0.41
	UG/G-DRY	10	
BROMOMETHANE		98785	<0.39
	UG/G-DRY	10	
CARBON TETRACHLORIDE		98680	<0.32
	UG/G-DRY	10	
CHLOROBENZENE		98681	<0.15
	UG/G-DRY	10	
CHLOROETHANE		98786	<0.52
	UG/G-DRY	10	
2-CHLOROETHYLVINYLET		98796	<0.41
HER	UG/G-DRY	10	
CHLOROFORM		98682	<0.169
	UG/G-DRY	10	
CHLOROMETHANE		98787	<0.32
	UG/G-DRY	10	
DIBROMOCHLOROMETHANE		98788	<0.32
	UG/G-DRY	10	
1,1-DICHLOROETHANE		98683	<0.16
	UG/G-DRY	10	
1,2-DICHLOROETHANE		98684	<0.30
	UG/G-DRY	10	
1,1-DICHLOROETHENE		98789	<0.34
	UG/G-DRY	10	
TRANS-1,2-DICHLOROET		98687	<0.31
ENE	UG/G-DRY	10	
1,2-DICHLOROPROPANE		98790	<0.21
	UG/G-DRY	10	
CIS-1,3-DICHLOROPROP		98791	<0.14
ENE	UG/G-DRY	10	
TRANS-1,3-DICHLOROPR		98792	<0.37
OPENE	UG/G-DRY	10	
ETHYLBENZENE		98688	<0.34
	UG/G-DRY	10	
METHYLENE CHLORIDE		98689	<0.32
	UG/G-DRY	10	

PROJECT NUMBER 85275 3000 PROJECT NAME PUERTO RICO CONFIRMATION STUDY
FIELD GROUP PRS01 PROJECT MANAGER R. BOWEN
PRS3 LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS	UNITS	STORET # METHOD	BSIA PRS01 32
DATE			01/09/86
TIME			09:00
1,1,2,2-TETRACHLOROETHANE	UG/G-DRY	98793 10	<0.18
TETRACHLOROETHENE	UG/G-DRY	98690 10	<0.49
TOLUENE	UG/G-DRY	98691 10	<0.16
1,1,1-TRICHLOROETHANE	UG/G-DRY	98692 10	<0.32
1,1,2-TRICHLOROETHANE	UG/G-DRY	98693 10	<0.35
TRICHLOROETHENE	UG/G-DRY	98694 10	<0.34
TRICHLOROFLUOROMETHANE	UG/G-DRY	98794 10	<0.28
VINYL CHLORIDE	UG/G-DRY	98795 10	<0.32
1,2-DIBROMOETHANE (EDB)	MG/KG-DRY	98798 0	<0.003
M-XYLENE	MG/KG-DRY	98799 10	<0.27
O,P-XYLENE	MG/KG-DRY	98800 10	<0.27
OIL&GR,IR,SED	UG/G- DRY	561 0	821
LEAD,SED	UG/G-DRY	1052 0	6.70
MOISTURE	%WET WT	70320 0	25.6
METHYL ETHYL KETONE	UG/G-DRY	98801 10	<4.2
MIBK	UG/G-DRY	98696 10	<0.40
DICHLOROBENZENE,TOTAL	UG/G-DRY	98803 10	<0.25

PROJECT NUMBER 87488 0000
FIELD GROUP RRPR8W
ROOSEVELT ROADS SITE 8 WATERS

PROJECT NAME PUERTO RICO - NAVSTA
PROJECT MANAGER RUSS BOWEN
LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS	UNITS	STORET # METHOD	8SW01 RRPR8W 1	8SW02 RRPR8W 2	8SW03 RRPR8W 3	8SW04 RRPR8W 5	8SW05 RRPR8W 6
DATE			10/27/87	10/27/87	10/27/87	10/27/87	10/27/87
TIME			08:30	07:30	09:15	10:55	11:30
WATER TEMP		10	27.3	27.5	28.1	28.9	29.8
	C	0					
PH,FIELD		400	7.20	7.20	7.60	8.70	8.80
	STD UNITS	0					
SP.COND.,FIELD@25C		94	549	1120	1260	467	391
	UMHOS/CM	0					
BENZENE		34030	1.1	<1.0	<1.0	<1.0	<1.0
	UG/L	GMS					
BROMODICHLOROMETHANE		32101	<2.2	<2.2	<2.2	<2.2	<2.2
	UG/L	GMS					
BROMOFORM		32104	<4.7	<4.7	<4.7	<4.7	<4.7
	UG/L	GMS					
BROMOMETHANE		34413	<5.8	<5.8	<5.8	<5.8	<5.8
	UG/L	GMS					
CARBON TETRACHLORIDE		32102	<2.8	<2.8	<2.8	<2.8	<2.8
	UG/L	GMS					
CHLOROBENZENE		34301	<6.0	<6.0	<6.0	<6.0	<6.0
	UG/L	GMS					
CHLOROETHANE		34311	<8.2	<8.2	<8.2	<8.2	<8.2
	UG/L	GMS					
2-CHLOROETHYLVINYL		34576	<15	<15	<15	<15	<15
ETHER	UG/L	GMS					
CHLOROFORM		32106	<1.6	<1.6	<1.6	<1.6	<1.6
	UG/L	GMS					
CHLOROMETHANE		34418	<4.3	<4.3	<4.3	<4.3	<4.3
	UG/L	GMS					
DIBROMOCHLOROMETHANE		32105	<3.1	<3.1	<3.1	<3.1	<3.1
	UG/L	GMS					
1,1-DICHLOROETHANE		34496	<4.7	<4.7	<4.7	<4.7	<4.7
	UG/L	GMS					
1,2-DICHLOROETHANE		34531	<2.8	<2.8	<2.8	<2.8	<2.8
	UG/L	GMS					
1,1-DICHLOROETHYLENE		34501	<2.8	<2.8	<2.8	<2.8	<2.8
	UG/L	GMS					
TRANS-1,2-DICHLORO		34546	<1.6	<1.6	<1.6	<1.6	<1.6
ETHENE	UG/L	GMS					
1,2-DICHLOROPROPANE		34541	<6.0	<6.0	<6.0	<6.0	<6.0
	UG/L	GMS					
CIS-1,3-DICHLORO		34704	<5.0	<5.0	<5.0	<5.0	<5.0
PROPENE	UG/L	GMS					

PROJECT NUMBER 87488 0000 PROJECT NAME PUERTO RICO - NAVSTA
FIELD GROUP RRPR8W PROJECT MANAGER RUSS BOWEN
ROOSEVELT ROADS SITE 8 WATERS LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	8SW01 RRPR8W 1	8SW02 RRPR8W 2	8SW03 RRPR8W 3	8SW04 RRPR8W 5	8SW05 RRPR8W 6
DATE		10/27/87	10/27/87	10/27/87	10/27/87	10/27/87
TIME		08:30	07:30	09:15	10:55	11:30
TRANS-1,3-DICHLORO PROPENE UG/L	34699 GMS	<6.4	<6.4	<6.4	<6.4	<6.4
ETHYLBENZENE UG/L	34371 GMS	<7.2	<7.2	<7.2	<7.2	<7.2
METHYLENE CHLORIDE UG/L	34423 GMS	<50	<50	<50	<50	<50
1,1,2,2-TETRACHLORO ETHANE UG/L	34516 GMS	<4.1	<4.1	<4.1	<4.1	<4.1
TETRACHLOROETHENE UG/L	34475 GMS	<3.0	<3.0	<3.0	<3.0	<3.0
TOLUENE UG/L	34010 GMS	<6.0	<6.0	<6.0	<6.0	<6.0
1,1,1-TRICHLOROETHANE UG/L	34506 GMS	<3.8	<3.8	<3.8	<3.8	<3.8
1,1,2-TRICHLOROETHANE UG/L	34511 GMS	<5.0	<5.0	<5.0	<5.0	<5.0
TRICHLOROETHENE UG/L	39180 GMS	1.1	<1.0	<1.0	<1.0	<1.0
TRICHLOROFLUORO-METHANE UG/L	34488 GMS	3.6	<3.2	<3.2	<3.2	<3.2
VINYL CHLORIDE UG/L	39175 GMS	<1.0	<1.0	<1.0	<1.0	<1.0
METHYL ETHYL KETONE UG/L	81595 GMS	<48	<48	<48	<48	<48
METHYL ISOBUTYL KETONE UG/L	81596 GMS	<12	<12	<12	<12	<12
O-XYLENE UG/L	98553 GMS	<12	<12	<12	<12	<12
M-AND/OR-P XYLENE UG/L	98554 GMS	<12	<12	<12	<12	<12
1,2-DIBROMOETHANE (EDB) UG/L	77651 EC	<0.010	<0.010	<0.010	<0.010	<0.010
LEAD,TOTAL UG/L	1051 GFAA	<1.9	<1.9	<1.9	<1.9	<1.9
OIL&GR,IR MG/L	560 1	<0.2	<0.2	<0.2	<0.2	<0.2

PROJECT NUMBER 87488 0000 PROJECT NAME PUERTO RICO - NAVSTA
FIELD GROUP RRPR8S PROJECT MANAGER RUSS BOWEN
ROOSEVELT ROADS SITE 8 SOILS LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS	UNITS	STORET # METHOD	8SE01 RRPR8S 1	8SE02 RRPR8S 2	8SE03 RRPR8S 3
DATE			10/27/87	10/27/87	10/27/87
TIME			08:45	07:45	09:30
MOISTURE	%WET WT	70320 1	31.1	21.9	48.5
OIL&GR,IR,SED	UG/G- DRY	561 1	247	69	306
BENZENE	UG/KG-DRY	34237 GMS	<320	<280	<430
BROMODICHLOROMETHANE	UG/KG-DRY	34330 GMS	<160	<140	<210
BROMOFORM	UG/KG-DRY	34290 GMS	<340	<300	<460
BROMOMETHANE	UG/KG-DRY	34416 GMS	<410	<360	<540
CARBON TETRACHLORIDE	UG/KG-DRY	34299 GMS	<200	<180	<270
CHLOROBENZENE	UG/KG-DRY	34304 GMS	<440	<380	<580
CHLOROETHANE	UG/KG-DRY	34314 GMS	<600	<520	<800
2-CHLOROETHYLVINYL ETHER	UG/KG-DRY	34579 GMS	<730	<640	<970
CHLOROFORM	UG/KG-DRY	34318 GMS	<120	<100	<160
CHLOROMETHANE	UG/KG-DRY	34421 GMS	<310	<280	<420
DIBROMOCHLOROMETHANE	UG/KG-DRY	34309 GMS	<220	<200	<300
1,1-DICHLOROETHANE	UG/KG-DRY	34499 GMS	<340	<300	<460
1,2-DICHLOROETHANE	UG/KG-DRY	34534 GMS	<200	<180	<270
1,1-DICHLOROETHYLENE	UG/KG-DRY	34504 GMS	<200	<180	<270
TRANS-1,2-DICHLORO ETHENE	UG/KG-DRY	34549 GMS	<120	<100	<160
1,2-DICHLOROPROPANE	UG/KG-DRY	34544 GMS	<440	<380	<580
CIS-1,3-DICHLORO PROPENE	UG/KG-DRY	34702 GMS	<360	<320	<490
TRANS-1,3-DICHLORO PROPENE	UG/KG-DRY	34697 GMS	<460	<410	<620

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ROOSEVELT ROADS SITE 8 SOILS LAB COORDINATOR LISA BARE

SAMPLE ID/#

PARAMETERS	UNITS	STORET # METHOD	8SE01 RRPR8S 1	8SE02 RRPR8S 2	8SE03 RRPR8S 3
DATE			10/27/87	10/27/87	10/27/87
TIME			08:45	07:45	09:30
ETHYLBENZENE	UG/KG-DRY	34374 GMS	<520	<460	<700
METHYLENE CHLORIDE	UG/KG-DRY	34426 GMS	<1500	<1300	<1900
1,1,2,2-TETRACHLORO ETHANE	UG/KG-DRY	34519 GMS	<300	<260	<400
TETRACHLOROETHENE	UG/KG-DRY	34478 GMS	<300	<260	<400
TOLUENE	UG/KG-DRY	34483 GMS	<440	<380	<580
1,1,1-TRICHL'ETHANE	UG/KG-DRY	34509 GMS	<280	<240	<370
1,1,2-TRICHL'ETHANE	UG/KG-DRY	34514 GMS	<360	<320	<490
TRICHLOROETHENE	UG/KG-DRY	34487 GMS	<140	<120	<180
TRICHLOROFLUOROMETHA NE	UG/KG-DRY	34491 GMS	<230	<200	<310
VINYL CHLORIDE	UG/KG-DRY	34495 GMS	<360	<310	<480
M-XYLENE	UG/KG-DRY	97016 GMS	<440	<380	<580
O,P-XYLENE	UG/KG-DRY	97017 GMS	<440	<380	<580
METHYL ETHYL KETONE	UG/KG-DRY	75078 GMS	<3500	<3100	<4700
METHYL ISOBUT'KETONE	UG/KG-DRY	75169 GMS	<870	<770	<1200
1,2-DIBROMOETHANE (EDB)	UG/KG-DRY	78756 EC	<0.246	<0.205	<0.344
LEAD,SED	UG/G-DRY	1052 GFAA	14.0	14.6	26.1