N60087.AR.000416
NAS BRUNSWICK
5090.3a

U.S. DEPARTMENT OF THE NAVY

INSTALLATION RESTORATION PROGRAM

NAVAL AIR STATION, BRUNSWICK

BRUNSWICK, MAINE

DRAFT FINAL TECHNICAL MEMORANDUM

SITE 9 NEPTUNE DRIVE DISPOSAL SITE

CURTIS MEMORIAL LIBRARY
BRUNSWICK MAINE 04011

MAY 1994

TECHNICAL MEMORANDUM

SUMMARY OF FIELD INVESTIGATIONS: SITE 9
NEPTUNE DRIVE DISPOSAL SITE
BRUNSWICK NAVAL AIR STATION
BRUNSWICK, MAINE

Prepared for:

U.S. Department of the Navy
Northern Division
Naval Facilities Engineering Command
Contract: N62472-84-C-1013

Prepared by:

ABB Environmental Services, Inc.
Portland, Maine
Project No. 7127-09

MAY 1994

U.S. DEPARTMENT OF THE NAVY
INSTALLATION RESTORATION PROGRAM

TABLE OF CONTENTS

Section	Title	Page No.
1.0	SITE BACKGROUND AND HISTORY	1-1
2.0	SUMMARY OF FIELD INVESTIGATIONS	2-1
2.1	SUMMARY OF 1988 AND 1990 REMEDIAL INVESTIGATIONS	2-1
2.1.1	Groundwater Flow and Subsurface Geology	2-1
2.1.2	Surface and Subsurface Soils	2-4
2.1.3	Leachate Seep and Sediment	2-4
2.1.4	Surface Water and Sediments	2-5
2.1.5	Groundwater	2-7
2.2	SUMMARY OF 1993 INVESTIGATIONS	2-9
2.2.1	North of Neptune Drive	2-11
2.2.1.1	Groundwater Flow and Subsurface Geology	2-11
2.2.1.2	Inactive Ash Landfill	2-12
2.2.1.3	Groundwater	2-19
2.2.1.4	Leachate Seep and Sediment	2-21
2.2.2	South of Neptune Drive	2-25
2.2.2.1	Groundwater Flow	2-25
2.2.2.2	Septic System	2-26
2.2.2.3	Groundwater	2-26
3.0	SUMMARY OF CONTAMINATION ASSESSMENT	3-1
4.0	SUMMARY OF SITE RISKS	4-1
5.0	CONCLUSIONS AND RECOMMENDATIONS	5-1
REFERENCES		
GLOSSARY OF ACRONYMS AND ABBREVIATIONS		

TABLE OF CONTENTS
(continued)

Section	Title	Page No.
APPENDICES		
APPENDIX A	BORING LOGS	
APPENDIX B	ANALYTICAL RESULTS 1993 FIELD INVESTIGATIONS AT SITE 9	
APPENDIX C	RISK CALCULATIONS - GROUNDWATER NORTH OF NEPTUNE DRIVE	
APPENDIX D	REGULATORY/TECHNICAL REVIEW COMMITTEE COMMENTS ON DRAFT TECHNICAL MEMORANDUM AND NAVY RESPONSES	
APPENDIX E	REGULATORY/TECHNICAL REVIEW COMMITTEE COMMENTS ON DRAFT FINAL TECHNICAL MEMORANDUM AND NAVY RESPONSES	

LIST OF FIGURES

Figure	Title	Page No.
1-1	Site Location Map: Site 9	1-2
1-2	Areas of Potential Contamination: Site 9	1-3
2-1	Site Location and Exploration Map: Site 9	2-2
2-2	PAH Concentrations in Surface Soils (0-2')	2-3
2-3	Surface Water, Leachate and Sediment Contaminant Distribution Map: Site 9	2-6
2-4	Interpretive Area of Inactive Ash Landfill	2-13

LIST OF TABLES

Table	Title	Page No.
2-1	Groundwater Data for RI Monitoring Wells	2-8
2-2	Groundwater Contaminants and Regulatory Criteria	2-10
2-3	Summary of Predesign Analytical Program	2-14
2-4	Summary of Soil Organic Analyses (1993)	2-15
2-5	Summary of Groundwater Organic Analyses (1993)	2-17
2-6	Summary of Groundwater Organic Analyses (1993)	2-20
2-7	Background Concentrations of Inorganics in Groundwater	2-22
2-8	Summary of Groundwater Inorganic Analyses (1993)	2-23

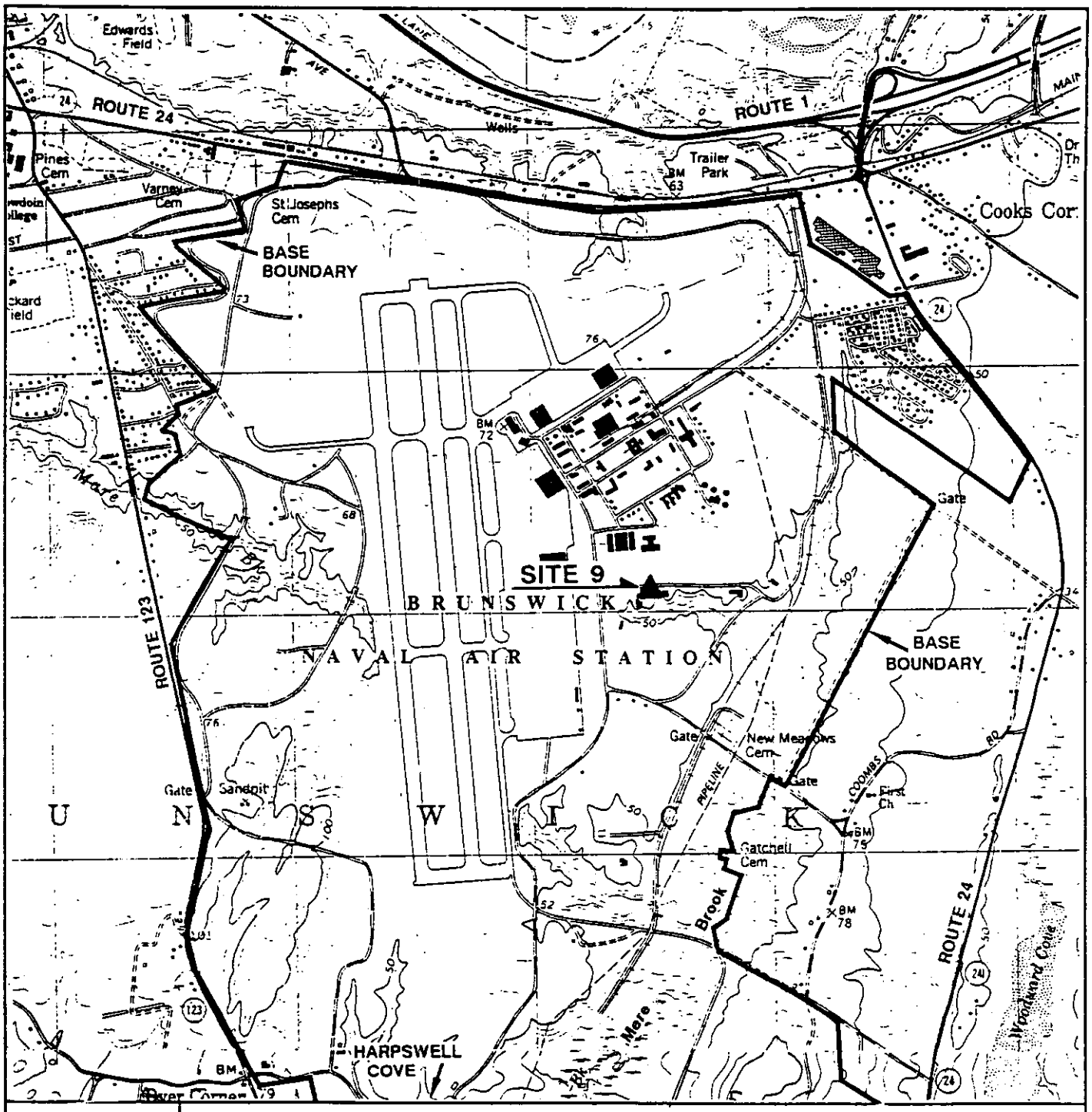
1.0 SITE BACKGROUND AND HISTORY

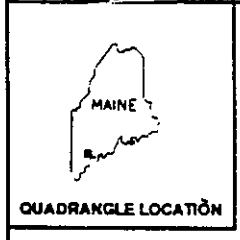
This Technical Memorandum summarizes site investigation activities at the Neptune Drive Disposal Site (Site 9) in the central portion of the Naval Air Station (NAS) Brunswick (Figure 1-1). NAS Brunswick, located south of the Androscoggin River between Brunswick and Bath, Maine, is an active facility supporting the U.S. Department of the Navy's antisubmarine warfare operations in the Atlantic Ocean and Mediterranean Sea. Its primary mission is to operate and maintain P-3 Orion aircraft. NAS Brunswick first became active in the 1940s during World War II, and underwent major expansion in the 1950s.

Based on historical information, including aerial photographs and grading plans, Site 9 was originally defined as three areas of potential contamination: (1) the former location of an incinerator in the northeast corner of Building 220 and an inactive ash landfill in the current location of Buildings 218 and 219 (Marine barracks north of Neptune Drive); (2) a reported disposal area behind Building 201 (the dining facility south of Neptune Drive); and (3) the two streams bordering the recreational area east of Building 201 (E.C. Jordan Co., 1990b), which had iron oxide staining characteristic of leachate. These areas, shown in Figure 1-2, are described in the following paragraphs.

Conflicting information exists regarding the dates of operation of the incinerator and inactive ash landfill, reportedly active during the 1940s and early 1950s (E.C. Jordan Co., 1990a). The incinerator was apparently operated during a period commencing on or after April 1943, when the air station was commissioned, until the fall of 1946, when the air station was demobilized. Although the station was leased to various occupants from 1947 through 1951, including the University of Maine and Bowdoin College for classrooms and student housing, and various small commercial enterprises, it is unknown if the incinerator was used during this period. The air station was recommissioned in 1951, but again, it is unknown if the incinerator resumed operation. The latest that it could have been used was 1953, when the barracks that now occupy the site of the former incinerator were built. The Initial Assessment Study submitted to the Navy in 1983 (R.F. Weston, Inc., 1983) states that during the period the incinerator was in operation, solid wastes were burned and the ash was placed in the dump. Reportedly, solvents and other liquids were burned on the ground. Wastes disposed of at the site reportedly included solvents, paint sludges, and possibly wastes from the Metal Shop for several years (R.F. Weston, Inc., 1983).

Current land use at the former incinerator and inactive ash landfill is military residential. The grading plans for the barracks (Buildings 212 through 220) constructed at this location





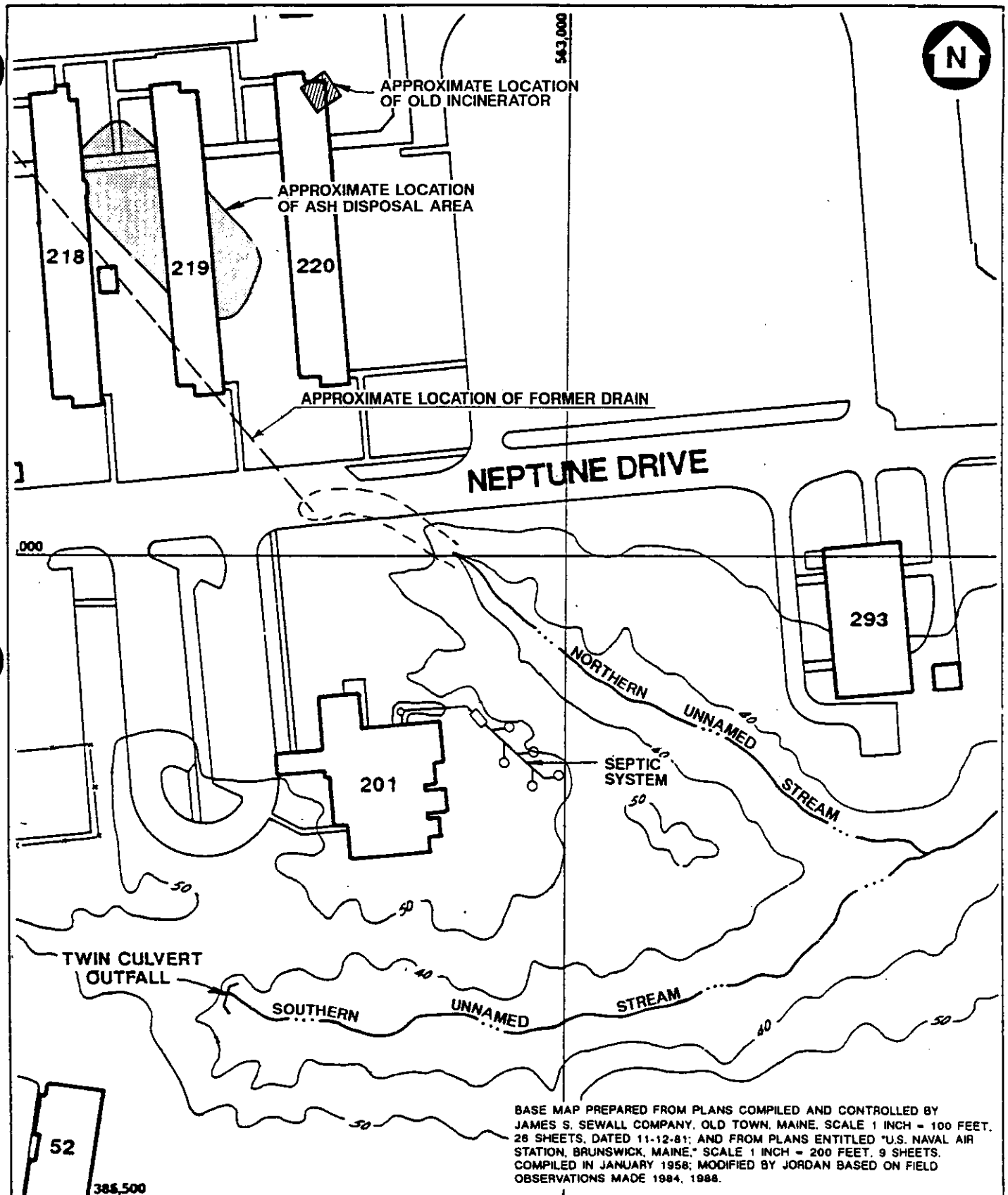
SOURCE: USGS QUADRANGLE, BRUNSWICK, AND ORRS ISLAND, ME, DATED 1980, 1978. 7.5 MINUTE SERIES.

N

SCALE IN FEET

0 2,000 4,000

ABB Environmental Services Inc. (ASEA BROWN BOVERI)	SITE LOCATION MAP SITE 9
INSTALLATION RESTORATION PROGRAM NAVAL AIR STATION BRUNSWICK, MAINE	TECHNICAL MEMORANDUM: SITE 9
	JOB NO. 7124-03 — FIGURE 1-1



SCALE IN FEET

0 100 200

ABB ASEA BROWN BOVERI — ABB Environmental Services Inc.	AREAS OF POTENTIAL CONTAMINATION: SITE 9
INSTALLATION RESTORATION PROGRAM NAVAL AIR STATION BRUNSWICK, MAINE	TECHNICAL MEMORANDUM: SITE 9
	JOB NO. 7124-03 — FIGURE 1-2

show an oblong "dump area," approximately 125 by 75 feet, located beneath existing Building 219. The grading plans also show an old drain (42-inch diameter) adjacent to the dump area. The drain ran from north of Orion Street, past the dump area, under Neptune Drive to the stream running between Buildings 201 and 293 (see Figure 1-2). On the basis of engineering plans, it is believed that the drain was removed and filled in during construction of the barracks.

The area behind Building 201, reportedly used as a dumping area (R.F. Weston, Inc., 1983), more recently has been used as a picnic area. A barbecue pit is located southeast of Building 201.

Site 9 was identified as a potential hazardous waste site in the Initial Assessment Study and was included in the Pollution Abatement Confirmation Study (R.F. Weston Inc., 1983 and E.C. Jordan Co., 1985). In August 1990, the Navy completed the Draft Final Remedial Investigation (RI) and Phase I Feasibility Study (FS) reports for nine sites at NAS Brunswick, including Site 9 (E.C. Jordan Co., 1990a and 1990b). The RI report described field sampling investigations, geology, and hydrogeology, and presented a contamination summary and risk assessment for Site 9 and other sites. The Draft Final Phase I FS identified remedial action objectives and developed and screened remedial alternatives for the nine original sites studied in the Draft Final RI. In April 1991, the Navy submitted the Draft Final Supplemental RI and FS reports (E.C. Jordan Co., 1991 and 1992) for regulatory review. The Supplemental RI included results of additional investigations at Site 9, which focused on identifying a source area of groundwater contamination and included test pitting, and soil and groundwater sampling. Data from extensive sampling did not uncover evidence of a solvent burning area or disposal area near Building 201.

In 1991, plans were discovered identifying the presence of a septic system east of Building 201. This septic system was installed in 1952 when Building 201 was built, and was used until 1972 when Building 201 was connected to the basewide sewer system (E.C. Jordan Co., 1991). The septic system, located upgradient of the most highly contaminated monitoring wells, was then speculated to be the primary source of groundwater contamination at Site 9, prompting further investigation of this area. In January through March of 1993, the Navy conducted additional investigations to evaluate the Building 201 septic system as a potential source of contamination and to address data gaps identified by the U. S. Environmental Protection Agency (USEPA) and the Maine Department of Environmental Protection in the northern portion of Site 9.

The purpose of this Technical Memorandum is to summarize the results of investigations at Site 9, including the 1993 data, to support the recommendation to implement long-term monitoring of groundwater as an interim action at this site. This Technical Memorandum amends the RI/FS for Site 9 and will become part of the Administrative Record for the site, because it provides part of the basis for the Navy's preferred alternative selection, which will be described in the forthcoming Interim Proposed Plan and Interim Record of Decision for Site 9. Following an evaluation of the data that will be collected during the additional source area investigations, the Navy will develop a Final Proposed Plan and Final ROD, which may recommend additional actions if warranted.

This report is organized as follows: Section 1.0 provides an overview of the site history and the purpose of the Technical Memorandum. Section 2.0 provides a summary of RI data and presents the results of the 1993 studies. Section 3.0 presents an interpretation of the results of all the investigations conducted to date at Site 9. Section 4.0 summarizes the risk assessment conducted as part of the RI and presents a quantitative risk assessment for the area north of Neptune Drive, using the 1993 data. Section 5.0 provides the rationale for the recommendation for long-term monitoring.

2.0 SUMMARY OF FIELD INVESTIGATIONS

The following subsections summarize the results of field investigations conducted at Site 9. Subsection 2.1 summarizes RI explorations and data presented in the RI and Supplemental RI reports (E. C. Jordan Co., 1990a and 1991). Subsection 2.2 provides information on recent investigations at Site 9 and summarizes analytical data. Boring logs and laboratory analytical reports for the 1993 work are presented in Appendix A.

2.1 SUMMARY OF 1988 AND 1990 REMEDIAL INVESTIGATIONS

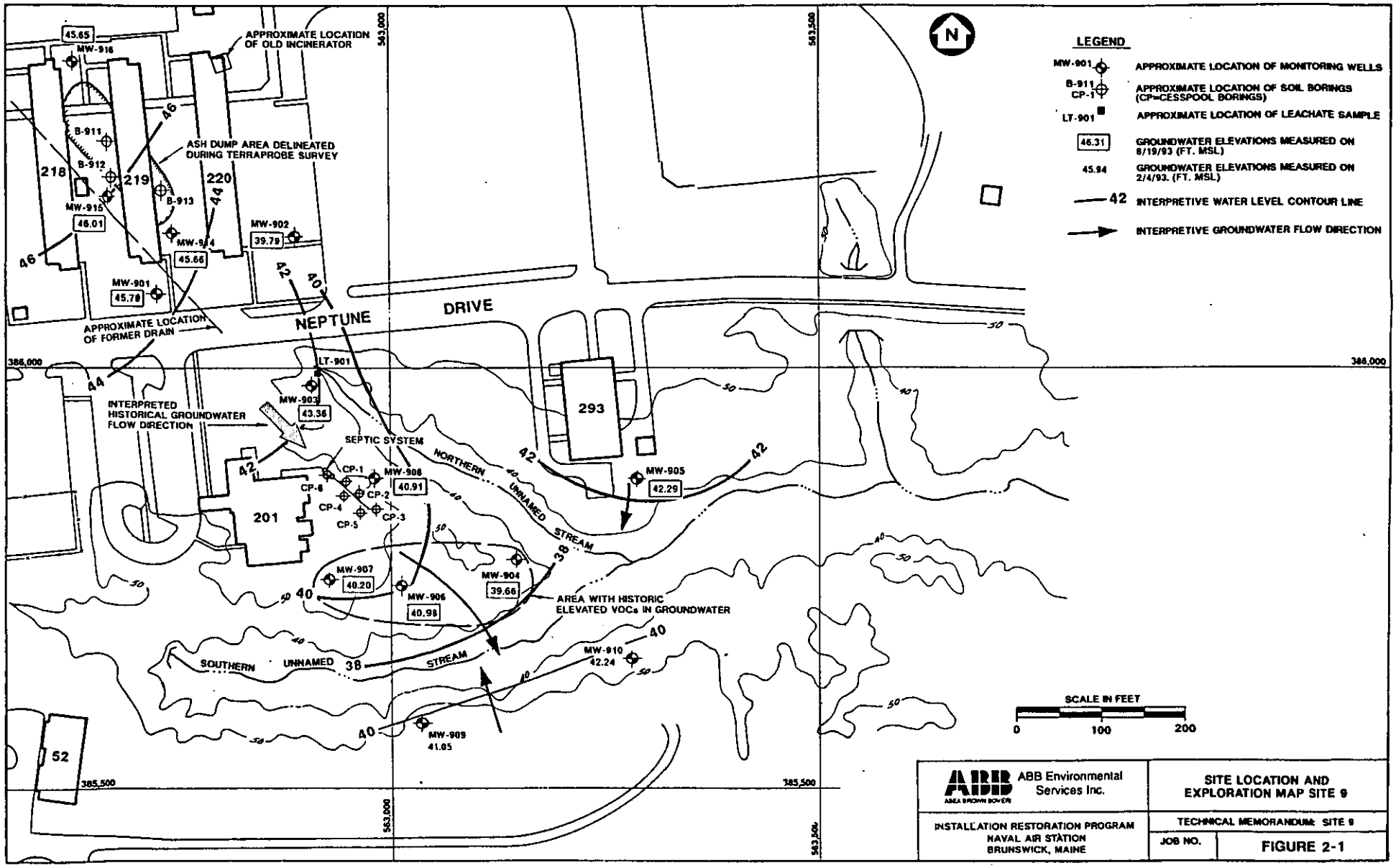
As part of the RI for Site 9, the Navy conducted field activities and environmental sampling to assess the geologic and hydrologic conditions and the distribution of contamination at this site. The results of the RI are presented in Section 11.0 of the Draft Final RI Report (E.C. Jordan Co., 1990a) and Section 7.0 of the Draft Final Supplemental RI Report (E.C. Jordan Co., 1991).

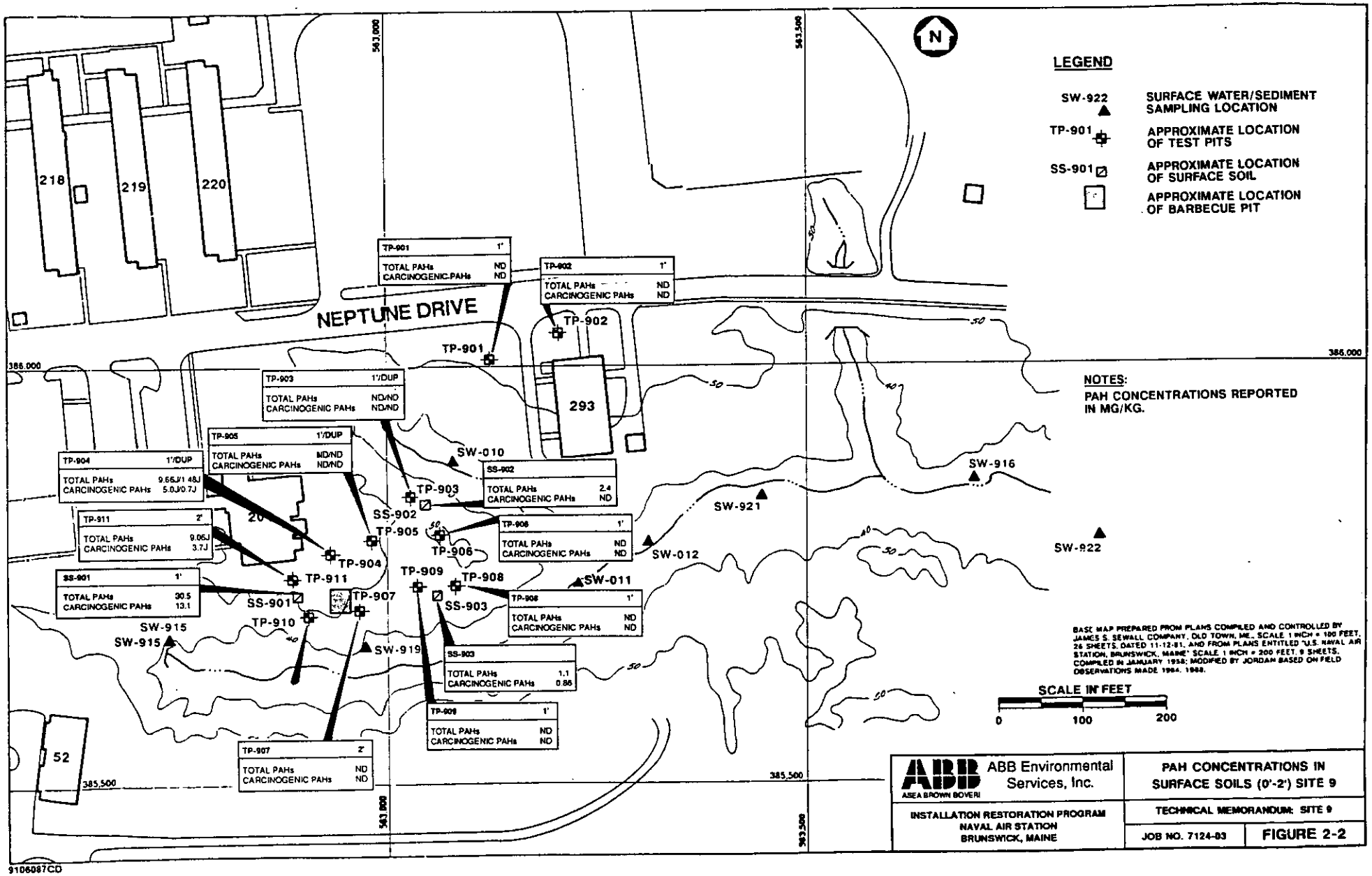
The RI fieldwork was designed to assess the areal distribution of soil contamination at the site, monitor groundwater quality downgradient of Site 9, assess the significance of chemicals detected in the groundwater, and establish the impact of this site on surface water and sediment quality. RI field activities included a soil gas survey; test pits; soil borings; installation of monitoring wells; sampling of soils, groundwater, surface water, sediment, and a leachate seep; and in situ aquifer permeability tests. Sampling locations are shown on Figures 2-1 and 2-2. Results of these investigations are summarized below.

Field investigations were conducted in 1988 and 1990 both north and south of Neptune Drive, but focused on the area south of Neptune Drive (near Building 201). Investigations north of Neptune Drive were designed to evaluate the potential impact of the former inactive ash landfill on groundwater quality, but did not confirm the existence or delineate the location of the disposal area.

2.1.1 Groundwater Flow and Subsurface Geology

Groundwater flow south of Neptune Drive is to the south and southeast, discharging to the two unnamed streams. The seepage velocities are estimated to range from 26 feet per year throughout most of the site to 130 feet per year in the vicinity of the streams (E.C. Jordan Co., 1991).


LEGEND
MW-901 APPROXIMATE LOCATION OF MONITORING WELLS
B-911 CP-1 APPROXIMATE LOCATION OF SOIL BORINGS (CP=CESSPOOL BORINGS)
LT-901 APPROXIMATE LOCATION OF LEACHATE SAMPLE
46.31 GROUNDWATER ELEVATIONS MEASURED ON 8/19/93 (FT. MSL)
45.94 GROUNDWATER ELEVATIONS MEASURED ON 2/4/93. (FT. MSL)
42 INTERPRETIVE WATER LEVEL CONTOUR LINE
INTERPRETIVE GROUNDWATER FLOW DIRECTION
N
APPROXIMATE LOCATION OF OLD INCINERATOR
ASH DUMP AREA DELINEATED DURING TERRAPROBE SURVEY
APPROXIMATE LOCATION OF FORMER DRAIN
INTERPRETED HISTORICAL GROUNDWATER FLOW DIRECTION
NEPTUNE DRIVE
SEPTIC SYSTEM
NORTHERN UNNAMED STREAM
SOUTHERN UNNAMED STREAM
AREA WITH HISTORIC ELEVATED VOCs IN GROUNDWATER
MW-916 45.65
B-911
B-912
B-913
218
219
220
MW-915 46.01
MW-914 45.66
MW-902 39.79
MW-901 45.78
LT-901
MW-903 43.36
CP-1
CP-2
CP-3
CP-4
CP-5
CP-6
MW-908 40.91
MW-905 42.29
293
201
MW-907 40.20
MW-906 40.98
MW-904 39.66
MW-910 42.24
MW-909 41.05
52
386,000
385,500
543,000
543,500
SCALE IN FEET
0
100
200
ABB Environmental Services Inc.
ASEA BROWN BOVERI
SITE LOCATION AND EXPLORATION MAP SITE 9
INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE
TECHNICAL MEMORANDUM: SITE 9
JOB NO.
FIGURE 2-1


LEGEND
SW-922 SURFACE WATER/SEDIMENT SAMPLING LOCATION
TP-901 APPROXIMATE LOCATION OF TEST PITS
SS-901 APPROXIMATE LOCATION OF SURFACE SOIL
APPROXIMATE LOCATION OF BARBECUE PIT
NOTES:
PAH CONCENTRATIONS REPORTED IN MG/KG.
NEPTUNE DRIVE
218
219
220
293
52
TP-901 1' TOTAL PAHs ND CARCINOGENIC PAHs ND
TP-902 1' TOTAL PAHs ND CARCINOGENIC PAHs ND
TP-903 1'/DUP TOTAL PAHs ND/ND CARCINOGENIC PAHs ND/ND
TP-904 1'/DUP TOTAL PAHs 9.66J/1.48J CARCINOGENIC PAHs 5.0J/0.7J
TP-905 1'/DUP TOTAL PAHs ND/ND CARCINOGENIC PAHs ND/ND
TP-906 1' TOTAL PAHs ND CARCINOGENIC PAHs ND
TP-907 2' TOTAL PAHs ND CARCINOGENIC PAHs ND
TP-908 1' TOTAL PAHs ND CARCINOGENIC PAHs ND
TP-909 1' TOTAL PAHs ND CARCINOGENIC PAHs ND
TP-910 1' TOTAL PAHs ND CARCINOGENIC PAHs ND
TP-911 2' TOTAL PAHs 9.05J CARCINOGENIC PAHs 3.7J
SS-901 1' TOTAL PAHs 30.5 CARCINOGENIC PAHs 13.1
SS-902 TOTAL PAHs 2.4 CARCINOGENIC PAHs ND
SS-903 TOTAL PAHs 1.1 CARCINOGENIC PAHs 0.86
SW-010
SW-011
SW-012
SW-915
SW-916
SW-919
SW-921
SW-922
386,000
385,500
563,000
563,500
BASE MAP PREPARED FROM PLANS COMPILED AND CONTROLLED BY JAMES S. SEWALL COMPANY, OLD TOWN, ME., SCALE 1 INCH = 100 FEET, 26 SHEETS, DATED 11-12-81, AND FROM PLANS ENTITLED "U.S. NAVAL AIR STATION, BRUNSWICK, MAINE" SCALE 1 INCH = 200 FEET, 9 SHEETS, COMPILED IN JANUARY 1958; MODIFIED BY JORDAN BASED ON FIELD OBSERVATIONS MADE 1984, 1988.
SCALE IN FEET
0
100
200
ABB Environmental Services, Inc.
ASEA BROWN BOVERI
INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE
PAH CONCENTRATIONS IN SURFACE SOILS (0'-2') SITE 9
TECHNICAL MEMORANDUM: SITE 9
JOB NO. 7124-03
FIGURE 2-2
9106087CD

Groundwater at Site 9 occurs in the overburden soil. Overburden soil at Site 9 is a stratified formation consisting of a sand layer, a transition layer, and a clay layer overlying bedrock. The ground surface elevation at the site is approximately 40 to 50 feet above mean sea level (MSL). The top of clay has been interpreted from boring logs to occur at a depth of about 25 feet above MSL on the southern edge of the site.

2.1.2 Surface and Subsurface Soils

The area behind Building 201 reportedly was used for disposal (R.F. Weston, Inc., 1983). A soil gas survey was conducted during the RI to help identify potential areas of volatile organic compound (VOC) contamination that might indicate a burning or disposal area. The survey included areas north of Neptune Drive (two soil gas samples between Buildings 218, 219, and 220, south of the historical ash dump area), and south of Neptune Drive (18 soil gas samples between Buildings 201 and 293). Two of the 20 soil gas samples detected low concentrations of VOCs (0.2 to 4 micrograms per liter [μg/L]). These locations are near Building 293, east of the site, and do not indicate a source of VOC contamination at Site 9. In subsequent subsurface soil sampling, one VOC, 1,2-dichloroethylene (DCE), was detected at 6 micrograms per kilogram (μg/kg) at a depth of 14 feet in one soil boring (i.e., MW-904) (E.C. Jordan Co., 1990a). No contaminants were detected in subsurface soil samples collected from borings drilled for monitoring well installations north of Neptune Drive.

Polynuclear aromatic hydrocarbons (PAHs) were detected in several surface soil and subsurface soil samples south of Neptune Drive at total concentrations up to 30.5 milligrams per kilogram (mg/kg). The sample locations and PAH concentrations are shown in Figure 2-2. The location of the highest concentrations of PAHs is near the barbecue pit, suggesting that PAHs may be the result of charcoal or ash disposal. The low levels of PAHs throughout the site may be attributable to base operations, including motor vehicle traffic and aircraft exhaust. Low levels of pesticides (i.e., less than 0.50 mg/kg) were detected in four test pit samples and three surface soil samples (E.C. Jordan Co., 1992). These pesticides are believed to be residues from the basewide use of dichlorodiphenyltrichloroethane (DDT) and other pesticides in the 1960s and early 1970s.

2.1.3 Leachate Seep and Sediment

One leachate seep (LT-901) was identified and sampled twice during the RI field programs at Site 9. The seep is located at the head of the northern stream at the discharge of the former drain. Contaminant concentrations detected as part of the RI program at this seep

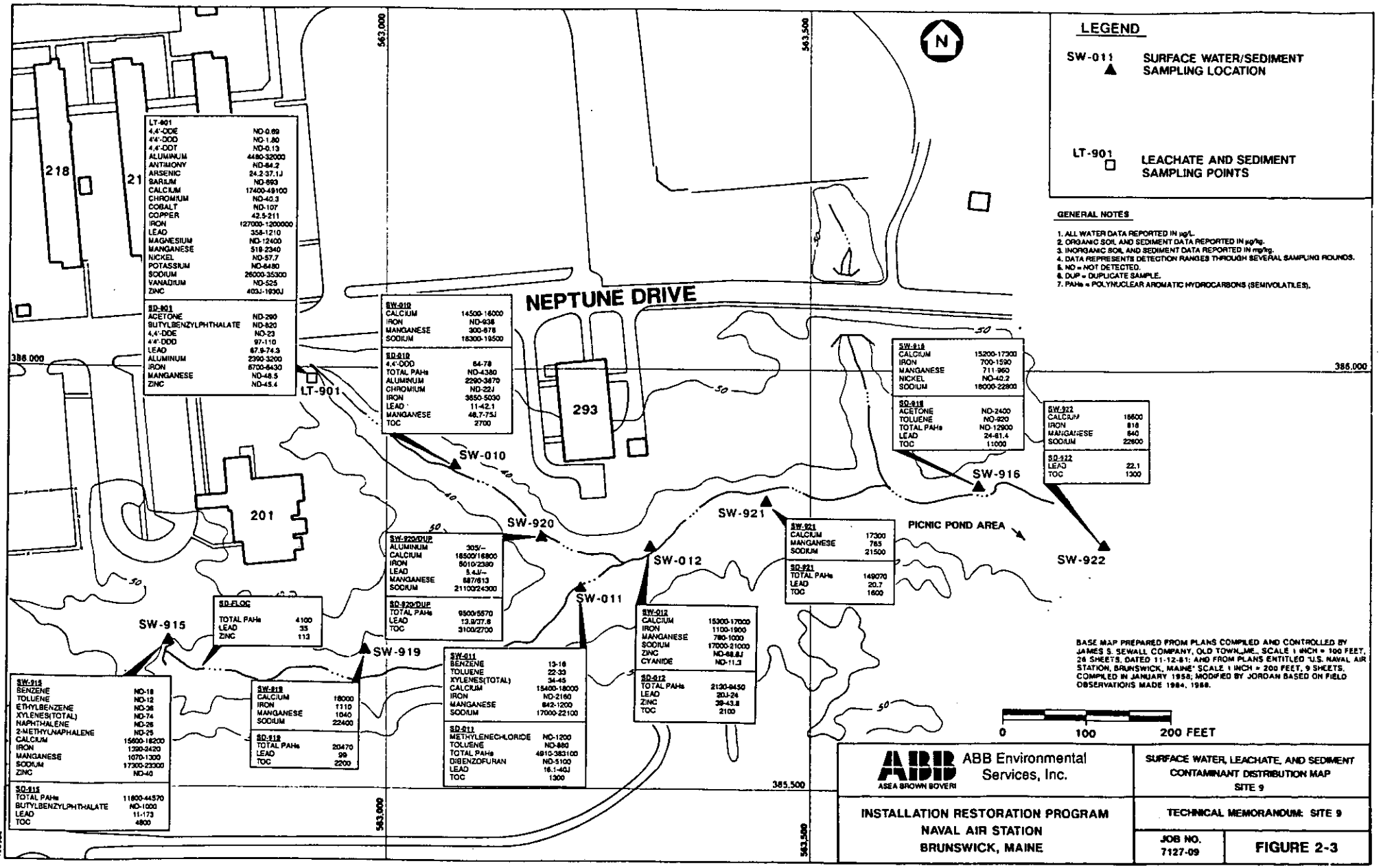
are summarized in Figure 2-3. Pesticides were detected at low concentrations in both the leachate and sediment from this location. Other organic compounds were not detected in the leachate, but one organic compound, butylbenzylphthalate, was detected in the sediment during one of the two sampling rounds at 820 μg/kg. The inorganic contaminants arsenic, lead, aluminum, iron, barium, chromium, cobalt, and copper were detected in leachate samples; lead, iron, aluminum, manganese, and zinc were detected in the sediment. Only calcium, iron, manganese, and sodium were detected in the surface water in the closest downstream sampling location (SW-010), and only aluminum, chromium, iron, lead, and manganese were detected in the associated sediment (SD-010) (see Figure 2-3).

2.1.4 Surface Water and Sediments

Sixteen surface water and sediment locations in the streams near Site 9 as well as downstream at the Picnic Area Pond (about 3,000 feet downstream of Site 9) were sampled four times during the RI field program. Contaminant concentrations detected in these samples are summarized in Figure 2-3. The fuel-related organic compounds benzene (6 to 18 μg/L), toluene (12 to 22 μg/L), ethylbenzene (36 μg/L), xylenes (34 to 74 μg/L), naphthalene (26 μg/L), and methylnaphthalene (25 μg/L) were detected in two of the three surface water samples in the stream bordering the southern side of Site 9 (E.C. Jordan Co., 1990a). The maximum concentration of all compounds except toluene was detected in the upstream sample (i.e., SW-915), suggesting that nonpoint source runoff from parking lots, roadways and/or the runways, upstream of this tributary, are the source of these contaminants. None of these compounds were detected above their respective Ambient Water Quality Criteria (AWQC) (USEPA, 1991c). AWQC are chemical-specific concentrations in surface water that are considered protective of aquatic organisms.

Calcium, iron, magnesium, and sodium were detected in the streams bordering Site 9 at concentrations exceeding area background concentrations in surface water samples collected in Mere Brook; the Mere Brook samples are considered to represent area background concentrations. In addition, the iron AWQC is exceeded in both upstream (i.e., SW-915) and on-site sampling locations. Concentrations of inorganics in surface water at the Picnic Area Pond are more consistent with background values and AWQC were not exceeded (E.C. Jordan Co., 1990a).

Site-related VOCs were not detected in sediment samples from the streams near Site 9; however, toluene was detected in two sediment samples from the Picnic Area Pond. Concentrations of inorganics in sediment samples were consistent with background concentrations in sand and clay soils (ABB-ES, 1993, Table 3-6). Lead is observed in


LEGEND
SW-011 SURFACE WATER/SEDIMENT SAMPLING LOCATION
LT-901 LEACHATE AND SEDIMENT SAMPLING POINTS
GENERAL NOTES
1. ALL WATER DATA REPORTED IN µg/L.
2. ORGANIC SOIL AND SEDIMENT DATA REPORTED IN µg/kg.
3. INORGANIC SOIL AND SEDIMENT DATA REPORTED IN mg/kg.
4. DATA REPRESENTS DETECTION RANGES THROUGH SEVERAL SAMPLING ROUNDS.
5. ND = NOT DETECTED.
6. DUP = DUPLICATE SAMPLE.
7. PAHs = POLYNUCLEAR AROMATIC HYDROCARBONS (SEMIVOLATILES).
NEPTUNE DRIVE
218
21
201
293
LT-901
LT-401
4,4'-DDE ND-0.69
4'4'-DDD ND-1.80
4,4'-DDT ND-0.13
ALUMINUM 4480-32000
ANTIMONY ND-84.2
ARSENIC 24.2-37.1J
BARIUM ND-893
CALCIUM 17400-49100
CHROMIUM ND-40.3
COBALT ND-107
COPPER 42.5-211
IRON 127000-1200000
LEAD 358-1210
MAGNESIUM ND-12400
MANGANESE 518-2340
NICKEL ND-57.7
POTASSIUM ND-8480
SODIUM 26000-35300
VANADIUM ND-525
ZINC 403J-1930J
SD-401
ACETONE ND-290
BUTYLBENZYLPHTHALATE ND-820
4,4'-DDE ND-23
4'4'-DDD 97-110
LEAD 67.9-74.3
ALUMINUM 2390-3200
IRON 5700-8430
MANGANESE ND-48.5
ZINC ND-45.4
SW-010
CALCIUM 14500-16000
IRON ND-938
MANGANESE 300-678
SODIUM 18300-19500
SD-010
4,4'-DDD 84-78
TOTAL PAHs ND-4380
ALUMINUM 2290-3470
CHROMIUM ND-22J
IRON 3850-5030
LEAD 11-42.1
MANGANESE 48.7-75J
TOC 2700
SW-916
CALCIUM 15200-17300
IRON 700-1590
MANGANESE 711-960
NICKEL ND-40.2
SODIUM 18000-22800
SD-916
ACETONE ND-2400
TOLUENE ND-920
TOTAL PAHs ND-12900
LEAD 24-81.4
TOC 11000
SW-922
CALCIUM 15600
IRON 818
MANGANESE 640
SODIUM 22600
SD-922
LEAD 22.1
TOC 1300
SW-920
SW-920/DUP
ALUMINUM 305/--
CALCIUM 18500/16800
IRON 5010/2380
LEAD 5.4J/--
MANGANESE 687/613
SODIUM 21100/24300
SD-920/DUP
TOTAL PAHs 9500/5570
LEAD 13.3/37.6
TOC 3100/2700
SW-921
CALCIUM 17300
MANGANESE 765
SODIUM 21500
SD-921
TOTAL PAHs 149070
LEAD 20.7
TOC 1600
PICNIC POND AREA
SW-922
SW-012
SW-011
SW-012
CALCIUM 15300-17000
IRON 1100-1900
MANGANESE 780-1000
SODIUM 17000-21000
ZINC ND-68.8J
CYANIDE ND-11.3
SD-012
TOTAL PAHs 2130-8450
LEAD 20J-24
ZINC 39-43.8
TOC 2100
SW-011
BENZENE 13-16
TOLUENE 22-33
XYLENES(TOTAL) 34-45
CALCIUM 15400-18000
IRON ND-2160
MANGANESE 842-1200
SODIUM 17000-22100
SD-011
METHYLENECHLORIDE ND-1200
TOLUENE ND-880
TOTAL PAHs 4910-383100
DIBENZOFURAN ND-5100
LEAD 16.1-40J
TOC 1300
SW-919
CALCIUM 18000
IRON 1110
MANGANESE 1040
SODIUM 22400
SD-919
TOTAL PAHs 20470
LEAD 99
TOC 2200
SD-FLOC
TOTAL PAHs 4100
LEAD 35
ZINC 113
SW-915
SW-915
BENZENE ND-18
TOLUENE ND-12
ETHYLBENZENE ND-36
XYLENES(TOTAL) ND-74
NAPHTHALENE ND-26
2-METHYLNAPHALENE ND-25
CALCIUM 15600-18200
IRON 1390-2420
MANGANESE 1070-1300
SODIUM 17300-23000
ZINC ND-40
SD-915
TOTAL PAHs 11600-44570
BUTYLBENZYLPHTHALATE ND-1000
LEAD 11-173
TOC 4800
386,000
385,500
563,000
563,500
50
40
0 100 200 FEET
BASE MAP PREPARED FROM PLANS COMPILED AND CONTROLLED BY JAMES S. SEWALL COMPANY, OLD TOWN, ME., SCALE 1 INCH = 100 FEET, 26 SHEETS, DATED 11-12-81; AND FROM PLANS ENTITLED "U.S. NAVAL AIR STATION, BRUNSWICK, MAINE" SCALE 1 INCH = 200 FEET, 9 SHEETS, COMPILED IN JANUARY 1958; MODIFIED BY JORDAN BASED ON FIELD OBSERVATIONS MADE 1984, 1988.
ABB ASEA BROWN BOVERI
ABB Environmental Services, Inc.
SURFACE WATER, LEACHATE, AND SEDIMENT CONTAMINANT DISTRIBUTION MAP
SITE 9
INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE
TECHNICAL MEMORANDUM: SITE 9
JOB NO. 7127-09
FIGURE 2-3

sediment samples at all sediment sampling locations near Site 9. These are thought to be attributable to base operations, motor vehicle traffic, and aircraft exhaust. The highest concentrations were recorded at the SD-901 and SD-915 locations, and concentrations tend to decrease farther downstream. Average lead concentration in sediments below the confluence of the two unnamed streams is between 22 and 32 mg/kg. The background concentrations of lead in sand and clay soils for NAS Brunswick is between 6 and 16 mg/kg (ABB-ES, 1993, Table 3-6). Lead concentrations in sediment samples from Mere Brook on the west (upstream) side of the runways ranged from non-detect to 9.2 mg/kg.

PAHs were detected in most sediment samples from most sampling rounds from the streams in the Site 9 vicinity, at total concentrations up to 383 mg/kg (see Figure 2-3). The highest total PAH concentration was detected in sample SD-011. Two other organic compounds, bis(2-ethylhexyl)phthalate (up to 1.9 mg/kg) and butylbenzylphthalate (up to 1 mg/kg), were detected sporadically in sediment samples from the Site 9 streams. The highest concentrations were detected in the upstream sample (SW-915/SD-915 location) at the culvert outfall (E.C. Jordan Co., 1990a).

2.1.5 Groundwater

Three monitoring wells were installed as part of the RI program in 1988. Two monitoring wells (MW-901 and MW-902) were placed downgradient of the former incinerator and disposal area (south of Buildings 218 and 219 and east of Building 220) (see Figure 2-1). The third monitoring well (MW-903) was placed next to the northern stream to monitor potential contamination along the alignment of the former drain. Groundwater samples collected from wells MW-901 and MW-903 contained the inorganics sodium, calcium, iron, and manganese at concentrations below background concentrations for NAS Brunswick (ABB-ES, 1993) while samples collected from MW-902 had concentrations for calcium, magnesium, and manganese above NAS Brunswick background concentrations. No site-related organic contamination was present in these samples.

The Target Compound List (TCL) VOCs vinyl chloride, 1,1-dichloroethane (1,1-DCA), 1,2-DCE, and 2-butanone were detected sporadically in three source area wells at Site 9 (i.e., MW-904, MW-906, and MW-907) during the five RI groundwater sampling rounds (Table 2-1). Groundwater upgradient of the septic system did not contain VOCs. Vinyl chloride was detected twice in MW-904 (12 to 27 μg/L), but in two subsequent analyses it was not detected. Vinyl chloride was detected in one of two samples from MW-906 (31 μg/L), and in one of two samples from MW-907 (18 μg/L). No temporal trend of the detections was apparent. The federal Maximum Contaminant Level (MCL) for vinyl

TABLE 2-1
GROUNDWATER DATA FOR RI MONITORING WELLS AT SITE 9

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

SAMPLING ROUND DATE SAMPLED LOCATION	1 9/88 MW-903	2 12/88 MW-903	4 10/89 MW-903	1 9/88 MW-904	2 12/88 MW-904	3 4/89 MW-904	4 10/89 MW-904	5 11/90 MW-904	4 10/89 MW-906	5 11/90 MW-906	4 10/89 MW-907	5 11/90 MW-907	4 10/89 MW-908
Vinyl Chloride	ND	ND	ND	12	27	ND	ND	NA	ND	31	18	NA	ND
1,1-Dichloroethane	ND	ND	ND	12	12	6J	5	NA	ND	ND	ND	NA	ND
1,2-Dichloroethylene	ND	ND	ND	6	6	ND	ND	NA	36	79	ND	NA	ND
2-Butanone	ND	ND	110	ND	ND	68J	ND	NA	ND	ND	ND	NA	ND
Aluminum	ND	ND	ND	ND	ND	1130	ND	NA	445J	ND	ND	NA	ND
Calcium	9700J	7140	6650	18000	21100	16800	18400	NA	12000	10700	26600	NA	18200
Iron	3600J	3430	3700	ND	ND	1950	ND	NA	ND	115	ND	NA	ND
Magnesium	ND	ND	ND	5700	5960J	5610	5730	NA	ND	ND	5570	NA	ND
Manganese	240J	207	223	160	167	123	155	NA	336	52.5	2500	NA	823
Mercury	ND	ND	ND	0.22J	0.23	ND	ND	NA	ND	ND	ND	NA	ND
Sodium	17000J	14000	17800	7500	5410	8040	ND	NA	36700	35100	16100	NA	10800
Zinc	ND	ND	ND	ND	ND	25.3	ND	NA	ND	ND	ND	NA	ND
Bicarbonate	NA	ND	NA	NA	ND	NA	NA	43	NA	74	NA	100	NA
Chloride	NA	NA	NA	NA	NA	NA	NA	7.3	NA	29	NA	24	NA
Sulfate	NA	NA	NA	NA	NA	NA	NA	4.9	NA	8.8	NA	6.2	NA

Notes:

All concentrations in μg/L except bicarbonate, chloride, and sulfate which are in mg/L.
Sample locations are shown in Figure 2-1.

μg/L = micrograms per liter
mg/L = milligrams per liter
J = estimated concentration
ND = not detected
NA = not analyzed
MW = monitoring well location

chloride is 2 μg/L. The federal Maximum Contaminant Level Goal (MCLG) is zero, because this compound is known to cause cancer. Maximum Exposure Guidelines (MEGs) are guidelines set by the State of Maine as the MCL in drinking water. The MEG for vinyl chloride is 0.15 μg/L, which is below the analytical detection limit for this compound.

1,1-DCA was detected in all four sampling rounds in MW-904 at concentrations ranging from 5 to 12 μg/L. 1,1-DCA was detected in MW-906 at 36 μg/L in only one sampling round. 1,1-DCA was also detected in two groundwater samples (i.e., CP-902 and CP-903) collected in 1991 downgradient of the septic system at 20 and 7 μg/L, respectively. There is neither a federal MCL nor an MCLG for 1,1-DCA, but the MEG for 1,1-DCA is 5 μg/L. 1,2-DCE was detected in MW-904 in two of four sampling rounds at 6 μg/L, and in MW-906 once at 79 μg/L. The MCL, MCLG, and MEG for 1,2-DCE are all 70 μg/L. Only two detections of 2-butanone were measured, with no spatial or temporal pattern; these detections are believed to be a sampling or laboratory artifact and not indicative of site-related contamination.

Inorganics detected in Site 9 groundwater were in the background range, except for sodium, calcium, iron, and magnesium (E.C. Jordan Co., 1990a). Mercury was detected in MW-904 in two sampling rounds in 1989, but has not been detected in any of the site wells since. Mercury concentrations were 0.22 and 0.23 μg/L, well below its MCL, MCLG, and MEG of 2 μg/L. A summary of groundwater contaminants, their maximum observed concentrations, and respective regulatory criteria are in Table 2-2.

2.2 SUMMARY OF 1993 INVESTIGATIONS

After completion of the RI and in response to regulatory concerns, limited additional fieldwork was conducted to gather more site-related information to support Remedial Design activities at Site 9. Because two separate source areas possibly exist, the presentation of the field activities at this site are discussed in two sections. Activities associated with the incinerator in the northeast corner of Building 220 and the inactive ash landfill in the current location of Buildings 218 and 219 will be referred to as "North of Neptune Drive." Activities associated with the VOC contamination located behind Building 201 will be referred to as "South of Neptune Drive."

TABLE 2-2
GROUNDWATER CONTAMINANTS AND REGULATORY CRITERIA

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

COMPOUND	MAXIMUM DETECTED CONCENTRATION[1] (µG/L)	FEDERAL MCL (µG/L)	FEDERAL MCLG (µG/L)	MAINE MEG (µG/L)
Vinyl Chloride	31(MW-906; 11/90)	2	0	0.15
1,1-Dichloroethane	12 (MW-904; 9/ & 12/88)	--	--	5
1,2-Dichloroethylene	79 (MW-906; 11/90)	70*	70*	70
2-Butanone	110 (MW-903; 10/89)	--	--	170
Mercury	0.23 (MW-904; 12/88)	2	2	2

Notes:

MCL = Maximum Contaminant Level; (USEPA, Office of Water, May 1993)
MCLG = Maximum Contaminant Level Goal; (USEPA, Office of Water, May 1993)
MEG = Maximum Exposure Guideline; (Maine Department of Human Services, September 1992)
µg/L = micrograms per liter
USEPA = U.S. Environmental Protection Agency

* = value for cis 1,2-dichloroethylene, value for trans 1,2-dichloroethylene is 100 µg/L. No standard for total 1,2-dichloroethylene.

[1] Well designations refer to sample location
Dates shown refer to collection dates
Concentrations shown represent compilation of data from both north and south of Neptune Drive.

2.2.1 North of Neptune Drive

Before 1993, invasive work had not been conducted around the reported location of the incinerator or the ash dump presumably located near Building 219. Therefore, the 1993 activities were aimed at confirming the presence of these features. Field activities performed north of Neptune Drive included:

- the installation of three borings (TB-911, MW-912, and MW-913)
- the collection of three soil samples total from TB-912, and TB-913) for off-site analysis
- a TerraProbe survey
- the installation of three monitoring wells (MW-914, MW-915, and MW-916)
- the collection and analysis of three groundwater samples
- the collection and analysis of a surface water and sediment sample
- the validation of the laboratory analytical data

2.2.1.1 Groundwater Flow and Subsurface Geology. Three monitoring wells were installed during the 1993 field investigation, consisting of one upgradient well, MW-916, and two downgradient wells, MW-914 and MW-915 (see Figure 2-1). The locations were chosen based upon results of the first phase of the TerraProbe survey (see Subsection 2.2.1.2) during which T-1 through T-17 were installed and the interpretation that groundwater flows southeast. The second phase of the TerraProbe survey, during which T-18 through T-33 were installed, was conducted after completion of the three monitoring wells. Also considered in locating these wells was the possibility that a former stream occupied the same area as the old drain adjacent to the dump that might cause groundwater to flow in a southerly direction. Water level data from wells at Site 9 were collected on August 19, 1993, and are shown on Figure 2-1. The water level for MW-902 was recorded at a surprising level of 39.79 feet MSL on the date of measurement, nearly six feet below its expected level. Past water level measurements in this well have historically been nearly equal to MW-901 measurements (E.C. Jordan Co., 1990a and 1991). This may be due to a measurement error or the well may be damaged. Additional measurements will be collected as part of the additional source investigations.

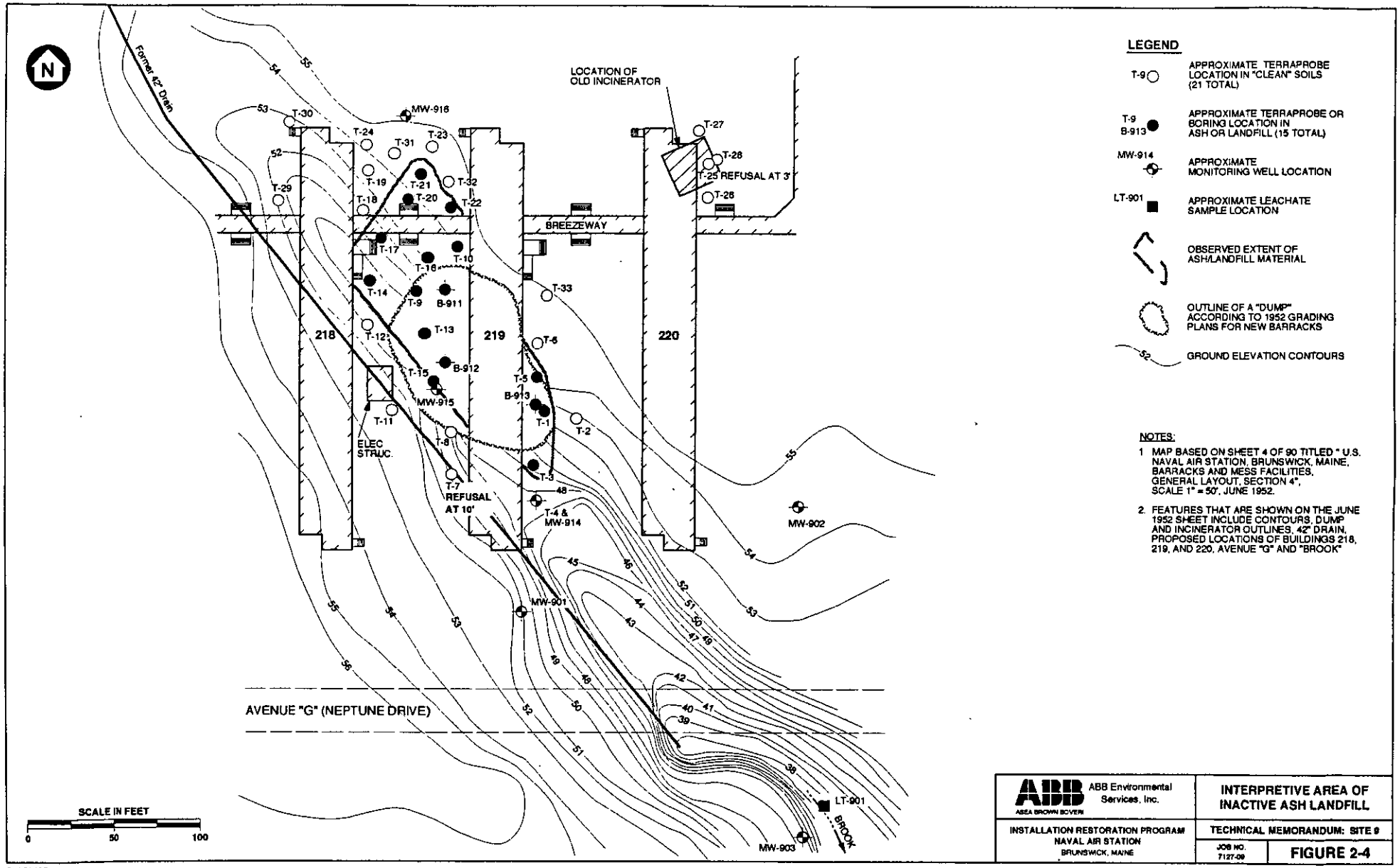
Subsurface geology of the area north of Neptune Drive was previously known from the borings for MW-901 and MW-902. These borings were drilled to depths of 42 and 27 feet below ground surface (bgs), respectively, and both intercepted gray and brown fine sands to the bottom of the borings. The three recently installed borings for MW-914, MW-915, and MW-916 were all drilled to 17 feet bgs and were sampled at 5-foot intervals. The

borings for MW-914 and MW-915 terminated in what was interpreted as being natural, micaceous, peat-rich soils representative of stream deposits. Soil samples collected from the boring for MW-916 were clean, well-sorted sands (Appendix A).

2.2.1.2 Inactive Ash Landfill. To test for the presence of the ash landfill, three hollow-stem auger borings, B-911, B-912, and B-913, were installed near Building 219 as shown on Figures 2-1 and 2-4. Each boring was continuously logged to depths of approximately 18 feet bgs. All three borings intercepted a black ash-fill material that included glass, metal shards, and assorted demolition debris. The ash-fill material was detected between 6 and 16 feet bgs in these borings. Groundwater was observed between 8 and 9 feet bgs. Three soil samples were collected for laboratory analysis, two from B-912 and one from B-913. The ash-fill material was difficult to sample using split-spoon samplers, and two samples (one each from B-912 and B-913) were collected from 4-foot intervals from within the fill (see boring logs in Appendix B). Samples were analyzed for TCL VOCs, TCL semivolatile organic compounds (SVOCs), TCL pesticides and polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) inorganics. Boring logs and analytical data are included in Appendices A and B. Table 2-3 is a summary of the analytical program. Tables 2-4 and 2-5 are summaries of analytical results for soil samples from B-912 and B-913 (analytical data for other soil samples are also included) and groundwater. Acetone and 2-butanone were detected in soil samples in B-912 at a depth of 16 feet and in B-913 at a depth of 11 feet. Both VOCs are considered common laboratory contaminants (USEPA, 1988) and their presence in these samples may not be indicative of site contamination. Other VOCs detected in these borings were detected but only at estimated values up to 3 μg/kg, well below the Contract Required Quantitation Limit (CRQL) of 10 μg/kg. Total PAHs detected in these samples ranged from 3.8 to 33 mg/kg. The presence of PAHs is typical with burned materials observed in the borings.

Low concentrations of pesticides were detected sporadically in the samples collected from B-912 and B-913. These detections are interpreted as representing low-level background concentrations, and they are consistent with values observed elsewhere at NAS Brunswick.

Inorganic values for soils collected from these borings are shown on Table 2-5 along with background inorganic values for sand at NAS Brunswick. The background values observed are maximum values observed for sands for each analyte and were established during previous RI studies from analysis of soil boring samples (E.C. Jordan Co., 1990a). Barium, cadmium, calcium, chromium, copper, iron, lead, and zinc were detected at values above background concentrations for the 14 inorganics for which background concentrations have been established.


N
Former 42" Drain
LOCATION OF OLD INCINERATOR
BREEZEWAY
218
219
220
ELEC STRUC.
REFUSAL AT 10'
T-25 REFUSAL AT 3'
T-4 & MW-914
MW-916
MW-915
MW-914
MW-901
MW-902
MW-903
LT-901
BROOK
AVENUE "G" (NEPTUNE DRIVE)
SCALE IN FEET
0
50
100
LEGEND
T-9 APPROXIMATE TERRAPROBE LOCATION IN "CLEAN" SOILS (21 TOTAL)
T-9 B-913 APPROXIMATE TERRAPROBE OR BORING LOCATION IN ASH OR LANDFILL (15 TOTAL)
MW-914 APPROXIMATE MONITORING WELL LOCATION
LT-901 APPROXIMATE LEACHATE SAMPLE LOCATION
OBSERVED EXTENT OF ASH/LANDFILL MATERIAL
OUTLINE OF A "DUMP" ACCORDING TO 1952 GRADING PLANS FOR NEW BARRACKS
52 GROUND ELEVATION CONTOURS
NOTES:
1 MAP BASED ON SHEET 4 OF 90 TITLED " U.S. NAVAL AIR STATION, BRUNSWICK, MAINE, BARRACKS AND MESS FACILITIES, GENERAL LAYOUT, SECTION 4", SCALE 1" = 50', JUNE 1952.
2. FEATURES THAT ARE SHOWN ON THE JUNE 1952 SHEET INCLUDE CONTOURS, DUMP AND INCINERATOR OUTLINES, 42" DRAIN, PROPOSED LOCATIONS OF BUILDINGS 218, 219, AND 220, AVENUE "G" AND "BROOK"
ABB ASEA BROWN BOVERI
ABB Environmental Services, Inc.
INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE
INTERPRETIVE AREA OF INACTIVE ASH LANDFILL
TECHNICAL MEMORANDUM: SITE 9
JOB NO. 7127-09
FIGURE 2-4

9405040D

TABLE 2-3
SUMMARY OF PREDESIGN ANALYTICAL PROGRAM

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

	TCL VOCs	TCL SVOCs	TCL PEST/PCBs	TAL INORGANICS	TCLP
Solids					
SD-001	1	1	1	1	-
B-912 (7' to 10')	1	1	1	1	-
B-912 (16')	1	1	1	1	-
B-913 (9' to 13')	1	1	1	1	-
CP-1 (11')	1	-	-	-	1
CP-2 (12')	1	-	-	-	-
CP-3 (9')	1	-	-	-	-
CP-4 (12')	1	-	-	-	1
CP-5 (11')	1	-	-	-	1
CP-6 (11')	1	-	-	-	-
(Feet below ground)					
Liquids					
LT-001	1	1	1	1	-
MW-904	1	1	1	1	-
MW-906	1	1	1	1	-
MW-907	1	1	1	1	-
MW-908	1	1	1	1	-
MW-909	1	1	1	1	-
MW-910	1	1	1	1	-
MW-914	1	1	1	1	-
MW-915	1	1	1	1	-
MW-916	1	1	1	1	-

Notes:

SD	=	Sediment
B	=	Boring
CP	=	Cesspool
LT	=	Leachate
MW	=	Monitoring Well
-	=	Not Analyzed
TCL	=	Target Compound List
TAL	=	Target Analyte List
VOC	=	Volatile Organic Compound
SVOC	=	Semivolatile Organic Compound
Pest/ PCB	=	Pesticides/Polychlorinated Biphenyls
TCLP	=	Toxicity Characteristic Leachate Procedure

TABLE 2-4
SUMMARY OF SOIL ORGANIC ANALYSES (1993)

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

	CRQL	SD-901/DUP 3/18/93	B-912(10') 1/18/93	B-912(16') 1/18/93	B-913(11') 1/17/93	*CP-1 9'-10' ORGANIC MAT 1/19/93	*CP-2 10'-12' ORGANIC MAT 1/19/93	*CP-3 7'-9' FILL 1/19/93	*CP-4 10'-12' ORGANIC MAT 1/19/93	*CP-5 9'-10' ORGANIC MAT 1/19/93	*CP-6 10'-12' SEPTIC TANK SOLIDS 1/19/93
VOCs (µg/kg)											
Acetone	10	ND	ND	120	85J	87	ND	ND	80J	37	100J
Carbon Disulfide	10	ND	1J	3J	2J	1J	ND	ND	ND	2J	2J
1,2-DCE	10	ND	ND	1J	ND	ND	ND	ND	ND	ND	ND
1,1-DCA	10	39/52	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	10	ND	ND	26	17	18	ND	ND	15	13J	14
Chlorobenzene	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	16
Toluene	10	ND	1J	3J	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	10	ND	ND	2J	ND	ND	ND	ND	ND	ND	ND
SVOCs (µg/kg)											
PAHs (Total)		10,848J/8,345J	6054J	3768J	33360J	NA	NA	NA	NA	NA	NA
Pest/PCB (µg/kg)											
Lindane	1.7	8.5J/12J	ND	ND	ND	NA	NA	NA	NA	NA	NA
Aldrin	1.7	0.79J/1.6J	ND	ND	ND	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	1.7	0.88J/0.68J	19J	ND	ND	NA	NA	NA	NA	NA	NA
Endosulfan 1	1.7	0.6J/0.55J	ND	ND	ND	NA	NA	NA	NA	NA	NA
Dieldrin	3.3	4.7J/4.4J	57J	ND	ND	NA	NA	NA	NA	NA	NA
4,4'-DDE	3.3	5.5/3.7J	8.6J	3.9J	11J	NA	NA	NA	NA	NA	NA

(continued)

TABLE 2-4
SUMMARY OF SOIL ORGANIC ANALYSES (1993)

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

	CRQL	SD-901/DUP 3/18/93	B-912(10') 1/18/93	B-912(16') 1/18/93	B-913(11') 1/17/93	*CP-1 9'-10' ORGANIC MAT 1/19/93	*CP-2 10'-12' ORGANIC MAT 1/19/93	*CP-3 7'-9' FILL 1/19/93	*CP-4 10'-12' ORGANIC MAT 1/19/93	*CP-5 9'-10' ORGANIC MAT 1/19/93	*CP-6 10'-12' SEPTIC TANK SOLIDS 1/19/93
Endrin	3.3	2.9J/-	ND	ND	ND	NA	NA	NA	NA	NA	NA
Endosulfan II	3.3	3.8J/3.5J	ND	ND	ND	NA	NA	NA	NA	NA	NA
4,4'-DDD	3.3	14J/5J	ND	9.4J	91J	NA	NA	NA	NA	NA	NA
4,4'-DDT	3.3	27J/19J	87J	2.3J	5.6J	NA	NA	NA	NA	NA	NA
Methoxychlor	17	9.8J/34J	ND	ND	ND	NA	NA	NA	NA	NA	NA
Endrin Ketone	3.3	5.6J/-	ND	ND	ND	NA	NA	NA	NA	NA	NA
Alpha Chlordane	1.7	1.5J/0.55J	32	ND	ND	NA	NA	NA	NA	NA	NA
Aroclor 1260	33	40J/27J	ND	ND	ND	NA	NA	NA	NA	NA	NA
TCLP		NA	NA	NA	NA	Passed	NA	NA	Passed	Passed	NA

Notes:

DUP = Duplicate Sample
J = Estimated Value
SD = Sediment
CRQL = Contract Required Quantitation Limit
ND = not dectected
B = Boring
CP = Cesspool
NA = Not Analyzed
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
Pest/PCB = Pesticides/Polychlorinated Biphenyls
TCLP = Toxicity Characteristic Leachate Procedure

µg/kg = micrograms per kilogram
Dates = Date of Collection
* = Depths of collection and type of material sampled are shown

W0069312T.080/5

TABLE 2-5
SUMMARY OF SOIL INORGANIC ANALYSIS (1993)

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

ANALYTE	CRDL (mg/kg)	+SD-901/DUP 3/18/93	B-912 (10') 1/18/93	B-912 (16') 1/18/93	B-913 (11') 1/17/93	*BACKGROUND INORGANIC SAND VALUES NAS BRUNSWICK
Aluminium	40	2,690J/2,400J	6,810	4,540	5,270	7,700
Antimony	12	ND/ND	ND	ND	ND	--
Arsenic	2	3.3/2.5J	5.0	2.5J	4.9	8.2
Barium	40	ND/ND	128J	830J	125J	27
Beryllium	1	ND/ND	ND	ND	ND	0.9
Cadmium	1	6.3J/1.9J	3.3	1.2J	8.2	-
Calcium	1,000	944J/1,230J	2,730	1,090J	1,920	790
Chromium	2	7.1/8.8	13.2	8.0	23.5	12
Cobalt	10	3.8J/3.0J	ND	ND	ND	5.9
Copper	5	13.5/18.7	26.3J	6.9J	183J	8.1
Iron	20	5,890J/7,030J	13,900J	7,680J	21,200J	11,000
Lead	0.6	27.7J/36.6J	43.4	9.7	151	6.2
Magnesium	1,000	735J/705J	1,700	1,770	2,380	3,300
Manganese	3	102/104	128J	84.4J	121J	260
Mercury	0.04	ND/ND	ND	ND	ND	0.025
Nickel	8	7.7J/8.1J	ND	ND	ND	9.9
Potassium	1,000	354J/329J	762J	811J	786J	1,800
Selenium	1	ND/0.32J	ND	ND	0.69J	0.22
Silver	2	ND/ND	ND	ND	ND	--
Sodium	1,000	487J/632J	ND	ND	ND	160
Thallium	2	ND/ND	ND	ND	ND	0.17
Vanadium	10	7.3J/8.3J	ND	ND	ND	20

(continued)

TABLE 2-5
SUMMARY OF SOIL INORGANIC ANALYSIS (1993)

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

ANALYTE	CRDL (mg/kg)	+SD-901/DUP 3/18/93	B-912 (10') 1/18/93	B-912 (16') 1/18/93	B-913 (11') 1/17/93	*BACKGROUND INORGANIC SAND VALUES NAS BRUNSWICK
Zinc	4	53.5/73.3	320	59.6	850	26
Cyanide	2	1.2/ND	R	R	R	--

Notes:

D = Sediment
DUP = Duplicate Sample
CRDL = Contract Required Detection Limit for Target Analyte List inorganic analysis.
mg/kg = milligrams per kilogram
B = Boring
+ = Sediment data from SD-901 are included for reference. These values should not be compared to background inorganics and values for NAS Brunswick.
J = Estimated Value
ND = Not Detected
R = Rejected Value
-- = no data

*Source: E.C. Jordan Co., 1990a, Volume 3, Appendix K and ABB Environmental Services, Inc., 1993.

To better define the extent of the ash landfill in the area around Building 219, a TerraProbe survey was conducted. The TerraProbe system is a truck-mounted, hydraulically driven soil sampling device that collects samples much like the standard drilling/split-spoon technique. During this survey, samples were collected at depths from 8 to 13 feet bgs to confirm the presence of ash-fill material at the depths seen in the soil borings. A total of 33 TerraProbe borings were made as shown on Figure 2-4. Copies of field notes taken during the survey are included in Appendix A. A TerraProbe survey was also conducted near the reported location of the former incinerator (northeast corner of Building 220). Of the four TerraProbe borings at this location, one boring encountered refusal at 3 feet bgs, having encountered some impenetrable object. The other three borings in this area detected clean, natural-looking soils.

Figure 2-4 is based on plans dated June 1952 for barracks in the vicinity of Site 9. These plans show existing site contours prior to construction and the locations of the proposed buildings. A dump is shown on the plans near the proposed location of Building 219. Also shown on the plans is the outline of the incinerator at the northern end of Building 220 and the location of a 42-inch drain that was removed during construction. Overlaid on these features are the exploration locations for the Site 9 area north of Neptune Drive.

2.2.1.3 Groundwater. Two weeks after monitoring wells MW-914, MW-915, and MW-916 were developed, a round of groundwater samples was collected. Samples were sent for analysis for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, and TAL inorganics. Results of the analytical samples are included in Appendix B. Table 2-6 summarizes the organic compounds detected in the groundwater samples and leachate sample at Site 9. No contaminants were detected in MW-916. Levels of vinyl chloride, 1,1-DCA, and 1,2-DCE detected in MW-914 and/or MW-915 were equal to or below the CRQL. Except for vinyl chloride, all compounds were detected below their respective MCLs. Vinyl chloride was detected only in MW-915 at a maximum concentration of 10J μg/L. The MCL for vinyl chloride is 2 μg/L.

TCL SVOCs were detected at a total concentration of 4J μg/L in MW-914 and at 3J μg/L in MW-915 and were not detected in MW-916. Bis(2-ethylhexyl)phthalate and butylbenzylphthalate were detected up to 2J μg/L in these wells; these detections may be site-related or sampling/analysis artifacts. All four groundwater samples analyzed (including a duplicate sample from MW-915) were non-detect for TCL pesticides/PCBs.

Evaluation of site characterization data for the presence of hazardous substances includes an evaluation of the degree to which potential contaminants are site-related. A way to

TABLE 2-6
SUMMARY OF GROUNDWATER ORGANIC ANALYSES (1993)

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

		SOUTH OF NEPTUNE DRIVE							NORTH OF NEPTUNE DRIVE		
	CRQL	*LT-901 3/18/93	MW-904 2/4/93	MW-906 2/4/93	MW-907 2/4/93	MW-908/DUP 2/4/93	MW-909 2/4/93	MW-910 2/4/93	MW-914 3/18/93	MW-915/DUP 3/18/93	MW-916 3/18/93
VOCs (µg/L)											
Vinyl Chloride	10	ND	8J	ND	9J	ND/2J	ND	ND	ND	10J/8J	ND
1,1-DCA	10	ND	ND	ND	2J	ND	ND	ND	ND	1J/1J	ND
1,2-DCE	10	ND	1J	4J	1J	ND	ND	ND	ND	ND	ND
Toluene	10	1J	ND	ND	ND	ND	ND	ND	ND	ND	ND
SVOCs (µg/L)											
PAHs (Total)		30J	5J	12J	1J	ND/ND	1J	ND	4J	3J/ND	ND
Pest/PCB (µg/L)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

J = Estimated Value
LT = Leachate
DUP = Duplicate Sample
MW = Monitoring Well
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
Pest/PCB = Pesticides/Polychlorinated Biphenyl
µg/L = micrograms per liter
ND = not detected
CRQL = Contract Required Quantitation Limit
* = LT-901 is a leachate water sample and not a monitoring well water sample

ascertain the degree of site-related inorganic contamination is to compare site data to NAS Brunswick background groundwater inorganic concentrations. Background concentrations of inorganics in groundwater at NAS Brunswick have been established during previous RI studies from analysis of groundwater samples (E.C. Jordan Co., 1990a and 1991). Concentration ranges of inorganics in background groundwater samples collected from locations throughout NAS Brunswick are summarized in Table 2-7. The maximum value for each parameter was used to establish background values. Inorganic concentrations for all Site 9 well samples in 1993 are listed on Table 2-8 with their respective MCLs and the background concentrations. For the wells north of the Neptune Drive, inorganics were detected above NAS Brunswick background concentrations. Nearly all detections of inorganics in MW-914 and MW-915 (except magnesium and sodium) were detected above NAS Brunswick background levels. The buried ash upgradient of these wells apparently contributes to inorganic concentrations, especially aluminum, iron, and manganese. MW-916 is upgradient of the ash landfill and, as such, may be considered to represent background conditions relative to other wells at Site 9. Concentrations for barium, calcium, and sodium detected in MW-916 are above NAS Brunswick background values. The value measured for sodium appears anomalous in that it also exceeds levels observed in the downgradient wells.

2.2.1.4 Leachate Seep and Sediment. To evaluate whether the old drain acts as a conduit for any contaminants that may be site-related, a leachate surface water (LT-901) and a sediment sample (SD-901) were collected on the south side of Neptune Drive at location LT-901 (See Figure 2-1). These samples were analyzed for the same analytes as those tested for in the groundwater samples. Results of the analytical samples are included in Appendix B, and are summarized in Tables 2-4, 2-5, 2-6, and 2-8.

Detections of 1,1-DCA, PAHs, and pesticides were noted in the sediment sample collected at SD-901 (see Table 2-4). The leachate water sample had no organic detections, except for toluene, a common laboratory contaminant, at a concentration of 1J μg/L. Inorganics detected in the leachate water sample are shown in Table 2-8. These values are almost all below detected values as reported on Figure 11-11 (page 11-19) of the Draft Final Remedial Investigation Report (E.C. Jordan Co., 1990a) which indicate a lesser impact over time. Exceptions are sodium at a concentration of 711,000 μg/L and cyanide at a concentration of 11.6 μg/L. The sodium and cyanide values are probably due to road salt runoff from Neptune Drive. The use of sodium ferrocyanide as a de-caking agent in salt has been documented in a study in Maine, linking it to cyanide contamination near salt storage piles (Olson and Ohno, 1989). The association of elevated levels of sodium and cyanide and the time of collection (March 18, 1993) suggests that these may be related to salt applied to the

TABLE 2-7
BACKGROUND CONCENTRATIONS OF INORGANICS IN GROUNDWATER

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

INORGANIC PARAMETER	CRDL (µg/L)	MINIMUM (µg/L)	MAXIMUM (µg/L)
Aluminum	200	15	652
Antimony	60	-	-
Arsenic	10	1.8	2.8
Barium	200	4.6	17
Beryllium	5	-	-
Cadmium	5	-	-
Calcium	5,000	1,190	18,000
Chromium	10	2.4	6.3
Cobalt	50	4.3	8
Copper	25	3	4
Iron	100	18	4,430
Lead	3	3.3	10
Magnesium	5,000	657	8,300
Manganese	15	11	570
Mercury	0.2	0.11	0.11
Nickel	40	-	-
Potassium	5,000	230	4,800
Selenium	5	-	-
Silver	10	-	-
Sodium	5,000	2,130	52,500
Thallium	10	1.4	2.1
Vanadium	50	4	9.2
Zinc	20	3.8	105
Cyanide	10	-	-

MONITORING WELLS USED TO DEFINE BACKGROUND CONSIST OF:

WELL AND LOCATION	DATE SAMPLED	WELL AND LOCATION	DATE SAMPLED
✓ MW-2118, Site 1	9/8/88	✓ MW-702, Site 7	9/15/88
* MW-301, Site 11	11/5/90	✓ MW-703, Site 7	9/15/88
* MW-312, East of Base Boundary	11/9/90	✓ MW-705, Site 7	9/15/88
* MW-320, Site 6	11/6/90	✓ MW-801, Site 8	4/14/89
✓ MW-403, Site 4	12/7/88		

Sources:

✓ = E.C. Jordan Co. (1990). "Draft Final RI Report - Naval Air Station, Brunswick, Brunswick, Maine"; U.S. Department of the Navy; Volume 3, Appendix K; August 1990.

* = E.C. Jordan Co. (1991). "Draft Final Supplemental RI Report - Naval Air Station, Brunswick, Brunswick, Maine"; U.S. Department of the Navy; Volume 3, Appendix M; August 1991.

TABLE 2-8
SUMMARY OF GROUNDWATER INORGANIC ANALYSES (1993)

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

		SOUTH OF NEPTUNE DRIVE									NORTH OF NEPTUNE DRIVE			
ANALYTE	CRDL (µg/L)	*MCL (µg/L)	**MEGS (µg/L)	*LT-901 3/18/93 (µg/L)	MW-904 2/4/93 (µg/L)	MW-906 2/4/93 (µg/L)	MW-907 2/4/93 (µg/L)	MW-908/DUP 2/4/93 (µg/L)	MW-909 2/4/93 (µg/L)	MW-910 2/4/93 (µg/L)	MW-914 3/18/93 (µg/L)	MW-915/DUP 3/18/93 (µg/L)	MW-916 3/18/93 (µg/L)	BKG. CONC. OF INORG./NASB (µg/L)
Aluminum	200	50-200 S	1,430	4,940	ND	ND	ND	ND	241J	ND	5,510	1,910/1,830	ND	652
Antimony	60	6	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Arsenic	10	50 R	-	9.4J	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8
Barium	200	2,000	1,500	64.4J	ND	ND	ND	ND	ND	ND	229	443/441	46.4J	17
Beryllium	5	4	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Cadmium	5	5	5	ND	ND	ND	ND	ND	ND	ND	6.4	ND	ND	-
Calcium	5,000	-	-	16,700	18,400	14,100	40,300	24,100/25,700	2,140J	4,180J	33,800	51,300/51,300	22,000	18,000
Chromium	10	100	100	16.3	ND	ND	ND	ND	ND	ND	9.9J	ND/4.3J	ND	6.3
Cobalt	50	-	-	7.8J	ND	ND	ND	ND	ND	ND	ND	ND	ND	8
Copper	25	1,300 T	-	23.1J	ND	ND	ND	ND	ND	ND	ND	ND	ND	4
Iron	100	300S	-	7,190J	ND	314J	ND	ND	360J	ND	30,100J	12,000J/12,100J	220J	4,430
Lead	3	15 T	20	32.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	10
Magnesium	5,000	-	-	2,180J	5,520	4,310J	5,530	3,000J/2,990J	775J	709J	3,050J	4,490J/4,500J	2,290J	8,300
Manganese	15	50 S	200	219	183	56.7	6,720	609/689	22.8	27.8	230	991/1010	14.7J	570
Mercury	0.2	2	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11
Nickel	40	100	150	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Potassium	5,000	-	-	3,040J	ND	2,190J	2,460J	2,630J/2,470J	ND	ND	3,570J	7,430/7,430	3,920J	4,800
Selenium	5	50	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Silver	10	100 S	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-

W0069312T.080/9

(continued)

TABLE 2-8
SUMMARY OF GROUNDWATER INORGANIC ANALYSES (1993)

TECHNICAL MEMORANDUM: SITE 9
NAS BRUNSWICK

		SOUTH OF NEPTUNE DRIVE									NORTH OF NEPTUNE DRIVE			
ANALYTE	CRDL (µg/L)	+MCL (µg/L)	++MEGS (µg/L)	*LT-901 3/18/93 (µg/L)	MW-904 2/4/93 (µg/L)	MW-906 2/4/93 (µg/L)	MW-907 2/4/93 (µg/L)	MW-908/DUP 2/4/93 (µg/L)	MW-909 2/4/93 (µg/L)	MW-910 2/4/93 (µg/L)	MW-914 3/18/93 (µg/L)	MW-915/DUP 3/18/93 (µg/L)	MW-916 3/18/93 (µg/L)	Bkg. Conc. of Inorg./NASB (µg/L)
Sodium	5,000	-	-	711,000	6,240	35,400	16,200	15,100/16,200	4,030J	2,550J	4,100J	27,900/27,900	58,800	52,500
Thallium	10	2	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1
Vanadium	50	-	-	11.0J	ND	ND	ND	ND	ND	ND	6.2J	ND	ND	9.2
Zinc	20	5,000 S	-	195	8.8J	6.9J	13.8J	ND/8.1J	10.4J	7.9J	ND	ND	ND	105
Cyanide	10	-	154	11.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	-

Notes:

CRDL = Contract Required Detection Limit
µg/L = micrograms per liter
MW = monitoring well
DUP = duplicate sample
ND = not detected
J = estimated value
LT = leachate
* = LT-901 is a leachate sample and not a monitoring well sample
+ = According to Safe Drinking Water Act (SDWA), U.S. Environmental Protection Agency (USEPA), 1992, Fact Sheet: Drinking Water Regulations and Health Advisories. Office of Water, Washington, D.C., December, 1992.
++ = Maximum Exposure Guideline, as established in the Maine Drinking Water Rules (10-144A CMR - Chapters 231-233).
R = Under Review
S = Secondary Drinking Water Standard
T = Based on Treatment Technique. Value given is an action level.
- = Value not available

nearby road surface. This association has also been shown to occur at Site 8 surface water sampling locations (E.C. Jordan Co., 1990a, p. 10-32).

2.2.2 South of Neptune Drive

It was recognized that additional soil and groundwater data were necessary to better characterize this part of Site 9. The efforts conducted to collect these data included:

- a ground survey and base map production
- a geophysical survey with ground-penetrating radar (GPR)
- six borings
- nine soil samples for off-site analysis
- two groundwater monitoring wells (MW-909 and MW-910)
- one round of groundwater samples for off-site analysis from two newly installed wells (MW-909 and MW-910) and four existing wells (MW-904, MW-906, MW-907, and MW-908)
- the validation of laboratory analytical data

2.2.2.1 Groundwater Flow. Historically, groundwater flow has been southeasterly (E.C. Jordan Co., 1990a and 1991) with discharges occurring in the southern and northern unnamed streams.

Because it was not known if the southern stream acts as a fully effective discharge line for contaminants detected north of the stream, two groundwater monitoring wells (MW-909 and MW-910) were installed south of the southern unnamed stream (see Figure 2-1). Ten-foot well screens were installed in sands just above a clay zone in each of these borings. These wells were installed for the long-term monitoring of groundwater south of Site 9. Groundwater levels in these wells were measured on February 4, 1993, and these levels are shown on Figure 2-1. Elevations of stream sampling points north of these wells are approximately 35 feet above MSL.

The observed leachate discharge (LT-901) next to MW-903 indicates that the streams at Site 9 may act as partial collectors of contaminants at the site. Observed piezometric levels in MW-903 are normally several feet above the adjacent leachate discharge area, indicating a substantial upward gradient at this location. Also, gradients seen at other NAS Brunswick sites with similar geology show groundwater flow distant from the streams being nearly horizontal, with discharging gradients close to the streams. Based upon the water levels observed in MW-909 and MW-910 and the levels of the stream north of these wells, it

appears the stream is a discharge area for shallow groundwater both north and south of the stream.

2.2.2.2 Septic System. A geophysical survey using GPR and a metal detector was conducted at Site 9 to help establish the location of the septic tank and leachfield presumably located east of Building 201. The septic system, according to Navy maps, consisted of approximately 50 feet of 8-inch pipe exiting the east side of Building 201, which ran into a 10-by-15-foot septic tank. Connected to the septic tank were five circular cesspools arranged in a trellis configuration. Typical of this type of system, the cesspools had slotted sides allowing effluent to infiltrate into surrounding soils. The geophysical survey results confirmed the location of the septic tank, but the associated five cesspools were not positively located.

Using the results of the geophysical survey and a plan of the septic system obtained from the NAS Brunswick Public Works department, six borings (i.e., CP-1 through CP-6) were installed in the area of the septic tank and five cesspools. One boring was drilled through the top of the septic tank and a sample of the solids (soil and/or sludge) on the bottom of the tank was collected for TCL VOC analysis. The boring was not drilled through the bottom of the tank. Five additional borings were drilled at locations established as being the likely locations for the cesspools. As described in the boring logs, all but the boring at the Cesspool 3 location intercepted cesspool construction material (e.g., bricks, concrete, gravel-bed material) and/or the organic mat that accumulates around a septic system. This black organic mat would not otherwise be present in a typical soil profile. Five soil samples were collected from these borings and were submitted for analysis for TCL VOCs. Three of these soil samples were also analyzed by the Toxicity Characteristic Leachate Procedure test for VOCs. A summary of the VOC analyses for soil samples collected at this site is shown on Table 2-4, and sampling locations of the borings are shown on Figure 2-1. The boring logs describing the observed soils and showing sampling depths and analytical data are included in Appendices A and B.

VOCs detected above CRQLs included acetone, 2-butanone, and chlorobenzene. Acetone and 2-butanone are common laboratory contaminants (USEPA, 1988). Only chlorobenzene, at a low value of 16 μg/kg, may be considered a site contaminant. In the cesspool soil samples, all TCL SVOCs and pesticides/PCBs were below detection limits.

2.2.2.3 Groundwater. Two weeks after monitoring wells MW-909 and MW-910 were developed, groundwater samples were collected from each of the newly installed wells and from the four existing wells (MW-904, MW-906, MW-907, and MW-908) behind Building 201. Samples were sent for analysis for TCL VOCs, TCL SVOCs, TCL pesticides and

PCBs, and TAL inorganics. Analytical data for organic analyses in groundwater are summarized on Table 2-6, and inorganic analyses are summarized in Table 2-8. Boring logs and well installation diagrams for the two new wells and analytical data are presented in Appendices A and B.

No TCL VOCs were detected above their CRQLs. However, detected vinyl chloride (ND to 9J μg/L), 1,1-DCA (ND to 2J μg/L), and toluene (ND to 1J μg/L) were observed in one or more samples in the 1993 sampling event. Toluene is a common laboratory contaminant (USEPA, 1988) and probably not a site contaminant. The remaining VOCs detected are considered site-related.

Only one detection of an SVOC, bis(2-ethylhexyl)phthalate at 12J μg/L in MW-906, was observed. This analyte is a common laboratory contaminant and is not considered site-related.

Only a few inorganics were observed in samples from MW-909 and MW-910 above NAS Brunswick and site background concentrations, as presented by MW-916 (see Table 2-8). Of these, only aluminum, iron, and manganese would exceed their respective MCLs, but these are secondary standards based on aesthetic qualities and not on protection of human health.

3.0 SUMMARY OF CONTAMINATION ASSESSMENT

North of Neptune Drive

Results of the TerraProbe survey and the three soil borings in the vicinity of Buildings 218, 219, and 220 have delineated both the lateral and the vertical extent of ash in the former inactive ash landfill (see Figure 2-4). The ash extends on either side of Building 219, in an oblong trench oriented northwest to southeast; it is not known if ash is located underneath the building as well. Ash, found from 6 to 16 feet below the existing ground surface, is mostly below the water table. Samples of the ash contained elevated levels of PAHs, which are typical products of incomplete combustion (USEPA, 1982). However, groundwater samples collected immediately downgradient of the ash dump did not contain PAHs above CRQLs. Sporadic low levels (below CRQLs) of 1,1-DCA and vinyl chloride are not indicative of a significant source of VOCs that continuously impacts groundwater at detectable concentrations. Overall groundwater quality in MW-914 and MW-915 would indicate that, although the ash is below the water table, organic compounds are not leaching from the ash or migrating through groundwater flow at levels of concern to human health or the environment.

Elevated inorganic concentrations downgradient of the ash dump were observed but are not of concern because the concentrations are not above MCLs, except for cadmium, detected at 6.4 μg/L in MW-914 and manganese, detected at 1,010 μg/L in MW-915. Higher concentrations of iron, manganese, and other metals in MW-914 and MW-915 relative to MW-916 (the upgradient well) indicate these wells are being impacted by leachate from the ash.

South of Neptune Drive

In January 1993, borings were drilled through the septic tank and four of the five cesspools to ascertain whether the septic system was the source of VOC contamination in groundwater east of Building 201. VOCs, if present, would most likely be sorbed to organic-rich soils within the septic tank and cesspools. Organic sediment in the septic tank and the organic layers in the cesspools were visually identified and sampled to characterize this potential source. While the septic system cannot be ruled out as being a past source of VOC contamination detected in this area, results of these recently collected samples establish that the septic system is not a current source of contamination.

VOC contamination in groundwater is areally and temporally sporadic; VOCs have occasionally been detected at concentrations equal to or below CRQLs. Vinyl chloride has been detected sporadically at concentrations exceeding its MCL of 2 μg/L. No SVOC or pesticide/PCB contaminants of concern in the groundwater were observed. Low levels of contamination were observed for several inorganic analytes.

Analytical results from February 1993 indicate that contaminants are not migrating beneath the southern tributary. These data support the contention that contaminants in shallow groundwater east of Building 201 discharge directly to the tributaries.

The leachate seep at the head of the northern tributary was sampled for a third time in March 1993. A single VOC detection of toluene, a common laboratory contaminant (USEPA, 1988), at a concentration of 1J μg/L was noted in the leachate sample. Total PAHs were detected at 30 μg/L. Eleven inorganics, including arsenic, chromium, lead, sodium, and cyanide were detected at concentrations above the NAS Brunswick background levels. These elevated readings are likely the result of non-point source contamination relating to anthropogenic activities. The presence of PAHs, pesticides, and PCBs in the seep sediment sample also is attributable to upgradient anthropogenic sources and the strong tendency of these compounds to bind to fine-grained, organic materials. Only the inorganics, cadmium, lead, and sodium, exceeded NAS Brunswick background concentrations for sands, which would be expected to have lower concentrations of inorganics than the fine-grained sediments at the seep.

4.0 SUMMARY OF SITE RISKS

A human health and ecological risk assessment was conducted as part of the RI to identify current and future potential risks to human health and the environment from contamination at Site 9. Both cancer and noncancer risks were evaluated. These risk assessments are presented in Appendix Q and are summarized in Section 15.0 of the Draft Final RI Report (E.C. Jordan Co., 1990a). After submittal of the RI, additional risk estimates for Site 9 were developed at the request of USEPA Region I based on more recent guidance (USEPA, 1991a). The revised risk estimates are presented in Appendix H of the FS and are summarized in Subsections 8.1.2 and 8.1.3 of the FS (E.C. Jordan Co., 1992). That risk assessment has not been revised since 1992 and does not incorporate the 1993 data.

The risk assessments estimate the current and future potential risks to human health and the environment posed by contaminants detected in surface soils, sediment, surface water, leachate seeps, leachate-associated sediment, and groundwater. These risks are based on contaminant levels detected at the site during the sampling events described in the RI Report (E.C. Jordan Co., 1990a). For future risk estimates, a residential exposure scenario was also considered that assumes long-term repetitive exposure through direct contact and incidental ingestion of soil occurring 350 days per year for 30 years. This scenario simulates the potential risks associated with future residential land use should the base close (E.C. Jordan Co., 1992).

Carcinogenic (i.e., cancer) risk estimates are compared to a target risk range established by the USEPA of 10^{-4} to 10^{-6} and the Maine Incremental Lifetime Cancer Risk Guideline of 10^{-5}. Risks exceeding 10^{-4} (i.e., one extra case of cancer in 10,000 exposed individuals) are generally considered unacceptable although risks greater than 10^{-4} may be considered acceptable, based on site-specific conditions (USEPA, 1991b). For noncarcinogenic risks, a target upper-range Hazard Index above 1.0 has been established by USEPA. Noncarcinogenic (i.e., noncancer) risk estimates calculated for all exposure scenarios for contaminants in any of the media at Site 9 were all less than 1.0 (E.C. Jordan Co., 1990a).

The current human health risks associated with direct contact with PAH-contaminated surface soils using the predicted exposure scenarios range from 1.4×10^{-5} (for exposure to average contaminant concentrations) to 2.4×10^{-5} for the worst-case scenario (using maximum concentrations). These risks are at the middle of the USEPA target risk range and slightly exceed the Maine risk guideline.

Additional risk estimates presented in the FS for the future residential scenario resulted in total incremental carcinogenic risks of 7.8×10^{-5} and 1.4×10^{-4}, based on exposure to the average and maximum detected concentrations. These risk estimates are at the upper end of the USEPA target risk range of 10^{-4} to 10^{-6} and exceed the Maine target risk of 10^{-5} by approximately one order of magnitude.

The exposure scenarios evaluated for Site 9 soils incorporate several conservative assumptions, which means that the actual risk to humans will likely be less than estimated and, for current land use, are likely to be less than 10^{-5}. Both current and residential scenarios assume that a young child or adult entering Site 9 will only contact soils from the barbecue pit area. Given the limited areal extent of PAH contamination, this assumption is considered conservative. It is likely that a person will also contact soils from uncontaminated areas, resulting in a lower exposure dose than assumed in these evaluations (E.C. Jordan Co., 1992).

Under current and future residential land use, carcinogenic risks associated with exposure to stream sediment at Site 9 range from 3×10^{-5} to 3×10^{-4}, which are within and slightly above the USEPA target risk range. These risks are due entirely to exposure to carcinogenic PAHs in sediment. The concentration of total PAHs in these sediments range from nondetect to 383 mg/kg.

Risks associated with exposure to leachate, leachate-associated sediment, and surface water at Site 9 and risks associated with surface water and sediment at the Picnic Area Pond under current and reasonable future land use were below levels considered to present a risk to human health (E.C. Jordan Co., 1990a).

Potential risks associated with exposure to groundwater were evaluated based on a comparison of contaminant concentrations to MCLs, MCLGs, MEGs, or health-based criteria, as presented in Subsection 2.1.5 and Table 2-2. In addition, a quantitative risk assessment was performed in 1993 to evaluate risks associated with potential future use of groundwater from the portion of Site 9 north of Neptune Drive not previously evaluated. The risks are based on the maximum and average concentrations of contaminants detected in monitoring wells MW-914, MW-915, and MW-916. A duplicate sample for MW-915 was analyzed and is considered a separate sample for purposes of identifying the maximum concentration, but was averaged with MW-915 before calculating site average concentrations. In the instances where the average concentration was greater than the maximum concentration, the maximum value was used in both risk evaluations. The exposure assumes a 70-kilogram adult drinking 2 liters of water per day for 30 years. The

calculations for this exposure are presented in Appendix C, Tables 1 and 2. The Hazard Index is calculated to be 6.0 for the maximum concentration and 3.0 for the average concentration, slightly exceeding the USEPA target level of 1.0, but below the USEPA Region I value of concern for Hazard Indices of 10 (USEPA, 1989). The elevated Hazard Index is due almost entirely to the presence of manganese. Manganese was detected at 1,010 μg/L, more than an order of magnitude greater than NAS Brunswick background concentrations. The incremental cancer risk is estimated to be $2x10^{-4}$ for the maximum and $1x10^{-4}$ for the average, attributable to the presence of vinyl chloride in MW-915 at concentrations below its CRQL. The estimated incremental cancer risk is at or slightly greater than the USEPA target risk range.

An ecological risk assessment was performed to evaluate the potential risks to both terrestrial and aquatic organisms from contaminant exposure at Site 9 (E.C. Jordan Co., 1990a). Exposure to soil contaminants by terrestrial receptors appears minimal. Exposure to contaminants in the two streams may result in potential risk to aquatic organisms. DDT is the contaminant of concern in the northern stream sediments, and PAHs are the contaminants of concern in the southern stream sediments.

Exposure to DDT was an initial concern because of the propensity of this compound to bioaccumulate and bioconcentrate in food chains. However, DDT was detected in only two of six sampling locations at an average concentration of 0.024 mg/kg. The chronic ecological Hazard Index, based on a food-web analysis of exposure to this concentration, is less than 1.0 for all species (E.C. Jordan Co., 1990a). This concentration is consistent with expected residual concentrations of this contaminant, because DDT was still widely used as an insecticide in the 1960s and early 1970s. The presence of DDT in stream sediments is not interpreted to be related to past disposal activities at the site.

The presence of PAH compounds in the southern stream sediments is attributable to base operations, including motor vehicle traffic, aircraft exhaust, and aircraft maintenance and fuel use. Total PAH concentrations in these samples ranged from 2.1 to 383 mg/kg, with an average of 59 mg/kg. PAHs are ubiquitous environmental contaminants and may be formed and released to the atmosphere during combustion of gasoline and fuels from motor vehicles and incinerators, gas- and oil-fired heating units, wood, and coal (*Federal Register*, 1990). In addition, PAHs are a component of fossil fuels and are released to the environment during the use and disposal of products containing these fuels. PAHs are detected in air and soil samples from both urban and rural areas (USEPA, 1982). PAHs have been detected in background sediment samples from NAS Brunswick at concentrations ranging from 1.8 to 21.9 mg/kg (E.C. Jordan Co., 1990a).

The fuel-related organic compounds benzene, toluene, ethylbenzene, xylenes, naphthalene, and methylnaphthalene, and the inorganic analytes calcium, iron, magnesium, and sodium were detected in the surface water at Site 9. Only iron was detected at concentrations exceeding the AWQC. The maximum concentration of all compounds except toluene was detected in the upstream sample (SW-915), suggesting that nonpoint source runoff from the roads and runways is the source of this contamination.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Field investigations conducted in 1993 have helped characterize the portion of Site 9 north of Neptune Drive and have provided information to supplement the data gathered during the RI, which supports no remedial action and continued groundwater monitoring, both north and south of Neptune Drive.

Sampling and analysis of soil and sediment in the cesspools and septic tank indicates they are not continuing sources of VOCs to groundwater, and therefore, it is not recommended that the septic system be removed. The VOC vinyl chloride has been detected sporadically in groundwater immediately downgradient of the septic system at levels exceeding MCLs in all six sampling rounds, so it is recommended that the groundwater continue to be monitored in this area until concentrations decrease to below regulatory standards or guideline levels. Contaminants were not detected in groundwater monitoring wells installed on the south side of the southern tributary (MW-909 and MW-910), indicating the contaminants are not migrating beyond the stream; however, continued monitoring at these locations is recommended to supplement the one round of data.

The inactive ash landfill north of Neptune Drive has been characterized in extent and chemistry. Because the ash is located on both sides and possibly beneath an existing barracks, it is not recommended that closure activities be conducted. Groundwater sampling immediately downgradient of the ash dump did not indicate that contaminants are leaching from the ash. PAHs, which were the primary constituents of the ash samples, were not detected in groundwater. Vinyl chloride and 1,1-DCA were detected in one well (MW-915) at concentrations of 10J μg/L and 1J μg/L, respectively. 1,1-DCA has no MCL, but the Maine MEG is 5 μg/L; therefore, the sole detection is probably not of concern. However, the MCL of vinyl chloride is 2 μg/L and, although this groundwater is not used as a potable water supply, the presence of vinyl chloride should continue to be evaluated. In addition, certain inorganics downgradient of the ash dump were elevated slightly above upgradient concentrations. Therefore, monitoring of groundwater north of Neptune Drive is recommended.

Leachate sampled at a seep at the head of the northern tributary likely results from groundwater flowing through the soils in the location of the former drain as well as through the area of the ash landfill. Inorganics in the leachate and associated sediment may be from the ash dump, but surface water samples downstream of the seep do not indicate the inorganics are migrating. No current or future risks to terrestrial receptors have been

associated with exposure to the leachate or sediment, based on RI data from LT-901. In addition, concentrations, as measured in 1993, have generally decreased since samples were first collected in 1990.

An ecological risk assessment was performed to evaluate risks to terrestrial organisms resulting from exposure to the leachate (E.C. Jordan Co., 1990a). Minimal risks were anticipated from ingestion of the leachate.

Compounds detected in surface water samples taken from streams at Site 9 are presented in Figure 2-3. These compounds were compared to upgradient conditions and AWQC. Only iron was identified as exceeding AWQC in the surface water samples. The maximum concentration identified (5 mg/L) was approximately five times greater than the AWQC of 1 mg/L. The concentration of iron identified in the upgradient surface water sample (SW-915, at 2.4 mg/L) also exceeded the AWQC. Only the maximum concentration of iron identified in surface water (sample SW-920) exceeded the upgradient sample concentration. Iron is naturally occurring in the soils, sediments and surface water at NAS Brunswick. The concentrations of iron in surface water samples that exceeded AWQC may be a result of natural conditions, non-point sources or non-site-related sources.

The presence of DDT is from past use of this compound as a pesticide, and not past disposal activities at Site 9. Because PAH contamination in the stream is a result of past and ongoing nonpoint source discharges related to current operations, including motor vehicle traffic, aircraft exhaust, and recreational activities -- and not past disposal practices -- contamination would be expected to return to the stream sediments after remedial action has been taken. Therefore, no remedial action is recommended for surface water or sediments, but these media should continue to be sampled and analyzed.

Analytical data identified a limited areal extent of PAH contamination in surface soils east of Building 201. The presence of these compounds is considered related to the barbecue pit and associated recreational activities. Exposure to these contaminants is not considered to pose an unacceptable health risk, and continued use of the barbecue pit would likely contribute to further PAH contamination. Therefore, remedial actions are not required for surface soils.

It is interpreted that no continuing source of contamination has been found (other than the ash as a likely source of inorganics) that is causing environmental impact and that the low levels of contamination are not migrating off-site. Therefore, no remedial action is currently warranted at Site 9. The Navy is proposing to conduct additional investigations in

upgradient areas in an attempt to locate a source of the low-level organic contaminants detected at Site 9. Therefore, until the new data have been collected and fully evaluated, current recommended actions are being considered as interim actions. The only recommended actions at Site 9 at this time include institutional controls to prevent the use of groundwater, and the monitoring of groundwater, surface water, stream sediment, leachate, and seep sediment as part of a long-term monitoring program. There is no current risk because no one is exposed to groundwater. Institutional controls should be implemented to confirm that future risks do not exceed target risk ranges. Monitoring groundwater would indicate whether contaminant concentrations change over time and establish whether expected natural attenuation is occurring. Surface water and sediment monitoring would also track contaminant concentrations to evaluate the impact, if any, of groundwater discharge to the streams. It is recommended that a monitoring program be developed by the Navy in cooperation with the regulatory agencies. Monitoring should occur for a minimum of five years, after which all data and associated human health and ecological risks will be reevaluated. The need for future remedial actions will be made based on this review.

Based on current information, the Navy believes that the recommended steps at Site 9 are consistent with the requirements of Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act, and its amendments, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan.

AWQC	Ambient Water Quality Criteria
bgs	below ground surface
CRQL	Contract Required Quantitation Limit
DCA	dichloroethane
DCE	dichloroethylene
DDT	dichlorodiphenyltrichloroethane
FS	Feasibility Study
GPR	ground-penetrating radar
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MEG	Maximum Exposure Guideline
mg/kg	milligrams per kilogram
MSL	mean sea level
NAS	Naval Air Station
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
RI	Remedial Investigation
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
μg/kg	micrograms per kilogram
μg/L	micrograms per liter
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

ABB Environmental Services, Inc. (ABB-ES), 1993. "Draft Final Site Inspection Swampy Road Debris Site Merriconeag Extension Debris Site"; Portland, Maine; August.

E.C. Jordan Co., 1985. *Pollution Abatement Confirmation Study, Step 1A-Verification*; Portland, Maine; June.

E.C. Jordan Co., 1990a. *Draft Final Remedial Investigation Report NAS Brunswick*; Portland, Maine; August.

E.C. Jordan Co., 1990b. *Draft Final Phase I Feasibility Study Development and Screening of Alternatives NAS Brunswick*; Portland, Maine; August.

E.C. Jordan Co., 1991. *Draft Final Supplemental Remedial Investigation Report NAS Brunswick*; Portland, Maine; August.

E.C. Jordan Co., 1992. *Feasibility Study NAS Brunswick*; Portland, Maine; March.

Federal Register, 1990. Vol. 55; No. 143; 40 CFR Part 141 et al. *National Primary and Secondary Drinking Water Regulations*; July 25; p. 30413.

Maine Department of Health (MEDOH), 1990. *Revised Maximum Exposure Guidelines*; Robert Frakes, Ph.D, State Toxicologist; May 30.

Olson and Ohno, 1989. "Determination of Free Cyanide Levels in Surface and Ground Waters Affected by Highway Salt Storage Facilities in Maine"; Maine Department of Transportation; Department of Plant and Soil Sciences, University of Maine; Orono, Maine.

R.F. Weston Inc., 1983. *Initial Assessment Study of Naval Air Station, Brunswick Maine*; Westchester, Pennsylvania; June.

U.S. Environmental Protection Agency (USEPA), 1982. *An Exposure and Risk Assessment for Benzo[a]pyrene and other Polycyclic Aromatic Hydrocarbons*; Office of Water; Final Draft Report.

U.S. Environmental Protection Agency (USEPA), 1988. *Region I Laboratory Data Validation: Functional Guidelines for Evaluating Organic Analysis*; prepared for the

USEPA Hazardous Site Evaluation Division; Washington D.C.; February 1, 1988 (modified November 1988).

U.S. Environmental Protection Agency (USEPA), 1989. *Supplemental Risk Assessment Guidance for the Superfund Program*; prepared by the USEPA Region I Risk Assessment Work Group; EPA 901/5-89-011; Draft Final; June.

U.S. Environmental Protection Agency (USEPA), 1991a. *Human Health Evaluation Manual Supplemental Guidance*; "Standard Default Exposure Factors;" Memorandum From: Timothy Fields Jr. and Bruce Diamond; Office of Solid Waste and Emergency Response; OSWER Directive 9285.6-03; March.

U.S. Environmental Protection Agency (USEPA), 1991b. "Role of the Baseline Risk Assessment in Superfund Selection Decisions"; OSWER Directive 9355.0-30; Washington, D.C.; April.

U.S. Environmental Protection Agency (USEPA), 1991c. "Water Quality Criteria"; Health and Ecological Criteria Division; Human Risk Assessment Division; May 1.

U.S. Environmental Protection Agency (USEPA), 1992. *Drinking Water Regulations and Health Advisories*; Office of Water; November.

APPENDIX A

BORING LOGS

NASB Field Boring Log

Client: U.S. Navy, Brunswick		Project No. 7177-09	Boring No.: CESSPOOL 1
			Protection: D
Contractor: NAB	Date Started: 1-19-93		Completed: 1-19-93
Method: HSA/~~CASING~~	Casing Size: (ID) 4.25" HSA		PI Meter: N/A
Ground Elev.:	Soil Drilled: 11'		Total Depth: 11'
Logged by: PB	Checked by:		▽ Below Ground: ~9'-10'
Screen: / (ft.) Riser: / (ft.)	Diam: / (ID)	Material: PVC	Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
						LOCATION IS IN ASHPALT DRIVEWAY				
2						FROM 2' TO 3', RED BRICK MATERIAL COMES UP AUGER FLIGHTS				
4	S-1	X		2.0/0.4		RED TO TAN MED. TO F. SAND, TRACE COARSE SAND, POORLY GRADED, LOOSE, DRY - BRICK MATERIAL FROM CESSPOOL?		2 2 2 3		
6	S-2	X		2.0/0.0		RED COBBLE SIZED PARTICLE IN SHOE PREVENTS RECOVERY		2 2 2 1		
8	S-3	X		2.0/0.3		BROWN MED. TO F. SAND, TRACE SILT, POORLY GRADED, LOOSE, DAMP		2 1 2 1		
10	S-4	X	VOA, TCLP ✓	2.0/1.1		GRAYISH BROWN TO BLACK MED. TO F. SAND, LITTLE SILT, POORLY GRADED, LOOSE SATURATED AT TIP. "ORGANIC SHADOW" OF CESSPOOL		3 1 1 8		
						B.O.B. @ 11'				

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

NASB Field Boring Log

			Boring No.: CESSPOOL-2
Client: **U.S. Navy, Brunswick**		Project No. 7127-09	Protection: D
Contractor: NHB	Date Started: 1-19-93		Completed: 1-19-93
Method: HSA/~~CASING~~	Casing Size: (ID) 4.25" HSA		PI Meter: N/A
Ground Elev.:	Soil Drilled: 12'		Total Depth: 12'
Logged by: TL	Checked by:		▽ Below Ground: ~10'
Screen: / (ft.)	Riser: / (ft.)	Diam: / (ID)	Material: PVC
			Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
						LOCATION IS IN ASPHALT DRIVEWAY				
2	S-1	X		2.0/1.8		ORANGE-BROWN FINE SAND, LOOSE, DRY & LAYERED - GRAY FINE SAND @ 3.5'		5 3 3 6		
4	S-2	X		2.0/1.6		0-0.4 ORANGE-BRN FINE SAND, WELL SORTED, LOOSE, DRY 0.4-0.9 ORANGE & GRAY F. SAND, LOOSE, DRY 0.9-1.6 RUSTY BRN F. SAND, & WHITE F. SAND, LOOSE, DRY, WELL SORTED		2 2 2 4		
6	S-3	X		2.0/0.8		YELLOW BRN F. SAND, LOOSE, DRY OVER COARSE GRAVEL (1"x1") & CONCRETE PIECES - POSSIBLY CESSPOOL CONSTRUCTION - DRY		12 14 12 13		
8	S-4	X		2.0/0.7		AS ABOVE, SANDY GRAVEL & COBBLES, WET AT TIP OF SPOON, RUSTY STAINED STONES, TR. SILT/CLAY - NOT ENOUGH TO SAMPLE		21 14 14 17		
10	S-5	X	✓ VOC, TCLP	2.0/1.3		"ORGANIC SHADOW" OF CESSPOOL APPARENT. BLACK STAINED SAND BECOMES LIGHTER IN COLOR W/ DEPTH OVER RUSTY RED & TAN LAYERED F. SAND, THIN LENSES, WELL SORTED, LOOSE, SATURATED		12 8 7 5		
12						B.O.B. 12'				

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

9301020D(a)

ABB Environmental Services, Inc.

NASB Field Boring Log

			Boring No.: CESSPOOL-3
Client: U.S. Navy, Brunswick		Project No. 7127-09	Protection: D
Contractor:	Date Started: 1-19-93		Completed: 1-19-93
Method: HSA/~~CASING~~	Casing Size: (ID) 4.25" HSA		PI Meter: N/A
Ground Elev.:	Soil Drilled: 11'		Total Depth: 11'
Logged by: PB	Checked by:		▽ Below Ground: ~10'
Screen: / (ft.)	Riser: / (ft.)	Diam: / (ID)	Material: PVC
			Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
						LOCATION IN JUST OFF OF GRASS ON EDGE OF ASPHALT DRIVEWAY				
2										
4	S-1	X		2.0/1.7		LIGHT GRAY TO LIGHT TAN FINE SAND, LITTLE SILT, TRACE M. SAND, POORLY GRADED, LOOSE, DRY		4 4 4 5		
6	S-2	X		2.0/1.7		AS ABOVE WITH REDDISH MOTTLES AT 5' TO 6'		4 4 4 6		
8	S-3	X	✓ VOA	2.0/1.8		GRAY F. SAND, SOME SILT, POORLY GRADED, LOOSE, MOIST TO SATURATED OVER BRIGHT RED FINE SAND, SILT, POORLY GRADED MOIST. IN THIN LENSES.		4 7 10 11		
10	S-4	X		2.0/1.9		OLIVE GRAY FINE SAND, TRACE SILT, POORLY GRADED, LOOSE, SATURATED		4 3 4 5		
12						B.O.B. @ 11'				

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

9301020D(a)

ABB Environmental Services, Inc.

NASB Field Boring Log

			Boring No.: CESSPOOL - 4
Client: **U.S. Navy, Brunswick**		Project No. 7127-09	Protection: D
Contractor: NHG	Date Started: 1-19-93		Completed: 1-19-93
Method: **HSA/~~CASING~~**	Casing Size: (ID) 4.25" HSA		PI Meter: N/A
Ground Elev.:	Soil Drilled: 12'		Total Depth: 12'
Logged by: TL	Checked by:		▽ Below Ground: ~10'
Screen: / (ft.)	Riser: / (ft.)	Diam: / (ID)	Material: ~~PVC~~
			Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
						LOCATION IS IN ASPHALT DRIVEWAY				
2	S-1	X		2.0/0.1		RED BRICK PIECES W/ TAN F. SAND, LOOSE, DRY - VERY LITTLE RECOVERY		1 3 3 2 1		
4	S-2	X		2.0/0.7		AS ABOVE OVER BROWN F. SAND, DRY, LOOSE W/ 1" LAYER OF BLACK ASPHALT, BOTTOM OF SPOON HAD GRAVEL PIECE.		2 3 8 5		
6	S-3	X		2.0/0.8		DIRTY BROWN FINE SAND, TR. COARSE SAND, DRY, LOOSE, W/ BLACK ORGANIC RICH LAYERS & DEEP RED MOTTLES - END OF SPOON HAS BLACK ASPHALT.		3 - 1 - 1		
8	S-4	X		2.0/0.8		DRILLED THROUGH VOID (SEE BLOWS) SPOON DROPPED FREELY - AS ABOVE, THEN ORGANIC, GRITTY BLACK TO BROWN SAND, DIRTY, LOOSE SATURATED		1 - 1 - 1		
10	S-5	X	✓ VOC	2.0/1.0		BLACK "ORGANIC SHADOW" OF CESSPOOL, SANDY, SATURATED, LOOSE. BECOMES LESS DARK W/ DEPTH - GRAY TO OLIVE GRAY F. SAND LOOSE, SAT., WELL SORTED THAN CLEAN SANDS		3 4 4 6		
12						B. O. B. @ 12'				

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

NASB Field Boring Log

			Boring No.: CESSPOOL - 5
Client: U.S. Navy, Brunswick		Project No. 7127-09	Protection: D
Contractor: NHB	Date Started: 1-19-93		Completed: 1-19-93
Method: HSA/~~CASING~~	Casing Size: (ID) 4.25" HSA		PI Meter: N/A
Ground Elev.:	Soil Drilled: 11'		Total Depth: 11'
Logged by: PB	Checked by:		▽ Below Ground: ~10'
Screen: / (ft.)	Riser: / (ft.)	Diam: / (ID)	Material: PVC / Page / of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
						LOCATION IS ON LAWN SOUTH OF DRIVEWAY				
2										
4	S-1	X		2.0/1.7		GRAYISH TAN, MED. TO F. SAND, TR. C. SAND, POORLY GRADED, LOOSE, DRY		2-1-2		
6	S-2	X		2.0/1.7		GRAY FINE SAND, TR. SILT, POORLY GRADED, LOOSE, DRY TO MOIST		1 1 2 7		
8	S-3	X		2.0/0.2		GRAYISH ANGULAR GRAVEL OR COBBLE FRAGMENTS - FROM CESSPOOL CONSTRUCTION		7 8 7 6		
10	S-4	X	✓ VOA TCLP	2.0/1.0		TAN TO BLACK, MED. TO F. SAND, TRACE SILT, POORLY GRADED, LOOSE, SATURATED		6 5 3 5		
12						B.O.B. @ 11'				

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

NASB Field Boring Log

Client: **U.S. Navy, Brunswick**		Project No. 7127-09	Boring No.: CESSPOOL - 6
Contractor: NHB	Date Started: 1-19-93		Protection: D
Method: HSA/~~CASING~~	Casing Size: (ID) 4.25" HSA		Completed: 1-19-93
Ground Elev.:	Soil Drilled: 4.5'		PI Meter: N/A
Logged by: PB	Checked by:		Total Depth: 12'
Screen: — (ft.) Riser: — (ft.)	Diam: — (ID)	Material: PVC	▽ Below Ground: N/A
			Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
						CESSPOOL 6 IS ACTUALLY THE SEPTIC TANK ITSELF. DRILLED DOWN TO SEPTIC TANK W/OUT SAMPLING. LOCATION IS ON GRASS JUST OFF ASPHALT DRIVEWAY. SPENT 20 MIN. DRILLING THROUGH TOP OF TANK				
2										
4						~4.5' TOP OF TANK				
6						VOID FROM 4.5'-12'				
8						SOIL/SLUDGE ~10'-12'				
10	S-1	X	✓ VOA	2.0 / 0.9		BLACK, MED. TO FINE SAND, POORLY GRADED, LOOSE, MOIST TO SATURATED		2-1-1		
12						~12' BOTTOM OF TANK				
14										

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

9301020D(a)

ABB Environmental Services, Inc.

NASB Field Boring Log

Client: **U.S. Navy, Brunswick**		Project No: 707709	Boring No.: MW 909
Contractor: DHB	Date Started: 1/17/93		Protection: D
Method: HSA/CASING	Casing Size: 4.25 (ID)		Completed: 1/18/93
Ground Elev.: 55.73	Soil Drilled: 40		PI Meter: HNU/TIP
Logged by: L. LaMarre / P. Bolmer	Checked by:		Total Depth: 40
Screen: 10 (ft.) Riser: (ft.)	Diam: 2" (ID)	Material: PVC	Below Ground:
			Page 1 of: 3

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
	S-1	1 - 3		2/0.7		<SAND> Reddish Brown Fine Sand, Trace Silt, Moist, Loose	SP	2/2/3/4 (6)		Cement
5	S-2	5 - 7		2/2	Bkg	<TRANSITION SOIL> Tan Fine Sand With Occasional Silty Fine Sand Seams And Gray Silt/Clay Layers.	SP-SM	10/11/13/11 (24)		Chips
10	S-3	10 - 12		2/1.4	Bkg	Stratified Brown Fine Sand, Little Silt, And Reddish Brown Fine Sand, Trace Silt, Wet, Medium Dense	SM	5/6/7/8 (13)		11.3
15	S-4	15 - 17		2/2	Bkg	Brown Fine Sand, Some Silt To Silty, Wet, Loose	SM	2/3/3/4 (6)		Vacuum
										18.9
20	S-5	17 - 21		2/1.4		Brown Silty Fine Sand With Reddish Brown Banding, Wet, Loose	SM	2/4/5/6 (9)		Chips

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (li)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

NASB Field Boring Log

			Boring No.: 909
Client: U.S. Navy, Brunswick		Project No.	Protection:
Contractor:	Date Started:		Completed:
Method: HSA/CASING	Casing Size: (ID)		PI Meter: HNK/TIP
Ground Elev.:	Soil Drilled:		Total Depth:
Logged by:	Checked by:		▽ Below Ground:
Screen: (ft.)	Riser: (ft.)	Diam: (ID)	Material: PVC

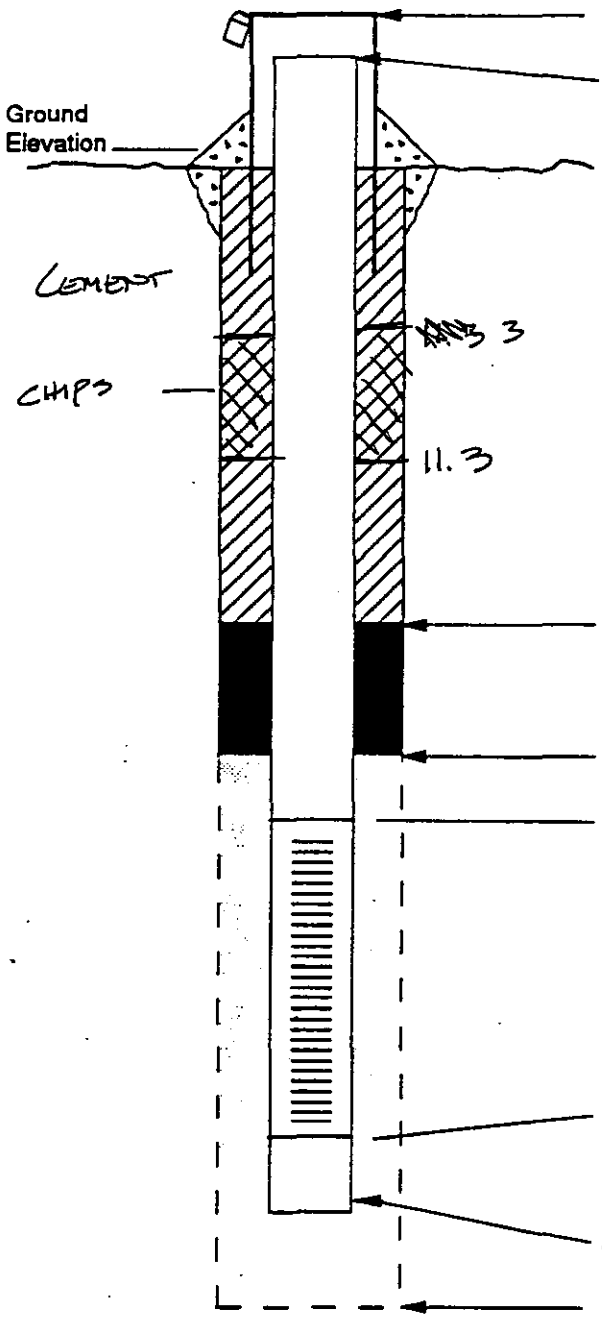
Page 2 of: 3

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
25	S-6	25 - 27	-	2/1.5		SIMILAR TO S-5 VERY LOOSE	SM	WOR/12"/2/6 (1)		
30	S-7	30 - 32		2/1.5		SIMILAR TO S-5, MEDIUM DENSE	SM	3/3/8/9 (11)		
						(SILTY CLAY)				
35	S-8	35 - 37		2/2		0-0.3 OLIVE SILTY CLAY 0.3-2 GRAY SILTY CLAY, FREQUENT FINE SAND LENSES: WET, VERY SOFT	ML CL	WOH/24"	SAND	
						SOIL RUNNING INTO AUGERS. OVERDRILL TO 40 FT TO CLEAN OUT.				
40						BOE @ 40 FT				

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

MONITORING WELL CONSTRUCTION DIAGRAM

Project NASB Site 9 Driller ~~M&D~~ M D'AMBROSIA
Project No. 212209 Boring No. 909 Drilling Method HSA
Elevation TBD Date Installed 1/18/93 Development Method



Elevation of Top of Surface Casing:
Stick-up of Casing Above Ground Surface:
Elevation of Top of Riser Pipe:
Type of Surface Seal: CEMENT
Type of Surface Casing: STEEL

ID of Surface Casing:

Diameter of Borehole:

Riser Pipe ID: 2"
Type of Riser Pipe: PVC

Type of Backfill: VOLCLAY GROUT

Elevation of Top of Seal:
Depth of Top of Seal: 18.9
Type of Seal: BENTONITE - PURE GOLD CHIPS

Elevation of Top of Sand:
Depth of Top of Sand: 22'
Elevation of Top of Screen:
Depth of Top of Screen: 25'

Type of Screen:
Slot Size x Length: 10 SLOT
ID of Screen: 2"

Type of Sandpack: POOL FILTER SAND

Elevation of Bottom of Screen:
Depth of Bottom of Screen: 35'
Depth of Sediment Sump with Plug:

Sediment Sump with Plug

Elevation of Bottom of Borehole:
Depth of Bottom of Borehole: 40'

93010200

ABB Environmental Services, Inc.

NASB Field Boring Log

Client: **U.S. Navy, Brunswick**		Project No. 7127 09	Boring No.: MW 910
			Protection: D
Contractor: NHB	Date Started: 1/12/93		Completed: 1/17/93
Method: HSA/CASING	~~Casing~~ Auger Size: 4.25 (ID)		PI Meter: HNK/TIP
Ground Elev.: 50.57	Soil Drilled: 17		Total Depth: 17 FT
Logged by: K. LaMarre	Checked by:		▽ Below Ground: 8.7
Screen: 5 (ft.)	Riser: 10.4 (ft.)	Diam: 2" (ID)	Material: PVC	Page 1 of: 2

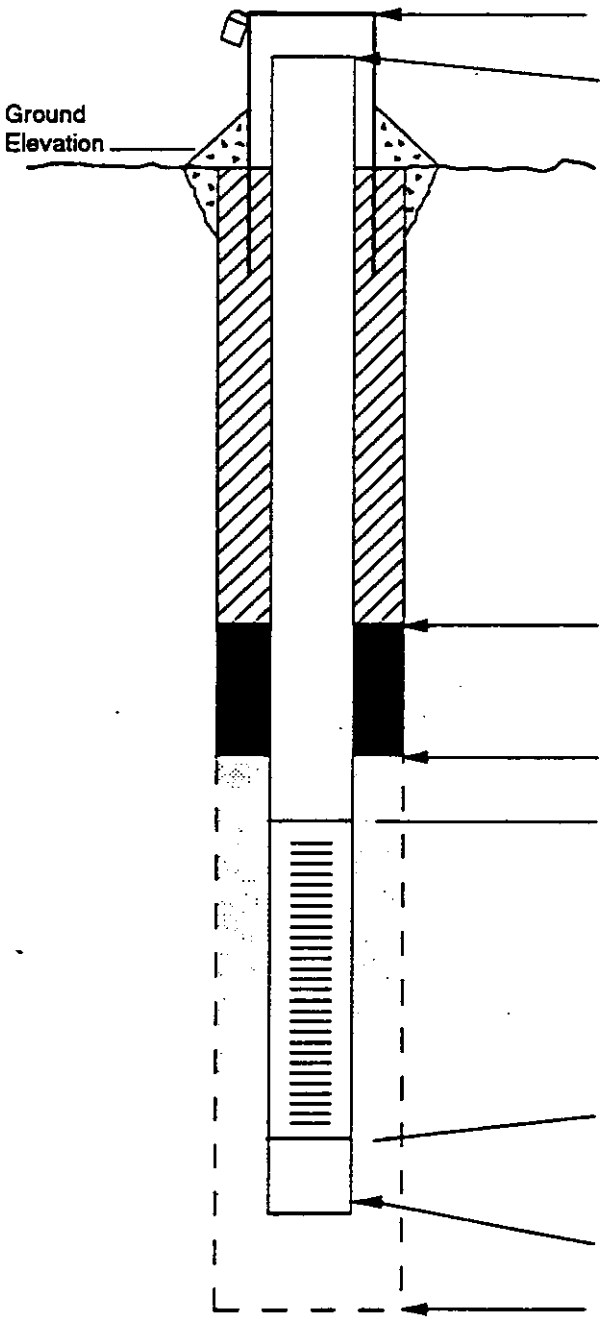
DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
						TOPSOIL - DARK BROWN FINE SANDY SILT W/ORGANICS 1' FROST				
						<SAND>				
	S-1	1 4 3	LA	2/1.7		0-0.1 BLACK SILTY FINE SAND 0.1-1.7 REDDISH BROWN TO TAN FINE SAND, MOIST, LOOSE	SP	2/2/3/4 (5)	CONCRETE	
5	S-2	5 1 7		2/1.7		0-0.2 SIMILAR TO S-1 (0.1-1.7) 0.2-0.4 REDDISH BROWN FINE SAND, MOIST 0.4-0.8 DARK BROWN FINE SAND LITTLE SILT, MOIST 0.8-1.7 BLACK FINE SAND, LITTLE SILT, WET MEDIUM DENSE	SP/SM	5/6/6/6 (12)	BENTONITE SEAL	
10	S-3	10 9 12		2/1.4		<TRANSITIONAL SOIL> 0-0.7 BROWN FINE SAND, SOME SILT 0.7-1.4 REDDISH BROWN AND BROWN FINE SAND, LITTLE SILT, WET	SM	3/2/4/3 (6)	SCREENED SAND PACK	
					BKG					
15	S-4	15 1 7		2/2		<SILTY CLAY> GRAY SILTY CLAY WITH OCCASIONAL FINE SAND LENSES. BLACK STREAKS AND TRACE SHELL FRAGMENTS. WET. VERY SOFT	MH/CL	4/24"		
20						BOE @ 17 FT INSTALL WELL				

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

2/2

MONITORING WELL CONSTRUCTION DIAGRAM

Project NASB Site 9 Driller MARK D'AMBROSIA
Project No. 7127-09 Boring No. MW 9G Drilling Method HSA
Elevation TBD Date Installed 1/17/93 Development Method



Elevation of Top of Surface Casing:
Stick-up of Casing Above Ground Surface: ~~3.4~~ ?
Elevation of Top of Riser Pipe: 3.4
Type of Surface Seal: CEMENT
Type of Surface Casing: ~~PVC~~ STEEL

ID of Surface Casing: 4".

Diameter of Borehole: 4.25" ID HSA

Riser Pipe ID: 2 INCH
Type of Riser Pipe: PVC ~~10 FEET~~

Type of Backfill: CEMENT TO SET WELL BOX

Elevation of Top of Seal:
Depth of Top of Seal: 3 FT
Type of Seal: BENTONITE PELLETS - PURE GOLD

Elevation of Top of Sand:
Depth of Top of Sand: 5 FT
Elevation of Top of Screen:
Depth of Top of Screen: 7'

Type of Screen: PVC
Slot Size x Length: 10 SLOT
ID of Screen: 2 INCH

Type of Sandpack: POOL FILTER SAND

Elevation of Bottom of Screen:
Depth of Bottom of Screen: 12'
Depth of Sediment Sump with Plug:

Sediment Sump with Plug

Elevation of Bottom of Borehole:
Depth of Bottom of Borehole: 13

93010200

ABB Environmental Services, Inc.

NASB Field Boring Log

Client: **U.S. Navy, Brunswick**		Project No. 7127-09	Boring No.: B-911
			Protection: D
Contractor: NHB	Date Started: 1-17-93		Completed: 1-17-93
Method: ~~HSA/CASING~~	Casing Size: (ID) 4.25" HSA		PI Meter: HNU
Ground Elev.:	Soil Drilled: 17'		Total Depth: 17'
Logged by: JR	Checked by:		▽ Below Ground: ~9'
Screen: / (ft.)	Riser: / (ft.)	Diam: / (ID)	Material: ~~PVC~~
			Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
2	S-1	X	Poor Recovery prevented collection for analysis	2.0/2.0	0	Brown to Dk. Brown fine to med sand w/ trace coarse sand & silt, moist, med. dense, well sorted, organics & wood-fill	SP	10 9 5 4		
4	S-2	X		2.0/1.8	0	Similar to S-1, moist, loose, mod. uniform grain size - layers of dark, organic material - fill		2 2 3 2		
6	S-3	X		2.0/1.0	0	0-0.4 Similar to S-1 0.4-0.8 Brown m-c sand, tr silt & fine sand - rusty stained layer & ash matl. 0.8-1.0 Black f-c sand w/ glass, ash, moist loose, well graded		1 5 3 2		
8	S-4	X		2.0/0.5	0	Brown m-c sand, some gravel, little fine sand, moist, loose, well graded Gravelly layer 8'-9' - kicked augers to side	ASH DUMP MATERIAL	10 6 3 3		
10	S-5	X		2.0/0.4	0	Dk. bn. f-c sand w/ ash, glass, debris, wet loose to med. dense, well graded		3 4 6 7		
12	S-6	X		2.0/0.6	0.5	Dk. bn. to blk. ash, glass, mixed w/ fine - coarse sand, pieces rubber. Water has oily sheen. Wet, dense, massive, well graded		5 14 14 17 8		
14	S-7	X		2.0/1.1	0	Top 0.6' blk. sandy ash fill w/ glass, paper etc. Bottom 0.6' brown to olive brown fine sand/some med. sand, wet, loose, well sorted, stratified w/ black layers (thin)	SP	3 2 5 7		
16	S-8	X		2.0/0.7	0	Lite brown to olive brown f. sand w/ some m. sand, wet, dense, well sorted, w/ some thin black layers		5 7 9 14		
18						B.O.B. @ 17'				
20										

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

9301020D(a)

ABB Environmental Services, Inc.

NASB Field Boring Log

			Boring No.: B-912
Client: **U.S. Navy, Brunswick**		Project No. 7127-09	Protection: D
Contractor: NHB	Date Started: 1-18-93		Completed: 1-18-93
Method: **HSA/CASING**	Casing Size: (ID) 4.25" HSA		PI Meter: HNU - N/A
Ground Elev.:	Soil Drilled: 18'		Total Depth: 18'
Logged by: TL	Checked by:		▽ Below Ground: ~8'
Screen: / (ft.) Riser: / (ft.)	Diam: / (ID)	Material: PVC	Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
2	S-1			2.0/2.0		BROWN SAND, FINE, TRACE GRAVEL, LOOSE, MOIST, CLEAN FILL	SP	8 7 7 4		
4	S-2			2.0/1.0		FINE to MED SAND, WELL SORTED, LOOSE w/ TRACE ASPHALT PIECES, RUSTY RED MOTTLES, FILL	SP	2 2 3 2		
6	S-3			2.0/1.0		COARSE & FINE SAND, TR. GRAVEL, LOOSE, MOIST		9 13 13 11		
8	S-4		✓	2.0/0.6		0-0.5' AS ABOVE then THIN BLACK SANDY ASH & FILL w/ WOOD & GLASS, WET AT TIP OF SPOON	ASH DUMP MATERIAL	7 5 2 1		
			✓	Pure recovery		VOC SAMPLE collected AT 7'-9' SVOC, P/P, INORGANICS FROM 9'-10'				
10	S-5			2.0/0.0		NO RECOVERY - BLACK WATER ON SPOON		8 2 3 2		
12	S-6			2.0/2.0		BLACK SATURATED FINE & MED. SAND w/ PLASTIC/Rubber-LIKE FIBERS IN MATRIX - ACTS LIKE GLUE when it STRETCHES while being PULLED APART, GLASS, ASH.		4 2 2 2		
14	S-7		✓	2.0/1.5		BLACK SANDY FILL, GLASS, WOOD, etc. over 3" of FIBROUS, peaty material		3 1 1 2		
16	S-8			2.0/1.0		4" of PEATY FIBROUS material over 8" of MICACEOUS FINE SAND w/ BLACK ORGANIC LENSES, well SORTED, LOOSE, SATURATED - BACKWATER DEPOSIT	SP	3 3 4 6		
18						B.O.B. @ 18'				
20										

PROPORTIONS	(-) AMOUNT (+)
Trace (tr)	0-10%
Little (ll)	10-20%
Some (so)	20-35%
and	35-50%

ABBREVIATIONS

f = fine	gr = gray	S = Split Spoon
m = medium	bn = brown	T = Thin Wall Tube Sample
c = coarse	blk = black	V = Vane Shear Test

9301020D(a)

ABB Environmental Services, Inc.

NASB Field Boring Log

Client: **U.S. Navy, Brunswick**		Project No. 7127-09	Boring No.: B-913
			Protection: D
Contractor: NHB	Date Started: 1-17-93		Completed: 1-17-93
Method: HSA/~~CASING~~	Casing Size: (ID) 4.25" HSA		PI Meter: HNU
Ground Elev.:	Soil Drilled: 17'		Total Depth: 17'
Logged by: TL	Checked by:		▽ Below Ground: ~9'
Screen: — (ft.) Riser: — (ft.)	Diam: — (ID)	Material: PVC	Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
						TOPSOIL - BROWN FINE SAND				
2	S-1	X		2.0/2.0	0	YELLOWISH BROWN AND BROWN FINE SAND, MICACEOUS, WELL SORTED OVER REDDISH BROWN TO BROWN LAYERED FINE SAND, LOOSE, DRY	SP	5 3 4 3		
4	S-2	X		2.0/0.8	0	AS ABOVE OVER DULL BROWN FINE SAND, WELL SORTED, CLEAN, STRATIFIED LOOSE, DRY TO MOIST	SP	3 5 12 13		
6	S-3	X		2.0/1.6	0	MOTTLED ORANGES TANS, BROWNS W/ LAYERED FINE SANDS, LOOSE, MOIST. SOME LENSES SLIGHTLY CEMENTED DUE TO IRON	SP	5 3 5 7		
8	S-4	X		2.0/1.7	0	0-0.6' AS ABOVE - SHARP CONTACT - RED 0.6'-1.7' BLACK FINE SAND, TR SILT, TR. COARSE SAND W/ ASPHALT PIECES, MOIST, MED. DENSE - ASH FILL? 8'-9' HARD DRILLING	SP	12 12 13 12		
10	S-5	X	VOA	2.0/1.3	0	SATURATED BLACK & RUSTY RED FILL WITH GLASS PIECES, BRICKS, SANDY FILL	ASH DUMP MATERIAL	1 2 1 5		
12	S-6	X	SVOA P/P INOR.	2.0	0	SATURATED BLACK FILL MATERIAL VOC collected AT 9'-11' SVOC, P/P, INORGANICS AT 11'-13'		3 4 3 2		
14	S-7	X		2.0/1.4	0	0-0.7' - BLACK SANDY, SILTY ASH-LIKE (AS ABOVE) SLIGHTLY PLASTIC 0.8'-1.4' - BROWN SAND W/ BLACK ORGANIC RICH MOTTLES LENSES, SATURATED WELL SORTED - FINE SAND	SP	3 5 11 13		
16	S-8	X		2.0/1.0	0	MOTTLED REDDISH FINE SAND, WELL SORTED, SATURATED, LOOSE, MICACEOUS WITH BLACK SPECS THROUGHOUT	SP	3 4 6 10		
18						B.O.B. @ 17'				
20										

PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

NASB Field Boring Log

			Boring No.: MW-914
Client: **U.S. Navy, Brunswick**		Project No. 7127-09	Protection: D
Contractor: NAB	Date Started: 3-3-93		Completed: 3-3-93
Method: ~~HSA/CASING~~	Casing Size: (ID) 4.25"		PI Meter: TE
Ground Elev.:	Soil Drilled: 17'		Total Depth: 17'
Logged by: TL	Checked by:		▽ Below Ground: ~9
Screen: 10 (ft.)	Riser: 9 (ft.)	Diam: 2" (ID)	Material: PVC
			Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
						DRILLED W/OUT SAMPLING TO 4'				
2										
4	S-1	X		2.0/1.6	0	0-0.8' - MAY BE OLD TOPSOIL - BRN. TO BLACK W/ GRAY LEACHED LAYERS, LOOSE, DRY TO MOIST 0.8'-1.6' - TAN LOOSE FINE SAND, WELL SORTED MOIST	SP	5 5 3 4		
6										
8										
10	S-2	X		2.0/2.0	0	0-1.5' - BROWN TO TAN FINE SANDS, VERY WELL SORTED, LOOSE, SATURATED, WITH THIN, BLACK ORGANIC-RICH LAYERS 1.5'-2.0' - BLACK ORGANIC RICH "PEATY" SOIL W/ PLANT FIBERS	SP/SM/Pt	2 1 → 1		▽
12										
14	S-3	X		2.0/1.5	0	OLIVE GRAY & DEEP BROWN MICACEOUS SAND, SATURATED, "DIRTY" TEXTURE, FEW ROOTS	SM	1 1 1 2		
16										
						B.O.B. = 17'				

PROPORTIONS	(-) AMOUNT (+)
Trace (tr)	0-10%
Little (ll)	10-20%
Some (so)	20-35%
and	35-50%

ABBREVIATIONS

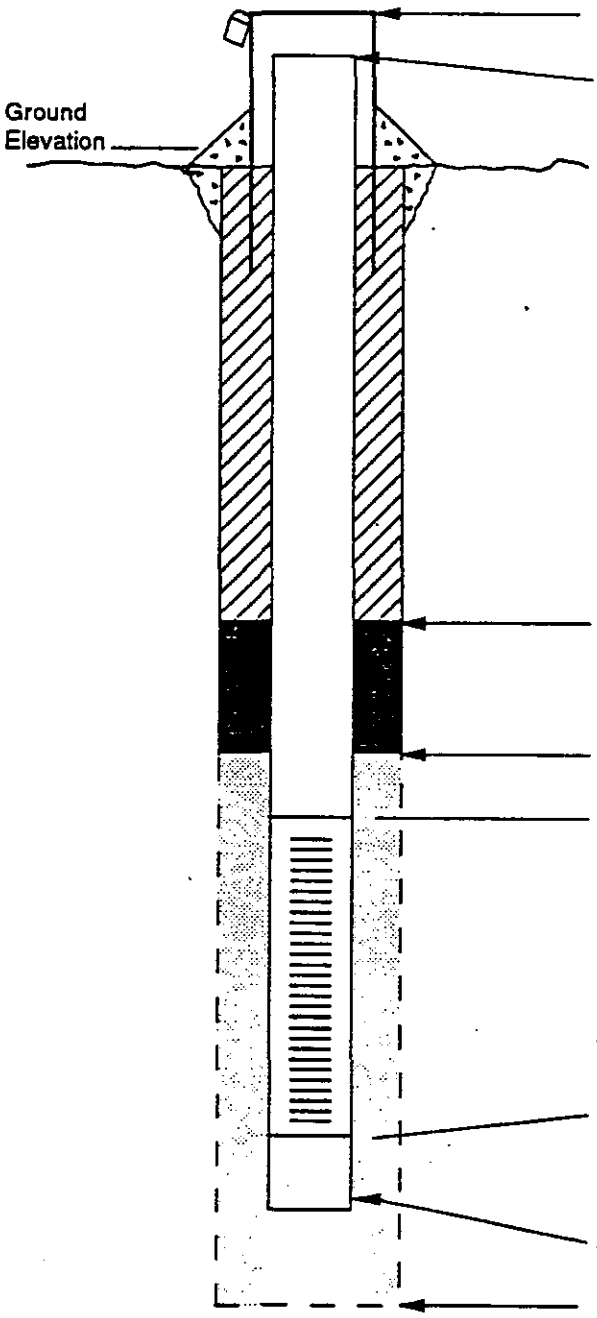
f = fine	gr = gray	S = Split Spoon
m = medium	bn = brown	T = Thin Wall Tube Sample
c = coarse	blk = black	V = Vane Shear Test

9301020D(a)

ABB Environmental Services, Inc.

MONITORING WELL CONSTRUCTION DIAGRAM

Project NASB Site SITE 9 Driller N.H. BORING / J. MICHAUD
Project No. 7127-09 Boring No. MW-914 Drilling Method HSA
Elevation _____ Date Installed 3-3-93 Development Method DRILL PUMP



Elevation of Top of Surface Casing: _____
Stick-up of Casing Above Ground Surface: _____
Elevation of Top of Riser Pipe: _____
Type of Surface Seal: CONCRETE
Type of Surface Casing: ~~CONCRETE~~ STEEL

ID of Surface Casing: 4"

Diameter of Borehole: 4.25" HSA

Riser Pipe ID: 2"
Type of Riser Pipe: PVC

Type of Backfill: CEMENTED-IN PROTECTIVE CASING TO 3'

Elevation of Top of Seal: _____
Depth of Top of Seal: 3'
Type of Seal: PURE GOLD BENT. CHIPS

Elevation of Top of Sand: _____
Depth of Top of Sand: 5'
Elevation of Top of Screen: _____
Depth of Top of Screen: 7'

Type of Screen: _____
Slot Size x Length: 10" X 0.01"
ID of Screen: 2"

Type of Sandpack: POOL FILTER SAND

Elevation of Bottom of Screen: _____
Depth of Bottom of Screen: 17'
Depth of Sediment Sump with Plug: N/A

Sediment Sump with Plug

Elevation of Bottom of Borehole: _____
Depth of Bottom of Borehole: 17'

93010200

ABB Environmental Services, Inc.

3-3-93 B-914

S-3 14'-16' 1-1-1-2 3.0/1.5 PID=0

Radiation Monitor = 0

Olive gray ; dely Brown

micaceous sand, saturated

"dirty" texture - few roots

Radiation Alert

Monitor 4

C-E ENV, INC. #10

Bkg. = 0.01 mR/hR. or less

13:45 Drilled to 17' & set well

Lead auger had very black sandy

material on it - looks natural -

but it appears to have fuel oil

soaked into it (black color)

NASB Field Boring Log

Client: **U.S. Navy, Brunswick**		Project No. 7127-09	Boring No.: MW-915
			Protection: D
Contractor: NHB	Date Started: 3-3-93		Completed: 3-3-93
Method: ~~HSA/CASING~~	Casing Size: (ID) 4.25" HSA		PI Meter: TE
Ground Elev.:	Soil Drilled: 17'		Total Depth: 17'
Logged by: TL	Checked by:		▽ Below Ground: ~9'
Screen: 10 (ft.)	Riser: 9 (ft.)	Diam: 2 (ID)	Material: PVC
			Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
2										
4	S-1	X		2.0/1.2	0	TAN FINE SAND, LOOSE, MOIST, very well SORTED	SP	8 11 13 11		
6										
8										
10	S-2	X		2.0/1.0	0	GRAY SAND, very well sorted, SATURATED - BOTTOM had apparent BLACK ASPHALT pieces	SP/SM	5 5 3 4		APPROX ▽
12	S-3	X		2.0/1.6	0	GRAY TO GRAY-GREEN TO BLACK AT BOTTOM MICACEOUS FINE SAND, SAT. SOME FINE ROOTS - OILY LOOK TO SANDS W/ FAINT HYDROCARBON ODOR	SM	4 3 4 4		
14	S-4	X		2.0/1.0	0	OLIVE GRAY MICACEOUS SAND, MOTTLED W/ PLANT FIBERS & FINE ROOTS, SATURATED - RED WOODY FIBERS AT BOTTOM - OILY LOOKING SAND AT TOP	SM	3 2 2 2		
16										
						B.O.B. @ 17'				

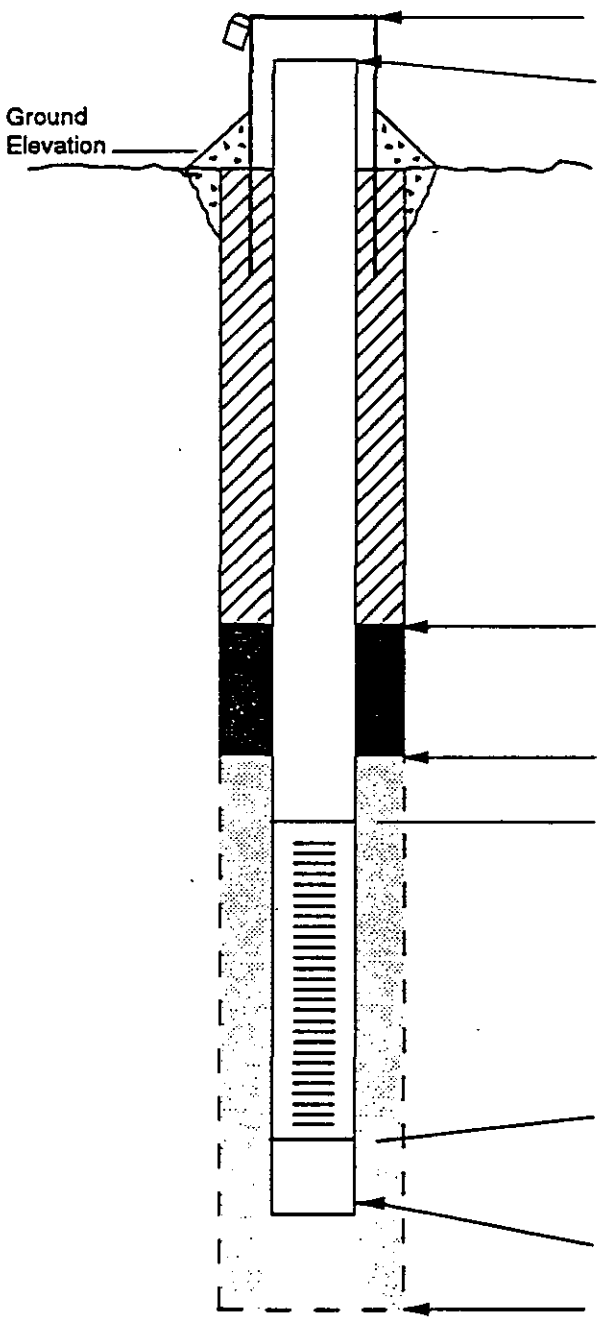
PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

9301020D(a)

ABB Environmental Services, Inc.

MONITORING WELL CONSTRUCTION DIAGRAM

Project NASB Site SITE 9 Driller N.A.B. / J. MICHAUD
Project No. 7127-09 Boring No. MW-915 Drilling Method HSA
Elevation _____ Date Installed 3-3-93 Development Method DRILL PUMP



Elevation of Top of Surface Casing: _____
Stick-up of Casing Above Ground Surface: _____
Elevation of Top of Riser Pipe: _____
Type of Surface Seal: CONCRETE
Type of Surface Casing: STEEL

ID of Surface Casing: 4"

Diameter of Borehole: 4.25" HSA

Riser Pipe ID: 2"
Type of Riser Pipe: PVC

Type of Backfill: CONCRETE TO SURFACE FROM 3' DEPTH

Elevation of Top of Seal: _____
Depth of Top of Seal: 3'
Type of Seal: PURE GOLD BENT. CHIPS

Elevation of Top of Sand: _____
Depth of Top of Sand: 5'
Elevation of Top of Screen: _____
Depth of Top of Screen: 7'

Type of Screen: PVC
Slot Size x Length: 10' x 0.01"
ID of Screen: 2"

Type of Sandpack: POOL FILTER SAND

Elevation of Bottom of Screen: _____
Depth of Bottom of Screen: 12'
Depth of Sediment Sump with Plug: N/A

Sediment Sump with Plug

Elevation of Bottom of Borehole: _____
Depth of Bottom of Borehole: 17'

93010200

ABB Environmental Services, Inc.

NASB Field Boring Log

			Boring No.: MW-916
Client: **U.S. Navy, Brunswick**		Project No. 7127-09	Protection: D
Contractor: NHB	Date Started: 3-4-93		Completed: 3-4-93
Method: **HSA/~~CASING~~**	Casing Size: (ID) 4.25" HSA		PI Meter: TE
Ground Elev.:	Soil Drilled: 17'		Total Depth: 17'
Logged by: TL	Checked by:		▽ Below Ground: ~9
Screen: 10 (ft.)	Riser: 9 (ft.)	Diam: 2 (ID)	Material: PVC	Page 1 of: 1

DEPTH (FT)	SAMPLE NUMBER	SAMPLE DEPTH	LAB ANALYSES	PEN/RECOVERY	PID (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS	BLOWS/6-IN.	WELL DATA	ELEVATION (FT.)
2										
4	S-1	X		2.0/1.3	0	FILL OVER OLD TOPSOIL - BLACK TO TAN FILL, FINE SAND, LOOSE, MOIST TO DRY OVER BRIGHT ORANGE-YELLOW FINE CLEAN SAND, LOOSE, MOIST	SP	6 6 6 8		
6										
8										
10	S-2	X		2.0/1.1	0	OLIVE GRAY W/ RUSTY RED LENSES IN A SATURATED, FINE SAND, V. WELL SORTED, TRACE SILT, LOOKS NATURAL	SP	6 8 8 10		Approx. ▽
12										
14	S-3	X		2.0/1.5	0	GRAY BROWN MICACEOUS SAND, SATURATED, VERY WELL SORTED, CLEAN	SP/SM	3 4 3 3		
16										
						B.O.B. @ 17'				

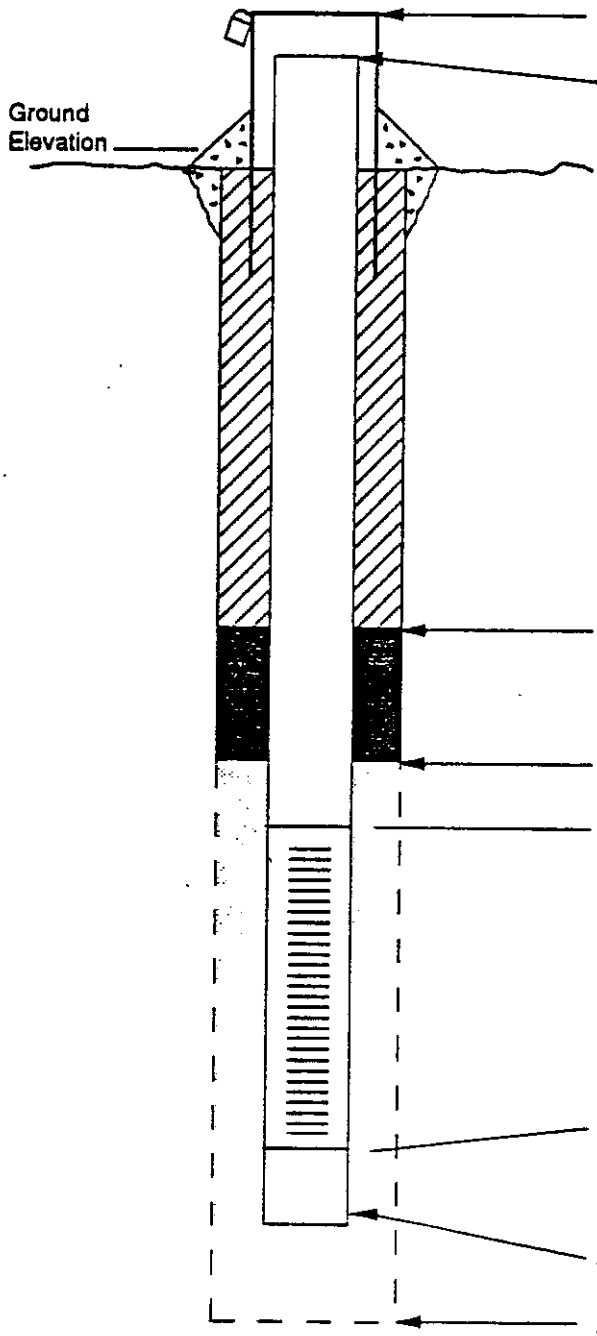
PROPORTIONS	(-) AMOUNT (+)	ABBREVIATIONS		
Trace (tr)	0-10%	f = fine	gr = gray	S = Split Spoon
Little (ll)	10-20%	m = medium	bn = brown	T = Thin Wall Tube Sample
Some (so)	20-35%	c = coarse	blk = black	V = Vane Shear Test
and	35-50%			

9301020D(a)

ABB Environmental Services, Inc.

MONITORING WELL CONSTRUCTION DIAGRAM

Project NASB Site SITE 9 Driller NHB / J. MICHAUD
Project No. 7127-09 Boring No. MW-916 Drilling Method HSA
Elevation _____ Date Installed 3-4-93 Development Method DRILL PUMP



Elevation of Top of Surface Casing: _____
Stick-up of Casing Above Ground Surface: _____
Elevation of Top of Riser Pipe: _____
Type of Surface Seal: CONCRETE
Type of Surface Casing: STEEL

ID of Surface Casing: 4"

Diameter of Borehole: 4.25" HSA

Riser Pipe ID: 2"
Type of Riser Pipe: PVC

Type of Backfill: CONCRETE FROM 0'-3' BGS

Elevation of Top of Seal: _____
Depth of Top of Seal: 3'
Type of Seal: PURE GOLD BENT. CHIPS

Elevation of Top of Sand: _____
Depth of Top of Sand: 5'
Elevation of Top of Screen: 7'
Depth of Top of Screen: _____

Type of Screen: PVC
Slot Size x Length: 10" x 0.01"
ID of Screen: 2"

Type of Sandpack: POOL FILTER SAND

Elevation of Bottom of Screen: _____
Depth of Bottom of Screen: 17'
Depth of Sediment Sump with Plug: N/A

Sediment Sump with Plug

Elevation of Bottom of Borehole: _____
Depth of Bottom of Borehole: 17'

9301020D

ABB Environmental Services, Inc.

COPIES OF FIELD NOTES TAKEN

DURING TERRAPROBE SURVEY

BNAS

2-25-93

Terraprobe survey w Bldg. 219 Green - T. Loyley & F. Hogan

T-1 8-10' 78'N 11'E — AT B-913 Took 8'-10' sample - wood & metal - Trash - 1'0 vel T.D 25' EAST of this boring -

T-2 - 8-10' 78'N 25'E — Took 8'-10' - SAND - ~~Took 10'-12'~~ Poor recovery - But got gray, black, tan FINE SAND

T-2 10-12 — SANDS - SAT. - NO ASH

2-25-93

Terraprobe Bldg. 219

T-3 — LOCATION IS 50' Along Bldg. 219 & 6' EAST

9'-11' Sample BLACK SAND w/ TAN SAND, wet looks like ash fill material

11'-13' BLACK ASH FILL

T-4 — LOCATION = 30' NORTH Along Bldg. 219 & 6' EAST

9'-11' CLEAN ORANGE BROWN FINE SANDS SATURATED

T-5 — LOCATION - 100' NORTH on Bldg. 219 & 6' EAST

9'-11' BLACK & ORANGE & SAND wet, WOOD FIBERS, etc., FILL

2-25-93 Terraprobe

T-6 LOCATION IS 120' NORTH along Bldg. 219 & 6' EAST

9'-11' CLEAN ORANGE TAN SAND, WET

T-7 Location is on WEST SIDE OF Bldg. 219 - 36' North on Bldg. 219 & 8' WEST

9'-10' Refusal @ 10'

GRAVELLY ORANGE SAND

T-8 LOCATION IS 60' North on WEST of Bldg. 219 & 8' WEST

AT 4', Became FIRM

9'-11' FIRM

GRAVELLY TAN SAND, WET

T-9 LOCATION - on WEST SIDE BLDG. 219

29' South of BREEZEWAY & 30' WEST OF BLDG. 219

~~9'-11'~~

2' to 5' Very FIRM, kicking probe TO THE WEST

5' to 7' SOFT

7' to 9' FIRM AGAIN

9'-11' No RECOVERY (AS IN B-911)

11'-13' RODS PUSHED DOWN

FAST TO SLOW - Looks Like Fill

BLACK SATURATED ASH FILL GLASS, etc.

T-10 LOCATION 6' South of BREEZEWAY & 7½' WEST OF BLDG. 219

- FILL - TRASH - BLACK, SATURATED, BRICK, GLASS, METAL

2-26-93 Terryonbe

V. Cold - T. Lofy & F. Harran

T-11 9'-11'

ORANGE & TAN FINE SILTY SAND, TR. C. SAND, SAT.

NO ASH FILL

LOCATION 80' NORTH on E. SIDE BLDG. 218 & 23' WEST OF Bldg. 215

T-12 9'-11'

DARK TAN SANDS, NO ASH BUT DEFINITELY FILL - AT 10' went Through piece of wood - SATURATED, WELL SORTED

11'-13'

OLIVEGRAY F. SAND, SATURATED, TOP HAD FIBROUS (PEAT)

T-12 material, woody plant pieces, smells like swamp sediments - NO ASH FILL

LOCATION 8' ~~WEST~~ EAST of Bldg. 218 & 5' South of Breezeway

T-13 9'-11' SATURATED BLACK ASH FILL MATERIAL - ASH & SAND LAYERS

LOCATION - 24' West of Bldg. 219 & 56' South of Breezeway

T-14 9'-11' (9' W. Bldg. 218, 26' S. of Breezeway)

DARK, DIRTY SATURATED SAND - MAY HAVE BITUMEN PIECE - POOR RECOVERY - YELLOW BLACK - yellow SAND & BLACK SAND MIX

11'-13' BLACK, SATURATED, W/ METAL PIECES - LOOKS LIKE ASH - FILL AT ANY RATE W/ TAR (PUDDLES) THROUGHOUT

2-26-93

T-15 9'-11' BRIGHT ORANGE SPECKLED SAND W/ OLIVE GRAY TO BLACK GRITTY SAND - TRACE OF CLAY LENSE - RUSTY - GRITTY WET SANDS - ~~FILL BUT NOT MUCH LE~~ ~~ANY ASH~~ MAY HAVE BITUMINOUS MIXED IN - SOME WOOD-LIKE ASH FRAGMENTS

11'-13' OLIVE GRAY SILTY SAND SATURATED, NO ASH

20' WEST OF BLDG. 219

84' South of Breezeway

2-26-93 Terrapaks

T-16 9'-11' Very Little recovery GLASS pieces, water - Rusty - Red fill, saturated - Location 24' West of Bldg. 219 14' South of Breezeway

T-17 9'-11' Very little recovery Bright orange, rusty, gritty sand, saturated & black bitumen-like, gray & saturated loose 2½' South of Breezeway 14½' EAST of Bldg. 218

4-19-93 BNAS

0800 T. Longley } ABB on Site
F. HAGAN }

Weather: Sunny, Pleasant
55°F, Calm

AT Bldg. 219-220 area w/
Terraprobe Truck to conduct
probings to check for extent
of ash filled area & Incinerator
Will have to check w/ Metal
Detector/Conduit Locator
for buried utilities.

TP-18 LOCATION 2.5' North of Freeway
& 4.5' ~~West~~ EAST of Bldg. 218
AT 8'-9' 4-19-93
Have Clean TAN, Gravelly
SAND looks ~~like~~ like fill
No ash

4-19-93 BNAS Terraprobe

0900 TROY Smith ME DEP arrives on Site

12'-13' - No Recovery - move over

12'-13' - Second Try - FILL - Gravelly SAND, SATURATED, No Ash

T-19 Location 26' North Breezeway & 7' EAST of Bldg. 218

8'-9' Wet, SAT. TAN MED. SANDS - clean

11' Refusal?

T-20 Location: 8' North Breezeway & 29½' EAST of Bldg. 218

8'-9' Some black ash mixed w/ concrete pieces & bright red Rusty soil & chalky soil

4-19-93 Terraprobe BNAS

Recovery is poor - saturated mostly (80-85%) brown SAND Though.

T-20 9'-10' Black & Reddish chalky ash w/ Glass fragments - Saturated. Ash here is not just black but chalky-red also

T-21 8'-9' Bright Reddish Rusty GRIT w/ GLASS etc. & thin black ash-like mat'l. - Gravelly SAND

(Location is 23' North of Breezeway & 32' EAST of Bldg. 218)

SATURATED, w/ GRAY leached fence also (burned Ash?)

9'-10' AS ABOVE - glass & fill in Rusty Red soil matrix

4-19-93 Terraprobe BNAS

T-22 Location - 5' North of Breezeway
& 12' West of Bldg. 219
- Ash mat'l as @ T-21

11:10 Troy Smith leaves site
w/ glass, gray leached ash,
Rusty Red soil matrix, demolition
pieces, etc.

T-23 Location is 23' West of 219
& 10' South along Bldg. 219
FUEL ODOR TO SAMPLE AT
RETRIEVAL - VERY HEAVY ODOR
GRAY, very well sorted FINE
SAND - Looks NATURAL - No
(8'-10' sample) GRITTY texture
while pushing

4-19-93 Terraprobe Sunny BNAS

T-24 Location is 5½' EAST of NE
Corner of Bldg. 218
8'-9' Yellow BRN. FINE, well
Sorted, clean Sands
12'-13' Saturated gray to yellow
BRN., Silty Fine SAND -
clean

T-25 Refusal @ 3' - VERY SOLID
Location is 6.5' E of Bldg. 220
& 10.5' South of NE corner

T-26 Location is 6' E of Bldg. 220
10' N of Breezeway
8'-9' Yellowish gray brown,
Well sorted FINE SANDS - SAT.
10'-11' AS ABOVE
Clean Sands - no resistance to probe
while pushing into ground

4-19-93 Terraprobe BNAS

T-27 Location is 7' North & in line w/ E. Side of Bldg. 220
8'-9' Sat. fine, well sorted Dark sands - clean -
No resistance to probe as going into the soils

T-28 Location 11' East of Bldg. 220 &
9' South of NE Corner
9'-10' same as @ T-27 - clean from the surface to depth

T-29 Location, 9' North of Breezeway &
14' West of Bldg. 218
9'-10' Natural ~~Black~~ Dark Gray To Gray Brn. Fine, well sorted micaceous sand w/ Some plant fibers - Smell bog-like

4-19-93 Terraprobe NASB

T-30 Location 7' West of Bldg. 218 & 3.5' North of NW-Corner
9'-10' Gray V. Fine & well sorted silt & F. Sand, sat.

T-31 Location 21' East of Bldg. 218 & 5.5' S. of NE Corner of 218
9'-10' Gray-Brown, micaceous Fine silty sand, well sorted, sat. clean

T-32 Location 19' North of Breezeway
15:50 & 13' West of Bldg. 219
9'-10' Black organic rich layer w/ roots over ~~Brn~~ Gray Brn. To Dk. Gray silt & F. Sand w/ Bright Rusty concretions & woody fibers - natural.

4-19-93 Terraprobe BNAF

T-33 Location 12' East of Bldg. 219 &

35' South of Breezeway

9'-10' Saturated Olive Brn,

micaceous, fine silty

sand, clean

DO

DO

APPENDIX B

ANALYTICAL RESULTS
1993 FIELD INVESTIGATIONS AT SITE 9

SITE 9
SOIL RESULTS:
CP-1 CP-2 CP-3
CP-4 CP-5 CP-6
SB-912 SB-913

To: Tom Longley

From: Kate Kuebler

Date: March 30, 1993

Subject: Validation : Brunswick Naval Air Station : Soil and Cesspool Samples
Project No.: 07127-05 and 07127-09
Sampling Date: January 17 - 20, 1993

Review is complete for the data packages generated by NET and ESE pertaining to soil and cesspool samples collected at the Brunswick Naval Air Station. Review was performed following USEPA Region I guidelines. Samples were analyzed for TCL volatile, semivolatile, and pesticide/PCB organics following USEPA 3/90 Statement of Work (3/90 SOW), TAL inorganics (3/90 SOW), organophosphorus pesticides using SW846 Method 8140, Rotenone and Pyrethrins using SW846 Method 8130, and TCLP volatile organics. Data packages were generally complete with the following resubmissions requested:

1. Form X (10-A) - Pesticide Identification Summaries for two samples.
2. Form VIII - Pesticide analytical sequence summary.
3. Clarification of reporting limits for TCLP analyses.

The data tables referred to in this memo are comprised of the following:

Table 1 : Laboratory Report of Analysis
Table 2 : Validation / Summary Table
Table 3 : Summary Table

The following subsections summarize the qualifications/edits that have been determined by validation.

All Organic Analyses

Compound results below the CRQL were flagged with a J by the laboratory and on Table 1. These results were considered estimated and flagged J on Tables 2 and 3.

Compound results greater than the calibration range were flagged with an E by the laboratory and on Table 1. Samples containing these compounds were diluted and reanalyzed, and the diluted results flagged with a D by the laboratory and on Table 1. On Table 2, the diluted results for all compounds beyond calibration range were inserted into the original results and the remainder of the diluted analysis deleted from Table 2 and Table 3.

Inorganic Analyses

Analytical results below the CRDL were flagged with a B by the laboratory and on Table 1. These results were considered estimated and flagged with a J on Tables 2 and 3.

Volatile Analyses - Qualifications/Edits

1. Due to method blank contamination, methylene chloride should be considered nondetect in all 09CP and 09SB samples, and in 95SSX11.

2. Due to method blank contamination, acetone should be considered nondetect in 09CPXX2X12, 09CPXX3XX9, 09SB912X10 and 95SSXX1.

3. Positive results for acetone were estimated in 09CPXX4X12 and 09CPXX6X11 because the continuing calibration standard percent differnece was greater than 25%.

Volatile Analyses - Comments

Please see items 1 - 3 under **Qualifications/Edits**. All hold time, instrument tune, internal standard, surrogate recovery, matrix spike, matrix spike duplicate, and method blank results were within QC limits. Initial and continuing calibration standards that did not meet QC limits had no effect on the results except as discussed above. All field duplicate results were acceptable. Volatile TICs were identified in seven samples. There was no equipment blank associated with the 95SS samples.

Semivolatile Analyses - Qualifications/Edits

4. Internal standard (IS) area for perylene-d10 was below QC limits in both the initial and reanalysis of 95SSX11. The IS area in the reanalysis was better than the initial so the results of the reanalysis were presented on Tables 2 and 3. All compounds quantitated with this internal standard were estimated.

5. Field duplicate relative percent difference (RPD) exceeded 50% for phenanthrene in the analysis of 95SSXX1 and its duplicate. The results were estimated.

6. The relative standard deviation (RSD) for bis(2-ethylhexyl)phthalate in the initial calibration standard exceeded 50%. Results were estimated in all 09SB samples.

Semivolatile Analyses - Comments

Please see items 4 - 6 under **Qualifications/Edits**. All hold time, instrument tune, method blank, and surrogate recovery criteria were met for all sample analyses. Initial and continuing calibration standards that did not meet QC limits had no effect on the results. Manual integration of the peaks of several compounds was required. No qualification was necessary. The field duplicate results were acceptable in 95SSXX4. Matrix spike (MS) and matrix spike duplicate (MSD) results associated with 95SSXX5 were acceptable. The matrix spike associated with 09SB913 had recovery below QC limits for pyrene. Semivolatile TICs were identified in most samples.

Pesticide/PCB Analyses - Qualifications/Edits

7. Because of matrix interferences and off-scale peaks, analytical results from the initial analysis of 09BS912 were unacceptable. The diluted analysis results were acceptable and were presented on Tables 2 and 3.

8. All surrogate recoveries were below the QC limit in the analysis of 95SSXX4/XD. All results were estimated.

9. Field duplicate results did not meet QC criteria for both pairs of field duplicates. Results were estimated for the following compounds:

95SSXX1XXX93XX/XD	Heptachlor epoxide 4,4'-DDD 4,4'-DDE 4,4'-DDT Methoxychlor
95SSXX4XXX93XX/XD	4,4'-DDE 4,4'-DDT

10. The resolution of DDE in the resolution check standard did not meet QC criteria. All positive results were estimated.

11. Initial calibration linearity criteria were not met for several compounds. Positive and nondetect results for the following compounds were estimated in associated samples:

alpha-BHC	4,4'-DDD	Dieldrin
delta-BHC	4,4'-DDE	
gamma-BHC	4,4'-DDT	
Aldrin	Endosulfan II	
Heptachlor epoxide	Endosulfan sulfate	
Endrin ketone	alpha Chlordane	
Endrin aldehyde	gamma Chlordane	

12. Continuing calibration criteria were not met for beta-BHC, 4,4'-DDT, methoxychlor, and endrin aldehyde. Positive and nondetect results for these compounds were estimated in associated samples.

Pesticide/PCB Analyses - Comments

Please see items 7 - 12 under **Qualifications/Edits**. All hold time, method blank, instrument blank, standard sequencing and compound retention time criteria were met. The matrix spike (MS) associated with 09SB913 had recovery of gamma-BHC below QC limits. The matrix spike duplicate (MSD) associated with 95SSXX5 had recovery for 4,4'-DDT above QC limits. All other MS and MSD results were acceptable.

Inorganic Analyses - Qualifications/Edits

13. Due to blank contamination, results less than the concentrations listed below should be considered nondetect in associated samples. The action levels listed below must be corrected for percent solids in individual samples.

<u>09BS samples</u>

Beryllium	1.3 mg/kg	Sodium	470 mg/kg
Cobalt	9.5 mg/kg	Vanadium	10.3 mg/kg
Nickel	25.2 mg/kg		

13.(cont)

95SS Samples

Barium	10.5 mg/kg
Nickel	15.1 mg/kg
Silver	7.8 mg/kg

14. Spike sample recovery for several analytes was outside QC limits. Results for the following analytes were qualified as shown:

09BS Samples	Antimony	J(+) UJ(nd)
	Selenium	J(+) UJ(nd)
	Cyanide	J(+) R (nd)
	Copper	J(+)
95SS Samples	Antimony	J(+) R (nd)
	Lead	J(+) UJ(nd)
	Selenium	J(+) UJ(nd)
	Mercury	J(+)

15. Laboratory duplicate precision criteria were not met for barium, iron, and manganese. Positive results were estimated in all 09BS samples.

16. Field duplicate precision criteria were not met for lead in the duplicate pair 95SSXX4/XX and 95SSXX4/XD. All positive lead results were estimated in the 95SS samples.

Inorganic Analyses - Comments

Please see items 13 - 16 under **Qualifications/Edits.** All appropriate QC criteria were reviewed and found acceptable unless noted under **Qualifications/Edits**. Field duplicate results were acceptable for 95SSXX1/XX and 95SSXX1/XD.

TCLP Volatile Analyses - Qualifications/Edits

There were no qualifications or edits to these data.

TCLP Volatile Analyses - Comments

All hold time, method blank, surrogate recovery, internal standard, and initial calibration criteria were within QC limits. There were no matrix spike, matrix spike duplicate, or field duplicate analyzed.

Rotenone/Pyrethrin Analyses - Qualifications/Edits

There were no qualifications or edits to these data.

Rotenone/Pyrethrin Analyses - Comments

Data were reviewed for hold times, matrix spike and matrix spike duplicate recovery, lab control sample recovery, field duplicate precision, method blank contamination, and calibration curve criteria. All QC results were acceptable.

Organophosphorus Pesticide Analyses - Qualification/Edits

17. Surrogate recovery in 95SSXX7 was less than 10%. All nondetect results were rejected.

Organophosphorus Pesticide Analyses - Comments

Please see item 17 under **Qualifications/Edits**. All hold time, standard sequencing, and method blank criteria were met. Most matrix spike (MS) and all matrix spike duplicate (MSD) recoveries were above QC limits. Additionally, nine of twenty compounds in the laboratory control sample (LCS) were above QC limits. Six target compounds were detected in the initial analysis of 95SSXX9 but were suspected contamination from the matrix spike. No target compounds were detected in the reanalysis of this sample. Several samples were reanalyzed because of elevated baselines in the chromatograms. Field duplicate results were nondetect in both duplicate pairs.

TENTATIVELY IDENTIFIED COMPOUND (TIC) SUMMARY
FOR NASB; FILE: 7127-101
SOIL (ug/kg)

VOLATILE

	09PCXX4X1293XX	09PCXX5X1193XX	09PCXX6X1193XX	09SB912X1693XX
C7H6C12 Isomer	6 J			
C9H18 Isomer		12 J		
C10H18 Isomer		14 J		
C9H12 Isomer			13 J	
C10H14 Isomer			13 J(2)	
C7H6C12 Isomer			68 J(3)	
C13H28 Isomer				14 J
Unknown Alkane				22 J

NO VOLATILE TICs WERE IDENTIFIED IN THE FOLLOWING SAMPLES:

09CPXX1X1193XX 09SB912X1093XX
09CPXX2X1293XX 09SB913XX193XX
09CPXX3XX993XX

SEMIVOLATILE

	09SB912X1093XX	09SB912X1693XX	09SB913X1193XX
C17H12 Isomer	360 J(2)		800 J
C20H12 Isomer	750 J(2)		2600 J(2)
Unknown Aldol	4400 J	10000 J	4000 J
Unknown Alkane	480 J	20000 J(7)	4200 J(4)

TENTATIVELY IDENTIFIED COMPOUND (TIC) SUMMARY
FOR NASB; FILE: 7127-106
SOIL (ug/kg)

SEMIVOLATILE

	95SSX10XXX93XX	95SSX11XXX93XX	95SSX11XXX93XXRE	95SSX12XXX93XX
Unknown Alkane	870 J(2)		520 J	310 J
C20H12 Isomer	520 J(2)			
9H-Fluoren-9-One		190 JN	190 JN	
C15H12 Isomer		480 J(2)	600 J(3)	
C16H12 Isomer		190 J		
9,10-Anthracenedione		520 JN	750 JN	
C17H12 Isomer		450 J(2)	410 J	
7H-Benz[de]Anthracen-7-One		220 JN	220 JN	
C18H10 Isomer		260 J	220 J	
C20H12 Isomer		1800 J	1200 J	
Benzo[b]Naphtho[2,3-d]Furan			150 JN	

	95SSXX1XXX93XX	95SSXX1XXX93XXD	95SSXX2XXX93XX	95SSXX3XXX93XX
Unknown Alkane	1850 J(3)	3360 J(3)	860 (2)	4900 J(4)
C20H12 Isomer	270 J			
Cyclohexanecarboxulic acid		270 JN		
C18H340 Isomer			180 J	970 J
Ergost-5-EN-3-ol				230 JN
.gamma.-Sitosterol				2200 JN

	95SSXX4XXX93XX	95SSXX4XXX93XD	95SSXX5XXX93XX	95SSXX6XXX93XX
Unknown Alkane	1060 J(2)	1200 J(2)	1500 J(4)	5500 J(5)
C18H340 Isomer		230 J		1100 J
C29H500 Isomer		830 J		

	95SSXX7XXX93XX	95SSXX8XXX93XX	95SSXX9XXX93XX
Unknown Alkane	4200 J(4)	1700 J(3)	670 J(2)
.gamma.-Sitasterol	790 JN		
9,10-Anthracenedione			210 JN
C17H12 Isomer			210 J
C14H10C14 Isomer			420 J(2)
C18H10 Isomer			140 J
C20H12 Isomer			570 J(2)

TENTATIVELY IDENTIFIED COMPOUND (TIC) SUMMARY
FOR NASB; FILE: 7127-103
SOIL (ug/kg)

VOLATILE

NO VOLITILE TICs WERE IDENTIFIED IN THE FOLLOWING SAMPLES:

95SSX10XXX93XX	95SSXX2XXX93XX	95SSXX6XXX93XX
95SSX11XXX93XX	95SSXX3XXX93XX	95SSXX7XXX93XX
95SSX12XXX93XX	95SSXX4XXX93XX	95SSXX8XXX93XX
95SSXX1XXX93XX	95SSXX4XXX93XD	95SSXX9XXX93XX
95SSXX1XXX93XD	95SSXX5XXX93XX	95SSXX9XXX93XD

TENTATIVELY IDENTIFIED COMPOUND (TIC) SUMMARY
FOR NASB; FILE: 7127-101
AQUEOUS (ug/L)

VOLATILE

NO VOLATILE TICs WERE IDENTIFIED IN THE FOLLOWING SAMPLE:

09QSXX1XXX93XX

SEMIVOLATILE

	09QSXX1XXX93XX
2-Ethyl-Hexanal	7 J

br101w

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09CPXX1X1193XX	09CPXX4X1293XX	09CPXX5X1193XX
LAB NUMBER:		71185	71186	71187
DATE SAMPLED:		01/19/93	01/19/93	01/19/93
DATE ANALYZED:		01/28/93	01/28/93	01/28/93
ANALYTE	RL			
Benzene	25	25 U	25 U	25 U
Carbon Tetrachloride	25	25 U	25 U	25 U
Chlorobenzene	25	25 U	25 U	25 U
Chloroform	25	25 U	25 U	25 U
1,2-Dichloroethane	25	25 U	25 U	25 U
Methyl Ethyl Ketone	100	100 U	100 U	100 U
1,1-Dichloroethylene	25	25 U	25 U	25 U
Tetrachloroethene	25	25 U	25 U	25 U
Trichloroethene	25	25 U	25 U	25 U
Vinyl Chloride	100	100 U	100 U	100 U
Associated Method Blank:		K6954	K6954	K6954
Associated Equipment Blank:		-	-	-
Associated Field Blank:		-	-	-

Site: CESSPOOL
Note: TCLP Analysis

Table 2
Validation / Summary Table

SAMPLE LOCATION:		09CPXX1X1193XX	09CPXX4X1293XX	09CPXX5X1193XX
LAB NUMBER:		71185	71186	71187
DATE SAMPLED:		01/19/93	01/19/93	01/19/93
DATE ANALYZED:		01/28/93	01/28/93	01/28/93
ANALYTE	RL			
Benzene	25	25 U	25 U	25 U
Carbon Tetrachloride	25	25 U	25 U	25 U
Chlorobenzene	25	25 U	25 U	25 U
Chloroform	25	25 U	25 U	25 U
1,2-Dichloroethane	25	25 U	25 U	25 U
Methyl Ethyl Ketone	100	100 U	100 U	100 U
1,1-Dichloroethylene	25	25 U	25 U	25 U
Tetrachloroethene	25	25 U	25 U	25 U
Trichloroethene	25	25 U	25 U	25 U
Vinyl Chloride	100	100 U	100 U	100 U
Associated Method Blank:		K6954	K6954	K6954
Associated Equipment Blank:		-	-	-
Associated Field Blank:		-	-	-

Site: CESSPOOL
Note: TCLP Analysis

Table 3
Summary Table

SAMPLE LOCATION:		09CPXX1X1193XX	09CPXX4X1293XX	09CPXX5X1193XX
LAB NUMBER:		71185	71186	71187
DATE SAMPLED:		01/19/93	01/19/93	01/19/93
DATE ANALYZED:		01/28/93	01/28/93	01/28/93
ANALYTE	RL			
Benzene	25	-	-	-
Carbon Tetrachloride	25	-	-	-
Chlorobenzene	25	-	-	-
Chloroform	25	-	-	-
1,2-Dichloroethane	25	-	-	-
Methyl Ethyl Ketone	100	-	-	-
1,1-Dichloroethylene	25	-	-	-
Tetrachloroethene	25	-	-	-
Trichloroethene	25	-	-	-
Vinyl Chloride	100	-	-	-
Associated Method Blank:		K6954	K6954	K6954
Associated Equipment Blank:		-	-	-
Associated Field Blank:		-	-	-

Site: CESSPOOL
Note: TCLP Analysis

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09CPXX1X1193XX	09CPXX2X1293XX	09CPXX3XX993XX	09CPXX4X1293XX	09CPXX5X1193XX	09CPXX6X1193XX
LAB NUMBER:	71178 #	71179 #	71180 #	71181 #	71182 #	71183 #
DATE SAMPLED:	01/19/93	01/19/93	01/19/93	01/19/93	01/19/93	01/19/93
DATE ANALYZED:	01/24/93	01/24/93	01/25/93	01/25/93	01/25/93	01/25/93
ANALYTE — SOW-3/90 - II — CRQL						
Chloromethane 10	13 U	13 U	12 U	13 U	13 U	12 U
Bromomethane 10	13 U	13 U	12 U	13 U	13 U	12 U
Vinyl Chloride 10	13 U	13 U	12 U	13 U	13 U	12 U
Chloroethane 10	13 U	13 U	12 U	13 U	13 U	12 U
Methylene Chloride 10	2 BJ	2 BJ	2 BJ	13 U	2 BJ	1 J
Acetone 10	87 B	15 B	5 BJ	80 B	37 B	100 B
Carbon Disulfide 10	1 J	13 U	12 U	13 U	2 J	2 J
1,1-Dichloroethene 10	13 U	13 U	12 U	13 U	13 U	12 U
1,1-Dichloroethane 10	13 U	13 U	12 U	13 U	13 U	12 U
1,2-Dichloroethene (total) 10	13 U	13 U	12 U	13 U	13 U	12 U
Chloroform 10	13 U	13 U	12 U	13 U	13 U	12 U
1,2-Dichloroethane 10	13 U	13 U	12 U	13 U	13 U	12 U
2-Butanone 10	18	13 U	12 U	15	13 J	14
1,1,1-Trichloroethane 10	13 U	13 U	12 U	13 U	13 U	12 U
Carbon Tetrachloride 10	13 U	13 U	12 U	13 U	13 U	12 U
Bromodichloromethane 10	13 U	13 U	12 U	13 U	13 U	12 U
1,2-Dichloropropane 10	13 U	13 U	12 U	13 U	13 U	12 U
cis-1,3-Dichloropropene 10	13 U	13 U	12 U	13 U	13 U	12 U
Trichloroethene 10	13 U	13 U	12 U	13 U	13 U	12 U
Dibromochloromethane 10	13 U	13 U	12 U	13 U	13 U	12 U
1,1,2-Trichloroethane 10	13 U	13 U	12 U	13 U	13 U	12 U
Benzene 10	13 U	13 U	12 U	13 U	13 U	12 U
trans-1,3-Dichloropropene 10	13 U	13 U	12 U	13 U	13 U	12 U
Bromoform 10	13 U	13 U	12 U	13 U	13 U	12 U
4-Methyl-2-Pentanone 10	13 U	13 U	12 U	13 U	13 U	12 U
2-Hexanone 10	13 U	13 U	12 U	13 U	13 U	12 U
Tetrachloroethene 10	13 U	13 U	12 U	13 U	13 U	12 U
1,1,2,2-Tetrachloroethane 10	13 U	13 U	12 U	13 U	13 U	12 U
Toluene 10	13 U	13 U	12 U	13 U	13 U	12 U
Chlorobenzene 10	13 U	13 U	12 U	13 U	13 U	16
Ethylbenzene 10	13 U	13 U	12 U	13 U	13 U	12 U
Styrene 10	13 U	13 U	12 U	13 U	13 U	12 U
Total Xylenes 10	13 U	13 U	12 U	13 U	13 U	12 U
Dilution Factor:	1.00	1.00	1.00	1.00	1.00	1.00
Percent Solids:	78	77	82	78	76	82
Associated Method Blank:	L4718	L4718	L4718	L4738	L4718	L4738
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-	-	-	-
Associated Trip Blank:	-	-	-	-	-	-

Site: CESSPOOL
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09CPXX1X1193XX	09CPXX2X1293XX	09CPXX3XX993XX	09CPXX4X1293XX	09CPXX5X1193XX	09CPXX6X1193XX
LAB NUMBER:	71178 #	71179 #	71180 #	71181 #	71182 #	71183 #
DATE SAMPLED:	01/19/93	01/19/93	01/19/93	01/19/93	01/19/93	01/19/93
DATE ANALYZED:	01/24/93	01/24/93	01/25/93	01/25/93	01/25/93	01/25/93

ANALYTE	SOW-3/90 - II CRQL											
Chloromethane	10	13	U	13	U	12	U	13	U	13	U	12	U
Bromomethane	10	13	U	13	U	12	U	13	U	13	U	12	U
Vinyl Chloride	10	13	U	13	U	12	U	13	U	13	U	12	U
Chloroethane	10	13	U	13	U	12	U	13	U	13	U	12	U
Methylene Chloride	10	13	U	13	U	12	U	13	U	13	U	12	U
Acetone	10	87		15	U	12	U	80	J	37		100	J
Carbon Disulfide	10	1	J	13	U	12	U	13	U	2	J	2	J
1,1-Dichloroethene	10	13	U	13	U	12	U	13	U	13	U	12	U
1,1-Dichloroethane	10	13	U	13	U	12	U	13	U	13	U	12	U
1,2-Dichloroethene (total)	10	13	U	13	U	12	U	13	U	13	U	12	U
Chloroform	10	13	U	13	U	12	U	13	U	13	U	12	U
1,2-Dichloroethane	10	13	U	13	U	12	U	13	U	13	U	12	U
2-Butanone	10	18		13	U	12	U	15		13	J	14	
1,1,1-Trichloroethane	10	13	U	13	U	12	U	13	U	13	U	12	U
Carbon Tetrachloride	10	13	U	13	U	12	U	13	U	13	U	12	U
Bromodichloromethane	10	13	U	13	U	12	U	13	U	13	U	12	U
1,2-Dichloropropane	10	13	U	13	U	12	U	13	U	13	U	12	U
cis-1,3-Dichloropropene	10	13	U	13	U	12	U	13	U	13	U	12	U
Trichloroethene	10	13	U	13	U	12	U	13	U	13	U	12	U
Dibromochloromethane	10	13	U	13	U	12	U	13	U	13	U	12	U
1,1,2-Trichloroethane	10	13	U	13	U	12	U	13	U	13	U	12	U
Benzene	10	13	U	13	U	12	U	13	U	13	U	12	U
trans-1,3-Dichloropropene	10	13	U	13	U	12	U	13	U	13	U	12	U
Bromoform	10	13	U	13	U	12	U	13	U	13	U	12	U
4-Methyl-2-Pentanone	10	13	U	13	U	12	U	13	U	13	U	12	U
2-Hexanone	10	13	U	13	U	12	U	13	U	13	U	12	U
Tetrachloroethene	10	13	U	13	U	12	U	13	U	13	U	12	U
1,1,2,2-Tetrachloroethane	10	13	U	13	U	12	U	13	U	13	U	12	U
Toluene	10	13	U	13	U	12	U	13	U	13	U	12	U
Chlorobenzene	10	13	U	13	U	12	U	13	U	13	U	16	
Ethylbenzene	10	13	U	13	U	12	U	13	U	13	U	12	U
Styrene	10	13	U	13	U	12	U	13	U	13	U	12	U
Total Xylenes	10	13	U	13	U	12	U	13	U	13	U	12	U

Dilution Factor:	1.00	1.00	1.00	1.00	1.00	1.00
Percent Solids:	78	77	82	78	76	82
Associated Method Blank:	L4718	L4718	L4718	L4738	L4718	L4738
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-	-	-	-
Associated Trip Blank:	-	-	-	-	-	-

Site: CESSPOOL
#: Level D Validation

Volatile Organic Soil Analysis (ug/kg)

Table 3
Summary Table

SAMPLE LOCATION:		09CPXX1X1193XX	09CPXX2X1293XX	09CPXX3XX993XX	09CPXX4X1293XX	09CPXX5X1193XX	09CPXX6X1193XX
LAB NUMBER:		71178 #	71179 #	71180 #	71181 #	71182 #	71183 #
DATE SAMPLED:		01/19/93	01/19/93	01/19/93	01/19/93	01/19/93	01/19/93
DATE ANALYZED:		01/24/93	01/24/93	01/25/93	01/25/93	01/25/93	01/25/93
ANALYTE	SOW-3/90 - II CRQL						
Chloromethane	10	-	-	-	-	-	-
Bromomethane	10	-	-	-	-	-	-
Vinyl Chloride	10	-	-	-	-	-	-
Chloroethane	10	-	-	-	-	-	-
Methylene Chloride	10	-	-	-	-	-	-
Acetone	10	87	-	-	80 J	37	100 J
Carbon Disulfide	10	1 J	-	-	-	2 J	2 J
1,1-Dichloroethene	10	-	-	-	-	-	-
1,1-Dichloroethane	10	-	-	-	-	-	-
1,2-Dichloroethene (total)	10	-	-	-	-	-	-
Chloroform	10	-	-	-	-	-	-
1,2-Dichloroethane	10	-	-	-	-	-	-
2-Butanone	10	18	-	-	15	13 J	14
1,1,1-Trichloroethane	10	-	-	-	-	-	-
Carbon Tetrachloride	10	-	-	-	-	-	-
Bromodichloromethane	10	-	-	-	-	-	-
1,2-Dichloropropane	10	-	-	-	-	-	-
cis-1,3-Dichloropropene	10	-	-	-	-	-	-
Trichloroethene	10	-	-	-	-	-	-
Dibromochloromethane	10	-	-	-	-	-	-
1,1,2-Trichloroethane	10	-	-	-	-	-	-
Benzene	10	-	-	-	-	-	-
trans-1,3-Dichloropropene	10	-	-	-	-	-	-
Bromoform	10	-	-	-	-	-	-
4-Methyl-2-Pentanone	10	-	-	-	-	-	-
2-Hexanone	10	-	-	-	-	-	-
Tetrachloroethene	10	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	10	-	-	-	-	-	-
Toluene	10	-	-	-	-	-	-
Chlorobenzene	10	-	-	-	-	-	16
Ethylbenzene	10	-	-	-	-	-	-
Styrene	10	-	-	-	-	-	-
Total Xylenes	10	-	-	-	-	-	-
Dilution Factor:		1.00	1.00	1.00	1.00	1.00	1.00
Percent Solids:		78	77	82	78	76	82
Associated Method Blank:		L4718	L4718	L4718	L4738	L4718	L4738
Associated Equipment Blank:		09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:		-	-	-	-	-	-
Associated Trip Blank:		-	-	-	-	-	-

Site: CESSPOOL
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09SB912X1093XX		09SB912X1693XX		09SB913X1193XX	
LAB NUMBER:	71176S #		71177S #		71175S #	
DATE SAMPLED:	01/17/93		01/17/93		01/17/93	
ANALYTE	SOW-3/90 - II CRDL					
Aluminum	40	6810		4540		5270	
Antimony	12	13.2	UN	13.0	UN	12.3	UN
Arsenic	2	5.0		2.5	B	4.9	
Barium	40	128	*	83.0	*	125	*
Beryllium	1	0.37	B	0.30	B	0.25	U
Cadmium	1	3.3		1.2	B	8.2	
Calcium	1000	2730		1090	B	1920	
Chromium	2	13.2	*	8.0	*	23.5	*
Cobalt	10	4.5	B	4.0	B	5.9	B
Copper	5	26.3	N	6.9	N	183	N
Iron	20	13900	*	7680	*	21200	*
Lead	0.6	43.4	*	9.7	S*	151	*
Magnesium	1000	1700		1770		2380	
Manganese	3	128	*	84.4	*	121	*
Mercury	0.04	0.13	U	0.13	U	0.12	U
Nickel	8	17.5		7.5	B	24.7	
Potassium	1000	762	B	811	B	786	B
Selenium	1	0.26	UN	0.26	UN	0.69	BWN
Silver	2	1.1	U	1.0	U	0.99	U
Sodium	1000	107	B	77.4	B	80.0	B
Thallium	2	0.53	U	0.52	U	0.49	U
Vanadium	10	12.1	B	10.2	B	11.0	B
Zinc	4	320		59.6		850	
Cyanide	2	0.66	UN	0.64	UN	0.61	UN
Percent Solids:		76		77		81	
Associated Method Blank:		PB2712CS		PB2712CS		PB2712CS	
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:		-		-		-	

Site: SOIL BORING
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09SB912X1093XX		09SB912X1693XX		09SB913X1193XX	
LAB NUMBER:	71176S #		71177S #		71175S #	
DATE SAMPLED:	01/17/93		01/17/93		01/17/93	
ANALYTE SOW-3/90 - II CRDL						
Aluminum 40	6810		4540		5270	
Antimony 12	13.2	UJ	13.0	UJ	12.3	UJ
Arsenic 2	5.0		2.5	J	4.9	
Barium 40	128	J	83.0	J	125	J
Beryllium 1	0.37	U	0.30	U	0.25	U
Cadmium 1	3.3		1.2	J	8.2	
Calcium 1000	2730		1090	J	1920	
Chromium 2	13.2		8.0		23.5	
Cobalt 10	4.5	U	4.0	U	5.9	U
Copper 5	26.3	J	6.9	J	183	J
Iron 20	13900	J	7680	J	21200	J
Lead 0.6	43.4		9.7		151	
Magnesium 1000	1700		1770		2380	
Manganese 3	128	J	84.4	J	121	J
Mercury 0.04	0.13	U	0.13	U	0.12	U
Nickel 8	17.5	U	7.5	U	24.7	U
Potassium 1000	762	J	811	J	786	J
Selenium 1	0.26	UJ	0.26	UJ	0.69	J
Silver 2	1.1	U	1.0	U	0.99	U
Sodium 1000	107	U	77.4	U	80.0	U
Thallium 2	0.53	U	0.52	U	0.49	U
Vanadium 10	12.1	U	10.2	U	11.0	U
Zinc 4	320		59.6		850	
Cyanide 2		R		R		R
Percent Solids:	76		77		81	
Associated Method Blank:	PB2712CS		PB2712CS		PB2712CS	
Associated Equipment Blank:	09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:	-		-		-	

Site: SOIL BORING
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:		09SB912X1093XX		09SB912X1693XX		09SB913X1193XX	
LAB NUMBER:		71176S #		71177S #		71175S #	
DATE SAMPLED:		01/17/93		01/17/93		01/17/93	
ANALYTE	SOW-3/90 - II CRDL						
Aluminum	40	6810		4540		5270	
Antimony	12	-		-		-	
Arsenic	2	5.0		2.5	J	4.9	
Barium	40	128	J	83.0	J	125	J
Beryllium	1	-		-		-	
Cadmium	1	3.3		1.2	J	8.2	
Calcium	1000	2730		1090	J	1920	
Chromium	2	13.2		8.0		23.5	
Cobalt	10	-		-		-	
Copper	5	26.3	J	6.9	J	183	J
Iron	20	13900	J	7680	J	21200	J
Lead	0.6	43.4		9.7		151	
Magnesium	1000	1700		1770		2380	
Manganese	3	128	J	84.4	J	121	J
Mercury	0.04	-		-		-	
Nickel	8	-		-		-	
Potassium	1000	762	J	811	J	786	J
Selenium	1	-		-		0.69	J
Silver	2	-		-		-	
Sodium	1000	-		-		-	
Thallium	2	-		-		-	
Vanadium	10	-		-		-	
Zinc	4	320		59.6		850	
Cyanide	2		R		R		R
Percent Solids:		76		77		81	
Associated Method Blank:		PB2712CS		PB2712CS		PB2712CS	
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:		-		-		-	

Site: SOIL BORING
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09SB912X1093XX	09SB912X1093XX	09SB912X1693XX	09SB913X1193XX
LAB NUMBER:	71176 #	71176 10 #	71177 #	71175 #
DATE SAMPLED:	01/17/93	01/17/93	01/17/93	01/17/93
DATE EXTRACTED:	01/23/93	01/23/93	01/23/93	01/23/93
DATE ANALYZED:	02/13/93	02/16/93	02/13/93	02/13/93

ANALYTE	SOW-3/90 - II CRQL								
alpha-BHC	1.7	2	U	20	U	2.3	U	22	U
beta-BHC	1.7	2	U	20	U	2.3	U	22	U
delta-BHC	1.7	2	U	20	U	2.3	U	22	U
gamma-BHC (Lindane)	1.7	2	U	20	U	2.3	U	22	U
Heptachlor	1.7	2	U	20	U	2.3	U	22	U
Aldrin	1.7	2	U	20	U	2.3	U	22	U
Heptachlor Epoxide	1.7	24	P	19	DJP	2.3	U	22	U
Endosulfan I	1.7	2	U	20	U	2.3	U	22	U
Dieldrin	3.3	44	P	57	DP	4.4	U	42	U
4,4'-DDE	3.3	9.8	P	8.6	DJP	3.9	J	11	JP
Endrin	3.3	3.9	U	39	U	4.4	U	42	U
Endosulfan II	3.3	0.93	JP	39	U	4.4	U	42	U
4,4'-DDD	3.3	15	P	39	U	9.4		91	
Endrin Aldehyde	3.3	3.9	U	39	U	4.4	U	42	U
Endosulfan Sulfate	3.3	5.1	P	39	U	4.4	U	42	U
4,4'-DDT	3.3	130		87	DP	2.3	JP	5.6	JP
Methoxychlor	17	20	U	200	U	23	U	220	U
Endrin Ketone	3.3	3.9	U	39	U	4.4	U	42	U
alpha-Chlordane	1.7	40		32	D	2.3	U	22	U
gamma-Chlordane	1.7	2	U	20	U	2.3	U	22	U
Toxaphene	170	200	U	2000	U	230	U	2200	U
Aroclor-1016	33	39	U	390	U	44	U	420	U
Aroclor-1221	67	80	U	800	U	89	U	860	U
Aroclor-1232	33	39	U	390	U	44	U	420	U
Aroclor-1242	33	39	U	390	U	44	U	420	U
Aroclor-1248	33	39	U	390	U	44	U	420	U
Aroclor-1254	33	39	U	390	U	44	U	420	U
Aroclor-1260	33	39	U	390	U	44	U	420	U
Dilution Factor:		1.00		10.0		1.00		10.0	
Percent Solids:		84		84		75		78	

Associated Method Blank:	PBLK101235A	PBLK101235A	PBLK101235A	PBLK101235A
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-	-

Site: SOIL BORING
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09SB912X1093XX		09SB912X1693XX		09SB913X1193XX	
LAB NUMBER:	71176_10 #		71177 #		71175 #	
DATE SAMPLED:	01/17/93		01/17/93		01/17/93	
DATE EXTRACTED:	01/23/93		01/23/93		01/23/93	
DATE ANALYZED:	02/16/93		02/13/93		02/13/93	
ANALYTE SOW-3/90 - II CRQL						
alpha-BHC 1.7	20	UJ	2.3	UJ	22	UJ
beta-BHC 1.7	20	UJ	2.3	UJ	22	UJ
delta-BHC 1.7	20	UJ	2.3	UJ	22	UJ
gamma-BHC (Lindane) 1.7	20	UJ	2.3	UJ	22	UJ
Heptachlor 1.7	20	U	2.3	U	22	U
Aldrin 1.7	20	UJ	2.3	UJ	22	UJ
Heptachlor Epoxide 1.7	19	J	2.3	U	22	U
Endosulfan I 1.7	20	U	2.3	U	22	U
Dieldrin 3.3	57	J	4.4	UJ	42	UJ
4,4'-DDE 3.3	8.6	J	3.9	J	11	J
Endrin 3.3	39	U	4.4	U	42	U
Endosulfan II 3.3	39	U	4.4	U	42	U
4,4'-DDD 3.3	39	UJ	9.4	J	91	J
Endrin Aldehyde 3.3	39	U	4.4	UJ	42	UJ
Endosulfan Sulfate 3.3	39	U	4.4	U	42	U
4,4'-DDT 3.3	87	J	2.3	J	5.6	J
Methoxychlor 17	200	UJ	23	U	220	U
Endrin Ketone 3.3	39	UJ	4.4	UJ	42	UJ
alpha-Chlordane 1.7	32		2.3	U	22	U
gamma-Chlordane 1.7	20	U	2.3	U	22	U
Toxaphene 170	2000	U	230	U	2200	U
Aroclor-1016 33	390	U	44	U	420	U
Aroclor-1221 67	800	U	89	U	860	U
Aroclor-1232 33	390	U	44	U	420	U
Aroclor-1242 33	390	U	44	U	420	U
Aroclor-1248 33	390	U	44	U	420	U
Aroclor-1254 33	390	U	44	U	420	U
Aroclor-1260 33	390	U	44	U	420	U
Dilution Factor:	10.0		1.00		10.0	
Percent Solids:	84		75		78	
Associated Method Blank:	PBLK101235A		PBLK101235A		PBLK101235A	
Associated Equipment Blank:	09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:	-		-		-	

Site: SOIL BORING
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09SB912X1093XX	09SB912X1693XX	09SB913X1193XX
LAB NUMBER:	71176 10 #	71177 #	71175 #
DATE SAMPLED:	01/17/93	01/17/93	01/17/93
DATE EXTRACTED:	01/23/93	01/23/93	01/23/93
DATE ANALYZED:	02/16/93	02/13/93	02/13/93

ANALYTE	SOW-3/90 - II CRQL					
alpha-BHC	1.7	-		-		-	
beta-BHC	1.7	-		-		-	
delta-BHC	1.7	-		-		-	
gamma-BHC (Lindane)	1.7	-		-		-	
Heptachlor	1.7	-		-		-	
Aldrin	1.7	-		-		-	
Heptachlor Epoxide	1.7	19	J	-		-	
Endosulfan I	1.7	-		-		-	
Dieldrin	3.3	57	J	-		-	
4,4'-DDE	3.3	8.6	J	3.9	J	11	J
Endrin	3.3	-		-		-	
Endosulfan II	3.3	-		-		-	
4,4'-DDD	3.3	-		9.4	J	91	J
Endrin Aldehyde	3.3	-		-		-	
Endosulfan Sulfate	3.3	-		-		-	
4,4'-DDT	3.3	87	J	2.3	J	5.6	J
Methoxychlor	17	-		-		-	
Endrin Ketone	3.3	-		-		-	
alpha-Chlordane	1.7	32		-		-	
gamma-Chlordane	1.7	-		-		-	
Toxaphene	170	-		-		-	
Aroclor-1016	33	-		-		-	
Aroclor-1221	67	-		-		-	
Aroclor-1232	33	-		-		-	
Aroclor-1242	33	-		-		-	
Aroclor-1248	33	-		-		-	
Aroclor-1254	33	-		-		-	
Aroclor-1260	33	-		-		-	
Dilution Factor:		10.0		1.00		10.0	
Percent Solids:		84		75		78	
Associated Method Blank:		PBLK101235A		PBLK101235A		PBLK101235A	
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:		-		-		-	

Site: SOIL BORING
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09SB912X1093XX	09SB912X1693XX	09SB913X1193XX
LAB NUMBER:	71176 #	71177 #	71175 #
DATE SAMPLED:	01/17/93	01/17/93	01/17/93
DATE EXTRACTED:	01/25/93	01/25/93	01/25/93
DATE ANALYZED:	01/28/93	01/27/93	01/28/93

ANALYTE	SOW-3/90 - II CRQL						
Phenol	330	400	U	590	U	2000	U
bis(2-Chloroethyl)ether	330	400	U	590	U	2000	U
2-Chlorophenol	330	400	U	590	U	2000	U
1,3-Dichlorobenzene	330	400	U	590	U	2000	U
1,4-Dichlorobenzene	330	400	U	590	U	2000	U
1,2-Dichlorobenzene	330	400	U	590	U	2000	U
2-Methylphenol	330	400	U	590	U	2000	U
2,2'-oxybis(1-Chloropropane)	330	400	U	590	U	2000	U
4-Methylphenol	330	400	U	590	U	2000	U
N-Nitroso-di-n-propylamine	330	400	U	590	U	2000	U
Hexachloroethane	330	400	U	590	U	2000	U
Nitrobenzene	330	400	U	590	U	2000	U
Isophorone	330	400	U	590	U	2000	U
2-Nitrophenol	330	400	U	590	U	2000	U
2,4-Dimethylphenol	330	400	U	590	U	2000	U
bis(2-Chloroethoxy)methane	330	400	U	590	U	2000	U
2,4-Dichlorophenol	330	400	U	590	U	2000	U
1,2,4-Trichlorobenzene	330	400	U	590	U	2000	U
Naphthalene	330	400	U	590	U	2000	U
4-Chloroaniline	330	400	U	590	U	2000	U
Hexachlorobutadiene	330	400	U	590	U	2000	U
4-Chloro-3-Methylphenol	330	400	U	590	U	2000	U
2-Methylnaphthalene	330	400	U	590	U	2000	U
Hexachlorocyclopentadiene	330	400	U	590	U	2000	U
2,4,6-Trichlorophenol	330	400	U	590	U	2000	U
2,4,5-Trichlorophenol	800	960	U	1400	U	4800	U
2-Chloronaphthalene	330	400	U	590	U	2000	U
2-Nitroaniline	800	960	U	1400	U	4800	U
Dimethylphthalate	330	400	U	590	U	2000	U
Acenaphthylene	330	43	J	590	U	260	J
2,6-Dinitrotoluene	330	400	U	590	U	2000	U

Site: SOIL BORING
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09SB912X1093XX		09SB912X1693XX		09SB913X1193XX	
LAB NUMBER:		71176 #		71177 #		71175 #	
DATE SAMPLED:		01/17/93		01/17/93		01/17/93	
DATE EXTRACTED:		01/25/93		01/25/93		01/25/93	
DATE ANALYZED:		01/28/93		01/27/93		01/28/93	
ANALYTE	SOW-3/90 - II CRQL						
3-Nitroaniline	800	960	U	1400	U	4800	U
Acenaphthene	330	400	U	75	J	2000	U
2,4-Dinitrophenol	800	960	U	1400	U	4800	U
4-Nitrophenol	800	960	U	1400	U	4800	U
Dibenzofuran	330	400	U	590	U	2000	U
2,4-Dinitrotoluene	330	400	U	590	U	2000	U
Diethylphthalate	330	400	U	590	U	240	J
4-Chlorophenyl-phenylether	330	400	U	590	U	2000	U
Fluorene	330	400	U	590	U	430	J
4-Nitroaniline	800	960	U	1400	U	4800	U
4,6-Dinitro-2-methylphenol	800	960	U	1400	U	4800	U
N-Nitrosodiphenylamine	330	400	U	590	U	2000	U
4-Bromophenyl-phenylether	330	400	U	590	U	2000	U
Hexachlorobenzene	330	400	U	590	U	2000	U
Pentachlorophenol	800	960	U	1400	U	4800	U
Phenanthrene	330	370	J	300	J	4300	
Anthracene	330	240	J	94	J	1100	J
Carbazole	330	400	U	590	U	2000	U
Di-n-butylphthalate	330	400	U	590	U	2000	U
Fluoranthene	330	1200		590		6000	
Pyrene	330	970		790		5100	
Butylbenzylphthalate	330	400	U	590	U	2000	U
3,3'-Dichlorobenzidine	330	400	U	590	U	2000	U
Benzo(a)Anthracene	330	670		320	J	2700	
Chrysene	330	730		380	J	3100	
bis(2-Ethylhexyl)phthalate	330	400	U	69	J	230	J
Di-n-octylphthalate	330	400	U	590	U	2000	U
Benzo(b)Fluoranthene	330	130	J	330	J	2400	
Benzo(k)Fluoranthene	330	530	Y	310	JY	2100	Y
Benzo(a)Pyrene	330	560		280	J	2400	
Indeno(1,2,3-c,d)Pyrene	330	280	J	130	J	1400	J
Dibenz(a,h)Anthracene	330	91	JY	590	U	400	JY
Benzo(g,h,i)perylene	330	240	J	100	J	1200	J
Dilution Factor:		1.00		1.00		5.00	
Percent Solids:		84		56		84	
Associated Method Blank:		J7513		J7513		J7513	
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:		-		-		-	

Site: SOIL BORING
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09SB912X1093XX	09SB912X1693XX	09SB913X1193XX
LAB NUMBER:	71176 #	71177 #	71175 #
DATE SAMPLED:	01/17/93	01/17/93	01/17/93
DATE EXTRACTED:	01/25/93	01/25/93	01/25/93
DATE ANALYZED:	01/28/93	01/27/93	01/28/93

ANALYTE	SOW-3/90 - 11 CRQL						
Phenol	330	400	U	590	U	2000	U
bis(2-Chloroethyl)ether	330	400	U	590	U	2000	U
2-Chlorophenol	330	400	U	590	U	2000	U
1,3-Dichlorobenzene	330	400	U	590	U	2000	U
1,4-Dichlorobenzene	330	400	U	590	U	2000	U
1,2-Dichlorobenzene	330	400	U	590	U	2000	U
2-Methylphenol	330	400	U	590	U	2000	U
2,2'-oxybis(1-Chloropropane)	330	400	U	590	U	2000	U
4-Methylphenol	330	400	U	590	U	2000	U
N-Nitroso-di-n-propylamine	330	400	U	590	U	2000	U
Hexachloroethane	330	400	U	590	U	2000	U
Nitrobenzene	330	400	U	590	U	2000	U
Isophorone	330	400	U	590	U	2000	U
2-Nitrophenol	330	400	U	590	U	2000	U
2,4-Dimethylphenol	330	400	U	590	U	2000	U
bis(2-Chloroethoxy)methane	330	400	U	590	U	2000	U
2,4-Dichlorophenol	330	400	U	590	U	2000	U
1,2,4-Trichlorobenzene	330	400	U	590	U	2000	U
Naphthalene	330	400	U	590	U	2000	U
4-Chloroaniline	330	400	U	590	U	2000	U
Hexachlorobutadiene	330	400	U	590	U	2000	U
4-Chloro-3-Methylphenol	330	400	U	590	U	2000	U
2-Methylnaphthalene	330	400	U	590	U	2000	U
Hexachlorocyclopentadiene	330	400	U	590	U	2000	U
2,4,6-Trichlorophenol	330	400	U	590	U	2000	U
2,4,5-Trichlorophenol	800	960	U	1400	U	4800	U
2-Chloronaphthalene	330	400	U	590	U	2000	U
2-Nitroaniline	800	960	U	1400	U	4800	U
Dimethylphthalate	330	400	U	590	U	2000	U
Acenaphthylene	330	43	J	590	U	260	J
2,6-Dinitrotoluene	330	400	U	590	U	2000	U

Site: SOIL BORING
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09SB912X1093XX		09SB912X1693XX		09SB913X1193XX	
LAB NUMBER:	71176 #		71177 #		71175 #	
DATE SAMPLED:	01/17/93		01/17/93		01/17/93	
DATE EXTRACTED:	01/25/93		01/25/93		01/25/93	
DATE ANALYZED:	01/28/93		01/27/93		01/28/93	
ANALYTE SOW-3/90 - II CRQL						
3-Nitroaniline 800	960	U	1400	U	4800	U
Acenaphthene 330	400	U	75	J	2000	U
2,4-Dinitrophenol 800	960	U	1400	U	4800	U
4-Nitrophenol 800	960	U	1400	U	4800	U
Dibenzofuran 330	400	U	590	U	2000	U
2,4-Dinitrotoluene 330	400	U	590	U	2000	U
Diethylphthalate 330	400	U	590	U	240	J
4-Chlorophenyl-phenylether 330	400	U	590	U	2000	U
Fluorene 330	400	U	590	U	430	J
4-Nitroaniline 800	960	U	1400	U	4800	U
4,6-Dinitro-2-methylphenol 800	960	U	1400	U	4800	U
N-Nitrosodiphenylamine 330	400	U	590	U	2000	U
4-Bromophenyl-phenylether 330	400	U	590	U	2000	U
Hexachlorobenzene 330	400	U	590	U	2000	U
Pentachlorophenol 800	960	U	1400	U	4800	U
Phenanthrene 330	370	J	300	J	4300	
Anthracene 330	240	J	94	J	1100	J
Carbazole 330	400	U	590	U	2000	U
Di-n-butylphthalate 330	400	U	590	U	2000	U
Fluoranthene 330	1200		590		6000	
Pyrene 330	970		790		5100	J
Butylbenzylphthalate 330	400	U	590	U	2000	U
3,3'-Dichlorobenzidine 330	400	U	590	U	2000	U
Benzo(a)Anthracene 330	670		320	J	2700	
Chrysene 330	730		380	J	3100	
bis(2-Ethylhexyl)phthalate 330	400	UJ	69	J	230	J
Di-n-octylphthalate 330	400	U	590	U	2000	U
Benzo(b)Fluoranthene 330	130	J	330	J	2400	
Benzo(k)Fluoranthene 330	530		310	J	2100	
Benzo(a)Pyrene 330	560		280	J	2400	
Indeno(1,2,3-c,d)Pyrene 330	280	J	130	J	1400	J
Dibenz(a,h)Anthracene 330	91	J	590	U	400	J
Benzo(g,h,i)perylene 330	240	J	100	J	1200	J
Dilution Factor:	1.00		1.00		5.00	
Percent Solids:	84		56		84	
Associated Method Blank:	J7513		J7513		J7513	
Associated Equipment Blank:	09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:	-		-		-	

Site: SOIL BORING
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09SB912X1093XX	09SB912X1693XX	09SB913X1193XX
LAB NUMBER:	71176 #	71177 #	71175 #
DATE SAMPLED:	01/17/93	01/17/93	01/17/93
DATE EXTRACTED:	01/25/93	01/25/93	01/25/93
DATE ANALYZED:	01/28/93	01/27/93	01/28/93

ANALYTE	SOW-3/90 - II CRQL			
Phenol	330	-	-	-
bis(2-Chloroethyl)ether	330	-	-	-
2-Chlorophenol	330	-	-	-
1,3-Dichlorobenzene	330	-	-	-
1,4-Dichlorobenzene	330	-	-	-
1,2-Dichlorobenzene	330	-	-	-
2-Methylphenol	330	-	-	-
2,2'-oxybis(1-Chloropropane)	330	-	-	-
4-Methylphenol	330	-	-	-
N-Nitroso-di-n-propylamine	330	-	-	-
Hexachloroethane	330	-	-	-
Nitrobenzene	330	-	-	-
Isophorone	330	-	-	-
2-Nitrophenol	330	-	-	-
2,4-Dimethylphenol	330	-	-	-
bis(2-Chloroethoxy)methane	330	-	-	-
2,4-Dichlorophenol	330	-	-	-
1,2,4-Trichlorobenzene	330	-	-	-
Naphthalene	330	-	-	-
4-Chloroaniline	330	-	-	-
Hexachlorobutadiene	330	-	-	-
4-Chloro-3-Methylphenol	330	-	-	-
2-Methylnaphthalene	330	-	-	-
Hexachlorocyclopentadiene	330	-	-	-
2,4,6-Trichlorophenol	330	-	-	-
2,4,5-Trichlorophenol	800	-	-	-
2-Chloronaphthalene	330	-	-	-
2-Nitroaniline	800	-	-	-
Dimethylphthalate	330	-	-	-
Acenaphthylene	330	43 J	-	260 J
2,6-Dinitrotoluene	330	-	-	-

Site: SOIL BORING
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09SB912X1093XX	09SB912X1693XX	09SB913X1193XX
LAB NUMBER:	71176 #	71177 #	71175 #
DATE SAMPLED:	01/17/93	01/17/93	01/17/93
DATE EXTRACTED:	01/25/93	01/25/93	01/25/93
DATE ANALYZED:	01/28/93	01/27/93	01/28/93

ANALYTE	SOW-3/90 - II CRQL					
3-Nitroaniline	800	-		-		-	
Acenaphthene	330	-		75	J	-	
2,4-Dinitrophenol	800	-		-		-	
4-Nitrophenol	800	-		-		-	
Dibenzofuran	330	-		-		-	
2,4-Dinitrotoluene	330	-		-		-	
Diethylphthalate	330	-		-		240	J
4-Chlorophenyl-phenylether	330	-		-		-	
Fluorene	330	-		-		430	J
4-Nitroaniline	800	-		-		-	
4,6-Dinitro-2-methylphenol	800	-		-		-	
N-Nitrosodiphenylamine	330	-		-		-	
4-Bromophenyl-phenylether	330	-		-		-	
Hexachlorobenzene	330	-		-		-	
Pentachlorophenol	800	-		-		-	
Phenanthrene	330	370	J	300	J	4300	
Anthracene	330	240	J	94	J	1100	J
Carbazole	330	-		-		-	
Di-n-butylphthalate	330	-		-		-	
Fluoranthene	330	1200		590		6000	
Pyrene	330	970		790		5100	J
Butylbenzylphthalate	330	-		-		-	
3,3'-Dichlorobenzidine	330	-		-		-	
Benzo(a)Anthracene	330	670		320	J	2700	
Chrysene	330	730		380	J	3100	
bis(2-Ethylhexyl)phthalate	330	-		69	J	230	J
Di-n-octylphthalate	330	-		-		-	
Benzo(b)Fluoranthene	330	130	J	330	J	2400	
Benzo(k)Fluoranthene	330	530		310	J	2100	
Benzo(a)Pyrene	330	560		280	J	2400	
Indeno(1,2,3-c,d)Pyrene	330	280	J	130	J	1400	J
Dibenz(a,h)Anthracene	330	91	J	-		400	J
Benzo(g,h,i)perylene	330	240	J	100	J	1200	J
Dilution Factor:		1.00		1.00		5.00	
Percent Solids:		84		56		84	
Associated Method Blank:		J7513		J7513		J7513	
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:		-		-		-	

Site: SOIL BORING
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09SB912X1093XX		09SB912X1693XX		09SB913X1193XX		
LAB NUMBER:		71176 #		71177 #		71175 #		
DATE SAMPLED:		01/17/93		01/17/93		01/17/93		
DATE ANALYZED:		01/24/93		01/24/93		01/25/93		
ANALYTE	SOW-3/90 - II CRQL							
Chloromethane	10	12	U	14	U	14	U	
Bromomethane	10	12	U	14	U	14	U	
Vinyl Chloride	10	12	U	14	U	14	U	
Chloroethane	10	12	U	14	U	14	U	
Methylene Chloride	10	2	BJ	4	BJ	2	J	
Acetone	10	6	BJ	120	B	85	B	
Carbon Disulfide	10	1	J	3	J	2	J	
1,1-Dichloroethene	10	12	U	14	U	14	U	
1,1-Dichloroethane	10	12	U	14	U	14	U	
1,2-Dichloroethene (total)	10	12	U	1	J	14	U	
Chloroform	10	12	U	14	U	14	U	
1,2-Dichloroethane	10	12	U	14	U	14	U	
2-Butanone	10	12	U	26		17		
1,1,1-Trichloroethane	10	12	U	14	U	14	U	
Carbon Tetrachloride	10	12	U	14	U	14	U	
Bromodichloromethane	10	12	U	14	U	14	U	
1,2-Dichloropropane	10	12	U	14	U	14	U	
cis-1,3-Dichloropropene	10	12	U	14	U	14	U	
Trichloroethene	10	12	U	14	U	14	U	
Dibromochloromethane	10	12	U	14	U	14	U	
1,1,2-Trichloroethane	10	12	U	14	U	14	U	
Benzene	10	12	U	14	U	14	U	
trans-1,3-Dichloropropene	10	12	U	14	U	14	U	
Bromoform	10	12	U	14	U	14	U	
4-Methyl-2-Pentanone	10	12	U	14	U	14	U	
2-Hexanone	10	12	U	14	U	14	U	
Tetrachloroethene	10	12	U	14	U	14	U	
1,1,2,2-Tetrachloroethane	10	12	U	14	U	14	U	
Toluene	10	1	J	3	J	14	U	
Chlorobenzene	10	12	U	14	U	14	U	
Ethylbenzene	10	12	U	14	U	14	U	
Styrene	10	12	U	14	U	14	U	
Total Xylenes	10	12	U	2	J	14	U	
Dilution Factor:		1.00		1.00		1.00		
Percent Solids:		86		69		71		
Associated Method Blank:		L4718		L4718		L4738		
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX		
Associated Field Blank:		-		-		-		
Associated Trip Blank:		-		-		-		

Site: SOIL BORING
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09SB912X1093XX	09SB912X1693XX	09SB913X1193XX
LAB NUMBER:	71176 #	71177 #	71175 #
DATE SAMPLED:	01/17/93	01/17/93	01/17/93
DATE ANALYZED:	01/24/93	01/24/93	01/25/93

ANALYTE	SOW-3/90 - II CRQL						
Chloromethane	10	12	U	14	U	14	U
Bromomethane	10	12	U	14	U	14	U
Vinyl Chloride	10	12	U	14	U	14	U
Chloroethane	10	12	U	14	U	14	U
Methylene Chloride	10	12	U	14	U	14	U
Acetone	10	12	U	120		85	J
Carbon Disulfide	10	1	J	3	J	2	J
1,1-Dichloroethene	10	12	U	14	U	14	U
1,1-Dichloroethane	10	12	U	14	U	14	U
1,2-Dichloroethene (total)	10	12	U	1	J	14	U
Chloroform	10	12	U	14	U	14	U
1,2-Dichloroethane	10	12	U	14	U	14	U
2-Butanone	10	12	U	26		17	
1,1,1-Trichloroethane	10	12	U	14	U	14	U
Carbon Tetrachloride	10	12	U	14	U	14	U
Bromodichloromethane	10	12	U	14	U	14	U
1,2-Dichloropropane	10	12	U	14	U	14	U
cis-1,3-Dichloropropene	10	12	U	14	U	14	U
Trichloroethene	10	12	U	14	U	14	U
Dibromochloromethane	10	12	U	14	U	14	U
1,1,2-Trichloroethane	10	12	U	14	U	14	U
Benzene	10	12	U	14	U	14	U
trans-1,3-Dichloropropene	10	12	U	14	U	14	U
Bromoform	10	12	U	14	U	14	U
4-Methyl-2-Pentanone	10	12	U	14	U	14	U
2-Hexanone	10	12	U	14	U	14	U
Tetrachloroethene	10	12	U	14	U	14	U
1,1,2,2-Tetrachloroethane	10	12	U	14	U	14	U
Toluene	10	1	J	3	J	14	U
Chlorobenzene	10	12	U	14	U	14	U
Ethylbenzene	10	12	U	14	U	14	U
Styrene	10	12	U	14	U	14	U
Total Xylenes	10	12	U	2	J	14	U

Dilution Factor:	1.00	1.00	1.00
Percent Solids:	86	69	71
Associated Method Blank:	L4718	L4718	L4738
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-
Associated Trip Blank:	-	-	-

Site: SOIL BORING
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:		09SB912X1093XX	09SB912X1693XX	09SB913X1193XX
LAB NUMBER:		71176 #	71177 #	71175 #
DATE SAMPLED:		01/17/93	01/17/93	01/17/93
DATE ANALYZED:		01/24/93	01/24/93	01/25/93
ANALYTE	SOW-3/90 - II CRQL			
Chloromethane	10	-	-	-
Bromomethane	10	-	-	-
Vinyl Chloride	10	-	-	-
Chloroethane	10	-	-	-
Methylene Chloride	10	-	-	-
Acetone	10	-	120	85 J
Carbon Disulfide	10	1 J	3 J	2 J
1,1-Dichloroethene	10	-	-	-
1,1-Dichloroethane	10	-	-	-
1,2-Dichloroethene (total)	10	-	1 J	-
Chloroform	10	-	-	-
1,2-Dichloroethane	10	-	-	-
2-Butanone	10	-	26	17
1,1,1-Trichloroethane	10	-	-	-
Carbon Tetrachloride	10	-	-	-
Bromodichloromethane	10	-	-	-
1,2-Dichloropropane	10	-	-	-
cis-1,3-Dichloropropene	10	-	-	-
Trichloroethene	10	-	-	-
Dibromochloromethane	10	-	-	-
1,1,2-Trichloroethane	10	-	-	-
Benzene	10	-	-	-
trans-1,3-Dichloropropene	10	-	-	-
Bromoform	10	-	-	-
4-Methyl-2-Pentanone	10	-	-	-
2-Hexanone	10	-	-	-
Tetrachloroethene	10	-	-	-
1,1,2,2-Tetrachloroethane	10	-	-	-
Toluene	10	1 J	3 J	-
Chlorobenzene	10	-	-	-
Ethylbenzene	10	-	-	-
Styrene	10	-	-	-
Total Xylenes	10	-	2 J	-
Dilution Factor:		1.00	1.00	1.00
Percent Solids:		86	69	71
Associated Method Blank:		L4718	L4718	L4738
Associated Equipment Blank:		09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:		-	-	-
Associated Trip Blank:		-	-	-

Site: SOIL BORING
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 71184S
DATE SAMPLED: 01/19/93

ANALYTE	SOW-3/90 - II CRDL		
Aluminum	200	25.0	U
Antimony	60	50.0	U
Arsenic	10	2.0	U
Barium	200	3.0	U
Beryllium	5	1.0	U
Cadmium	5	4.0	U
Calcium	5000	154	B
Chromium	10	4.0	U
Cobalt	50	5.0	U
Copper	25	5.0	U
Iron	100	23.2	B
Lead	3	3.8	
Magnesium	5000	20.0	U
Manganese	15	3.0	U
Mercury	0.2	0.20	U
Nickel	40	14.0	U
Potassium	5000	250	U
Selenium	5	1.0	U
Silver	10	4.0	U
Sodium	5000	470	B
Thallium	10	2.0	U
Vanadium	50	5.0	U
Zinc	20	10.2	B
Cyanide	10	10.0	U

Associated Method Blank: PB2712CS
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 71184
DATE SAMPLED: 01/19/93
DATE EXTRACTED: 01/22/93
DATE ANALYZED: 02/09/93

ANALYTE	SOW-3/90 - II CRQL		
alpha-BHC	0.05	0.05	U
beta-BHC	0.05	0.05	U
delta-BHC	0.05	0.05	U
gamma-BHC (Lindane)	0.05	0.05	U
Heptachlor	0.05	0.05	U
Aldrin	0.05	0.05	U
Heptachlor Epoxide	0.05	0.05	U
Endosulfan I	0.05	0.05	U
Dieldrin	0.1	0.1	U
4,4'-DDE	0.1	0.1	U
Endrin	0.1	0.1	U
Endosulfan II	0.1	0.1	U
4,4'-DDD	0.1	0.1	U
Endrin Aldehyde	0.1	0.1	U
Endosulfan Sulfate	0.1	0.1	U
4,4'-DDT	0.1	0.1	U
Methoxychlor	0.5	0.5	U
Endrin Ketone	0.1	0.1	U
alpha-Chlordane	0.05	0.05	U
gamma-Chlordane	0.05	0.05	U
Toxaphene	5	5	U
Aroclor-1016	1	1	U
Aroclor-1221	2	2	U
Aroclor-1232	1	1	U
Aroclor-1242	1	1	U
Aroclor-1248	1	1	U
Aroclor-1254	1	1	U
Aroclor-1260	1	1	U
Dilution Factor:		1.00	

Associated Method Blank: PBLK10122AA
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 71184
DATE SAMPLED: 01/19/93
DATE EXTRACTED: 01/25/93
DATE ANALYZED: 01/29/93

ANALYTE	SOW-3/90 - II CRQL		
Phenol	10	11	U
bis(2-Chloroethyl)ether	10	11	U
2-Chlorophenol	10	11	U
1,3-Dichlorobenzene	10	11	U
1,4-Dichlorobenzene	10	11	U
1,2-Dichlorobenzene	10	11	U
2-Methylphenol	10	11	U
2,2'-oxybis(1-Chloropropane)	10	11	U
4-Methylphenol	10	11	U
N-Nitroso-di-n-propylamine	10	11	U
Hexachloroethane	10	11	U
Nitrobenzene	10	11	U
Isophorone	10	11	U
2-Nitrophenol	10	11	U
2,4-Dimethylphenol	10	11	U
bis(2-Chloroethoxy)methane	10	11	U
2,4-Dichlorophenol	10	11	U
1,2,4-Trichlorobenzene	10	11	U
Naphthalene	10	11	U
4-Chloroaniline	10	11	U
Hexachlorobutadiene	10	11	U
4-Chloro-3-Methylphenol	10	11	U
2-Methylnaphthalene	10	11	U
Hexachlorocyclopentadiene	10	11	U
2,4,6-Trichlorophenol	10	11	U
2,4,5-Trichlorophenol	25	28	U
2-Chloronaphthalene	10	11	U
2-Nitroaniline	25	28	U
Dimethylphthalate	10	11	U
Acenaphthylene	10	11	U
2,6-Dinitrotoluene	10	11	U

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 71184
DATE SAMPLED: 01/19/93
DATE EXTRACTED: 01/25/93
DATE ANALYZED: 01/29/93

ANALYTE	SOW-3/90 - II CRQL		
3-Nitroaniline	25	28	U
Acenaphthene	10	11	U
2,4-Dinitrophenol	25	28	U
4-Nitrophenol	25	28	U
Dibenzofuran	10	11	U
2,4-Dinitrotoluene	10	11	U
Diethylphthalate	10	11	U
4-Chlorophenyl-phenylether	10	11	U
Fluorene	10	11	U
4-Nitroaniline	25	28	U
4,6-Dinitro-2-methylphenol	25	28	U
N-Nitrosodiphenylamine	10	11	U
4-Bromophenyl-phenylether	10	11	U
Hexachlorobenzene	10	11	U
Pentachlorophenol	25	28	U
Phenanthrene	10	11	U
Anthracene	10	11	U
Carbazole	10	11	U
Di-n-butylphthalate	10	11	U
Fluoranthene	10	11	U
Pyrene	10	11	U
Butylbenzylphthalate	10	11	U
3,3'-Dichlorobenzidine	10	11	U
Benzo(a)Anthracene	10	11	U
Chrysene	10	11	U
bis(2-Ethylhexyl)phthalate	10	11	U
Di-n-octylphthalate	10	11	U
Benzo(b)Fluoranthene	10	11	U
Benzo(k)Fluoranthene	10	11	U
Benzo(a)Pyrene	10	11	U
Indeno(1,2,3-c,d)Pyrene	10	11	U
Dibenz(a,h)Anthracene	10	11	U
Benzo(g,h,i)perylene	10	11	U

Dilution Factor: 1.00

Associated Method Blank: F4408
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 71184
DATE SAMPLED: 01/19/93
DATE ANALYZED: 01/22/93

ANALYTE	SOW-3/90 - II CRQL		
Chloromethane	10	10	U
Bromomethane	10	10	U
Vinyl Chloride	10	10	U
Chloroethane	10	10	U
Methylene Chloride	10	2	J
Acetone	10	10	U
Carbon Disulfide	10	10	U
1,1-Dichloroethene	10	10	U
1,1-Dichloroethane	10	10	U
1,2-Dichloroethene (total)	10	10	U
Chloroform	10	10	U
1,2-Dichloroethane	10	10	U
2-Butanone	10	10	U
1,1,1-Trichloroethane	10	10	U
Carbon Tetrachloride	10	10	U
Bromodichloromethane	10	10	U
1,2-Dichloropropane	10	10	U
cis-1,3-Dichloropropene	10	10	U
Trichloroethene	10	10	U
Dibromochloromethane	10	10	U
1,1,2-Trichloroethane	10	10	U
Benzene	10	10	U
trans-1,3-Dichloropropene	10	10	U
Bromoform	10	10	U
4-Methyl-2-Pentanone	10	10	U
2-Hexanone	10	10	U
Tetrachloroethene	10	10	U
1,1,2,2-Tetrachloroethane	10	10	U
Toluene	10	10	U
Chlorobenzene	10	10	U
Ethylbenzene	10	10	U
Styrene	10	10	U
Total Xylenes	10	10	U

Dilution Factor: 1.00

Associated Method Blank: K6812
Associated Equipment Blank: -
Associated Field Blank: -
Associated Trip Blank: -

Site: 9

SITE 9

WATER RESULTS:
MW-904 MW-906
MW-907 MW-908
MW-909 MW-910

To: Tom Longley

From: Kate Kuebler / Steve Turner

Date: March 23, 1993

Subject: Validation : Brunswick Naval Air Station : Ground Water Samples
Project No.: 07127-05 and 07127-09
Sampling Date: February 03 - 04, 1993

Review is complete for the data packages generated by NET pertaining to water samples collected at the Brunswick Naval Air Station. Review was performed following USEPA Region I guidelines. Samples were analyzed for TCL volatile, semivolatile, and pesticide/PCB organics following USEPA 3/90 Statement of Work (3/90 SOW), TAL inorganics (3/90 SOW), organophosphorus pesticides using SW846 Method 8140, and Rotenone and Pyrethrins using SW846 Method 8130. Package documentation was complete with no resubmissions requested.

The data tables referred to in this memo are comprised of the following:

Table 1 : Laboratory Report of Analysis
Table 2 : Validation / Summary Table
Table 3 : Summary Table

The following subsections summarize the qualifications/edits that have been determined by validation.

<u>All Organic Analyses</u>

Compound results below the CRQL were flagged with a J by the laboratory and on Table 1. These results were considered estimated and flagged J on Tables 2 and 3.

Compound results greater than the calibration range were flagged with an E by the laboratory and on Table 1. Samples containing these compounds were diluted and reanalyzed, and the diluted results flagged with a D by the laboratory and on Table 1. On Table 2, the diluted results for all compounds beyond calibration range were inserted into the original results and the remainder of the diluted analysis deleted from Table 2 and Table 3.

<u>Inorganic Analyses</u>

Analytical results below the CRDL were flagged with a B by the laboratory and on Table 1. These results were considered estimated and flagged with a J on Tables 2 and 3.

Volatile Analyses - Qualifications/Edits

1. Due to equipment blank contamination, acetone should be considered nondetect in 95GWX01, 95GWX03/XD, and 95GWX04.

Volatile Analyses - Comments

Please see item 1 under **Qualifications/Edits**. All hold time, instrument tune, internal standard,

surrogate recovery, matrix spike, matrix spike duplicate, and method blank results were within QC limits. Initial and continuing calibration standards that did not meet QC limits had no effect on the results. All field duplicate results were acceptable. No volatile TICs were identified in these water samples.

Semivolatile Analyses - Qualifications/Edits

2. Initial calibration Relative Standard Deviation (RSD) was above QC limits for bis(2-ethylhexyl)phthalate (BEHP). The positive result for BEHP in 09GW906 was estimated.

3. Continuing calibration percent difference (%D) was greater than 50% for 2,4-dinitrophenol. The nondetect result for 95GWX03/XD was estimated.

Semivolatile Analyses - Comments

Please see items 2 and 3 under **Qualifications/Edits**. All hold time, instrument tune, method blank, internal standard, matrix spike, matrix spike duplicate, and surrogate recovery criteria were met for all sample analyses. Field duplicate results were acceptable. Semivolatile TICs were identified in two of these samples.

Pesticide/PCB Analyses - Qualifications/Edits

4. Because of matrix interferences, samples 95GWX03/XX and 95GWX03/XD were initially analyzed at a 10X dilution. Due to off-scale peaks, these samples were reanalyzed at a 100X dilution. The chromatographs from the initial analysis were unacceptable due to the interferences and off-scale peaks, so the results of the 100X dilution were presented on Tables 2 and 3.

5. Initial calibration linearity criteria were not met for 4,4'-DDT. All positive results for this compound were estimated.

6. Continuing calibration criteria were not met for beta-BHC and gamma-BHC. Positive or nondetect results were estimated in associated samples.

Pesticide/PCB Analyses - Comments

Please see items 4 - 6 under **Qualifications/Edits**. All hold time and method blank criteria were met. Recovery of surrogate TCX was acceptable on both columns, while recovery of DCB was generally below QC limits on both columns. No qualification of data was necessary. All standard sequencing and compound retention time criteria were met. Resolution check standard showed only a 6% resolution of 4,4'DDE on one column but was acceptable on the other. No qualification was necessary since all positive DDE results were already estimated. Matrix spike (MS) and matrix spike duplicate (MSD) recoveries for 4,4'-DDT were unacceptable in sample 95GWX03. The MS recovery was -540% and the MSD recovery was +350%. Field duplicate results for 4,4'-DDT were also unacceptable in sample 95GWX03. 4,4'-DDT was previously qualified. (See Item 5 above.) Field duplicate results for 09GW908/XX and 09GW908/XD were all nondetect.

Inorganic Analyses - Qualifications/Edits

7. Due to blank contamination, results less than the concentrations listed below should be considered nondetect in all samples:

Aluminum	236 ug/L	Potassium	1490 ug/L
Iron	274 ug/L		
Lead	12 ug/L		

8. Spike sample recovery for iron was above QC limits. All positive results were estimated.

9. Laboratory duplicate precision criteria were not met for aluminum and iron. Positive results were estimated in all samples.

10. Field duplicate precision criteria were not met for aluminum and zinc in sample 95GWX03/XX and 95GWX03/XD. All positive aluminum and zinc results were estimated in the 95GW samples.

11. Post-digestion spike recovery was below QC limits for selenium. Results were estimated in 09GW908/XD and 95GWX02.

12. Post-digestion spike recovery was below QC limits for thallium. Results were estimated in 95GWX02, 95GWX03/XD, 95GWX03/XX, and 09GW908/XX.

Inorganic Analyses - Comments

Please see items 7 - 12 under **Qualifications/Edits.** All appropriate QC criteria were reviewed and found acceptable unless noted under **Qualifications/Edits.** Field duplicate results were acceptable for 09GW908/XX and 09GW908/XD.

Organophosphorus Pesticide Analyses - Qualifications/Edits

13. Surrogate recoveries were below QC limits. All results were estimated in 95GWX01, 95GWX02, 95GWX03/XX, and 95GWX03/XD.

Organophosphorus Pesticide Analyses - Comments

Please see item 13 under **Qualifications/Edits.** All hold time and method blank criteria were met. All standard sequencing and compound retention time criteria were met. All matrix spike (MS) and matrix spike duplicate (MSD) recoveries were above QC limits. Field duplicate results were acceptable.

Rotenone/Pyrethrin Analyses - Qualifications/Edits

14. All samples were extracted 9 days past hold time. All results were estimated.

Rotenone/Pyrethrin Analyses - Comments

Data were reviewed for hold times, matrix spike and matrix spike duplicate recovery, lab control sample recovery, method blank contamination, and calibration curve criteria. All QC results were acceptable except hold times. According to the case narrative, samples were initially extracted with the 7 day hold time. However, adjusting the pH of the extracts to pH=12, per the method, caused the pyrethrins to hydrolyze and resulted in unacceptable spike recoveries. The re-extractions were not pH adjusted.

TENTATIVELY IDENTIFIED COMPOUND (TIC) SUMMARY
FOR NASB; FILE: 7127-108
AQUEOUS (ug/L)

VOLATILE

NO VOLATILE TICs WERE IDENTIFIED IN THE FOLLOWING SAMPLES:

09GW904XXX93XX	09GW910XXX93XX	95GWX01XXX93XX
09GW906XXX93XX	09GW908XXX93XD	95GWX02XXX93XX
09GW907XXX93XX	95QSXX1XXX93XX	95GWX03XXX93XX
09GW908XXX93XX	BSQTXX1XXX93XX	95GWX04XXX93XX
09GW909XXX93XX	BSQTXX2XXX93XX	95GWX03XXX93XD

SEMIVOLATILE

	09GW910XXX93XX	95GWX03XXX93XD
Ethanol, 2-(2-butoxyethoxy)-	26 J	
C14H10C14		16 J

NO SEMIVOLATILE TICs WERE IDENTIFIED IN THE FOLLOWING SAMPLES:

09GW904XXX93XX	09GW909XXX93XX	95QSXX1XXX93XX
09GW906XXX93XX	95GWX01XXX93XX	
09GW907XXX93XX	95GWX02XXX93XX	
09GW908XXX93XX	95GWX03XXX93XX	
09GW908XXX93XD	95GWX04XXX93XX	

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 95QSXX1XXX93XX
LAB NUMBER: 71693
DATE SAMPLED: 02/03/93
DATE EXTRACTED: 02/08/93
DATE ANALYZED: 02/16/93

ANALYTE	SOW-3/90 - II CRQL		
alpha-BHC	0.05	0.056	U
beta-BHC	0.05	0.056	U
delta-BHC	0.05	0.056	U
gamma-BHC (Lindane)	0.05	0.056	U
Heptachlor	0.05	0.056	U
Aldrin	0.05	0.056	U
Heptachlor Epoxide	0.05	0.056	U
Endosulfan I	0.05	0.056	U
Dieldrin	0.1	0.11	U
4,4'-DDE	0.1	0.11	U
Endrin	0.1	0.11	U
Endosulfan II	0.1	0.11	U
4,4'-DDD	0.1	0.11	U
Endrin Aldehyde	0.1	0.11	U
Endosulfan Sulfate	0.1	0.11	U
4,4'-DDT	0.1	0.11	U
Methoxychlor	0.5	0.56	U
Endrin Ketone	0.1	0.11	U
alpha-Chlordane	0.05	0.056	U
gamma-Chlordane	0.05	0.056	U
Toxaphene	5	5.6	U
Aroclor-1016	1	1.1	U
Aroclor-1221	2	2.2	U
Aroclor-1232	1	1.1	U
Aroclor-1242	1	1.1	U
Aroclor-1248	1	1.1	U
Aroclor-1254	1	1.1	U
Aroclor-1260	1	1.1	U
Dilution Factor:		1.00	

Associated Method Blank: PBLK20208AA
Associated Equipment Blank: -
Associated Field Blank: -

Site: EQUIPMENT RINSATE

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 95QSXX1XXX93XX
LAB NUMBER: 71693
DATE SAMPLED: 02/03/93
DATE ANALYZED: 02/08/93

ANALYTE	SOW-3/90 - II CRQL		
Chloromethane	10	10	U
Bromomethane	10	10	U
Vinyl Chloride	10	10	U
Chloroethane	10	10	U
Methylene Chloride	10	10	U
Acetone	10	14	
Carbon Disulfide	10	10	U
1,1-Dichloroethene	10	10	U
1,1-Dichloroethane	10	10	U
1,2-Dichloroethene (total)	10	10	U
Chloroform	10	2	J
1,2-Dichloroethane	10	10	U
2-Butanone	10	10	U
1,1,1-Trichloroethane	10	10	U
Carbon Tetrachloride	10	10	U
Bromodichloromethane	10	10	U
1,2-Dichloropropane	10	10	U
cis-1,3-Dichloropropene	10	10	U
Trichloroethene	10	10	U
Dibromochloromethane	10	10	U
1,1,2-Trichloroethane	10	10	U
Benzene	10	10	U
trans-1,3-Dichloropropene	10	10	U
Bromoform	10	10	U
4-Methyl-2-Pentanone	10	10	U
2-Hexanone	10	10	U
Tetrachloroethene	10	10	U
1,1,2,2-Tetrachloroethane	10	10	U
Toluene	10	10	U
Chlorobenzene	10	10	U
Ethylbenzene	10	10	U
Styrene	10	10	U
Total Xylenes	10	10	U

Dilution Factor: 1.00

Associated Method Blank: K7164
Associated Equipment Blank: -
Associated Field Blank: -
Associated Trip Blank: -

Site: EQUIPMENT RINSATE

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 95QSXX1XXX93XX
LAB NUMBER: 71693S
DATE SAMPLED: 02/03/93

ANALYTE	SOW-3/90 - II CRDL		
Aluminum	200	47.2	B*
Antimony	60	50.0	U
Arsenic	10	2.0	UW
Barium	200	3.0	U
Beryllium	5	1.0	U
Cadmium	5	4.0	U
Calcium	5000	106	B
Chromium	10	4.0	U
Cobalt	50	5.0	U
Copper	25	7.1	B
Iron	100	54.8	B*
Lead	3	2.4	B
Magnesium	5000	20.0	U
Manganese	15	3.0	U
Mercury	0.2	0.20	U
Nickel	40	14.0	U
Potassium	5000	250	U
Selenium	5	1.0	U
Silver	10	4.0	U
Sodium	5000	432	B
Thallium	10	2.0	U
Vanadium	50	5.0	U
Zinc	20	6.0	U
Cyanide	10	10.0	U

Associated Method Blank: PB4046CW
Associated Equipment Blank: -
Associated Field Blank: -

Site: EQUIPMENT RINSATE

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 95QSXX1XXX93XX
LAB NUMBER: BNASW4*2
DATE SAMPLED: 02/03/93
DATE ANALYZED: 02/22/93

ANALYTE	RL	
ROTENONE	0.71	0.71 U
PYRETHRINS, TOTAL	20.0	20 U

Associated Method Blank: PBG35281
Associated Equipment Blank: -
Associated Field Blank: -

Site: EQUIPMENT RINSATE

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 95QSXX1XXX93XX
LAB NUMBER: 71693
DATE SAMPLED: 02/03/93
DATE EXTRACTED: 02/10/93
DATE ANALYZED: 02/27/93

ANALYTE	RL	
Methyl Azinphos	2.5	2.5 U
Bolstar	2.5	2.5 U
Cholorpyrifos	2.5	2.5 U
Coumaphos	2.5	2.5 U
O-Demeton	2.5	2.5 U
S-Demeton	2.5	2.5 U
Diazinon	2.5	2.5 U
Dichlorvos	2.5	2.5 U
Dimethoate	2.5	2.5 U
Disulfoton	2.5	2.5 U
EPN	2.5	2.5 U
Ethoprop	2.5	2.5 U
Fensulfothion	2.5	2.5 U
Fenthion	2.5	2.5 U
Malathion	2.5	2.5 U
Merphos	2.5	2.5 U
Mevinphos	2.5	2.5 U
Monocrotophos	2.5	2.5 U
Naled	2.5	2.5 U
Ethyl Parathion	2.5	2.5 U
Methyl Parathion	2.5	2.5 U
Phorate	2.5	2.5 U
Ronnel	2.5	2.5 U
Sulfotep	2.5	2.5 U
TEPP	2.5	2.5 U
Tetrachlorovinphos	2.5	2.5 U
Tokuthion	2.5	2.5 U
Trichloronate	2.5	2.5 U

==========

Associated Method Blank: PBLK10210A
Associated Equipment Blank: -
Associated Field Blank: -

Site: EQUIPMENT RINSATE

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:		71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:		02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE ANALYZED:		02/10/93	02/09/93	02/09/93	02/10/93	02/10/93	02/10/93	02/10/93
ANALYTE	SOW-3/90 - II CRQL							
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	8 J	10 U	9 J	2 J	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10	10 U	10 U	2 J	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10	1 J	4 J	1 J	10 U	10 U	10 U	10 U
Chloroform	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Xylenes	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dilution Factor:		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Associated Method Blank:		K7207	K7192	K7192	K7207	K7207	K7207	K7207
Associated Equipment Blank:		95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:		-	-	-	-	-	-	-
Associated Trip Blank:		BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX

Site: GROUNDWATER
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE ANALYZED:	02/10/93	02/09/93	02/09/93	02/10/93	02/10/93	02/10/93	02/10/93

ANALYTE	SOW-3/90 - II CRQL							
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	8 J	10 U	9 J	2 J	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10	10 U	10 U	2 J	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10	1 J	4 J	1 J	10 U	10 U	10 U	10 U
Chloroform	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Xylenes	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dilution Factor:		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Associated Method Blank:	K7207	K7192	K7192	K7207	K7207	K7207	K7207
Associated Equipment Blank:	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:	-	-	-	-	-	-	-
Associated Trip Blank:	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX

Site: GROUNDWATER
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE ANALYZED:	02/10/93	02/09/93	02/09/93	02/10/93	02/10/93	02/10/93	02/10/93
ANALYTE SOW-3/90 - II CRQL							
Chloromethane 10	-	-	-	-	-	-	-
Bromomethane 10	-	-	-	-	-	-	-
Vinyl Chloride 10	8 J	-	9 J	2 J	-	-	-
Chloroethane 10	-	-	-	-	-	-	-
Methylene Chloride 10	-	-	-	-	-	-	-
Acetone 10	-	-	-	-	-	-	-
Carbon Disulfide 10	-	-	-	-	-	-	-
1,1-Dichloroethene 10	-	-	-	-	-	-	-
1,1-Dichloroethane 10	-	-	2 J	-	-	-	-
1,2-Dichloroethene (total) 10	1 J	4 J	1 J	-	-	-	-
Chloroform 10	-	-	-	-	-	-	-
1,2-Dichloroethane 10	-	-	-	-	-	-	-
2-Butanone 10	-	-	-	-	-	-	-
1,1,1-Trichloroethane 10	-	-	-	-	-	-	-
Carbon Tetrachloride 10	-	-	-	-	-	-	-
Bromodichloromethane 10	-	-	-	-	-	-	-
1,2-Dichloropropane 10	-	-	-	-	-	-	-
cis-1,3-Dichloropropene 10	-	-	-	-	-	-	-
Trichloroethene 10	-	-	-	-	-	-	-
Dibromochloromethane 10	-	-	-	-	-	-	-
1,1,2-Trichloroethane 10	-	-	-	-	-	-	-
Benzene 10	-	-	-	-	-	-	-
trans-1,3-Dichloropropene 10	-	-	-	-	-	-	-
Bromoform 10	-	-	-	-	-	-	-
4-Methyl-2-Pentanone 10	-	-	-	-	-	-	-
2-Hexanone 10	-	-	-	-	-	-	-
Tetrachloroethene 10	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane 10	-	-	-	-	-	-	-
Toluene 10	-	-	-	-	-	-	-
Chlorobenzene 10	-	-	-	-	-	-	-
Ethylbenzene 10	-	-	-	-	-	-	-
Styrene 10	-	-	-	-	-	-	-
Total Xylenes 10	-	-	-	-	-	-	-
Dilution Factor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Associated Method Blank:	K7207	K7192	K7192	K7207	K7207	K7207	K7207
Associated Equipment Blank:	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:	-	-	-	-	-	-	-
Associated Trip Blank:	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX	BSQTXX2XXX93XX

Site: GROUNDWATER
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE EXTRACTED:	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93
DATE ANALYZED:	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93

ANALYTE	SOW-3/90 - II CRQL							
Phenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
Dimethylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U

Site: GROUNDWATER
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE EXTRACTED:	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93
DATE ANALYZED:	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93

ANALYTE	SOW-3/90 - II CRQL							
3-Nitroaniline	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
Acenaphthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
4-Nitrophenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
4,6-Dinitro-2-methylphenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
N-Nitrosodiphenylamine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10	5 J	12	1 J	10 U	10 U	1 J	10 U
Di-n-octylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-c,d)Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dilution Factor:		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Associated Method Blank:		J7625	J7625	J7625	J7625	J7625	J7625	J7625
Associated Equipment Blank:		95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:		-	-	-	-	-	-	-

Site: GROUNDWATER
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE EXTRACTED:	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93
DATE ANALYZED:	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93

ANALYTE	SOW-3/90 - II CRQL							
Phenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
Dimethylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U

Site: GROUNDWATER
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE EXTRACTED:	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93
DATE ANALYZED:	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93

ANALYTE	SOW-3/90 - II CRQL							
3-Nitroaniline	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
Acenaphthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
4-Nitrophenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
4,6-Dinitro-2-methylphenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
N-Nitrosodiphenylamine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25	26 U	26 U	25 U	25 U	26 U	26 U	26 U
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10	5 J	12 J	1 J	10 U	10 U	1 J	10 U
Di-n-octylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-c,d)Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dilution Factor:		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Associated Method Blank:		J7625	J7625	J7625	J7625	J7625	J7625	J7625
Associated Equipment Blank:		95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:		-	-	-	-	-	-	-

Site: GROUNDWATER
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE EXTRACTED:	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93
DATE ANALYZED:	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93
ANALYTE SOW-3/90 - II	CRQL						
Phenol	10	-	-	-	-	-	-	-
bis(2-Chloroethyl)ether	10	-	-	-	-	-	-	-
2-Chlorophenol	10	-	-	-	-	-	-	-
1,3-Dichlorobenzene	10	-	-	-	-	-	-	-
1,4-Dichlorobenzene	10	-	-	-	-	-	-	-
1,2-Dichlorobenzene	10	-	-	-	-	-	-	-
2-Methylphenol	10	-	-	-	-	-	-	-
2,2'-oxybis(1-Chloropropane)	10	-	-	-	-	-	-	-
4-Methylphenol	10	-	-	-	-	-	-	-
N-Nitroso-di-n-propylamine	10	-	-	-	-	-	-	-
Hexachloroethane	10	-	-	-	-	-	-	-
Nitrobenzene	10	-	-	-	-	-	-	-
Isophorone	10	-	-	-	-	-	-	-
2-Nitrophenol	10	-	-	-	-	-	-	-
2,4-Dimethylphenol	10	-	-	-	-	-	-	-
bis(2-Chloroethoxy)methane	10	-	-	-	-	-	-	-
2,4-Dichlorophenol	10	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	10	-	-	-	-	-	-	-
Naphthalene	10	-	-	-	-	-	-	-
4-Chloroaniline	10	-	-	-	-	-	-	-
Hexachlorobutadiene	10	-	-	-	-	-	-	-
4-Chloro-3-Methylphenol	10	-	-	-	-	-	-	-
2-Methylnaphthalene	10	-	-	-	-	-	-	-
Hexachlorocyclopentadiene	10	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	10	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	25	-	-	-	-	-	-	-
2-Chloronaphthalene	10	-	-	-	-	-	-	-
2-Nitroaniline	25	-	-	-	-	-	-	-
Dimethylphthalate	10	-	-	-	-	-	-	-
Acenaphthylene	10	-	-	-	-	-	-	-
2,6-Dinitrotoluene	10	-	-	-	-	-	-	-

Site: GROUNDWATER
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE EXTRACTED:	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93	02/09/93
DATE ANALYZED:	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93	02/11/93

ANALYTE	SOW-3/90 - II CRQL							
3-Nitroaniline	25	-	-	-	-	-	-	-
Acenaphthene	10	-	-	-	-	-	-	-
2,4-Dinitrophenol	25	-	-	-	-	-	-	-
4-Nitrophenol	25	-	-	-	-	-	-	-
Dibenzofuran	10	-	-	-	-	-	-	-
2,4-Dinitrotoluene	10	-	-	-	-	-	-	-
Diethylphthalate	10	-	-	-	-	-	-	-
4-Chlorophenyl-phenylether	10	-	-	-	-	-	-	-
Fluorene	10	-	-	-	-	-	-	-
4-Nitroaniline	25	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	25	-	-	-	-	-	-	-
N-Nitrosodiphenylamine	10	-	-	-	-	-	-	-
4-Bromophenyl-phenylether	10	-	-	-	-	-	-	-
Hexachlorobenzene	10	-	-	-	-	-	-	-
Pentachlorophenol	25	-	-	-	-	-	-	-
Phenanthrene	10	-	-	-	-	-	-	-
Anthracene	10	-	-	-	-	-	-	-
Carbazole	10	-	-	-	-	-	-	-
Di-n-butylphthalate	10	-	-	-	-	-	-	-
Fluoranthene	10	-	-	-	-	-	-	-
Pyrene	10	-	-	-	-	-	-	-
Butylbenzylphthalate	10	-	-	-	-	-	-	-
3,3'-Dichlorobenzidine	10	-	-	-	-	-	-	-
Benzo(a)Anthracene	10	-	-	-	-	-	-	-
Chrysene	10	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate	10	5 J	12 J	1 J	-	-	1 J	-
Di-n-octylphthalate	10	-	-	-	-	-	-	-
Benzo(b)Fluoranthene	10	-	-	-	-	-	-	-
Benzo(k)Fluoranthene	10	-	-	-	-	-	-	-
Benzo(a)Pyrene	10	-	-	-	-	-	-	-
Indeno(1,2,3-c,d)Pyrene	10	-	-	-	-	-	-	-
Dibenz(a,h)Anthracene	10	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	10	-	-	-	-	-	-	-
Dilution Factor:		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Associated Method Blank:	J7625	J7625	J7625	J7625	J7625	J7625	J7625
Associated Equipment Blank:	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:	-	-	-	-	-	-	-

Site: GROUNDWATER
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE EXTRACTED:	02/10/93	02/10/93	02/10/93	02/10/93	02/10/93	02/10/93	02/10/93
DATE ANALYZED:	02/18/93	02/18/93	02/17/93	02/18/93	02/18/93	02/18/93	02/18/93
ANALYTE — SOW-3/90 - II CRQL							
alpha-BHC 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
beta-BHC 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
delta-BHC 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
gamma-BHC (Lindane) 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
Heptachlor 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
Aldrin 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
Heptachlor Epoxide 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
Endosulfan I 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
Dieldrin 0.1	0.1 U	0.1 U	0.12 U	0.1 U	0.1 U	0.11 U	0.098 U
4,4'-DDE 0.1	0.1 U	0.1 U	0.12 U	0.1 U	0.1 U	0.11 U	0.098 U
Endrin 0.1	0.1 U	0.1 U	0.12 U	0.1 U	0.1 U	0.11 U	0.098 U
Endosulfan II 0.1	0.1 U	0.1 U	0.12 U	0.1 U	0.1 U	0.11 U	0.098 U
4,4'-DDD 0.1	0.1 U	0.1 U	0.12 U	0.1 U	0.1 U	0.11 U	0.098 U
Endrin Aldehyde 0.1	0.1 U	0.1 U	0.12 U	0.1 U	0.1 U	0.11 U	0.098 U
Endosulfan Sulfate 0.1	0.1 U	0.1 U	0.12 U	0.1 U	0.1 U	0.1 U	0.098 U
4,4'-DDT 0.1	0.1 U	0.1 U	0.12 U	0.1 U	0.1 U	0.11 U	0.098 U
Methoxychlor 0.5	0.51 U	0.5 U	0.59 U	0.5 U	0.51 U	0.53 U	0.49 U
Endrin Ketone 0.1	0.1 U	0.1 U	0.12 U	0.1 U	0.1 U	0.11 U	0.098 U
alpha-Chlordane 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
gamma-Chlordane 0.05	0.051 U	0.05 U	0.059 U	0.05 U	0.051 U	0.053 U	0.049 U
Toxaphene 5	5.1 U	5 U	5.9 U	5 U	5.1 U	5.3 U	4.9 U
Aroclor-1016 1	1 U	1 U	1.2 U	1 U	1 U	1.1 U	0.98 U
Aroclor-1221 2	2 U	2 U	2.4 U	2 U	2 U	2.1 U	2 U
Aroclor-1232 1	1 U	1 U	1.2 U	1 U	1 U	1.1 U	0.98 U
Aroclor-1242 1	1 U	1 U	1.2 U	1 U	1 U	1.1 U	0.98 U
Aroclor-1248 1	1 U	1 U	1.2 U	1 U	1 U	1.1 U	0.98 U
Aroclor-1254 1	1 U	1 U	1.2 U	1 U	1 U	1.1 U	0.98 U
Aroclor-1260 1	1 U	1 U	1.2 U	1 U	1 U	1.1 U	0.98 U
Dilution Factor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Associated Method Blank:	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA
Associated Equipment Blank:	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:	-	-	-	-	-	-	-

Site: GROUNDWATER
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE EXTRACTED:	02/10/93	02/10/93	02/10/93	02/10/93	02/10/93	02/10/93	02/10/93
DATE ANALYZED:	02/18/93	02/18/93	02/17/93	02/18/93	02/18/93	02/18/93	02/18/93

ANALYTE	SOW-3/90 - II CRQL														
alpha-BHC	0.05	0.051	U	0.05	U	0.059	U	0.05	U	0.051	U	0.053	U	0.049	U
beta-BHC	0.05	0.051	UJ	0.05	UJ	0.059	UJ	0.05	UJ	0.051	UJ	0.053	UJ	0.049	UJ
delta-BHC	0.05	0.051	U	0.05	U	0.059	U	0.05	U	0.051	U	0.053	U	0.049	U
gamma-BHC (Lindane)	0.05	0.051	U	0.05	U	0.059	U	0.05	U	0.051	U	0.053	U	0.049	U
Heptachlor	0.05	0.051	U	0.05	U	0.059	U	0.05	U	0.051	U	0.053	U	0.049	U
Aldrin	0.05	0.051	U	0.05	U	0.059	U	0.05	U	0.051	U	0.053	U	0.049	U
Heptachlor Epoxide	0.05	0.051	U	0.05	U	0.059	U	0.05	U	0.051	U	0.053	U	0.049	U
Endosulfan I	0.05	0.051	U	0.05	U	0.059	U	0.05	U	0.051	U	0.053	U	0.049	U
Dieldrin	0.1	0.1	U	0.1	U	0.12	U	0.1	U	0.1	U	0.11	U	0.098	U
4,4'-DDE	0.1	0.1	U	0.1	U	0.12	U	0.1	U	0.1	U	0.11	U	0.098	U
Endrin	0.1	0.1	U	0.1	U	0.12	U	0.1	U	0.1	U	0.11	U	0.098	U
Endosulfan II	0.1	0.1	U	0.1	U	0.12	U	0.1	U	0.1	U	0.11	U	0.098	U
4,4'-DDD	0.1	0.1	U	0.1	U	0.12	U	0.1	U	0.1	U	0.11	U	0.098	U
Endrin Aldehyde	0.1	0.1	U	0.1	U	0.12	U	0.1	U	0.1	U	0.11	U	0.098	U
Endosulfan Sulfate	0.1	0.1	U	0.1	U	0.12	U	0.1	U	0.1	U	0.1	U	0.098	U
4,4'-DDT	0.1	0.1	U	0.1	U	0.12	U	0.1	U	0.1	U	0.11	U	0.098	U
Methoxychlor	0.5	0.51	U	0.5	U	0.59	U	0.5	U	0.51	U	0.53	U	0.49	U
Endrin Ketone	0.1	0.1	U	0.1	U	0.12	U	0.1	U	0.1	U	0.11	U	0.098	U
alpha-Chlordane	0.05	0.051	U	0.05	U	0.059	U	0.05	U	0.051	U	0.053	U	0.049	U
gamma-Chlordane	0.05	0.051	U	0.05	U	0.059	U	0.05	U	0.051	U	0.053	U	0.049	U
Toxaphene	5	5.1	U	5	U	5.9	U	5	U	5.1	U	5.3	U	4.9	U
Aroclor-1016	1	1	U	1	U	1.2	U	1	U	1	U	1.1	U	0.98	U
Aroclor-1221	2	2	U	2	U	2.4	U	2	U	2	U	2.1	U	2	U
Aroclor-1232	1	1	U	1	U	1.2	U	1	U	1	U	1.1	U	0.98	U
Aroclor-1242	1	1	U	1	U	1.2	U	1	U	1	U	1.1	U	0.98	U
Aroclor-1248	1	1	U	1	U	1.2	U	1	U	1	U	1.1	U	0.98	U
Aroclor-1254	1	1	U	1	U	1.2	U	1	U	1	U	1.1	U	0.98	U
Aroclor-1260	1	1	U	1	U	1.2	U	1	U	1	U	1.1	U	0.98	U
Dilution Factor:		1.00		1.00		1.00		1.00		1.00		1.00		1.00	

Associated Method Blank:	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA
Associated Equipment Blank:	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:	-	-	-	-	-	-	-

Site: GROUNDWATER
#: Level D Validation

Pesticides/PCBs Aqueous Analysis (ug/L)

Table 3
Summary Table

SAMPLE LOCATION:	09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:	71720 #	71719 #	71718 #	71722 #	71721 #	71724 #	71723 #
DATE SAMPLED:	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
DATE EXTRACTED:	02/10/93	02/10/93	02/10/93	02/10/93	02/10/93	02/10/93	02/10/93
DATE ANALYZED:	02/18/93	02/18/93	02/17/93	02/18/93	02/18/93	02/18/93	02/18/93
ANALYTE — SOW-3/90 - II CRQL							
alpha-BHC 0.05	-	-	-	-	-	-	-
beta-BHC 0.05	-	-	-	-	-	-	-
delta-BHC 0.05	-	-	-	-	-	-	-
gamma-BHC (Lindane) 0.05	-	-	-	-	-	-	-
Heptachlor 0.05	-	-	-	-	-	-	-
Aldrin 0.05	-	-	-	-	-	-	-
Heptachlor Epoxide 0.05	-	-	-	-	-	-	-
Endosulfan I 0.05	-	-	-	-	-	-	-
Dieldrin 0.1	-	-	-	-	-	-	-
4,4'-DDE 0.1	-	-	-	-	-	-	-
Endrin 0.1	-	-	-	-	-	-	-
Endosulfan II 0.1	-	-	-	-	-	-	-
4,4'-DDD 0.1	-	-	-	-	-	-	-
Endrin Aldehyde 0.1	-	-	-	-	-	-	-
Endosulfan Sulfate 0.1	-	-	-	-	-	-	-
4,4'-DDT 0.1	-	-	-	-	-	-	-
Methoxychlor 0.5	-	-	-	-	-	-	-
Endrin Ketone 0.1	-	-	-	-	-	-	-
alpha-Chlordane 0.05	-	-	-	-	-	-	-
gamma-Chlordane 0.05	-	-	-	-	-	-	-
Toxaphene 5	-	-	-	-	-	-	-
Aroclor-1016 1	-	-	-	-	-	-	-
Aroclor-1221 2	-	-	-	-	-	-	-
Aroclor-1232 1	-	-	-	-	-	-	-
Aroclor-1242 1	-	-	-	-	-	-	-
Aroclor-1248 1	-	-	-	-	-	-	-
Aroclor-1254 1	-	-	-	-	-	-	-
Aroclor-1260 1	-	-	-	-	-	-	-
Dilution Factor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Associated Method Blank:	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA	PBLK10210AA
Associated Equipment Blank:	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:	-	-	-	-	-	-	-

Site: GROUNDWATER
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09GW904XXX93XX		09GW906XXX93XX		09GW907XXX93XX		09GW908XXX93XD		09GW908XXX93XX		09GW909XXX93XX		09GW910XXX93XX	
LAB NUMBER:		71720S #		71719S #		71718S #		71722S #		71721S #		71724S #		71723S #	
DATE SAMPLED:		02/04/93		02/04/93		02/04/93		02/04/93		02/04/93		02/04/93		02/04/93	
ANALYTE	SOW-3/90 - II CRDL														
Aluminum	200	85.1	B*	48.8	B*	44.2	B*	69.9	B*	32.4	B*	241	*	207	*
Antimony	60	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U
Arsenic	10	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Barium	200	7.0	B	7.6	B	15.0	B	9.8	B	9.1	B	3.3	B	3.3	B
Beryllium	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Cadmium	5	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Calcium	5000	18400		14100		40300		25700		24100		2140	B	4180	B
Chromium	10	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Cobalt	50	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Copper	25	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Iron	100	130	*	314	*	41.0	B*	67.4	B*	37.8	B*	360	*	192	*
Lead	3	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Magnesium	5000	5520		4310	B	5530		2990	B	3000	B	775	B	709	B
Manganese	15	183		56.7		6720		689		609		22.8		27.8	
Mercury	0.2	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	40	14.0	U	14.0	U	14.0	U	14.0	U	14.0	U	14.0	U	14.0	U
Potassium	5000	1290	B	2190	B	2460	B	2470	B	2630	B	571	B	250	U
Selenium	5	1.0	U	1.0	U	1.0	U	1.0	UW	1.0	U	1.0	U	1.0	U
Silver	10	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Sodium	5000	6240		35400		16200		16200		15100		4030	B	2550	B
Thallium	10	.2.0	U	2.0	U	2.0	U	2.0	U	2.0	UW	2.0	U	2.0	U
Vanadium	50	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Zinc	20	8.8	B	6.9	B	13.8	B	8.1	B	6.0	U	10.4	B	7.9	B
Cyanide	10	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U

Associated Method Blank:	PB4046CW	PB4046CW	PB4046CW	PB4046CW	PB4046CW	PB4046CW	PB4046CW
Associated Equipment Blank:	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:	-	-	-	-	-	-	-

Site: GROUNDWATER
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:		09GW904XXX93XX		09GW906XXX93XX		09GW907XXX93XX		09GW908XXX93XD		09GW908XXX93XX		09GW909XXX93XX		09GW910XXX93XX	
LAB NUMBER:		71720S #		71719S #		71718S #		71722S #		71721S #		71724S #		71723S #	
DATE SAMPLED:		02/04/93		02/04/93		02/04/93		02/04/93		02/04/93		02/04/93		02/04/93	
ANALYTE	SOW-3/90 - II CRDL														
Aluminum	200	85.1	U	48.8	U	44.2	U	69.9	U	32.4	U	241	J	207	U
Antimony	60	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U
Arsenic	10	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Barium	200	7.0	U	7.6	U	15.0	U	9.8	U	9.1	U	3.3	U	3.3	U
Beryllium	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Cadmium	5	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Calcium	5000	18400		14100		40300		25700		24100		2140	J	4180	J
Chromium	10	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Cobalt	50	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Copper	25	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Iron	100	130	U	314	J	41.0	U	67.4	U	37.8	U	360	J	192	U
Lead	3	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Magnesium	5000	5520		4310	J	5530		2990	J	3000	J	775	J	709	J
Manganese	15	183		56.7		6720		689		609		22.8		27.8	
Mercury	0.2	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	40	14.0	U	14.0	U	14.0	U	14.0	U	14.0	U	14.0	U	14.0	U
Potassium	5000	1290	U	2190	J	2460	J	2470	J	2630	J	571	U	250	U
Selenium	5	1.0	U	1.0	U	1.0	U	1.0	UJ	1.0	U	1.0	U	1.0	U
Silver	10	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Sodium	5000	6240		35400		16200		16200		15100		4030	J	2550	J
Thallium	10	2.0	U	2.0	U	2.0	U	2.0	U	2.0	UJ	2.0	U	2.0	U
Vanadium	50	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Zinc	20	8.8	J	6.9	J	13.8	J	8.1	J	6.0	U	10.4	J	7.9	J
Cyanide	10	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
Associated Method Blank:		PB4046CW		PB4046CW		PB4046CW		PB4046CW		PB4046CW		PB4046CW		PB4046CW	
Associated Equipment Blank:		95QSXX1XXX93XX		95QSXX1XXX93XX		95QSXX1XXX93XX		95QSXX1XXX93XX		95QSXX1XXX93XX		95QSXX1XXX93XX		95QSXX1XXX93XX	
Associated Field Blank:		-		-		-		-		-		-		-	

Site: GROUNDWATER
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:		09GW904XXX93XX	09GW906XXX93XX	09GW907XXX93XX	09GW908XXX93XD	09GW908XXX93XX	09GW909XXX93XX	09GW910XXX93XX
LAB NUMBER:		71720S #	71719S #	71718S #	71722S #	71721S #	71724S #	71723S #
DATE SAMPLED:		02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93	02/04/93
ANALYTE	SOW-3/90 - I1 CRDL							
Aluminum	200	-	-	-	-	-	241 J	-
Antimony	60	-	-	-	-	-	-	-
Arsenic	10	-	-	-	-	-	-	-
Barium	200	-	-	-	-	-	-	-
Beryllium	5	-	-	-	-	-	-	-
Cadmium	5	-	-	-	-	-	-	-
Calcium	5000	18400	14100	40300	25700	24100	2140 J	4180 J
Chromium	10	-	-	-	-	-	-	-
Cobalt	50	-	-	-	-	-	-	-
Copper	25	-	-	-	-	-	-	-
Iron	100	-	314 J	-	-	-	360 J	-
Lead	3	-	-	-	-	-	-	-
Magnesium	5000	5520	4310 J	5530	2990 J	3000 J	775 J	709 J
Manganese	15	183	56.7	6720	689	609	22.8	27.8
Mercury	0.2	-	-	-	-	-	-	-
Nickel	40	-	-	-	-	-	-	-
Potassium	5000	-	2190 J	2460 J	2470 J	2630 J	-	-
Selenium	5	-	-	-	-	-	-	-
Silver	10	-	-	-	-	-	-	-
Sodium	5000	6240	35400	16200	16200	15100	4030 J	2550 J
Thallium	10	-	-	-	-	-	-	-
Vanadium	50	-	-	-	-	-	-	-
Zinc	20	8.8 J	6.9 J	13.8 J	8.1 J	-	10.4 J	7.9 J
Cyanide	10	-	-	-	-	-	-	-
Associated Method Blank:		PB4046CW	PB4046CW	PB4046CW	PB4046CW	PB4046CW	PB4046CW	PB4046CW
Associated Equipment Blank:		95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX	95QSXX1XXX93XX
Associated Field Blank:		-	-	-	-	-	-	-

Site: GROUNDWATER
#: Level D Validation

SITE 9

WATER RESULTS:
LT-001 MW-914
MW-915 MW-916
SOIL RESULTS:
SD-001

To: Tom Longley / Beth Walter

From: Kate Kuebler

Date: May 17, 1993

Subject: Validation : Brunswick Naval Air Station - Site 09
Project No.: 07127-09
Sampling Date: March 18, 1993

Review is complete for the data packages generated by NET pertaining to sediment, leachate, and water samples collected at the Brunswick Naval Air Station - Site 09. Review was performed following USEPA Region I guidelines. All analyses were validated at Level D. Samples were analyzed for TCL volatile, semivolatile, and pesticide/PCB organics, and TAL inorganics following USEPA CLP 3/90 Statement of Work (3/90 SOW). Package documentation was complete but several pages were illegible and required resubmission.

The data tables referred to in this memo are comprised of the following:

Table 1 : Laboratory Report of Analysis
Table 2 : Validation / Summary Table
Table 3 : Summary Table

The following subsections summarize the qualifications/edits that have been determined by validation.

All Organic Analyses

Compound results below the sample-adjusted CRQL were flagged with a J by the laboratory and on Table 1. These results were considered estimated and flagged J on Tables 2 and 3.

Compound results greater than the calibration range were flagged with an E by the laboratory and on Table 1. Samples containing these compounds were diluted and reanalyzed, and the diluted results flagged with a D by the laboratory and on Table 1. On Table 2, the diluted results for all compounds beyond calibration range were inserted into the original results and the remainder of the diluted analysis deleted from Table 2 and Table 3.

All Pesticide Analyses

Compounds that had greater than 25% difference between the results of the two columns were flagged with a P by the laboratory. These were flagged J on Tables 2 and 3.

Inorganic Analyses

Analytical results below the sample-adjusted CRDL were flagged with a B by the laboratory and on Table 1. These results were considered estimated and flagged with a J on Tables 2 and 3.

Volatile Analyses - Qualifications/Edits

1. Due to method blank contamination, acetone should be considered nondetect in 09LT001 and 09MW915/XD.

2. Continuing calibration criteria were not met for several compounds. Results were estimated in associated samples for acetone, vinyl chloride, and 2-butanone.

Volatile Analyses - Comments

Please see items 1 - 2 under **Qualifications/Edits**. All hold times, instrument tunes, surrogate recoveries, matrix spike and matrix spike duplicate recoveries, internal standards, and method blanks were within QC limits. Initial and continuing calibration standards that did not meet QC requirements had no effect on the results except as discussed above. Field duplicate results met precision criteria for the sediment and the aqueous duplicate samples. No TICs were identified in these samples.

Semivolatile Analyses - Qualifications/Edits

There were no qualifications or edits to the aqueous analytical results.

3. Recovery of pyrene was below QC limits in the matrix spike analysis of 09SD001. Results were estimated in this sample only.

4. Field duplicate precision criteria were not met for 09SD001 and its duplicate. Results for bis(2-ethylhexyl)phthalate were estimated in both 09SD001/XX and 09SD001/XD.

Semivolatile Analyses - Comments

Please see items 3 and 4 under **Qualifications/Edits**. All hold time, instrument tune, method blank, internal standard, and surrogate recovery criteria were met for all sample analyses. The aqueous matrix spike duplicate recovery of 4-nitrophenol was above QC limits. The sediment matrix spike recovery of n-nitroso-di-n-propylamine was below QC limits. Initial and continuing calibration standards that did not meet QC requirements had no effect on the results. Aqueous field duplicate results were acceptable. TICs were identified in the leachate sample only.

Pesticide/PCB Analyses - Qualifications/Edits

There were no qualifications or edits to the aqueous analytical results.

5. Field duplicate precision criteria were not met for 09SD001 and its duplicate. Results for 4,4'-DDT and methoxychlor were estimated in both 09SD001/XX and 09SD001/XD

Pesticide/PCB Analyses - Comments

Please see item 5 under **Qualifications/Edits**. All samples were extracted and analyzed within hold time. All method and instrument blanks, continuing calibrations, standard sequencing, DDT/endrin breakdown, aqueous matrix spike and matrix spike duplicate recoveries, and resolution check standards met QC criteria. Initial calibration standards that did not meet QC requirements had no effect on the results. Sediment matrix spike duplicate recovery of gamma-BHC was below QC limits. Recovery of surrogate DCB was slightly low on one column during the analysis of 09MW914 and 09MW915 but no qualification was necessary. Surrogate TCX eluted slightly outside the retention time window (0.01 minutes early) during the analysis of several standards and two aqueous samples. No qualification was necessary. Aqueous field duplicate results were acceptable. Dilution factors shown on Tables 1, 2, and 3 represent the effect of sample sizes that deviated from method-specified volume.

Inorganic Analyses - Qualifications/Edits

Aqueous Samples (LT and MW)

6. Due to preparation blank contamination, aluminum should be considered nondetect (U) in 09MW916. Additionally, selenium results less than 6 ug/l and zinc results less than 102 ug/l should be considered nondetect in all samples.

7. Due to equipment blank contamination, copper results less than 21.5 ug/l and lead results less than 14 ug/l should be considered nondetect in all MW samples.

8. Spike sample recoveries of mercury and iron were above QC limits. Positive results were estimated in all samples.

9. Spike sample recovery of silver was below QC limits. Positive and nondetect results were estimated in all samples.

Sediment Samples (SD)

10. Due to prep blank contamination, barium should be considered nondetect in both samples.

11. Results for the calibration blank were less than 2X the negative IDL for mercury. Results were estimated in both samples.

12. Spike sample recovery of cadmium was below QC limits. Results were estimated in both samples.

13. Laboratory duplicate precision criteria were not met for aluminum, cadmium, iron, and lead. All results were estimated.

Inorganic Analyses - Comments

Please see items 6 - 13 under **Qualifications/Edits.** All appropriate QC criteria were reviewed and found acceptable unless noted under **Qualifications/Edits.** All field duplicate results were acceptable.

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047S #
DATE SAMPLED: 03/18/93

ANALYTE	SOW-3/90 - II CRDL		
Aluminum	200	4940	
Antimony	60	50.0	U
Arsenic	10	9.4	B
Barium	200	64.4	B
Beryllium	5	1.0	U
Cadmium	5	4.0	U
Calcium	5000	16700	
Chromium	10	16.3	
Cobalt	50	7.8	B
Copper	25	23.1	B
Iron	100	7190	
Lead	3	32.8	
Magnesium	5000	2180	B
Manganese	15	219	
Mercury	0.2	0.20	UN
Nickel	40	14.0	U
Potassium	5000	3040	B
Selenium	5	1.4	BW
Silver	10	4.0	UN
Sodium	5000	711000	
Thallium	10	2.0	UW
Vanadium	50	11.1	B
Zinc	20	195	
Cyanide	10	11.6	

Associated Method Blank: PB73042S
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047S #
DATE SAMPLED: 03/18/93

ANALYTE	SOW-3/90 - II CRDL		
Aluminum	200	4940	
Antimony	60	50.0	U
Arsenic	10	9.4	J
Barium	200	64.4	J
Beryllium	5	1.0	U
Cadmium	5	4.0	U
Calcium	5000	16700	
Chromium	10	16.3	
Cobalt	50	7.8	J
Copper	25	23.1	J
Iron	100	7190	J
Lead	3	32.8	
Magnesium	5000	2180	J
Manganese	15	219	
Mercury	0.2	0.20	U
Nickel	40	14.0	U
Potassium	5000	3040	J
Selenium	5	1.4	UJ
Silver	10	4.0	UJ
Sodium	5000	711000	
Thallium	10	2.0	UJ
Vanadium	50	11.1	J
Zinc	20	195	
Cyanide	10	11.6	

Associated Method Blank: PB73042S
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047S #
DATE SAMPLED: 03/18/93

ANALYTE	SOW-3/90 - II CRDL		
Aluminum	200	4940	
Antimony	60	-	
Arsenic	10	9.4	J
Barium	200	64.4	J
Beryllium	5	-	
Cadmium	5	-	
Calcium	5000	16700	
Chromium	10	16.3	
Cobalt	50	7.8	J
Copper	25	23.1	J
Iron	100	7190	J
Lead	3	32.8	
Magnesium	5000	2180	J
Manganese	15	219	
Mercury	0.2	-	
Nickel	40	-	
Potassium	5000	3040	J
Selenium	5	-	
Silver	10	-	
Sodium	5000	711000	
Thallium	10	-	
Vanadium	50	11.0	J
Zinc	20	195	
Cyanide	10	11.6	

Associated Method Blank: PB73042S
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 04/16/93

ANALYTE	SOW-3/90 - II CRQL		
alpha-BHC	0.05	0.052	U
beta-BHC	0.05	0.052	U
delta-BHC	0.05	0.057	U
gamma-BHC (Lindane)	0.05	0.052	U
Heptachlor	0.05	0.052	U
Aldrin	0.05	0.057	U
Heptachlor Epoxide	0.05	0.052	U
Endosulfan I	0.05	0.057	U
Dieldrin	0.1	0.11	U
4,4'-DDE	0.1	0.1	U
Endrin	0.1	0.1	U
Endosulfan II	0.1	0.034	JP
4,4'-DDD	0.1	0.1	U
Endrin Aldehyde	0.1	0.11	U
Endosulfan Sulfate	0.1	0.11	U
4,4'-DDT	0.1	0.11	U
Methoxychlor	0.5	0.57	U
Endrin Ketone	0.1	0.1	U
alpha-Chlordane	0.05	0.052	U
gamma-Chlordane	0.05	0.057	U
Toxaphene	5	5.2	U
Aroclor-1016	1	1	U
Aroclor-1221	2	2.1	U
Aroclor-1232	1	1	U
Aroclor-1242	1	1	U
Aroclor-1248	1	1	U
Aroclor-1254	1	1	U
Aroclor-1260	1	1	U
Dilution Factor:		1.05	

Associated Method Blank: PBLK10319AA
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 04/16/93

ANALYTE	SOW-3/90 - II CRQL		
alpha-BHC	0.05	0.052	U
beta-BHC	0.05	0.052	U
delta-BHC	0.05	0.057	U
gamma-BHC (Lindane)	0.05	0.052	U
Heptachlor	0.05	0.052	U
Aldrin	0.05	0.057	U
Heptachlor Epoxide	0.05	0.052	U
Endosulfan I	0.05	0.057	U
Dieldrin	0.1	0.11	U
4,4'-DDE	0.1	0.1	U
Endrin	0.1	0.1	U
Endosulfan II	0.1	0.034	J
4,4'-DDD	0.1	0.1	U
Endrin Aldehyde	0.1	0.11	U
Endosulfan Sulfate	0.1	0.11	U
4,4'-DDT	0.1	0.11	U
Methoxychlor	0.5	0.57	U
Endrin Ketone	0.1	0.1	U
alpha-Chlordane	0.05	0.052	U
gamma-Chlordane	0.05	0.057	U
Toxaphene	5	5.2	U
Aroclor-1016	1	1	U
Aroclor-1221	2	2.1	U
Aroclor-1232	1	1	U
Aroclor-1242	1	1	U
Aroclor-1248	1	1	U
Aroclor-1254	1	1	U
Aroclor-1260	1	1	U
Dilution Factor:		1.05	

Associated Method Blank: PBLK10319AA
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 04/16/93

ANALYTE	SOW-3/90 - II CRQL		
alpha-BHC	0.05	-	
beta-BHC	0.05	-	
delta-BHC	0.05	-	
gamma-BHC (Lindane)	0.05	-	
Heptachlor	0.05	-	
Aldrin	0.05	-	
Heptachlor Epoxide	0.05	-	
Endosulfan I	0.05	-	
Dieldrin	0.1	-	
4,4'-DDE	0.1	-	
Endrin	0.1	-	
Endosulfan II	0.1	0.034	J
4,4'-DDD	0.1	-	
Endrin Aldehyde	0.1	-	
Endosulfan Sulfate	0.1	-	
4,4'-DDT	0.1	-	
Methoxychlor	0.5	-	
Endrin Ketone	0.1	-	
alpha-Chlordane	0.05	-	
gamma-Chlordane	0.05	-	
Toxaphene	5	-	
Aroclor-1016	1	-	
Aroclor-1221	2	-	
Aroclor-1232	1	-	
Aroclor-1242	1	-	
Aroclor-1248	1	-	
Aroclor-1254	1	-	
Aroclor-1260	1	-	

Dilution Factor: 1.05

Associated Method Blank: PBLK10319AA
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 03/23/93

ANALYTE	SOW-3/90 - II CRQL		
Phenol	10	10	U
bis(2-Chloroethyl)ether	10	10	U
2-Chlorophenol	10	10	U
1,3-Dichlorobenzene	10	10	U
1,4-Dichlorobenzene	10	10	U
1,2-Dichlorobenzene	10	10	U
2-Methylphenol	10	10	U
2,2'-oxybis(1-Chloropropane)	10	10	U
4-Methylphenol	10	10	U
N-Nitroso-di-n-propylamine	10	10	U
Hexachloroethane	10	10	U
Nitrobenzene	10	10	U
Isophorone	10	10	U
2-Nitrophenol	10	10	U
2,4-Dimethylphenol	10	10	U
bis(2-Chloroethoxy)methane	10	10	U
2,4-Dichlorophenol	10	10	U
1,2,4-Trichlorobenzene	10	10	U
Naphthalene	10	10	U
4-Chloroaniline	10	10	U
Hexachlorobutadiene	10	10	U
4-Chloro-3-Methylphenol	10	10	U
2-Methylnaphthalene	10	10	U
Hexachlorocyclopentadiene	10	10	U
2,4,6-Trichlorophenol	10	10	U
2,4,5-Trichlorophenol	25	25	U
2-Chloronaphthalene	10	10	U
2-Nitroaniline	25	25	U
Dimethylphthalate	10	10	U
Acenaphthylene	10	10	U
2,6-Dinitrotoluene	10	10	U

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 03/23/93

ANALYTE	SOW-3/90 - II CRQL		
3-Nitroaniline	25	25	U
Acenaphthene	10	10	U
2,4-Dinitrophenol	25	25	U
4-Nitrophenol	25	25	U
Dibenzofuran	10	10	U
2,4-Dinitrotoluene	10	10	U
Diethylphthalate	10	10	U
4-Chlorophenyl-phenylether	10	10	U
Fluorene	10	1	J
4-Nitroaniline	25	25	U
4,6-Dinitro-2-methylphenol	25	25	U
N-Nitrosodiphenylamine	10	10	U
4-Bromophenyl-phenylether	10	10	U
Hexachlorobenzene	10	10	U
Pentachlorophenol	25	25	U
Phenanthrene	10	11	
Anthracene	10	10	U
Carbazole	10	2	J
Di-n-butylphthalate	10	10	U
Fluoranthene	10	7	J
Pyrene	10	4	J
Butylbenzylphthalate	10	10	U
3,3'-Dichlorobenzidine	10	10	U
Benzo(a)Anthracene	10	10	U
Chrysene	10	2	J
bis(2-Ethylhexyl)phthalate	10	1	J
Di-n-octylphthalate	10	10	U
Benzo(b)Fluoranthene	10	1	J
Benzo(k)Fluoranthene	10	1	J
Benzo(a)Pyrene	10	10	U
Indeno(1,2,3-c,d)Pyrene	10	10	U
Dibenz(a,h)Anthracene	10	10	U
Benzo(g,h,i)perylene	10	10	U

Dilution Factor: 1.00

Associated Method Blank: J8035
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 03/23/93

ANALYTE	SOW-3/90 - II CRQL		
Phenol	10	10	U
bis(2-Chloroethyl)ether	10	10	U
2-Chlorophenol	10	10	U
1,3-Dichlorobenzene	10	10	U
1,4-Dichlorobenzene	10	10	U
1,2-Dichlorobenzene	10	10	U
2-Methylphenol	10	10	U
2,2'-oxybis(1-Chloropropane)	10	10	U
4-Methylphenol	10	10	U
N-Nitroso-di-n-propylamine	10	10	U
Hexachloroethane	10	10	U
Nitrobenzene	10	10	U
Isophorone	10	10	U
2-Nitrophenol	10	10	U
2,4-Dimethylphenol	10	10	U
bis(2-Chloroethoxy)methane	10	10	U
2,4-Dichlorophenol	10	10	U
1,2,4-Trichlorobenzene	10	10	U
Naphthalene	10	10	U
4-Chloroaniline	10	10	U
Hexachlorobutadiene	10	10	U
4-Chloro-3-Methylphenol	10	10	U
2-Methylnaphthalene	10	10	U
Hexachlorocyclopentadiene	10	10	U
2,4,6-Trichlorophenol	10	10	U
2,4,5-Trichlorophenol	25	25	U
2-Chloronaphthalene	10	10	U
2-Nitroaniline	25	25	U
Dimethylphthalate	10	10	U
Acenaphthylene	10	10	U
2,6-Dinitrotoluene	10	10	U

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 03/23/93

ANALYTE	SOW-3/90 - II CRQL		
3-Nitroaniline	25	25	U
Acenaphthene	10	10	U
2,4-Dinitrophenol	25	25	U
4-Nitrophenol	25	25	U
Dibenzofuran	10	10	U
2,4-Dinitrotoluene	10	10	U
Diethylphthalate	10	10	U
4-Chlorophenyl-phenylether	10	10	U
Fluorene	10	1	J
4-Nitroaniline	25	25	U
4,6-Dinitro-2-methylphenol	25	25	U
N-Nitrosodiphenylamine	10	10	U
4-Bromophenyl-phenylether	10	10	U
Hexachlorobenzene	10	10	U
Pentachlorophenol	25	25	U
Phenanthrene	10	11	
Anthracene	10	10	U
Carbazole	10	2	J
Di-n-butylphthalate	10	10	U
Fluoranthene	10	7	J
Pyrene	10	4	J
Butylbenzylphthalate	10	10	U
3,3'-Dichlorobenzidine	10	10	U
Benzo(a)Anthracene	10	10	U
Chrysene	10	2	J
bis(2-Ethylhexyl)phthalate	10	1	J
Di-n-octylphthalate	10	10	U
Benzo(b)Fluoranthene	10	1	J
Benzo(k)Fluoranthene	10	1	J
Benzo(a)Pyrene	10	10	U
Indeno(1,2,3-c,d)Pyrene	10	10	U
Dibenz(a,h)Anthracene	10	10	U
Benzo(g,h,i)perylene	10	10	U

Dilution Factor: 1.00

Associated Method Blank: J8035
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 03/23/93

ANALYTE	SOW-3/90 - II CRQL	
Phenol	10	-
bis(2-Chloroethyl)ether	10	-
2-Chlorophenol	10	-
1,3-Dichlorobenzene	10	-
1,4-Dichlorobenzene	10	-
1,2-Dichlorobenzene	10	-
2-Methylphenol	10	-
2,2'-oxybis(1-Chloropropane)	10	-
4-Methylphenol	10	-
N-Nitroso-di-n-propylamine	10	-
Hexachloroethane	10	-
Nitrobenzene	10	-
Isophorone	10	-
2-Nitrophenol	10	-
2,4-Dimethylphenol	10	-
bis(2-Chloroethoxy)methane	10	-
2,4-Dichlorophenol	10	-
1,2,4-Trichlorobenzene	10	-
Naphthalene	10	-
4-Chloroaniline	10	-
Hexachlorobutadiene	10	-
4-Chloro-3-Methylphenol	10	-
2-Methylnaphthalene	10	-
Hexachlorocyclopentadiene	10	-
2,4,6-Trichlorophenol	10	-
2,4,5-Trichlorophenol	25	-
2-Chloronaphthalene	10	-
2-Nitroaniline	25	-
Dimethylphthalate	10	-
Acenaphthylene	10	-
2,6-Dinitrotoluene	10	-

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 03/23/93

ANALYTE	SOW-3/90 - II CRQL		
3-Nitroaniline	25	-	
Acenaphthene	10	-	
2,4-Dinitrophenol	25	-	
4-Nitrophenol	25	-	
Dibenzofuran	10	-	
2,4-Dinitrotoluene	10	-	
Diethylphthalate	10	-	
4-Chlorophenyl-phenylether	10	-	
Fluorene	10	1	J
4-Nitroaniline	25	-	
4,6-Dinitro-2-methylphenol	25	-	
N-Nitrosodiphenylamine	10	-	
4-Bromophenyl-phenylether	10	-	
Hexachlorobenzene	10	-	
Pentachlorophenol	25	-	
Phenanthrene	10	11	
Anthracene	10	-	
Carbazole	10	2	J
Di-n-butylphthalate	10	-	
Fluoranthene	10	7	J
Pyrene	10	4	J
Butylbenzylphthalate	10	-	
3,3'-Dichlorobenzidine	10	-	
Benzo(a)Anthracene	10	-	
Chrysene	10	2	J
bis(2-Ethylhexyl)phthalate	10	1	J
Di-n-octylphthalate	10	-	
Benzo(b)Fluoranthene	10	1	J
Benzo(k)Fluoranthene	10	1	J
Benzo(a)Pyrene	10	-	
Indeno(1,2,3-c,d)Pyrene	10	-	
Dibenz(a,h)Anthracene	10	-	
Benzo(g,h,i)perylene	10	-	

Dilution Factor: 1.00

Associated Method Blank: J8035
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE ANALYZED: 03/24/93

ANALYTE	SOW-3/90 - II CRQL		
Chloromethane	10	10	U
Bromomethane	10	10	U
Vinyl Chloride	10	10	U
Chloroethane	10	10	U
Methylene Chloride	10	10	U
Acetone	10	9	BJ
Carbon Disulfide	10	10	U
1,1-Dichloroethene	10	10	U
1,1-Dichloroethane	10	10	U
1,2-Dichloroethene (total)	10	10	U
Chloroform	10	10	U
1,2-Dichloroethane	10	10	U
2-Butanone	10	10	U
1,1,1-Trichloroethane	10	10	U
Carbon Tetrachloride	10	10	U
Bromodichloromethane	10	10	U
1,2-Dichloropropane	10	10	U
cis-1,3-Dichloropropene	10	10	U
Trichloroethene	10	10	U
Dibromochloromethane	10	10	U
1,1,2-Trichloroethane	10	10	U
Benzene	10	10	U
trans-1,3-Dichloropropene	10	10	U
Bromoform	10	10	U
4-Methyl-2-Pentanone	10	10	U
2-Hexanone	10	10	U
Tetrachloroethene	10	10	U
1,1,2,2-Tetrachloroethane	10	10	U
Toluene	10	1	J
Chlorobenzene	10	10	U
Ethylbenzene	10	10	U
Styrene	10	10	U
Total Xylenes	10	10	U

Dilution Factor: 1.00

Associated Method Blank: G0074
Associated Equipment Blank: -
Associated Field Blank: -
Associated Trip Blank: BSQTXX1XXX93XX

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE ANALYZED: 03/24/93

ANALYTE	SOW-3/90 - II CRQL		
Chloromethane	10	10	U
Bromomethane	10	10	U
Vinyl Chloride	10	10	U
Chloroethane	10	10	U
Methylene Chloride	10	10	U
Acetone	10	10	UJ
Carbon Disulfide	10	10	U
1,1-Dichloroethene	10	10	U
1,1-Dichloroethane	10	10	U
1,2-Dichloroethene (total)	10	10	U
Chloroform	10	10	U
1,2-Dichloroethane	10	10	U
2-Butanone	10	10	U
1,1,1-Trichloroethane	10	10	U
Carbon Tetrachloride	10	10	U
Bromodichloromethane	10	10	U
1,2-Dichloropropane	10	10	U
cis-1,3-Dichloropropene	10	10	U
Trichloroethene	10	10	U
Dibromochloromethane	10	10	U
1,1,2-Trichloroethane	10	10	U
Benzene	10	10	U
trans-1,3-Dichloropropene	10	10	U
Bromoform	10	10	U
4-Methyl-2-Pentanone	10	10	U
2-Hexanone	10	10	U
Tetrachloroethene	10	10	U
1,1,2,2-Tetrachloroethane	10	10	U
Toluene	10	1	J
Chlorobenzene	10	10	U
Ethylbenzene	10	10	U
Styrene	10	10	U
Total Xylenes	10	10	U

Dilution Factor: 1.00

Associated Method Blank: G0074
Associated Equipment Blank: -
Associated Field Blank: -
Associated Trip Blank: BSQTXX1XXX93XX

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION: 09LT001XXX93XX
LAB NUMBER: 73047 #
DATE SAMPLED: 03/18/93
DATE ANALYZED: 03/24/93

ANALYTE	SOW-3/90 - II CRQL		
Chloromethane	10	-	
Bromomethane	10	-	
Vinyl Chloride	10	-	
Chloroethane	10	-	
Methylene Chloride	10	-	
Acetone	10	-	
Carbon Disulfide	10	-	
1,1-Dichloroethene	10	-	
1,1-Dichloroethane	10	-	
1,2-Dichloroethene (total)	10	-	
Chloroform	10	-	
1,2-Dichloroethane	10	-	
2-Butanone	10	-	
1,1,1-Trichloroethane	10	-	
Carbon Tetrachloride	10	-	
Bromodichloromethane	10	-	
1,2-Dichloropropane	10	-	
cis-1,3-Dichloropropene	10	-	
Trichloroethene	10	-	
Dibromochloromethane	10	-	
1,1,2-Trichloroethane	10	-	
Benzene	10	-	
trans-1,3-Dichloropropene	10	-	
Bromoform	10	-	
4-Methyl-2-Pentanone	10	-	
2-Hexanone	10	-	
Tetrachloroethene	10	-	
1,1,2,2-Tetrachloroethane	10	-	
Toluene	10	1	J
Chlorobenzene	10	-	
Ethylbenzene	10	-	
Styrene	10	-	
Total Xylenes	10	-	

Dilution Factor: 1.00

Associated Method Blank: G0074
Associated Equipment Blank: -
Associated Field Blank: -
Associated Trip Blank: BSQTXX1XXX93XX

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09MW914XXX93XX		09MW915XXX93XD		09MW915XXX93XX		09MW916XXX93XX	
LAB NUMBER:	73042S #		73045S #		73044S #		73043S #	
DATE SAMPLED:	03/18/93		03/18/93		03/18/93		03/18/93	
ANALYTE SOW-3/90 - II CRDL								
Aluminum 200	5510		1830		1910		111	B
Antimony 60	50.0	U	50.0	U	50.0	U	50.0	U
Arsenic 10	2.0	U	2.0	U	2.0	U	2.0	U
Barium 200	229		441		443		46.4	B
Beryllium 5	1.0	U	1.0	U	1.0	U	1.0	U
Cadmium 5	6.4		4.0	U	4.0	U	4.0	U
Calcium 5000	33800		51300		51300		22000	
Chromium 10	9.9	B	4.3	B	4.0	U	4.0	U
Cobalt 50	5.0	U	5.0	U	5.0	U	5.0	U
Copper 25	11.6	B	13.7	B	5.8	B	5.0	U
Iron 100	30100		12100		12000		220	
Lead 3	7.6		2.6	B	2.2	B	2.0	U
Magnesium 5000	3050	B	4500	B	4490	B	2290	B
Manganese 15	230		1010		991		14.7	B
Mercury 0.2	0.20	UN	0.20	UN	0.20	UN	0.20	UN
Nickel 40	14.0	U	14.0	U	14.0	U	14.0	U
Potassium 5000	3570	B	7430		7430		3920	B
Selenium 5	1.0	B	1.0	U	1.0	U	1.0	U
Silver 10	4.0	UN	4.0	UN	4.0	UN	4.0	UN
Sodium 5000	4100	B	27900		27900		58800	
Thallium 10	2.0	U	2.0	U	2.0	U	2.0	U
Vanadium 50	6.2	B	5.0	U	5.0	U	5.0	U
Zinc 20	50.6		25.9		28.3		31.5	
Cyanide 10	10.0	U	10.0	U	10.0	U	10.0	U

Associated Method Blank:	PB73042S	PB73042S	PB73042S	PB73042S
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-	-

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:		09MW914XXX93XX		09MW915XXX93XD		09MW915XXX93XX		09MW916XXX93XX	
LAB NUMBER:		73042S #		73045S #		73044S #		73043S #	
DATE SAMPLED:		03/18/93		03/18/93		03/18/93		03/18/93	
ANALYTE	SOW-3/90 - II CRDL								
Aluminum	200	5510		1830		1910		111	U
Antimony	60	50.0	U	50.0	U	50.0	U	50.0	U
Arsenic	10	2.0	U	2.0	U	2.0	U	2.0	U
Barium	200	229		441		443		46.4	J
Beryllium	5	1.0	U	1.0	U	1.0	U	1.0	U
Cadmium	5	6.4		4.0	U	4.0	U	4.0	U
Calcium	5000	33800		51300		51300		22000	
Chromium	10	9.9	J	4.3	J	4.0	U	4.0	U
Cobalt	50	5.0	U	5.0	U	5.0	U	5.0	U
Copper	25	11.6	U	13.7	U	5.8	U	5.0	U
Iron	100	30100	J	12100	J	12000	J	220	J
Lead	3	7.6	U	2.6	U	2.2	U	2.0	U
Magnesium	5000	3050	J	4500	J	4490	J	2290	J
Manganese	15	230		1010		991		14.7	J
Mercury	0.2	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	40	14.0	U	14.0	U	14.0	U	14.0	U
Potassium	5000	3570	J	7430		7430		3920	J
Selenium	5	1.0	U	1.0	U	1.0	U	1.0	U
Silver	10	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ
Sodium	5000	4100	J	27900		27900		58800	
Thallium	10	2.0	U	2.0	U	2.0	U	2.0	U
Vanadium	50	6.2	J	5.0	U	5.0	U	5.0	U
Zinc	20	50.6	U	25.9	U	28.3	U	31.5	U
Cyanide	10	10.0	U	10.0	U	10.0	U	10.0	U

Associated Method Blank:	PB73042S	PB73042S	PB73042S	PB73042S
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-	-

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09MW914XXX93XX		09MW915XXX93XD		09MW915XXX93XX		09MW916XXX93XX	
LAB NUMBER:	73042S #		73045S #		73044S #		73043S #	
DATE SAMPLED:	03/18/93		03/18/93		03/18/93		03/18/93	
ANALYTE SOW-3/90 - II CRDL								
Aluminum 200	5510		1830		1910		-	
Antimony 60	-		-		-		-	
Arsenic 10	-		-		-		-	
Barium 200	229		441		443		46.4	J
Beryllium 5	-		-		-		-	
Cadmium 5	6.4		-		-		-	
Calcium 5000	33800		51300		51300		22000	
Chromium 10	9.9	J	4.3	J	-		-	
Cobalt 50	-		-		-		-	
Copper 25	-		-		-		-	
Iron 100	30100	J	12100	J	12000	J	220	J
Lead 3	-		-		-		-	
Magnesium 5000	3050	J	4500	J	4490	J	2290	J
Manganese 15	230		1010		991		14.7	J
Mercury 0.2	-		-		-		-	
Nickel 40	-		-		-		-	
Potassium 5000	3570	J	7430		7430		3920	J
Selenium 5	-		-		-		-	
Silver 10	-		-		-		-	
Sodium 5000	4100	J	27900		27900		58800	
Thallium 10	-		-		-		-	
Vanadium 50	6.2	J	-		-		-	
Zinc 20	-		-		-		-	
Cyanide 10	-		-		-		-	
Associated Method Blank:	PB73042S		PB73042S		PB73042S		PB73042S	
Associated Equipment Blank:	09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:	-		-		-		-	

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09MW914XXX93XX		09MW915XXX93XD		09MW915XXX93XX		09MW916XXX93XX	
LAB NUMBER:		73042 #		73045 #		73044 #		73043 #	
DATE SAMPLED:		03/18/93		03/18/93		03/18/93		03/18/93	
DATE EXTRACTED:		03/19/93		03/19/93		03/19/93		03/19/93	
DATE ANALYZED:		04/16/93		04/16/93		04/16/93		04/16/93	
ANALYTE	SOW-3/90 - II CRQL								
alpha-BHC	0.05	0.05	U	0.05	U	0.048	U	0.048	U
beta-BHC	0.05	0.05	U	0.05	U	0.048	U	0.048	U
delta-BHC	0.05	0.05	U	0.05	U	0.048	U	0.048	U
gamma-BHC (Lindane)	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Heptachlor	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Aldrin	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Heptachlor Epoxide	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Endosulfan I	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Dieldrin	0.1	0.1	U	0.1	U	0.096	U	0.095	U
4,4'-DDE	0.1	0.1	U	0.1	U	0.096	U	0.095	U
Endrin	0.1	0.1	U	0.1	U	0.096	U	0.095	U
Endosulfan II	0.1	0.1	U	0.1	U	0.096	U	0.095	U
4,4'-DDD	0.1	0.1	U	0.1	U	0.096	U	0.095	U
Endrin Aldehyde	0.1	0.1	U	0.1	U	0.093	U	0.091	U
Endosulfan Sulfate	0.1	0.1	U	0.1	U	0.096	U	0.095	U
4,4'-DDT	0.1	0.1	U	0.1	U	0.096	U	0.095	U
Methoxychlor	0.5	0.5	U	0.5	U	0.48	U	0.48	U
Endrin Ketone	0.1	0.1	U	0.1	U	0.096	U	0.095	U
alpha-Chlordane	0.05	0.05	U	0.05	U	0.048	U	0.048	U
gamma-Chlordane	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Toxaphene	5	5	U	5	U	4.8	U	4.8	U
Aroclor-1016	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1221	2	2	U	2	U	1.9	U	1.9	U
Aroclor-1232	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1242	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1248	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1254	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1260	1	1	U	1	U	0.96	U	0.95	U
Dilution Factor:		1.00		1.00		.962		.952	
Associated Method Blank:		PBLK10319AA		PBLK10319AA		PBLK10319AA		PBLK10319AA	
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:		-		-		-		-	

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09MW914XXX93XX	09MW915XXX93XD	09MW915XXX93XX	09MW916XXX93XX
LAB NUMBER:	73042 #	73045 #	73044 #	73043 #
DATE SAMPLED:	03/18/93	03/18/93	03/18/93	03/18/93
DATE EXTRACTED:	03/19/93	03/19/93	03/19/93	03/19/93
DATE ANALYZED:	04/16/93	04/16/93	04/16/93	04/16/93

ANALYTE	SOW-3/90 - II CRQL							
alpha-BHC	0.05	0.05	U	0.05	U	0.048	U	0.048	U
beta-BHC	0.05	0.05	U	0.05	U	0.048	U	0.048	U
delta-BHC	0.05	0.05	U	0.05	U	0.048	U	0.048	U
gamma-BHC (Lindane)	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Heptachlor	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Aldrin	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Heptachlor Epoxide	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Endosulfan I	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Dieldrin	0.1	0.1	U	0.1	U	0.096	U	0.095	U
4,4'-DDE	0.1	0.1	U	0.1	U	0.096	U	0.095	U
Endrin	0.1	0.1	U	0.1	U	0.096	U	0.095	U
Endosulfan II	0.1	0.1	U	0.1	U	0.096	U	0.095	U
4,4'-DDD	0.1	0.1	U	0.1	U	0.096	U	0.095	U
Endrin Aldehyde	0.1	0.1	U	0.1	U	0.093	U	0.091	U
Endosulfan Sulfate	0.1	0.1	U	0.1	U	0.096	U	0.095	U
4,4'-DDT	0.1	0.1	U	0.1	U	0.096	U	0.095	U
Methoxychlor	0.5	0.5	U	0.5	U	0.48	U	0.48	U
Endrin Ketone	0.1	0.1	U	0.1	U	0.096	U	0.095	U
alpha-Chlordane	0.05	0.05	U	0.05	U	0.048	U	0.048	U
gamma-Chlordane	0.05	0.05	U	0.05	U	0.048	U	0.048	U
Toxaphene	5	5	U	5	U	4.8	U	4.8	U
Aroclor-1016	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1221	2	2	U	2	U	1.9	U	1.9	U
Aroclor-1232	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1242	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1248	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1254	1	1	U	1	U	0.96	U	0.95	U
Aroclor-1260	1	1	U	1	U	0.96	U	0.95	U
Dilution Factor:		1.00		1.00		.962		.952	

Associated Method Blank:	PBLK10319AA	PBLK10319AA	PBLK10319AA	PBLK10319AA
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-	-

Site: 9
#: Level D Validation

PROJECT: BNAS Amendment 3 Site 9

Pesticides/PCBs Aqueous Analysis (ug/L)

05/18/93

Table 3
Summary Table

SAMPLE LOCATION:		09MW914XXX93XX	09MW915XXX93XD	09MW915XXX93XX	09MW916XXX93XX
LAB NUMBER:		73042 #	73045 #	73044 #	73043 #
DATE SAMPLED:		03/18/93	03/18/93	03/18/93	03/18/93
DATE EXTRACTED:		03/19/93	03/19/93	03/19/93	03/19/93
DATE ANALYZED:		04/16/93	04/16/93	04/16/93	04/16/93
ANALYTE	SOW-3/90 - II CRQL				
alpha-BHC	0.05	-	-	-	-
beta-BHC	0.05	-	-	-	-
delta-BHC	0.05	-	-	-	-
gamma-BHC (Lindane)	0.05	-	-	-	-
Heptachlor	0.05	-	-	-	-
Aldrin	0.05	-	-	-	-
Heptachlor Epoxide	0.05	-	-	-	-
Endosulfan I	0.05	-	-	-	-
Dieldrin	0.1	-	-	-	-
4,4'-DDE	0.1	-	-	-	-
Endrin	0.1	-	-	-	-
Endosulfan II	0.1	-	-	-	-
4,4'-DDD	0.1	-	-	-	-
Endrin Aldehyde	0.1	-	-	-	-
Endosulfan Sulfate	0.1	-	-	-	-
4,4'-DDT	0.1	-	-	-	-
Methoxychlor	0.5	-	-	-	-
Endrin Ketone	0.1	-	-	-	-
alpha-Chlordane	0.05	-	-	-	-
gamma-Chlordane	0.05	-	-	-	-
Toxaphene	5	-	-	-	-
Aroclor-1016	1	-	-	-	-
Aroclor-1221	2	-	-	-	-
Aroclor-1232	1	-	-	-	-
Aroclor-1242	1	-	-	-	-
Aroclor-1248	1	-	-	-	-
Aroclor-1254	1	-	-	-	-
Aroclor-1260	1	-	-	-	-
Dilution Factor:		1.00	1.00	.962	.952
Associated Method Blank:		PBLK10319AA	PBLK10319AA	PBLK10319AA	PBLK10319AA
Associated Equipment Blank:		09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:		-	-	-	-

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09MW914XXX93XX	09MW915XXX93XD	09MW915XXX93XX	09MW916XXX93XX
LAB NUMBER:	73042 #	73045 #	73044 #	73043 #
DATE SAMPLED:	03/18/93	03/18/93	03/18/93	03/18/93
DATE EXTRACTED:	03/19/93	03/19/93	03/19/93	03/19/93
DATE ANALYZED:	03/22/93	03/22/93	03/22/93	03/22/93

ANALYTE	SOW-3/90 - II CRQL								
Phenol	10	10	U	10	U	10	U	10	U
bis(2-Chloroethyl)ether	10	10	U	10	U	10	U	10	U
2-Chlorophenol	10	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	10	U	10	U	10	U	10	U
2-Methylphenol	10	10	U	10	U	10	U	10	U
2,2'-oxybis(1-Chloropropane)	10	10	U	10	U	10	U	10	U
4-Methylphenol	10	10	U	10	U	10	U	10	U
N-Nitroso-di-n-propylamine	10	10	U	10	U	10	U	10	U
Hexachloroethane	10	10	U	10	U	10	U	10	U
Nitrobenzene	10	10	U	10	U	10	U	10	U
Isophorone	10	10	U	10	U	10	U	10	U
2-Nitrophenol	10	10	U	10	U	10	U	10	U
2,4-Dimethylphenol	10	10	U	10	U	10	U	10	U
bis(2-Chloroethoxy)methane	10	10	U	10	U	10	U	10	U
2,4-Dichlorophenol	10	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	10	U	10	U	10	U	10	U
Naphthalene	10	1	J	10	U	10	U	10	U
4-Chloroaniline	10	10	U	10	U	10	U	10	U
Hexachlorobutadiene	10	10	U	10	U	10	U	10	U
4-Chloro-3-Methylphenol	10	10	U	10	U	10	U	10	U
2-Methylnaphthalene	10	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene	10	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol	10	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol	25	25	U	25	U	25	U	25	U
2-Chloronaphthalene	10	10	U	10	U	10	U	10	U
2-Nitroaniline	25	25	U	25	U	25	U	25	U
Dimethylphthalate	10	10	U	10	U	10	U	10	U
Acenaphthylene	10	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene	10	10	U	10	U	10	U	10	U

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09MW914XXX93XX		09MW915XXX93XD		09MW915XXX93XX		09MW916XXX93XX	
LAB NUMBER:	73042 #		73045 #		73044 #		73043 #	
DATE SAMPLED:	03/18/93		03/18/93		03/18/93		03/18/93	
DATE EXTRACTED:	03/19/93		03/19/93		03/19/93		03/19/93	
DATE ANALYZED:	03/22/93		03/22/93		03/22/93		03/22/93	
ANALYTE SOW-3/90 - II CRQL								
3-Nitroaniline 25	25	U	25	U	25	U	25	U
Acenaphthene 10	1	J	10	U	10	U	10	U
2,4-Dinitrophenol 25	25	U	25	U	25	U	25	U
4-Nitrophenol 25	25	U	25	U	25	U	25	U
Dibenzofuran 10	10	U	10	U	10	U	10	U
2,4-Dinitrotoluene 10	10	U	10	U	10	U	10	U
Diethylphthalate 10	10	U	10	U	10	U	10	U
4-Chlorophenyl-phenylether 10	10	U	10	U	10	U	10	U
Fluorene 10	10	U	10	U	10	U	10	U
4-Nitroaniline 25	25	U	25	U	25	U	25	U
4,6-Dinitro-2-methylphenol 25	25	U	25	U	25	U	25	U
N-Nitrosodiphenylamine 10	10	U	10	U	10	U	10	U
4-Bromophenyl-phenylether 10	10	U	10	U	10	U	10	U
Hexachlorobenzene 10	10	U	10	U	10	U	10	U
Pentachlorophenol 25	25	U	25	U	25	U	25	U
Phenanthrene 10	1	J	10	U	10	U	10	U
Anthracene 10	10	U	10	U	10	U	10	U
Carbazole 10	10	U	10	U	10	U	10	U
Di-n-butylphthalate 10	10	U	10	U	10	U	10	U
Fluoranthene 10	10	U	10	U	10	U	10	U
Pyrene 10	10	U	10	U	10	U	10	U
Butylbenzylphthalate 10	10	U	10	U	1	J	10	U
3,3'-Dichlorobenzidine 10	10	U	10	U	10	U	10	U
Benzo(a)Anthracene 10	10	U	10	U	10	U	10	U
Chrysene 10	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)phthalate 10	1	J	10	U	2	J	10	U
Di-n-octylphthalate 10	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene 10	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene 10	10	U	10	U	10	U	10	U
Benzo(a)Pyrene 10	10	U	10	U	10	U	10	U
Indeno(1,2,3-c,d)Pyrene 10	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene 10	10	U	10	U	10	U	10	U
Benzo(g,h,i)perylene 10	10	U	10	U	10	U	10	U
Dilution Factor:	1.00		1.00		1.00		1.00	
Associated Method Blank:	J8035		J8035		J8035		J8035	
Associated Equipment Blank:	09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:	-		-		-		-	

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09MW914XXX93XX	09MW915XXX93XD	09MW915XXX93XX	09MW916XXX93XX
LAB NUMBER:	73042 #	73045 #	73044 #	73043 #
DATE SAMPLED:	03/18/93	03/18/93	03/18/93	03/18/93
DATE EXTRACTED:	03/19/93	03/19/93	03/19/93	03/19/93
DATE ANALYZED:	03/22/93	03/22/93	03/22/93	03/22/93

ANALYTE	SOW-3/90 - II CRQL							
Phenol	10	10	U	10	U	10	U	10	U
bis(2-Chloroethyl)ether	10	10	U	10	U	10	U	10	U
2-Chlorophenol	10	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	10	U	10	U	10	U	10	U
2-Methylphenol	10	10	U	10	U	10	U	10	U
2,2'-oxybis(1-Chloropropane)	10	10	U	10	U	10	U	10	U
4-Methylphenol	10	10	U	10	U	10	U	10	U
N-Nitroso-di-n-propylamine	10	10	U	10	U	10	U	10	U
Hexachloroethane	10	10	U	10	U	10	U	10	U
Nitrobenzene	10	10	U	10	U	10	U	10	U
Isophorone	10	10	U	10	U	10	U	10	U
2-Nitrophenol	10	10	U	10	U	10	U	10	U
2,4-Dimethylphenol	10	10	U	10	U	10	U	10	U
bis(2-Chloroethoxy)methane	10	10	U	10	U	10	U	10	U
2,4-Dichlorophenol	10	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	10	U	10	U	10	U	10	U
Naphthalene	10	1	J	10	U	10	U	10	U
4-Chloroaniline	10	10	U	10	U	10	U	10	U
Hexachlorobutadiene	10	10	U	10	U	10	U	10	U
4-Chloro-3-Methylphenol	10	10	U	10	U	10	U	10	U
2-Methylnaphthalene	10	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene	10	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol	10	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol	25	25	U	25	U	25	U	25	U
2-Chloronaphthalene	10	10	U	10	U	10	U	10	U
2-Nitroaniline	25	25	U	25	U	25	U	25	U
Dimethylphthalate	10	10	U	10	U	10	U	10	U
Acenaphthylene	10	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene	10	10	U	10	U	10	U	10	U

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09MW914XXX93XX	09MW915XXX93XD	09MW915XXX93XX	09MW916XXX93XX
LAB NUMBER:	73042 #	73045 #	73044 #	73043 #
DATE SAMPLED:	03/18/93	03/18/93	03/18/93	03/18/93
DATE EXTRACTED:	03/19/93	03/19/93	03/19/93	03/19/93
DATE ANALYZED:	03/22/93	03/22/93	03/22/93	03/22/93

ANALYTE	SOW-3/90 - II CRQL							
3-Nitroaniline	25	25	U	25	U	25	U	25	U
Acenaphthene	10	1	J	10	U	10	U	10	U
2,4-Dinitrophenol	25	25	U	25	U	25	U	25	U
4-Nitrophenol	25	25	U	25	U	25	U	25	U
Dibenzofuran	10	10	U	10	U	10	U	10	U
2,4-Dinitrotoluene	10	10	U	10	U	10	U	10	U
Diethylphthalate	10	10	U	10	U	10	U	10	U
4-Chlorophenyl-phenylether	10	10	U	10	U	10	U	10	U
Fluorene	10	10	U	10	U	10	U	10	U
4-Nitroaniline	25	25	U	25	U	25	U	25	U
4,6-Dinitro-2-methylphenol	25	25	U	25	U	25	U	25	U
N-Nitrosodiphenylamine	10	10	U	10	U	10	U	10	U
4-Bromophenyl-phenylether	10	10	U	10	U	10	U	10	U
Hexachlorobenzene	10	10	U	10	U	10	U	10	U
Pentachlorophenol	25	25	U	25	U	25	U	25	U
Phenanthrene	10	1	J	10	U	10	U	10	U
Anthracene	10	10	U	10	U	10	U	10	U
Carbazole	10	10	U	10	U	10	U	10	U
Di-n-butylphthalate	10	10	U	10	U	10	U	10	U
Fluoranthene	10	10	U	10	U	10	U	10	U
Pyrene	10	10	U	10	U	10	U	10	U
Butylbenzylphthalate	10	10	U	10	U	1	J	10	U
3,3'-Dichlorobenzidine	10	10	U	10	U	10	U	10	U
Benzo(a)Anthracene	10	10	U	10	U	10	U	10	U
Chrysene	10	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)phthalate	10	1	J	10	U	2	J	10	U
Di-n-octylphthalate	10	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene	10	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene	10	10	U	10	U	10	U	10	U
Benzo(a)Pyrene	10	10	U	10	U	10	U	10	U
Indeno(1,2,3-c,d)Pyrene	10	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene	10	10	U	10	U	10	U	10	U
Benzo(g,h,i)perylene	10	10	U	10	U	10	U	10	U
Dilution Factor:		1.00		1.00		1.00		1.00	

Associated Method Blank:	J8035	J8035	J8035	J8035
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-	-

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09MW914XXX93XX	09MW915XXX93XD	09MW915XXX93XX	09MW916XXX93XX
LAB NUMBER:	73042 #	73045 #	73044 #	73043 #
DATE SAMPLED:	03/18/93	03/18/93	03/18/93	03/18/93
DATE EXTRACTED:	03/19/93	03/19/93	03/19/93	03/19/93
DATE ANALYZED:	03/22/93	03/22/93	03/22/93	03/22/93

ANALYTE	SOW-3/90 - II CRQL				
Phenol	10	-	-	-	-
bis(2-Chloroethyl)ether	10	-	-	-	-
2-Chlorophenol	10	-	-	-	-
1,3-Dichlorobenzene	10	-	-	-	-
1,4-Dichlorobenzene	10	-	-	-	-
1,2-Dichlorobenzene	10	-	-	-	-
2-Methylphenol	10	-	-	-	-
2,2'-oxybis(1-Chloropropane)	10	-	-	-	-
4-Methylphenol	10	-	-	-	-
N-Nitroso-di-n-propylamine	10	-	-	-	-
Hexachloroethane	10	-	-	-	-
Nitrobenzene	10	-	-	-	-
Isophorone	10	-	-	-	-
2-Nitrophenol	10	-	-	-	-
2,4-Dimethylphenol	10	-	-	-	-
bis(2-Chloroethoxy)methane	10	-	-	-	-
2,4-Dichlorophenol	10	-	-	-	-
1,2,4-Trichlorobenzene	10	-	-	-	-
Naphthalene	10	1 J	-	-	-
4-Chloroaniline	10	-	-	-	-
Hexachlorobutadiene	10	-	-	-	-
4-Chloro-3-Methylphenol	10	-	-	-	-
2-Methylnaphthalene	10	-	-	-	-
Hexachlorocyclopentadiene	10	-	-	-	-
2,4,6-Trichlorophenol	10	-	-	-	-
2,4,5-Trichlorophenol	25	-	-	-	-
2-Chloronaphthalene	10	-	-	-	-
2-Nitroaniline	25	-	-	-	-
Dimethylphthalate	10	-	-	-	-
Acenaphthylene	10	-	-	-	-
2,6-Dinitrotoluene	10	-	-	-	-

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09MW914XXX93XX	09MW915XXX93XD	09MW915XXX93XX	09MW916XXX93XX
LAB NUMBER:	73042 #	73045 #	73044 #	73043 #
DATE SAMPLED:	03/18/93	03/18/93	03/18/93	03/18/93
DATE EXTRACTED:	03/19/93	03/19/93	03/19/93	03/19/93
DATE ANALYZED:	03/22/93	03/22/93	03/22/93	03/22/93

ANALYTE	SOW-3/90 - II CRQL							
3-Nitroaniline	25	-		-		-		-
Acenaphthene	10	1	J	-		-		-
2,4-Dinitrophenol	25	-		-		-		-
4-Nitrophenol	25	-		-		-		-
Dibenzofuran	10	-		-		-		-
2,4-Dinitrotoluene	10	-		-		-		-
Diethylphthalate	10	-		-		-		-
4-Chlorophenyl-phenylether	10	-		-		-		-
Fluorene	10	-		-		-		-
4-Nitroaniline	25	-		-		-		-
4,6-Dinitro-2-methylphenol	25	-		-		-		-
N-Nitrosodiphenylamine	10	-		-		-		-
4-Bromophenyl-phenylether	10	-		-		-		-
Hexachlorobenzene	10	-		-		-		-
Pentachlorophenol	25	-		-		-		-
Phenanthrene	10	1	J	-		-		-
Anthracene	10	-		-		-		-
Carbazole	10	-		-		-		-
Di-n-butylphthalate	10	-		-		-		-
Fluoranthene	10	-		-		-		-
Pyrene	10	-		-		-		-
Butylbenzylphthalate	10	-		-		1	J	-
3,3'-Dichlorobenzidine	10	-		-		-		-
Benzo(a)Anthracene	10	-		-		-		-
Chrysene	10	-		-		-		-
bis(2-Ethylhexyl)phthalate	10	1	J	-		2	J	-
Di-n-octylphthalate	10	-		-		-		-
Benzo(b)Fluoranthene	10	-		-		-		-
Benzo(k)Fluoranthene	10	-		-		-		-
Benzo(a)Pyrene	10	-		-		-		-
Indeno(1,2,3-c,d)Pyrene	10	-		-		-		-
Dibenz(a,h)Anthracene	10	-		-		-		-
Benzo(g,h,i)perylene	10	-		-		-		-
Dilution Factor:		1.00		1.00		1.00		1.00

Associated Method Blank:	J8035	J8035	J8035	J8035
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-	-

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09MW914XXX93XX		09MW915XXX93XD		09MW915XXX93XX		09MW916XXX93XX			
LAB NUMBER:		73042 #		73045 #		73044 #		73043 #			
DATE SAMPLED:		03/18/93		03/18/93		03/18/93		03/18/93			
DATE ANALYZED:		03/25/93		03/24/93		03/25/93		03/25/93			
ANALYTE	SOW-3/90 - II CRQL										
Chloromethane	10	10	U	10	U	10	U	10	U		
Bromomethane	10	10	U	10	U	10	U	10	U		
Vinyl Chloride	10	10	U	8	J	10		10	U		
Chloroethane	10	10	U	10	U	10	U	10	U		
Methylene Chloride	10	10	U	10	U	10	U	10	U		
Acetone	10	10	U	2	BJ	10	U	10	U		
Carbon Disulfide	10	10	U	10	U	10	U	10	U		
1,1-Dichloroethene	10	10	U	10	U	10	U	10	U		
1,1-Dichloroethane	10	10	U	1	J	1	J	10	U		
1,2-Dichloroethene (total)	10	10	U	10	U	10	U	10	U		
Chloroform	10	10	U	10	U	10	U	10	U		
1,2-Dichloroethane	10	10	U	10	U	10	U	10	U		
2-Butanone	10	10	U	10	U	10	U	10	U		
1,1,1-Trichloroethane	10	10	U	10	U	10	U	10	U		
Carbon Tetrachloride	10	10	U	10	U	10	U	10	U		
Bromodichloromethane	10	10	U	10	U	10	U	10	U		
1,2-Dichloropropane	10	10	U	10	U	10	U	10	U		
cis-1,3-Dichloropropene	10	10	U	10	U	10	U	10	U		
Trichloroethene	10	10	U	10	U	10	U	10	U		
Dibromochloromethane	10	10	U	10	U	10	U	10	U		
1,1,2-Trichloroethane	10	10	U	10	U	10	U	10	U		
Benzene	10	10	U	10	U	10	U	10	U		
trans-1,3-Dichloropropene	10	10	U	10	U	10	U	10	U		
Bromoform	10	10	U	10	U	10	U	10	U		
4-Methyl-2-Pentanone	10	10	U	10	U	10	U	10	U		
2-Hexanone	10	10	U	10	U	10	U	10	U		
Tetrachloroethene	10	10	U	10	U	10	U	10	U		
1,1,2,2-Tetrachloroethane	10	10	U	10	U	10	U	10	U		
Toluene	10	10	U	10	U	10	U	10	U		
Chlorobenzene	10	10	U	10	U	10	U	10	U		
Ethylbenzene	10	10	U	10	U	10	U	10	U		
Styrene	10	10	U	10	U	10	U	10	U		
Total Xylenes	10	10	U	10	U	10	U	10	U		
Dilution Factor:		1.00		1.00		1.00		1.00			
Associated Method Blank:		K7961		G0074		K7961		K7961			
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX		09QSXX1XXX93XX			
Associated Field Blank:		-		-		-		-			
Associated Trip Blank:		BSQTXX1XXX93XX		BSQTXX1XXX93XX		BSQTXX1XXX93XX		BSQTXX1XXX93XX			

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09MW914XXX93XX	09MW915XXX93XD	09MW915XXX93XX	09MW916XXX93XX
LAB NUMBER:	73042 #	73045 #	73044 #	73043 #
DATE SAMPLED:	03/18/93	03/18/93	03/18/93	03/18/93
DATE ANALYZED:	03/25/93	03/24/93	03/25/93	03/25/93

ANALYTE	SOW-3/90 - II CRQL							
Chloromethane	10	10	U	10	U	10	U	10	U
Bromomethane	10	10	U	10	U	10	U	10	U
Vinyl Chloride	10	10	U	8	J	10	J	10	U
Chloroethane	10	10	U	10	U	10	U	10	U
Methylene Chloride	10	10	U	10	U	10	U	10	U
Acetone	10	10	U	10	UJ	10	U	10	U
Carbon Disulfide	10	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	10	U	1	J	1	J	10	U
1,2-Dichloroethene (total)	10	10	U	10	U	10	U	10	U
Chloroform	10	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	10	U	10	U	10	U	10	U
2-Butanone	10	10	U	10	U	10	U	10	U
1,1,1-Trichloroethane	10	10	U	10	U	10	U	10	U
Carbon Tetrachloride	10	10	U	10	U	10	U	10	U
Bromodichloromethane	10	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10	10	U	10	U	10	U	10	U
Trichloroethene	10	10	U	10	U	10	U	10	U
Dibromochloromethane	10	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	10	U	10	U	10	U	10	U
Benzene	10	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10	10	U	10	U	10	U	10	U
Bromoform	10	10	U	10	U	10	U	10	U
4-Methyl-2-Pentanone	10	10	U	10	U	10	U	10	U
2-Hexanone	10	10	U	10	U	10	U	10	U
Tetrachloroethene	10	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	10	U	10	U	10	U	10	U
Toluene	10	10	U	10	U	10	U	10	U
Chlorobenzene	10	10	U	10	U	10	U	10	U
Ethylbenzene	10	10	U	10	U	10	U	10	U
Styrene	10	10	U	10	U	10	U	10	U
Total Xylenes	10	10	U	10	U	10	U	10	U
Dilution Factor:		1.00		1.00		1.00		1.00	

Associated Method Blank:	K7961	G0074	K7961	K7961
Associated Equipment Blank:	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:	-	-	-	-
Associated Trip Blank:	BSQTXX1XXX93XX	BSQTXX1XXX93XX	BSQTXX1XXX93XX	BSQTXX1XXX93XX

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:		09MW914XXX93XX	09MW915XXX93XD	09MW915XXX93XX	09MW916XXX93XX
LAB NUMBER:		73042 #	73045 #	73044 #	73043 #
DATE SAMPLED:		03/18/93	03/18/93	03/18/93	03/18/93
DATE ANALYZED:		03/25/93	03/24/93	03/25/93	03/25/93
ANALYTE	SOW-3/90 - II CRQL				
Chloromethane	10	-	-	-	-
Bromomethane	10	-	-	-	-
Vinyl Chloride	10	-	8 J	10 J	-
Chloroethane	10	-	-	-	-
Methylene Chloride	10	-	-	-	-
Acetone	10	-	-	-	-
Carbon Disulfide	10	-	-	-	-
1,1-Dichloroethene	10	-	-	-	-
1,1-Dichloroethane	10	-	1 J	1 J	-
1,2-Dichloroethene (total)	10	-	-	-	-
Chloroform	10	-	-	-	-
1,2-Dichloroethane	10	-	-	-	-
2-Butanone	10	-	-	-	-
1,1,1-Trichloroethane	10	-	-	-	-
Carbon Tetrachloride	10	-	-	-	-
Bromodichloromethane	10	-	-	-	-
1,2-Dichloropropane	10	-	-	-	-
cis-1,3-Dichloropropene	10	-	-	-	-
Trichloroethene	10	-	-	-	-
Dibromochloromethane	10	-	-	-	-
1,1,2-Trichloroethane	10	-	-	-	-
Benzene	10	-	-	-	-
trans-1,3-Dichloropropene	10	-	-	-	-
Bromoform	10	-	-	-	-
4-Methyl-2-Pentanone	10	-	-	-	-
2-Hexanone	10	-	-	-	-
Tetrachloroethene	10	-	-	-	-
1,1,2,2-Tetrachloroethane	10	-	-	-	-
Toluene	10	-	-	-	-
Chlorobenzene	10	-	-	-	-
Ethylbenzene	10	-	-	-	-
Styrene	10	-	-	-	-
Total Xylenes	10	-	-	-	-
Dilution Factor:		1.00	1.00	1.00	1.00
Associated Method Blank:		K7961	G0074	K7961	K7961
Associated Equipment Blank:		09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX	09QSXX1XXX93XX
Associated Field Blank:		-	-	-	-
Associated Trip Blank:		BSQTXX1XXX93XX	BSQTXX1XXX93XX	BSQTXX1XXX93XX	BSQTXX1XXX93XX

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 73049S
DATE SAMPLED: 03/18/93

ANALYTE	SOW-3/90 - II CRDL		
Aluminum	200	39.5	B
Antimony	60	45.0	U
Arsenic	10	2.0	U
Barium	200	3.0	U
Beryllium	5	1.0	U
Cadmium	5	3.0	U
Calcium	5000	111	B
Chromium	10	5.0	U
Cobalt	50	8.0	U
Copper	25	4.3	B
Iron	100	29.6	B
Lead	3	2.8	B
Magnesium	5000	30.0	U
Manganese	15	1.1	B
Mercury	0.2	0.20	U
Nickel	40	20.0	U
Potassium	5000	350	U
Selenium	5	1.0	U
Silver	10	7.0	U
Sodium	5000	231	B
Thallium	10	2.0	U
Vanadium	50	3.0	U
Zinc	20	15.0	B
Cyanide	10	10.0	U

Associated Method Blank: PB2742CS
Associated Equipment Blank: -
Associated Field Blank: -

Site: 09

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 73049
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 04/16/93

ANALYTE	SOW-3/90 - II CRQL		
alpha-BHC	0.05	0.049	U
beta-BHC	0.05	0.049	U
delta-BHC	0.05	0.049	U
gamma-BHC (Lindane)	0.05	0.049	U
Heptachlor	0.05	0.049	U
Aldrin	0.05	0.049	U
Heptachlor Epoxide	0.05	0.049	U
Endosulfan I	0.05	0.049	U
Dieldrin	0.1	0.097	U
4,4'-DDE	0.1	0.097	U
Endrin	0.1	0.097	U
Endosulfan II	0.1	0.097	U
4,4'-DDD	0.1	0.097	U
Endrin Aldehyde	0.1	0.097	U
Endosulfan Sulfate	0.1	0.097	U
4,4'-DDT	0.1	0.097	U
Methoxychlor	0.5	0.49	U
Endrin Ketone	0.1	0.097	U
alpha-Chlordane	0.05	0.049	U
gamma-Chlordane	0.05	0.049	U
Toxaphene	5	4.9	U
Aroclor-1016	1	0.97	U
Aroclor-1221	2	1.9	U
Aroclor-1232	1	0.97	U
Aroclor-1242	1	0.97	U
Aroclor-1248	1	0.97	U
Aroclor-1254	1	0.97	U
Aroclor-1260	1	0.97	U
Dilution Factor:		.971	

Associated Method Blank: PBLK20319AA
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 73049
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 03/23/93

ANALYTE	SOW-3/90 - II CRQL		
Phenol	10	10	U
bis(2-Chloroethyl)ether	10	10	U
2-Chlorophenol	10	10	U
1,3-Dichlorobenzene	10	10	U
1,4-Dichlorobenzene	10	10	U
1,2-Dichlorobenzene	10	10	U
2-Methylphenol	10	10	U
2,2'-oxybis(1-Chloropropane)	10	10	U
4-Methylphenol	10	10	U
N-Nitroso-di-n-propylamine	10	10	U
Hexachloroethane	10	10	U
Nitrobenzene	10	10	U
Isophorone	10	10	U
2-Nitrophenol	10	10	U
2,4-Dimethylphenol	10	10	U
bis(2-Chloroethoxy)methane	10	10	U
2,4-Dichlorophenol	10	10	U
1,2,4-Trichlorobenzene	10	10	U
Naphthalene	10	10	U
4-Chloroaniline	10	10	U
Hexachlorobutadiene	10	10	U
4-Chloro-3-Methylphenol	10	10	U
2-Methylnaphthalene	10	10	U
Hexachlorocyclopentadiene	10	10	U
2,4,6-Trichlorophenol	10	10	U
2,4,5-Trichlorophenol	25	26	U
2-Chloronaphthalene	10	10	U
2-Nitroaniline	25	26	U
Dimethylphthalate	10	10	U
Acenaphthylene	10	10	U
2,6-Dinitrotoluene	10	10	U

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 73049
DATE SAMPLED: 03/18/93
DATE EXTRACTED: 03/19/93
DATE ANALYZED: 03/23/93

ANALYTE	SOW-3/90 - II CRQL		
3-Nitroaniline	25	26	U
Acenaphthene	10	10	U
2,4-Dinitrophenol	25	26	U
4-Nitrophenol	25	26	U
Dibenzofuran	10	10	U
2,4-Dinitrotoluene	10	10	U
Diethylphthalate	10	10	U
4-Chlorophenyl-phenylether	10	10	U
Fluorene	10	10	U
4-Nitroaniline	25	26	U
4,6-Dinitro-2-methylphenol	25	26	U
N-Nitrosodiphenylamine	10	10	U
4-Bromophenyl-phenylether	10	10	U
Hexachlorobenzene	10	10	U
Pentachlorophenol	25	26	U
Phenanthrene	10	10	U
Anthracene	10	10	U
Carbazole	10	10	U
Di-n-butylphthalate	10	10	U
Fluoranthene	10	10	U
Pyrene	10	10	U
Butylbenzylphthalate	10	10	U
3,3'-Dichlorobenzidine	10	10	U
Benzo(a)Anthracene	10	10	U
Chrysene	10	10	U
bis(2-Ethylhexyl)phthalate	10	10	U
Di-n-octylphthalate	10	10	U
Benzo(b)Fluoranthene	10	10	U
Benzo(k)Fluoranthene	10	10	U
Benzo(a)Pyrene	10	10	U
Indeno(1,2,3-c,d)Pyrene	10	10	U
Dibenz(a,h)Anthracene	10	10	U
Benzo(g,h,i)perylene	10	10	U

Dilution Factor: 1.00

Associated Method Blank: J8035
Associated Equipment Blank: -
Associated Field Blank: -

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: 09QSXX1XXX93XX
LAB NUMBER: 73049
DATE SAMPLED: 03/18/93
DATE ANALYZED: 03/24/93

ANALYTE	SOW-3/90 - II CRQL		
Chloromethane	10	10	U
Bromomethane	10	10	U
Vinyl Chloride	10	10	U
Chloroethane	10	10	U
Methylene Chloride	10	3	J
Acetone	10	16	B
Carbon Disulfide	10	10	U
1,1-Dichloroethene	10	10	U
1,1-Dichloroethane	10	10	U
1,2-Dichloroethene (total)	10	10	U
Chloroform	10	10	U
1,2-Dichloroethane	10	10	U
2-Butanone	10	10	U
1,1,1-Trichloroethane	10	10	U
Carbon Tetrachloride	10	10	U
Bromodichloromethane	10	10	U
1,2-Dichloropropane	10	10	U
cis-1,3-Dichloropropene	10	10	U
Trichloroethene	10	10	U
Dibromochloromethane	10	10	U
1,1,2-Trichloroethane	10	10	U
Benzene	10	10	U
trans-1,3-Dichloropropene	10	10	U
Bromoform	10	10	U
4-Methyl-2-Pentanone	10	10	U
2-Hexanone	10	10	U
Tetrachloroethene	10	10	U
1,1,2,2-Tetrachloroethane	10	10	U
Toluene	10	10	U
Chlorobenzene	10	10	U
Ethylbenzene	10	10	U
Styrene	10	10	U
Total Xylenes	10	10	U
Dilution Factor:		1.00	

Associated Method Blank: G0074
Associated Equipment Blank: -
Associated Field Blank: -
Associated Trip Blank: -

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION: BSQTXX1XXX93XX
LAB NUMBER: 73046
DATE SAMPLED: 03/18/93
DATE ANALYZED: 03/24/93

ANALYTE	SOW-3/90 - II CRQL		
Chloromethane	10	10	U
Bromomethane	10	10	U
Vinyl Chloride	10	10	U
Chloroethane	10	10	U
Methylene Chloride	10	2	J
Acetone	10	17	B
Carbon Disulfide	10	10	U
1,1-Dichloroethene	10	10	U
1,1-Dichloroethane	10	10	U
1,2-Dichloroethene (total)	10	10	U
Chloroform	10	10	U
1,2-Dichloroethane	10	10	U
2-Butanone	10	15	
1,1,1-Trichloroethane	10	10	U
Carbon Tetrachloride	10	10	U
Bromodichloromethane	10	10	U
1,2-Dichloropropane	10	10	U
cis-1,3-Dichloropropene	10	10	U
Trichloroethene	10	10	U
Dibromochloromethane	10	10	U
1,1,2-Trichloroethane	10	10	U
Benzene	10	10	U
trans-1,3-Dichloropropene	10	10	U
Bromoform	10	10	U
4-Methyl-2-Pentanone	10	10	U
2-Hexanone	10	10	U
Tetrachloroethene	10	10	U
1,1,2,2-Tetrachloroethane	10	10	U
Toluene	10	10	U
Chlorobenzene	10	10	U
Ethylbenzene	10	10	U
Styrene	10	10	U
Total Xylenes	10	10	U

Dilution Factor: 1.00

Associated Method Blank: G0074
Associated Equipment Blank: -
Associated Field Blank: -
Associated Trip Blank: -

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09SD001XXX93XD		09SD001XXX93XX	
LAB NUMBER:		73050S #		73048S #	
DATE SAMPLED:		03/18/93		03/18/93	
ANALYTE	SOW-3/90 - II CRDL				
Aluminum	40	2400	*	2690	*
Antimony	12	12.6	U	14.0	U
Arsenic	2	2.5	B	3.3	
Barium	40	20.1	B	16.1	B
Beryllium	1	0.28	U	0.31	U
Cadmium	1	1.9	N*	6.3	N*
Calcium	1000	1230	B	944	B
Chromium	2	8.8	*	7.1	*
Cobalt	10	3.0	B	3.8	B
Copper	5	18.7		13.5	
Iron	20	7030	*	5890	*
Lead	0.6	36.6	S*	27.7	*W
Magnesium	1000	705	B	735	B
Manganese	3	104	*	102	*
Mercury	0.04	0.14	U	0.16	U
Nickel	8	8.1	B	7.7	B
Potassium	1000	329	B	354	B
Selenium	1	0.32	BW	0.31	U
Silver	2	2.0	U	2.2	U
Sodium	1000	632	B	487	B
Thallium	2	0.56	U	0.62	U
Vanadium	10	8.3	B	7.3	B
Zinc	4	73.3	*	53.5	*
Cyanide	2	0.70	U*	1.2	*
Percent Solids:		72		64	
Associated Method Blank:		PB2742CS		PB2742CS	
Associated Equipment Blank:		-		-	
Associated Field Blank:		-		-	

Site: 9

Table 2
Validation / Summary Table

SAMPLE LOCATION:		09SD001XXX93XD		09SD001XXX93XX	
LAB NUMBER:		73050S #		73048S #	
DATE SAMPLED:		03/18/93		03/18/93	
ANALYTE	SOW-3/90 - II CRDL				
Aluminum	40	2400	J	2690	J
Antimony	12	12.6	U	14.0	U
Arsenic	2	2.5	J	3.3	
Barium	40	20.1	U	16.1	U
Beryllium	1	0.28	U	0.31	U
Cadmium	1	1.9	J	6.3	J
Calcium	1000	1230	J	944	J
Chromium	2	8.8		7.1	
Cobalt	10	3.0	J	3.8	J
Copper	5	18.7		13.5	
Iron	20	7030	J	5890	J
Lead	0.6	36.6	J	27.7	J
Magnesium	1000	705	J	735	J
Manganese	3	104		102	
Mercury	0.04	0.14	UJ	0.16	UJ
Nickel	8	8.1	J	7.7	J
Potassium	1000	329	J	354	J
Selenium	1	0.32	J	0.31	U
Silver	2	2.0	U	2.2	U
Sodium	1000	632	J	487	J
Thallium	2	0.56	U	0.62	U
Vanadium	10	8.3	J	7.3	J
Zinc	4	73.3		53.5	
Cyanide	2	0.70	U	1.2	
Percent Solids:		72		64	
Associated Method Blank:		PB2742CS		PB2742CS	
Associated Equipment Blank:		-		-	
Associated Field Blank:		-		-	

Site: 9

Table 3
Summary Table

SAMPLE LOCATION:	09SD001XXX93XD		09SD001XXX93XX	
LAB NUMBER:	73050S #		73048S #	
DATE SAMPLED:	03/18/93		03/18/93	
ANALYTE	SOW-3/90 - II CRDL			
Aluminum	40	2400	J	2690	J
Antimony	12	-		-	
Arsenic	2	2.5	J	3.3	
Barium	40	-		-	
Beryllium	1	-		-	
Cadmium	1	1.9	J	6.3	J
Calcium	1000	1230	J	944	J
Chromium	2	8.8		7.1	
Cobalt	10	3.0	J	3.8	J
Copper	5	18.7		13.5	
Iron	20	7030	J	5890	J
Lead	0.6	36.6	J	27.7	J
Magnesium	1000	705	J	735	J
Manganese	3	104		102	
Mercury	0.04	-		-	
Nickel	8	8.1	J	7.7	J
Potassium	1000	329	J	354	J
Selenium	1	0.32	J	-	
Silver	2	-		-	
Sodium	1000	632	J	487	J
Thallium	2	-		-	
Vanadium	10	8.3	J	7.3	J
Zinc	4	73.3		53.5	
Cyanide	2	-		1.2	
Percent Solids:		72		64	
Associated Method Blank:		PB2742CS		PB2742CS	
Associated Equipment Blank:		-		-	
Associated Field Blank:		-		-	

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09SD001XXX93XD		09SD001XXX93XX	
LAB NUMBER:		73050		73048	
DATE SAMPLED:		03/18/93		03/18/93	
DATE EXTRACTED:		03/22/93		03/22/93	
DATE ANALYZED:		04/09/93		04/09/93	
ANALYTE	SOW-3/90 - II CRQL				
alpha-BHC	1.7	2.8	U	2.4	U
beta-BHC	1.7	2.8	U	2.4	U
delta-BHC	1.7	2.8	U	2.4	U
gamma-BHC (Lindane)	1.7	12	P	8.5	P
Heptachlor	1.7	2.8	U	2.4	U
Aldrin	1.7	1.6	JP	0.79	J
Heptachlor Epoxide	1.7	0.68	J	0.88	JP
Endosulfan I	1.7	0.55	JP	0.6	JP
Dieldrin	3.3	4.4	JP	4.7	JP
4,4'-DDE	3.3	3.7	J	5.5	
Endrin	3.3	5.5		2.9	JP
Endosulfan II	3.3	3.5	JP	3.8	JP
4,4'-DDD	3.3	5	JP	14	
Endrin Aldehyde	3.3	5.5	U	4.7	U
Endosulfan Sulfate	3.3	5.5	U	4.7	U
4,4'-DDT	3.3	19		27	P
Methoxychlor	17	34	P	9.8	JP
Endrin Ketone	3.3	5.5	U	5.6	
alpha-Chlordane	1.7	0.55	JP	1.5	JP
gamma-Chlordane	1.7	2.8	U	2.4	U
Toxaphene	170	280	U	240	U
Aroclor-1016	33	55	U	47	U
Aroclor-1221	67	110	U	96	U
Aroclor-1232	33	55	U	47	U
Aroclor-1242	33	55	U	47	U
Aroclor-1248	33	55	U	47	U
Aroclor-1254	33	55	U	47	U
Aroclor-1260	33	27	JP	40	JP
Dilution Factor:		1.00		1.00	
Percent Solids:		70		60	
Associated Method Blank:		PBLK10322SA		PBLK10322SA	
Associated Equipment Blank:		-		-	
Associated Field Blank:		-		-	

Site: 9

Table 2
Validation / Summary Table

SAMPLE LOCATION:		09SD001XXX93XD		09SD001XXX93XX		
LAB NUMBER:		73050		73048		
DATE SAMPLED:		03/18/93		03/18/93		
DATE EXTRACTED:		03/22/93		03/22/93		
DATE ANALYZED:		04/09/93		04/09/93		
ANALYTE	SOW-3/90 - II CRQL					
alpha-BHC	1.7	2.8	U	2.4	U	
beta-BHC	1.7	2.8	U	2.4	U	
delta-BHC	1.7	2.8	U	2.4	U	
gamma-BHC (Lindane)	1.7	12	J	8.5	J	
Heptachlor	1.7	2.8	U	2.4	U	
Aldrin	1.7	1.6	J	0.79	J	
Heptachlor Epoxide	1.7	0.68	J	0.88	J	
Endosulfan I	1.7	0.55	J	0.6	J	
Dieldrin	3.3	4.4	J	4.7	J	
4,4'-DDE	3.3	3.7	J	5.5		
Endrin	3.3	5.5	U	2.9	J	
Endosulfan II	3.3	3.5	J	3.8	J	
4,4'-DDD	3.3	5	J	14	J	
Endrin Aldehyde	3.3	5.5	U	4.7	U	
Endosulfan Sulfate	3.3	5.5	U	4.7	U	
4,4'-DDT	3.3	19	J	27	J	
Methoxychlor	17	34	J	9.8	J	
Endrin Ketone	3.3	5.5	U	5.6		
alpha-Chlordane	1.7	0.55	J	1.5	J	
gamma-Chlordane	1.7	2.8	U	2.4	U	
Toxaphene	170	280	U	240	U	
Aroclor-1016	33	55	U	47	U	
Aroclor-1221	67	110	U	96	U	
Aroclor-1232	33	55	U	47	U	
Aroclor-1242	33	55	U	47	U	
Aroclor-1248	33	55	U	47	U	
Aroclor-1254	33	55	U	47	U	
Aroclor-1260	33	27	J	40	J	
Dilution Factor:		1.00		1.00		
Percent Solids:		70		60		
Associated Method Blank:		PBLK10322SA		PBLK10322SA		
Associated Equipment Blank:		-		-		
Associated Field Blank:		-		-		

Site: 9

Table 3
Summary Table

SAMPLE LOCATION:		09SD001XXX93XD		09SD001XXX93XX	
LAB NUMBER:		73050		73048	
DATE SAMPLED:		03/18/93		03/18/93	
DATE EXTRACTED:		03/22/93		03/22/93	
DATE ANALYZED:		04/09/93		04/09/93	
ANALYTE	SOW-3/90 - II CRQL				
alpha-BHC	1.7	-		-	
beta-BHC	1.7	-		-	
delta-BHC	1.7	-		-	
gamma-BHC (Lindane)	1.7	12	J	8.5	J
Heptachlor	1.7	-		-	
Aldrin	1.7	1.6	J	0.79	J
Heptachlor Epoxide	1.7	0.68	J	0.88	J
Endosulfan I	1.7	0.55	J	0.6	J
Dieldrin	3.3	4.4	J	4.7	J
4,4'-DDE	3.3	3.7	J	5.5	
Endrin	3.3	-		2.9	J
Endosulfan II	3.3	3.5	J	3.8	J
4,4'-DDD	3.3	5	J	14	J
Endrin Aldehyde	3.3	-		-	
Endosulfan Sulfate	3.3	-		-	
4,4'-DDT	3.3	19	J	27	J
Methoxychlor	17	34	J	9.8	J
Endrin Ketone	3.3	-		5.6	
alpha-Chlordane	1.7	0.55	J	1.5	J
gamma-Chlordane	1.7	-		-	
Toxaphene	170	-		-	
Aroclor-1016	33	-		-	
Aroclor-1221	67	-		-	
Aroclor-1232	33	-		-	
Aroclor-1242	33	-		-	
Aroclor-1248	33	-		-	
Aroclor-1254	33	-		-	
Aroclor-1260	33	27	J	40	J
Dilution Factor:		1.00		1.00	
Percent Solids:		70		60	
Associated Method Blank:		PBLK10322SA		PBLK10322SA	
Associated Equipment Blank:		-		-	
Associated Field Blank:		-		-	

Site: 9

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09SD001XXX93XD	09SD001XXX93XX
LAB NUMBER:	73050 #	73048 #
DATE SAMPLED:	03/18/93	03/18/93
DATE EXTRACTED:	03/23/93	03/23/93
DATE ANALYZED:	03/26/93	03/26/93

ANALYTE	SOW-3/90 - II CRQL				
Phenol	330	550	U	480	U
bis(2-Chloroethyl)ether	330	550	U	480	U
2-Chlorophenol	330	550	U	480	U
1,3-Dichlorobenzene	330	550	U	480	U
1,4-Dichlorobenzene	330	550	U	480	U
1,2-Dichlorobenzene	330	550	U	480	U
2-Methylphenol	330	550	U	480	U
2,2'-oxybis(1-Chloropropane)	330	550	U	480	U
4-Methylphenol	330	550	U	480	U
N-Nitroso-di-n-propylamine	330	550	U	480	U
Hexachloroethane	330	550	U	480	U
Nitrobenzene	330	550	U	480	U
Isophorone	330	550	U	480	U
2-Nitrophenol	330	550	U	480	U
2,4-Dimethylphenol	330	550	U	480	U
bis(2-Chloroethoxy)methane	330	550	U	480	U
2,4-Dichlorophenol	330	550	U	480	U
1,2,4-Trichlorobenzene	330	550	U	480	U
Naphthalene	330	550	U	480	U
4-Chloroaniline	330	550	U	480	U
Hexachlorobutadiene	330	550	U	480	U
4-Chloro-3-Methylphenol	330	550	U	480	U
2-Methylnaphthalene	330	550	U	480	U
Hexachlorocyclopentadiene	330	550	U	480	U
2,4,6-Trichlorophenol	330	550	U	480	U
2,4,5-Trichlorophenol	800	1300	U	1200	U
2-Chloronaphthalene	330	550	U	480	U
2-Nitroaniline	800	1300	U	1200	U
Dimethylphthalate	330	550	U	480	U
Acenaphthylene	330	550	U	480	U
2,6-Dinitrotoluene	330	550	U	480	U

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:		09SD001XXX93XD		09SD001XXX93XX	
LAB NUMBER:		73050 #		73048 #	
DATE SAMPLED:		03/18/93		03/18/93	
DATE EXTRACTED:		03/23/93		03/23/93	
DATE ANALYZED:		03/26/93		03/26/93	
ANALYTE	SOW-3/90 - II CRQL				
3-Nitroaniline	800	1300	U	1200	U
Acenaphthene	330	98	J	180	J
2,4-Dinitrophenol	800	1300	U	1200	U
4-Nitrophenol	800	1300	U	1200	U
Dibenzofuran	330	550	U	70	J
2,4-Dinitrotoluene	330	550	U	480	U
Diethylphthalate	330	550	U	480	U
4-Chlorophenyl-phenylether	330	550	U	480	U
Fluorene	330	87	J	160	J
4-Nitroaniline	800	1300	U	1200	U
4,6-Dinitro-2-methylphenol	800	1300	U	1200	U
N-Nitrosodiphenylamine	330	550	U	480	U
4-Bromophenyl-phenylether	330	550	U	480	U
Hexachlorobenzene	330	550	U	480	U
Pentachlorophenol	800	1300	U	1200	U
Phenanthrene	330	840		1300	
Anthracene	330	140	J	270	J
Carbazole	330	120	J	180	J
Di-n-butylphthalate	330	550	U	480	U
Fluoranthene	330	1300		1800	
Pyrene	330	1200		1500	
Butylbenzylphthalate	330	120	J	98	J
3,3'-Dichlorobenzidine	330	550	U	480	U
Benzo(a)Anthracene	330	490	J	750	
Chrysene	330	680		900	
bis(2-Ethylhexyl)phthalate	330	810		480	
Di-n-octylphthalate	330	550	U	480	U
Benzo(b)Fluoranthene	330	830		910	
Benzo(k)Fluoranthene	330	420	J	650	
Benzo(a)Pyrene	330	510	J	710	
Indeno(1,2,3-c,d)Pyrene	330	300	J	400	J
Dibenz(a,h)Anthracene	330	140	J	150	J
Benzo(g,h,i)perylene	330	260	J	340	J
Dilution Factor:		1.00		1.00	
Percent Solids:		60		70	
Associated Method Blank:		J8087		J8087	
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:		-		-	

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:		09SD001XXX93XD		09SD001XXX93XX		
LAB NUMBER:		73050 #		73048 #		
DATE SAMPLED:		03/18/93		03/18/93		
DATE EXTRACTED:		03/23/93		03/23/93		
DATE ANALYZED:		03/26/93		03/26/93		
ANALYTE	SOW-3/90 - II CRQL					
Phenol	330	550	U	480	U	
bis(2-Chloroethyl)ether	330	550	U	480	U	
2-Chlorophenol	330	550	U	480	U	
1,3-Dichlorobenzene	330	550	U	480	U	
1,4-Dichlorobenzene	330	550	U	480	U	
1,2-Dichlorobenzene	330	550	U	480	U	
2-Methylphenol	330	550	U	480	U	
2,2'-oxybis(1-Chloropropane)	330	550	U	480	U	
4-Methylphenol	330	550	U	480	U	
N-Nitroso-di-n-propylamine	330	550	U	480	U	
Hexachloroethane	330	550	U	480	U	
Nitrobenzene	330	550	U	480	U	
Isophorone	330	550	U	480	U	
2-Nitrophenol	330	550	U	480	U	
2,4-Dimethylphenol	330	550	U	480	U	
bis(2-Chloroethoxy)methane	330	550	U	480	U	
2,4-Dichlorophenol	330	550	U	480	U	
1,2,4-Trichlorobenzene	330	550	U	480	U	
Naphthalene	330	550	U	480	U	
4-Chloroaniline	330	550	U	480	U	
Hexachlorobutadiene	330	550	U	480	U	
4-Chloro-3-Methylphenol	330	550	U	480	U	
2-Methylnaphthalene	330	550	U	480	U	
Hexachlorocyclopentadiene	330	550	U	480	U	
2,4,6-Trichlorophenol	330	550	U	480	U	
2,4,5-Trichlorophenol	800	1300	U	1200	U	
2-Chloronaphthalene	330	550	U	480	U	
2-Nitroaniline	800	1300	U	1200	U	
Dimethylphthalate	330	550	U	480	U	
Acenaphthylene	330	550	U	480	U	
2,6-Dinitrotoluene	330	550	U	480	U	

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:		09SD001XXX93XD		09SD001XXX93XX	
LAB NUMBER:		73050 #		73048 #	
DATE SAMPLED:		03/18/93		03/18/93	
DATE EXTRACTED:		03/23/93		03/23/93	
DATE ANALYZED:		03/26/93		03/26/93	
ANALYTE	SOW-3/90 - II CRQL				
3-Nitroaniline	800	1300	U	1200	U
Acenaphthene	330	98	J	180	J
2,4-Dinitrophenol	800	1300	U	1200	U
4-Nitrophenol	800	1300	U	1200	U
Dibenzofuran	330	550	U	70	J
2,4-Dinitrotoluene	330	550	U	480	U
Diethylphthalate	330	550	U	480	U
4-Chlorophenyl-phenylether	330	550	U	480	U
Fluorene	330	87	J	160	J
4-Nitroaniline	800	1300	U	1200	U
4,6-Dinitro-2-methylphenol	800	1300	U	1200	U
N-Nitrosodiphenylamine	330	550	U	480	U
4-Bromophenyl-phenylether	330	550	U	480	U
Hexachlorobenzene	330	550	U	480	U
Pentachlorophenol	800	1300	U	1200	U
Phenanthrene	330	840		1300	
Anthracene	330	140	J	270	J
Carbazole	330	120	J	180	J
Di-n-butylphthalate	330	550	U	480	U
Fluoranthene	330	1300		1800	
Pyrene	330	1200		1500	J
Butylbenzylphthalate	330	120	J	98	J
3,3'-Dichlorobenzidine	330	550	U	480	U
Benzo(a)Anthracene	330	490	J	750	
Chrysene	330	680		900	
bis(2-Ethylhexyl)phthalate	330	810	J	480	J
Di-n-octylphthalate	330	550	U	480	U
Benzo(b)Fluoranthene	330	830		910	
Benzo(k)Fluoranthene	330	420	J	650	
Benzo(a)Pyrene	330	510	J	710	
Indeno(1,2,3-c,d)Pyrene	330	300	J	400	J
Dibenz(a,h)Anthracene	330	140	J	150	J
Benzo(g,h,i)perylene	330	260	J	340	J
Dilution Factor:		1.00		1.00	
Percent Solids:		60		70	
Associated Method Blank:		J8087		J8087	
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:		-		-	

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09SD001XXX93XD	09SD001XXX93XX
LAB NUMBER:	73050 #	73048 #
DATE SAMPLED:	03/18/93	03/18/93
DATE EXTRACTED:	03/23/93	03/23/93
DATE ANALYZED:	03/26/93	03/26/93

ANALYTE	SOW-3/90 - II CRQL		
Phenol	330	-	-
bis(2-Chloroethyl)ether	330	-	-
2-Chlorophenol	330	-	-
1,3-Dichlorobenzene	330	-	-
1,4-Dichlorobenzene	330	-	-
1,2-Dichlorobenzene	330	-	-
2-Methylphenol	330	-	-
2,2'-oxybis(1-Chloropropane)	330	-	-
4-Methylphenol	330	-	-
N-Nitroso-di-n-propylamine	330	-	-
Hexachloroethane	330	-	-
Nitrobenzene	330	-	-
Isophorone	330	-	-
2-Nitrophenol	330	-	-
2,4-Dimethylphenol	330	-	-
bis(2-Chloroethoxy)methane	330	-	-
2,4-Dichlorophenol	330	-	-
1,2,4-Trichlorobenzene	330	-	-
Naphthalene	330	-	-
4-Chloroaniline	330	-	-
Hexachlorobutadiene	330	-	-
4-Chloro-3-Methylphenol	330	-	-
2-Methylnaphthalene	330	-	-
Hexachlorocyclopentadiene	330	-	-
2,4,6-Trichlorophenol	330	-	-
2,4,5-Trichlorophenol	800	-	-
2-Chloronaphthalene	330	-	-
2-Nitroaniline	800	-	-
Dimethylphthalate	330	-	-
Acenaphthylene	330	-	-
2,6-Dinitrotoluene	330	-	-

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:		09SD001XXX93XD		09SD001XXX93XX	
LAB NUMBER:		73050 #		73048 #	
DATE SAMPLED:		03/18/93		03/18/93	
DATE EXTRACTED:		03/23/93		03/23/93	
DATE ANALYZED:		03/26/93		03/26/93	
ANALYTE	SOW-3/90 - II CRQL				
3-Nitroaniline	800	-		-	
Acenaphthene	330	98	J	180	J
2,4-Dinitrophenol	800	-		-	
4-Nitrophenol	800	-		-	
Dibenzofuran	330	-		70	J
2,4-Dinitrotoluene	330	-		-	
Diethylphthalate	330	-		-	
4-Chlorophenyl-phenylether	330	-		-	
Fluorene	330	87	J	160	J
4-Nitroaniline	800	-		-	
4,6-Dinitro-2-methylphenol	800	-		-	
N-Nitrosodiphenylamine	330	-		-	
4-Bromophenyl-phenylether	330	-		-	
Hexachlorobenzene	330	-		-	
Pentachlorophenol	800	-		-	
Phenanthrene	330	840		1300	
Anthracene	330	140	J	270	J
Carbazole	330	120	J	180	J
Di-n-butylphthalate	330	-		-	
Fluoranthene	330	1300		1800	
Pyrene	330	1200		1500	J
Butylbenzylphthalate	330	120	J	98	J
3,3'-Dichlorobenzidine	330	-		-	
Benzo(a)Anthracene	330	490	J	750	
Chrysene	330	680		900	
bis(2-Ethylhexyl)phthalate	330	810	J	480	J
Di-n-octylphthalate	330	-		-	
Benzo(b)Fluoranthene	330	830		910	
Benzo(k)Fluoranthene	330	420	J	650	
Benzo(a)Pyrene	330	510	J	710	
Indeno(1,2,3-c,d)Pyrene	330	300	J	400	J
Dibenz(a,h)Anthracene	330	140	J	150	J
Benzo(g,h,i)perylene	330	260	J	340	J
Dilution Factor:		1.00		1.00	
Percent Solids:		60		70	
Associated Method Blank:		J8087		J8087	
Associated Equipment Blank:		09QSXX1XXX93XX		09QSXX1XXX93XX	
Associated Field Blank:		-		-	

Site: 9
#: Level D Validation

Table 1
Laboratory Report of Analysis

SAMPLE LOCATION:	09SD001XXX93XD	09SD001XXX93XX
LAB NUMBER:	73050 #	73048 #
DATE SAMPLED:	03/18/93	03/18/93
DATE ANALYZED:	03/25/93	03/25/93

ANALYTE	SOW-3/90 - II CRQL				
Chloromethane	10	17	U	14	U
Bromomethane	10	17	U	14	U
Vinyl Chloride	10	17	U	14	U
Chloroethane	10	17	U	14	U
Methylene Chloride	10	17	U	14	U
Acetone	10	17	U	14	U
Carbon Disulfide	10	17	U	14	U
1,1-Dichloroethene	10	17	U	14	U
1,1-Dichloroethane	10	17	U	14	U
1,2-Dichloroethene (total)	10	17	U	14	U
Chloroform	10	17	U	14	U
1,2-Dichloroethane	10	52		39	
2-Butanone	10	17	U	14	U
1,1,1-Trichloroethane	10	17	U	14	U
Carbon Tetrachloride	10	17	U	14	U
Bromodichloromethane	10	17	U	14	U
1,2-Dichloropropane	10	17	U	14	U
cis-1,3-Dichloropropene	10	17	U	14	U
Trichloroethene	10	17	U	14	U
Dibromochloromethane	10	17	U	14	U
1,1,2-Trichloroethane	10	17	U	14	U
Benzene	10	17	U	14	U
trans-1,3-Dichloropropene	10	17	U	14	U
Bromoform	10	17	U	14	U
4-Methyl-2-Pentanone	10	17	U	14	U
2-Hexanone	10	17	U	14	U
Tetrachloroethene	10	17	U	14	U
1,1,2,2-Tetrachloroethane	10	17	U	14	U
Toluene	10	17	U	14	U
Chlorobenzene	10	17	U	14	U
Ethylbenzene	10	17	U	14	U
Styrene	10	17	U	14	U
Total Xylenes	10	17	U	14	U

Dilution Factor:	1.00	1.00
Percent Solids:	60	70
Associated Method Blank:	H5479	H5479
Associated Equipment Blank:	-	-
Associated Field Blank:	-	-
Associated Trip Blank:	-	-

Site: 9
#: Level D Validation

Table 2
Validation / Summary Table

SAMPLE LOCATION:	09SD001XXX93XD		09SD001XXX93XX	
LAB NUMBER:	73050 #		73048 #	
DATE SAMPLED:	03/18/93		03/18/93	
DATE ANALYZED:	03/25/93		03/25/93	
ANALYTE	SOW-3/90 - II CRQL			
Chloromethane	10	17	U	14	U
Bromomethane	10	17	U	14	U
Vinyl Chloride	10	17	U	14	U
Chloroethane	10	17	U	14	U
Methylene Chloride	10	17	U	14	U
Acetone	10	17	UJ	14	UJ
Carbon Disulfide	10	17	U	14	U
1,1-Dichloroethene	10	17	U	14	U
1,1-Dichloroethane	10	17	U	14	U
1,2-Dichloroethene (total)	10	17	U	14	U
Chloroform	10	17	U	14	U
1,2-Dichloroethane	10	52		39	
2-Butanone	10	17	UJ	14	UJ
1,1,1-Trichloroethane	10	17	U	14	U
Carbon Tetrachloride	10	17	U	14	U
Bromodichloromethane	10	17	U	14	U
1,2-Dichloropropane	10	17	U	14	U
cis-1,3-Dichloropropene	10	17	U	14	U
Trichloroethene	10	17	U	14	U
Dibromochloromethane	10	17	U	14	U
1,1,2-Trichloroethane	10	17	U	14	U
Benzene	10	17	U	14	U
trans-1,3-Dichloropropene	10	17	U	14	U
Bromoform	10	17	U	14	U
4-Methyl-2-Pentanone	10	17	U	14	U
2-Hexanone	10	17	U	14	U
Tetrachloroethene	10	17	U	14	U
1,1,2,2-Tetrachloroethane	10	17	U	14	U
Toluene	10	17	U	14	U
Chlorobenzene	10	17	U	14	U
Ethylbenzene	10	17	U	14	U
Styrene	10	17	U	14	U
Total Xylenes	10	17	U	14	U
Dilution Factor:		1.00		1.00	
Percent Solids:		60		70	
Associated Method Blank:		H5479		H5479	
Associated Equipment Blank:		-		-	
Associated Field Blank:		-		-	
Associated Trip Blank:		-		-	

Site: 9
#: Level D Validation

Table 3
Summary Table

SAMPLE LOCATION:	09SD001XXX93XD	09SD001XXX93XX
LAB NUMBER:	73050 #	73048 #
DATE SAMPLED:	03/18/93	03/18/93
DATE ANALYZED:	03/25/93	03/25/93

ANALYTE	SOW-3/90 - II CRQL		
Chloromethane	10	-	-
Bromomethane	10	-	-
Vinyl Chloride	10	-	-
Chloroethane	10	-	-
Methylene Chloride	10	-	-
Acetone	10	-	-
Carbon Disulfide	10	-	-
1,1-Dichloroethene	10	-	-
1,1-Dichloroethane	10	-	-
1,2-Dichloroethene (total)	10	-	-
Chloroform	10	-	-
1,2-Dichloroethane	10	52	39
2-Butanone	10	-	-
1,1,1-Trichloroethane	10	-	-
Carbon Tetrachloride	10	-	-
Bromodichloromethane	10	-	-
1,2-Dichloropropane	10	-	-
cis-1,3-Dichloropropene	10	-	-
Trichloroethene	10	-	-
Dibromochloromethane	10	-	-
1,1,2-Trichloroethane	10	-	-
Benzene	10	-	-
trans-1,3-Dichloropropene	10	-	-
Bromoform	10	-	-
4-Methyl-2-Pentanone	10	-	-
2-Hexanone	10	-	-
Tetrachloroethene	10	-	-
1,1,2,2-Tetrachloroethane	10	-	-
Toluene	10	-	-
Chlorobenzene	10	-	-
Ethylbenzene	10	-	-
Styrene	10	-	-
Total Xylenes	10	-	-
Dilution Factor:		1.00	1.00
Percent Solids:		60	70
Associated Method Blank:		H5479	H5479
Associated Equipment Blank:		-	-
Associated Field Blank:		-	-
Associated Trip Blank:		-	-

Site: 9
#: Level D Validation

APPENDIX C

RISK CALCULATIONS - GROUNDWATER
NORTH OF NEPTUNE DRIVE

TABLE 1 NDIX C
INGESTION OF DRINKING WATER
RESIDENTIAL – ADULT
MW–914, MW–915, MW–916: MAXIMUM CONCENTRATION
TECHNICAL MEMORANDUM: SITE 9, NAS BRUNSWICK

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW		mg/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	30	years	USEPA, 1991
RELATIVE ABSORPTION FACTOR	RAF	100%		

USEPA, 1989. Risk Assessment Guidance for Superfund
USEPA, 1991. Standard Default Exposure Factors

EQUATIONS

CANCER RISK = INTAKE (mg/kg–day) x CANCER SLOPE FACTOR $(mg/kg–day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg–day) / REFERENCE DOSE (mg/kg–day)

$$\text{INTAKE–INGESTION} = \frac{CW \times IR \times RAF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Note:
For noncarcinogenic effects: AT = ED

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	INGESTION RAF	INTAKE INGESTION (mg/kg–day)	CANCER SLOPE FACTOR $(mg/kg–day)^{-1}$	CANCER RISK INGESTION
Vinyl Chloride	0.01	1	1.2E–04	1.9	2.2E–04
Bis(2–ethylhexyl)phthalate	0.002	1	2.3E–05	0.014	3.3E–07
				SUMMARY CANCER RISK	2E–04

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	INGESTION RAF	INTAKE INGESTION (mg/kg–day)	REFERENCE DOSE (mg/kg–day)	HAZARD QUOTIENT INGESTION
Vinyl Chloride	0.01	1	2.7E–04	ND	
1,1–Dichloroethane	0.001	1	2.7E–05	0.1	2.7E–04
Naphthalene	0.001	1	2.7E–05	0.04	6.8E–04
Acenaphthene	0.001	1	2.7E–05	0.06	4.6E–04
Phenanthrene	0.001	1	2.7E–05	0.04	6.8E–04
Bis(2–ethylhexyl)phthalate	0.002	1	5.5E–05	0.02	2.7E–03
Aluminum	5.51	1	1.5E–01	ND	
Barium	0.443	1	1.2E–02	0.07	1.7E–01
Cadmium	0.0064	1	1.8E–04	0.0005	3.5E–01
Chromium	0.0099	1	2.7E–04	0.005	5.4E–02
Manganese	1.01	1	2.8E–02	0.005	5.5E+00
Vanadium	0.0062	1	1.7E–04	0.007	2.4E–02
				SUMMARY HAZARD INDEX	6

TABLE 2[illegible]NDIX C
INGESTION OF DRINKING WATER
RESIDENTIAL – ADULT
MW-914, MW-915, MW-916: AVERAGE CONCENTRATION
TECHNICAL MEMORANDUM: SITE 9, NAS BRUNSWICK

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW		mg/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	30	years	USEPA, 1991
RELATIVE ABSORPTION FACTOR	RAF	100%		

USEPA, 1989. Risk Assessment Guidance for Superfund
USEPA, 1991. Standard Default Exposure Factors

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times RAF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Note:
For noncarcinogenic effects: AT = ED

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	INGESTION RAF	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION
Vinyl Chloride	0.006	1	7.0E-05	1.9	1.3E-04
Bis(2-ethylhexyl)phthalate	0.002	1	2.3E-05	0.014	3.3E-07
			SUMMARY CANCER RISK		1E-04

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	INGESTION RAF	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Vinyl Chloride	0.006	1	1.6E-04	ND	
1,1-Dichloroethane	0.001	1	2.7E-05	0.1	2.7E-04
Naphthalene	0.001	1	2.7E-05	0.04	6.8E-04
Acenaphthene	0.001	1	2.7E-05	0.06	4.6E-04
Phenanthrene	0.001	1	2.7E-05	0.04	6.8E-04
Bis(2-ethylhexyl)phthalate	0.002	1	5.5E-05	0.02	2.7E-03
Aluminum	2.493	1	6.8E-02	ND	
Barium	0.239	1	6.5E-03	0.07	9.4E-02
Cadmium	0.0038	1	1.0E-04	0.0005	2.1E-01
Chromium	0.0064	1	1.8E-04	0.005	3.5E-02
Manganese	0.415	1	1.1E-02	0.005	2.3E+00
Vanadium	0.0062	1	1.7E-04	0.007	2.4E-02
			SUMMARY HAZARD INDEX		3

APPENDIX D

REGULATORY/TECHNICAL REVIEW COMMITTEE COMMENTS ON DRAFT TECHNICAL MEMORANDUM AND NAVY RESPONSES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 6

To: Bob McGrath	From: Meghan Cassidy
Dept./Agency: ABB ES	Phone # 617-573-5785
Fax # 207-772-4762	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

August 11, 1993

Mr. James Shafer
Northern Division
Naval Facilities Engineering Command
Code 1821/JS
10 Industrial Hwy., Mail Stop #82
Lester, PA 19113-2090

Re: Draft Technical Memorandum
Site 9
Neptune Drive Disposal Site
June 1993

Dear Jim:

The United States Environmental Protection Agency (EPA) has reviewed the document entitled "Draft Technical Memorandum, Site 9, Neptune Drive Disposal Site" dated June 1993. The report was submitted by the Department of the Navy for Naval Air Station Brunswick in Brunswick, Maine.

EPA's comments regarding this document are provided in Attachment I to this letter.

As discussed during a conference call held on July 27, 1993, EPA recommends that either ~~a meeting or second conference call be convened~~ following the Navy's review of comments on this document. The purpose of such a meeting or call would be to discuss the follow-up actions for Site 9.

Please contact me at (617)573-5785 to schedule a meeting or conference call, or if you have any questions regarding EPA's comments.

Sincerely,

Meghan F. Cassidy

Meghan F. Cassidy
Remedial Project Manager

Enclosures

PRINTED ON RECYCLED PAPER

cc: Nancy Beardsley/ME DEP
Jim Caruthers/NASB
Bob McGirr/ABB
Susan Weddle/BASCE
Carolyn LePage/Gerber, Inc.
Sam Butcher/Harpswell Community Rep.
Rene Bernier/Topsham Community Rep.
Bob Lim/EPA

ATTACHMENT I

The following are EPA's comments pertaining to the document entitled "Draft Technical Memorandum, Site 9, Neptune Drive Disposal Site" dated June 1993. The document was submitted by the Department of the Navy for Naval Air Station Brunswick in Brunswick, Maine.

1. General: In reviewing the information presented in this document, it appears that there are still some outstanding issues regarding the area north of Neptune Drive. For instance, whether inorganics present in groundwater are really representative of background or are a result of leaching from the ash. For this reason it may be premature to be considering remedy selection for this area. The need for additional studies should discussed.

2. General: The analytical results of soil samples from the cesspool area south of Neptune Drive indicate that the septic system is not a current source of VOC contamination. However, it cannot be determined whether the septic system may have been a past source. Since the levels of VOC contamination in this area continue to be low, EPA believes that a long-term monitoring program should be implemented in the near future. Once a long-term monitoring program is in place more information will be available regarding contamination trends, groundwater flow directions, changes in flow directions, etc. EPA recommends that the Navy consider, and discuss with the regulatory agencies, implementing an interim action for the area south of Neptune Drive.

3. General: More discussion regarding the period of operation of the incinerator, type of material burned, etc. is needed to evaluate whether any further investigation should include sampling of the ash for dioxins.

4. Page 2-7, Section 2.1.4: Lead was not discussed in the Surface Water and Sediment section. However, Figure 2-3 shows some elevated concentrations. Compare the lead concentrations to background levels and provide an explanation.

5. Page 2-8, Figure 2-3: Note #7 in general notes incorrectly defines PAHs as polycarbonate aromatic hydrocarbons. Correct this reference.

6. Page 2-10, ¶ 2, last sentence: This sentence must be revised to indicate that only that no site-related organics have been detected in groundwater. The presence of inorganics may be related to the ash contamination.

7. Page 2-14, Table 2-2: Clarify whether the maximum concentrations presented in this table represent a compilation of data from both north and south of Neptune Drive.

8. Page 2-20, ¶ 2: At what depths were pesticides detected in B-912 and B-913? This information is critical to determining whether the presence of pesticide is a remnant of surface applications in ash. If pesticides were detected at any appreciable depth it is doubtful whether they can be related to basewide use.

9. Page 2-20, ¶ 1: The text indicates that VOCs were detected only at values below Contract Required Quantitation Limits (CRQLs). The VOCs were estimated values here because the CRQLs tend to be higher than the PQLs due to different laboratory analysis performance. However, the statement as presented in the text gives a false impression that the contaminant concentrations are not of concern because of the CRQL. The text should explain that in some cases, the CRQL is higher than the MCL or other regulatory standard and that the CRQL cannot be used to assess risk in any case.

10. Page 2-24, Table 2-6: Clarify what sample LT-901 represents. Is this a leachate sample? If so clarify this in the table so that the reader does not assume it represents groundwater conditions.

11. Page 2-25 through 2-26, Table 2-7: Results of groundwater inorganic analysis need to be compared to MCLs where they exist.

    The sodium and calcium levels at MW-916 appear high. All inorganic concentrations for MW-916 should be compared to other background well data at NASB before conclusions can be made regarding whether MW-916 is representative of background conditions.

12. Page 2-27, ¶ 1: Provide the total depth of the TerraProbe borings.

13. Page 2-28, ¶ 2: According to the text MW-916 is being considered to represent background conditions since it is upgradient of the ash disposal area. Use of this well alone is not acceptable for establishing background conditions. The data from MW-916 must be compared to data used to establish "background" levels during previous studies at NASB.

14. Page 2-29, ¶ 1: Background levels from monitoring well MW-916 cannot be used for comparison to leachate samples. Base-wide background levels (in leachate if applicable) must be used for comparison.

15. Page 2-32, ¶ The text indicates that five soil samples were collected from the borings in the cesspool area and analyzed for TCL VOCs. Indicate at what depth these samples were taken and the nature of the material (i.e., organic mat, fill, native soils, etc.).

16. Page 3-1, ¶ 1: Indicate why there is still some uncertainty regarding the vertical extent of ash in the former ash disposal area.

17. Page 3-2, 1st sentence: As stated previously, inorganic background values must be compared to base-wide background values previously established, not just to values from MW-916.

18. Page 3-2, ¶ 2: This paragraph indicates that the septic system was not the original source of contaminants in groundwater south of Neptune Drive. While it is clear that the septic system is not a current source, the conclusion regarding a past source cannot be substantiated. The text should explain this further.

19. Page 3-2, ¶ 3: The text indicates that VOC contamination is groundwater is at concentrations below CRQLs. While this may be true, the text should also indicate that there have been groundwater hits of VOCs above the MCLs.

    The text states that "no VOC, SVOC, or pesticide/PCB contaminants of concern" were observed in the groundwater. This is inaccurate since VOCs (specifically vinyl chloride) was detected. Clarify this statement.

20. Page 3-3, ¶ 2: Briefly summarize the contaminants found in leachate and sediment. Also, indicate whether these results are indicative of elevated contaminant levels, source, etc.

21. Section 4.0: This section must include a summary of ecological risks associated with exposure to the seep area at location LT-901.

22. Page 4-3, ¶ 1: The last sentence in this paragraph states that the risk estimates presented (i.e., 7.8×10^{-5} and 1.4×10^{-5}) are at the upper end of EPA's risk range. Since the EPA risk range is 10^{-4} to 10^{-6}, these values are in the middle of the risk range. Clarify the text.

23. Page 4-4, last ¶: The text indicates that in some cases the average concentration was greater than the maximum concentration. Provide specific examples where this occurred.

24. Page 4-5, ¶ 1: The text indicates that the elevated HI is due to the presence of manganese at concentrations that exceed the proposed MCL of 200 ug/L. The text should clarify that the 200 ug/L level is the MCLG rather than the proposed MCL. Also, the HI is based on Reference Dose (RfD) rather than the MCL as indicated.

25. Page 5-2, ¶ 1: This paragraph should include a discussion of the detection of low levels of VOCs (vinyl chloride) in groundwater north of Neptune Drive.

26. Page 5-2, ¶ 2: The text states that no current or future risks are associated with leachate or sediment. Clarify whether this includes both ecological and human health risks.

27. Page 5-4, ¶ 1, 1st sentence: The text states that there is no continuing source of contamination causing environmental impact at Site 9. This is not accurate. The ash is most likely a continuing source of inorganics in groundwater. This statement should be clarified.

28. Page 5-4, ¶ 1, 2nd sentence: While EPA is not ready to concur that only monitoring is necessary at Site 9, any future monitoring proposed for the site must include leachate and leachate sediment. This should be reflected in the text.

RESPONSE TO U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS DATED AUGUST 11, 1993

1. General. A table and discussion has been included that addresses NAS Brunswick background inorganic data and site-related inorganic data. Also, see responses to specific comments regarding background concentrations.

2. General. It is recognized that the existing data address current conditions, which are not necessarily representative of conditions when the septic tank and cesspools were operational.

   The Navy concurs with the suggestion that long-term groundwater monitoring be implemented in the area of Site 9. This will be discussed further with the regulatory agencies.

3. General. The incinerator was apparently operated during a period commencing on or after April 1943, when the Air Station was commissioned, until the fall of 1946, when the Air Station was demobilized. Although the Station was leased to various occupants from 1947 through 1951, including the University of Maine and Bowdoin College for classrooms and student housing, and various small commercial enterprises, it is unknown if the incinerator was used during this period. The Air Station was recommissioned in 1951, but again, it is unknown if the incinerator resumed operation. The latest that it could have been used was 1953, when the barracks that now occupy the site of the former incinerator were built. This information has been added to the text.

   The Initial Assessment Study submitted to the Navy in 1983 (R.F. Weston, Inc., 1983) states that during the period the incinerator was in operation, solid wastes were burned and the ash was placed in the dump. Solvents and other liquids were burned on the ground. Wastes disposed of at the site reportedly included solvents, paint sludges, and possibly wastes from the Metal Shop for several years.

4. Page 2-7, Section 2.1.4. A discussion of on-site lead levels relative to background concentrations has been included in the revised document.

5. Page 2-8, Figure 2-3. Note 7 has been corrected as suggested.

6. Page 2-10, Paragraph 2, last sentence. The sentence has been revised as suggested.

7. Page 2-14, Table 2-2. The maximum concentrations shown on the draft version of this table did represent a compilation of data from both north and south of Neptune Drive. A note has been added for clarification.

8. Page 2-20, Paragraph 2. As shown in Table 2-4, low (less than 0.1 mg/kg) concentrations of pesticides were detected in ash samples from 10 feet and 16 feet in boring B-912, and from 11 feet in boring B-913. Although one would not typically expect to find pesticides at this depth from general surface applications, this ash was originally at the ground surface, before being subsequently covered by clean fill. Thus, it is concluded that the observed traces of pesticides are, in fact, the result of general pesticide use at the Air Station sometime prior to filling and grading activities.

9. Page 2-20, Paragraph 1. The reader may have misread this paragraph, which is discussing only soil sample results from borings B-912 and B-913. Therefore, comparisons to MCLs are not appropriate. The other VOCs were detected in the soil samples at concentrations only up to 3J μg/kg, well below the CRQL. The text has been revised for clarity. Conclusions regarding risks should not be inferred by the reader as a result of comparison to CRQLs. Risks are discussed in Section 4.

10. Page 2-24, Table 2-6. The sample LT-901 is a water leachate sample. Tables 2-6 and 2-7 have been revised to reflect this.

11. Page 2-25 through 2-26, Table 2-7. Although this table has been updated to incorporate MCLs (and background concentrations) so as to facilitate discussions of the data, the water in the unnamed streams is not used for potable water and therefore MCLs are not applicable.

    Also, see response to general comment #1 above concerning background inorganic values.

12. Page 2-27, Paragraph 1. Copies of the field notes taken during the TerraProbe survey are included in Appendix A. Depths of the borings are given on these logs.

    The survey was designed to confirm the presence/absence of the ash and not to fully characterize the depth of the ash at the individual boring locations. Based on information of the borings B-911, B-912, and B-913 that showed the ash being between 6 and 16 feet bgs, the TerraProbe survey tested depths ranging between 8 to 13 feet bgs, as noted in the text.

13. Page 2-28, Paragraph 2. The data from MW-916 has been compared to background data collected during previous studies at other locations at NAS

Brunswick. However, MW-916 is still considered to represent groundwater conditions upgradient of the ash dump.

14. Page 2-29, Paragraph 1. We agree that comparisons between leachate and monitoring well samples are not ideal. A more appropriate comparison would be to compare the leachate LT-901 samples with historical values for this location as reported on Figure 11-11 in the Draft Final Remedial Investigation Report, E.C. Jordan Co., 1990. The text has been modified to address this comment.

15. Page 2-32, Paragraph 1. Table 2-4 has been revised to include the depths of the samples and the type of material sampled.

16. Page 3-1, Paragraph 1. Based on results of the borings B-911, B-912, and B-913, the depth of the ash is known to extend to 16 feet bgs. The vertical extent is based upon these three borings, while the lateral extent is based upon 33 TerraProbe borings. The sentence containing ", with less certainty," has been revised for clarity.

17. Page 3-2, Sentence 1. MW-916 is upgradient of Site 9 and was therefore used to represent site-specific background conditions, in accordance with USEPA guidance documents. Background levels represent both naturally occurring and anthropogenic concentrations not related to site-specific activities. For example, widespread PAH or lead levels due to non-point source automobile or airplane traffic are considered to be background with respect to an individual site. As a result of this comment, the report has been revised to include comparisons to both site-specific and base-wide background data. Also, see response to General Comment 1.

18. Page 3-2, Paragraph 2. This paragraph has been revised to state that the septic system is not a current source of VOC contamination to the area east of Building 201.

19. Page 3-2, Paragraph 2. The text has been revised to address the exceedances of the vinyl chloride MCL. However, it is again noted that MCLs are not considered to be ARARs because the stream is not used for potable water.

20. Page 3-3, Paragraph 2. The text has been expanded to summarize the contaminants found in the seep samples.

21. Section 4.0. The summary of ecological risks associated with LT-901 is presented in Section 5.

22. Page 4-3, Paragraph 1. The risk calculated for exposure to the maximum concentration is $1.4x10^{-4}$, not $1.4x10^{-5}$, as originally presented in the document. The typographical error has been corrected.

23. Page 4-4, last paragraph. The phenomenon of the average concentration of a contaminant being mathematically higher than its maximum detected concentration is due to the use of ½ the CRQL/CRDL for non-detects. In many instances, the CLP laboratories detect contaminants at concentrations below ½ the CRQL/CRDL, occasionally this results in the paradox of detected concentrations being lower than undetected concentrations.

24. Page 4-5, Paragraph 1. The text has been corrected to indicate that the 200 μg/L concentration for manganese is the MCLG, rather than the proposed MCL. The wording has been clarified.

25. Page 5-2, Paragraph 1. A discussion on the low level vinyl chloride detections has been added.

26. Page 5-2, Paragraph 2. The text has been clarified to indicate that only ecological risks for terrestrial organisms were evaluated for exposure to seeps.

27. Page 5-4, Paragraph 1, Sentence 1. This statement has been clarified.

28. Page 5-4, Paragraph 1, Sentence 2. The text has been revised to include leachate and leachate sediment sampling as a component of a long-term monitoring program.

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN R. McKERNAN, JR.
GOVERNOR

DEAN C. MARRIOTT
COMMISSIONER

DEBRAH RICHARD
DEPUTY COMMISSIONER

August 6, 1993

Mr. James Shafer
Project Manager, Code 1821
Department of the Navy, Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mailstop 82
Lester, Penn. 19112-2090

Dear Jim:

The Maine Department of Environmental Protection has received and reviewed the "Draft Technical Memorandum Site 9 Neptune Drive Disposal Site", dated June 1993, Naval Air Station Brunswick, Brunswick, Maine. The Department's comments are provided below.

At this time the Department does not support the Navy's recommendation for no remedial action and continued groundwater monitoring, both north and south of Neptune Drive, at Site 9. Perhaps after the Navy responds to our comments, the Department will be able to support the no action recommendation.

General Comments
1. Background Locations
Background location maps and data results should be included in the Technical Memorandum Report. It was very time consuming to track down background numbers and locations. The Technical Memorandum references E.C. Jordan Co., 1990a, Volume 3, Appendix K, for the inorganic background numbers and locations. Appendix K contains all of the laboratory results for that investigation. It does not provide locations for the samples. It does not indicate which background samples were used to establish background concentrations. The background samples used to establish the background concentrations were found in the unreferenced Draft Swampy Road and Merriconeag Extension SI. The locations of the background samples were found in another unreferenced report.

It appears that two soil samples from MW-903 were used to establish background concentrations. Please explain why these two soil samples were chosen. MW-903's location, adjacent to LT-901, doesn't seem like an appropriate background sampling location.

AUGUSTA
STATE HOUSE STATION 17
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826
OFFICE LOCATED AT RAY BUILDING HOSPITAL STREET

PORTLAND
312 CANCO ROAD
PORTLAND ME 04103
(207) 879-6300 FAX: (207) 879-6303

BANGOR
106 HOGAN ROAD
BANGOR, ME 04401
(207) 941-4570 FAX: (207) 941-4584

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, ME 04769
(207) 764-0477 FAX: (207) 764-1507

printed on recycled paper

Please explain why MW-916 was chosen as a background location. MW-916 is located approximately 20 feet from T-21 which has observed ash material below the water table. The hydraulic gradient in this area is very small, approximately 0.0022 ft/ft. It is possible that groundwater samples collected from MW-916 have been impacted from the landfill materials and is not representative of background concentrations.

2. The Department does not believe that groundwater flow directions can be determined from the few groundwater elevation measurements taken to date. Groundwater elevations were measured during periods of high water. Why weren't water level measurements taken for MW-901, MW-902, and MW-903? The possible influences of the drain on the shallow groundwater flow has not been discussed. Please submit a revised groundwater flow map.

3. Only three soil samples were analyzed from within the landfill. There are no TCLP results for the landfill material. A TCLP test should be performed for the landfill material.

4. No groundwater has been analyzed from within the landfill.

5. It has not been determined if the pesticides and VOCs found in LT-901 are from past disposal practices at the ash landfill.

6. It has not been determined if the VOCs found south of Neptune Drive have a source north of Neptune Drive.

Specific Comments

8. Page 2-9, first paragraph
Several of the results reported in the E.C. Jordan 1990 Report are above the AWQC. When determining compliance with AWQC, the Department uses the most stringent concentration listed for any given chemical. It is not clear if ABB-ES is using the same method for determining compliance with AWQC.

9. Page 2-9, second paragraph
No hydrogeologic data has been presented in this Technical Memorandum or in the E.C. Jordan Report to demonstrate that SW-915 is upstream of the contaminant plume associated with Site 9. Figure 11-3 of the E.C. Jordan Report suggests that contaminants flowing from Site 9 could discharge to the southern unnamed stream in the vicinity of SW-915.

The AWQC appear to be improperly applied to the surface water results in the Picnic Area Pond. Surface water associated with the Picnic Area Pond exceeds the AWQC for

iron and manganese. The Picnic Area Pond is located approximately 2500 feet from the seep location. The Department does not consider down stream concentrations when determining impacts from the seep. It is not clear why the Technical Memorandum includes the Picnic Area Pond in the inorganics discussion. The Picnic Area Pond is referenced in the text, but its location is not shown on a site plan.

10. page 2-10, first paragraph
What is the upstream sample taken at the culvert outfall? Is it SW-915? When referencing specific information from past reports, references must provide page numbers, figure numbers, and other important reference notes.

11. Page 2-10, second paragraph
Strike the statement that states that no site-related inorganic contamination was present in MW-901, MW-902, and MW-903. Considering that these wells are located downgradient from an ash disposal landfill, all metals found downgradient should be considered site related, especially those found above background concentrations.

12. Page 2-11
The MEG for vinyl chloride is below the detection limit, however, this level is applicable.

13. Section 2.2.1.2 Ash Disposal Area
The ash disposal area is classified under Maine's Solid Waste Management Regulations as an unlicensed special waste landfill. Please change all references from an ash disposal area to an ash landfill.

14. Samples should be collected from the ash and analyzed for TCLP. Additionally, groundwater samples from within the ash should be collected to determine the effectiveness of the existing monitoring well network.

15. Page 2-17, second paragraph
Please clarify haw many samples were collected from each boring and how many samples were analyzed.

16. Page 2-21, Table 2-4
PAH results for SD-901/DUP are reversed. SD-901 is 10848J and DUP is 8345J.

The text on page 2-5 states that 0.5 mg/kg is the site background concentration for pesticides in soil. The text should expand on the pesticide results from SD-901.

17. Page 2-24, Table 2-6
Table 2-4 reports Total PAHs for soil, Table 2-6 reports individual PAHs for groundwater. Either both should show

total PAHs or both should show individual PAHs. It appears that LT-901 PAH concentrations should be corrected.

Please provide TerraProbe investigation logs indicating intervals sampled and recovery quality. From on-site observation samples were collected at intervals 8-9' and 12-13'. The text indicates that continuous samples were collected.

18. Page 2-32
How was the black organic material found in the cesspool borings different from the organic material found in MW-914 and MW-915?

19. Section 3.0 Summary of Contamination Assessment
Page 3-1, first paragraph
It has not been determined whether the ash extends beneath Building 219.

The source of the VOCs found east of building 201 is not known . What is the meaning of a continuing source, as written in "Sporadic low levels (below CRQL) of 1,1,-DCA and vinyl chloride are not indicative of a continuing source of VOCs." What are sporadic low levels indicative of?

20. Section 4.0 Summary of Site Risks
Page 4-2, 4-3
Maximum values must be used to assess risk. Please include the State of Maine's Incremental Lifetime Cancer Risk Guideline of 1 x 10-5 in the carcinogenic risk discussion.

21. Page 4-5, first paragraph
The text should include a discussion about the elevated manganese levels.

22. page 5-2, first paragraph
The ash dump has not been fully characterized. It has not been determined if the ash extends beneath building 219. No TCLP analysis has been conducted from within the ash. No groundwater samples have been collected from within the ash. It is possible that the landfill may have been a dumping ground for cleaning solvents used at the incinerator.

One TerraProbe location, T-29, was sampled west of Building 218? Are you confident that one TerraProbe sample is enough to verify the ash does not extend to the west of Building 218?

23. The Department recommends that groundwater be sampled from within the more permeable soils in the location of the former drain.

24. Page 5-2, last sentence
Iron, aluminum, and zinc are naturally occurring elements, however, the concentrations detected do not represent background concentrations.

Please call me if you have any questions or comments.

Sincerely,

Nancy Beardsley

Nancy Beardsley
Project Manager, Federal Facilities Unit
Office of the Commissioner

cc: Meghan Cassidy, USEPA
Jim Caruthers, NAS Brunswick
Carolyn Lepage, R.G. Gerber Inc.
Bob McGirr, ABB ES
Rene Bernier, Topsham
Sam Butcher, Harpswell
Susan Weddle, Brunswick
Brunswick Topsham Water District
Mark Hyland, DEP
Marianne Hubert, DEP
Troy Smith, DEP

RESPONSE TO MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMENTS DATED AUGUST 6, 1993

GENERAL COMMENTS

1. General. New calculations of background concentrations of inorganics in soils and in groundwater have been determined for NAS Brunswick, and these have been used for comparative purposes for the Site 9 results. This table includes boring numbers and locations that allow for easier references.

   MW-916 is used as a site-specific background location, especially relative to MW-914 and MW-915, because it is in a hydraulically upgradient location from these wells. MW-916 is considered reasonable as a site-specific background location for all Site 9 wells. As a result of this and other comments, information on both background concentrations for NAS Brunswick and Site 9-specific background has been generated and incorporated into the revised document.

   The Navy disagrees that a hydraulic gradient of 0.0022 ft/ft is "very small" as the comment states. In fact, this gradient is fairly typical of locations in the eastern U.S. and is considered to be significant enough so as to easily establish groundwater flow direction.

2. General. An updated groundwater flow map incorporating data from all wells at Site 9 has been included in the revised document. Although the number of data values is not ideal, the interpreted groundwater flow direction is consistent with that inferred on a larger scale.

3. General. Although TCLP can give an indication of the potential for the ash to leach toxic constituents, its intended use is to determine waste handling and disposal requirements (i.e. land ban). The Navy did not perform TCLP during these preliminary investigations because the waste is not being excavated for disposal. Additionally, actual groundwater samples collected immediately adjacent to the ash landfill give a "real life" indication of the extent to which groundwater quality is being impacted by leaching of the ash. The need for TCLP data has not been established.

   The rationale for placing wells immediately adjacent to, instead of directly within, the ash landfill was that the ash has been at its present location for at least 40 years. If the ash were affecting groundwater quality, it would be impact samples collected immediately adjacent to the ash. While a water sample collected from the saturated portion of the ash would indeed be a

"worst case" sample, the Navy does not believe that it would in any way be representative of actual groundwater quality, particularly if it is an unfiltered sample. Instead, the wells adjacent to the disposal area provide samples that accurately portray the extent of impact the ash is having on groundwater. The adjacent wells are approximately within 10 feet downgradient of the ash and accurately characterize impacts to the groundwater quality.

4. General. Please see the response to MEDEP Comment No. 3.

5. General. The Navy agrees that the source of trace (i.e., less than 2 $\mu g/kg$) levels of pesticides in leachate sample LT-901 is undetermined. Such extremely low levels are likely the result of historic use of these pesticides on the Station. The lack of pesticides in groundwater samples collected between the ash landfill and LT-901 suggest that the ash is not the source. Given the low levels at which the pesticides were detected (only about 25% of the target soil cleanup level for Building 95 remediation), the lack of a clearly defined "source", which may not even exist in the traditional sense, is not considered to be a data gap of concern.

6. General. Comment noted. The Navy agrees that there is still no identified source of the sporadic, low levels of VOCs in groundwater south of Neptune Drive.

SPECIFIC COMMENTS

7. The MEDEP comment letter jumped from comment 6 to comment 8.

8. Page 2-9, Paragraph 1. The regulatory standards and regulations against which analytical data are compared are those which are considered to be appropriate, given the actual exposures. In the northern and southern unnamed streams, because the water is not used for potable purposes, both MCLs and AWQC for protection of human health are not ARARs, and are therefore not considered except to provide reference framework within which the observed values may be evaluated. The AWQC For Protection of Freshwater Aquatic Life are considered, however, as relevant standards. As the text already notes, the iron chronic AWQC For Protection of Freshwater Aquatic Life is exceeded in both upstream and downstream surface water samples.

9. Page 2-9, Paragraph 2. The Navy disagrees that a definable "contaminant plume" exists at Site 9, on the basis of data currently available. Our interpretation of groundwater elevation data is that SW-915 is upgradient or

cross-gradient of any groundwater contamination that may be associated with Site 9.

Water from the Picnic Area Pond, as well as water from the unnamed streams, is not used for potable purposes; therefore, comparison of water quality data to standards established for protection of human health is not appropriate. The water quality data has been compared to the AWQC for protection of freshwater aquatic life, however, and it was noted that the iron AWQC is exceeded upstream, but not in the Picnic Area Pond. This information was presented to help in the interpretation of both upstream and downstream water quality information.

10. Page 2-10, Paragraph 1. The upstream sample location is SW-915/SD-915 location. Referenced material from past reports have been more clearly identified.

11. Page 2-10, Paragraph 2. A table relating NAS Brunswick background and Site 9 background inorganic data has been included in the revised document. We disagree with the MEDEP statement that all metals should be considered site-related. **Only** those metals present at concentrations above background levels (defined as both naturally occurring and non-site-related anthropogenic concentrations) should be evaluated as site-related contaminants of concern.

12. Page 2-11. The MEG, as well as the MCLs, are not "applicable" because there is no current human exposure to these waters as a result of institutional controls.

13. Section 2.2.1.2 Ash Disposal Area. The terminology in this document has been changed from "ash disposal area" to "inactive ash landfill".

14. Please see response to MEDEP Comment No. 3.

15. Page 2-17, Paragraph 2. The text has been modified to better define how many samples were collected for analysis from each of the borings.

16. Page 2-21, Table 2-4. A correction has been made based on this comment.

    The referenced subsection of the document is 2.1.2 "Surface and Subsurface Soils"; therefore, a discussion of leachate sediment sample SD-901 is not appropriate here. SD-901 is already discussed in Subsection 2.1.3 "Leachate Seep and Sediment".

17. Page 2-24, Table 2-6. To be consistent with how data is reported in Table 2-4, Table 2-6 has been changed to show total PAHs. Also, PAH data for LT-901 has been corrected.

The text has been clarified to distinguish between conventional borings installed with a drill rig and identified as "B-###" on figures versus borings installed with the Terraprobe system and identified as "T-##" on figures. As stated in the text, samples obtained (for observation only) during the TerraProbe survey were collected at depths from 8 to 13 feet bgs.

Copies of the field notes taken during the TerraProbe survey are included in Appendix A.

18. Page 2-32. The black organic material found in the cesspool borings is typical of the black "halo" surrounding an effluent disposal system. As is the case with this system, leaching systems typically are backfilled during construction with clean, well-sorted, sandy soils. The organic halo in a leaching system extends outward for several feet from the cesspool, leaching pipes, etc., into these surrounding sands. The black halo, consisting of decomposed organic material from the waste stream and remains of organisms that thrive in this environment, decreases with distance away from the system due to filtering. The pore spaces are filled, and the individual sand grains of the filter material are coated with this black organic mat. However, the texture of the filter material does not appreciably change.

The organic soils found in the borings for MW-914 and MW-915 are depositional in nature, are natural, and are not a product of a filtering process as described above. Along with a silty, micaceous texture and a bog-like odor, reeds and plant fibers were clearly observed in these borings. The organic material found in these borings is very different from the cesspool material.

19. Section 3.0 Summary of Contamination Assessment. The sentence has been revised to indicate the uncertainty regarding the presence of ash under Building 219.

The detections of vinyl chloride, for example, display no temporal or spatial consistency (see table below). The highest concentration of vinyl chloride observed in five wells south of Neptune Drive was 31J μg/L in well MW-904 in November 1990. However, the sampling events both immediately before and after the November 1990 sampling event were both non-detect for vinyl chloride. Other wells in this area display similar patterns, except possibly for MW-907 which has only been sampled twice and has had vinyl chloride detections of 18 μg/L and 9J μg/L. The lack of consistent detections of vinyl chloride, or other VOCs, is interpreted as indicating that no steady source of

vinyl chloride, or of parent compounds, exists at a high enough source strength to result in reproducible detections in downgradient wells over a period of time. Instead, the observed detections are more representative of small sources of contaminants that occasionally impact groundwater. For example, a small volume of contaminated soils may periodically impact groundwater as the water table rises, or when percolating rainwater transports contaminants downward to the groundwater, which then transports it downgradient. Such low-level, intermittent "sources" are obviously almost impossible to locate.

VINYL CHLORIDE ($\mu g/L$)

DATE	MW-903	MW-904	MW-906	MW-907	MW-908
SEP-88	-	12	NA	NA	NA
DEC-88	-	27	NA	NA	NA
MAR-89	-	-	NA	NA	NA
OCT-89	-	-	-	18	-
NOV-90	NA	NA	31	NA	NA
FEB-93	NA	8J	-	9J	-/2J

The text has been revised to clarify this information.

20. Section 4.0 Summary of Site Risks, Pages 4-2, 4-3. Risks associated with both average and maximum contaminant concentrations are reported. The Maine Incremental Lifetime Cancer Risk Guideline of 10^{-5} has been referenced.

21. Page 4-5, Paragraph 1. A discussion on the elevated manganese concentrations observed in MW-907 has been added to the text.

22. Page 5-2, Paragraph 1. The text has been revised to reflect the uncertainty regarding the existence of ash under Building 219.

    It has been reported in the *Initial Assessment Study* (R.F. Weston, 1983) that the ash disposal area and possibly the area behind Building 201 may have been used as dumping grounds for solvents and other substances, as the comment notes. Although the detections of organic compounds are sporadic, MW-903 (sampled 4 times) and MW-908 (sampled twice), which are downgradient of the ash (see Figure 2-4) but upgradient or cross-gradient of the area behind Building 201, have been essentially free of solvents.

    Monitoring wells MW-904, MW-906, and MW-907, all of which are downgradient of the area behind Building 201, have had at least one VC detection during the two to five sampling events at each well. On the basis of the groundwater analytical data, it is concluded that the ash landfill is not a **current** source of solvents of any magnitude. It is not possible to absolutely

establish the extent to which solvents were **originally** disposed in the ash landfill.

Based upon the outline of the dump according to a 1952 grading plan of the area (see Figure 2-4), the distribution of the ash as determined during the TerraProbe survey in the vicinity of Building 218, and the apparent linear feature of the southwestern edge of the ash material, it was concluded that the dump most likely does not extend to the west of Building 218. Only one boring, T-14, identified ash immediately **east** of Building 218; borings T-12 and T-18, located about 25 to 35 feet south and north of T-14, respectively, did not detect ash. Two Terraprobe borings, T-29 and T-30, installed west of the building did not detect ash. While one may speculate almost anything, the narrowness of the ash detections east of Building 218, the lack of detections west of the building, and the linearity of the feature, the most plausible interpretation is that the ash does not exist west of the building.

Please refer to the response to MEDEP general comment 3 for a discussion of TCLP analyses.

23. The assumption that the soils in the location of the former drain are more permeable may not be true; these soils may not be more permeable. Also, the elevation of the former drain is not known and may have been above the water table.

The locations of MW-914 and MW-915 are such that groundwater that may be moving from the ash towards the location of the former drain area is sampled by these wells. The Navy feels that MW-914 and MW-915 are placed within the drainage channel of the former stream. The stream drained this area prior to the barracks being constructed. It was the area of the stream banking and the channel that reportedly received the burned ash from the former incinerator.

24. Page 5-2, last sentence. This subsection has been revised to address site-related inorganics concentrations relative to background levels.

ROBERT G.
GERBER, INC.
Consulting Geotechnical Engineers and Geologists
17 West Street • Freeport, Maine • 04032-1133 207-865-6138

Post-it™ brand fax transmittal memo 7671	# of pages ▸
To: BOB MCGILL	From: JIM SHAFER
Co.	Co.
Dept.	Phone #
Fax # 207 772 4762	Fax #

August 10, 1993
File #965

Ms. Loukie Lofchie
Brunswick Area Citizens for a Safe Environment
P. O. Box 245
Brunswick, ME 04011

Subject: Review of "Draft Technical Memorandum, Site 9, Neptune Drive Disposal Site", Naval Air Station Brunswick, Brunswick, Maine, June 1993.

Dear Ms. Lofchie:

As requested by the Brunswick Area Citizens for a Safe Environment (BACSE), Robert G. Gerber, Inc., has reviewed the "Draft Technical Memorandum, Site 9, Neptune Drive Disposal Site" for Naval Air Station Brunswick, Brunswick, Maine, dated June 1993. The document was prepared by ABB Environmental Services, Inc., (ABB) for the U. S. Department of the Navy for the Naval Air Station Brunswick (NAS Brunswick) located in Brunswick, Maine. The subject document is intended to summarize site investigation activities and make recommendations for future actions at the Neptune Drive Disposal Site.

Site 9, also known as the Neptune Drive Disposal Site, is located in the central portion of NAS Brunswick. The site initially included three areas of potential contamination: a former incinerator location and ash disposal area; an area reportedly used for burning and disposal of solvents; and two streams exhibiting iron-staining characteristic of leachate. Results of earlier environmental investigations were reported in the August 1990 Draft Final Remedial Investigation (RI) and the April 1991 Draft Final Supplemental RI reports prepared by E. C. Jordan. The June 1993 subject document presents a summary of investigations and analysis conducted through 1993, and recommendations for future activities at the site.

The subject document was discussed during a conference call on July 27, 1993, by representatives of the Navy, ABB, U.S. Environmental Protection Agency, Maine Department of Environmental Protection, and BACSE. The Navy had initiated the conference call to gage the response by the regulatory agencies and BACSE to the results and recommendations

presented in the Technical Memorandum. The Navy had hoped to initiate action at Site 9 prior to receiving written comments on the document. However, based on concerns expressed during the call, including the need to identify the source or sources of the volatile organic compounds (VOCs) detected in groundwater at the site, the Navy decided to withhold further action until written comments were received.

Based on our earlier conversation with Susan Weddle the risk assessment portion of the subject document was reviewed by SafeTech Consultants, Inc., while we focussed our review on the remaining sections of the Technical Memorandum. We are enclosing SafeTech Consultant's comments. Our comments on the subject document are as follows:

1. **Page 1-1.** What do the aerial photographs reveal about changes in topography and drainage and their potential affects on disposal locations and contaminant migration during the evolution of Site 9? Have all available historical aerial photographs been evaluated to determine likely and potential disposal areas and changes in activities at Site 9 during the past half century?

2. **Page 1-1.** The first of the three areas of potential contamination listed in the second paragraph is described as an incinerator and an ash disposal area in the vicinity of Buildings 218, 219, and 220. The description of the disposal site activities on page 11-1 of the August 1990 Draft Final RI report mentions that, in addition to incineration of wastes and subsequent dumping of ash, solvents and other liquids were burned on the ground, and direct disposal of an unknown quantity of solid waste also occurred. The wastes reportedly included solvents, paint sludges and possibly metal shop wastes. During the July 27 conference call, the point was made that VOCs would not be expected to occur in the ash remaining after incineration. However, the description of the waste disposal activities outlined in the August 1990 RI report indicate that unburned solvents and other potential contaminants were likely to have been disposed in the vicinity of the incinerator and ash landfill. These unburned wastes may be a source of the VOCs detected in the groundwater at Site 9.

3. **Page 1-3.** Figure 2-3 (page 2-10) in the August 1990 RI report shows a brook flowing southeasterly approximately 200 feet from the incinerator. On page 11-21 of the same RI report, the "northern" tributary at Site 9 is described as appearing "to be the original channel of a brook that crossed the old dump and was backfilled to accommodate construction of the barracks". On page 1-3 of the subject document, a 42-inch drain is described as running north from Orion Street, past the dump area, under Neptune Drive to a stream. The drain was apparently removed and filled in during the construction of the barracks. However, the trace of the brook shown on Figure 2-3 of the August 1990 RI report and the trend of the former drain shown on Figure 1-2 of the subject document do not appear to coincide. The Navy should evaluate the former brook location and its potential impact on contaminant migration. In addition, the Navy should clarify the initial flow direction of the "northern tributary". On Figure 1-2 of the subject document, the tributary appears to originate almost on line with the end of the former drain. However, several figures in the August 1990 RI report (Figure 11-1 for example) indicate the

tributary enters the drainageway from the northeastern side, approximately 100 feet to the southeast from its origin shown in the subject document. Which location is correct, and how does the correct location relate to the former brook and the former drain?

4. Pages 2-2, 2-30, and 2-31. Because of the apparent shallow gradients at Site 9, additional data are needed to determine more precisely the direction of groundwater flow, the relationship of groundwater to streamflow in the two unnamed tributaries, and seasonal variations of the hydrologic system. In addition, investigators need to define the flow regime in each of the three shallow stratigraphic units at the site (the sand layer, the transition layer, and the clay layer overlying bedrock).

5. Page 2-3. The groundwater flow direction graphically depicted in Figure 2-1 appears to indicate water quality in MW-907 may be affected by a possible source located northwesterly from Building 201. How has the Navy evaluated potential sources in this area?

6. Pages 2-9, 2-20, and 2-23. It is preferable to determine background concentrations on a site-specific basis, rather than use the base-wide background concentrations established during previous remedial investigation (RI) studies. The base-wide background concentrations of inorganic constituents in sandy lithologies were based on samples collected at only four locations (see pages 5-12 through 5-15 in the August 1990 Draft Final RI Report by E. C. Jordan). One of these background samples was collected from MW-908, which is located adjacent to the Building 201 septic system and downgradient from the Site 9 incinerator ash landfill. It would appear that MW-908 does not meet the criteria that a background sample be collected in an area upgradiant of, and unaffected by, a facility, disposal area, or other source. In addition, base-wide background concentrations for clay soils are based on samples collected at seven locations, one of which is MW-905. Monitoring well MW-905 is located down-gradient of VOC detections and in an area where surface debris was reported.

7. Page 2-12. While Table 2-1 lists the results of the cone penetrometer (CP)sampling conducted in April 1991, there is no description of the method or results in the text (pages 2-10 through 2-13). It should be noted that the samples collected at the 1991 CP locations, including the southernmost locations intended to determine the limit of the VOC plume (CP-151, CP-152, and CP-153) were not tested for vinyl chloride, one of the contaminants of concern at Site 9. Therefore, the CP results may not provide sufficient information to delineate the extent of groundwater contamination.

8. Page 2-16. Given the apparent flat groundwater gradient at Site 9, unknown seasonal variations in the groundwater flow regime, and with its location relatively close to the ash/landfill material, MW-916 may not be an appropriate background water quality location.

9. Pages 2-16 and 2-17. Are monitoring wells MW-914 and MW-915 located in the former stream channel (see comment 3 above)? How do their locations compare with the brook location

shown on older plans or maps or historical aerial photographs? How does the former stream location affect groundwater flow and contaminant migration, as well as the water level and quality information collected at MW-914 and MW-915?

10. Pages 2-18, 3-1, and 5-2. The outline indicating the observed extent of ash/landfill material, as shown on Figure 2-4, should not include portions of Buildings 218 and 219, as there are no direct observations of the material beneath either building. In addition, it is incorrect to state at this time that the ash is located in a trench beneath Building 219 (see page 3-1) or that the ash is located beneath an existing barracks (see page 5-2). As was discussed at the latest Technical Review Committee meeting and during the July 27th conference call, the Navy should conduct additional investigations to determine the extent and nature of any ash or landfill material underlying Buildings 218 and 219. The area of former incinerator intersecting the footprint of Building 220 should also be investigated.

11. Pages 2-28, 2-29, and 3-3. What is the significance of the 1,1-DCA and other constituents detected in sample SD-901? Does the old drain act as a conduit for contaminants?

12. Pages 2-33 and 2-34. Did the appropriate blanks indicate that acetone, 2-butanone, toluene, and bis(2-ethylhexyl)phthalate were likely to be laboratory contaminants in the samples collected at Site 9?

13. Page 3-1. If the sporadic low levels of 1,1-DCA and vinyl chloride are not indicative of a continuing source of VOCs, what do the concentrations indicate? What is the basis for concluding there is no continuing source of VOCs?

14. Pages 5-1 - 5-4. While we agree with the proposed on-going monitoring of groundwater quality in the existing wells at Site 9, we cannot agree that there is no continuing source of VOCs at the site based on currently available information. The sporadic occurrence of VOCs in groundwater samples indicates there may be more than one source. Additional investigations should be conducted, both north and south of Neptune Drive, to respond to the questions and comments outlined above and to identify the source or sources. Once the source(s) is (are) identified, additional remedial actions should be evaluated.

15. General comment. Will remedial actions involving pumping of the Eastern Plume have an effect on groundwater conditions at Site 9?

16. General Comment. We were unable to find any description of the evaluation of radioactive hazards at the site. Please provide specific information concerning how radioactive hazards were evaluated. At a minimum, monitoring for radioactive hazards should be part of the Site Safety Plan to protect site workers' health and safety. If the radioactive hazards have

shown on older plans or maps or historical aerial photographs? How does the former stream location affect groundwater flow and contaminant migration, as well as the water level and quality information collected at MW-914 and MW-915?

10. Pages 2-18, 3-1, and 5-2. The outline indicating the observed extent of ash/landfill material, as shown on Figure 2-4, should not include portions of Buildings 218 and 219, as there are no direct observations of the material beneath either building. In addition, it is incorrect to state at this time that the ash is located in a trench beneath Building 219 (see page 3-1) or that the ash is located beneath an existing barracks (see page 5-2). As was discussed at the latest Technical Review Committee meeting and during the July 27th conference call, the Navy should conduct additional investigations to determine the extent and nature of any ash or landfill material underlying Buildings 218 and 219. The area of former incinerator intersecting the footprint of Building 220 should also be investigated.

11. Pages 2-28, 2-29, and 3-3. What is the significance of the 1,1-DCA and other constituents detected in sample SD-9017 Does the old drain act as a conduit for contaminants?

12. Pages 2-33 and 2-34. Did the appropriate blanks indicate that acetone, 2-butanone, toluene, and bis(2-ethylhexyl)phthalate were likely to be laboratory contaminants in the samples collected at Site 9?

13. Page 3-1. If the sporadic low levels of 1,1-DCA and vinyl chloride are not indicative of a continuing source of VOCs, what do the concentrations indicate? What is the basis for concluding there is no continuing source of VOCs?

14. Pages 5-1 - 5-4. While we agree with the proposed on-going monitoring of groundwater quality in the existing wells at Site 9, we cannot agree that there is no continuing source of VOCs at the site based on currently available information. The sporadic occurrence of VOCs in groundwater samples indicates there may be more than one source. Additional investigations should be conducted, both north and south of Neptune Drive, to respond to the questions and comments outlined above and to identify the source or sources. Once the source(s) is (are) identified, additional remedial actions should be evaluated.

15. General comment. Will remedial actions involving pumping of the Eastern Plume have an effect on groundwater conditions at Site 9?

16. General Comment. We were unable to find any description of the evaluation of radioactive hazards at the site. Please provide specific information concerning how radioactive hazards were evaluated. At a minimum, monitoring for radioactive hazards should be part of the Site Safety Plan to protect site workers' health and safety. If the radioactive hazards have

not been evaluated, they should be before any additional work is conducted, and the monitoring methods and results should be communicated to the members of the Technical Review Committee.

Please do not hesitate to give us a call if you have any questions on the comments above.

Sincerely,
Robert G. Gerber, Inc.

Carolyn A. Lepage

STATE OF MAINE
CAROLYN A. LEPAGE
#202
CERTIFIED GEOLOGIST

Carolyn A. Lepage, C.G.
Director of Operations

Andrews L. Tolman, C.G.
Chief Hydrogeologist

Enc.

RESPONSE TO BRUNSWICK AREA CITIZENS FOR A SAFE ENVIRONMENT COMMENTS BY R.G. GERBER DATED AUGUST 10, 1993

1. Page 1-1. Available air photographs of NAS Brunswick include a 1940 air photograph that includes the Site 9 area. This photograph was taken prior to any construction activities near the site. The area of Site 9 is wooded and natural and the channels of the northern and southern unnamed tributaries are apparent. Subsequent air photograph coverage begins with a 1959 photograph which shows the barracks north of Neptune Drive and Building 201 south of Neptune Drive as having been built. Other photographs of the area were taken in 1965, 1966, 1972, 1978, and 1980. These photographs do not show obvious indications of dumping, etc., in the Site 9 area.

   Plans titled "General Layout-Section 4" dated in 1952 are details of proposed plans for the construction of barracks and mess facilities. The area detailed on these plans is shown prior to barracks construction and covers the area north of Neptune Drive. Contour intervals are shown along with the location of a small building at the northeast corner of planned Building 220 (the incinerator) and an outline of a "dump" located under what later becomes Building 219. The outline of this dump is mostly along the northeast side of a natural drainage gully and extends slightly to the opposite side of the gully. Contour intervals between 48 and 54 (assumed to be feet MSL) stop at the edges of the dump. The dump measures as much as 120' long by 80' feet wide. Also shown is the location of a drain labelled "EXISTING 42" DRAIN TO BE REMOVED" running along the west side of the gully. This drain terminates at a "BROOK" which is the present location of LT-901 and the current beginning of the so-called northern tributary. These features have been included on Figure 2-4.

   The locations of MW-916, MW-914, and MW-915 and LT-901 are so placed so that the upgradient and downgradient conditions of the dump area are monitored by these sampling locations. Additional downgradient conditions are also monitored by MW-901, MW-902, and MW-903.

2. Page 1-1. The analytical results from the three samples of ash collected from the ash landfill do not indicate the presence of solvents. No solvents were detected in MW-914. Vinyl chloride was detected approximately at the CRQL of 10 ppb, and 1,1-DCA was reported at 1 ppb, in monitoring well 915. These data suggest that, at most, the ash landfill contains sporadic, low levels of solvent contamination. The Navy feels that continued monitoring of the existing wells between the ash landfill and Neptune Drive is appropriate to

obtain better definition of the impact, if any, the ash landfill is having on groundwater.

3. Page 1-3. Please see response to comment 1 above.

   Several figures in the 1990 RI report erroneously depict the northernmost tributary as entering the drainageway from the northeastern side, approximately 100 feet to the southeast from the origin as shown in the "Draft Technical Memorandum, Site 9, Neptune Drive Disposal Site". This drainageway does exist; however, it is the outfall of a catchbasin that collects rainwater from Neptune Drive and the parking lots located east of the barracks and is not perennial. The location of the drainageway as shown in this document is correct.

4. Pages 2-2, 2-30, and 2-31. The Navy disagrees that groundwater hydraulic gradients are so low as to impact the accuracy of interpreted groundwater flow direction. The seasonal variation of groundwater levels has been previously evaluated as part of the January 1993 numerical modeling report. As shown in that document, water levels obtained in Summer 1992 compared with Fall 1990 indicate similar flow directions and hydraulic gradients. The summer months typically represent seasonal low groundwater levels with the Fall season representing high groundwater levels (Caswell, 1978; *Ground Water Handbook for the State of Maine*).

5. Page 2-3. The area northwest of Building 201 has not been evaluated because nothing in this area has been identified as a possible source.

6. Pages 2-9, 2-20, and 2-23. Please see previous responses that address background inorganics. These calculations have been revised to include more samples and delete samples, such as those from MW-908, which may have been impacted by site-specific contamination.

7. Page 2-12. Comment noted. The Navy agrees that the cone penetrometer data alone cannot be used to define groundwater contamination.

8. Page 2-16. The Navy disagrees that the groundwater gradients in this area are "flat" or that other uncertainties preclude the use of MW-916 as a background water quality location. Please refer to earlier responses that address site-specific and NAS Brunswick background levels of inorganic analytes.

9. Pages 2-16 and 2-17. According to grading plans dated in 1952 concerning new barracks construction, both of the monitoring wells MW-914 and MW-915 are located in the former stream channel (see revised Figure 2-4, page 2-18). Also, according to these plans, MW-915 is placed within the footprint of the

dump. Both the logs for MW-915 and TerraProbe location T-15 showed samples that appeared to contain asphalt pieces between 9 and 11 feet bgs, but ash was not found in either of these borings.

It is the Navy's opinion that the monitoring wells MW-914 and MW-915 effectively monitor the water conditions of the former dump area. These wells were placed to monitor downgradient water conditions of the dump. Based upon water level data, historic contour data, and inorganic water quality results, it is apparent that these wells effectively characterize impacts from the dump.

10. Pages 2-18, 3-1, and 5-2. Please see earlier responses that address the extent of the ash and the uncertainties associated with its delineation. At the present time, the Navy has no plans for and does not see the need of another invasive characterization of the extent of the ash.

11. Pages 2-28, 2-29, and 3-3. The presence of the constituents detected in SD-901 demonstrates only that these constituents are present at this location. However, concentrations of some constituents detected at SD-901 are also present at other upgradient locations and this may be due to groundwater being channeled along the old stream-bed. The VOC of 1,1 DCA, detected at 39/52 μg/kg in SD-901 and the duplicate sample, was detected at a concentration of 1J μg/L in the MW-915 water sample but is not present in the other upgradient sampling locations. PAHs detected at the SD-901 location are typical of basewide distribution of PAHs in sediments. The pesticides 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT detected in the LT-901 sample were also detected in generally higher concentrations in the upgradient borings for B-912 and B-913, but below concentrations previously determined at NAS Brunswick as representing background for surface soils. Also, the inorganics detected at SD-901 are also present in generally higher concentrations in the soil samples from the borings B-912 and B-913.

12. Pages 2-33 and 2-34. Acetone was detected in some method blank samples, and, as a result, acetone detections for several samples were rejected during the data validation process. Only VOC detections that survived the data validation process are reported in the text. The acetone and 2-butanone detections that did survive data validation were attributed to sampling or laboratory contamination because both compounds are very volatile (as indicated by their vapor pressures and Henry's Law Constants), because they are typical laboratory contaminants, and because they were observed in other method blanks analyzed during this same interval.

13. Page 3-1. Please see response to BACSE Comment No. 2.

14. Pages 5-1 - 5-4. The Navy disagrees that the data collected to date warrant such additional efforts and expense to the taxpayer. The lack of temporally and spatially reproducible VOC detections do not support the conjecture that one or more sources **of any significance** exist. A long-term monitoring program will establish that contaminants: 1) continue to be sporadic and at low levels; 2) are decreasing in concentration and frequency; or 3) are increasing in concentration and frequency. If the last possibility is observed, then enough data would hopefully exist such that investigations into a source area(s) would be more easily defined and productive. Otherwise, however, the need for additional investigations is not indicated.

15. General Comment. Numerical modeling simulations conducted as part of the January 1993 design modeling program do not indicate any influences to the Site 9 area associated with groundwater extraction at either the eastern plume or Site 1 and 3 landfill sites. Both particle tracking simulations and groundwater contour data do not indicate any hydraulic influences to Site 9 based on remedial actions at the above sites.

16. General Comment. Monitoring for radioactive hazards is a normal course of operations whenever invasive activities occur on site. Initial monitoring at sites includes the requirement of using a Radiation Monitor 4 instrument. This requirement is always incorporated in Site Safety Plans. The Monitor 4 senses the four main types of ionizing radiation (alpha, beta, gamma, and x-ray) by means of a Geiger-Mueller detector tube. Naturally occurring background radiation and other radiation sources are detected with this instrument. The level of radiation for gamma and x-rays is measured in milliRoentgens per hour (mR/hr). Alpha and beta radiation are measured in counts per minute (CPM).

While conducting work at Site 9, one of these instruments was used. Readings above background were not noted during the survey. As an example, a copy of a page from the field notes is included in Appendix A containing the field log for the boring B-914/MW-914.

SAFETECH CONSULTANTS INC. WORKPLACE SAFETY & HEALTH ■ REGULATORY COMPLIANCE ■ TOXIC EVALUATION ■ TRAINING ■ PROGRAM DEVELOPMENT

August 10, 1993

Carolyn Lepage
R. G. Gerber, Inc.
17 West Street
Freeport, ME 04032-1133

Dear Carolyn:

As requested by the Brunswick Area Citizens for a Safe Environment (BACSE), SafeTech Consultants, Inc., has reviewed the risk assessment section of the "Draft Technical Memorandum, Site 9, Neptune Drive Disposal Site" for Naval Air Station Brunswick (NAS Brunswick) located in Brunswick, Maine. It should be noted that SafeTech has not reviewed the remainder of this document except to clarify statements regarding the risk assessment in Section 4.

Our comments on the document are as follows:

1. **Page 4-4.** The discussion of the potential risk for exposure to groundwater states that the Hazard Index is 3.0 for the average concentration due to the presence of manganese, which exceeds the USEPA target of 1.0. No further mention of this is made except that there is no current risk since no one is exposed to groundwater (page 5-4). Has there been consideration of where the contaminated groundwater may travel ? Since the Hazard Index well exceeds the USEPA target, why is no action other than institutional controls and monitoring recommended?

2. **Page 4-5.** The incremental cancer risk from vinyl chloride is said to be at or slightly greater than the USEPA target range, yet no recommendations were made to further investigate the source after the septic system was eliminated as a point source. Vinyl chloride is a man-made chemical and is not found naturally in the environment. It may also be a degradation product, meaning the actual source may be other solvents. Once in the groundwater, it may remain for months or years in its original form. Point sources of the vinyl chloride need to be further investigated before a decision can be made as to the necessary remedial action.

3. **Page 4-6.** PAH levels averaging 59 mg/kg were found in the southern stream sediments, with the NAS Brunswick background sediment samples indicating a maximum of 21.9 mg/kg. Although we do not know if any feasible remedial action exists to address this contaminated sediment, it would seem reasonable to investigate further what action has been taken at other bases or sites with high levels of PAHs in sediment.

500 Southborough Drive ■ South Portland, Maine 04106 ■ (207) 773-6753 ■ FAX (207) 773-7044

4. **General comment.** We do not feel that there is sufficient data to arrive at the conclusion that no action is needed on Site 9. Sources of VOCs are not clear and assumptions should not be made without some further attempt to identify and therefore remediate point sources.

If I may be of any further assistance, please don't hesitate to give me a call.

Sincerely,

Deborah R. Roy, MPH, RN, COHN, CET
President, SafeTech Consultants, Inc.

SafeTech Consultants Inc.

RESPONSE TO BRUNSWICK AREA CITIZENS FOR A SAFE ENVIRONMENT COMMENTS BY SAFETECH CONSULTANTS, INC. DATED AUGUST 10, 1993

1. Page 4-4. As explained in Section 3.0 Summary of Contamination Assessment, analytical results from MW-909 and MW-910 indicate that contaminants are not migrating beneath the southern tributary. This is also supported by groundwater level measurements which show shallow groundwater discharging to the streams.

2. Page 4-5. No current source for vinyl chloride at the site has been found. To better characterize the nature of the contamination, it is recommended that a long-term monitoring program be implemented. The results of the long-term monitoring would provide information as to the extent of any residual source of contamination at the site.

3. Page 4-6. The long-term monitoring program will include surface water and sediment sampling to better characterize the extent of PAH contamination and its fate in the environment.

4. General Comment. The Navy is recommending no action at this time. The comment is correct in that there is insufficient information to support remedial action. As explained in response to comment #2 above, long-term monitoring will provide the necessary information to characterize the extent of any residual source of contamination.

APPENDIX E

REGULATORY/TECHNICAL REVIEW COMMITTEE COMMENTS ON DRAFT FINAL TECHNICAL MEMORANDUM AND NAVY RESPONSES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

October 27, 1993

Mr. Fred Evans
Department of the Navy
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mailstop 82
Lester, PA 19113-2090

Re: Draft Final Technical Memorandum
Site 9
Neptune Drive Disposal Area
September 1993

Dear Fred:

The United States Environmental Protection Agency (EPA) has reviewed the document entitled "Draft Final Technical Memorandum, Site 9, Neptune Drive Disposal Site" dated September 1993. EPA's comments can be found in Attachment I of this letter.

In this technical memorandum, the Navy recommends "natural attenuation with no further action other than institutional controls and groundwater monitoring" for both north and south of Neptune Drive.

However from the conference call held on Friday afternoon, October 22, 1993, and the site visit held on Tuesday morning, October 26, 1993, the Navy has proposed to monitor Site 9 through a different mechanism and to discontinue the future submission of a Proposed Plan and Record of Decision (ROD). It must be made clear though that the monitoring of Site 9 is considered a remedial action by EPA and the Navy must document this action through the formal remedy selection process.

According to the schedule accompanying the technical memorandum, the Navy has scheduled a ROD for Site 9 by the summer of 1994. In light of the situation, the EPA suggests that the Navy propose an Interim Action ROD which would be then be followed by a final ROD when a satisfactory groundwater database has been established.

PRINTED ON RECYCLED PAPER

Perhaps another conference call can be scheduled to discuss Site 9 further, but should you have any immediate questions regarding EPA's comments, please contact me at (617) 223-5521.

Sincerely,

Robert Lim

Robert Lim
Remedial Project Manager

cc. Meghan Cassidy/USEPA
Nancy Beardsley/ME DEP
Jim Caruthers/NASB
Susan Weddle/BASCE
Carolyn LePage/Gerber, Inc.
Sam Butcher/Harpswell Community Rep.
Rene Bernier/Topsham Community Rep.

Enclosures

ATTACHMENT I

The following are EPA's comments pertaining to the document entitled "Draft Final Technical Memorandum, Site 9, Neptune Drive Disposal Site" dated September 1993.

1. General - It is clear from the new data that the cesspool is not currently a source of the VOC contamination found in the well in the area South of Neptune Drive. However, the cesspool has not completely been ruled out as a past source. It is assumed then that the proposed monitoring plan and future data would answer this question.

2. General - If possible, EPA suggests starting the monitoring program as soon as possible and accumulating groundwater data to establish a database with some degree of continuity.

3. General - The EPA anticipates the review of the draft Proposed Plan for Site 9 with the Navy's preferred alternative. Based on the information presented in this technical memorandum, EPA concurs with the Navy and believes that, at this time, an Interim No Further Action ROD with institutional controls and a long term monitoring plan is the most practical solution for Site 9.

4. pg 2-4, Figure 2-2 - Delete "LT-901 New Leachate and Sediment Sampling Point" from Legend because it is not shown on figure.

5. pg 2-12, 2.2.1.2 Inactive Ash Landfill, ¶ 3 - According to Table 2-5, barium was also detected at values above background concentrations. Add barium to "Cadmium, calcium, chromium..."

6. pg 2-25, 2.2.2 South of Neptune Drive, ¶ 1 - In light of new data and recommendations, is the referenced draft proposed plan with a preferred alternative of source removal/off-site disposal still valid?

7. pg 2-26 - Please provide rationale for TCLP testing the cesspool borings (i.e. was this done in anticipation triggering "lan ban" requirements?). In addition, for what TCLP parameters were the the cesspool borings tested? ICR, toxicity, or both.

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN R. McKERNAN, JR.
GOVERNOR

DEAN C. MARRIOTT
COMMISSIONER

DEBRAH RICHARD
DEPUTY COMMISSIONER

October 27, 1993

Mr. Fred Evans
Project Manager, Code 1821
Department of the Navy, Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mailstop 82
Lester, Penn. 19112-2090

Dear Mr. Evans:

The Maine Department of Environmental Protection has received and reviewed the, "Draft Technical Memorandum Site 9 Neptune Drive Disposal Site", dated September 1993, Naval Air Station Brunswick, Brunswick, Maine. The Department's comments are provided below.

I enjoyed meeting you on Base for our abbreviated site tour on Tuesday October 27, 1993. As we discussed, the State still has concerns about the sporadic detections of Vinyl Chloride both north and south of Neptune Drive and the lack of groundwater monitoring data north of Neptune Drive, in addition to several other questions which are provided in this letter. From what you told me yesterday on-site, the Navy is not at this time proposing long-term monitoring and natural attenuation as a final remedial action, nor is this action being proposed in pursuit of a ROD.

Considering our conversation yesterday, the State, at this time, supports the Navy's recommendation for additional groundwater monitoring at Site 9, provided that this action is not proposed as a final solution, that this action is not proposed in pursuit of a ROD, and that the Navy provides a groundwater monitoring plan to the Department for the Department's comments prior the Navy conducting additional groundwater monitoring at Site 9.

General Comments

The Department still has some concerns regarding Base-wide background locations, as also noted in the Department's comments on the Draft Final SI for the Swampy Road and Merriconeag Sites. It would be very helpful if you would submit to the Department: Site Maps for each background location (Showing the extent of known contamination and

AUGUSTA
STATE HOUSE STATION 17
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826
OFFICE LOCATED AT RAY BUILDING, HOSPITAL STREET

PORTLAND
312 CANCO ROAD
PORTLAND, ME 04103
(207) 879-6300 FAX: (207) 879-6303

BANGOR
106 HOGAN ROAD
BANGOR, ME 04401
(207) 941-4570 FAX: (207) 941-4584

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, ME 04769
(207) 764-0477 FAX: (207) 764-1507

printed on recycled paper

groundwater flow directions) and all analytical data for soils and water collected at the background locations including boring logs and screening data.

Site 9 Background Locations: The Department does not accept MW-916 as an appropriate site-specific background location. MW-916 is approximately 22 feet away from TerraProbe sampling location T-21. T-21 was sampled from 8-10 feet below land surface. Ash comprised almost all of the two foot sample. Although TerraProbe samples were collected between t-21 and MW-916, the appropriate depths may not have been sampled. For example, T-23 was sampled at 8-10', T-24 was sampled at 8-9 feet and 12-13', and T-31 was sampled at 9-10

The boring log for MW-916 must be included in this Report. The Department must review this boring log prior to consideration of MW-916 as an appropriate background location. The photocopy of the TerraProbe field log included in the Tech Memo appears to be missing some information related to T-23. The Department would like to view the original field notes.

Improper application of AWQC:
The Department does not apply AWQC based on whether or not surface water is used for drinking water. The State of Maine has a Water Classification System in place which classifies all waters of the State. The designated use of all surface waters is that the water must be suitable for drinking. Sometimes surface water may require disinfection or treatment, so that it can meet drinking water standards.

The Department does not agree with the Navy's argument that because the surface water in the unnamed streams at Site 9 is not used for drinking water, the AWQC for Protection of Human Health are not ARARs, and are therefore not considered except to provide reference framework within which the observed values may be evaluated. AWQC must be considered for both the Protection of Human Health and for Protection of Freshwater Aquatic Life.

Effectiveness of the current Monitoring Well Network
The Navy must conduct further studies to support the conclusion that the current well network is sufficiently monitoring leachate emanating from the ash landfill. The Navy's responses to comments concerning the effectiveness of the well network are not supported by site specific data. Information must be collected to support or to refute their position.

The Navy must evaluate the water quality throughout the vertical extent of the aquifer. Monitoring wells MW-914 and MW-915 screen the interval from 7-17 feet below the land

surface. No other intervals have been screened in the area directly downgradient of the ash landfill. Although the specific density of vinyl chloride is less than water(0.91), it is probably a breakdown product of a chlorinated solvent whose specific gravity is greater than one.

It appears that analysis for Vinyl Chloride was performed on about half the samples. The sporadic detection's of Vinyl Chloride may be due more to ineffective sampling techniques and sporadic analysis of the samples. As we discussed with Jack Dunleavy on Tuesday, a different sampling approach may be required to capture Vinyl Choride during sampling. Troy Smith is going to send Mr. Dunleavy information on a technique devised by Robert Puls which may be useful in sampling at Site 9. Vinyl Chloride is one of the most difficult compounds to sample without loosing it to the atmosphere. An alternative groundwater sampling method must be developed to reduce the volatilization. The rapid volatilization could be the cause for the sporadic detections.

Evaluate other possible source areas for VOC contamination. There are other buildings near Site 9 that may have had releases contributing to VOCs detected both north and south of Neptune Drive.

Additional information is required to determine the extent of the hydraulic control the former drainpipe has on the aquifer in the vicinity of LT-901. The existence of the control is evidenced by the presence of a seep at the former discharge point of the removed drainpipe. Page 2-3 states, "The seep is located at the end of the northern stream at the discharge of the former drain."

Specific Comments

Page 2-1, third paragraph.
Figure 2-1 does not show RI test pit locations as indicated in the text.

Page 2-1, fifth paragraph.
Given the estimated seepage rates, is it possible to sample the seeps with a seep sampling device?

Figure 2-1
What was the rationale for not including MW-909 and MW-910 in the groundwater elevation measurements on 8/19/93? Groundwater elevation measurements in these wells are important to know.

Page 2-7, top paragraph.
How do the lead concentrations detected in the Site 9 sediments compare to the Mere Brook sediment samples?

Page 2-11
The text should state that two phases of TerraProbe investigations were completed north of Neptune Drive. The second phase was completed after the installation of monitoring wells 914, 915, and 916. Information collected during the second phase revealed that ash exists north of the breezeway between buildings 218 and 219. Ash was discovered within 22 feet of MW-916 at a thickness greater than two feet. Therefore, additional information will be needed to determine if MW-916 is an appropriate background location.

Section 2.2.1.2-3, PAH detections.
Are the petroleum odors and oily sheens indicated in the TerraProbe logs associated with the presence of PAHs?

Figure 2-4
T-15 should be solid black to indicate that ash was present in the sample collected.

The Figure should show that the presence or absence of ash at T-7 could not be evaluated due to refusal at 10 feet. Please determine the nature of the object at that caused refusal at 10 feet.

Table 2-8
The State of Maine MEGs should be included in this Table.

Field Notes
Field notes taken during boring and well installation must be included in an Appendix.

Please call me at 207-287-2651 if you have any questions or comments.

Sincerely,

Nancy Beardsley

Nancy Beardsley
Project Manager, Federal Facilities Unit
Office of the Commissioner

cc: Bob Lim, USEPA
Jim Caruthers, NAS Brunswick
Carolyn Lepage, R.G. Gerber Inc.
Bob McGirr, ABB ES

Rene Bernier, Topsham
Sam Butcher, Harpswell
Susan Weddle, Brunswick
Brunswick Topsham Water District
Mark Hyland, DEP
Marianne Hubert, DEP
Troy Smith, DEP

ROBERT G.
GERBER, INC.
Consulting Geotechnical Engineers and Geologists
17 West Street • Freeport, Maine • 04032-1133 207-865-6138

October 26, 1993
File #965

Ms. Loukie Lofchie
Brunswick Area Citizens for a Safe Environment
P. O. Box 245
Brunswick, ME 04011

Subject: Review of "Draft Final Technical Memorandum, Site 9, Neptune Drive Disposal Site", Naval Air Station Brunswick, Brunswick, Maine, September 1993.

Dear Ms. Lofchie:

As requested by the Brunswick Area Citizens for a Safe Environment (BACSE), Robert G. Gerber, Inc. (RGGI), has reviewed the "Draft Final Technical Memorandum, Site 9, Neptune Drive Disposal Site" for Naval Air Station Brunswick, Brunswick, Maine, dated September 1993. The document was prepared by ABB Environmental Services, Inc., (ABB) for the U. S. Department of the Navy for the Naval Air Station Brunswick (NAS Brunswick) located in Brunswick, Maine. The subject document is intended to summarize site investigation activities and make recommendations for future actions at the Neptune Drive Disposal Site.

Site 9, also known as the Neptune Drive Disposal Site, is located in the central portion of NAS Brunswick. The site initially included three areas of potential contamination: a former incinerator location and ash disposal area; an area reportedly used for burning and disposal of solvents; and two streams exhibiting iron-staining characteristic of leachate. Results of earlier environmental investigations were reported in the August 1990 Draft Final Remedial Investigation (RI) and the April 1991 Draft Final Supplemental RI reports prepared by E. C. Jordan.

The subject document presents a summary of investigations and analysis conducted through 1993, and recommendations for future activities at the site. We commented on the June 1993 version of the subject document in our letter to you dated August 10, 1993. Several of the issues and concerns we raised in our August 10th letter remain, particularly those related to source identification. We have summarized our comments and concerns in the following:

1. **General Comment.** The primary focus of the recent investigation activities conducted at Site 9 has been on field evaluations and environmental sampling related to the ash landfill and the septic system at Building 201. As the Navy has concluded that neither of these two areas

is the current source of the low levels of volatile organic compounds (VOCs) detected at Site 9, additional investigations of other current and historic potential sources should be conducted at this time. For instance, it is our understanding that there is an auto hobby shop relatively close to and upgradient of Site 9. Several flightline buildings are also located upgradient of Site 9. These and other potential source areas should be investigated as the possible sources of the VOCs. The investigations could be conducted concurrently with the implementation of groundwater monitoring, with the understanding that the monitoring plan might be modified to accommodate new information. Additional field investigations might also be necessary to further evaluate the environmental effects of any new potential sources.

2. General Comment. We reiterate comments we made in our August 10th letter concerning the need for additional data to determine more precisely the direction of groundwater flow, the relationship of groundwater to streamflow in the two unnamed tributaries, the effect of the former stream channel and the former drain location on groundwater flow and contaminant migration, and seasonal variations of the hydrologic system. Hydrogeologic data gathered in the course of the proposed quarterly monitoring should be presented in the form of water level contour maps and other appropriate forms for review on a regular basis (annually at a minimum). The results of the data analysis and compilation may indicate a need to modify assumptions concerning the groundwater flow regime and/or conduct additional field investigations. For instance, additional data may indicate monitoring well MW-916 cannot be considered a background well.

3. Page 3-1, for example. It is misleading to characterize the occurrence of VOCs in groundwater samples collected at Site 9 as "sporadic". Rather, the *collection* of samples has been sporadic (six times over the past five years). Rather than continue to speculate with the limited data currently available, we feel that the regularly scheduled (quarterly, for example) collection and analysis of environmental samples from existing sampling locations should be initiated in a timely fashion, while additional investigations (such as for potential sources) should be conducted concurrently. The possibility of the concurrent actions was presented by Jim Shafer (Navy Northern Division) at the September 23, 1993 TRC (Technical Review Committee) meeting. Perhaps an interim action, mentioned in the EPA's August 11, 1993 comment letter (Appendix D), would be appropriate for Site 9. There seems to be general agreement among the parties providing technical comments and responses to comments that additional environmental data is needed to determine a long-term plan for Site 9. An interim action could allow the collection of the environmental data from existing sample locations to begin and accommodate new information generated during concurrent investigations, such as the evaluation of additional potential sources.

4. Pages 5-1 - 5-3. While we agree with the proposed on-going monitoring of groundwater quality in the existing wells at Site 9, we cannot agree that there is no continuing source of VOCs at the site based on currently available information. The occurrence of VOCs in groundwater samples indicates there may be more than one source. Additional investigations

should be conducted, both north and south of Neptune Drive, to respond to the questions and comments outlined above and to identify the source or sources. Once the source(s) is (are) identified, additional remedial actions should be evaluated. Institutional controls should also address the excavation and removal of the ash landfill should any construction occur in the barracks area.

5. **Appendix D.** In response to our comment #16 in our August 10th letter concerning the evaluation of radioactive hazards at the site, the Navy described the instrument used during investigations at Site 9, and stated that "readings above background were not noted during the survey". However, we are uncertain how background levels were determined. Please provide specific information concerning how background levels for radioactive hazard evaluation were determined.

6. **General Comment.** The subject document was discussed during a conference call on October 21, 1993, by representatives of the Navy, U.S. Environmental Protection Agency (EPA), and Maine Department of Environmental Protection. We were initially contacted by Bob Lim of the EPA at 2 PM on October 21st to participate in the conference call that was to start an hour later at 3 PM. We indicated we would need to contact a BACSE representative to authorize us to actively participate in the conference call, but at a minimum, we could listen to the conversation and ask questions. However, we never received the conference call. We also understand that Mr. Lim contacted Susan Weddle (BACSE) after he contacted us, and that she did not receive his message until that evening. We are concerned that BACSE did not receive information in a timely fashion about the conference call from either the Navy or EPA. As a result, BACSE was left out. In addition, we had indicated our interest in participating in the call, but RGGI was also left out. It was our understanding that the same parties involved in the conference call regarding the June 1993 version of the subject document were to participate in the latest conference call. Sufficient notice should be provided to allow BACSE and its representatives to participate in a constructive manner.

Please do not hesitate to give us a call if you have any questions on the comments above.

Sincerely,
Robert G. Gerber, Inc.

Carolyn A. Lepage

STATE OF MAINE
CAROLYN A. LEPAGE
6202
CERTIFIED GEOLOGIST

Carolyn A. Lepage, C.G.
Director of Operations

Andrews L. Tolman, C.G.
Chief Hydrogeologist

RESPONSE TO U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS DATED OCTOBER 27, 1993

1. General. It is agreed that the septic system is not currently a source of VOC contamination observed in this area. However, it is not clear how the proposed monitoring plan would address past releases from this potential source, especially in light of the proximity of the unnamed streams and the volatility of vinyl chloride, the principal VOC detected here. The monitoring plan would be designed to ensure that the septic system remains a "non-source" and to determine the absence/presence of a continuing source. Discussions during the preparation of the monitoring plan would be useful to insure that this comment is addressed.

2. General. The Navy agrees that it is desirable to start the monitoring as soon as the monitoring plan is approved.

3. General. The Navy has discussed the appropriate procedures to follow administratively for the monitoring with the USEPA and Maine DEP. The long-term monitoring will be governed by an Interim Record of Decision (ROD) for the groundwater at this site. Also, please see previous response.

4. Page 2-4, Figure 2-2. The "LT-901" legend should not have been included in the figure legend.

5. Page 2-12, 2.2.1.2. "Barium" should have been included in the referenced sentence.

6. Page 2-25, 2.2.2. This section is now out-of-date. The current approach is to conduct long-term monitoring, rather than the "source removal/off site disposal" originally under consideration.

7. Page 2-26. At the time that the pre-design sampling was defined, the expected remedial action for Site 9 was excavation and off-site disposal of the septic tank and leach field. Since there was no evidence to suggest disposal of listed hazardous wastes through the septic system, the excavated material

would be considered hazardous only it if exhibited a regulated characteristic, such as corrosivity. Due to the expedited schedule that the Navy was trying to follow, a decision was made to proceed with the TCLP analyses of the samples, even though the septic system had not yet been confirmed as a source of groundwater contamination. Now that the septic system has been eliminated as an active source, the TCLP results are not necessary, however, they do provide some information into the leachability of these samples.

RESPONSE TO MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMENTS DATED OCTOBER 27, 1993

This comment letter states that the DEP approves a long-term monitoring plan for Site 9, provided certain conditions are met. The DEP, USEPA, and Navy discussed the preferred mechanisms for administering the monitoring program in a conference call on November 19, 1993.

General Comments

1. The Navy is preparing a package of information addressing the issue of background inorganics concentrations for various media at NAS Brunswick. This package will include drilling logs, analytical data, etc. as requested in the comment. This package will be delivered under separate cover.

   Site 9 Background Locations:

   A total of six (6) Terraprobe borings completed between Buildings 218 and 219 north of the breezeway, but south of MW-916, were free of any ash material. The 1952 grading plan show the dump area to be approximately 100 feet south of MW-916. The boring log for MW-916 indicates clean sands only. The ash landfill originally formed the ground surface which was subsequently covered with fill. Therefore, the ash would be expected to be found at about the same depths in all locations; in fact, all Terraprobe borings that encountered ash did so at between 8 feet and 13 feet bgs. Therefore, sampling depths are appropriate for the detection of dissolved contaminants. Groundwater flow direction is known with enough certainty to establish that MW-916 is upgradient of the ash landfill. Based on this information, the Navy considers that MW-916 is an appropriate site-specific background location.

   Given that a site-specific upgradient location is useful for the interpretation of site-specific impacts, and given that a long-term monitoring plan will be developed, it is recommended that the issue of background conditions be further addressed in the monitoring plan. The boring log for MW-916 was inadvertently omitted from the draft final version of this document and has been attached to this letter. The photocopy of one page in the field log for T-23 included in the draft final document had two lines of information obscured; this page has been re-copied from the log book and is attached to this letter. The Navy contractor who conducted the field investigations, ABB-Environmental Services, Inc. will discuss this issue further with the Maine DEP and the USEPA if requested.

Improper Application of AWQC:

Both the DEP and the Navy have stated their positions on this issue. This will be discussed further and fully resolved as part of the interpretation of the long-term monitoring data.

In addition, the Navy does not believe that AWQCs represent the most appropriate criteria to evaluate potential risks to human health. The values derived for the protection of human health from the ingestion of water and/or aquatic organisms are based on outdated exposure assumptions and for some compounds toxicity information. The Integrated Risk Information System (IRIS), USEPA's primary source of peer reviewed toxicity information, has deleted reference to these criteria.

Effectiveness of the Current Monitoring Well Network:

It is not clear specifically what additional information is necessary. The Navy believes that two existing wells (MW-914 and MW-915) are adequately characterizing ash leachate, for the following reasons. The two wells are only approximately 10 to 20 feet downgradient of the ash, and screened at the same depth as the ash. MW-915 1) encountered "oily looking sands"; 2) is immediately adjacent to the Terraprobe boring T-15 (which DEP has stated is in the landfill ash); 3) is located within the "dump" area identified by the 1952 grading plan; and 4) is downgradient of both the bulk of the ash landfill (as identified by Terraprobe borings) and the "dump". Therefore, MW-915 and, to a lesser degree, MW-914 are judged as having been located in appropriate locations to detect the groundwater impacts attributable to the ash landfill.

Secondly, this comment questions the existing vertical coverage of the aquifer, and notes that the specific gravities of vinyl chloride and other chlorinated solvents are significantly different from that of water. This is certainly true of pure products, but is definitely not true at the levels of contaminants observed in these wells. The observed levels of VC, which range up to 30 μg/L, have negligible impact on the density of the water and will therefore result in no density-driven flow. Furthermore, the observed concentrations are minuscule compared to the saturation concentrations of VC in water, which is approximately 8,800,000 μg/L. If pure product existed, then the dissolved concentrations of VC would most likely be significantly higher than what has been observed.

The site history (as reported in the IAS) involved only sporadic dumping of very small quantities of solvents; the small quantities allegedly dumped are unlikely to result in pure product reaching the groundwater. These activities

could result in low-concentration, sporadic detections of solvents, as we have seen in the monitoring wells.

The difficulties associated with the sampling and analysis for VOCs, especially vinyl chloride, are recognized. The Navy is interested in any information regarding sampling and analysis protocols for vinyl chloride, and notes the importance of resolving all such issues prior to the initiation of the long-term monitoring program. The Site 9 samples, as well as those from other sites at NAS Brunswick, and at other locations across the state and country, have been collected and analyzed using standard, approved methodologies. Thus, it is not clear why these techniques are now considered to be "ineffective".

The Navy is attempting to locate additional literature relevant to this issue. This information will be evaluated, with the intent of selecting the most suitable sampling methodology. However, please recognize that it is not appropriate for the Navy IR Program to embark upon a lengthy program to devise and develop innovative sampling techniques if acceptable ones already exist.

The investigation into other possible sources of VOC contamination in this area of the base may be done after sufficient monitoring data have been collected from existing wells to establish that, in fact, a definable "plume" of groundwater contamination or identifiable source even exists. The need for a more extensive monitoring network is not indicated by the current data set.

Although the former drain clearly has some hydraulic influence, it is not estimated to have a major impact. A quantitative evaluation of the hydraulic control that the former drainpipe has is not yet needed. The seep itself has been sampled and found to be free of any significant contamination. Should the results of the long-term monitoring indicate the need for a better understanding of the hydrogeology, then those additional investigations will be done at that time.

Specific Comments

Page 2-1, 3rd paragraph. The test pit locations are shown on Figure 2-2.

Page 2-1, 5th paragraph. It is not clear if this comment refers to collection of samples for chemical analyses, measurement of seepage velocities, or something else. These questions will be discussed when the long-term monitoring plan is developed.

Figure 2-1. These wells were visited on 8/19/93, but the water level monitoring equipment did not function at these two wells, even though water was present in the

wells. Future efforts during the long-term monitoring program will include measurements from all wells.

Page 2-7, top paragraph. Lead concentrations in background sediment samples collected from Mere Brook on the west (upstream) side of the runways ranged from non-detect to 9.2 mg/kg, as compared to the 22 to 32 mg/kg detected here.

Page 2-11. Please see response to general comment regarding background locations.

Section 2.2.1.2-3. It is not known if the PAHs, which were detected at concentrations of only 4J μg/L or less in these groundwater samples, are directly related to the observations in some of the Terraprobe samples.

Figure 2-4. T-15 could have been colored solid black to note that ash was found, however, the reader is cautioned that the appearance of the ash at this location is different from that observed in other Terraprobe samples; based on this different appearance, T-15 was originally left unshaded.

The nature of the object causing refusal in this location, which is outside of the landfill and above the former drain, could not be identified without significant excavation. At this time, the need for such an effort is not indicated.

Table 2-8. Comment noted.

Field notes. Copies of field notes taken during the installation of Terraprobe borings are already included in Appendix A. Copies of field notes collected during the installation of conventional borings, the logs for which are in Appendix A, total approximately 50 pages and will be copied and forwarded to MEDEP under separate cover.

RESPONSE TO BRUNSWICK AREA CITIZENS FOR A SAFE ENVIRONMENT COMMENTS DATED OCTOBER 26, 1993

1. General Comment. The ash landfill has not been positively ruled out as a potential source of VOCs detected in downgradient groundwater (note the detection of vinyl chloride in MW-915). The data available to date do not conclusively establish that a significant source of the VOCs exists. The long term monitoring will provide the necessary information from which to evaluate the need for other investigations. Those investigations, if required, can be initiated only after sufficient monitoring data has been collected and evaluated.

2. General Comment. Hydrogeologic as well as chemical data will be collected during the monitoring program.

3. Page 3-1, for example. The lack of reproducible detections of VOCs in one or more sampling locations from one monitoring event to the next demonstrates that these detections are sporadic. It has been suggested for some time that long-term monitoring be implemented at this site, in order to better characterize and understand the contamination present there.

As noted above, the need for additional investigations "for potential sources", much less the details of any such investigations, is not yet clearly established. This decision will be made after sufficient monitoring data are collected and evaluated.

4. Page 5-1 - 5-3. See previous comments and responses. The nature of future actions regarding the landfill will be evaluated once the long-term monitoring data are collected and evaluated.

5. Appendix D. The Monitor 4 senses ionizing radiation by means of a Geiger-Mueller tube. When ionizing radiation strikes the tube, it is sensed electronically and displayed by a flashing count light. With this instrument, about 5 to 25 of these counts per minute can be expected from naturally occurring background radiation. The instrument did not detect readings above these background levels. The instrument recorded only about 5 counts per minute at this site.

6. General Comment. The Navy apologizes for any misunderstanding. The referenced telephone call was intended as an informal discussion among the EPA,

DEP, and Navy. An attempt was made to allow BACSE to participate in this call as a courtesy. Conference calls which involve formal discussions will be arranged in a timely fashion, as has been done in the past.