Final

1996 Annual Report
Monitoring Events 5 through 7
Site 9: Neptune Drive Disposal Site
Naval Air Station, Brunswick, Maine

Contract No. N62472-92-D-1296
Contract Task Order No. 0047

Prepared for

Department of the Navy
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway
Mail Stop 82
Lester, Pennsylvania 19113-2090

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July 1997
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July 1997

QUALITY REVIEW STATEMENT

Contract No. N62472-92-D-1296 EA Project Number: 29600.47
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Description of Report/Deliverable:

Final 1996 Annual Report, Monitoring Events 5 through 7, Site 9: Neptune Drive Disposal Site, Naval Air Station, Brunswick, Maine

EA CTO Manager: Michael S. Battle, P.G.

In compliance with EA's Quality Procedures for review of deliverables outlined in the Quality Management Plan, this final deliverable has been reviewed for quality by the undersigned Senior Technical Reviewer(s). The information presented in this report/deliverable has been prepared in accordance with the approved Implementation Plan for the Contract Task Order (CTO) and reflects a proper presentation of the data and/or the conclusions drawn and/or the analyses or design completed during the conduct of the work. This statement is based upon the standards identified in the CTO and/or the standard of care existing at the time of preparation.

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1. INTRODUCTION

1.1 BACKGROUND

Under Contract No. N62472-92-D-1296, Contract Task Order No. 0047, Northern Division, Naval Facilities Engineering Command contracted with EA Engineering, Science, and Technology to perform long-term monitoring at the Neptune Drive Disposal Site (Site 9), Naval Air Station (NAS), Brunswick, Maine. NAS Brunswick is located south of the Androscoggin River between Brunswick and Bath, Maine (Figure 1-1). The layout of Site 9 is provided on Figure 1-2.

NAS Brunswick is an active base owned and operated by the Federal government through the Department of the Navy. In 1987, NAS Brunswick was placed on the National Priorities List by the U.S. Environmental Protection Agency (EPA) and is currently participating in the Navy's Installation Restoration Program. At Site 9, the Navy is performing long-term monitoring, maintenance, and corrective measures as part of the long-term remedial actions required by the Interim Groundwater Record of Decision dated September 1994 (ABB-ES 1994a). A Long-Term Monitoring Plan (LTMP) was established pursuant to the Interim Groundwater Record of Decision (ABB-ES 1995); this document serves as the basis for conducting long-term monitoring activities.

1.2 LONG-TERM MONITORING PROGRAM

The LTMP document, which is comprised of a Long-Term Monitoring Program; an addendum to the Quality Assurance Project Plan contained in the LTMP for Building 95, Sites 1 and 3, and Eastern Plume (ABB-ES 1994b); and technical review comments, establishes the requirement for monitoring/sampling of ground water, surface water, sediment, and leachate, along with the implementation of institutional controls to prevent human contact with ground water in the area. Tri-annual sampling was initiated at Site 9 during 1996. Implementation of the monitoring program will enable the Navy to collect data in order to conduct a 5-year review, which is an analysis of newly promulgated or modified federal and state regulations to determine if they are applicable or relevant and appropriate requirements and to determine if they challenge the protectiveness of the implemented remedial strategy. It is anticipated that monitoring will continue until a review is completed which suggests that no further action, or an alternate remedial action (i.e., other than natural attenuation), should be selected. These reviews will occur a minimum of once every 5 years.

The objective of the Long-Term Monitoring Program is to obtain data necessary to monitor the long-term effectiveness of the remedial action (i.e., natural attenuation) conducted at Site 9. Monitoring and sampling data collected during the performance of long-term monitoring are being used to:

- Assess variations, if any, in the chemical quality of ground-water, surface water, sediment, and leachate station seep and sediment.

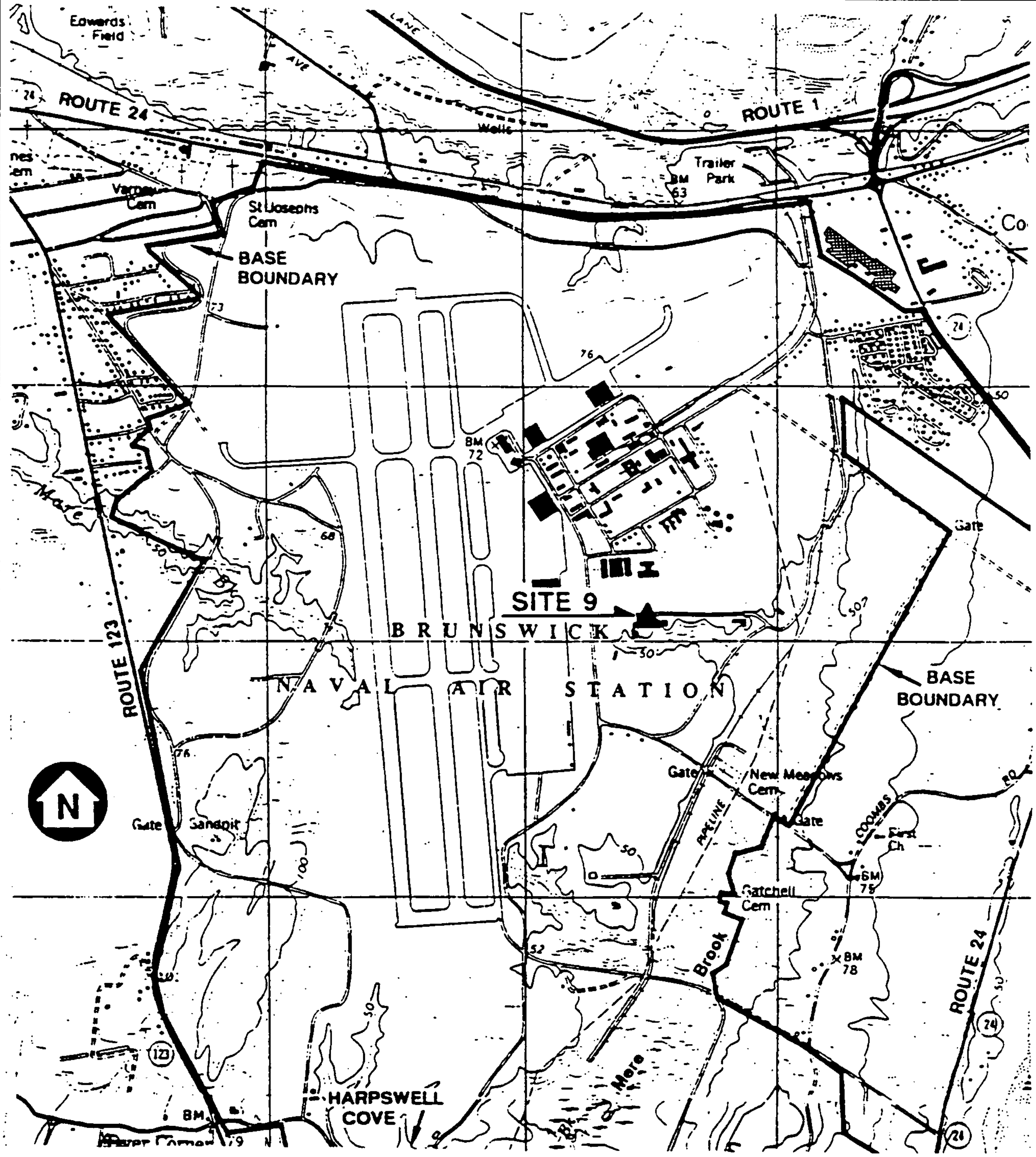
- Assess the potential for adverse environmental impacts by monitoring for evidence of stressed vegetation and additional leachate seeps.

- Evaluate the integrity of the ground-water monitoring well network by inspecting the conditions of well casings and seals and ensuring the wells are labeled and locked.

In accordance with the LTMP (ABB-ES 1994b), the Method Detection Limit study for EPA Method 8260 was submitted to EPA Region I for approval. Approval of the Method Detection Limit study was received from EPA Region I on 8 January 1997. Approval of the use of trace inductively coupled plasma methodologies for Target Analyte List metals, except mercury and cyanide, was obtained from EPA Region I on 25 August 1995. The requirement for cyanide analysis was removed effective October 1996, prior to Event 7 (November 1996). Although not required by the LTMP, bi-monthly gauging of wells at Site 9 was performed during May, July, and September 1996 to investigate the potential for seasonal changes in ground-water flow patterns at the site.

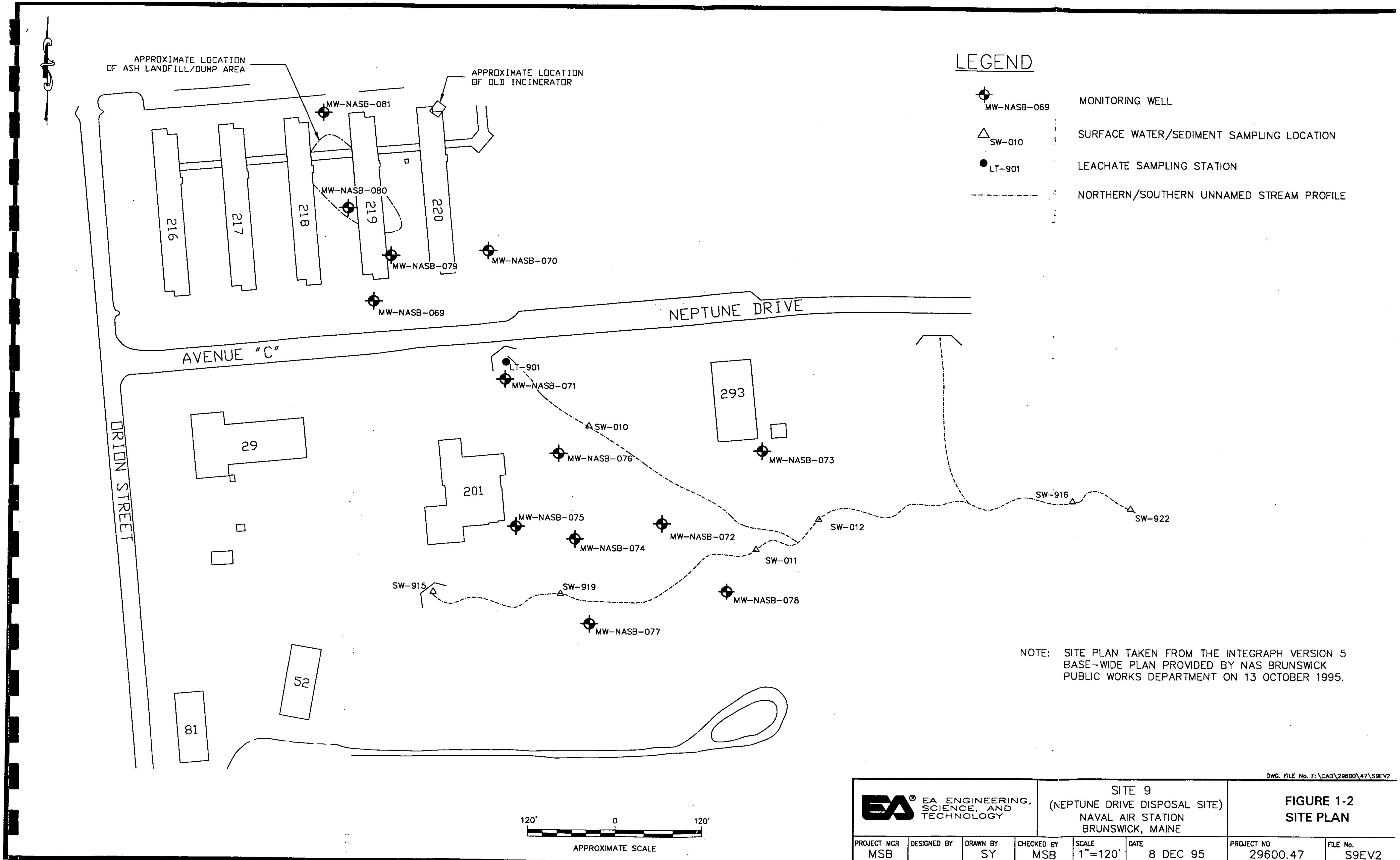
1.3 ANNUAL REPORT ORGANIZATION

This annual report details the project activities conducted as part of the Long-Term Monitoring Program at Site 9 during the three monitoring/sampling events of 1996. Chapter 1 provides an introduction and overview of the Long-Term Monitoring Program activities conducted at the site. Chapter 2 presents site background information and a description of the geology and hydrogeology of the site. Chapter 3 discusses the results of the three monitoring events conducted during 1996. Chapter 4 summarizes the results of the 1996 monitoring events and presents conclusions and recommendations based on these results.



Source: USGS 7.5-minute series topographic maps: Brunswick, Maine, Quadrangles (1980); and Orrs Island, Maine, 1978. Scale 1:24,000.

Figure 1-1. Site location map for Site 9, Naval Air Station, Brunswick, Maine.



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

SITE 9
(NEPTUNE DRIVE DISPOSAL SITE)
NAVAL AIR STATION
BRUNSWICK, MAINE

FIGURE 1-2
SITE PLAN

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB		SY	MSB	1"=120'	8 DEC 95	29600.47	S9EV2

2. SITE BACKGROUND

2.1 SITE DESCRIPTION

The Neptune Drive Disposal Site (Site 9) is an area north of Neptune Drive containing a former incinerator and an abandoned ash landfill/dump area, and an area south of Neptune Drive where hazardous materials disposal activities reportedly occurred (Figure 1-2). Areas of potential concern include:

- The Former Incinerator and Ash Landfill located in the northeast quadrant of the current site of Building 220 and the ash disposal dump in the current area of Buildings 218 and 219. There are no exact data detailing the location or the types of wastes handled or disposed of at these locations, although wastes may have included solvents that were burned on the ground, paint sludge, and metal shop wastes. The current location of the dump area is based on grading plans for barracks that indicated a "dump area" was located around existing Building 219, and from soil borings conducted in 1993.

- Building 201 is located west of the unnamed stream. An area southeast of the building reportedly was once used as a dumping area. A septic system east of Building 201 was thought to be a possible source of VOC in ground-water, although investigations have indicated that this area is not currently a likely source (ABB-ES 1995).

- The two unnamed streams located near Building 201. These streams receive water from the Site 9 area and receive surface runoff from the central portion of NAS Brunswick, including runways, parking lots, and paved roads.

2.2 GEOLOGY

The Site 9 area is underlain by fine to medium sand at depths ranging in thickness up to 40 ft. The sand units decrease in thickness to the east and south. Underlying the sand is a transition unit composed of fine sand and silt with clay. The thickness of the transition unit varies across the site, and shows increasing thickness on the south side of the unnamed stream. A silty clay unit underlies the transition unit and extends to an undetermined depth. The top elevation of the clay unit increases to the east and south, which may be due to a bedrock high observed to the south of Site 9. The depth to bedrock at the site has not been determined.

2.3 HYDROGEOLOGY

Ground water occurs at the site in the overburden soil at a depth of less than 20 ft below surface grade. Thirteen ground-water monitoring wells are part of the Long-Term Monitoring Program at Site 9. Monitoring wells have completion depths ranging from 15 to 42 ft below surface grade. Based on ground-water elevation data provided in the LTMP (ABB-ES 1995), the ground-water flow direction is south-southeast toward the unnamed streams located south of Neptune Drive. Hydraulic gradients vary across the site but are shallowest in the northern portion of the site and generally increase to the south. The steepest gradients are near the unnamed streams in the eastern portion of the site. Seepage velocities at the site have been estimated from 26 ft/year to 130 ft/year (E.C. Jordan Company 1991).

The unnamed streams are likely to receive most of the ground water flowing across the site, although ground water in the eastern part of the site may also flow southeast of Site 9 (ABB-ES 1995). Hydraulic conductivities estimated from well tests at the site have been reported to range from 0.009 ft/day (3.1×10^{-6} cm/sec) to 8.2 ft/day (2.9×10^{-3} cm/sec), with a geometric mean of 1.8 ft/day (6.3×10^{-4} cm/sec) (E.C. Jordan Company 1991).

2.4 RESULTS OF PREVIOUS INVESTIGATIONS

Investigations have been conducted at Site 9 since 1988, when a remedial investigation was performed to evaluate the occurrence and distribution of constituents of concern at the site. Supplemental investigations were conducted in 1990, and the septic system associated with Building 201 was investigated in 1991. An additional investigation was conducted in 1993 to assess if the septic system was a potential source of VOC in ground water. An Interim Record of Decision was signed in 1994 that specified actions for the site, including natural attenuation, long-term environmental monitoring, institutional controls, and 5-year reviews. An investigation conducted in 1995 did not identify a continuing source area at the site (ABB-ES 1997). Long-term monitoring has been instituted while additional investigations are being conducted, as summarized in the LTMP (ABB-ES 1995).

The results of previous investigations identified the presence of volatile organic compounds (VOC), semivolatile organic compounds (SVOC) (including polycyclic aromatic hydrocarbons [PAH]), pesticides, and inorganic analytes in various media. Media impacted include soil, ground water, surface water, sediment, and seeps.

Compounds/analytes that have been reported at Site 9 include (ABB-ES 1995):

- Vinyl chloride, which has been reported in ground water in excess of the corresponding Federal Maximum Contaminant Level (MCL) and State of Maine Maximum Exposure Guideline (MEG).
- Dichloroethene, which has been reported in ground water in excess of the corresponding Federal MCL and State MEG.
- 1,1-Dichloroethane, which has been reported in ground water in excess of the corresponding State MEG.

- Elevated concentrations of inorganic analytes, which have been detected in ground-water samples collected hydraulically downgradient of the ash disposal area.

- PAH, which have been detected in ash material, although these compounds were not detected in ground water immediately downgradient of this area (ABB-ES 1995).

- Inorganic analytes and PAH, which have been reported in leachate seep and/or sediment samples.

Previous investigations have not defined a specific source for the presence of VOC in ground water. Elevated concentrations of inorganic analytes in ground water have been attributed to past disposal practices at the ash landfill/dump area. PAH and inorganic analyte concentrations in seep/sediment samples have been attributed to the ash or to other non-point source runoff from paved areas.

Background inorganic analyte concentrations reported in samples collected during previous investigations are summarized in Table 2-1. Results of the background samples indicate that maximum concentrations of five metals (aluminum, iron, magnesium, manganese, and thallium) are greater than corresponding MEG and/or MCL for these analytes (ABB-ES 1994a).

TABLE 2-1 SUMMARY OF BACKGROUND CONCENTRATIONS OF INORGANIC ANALYTES IN GROUND WATER FROM PREVIOUS INVESTIGATIONS

Inorganic Parameter	CRDL (µg/L)	Minimum (µg/L)	Maximum (µg/L)	MEG[a] (µg/L)	MCL[b] (µg/L)
Aluminum	200	15	**652**	1,430	50-200[c]
Antimony	60	---	---	2.8	6
Arsenic	10	1.8	2.8	---	50
Barium	200	4.6	17	1,500	2,000
Beryllium	5	---	---	---	4
Cadmium	5	---	---	5	5
Calcium	5,000	1,190	18,000	---	---
Chromium	10	2.4	6.3	100	100
Cobalt	50	4.3	8	---	---
Copper	25	3	4	---	1,300[d]
Iron	100	18	**4,430**	---	300[c]
Lead	3	3.3	10	20	15[d]
Magnesium	5,000	**657**	**8,300**	200	50[c]
Manganese	15	11	**570**	200	50[c]
Mercury	0.2	0.11	0.11	2	2
Nickel	40	---	---	100	100
Potassium	5,000	230	4,800	---	---
Selenium	5	---	---	10	50
Silver	10	---	---	50	100[c]
Sodium	5,000	2,130	52,500	---	---
Thallium	10	**1.4**	**2.1**	0.4	2
Vanadium	50	4	9.2	---	---
Zinc	20	3.8	105	---	5,000[c]
Cyanide	10	---	---	154	200

(a) MEG (Maximum Exposure Guideline) obtained from State of Maine Department of Human Services Revised Maximum Exposure Guidelines, memorandum dated 23 October 1992. Dashes (---) indicate no MEG applicable.
(b) MCL (Maximum Contamination Level) obtained from 40 CFR Parts 141 and 142 (U.S. EPA 1994). Dashes (---) indicate no MCL applicable.
(c) Secondary MCL, based on taste, odor, or color.
(d) Action level.

NOTE: Bold indicates concentration exceeds State MEG or Federal MCL.
CRDL = Contract Required Detection Limit.

MONITORING WELLS USED TO DEFINE BACKGROUND CONSIST OF:

Well and Location	Well and Location
MW-2118, Site 1	MW-702, Site 7
MW-301, Site 11	MW-703, Site 7
MW-312, East of Base Boundary	MW-705, Site 7
MW-320, Site 6	MW-801, Site 8
MW-403, Site 4	

SOURCES: E.C. Jordan Company (1990, 1991); ABB-ES (1994b).

3. LONG-TERM MONITORING PROGRAM—1996

3.1 WATER LEVEL GAUGING PROGRAM

3.1.1 Description of Water Level Gauging Program

During the 1996 monitoring events, water level measurements were obtained from 13 ground-water monitoring wells located at Site 9. Well gauging was conducted as part of tri-annual sampling events completed on 14 February, 13 June, and 4 November 1996. Although not required by the LTMP, bi-monthly water level measurements were collected from Site 9 wells on 13 May, 1 July, and 3 September 1996 in order to assess the potential for seasonal changes in ground-water flow direction. Depth to water measurements were conducted in accordance with procedures specified in the LTMP (ABB-ES 1995). Table 3-1 summarizes the monitoring wells included in the well gauging program; the locations of monitoring wells are shown in Figure 1-2.

3.1.2 Quality Assurance/Quality Control Procedures

Field equipment used for water level gauging was decontaminated, calibrated, and operated in accordance with the Quality Assurance Project Plan contained in the LTMP for Building 95, Sites 1 and 3, and the Eastern Plume (ABB-ES 1994b). Water levels were gauged on a single day before ground-water sampling activities were conducted. Water level gauging was conducted using either a QED Environmental Systems, Inc. Model 6000 or a Slope Indicator Model 51453 water level indicator, capable of measuring depth to water to an accuracy of 0.01 ft. Well gauging was completed by lowering the sensing probe down the well and measuring the depth to water from the notch/indelible marking on the top of the well riser.

3.1.3 Results of Water Level Gauging Program

Water levels were collected to assess ground-water flow at Site 9. The additional bi-monthly water level measurements were collected to better assess seasonal fluctuations in ground-water potentiometric elevations and the potential for significant variations in ground-water flow directions with time. A summary of the depth to ground water and water table elevations for Monitoring Events 5 through 7 and the May, July, and September 1996 bi-monthly gauging events is presented in Table 3-2. The completed Field Record of Well Gauging forms are provided in the reports for the February 1996 (EA 1996a), June 1996 (EA 1996b), and November 1996 (EA 1997) monitoring events.

Interpretive water table elevation maps were developed from data collected during the tri-annual (February, June, and November 1996) and three bi-monthly gauging events (May, July, and September 1996). Figure 3-1 through 3-6 provide the interpreted water table contour maps for the six gauging events.

The ground-water contour maps indicate the predominant ground-water flow direction at the site is generally toward the unnamed streams located south of Neptune Drive. Consistent with historic data, the hydraulic gradient is shallowest north of Neptune Drive and shows an increasing gradient to the south of Neptune Drive. Based on the annual data, the average hydraulic gradient across the central portion of the site, from well MW-NASB-069 to MW-NASB-075, near Building 201, is 0.015 ft/ft.

The steepest hydraulic gradient is observed in the vicinity of the unnamed streams south of Neptune Drive. Based on annual data, the average hydraulic gradient between MW-NASB-073 and the northern branch of the unnamed stream, near SW-012, is approximately 0.033 ft/ft.

Overburden ground water discharges to the unnamed stream, as indicated by localized ground-water flow toward the stream branches from the north, southwest, and south. Based on interpretation of well gauging data, overburden ground water in the vicinity of the ash landfill/dump area, and the approximate location of the old incinerator, discharges to the northern branch of the unnamed stream; overburden ground water in the vicinity of Building 201 discharges to the northern and southern branches of the unnamed stream.

3.2 GROUND-WATER MONITORING AND SAMPLING PROGRAM

3.2.1 Description of Ground-Water Monitoring and Sampling Program

Ground-water samples were obtained during the tri-annual sampling events from 9 of 13 ground-water monitoring wells included in the Long-Term Monitoring Program at Site 9. Two wells (MW-NASB-070 and MW-NASB-073) which have not shown past ground-water impacts are not included in the Long-Term Monitoring Program. A summary of the wells included in the Long-Term Monitoring Program at Site 9 is provided in Table 3-1. During Monitoring Event 5 (February 1996), ground-water samples were collected from 7 of 13 ground-water monitoring wells located at Site 9. Well MW-NASB-071 was frozen and could not be sampled; well MW-NASB-079 went dry during purging and did not recover sufficiently to permit sampling to occur. All planned ground-water samples were collected during Monitoring Event 6 (June 1996) and Monitoring Event 7 (November 1996).

One well is located hydraulically upgradient of the site (MW-NASB-081), 4 wells are located near the old landfill (MW-NASB-069, MW-NASB-071, MW-NASB-079, MW-NASB-080), and 4 wells are hydraulically downgradient of the site (MW-NASB-072, MW-NASB-074, MW-NASB-075, MW-NASB-076). Two wells located on the southern side of the southern unnamed stream (MW-NASB-077 and MW-NASB-078) were sampled once during 1996.

The ground-water sampling program was performed in accordance with the general methodologies established in the LTMP (ABB-ES 1994b). Dedicated Grundfos Redi-Flo2 stainless steel and Teflon® submersible pumping systems were utilized at all wells to permit sampling using the low flow sampling technique. A detailed discussion of the low flow sampling technique, including dedicated pump system installation, is provided as Appendix A of the report prepared for the March 1995 sampling event (EA 1995). Water quality indicator parameters, including pH, conductivity, temperature, dissolved oxygen, turbidity, and eH, were monitored in a flow-through cell during well purging using a Grant/YSI Model 3800 multiparameter water quality meter. To the extent practical, ground-water samples were collected following stabilization of water quality indicator parameters. Stabilization of water quality indicator parameters was achieved when three consecutive measurements were within 10 percent agreement of the previous measurement, or when the turbidity measurements were reduced to below 10 nephelometric turbidity units (NTU). In general, stabilized water quality indicator parameters, including pH, conductivity, and dissolved oxygen, were observed during the collection of ground-water samples. Turbidity measurements stabilized during the sampling events, although measurements could not be reduced to below 10 NTU at several wells during each sampling event. During Monitoring Event 7 (November 1996), 3 of 9 wells did not reach equilibrium for turbidity.

Ground-water samples from Site 9 were collected for analysis of Target Compound List (TCL) VOC plus a library search of 15 tentatively identified compounds by EPA Method 8260. Five of 11 ground-water samples (NASB-MW-071, NASB-MW-072, NASB-MW-079, NASB-MW-080, and NASB-MW-081) were also collected for analysis of Target Analyte List elements, including metals by trace inductively coupled plasma (EPA Method 6010), mercury by cold vapor atomic adsorption (EPA Method 7470), and cyanide by EPA Method 9010. Samples were not analyzed for cyanide by EPA 9010 following Event 6 (June 1996). TAL metals (excluding mercury) analyses for the February and June 1996 sampling events were performed using trace inductively coupled plasma (EPA Method 6010); mercury was analyzed by cold vapor atomic adsorption (EPA Method 7470). During the November 1996 sampling event, analysis of TAL metals (excluding mercury) was performed by inductively coupled plasma (EPA Method 6010) and graphite furnace (EPA Method 7000 series) and mercury by EPA Method 7470. Chromium was analyzed by inductively coupled plasma (EPA Method 6000) rather than graphite furnace atomic adsorption (EPA Method 7191) during the November 1996 event; precision and accuracy objectives and reporting requirements identified in the LTMP were met. Samples were analyzed by Katahdin Analytical Services, Inc. (formerly Pace Incorporated) of Westbrook, Maine, for Monitoring Events 5 and 6 and by EA Laboratories of Sparks, Maryland for Monitoring Event 7. Table 3-1 summarizes the analytical program for ground-water samples at Site 9. A summary of the analytical results for ground-water samples collected during Monitoring Events 5 through 7 is provided in Table 3-3. Summaries of tentatively identified compounds reported in ground-water samples are provided in the summary reports for Monitoring Events 5 through 7 (EA 1996a, 1996b, and 1997).

3.2.2 Quality Assurance/Quality Control Procedures

Quality assurance/quality control procedures for ground-water sampling were conducted in accordance with the Quality Assurance Project Plan contained in the LTMP for Building 95, Sites 1 and 3 and Eastern Plume (ABB-ES 1994b). To meet data quality objectives, chain-of-custody, sampling handling practices, and documentation were maintained in the field in accordance with the LTMP. The revised sample tracking system developed following the May 1995 sampling event was employed during the tri-annual sampling events to improve the data quality review process. This process included revisions to the sample identification system, designed to reduce potential for transcription error.

Field quality control was documented through the submission of field quality control samples for analysis, including trip blanks, source water blanks, field duplicates, and matrix spike/matrix spike duplicate samples. The analytical laboratory provided data packages consisting of Level III deliverables (as defined by EPA data quality objectives guidance), including sample analysis data, blank analysis data, duplicate sample results, surrogate recoveries, matrix spike recoveries, and laboratory control sample recoveries. The level of data quality required by the LTMP did not require validation and documentation of EPA Contract Laboratory Program procedures; however, review of laboratory data was performed on selected quality control parameters to evaluate precision, accuracy, completeness, and data quality objective requirements, as required by the LTMP. Summaries of the data quality reviews are provided in the Monitoring Events 5 through 7 summary reports (EA 1996a, 1996b, and 1997). There were no significant variations in data quality noted in these reviews which would affect the usability of the data.

3.2.3 Results of Ground-Water Monitoring, Sampling, and Analysis Program

Summaries of those compounds/analytes detected in ground-water samples collected during the three sampling events, and those listed as contaminants of concern for Site 9, are provided in Table 3-3. The analytical results of ground-water samples were compared against State MEGs and Federal MCLs to assess whether ground-water quality exceeded applicable regulatory criteria.

3.2.3.1 Volatile Organic Compounds

VOC were reported in ground-water samples collected at the 11 wells sampled during the 1996 sampling events. A total of 13 VOC were reported in ground-water samples. Acetone and methylene chloride were reported in associated method blanks, and were likely laboratory contaminants. One VOC (carbon disulfide) reported in ground-water samples collected during Monitoring Event 7 was also reported in the acid used during sample preservation, and is considered a field artifact. Excluding suspected laboratory and field artifacts, 9 VOC were reported, including: vinyl chloride, 2-butanone, toluene, 1,1-dichloroethane, 1,2-dichlorobenzene, 1,4-dichlorobenzene, trichloroethene, tetrachloroethene, and total 1,2-dichloroethene.

One of 13 VOC detected in ground-water samples collected during Monitoring Events 5 through 7 were reported in exceedance of corresponding State MEGs and/or Federal MCLs. Vinyl chloride was reported at concentrations above the corresponding Federal MCL or State MEG in samples from 5 monitoring wells during 1996: MW-NASB-072, MW-NASB-074, MW-NASB-075, MW-NASB-076, and MW-NASB-080. The State MEG of 0.15 μg/L and/or the Federal

MCL of 2 μg/L for vinyl chloride was exceeded in 14 samples collected at these wells. The highest reported vinyl chloride concentration (13 μg/L) was reported in the MW-NASB-075 sample during the November 1996 sampling event. In general, the highest concentrations of vinyl chloride were reported in samples from wells hydraulically downgradient of Building 201 (i.e., wells MW-NASB-072 and MW-NASB-075), and from MW-NASB-080 located within the footprint of the ash landfill.

Figure 3-7 provides graphs of total VOC and vinyl chloride for the 7 wells which had reported VOC concentrations above corresponding State MEGs and/or Federal MCLs for Monitoring Events 1 through 7. Two wells (MW-NASB-069 and MW-NASB-071) had reported vinyl chloride levels during 1995, but this compound was not reported in samples collected during 1996 sampling events. No discernable trends were noted in VOC or vinyl chloride concentrations, although general decreases in total VOC and vinyl chloride concentrations were observed between Monitoring Event 5 (June 1996) and Monitoring Event 7 (November 1996) in samples collected from MW-NASB-074 and MW-NASB-076.

3.2.3.2 Inorganic Analytes

Inorganic analytes were reported in each of the 5 wells analyzed for this parameter during the 1996 monitoring events. A total of 22 analytes were reported in ground-water samples, including: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, vanadium, zinc, and cyanide. Of the 22 reported analytes, concentrations of only one analyte (manganese) were reported above the corresponding State MEG during the 1996 sampling events. Concentrations of manganese were reported above the corresponding State MEG of 200 μg/L in samples collected from 3 Site 9 wells (MW-NASB-071, MW-NASB-080, and MW-NASB-081) during 1996. Background concentrations of manganese have also been reported above the corresponding State MEG (Table 2-1) Therefore, the presence of this analyte may represent natural site conditions.

3.2.4 Frequency of Analytical Detections in Ground Water

The frequency of detection for each compound/analyte can be used to evaluate which compounds/analytes are consistently reported in ground-water samples, or which have been reported infrequently. Frequency of detection is calculated by dividing the total number of detections in samples, including duplicate samples, by the total number of analyses for that compound/analyte (Table 3-4). A detection frequency of 100 percent indicates a compound/analyte is reported in all site wells. This would be expected for compounds/analytes that are common laboratory contaminants, or which are naturally occurring, and not related to past disposal practices at the site.

Results listed in Table 3-4 indicate that the majority of VOC are detected with a frequency of 25 percent or less. Carbon disulfide, a confirmed field acid contaminant, had a frequency of detection of 30 percent. Other than carbon disulfide, only one VOC, vinyl chloride (42 percent) had a frequency of detection greater than 25 percent. Several naturally occurring inorganic analytes, including calcium, magnesium, potassium, and sodium, had frequency of detections of 100 percent.

3.3 SURFACE WATER, SEDIMENT, AND SEEP SAMPLING

3.3.1 Description of Surface Water, Sediment, and Seep Sampling Program

Surface water (SW) and sediment (SED) samples were collected from 7 locations along the northern and southern unnamed streams (SW/SED-010, SW/SED-011, SW/SED-012, SW/SED-915, SW/SED-916, SW/SED-919, and SW/SED-922); the locations of the sample stations are provided in Figure 1-2. Sample location SW/SED-916, located approximately 250 ft downstream of the confluence of the northern and southern branches of the unnamed stream, was sampled once (i.e., annual event), as specified in the LTMP (ABB-ES 1995). A sample station located at the head of the northern unnamed stream (LT-901) was sampled for seep and sediment during each sampling event.

The surface water and sediment sampling program at Site 9 was performed in accordance with the general methodologies established in the LTMP (ABB-ES 1995). The locations of these sample stations have been flagged and the same locations were sampled during each sampling event. Table 3-1 summarizes the analytical parameters for surface water, sediment, and seep samples collected at Site 9.

Surface water, sediment, and seep samples were collected at Site 9 for analysis of TCL VOC plus a library search of 15 tentatively identified compounds by EPA Method 8260. Five of 6 sediment samples were analyzed for the presence of TCL SVOC plus a library search of 20 tentatively identified compounds EPA Method 8270. The seep and sediment samples collected at sample station LT-901 were also analyzed for Target Analyte List elements, including metals by trace inductively coupled plasma (EPA Method 6010), mercury by cold vapor atomic adsorption (EPA Method 7470) and cyanide by EPA Method 9010. Samples were not analyzed for cyanide by EPA 9010 following Event 6 (June 1996). TAL metals (excluding mercury) analyses for the February and June 1996 sampling events were performed using trace inductively coupled plasma (EPA Method 6010); mercury was analyzed by cold vapor atomic adsorption (EPA Method 7470). During the November 1996 sampling event, analysis of TAL metals (excluding mercury) was performed by inductively coupled plasma (EPA Method 6010) and graphite furnace (EPA Method 7000 series) and mercury by EPA Method 7470. Chromium was analyzed by inductively coupled plasma (EPA Method 6000) rather than graphite furnace atomic adsorption (EPA Method 7191) during the November 1996 event; precision and accuracy objectives and reporting requirements identified in the LTMP were met. A summary of analytical results for surface water samples collected during Monitoring Events 5 through 7 is provided in Table 3-5. A summary of analytical results for sediment samples collected during Monitoring Events 5 through 7 is provided in Table 3-6. A summary of analytical results for the aqueous and sediment samples collected at sample station LT-901 during Monitoring Events 5 through 7 is provided in Table 3-7. Summaries of tentatively identified compounds reported in surface water, sediment, and seep samples are provided in the monitoring reports (EA 1996a, 1996b, and 1997).

3.3.2 Quality Assurance/Quality Control Procedures

Quality assurance/quality control procedures for surface water, sediment, and leachate station seep and sediment sampling were conducted in accordance with the Quality Assurance Project Plan contained in the LTMP for Building 95, Sites 1 and 3, and the Eastern Plume (ABB-ES 1994b). To meet data quality objectives, chain-of-custody, sampling handling practices, and documentation were maintained in the field in accordance with the LTMP. The revised sample tracking system developed following the May 1995 sampling event was employed during the 1996 sampling events to improve the sample tracking and data quality review process.

Field quality control was documented though the submission of field quality control samples for analysis, including trip blanks, rinsate blanks, source water blanks, field duplicates, and matrix spike/matrix spike duplicate samples. The analytical laboratory provided data packages consisting of Level III (as defined by EPA data quality objectives guidance) deliverables, including sample analysis data, blank analysis data, duplicate sample results, surrogate recoveries, matrix spike recoveries, and laboratory control sample recoveries. As required by the LTMP, a review of laboratory data was performed on selected quality control parameters; the results of the data quality reviews are contained in the monitoring reports (EA 1996a, 1996b, 1997).

3.3.3 Results of the Surface Water, Sediment, and Seep Sampling Program

3.3.3.1 Surface Water Sample Results

A total of 7 VOC were reported in surface water samples collected during the three sampling events at Site 9. Six of 7 VOC were reported at a maximum concentration of less than 5 μg/L. Two VOC were reported at concentrations above 5 μg/L: acetone and carbon disulfide. Carbon disulfide was reported in the 6 surface water samples collected during Monitoring Event 7, and in the acid used during sample preservation; therefore, carbon disulfide is considered a field sampling artifact. Two VOC, acetone and methylene chloride, were frequently reported in the method blanks associated with these samples and are considered likely laboratory contaminants. Excluding results with laboratory and field artifacts, the two highest reported VOC concentrations were present in samples collected from SW-011 and SW-915 during the February 1996 sampling event (total xylenes at 2 μg/L and toluene at 3 μg/L). In general, higher concentrations of VOC were observed during the February 1996 sampling event as compared to subsequent sampling events. A summary of analytical results for surface water samples collected during Monitoring Events 5 through 7 is provided in Table 3-5.

3.3.3.2 Sediment Sample Results

A total of 13 VOC were reported in sediment samples collected during Monitoring Events 5 through 7. Eight of the 13 VOC were reported at maximum concentrations less than 5 μg/kg. The 5 VOC reported at concentrations greater than 5 μg/kg included methylene chloride, acetone, total 1,2-dichloroethene, 1,1,2,2-tetrachloroethane, and 2-butanone. Two of these compounds (methylene chloride and acetone) were frequently reported in associated method blanks and are considered field and/or laboratory contaminants. Excluding the above compounds, the highest reported VOC concentration (1,1,2,2-tetrachloroethane at 20 μg/kg) was reported in SED-012 during the February 1996 sampling event. The highest concentrations of total 1,2-dichloroethene (8 μg/kg) and trichloroethene (2J μg/kg) were reported during February 1996 in sample SED-010, located mid-stream of the northern branch of the unnamed stream. Total 1,2-dichloroethene and trichloroethene were reported in only one sample, SED-010. In general, more VOC were reported in sediment samples collected during the February 1996 sampling event compared with subsequent sampling events. A summary of analytical results for sediment samples collected during Monitoring Events 5 through 7 is provided in Table 3-6.

A total of 20 SVOC were reported in 5 sediment samples analyzed for this parameter during Monitoring Events 5 through 7 (Table 3-6). Figure 3-8 shows the total SVOC concentrations reported from sediment samples collected from the northern branch of the unnamed stream (SED-010 and SED-012) and from the southern branch (SED-915, SED-919, and SED-011). The highest concentrations of SVOC were reported at SED-919 during 1995 (259,082 μg/kg; Monitoring Event 3) and 1996 (98,610 μg/kg; Monitoring Event 7). The majority of reported SVOC were PAH present at concentrations greater than 100 μg/kg. The lowest PAH concentrations were generally reported in samples collected at SED-011 located near the confluence of the two unnamed streams.

3.3.3.3 Sample Station LT-901 Seep and Sediment Results

Seep Sample Results

A total of three VOC were detected in the seep samples collected at LT-901 during Monitoring Events 5 through 7, including: acetone, carbon disulfide, and methylene chloride. Methylene chloride and acetone were frequently reported in the method blanks associated with these samples and are considered laboratory contaminants. Carbon disulfide was reported in acid used for sample preservation during Monitoring Event 7 and is considered a field sampling artifact. Table 3-7 provides a summary of analytical results for seep samples collected at sample station LT-901.

Twenty-two inorganic analytes were reported in the seep samples collected during Monitoring Events 5 through 7 (Table 3-7). In general, the highest concentrations were noted during the June 1996 sampling event, as compared to prior and subsequent sampling events.

Sediment Sample Results

A total of 7 VOC were detected in the sediment samples collected at sample station LT-901 during Monitoring Events 5 through 7. Two VOC were reported at concentrations greater than 5 μg/kg, including: acetone and methylene chloride. Methylene chloride and acetone are common laboratory contaminants. Excluding the presence of methylene chloride and acetone, the highest reported individual VOC concentration was 5 μg/kg of 1,2-dichloroethane, reported in the sediment sample collected during the February 1996 sampling event. A summary of analytical results for sediment samples collected at LT-901 during 1996 is provided in Table 3-7.

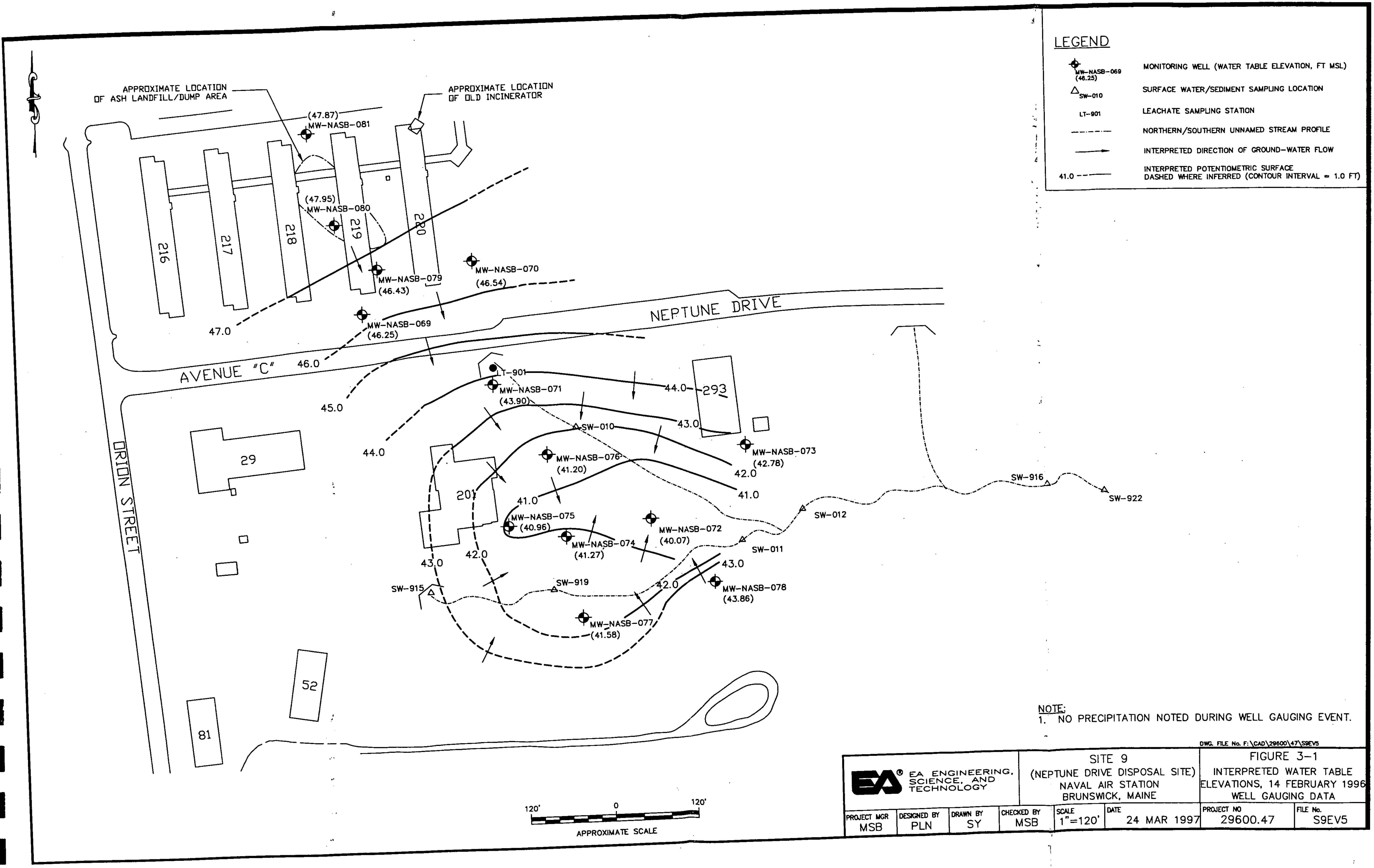
Twenty-one inorganic analytes were reported in the sediment samples collected at sample station LT-901 during Monitoring Events 5 through 7 (Table 3-7). Aluminum, iron, and magnesium were consistently reported at concentrations greater than 1,000 mg/kg, with aluminum concentrations ranging from 3,780 mg/kg (February 1996) to 6,090 mg/kg (November 1996), iron concentrations ranging from 5,950 mg/kg (February 1996) to 10,600 mg/kg (November 1996), and magnesium concentrations ranging from 1,150 mg/kg (February 1996) to 2,660 mg/kg (June 1996). In general, the highest reported concentrations were noted during the November 1996 sampling event.

3.4 VISUAL INSPECTION

Site inspection activities were completed during the 1996 monitoring events by a civil engineer in accordance with the LTMP (ABB-ES 1995). Site inspection activities included the following:

- Inspection of the ground surface for evidence of stressed vegetation
- Inspection and maintenance of the site ground-water monitoring wells
- Inspection of the stream channel for evidence of additional seeps.

Site inspections indicated no evidence of stressed vegetation in the vicinity of the site during any of the three inspection events. Iron staining was observed during each monitoring event in the vicinity of MW-NASB-071 and sample station LT-901, and along the southern unnamed creek from the point of exit from the drain to the confluence with the northern unnamed creek. There were no additional seeps observed. No physical evidence of tampering of site wells was evident. All wells were observed to be locked, with the exception of MW-NASB-069 which was observed to have a broken latch and bent protective casing during the February and June sampling events. Well MW-NASB-069 was subsequently repaired in 1996. All wells were labeled. Construction of two surface impoundments was ongoing at Site 9 during the latter half of 1996. Restoration of surfaces was not complete at the time of inspection during Monitoring Event 7.

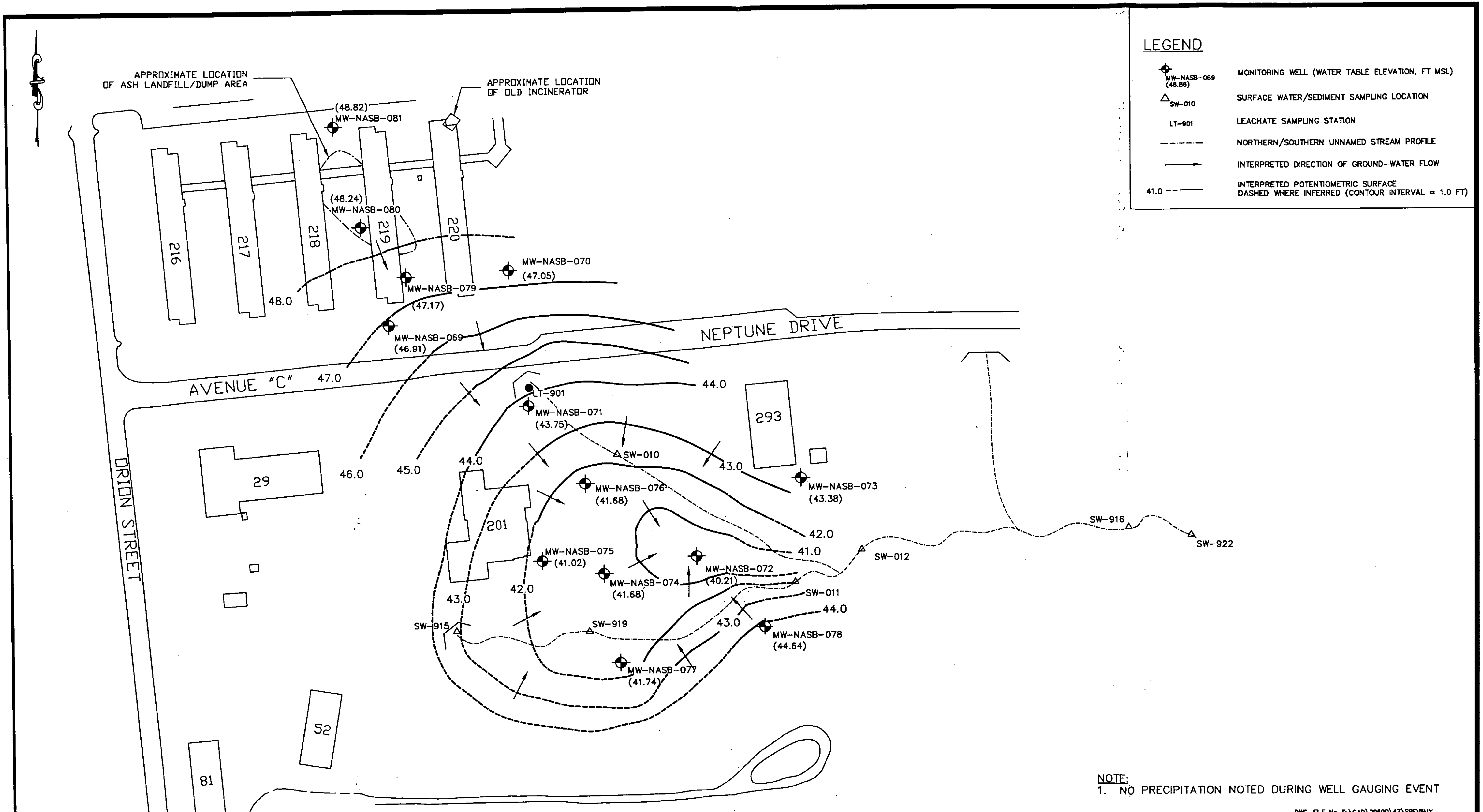


EA ENGINEERING, SCIENCE, AND TECHNOLOGY

SITE 9
(NEPTUNE DRIVE DISPOSAL SITE)
NAVAL AIR STATION
BRUNSWICK, MAINE

FIGURE 3-1
INTERPRETED WATER TABLE ELEVATIONS, 14 FEBRUARY 1996 WELL GAUGING DATA

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB	PLN	SY	MSB	1"=120'	24 MAR 1997	29600.47	S9EV5

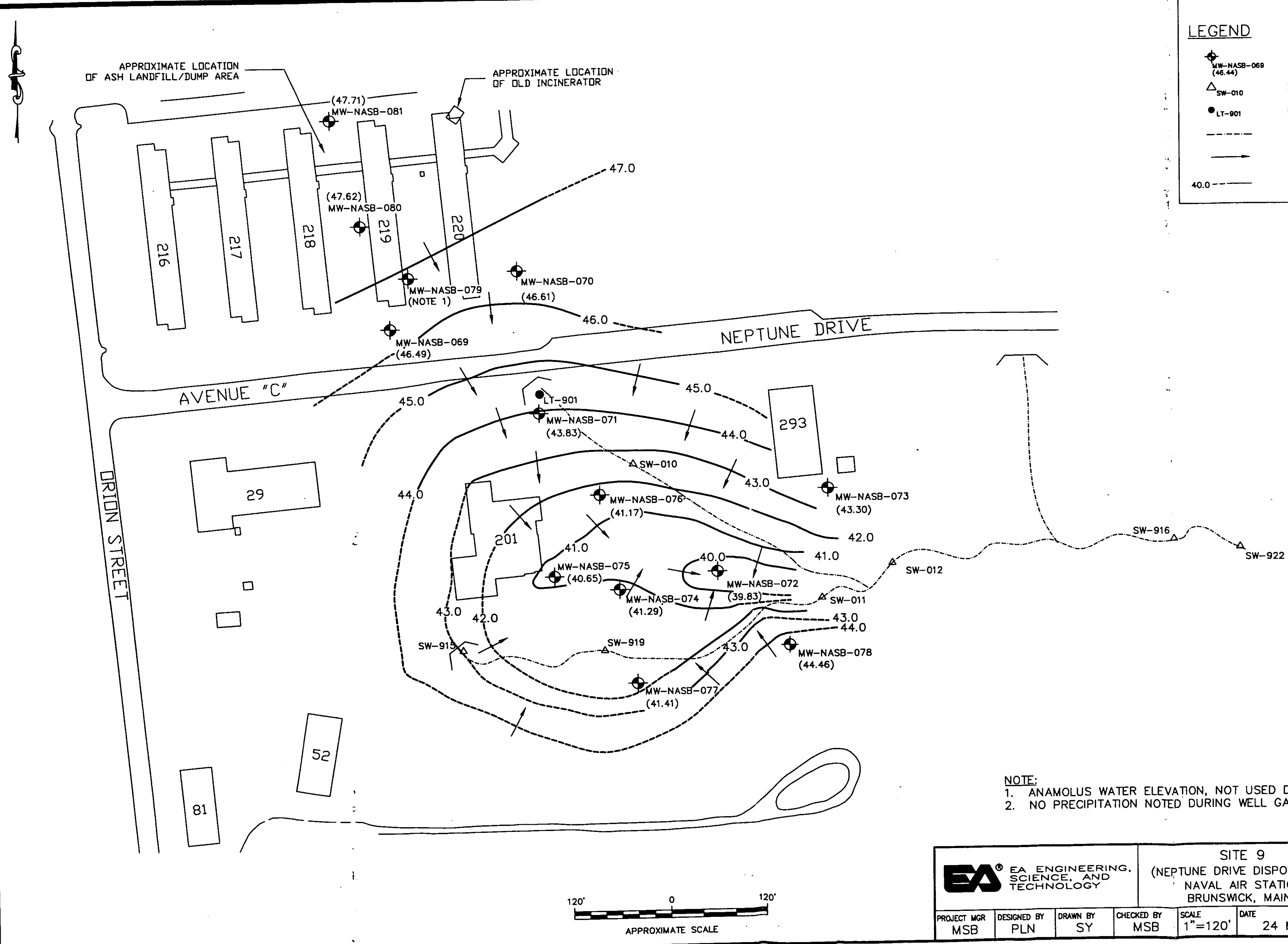


EA ENGINEERING, SCIENCE, AND TECHNOLOGY

SITE 9
(NEPTUNE DRIVE DISPOSAL SITE)
NAVAL AIR STATION
BRUNSWICK, MAINE

FIGURE 3-2
INTERPRETED WATER TABLE ELEVATIONS, 13 MAY 1996
WELL GAUGING DATA

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB	PLN	SY	MSB	1"=120'	24 MAR 1996	29600.47	S9EV6MY



LEGEND

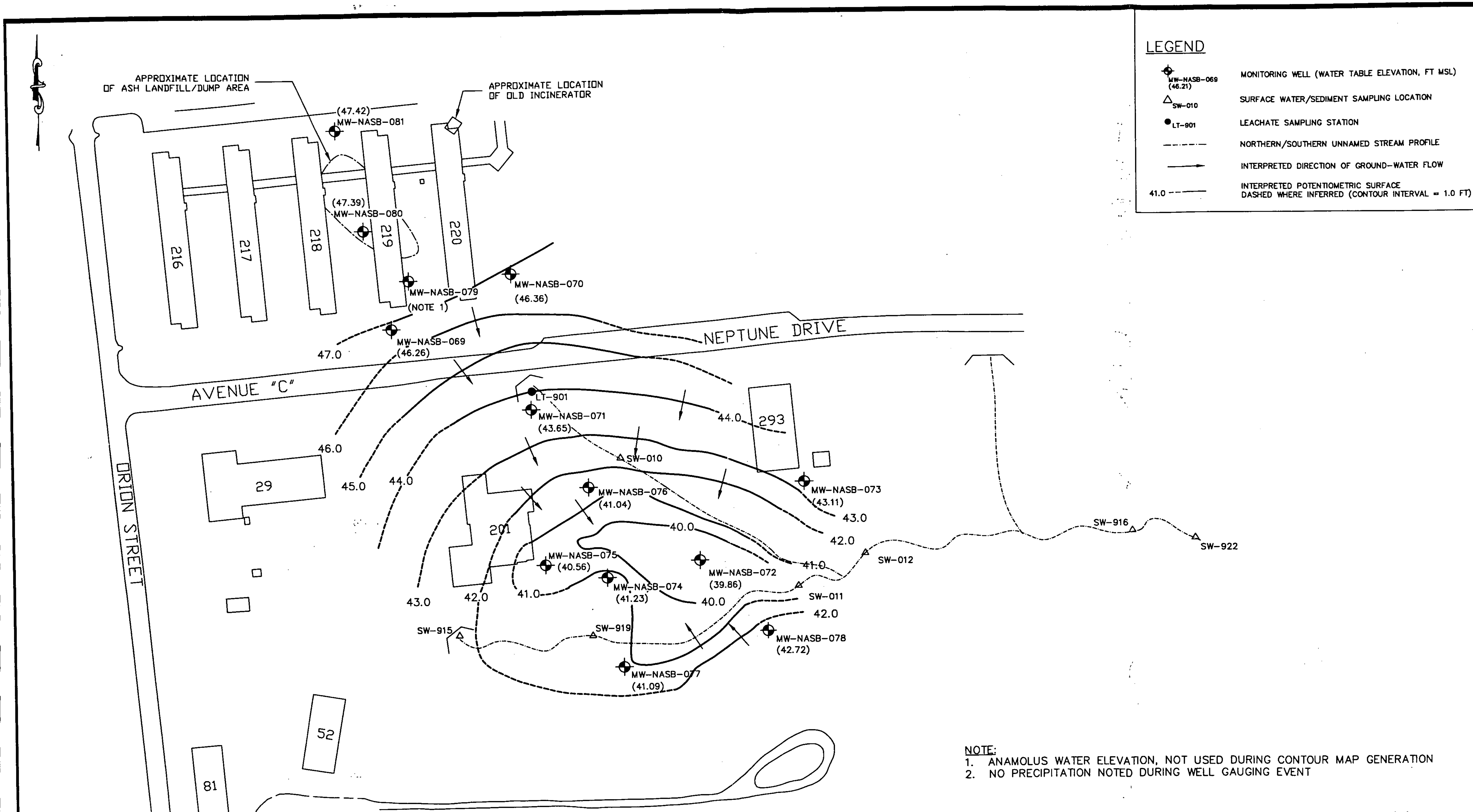
- MW-NASB-069 (46.44) — MONITORING WELL (WATER TABLE ELEVATION, FT MSL)
- SW-010 — SURFACE WATER/SEDIMENT SAMPLING LOCATION
- LT-901 — LEACHATE SAMPLING STATION
- NORTHERN/SOUTHERN UNNAMED STREAM PROFILE
- INTERPRETED DIRECTION OF GROUND-WATER FLOW
- 40.0 — INTERPRETED POTENTIOMETRIC SURFACE DASHED WHERE INFERRED (CONTOUR INTERVAL = 1.0 FT)

NOTE:
1. ANAMOLUS WATER ELEVATION, NOT USED DURING CONTOUR MAP GENERATION
2. NO PRECIPITATION NOTED DURING WELL GAUGING

DWG. FILE No. F:\CAD\29600\47\S9EV6JU

EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SITE 9 (NEPTUNE DRIVE DISPOSAL SITE) NAVAL AIR STATION BRUNSWICK, MAINE	FIGURE 3-3 INTERPRETED WATER TABLE ELEVATIONS, 13 JUNE 1996 WELL GAUGING DATA

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB	PLN	SY	MSB	1"=120'	24 MAR 97	29600.47	S9EV6JU

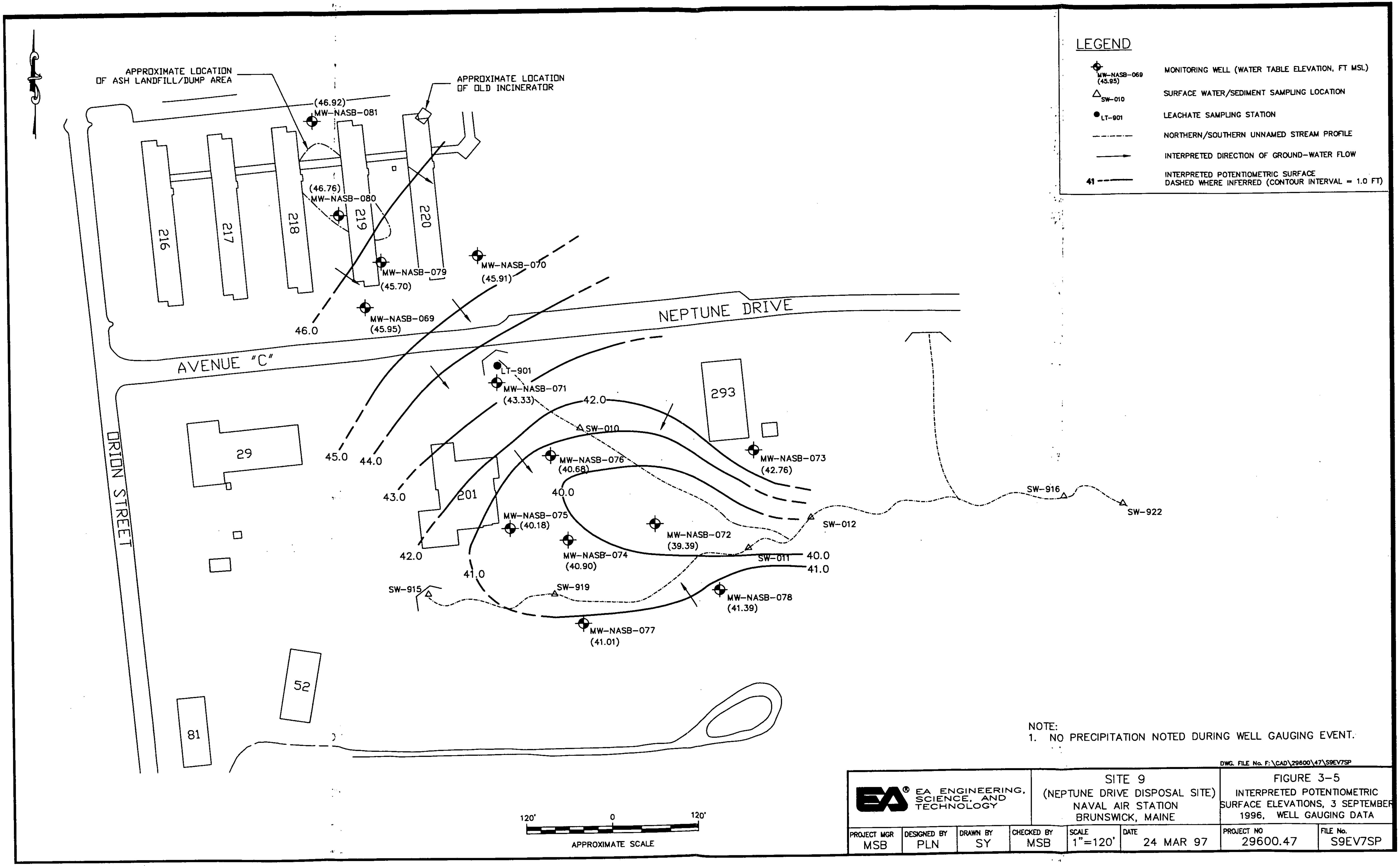


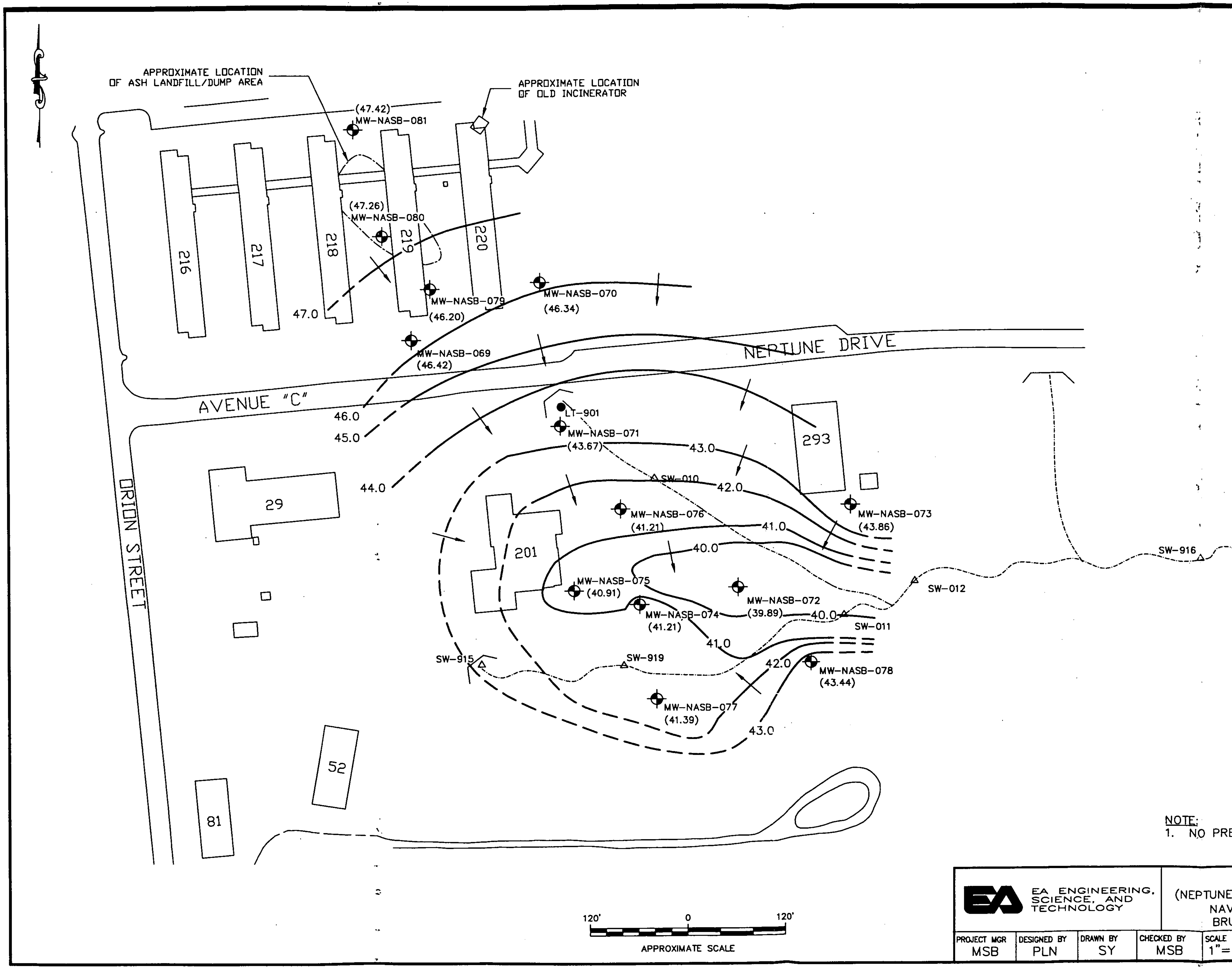
NOTE:
1. ANAMOLUS WATER ELEVATION, NOT USED DURING CONTOUR MAP GENERATION
2. NO PRECIPITATION NOTED DURING WELL GAUGING EVENT

DWG. FILE No. F:\CAD\29600\47\S9EV5

EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SITE 9 (NEPTUNE DRIVE DISPOSAL SITE) NAVAL AIR STATION BRUNSWICK, MAINE	FIGURE 3-4 INTERPRETED WATER TABLE ELEVATIONS, 1 JULY 1996 WELL GAUGING DATA

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB	PLN	SY	MSB	1"=120'	24 MAY 97	29600.47	S9EV6


LEGEND
MW-NASB-069 (45.95)
MONITORING WELL (WATER TABLE ELEVATION, FT MSL)
SW-010
SURFACE WATER/SEDIMENT SAMPLING LOCATION
LT-901
LEACHATE SAMPLING STATION
NORTHERN/SOUTHERN UNNAMED STREAM PROFILE
INTERPRETED DIRECTION OF GROUND-WATER FLOW
41
INTERPRETED POTENTIOMETRIC SURFACE DASHED WHERE INFERRED (CONTOUR INTERVAL = 1.0 FT)
APPROXIMATE LOCATION OF ASH LANDFILL/DUMP AREA
APPROXIMATE LOCATION OF OLD INCINERATOR
(46.92) MW-NASB-081
(46.76) MW-NASB-080
MW-NASB-079 (45.70)
MW-NASB-070 (45.91)
MW-NASB-069 (45.95)
LT-901
MW-NASB-071 (43.33)
MW-NASB-076 (40.68)
MW-NASB-073 (42.76)
MW-NASB-075 (40.18)
MW-NASB-074 (40.90)
MW-NASB-072 (39.39)
MW-NASB-078 (41.39)
MW-NASB-077 (41.01)
SW-010
SW-011
SW-012
SW-915
SW-916
SW-919
SW-922
216
217
218
219
220
29
201
293
52
81
46.0
45.0
44.0
43.0
42.0
41.0
40.0
NEPTUNE DRIVE
AVENUE "C"
ORION STREET
120'
0
120'
APPROXIMATE SCALE
NOTE:
1. NO PRECIPITATION NOTED DURING WELL GAUGING EVENT.
DWG. FILE No. F:\CAD\29600\47\S9EV7SP
EA ENGINEERING, SCIENCE, AND TECHNOLOGY
SITE 9
(NEPTUNE DRIVE DISPOSAL SITE)
NAVAL AIR STATION
BRUNSWICK, MAINE
FIGURE 3-5
INTERPRETED POTENTIOMETRIC SURFACE ELEVATIONS, 3 SEPTEMBER 1996, WELL GAUGING DATA
PROJECT MGR MSB
DESIGNED BY PLN
DRAWN BY SY
CHECKED BY MSB
SCALE 1"=120'
DATE 24 MAR 97
PROJECT NO 29600.47
FILE No. S9EV7SP



LEGEND

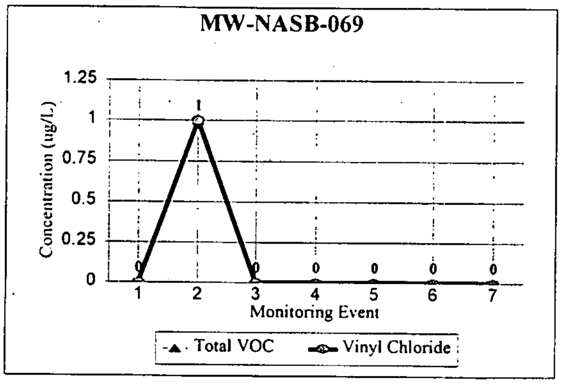
- MW-NASB-069 (46.42) — MONITORING WELL (WATER TABLE ELEVATION, FT MSL)
- SW-010 — SURFACE WATER/SEDIMENT SAMPLING LOCATION
- LT-901 — LEACHATE SAMPLING STATION
- NORTHERN/SOUTHERN UNNAMED STREAM PROFILE
- INTERPRETED DIRECTION OF GROUND-WATER FLOW
- 41 — INTERPRETED POTENTIOMETRIC SURFACE DASHED WHERE INFERRED (CONTOUR INTERVAL = 1.0 FT)

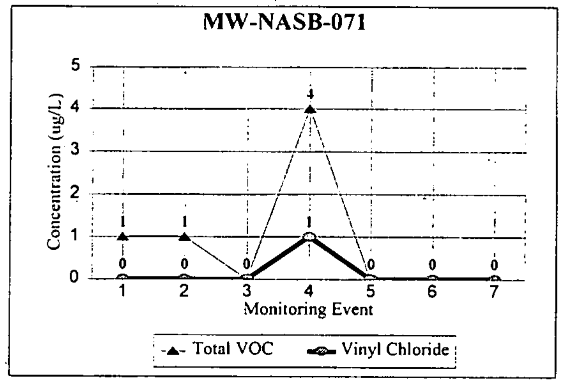
NOTE:
1. NO PRECIPITATION NOTED DURING WELL GAUGING EVENT

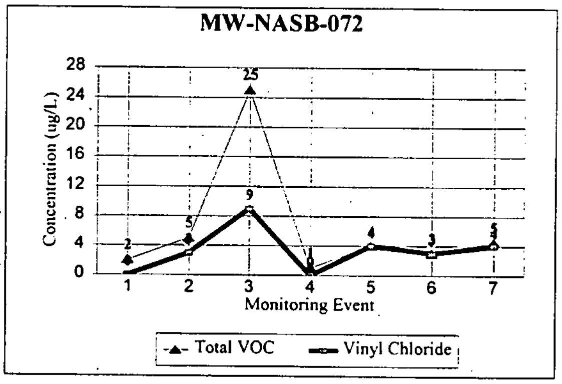
DWG. FILE No. F:\CAD\29600\47\S9EV7NV

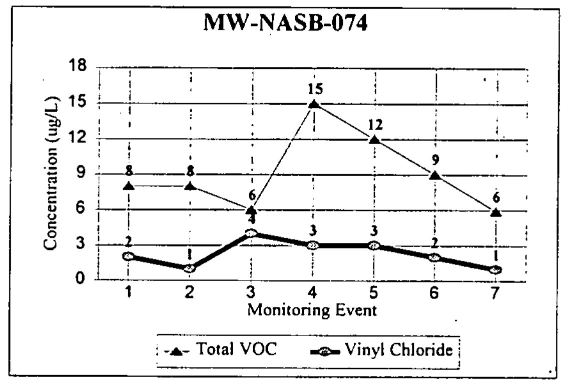
EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SITE 9 (NEPTUNE DRIVE DISPOSAL SITE) NAVAL AIR STATION BRUNSWICK, MAINE	FIGURE 3-6 INTERPRETED POTENTIOMETRIC SURFACE ELEVATIONS, 4 NOVEMBER 1996, WELL GAUGING DATA

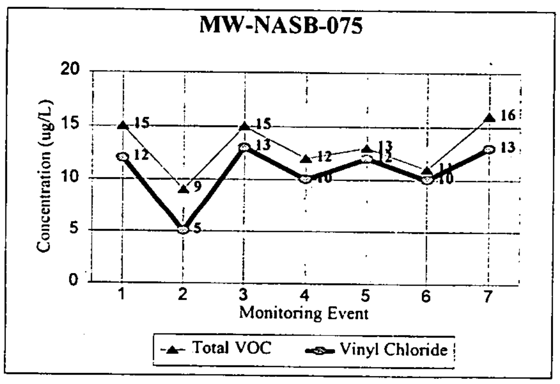
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB	PLN	SY	MSB	1"=120'	24 MAR 97	29600.47	S9EV7NV

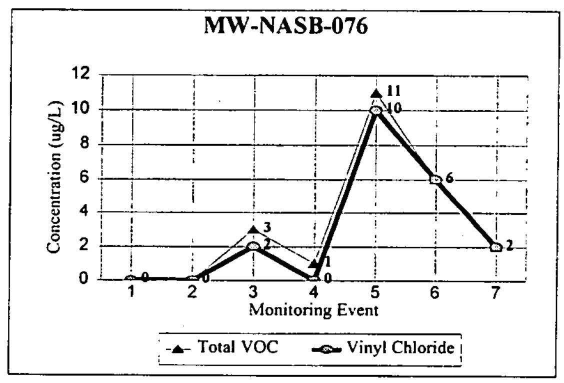


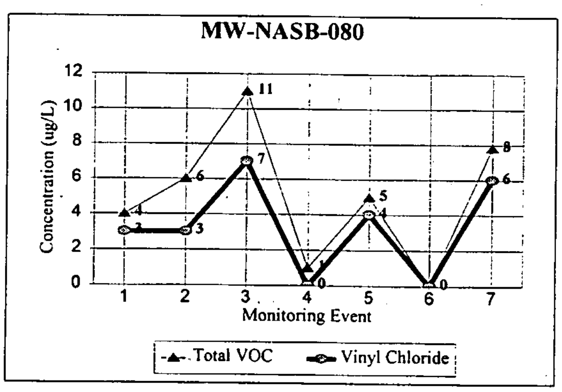








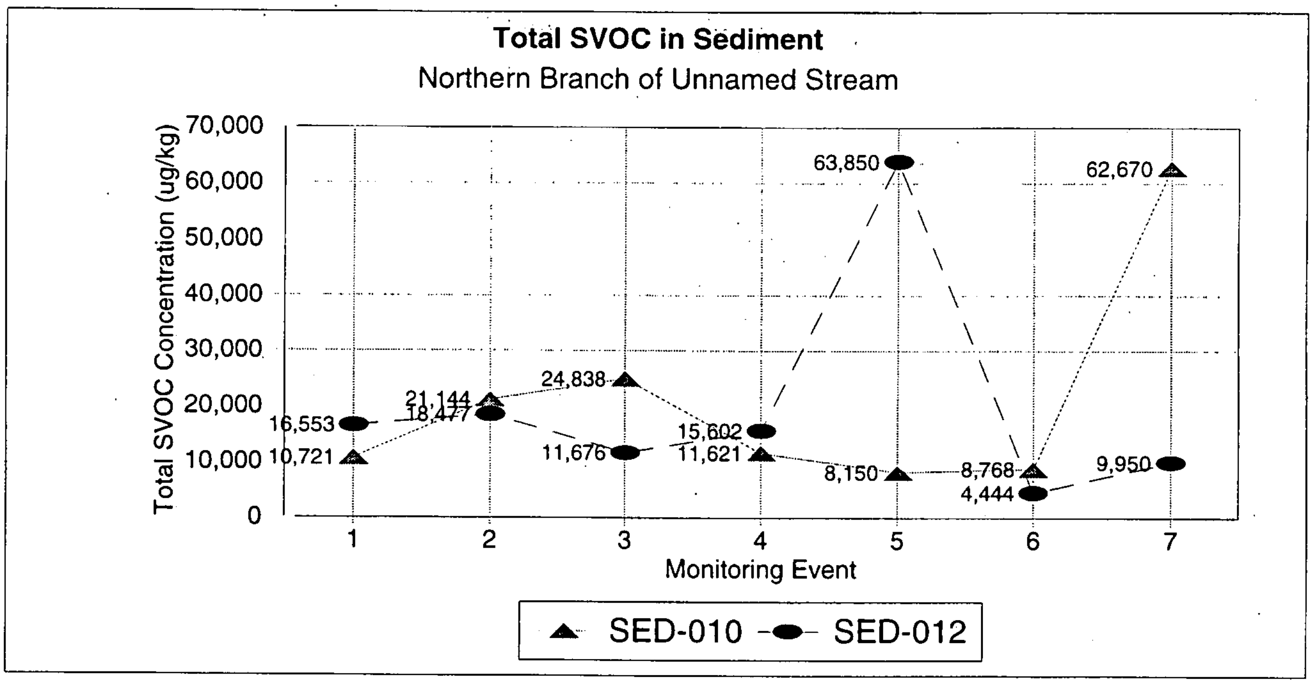


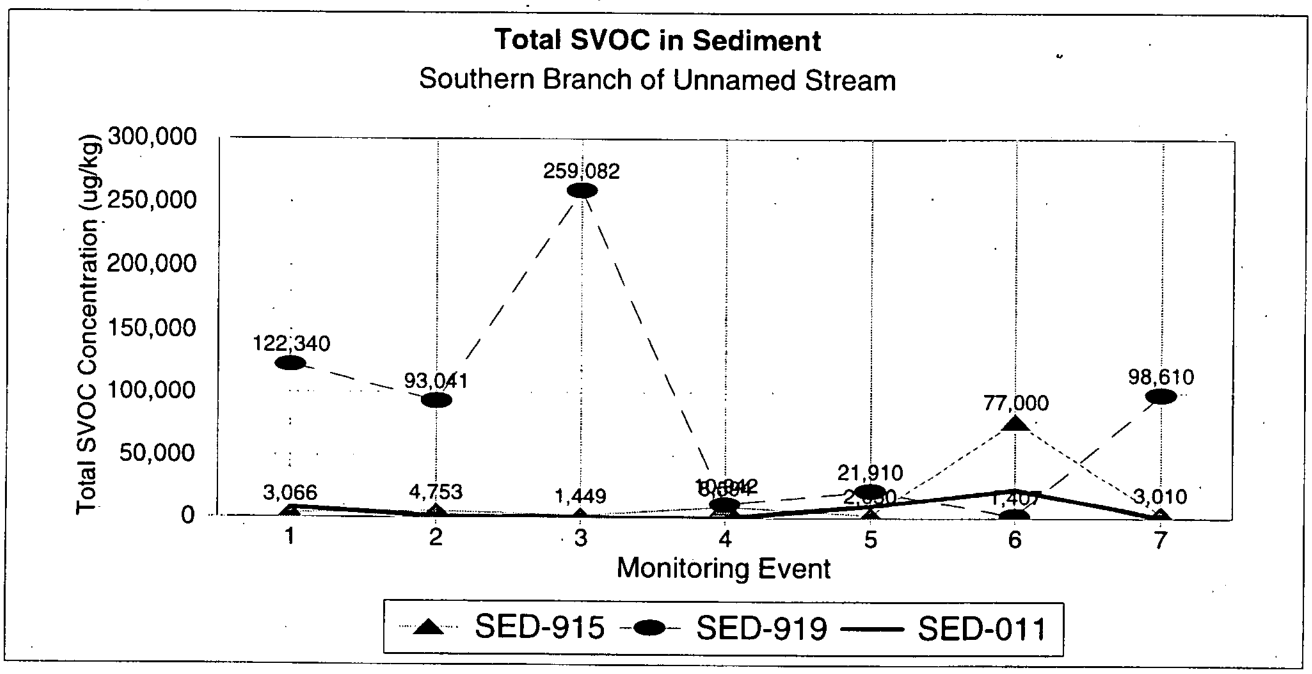


Note:
Only wells with a reported concentration above State Meg or Federal MCL during 1995 are included in this figure.

Total VOC concentrations do not include suspected laboratory and/or field contaminates.

Figure 3-7. Total volatile organic compounds and vinyl chloride in ground water, Monitoring Events 1 through 7, Site 9.





Note: Sediment station SW-916 is sampled annually and therefore is not presented on this graph. SW-916 reported 15 ug/kg total SVOC in Event 2 (May 1995), and 2 ug/kg in Event 6 (June 1996). Sediment station SW-922 is not sampled for SVOC.

Figure 3-8. Total semivolatile organic compounds in sediment samples, northern and southern branches of unnamed stream.

TABLE 3-1 SUMMARY OF LONG-TERM MONITORING PROGRAM AT SITE 9, NAVAL AIR STATION, BRUNSWICK, MAINE

			Sample Parameters			
Well Number	Sample Type/ Location	Monitoring Frequency	TCL VOC	TCL SVOC	TAL Elements	Field Parameters[a]
Monitoring Wells						
MW-NASB-069	MW-901	Tri-annual	X			X
MW-NASB-070	MW-902	Tri-annual				X[b]
MW-NASB-071	MW-903	Tri-annual	X		X	X
MW-NASB-072	MW-904	Tri-annual	X		X	X
MW-NASB-073	MW-905	Tri-annual				X[b]
MW-NASB-074	MW-906	Tri-annual	X			X
MW-NASB-075	MW-907	Tri-annual	X			X
MW-NASB-076	MW-908	Tri-annual	X			X
MW-NASB-077	MW-909	Annually	X			X
MW-NASB-078	MW-910	Annually	X			X
MW-NASB-079	MW-914	Tri-annual	X		X	X
MW-NASB-080	MW-915	Tri-annual	X		X	X
MW-NASB-081	MW-916	Tri-annual	X		X	X

(a) Determination of field parameters in accordance with EPA/600/4-79/020 including: pH (Method 150.1), temperature (Method 170.1), specific conductance (Method 180.1), and dissolved oxygen (Method 360.1). Includes water level and Eh measurement.
(b) Indicates water level measurement only.

NOTE: SVOC = Semivolatile organic compounds
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile organic compounds (EPA SW-846).

Sample Type/ Location	Monitoring Frequency	Sample Parameters: TCL VOC	TCL SVOC	TAL Elements	Field Parameters[a]
Leachate Station[c]					
LT-901 (SEEP)	Tri-annual	X		X	X
LT-901 (SED)	Tri-annual	X		X	
Surface Water					
SW-010	Tri-annual	X			X
SW-011	Tri-annual	X			X
SW-012	Tri-annual	X			X
SW-915	Tri-annual	X			X
SW-916	Annual	X			X
SW-919	Tri-annual	X			X
SW-922	Tri-annual	X			X
Sediment					
SED-010	Tri-annual	X	X		
SED-011	Tri-annual	X	X		
SED-012	Tri-annual	X	X		
SED-915	Tri-annual	X	X		
SED-916	Annual	X			
SED-919	Tri-annual	X	X		
SED-922	Tri-annual	X			

(c) Sampling occurs if sufficient flow is available.

TABLE 3-2 MONITORING WELL GAUGING SUMMARY SITE 9, NAVAL AIR STATION, BRUNSWICK, MAINE

Gauging Date	Well Riser Elevation (ft MSL)	Depth to Well Bottom (ft below top of well riser)	Depth to Water (ft below top of well riser)	Water Table Elevation (ft MSL)
MW-NASB-069				
14 FEB 1996	57.30	42.42	11.05	46.25
13 MAY 1996	57.30	42.42	10.44	46.86
13 JUNE 1996	57.30	42.42	10.86	46.44
01 JULY 1996	57.30	42.42	11.09	46.21
03 SEPT 1996	57.30	42.42	11.40	45.95
04 NOV 1996	57.30	42.42	10.90	46.45
MW-NASB-070				
14 FEB 1996	58.18	27.32	11.72	46.54
13 MAY 1996	58.18	27.32	11.21	47.05
13 JUNE 1996	58.18	27.32	11.65	46.61
01 JULY 1996	58.18	27.32	11.90	46.36
03 SEPT 1996	58.18	27.32	12.35	45.91
04 NOV 1996	58.18	27.32	11.92	46.34
MW-NASB-071				
14 FEB 1996	46.25	21.54	2.35[a]	43.90
13 MAY 1996	46.25	21.54	2.50	43.75
13 JUNE 1996	46.25	21.54	2.42	43.83
01 JULY 1996	46.25	21.54	2.60	43.65
03 SEPT 1996	46.25	21.54	2.92	43.33
04 NOV 1996	46.25	21.54	2.58	43.67
MW-NASB-072				
14 FEB 1996	49.81	14.63	9.74	40.07
13 MAY 1996	49.81	14.63	9.60	40.21
13 JUNE 1996	49.81	14.63	9.98	39.83
01 JULY 1996	49.81	14.63	9.95	39.86
03 SEPT 1996	49.81	14.63	10.42	39.39
04 NOV 1996	49.81	14.63	9.92	39.89

(a) Measurement to frozen water.

NOTE: MSL = Mean sea level.

Gauging Date	Well Riser Elevation (ft MSL)	Depth to Well Bottom (ft below top of well riser)	Depth to Water (ft below top of well riser)	Water Table Elevation (ft MSL)
MW-NASB-073				
14 FEB 1996	51.71	32.12	8.93	42.78
13 MAY 1996	51.71	32.12	8.33	43.38
13 JUNE 1996	51.71	32.12	8.41	43.30
01 JULY 1996	51.71	32.12	8.60	43.11
03 SEPT 1996	51.71	32.12	8.95	42.76
04 NOV 1996	51.71	32.12	7.85	43.86
MW-NASB-074				
14 FEB 1996	51.68	27.12	10.41	41.27
13 MAY 1996	51.68	27.12	10.00	41.68
13 JUNE 1996	51.68	27.12	10.39	41.29
01 JULY 1996	51.68	27.12	10.45	41.23
03 SEPT 1996	51.68	27.12	10.78	40.90
04 NOV 1996	51.68	27.12	10.47	41.21
MW-NASB-075				
14 FEB 1996	54.91	21.22	13.95	40.96
13 MAY 1996	54.91	21.22	13.89	41.02
13 JUNE 1996	54.91	21.22	14.26	40.65
01 JULY 1996	54.91	21.22	14.35	40.56
03 SEPT 1996	54.91	21.22	14.73	40.18
04 NOV 1996	54.91	21.22	14.00	40.91
MW-NASB-076				
14 FEB 1996	52.79	19.94	11.59	41.20
13 MAY 1996	52.79	19.94	11.11	41.68
13 JUNE 1996	52.79	19.94	11.62	41.17
01 JULY 1996	52.79	19.94	11.75	41.04
03 SEPT 1996	52.79	19.94	12.11	40.68
04 NOV 1996	52.79	19.94	11.58	41.21
MW-NASB-077				
14 FEB 1996	58.89	37.29	17.31	41.58
13 MAY 1996	58.89	37.29	17.15	41.74
13 JUN 1996	58.89	37.29	17.48	41.41
01 JULY 1996	58.89	37.29	17.80	41.09
03 SEPT 1996	58.89	37.29	17.88	41.01
04 NOV 1996	58.89	37.29	17.50	41.39

Gauging Date	Well Riser Elevation (ft MSL)	Depth to Well Bottom (ft below top of well riser)	Depth to Water (ft below top of well riser)	Water Table Elevation (ft MSL)
MW-NASB-078				
14 FEB 1996	53.74	14.93	9.88	43.86
13 MAY 1996	53.74	14.93	9.10	44.64
13 JUNE 1996	53.74	14.93	9.28	44.46
01 JULY 1996	53.74	14.93	11.02	42.72
03 SEPT 1996	53.74	14.93	12.35	41.39
04 NOV 1996	53.74	14.93	10.30	43.44
MW-NASB-079				
14 FEB 1996	58.15	18.92	11.72	46.43
13 MAY 1996	58.15	18.92	10.98	47.17
13 JUNE 1996	58.15	18.92	8.98	49.17
01 JULY 1996	58.15	18.92	9.30	48.85
03 SEPT 1996	58.15	18.92	12.45	45.70
04 NOV 1996	58.15	18.92	11.95	46.20
MW-NASB-080				
14 FEB 1996	58.51	19.04	11.04	47.47
13 MAY 1996	58.51	19.04	10.27	48.24
13 JUNE 1996	58.51	19.04	10.89	47.62
01 JULY 1996	58.51	19.04	11.12	47.39
03 SEPT 1996	58.51	19.04	11.75	46.76
04 NOV 1996	58.22	19.04	11.25	47.26
MW-NASB-081				
14 FEB 1996	58.22	18.85	10.63	49.59
13 MAY 1996	58.22	18.85	10.00	48.22
13 JUNE 1996	58.22	18.85	10.51	47.71
01 JULY 1996	58.22	18.85	10.80	47.42
03 SEPT 1996	58.22	18.85	11.30	46.92
04 NOV 1996	58.22	18.85	10.80	47.42

TABLE 3-3 SUMMARY OF ANALYTICAL RESULTS FOR GROUND-WATER SAMPLES COLLECTED DURING MONITORING EVENTS 5 THROUGH 7, SITE 9

MW-NASB-069					
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)	MEG[a]	MCL[b]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)					
1,1-Dichloroethane	(<2U)	(<1U)	(<1U)	70	---
Carbon disulfide	(<5U)	(<1U)	16	---	---
Ethylbenzene	(<2U)	(<1U)	(<1U)	700	700
Toluene	(<2U)	(<1U)	(<1U)	1,400	1,000
Total 1,2-Dichloroethene	(<2U)	(<1U)	(<1U)	70	70
Total xylenes	(<2U)	(<1U)	(<1U)	600	10,000
Trichloroethene	(<2.5U)	(<1U)	0.3J	5	5
Vinyl chloride	(<2U)	(<2U)	(<1U)	0.15	2
NOTE: See Standard Notes Table at end of table section.					

MW-NASB-071					
Analyte	Event 6 (JUN 1996)	Event 6 Duplicate (JUN 1996)	Event 7 (NOV 1996)	MEG[a]	MCL[b]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)					
1,1-Dichloroethane	(<1U)	(<1U)	(<1U)	70	---
Acetone	(<5U)	3J	(<5U)	---	---
Carbon disulfide	(<1U)	(<1U)	3	---	---
Ethylbenzene	(<1U)	(<1U)	(<1U)	700	700
Toluene	(<1U)	(<1U)	(<1U)	1,400	1,000
Total 1,2-Dichloroethene	(<1U)	(<1U)	(<1U)	70	70
Total xylenes	(<1U)	(<1U)	(<1U)	600	10,000
Vinyl chloride	(<2U)	(<2U)	(<1U)	0.15	2
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000 SERIES METHODS (μg/L)					
Aluminum	21.8B*	25B*	(<39U)	1,430	200[c]
Arsenic	5.7B*	5.8B*	3B*	---	50
Barium	6.5	6.5	(<14U)	1,500	2,000
Cadmium	(<0.3U)	(<0.3U)	(<1U)	5	5
Calcium	14,200	13,300	9,670	---	---
Chromium	(<0.7U)	(<0.7U)	(<2U)	100	100
Cobalt	1.8B*	1.1B*	(<2U)	---	30
Iron	11,500	11,200	7,080	---	300[c]
Lead	(<1U)	(<1U)	1.7B*	---	15[d]
Magnesium	6,840	6,410	4,680	---	---
Manganese	**343**	**321**	**262**	200	50[c]
Mercury	(<0.1U)	(<0.1U)	0.21	2	2
Potassium	3,100	2,830	2,090	---	---
Silver	(<1U)	(<1U)	3.1B*	50	100
Sodium	37,100	35,100	31,500	---	---
Zinc	3B*	7.4B*	22.1	---	5,000[c]

MW-NASB-072					
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)	MEG[a]	MCL[b]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)					
1,1-Dichloroethane	(<2U)	(<1U)	0.5J	70	---
Carbon disulfide	(<5U)	(<1U)	10	---	---
Ethylbenzene	(<2U)	(<1U)	(<1U)	700	700
Toluene	(<2U)	(<1U)	(<1U)	1,400	1,000
Total 1,2-Dichloroethene	(<2U)	(<1U)	(<1U)	70	70
Total xylenes	(<2U)	(<1U)	(<1U)	600	10,000
Vinyl chloride	**4**	**3**	**4**	0.15	2
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000 SERIES METHODS (μg/L)					
Aluminum	33.4B*	39.1B*	51.7B*	1,430	200[c]
Barium	6.1B*	6.4	(<14U)	1,500	2,000
Beryllium	0.09B*	(<0.2U)	(<1U)	---	4
Cadmium	(<0.21U)	(<0.3U)	(<1U)	5	5
Calcium	16,900	190,000	23,000	---	---
Chromium	0.78B*	0.96B*	(<2U)	100	100
Cobalt	(<0.71U)	0.71B*	(<2U)	---	30
Iron	102	46.6B*	72B*	---	300[c]
Magnesium	4,520B*	4,740	6,000	---	---
Manganese	112	169	137	200	50[c]
Mercury	0.17B*	(<0.1U)	0.21	2	2
Nickel	(<1.2U)	1.2B*	(<2U)	100	100
Potassium	913B*	1,580	1,320	---	---
Sodium	6,760	10,000	8,990	---	---
Vanadium	(<0.9U)	0.73B*	(<5U)	---	---
Zinc	(<6.8U)	2B*	(<10U)	---	5,000[c]

MW-NASB-074					
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)	MEG[(a)]	MCL[(b)]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)					
1,1-Dichloroethane	(<2U)	(<1U)	(<1U)	70	---
Ethylbenzene	(<2U)	(<1U)	(<1U)	700	700
Tetrachloroethene	(<2U)	(<1U)	0.2J	3	5
Toluene	(<2U)	(<1U)	(<1U)	1,400	1,000
Total 1,2-Dichloroethene	9	7	4	70	70
Total xylenes	(<2U)	(<1U)	(<1U)	600	10,000
Trichloroethene	(<2.5U)	(<1U)	0.7J	5	5
Vinyl chloride	**3**	**2**	**1**	0.15	2

MW-NASB-075					
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)	MEG[(a)]	MCL[(b)]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)					
1,1-Dichloroethane	(<2U)	1	2	70	---
Carbon disulfide	(<5U)	(<1U)	4	---	---
Ethylbenzene	(<2U)	(<1U)	(<1U)	700	700
Methylene chloride	2JB	(<1U)	(<1U)	---	5
Toluene	(<2U)	(<1U)	(<1U)	1,400	1,000
Total 1,2-Dichloroethene	1J	(<1U)	1	70	70
Total xylenes	(<2U)	(<1U)	(<1U)	600	10,000
Vinyl chloride	**12**	**10**	**13**	0.15	2

MW-NASB-076					
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)	MEG[(a)]	MCL[(b)]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)					
1,1-Dichloroethane	(<2U)	(<1U)	(<1U)	70	---
Acetone	3JB	(<5U)	(<5U)	---	---
Carbon disulfide	(<5U)	(<1U)	1	---	---
Ethylbenzene	(<2U)	(<1U)	(<1U)	700	700
Toluene	(<2U)	(<1U)	(<1U)	1,400	1,000
Total 1,2-Dichloroethene	1J	(<1U)	(<1U)	70	70
Total xylenes	(<2U)	(<1U)	(<1U)	600	10,000
Vinyl chloride	**10**	**6**	**2**	0.15	2

MW-NASB-077			
Analyte	Event 6 (JUN 1996)	MEG[a]	MCL[b]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)			
1,1-Dichloroethane	(<1U)	70	---
2-Butanone	5J	---	---
Ethylbenzene	(<1U)	700	700
Toluene	1	1,400	1,000
Total 1,2-Dichloroethene	(<1U)	70	70
Total xylenes	(<1U)	600	10,000
Vinyl chloride	(<2U)	0.15	2

MW-NASB-078			
Analyte	Event 5 (FEB 1996)	MEG[a]	MCL[b]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)			
1,1-Dichloroethane	(<2U)	70	---
1,2-Dichlorobenzene	1	600	600
1,4-Dichlorobenzene	1	27	75
Ethylbenzene	(<2U)	700	700
Toluene	(<2U)	1,400	1,000
Total 1,2-Dichloroethene	(<2U)	70	70
Total xylenes	(<2U)	600	10,000
Vinyl chloride	(<2U)	0.15	2

MW-NASB-079					
Analyte	Event 6 (JUN 1996)	Event 7 (NOV 1996)	Event 7 Duplicate (NOV 1996)	MEG[a]	MCL[b]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)					
1,1-Dichloroethane	(<1U)	(<1U)	(<1U)	70	---
Carbon disulfide	(<1U)	8	9	---	---
Ethylbenzene	(<1U)	(<1U)	(<1U)	700	700
Toluene	(<1U)	(<1U)	(<1U)	1,400	1,000
Total 1,2-Dichloroethene	(<1U)	(<1U)	(<1U)	70	70
Total xylenes	(<1U)	(<1U)	(<1U)	600	10,000
Vinyl chloride	(<2U)	(<1U)	(<1U)	0.15	2
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000 SERIES METHODS (μg/L)					
Aluminum	36.6B*	45.8B*	(<39U)	1,430	200[c]
Arsenic	(<3U)	(<2U)	2.4B*	---	50
Barium	251	(<14U)	(<14U)	1,500	2,000
Cadmium	(<0.3U)	(<1U)	(<1U)	5	5
Calcium	31,900	21,800	25,400	---	---
Chromium	(<0.7U)	(<2U)	(<2U)	100	100
Iron	20,500	13,600	16,200	---	300[c]
Lead	(<1U)	(<1U)	2.5B*	---	15[d]
Magnesium	2,000	1,380	1,560	---	---
Manganese	125	78.7	88.4	200	50[c]
Mercury	(<0.1U)	0.21	0.29	2	2
Potassium	3,230	2,390	2,780	---	---
Silver	(<1U)	(<3U)	3.5B*	50	100
Sodium	3,940	3,080	3,200	---	---
Zinc	3.2B*	(<10U)	(<10U)	---	5,000[c]

MW-NASB-080					
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)	MEG[(a)]	MCL[(b)]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)					
1,1-Dichloroethane	1J	(<1U)	1	70	---
Acetone	59	(<5U)	(<5U)	---	---
Carbon disulfide	(<5U)	(<1U)	9	---	---
Ethylbenzene	(<2U)	(<1U)	(<1U)	700	700
Toluene	(<2U)	(<1U)	(<1U)	1,400	1,000
Total 1,2-Dichloroethene	(<2U)	(<1U)	0.8J	70	70
Total xylenes	(<2U)	(<1U)	(<1U)	600	10,000
Vinyl chloride	**4**	(<2U)	**6**	0.15	2
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (μg/L)					
Aluminum	132B*	53.5B*	41.1B*	1,430	200[(c)]
Arsenic	(<3.4U)	(<3U)	2B*	---	50
Barium	826	814	42.5B*	1,500	2,000
Cadmium	(<0.21U)	(<0.3U)	(<1U)	5	5
Calcium	49,400	64,600	54,500	---	---
Chromium	3.9B*	1.9B*	(<2U)	100	100
Cobalt	2.7B*	(<0.7U)	(<2U)	---	30
Copper	1.2B*	(<0.7U)	(<4U)	---	1,300[(d)]
Cyanide	1.5B*	(<1.3U)	NR	154	200
Iron	4,930	1,960	3,700	---	300[(c)]
Lead	1.4B*	(<1U)	(<1U)	---	15[(d)]
Magnesium	3,130B*	3,900	3,530	---	---
Manganese	193	122	**311**	200	50[(c)]
Mercury	0.11B*	(<0.1U)	(<0.2U)	2	2
Nickel	6.8B*	2B*	(<2U)	100	100
Potassium	5,760	6,960	6,850	---	---
Silver	(<5.2U)	(<1U)	3.2B*	50	100
Sodium	16,300	16,800	15,200	---	---
Vanadium	1B*	(<0.6U)	(<5U)	---	---
Zinc	15.2B*	5.4B*	(<10U)	---	5,000[(c)]

MW-NASB-081								
Analyte	Event 5 (FEB 1996)	Event 5 Duplicate (FEB 1996)	Event 6 (JUN 1996)	Event 6 Duplicate (JUN 1996)	Event 7 (NOV 1996)	Event 7 Duplicate (NOV 1996)	MEG[a]	MCL[b]
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)								
1,1-Dichloroethane	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)	70	---
Carbon disulfide	(<5U)	(<5U)	(<1U)	(<1U)	8	2	---	---
Ethylbenzene	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)	700	700
Toluene	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)	1,400	1,000
Total 1,2-Dichloroethene	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)	70	70
Total xylenes	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)	600	10,000
Vinyl chloride	(<2U)	(<2U)	(<2U)	(<2U)	(<1U)	(<1U)	0.15	2
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (μg/L)								
Aluminum	24B*	26B*	39.3B*	32.5B*	(<39U)	(<39U)	1,430	200[c]
Antimony	(<4.1U)	(<4.1U)	**8.8B***	(<3.6U)	(<2U)	**8.8B***	7.8	6
Barium	27B*	28.2B*	65.3	64.2	(<14U)	(<14U)	1,500	2,000
Cadmium	0.36B*	0.25B*	(<0.3U)	(<0.3U)	(<1U)	(<1U)	5	5
Calcium	34,000	35,700	60,400	57,900	56,200	48,900	---	---
Chromium	2.1B*	2.6B*	6B*	2.1B*	6.8B*	3B*	100	100
Cobalt	0.78B*	(<0.71U)	1.1B*	(<0.7U)	(<2U)	(<2U)	---	30
Copper	2.6B*	1.9B*	0.83B*	(<.7U)	(<4U)	(<4U)	---	1,300[d]
Cyanide	1.5B*	(<4.3U)	(<1.3U)	(<4.3U)	NR	NR	154	200
Iron	(<25.4U)	41.3B*	75.2	40.1B*	235	141	---	300[c]
Lead	1.2B*	(<1.1U)	(<1U)	(<1U)	(<1U)	(<1U)	---	15[d]
Magnesium	2,150B*	2,220B*	3,670	3,570	3,660	3,220	---	---
Manganese	**876**	**938**	29	21.3	2.6B*	(<1U)	200	50[c]
Mercury	0.1B*	0.11B*	(<0.1U)	(<0.1U)	0.25	0.22	2	2
Nickel	3.5B*	3.6B*	6B*	2.7B*	(<2U)	(<2U)	100	100
Potassium	3,790B*	4,520B*	10,700	10,200	8,240	6,990	---	---
Silver	(<5.2U)	(<5.2U)	(<1U)	(<1U)	4.7B*	3.7B*	50	100
Sodium	30,000	30,100	56,000	54,400	38,700	32,500	---	---
Zinc	9.6B*	(<6.8U)	5.4B*	3.3B*	(<10U)	(<10U)	---	5,000[c]

TABLE 3-4 FREQUENCY OF ANALYTICAL DETECTIONS FOR THE GROUND-WATER SAMPLES COLLECTED DURING MONITORING EVENTS 5 THROUGH 7, SITE 9

Analyte	Event 5 (FEB 1996)	Event 5 Duplicate (FEB 1996)	Event 6 (JUN 1996)	Event 6 Duplicate (JUN 1996)	Event 7 (NOV 1996)	Event 7 Duplicate (NOV 1996)	Total	Frequency of Detection (%)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)								
1,1,1-Trichloroethane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
1,1,2,2-Tetrachloroethane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
1,1,2-Trichloroethane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
1,1-Dichloroethane	1/8	0/1	1/10	0/3	3/9	0/2	5/33	15
1,2-Dichlorobenzene	1/8	0/1	0/10	0/3	0/9	0/2	1/33	3
1,2-Dichloroethane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
1,2-Dichloropropane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
1,3-Dichlorobenzene	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
1,4-Dichlorobenzene	1/8	0/1	0/10	0/3	0/9	0/2	1/33	3
2-Butanone	0/8	0/1	1/10	0/3	0/9	0/2	1/33	3
2-Hexanone	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
4-Methyl-2-pentanone	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Acetone	2/8	0/1	0/10	2/3	0/9	0/2	4/33	12
Benzene	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Bromodichloromethane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Bromoform	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Bromomethane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Carbon disulfide	0/8	0/1	0/10	0/3	8/9	2/2	10/33	30
Carbon tetrachloride	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Chlorobenzene	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Chloroethane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Chloroform	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Chloromethane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
cis-1,3-Dichloropropene	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Dibromochloromethane	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Ethylbenzene	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Methylene chloride	1/8	0/1	0/10	0/3	0/9	0/2	1/33	3
Styrene	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Tetrachloroethene	0/8	0/1	0/10	0/3	1/9	0/2	1/33	3
Toluene	0/8	0/1	1/10	0/3	0/9	0/2	1/33	3
Total 1,2-Dichloroethene	3/8	0/1	1/10	0/3	3/9	0/2	7/33	21
Total Xylenes	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
trans-1,3-Dichloropropene	0/8	0/1	0/10	0/3	0/9	0/2	0/33	0
Trichloroethene	0/8	0/1	0/10	0/3	2/9	0/2	2/33	6
Vinyl chloride	5/8	0/1	4/10	0/3	5/9	0/2	14/33	42

NOTE: See Standard Notes Table at end of table section.

Analyte	Event 5 (FEB 1996)	Event 5 Duplicate (FEB 1996)	Event 6 (JUN 1996)	Event 6 Duplicate (JUN 1996)	Event 7 (NOV 1996)	Event 7 Duplicate (NOV 1996)	Total	Frequency of Detection (%)
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (μg/L)								
Aluminum	3/3	1/1	5/5	2/2	3/5	0/2	14/18	78
Antimony	0/3	0/1	0/5	0/2	0/5	1/2	1/18	6
Arsenic	0/3	0/1	1/5	1/2	2/5	1/2	5/18	28
Barium	3/3	1/1	5/5	2/2	1/5	0/2	12/18	67
Beryllium	1/3	0/1	0/5	0/2	0/5	0/2	1/18	6
Cadmium	1/3	1/1	0/5	0/2	0/5	0/2	2/18	11
Calcium	3/3	1/1	5/5	2/2	5/5	2/2	18/18	100
Chromium	3/3	1/1	3/5	1/2	1/5	1/2	10/18	56
Cobalt	2/3	0/1	3/5	1/2	0/5	0/2	6/18	33
Copper	2/3	1/1	1/5	0/2	0/5	0/2	4/18	22
Cyanide	2/3	0/1	0/5	0/2	NR	NR	2/11	18
Iron	2/3	1/1	5/5	2/2	5/5	2/2	17/18	94
Lead	2/3	0/1	0/5	0/2	1/5	1/2	4/18	22
Magnesium	3/3	1/1	5/5	2/2	5/5	2/2	18/18	100
Manganese	3/3	1/1	5/5	2/2	5/5	1/2	17/18	94
Mercury	3/3	1/1	0/5	0/2	4/5	2/2	10/18	56
Nickel	2/3	1/1	3/5	1/2	0/5	0/2	7/18	39
Potassium	3/3	1/1	5/5	2/2	5/5	2/2	18/18	100
Selenium	0/3	0/1	0/5	0/2	0/5	0/2	0/18	0
Silver	0/3	0/1	0/5	0/2	3/5	2/2	5/18	28
Sodium	3/3	1/1	5/5	2/2	5/5	2/2	18/18	100
Thallium	0/3	0/1	0/5	0/2	0/5	0/2	0/18	0
Vanadium	1/3	0/1	1/5	0/2	0/5	0/2	2/18	11
Zinc	2/3	0/1	5/5	2/2	1/5	0/2	10/18	56

TABLE 3-5 SUMMARY OF ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES COLLECTED DURING MONITORING EVENTS 5 THROUGH 7, SITE 9

SW-010			
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)			
1,1-Dichloroethane	(<2U)	(<1U)	(<1U)
Acetone	10	(<5U)	(<5U)
Carbon disulfide	(<5U)	(<1U)	15
Ethylbenzene	(<2U)	(<1U)	(<1U)
Methylene chloride	2JB	(<1U)	(<1U)
Toluene	(<2U)	(<1U)	(<1U)
Total 1,2-Dichloroethene	(<2U)	(<1U)	0.5J
Total xylenes	(<2U)	(<1U)	(<1U)
Trichloroethene	(<2.5U)	(<1U)	0.3J
Vinyl chloride	(<2U)	(<2U)	(<1U)

SW-011			
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)			
1,1-Dichloroethane	(<2U)	(<1U)	(<1U)
Acetone	10	6	(<5U)
Carbon disulfide	(<5U)	(<1U)	0.8J
Ethylbenzene	(<2U)	(<1U)	(<1U)
Tetrachloroethene	(<2U)	(<1U)	0.3J
Toluene	3	(<1U)	(<1U)
Total 1,2-Dichloroethene	(<2U)	(<1U)	(<1U)
Total xylenes	2	(<1U)	0.6J
Trichloroethene	(<2.5U)	(<1U)	0.1J
Vinyl chloride	(<2U)	(<2U)	(<1U)
NOTE: See Standard Notes Table at end of table section.			

SW-012			
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)			
1,1-Dichloroethane	(<2U)	(<1U)	(<1U)
Acetone	11	(<5U)	(<5U)
Carbon disulfide	(<5U)	(<1U)	2
Ethylbenzene	(<2U)	(<1U)	(<1U)
Tetrachloroethene	(<2U)	(<1U)	0.2J
Toluene	2	(<1U)	0.3J
Total 1,2-Dichloroethene	(<2U)	(<1U)	(<1U)
Total xylenes	2J	1	(<1U)
Vinyl chloride	(<2U)	(<2U)	(<1U)

SW-915			
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)			
1,1-Dichloroethane	(<2U)	(<1U)	(<1U)
Acetone	14	(<5U)	(<5U)
Carbon disulfide	(<5U)	(<1U)	4
Ethylbenzene	(<2U)	(<1U)	(<1U)
Tetrachloroethene	(<2U)	(<1U)	0.5J
Toluene	3	1	(<1U)
Total 1,2-Dichloroethene	(<2U)	(<1U)	(<1U)
Total xylenes	2	1	1
Trichloroethene	(<2.5U)	(<1U)	0.2J
Vinyl chloride	(<2U)	(<2U)	(<1U)

SW-916	
Analyte	Event 6 (JUN 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)	
1,1-Dichloroethane	(<1U)
Ethylbenzene	(<1U)
Toluene	(<1U)
Total 1,2-Dichloroethene	(<1U)
Total xylenes	(<1U)
Vinyl chloride	(<2U)

SW-919			
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)			
1,1-Dichloroethane	(<2U)	(<1U)	(<1U)
Acetone	12	(<5U)	(<5U)
Carbon disulfide	(<5U)	(<1U)	8
Ethylbenzene	(<2U)	(<1U)	(<1U)
Tetrachloroethene	(<2U)	(<1U)	0.3J
Toluene	2	(<1U)	(<1U)
Total 1,2-Dichloroethene	(<2U)	(<1U)	(<1U)
Total xylenes	(<2U)	1	0.7J
Vinyl chloride	(<2U)	(<2U)	(<1U)

SW-922			
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)			
1,1-Dichloroethane	(<2U)	(<1U)	(<1U)
Acetone	11	7	(<5U)
Carbon disulfide	(<5U)	(<1U)	1
Ethylbenzene	(<2U)	(<1U)	(<1U)
Toluene	1J	(<1U)	(<1U)
Total 1,2-Dichloroethene	(<2U)	(<1U)	(<1U)
Total xylenes	1J	(<1U)	(<1U)
Vinyl chloride	(<2U)	(<2U)	(<1U)

TABLE 3-6 SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES COLLECTED DURING MONITORING EVENTS 5 THROUGH 7, SITE 9

SED-010			
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/kg)			
1,2-Dichloroethane	2J	(<1.2U)	(<6U)
2-Butanone	7J	(<6U)	(<13U)
Acetone	24B	4J	(<13U)
Methylene chloride	7B	3B	(<6U)
Toluene	3J	(<1.2U)	(<6U)
Total 1,2-Dichloroethene	8	4	(<6U)
Trichloroethene	2J	(<1.2U)	(<6U)
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (μg/kg)			
Acenaphthene	(<460U)	140J	1,800
Anthracene	(<460U)	210J	2,100
Benzo(a)anthracene	790	700	4,700
Benzo(a)pyrene	450J	630	4,800
Benzo(b)fluoranthene	1,100	1,100	6,500
Benzo(g,h,i)perylene	480	360J	1,800
Benzo(k)fluoranthene	(<460U)	(<400U)	2,400
bis(2-Ethylhexyl)phthalate	250J	(<400U)	(<860U)
Carbazole	(<460U)	190J	1,400
Chrysene	690	700	4,300
Dibenz(a,h)anthracene	(<460U)	67J	530J
Dibenzofuran	(<460U)	70J	840J
Fluoranthene	1,700	1,700	9,300
Fluorene	(<460U)	140J	1,400
Indeno(1,2,3-cd)pyrene	390J	330J	2,100
Naphthalene	(<460U)	31J	(<860U)
Phenanthrene	1,100	1,300	10,000
Pyrene	1,200	1,100	8,700
NOTE: See Standard Notes Table at end of table section.			

SED-011				
Analyte	Event 5 (FEB 1996)	Event 5 Dup (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/kg)				
1,2-Dichlorobenzene	(<3.2U)	(<2.8U)	4	(<7U)
2-Butanone	19	(<7U)	30	(<14U)
Acetone	64B	41B	98	(<14U)
Methylene chloride	6B	4B	6B	(<7U)
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (μg/kg)				
Benzo(a)anthracene	(<530U)	720	1,500	(<480U)
Benzo(a)pyrene	(<530U)	480	890	(<480U)
Benzo(b)fluoranthene	(<530U)	1,200	2,500	(<480U)
Benzo(g,h,i)perylene	(<530U)	350J	500	(<480U)
bis(2-Ethylhexyl)phthalate	(<530U)	450J	4,000	(<480U)
Carbazole	(<530U)	(<460U)	180J	(<480U)
Chrysene	(<530U)	1,000	1,900	(<480U)
Fluoranthene	(<530U)	2,300	5,300	150J
Fluorene	(<530U)	(<460U)	100J	(<480U)
Indeno(1,2,3-cd)pyrene	(<530U)	300J	510	(<480U)
Naphthalene	(<530U)	(<460U)	91J	(<480U)
Phenanthrene	(<530U)	1,100	1,400	(<480U)
Pyrene	(<530U)	1,700	4,200	130J

SED-012				
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 6 Dup (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/kg)				
1,1,2,2-Tetrachloroethane	20	(<1.3U)	(<1.3U)	(<7U)
1,2-Dichlorobenzene	2J	(<1.3U)	(<1.3U)	(<7U)
1,3-Dichlorobenzene	2J	(<1.3U)	(<1.3U)	(<7U)
1,4-Dichlorobenzene	2J	(<1.3U)	(<1.3U)	(<7U)
2-Butanone	7J	(<6.5U)	(<6.5U)	(<13U)
Acetone	9B	13	(<6.5U)	(<13U)
Methylene chloride	5B	2B	(<1.3U)	(<7U)
Total xylenes	2J	(<1.3U)	(<1.3U)	(<7U)
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (μg/kg)				
2-Methylnaphthalene	260J	(<430U)	(<430U)	(<440U)
Acenaphthene	1,400	48J	82J	150J
Anthracene	2,100	71J	140J	(<440U)
Benzo(a)anthracene	5,100	360J	590	760
Benzo(a)pyrene	3,100	290J	510	850
Benzo(b)fluoranthene	6,900	560	910	1,200
Benzo(g,h,i)perylene	2,600	230J	300J	350J
Benzo(k)fluoranthene	(<460U)	(<430U)	(<430U)	500
bis(2-Ethylhexyl)phthalate	540	150J	92J	370J
Carbazole	1,700	61J	97J	140J
Chrysene	4,700	390J	520	850
Dibenz(a,h)anthracene	1,100	(<430U)	(<430U)	100J
Dibenzofuran	1,100	(<430U)	42J	(<440U)
Fluoranthene	11,000	790	1,300	1,600
Fluorene	1,800	54J	87J	150J
Indeno(1,2,3-cd)pyrene	2,300	170J	280J	380J
Naphthalene	650	(<430U)	(<430U)	(<440U)
Phenanthrene	10,000	620	880	750
Pyrene	7,500	650	900	1,800

SED-915			
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/kg)			
Acetone	5JB	(<6U)	(<12U)
Methylene chloride	6B	3B	(<6U)
Tetrachloroethene	1J	(<1.2U)	(<6U)
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (μg/kg)			
2-Methylnaphthalene	(<400U)	150J	(<400U)
Acenaphthene	(<400U)	770	(<400U)
Anthracene	(<400U)	1,000	(<400U)
Benzo(a)anthracene	230J	6,700	230J
Benzo(a)pyrene	(<400U)	3,900	260J
Benzo(b)fluoranthene	350J	10,000	380J
Benzo(g,h,i)perylene	(<400U)	1,800	110J
Benzo(k)fluoranthene	(<400U)	(<400U)	140J
bis(2-Ethylhexyl)phthalate	(<400U)	350J	410
Carbazole	(<400U)	720	(<400U)
Chrysene	310J	6,500	260J
Di-n-octylphthalate	(<400U)	310J	(<400U)
Dibenz(a,h)anthracene	(<400U)	530	(<400U)
Dibenzofuran	(<400U)	320J	(<400U)
Fluoranthene	660	19,000	590
Fluorene	(<400U)	620	(<400U)
Indeno(1,2,3-cd)pyrene	(<400U)	1,700	110J
Naphthalene	(<400U)	330J	(<400U)
Phenanthrene	(<400U)	5,300	(<400U)
Pyrene	500	17,000	520

SED-916	
Analyte	Event 6 (JUN 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/kg)	
Methylene chloride	2B

SED-919				
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)	Event 7 Dup (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/kg)				
Acetone	45B	6J	(<13U)	(<13U)
Methylene chloride	5B	3B	(<7U)	(<7U)
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (μg/kg)				
Acenaphthene	(<400U)	(<400U)	(<440U)	170J
Benzo(a)anthracene	2,000	120J	1,000	8,800
Benzo(a)pyrene	1,100	100J	750	5,800
Benzo(b)fluoranthene	2,700	210J	1,100	11,000
Benzo(g,h,i)perylene	680	83J	220J	1,900
Benzo(k)fluoranthene	(<400U)	(<400U)	430J	3,300
bis(2-Ethylhexyl)phthalate	390J	98J	100J	12,000
Carbazole	(<400U)	(<400U)	(<440U)	420
Chrysene	2,500	86J	1,100	11,000
Dibenz(a,h)anthracene	(<400U)	(<400U)	(<440U)	500
Fluoranthene	6,000	280J	2,700	19,000
Fluorene	(<400U)	(<400U)	(<440U)	220J
Indeno(1,2,3-cd)pyrene	640	60J	260J	2,200
Phenanthrene	1,400	110J	220J	3,300
Pyrene	4,500	260J	2,700	19,000

SED-922			
Analyte	Event 5 (FEB 1996)	Event 6 (JUN 1996)	Event 7 (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/kg)			
2-Butanone	9	(<6.5U)	(<12U)
Acetone	46B	(<6.5U)	(<12U)
Methylene chloride	47B	2B	(<6U)
Tetrachloroethene	2J	(<1.3U)	(<6U)
Toluene	2J	(<1.3U)	(<6U)
Total xylenes	2J	(<1.3U)	(<6U)

TABLE 3-7 SUMMARY OF ANALYTICAL RESULTS FOR SEEP STATION AQUEOUS AND SEDIMENT SAMPLES COLLECTED DURING MONITORING EVENTS 5 THROUGH 7, SITE 9

LT-901 (SEEP)						
Analyte	Event 5 (FEB 1996)	Event 5 Duplicate (FEB 1996)	Event 6 (JUN 1996)	Event 6 Duplicate (JUN 1996)	Event 7 (NOV 1996)	Event 7 Duplicate (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (µg/L)						
1,1-Dichloroethane	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)
Acetone	(<5U)	(<5U)	(<5U)	4J	(<5U)	(<5U)
Carbon disulfide	(<5U)	(<5U)	(<1U)	(<1U)	1	(<1U)
Ethylbenzene	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)
Methylene chloride	(<3U)	2JB	(<1U)	(<1U)	(<1U)	(<1U)
Toluene	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)
Total 1,2-Dichloroethene	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)
Total xylenes	(<2U)	(<2U)	(<1U)	(<1U)	(<1U)	(<1U)
Vinyl chloride	(<2U)	(<2U)	(<2U)	(<2U)	(<1U)	(<1U)
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (µg/L)						
Aluminum	4,090	275	14,100	3,950	5,460	(<39U)
Arsenic	4.1B*	(<3.4U)	62.6	19.7	11.3	5.4B*
Barium	50.5B*	23.4B*	392	137	142B*	(<14U)
Beryllium	(<0.09U)	(<0.09U)	0.75B*	(<0.2U)	(<1U)	(<1U)
Cadmium	0.44B*	(<0.21U)	(<0.3U)	1.2B*	5.1	1.9B*
Calcium	15,500	15,000	44,500	33,400	28,200	23,100
Chromium	12.3	0.83B*	45.1	13.9B*	13.6	4.5B*
Cobalt	2B*	(<0.71U)	9.4B*	3.3B*	(<2U)	(<2U)
Copper	16.1B*	2.1B*	58.8	26.6	(<4U)	(<4U)
Cyanide	(<1.3U)	(<1.3U)	4.5B*	6	NR	NR
Iron	20,500	4,940	403,000	123,000	243,000	97,700
Lead	76.3	9.8	188	55.5	92.2	46.2
Magnesium	3,000B*	1,770B*	7,790	4,130	3,830	2,840
Manganese	196	123	1,610	715	478	298
Mercury	0.14B*	0.1B*	0.19B*	0.11B*	0.26	(<0.2U)
Nickel	8.6B*	(<1.2U)	31.1B*	9B*	(<2U)	(<2U)
Potassium	3,360B*	1,580B*	6,200	4,080	3,570	3,230
Silver	(<5.2U)	(<5.2U)	(<1U)	(<1U)	(<3U)	4.3B*
Selenium	(<5.3U)	(<5.3U)	6.1B*	(<3.7U)	(<1U)	(<1U)
Sodium	26,500	27,900	48,400	47,500	38,900	37,800
Vanadium	18.6B*	2.3B*	82	23.2B*	12.6B*	5.3B*
Zinc	87.2	17B*	451	160	132	67.4
NOTE: See Standard Notes Table at end of table section.						

LT-901 (SED)						
Analyte	Event 5 (FEB 1996)	Event 5 Duplicate (FEB 1996)	Event 6 (JUN 1996)	Event 6 Duplicate (JUN 1996)	Event 7 (NOV 1996)	Event 7 Duplicate (NOV 1996)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/kg)						
1,2-Dichlorobenzene	(<2.6U)	(<2.6U)	3	4	(<9U)	(<8U)
1,2-Dichloroethane	5	6	(<1.4U)	(<1.4U)	(<9U)	(<8U)
1,3-Dichlorobenzene	(<2.6U)	(<2.6U)	3	4	(<9U)	(<8U)
1,4-Dichlorobenzene	(<2.6U)	(<2.6U)	3	5	(<9U)	(<8U)
2-Butanone	(<6.5U)	(<6.5U)	(<7U)	11	(<18U)	(<17U)
Acetone	25	62	16	260	(<18U)	(<17U)
Methylene chloride	15B	11	2	28	(<9U)	(<8U)
Toluene	(<2.6U)	2J	0.8J	(<1.4U)	(<9U)	(<8U)
Total xylenes	(<2.6U)	(<2.6U)	(<1.4U)	2	(<9U)	(<8U)
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (μg/kg)						
Aluminum	3,780	3,380	6,090	5,110	5,430	6,850
Antimony	(<0.43U)	(<0.45U)	(<0.39U)	(<0.39U)	0.39B*	0.42B*
Arsenic	2.2	1.8	3	2.2	NA	2.8
Barium	12.3B*	10.3B*	19.4	11.8	20.4B*	29.2B*
Beryllium	0.21B*	0.16B*	0.23B*	0.21B*	(<0.18U)	0.23B*
Cadmium	0.08B*	0.07B*	0.25B*	0.21B*	0.87B*	0.83
Calcium	640	919	1,130	980	1,230	1,630
Chromium	6.3	6.5	11.5	9.6	10.2	15.6
Cobalt	2.8B*	2B*	4.1	4	2.3B*	2.4B*
Copper	6.4	7.8	9.6	11.3	16.1	25
Cyanide	0.08B*	(<0.07U)	(<0.08U)	(<0.07U)	NR	NR
Iron	5,950	5,300	9,500	8,520	10,600	12,200
Lead	40.4	43.1	55.8	65.1	122	275
Magnesium	1,150	1,110	2,660	2,320	1,860	2,240
Manganese	55.5	51.1	92.4	85	83.2	99.6
Mercury	0.02B*	(<0.02U)	0.04B*	0.04B*	(<0.15U)	(<0.15U)
Nickel	6.8	6	11.6	12.5	9.7	12
Potassium	594	462B*	1,060	526	697	984
Sodium	67.2B*	72.5B*	90.1	94.6	214	233
Vanadium	12.1	9.9	16.9	13.6	15.6	24.5
Zinc	28.6	29.6	41.5	43.4	78.4	122

STANDARD NOTES FOR SAMPLES COLLECTED DURING MONITORING EVENTS 5 THROUGH 7 AT SITE 9 NAVAL AIR STATION, BRUNSWICK, MAINE

GROUND WATER

(a) MEG (Maximum Exposure Guideline) obtained from State of Maine Department of Human Services Revised Maximum Exposure Guidelines, memorandum dated 23 October 1992. Dashes (---) indicate no MEG applicable.
(b) MCL (Maximum Contamination Level) obtained from 40 CFR Parts 141 and 142 (U.S. EPA 1994). Dashes (---) indicate no MCL applicable.
(c) Secondary MCL, based on taste, odor, or color.
(d) Action level.

NOTE:
- U = Not detected. Sample quantitation limits are shown as (<____U).
- J = Estimated concentration below detection limit.
- B = Compound detected in associated method blank.
- B* = Analyte concentration is between the instrument detection limit and the Contract Required Detection Limit.
- NR = Analysis not required.

Only those analytes detected in at least one of the samples, and the contaminants of concern listed in the Long-Term Monitoring Plan (ABB-ES 1995), are shown on this table.
Results in bold indicate concentrations above primary Federal MCL and/or State MEG.

SURFACE WATER

NOTE:
- U = Not detected. Sample quantitation limits are shown as (<____U).
- B = Compound detected in associated method blank.
- J = Estimated concentration below detection limit.

Only those analytes detected in at least one of the samples, and contaminants of concern listed in the Long-Term Monitoring Plan (ABB-ES 1995), are shown on this table.

SEDIMENT

NOTE:
- U = Not detected. Sample quantitation limits are shown as (<____U).
- B = Compound detected in associated method blank.
- J = Estimated concentration below detection limit.

Only those analytes detected in at least one of the samples, and contaminants of concern listed in the Long-Term Monitoring Plan (ABB-ES 1995), are shown on this table.

SAMPLE STATION LT-901 - SEEP AND SEDIMENT

NOTE:
- U = Not detected. Sample quantitation limits are shown as (<____U).
- J = Estimated concentration below detection limit.
- B = Compound detected in associated method blank.
- B* = Analyte concentration is between the instrument detection limit and the Contract Required Detection Limit.
- NR = Analysis not required.

Only those analytes detected in at least one of the samples, and contaminants of concern listed in the Long-Term Monitoring Plan (ABB-ES 1995), are shown on this table.

4. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

4.1 SUMMARY OF FINDINGS

4.1.1 Water Level Gauging Program

Results of the water level gauging program conducted during 1996 indicate that ground-water flow is generally to the south-southeast, toward the unnamed stream located south of Neptune Drive. The interpreted hydraulic gradient is shallowest north of Neptune Drive and shows an increasing gradient to the south. The steepest hydraulic gradients are observed in the vicinity of the northern and southern branches of the unnamed stream.

Based on data collected during 1996, the following observations are noted:

- Overburden ground water is likely to discharge to the unnamed streams located south of Neptune Drive, as indicated by localized ground-water flow to the north, southwest, and south.

- Overburden ground water from the ash landfill/dump area, and the approximate location of the old incinerator, is likely to discharge to the northern branch of the unnamed stream; overburden ground water in the vicinity of Building 201 discharges to the northern and southern branches of the unnamed streams.

- There were no significant variations in ground-water flow patterns noted during the three monitoring or bi-monthly gauging events.

4.1.2 Ground-Water Monitoring and Sampling Program

Results of the ground-water sampling and analysis program conducted at Site 9 during 1996 indicate the following:

- VOC were reported in the 11 site wells during 1996, although several VOC detections were reported in associated method blanks (methylene chloride and acetone), or were the result of field contamination (carbon disulfide). Excluding results with corresponding blank or field contamination, 10 VOC were reported in ground-water samples.

- Vinyl chloride was the only VOC reported at concentrations above the corresponding Federal MCL or State MEG. Vinyl chloride was reported at concentrations above the State MEG of 0.15 μg/L and Federal MCL of 2 μg/L in 5 wells: MW-NASB-072, MW-NASB-074, MW-NASB-075, MW-NASB-076, and MW-NASB-080. During 1996, concentrations of vinyl chloride were reported hydraulically downgradient of Building 201, in wells MW-NASB-075 (12 μg/L), MW-NASB-072 (4 μg/L), and MW-NASB-074 (3 μg/L).

- A general decrease in total VOC and vinyl chloride concentrations was observed between the fifth (June 1996) and seventh (November 1996) monitoring events in MW-NASB-074 and MW-NASB-076.

- Vinyl chloride was reported in 2 wells (MW-NASB-069 and MW-NASB-071) during the 1995 monitoring events, however, vinyl chloride was not detected in these 2 wells during 1996 Monitoring Events 5 through 7.

- Twenty-two inorganic analytes were reported in ground-water samples collected from monitoring wells in 1996. One analyte (manganese) was reported above the corresponding State MEG of 200 μg/L at 3 wells during 1996 sampling events (MW-NASB-071, MW-NASB-080, and MW-NASB-081). All other analytes were reported consistently below applicable State MEGs and Federal MCLs. Elevated manganese concentrations have also been reported in background samples.

4.1.3 Surface Water Sampling Program

Results of the surface water sampling and analysis program conducted during 1996 indicate the following:

- Seven VOC were detected in surface water samples. The majority of the 7 VOC detected in surface water were reported at concentrations less than 5 μg/L. Several VOC, including methylene chloride, acetone, and carbon disulfide, were reported in trip blanks, the associated method blanks, and in the acid used in sample preservation. Two VOC were reported at concentrations above 5 μg/L, including acetone and carbon disulfide.

- The highest reported VOC concentrations were present in samples collected from the southern branch of the unnamed stream. VOC concentrations in the surface water samples consistently showed a trend of decreasing concentrations from SW-915, located upstream at the culvert outfall along the southern branch of the unnamed stream, to SW-012, located immediately downstream of the confluence of the northern and southern branches of the unnamed stream.

- Evaluation of surface water quality using toluene and total xylenes concentrations as an indicator shows that surface water from the southern branch of the unnamed stream contributes to the majority of reported VOC downstream of the confluence of the northern and southern branches of the unnamed stream.

- The highest concentrations of VOC were reported during the February 1996 sampling event; VOC concentrations were consistently lower during subsequent sampling events.

4.1.4 Sediment Sampling Program

Results of the sediment sampling and analysis program conducted during 1996 indicate the following:

- Eight of 13 VOC detected in the sediment samples collected during 1996 were reported at concentrations less than 5 μg/kg. Five VOC were reported at concentrations greater than 5 μg/kg: methylene chloride, acetone, total 1,2-dichloroethene, 1,1,2,2-tetrachloroethane, and 2-butanone. Excluding those compounds which are suspected field or laboratory artifacts (i.e., methylene chloride, and acetone), the highest reported individual VOC concentration (1,1,2,2-tetrachloroethane at 20 μg/kg) was detected in SED-912, located downstream of the confluence of the northern and southern branches of the unnamed stream.

- The highest concentrations of total 1,2-dichloroethene (8 μg/kg), and trichloroethene (5J μg/kg) were reported in the sample collected at SED-010, which is located midstream of the northern branch of the unnamed stream. These compounds were not reported in samples collected from any other sediment sample location.

- Twenty SVOC were reported in sediment samples, and the majority of the SVOC were PAH. Samples collected from sample station SED-919, which is located mid-stream of the southern branch of the unnamed stream, showed the highest concentrations of SVOC in 1996.

4.1.5 Sample Station LT-901 Seep and Sediment Sampling Program

4.1.5.1 Seeps

Results of the seep sampling and analysis program conducted during 1996 indicate the following:

- Three VOC (acetone, methylene chloride, and carbon disulfide) were detected in the seep samples collected at LT-901. These VOC were likely laboratory or field artifacts.

- Twenty-two inorganic analytes were reported in the seep samples collected during 1996. In general, the highest concentrations were noted during the June 1996 sampling event, as compared to prior and subsequent sampling events.

4.1.5.2 Sediment

Results of the leachate sediment sampling and analysis program conducted during 1996 indicate the following:

- Seven VOC were detected in leachate station sediment samples. Two VOC were reported at concentrations above 5 μg/kg, including acetone and methylene chloride. These VOC were frequently reported in associated method blanks and are considered laboratory artifacts.

- Excluding results with corresponding blank contamination, the highest reported VOC concentration was 1,2-dichloroethane (5 μg/kg) which was reported in the sediment sample collected during the February 1996 sampling event.

- Twenty inorganic analytes were reported in the sediment samples. In general, the highest concentrations were reported in samples collected during the November 1996 sampling event.

4.1.6 Visual Inspection

The site inspections conducted during 1996 indicated no evidence of stressed vegetation in the vicinity of the site. Iron staining was consistently observed in the vicinity of MW-NASB-071 and leachate sample station LT-901, and along the southern branch of the unnamed stream from the point of exit from the drain to the confluence with the northern unnamed creek. No additional seeps were observed, and no physical evidence of tampering of site wells was evident.

4.2 CONCLUSIONS

Based on the results of Monitoring Events 5 through 7, the following conclusions can be made:

- One VOC (vinyl chloride), and 1 metal (manganese) were present at concentrations above state or federal ground-water quality criteria. Vinyl chloride was detected in samples from 5 wells during 1996, with the highest concentrations occurring in samples from 3 wells located downgradient of Building 201. No readily apparent water quality trends were identified based on the reported concentrations of VOC in ground water from data collected during 1995 and 1996. The presence of manganese in site ground water is likely attributable to natural site conditions.

- No apparent trends could be established based on the reported concentrations of the constituents of concern identified for surface water, sediment, or seep/sediment samples to assess the effectiveness of natural attenuation.

- The site inspections conducted during 1996 indicated no evidence of stressed vegetation in the vicinity of the site. There were no additional seeps observed at the site.

4.3 RECOMMENDATIONS

Based on the results of Monitoring Events 5 through 7, the following are recommended:

- Continue long-term monitoring and sampling to provide data necessary to assess the effectiveness of natural attenuation at the site.

- Continue tri-annual sampling due to the low overall analyte concentrations reported, the low frequency of exceedances of ground-water quality criteria, and the inherent difficulties associated with the collection of samples during the December-February time period (i.e., field monitoring equipment response limitations due to extreme cold weather conditions).

- Consider elimination of analysis for presence and concentration of tentatively identified compounds (VOC and SVOC). These data are not used to assess long-term effectiveness of the remedial strategy (natural attenuation).

- Consider reduction of analysis on annual basis for inorganic analytes at sediment sample stations. Data generated to date do not indicate the need to assess changes in concentrations on a more frequent basis.

REFERENCES

ABB Environmental Services (ABB-ES). 1994a. Technical Memorandum, Site 9: Neptune Drive Disposal Site. May.

ABB-ES. 1994b. Final Long-Term Monitoring Plan, Building 95, Sites 1 and 3, and Eastern Plume. August.

ABB-ES. 1995. Long-Term Monitoring Plan, Site 9: Neptune Drive Disposal Site. Naval Air Station, Brunswick, Maine. January.

ABB-ES. 1997. Final Source Investigation Report, Site 9: Neptune Disposal Area. April.

EA Engineering, Science, and Technology. 1995. Quarterly Monitoring Event 1 - March 1995, Site 9: Neptune Drive Disposal Site, Naval Air Station, Brunswick, Maine. June.

EA. 1996a. Final Report - Quarterly Monitoring Event 5 - February 1996. Site 9, Naval Air Station, Brunswick, Maine. July.

EA. 1996b. Final Report - Monitoring Event 6 - June 1996. Site 9, Naval Air Station, Brunswick, Maine. October.

EA. 1997. Final Report - Monitoring Event 7 - November 1996. Site 9, Naval Air Station, Brunswick, Maine. February.

E.C. Jordan Company. 1990. Draft Final Remedial Investigation Report - Naval Air Station, Brunswick, Brunswick, Maine. U.S. Department of the Navy. August.

E.C. Jordan Company. 1991. Draft Final Supplemental Remedial Investigation Report - Naval Air Station, Brunswick, Brunswick, Maine. U.S. Department of the Navy. August.

U.S. Environmental Protection Agency (U.S. EPA). 1994. National Primary Drinking Water Standards. Office of Water, Washington, D.C. EPA 610-P-94-001. February.