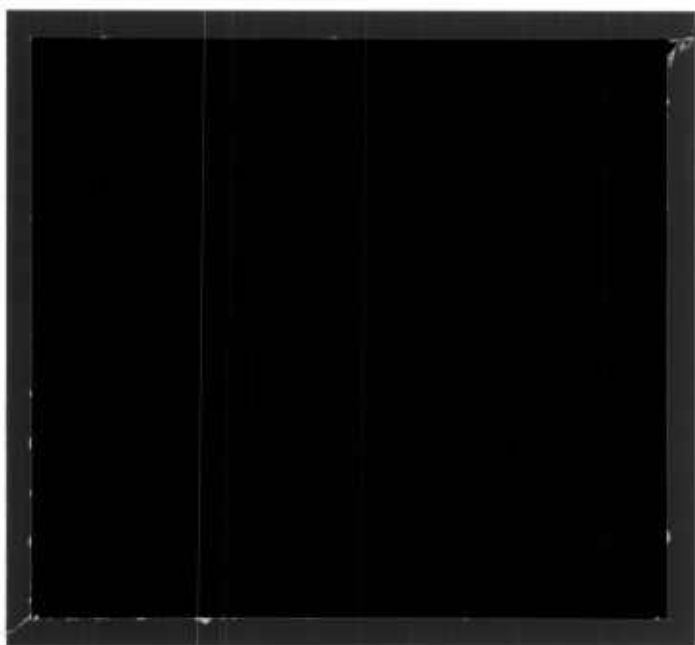


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**GROUNDWATER INVESTIGATION
QUARTERLY SUMMARY REPORT
NO. 1 APRIL - JUNE 2002**

Hart-Miller Island
Dredged Material Containment Facility
Baltimore County, Maryland

Prepared for:

Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, Maryland 21401

December 19, 2002

Prepared by:

URS Corporation
7101 Wisconsin Avenue, Suite 700
Bethesda, Maryland 20814

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QUARTERLY SUMMARY REPORT NO. 1
APRIL - JUNE 2002
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BALTIMORE COUNTY, MARYLAND**

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Printed on Recycled Paper

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ACRONYMS AND ABBREVIATIONS

COMAR	Code of Maryland Regulation
ft ³	Cubic feet
HMI	Hart-Miller Island
lbs	Pounds
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
MES	Maryland Environmental Services
mg/L	Milligram(s) per liter (i.e., parts per million)
NAD	North American Datum
NAVD	North American Vertical Datum
PP	Priority Pollutant(s)
RBC	Risk-Based Concentration
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE OF WORK

This document presents the results of activities conducted as part of the Groundwater Investigation from April through June 2002 at the Hart-Miller Island (HMI) Dredged Material Containment Facility, Baltimore County, Maryland. This report summarizes activities conducted during the quarter, presents the results of the groundwater monitoring data, and provides initial estimates of dissolved metals loadings in groundwater from the facility. The HMI facility is located within the Chesapeake Bay off Middle River and east of Baltimore City. Long-term management plans for the facility are to develop the area as a wildlife habitat and passive recreational area.

The groundwater monitoring program activities described in this report were conducted between April and June 2002, and included the following tasks:

- Installing pressure transducers and dataloggers to continuously monitor and record groundwater levels on HMI and water levels in the North Cell and the Bay;
- Collecting and contouring synoptic groundwater and surface level data from monitoring wells and Bay stilling wells;
- Surveying of newly installed monitoring wells and surface water level monitoring points, and;
- Collecting and chemically analyzing one round of groundwater samples from 34 newly installed wells and one round of surface water samples from the South Cell and Chesapeake Bay.

Additionally, single-well permeability tests using the slug-test methodology were performed in March 2002 on the newly installed wells. Dedicated submersible pump systems were installed in the wells after the permeability testing was completed.

These activities were conducted under the protocols established in the HMI Site Assessment Work Plan and Standard Operating Procedures (URS, 2002).

1.2 BACKGROUND

1.2.1 Location and Current Conditions

HMI is located at the mouth of the Middle River in the Chesapeake Bay, and incorporates the remnants of Hart and Miller Islands. The current HMI facility covers approximately 1,140 acres. The HMI areas consist of a North Cell (active), South Cell, various material staging facilities, an industrial/office complex for site operations, and a barge unloading facility. Since 1984, Maryland Environmental Services (MES) has operated the HMI Dredged Material Containment Facility for the Maryland Port Administration. Filling of the South Cell was completed in 1990. The North Cell is still in operation and is expected to continue to receive dredged material until the year 2009. Since filling was completed in 1990, the water contained within the South Cell has become acidic ($\text{pH} < 4$) resulting in the mobilization of metals naturally occurring within the dredge spoil. Previous analysis of surface water samples collected within a drainage system crossing the South Cell indicate elevated levels of dissolved metals such as zinc and copper. Previous analysis of groundwater samples also indicated potentially elevated concentrations of metals.

The initial geologic investigation included the installation of a network of monitoring wells around and within the island from December, 2001 through February, 2002. These wells were installed to provide geologic data for the island, and locations to measure groundwater levels and to obtain groundwater samples for chemical analyses (Figure 1-1).

LEGEND

- 34- GROUND CONTOUR
(CONTOUR INTERVAL IS 1 FOOT;
ELEVATION DATUM IS NAVD 1988)
- ⊕ GROUNDWATER MONITORING WELL
- SURFACE WATER SAMPLE

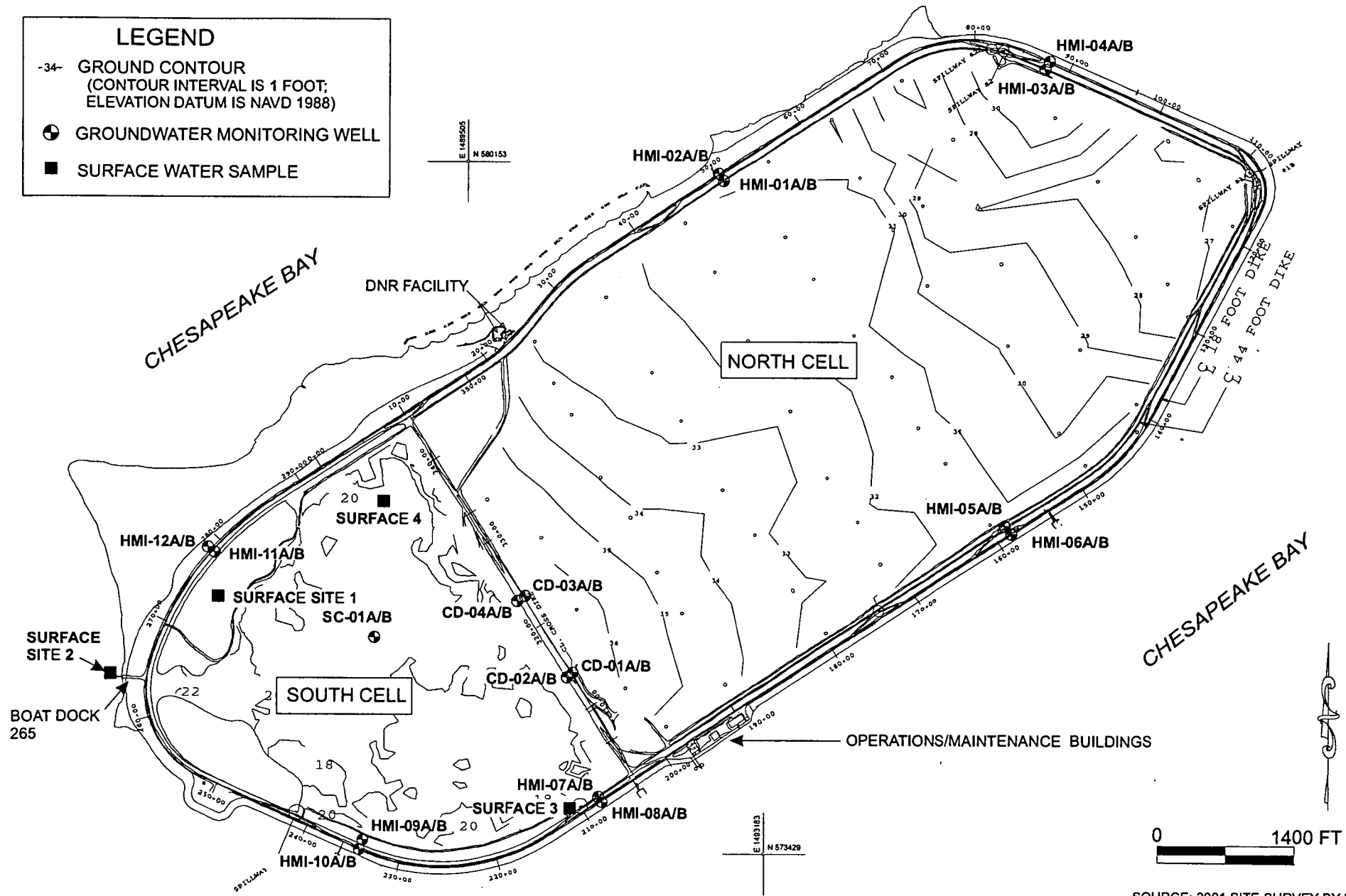


Figure 1-1
Site Map and Groundwater Monitoring Well/Surface Water Sample Locations
Hart-Miller Island, Maryland

2.0 FIELD METHODOLOGY

2.1 WATER LEVEL MEASUREMENTS

Subsequent to well development and the slug tests, pressure transducers equipped with dataloggers were installed into four well pairs (i.e., 8 wells), and stilling wells were installed at Spillway 001B and at two locations in the Bay. Transducers/dataloggers were installed on April 10 and 11, 2002. Selected locations included wells SC-01A/01B, HMI-04A/04B, CD-03A/03B and CD-04A/04B. Surface water levels were recorded for the North Cell at Spillway 001B and for the Bay at the North Unloading Facility 155 and the HMI Boat Dock 265. Monitoring locations are shown in Figure 2-1. The datalogger internal clock times were synchronized and set to record water levels every half-hour. The dataloggers are downloaded once a month and the data are stored as electronic files in binary and text formats.

Synoptic groundwater levels were collected on June 7, 2002. Groundwater levels were measured and recorded to an accuracy of 0.01 feet and were reported as "depth to water" from the top of the well casing. The levels are then converted to elevation using the well top-of-casing elevation established by surveying.

2.2 SURVEYING

Land surveying was conducted to provide elevations and horizontal locations for the new wells and stilling wells used for the North Cell and Bay levels. Horizontal and vertical survey measurements were recorded at four ground locations and the marked location on the top rim of the plastic well casing for the groundwater wells and North Cell and Bay stilling wells. Surveying was performed by MES with assistance from EBA Engineering personnel.

Vertical elevations were provided to an accuracy of at least 0.01 foot, based on the North America Vertical Datum (NAVD) of 1988. The horizontal locations were measured to an accuracy of 0.1 foot and were reported in the U.S. State Plane System-North America Datum (NAD) of 1983. Results of the survey are provided as Appendix A.

LEGEND

- 34- GROUND CONTOUR
(CONTOUR INTERVAL IS 1 FOOT;
ELEVATION DATUM IS NAVD 1988)
- ⊕ GROUNDWATER LEVEL LOCATIONS
MONTHLY LEVEL LOCATIONS - ALL WELLS
CONTINUOUS LEVEL LOCATIONS IN ITALICS
- ⊕ SURFACE WATER LEVEL
MONITORING POINT (CONTINUOUS)

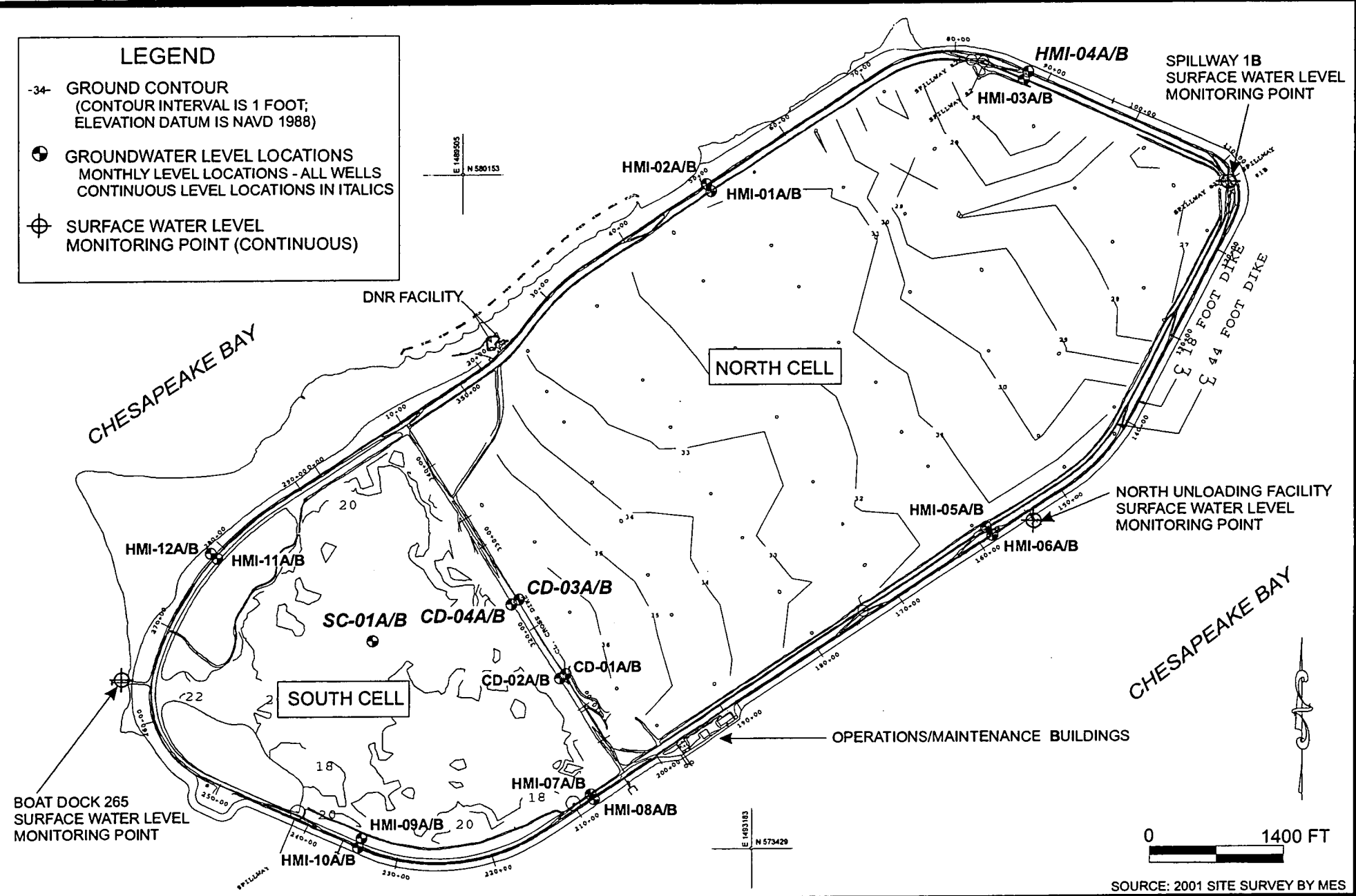


Figure 2-1
Groundwater and Surface Water Level Monitoring Locations
Hart-Miller Island, Maryland

2.3 CHEMICAL ANALYSES PROGRAM

Because the dredge spoil materials handling activities at HMI are well documented, laboratory analyses of water samples focused on metals reported to have been detected in previous investigations. These analytes include the eight U.S. Environmental Protection Agency (USEPA) Priority Pollutant (PP) List metals, and those parameters which can affect metals migration. As part of the third quarter sampling, groundwater samples from five well pairs will also be analyzed for volatile organic compounds, semi-volatile organic compounds, and polychlorinated biphenyls. Samples for Round 1 were analyzed by MES contracted laboratory, Atlantic Coast Laboratory in Delaware.

Groundwater samples were collected from each of 34 wells from May 22 through May 31, 2002. Purging and sampling was by the low-flow purge and sample technique using dedicated submersible pumps and tubing installed into each well. Wells were purged until a constant pH and Eh were obtained in accordance with the Work Plan (URS, 2002). Once the purging criteria were met, samples were collected in laboratory-supplied containers and placed immediately in coolers with ice. The MES-HMI Environmental Monitoring staff oversaw in the sample collection, completed MES chain-of-custody forms, and delivered the samples to the laboratory under that chain-of-custody. The samples were submitted to the laboratory and analyzed for total and dissolved metals and inorganic non-metals. Samples to be analyzed for dissolved metals were filtered by the laboratory upon receipt of the samples. Samples for total metals analyses were not filtered.

Analytical parameters were selected based on previously analyzed and/or expected constituents. Field measurements consisted of pH, Eh, specific conductivity, temperature, dissolved oxygen, and turbidity. These parameters were measured periodically during purging and at the time samples were collected from the wells. Purge records are provided as Appendix B.

Laboratory analyses consisted of USEPA PP List metals (total and dissolved), total organic carbon, cations (sodium, calcium, barium, magnesium, potassium, ammonia), anions (chloride, bromide, fluoride, nitrite, nitrate, phosphate, sulfate, sulfide), alkalinity, and hardness. The surface water samples were collected during the same period as the groundwater samples and were analyzed for the same parameters. Analytical methods used were those described in the Work Plan.

2.4 CHEMICAL DATA VALIDATION

Data review/validation was performed on 10 percent of the laboratory analytical results for the assessment. Reviewed were samples collected for wells HMI-10A, HMI-10B, HMI-11A, HMI-11B, HMI-12A, HMI-12B, and HMI-12B (duplicate),. The purpose of the review is to evaluate the results and supporting data with established USEPA quality assurance and quality control protocols to assess the reliability and accuracy of the data. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review and the specifics of the analytical method employed. Chemical data was supplied by the laboratory in hardcopy and electronic forms as laboratory results reports and spreadsheets/database files. Results of the validation are discussed further in Section 3.

3.0 RESULTS

3.1 WATER LEVEL MEASUREMENTS

Table 3-1 lists the groundwater levels and elevations for measurements obtained on June 7, 2002. Figures 3-1 and 3-2 are the groundwater elevation contour maps of the surficial aquifer "A" wells and the deeper aquifer "B" wells for June 7th. For the surficial aquifer, groundwater depths range from approximately 1 foot below grade in the South Cell to approximately 40 feet along the north side of the upper dike. The water levels in the deeper wells range from approximately 13 feet along the northern edge of the South Cell to over 50 feet below grade along the cross dike.

Figure 3-1 indicates radial flow patterns for shallow groundwater in the both the North Cell and South Cell areas. Groundwater flows to the north, east and south in the North Cell in response to groundwater mounding near well CD-03A, which is in the vicinity of the inflow discharge point and the topographic high for the cell. Groundwater in the South Cell flows to the northwest, west and south-southeast in response to the upgradient groundwater mound near well CD-03A.

Figure 3-2 indicates a lower-gradient groundwater flow field for the deeper aquifer. Groundwater in the North Cell appears to diverge to the northeast and northwest in the upper third of the cell, possibly in response to drainage induced by the South Cell pond and/or recharge from the overlying surficial aquifer. A radial flow pattern is also apparent in the South Cell, with a localized upgradient area apparent in the vicinity of well HMI-09B.

Plots of continuous water levels collected from groundwater and surface water monitoring points are provided as Appendix C.

3.2 SAMPLING AND CHEMICAL ANALYSIS PROGRAM

3.2.1 Selection of Chemical-Specific Screening Criteria

In this section, chemical-specific screening criteria are used to evaluate the levels of constituents detected in groundwater and surface water samples. The purpose of the comparison

Table 3-1
Groundwater Levels - June 7, 2002
Hart-Miller Island, Maryland

Well Designation	Well Casing Elevation (Feet - NAVD 1988)	June 7, 2002	
		Depth to Water from Top of Casing (Feet)	Groundwater Elevation (Feet MSL)
CD-01A	53.96	34.81	19.15
CD-01B	53.95	50.50	3.45
CD-02A	28.52	13.37	15.15
CD-02B	28.54	25.25	3.29
CD-03A	55.23	18.86	36.37
CD-03B	54.28	51.76	2.52
CD-04A	30.86	14.45	16.41
CD-04B	30.74	27.41	3.33
HMI-01A	46.40	42.58	3.82
HMI-01B	46.36	43.31	3.05
HMI-02A	19.98	17.20	2.78
HMI-02B	20.04	17.12	2.92
HMI-03A	46.74	36.89	9.85
HMI-03B	46.84	45.21	1.63
HMI-04A	21.48	19.72	1.76
HMI-04B	21.34	20.26	1.08
HMI-05A	47.06	35.72	11.34
HMI-05B	46.94	44.21	2.73
HMI-06A	21.41	20.45	0.96
HMI-06B	21.36	18.90	2.46
HMI-07A	31.22	29.77	1.45
HMI-07B	30.91	27.78	3.13
HMI-08A	21.07	19.78	1.29
HMI-08B	20.89	17.57	3.32
HMI-09A	24.30	18.71	5.59
HMI-09B	24.98	19.16	5.82
HMI-10A	20.98	18.08	2.90
HMI-10B	20.90	16.68	4.22
HMI-11A	20.90	16.10	4.80
HMI-11B	20.94	21.10	-0.16
HMI-12A	13.60	9.21	4.39
HMI-12B	13.55	13.32	0.23
SC-01A	19.74	4.56	15.18
SC-01B	20.04	16.60	3.44

LEGEND

- 34- GROUND CONTOUR
(CONTOUR INTERVAL IS 1 FOOT;
DATUM IS NAVD 1988)
- ⊕ GROUNDWATER MONITORING WELL
- ⊕ SURFACE WATER STILLING WELL
- 10 WATER ELEVATION (FEET NAVD 1988)
- GROUNDWATER ELEVATION CONTOUR
(FEET NAVD 1988; DASHED WHERE
INFERRED)

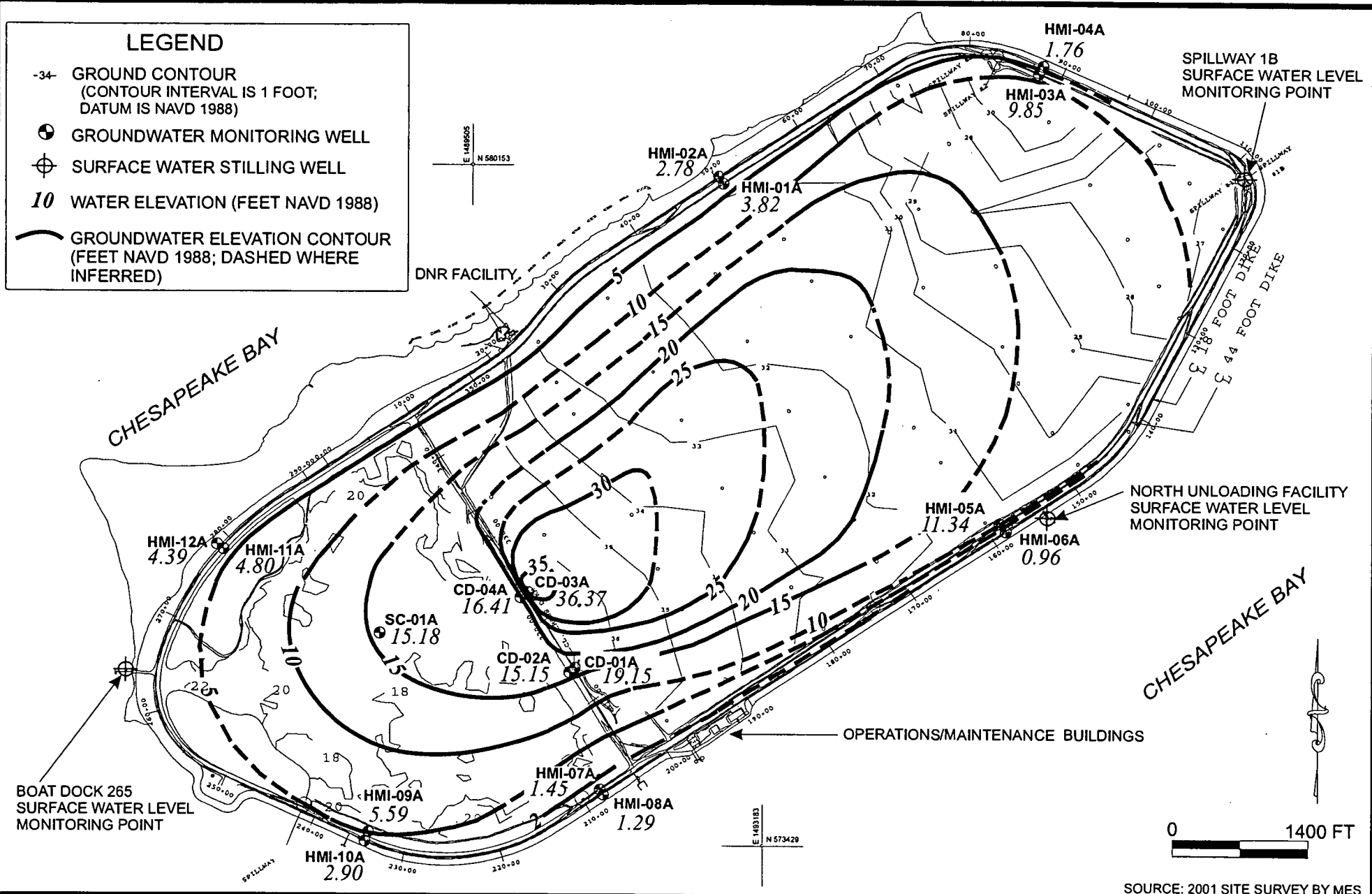


Figure 3-1
Surficial Aquifer Groundwater Surface Contour Map - June 7, 2002
Hart-Miller Island, Maryland

3-3

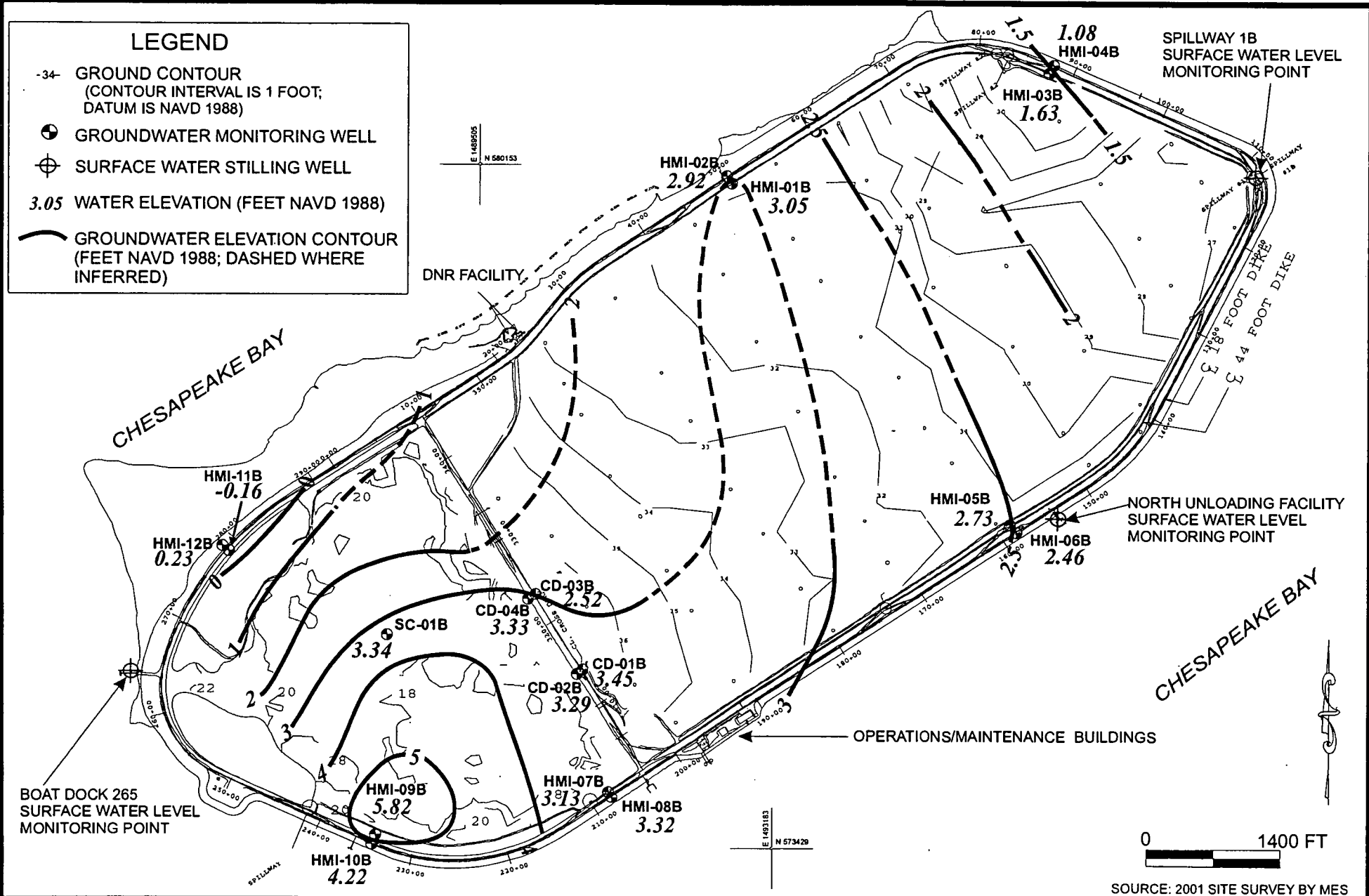


Figure 3-2
 Lower Aquifer Groundwater Surface Contour Map - June 7, 2002
 Hart-Miller Island, Maryland

criteria is to gage the degree of observed levels of analytes in relation to available regulatory standards and/or criteria.

Presently, the Maryland Department of the Environment (MDE) considers their August 2001 *Cleanup Standards for Soil and Groundwater* (MDE, 2001) to be potentially relevant requirements for assessing contaminant levels in groundwater. The groundwater standards are based on drinking water primary Maximum Contaminant Levels (MCLs) [40 Code of Federal Regulations 141] and State groundwater standards [Code of Maryland Regulations (COMARs) 26.04.01]. MCLs, which are based on potential impacts to human health and technological and economic feasibility, are federal, legally enforceable, concentrations of constituents allowable in drinking water supplies. Although a drinking water supply is not presently located in the surficial aquifer at HMI, MCLs are typically used by regulatory agencies when establishing action levels or permit levels for groundwater. In the absence of MCLs, MDE uses Risk-Based Concentrations (RBCs) based on default or standard ingestion and inhalation exposure scenarios using a target hazard quotient of 0.1 and a target cancer risk of 10^{-5} for each chemical. In this report, available primary and secondary MCLs and RBCs are used as groundwater comparison criteria.

Surface water monitoring results are screened using the State of Maryland Numerical Criteria for Toxic Substances in Surface Water (COMAR 26.08.02.03). The criteria were developed to establish levels of constituents in surface water that are necessary to protect aquatic life and human health. The most stringent levels for the freshwater water acute effects, freshwater chronic effects, and the human health fish consumption were selected for the screening of sampling Sites 1, 3, and 4. Results from Site 2 are compared to estuarine/saltwater criteria. For the purpose of applying the toxic substance numerical criteria to the Bay, the State of Maryland [COMAR 26.08.02.03-1(t)] has designated the freshwater and estuarine/salt water boundary in the Bay as a line connecting Booby Point (39° 17' 4.5" north latitude; 76° 10' 54" west longitude) and Handy's Point (39° 17' 31" north latitude; 76° 10' 54" west longitude). HMI is located south of this line; therefore, the estuarine/salt water criteria are expected to apply to the Bay water surrounding HMI. Additionally, the Chesapeake Bay in the vicinity of HMI is designated by the State of Maryland environmental regulations (COMAR 26.08.02.07 and .08) for Use I (i.e., water contact recreation, fishing, and

protection of aquatic life) and Use II (i.e., shellfish harvesting). There are additional criteria for these use categories.

3.2.2 Data Validation Results

With the exception of the results discussed below, the chemical data in the reviewed sample delivery group were found to be useable, as qualified, for their intended purpose. The data validation indicates that phosphate analyses were performed beyond the method holding time. Therefore, all positive results in this group are considered to be estimated and having a low bias (i.e., J validation flag), and non-detects are considered to be unusable. Although the remaining phosphate analyses were not validated, holding times were checked for the entire phosphate analyses and were found to be outside of the method period. Therefore, the same data qualification is expected for those phosphate results. Sulfide results were incorrectly reported as non-detects in samples 22132-11B, 22133-12A, and 22137-10B. Additionally, dissolved zinc and copper in sample 22135-12B, and the total hardness for sample 22137-10B were incorrectly reported on the data summary forms. The laboratory also checked the entire sulfide data set and reported four additional transcription errors. Revised summary forms were received and are included as part of the data validation report (Appendix D) and the laboratory summary reports (Appendix E).

Laboratory blank contamination was reported for some total organic carbon, sulfide, and aluminum analyses. The associated samples were qualified "B" indicating the presence of these analytes in the associated laboratory blank samples.

For the nitrate and nitrite analysis, 21 of 45 samples were analyzed beyond the holding time of 48 hours. Although the review of these sample data is beyond the scope of this project, positive results for nitrite and nitrate data are considered to be estimated and having a low bias, and non-detections should be considered unusable.

3.2.3 Groundwater Analyses

The comparison criteria and chemical results of the groundwater samples are provided in Table 3-2. The results of the groundwater samples indicate detectable concentrations of several total and dissolved metals. Two metals (cadmium and silver) were not detected in any of the groundwater

Table 3-2
Summary of Chemical Results for Groundwater and Surface Water Samples - May 2002
Hart-Miller Island, Maryland

Sample Information						Analyte Parameters										Field Parameters									
Year	Month	Day	Location	Sample #		Ammonia as N mg/L	Nitrate mg/L	Nitrite mg/L	Alkalinity mg/L as CaCO ₃	TOC mg/L	Tot. Hardness mg/L as CaCO ₃	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Phosphate mg/L	Sulfate mg/L	Sulfide mg/L	pH SU	Temp Deg. C	Cond uS/cm ²	DO mg/L	ORP mVolts	Turb NTU		
Groundwater Screening Criteria																6.5-8.5									
Shallow Wells						70	1						250	4			500								
2002	5	22	CD 1a	22151		46	< 0.06	< 0.02	1655	24	5044	26.8	9921	< 0.21	< 0.05	4680	0.18	6.90	16.68	22.0	1.37	-193	7.7		
2002	5	23	CD 2a	22158		13	< 0.06	< 0.02	728	9.9	1118	16.7	7197	< 0.21	0.04	44.2	0.32	7.18	15.28	11.4	1.53	-199	3.2		
2002	5	22	CD 3a	22152		48	1.31	< 0.02	1502	23	2160	24.6	5395	< 0.21	0.10	249	0.31	6.97	15.74	15.50	1.07	-198	7.3		
2002	5	22	CD 4a	22149		20	< 0.06	< 0.02	682	11	1218	15.6	3746	< 0.21	0.05	10.3	0.07	6.81	15.44	11.80	1.04	-144	7.1		
2002	5	28	HMI-01a	22176		14	< 0.06	< 0.02	818	11	3291	10.3	3078	< 0.21	0.42	3776	< 0.03								
2002	5	23	HMI-02a	22164		2.0	< 0.06	< 0.02	3.6	4.9	1263	14.8	4110	< 0.21	0.28	512	0.08	5.58	14.84	12.7	1.76	-7	2.4		
2002	5	23	HMI-03a	22153		0.32	0.84	< 0.02	379	3.9	2268	8.29	1472	< 0.21	0.03	1512	0.06	6.45	18.02	9.20	1.94	-95	2.1		
2002	5	23	HMI-04e	22162		9.0	< 0.06	< 0.02	445	6.2	1745	10.5	2946	< 0.21	0.02	1299	0.07	7.24	13.76	9.8	1.78	-160	1.6		
2002	5	23	HMI-05a	22157		20	< 0.06	< 0.02	483	10	2368	11.2	3498	< 0.21	< 0.05	3390	0.11	6.69	15.85	10.3	1.94	-145	2.9		
2002	5	23	HMI-06a	22160		15	< 0.06	< 0.02	872	7.6	1651	14.0	8167	< 0.21	0.02	341	0.32	7.03	14.29	11.4	1.05	-165	2.1		
2002	5	22	HMI-07e	22145		13	< 0.06	< 0.02	385	4.6	2066	8.99	2108	< 0.21	0.03	1538	0.03	7.02	15.12	10.00	1.05	-178	0.1		
2002	5	22	HMI-08a	22140		8.2	< 0.06	< 0.02	284	3.9	2111	11.0	3258	< 0.21	0.03	1970	0.05	6.93	14.28	10.70	1.04	-163	0.1		
2002	5	22	HMI-09a	22139		6.0	< 0.06	< 0.02	128	3.9	2204	6.48	1686	< 0.21	0.05	2266	0.06	6.99	15.22	9.58	2.15	-153	0.7		
2002	5	21	HMI-10a	22136		3.5	< 0.06 UJ	< 0.02	26	3.4	B 2794	10.4	J 3725	< 0.21	0.09	J 5929	0.03	6.67	14.22	9.4	1.95	-106	0.0		
2002	5	21	HMI-11a	22131		0.29	< 0.06 UJ	< 0.02	33	1.4	B 1270	2.50	J 596	< 0.21	0.35	J 1440	< 0.03	6.54	14.64	4.71	1.95	-114	0.0		
2002	5	21	HMI-12a	22133		0.84	< 0.06 UJ	< 0.02	< 1.0	1.3	B 1186	3.50	J 789	< 0.21	0.01	J 1512	0.04	6.41	13.54	4.64	3.64	-84	2.2		
2002	5	24	SC 1A	22168		47	< 0.06	< 0.02	1138	22	1534	16.2	5221	< 0.21	0.06	44.0	0.21	8.90	15.28	15.1	2.11	-169	3.2		
No. of Detections Per 17 Well Locations/Samples¹						17	2	0	16	17	17	17	17	0	16	17	15	16	16	16	16	16	18	18	
Mean (Detections only)¹						15.66	1.08	< 0.02	608	8.9	2079	12.50	4059	< 0.21	0.13	1841	0.13	6.77	15.01	11.14	1.71	-142.06	2.67	2.67	
Minimum¹						0.29	< 0.06	< 0.02	< 1.0	1.30	1118	2.50	598	< 0.21	0.01	10.3	< 0.03	5.58	13.54	4.64	1.04	-199.00	0.0	0.0	
Maximum¹						48	1.31	< 0.02	1742	24	5044	26.8	9921	< 0.21	0.47	5929	0.32	7	17	22	4	-7	7.7	7.7	
Duplicate Results																									
2002	5	28	CD 1a (Dup.)	22178		45	< 0.06	< 0.02	1742	24	4343	25.6	9162	< 0.21	< 0.05	3924	0.15	6.90	16.68	22.0	1.37	-193	7.7		
2002	5	22	CD 4a (Dup.)	22150		19	< 0.06	< 0.02	645	11	1276	16.3	5830	< 0.21	0.47	11.4	0.10	6.81	15.44	11.80	1.04	-144	7.1		
2002	5	23	HMI-05a (Dup.)	22156		20	< 0.06	< 0.02	562	10	2269	11.2	5230	< 0.21	0.05	4171	0.09	6.69	15.85	10.3	1.94	-145	2.9		
Deep Wells																									
2002	5	28	CD 1b	22180		5.4	< 0.06	< 0.02	165	5.0	435	< 0.21	387	1.56	0.01	2.76	0.10	7.19	16.94	1.87	2.46	-212	2.5		
2002	5	31	CD 2b	22185		5.3	< 0.06	< 0.02	136	1.3	359	< 0.21	393	< 0.21	0.03	3.41	0.04	7.10	18.15	1.82	3.22	-199	9.6		
2002	5	28	CD 3b	22174		3.9	< 0.06	< 0.02	177	6.8	258	< 0.21	170	0.69	0.02	< 0.38	0.10	7.25	16.10	1.08	1.02	-189	7.0		
2002	5	22	CD 4b	22148		7.7	< 0.06	< 0.02	81	2.1	529	4.04	974	< 0.21	0.05	< 0.38	0.13	8.68	15.57	3.40	1.06	-404	16.8		
2002	5	28	HMI-01b	22175		4.5	< 0.06	< 0.02	189	4.9	579	< 0.21	359	0.34	0.04	2.40	< 0.03	6.89	16.78	2.05	2.49	-177	10.8		
2002	5	23	HMI-02b	22163		3.9	< 0.06	< 0.02	195	2.0	489	1.61	279	< 0.21	0.16	4.30	< 0.03	6.88	14.93	1.43	1.68	-162	4.6		
2002	5	23	HMI-03b	22154		2.6	< 0.06	< 0.02	620	2.9	1411	14.6	5398	< 0.21	0.04	68.1	0.27	6.15	15.64	11.3	2.05	-30	0.6		
2002	5	31	HMI-04b	22188		5.7	< 0.06	< 0.02	705	9.0	1311	19.9	4647	< 0.21	0.02	14.1	< 0.03	6.67	15.97	13.1	2.43	-117	4.9		
2002	5	31	HMI-05b	22188		3.5	2.26	< 0.02	95	< 1.0	960	12.2	154	< 0.21	0.60	187	< 0.03	5.78	15.97	10.7	3.22	-15	4.9		
2002	5	23	HMI-06b	22159		3.7	< 0.06	< 0.02	111	1.5	1003	13.9	2265	< 0.21	0.03	250	0.18	6.02	15.35	9.9	2.01	-47	1.1		
2002	5	28	HMI-07b	22146		6.6	< 0.06	< 0.02	183	11	567	1.90	518	1.15	0.06	58.7	0.03	7.01	15.49	2.1	2.12	-170	4.4		
2002	5	22	HMI-08b	22141		8.0	< 0.06	< 0.02	152	5.6	597	2.45	481	1.29	0.02	< 0.38	0.03	7.18	15.19	2.15	0.82	-222	5.2		
2002	5	22	HMI-09b	22138		22	< 0.06	< 0.02	622	9.0	1437	16.0	4412	< 0.21	1.3	35.2	0.40	7.10	15.00	11.50	1.38	-162	1.8		
2002	5	21	HMI-10b	22137		7.1	< 0.06 UJ	< 0.02	132	4.2	B 2171	11.3	J 4193	< 0.21	0.46	J 4240	0.05	7.02	14.63	9.67	1.22	-194	1.7		
2002	5	21	HMI-11b	22132		5.7	< 0.06 UJ	< 0.02	117	3.0	B 91.4	< 0.21	2.49	0.70	0.02	J < 0.38	0.05	7.29	15.73	0.21	1.61	-235	106		
2002	5	21	HMI-12b	22135		5.1	< 0.06 UJ	< 0.02	136	2.8	B 94.4	< 0.21	3.11	0.31	0.20	J 1.52	< 0.03	8.57	14.80	0.22	2.16	-430	5.8		
2002	5	24	SC 1B	22166		0.39	1.31	< 0.02	109	1.9	91.4	< 0.21	12.7	0.38	< 0.01	< 0.38	0.08	7.11	16.00	0.243	2.04	-160	2.6		
No. of Detections Per 17 Well Locations/Samples¹						17	3	0	17	16	17	10	17	8	16	12	12	17	17	17	17	17	17	17	
Mean (Detections only)¹						5.95	1.30	< 0.02	231	4.58	731	10.05	1661	0.80	0.19	406	0.14	7.05	15.78	4.87	1.94	-184	11.2	11.2	
Minimum¹						0.39	< 0.06	< 0.02	81	< 1.0	91.4	< 0.21	2.49	< 0.21	< 0.01	< 0.38	< 0.03	5.78	14.63	0.21	0.82	-430	0.6	0.6	
Maximum¹						22	2.26	< 0.02	705	11	2171	19.9	5398	1.56	1.3	4240	0.40	8.68	18.15	13.1	3.22	-15	106	106	
Duplicate Results																									
2002	5	28	CD 1b (Dup.)	22181		5.4	< 0.06	< 0.02	166	4.4	420	< 0.21	361	0.43	0.03	< 0.38	0.38	7.19	16.94	1.87	2.46	-212	2.5		
2002	5	31	HMI-05b (Dup.)	22187		3.4	< 0.06	< 0.02	90	< 1.0	999	14.8	3744	< 0.21	0.01	194	< 0.03	5.78	15.97	10.7	3.22	-15	4.9		
2002	5	21	HMI-12b (Dup.)	22134		5.1	0.33	J < 0.02	135	3.0	B 96.1	< 0.21	3.52	0.23	0.22	1.09									

Table 3-2
Summary of Chemical Results for Groundwater and Surface Water Samples - May 2002
Hart-Miller Island, Maryland

Sample Information						Metals, Total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Year	Month	Day	Location	Sample #	Aluminum mg/L	Arsenic mg/L	Barium mg/L	Cadmium mg/L	Calcium mg/L	Chromium mg/L	Copper mg/L	Iron mg/L	Lead mg/L	Magnesium mg/L	Potassium mg/L	Silver mg/L	Sodium, Tot mg/L	Zinc mg/L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Groundwater Screening Criteria						0.05	0.05	2	0.005		0.1	1.3	0.3	0.015		0.018		1.1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Shallow Wells																				2002	5	22	CD 1a	22151	< 0.052	0.026	0.122	< 0.004	645	< 0.008	0.010	45.8	< 0.002	834	158	< 0.001	3828	< 0.003	2002	5	23	CD 2a	22158	< 0.052	0.024	0.914	< 0.004	139	< 0.008	0.005	14.4	< 0.002	188	71.0	< 0.001	2009	< 0.003	2002	5	22	CD 3a	22152	< 0.052	0.038	0.103	< 0.004	227	< 0.008	< 0.003	30.3	< 0.002	387	116	< 0.001	2660	< 0.003	2002	5	22	CD 4a	22149	< 0.052	0.019	0.697	< 0.004	90.9	< 0.008	0.006	12.5	< 0.002	241	75.2	< 0.001	2145	< 0.003	2002	5	28	HMI-01e	22176	13.5	0.019	0.248	< 0.004	671	0.064	0.064	159	0.055	393	76.2	< 0.001	1665	0.146	2002	5	23	HMI-02a	22164	< 0.052	0.009	0.037	< 0.004	113	< 0.008	< 0.003	122	< 0.002	238	6.13	< 0.001	2243	< 0.003	2002	5	23	HMI-03a	22153	< 0.052	0.008	0.082	< 0.004	450	< 0.008	0.039	41.9	< 0.002	278	61.3	< 0.001	1319	0.082	2002	5	23	HMI-04a	22162	< 0.052	0.012	0.133	< 0.004	308	< 0.008	< 0.003	7.23	< 0.002	237	73.5	< 0.001	1655	< 0.003	2002	5	23	HMI-05a	22157	< 0.052	0.008	0.059	< 0.004	340	< 0.008	< 0.003	65.3	< 0.002	369	87.5	< 0.001	1544	< 0.003	2002	5	23	HMI-06e	22160	< 0.052	0.017	0.227	< 0.004	131	< 0.008	< 0.003	16.5	< 0.002	306	64.3	< 0.001	1896	< 0.003	2002	5	22	HMI-07a	22145	< 0.052	0.010	0.124	< 0.004	298	< 0.008	0.006	13.0	< 0.002	321	87.8	< 0.001	1590	< 0.003	2002	5	22	HMI-08a	22140	< 0.052	0.011	0.085	< 0.004	304	< 0.008	0.008	24.4	< 0.002	328	86.4	< 0.001	1803	< 0.003	2002	5	22	HMI-09a	22139	< 0.052	0.010	0.065	< 0.004	400	< 0.008	0.033	25.5	< 0.002	293	67.9	< 0.001	1163	0.018	2002	5	21	HMI-10a	22136	< 0.052	0.003	L 0.020	< 0.004	436	J < 0.008	0.014	15.2	< 0.002	414	J 84.0	< 0.001	1396	0.465	2002	5	21	HMI-11a	22131	< 0.052	0.004	L 0.049	< 0.004	247	J < 0.008	0.006	11.3	< 0.002	158	J 33.5	< 0.001	490	0.007	2002	5	21	HMI-12a	22133	< 0.052	0.006	L 0.033	< 0.004	218	J < 0.008	< 0.003	42.9	< 0.002	156	J 30.1	< 0.001	506	< 0.003	2002	5	24	SC 1A	22168	< 0.052	0.021	0.218	< 0.004	137	< 0.008	0.005	12.6	< 0.002	290	85.3	< 0.001	2558	< 0.003	No. of Detections Per 17 Well Locations/Samples¹						1	17	17	0	17	1	11	17	1	17	17	0	17	5	Mean (Detections only)¹						13.5	0.015	0.195	< 0.004	303	0.064	0.013	39.3	0.055	320	74.3	< 0.001	1795	0.044	Minimum¹						< 0.052	0.003	0.020	< 0.004	90.9	< 0.008	< 0.003	7.23	< 0.002	156	6.13	< 0.001	490	< 0.003	Maximum¹						13.5	0.038	0.914	< 0.004	671	0.064	0.064	159	0.055	834	158	< 0.001	3828	0.465	Duplicate Results																				2002	5	28	CD 1a (Dup.)	22178	< 0.052	0.023	0.105	< 0.004	572	< 0.008	< 0.003	34.8	< 0.002	708	152	< 0.001	3620	< 0.003	2002	5	22	CD 4a (Dup.)	22150	< 0.052	0.021	0.800	< 0.004	91.7	< 0.008	< 0.003	18.6	< 0.002	252	73.9	< 0.001	2183	< 0.003	2002	5	23	HMI-05a (Dup.)	22156	< 0.052	0.008	0.061	< 0.004	324	< 0.008	< 0.003	67.1	< 0.002	355	87.3	< 0.001	1470	< 0.003	Deep Wells																				2002	5	28	CD 1b	22180	< 0.052	0.005	0.094	< 0.004	142	< 0.008	< 0.003	16.0	< 0.002	18.2	4.97	< 0.001	101	< 0.003	2002	5	31	CD 2b	22185	0.084	< 0.002	0.073	< 0.004	116	< 0.008	0.004	16.3	< 0.002	17.0	7.60	< 0.001	111	< 0.003	2002	5	28	CD 3b	22174	0.169	0.004	0.092	< 0.004	81.9	< 0.008	0.088	7.91	0.003	12.9	4.90	< 0.001	64.6	0.075	2002	5	22	CD 4b	22148	0.097	0.004	0.113	< 0.004	196	< 0.008	< 0.003	10.8	< 0.002	9.83	9.38	< 0.001	371	< 0.003	2002	5	28	HMI-01b	22175	0.115	< 0.002	0.123	< 0.004	218	0.008	< 0.003	33.6	< 0.002	8.31	4.36	< 0.001	66.8	0.004	2002	5	23	HMI-02b	22163	< 0.052	< 0.002	0.065	< 0.004	185	< 0.008	0.003	16.6	< 0.002	6.57	2.90	< 0.001	31.7	0.004	2002	5	23	HMI-03b	22154	< 0.052	0.016	0.282	< 0.004	140	< 0.008	< 0.003	11.4	< 0.002	261	37.3	< 0.001	2009	< 0.003	2002	5	31	HMI-04b	22188	< 0.052	0.018	0.668	< 0.004	902	< 0.008	< 0.003	18.1	< 0.002	275	59.8	< 0.001	2108	< 0.003	2002	5	31	HMI-05b	22186	0.057	0.011	0.107	< 0.004	109	< 0.008	< 0.003	61.4	< 0.002	163	30.8	< 0.001	1679	< 0.003	2002	5	23	HMI-06b	22159	< 0.052	0.010	0.121	< 0.004	84.0	< 0.008	< 0.003	32.5	< 0.002	188	44.6	< 0.001	1769	< 0.003	2002	5	28	HMI-07b	22146	0.294	0.002	0.166	< 0.004	172	< 0.008	0.016	21.3	0.004	28.8	6.80	< 0.001	116	0.017	2002	5	22	HMI-08b	22141	< 0.052	0.004	0.179	< 0.004	187	< 0.008	< 0.003	27.2	< 0.002	26.5	6.50	< 0.001	129	0.009	2002	5	22	HMI-09b	22138	< 0.052	0.015	0.263	< 0.004	163	< 0.008	0.012	4.15	< 0.002	250	58.7	< 0.001	2066	< 0.003	2002	5	21	HMI-10b	22137	< 0.052	0.003	L 0.107	< 0.004	356	< 0.008	< 0.003	17.2	< 0.002	311	60.1	< 0.001	1299	< 0.003	2002	5	21	HMI-11b	22132	< 0.052	< 0.002	UL 0.055	< 0.004	21.4	J < 0.008	< 0.003	9.17	< 0.002	9.21	J 0.735	< 0.001	6.24	< 0.003	2002	5	21	HMI-12b	22135	0.081	< 0.002	UL 0.080	< 0.004	24.9	J < 0.008	0.006	3.76	< 0.002	7.85	J 7.81	< 0.001	11.8	0.010	2002	5	24	SC 1B	22166	0.471	0.007	0.038	< 0.004	33.3	0.012	0.013	3.90	0.004	2.04	2.88	< 0.001	12.8	0.004	No. of Detections Per 17 Well Locations/Samples¹						8	12	17	0	17	2	8	17	3	17	17	0	17	8	Mean (Detections only)¹						0.158	0.008	0.15	< 0.004	185	0.010	0.018	18.3	0.004	94.2	20.6	0.001	705	0.018	Minimum¹						< 0.052	< 0.002	0.038	< 0.004	21.4	< 0.008	< 0.003	3.76	< 0.002	2.04	0.735	< 0.001	6.24	< 0.003	Maximum¹						0.471	0.018	0.668	< 0.004	902	0.012	0.088	64.2	0.004	311	60.1	< 0.001	2108	0.075	Duplicate Results																				2002	5	28	CD 1b (Dup.)	22181	< 0.052	0.003	0.095	< 0.004	137	< 0.008	0.004	15.5	< 0.002	17.6	5.01	< 0.001	98.9	0.004	2002	5	31	HMI-05b (Dup.)	22187	< 0.052	0.013	0.100	< 0.004	121	< 0.008	< 0.003	64.2	< 0.002	169	30.4	< 0.001	1706	< 0.003	2002	5	21	HMI-12b (Dup.)	22134	0.078	< 0.002	UL 0.082	< 0.004	25.4	J < 0.008	0.004	3.87	< 0.002	7.91	J 8.07	< 0.001	11.4	< 0.003	Surface Water Screening Criteria-Sites 1,3,4 (COMAR 26.08.02.03)						0.04	2	0.0022		0.074	0.009		0.0025		0.0034		0.120	Surface Water Screening Criteria-Site 2 (COMAR 26.08.02.03)						0.036	2	0.0093		0.05	0.0034		0.0081		0.0019		0.081	Surface Sites																				2002	5	22	Surface Site 1 ²	22143	7.67	0.002	0.032	0.007	445	0.008	0.049	6.59	0.007	419	95.9	< 0.001	1433	3.31	2002	5	22	Surface Site 2 ³	22147	65.9	< 0.002	0.010	0.023	466	0.023	0.131	36.7	0.007	321	52.2	< 0.001	545	8.59	2002	5	24	Surface Site 3 ⁴	22165	0.309	< 0.002	0.009	< 0.004	262	< 0.008	0.010	0.203	< 0.002	168	37.1	< 0.001	554	0.382	2002	5	24	Surface Site 4 ⁵	22169	0.652	0.003	0.019	< 0.004	23.6	< 0.008	0.007	0.461	< 0.002	51.9	18.8	< 0.001	487	0.011	No. of Detections Per 4 Locations¹						4	2	4	2	4	2	4	4	2	4	4	0	4	4	Mean (Detections only)¹						18.63	0.003	0.018	0.015	299	0.016	0.049	11.13	0.007	240	52.3	< 0.001	755	3.10	Minimum¹						0.309	< 0.002	0.009	< 0.004	23.6	< 0.008	0.007	0.203	< 0.002	51.9	18.8	< 0.001	487	0.011	Maximum¹						65.9	0.003	0.032	0.023	466	0.023	0.131	36.7	0.007	419	101	< 0.001	1433	8.59	Duplicate Results																				2002	5	22	Surface Site 1 (Dup)	22144	7.59	0.002	0.031	0.007	442	0.009	0.049	7.17	0.006	414	101	< 0.001	1401	3.42
2002	5	22	CD 1a	22151	< 0.052	0.026	0.122	< 0.004	645	< 0.008	0.010	45.8	< 0.002	834	158	< 0.001	3828	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	CD 2a	22158	< 0.052	0.024	0.914	< 0.004	139	< 0.008	0.005	14.4	< 0.002	188	71.0	< 0.001	2009	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	CD 3a	22152	< 0.052	0.038	0.103	< 0.004	227	< 0.008	< 0.003	30.3	< 0.002	387	116	< 0.001	2660	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	CD 4a	22149	< 0.052	0.019	0.697	< 0.004	90.9	< 0.008	0.006	12.5	< 0.002	241	75.2	< 0.001	2145	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	28	HMI-01e	22176	13.5	0.019	0.248	< 0.004	671	0.064	0.064	159	0.055	393	76.2	< 0.001	1665	0.146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	HMI-02a	22164	< 0.052	0.009	0.037	< 0.004	113	< 0.008	< 0.003	122	< 0.002	238	6.13	< 0.001	2243	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	HMI-03a	22153	< 0.052	0.008	0.082	< 0.004	450	< 0.008	0.039	41.9	< 0.002	278	61.3	< 0.001	1319	0.082																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	HMI-04a	22162	< 0.052	0.012	0.133	< 0.004	308	< 0.008	< 0.003	7.23	< 0.002	237	73.5	< 0.001	1655	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	HMI-05a	22157	< 0.052	0.008	0.059	< 0.004	340	< 0.008	< 0.003	65.3	< 0.002	369	87.5	< 0.001	1544	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	HMI-06e	22160	< 0.052	0.017	0.227	< 0.004	131	< 0.008	< 0.003	16.5	< 0.002	306	64.3	< 0.001	1896	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	HMI-07a	22145	< 0.052	0.010	0.124	< 0.004	298	< 0.008	0.006	13.0	< 0.002	321	87.8	< 0.001	1590	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	HMI-08a	22140	< 0.052	0.011	0.085	< 0.004	304	< 0.008	0.008	24.4	< 0.002	328	86.4	< 0.001	1803	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	HMI-09a	22139	< 0.052	0.010	0.065	< 0.004	400	< 0.008	0.033	25.5	< 0.002	293	67.9	< 0.001	1163	0.018																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	21	HMI-10a	22136	< 0.052	0.003	L 0.020	< 0.004	436	J < 0.008	0.014	15.2	< 0.002	414	J 84.0	< 0.001	1396	0.465																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	21	HMI-11a	22131	< 0.052	0.004	L 0.049	< 0.004	247	J < 0.008	0.006	11.3	< 0.002	158	J 33.5	< 0.001	490	0.007																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	21	HMI-12a	22133	< 0.052	0.006	L 0.033	< 0.004	218	J < 0.008	< 0.003	42.9	< 0.002	156	J 30.1	< 0.001	506	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	24	SC 1A	22168	< 0.052	0.021	0.218	< 0.004	137	< 0.008	0.005	12.6	< 0.002	290	85.3	< 0.001	2558	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
No. of Detections Per 17 Well Locations/Samples¹						1	17	17	0	17	1	11	17	1	17	17	0	17	5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Mean (Detections only)¹						13.5	0.015	0.195	< 0.004	303	0.064	0.013	39.3	0.055	320	74.3	< 0.001	1795	0.044																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Minimum¹						< 0.052	0.003	0.020	< 0.004	90.9	< 0.008	< 0.003	7.23	< 0.002	156	6.13	< 0.001	490	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Maximum¹						13.5	0.038	0.914	< 0.004	671	0.064	0.064	159	0.055	834	158	< 0.001	3828	0.465																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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2002	5	28	CD 1a (Dup.)	22178	< 0.052	0.023	0.105	< 0.004	572	< 0.008	< 0.003	34.8	< 0.002	708	152	< 0.001	3620	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	CD 4a (Dup.)	22150	< 0.052	0.021	0.800	< 0.004	91.7	< 0.008	< 0.003	18.6	< 0.002	252	73.9	< 0.001	2183	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	HMI-05a (Dup.)	22156	< 0.052	0.008	0.061	< 0.004	324	< 0.008	< 0.003	67.1	< 0.002	355	87.3	< 0.001	1470	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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2002	5	28	CD 1b	22180	< 0.052	0.005	0.094	< 0.004	142	< 0.008	< 0.003	16.0	< 0.002	18.2	4.97	< 0.001	101	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	31	CD 2b	22185	0.084	< 0.002	0.073	< 0.004	116	< 0.008	0.004	16.3	< 0.002	17.0	7.60	< 0.001	111	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	28	CD 3b	22174	0.169	0.004	0.092	< 0.004	81.9	< 0.008	0.088	7.91	0.003	12.9	4.90	< 0.001	64.6	0.075																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	CD 4b	22148	0.097	0.004	0.113	< 0.004	196	< 0.008	< 0.003	10.8	< 0.002	9.83	9.38	< 0.001	371	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	28	HMI-01b	22175	0.115	< 0.002	0.123	< 0.004	218	0.008	< 0.003	33.6	< 0.002	8.31	4.36	< 0.001	66.8	0.004																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	HMI-02b	22163	< 0.052	< 0.002	0.065	< 0.004	185	< 0.008	0.003	16.6	< 0.002	6.57	2.90	< 0.001	31.7	0.004																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	HMI-03b	22154	< 0.052	0.016	0.282	< 0.004	140	< 0.008	< 0.003	11.4	< 0.002	261	37.3	< 0.001	2009	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	31	HMI-04b	22188	< 0.052	0.018	0.668	< 0.004	902	< 0.008	< 0.003	18.1	< 0.002	275	59.8	< 0.001	2108	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	31	HMI-05b	22186	0.057	0.011	0.107	< 0.004	109	< 0.008	< 0.003	61.4	< 0.002	163	30.8	< 0.001	1679	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	23	HMI-06b	22159	< 0.052	0.010	0.121	< 0.004	84.0	< 0.008	< 0.003	32.5	< 0.002	188	44.6	< 0.001	1769	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	28	HMI-07b	22146	0.294	0.002	0.166	< 0.004	172	< 0.008	0.016	21.3	0.004	28.8	6.80	< 0.001	116	0.017																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	HMI-08b	22141	< 0.052	0.004	0.179	< 0.004	187	< 0.008	< 0.003	27.2	< 0.002	26.5	6.50	< 0.001	129	0.009																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	HMI-09b	22138	< 0.052	0.015	0.263	< 0.004	163	< 0.008	0.012	4.15	< 0.002	250	58.7	< 0.001	2066	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	21	HMI-10b	22137	< 0.052	0.003	L 0.107	< 0.004	356	< 0.008	< 0.003	17.2	< 0.002	311	60.1	< 0.001	1299	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	21	HMI-11b	22132	< 0.052	< 0.002	UL 0.055	< 0.004	21.4	J < 0.008	< 0.003	9.17	< 0.002	9.21	J 0.735	< 0.001	6.24	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	21	HMI-12b	22135	0.081	< 0.002	UL 0.080	< 0.004	24.9	J < 0.008	0.006	3.76	< 0.002	7.85	J 7.81	< 0.001	11.8	0.010																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	24	SC 1B	22166	0.471	0.007	0.038	< 0.004	33.3	0.012	0.013	3.90	0.004	2.04	2.88	< 0.001	12.8	0.004																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
No. of Detections Per 17 Well Locations/Samples¹						8	12	17	0	17	2	8	17	3	17	17	0	17	8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Mean (Detections only)¹						0.158	0.008	0.15	< 0.004	185	0.010	0.018	18.3	0.004	94.2	20.6	0.001	705	0.018																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Minimum¹						< 0.052	< 0.002	0.038	< 0.004	21.4	< 0.008	< 0.003	3.76	< 0.002	2.04	0.735	< 0.001	6.24	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Maximum¹						0.471	0.018	0.668	< 0.004	902	0.012	0.088	64.2	0.004	311	60.1	< 0.001	2108	0.075																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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2002	5	28	CD 1b (Dup.)	22181	< 0.052	0.003	0.095	< 0.004	137	< 0.008	0.004	15.5	< 0.002	17.6	5.01	< 0.001	98.9	0.004																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	31	HMI-05b (Dup.)	22187	< 0.052	0.013	0.100	< 0.004	121	< 0.008	< 0.003	64.2	< 0.002	169	30.4	< 0.001	1706	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	21	HMI-12b (Dup.)	22134	0.078	< 0.002	UL 0.082	< 0.004	25.4	J < 0.008	0.004	3.87	< 0.002	7.91	J 8.07	< 0.001	11.4	< 0.003																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Surface Water Screening Criteria-Sites 1,3,4 (COMAR 26.08.02.03)						0.04	2	0.0022		0.074	0.009		0.0025		0.0034		0.120																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Surface Water Screening Criteria-Site 2 (COMAR 26.08.02.03)						0.036	2	0.0093		0.05	0.0034		0.0081		0.0019		0.081																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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2002	5	22	Surface Site 1 ²	22143	7.67	0.002	0.032	0.007	445	0.008	0.049	6.59	0.007	419	95.9	< 0.001	1433	3.31																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	22	Surface Site 2 ³	22147	65.9	< 0.002	0.010	0.023	466	0.023	0.131	36.7	0.007	321	52.2	< 0.001	545	8.59																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	24	Surface Site 3 ⁴	22165	0.309	< 0.002	0.009	< 0.004	262	< 0.008	0.010	0.203	< 0.002	168	37.1	< 0.001	554	0.382																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2002	5	24	Surface Site 4 ⁵	22169	0.652	0.003	0.019	< 0.004	23.6	< 0.008	0.007	0.461	< 0.002	51.9	18.8	< 0.001	487	0.011																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
No. of Detections Per 4 Locations¹						4	2	4	2	4	2	4	4	2	4	4	0	4	4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Mean (Detections only)¹						18.63	0.003	0.018	0.015	299	0.016	0.049	11.13	0.007	240	52.3	< 0.001	755	3.10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Minimum¹						0.309	< 0.002	0.009	< 0.004	23.6	< 0.008	0.007	0.203	< 0.002	51.9	18.8	< 0.001	487	0.011																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Maximum¹						65.9	0.003	0.032	0.023	466	0.023	0.131	36.7	0.007	419	101	< 0.001	1433	8.59																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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2002	5	22	Surface Site 1 (Dup)	22144	7.59	0.002	0.031	0.007	442	0.009	0.049	7.17	0.006	414	101	< 0.001	1401	3.42																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

mg/L = Milligrams per liter (i.e., parts per million)

Bold highlight indicates value exceeds comparison criterion.

¹ No. of Detections includes a duplicate detection where the primary sample result was non-detect. Means, minimums, and maximums include the greater concentration obtained for a sample and its duplicate.

Table 3-2
Summary of Chemical Results for Groundwater and Surface Water Samples - May 2002
Hart-Miller Island, Maryland

Sample Information						Metals, Dissolved																	
Year	Month	Day	Location	Sample #	Aluminum mg/L	Arsenic mg/L	Barium mg/L	Cadmium mg/L	Calcium mg/L	Chromium mg/L	Copper mg/L	Iron mg/L	Lead mg/L	Magnesium mg/L	Potassium mg/L	Silver mg/L	Sodium, diss. mg/L	Zinc mg/L					
Groundwater Screening Criteria						0.05	0.05	2	0.005		0.1	1.3	0.3	0.015		0.018		1.1					
Shallow Wells	2002	5	22	CD 1e	22151	< 0.052	0.016	0.068	< 0.004	629	< 0.008	0.010	0.013	< 0.002	338	159	< 0.001	3907	< 0.003				
	2002	5	23	CD 2a	22158	< 0.052	0.014	0.763	< 0.004	139	< 0.008	0.005	< 0.009	< 0.002	197	71.6	< 0.001	2058	0.009				
	2002	5	22	CD 3a	22152	< 0.052	0.020	0.041	< 0.004	228	< 0.008	< 0.003	0.041	< 0.002	396	116	< 0.001	2660	< 0.003				
	2002	5	22	CD 4a	22149	< 0.052	0.014	0.613	< 0.004	93.9	< 0.008	0.006	0.016	< 0.002	248	76.4	< 0.001	2213	0.011				
	2002	5	28	HMI-01e	22176	< 0.052	0.003	0.038	< 0.004	637	< 0.008	0.004	< 0.009	< 0.002	391	74.5	< 0.001	1686	< 0.003				
	2002	5	23	HMI-02a	22164	< 0.052	0.009	0.037	< 0.004	109	< 0.008	< 0.003	85.9	< 0.002	232	5.30	< 0.001	2205	< 0.003				
	2002	5	23	HMI-03a	22153	< 0.052	0.005	0.062	< 0.004	470	< 0.008	< 0.003	< 0.009	< 0.002	291	60.3	< 0.001	1341	0.038				
	2002	5	23	HMI-04e	22162	< 0.052	0.008	0.119	< 0.004	306	< 0.008	0.005	< 0.009	< 0.002	234	69.8	< 0.001	1642	0.008				
	2002	5	23	HMI-05e	22157	< 0.052	0.006	0.033	< 0.004	324	< 0.008	0.007	< 0.009	< 0.002	362	85.8	< 0.001	1510	0.013				
	2002	5	23	HMI-06a	22160	< 0.052	0.012	0.191	< 0.004	135	< 0.008	0.007	< 0.009	< 0.002	311	66.8	< 0.001	1896	0.012				
	2002	5	22	HMI-07a	22145	< 0.052	0.006	0.107	< 0.004	310	< 0.008	0.005	< 0.009	< 0.002	334	88.8	< 0.001	1642	< 0.003				
	2002	5	22	HMI-08a	22140	< 0.052	0.006	0.063	< 0.004	314	< 0.008	0.003	< 0.009	< 0.002	335	77.9	< 0.001	1682	< 0.003				
	2002	5	22	HMI-09a	22139	< 0.052	0.003	0.055	< 0.004	374	< 0.008	0.006	< 0.009	< 0.002	275	66.0	< 0.001	1103	< 0.003				
	2002	5	21	HMI-10a	22136	< 0.052	< 0.002	UL	0.019	< 0.004	429	J	< 0.008	0.009	< 0.009	UL	< 0.002	409	84.6	< 0.001	1394	0.418	
	2002	5	21	HMI-11a	22131	< 0.052	< 0.002	UL	0.048	< 0.004	256	J	< 0.008	0.007	< 0.009	UL	< 0.002	164	J	34.7	< 0.001	511	< 0.003
	2002	5	21	HMI-12a	22133	< 0.052	< 0.002	UL	0.033	< 0.004	223	J	< 0.008	0.005	8.90	J	< 0.002	158	J	32.4	< 0.001	511	< 0.003
	2002	5	24	SC 1A	22168	< 0.052	0.016	0.128	< 0.004	134	< 0.008	< 0.003	0.044	< 0.002	285	83.0	< 0.001	2445	< 0.003				
No. of Detections Per 17 Well Locations/Samples ¹						0	14	17	0	17	0	13	6	0	17	17	0	17	7				
Mean (Detections only) ¹						< 0.052	0.010	0.142	< 0.004	301	< 0.008	0.007	15.82	< 0.002	314	73.9	< 0.001	1791	0.073				
Minimum ¹						< 0.052	< 0.002	0.019	< 0.004	93.9	< 0.008	< 0.003	< 0.009	< 0.002	158	5.30	< 0.001	511	< 0.003				
Maximum ¹						< 0.052	0.020	0.763	< 0.004	637	< 0.008	0.016	85.9	< 0.002	708	159	< 0.001	3907	0.418				
Duplicate Results	2002	5	28	CD 1e (Dup.)	22178	< 0.052	0.015	0.068	< 0.004	560	< 0.008	0.016	0.027	< 0.002	708	153	< 0.001	1371	0.029				
	2002	5	22	CD 4a (Dup.)	22150	< 0.052	0.016	0.621	< 0.004	89.1	< 0.008	< 0.003	0.023	< 0.002	243	70.1	< 0.001	2161	< 0.003				
	2002	5	23	HMI-05e (Dup.)	22156	< 0.052	0.006	0.035	< 0.004	328	< 0.008	< 0.003	< 0.009	< 0.002	366	90.0	< 0.001	1554	< 0.003				
Deep Wells	2002	5	28	CD 1b	22180	< 0.052	0.003	0.072	< 0.004	136	< 0.008	< 0.003	< 0.009	< 0.002	17.8	4.76	< 0.001	97.8	< 0.002				
	2002	5	31	CD 2b	22185	0.053	< 0.002	0.056	< 0.004	120	< 0.008	0.003	< 0.009	< 0.002	17.5	6.66	< 0.001	111	< 0.003				
	2002	5	28	CD 3b	22174	< 0.052	< 0.002	0.073	< 0.004	82.3	< 0.008	0.008	< 0.009	< 0.002	13.2	4.16	< 0.001	62.0	< 0.003				
	2002	5	22	CD 4b	22148	< 0.052	0.003	0.094	< 0.004	188	< 0.008	< 0.002	0.034	< 0.002	9.32	9.23	< 0.001	357	0.004				
	2002	5	28	HMI-01b	22175	0.058	< 0.002	0.082	< 0.004	212	< 0.008	0.007	< 0.009	< 0.002	8.31	4.84	< 0.001	65.3	< 0.003				
	2002	5	23	HMI-02b	22163	< 0.052	< 0.002	0.042	< 0.004	165	< 0.008	< 0.002	< 0.009	< 0.002	6.67	2.80	< 0.001	30.2	< 0.003				
	2002	5	23	HMI-03b	22154	< 0.052	0.014	0.267	< 0.004	144	< 0.008	0.003	< 0.009	< 0.002	261	37.0	< 0.001	2009	< 0.003				
	2002	5	31	HMI-04b	22188	< 0.052	0.013	0.522	< 0.004	90.4	< 0.080	< 0.003	< 0.009	< 0.002	274	59.0	< 0.001	2113	< 0.003				
	2002	5	31	HMI-05b	22186	< 0.052	0.008	0.100	< 0.004	109	< 0.008	0.005	0.918	< 0.002	158	30.9	< 0.001	1653	< 0.003				
	2002	5	23	HMI-06b	22159	< 0.052	0.009	0.114	< 0.004	86.3	< 0.008	0.005	< 0.009	< 0.002	194	45.2	< 0.001	1764	0.009				
	2002	5	28	HMI-07b	22146	< 0.052	< 0.002	0.131	< 0.004	171	< 0.008	0.003	< 0.009	< 0.002	28.8	6.72	< 0.001	112	< 0.003				
	2002	5	22	HMI-08b	22141	< 0.052	0.002	0.128	< 0.004	176	< 0.008	0.007	0.024	< 0.002	25.9	5.86	< 0.001	124	< 0.003				
	2002	5	22	HMI-09b	22138	< 0.052	0.014	0.190	< 0.004	159	< 0.008	< 0.003	0.027	< 0.002	246	58.6	< 0.001	2027	< 0.003				
	2002	5	21	HMI-10b	22137	< 0.052	0.003	L	0.084	< 0.004	355	< 0.008	0.009	< 0.009	UL	< 0.002	306	J	61.2	< 0.001	1282	< 0.003	
	2002	5	21	HMI-11b	22132	< 0.052	< 0.002	UL	0.026	< 0.004	21.0	J	< 0.008	< 0.003	0.019	J	< 0.002	9.16	J	1.71	< 0.001	5.41	< 0.003
	2002	5	21	HMI-12b	22135	0.057	< 0.002	UL	0.047	< 0.004	24.3	J	< 0.008	< 0.003	0.103	J	< 0.002	7.77	J	6.48	< 0.001	11.1	< 0.003
	2002	5	24	SC 1B	22166	< 0.052	< 0.002	0.030	< 0.004	32.0	< 0.008	< 0.002	< 0.009	< 0.002	1.94	0.724	< 0.001	12.4	< 0.003				
No. of Detections Per 17 Well Locations/Samples ¹						3	9	17	0	17	0	10	6	0	17	17	0	17	2				
Mean (Detections only) ¹						0.056	0.008	0.122	0.004	134	< 0.008	0.006	0.219	< 0.002	93.6	20.5	< 0.001	699	0.0065				
Minimum ¹						< 0.052	< 0.002	0.026	< 0.004	21.0	< 0.008	< 0.002	< 0.009	< 0.002	1.94	0.724	< 0.001	5.41	< 0.002				
Maximum ¹						0.058	0.014	0.522	< 0.004	355	< 0.080	0.009	0.918	< 0.002	306	61.2	< 0.001	2113	0.009				
Duplicate Results	2002	5	28	CD 1b (Dup.)	22181	< 0.052	< 0.002	0.075	< 0.004	136	< 0.008	0.005	< 0.009	< 0.002	17.9	5.41	< 0.001	98.4	< 0.003				
	2002	5	31	HMI-05b (Dup.)	22187	< 0.052	0.009	0.093	< 0.004	115	< 0.008	< 0.003	0.05	< 0.002	163	32.0	< 0.001	1698	< 0.003				
	2002	5	21	HMI-12b (Dup.)	22134	< 0.052	< 0.002	UL	0.052	< 0.004	25.1	< 0.008	< 0.003	0.293	J	< 0.002	7.79	J	7.17	< 0.001	11.7	< 0.003	
Surface Water Screening Criteria-Sites 1,3,4 (COMAR 26.08.02.03)						0.041		0.022		0.074	0.009		0.0025		0.0034			0.120					
Surface Water Screening Criteria-Site 2 (COMAR 26.08.02.03)						0.036		0.0093		0.05	0.0034		0.0081		0.0079			0.081					
Surface Water	2002	5	22	Surface Site 1 ²	22143	7.66	< 0.002	0.033	0.006	423	< 0.008	0.044	< 0.009	0.005	401	97.6	< 0.001	1390	3.41				
Water Sites	2002	5	22	Surface Site 2 ³	22147	72.1	< 0.002	0.011	0.025	465	0.022	0.138	15.5	0.005	321	55.4	< 0.001	553	9.05				
	2002	5	24	Surface 3 ⁴	22165	< 0.052	< 0.002	0.009	< 0.004	265	< 0.008	0.006	< 0.009	< 0.002	49.6	37.7	&						

samples. Other metals (chromium and lead) were both detected infrequently in the total metals analyses and were not detected in the dissolved metals analyses. Trace levels of aluminum were reported for several samples. However, aluminum was also reported in laboratory blanks. Therefore, low levels of aluminum for several samples are likely artifacts of the laboratory analysis and not site related. Generally, anion and metal concentrations tended to be greater for the surficial aquifer. However, concentrations of some indicator parameters such as sodium, magnesium, chloride and sulfate in several of the "B" wells were similar to the "A" well results where separating confining units may be small or do not exist.

Dissolved metals exceeding the comparison criteria are shown in Figure 3-3. For the surficial aquifer wells, dissolved iron exceeds the comparison criterion in only two (HMI-02A and HMI-12A) of the 17 wells. The higher iron levels coincided with relatively lower pH for these wells (pHs of 5.58 and 6.41 for HMI-02A and HMI-12A, respectively). However, iron was not detected in upgradient wells HMI-01A and HMI-11A. Concentrations of chloride and sulfate also exceeded their criteria at most surficial aquifer well locations. Field-determined pH levels are outside the criteria limits at three well locations (HMI-02A, HMI-03A, and HMI-12A). Total iron exceeded the criterion at all surficial aquifer well locations. Total aluminum and lead exceeded their criteria at one well location only (HMI-01A).

Dissolved aluminum at three locations, and dissolved iron at one location each exceeded the criteria in the deeper well set. However, the aluminum exceedances (0.053 through 0.058 mg/L) were only slightly greater than the criterion of 0.05 and the method detection limit. Data validation demonstrated that the aluminum level reported for HMI-12B may be an artifact of the laboratory analysis. The other aluminum detections are also at similar levels and may also be artifacts of the analysis. As with the surficial well samples, concentrations of total iron, chloride, and pH exceeded the criteria in the deeper well samples. Total aluminum at several locations and sulfate at one location exceeded the criterion.

3.2.4 Surface Water Analyses

The chemical results for the four surface water samples are provided in Table 3-2. Figure 3-3 shows the dissolved metals that exceeded the comparison criteria. The results of the samples

3-11

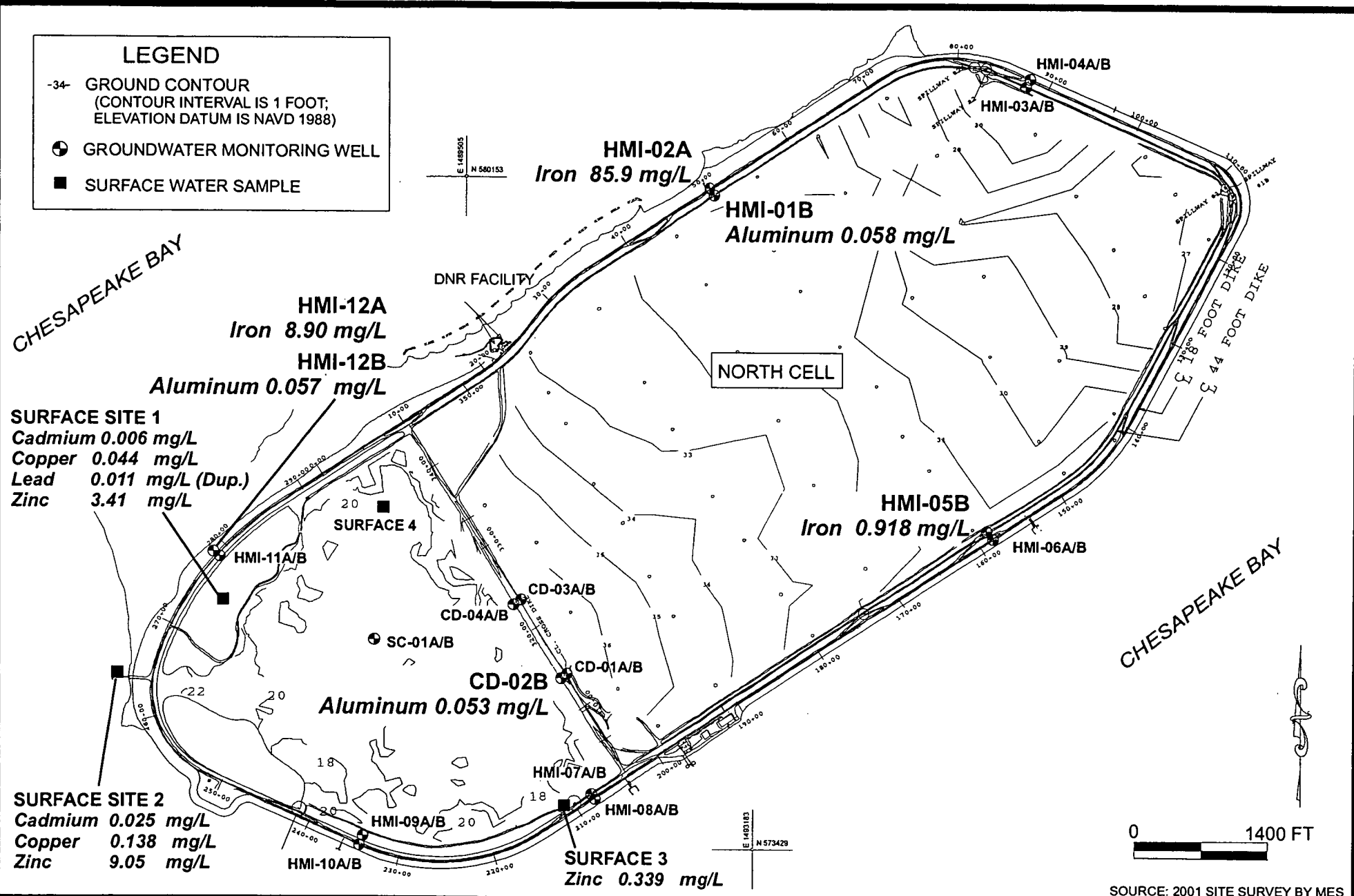


Figure 3-3
 Dissolved Metals Exceeding Criteria, May 2002
 Hart-Miller Island, Maryland

indicate detectable concentrations of several total and dissolved metals. Silver was not detected in any of the samples. Of the metals detected, total and dissolved cadmium, copper, lead and zinc exceeded the criteria in a total of three samples. The South Cell pond sample (Surface Site 1) contained similar levels of these metals as those reported in the Chesapeake Bay sample (Surface Site 2). No analyte concentrations reported for the South Cell northern drainage sample (Surface 4) exceed the criteria.

3.3 ESTIMATED METAL LOADINGS

Dissolved metal loadings from HMI groundwater are estimated for the period May through June. The loadings are based on the May 2002 sample results, permeability test results for the surficial aquifer wells, and groundwater hydraulic gradients obtained from the June 2002 synoptic groundwater level measurements. Estimates are shown in bold highlights in Table 3-3 for metal loadings for the South Cell (wells CD-02A and CD-04A) and the Bay (perimeter HMI wells). The bottom two sections of the tables provide estimates for a 30-day month (April and June) and a 31-day month (May).

The loading were estimated by calculating total groundwater discharges (i.e., volumes) through the cross dike for the South Cell and from the outermost "A" wells along the island perimeter for the Bay. Groundwater discharges were computed using average linear groundwater velocities and the cross-sectional area (i.e., the product of aquifer thickness and perimeter length) for each of the wells used for the analysis. The 30- and 31-day groundwater volumes were then multiplied by the dissolved metals concentrations converted to pounds (lbs) per cubic feet (ft³). Average linear groundwater velocities were computed using the average permeabilities determined from slug test analyses, the hydraulic gradient estimated from each outer perimeter well (e.g., well HMI-12A) to the closest downgradient point at the Bay, and an assumed effective porosity of 0.25. The effective porosity was selected from the hydrogeologic modeling literature (Spitz and Moreno, 1996; Anderson and Woessner, 1992) and represents a value typical of sand and silt, which are the major components of aquifers underlying HMI. Because water levels were only measured in June during this quarter, water elevations used for the estimates were those measured on June 7, 2002. It is assumed that an elevation of 0 feet MSL is the discharge elevation in the Bay. Average aquifer

Table 3-3
Estimated Dissolved Metals Loadings from Groundwater to the South Cell and Bay
Hart-Miller Island, Maryland

May 2002 Sample Results In mg/L									
Location	Arsenic mg/L	Barium mg/L	Calcium mg/L	Copper mg/L	Iron mg/L	Magnesium mg/L	Potassium mg/L	Sodium, diss. mg/L	Zinc mg/L
CD 2a	0.014	0.763	139	0.005		197	71.6	2058	0.009
CD 4a	0.014	0.613	93.9	0.006	0.016	246	76.4	2213	0.011
HMI-02a	0.009	0.037	109	0.005	85.9	232	5.30	2205	0.009
HMI-04a	0.008	0.119	306	0.005		234	69.8	1642	0.008
HMI-06a	0.012	0.191	135	0.007		311	66.8	1898	0.012
HMI-08a	0.006	0.063	314	0.006		335	77.9	1682	0.012
HMI-10a		0.019	429	0.006		409	84.6	1394	0.167
HMI-12a		0.033	223	0.003	8.90	158	32.4	511	0.008

Location	Concentration Arsenic lb/ft3	Concentration Barium lb/ft3	Concentration Calcium lb/ft3	Concentration Copper lb/ft3	Concentration Iron lb/ft3	Concentration Magnesium lb/ft3	Concentration Potassium lb/ft3	Concentration Sodium, diss. lb/ft3	Concentration Zinc lb/ft3
CD 2a	1.09E-09	5.94E-08	1.08E-05	3.89E-10	0.00E+00	1.53E-05	5.57E-06	1.60E-04	7.01E-10
CD 4a	1.09E-09	4.77E-08	7.31E-06	4.67E-10	1.25E-09	1.92E-05	5.95E-06	1.72E-04	8.56E-10
HMI-02a	7.01E-10	2.88E-09	8.49E-06	3.89E-10	6.69E-06	1.81E-05	4.13E-07	1.72E-04	7.01E-10
HMI-04a	6.23E-10	9.26E-09	2.38E-05	3.89E-10	0.00E+00	1.82E-05	5.43E-06	1.28E-04	6.23E-10
HMI-06a	9.34E-10	1.49E-08	1.05E-05	5.45E-10	0.00E+00	2.42E-05	5.20E-06	1.48E-04	9.34E-10
HMI-08a	4.67E-10	4.90E-09	2.44E-05	4.87E-10	0.00E+00	2.81E-05	8.07E-06	1.31E-04	9.34E-10
HMI-10a	0.00E+00	1.48E-09	3.34E-05	4.67E-10	0.00E+00	3.18E-05	6.59E-06	1.09E-04	1.30E-08
HMI-12a	0.00E+00	2.57E-09	1.74E-05	2.34E-10	6.93E-07	1.23E-05	2.52E-06	3.98E-05	6.23E-10

Location	Head Drop Feet	Distance Between Well and Bay Feet	Hydraulic Gradient i Ft/Ft	Hydraulic Conductivity K Ft/day	Porosity n Ft3/Ft3	Linear velocity v Ft/day	Aquifer Thickness b Feet	Island Perimeter Distance L Feet	Groundwater Volume Ft3/day	Groundwater Volume 30-day Month Ft3/Month	Groundwater Volume 31-day Month Ft3/Month
CD 2a	-4.00	50	-0.0800	19.8	0.25	6.34	13	1556	32041	961235	993276
CD 4a	-19.96	50	-0.3992	10.8	0.25	17.25	39	3039	510987	15329601	15840588
HMI-02a	-2.78	183	-0.0152	84.2	0.25	5.12	23	5004	147215	4416439	4563653
HMI-04a	-1.76	70	-0.0251	13.3	0.25	1.34	13	5364	23318	699551	722870
HMI-06a	-0.96	70	-0.0137	71.3	0.25	3.91	14	5977	81823	2454682	2536505
HMI-08a	-1.29	70	-0.0184	89.5	0.25	6.60	17	3759	105399	3161966	3267365
HMI-10a	-2.90	70	-0.0414	86	0.25	14.25	37	3524	464554	13936615	14401168
HMI-12a	-4.39	774	-0.0057	20.6	0.25	0.47	21	5382	13205	396164	409369

Loadings in lbs for each 30 day month (April and June)

Location	Arsenic	Barium	Calcium	Copper	Iron	Magnesium	Potassium	Sodium, diss.	Zinc
South Cell									
CD 2a	1.05E-03	5.71E-02	1.04E+01	3.74E-04	0.00E+00	1.47E+01	5.36E+00	1.54E+02	6.74E-04
CD 4a	1.67E-02	7.32E-01	1.12E+02	7.16E-03	1.91E-02	2.94E+02	9.12E+01	2.64E+03	1.31E-02
Total	1.78E-02	7.89E-01	1.22E+02	7.54E-03	1.91E-02	3.08E+02	9.65E+01	2.80E+03	1.38E-02
Bay									
HMI-02a	3.09E-03	1.27E-02	3.75E+01	1.72E-03	2.95E+01	7.98E+01	1.82E+00	7.58E+02	3.09E-03
HMI-04a	4.36E-04	8.48E-03	1.67E+01	2.72E-04	0.00E+00	1.27E+01	3.80E+00	8.94E+01	4.36E-04
HMI-06a	2.29E-03	3.65E-02	2.58E+01	1.34E-03	0.00E+00	5.94E+01	1.28E+01	3.62E+02	2.29E-03
HMI-08a	1.48E-03	1.55E-02	7.73E+01	1.48E-03	0.00E+00	8.25E+01	1.92E+01	4.14E+02	2.95E-03
HMI-10a	0.00E+00	2.06E-02	4.65E+02	6.51E-03	0.00E+00	4.44E+02	9.18E+01	1.51E+03	1.81E-01
HMI-12a	0.00E+00	1.02E-03	6.88E+00	9.25E-05	2.75E-01	4.87E+00	9.99E-01	1.58E+01	2.47E-04
Total	7.30E-03	9.29E-02	6.30E+02	1.14E-02	2.98E+01	6.83E+02	1.30E+02	3.15E+03	1.90E-01

Loadings in lbs for 30 day month (May)

Location	Arsenic	Barium	Calcium	Copper	Iron	Magnesium	Potassium	Sodium, diss.	Zinc
South Cell									
CD 2a	1.08E-03	5.90E-02	1.07E+01	3.87E-04	0.00E+00	1.52E+01	5.54E+00	1.59E+02	8.96E-04
CD 4a	1.73E-02	7.56E-01	1.16E+02	7.40E-03	1.97E-02	3.03E+02	9.42E+01	2.73E+03	1.36E-02
Total	1.83E-02	8.15E-01	1.27E+02	7.79E-03	1.97E-02	3.19E+02	9.98E+01	2.89E+03	1.43E-02
Bay									
HMI-02a	3.20E-03	1.31E-02	3.87E+01	1.78E-03	3.05E+01	8.24E+01	1.88E+00	7.83E+02	3.20E-03
HMI-04a	4.50E-04	6.70E-03	1.72E+01	2.81E-04	0.00E+00	1.32E+01	3.93E+00	9.24E+01	4.50E-04
HMI-06a	2.37E-03	3.77E-02	2.67E+01	1.38E-03	0.00E+00	6.14E+01	1.32E+01	3.74E+02	2.37E-03
HMI-08a	1.53E-03	1.60E-02	7.99E+01	1.53E-03	0.00E+00	8.52E+01	1.98E+01	4.28E+02	3.05E-03
HMI-10a	0.00E+00	2.13E-02	4.81E+02	6.73E-03	0.00E+00	4.59E+02	9.49E+01	1.56E+03	1.87E-01
HMI-12a	0.00E+00	1.05E-03	7.11E+00	9.56E-05	2.84E-01	5.04E+00	1.03E+00	1.63E+01	2.55E-04
Total	7.54E-03	9.59E-02	6.51E+02	1.18E-02	3.08E+01	7.06E+02	1.35E+02	3.26E+03	1.97E-01

thicknesses were determined from well boring logs. The horizontal distance parallel to the island perimeter (i.e., island seepage plane) was measured from the well under consideration to the midpoint distances of wells located on either side of the well.

The loadings from the North Cell to the South Cell range from a low of 0.0078 lbs per month of copper to 2,890 lbs per month of sodium (31-day loading). For the Bay, total 31-day loadings range from 0.0075 lbs of arsenic to 3,260 lbs of sodium.

4.0 SUMMARY OF FINDINGS

- Environmental investigations have been conducted at HMI from April through June pursuant to and in accordance with the Work Plan. These investigations included measuring and recording synoptic and continuous groundwater and surface water levels, collecting and chemically analyzing groundwater and surface water samples, and surveying of wells and surface water level locations.
- Groundwater in the surficial aquifer flows in a radial pattern from a groundwater mound near the cross dike toward downslope areas of the North and South Cells. The concentric groundwater surface contours for the surficial aquifer mimic the shape of HMI. Flow is radial towards the Chesapeake Bay. Groundwater in the deeper aquifer is more regular, with some minor groundwater mounding in the southwestern section of the South Cell and slightly upgradient of the North Cell midsection.
- Concentrations of dissolved iron exceed the screening criteria in two shallow wells (HMI-02A and HMI-12A) along the north side of HMI and one deep well (HMI-05B) to the south (HMI-05B). Concentrations of chloride and sulfate also exceeded their criteria at most shallow well locations but at fewer deep well locations (only one deep well exceedance of sulfate). Field-determined pH levels are outside of the criteria limits at three shallow well locations (HMI-02A, HMI-03A, and HMI-12A) and five deep well locations. Total iron exceeded the criterion at all shallow well locations and most deep well locations. Total aluminum and lead exceeded their criteria at one well shallow well location (HMI-01A), and total aluminum exceeded the criterion at several deep well locations. However, low levels of aluminum are suspect, as this analyte was detected in laboratory blanks during the analyses.
- Four metals (cadmium, copper, lead, and zinc) exceed the criteria in a total of three surface water samples. All four metals exceeded the criteria in the Bay sample collected off of the western shore of the island and the South Cell pond sample. The South Cell pond sample (Surface Site 1) contained similar levels of these metals as those reported in the Chesapeake Bay sample (Surface Site 2).

- Estimated loadings from the North Cell to the South Cell range from a low of 0.0078 lbs per month of copper to 2,890 lbs per month of sodium (31-day loading). For the Bay, total 31-day loadings range from 0.0075 lbs of arsenic to 3,260 lbs of sodium.

5.0 REFERENCES

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**APPENDIX A:
SURVEYOR'S REPORT**

SAMPLE LOCATION	NORTHING	EASTING	ELEVATION
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SPILLWAY4 BASe	575475.031	1494119.442	52.482
NC 53	576213.947	1495455.699	17.690
6a g	576196.760	1495451.135	18.509
6a c	576196.450	1495451.273	21.458
mgs n	574821.488	1493343.987	18.255
mgs n 2	574820.708	1493343.800	18.284
mgs n 3	574820.997	1493343.124	18.176
mgs n 4	574821.751	1493343.340	18.190
mgs n 5	574821.329	1493343.798	21.130
mgs n 2 1	574824.493	1493346.559	17.952
mgs n 2 2	574824.909	1493345.894	17.976
mgs n 2 3	574824.021	1493345.479	17.967
mgs n 2 4	574823.840	1493346.396	18.029
mgs n 2 5	574824.348	1493345.887	21.690
old n 1	574827.628	1493352.563	18.159
old n 2	574827.576	1493352.968	18.216
old n 3	574827.075	1493352.881	18.199
old n 4	574827.174	1493352.328	18.271
old n 5	574827.636	1493352.663	19.983
old n b 1	574831.054	1493358.650	18.008
old n b 2	574830.484	1493358.535	18.087
old n b 3	574830.331	1493359.031	18.035
old n b 4	574830.872	1493359.190	18.192
old n b 5	574830.616	1493358.998	19.904
hmi 6a 1	576196.774	1495451.535	18.596
hmi 6a 2	576195.967	1495451.428	18.452
hmi 6a 3	576196.168	1495450.818	18.461
hmi 6a 4	576196.907	1495450.885	18.483
hmi 6a 5	576196.739	1495451.218	21.406
hmi 6b 1	576200.608	1495456.615	18.351
hmi 6b 2	576199.971	1495456.633	18.353
hmi 6b 3	576200.264	1495455.963	18.256
hmi 6b 4	576200.867	1495456.139	18.284
hmi 6b 5	576200.587	1495456.157	21.362
n unloader 1	576368.567	1495915.552	12.194
n unloader 2	576368.415	1495915.532	12.211
n unloader 3	576368.640	1495915.356	12.223
hmi 4a 1	581053.464	1495835.098	18.579
hmi 4a 2	581053.719	1495835.622	18.563
hmi 4a 3	581053.008	1495835.652	18.595
hmi 4a 4	581053.084	1495835.097	18.606
hmi 4a 5	581053.411	1495835.029	21.484
hmi 4b 1	581056.598	1495828.137	18.443

hmi 4b 2	581057.009	1495828.467	18.406
hmi 4b 3	581056.265	1495828.674	18.478
hmi 4b 4	581056.245	1495828.158	18.465
hmi 4b 5	581056.460	1495828.363	21.337
hmi 2a 1	579899.483	1492534.648	17.416
hmi 2a 2	579900.856	1492533.798	17.213
hmi 2a 3	579902.016	1492535.417	17.169
hmi 2a 4	579900.479	1492536.368	17.383
hmi 2a 5	579900.599	1492535.068	19.976
hmi 2b 1	579902.648	1492542.435	17.485
hmi 2b 2	579904.523	1492541.136	17.432
hmi 2b 3	579905.655	1492543.581	17.556
hmi 2b 4	579903.928	1492544.613	17.656
hmi 2b 5	579904.300	1492542.621	20.043
hmi 12b 1	576044.008	1487438.289	18.239
hmi 12b 2	576042.459	1487439.995	18.182
hmi 12b 3	576040.686	1487438.798	18.097
hmi 12b 4	576042.271	1487436.735	18.292
hmi 12b 5	576042.412	1487438.198	20.904
hmi 12b2 1	576047.059	1487441.492	18.228
hmi 12b2 2	576049.057	1487443.216	18.211
hmi 12b2 3	576047.505	1487444.493	18.301
hmi 12b2 4	576045.751	1487443.050	18.163
hmi 12b2 5	576047.820	1487442.979	20.943
265 1	574760.156	1486361.383	8.678
265 2	574760.262	1486361.158	8.697
265 3	574760.265	1486361.382	8.684
hmi 10a 1	573016.743	1488935.591	17.870
hmi 10a 2	573016.491	1488937.345	17.842
hmi 10a 3	573015.062	1488936.066	17.874
hmi 10a 4	573014.669	1488935.883	18.241
hmi 10a 5	573015.583	1488936.366	20.977
hmi 10b 1	573018.007	1488931.849	17.680
hmi 10b 2	573016.871	1488931.320	18.182
hmi 10b 3	573017.259	1488930.505	17.644
hmi 10b 4	573018.686	1488930.778	17.815
hmi 10b 5	573017.662	1488930.873	20.895

hmi 8a 1	573507.629	1491329.177	17.814
hmi 8a 2	573506.334	1491330.055	18.112
hmi 8a 3	573505.262	1491328.050	18.177
hmi 8a 4	573506.565	1491327.318	17.849
hmi 8a 5	573506.468	1491328.806	21.069
hmi 8b 1	573509.756	1491332.251	17.960
hmi 8b 2	573510.721	1491333.756	17.964
hmi 8b 3	573509.536	1491334.563	18.280
hmi 8b 4	573509.073	1491332.901	17.840
hmi 8b 5	573509.482	1491333.753	20.885
old s a 1	573518.010	1491346.288	18.459
old s a 2	573518.665	1491347.264	18.458
old s a 3	573518.057	1491347.560	18.153
old s a 4	573517.308	1491346.412	18.181
old s a 5	573518.254	1491346.837	20.269
old s b 1	573522.811	1491352.801	18.288
old s b 2	573523.490	1491353.877	18.386
old s b 3	573522.643	1491354.287	18.255
old s b 4	573522.076	1491353.060	18.301
old s b 5	573523.034	1491353.492	20.482
mgs s a 1	573529.903	1491361.569	18.159
mgs s a 2	573530.866	1491363.149	18.176
mgs s a 3	573529.663	1491364.524	18.030
mgs s a 4	573528.361	1491362.933	18.282
mgs s a 5	573529.781	1491363.304	21.634
mgs s b 1	573536.270	1491372.641	18.064
mgs s b 2	573537.073	1491374.129	18.090
mgs s b 3	573536.168	1491374.592	18.157
mgs s b 4	573535.350	1491373.177	18.073
mgs s b 5	573536.243	1491373.626	21.209
hmi 7a 1	573569.475	1491287.445	28.098
hmi 7a 2	573570.986	1491285.937	28.048
hmi 7a 3	573572.519	1491287.492	27.952
hmi 7a 4	573571.021	1491288.941	28.027
hmi 7a 5	573571.019	1491287.505	31.217
hmi 7b 1	573572.544	1491291.066	27.884
hmi 7b 2	573573.897	1491290.038	27.905
hmi 7b 3	573574.964	1491291.918	27.740
hmi 7b 4	573573.478	1491293.060	27.791
hmi 7b 5	573573.431	1491291.567	30.907
hmi 9a 1	573125.353	1488978.596	21.336
hmi 9a 2	573123.602	1488977.857	21.413
hmi 9a 3	573124.119	1488976.219	21.388

hmi 9a 4	573126.025	1488977.001	21.396
hmi 9a 5	573124.571	1488977.489	24.304
hmi 9b 1	573126.827	1488974.484	21.258
hmi 9b 2	573125.095	1488973.106	21.217
hmi 9b 3	573126.686	1488971.533	21.098
hmi 9b 4	573128.067	1488972.852	21.233
hmi 9b 5	573127.062	1488973.479	24.976
hmi 5a 1	576300.098	1495399.803	44.027
hmi 5a 2	576301.682	1495398.506	44.019
hmi 5a 3	576302.863	1495400.240	44.110
hmi 5a 4	576301.506	1495401.581	44.132
hmi 5a 5	576301.578	1495399.889	47.060
hmi 5b 1	576298.739	1495397.409	44.009
hmi 5b 2	576297.761	1495395.268	43.977
hmi 5b 3	576299.481	1495394.412	43.942
hmi 5b 4	576300.613	1495396.251	44.109
hmi 5b 5	576299.133	1495395.694	46.940
hmi 3a 1	580964.495	1495782.670	43.686
hmi 3a 2	580962.565	1495781.870	43.582
hmi 3a 3	580963.177	1495779.804	43.699
hmi 3a 4	580965.289	1495780.541	43.723
hmi 3a 5	580964.089	1495781.170	46.744
hmi 3b 1	580963.191	1495785.037	43.635
hmi 3b 2	580962.490	1495786.992	43.554
hmi 3b 3	580960.569	1495786.267	43.541
hmi 3b 4	580961.454	1495784.547	43.653
hmi 3b 5	580962.234	1495785.808	46.841
hmi 1a 1	579802.554	1492593.577	43.496
hmi 1a 2	579801.131	1492595.008	43.417
hmi 1a 3	579799.664	1492593.420	43.606
hmi 1a 4	579801.426	1492592.223	43.469
hmi 1a 5	579800.857	1492593.597	46.400
hmi 1b 1	579803.835	1492596.100	43.445
hmi 1b 2	579805.199	1492597.726	43.496
hmi 1b 3	579803.639	1492598.895	43.331
hmi 1b 4	579802.366	1492597.348	43.506
hmi 1b 5	579803.582	1492597.357	46.364

hmi sc1a 1	575090.529	1489092.929	17.000
hmi sc1a 2	575089.002	1489093.912	16.989
hmi sc1a 3	575088.056	1489092.554	17.024
hmi sc1a 4	575089.609	1489091.389	17.124
hmi sc1a 5	575089.481	1489093.009	19.742
hmi sc1b 1	575092.829	1489090.940	17.183
hmi sc1b 2	575091.647	1489089.347	17.164
hmi sc1b 3	575093.450	1489088.323	17.271
hmi sc1b 4	575094.582	1489089.969	17.280
hmi sc1b 5	575092.837	1489089.633	20.042
hmi 11a	576085.863	1487385.252	11.031
hmi 11a	576087.317	1487383.936	10.948
hmi 11a	576085.811	1487382.288	10.885
hmi 11a	576084.390	1487383.647	11.022
hmi 11a	576085.828	1487383.804	13.600
hmi 11b	576088.774	1487386.054	10.972
hmi 11b	576090.524	1487387.917	10.847
hmi 11b	576088.930	1487388.961	11.068
hmi 11b	576087.835	1487387.572	11.074
hmi 11b	576088.708	1487387.534	13.546
cd 4a 1	575540.080	1490473.599	27.887
cd 4a 2	575538.295	1490474.959	27.910
cd 4a 3	575536.870	1490472.968	27.985
cd 4a 4	575538.930	1490471.710	27.949
cd 4a 5	575538.431	1490473.235	30.861
cd 4b 1	575541.988	1490469.928	27.966
cd 4b 2	575543.480	1490471.298	28.000
cd 4b 3	575544.815	1490469.741	28.059
cd 4b 4	575543.623	1490468.302	27.951
cd 4b 5	575543.385	1490469.514	30.743
cd ba 1	574713.874	1490986.091	25.346
cd ba 2	574712.824	1490984.546	25.284
cd ba 3	574714.377	1490983.502	25.260
cd ba 4	574715.545	1490985.009	25.340
cd ba 5	574713.832	1490984.760	28.519
cd 2b 1	574718.087	1490983.600	25.269
cd 2b 2	574717.022	1490981.746	25.237
cd 2b 3	574718.826	1490980.699	25.283

cd 2b 4	574719.987	1490982.538	25.424
cd 2b 5	574718.296	1490982.154	28.544
cd 1a 1	574776.534	1491065.366	51.011
cd 1a 2	574775.804	1491063.749	50.818
cd 1a 3	574777.458	1491062.777	50.695
cd 1a 4	574778.283	1491064.286	50.893
cd 1a 5	574776.961	1491063.963	53.964
cd 1b 1	574769.206	1491068.813	50.679
cd 1b 2	574770.300	1491070.463	50.753
cd 1b 3	574768.817	1491071.587	50.865
cd 1b 4	574767.429	1491069.813	50.767
cd 1b 5	574768.902	1491070.150	53.948
cd 3a 1	575590.451	1490556.924	52.029
cd 3a 2	575589.061	1490557.861	52.007
cd 3a 3	575587.924	1490556.730	51.873
cd 3a 4	575589.736	1490555.618	51.970
cd 3a 5	575589.276	1490556.675	55.237
cd 3b 1	575593.601	1490555.395	52.131
cd 3b 2	575592.664	1490554.008	52.019
cd 3b 3	575594.389	1490552.823	51.979
cd 3b 4	575595.151	1490554.113	51.142
cd 3b 5	575593.967	1490554.096	54.284
spillway 001b 1	579911.219	1497864.261	46.193
spillway 001b 2	579911.348	1497864.168	46.155
spillway 001b 3	579911.059	1497864.351	46.162
spillway weir 1	579919.362	1497850.185	43.294
spillway weir 2	579923.202	1497851.622	42.778
unnnown a 1	573930.004	1491855.738	27.566
unnnown a 2	573930.006	1491854.628	27.678
unnnown a 3	573931.437	1491854.430	28.367
unnnown a 4	573931.913	1491856.166	28.161
unnnown a 5	573930.548	1491855.905	30.282
unknown b 1	573927.320	1491849.204	27.905
unknown b 2	573926.946	1491847.719	28.207
unknown b 3	573928.275	1491847.445	28.743
unknown b 4	573928.803	1491849.154	28.528
unknown b 5	573927.680	1491848.419	30.382

**APPENDIX B:
WELL PURGE RECORDS**

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI CD 1A Sample ID # ~~22178~~ 22178

Date: 05/22/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 36.4

Depth to Bottom of Well - (TOC): 48.2

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 \cdot r^2 \cdot h$ r = well radius (ft)

Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h = length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

J.L.
6.9

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
13:33		16.14	6.95	22.1	4.04	-176	13.3
13:36		16.50	6.91	22.0	2.52	-187	8.8
13:39		16.66	6.90	22.0	2.07	-190	7.8
13:42		16.59	6.90	22.0	1.94	-190	7.4
13:45		16.60	6.90	22.0	1.37	-193	7.7

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI CD1B # 22180 # 22181 DUPLICATE

Date: 05/28/02

Purged/Sampled By: ALX/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 50.60

Depth to Bottom of Well - (TOC): 128.35

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
10:30		17.01	7.56	1.82	15.85	74	53.3
10:33		16.72	7.26	1.82	6.53	-158	43.2
10:36		16.94	7.18	1.87	4.25	-193	7.5
10:39		16.98	7.18	1.88	3.49	-202	3.4
10:42		16.94	7.19	1.87	2.46	-212	2.5

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI CD 2A Sample ID# 22158

Date: 05/23/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 13.21

Depth to Bottom of Well - (TOC): 33.12

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 \cdot r^2 \cdot h$ r = well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h = length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
J.L. 53 10:53		15.26	7.30	11.5	4.14	-166	7.3
10:56		15.30	7.26	11.5	3.07	-180	4.9
10:59		15.40	7.23	11.5	2.33	-192	1.5
11:02		15.43	7.21	11.4	1.92	-197	1.6
69 11:05		15.28	7.18	11.4	1.53	-199	3.2

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI CD2B Sample ID # 22185

Date: 05/28/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 25.70

Depth to Bottom of Well - (TOC): 109.05

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
08:14		17.19	7.26	1.86	11.60	-27	12.9
08:17		16.83	7.07	1.84	6.04	-168	9.7
08:20		17.48	7.07	1.82	4.59	-185	12.1
08:23		18.08	7.09	1.81	3.78	-193	13.6
08:26		18.15	7.10	1.82	3.22	-199	9.6

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
Location: Hart-Miller Island, Baltimore County Maryland
Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMICD3A Sample ID # 22152

Date: 05/22/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 17.39

Depth to Bottom of Well - (TOC): 45.75

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
<u>13:56</u>		<u>15.73</u>	<u>7.07</u>	<u>15.6</u>	<u>2.82</u>	<u>-167</u>	<u>6.7</u>
<u>13:59</u>		<u>15.65</u>	<u>6.99</u>	<u>15.5</u>	<u>1.36</u>	<u>-187</u>	<u>7.0</u>
<u>14:02</u>		<u>15.72</u>	<u>6.97</u>	<u>15.5</u>	<u>1.08</u>	<u>-195</u>	<u>7.4</u>
<u>14:05</u>		<u>15.76</u>	<u>6.97</u>	<u>15.5</u>	<u>1.04</u>	<u>-196</u>	<u>6.3</u>
<u>14:08</u>		<u>15.74</u>	<u>6.97</u>	<u>15.5</u>	<u>1.07</u>	<u>-198</u>	<u>7.3</u>

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:		
Color:		
Other:		

Sample ID: _____

Sample Date/Time: _____

Analytes								
Container(s)								
Preservative								

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI CD3B Sample ID# ~~22154~~ 22174

Date: 05/22/02

Purged/Sampled By: AK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 51.71

Depth to Bottom of Well - (TOC): 128.61

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
<u>14:11</u>		<u>15.41</u>	<u>7.77</u>	<u>1.42</u>	<u>5.75</u>	<u>-159</u>	<u>3.08</u>
<u>14:14</u>		<u>15.49</u>	<u>7.37</u>	<u>1.15</u>	<u>2.18</u>	<u>-167</u>	<u>22.7</u>
<u>14:17</u>		<u>15.94</u>	<u>7.28</u>	<u>1.10</u>	<u>1.11</u>	<u>-181</u>	<u>3.3</u>
<u>14:21</u>		<u>16.2</u>	<u>7.23</u>	<u>1.10</u>	<u>1.11</u>	<u>-187</u>	<u>4.0</u>
<u>14:24</u>		<u>16.1</u>	<u>7.25</u>	<u>1.08</u>	<u>1.02</u>	<u>-189</u>	<u>7.0</u>

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMFC04A Sample IO# 22149

Date: 05/22/02

Purged/Sampled By: BIC/JACK

Pre-Purging Static Water Level - Top of Casing (TOC): 13.64

Depth to Bottom of Well - (TOC): 32.60

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

W.L.
3.66
13.96
13.99

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
11:34		15.16	7.07	11.8	3.83	-116	26.5
11:37		15.36	6.87	11.9	1.58	-113	15.1
11:40		15.36	6.86	11.9	1.49	-115	14.8
11:43		15.40	6.84	11.9	1.31	-122	12.2
11:46		15.44	6.81	11.8	1.04	-144	7.1

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI CD4B sample # 22148

Date: 05/22/02

Purged/Sampled By: ALX/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): ~~27.48~~ 27.44

Depth to Bottom of Well - (TOC): 107.30

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

v. L.
7.46
49

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
11:19		16.28	10.05	2.80	7.37	-117	2.9
11:22		15.28	8.73	3.41	2.91	-335	12.1
11:25		15.63	8.71	3.42	1.43	-395	22.2
11:28		15.55	8.68	3.40	1.15	-403	22.2
11:31		15.57	8.68	3.40	1.06	-404	16.8

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
Location: Hart-Miller Island, Baltimore County Maryland
Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-0100061.00

Well No: HMI 1A # 22176

Date: 05/22/02

Purged/Sampled By: _____

Pre-Purging Static Water Level - Top of Casing (TOC): 42.69

Depth to Bottom of Well - (TOC): _____

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

*Hand bailed
approx. 1 1/4 gal*

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes								
Container(s)								
Preservative								

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 1B # 22175

Date: 05/23/02

Purged/Sampled By: AKK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 43.11

Depth to Bottom of Well - (TOC): 110.3

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
<u>8:41</u>	<u>0</u>	<u>16.30</u>	<u>6.89</u>	<u>1.77</u>	<u>9.20</u>	<u>-64</u>	<u>7.6</u>
<u>8:44</u>		<u>16.72</u>	<u>6.84</u>	<u>1.84</u>	<u>7.54</u>	<u>-96</u>	<u>5.6</u>
<u>8:49</u>		<u>17.46</u>	<u>6.84</u>	<u>1.87</u>	<u>9.56</u>	<u>-100</u>	<u>31.4</u>
<u>8:50</u>		<u>16.89</u>	<u>6.81</u>	<u>2.04</u>	<u>5.12</u>	<u>-139</u>	<u>49.4</u>
<u>8:53</u>		<u>16.78</u>	<u>6.89</u>	<u>2.05</u>	<u>2.49</u>	<u>-177</u>	<u>10.8</u>

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 2A Sample ID# 22164

Date: 05/23/02

Purged/Sampled By: AK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 16.28

Depth to Bottom of Well - (TOC): 37.43

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 \cdot r^2 \cdot h$ r = well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h = length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

w.c.
7.36
7.44

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
13:40		15.42	5.89	12.5	5.42	-32	1.3
13:43		14.89	5.63	12.7	2.72	-13	1.6
13:46		14.92	5.59	12.7	2.04	-7	1.6
13:49		14.93	5.59	12.7	1.99	-6	1.8
13:52		14.84	5.58	12.7	1.76	-7	2.4

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI2B Sample ID# 22163

Date: 05/23/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 17.29

Depth to Bottom of Well - (TOC): 82.83

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

w.l.
-49
7.56

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
13:27		15.14	7.15	1.66	7.62	-170	2.1
13:30		15.13	7.03	1.33	3.59	-164	4.7
13:33		15.05	6.94	1.30	2.57	-159	2.7
13:36		14.95	6.90	1.39	2.06	-160	3.9
13:39		14.93	6.88	1.43	1.68	-162	4.6

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI3A Sample ID# 22153
 Date: 05/23/02
 Purged/Sampled By: AW/BTC
 Pre-Purging Static Water Level - Top of Casing (TOC): 37.01
 Depth to Bottom of Well - (TOC): 43.35
 Stickup: _____
 Diameter of Well: _____
 Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r = well radius (ft)
 Contained in Annulus (Gal): _____ (Assume 30% Porosity) h = length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

J.L.
9:41
9:65

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
9:20		16.62	6.47	12.6	5.42	-50	5.3
9:23		16.45	6.48	10.2	2.25	-83	5.1
9:26		16.40	6.49	9.6	1.97	-87	3.8
9:29		16.23	6.44	9.4	1.77	-90	4.1
9:31		16.02	6.45	9.2	1.94	-95	2.1

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____
 Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 3B Sample ID# 22154

Date: 05/23/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 44.85

Depth to Bottom of Well - (TOC): ~~98.06~~ 98.06

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
9:00		15.43	6.50	11.2	5.46	-17	2.0
9:03		15.47	6.24	11.3	2.99	-23	0.6
9:06		15.48	6.19	11.3	2.65	-24	0.3
9:09		15.60	6.16	11.3	2.34	-27	0.8
9:12		15.64	6.15	11.3	2.05	-30	0.6

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
Location: Hart-Miller Island, Baltimore County Maryland
Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 4A Sample ID# 22162

Date: 05/23/02

Purged/Sampled By: Alk/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 20.48

Depth to Bottom of Well - (TOC): 32.55

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 \cdot r^2 \cdot h$ r = well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h = length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
<u>12:58</u>		<u>14.58</u>	<u>7.39</u>	<u>9.8</u>	<u>6.83</u>	<u>-85</u>	<u>2.9</u>
<u>13:01</u>		<u>14.18</u>	<u>7.27</u>	<u>9.9</u>	<u>2.78</u>	<u>-147</u>	<u>2.9</u>
<u>13:04</u>		<u>14.06</u>	<u>7.26</u>	<u>9.9</u>	<u>2.42</u>	<u>-152</u>	<u>2.2</u>
<u>13:07</u>		<u>13.83</u>	<u>7.24</u>	<u>9.9</u>	<u>1.88</u>	<u>-159</u>	<u>1.7</u>
<u>13:10</u>		<u>13.76</u>	<u>7.24</u>	<u>9.8</u>	<u>1.78</u>	<u>-160</u>	<u>1.6</u>

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes								
Container(s)								
Preservative								

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 4B Sample # 22188

Date: 09/30/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 18.76

Depth to Bottom of Well - (TOC): 75.25

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
09:43		15.92	6.56	11.7	5.80	-42	7.3
09:46		15.80	6.70	13.2	4.15	-93	4.3
09:49		15.81	6.68	13.2	3.12	-106	4.5
09:52		15.83	6.67	13.2	3.22	-111	4.7
09:55		15.97	6.67	13.1	2.43	-117	4.9

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 5A Sample ID # 22158 DUP # 22156

Date: 05/23/02

Purged/Sampled By: AWK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 35.75

Depth to Bottom of Well - (TOC): 42.95

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 \cdot r^2 \cdot h$ r = well radius (ft)

Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h = length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

w.l.
5.98

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
9:54		15.61	6.93	9.89	4.88	-143	3.5
9:57		15.66	6.80	9.7	3.61	-143	2.2
9:59		15.72	6.74	9.8	2.66	-144	2.3
10:02		15.78	6.71	10.2	2.35	-144	2.5
10:05		15.85	6.69	10.3	1.94	-145	2.9

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI5B # 22186 DUPLICATE # 22187

Date: 05/28/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 43.62

Depth to Bottom of Well - (TOC): 88.46

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
3.62 09:11		16.40	6.65	5.62	13.50	28	12.1
09:14		16.59	5.89	10.4	6.18	-14	5.5
43.69 09:17		16.70	5.85	10.5	5.18	-15	5.0
09:20		16.69	5.82	10.6	4.32	-16	5.0
43.73 09:23		15.97	5.78	10.7	3.22	-15	4.9

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:		
Color:		
Other:		

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 6A Sample ID# 22160

Date: 05/23/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 20.49

Depth to Bottom of Well - (TOC): 32.80

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
12:24		14.31	6.83	11.6	4.22	-118	1.2
12:27		14.50	7.00	12.1	1.67	-149	4.7
12:30		14.86	7.02	12.1	1.33	-158	9.7
12:33		14.94	7.04	12.1	1.22	-163	12.5
12:36		14.29	7.03	11.4	1.05	-165	2.1

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 6B Sample ID# 22159

Date: 05/23/02

Purged/Sampled By: AUC/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 18.89

Depth to Bottom of Well - (TOC): 61.15

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

W.L.

18.96

19.04

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
12:09		15.76	7.22	8.56	8.89	-105	10.2
12:12		15.51	6.64	9.6	4.70	-109	4.3
12:15		15.47	6.13	9.9	2.91	-66	0.8
12:18		15.48	6.04	9.9	2.39	-53	0.7
12:21		15.35	6.02	9.9	2.01	-47	1.1

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 7A Sample IO# 22145

Date: 05/22/02

Purged/Sampled By: AK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 29.85

Depth to Bottom of Well - (TOC): No depth data

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
10:21		14.82	7.03	9.9	4.64	-169	1.0
10:24		15.01	7.02	9.9	2.67	-172	0.4
10:27		15.14	7.01	9.9	1.35	-176	0.2
10:30		15.22	7.01	10.0	1.17	-177	0.1
10:33		15.12	7.02	10.0	1.05	-178	0.1

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 7B Sample ID# 22146

Date: 05/22/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 27.74

Depth to Bottom of Well - (TOC): No depth data

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

W.L.

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
10:09		15.02	7.05	2.07	4.55	-168	1.3
10:12		15.25	6.97	2.10	2.66	-164	2.3
10:15		15.47	7.00	2.12	2.17	-170	4.4
10:18		15.49	7.03	2.07	2.12	-171	4.4
10:21		15.49	7.01	2.10	2.12	-170	4.4

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMISA Sample ID# 22140

Date: 09/22/02

Purged/Sampled By: AK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 19.92

Depth to Bottom of Well - (TOC): 32.35

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 \cdot r^2 \cdot h$ r = well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h = length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

W.C.

9:06

9:11

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
9:29		14.22	6.96	10.7	4.11	-138	-0.2
9:32		14.19	6.93	10.7	2.72	-149	0.0
9:35		14.20	6.93	10.7	1.82	-155	0.0
9:38		14.22	6.93	10.7	1.54	-157	0.0
9:41		14.28	6.93	10.7	1.04	-163	0.1

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HWM183 Sample ID# 22141

Date: 09/22/02

Purged/Sampled By: ALX/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 17.71

Depth to Bottom of Well - (TOC): 99.63

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

W.L.
83

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
9:46		15.10	7.19	2.18	1.20	-208	6.4
9:49		15.17	7.18	2.19	0.92	-217	2.2
9:52		15.17	7.19	2.16	0.86	-220	11.1
9:55		15.20	7.19	2.15	0.83	-222	3.6
9:58		15.19	7.18	2.15	0.82	-222	5.2

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:		
Color:		
Other:		

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 9A Sample ID# 22139

Date: 05/22/02

Purged/Sampled By: ALB/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 19.99

Depth to Bottom of Well - (TOC): 37.95

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r = well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h = length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

w.l.
1.2

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
8:37		14.76	7.00	9.57	2.98	-151	0.2
8:40		14.87	7.00	9.51	2.31	-160	0.7
8:43		15.23	6.99	9.57	2.03	-163	0.8
8:46		15.10	6.99	9.610	2.22	-142	39.4
8:49		15.22	6.99	9.58	2.15	-153	0.7

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 9B SAMPLE ID# 22138

Date: 05/22/02

Purged/Sampled By: ALK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 20.26

Depth to Bottom of Well - (TOC): 57.9

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
9:00		14.78	7.08	11.5	6.26	-145	2.9
9:03		14.87	7.07	11.5	2.00	-155	1.5
9:06		14.89	7.03	11.5	1.75	-157	2.3
9:09		14.95	7.07	11.5	1.61	-159	2.7
9:12		15.00	7.10	11.5	1.38	-162	1.8

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

205
2.3
243

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
Location: Hart-Miller Island, Baltimore County Maryland
Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 10A Sample ID# 22136

Date: 05/21/02

Purged/Sampled By: ALX/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 18.16

Depth to Bottom of Well - (TOC): 29.35

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
29 13:20		14.08	6.72	9.6	4.33	-92	-0.3
13:23		14.15	6.69	9.6	3.28	-97	-0.3
13:26		14.17	6.68	9.5	2.51	-102	-0.3
23 13:29		14.19	6.68	9.5	2.11	-105	-0.4
13:31		14.22	6.67	9.4	1.95	-106	-0.3

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

552

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 10B Sample ID# 22137

Date: 05/21/02

Purged/Sampled By: AUC/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 16.85

Depth to Bottom of Well - (TOC): 58.03

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

W.L.
30
7.45

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
13:43		14.56	6.96	9.73	2.71	-176	4.1
13:46		14.62	7.00	9.71	1.87	-183	3.1
13:49		14.65	7.01	9.70	1.36	-192	2.4
13:51		14.64	7.02	9.66	1.27	-193	2.4
13:55		14.63	7.02	9.67	1.22	-194	1.7

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: 11A Sample ID# 22131

Date: 5/21/02

Purged/Sampled By: BTC/AV // FJK

Pre-Purging Static Water Level - Top of Casing (TOC): 16.29

Depth to Bottom of Well - (TOC): 9.11

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): 177.65 Vol. in Gal. = $23.50 * r^2 * h$ r = well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h = length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements: WL=16.46

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
<u>46</u> 10:00		<u>14.78</u>	<u>6.42</u>	<u>4.71</u>	<u>4.84</u>	<u>-76</u>	<u>-2.3</u>
10:06		<u>14.66</u>	<u>6.49</u>	<u>4.71</u>	<u>3.27</u>	<u>-94</u>	<u>-2.2</u>
10:09		<u>14.59</u>	<u>6.50</u>	<u>4.70</u>	<u>2.89</u>	<u>-99</u>	<u>-2.3</u>
<u>60</u> 10:12		<u>14.60</u>	<u>6.52</u>	<u>4.70</u>	<u>2.59</u>	<u>-104</u>	<u>-2.3</u>
10:15		<u>14.58</u>	<u>6.52</u>	<u>4.69</u>	<u>2.42</u>	<u>-107</u>	<u>-2.4</u>
10:18		<u>14.59</u>	<u>6.54</u>	<u>4.70</u>	<u>2.10</u>	<u>-111</u>	<u>-2.4</u>
<u>65</u> 10:21		<u>14.64</u>	<u>6.54</u>	<u>4.71</u>	<u>1.95</u>	<u>-114</u>	<u>-2.4</u>

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes								
Container(s)								
Preservative								

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
Location: Hart-Miller Island, Baltimore County Maryland
Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: ~~HMI~~ HMI 113 **SAMPLE ID:** ~~22~~ 22132
Date: 05/21/02
Purged/Sampled By: MUC/BTC
Pre-Purging Static Water Level - Top of Casing (TOC): ~~22~~ 21.31
Depth to Bottom of Well - (TOC): 128.95
Stickup: _____
Diameter of Well: _____
Screen Length: _____
Quantity of Water in Well Prior to Development:
 Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)
 Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h=length of H₂O column (ft)
Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
10:45		15.44	7.10	0.22	2.90	-195	8.4
10:48		15.44	7.25	0.22	2.42	-224	27.2
10:51		15.70	7.28	0.22	2.34	-230	55.6
10:54		15.88	7.28	0.22	2.06	-233	82.0
10:58		15.73	7.29	0.21	1.61	-235	106.0

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____
Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI 2A SAMPLE ID: 22133

Date: 05/21/02

Purged/Sampled By: ALX/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 10.38

Depth to Bottom of Well - (TOC): 24.50 + 2.8 = 27.3

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

w.l.
9.46
.55

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
<u>11:25</u>		<u>14.07</u>	<u>6.43</u>	<u>4.65</u>	<u>8.3</u>	<u>-70</u>	<u>6.0</u>
<u>11:28</u>		<u>13.99</u>	<u>6.42</u>	<u>4.65</u>	<u>6.97</u>	<u>-76</u>	<u>1.7</u>
<u>11:31</u>		<u>14.23</u>	<u>6.42</u>	<u>4.65</u>	<u>5.12</u>	<u>-81</u>	<u>1.1</u>
<u>11:35</u>		<u>13.59</u>	<u>6.42</u>	<u>4.64</u>	<u>4.64</u>	<u>-82</u>	<u>2.4</u>
<u>11:38</u>		<u>13.54</u>	<u>6.41</u>	<u>4.64</u>	<u>3.64</u>	<u>-84</u>	<u>2.2</u>

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes									
Container(s)									
Preservative									

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMT 12B Sample ID: 22134 Sample Dup ID: 22135

Date: 05/21/02

Purged/Sampled By: AK/BTC

Pre-Purging Static Water Level - Top of Casing (TOC): 13.76

Depth to Bottom of Well - (TOC): 116.0

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal.): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

N.L.
85
14.06
4.1

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
12:40		15.29	9.14	0.22	4.65	-110	11.2
12:45		14.78	9.15	0.22	10.54	-103	3.9
12:48		14.75	8.99	0.22	8.27	-317	6.7
12:51		14.86	8.59	0.22	4.75	-407	187
12:54		14.82	8.56	0.22	3.08	-422	12.0
12:57		14.80	8.57	0.22	2.16	-430	5.8

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI SC-1A Sample #22166

Date: 05/24/02

Purged/Sampled By: ALK/BG

Pre-Purging Static Water Level - Top of Casing (TOC): 4.46

Depth to Bottom of Well - (TOC): 42.55

Stickup: _____

Diameter of Well: _____

Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)

Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

w.v.
4.71
7.91

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
10:54		15.56	6.87	15.1	5.85	-136	8.2
10:57		15.67	6.87	15.1	3.86	-151	4.7
11:00		15.72	6.88	15.1	3.22	-157	4.2
11:03		15.22	6.90	15.0	2.36	-166	3.2
11:06		15.28	6.90	15.1	2.11	-169	3.2

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	Initial	Final
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

Sample ID: _____

Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

Comments:

WELL PURGING AND SAMPLING RECORD

Project Name: Hart-Miller Island Groundwater Study
 Location: Hart-Miller Island, Baltimore County Maryland
 Client: Maryland Environmental Service, Annapolis, MD

Project No.: 89-01000061.00

Well No: HMI SC-1B Sample # 2216B
 Date: 05/24/02
 Purged/Sampled By: ALW/BG
 Pre-Purging Static Water Level - Top of Casing (TOC): 16.66
 Depth to Bottom of Well - (TOC): 89.10
 Stickup: _____
 Diameter of Well: _____
 Screen Length: _____

Quantity of Water in Well Prior to Development:

Standing in Well (Gal.): _____ Vol. in Gal. = $23.50 * r^2 * h$ r=well radius (ft)
 Contained in Annulus (Gal): _____ (Assume 30% Porosity) h=length of H₂O column (ft)

Purging Device and Rate: _____

Field Parameter Meter(s) Make(s), Model(s) and Serial Number(s):

Field Measurements:

N.L.
e.84
7.02

Time (24 Hr. Desig.)	Gallons Removed	Temp (°C)	pH	Cond (uS/cm ²)	DO (mg/L)	Eh/ORP (mV)	Turb (NTU)
10:31		15.94	6.85	0.242	5.69	-63	9.0
10:34		16.07	7.03	0.244	2.94	-131	3.2
10:37		16.11	7.05	0.243	2.67	-141	3.3
10:40		16.14	7.08	0.244	2.39	-149	3.0
10:43		16.00	7.11	0.243	2.04	-160	2.6

Record Additional Measurements on Continuation Page, if Required

Water Characteristics and Changes During/After Purging:

	<u>Initial</u>	<u>Final</u>
Clarity:	_____	_____
Color:	_____	_____
Other:	_____	_____

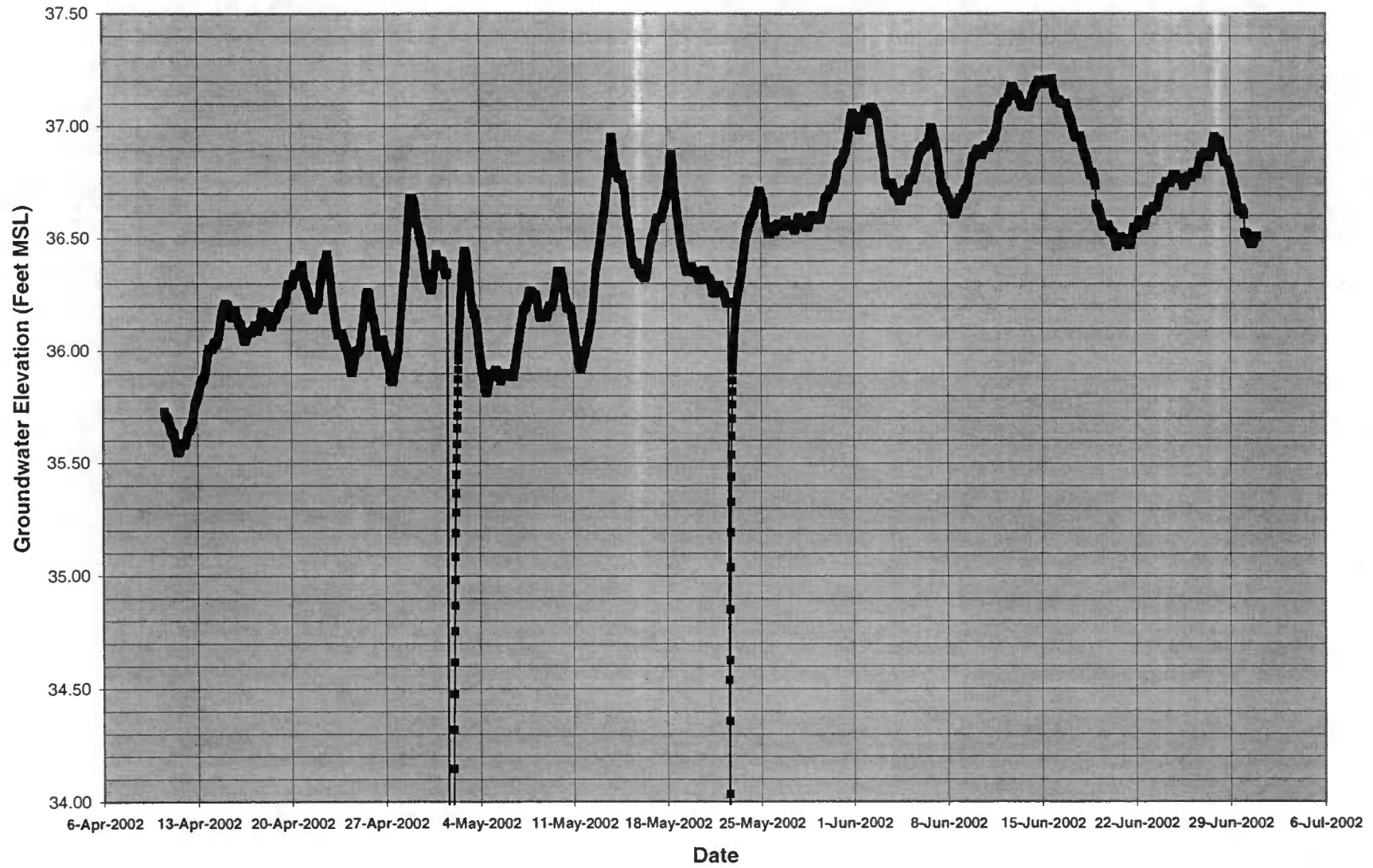
Sample ID: _____
 Sample Date/Time: _____

Analytes							
Container(s)							
Preservative							

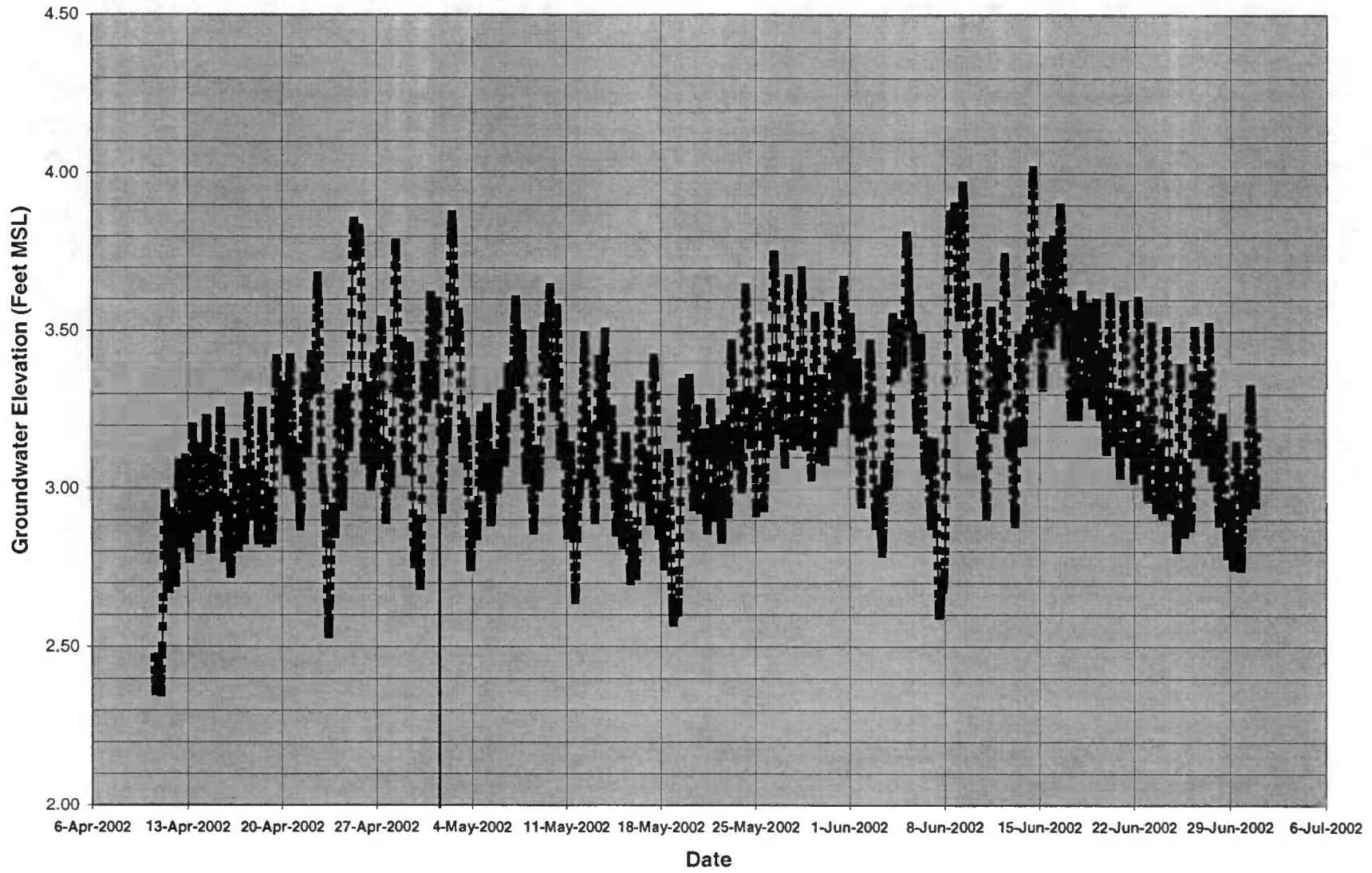
Comments:

APPENDIX C:
PLOTS OF CONTINUOUS WATER LEVEL MEASUREMENTS

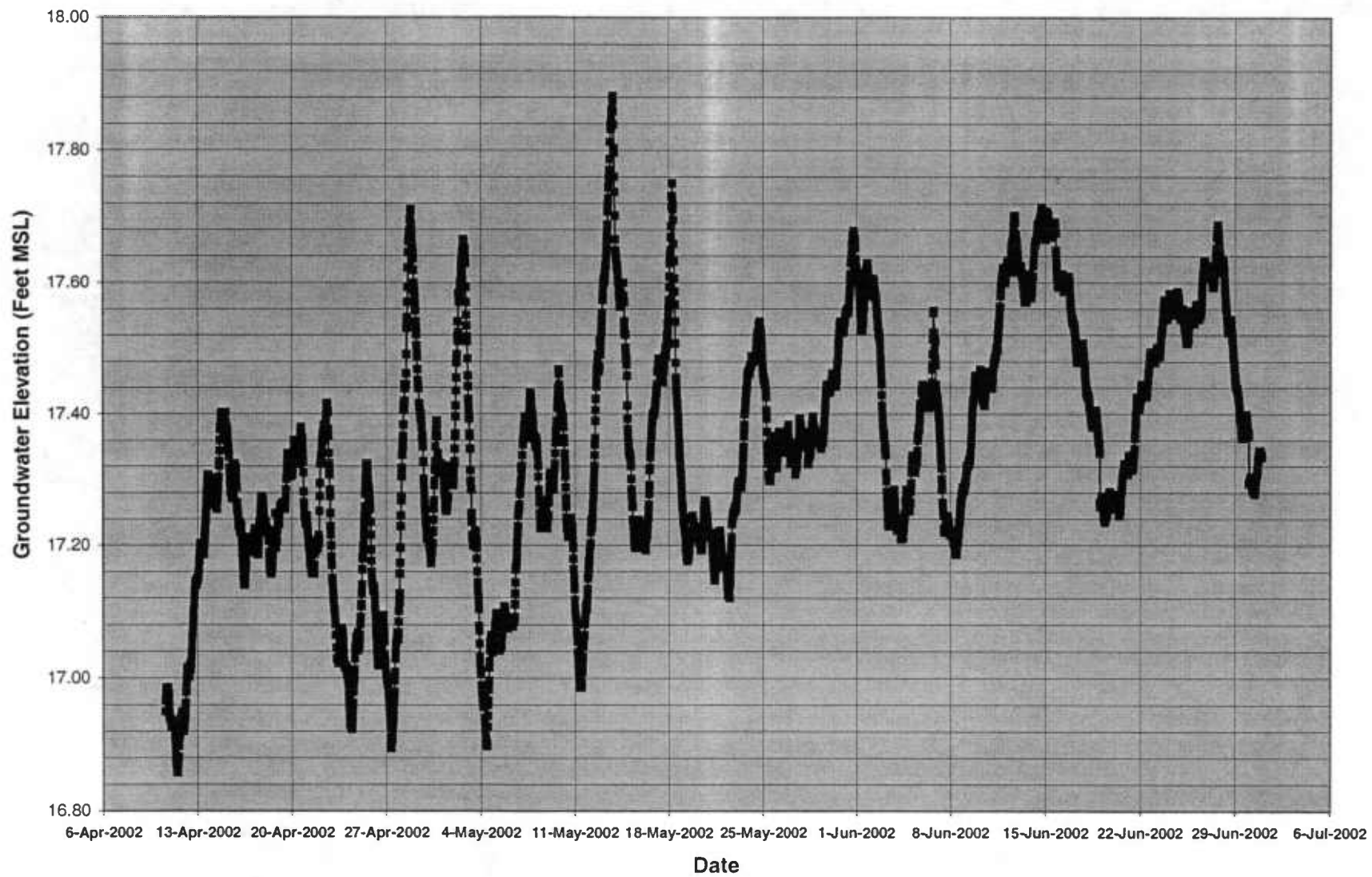
Hydrograph of Well CD-03A
April-June, 2002



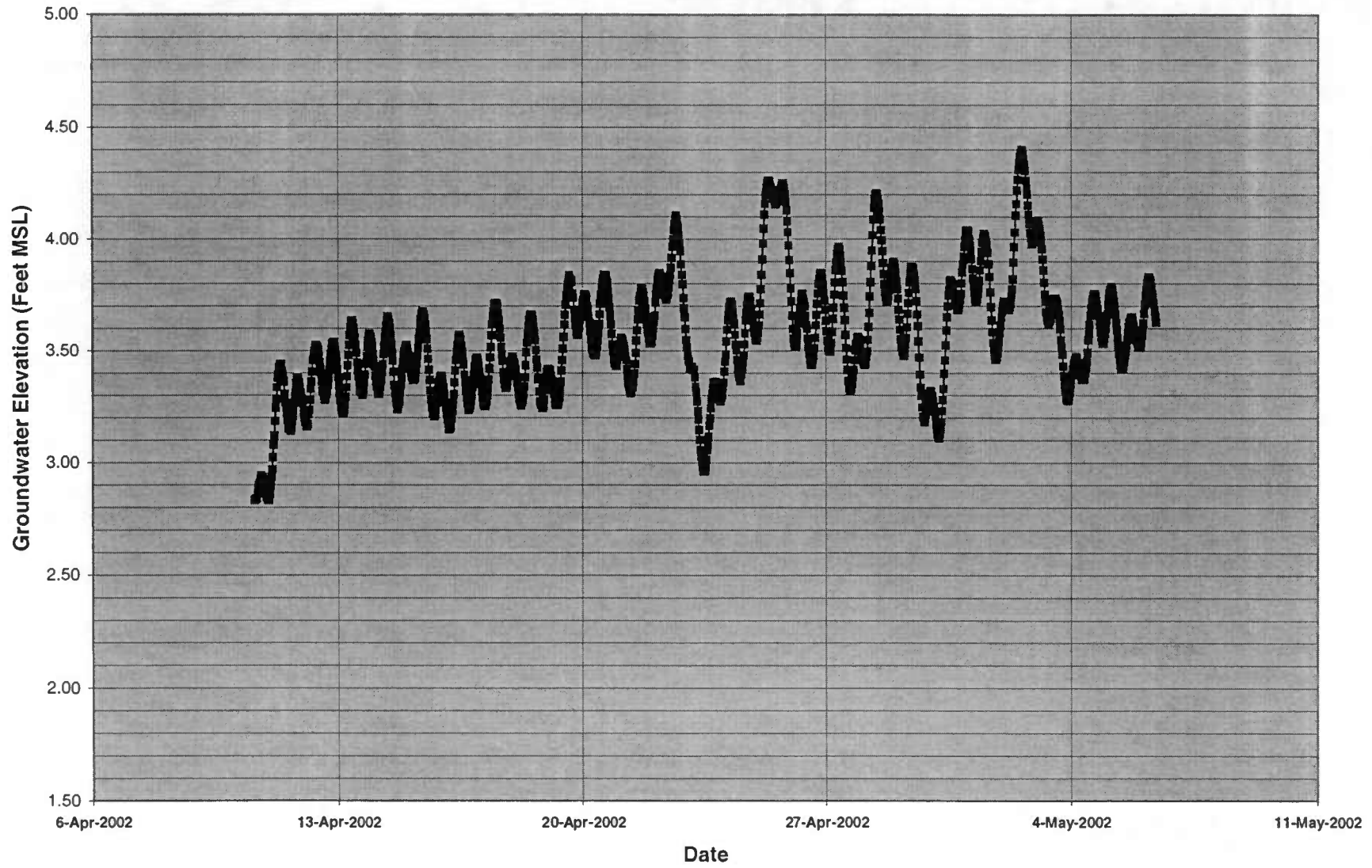
Hydrograph of Well CD-03B
April-June, 2002



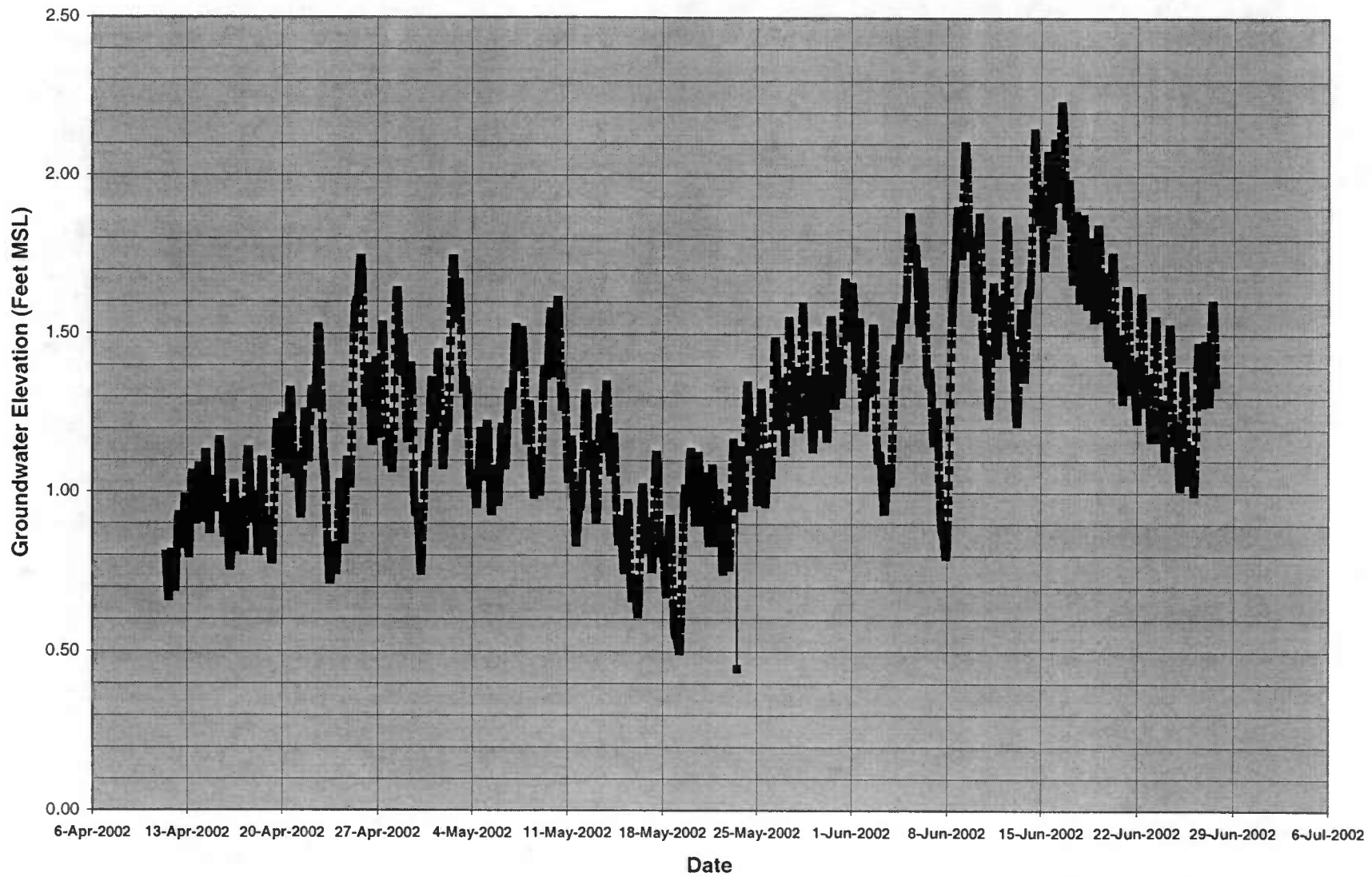
Hydrograph of Well CD-04A
April-June, 2002



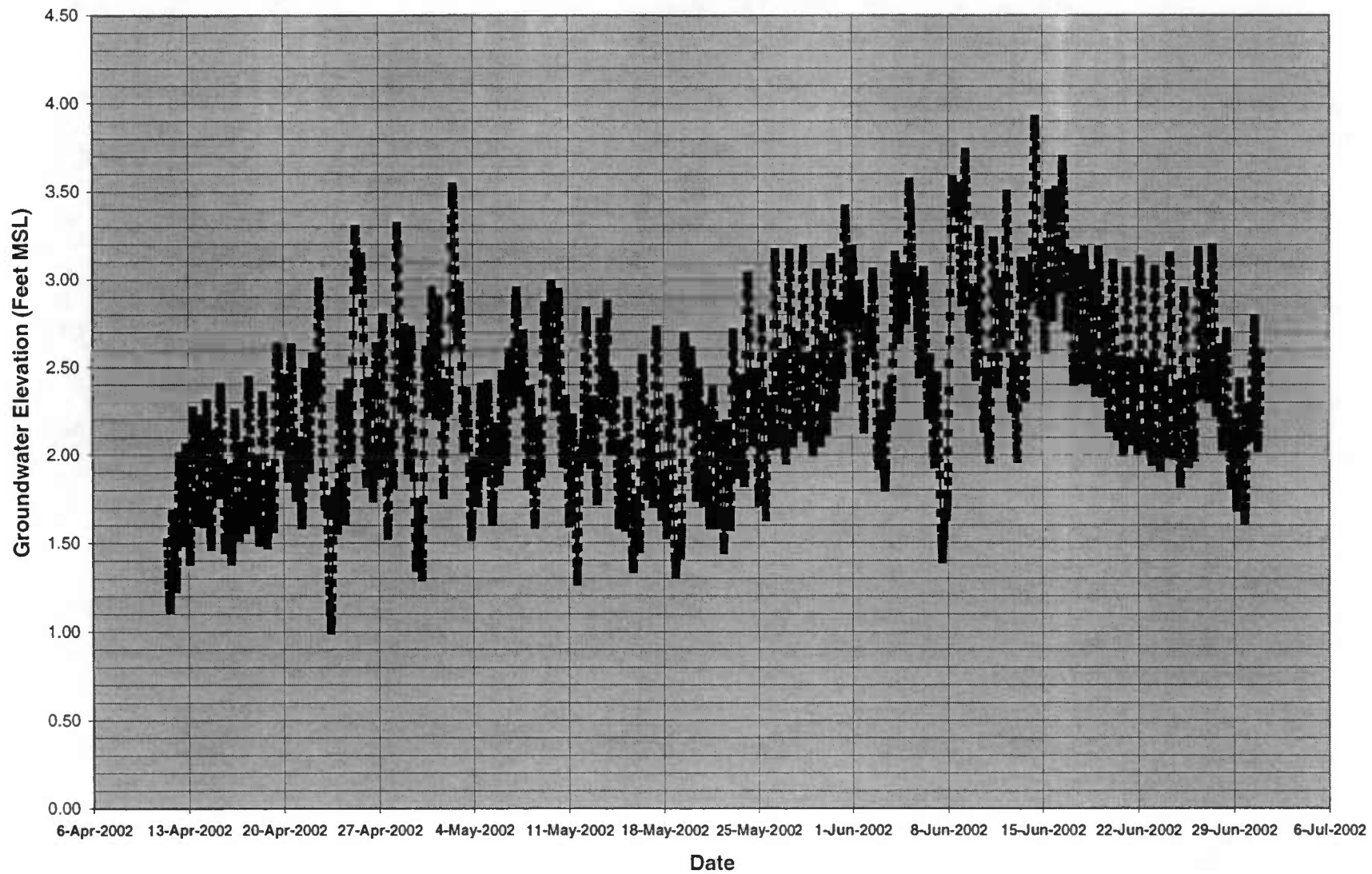
Hydrograph of Well CD-04B
April-May, 2002



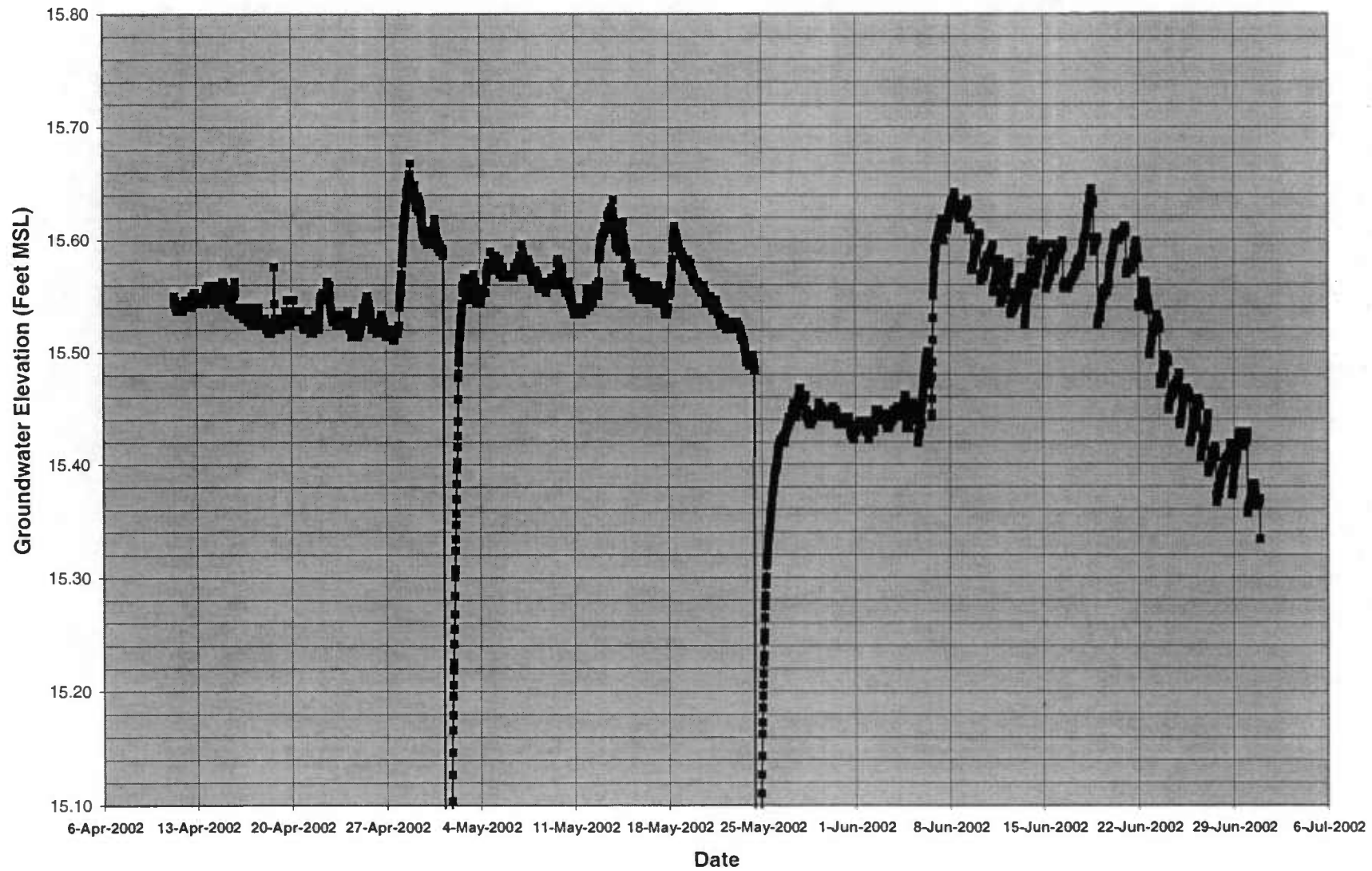
Hydrograph of Well HMI-04A
April-June, 2002



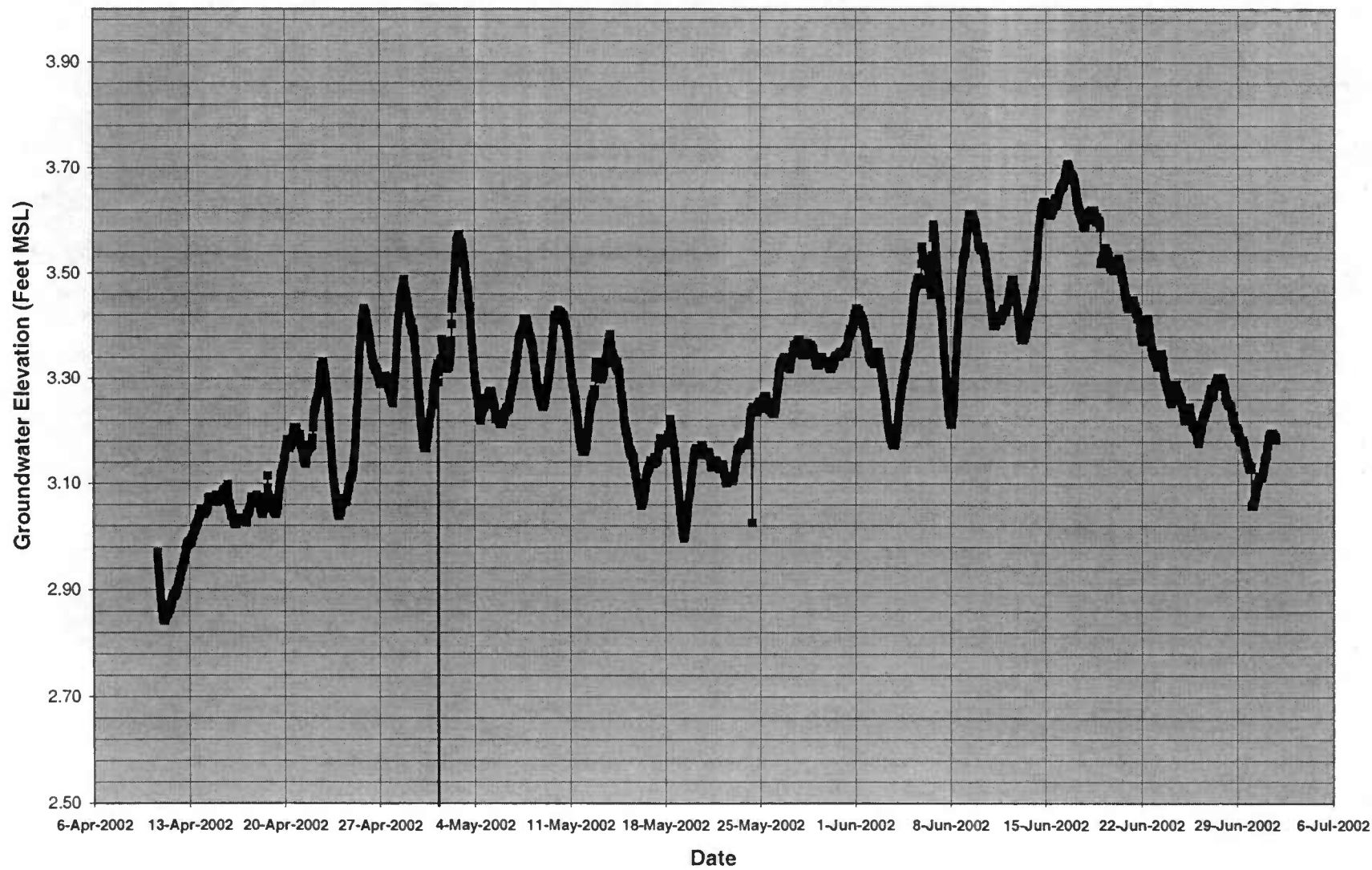
Hydrograph of Well HMI-04B
April-June, 2002



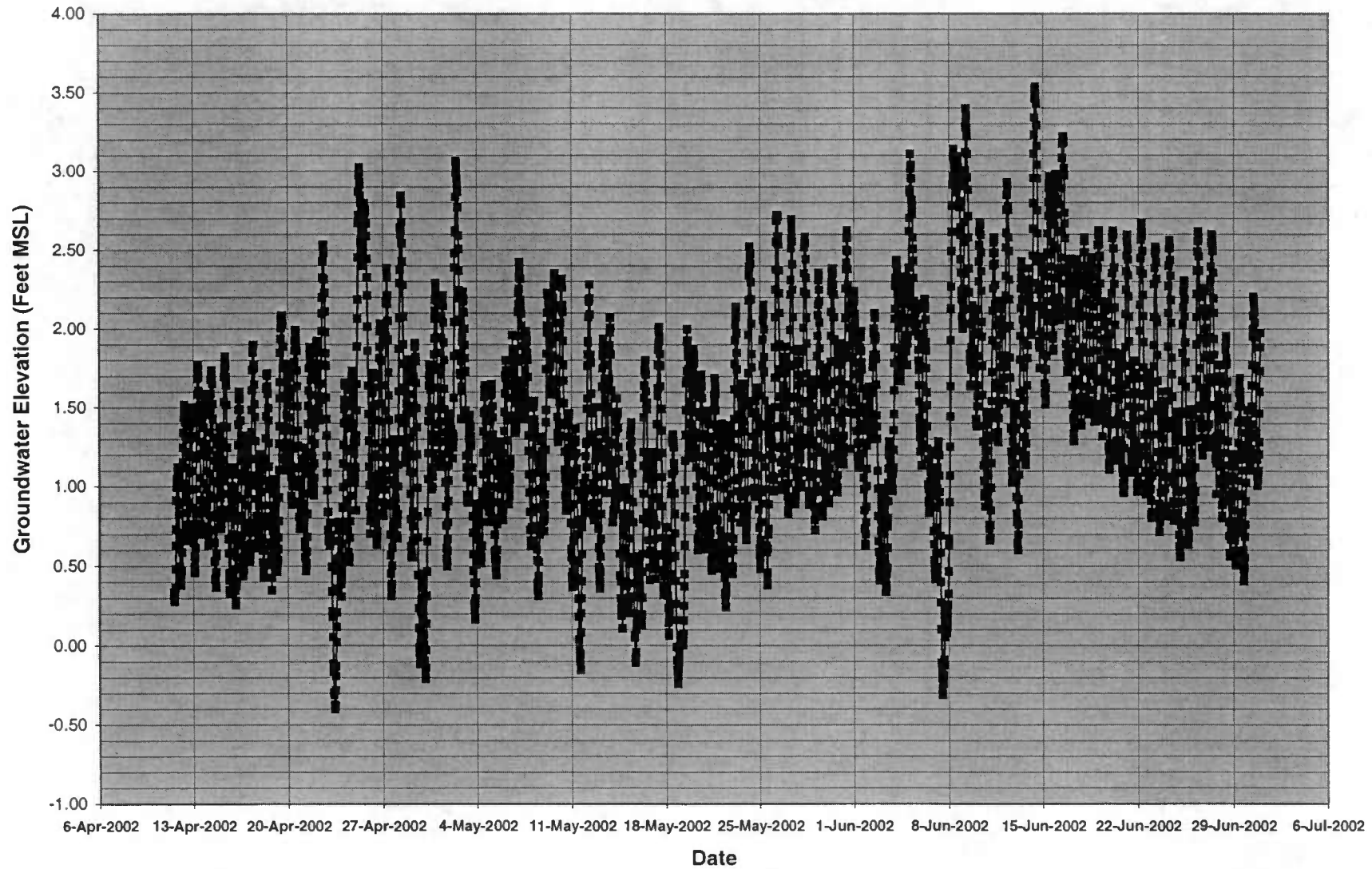
Hydrograph of Well SC-01A
April-June, 2002



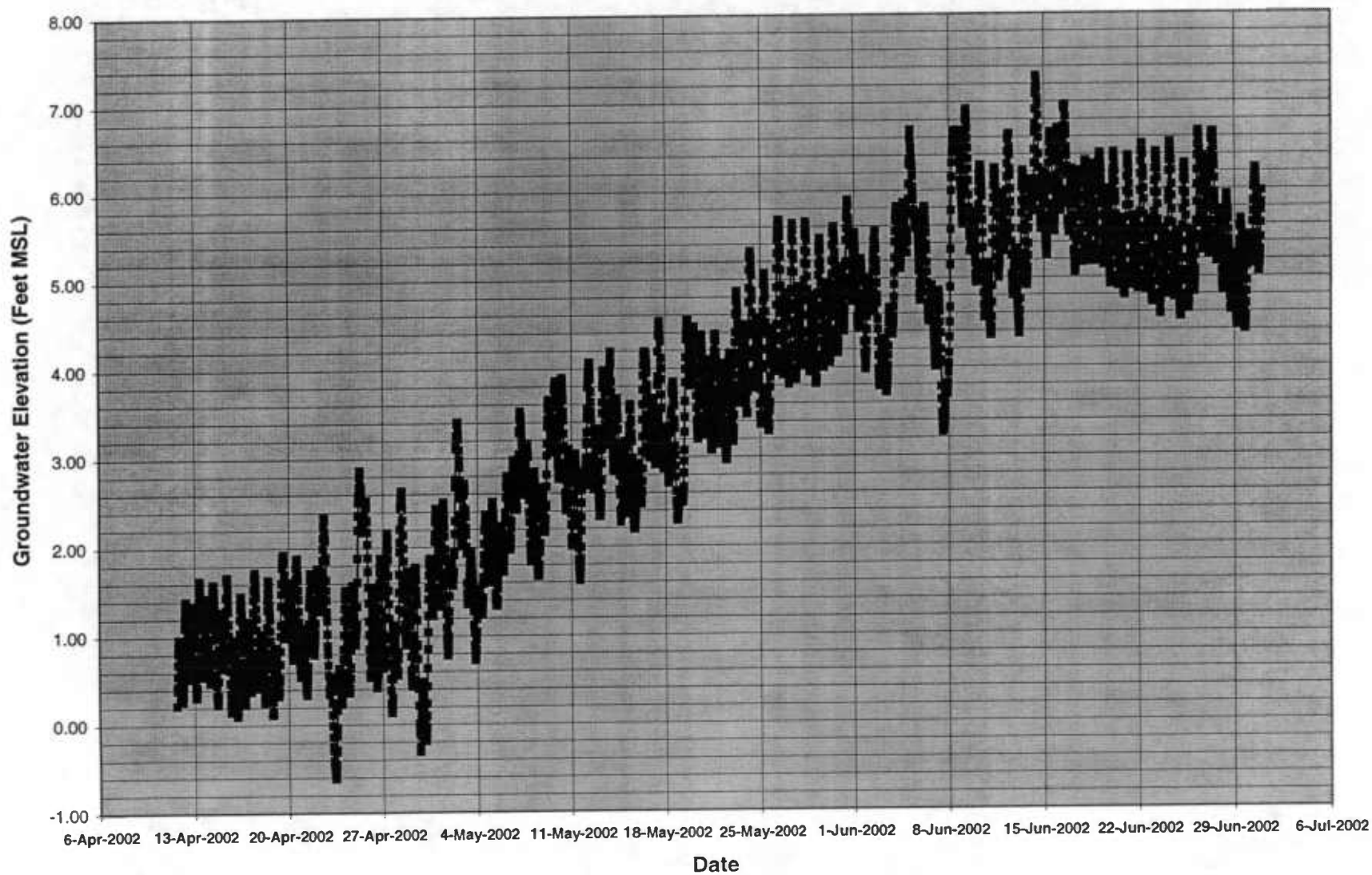
Hydrograph of Well SC-01B
April-June, 2002



Hydrograph of Chesapeake Bay at North Unloading Facility 155
April-June, 2002



Hydrograph of Chesapeake Bay at Boat Dock 265
April-June, 2002



**APPENDIX D:
DATA VALIDATION REPORT**

DATA VALIDATION REPORT - Level IV Review

SDG No.: 0205910 Fraction: Total & Dissolved Metals, TOC,
Ammonia, ortho-Phosphate, Sulfide,
Alkalinity, total Hardness, & Anions

Lab: Atlantic Coast Laboratory Project Name: Hart-Miller Island -GW

Reviewer: JA Date: November 22, 2002

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied, the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review and the specifics of the analytical method employed.

Major

Anomalies: For the ortho-phosphate analyses, all samples were analyzed outside the holding time (i.e., 48 hours) by more than 2X in this SDG. Ortho-phosphate was detected in all samples and positive detections were flagged "J, h". It was noticed in the case narratives that all samples (including other five SDGs) were either received and analyzed outside the holding time or analyzed outside the holding time. Since the ortho-phosphate data from the other five SDGs were not scheduled for validation, no data qualifying action was taken. However, the data user should be aware that all positive ortho-phosphate data should be considered estimates with low biases and non-detects should be considered unusable. It is recommended by the reviewer that all future samples be shipped to the laboratory overnight and the laboratory analyzes these samples immediately upon receipt for ortho-phosphate.

Minor

Anomalies: For total and dissolved metals analyses, the continuing calibration verification (CCV9) displayed a %R less than the lower control limit (i.e., 90%) for silver at 83%. Since no field samples were associated with this CCV, no data qualifying action was taken. The preparation blank displayed a positive detection for magnesium at 0.009 mg/L. Since magnesium results in the associated samples were greater than five times the blank concentration, no data qualifying action was taken. Aluminum was detected in the initial calibration blank (ICB) at 0.071 mg/L. Positive aluminum results less than five times the blank concentration were flagged "B, o". The MS recovery for arsenic (71%) was less than the lower control limit (i.e., 75%) in the MS sample (22131-11A). All positive arsenic results were flagged "L, m" and non-detects were flagged "UL, m" in the associated samples. The %Ds for calcium (44.2%) and magnesium (35.0%) were greater than the acceptance limit (i.e., <10%) in one serial dilution analysis (22131-11A). Positive calcium and magnesium results were flagged "J, s". Field duplicates displayed an absolute difference greater than the control limit (i.e., 2 times the reporting limit, 0.006 mg/L) for total zinc at 0.01 mg/L and a relative

percent difference (RPD) greater than the control limit (i.e., 50%) for dissolved iron at 96% in the 22134-12B/22135-12BDUP field duplicate pair. All total zinc and dissolved iron results were flagged "J, f" for positive detections and "UJ, f" for non-detects in the associated samples.

For the total organic carbon (TOC) analyses, TOC was detected in the ICB at 1.3 mg/L and two continuing calibration blanks at 1.1 mg/L (CCB3) and 1.0 mg/L (CCB7). All positive TOC results were flagged "B, o" in the associated samples.

For the sulfide analyses, the method blank contained sulfide at 0.058 mg/L. Positive sulfide results in the associated samples were flagged "B, p". The MS recovery for sulfide (66%) was less than the lower control limit (i.e., 75%) in the MS sample (22162-4A in SDG: 0205995). Since MS recoveries in other two MS samples (22138-9B and 22150-CD4A-DUP) were in control, no data qualifying action was taken. Field duplicates displayed an absolute difference greater than the control limit (i.e., 2 times the reporting limit, 0.06 mg/L) for sulfide at 0.105 mg/L in the 22134-12B/22135-12BDUP field duplicate pair. Since this poor precision may be attributed to the method blank contamination and all positive detections were previously flagged due to this blank contamination, no further data qualifying action was taken.

For the anions analyses, the MS recovery for nitrite (139%) was greater than the upper control limit (i.e., 125%) in the MS sample (22131-11A). Since nitrite was not detected in the associated samples and non-detects were not impacted by this high MS recovery, no data qualifying action was taken. The RPD for bromide (22.1%) was greater than the acceptance limit (i.e., 20%) in the laboratory duplicate sample (22131-11A). Positive bromide results were flagged "J, k". Field duplicates displayed an absolute difference greater than the control limit (i.e., 2 times the reporting limit 0.12 mg/L) for nitrate at 0.33 mg/L in the 22134-12B/22135-12BDUP field duplicate pair. All nitrate results were flagged "J, f" for positive detections and "UJ, f" for non-detects in the associated samples.

Correctable

Anomalies: Sulfide results were incorrectly reported as non-detects in samples 22132-11B, 22133-12A, and 22137-10B. Dissolved copper and dissolved zinc results in sample 22135-12B (from ICP-MS analysis) and the total hardness result in sample 22137-10B (in dissolved metal section) were incorrectly reported on the data summary form. The laboratory was contacted and revised data summary forms were received. The laboratory also went back to check the entire sulfide data set and found four additional transcription errors in SDG: 0205990 (22138-09B, 22140-8A, 22141-8B, and 22147-Surface Site 2). Revised data summary forms are attached to this data validation report.

Comments: For the nitrite and nitrate analyses, 21 of 45 samples were received and analyzed outside the holding time (i.e., 48 hours) and another nine of 45 samples were analyzed outside the holding time. Some analyses grossly exceeded the holding time. Since these samples were not scheduled for data validation, no data qualifying action was taken. However, the data user should be aware that all positive nitrite and nitrate data should be considered estimates with low bias and non-detects should be considered unusable. It is recommended by the reviewer that all future samples be shipped to the laboratory overnight and the laboratory analyze these samples immediately upon receipt for nitrite and nitrate.

On the basis of this evaluation, the laboratory appears to have followed the specified analytical method with the exception of those anomalies identified above. It should be noted that if a given fraction (analysis) is not discussed in this report, it indicates that no anomalies were observed for that fraction. All data in SDG: 0205910 are usable, as qualified, for their intended purpose, based on the data reviewed.

Signed: _____

Chai-chun

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result.

Table 2: Reason Codes

The other type of code used by URS is a Reason Code. The reason code indicates the type of quality control failure that lead to the application of the data validation flag.

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
c	Calibration failure; poor (RRF) or unstable (%D) response	b	Instrument performance failure or poor chromatography	c	Calibration failure
d	MS/MSD or LCS/LCSD RPD imprecision	c	Calibration failure; poor or unstable (%D) response	d	MS/MSD or LCS/LCSD RPD imprecision
e	Sample preservation or cooler temperature failure	d	MS/MSD or LCS/LCSD RPD imprecision	e	Sample preservation or cooler temperature failure
f	Field duplicate imprecision	e	Sample preservation or cooler temperature failure	f	Field duplicate imprecision
h	Holding time violation	f	Field duplicate imprecision	h	Holding time violation
j	Tuning Failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
l	LCS recovery failure	h	Holding time violation	l	LCS recovery failure
m	MS/MSD recovery failure	l	LCS recovery failure	m	MS/MSD recovery failure
n	Internal standard failure	m	MS/MSD recovery failure	n	ICP interference check sample failure
p	Air bubble (> 6 mm or ¼ inch) in VOC vials	p	Air bubble (> 6 mm or ¼ inch) in VOC vials	o	Calibration blank contamination
q	Concentration exceeded the linear range	q	Concentration exceeded the linear range	p	Preparation blank contamination
r	linearity (%RSD or r) failure in initial calibration	r	linearity (%RSD or r) failure in initial calibration	q	Concentration exceeded the linear range
s	Surrogate failure	s	Surrogate failure	r	Linearity failure in calibration or MSA
t	Tentatively identified Compound	u	No confirmation column	s	Serial dilution failure
w	Identification criteria failure	w	Identification criteria failure	v	Post-digestion spike failure
x	Field and/or equipment blank contamination	x	Field and/or equipment blank contamination	w	CRDL standard recovery failure
y	Trip blank contamination	y	Trip blank contamination	x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination	z	Method blank and/or storage blank contamination	z	Laboratory storage blank contamination
Q	Other – see bottom of data report for explanation	Q	Other – see bottom of data report for explanation	Q	Other - see bottom of data report for explanation



REPORT OF ANALYSIS

Maryland Environmental Svc
2011 Commerce Park Drive
Annapolis, MD 21401

Order #: 02-05-910
Date: 08/13/02 13:07
Work ID: Hart-Miller Island DCMF
Date Received: 05/22/02
Date Completed: 06/21/02

Attn: Mr. Rex A. Lloyd

Purchase Order: 98-04-11/1-01 Act:2170292
Invoice Number: 96286

Client Code: MES_AB

SAMPLE IDENTIFICATION

<u>Sample Number</u>	<u>Sample Description</u>	<u>Sample Number</u>	<u>Sample Description</u>
01	22131 11a	05	22135 12b dup
02	22132 11b	06	22136 10a
03	22133 12a	07	22137 10b
04	22134 12b		

This cover page is an integral part of the analytical report.

Laboratory Certifications: DE DE00011 PA 68-335
MD 138 NJ DE568

Certified By
Warren Van Arsdall

TEST RESULTS BY SAMPLE

Sample: 01A 22131 11a
Collected: 05/21/02 10:20

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed	Dt/Tm
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02	15:51
Arsenic, ICP-MS	0.004	L, mo.002	mg/L	JTH	06/05/02	02:45
Barium, ICP	0.049	0.003	mg/L	EL	06/01/02	15:51
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02	15:51
Calcium, ICP	247	J, s 0.800	mg/L	EL	06/01/02	16:01
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02	15:51
Copper, ICP	0.006	0.003	mg/L	EL	06/01/02	15:51
Digestion, Aqueous, 200.2	05/28/02		date prepared	EL	05/28/02	18:00
Iron, ICP	11.3	0.009	mg/L	EL	06/01/02	15:51
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	02:45
Magnesium, ICP	158	J, s 0.040	mg/L	EL	06/01/02	16:01
Metals, ICP/MS	06/05/02		date analyzed			
Metals, ICP/OES	06/01/02		date analyzed			
Potassium, ICP	33.5	0.39	mg/L	EL	06/01/02	15:51
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	02:45
Sodium, ICP	490	2.00	mg/L	EL	06/01/02	16:01
Total Hardness, Calculation	1270	5.0	mg/L as CaCO3	EL	06/01/02	16:01
Zinc, ICP	0.007	J, f 0.003	mg/L	EL	06/01/02	15:51

Sample: 01B 22131 11a dissolved
Collected: 05/21/02 10:20

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed	Dt/Tm
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02	16:20
Arsenic, ICP-MS	ND	uL, mo.002	mg/L	JTH	06/05/02	07:24
Barium, ICP	0.048	0.003	mg/L	EL	06/01/02	16:20
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02	16:20
Calcium, ICP	256	J, s 0.800	mg/L	EL	06/01/02	16:04
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02	16:20
Copper, ICP	0.007	0.003	mg/L	EL	06/01/02	16:20
Iron, ICP	ND	u, f 0.009	mg/L	EL	06/01/02	16:20
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	07:24
Magnesium, ICP	164	J, s 0.040	mg/L	EL	06/01/02	16:04
Metals, ICP/MS	06/05/02		date analyzed			
Metals, ICP/OES	06/01/02		date analyzed			
Potassium, ICP	34.7	0.39	mg/L	EL	06/01/02	16:20
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	07:24
Sodium, ICP	511	2.00	mg/L	EL	06/01/02	16:04
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02	16:20

Sample: 01C 22131 11a
Collected: 05/21/02 10:20

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed	Dt/Tm
Bromide, Ion Chrom	2.50	J, k 0.21	mg/L	MSO	05/23/02	10:09
Chloride, Ion Chrom	598	0.39	mg/L	MSO	05/23/02	10:09
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02	10:09

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ion chromatography	05/23/02		date complete		
Nitrate, Ion Chrom	ND <i>UJ,f</i>	0.06	mg/L as N	MSO	05/23/02 10:09
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 10:09
Phosphate, Ortho	0.35 <i>J,h</i>	0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	1440	0.38	mg/L	MSO	05/23/02 10:09
Total Alkalinity-Titration	33	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

Sample: 01D 22131 11a
Collected: 05/21/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	0.29	0.20	mg/L as N	BLT	05/30/02 11:48
Total Organic Carbon, Aq	1.4 <i>B,D</i>	1.0	mg/L	KS	05/29/02 11:19

Sample: 01E 22131 11a
Collected: 05/21/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	05/28/02 08:00

Sample: 02A 22132 11b
Collected: 05/21/02 11:02

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:23
Arsenic, ICP-MS	ND <i>UL,MO</i>	0.002	mg/L	JTH	06/05/02 03:16
Barium, ICP	0.055	0.003	mg/L	EL	06/01/02 16:23
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:23
Calcium, ICP	21.4 <i>J,S</i>	0.080	mg/L	EL	06/01/02 16:23
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:23
Copper, ICP	ND	0.003	mg/L	EL	06/01/02 16:23
Digestion, Aqueous, 200.2	05/28/02		date prepared	EL	05/28/02 18:00
Iron, ICP	9.17	0.009	mg/L	EL	06/01/02 16:23
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:16
Magnesium, ICP	9.21 <i>J,S</i>	0.004	mg/L	EL	06/01/02 16:23
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/01/02		date analyzed		
Potassium, ICP	0.735	0.39	mg/L	EL	06/01/02 16:23
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 03:16
Sodium, ICP	6.24	0.20	mg/L	EL	06/01/02 16:23
Total Hardness, Calculation	91.4	0.50	mg/L as CaCO3	EL	06/01/02 16:23
Zinc, ICP	ND <i>UJ,f</i>	0.003	mg/L	EL	06/01/02 16:23

Sample: 02B 22132 11b
Collected: 05/21/02 11:02

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:26
Arsenic, ICP-MS	ND <i>UL,MO</i>	0.002	mg/L	JTH	06/05/02 07:32
Barium, ICP	0.026	0.003	mg/L	EL	06/01/02 16:26
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:26

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Calcium, ICP	21.0	J,S 0.080	mg/L	EL	06/01/02 16:26
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:26
Copper, ICP	ND	0.003	mg/L	EL	06/01/02 16:26
Iron, ICP	0.019	J,f 0.009	mg/L	EL	06/01/02 16:26
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:32
Magnesium, ICP	9.16	J,S 0.004	mg/L	EL	06/01/02 16:26
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/01/02				date analyzed
Potassium, ICP	1.71	0.39	mg/L	EL	06/01/02 16:26
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 07:32
Sodium, ICP	5.41	0.20	mg/L	EL	06/01/02 16:26
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:26

Sample: 02C 22132 11b
Collected: 05/21/02 11:02

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 10:43
Chloride, Ion Chrom	2.49	0.39	mg/L	MSO	05/23/02 10:43
Fluoride, Ion Chrom	0.70	0.21	mg/L	MSO	05/23/02 10:43
Ion chromatography	05/23/02				date complete
Nitrate, Ion Chrom	ND	W,f 0.06	mg/L as N	MSO	05/23/02 10:43
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 10:43
Phosphate, Ortho	0.02	J,h 0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	ND	0.38	mg/L	MSO	05/23/02 10:43
Total Alkalinity-Titration	117	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

Sample: 02D 22132 11b
Collected: 05/21/02 11:02

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	5.7	0.20	mg/L as N	BLT	05/30/02 11:48
Total Organic Carbon, Aq	3.0	B,o 1.0	mg/L	KS	05/29/02 11:19

Sample: 02E 22132 11b
Collected: 05/21/02 11:02

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.05	B,p 0.03	mg/L	MSO	05/28/02 08:00

Sample: 03A 22133 12a
Collected: 05/21/02 11:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:29
Arsenic, ICP-MS	0.006	L,m 0.002	mg/L	JTH	06/05/02 03:24
Barium, ICP	0.033	0.003	mg/L	EL	06/01/02 16:29
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:29
Calcium, ICP	218	J,S 0.800	mg/L	EL	06/04/02 20:12
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:29
Copper, ICP	ND	0.003	mg/L	EL	06/01/02 16:29

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TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Digestion, Aqueous, 200.2	05/28/02		date prepared	EL	05/28/02 18:00
Iron, ICP	42.9	0.009	mg/L	EL	06/01/02 16:29
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:24
Magnesium, ICP	156 <i>J,s</i>	0.040	mg/L	EL	06/04/02 20:12
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/04/02		date analyzed		
Potassium, ICP	30.1	0.39	mg/L	EL	06/01/02 16:29
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 03:24
Sodium, ICP	506	2.0	mg/L	EL	06/04/02 20:12
Total Hardness, Calculation	1186	5.0	mg/L as CaCO3	EL	06/04/02 20:12
Zinc, ICP	ND <i>WJ,f</i>	0.003	mg/L	EL	06/01/02 16:29

Sample: 03B 22133 12a
Collected: 05/21/02 11:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:32
Arsenic, ICP-MS	ND <i>VL,m</i>	0.002	mg/L	JTH	06/05/02 07:40
Barium, ICP	0.033	0.003	mg/L	EL	06/01/02 16:32
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:32
Calcium, ICP	223 <i>J,s</i>	0.800	mg/L	EL	06/04/02 20:16
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:32
Copper, ICP	0.005	0.003	mg/L	EL	06/01/02 16:32
Iron, ICP	8.90 <i>J,f</i>	0.009	mg/L	EL	06/01/02 16:32
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:40
Magnesium, ICP	158 <i>J,s</i>	0.040	mg/L	EL	06/04/02 20:16
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/04/02		date analyzed		
Potassium, ICP	32.4	0.39	mg/L	EL	06/01/02 16:32
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 07:40
Sodium, ICP	511	2.0	mg/L	EL	06/04/02 20:16
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:32

Sample: 03C 22133 12a
Collected: 05/21/02 11:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	3.50 <i>J,k</i>	0.21	mg/L	MSO	05/23/02 10:55
Chloride, Ion Chrom	789	0.39	mg/L	MSO	05/23/02 10:55
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 10:55
Ion chromatography	05/23/02		date complete		
Nitrate, Ion Chrom	ND <i>WJ,f</i>	0.06	mg/L, as N	MSO	05/23/02 10:55
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 10:55
Phosphate, Ortho	0.01 <i>J,h</i>	0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	1512	0.38	mg/L	MSO	05/23/02 10:55
Total Alkalinity-Titration	ND	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

TEST RESULTS BY SAMPLE

Sample: 03D 22133 12a
Collected: 05/21/02 11:40

Category: GW

Test Description	Result	Det Limit	Units By	Analyzed Dt/Tm
Ammonia, Automated Phenate	0.84	0.20	mg/L as N BLT	05/30/02 11:48
Total Organic Carbon, Aq	1.3 <i>B, O</i>	1.0	mg/L KS	05/29/02 11:19

Sample: 03E 22133
Collected: 05/21/02 11:40

Category: GW

Test Description	Result	Det Limit	Units By	Analyzed Dt/Tm
Sulfide, colorimetric	0.04 <i>B, P</i>	0.03	mg/L MSO	05/28/02 08:00

Sample: 04A 22134 12b
Collected: 05/21/02 12:55

Category: GW

Test Description	Result	Det Limit	Units By	Analyzed Dt/Tm
Aluminum, ICP	0.081 <i>B, O</i>	0.052	mg/L EL	06/01/02 16:35
Arsenic, ICP-MS	ND <i>UL, M</i>	0.002	mg/L JTH	06/05/02 03:32
Barium, ICP	0.080	0.003	mg/L EL	06/01/02 16:35
Cadmium, ICP	ND	0.004	mg/L EL	06/01/02 16:35
Calcium, ICP	24.9 <i>J, S</i>	0.080	mg/L EL	06/01/02 16:35
Chromium, ICP	ND	0.008	mg/L EL	06/01/02 16:35
Copper, ICP	0.006	0.003	mg/L EL	06/01/02 16:35
Digestion, Aqueous, 200.2	05/28/02		date prepared	EL 05/28/02 18:00
Iron, ICP	3.76	0.009	mg/L EL	06/01/02 16:35
Lead, ICP-MS	ND	0.002	mg/L JTH	06/05/02 03:32
Magnesium, ICP	7.85 <i>J, S</i>	0.004	mg/L EL	06/01/02 16:35
Metals, ICP/MS	06/05/02		date analyzed	
Metals, ICP/OES	06/01/02		date analyzed	
Potassium, ICP	7.81	0.39	mg/L EL	06/01/02 16:35
Silver, ICP-MS	ND	0.001	mg/L JTH	06/05/02 03:32
Sodium, ICP	11.8	0.20	mg/L EL	06/01/02 16:35
Total Hardness, Calculation	94.4	0.50	mg/L as CaCO3	EL 06/01/02 16:35
Zinc, ICP	0.010 <i>J, f</i>	0.003	mg/L EL	06/01/02 16:35

Sample: 04B 22134 12b
Collected: 05/21/02 12:55

Category: GW

Test Description	Result	Det Limit	Units By	Analyzed Dt/Tm
Aluminum, ICP	0.057 <i>B, O</i>	0.052	mg/L EL	06/01/02 16:38
Arsenic, ICP-MS	ND <i>UL, M</i>	0.002	mg/L JTH	06/05/02 07:48
Barium, ICP	0.047	0.003	mg/L EL	06/01/02 16:38
Cadmium, ICP	ND	0.004	mg/L EL	06/01/02 16:38
Calcium, ICP	24.3 <i>J, S</i>	0.080	mg/L EL	06/01/02 16:38
Chromium, ICP	ND	0.008	mg/L EL	06/01/02 16:38
Copper, ICP	ND	0.003	mg/L EL	06/01/02 16:38
Iron, ICP	0.103 <i>J, f</i>	0.009	mg/L EL	06/01/02 16:38
Lead, ICP-MS	ND	0.002	mg/L JTH	06/05/02 07:48
Magnesium, ICP	7.77 <i>J, S</i>	0.004	mg/L EL	06/01/02 16:38
Metals, ICP/MS	06/05/02		date analyzed	

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TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Metals, ICP/OES	06/01/02		date analyzed		
Potassium, ICP	6.48	0.39	mg/L	EL	06/01/02 16:38
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 07:48
Sodium, ICP	11.1	0.20	mg/L	EL	06/01/02 16:38
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:38

Sample: 04C 22134 12b
Collected: 05/21/02 12:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 11:07
Chloride, Ion Chrom	3.11	0.39	mg/L	MSO	05/23/02 11:07
Fluoride, Ion Chrom	0.31	0.21	mg/L	MSO	05/23/02 11:07
Ion chromatography	05/23/02		date complete		
Nitrate, Ion Chrom	ND <i>UJ,f</i>	0.06	mg/L as N	MSO	05/23/02 11:07
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 11:07
Phosphate, Ortho	0.20 <i>J,h</i>	0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	1.52	0.38	mg/L	MSO	05/23/02 11:07
Total Alkalinity-Titration	136	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

Sample: 04D 22134 12b
Collected: 05/21/02 12:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	5.1	0.20	mg/L as N	BLT	05/30/02 11:48
Total Organic Carbon, Aq	2.8 <i>B,O</i>	1.0	mg/L	KS	05/29/02 11:19

Sample: 04E 22134 12b
Collected: 05/22/02 12:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	05/28/02 08:00

Sample: 05A 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.078 <i>B,O</i>	0.052	mg/L	EL	06/01/02 16:41
Arsenic, ICP-MS	ND <i>uL,mb</i>	0.002	mg/L	JTH	06/05/02 03:40
Barium, ICP	0.082	0.003	mg/L	EL	06/01/02 16:41
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:41
Calcium, ICP	25.4 <i>J,S</i>	0.080	mg/L	EL	06/01/02 16:41
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:41
Copper, ICP	0.004	0.003	mg/L	EL	06/01/02 16:41
Digestion, Aqueous, 200.2	05/28/02		date prepared EL 05/28/02 18:00		
Iron, ICP	3.87	0.009	mg/L	EL	06/01/02 16:41
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:40
Magnesium, ICP	7.91 <i>J,S</i>	0.004	mg/L	EL	06/01/02 16:41
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/01/02		date analyzed		
Potassium, ICP	8.07	0.39	mg/L	EL	06/01/02 16:41

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TEST RESULTS BY SAMPLE

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 03:40
Sodium, ICP	11.4	0.20	mg/L	EL	06/01/02 16:41
Total Hardness, Calculation	96.1	0.50	mg/L as CaCO3	EL	06/01/02 16:41
Zinc, ICP	ND <i>W,f</i>	0.003	mg/L	EL	06/01/02 16:41

Sample: 05B 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:44
Arsenic, ICP-MS	ND <i>UL, mp</i>	0.002	mg/L	JTH	06/05/02 07:55
Barium, ICP	0.052	0.003	mg/L	EL	06/01/02 16:44
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:44
Calcium, ICP	25.1 <i>J,s</i>	0.080	mg/L	EL	06/01/02 16:44
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:44
Copper, ICP	ND	0.003	mg/L	EL	06/01/02 16:44
Iron, ICP	0.293 <i>J,f</i>	0.009	mg/L	EL	06/01/02 16:44
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:55
Magnesium, ICP	7.79 <i>J,s</i>	0.004	mg/L	EL	06/01/02 16:44
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/01/02				date analyzed
Potassium, ICP	7.17	0.39	mg/L	EL	06/01/02 16:44
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 07:55
Sodium, ICP	11.7	0.20	mg/L	EL	06/01/02 16:44
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:44

Sample: 05C 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 11:18
Chloride, Ion Chrom	3.52	0.39	mg/L	MSO	05/23/02 11:18
Fluoride, Ion Chrom	0.23	0.21	mg/L	MSO	05/23/02 11:18
Ion chromatography	05/23/02				date complete
Nitrate, Ion Chrom	0.33 <i>J,f</i>	0.06	mg/L as N	MSO	05/23/02 11:18
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 11:18
Phosphate, Ortho	0.22 <i>J,h</i>	0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	1.09	0.38	mg/L	MSO	05/23/02 11:18
Total Alkalinity-Titration	135	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

Sample: 05D 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Ammonia, Automated Phenate	5.1	0.20	mg/L as N	BLT	05/30/02 11:48
Total Organic Carbon, Aq	3.0 <i>B,0</i>	1.0	mg/L	KS	05/29/02 11:19

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TEST RESULTS BY SAMPLE

Sample: 05E 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.13	B,p 0.03	mg/L	MSO	05/28/02 08:00

Sample: 06A 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:58
Arsenic, ICP-MS	0.003	L,m 0.002	mg/L	JTH	06/05/02 04:03
Barium, ICP	0.020	0.003	mg/L	EL	06/01/02 16:58
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:58
Calcium, ICP	436	J,s 3.20	mg/L	EL	06/04/02 20:19
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:58
Copper, ICP	0.014	0.003	mg/L	EL	06/01/02 16:58
Digestion, Aqueous, 200.2	05/28/02		date prepared	EL	05/28/02 18:00
Iron, ICP	15.2	0.009	mg/L	EL	06/01/02 16:58
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 04:03
Magnesium, ICP	414	J,s 0.160	mg/L	EL	06/04/02 20:19
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/04/02		date analyzed		
Potassium, ICP	84.0	0.39	mg/L	EL	06/01/02 16:58
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 04:03
Sodium, ICP	1396	8.00	mg/L	EL	06/04/02 20:19
Total Hardness, Calculation	2794	20	mg/L as CaCO3	EL	06/04/02 20:19
Zinc, ICP	0.465	J,f 0.003	mg/L	EL	06/01/02 16:58

Sample: 06B 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 17:01
Arsenic, ICP-MS	ND	uL,m 0.002	mg/L	JTH	06/05/02 08:03
Barium, ICP	0.019	0.003	mg/L	EL	06/01/02 17:01
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 17:01
Calcium, ICP	429	J,s 3.30	mg/L	EL	06/04/02 20:22
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 17:01
Copper, ICP	0.009	0.003	mg/L	EL	06/01/02 17:01
Iron, ICP	ND	uJ,f 0.009	mg/L	EL	06/01/02 17:01
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 08:03
Magnesium, ICP	409	J,s 0.165	mg/L	EL	06/04/02 20:22
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/04/02		date analyzed		
Potassium, ICP	84.6	0.39	mg/L	EL	06/01/02 17:01
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 08:03
Sodium, ICP	1394	8.24	mg/L	EL	06/04/02 20:22
Zinc, ICP	0.418	0.003	mg/L	EL	06/01/02 17:01

TEST RESULTS BY SAMPLE

Sample: 06C 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	10.4	J,K 0.21	mg/L	MSO	05/23/02	11:30
Chloride, Ion Chrom	3725	0.39	mg/L	MSO	05/25/02	17:02
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02	11:30
Ion chromatography	05/25/02				date complete	
Nitrate, Ion Chrom	ND	W,f 0.06	mg/L	as N MSO	05/23/02	11:30
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/23/02	11:30
Phosphate, Ortho	0.09	J,h 0.01	mg/L	as P BLT	05/30/02	09:50
Sulfate, Ion Chrom	5929	0.38	mg/L	MSO	05/25/02	17:02
Total Alkalinity-Titration	26	1.0	mg/L	as CaCO3 TLC	06/03/02	08:45

Sample: 06D 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Ammonia, Automated Phenate	3.5	0.20	mg/L	as N BLT	05/30/02	11:48
Total Organic Carbon, Aq	3.4	B, D 1.0	mg/L	KS	05/29/02	11:19

Sample: 06E 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	05/28/02	08:00

Sample: 07A 22137. 10b
Collected: 05/21/02 13:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02	17:04
Arsenic, ICP-MS	0.003	L,M 0.002	mg/L	JTH	06/05/02	04:10
Barium, ICP	0.107	0.003	mg/L	EL	06/01/02	17:04
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02	17:04
Calcium, ICP	356	J,S 3.20	mg/L	EL	06/04/02	20:25
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02	17:04
Copper, ICP	ND	0.003	mg/L	EL	06/01/02	17:04
Digestion, Aqueous, 200.2	05/28/02			date prepared	EL	05/28/02 18:00
Iron, ICP	17.2	0.009	mg/L	EL	06/01/02	17:04
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	04:10
Magnesium, ICP	311	J,S 0.160	mg/L	EL	06/04/02	20:25
Metals, ICP/MS	06/05/02			date analyzed		
Metals, ICP/OES	06/04/02			date analyzed		
Potassium, ICP	60.1	0.39	mg/L	EL	06/01/02	17:04
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	04:10
Sodium, ICP	1299	8.00	mg/L	EL	06/04/02	20:25
Total Hardness, Calculation	2171	20	mg/L	as CaCO3 EL,	06/04/02	20:25
Zinc, ICP	ND	W,f 0.003	mg/L	EL	06/01/02	17:04

Order # 02-05-910
11/13/02 13:11

TEST RESULTS BY SAMPLE

Page 10

Sample: 07B 22137 10b
Collected: 05/21/02 13:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 17:07
Arsenic, ICP-MS	0.003	L, M 0.002	mg/L	JTH	06/05/02 08:11
Barium, ICP	0.084	0.003	mg/L	EL	06/01/02 17:07
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 17:07
Calcium, ICP	355	J, S 3.30	mg/L	EL	06/04/02 20:28
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 17:07
Copper, ICP	0.009	0.003	mg/L	EL	06/01/02 17:07
Iron, ICP	ND	W, f 0.009	mg/L	EL	06/01/02 17:07
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 08:11
Magnesium, ICP	306	J, S 0.165	mg/L	EL	06/04/02 20:28
Metals, ICP/MS	06/05/02			date analyzed	
Metals, ICP/OES	06/04/02			date analyzed	
Potassium, ICP	61.2	0.39	mg/L	EL	06/01/02 17:07
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 08:11
Sodium, ICP	1282	8.24	mg/L	EL	06/04/02 20:28
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 17:07

Sample: 07C 22137 10b
Collected: 05/21/02 13:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	11.3	J, K 0.21	mg/L	MSO	05/23/02 11:41
Chloride, Ion Chrom	4193	0.39	mg/L	MSO	05/25/02 17:14
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 11:41
Ion chromatography	05/25/02			date complete	
Nitrate, Ion Chrom	ND	W, f 0.06	mg/L	as N MSO	05/23/02 11:41
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/23/02 11:41
Phosphate, Ortho	0.46	J, h 0.01	mg/L	as P BLT	05/30/02 09:50
Sulfate, Ion Chrom	4240	0.38	mg/L	MSO	05/25/02 17:14
Total Alkalinity-Titration	132	1.0	mg/L	as CaCO3 TLC	06/03/02 08:45

Sample: 07D 22137 10b
Collected: 05/21/02 13:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	7.1	0.20	mg/L	as N BLT	05/30/02 11:48
Total Organic Carbon, Aq	4.2	B, O 1.0	mg/L	KS	05/29/02 11:19

Sample: 07E 22137 10b
Collected: 05/22/02 13:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.05	B, P 0.03	mg/L	MSO	05/28/02 08:00

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*Revised
for 11/13/02*

TEST METHODOLOGIES

Silver (Ag) - ICP-MS
Wastewater & drinking water EPA Method 200.8
RCRA TCLP & groundwater SW 846 Method 6020
Solids SW 846 Method 6020

Aluminum (Al) - ICP (Inductively Coupled Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Arsenic (As) - ICP-MS
Wastewater & drinking water EPA Method 200.8
RCRA TCLP & groundwater SW 846 Method 6020
Solids SW 846 Method 6020

Barium (Ba) - ICP (Inductively Coupled Plasma Emission Spectroscopy)
Wastewater & drinking water EPA Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Calcium (Ca) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Cadmium (Cd) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Chromium (Cr) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Copper (Cu) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Digestion Method 200.2

Iron (Fe) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Hardness, Total SM2340B ICP, Calculation

ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA Method 200.7

TEST METHODOLOGIES

RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
ICP/MS (Inductively Coupled Argon Plasma Mass Spectrometry)	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Potassium (K) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Magnesium (Mg) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Sodium (Na) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Lead (Pb) - ICP-MS	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Zinc (Zn) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Total Organic Carbon, Aqueous	EPA Method 415.1 SW-846 Method 9060
Total Alkalinity	SM 2320B (titrimetric)
Bromide by IC	USEPA 300.0
Chloride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Fluoride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Ammonia	SM 4500-NH3-G 19th ed. Automated phenate EPA Method 350.1
Nitrite, Ion Chromatography	

TEST METHODOLOGIES

Drinking water, wastewater Groundwater, RCRA wastes	Method 300.0 SW-846 Method 9056
Nitrate, Ion Chromatography Drinking water, wastewater Groundwater, RCRA wastes	Method 300.0 SW-846 Method 9056
Phosphate, Ortho	EPA Method 365.3 (colorimetric, ascorbic acid)
Sulfide in Aqueous Samples	EPA Method 376.2 - Methylene Blue Method
Sulfate, Ion Chromatography Drinking water, wastewater Groundwater, RCRA wastes	Method 300.0 SW-846 Method 9056

DATA VALIDATION WORKSHEET
INORGANIC - ICP, GFAA, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: MES- HMI
 Reviewer: JA
 Date: _____

SDG No.: 0205910.
 Method: _____

1.0 Chain of Custody/Sample Condition/Raw Data

	ICP			GFAA			CVAA-Hg			Cyanide		
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1 Do Chain-of-Custody forms list all samples which were analyzed?	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
1.2 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
1.3 Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
1.4 Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 2 °C For Cyanide: water samples PH> 12) If not, flag L(+)/UL(-).	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
1.5 Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		

Note: _____

2.0 Holding Time

	ICP			GFAA			CVAA-Hg			Cyanide		
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1 Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months, cyanide: 14 days) Action: L(+)/UL(-). If the holding times are grossly exceeded (twice the holding time criteria), L(+)/R().		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		

Note: Date Collected Date Analyzed H.T.

_____ 5/21/02. ICP/OBS 6/1/02 11 days

_____ ICP/MS 6/5/02 15 days

3.0 Instrument Calibration

		ICP			GFAA			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)				■			■			■		
3.1.1	Are the correlation coefficients > 0.995? (for GFAA, CVAA, and cyanide) Action: J(+)/UJ(-).				■			■			■		
3.2	Was an initial calibration check standard (ICV) analyzed immediately after instrument system have been calibrated? Action: If no, all associated data are rejected "R".	✓			■			■			■		
3.3	Was a mid-range standard distilled with CN batch that agrees within +/-15% of a undistilled standard. If not, J(+).										■		
3.4	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓			■			■			■		
3.4.1	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? ICV and CCV: 80-120% for mercury and 90%-110% for other metals; Cyanide: 85-115%.		✓		■			■			■		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Other Metals < 75% 75% - 89% > 110% Cyanide < 70% 70% - 84% > 115%												
3.5	Was the CRDL (CRI [2XCRDL] and CRA [at CRDL]) run displaying recoveries with 90-110%?					✓							
	For each element out (only for ICP and AA): Action: L(+)/R(-) L(+)/UL(-) K(+) results < 2XCRDL < 50% 50% - 89% > 110%												
3.6	Was CCS solution analyzed at every wavelength used for the analysis of each analyte? If no, all associated sample data for the affected analyte(s) are rejected "R".	✓			■			■			■		
3.7	Was CCS at or near the mid-range level of the calibration curve? If no, all associated sample data were rejected "R".	✓			■			■			■		
3.8	Were any transcription/calculation errors noted in the calibration verification data? Action: For any transcription/calculation errors, contact the laboratory for explanation/resubmittal.					✓		■			■		

Note: ICP/MS 6/5/02 Ag 83% (CCV9). → No field samples associated with this
CLV, OK

**Atlantic Coast Laboratories, Inc.
Metals QC Summary**

Client:	Maryland Environmental Services	0205910	0205997
Project:	Hart Miller Island	0205990	0205B34
Date:	May 2002	0205995	0206243

Continuing Calibration Verification

Element	Date	Conc (mg/L)	CCV 1 % Rec	CCV 2 % Rec	CCV 3 % Rec	CCV 4 % Rec
<i>ICP/OES</i>			1525	1612	1653	1737
Al	06/01/02	2.000	2.017 101%	2.026 101%	2.099 105%	2.158 108%
As*	06/01/02	5.000	4.986 100%	5.050 101%	5.165 103%	5.315 106%
Ba	06/01/02	2.000	1.971 99%	1.997 100%	2.040 102%	2.086 104%
Ca	06/01/02	5.000	5.035 101%	5.086 102%	5.182 104%	5.315 106%
Cd	06/01/02	1.000	1.009 101%	1.015 102%	1.028 103%	1.056 106%
Cr	06/01/02	0.200	0.203 102%	0.203 101%	0.209 105%	0.216 108%
Cu	06/01/02	1.000	1.008 101%	1.012 101%	1.038 104%	1.065 107%
Fe	06/01/02	2.000	2.002 100%	2.023 101%	2.074 104%	2.129 106%
K	06/01/02	10.000	9.298 93%	9.096 91%	9.600 96%	9.968 100%
Mg	06/01/02	5.000	5.115 102%	5.195 104%	5.289 106%	5.413 108%
Na	06/01/02	5.000	5.106 102%	5.122 102%	5.334 107%	5.308 106%
Pb*	06/01/02	5.000	5.136 103%	5.172 103%	5.260 105%	5.437 109%
Zn	06/01/02	1.000	0.998 100%	1.007 101%	1.024 102%	1.052 105%
<i>ICP/MS</i>			0215	0347	0520	0654
As-M75	06/05/02	0.050	0.052 104%	0.0509 102%	0.0507 101%	0.0519 104%
Pb-M208	06/05/02	0.050	0.050 99%	0.0494 99%	0.0495 99%	0.0486 97%
Ag-M107	06/05/02	0.050	0.049 98%	0.0482 96%	0.0485 97%	0.0487 97%
			↑	↑		↑
			01A	06A		01B
			02A	07A		02C
			03A			03E
			04A			04E
			05A			05E
						06E
						07E

4.0 Blanks

		ICP			GFAA			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, batch, matrix, and level)?	✓			✓			✓			✓		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICP and CCVs? Action: If no ICB was run, all associated data are rejected. If the sequency/frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓			✓			✓			✓		
4.3	Are there reported MB or ICB/CCBs values > MDL?	✓	✓			✓		✓			✓		
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > MDL?		✓			✓			✓			✓	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank or trip blank values > +MDL?		✓			✓			✓			✓	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: PB Mg 0.009 mg/L - All Mg results > 5X blank conc. OK
ICB Al 0.071 mg/L 04A 0.081 mg/L B.O 05A 0.078 mg/L B.O.
04B 0.057 mg/L B.O.

5.0 ICP Interference Check Sample (ICS)

		ICP			GFAA			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning and end of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	✓											
5.2	Are the ICS AB recoveries within 80% - 120%?	✓											
5.3	Are the results for unspiked analytes (in ICS A) < +IDL?	✓											
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?	✓											
	If not...												
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -IDL > IDL < 50% 50% - 79% > 120%												
	L(+)/UL(-) K(+) L(+)/R(-) L(+)/UL(-) K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		ICP			GFAA			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? Action: If no, J(+) any sample not associated with LCS results.	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
Action:		Solid			Aqueous								
		<LCL	>UCL	<50%	50% - 79%	>120%							
		L(+)/UL(-)	K(+)	L(+)/R(-)	L(+)/UL(-)	K(+)							

Note:

1CP/065 (6/1/02) All %Rs were in control.

1CP/MS (6/5/02) All %Rs were in control.

7.0 Laboratory Duplicates

		ICP			GFAA			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix, and level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± CRDL . Action: If no, J(+)/UJ(-).	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
Note: RPD criteria is used when both sample and duplicate results are > 5X CRDL.													

Note:

Lab dup - LIA	original	Dup.	Difference / RPD	RL
Al	0.035	0.061	0.026	0.052
Cu	0.0059	0.0027	0.0032	0.003
Other	→ All %RPDs < 20%			

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		ICP			GFAA			CVAA-Hg			Cyanide													
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA											
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix, and level)? Action: If no, J(+), with professional judgement, analytes not associated with matrix spike results.	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>													
8.2	Was a field blank used for the matrix spike analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>											
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.																							
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>													
	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="text-align: center;">%R > 125%</td> <td style="text-align: center;">30% < %R < 74%</td> <td style="text-align: center;">< 30%</td> </tr> <tr> <td>Positive</td> <td style="text-align: center;">K</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> </tr> <tr> <td>Non-detect</td> <td style="text-align: center;">None</td> <td style="text-align: center;">UL</td> <td style="text-align: center;">R</td> </tr> </table>		%R > 125%	30% < %R < 74%	< 30%	Positive	K	L	L	Non-detect	None	UL	R											
	%R > 125%	30% < %R < 74%	< 30%																					
Positive	K	L	L																					
Non-detect	None	UL	R																					
8.4	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits (except Ag), was a post-digestion spike performed? (Lab uses "N" to flag the data.) Note any failures in the DV report, but no data qualifying action is required.	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>													

Note: MS-11A. As = 71% (ICP/MS). → No post-digestion spike were reported.
L.m

9.0 Instrument Detection Limits (IDL)

		ICP			GFAA			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		

Note: _____

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

	ICP			GFAA			CVAA-Hg			Cyanide		
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	<input checked="" type="checkbox"/>										
10.2	Was a five-fold dilution performed?	<input checked="" type="checkbox"/>										
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 50 X the IDL (or MDL) in the original sample? If no, J(+).		<input checked="" type="checkbox"/>									

Note: ICP serial dilution - 11A (0205910-1A).
Ca %D = 44.2%
Mg %D = 35.0%

11.0 Field Duplicate Samples

	ICP			GFAA			CVAA-Hg			Cyanide		
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	<input checked="" type="checkbox"/>										
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		<input checked="" type="checkbox"/>									
	For sample results > 5 x CRDL (or the RL), a control limit of 20% RPD for water and 35% RPD for soil will be used. For sample results < 5 x CRDL (or RL), a control limit of 2 x CRDL (or RL) for water and 4 x CRDL (or RL) for soil will be used.											

Note: 12b/12b-Dup. Total metals Zn Difference > 2xRL J/WJ, f
Dissolved metals Fe RPD > 50%. J

12.0 Result Verification

	ICP			GFAA			CVAA-Hg			Cyanide		
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?		<input checked="" type="checkbox"/>									
12.2	Were all dilution reflected in the positive results and detection limits?	<input checked="" type="checkbox"/>										
12.3	Were the units in ug/L or ug/Kg?		<input checked="" type="checkbox"/>									

→ All aqueous samples

Note: Aqueous samples - report unit mg/L

		Total Metals mg/L			RPD	RL
		12b	12b-DUP	Difference		
Al	ICP/OES	0.081	0.078		4%	
As	ICP/MS	0.002 U	0.002 U			
Ba	ICP/OES	0.080	0.082		2%	
Cd	ICP/OES	0.004 U	0.004 U			
Ca	ICP/OES	24.9	25.4		2%	
Cr	ICP/OES	0.008 U	0.008 U			
Cu	ICP/OES	0.006	0.004	0.002		0.003
Fe	ICP/OES	3.76	3.87		3%	
Pb	ICP/MS	0.002 U	0.002 U			
Mg	ICP/OES	7.85	7.91		1%	
K	ICP/OES	7.81	8.07		3%	
Ag	ICP/MS	0.001 U	0.001 U			
Na	ICP/OES	11.8	11.4		3%	
Zn	ICP/OES	0.01	0.003 U	0.007		0.003
Total Hardness		94.4	96.1	1.7	2%	

> 2XRL

		Dissolved Metals mg/L				
		12b	12b-DUP	Difference	RPD	RL
Al	ICP/OES	0.057	0.052 U	0.057		0.052
As	ICP/MS	0.002 U	0.002 U			
Ba	ICP/OES	0.047	0.052		10%	
Cd	ICP/OES	0.004 U	0.004 U			
Ca	ICP/OES	24.3	25.1		3%	
Cr	ICP/OES	0.008 U	0.008 U			
Cu	ICP/OES	0.003 U	0.003 U			
Fe	ICP/OES	0.103	0.293		96%	0.009
Pb	ICP/MS	0.002 U	0.002 U			
Mg	ICP/OES	7.77	7.79		0%	
K	ICP/OES	6.48	7.17		10%	
Ag	ICP/MS	0.001 U	0.001 U			
Na	ICP/OES	11.1	11.7		5%	
Zn	ICP/OES	0.003 U	0.003 U			

13.0 Completeness Calculation

13.1	Is % completeness within the control limits? (Control limit 95%)
13.1.1	Number of samples: <u>7</u>
13.1.2	Number of target compounds in each analysis:
13.1.3	Number of results rejected and not reported: <u>0</u>
	% Completeness = $(13.1.1 \times 13.1.2 - 13.1.3) \times 100 / (13.1.1 \times 13.1.2)$
	% Completeness = <u>100%</u>

ICP			GFAA			CVAA-Hg			Cyanide		
Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		

Note: _____

14.0 Furnance AA QC Analysis/Method of Standard Additions (MSA)

14.1	Were duplicate injections performed? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.
14.1.1	Are the duplicate injection RSD values < + 20%?(Lab will flag "M") Action: If no, J(+). (No control limits for non-detects.)
14.2	Were any sample results reported from analyses with spike recoveries < 10%? If yes, J(+)/R(-).
14.2.1	had the above samples (if any) been diluted and repeated as required? Action: If no, note in reviewer narrative.
14.3	Were any sample results reported from analyses with spike recoveries between 10 and 40%? Action: If yes, J(+)/UJ(-).
14.3.1	had the above samples (if any) been diluted and repeated as required? Action: If no, note in reviewer narrative.
14.4	Were any sample results results reported from analyses with spike recoveries between 40 and 85% or > 115%? Action: If yes, J(+)/UJ(-) for %R < 85% or J(+) for %R > 115%.
14.4.1	For the above samples (if any), was the sample concentration < 50% of the spike concentration as required? (Lab will flag "W" with no MSA.) Action: If no, note in reviewer narrative.
14.5	Were any sample results reported from analyses with MSA correlation coefficients < 0.995? Criteria: Post spike recovery >40% and [sample] >50% of the [spike], but spike recovery is not between 85-115%; (Lab will also flag "W") If yes, J(+).
14.5.1	for the above sample results (if any), were the analyses repeated as required? Action; If no, note in reviewer narrative.
14.6	Were any transcription/calculation errors noted in the furnace AA QC data?

ICP			GFAA			CVAA-Hg			Cyanide		
Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
			<input checked="" type="checkbox"/>								
			<input checked="" type="checkbox"/>								
				<input checked="" type="checkbox"/>							
			<input checked="" type="checkbox"/>								
				<input checked="" type="checkbox"/>							
			<input checked="" type="checkbox"/>								
				<input checked="" type="checkbox"/>							
				<input checked="" type="checkbox"/>							
				<input checked="" type="checkbox"/>							
				<input checked="" type="checkbox"/>							

Not used.

Note: _____

DATA VALIDATION WORKSHEET

Conventional Analysis

Reviewer: JA

Date: _____

DV Level: II III IV

Review Document:

- NFG/SW-846
 Project QAPP/SAP
 NJDEP/SW-846
 Region III/SW-846
 NFG/CLP

Project Name: MES- HMI

Project Number: _____

Laboratory: Atlantic Coast Lab

SDG No.: 0205910

Test Name: TOC

Method No.: _____

1.0 General: Chain-of-Custody/Data Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Does sample preservation, collection and storage meet method requirement?	✓		
1.5	Are the sample preparation benchsheets present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓		
1.6	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Were sample preserved as specified in the method?	✓		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		✓	

Notes:

Date Collected
Date Analyzed
H.T

5/21/02
5/29/02
8 days

3.0 Instrument Calibration

		Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
3.2	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
2.3	Was continuing calibration verification (CCV) analyzed every 10 field samples or every 2 hours, whichever is more frequent? If no, J(+)/UJ(-) all samples analyzed after the last passing CCV.	✓		
2.4	Are all calibration standard (ICV and CCV) percent recoveries within the control limits?	✓		
2.5	Were any transcription/calculation errors noted in the calibration verification data? Action: For any transcription or calculation errors, contact the laboratory for explanation/resubmittal.		✓	

Notes: 5/29/02 I. Cal $r^2 = 0.9997$
 ICV/CCVs All %Rs were in control (90-110%)

4.0 Blanks (Laboratory and Field)

		Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓		
4.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	✓		
4.3	Were there any transcription/calculation errors in blank data?		✓	
4.4	Do any field equipment blanks/trip blanks have positive results?			✓
4.5	Are there field equipment blank/trip blanks associated with every sample?			✓

Notes: ICB/CEB - ICB 1.3 mg/L CCB3 1.1 mg/L CCB7 1.0 mg/L
 All B₀

5.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
5.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
5.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.3	Was a field blank used for MS/MSD analyses?		✓	
5.4	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?		✓	
5.5	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?		✓	
5.6	Were there any transcription /calculation errors?		✓	

Notes: MS - (0205903-1B TOC = 104% $21.0/20 = 105\%$
 (0205905-9B TOC = 105% $21.2/20 = 106\%$
 (non-client samples) ✓

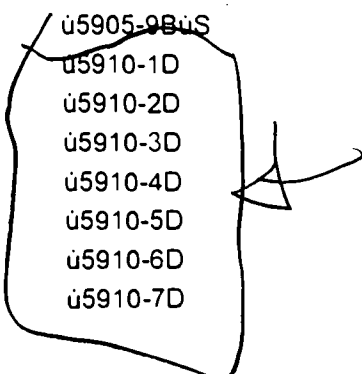
Calibration Information:

Sample ID	Conc., mg/L	Response	Result, mg/L	Statistics:
úSTANDARD2	0.0	3.54	0.7	Slope: 5.708395604
úSTANDARD2	2.0	11.34	2.1	Intercept: -0.509391941
úSTANDARD2	5.0	25.24	4.5	R-squared: 0.9997
úSTANDARD2	20.0	111.49	19.6	
úSTANDARD2	25.0	140.9	24.8	
úSTANDARD2	50.0	286.69	50.3	

If the info message is anything other than úI2, please examine printout.

If the status message is OVERRANGE sample must be diluted.

Sample Information:	Dilution	Response	Result, mg/L	MDL, mg/L	Info Message	Status
úBLANK	1	6.79	1.3	1.0	úI2	OKAY
úLFB <i>100%</i>	1	88.96	15.7 <i>98%</i>	1.0	úI2	OKAY
úBLANK <i>1</i>	1	4.72	ND <i>✓</i>	1.0	úI2	OKAY
ú5903-1B	1	24.11	4.3	1.0	úI2	OKAY
ú5903-1BúD	1	25.64	4.6	1.0	úI2	OKAY
ú5903-1BúS	1	119.64	21.0 <i>104%</i>	1.0	úI2	OKAY
ú5905-1B	1	4.33	ND	1.0	úI2	OKAY
ú5905-2B	1	4.28	ND	1.0	úI2	OKAY
ú5905-3B	1	3.63	ND	1.0	úI2	OKAY
ú5905-4B	1	4.23	ND	1.0	úI2	OKAY
ú5905-5B	1	33.11	5.9	1.0	úI2OF	OKAY
ú5905-6B	1	48.27	8.5	1.0	úI2	OKAY
ú5905-7B	1	7.49	1.4	1.0	úI2OF	OKAY
ú5905-8B	1	10.1	1.9	1.0	úI2	OKAY
ú5994-1A100	100	84.95	1497.1	100.0	úI2	OKAY
úBLK <i>✓</i>	1	4.23	ND <i>✓</i>	1.0	úI2	OKAY
ú25úMG/L	1	150.49	26.5 <i>106%</i>	1.0	úI2	OKAY
úLFB	1	95.63	16.8 <i>105%</i>	1.0	úI2	OKAY
úBLK <i>3</i>	1	5.57	1.1	1.0	úI2	OKAY
ú5905-9B	1	24.35	4.4	1.0	úI2OF	OKAY
ú5905-9BúD	1	24.13	4.3	1.0	úI2OF	OKAY
ú5905-9BúS	1	120.28	21.2 <i>105%</i>	1.0	úI2	OKAY
ú5910-1D	1	7.64	1.4 <i>✓</i>	1.0	úI2	OKAY
ú5910-2D	1	16.8	3.0 <i>✓</i>	1.0	úI2	OKAY
ú5910-3D	1	7.15	1.3 <i>✓</i>	1.0	úI2	OKAY
ú5910-4D	1	15.73	2.8	1.0	úI2	OKAY
ú5910-5D	1	16.47	3.0	1.0	úI2	OKAY
ú5910-6D	1	19.1	3.4	1.0	úI2	OKAY
ú5910-7D	1	23.57	4.2	1.0	úI2	OKAY



TOC Analysis: 5/29/02 1119

Analyst: ks

Calibration Information:

Sample ID	Conc., mg/L	Response	Result, mg/L	Statistics:
úSTANDARD2	0.0	3.54	0.7	Slope: 5.708395604
úSTANDARD2	2.0	11.34	2.1	Intercept: -0.509391941
úSTANDARD2	5.0	25.24	4.5	R-squared: 0.9997
úSTANDARD2	20.0	111.49	19.6	
úSTANDARD2	25.0	140.9	24.8	
úSTANDARD2	50.0	286.69	50.3	

If the info message is anything other than ú12, please examine printout.
 If the status message is OVERRANGE sample must be diluted.

Sample Information:	Dilution	Response	Result, mg/L	MDL, mg/L	Info Message	Status
ú5920-1B	1	11.11	2.0	1.0	ú12OF	OKAY
ú5920-2B	1	17.4	3.1	1.0	ú12	OKAY
úBLK ✓	1	3.72	ND ✓	1.0	ú12	OKAY
ú25úMG/L	1	152.38	26.8 107%	1.0	ú12	OKAY
úLFB	1	96.34	17.0 106%	1.0	ú12	OKAY
úBLK ✓	1	4.8	ND ✓	1.0	ú12	OKAY
ú5940-1A	1	19.77	3.6	1.0	ú12	OKAY
ú5940-1AúD	1	20.51	3.7	1.0	ú12	OKAY
ú5940-1AúS	1	115.52	20.3 104%	1.0	ú12	OKAY
ú5940-2A	1	12.4	2.3	1.0	ú12	OKAY
ú5940-3A	1	10.53	1.9	1.0	ú12	OKAY
ú5940-4A 5A	1	19.14	3.4	1.0	ú12	OKAY
ú5940-5A 6A	1	21.38	3.8	1.0	ú12	OKAY
ú5940-6A 7A	1	41.65	7.4	1.0	ú12	OKAY
ú5970-1B	1	4.91	ND	1.0	ú12	OKAY
ú5970-2B	1	4.73	ND	1.0	ú12	OKAY
ú5970-3B	1	7.9	1.5	1.0	ú12	OKAY
ú5970-4B	1	7.4	1.4	1.0	ú12	OKAY
úBLK ✓	1	4.08	ND ✓	1.0	ú12	OKAY
ú25úMG/L	1	152.54	26.8 107%	1.0	ú12	OKAY
úLFB	1	96.27	17.0 106%	1.0	ú12TO	OKAY
úBLK ✓	1	5.21	1.0	1.0	ú12	OKAY
ú5970-5B	1	4.51	ND	1.0	ú12	OKAY
ú5970-5BúD	1	4.09	ND	1.0	ú12	OKAY
ú5970-5BúS	1	92.39	16.3 102%	1.0	ú12	OKAY
ú4C59-1E	1	13.05	2.4	1.0	ú12	OKAY
ú4C60-1E	1	11.75	2.1	1.0	ú12	OKAY
ú4C61-1E	1	23.14	4.1	1.0	ú12	OKAY
ú4C62-1E	1	7.25	1.4	1.0	ú12	OKAY

6.0 Laboratory Control Sample/Laboratory Copntrol Sample Duplicate (LCS/LCSD)

		Yes	No	NA
6.1	Is the LCS/LCSD recovery form present?	✓		
6.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Are there any %R for LCS/LCSD recoveries outside the laboratory QC limits?		✓	
6.4	Are there any RPD for LCS/LCSD recoveries outside the laboratory QC limits? <i>only LCS</i>		✓	✓
6.5	Were there any transcription /calculation errors?		✓	

Notes:

1 FB - All %Rs were in control.

7.0 Laboratory Duplicate

		Yes	No	NA
7.1	Were laboratory duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
7.2	Was a field blank used for duplicate analysis? If yes, use professional judgement to determine the effect on the data and note in reviewer narrative.		✓	
7.3	Are all analyte duplicate results within control limits?	✓	✓	
7.4	Were there any transcription /calculation errors?		✓	

Notes:

Lab dup. U205903-01B 4.3/4.6 RPD = 6.7%

*U205905-9B 4.4/4.3 RPD = 2.3%
→ non-client samples.*

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
8.2	Are all analyte duplicate results within control limits? If no, contact your PM for guidance.	✓		
8.3	Were there any transcription /calculation errors noted in the duplicate data?		✓	

Notes:

*TOL 12.6 12.6-dup. RPD 4.6%
15.73 16.47*

9.0 Sample Results/Detection Limit Verification

		Yes	No	NA
9.1	Are all sample results within the calibrated range?	✓		
9.2	If samples are not within the calibrated range, were they diluted and reanalyzed or was a high-level check standard analyzed? If not, contact laboratory. Request reanalysis if holding times have not been exceeded. If exceeded, qualify specific sample(s) J.			✓
9.3	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		
9.4	Were there any transcription /calculation errors?		✓	

Notes:

10.0 Data Completeness

		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 95%)	✓		
10.1.1	Number of samples: <u>7</u>			
10.1.2	Number of target compounds in each analysis: <u>1</u>			
10.1.3	Number of results rejected and not reported: <u>0</u>			
	% Completeness = $(10.1.1 \times 10.1.2 - 10.1.3) \times 100 / (10.1.1 \times 10.1.2)$			
	% Completeness = <u>100%</u>			

Notes:

11.0 Surrogate Recovery

		Yes	No	NA
11.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			✓
11.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?			✓
11.3	If No in Section 7.2, are these sample(s) or method blank(s) reanalyzed?			✓
11.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			✓

Notes:

DATA VALIDATION WORKSHEET

Conventional Analysis

Reviewer: JA

Date: _____

DV Level: II III IV

Review Document:

- NFG/SW-846
 NJDEP/SW-846
 NFG/CLP
- Project QAPP/SAP
 Region III/SW-846

Project Name: MES - HMI

Project Number: _____

Laboratory: Atlantic Coast Lab

SDG No.: 0205910

Test Name: Ammonia

Method No.: _____

1.0 General: Chain-of-Custody/Data Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Does sample preservation, collection and storage meet method requirement?	✓		
1.5	Are the sample preparation benchesheets present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓		
1.6	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes: _____

2.0 Holding Times

		Yes	No	NA
2.1	Were sample preserved as specified in the method?	✓		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		✓	

Notes: Date Collected Date Analyzed H.T.

5/21/02 5/30/02 9 days

3.0 Instrument Calibration

		Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
3.2	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
2.3	Was continuing calibration verification (CCV) analyzed every 10 field samples or every 2 hours, whichever is more frequent? If no, J(+)/UJ(-) all samples analyzed after the last passing CCV.	✓		
2.4	Are all calibration standard (ICV and CCV) percent recoveries within the control limits?	✓		
2.5	Were any transcription/calculation errors noted in the calibration verification data? Action: For any transcription or calculation errors, contact the laboratory for explanation/resubmittal.		✓	

Notes: J. Cal (5/30/02) 7-point $r = 0.99955$
 ICV/cev %Rs were in control (90-110%)

4.0 Blanks (Laboratory and Field)

		Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓		
4.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		✓	
4.3	Were there any transcription/calculation errors in blank data?		✓	
4.4	Do any field equipment blanks/trip blanks have positive results?			✓
4.5	Are there field equipment blank/trip blanks associated with every sample?			✓

Notes: 1 CB/CEBs - All NDS

5.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
5.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
5.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?		✓	
5.3	Was a field blank used for MS/MSD analyses?		✓	
5.4	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?		✓	
5.5	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?		✓	✓
5.6	Were there any transcription /calculation errors?		✓	

Notes: MS - 0208 0205845-06 Ammonia 99%

(non-client sample)
 0205990-01 (9B) 93% / W (26.42-21.79)/5 = 92.6%
 0205990-10 (CD4A) 80%
 0205995-11 (4A) 98%

6.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

	Yes	No	NA
6.1 Is the LCS/LCSD recovery form present?	✓		
6.2 Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3 Are there any %R for LCS/LCSD recoveries outside the laboratory QC limits?		✓	
6.4 Are there any RPD for LCS/LCSD recoveries outside the laboratory QC limits?			✓
6.5 Were there any transcription /calculation errors?		✓	

Notes:

All LFBs → %Rs were in control (90-110%)

7.0 Laboratory Duplicate

	Yes	No	NA
7.1 Were laboratory duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
7.2 Was a field blank used for duplicate analysis? If yes, use professional judgement to determine the effect on the data and note in reviewer narrative.		✓	
7.3 Are all analyte duplicate results within control limits?	✓		
7.4 Were there any transcription /calculation errors?		✓	

Notes:

Lab dup. 0205845-01 Ammonia 11.4% RPD
 0205990-01 (9B) 21.79/22.17 1.7%
 0205990-10 (CD4A) 20.32/20.21 0.6%
 0205995-11 (4A) 8.99/8.96 0.3%

8.0 Field Duplicate

	Yes	No	NA
8.1 Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
8.2 Are all analyte duplicate results within control limits? If no, contact your PM for guidance.	✓		
8.3 Were there any transcription /calculation errors noted in the duplicate data?		✓	

Notes:

12b 12b-Dup RPD
 Ammonia 5.1 5.1 0%
 (5.14) (5.11)

9.0 Sample Results/Detection Limit Verification

		Yes	No	NA
9.1	Are all sample results within the calibrated range?	✓		
9.2	If samples are not within the calibrated range, were they diluted and reanalyzed or was a high-level check standard analyzed? If not, contact laboratory. Request reanalysis if holding times have not been exceeded. If exceeded, qualify specific sample(s) J.			✓
9.3	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		
9.4	Were there any transcription /calculation errors?		✓	

Notes:

10.0 Data Completeness

		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 95%)	✓		
10.1.1	Number of samples:			
10.1.2	Number of target compounds in each analysis:			
10.1.3	Number of results rejected and not reported:			
	% Completeness = $(10.1.1 \times 10.1.2 - 10.1.3) \times 100 / (10.1.1 \times 10.1.2)$			
	% Completeness =			

Notes:

11.0 Surrogate Recovery

		Yes	No	NA
11.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			✓
11.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?			✓
11.3	If No in Section 7.2, are these sample(s) or method blank(s) reanalyzed?			✓
11.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			✓

Notes:

DATA VALIDATION WORKSHEET

Conventional Analysis

Reviewer: JA

Date: _____

DV Level: II III IV

Review Document:

- NFG/SW-846
- NJDEP/SW-846
- NFG/CLP
- Project QAPP/SAP
- Region III/SW-846

Project Name: MBS-HMI

Project Number: _____

Laboratory: Atlantic Coast Lab

SDG No.: 0205910

Test Name: Ortho-Phosphorus

Method No.: 365.3

1.0 General: Chain-of-Custody/Data Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Does sample preservation, collection and storage meet method requirement?	✓		
1.5	Are the sample preparation benchsheets present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓		
1.6	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes: _____

2.0 Holding Times

		Yes	No	NA
2.1	Were sample preserved as specified in the method?	✓		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). <u>48 hours</u>	✓	✓	(JA)
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	✓	✓	(JA)

Notes: Date Collected Date Analyzed H.T.

5/21/02 5/30/02 9 days J/MS, H (JA)

⊗ All samples were run outside of holding time.
 of a total of 45 samples, 22 were received with holding time expired.
 others - analyzed outside of holding time

3.0 Instrument Calibration

	Yes	No	NA	
3.1	Are sufficient standards included in the calibration curve? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
3.2	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
2.3	Was continuing calibration verification (CCV) analyzed every 10 field samples or every 2 hours, whichever is more frequent? If no, J(+)/UJ(-) all samples analyzed after the last passing CCV.	✓		
2.4	Are all calibration standard (ICV and CCV) percent recoveries within the control limits?	✓		
2.5	Were any transcription/calculation errors noted in the calibration verification data? Action: For any transcription or calculation errors, contact the laboratory for explanation/resubmittal.		✓	

Notes: I. Cal. 5/30/02 $r^2 = 1.000$.
 ICV (LEB), CCV. → All %Rs were in control (No ending CCV).

4.0 Blanks (Laboratory and Field)

	Yes	No	NA	
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓		
4.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		✓	
4.3	Were there any transcription/calculation errors in blank data?		✓	
4.4	Do any field equipment blanks/trip blanks have positive results?			✓
4.5	Are there field equipment blank/trip blanks associated with every sample?			✓

Notes: MB - ND

5.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

	Yes	No	NA	
5.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
5.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.3	Was a field blank used for MS/MSD analyses?		✓	
5.4	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?		✓	
5.5	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?			✓
5.6	Were there any transcription /calculation errors?		✓	

Notes: MS - 0205A95-4A. Ortho-Phosphorus 95%
 (non-client sample)
 MS - 0205B34-10D (CD-1B) ortho-Phosphorus 115% / ✓
 (non-client sample)
 In SDG: 0205990
 0205990-7D. ortho-phosphorus 115% / ✓
 (7A)

6.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
6.1	Is the LCS/LCSD recovery form present?	✓		
6.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Are there any %R for LCS/LCSD recoveries outside the laboratory QC limits?		✓	
6.4	Are there any RPD for LCS/LCSD recoveries outside the laboratory QC limits? <i>only LCS.</i>		✓	✓
6.5	Were there any transcription /calculation errors?		✓	

Notes: LFB ortho-phosphorus 100% 0.26/0.26
 LFB ortho-phosphorus 100% 0.26/0.26

7.0 Laboratory Duplicate

		Yes	No	NA
7.1	Were laboratory duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
7.2	Was a field blank used for duplicate analysis? If yes, use professional judgement to determine the effect on the data and note in reviewer narrative.		✓	
7.3	Are all analyte duplicate results within control limits?	✓		
7.4	Were there any transcription /calculation errors?		✓	

Notes: In SDG: 0205910. 0205A95-4A *non-client sample.* 3.01/3.01 RPD=0%
 0205B34-10D *non-client sample* 0.01/0.01U. Difference ≤ 0.01 *PK*
 0205990. (7A) 0205990-7D 0.03/0.03 RPD=0% *PK*
 (CO1B)

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
8.2	Are all analyte duplicate results within control limits? If no, contact your PM for guidance.	✓		
8.3	Were there any transcription /calculation errors noted in the duplicate data?		✓	

Notes: 12b 12b-Dup RPD
 ortho-phosphorus 0.20 0.22 9.5%

9.0 Sample Results/Detection Limit Verification

		Yes	No	NA
9.1	Are all sample results within the calibrated range?	✓		
9.2	If samples are not within the calibrated range, were they diluted and reanalyzed or was a high-level check standard analyzed? If not, contact laboratory. Request reanalysis if holding times have not been exceeded. If exceeded, qualify specific sample(s) J.			✓
9.3	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		
9.4	Were there any transcription /calculation errors?		✓	

Notes:

10.0 Data Completeness

		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 95%)	✓		
10.1.1	Number of samples:			
10.1.2	Number of target compounds in each analysis:			
10.1.3	Number of results rejected and not reported:			
	% Completeness = $(10.1.1 \times 10.1.2 - 10.1.3) \times 100 / (10.1.1 \times 10.1.2)$			
	% Completeness =			

Notes:

11.0 Surrogate Recovery

		Yes	No	NA
11.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			✓
11.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?			✓
11.3	If No in Section 7.2, are these sample(s) or method blank(s) reanalyzed?			✓
11.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			✓

Notes:

DATA VALIDATION WORKSHEET

Reviewer: JA

Conventional Analysis

Project Name: MES - HMI

Date: _____

Project Number: _____

DV Level: II III IV

Laboratory: Atlantic Coast Lab

Review Document:

SDG No.: 0205910

____ NFG/SW-846 Project QAPP/SAP

Test Name: Sulfide

____ NJDEP/SW-846 Region III/SW-846

Method No.: _____

____ NFG/CLP

1.0 General: Chain-of-Custody/Data Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Does sample preservation, collection and storage meet method requirement?	✓		
1.5	Are the sample preparation benchsheets present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓		
1.6	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Were sample preserved as specified in the method?	✓		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		✓	

Notes:

Date Collected

Date Analyzed

H-T

5/21/02

5/28/02

7 days

3.0 Instrument Calibration

		Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
3.2	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
2.3	Was continuing calibration verification (CCV) analyzed every 10 field samples or every 2 hours, whichever is more frequent? If no, J(+)/UJ(-) all samples analyzed after the last passing CCV.	✓		
2.4	Are all calibration standard (ICV and CCV) percent recoveries within the control limits?	✓		
2.5	Were any transcription/calculation errors noted in the calibration verification data? Action: For any transcription or calculation errors, contact the laboratory for explanation/resubmittal.		✓	

Notes: I. Cal. (5/28/02) - 5-point. $r^2 = 0.99690$. /N
ICV/CCV (use LFB) All %Rs were in control.

4.0 Blanks (Laboratory and Field)

		Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓		
4.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		✓	
4.3	Were there any transcription/calculation errors in blank data?		✓	
4.4	Do any field equipment blanks/trip blanks have positive results?			✓
4.5	Are there field equipment blank/trip blanks associated with every sample?			✓

Notes: MIB - 0.058 mg/L → B.P

5.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
5.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
5.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.3	Was a field blank used for MS/MSD analyses?		✓	
5.4	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?	✓	✓	Ⓜ
5.5	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?		✓	✓
5.6	Were there any transcription /calculation errors?		✓	

Notes: MS - 0205990-1C (9B) Sulfide 80%. 0205990-11 (4A) 66%

0205990-11C (4A-Dup) Sulfide 85%

6.0 Laboratory Control Sample/Laboratory Copntrol Sample Duplicate (LCS/LCSD)

		Yes	No	NA
6.1	Is the LCS/LCSD recovery form present?	✓		
6.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Are there any %R for LCS/LCSD recoveries outside the laboratory QC limits?		✓	
6.4	Are there any RPD for LCS/LCSD recoveries outside the laboratory QC limits?			✓
6.5	Were there any transcription /calculation errors?		✓	

Notes: LFB (1) 99%
LFB (2) 106%.

7.0 Laboratory Duplicate

		Yes	No	NA
7.1	Were laboratory duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
7.2	Was a field blank used for duplicate analysis? If yes, use professional judgement to determine the effect on the data and note in reviewer narrative.		✓	
7.3	Are all analyte duplicate results within control limits?	✓		
7.4	Were there any transcription /calculation errors?		✓	

Notes: Lab dup. 0205990-1C (9B) 0.404/0.351 RPD = 14.0%

0205990-11C (4A-Dup) 0.099/0.095 RPD = 4.1%

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
8.2	Are all analyte duplicate results within control limits? If no, contact your PM for guidance.		✓	
8.3	Were there any transcription /calculation errors noted in the duplicate data?		✓	

Notes: Sulfide 12.6 12.6-dup Difference R/L
0.034 0.13 0.105 0.03 J/UJ
(0.025) > 2xRL.

9.0 Sample Results/Detection Limit Verification

		Yes	No	NA
9.1	Are all sample results within the calibrated range?	<input checked="" type="checkbox"/>		
9.2	If samples are not within the calibrated range, were they diluted and reanalyzed or was a high-level check standard analyzed? If not, contact laboratory. Request reanalysis if holding times have not been exceeded. If exceeded, qualify specific sample(s) J.			<input checked="" type="checkbox"/>
9.3	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	<input checked="" type="checkbox"/>		
9.4	Were there any transcription /calculation errors?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Notes: 0205910-2E conc. 0.045 mg/L. reported as 0.03 u
 3 E 0.037 mg/L.
 7 E 0.045 mg/L. ↓

⊕ check with lab.

10.0 Data Completeness

		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 95%)	<input checked="" type="checkbox"/>		
10.1.1	Number of samples:			
10.1.2	Number of target compounds in each analysis:			
10.1.3	Number of results rejected and not reported:			
	% Completeness = $(10.1.1 \times 10.1.2 - 10.1.3) \times 100 / (10.1.1 \times 10.1.2)$			
	% Completeness =			

Notes:

11.0 Surrogate Recovery

		Yes	No	NA
11.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			<input checked="" type="checkbox"/>
11.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?			<input checked="" type="checkbox"/>
11.3	If No in Section 7.2, are these sample(s) or method blank(s) reanalyzed?			<input checked="" type="checkbox"/>
11.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			<input checked="" type="checkbox"/>

Notes:

Sulfide by Colorimetric Determination

Date/Time Analyzed: 5/28/02 8:00

Analyst: MSO

Sample ID	Volume, in mL	Dilution	Absorbance	Conc., in mg/L	Reported Conc.
BLK			0.017	0.058	
1			0.078	0.309	
2			0.185	0.751	
3			0.344	1.407	
4			0.535	2.196	
5			0.749	3.079	
LFB (1)			0.245	0.999	99% _w
0205968-1A			0.011	0.033	
↓ dup			0.013	0.041	
↓ spk			0.091*	0.363	33% _w
0205968-2A			0.007	0.016 14.235 MSO	
0205876-1A		$\frac{1.0g}{50 mL DIN}$ MSO	0.072	14.235 0.0 MSO	

Second Level by: _____ on _____

$$LFB_1 = \frac{0.999}{1} = 99\%_w$$

$$SpK = \frac{.363 - 0.033}{1} = 33\%_w$$

Sulfide by Colorimetric Determination

Date/Time Analyzed: 5/28/02 8:00

Analyst: MSD (cont)

Sample ID	Volume, in mL	Dilution	Absorbance	Conc., in mg/L	Reported Conc.
<u>0205910-1E</u>			<u>0.005</u>	<u>0.008</u>	
<u>2E</u>			<u>0.014</u>	<u>0.045</u>	
<u>3E</u>			<u>0.012</u>	<u>0.037</u>	
<u>4E</u>			<u>0.009</u>	<u>0.025</u>	
<u>5E</u>			<u>0.035</u>	<u>0.132</u>	
<u>6E</u>			<u>0.005</u>	<u>0.008</u>	
<u>7E</u>			<u>0.014</u>	<u>0.045</u>	
<u>LFB(2)</u>			<u>0.260</u>	<u>1.061</u>	<u>100%</u>
<u>0205990-1C</u>			<u>0.101</u>	<u>0.404</u>	
<u>dup</u>			<u>0.088</u>	<u>0.351</u>	
<u>Spk</u>			<u>0.295</u>	<u>1.205</u>	
<u>5990-2C</u>			<u>0.017</u>	<u>0.058</u>	

Second Level by: _____ on _____

$$LFB_2 = \frac{1.061}{1} = 100\%$$

$$Spk = \frac{1.205 - 0.404}{1} = 80\%$$

Sulfide by Colorimetric Determination

Date/Time Analyzed: 5/28/02 (8:00 cont)

Analyst: MSO

Sample ID	Volume, in mL	Dilution	Absorbance	Conc., in mg/L	Reported Conc.
5990-3C			0.015 0.05100	0.049	
4C			0.011	0.033	
5C			0.002	-0.004	
6C			0.005	0.008	
7C			0.023	0.082	
8C			0.011	0.033	
9C			0.035	0.132	
10C			0.019	0.061 0.066	
LFB ③			0.260	1.061	106%
0205990-11C			0.027	0.099	
dup			0.026	0.095	
spk			0.235	0.957	

Second Level by: _____ on _____

$$LFB_3 = \frac{1.061}{1} = 106\%$$

$$SPK = \frac{0.957 - 0.099}{1} = 85\%$$

Sulfide by Colorimetric Determination

Date/Time Analyzed: 3/28/02 (8:00 cont.)

Analyst: MSO

Sample ID	Volume, in mL	Dilution	Absorbance	Conc., in mg/L	Reported Conc.
5995-1C			0.046	0.177	
2C			0.078	0.309	
4C					
3C			0.018	0.062	
5C					
4C			0.068	0.268	
6C					
5C			0.025	0.091	
7C					
6C			0.029	0.107	
8C					
7C			0.081	0.322	
9C					
8C			0.042	0.161	
10C					
9C			0.080	0.318	
LFB (4) 5995-10E			0.249	1.015	101%
0205995-11C			0.019	0.066	
↓ dup			0.016	0.054	

Second Level by: _____ on _____

$$LFB_4 = \frac{1.015}{1} = 101\%$$

$$SPK = \frac{0.735 - 0.066}{1} = 66\%$$

* sample 5995-11C colored for 1.0. water opt

Sulfide by Colorimetric Determination

Date/Time Analyzed: 5/28/02 (8:00 cont.)

Analyst: MSD

Sample ID	Volume, in mL	Dilution	Absorbance	Conc., in mg/L	Reported Conc.
5995-11C	<u>SPK</u>		0.181	0.735	
0205997-1C			0.005	0.008	
✓ 2C			0.022	0.078	
0205945-01E			0.074	0.293	
0205977-1A		<u>1.0g</u> 50mL IN 120mL	0.103	20.632	

Second Level by: ZA on 5/29

Sulfide by Colorimetric Determination

Standard Preparation:

Stock Standard: 5.0 gm Na₂S*9H₂O per 30 mL DI water

Intermediate Stds:

Drops/1.0 L	mL of Std Titrated	mL Iodine	mL PAO	Conc., in mg/L
5	200	10	6.25	7.5

$$\frac{400(10 - 6.25)}{200} = 7.5$$

$$\frac{7.5}{7.5} = 1.00$$

Working Stds:

Std #	mL of inter. std	conc., mg/L Inter. Std	Final Vol. in mL	Conc. in mg/L
1	4	7.5	100	0.30
2	10		 ↓	0.75
3	20			1.50
4	30			2.25
5	40			3.00

Date/Time Prepared: 5/28/02 (7:30)

Analyst: MSO

LFB and Spike Preparation:

$r^2 = 0.99690$

TEST RESULTS BY SAMPLE

Sample: 01F 22138 9b dissolved
Collected: 05/22/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02 14:32
Arsenic, ICP-MS	0.014	0.002	mg/L	JTH	06/05/02 12:44
Barium, ICP	0.190	0.003	mg/L	LC	06/09/02 14:32
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 14:32
Calcium, ICP	159	0.800	mg/L	LC	06/09/02 10:19
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 14:32
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 14:32
Iron, ICP	0.027	0.009	mg/L	LC	06/09/02 14:32
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 12:44
Magnesium, ICP	246	0.040	mg/L	LC	06/09/02 10:19
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/09/02				date analyzed
Potassium, ICP	58.6	0.39	mg/L	LC	06/09/02 14:32
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 12:44
Sodium, ICP	2027	2.0	mg/L	LC	06/09/02 10:19
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 14:32

Sample: 02B 22139 9a
Collected: 05/22/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	6.0	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	3.9	1.0	mg/L	WV	06/05/02 09:50

Sample: 02C 22139 9a
Collected: 05/22/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.06	0.03	mg/L	MSO	05/28/02 08:00

Sample: 02D 22139 9a
Collected: 05/22/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	6.48	0.21	mg/L	MSO	05/25/02 18:23
Chloride, Ion Chrom	1686	0.39	mg/L	MSO	05/31/02 18:47
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 18:23
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02 18:23
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02 18:23
Phosphate, Ortho	0.05	0.01	mg/L as P	BLT	05/31/02 07:10
Sulfate, Ion Chrom	2266	0.38	mg/L	MSO	05/31/02 18:47
Total Alkalinity-Titration	128	1.0	mg/L as CaCO3	TLC	06/04/02 07:35

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*Revised
02 11/13/02*

Order # 02-05-990
11/13/02 13:12

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TEST RESULTS BY SAMPLE

Sample: 03C 22140 8a
Collected: 05/22/02 09:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	0.05	0.03	mg/L	MSO	05/28/02	08:00

Sample: 03D 22140 8a
Collected: 05/22/02 09:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	11.0	0.21	mg/L	MSO	05/25/02	18:35
Chloride, Ion Chrom	3258	0.39	mg/L	MSO	05/31/02	18:58
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02	18:35
Ion chromatography	05/31/02		date complete			
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02	18:35
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02	18:35
Phosphate, Ortho	0.03	0.01	mg/L as P	BLT	05/31/02	07:10
Sulfate, Ion Chrom	1970	0.38	mg/L	MSO	05/31/02	18:58
Total Alkalinity-Titration	284	1.0	mg/L as CaCO3	TLC	06/04/02	07:35

Sample: 03E 22140 8a
Collected: 05/22/02 09:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02	14:44
Arsenic, ICP-MS	0.011	0.002	mg/L	JTH	06/05/02	09:44
Barium, ICP	0.085	0.003	mg/L	LC	06/09/02	14:44
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02	14:44
Calcium, ICP	304	0.800	mg/L	LC	06/09/02	10:28
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02	14:44
Copper, ICP	0.008	0.003	mg/L	LC	06/09/02	14:44
Digestion, Aqueous, 200.2	05/31/02		date prepared	EL	05/31/02	16:45
Iron, ICP	24.4	0.009	mg/L	LC	06/09/02	14:44
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	09:44
Magnesium, ICP	328	0.040	mg/L	LC	06/09/02	10:28
Metals, ICP/MS	06/05/02		date analyzed			
Metals, ICP/OES	06/09/02		date analyzed			
Potassium, ICP	86.4	0.39	mg/L	LC	06/09/02	14:44
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	09:44
Sodium, ICP	1803	2.0	mg/L	LC	06/09/02	10:28
Total Hardness, Calculation	2111	5.0	mg/L as CaCO3	LC	06/09/02	10:28
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02	14:44

Sample: 03F 22140 8a dissolved
Collected: 05/22/02 09:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02	14:48
Arsenic, ICP-MS	0.006	0.002	mg/L	JTH	06/05/02	13:00
Barium, ICP	0.063	0.003	mg/L	LC	06/09/02	14:48
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02	14:48

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Kh, 11/13/02
Rued

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Calcium, ICP	314	0.800	mg/L	LC	06/09/02 10:31
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 14:48
Copper, ICP	0.003	0.003	mg/L	LC	06/09/02 14:48
Iron, ICP	ND	0.009	mg/L	LC	06/09/02 14:48
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 13:00
Magnesium, ICP	335	0.040	mg/L	LC	06/09/02 10:31
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/09/02				date analyzed
Potassium, ICP	77.9	0.39	mg/L	LC	06/09/02 14:48
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 13:00
Sodium, ICP	1682	2.0	mg/L	LC	06/09/02 10:31
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 14:48

Sample: 04B 22141 8b
Collected: 05/22/02 09:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	8.0	0.20	mg/L	as N BLT	05/31/02 06:53
Total Organic Carbon, Aq	5.6	1.0	mg/L	WV	06/05/02 09:50

Sample: 04C 22141 8b
Collected: 05/22/02 09:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.03	0.03	mg/L	MSO	05/28/02 08:00

Sample: 04D 22141 8b
Collected: 05/22/02 09:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	2.45	0.21	mg/L	MSO	05/25/02 18:46
Chloride, Ion Chrom	481	0.39	mg/L	MSO	05/25/02 18:46
Fluoride, Ion Chrom	1.29	0.21	mg/L	MSO	05/25/02 18:46
Ion chromatography	05/25/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/25/02 18:46
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/25/02 18:46
Phosphate, Ortho	0.02	0.01	mg/L	as P BLT	05/31/02 07:10
Sulfate, Ion Chrom	ND	0.38	mg/L	MSO	05/25/02 18:46
Total Alkalinity-Titration	152	1.0	mg/L	as CaCO3 TLC	06/04/02 07:35

Sample: 04E 22141 8b
Collected: 05/22/02 09:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/20/02 18:00
Arsenic, ICP-MS	0.004	0.002	mg/L	JTH	06/05/02 09:52
Barium, ICP	0.179	0.003	mg/L	EL	06/20/02 18:00
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 15:00
Calcium, ICP	187	0.800	mg/L	LC	06/09/02 10:31
Chromium, ICP	ND	0.008	mg/L	EL	06/28/02 01:32
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 15:00

*Revised
06/11/02*

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11/13/02 13:12

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TEST RESULTS BY SAMPLE

Sample: 08C 22147 Surface Site 2
Collected: 05/22/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.03	0.03	mg/L MSO 05/28/02 08:00

Sample: 08D 22147 Surface Site 2
Collected: 05/22/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By Analyzed Dt/Tm</u>
Bromide, Ion Chrom	3.24	0.21	mg/L MSO 05/25/02 19:33
Chloride, Ion Chrom	666	0.39	mg/L MSO 05/25/02 19:33
Fluoride, Ion Chrom	3.00	0.21	mg/L MSO 05/25/02 19:33
Ion chromatography	06/29/02		date complete MSO
Nitrate, Ion Chrom	0.51	0.06	mg/L as N MSO 05/25/02 19:33
Nitrite, Ion Chrom	ND	0.02	mg/L as N MSO 05/25/02 19:33
Phosphate, Ortho	0.06	0.01	mg/L as P BLT 05/31/02 07:10
Sulfate, Ion Chrom	5220	0.38	mg/L MSO 06/29/02 03:52
Total Alkalinity-Titration	ND	1.0	mg/L as CaCO3 TLC 06/04/02 07:35

Sample: 08E 22147 Surface Site 2
Collected: 05/22/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By Analyzed Dt/Tm</u>
Aluminum, ICP	65.9	0.052	mg/L EL 06/28/02 00:34
Arsenic, ICP-MS	ND	0.002	mg/L JTH 06/05/02 10:39
Barium, ICP	0.010	0.003	mg/L EL 06/28/02 00:34
Cadmium, ICP	0.023	0.004	mg/L LC 06/09/02 15:31
Calcium, ICP	466	0.800	mg/L LC 06/09/02 11:20
Chromium, ICP	0.023	0.008	mg/L EL 06/28/02 00:34
Copper, ICP	0.131	0.003	mg/L LC 06/09/02 15:31
Digestion, Aqueous, 200.2	05/31/02		date prepared EL 05/31/02 16:45
Iron, ICP	36.7	0.009	mg/L LC 06/09/02 15:31
Lead, ICP-MS	0.007	0.002	mg/L JTH 06/05/02 10:39
Magnesium, ICP	321	0.040	mg/L LC 06/09/02 11:20
Metals, ICP/MS	06/05/02		date analyzed
Metals, ICP/OES	06/28/02		date analyzed
Potassium, ICP	52.2	0.39	mg/L LC 06/09/02 15:31
Silver, ICP-MS	ND	0.001	mg/L JTH 06/05/02 10:39
Sodium, ICP	545	2.0	mg/L LC 06/09/02 11:20
Total Hardness, Calculation	2484	5.0	mg/L as CaCO3 LC 06/09/02 11:20
Zinc, ICP	8.59	0.003	mg/L LC 06/09/02 15:31

Sample: 00F 22147 SS2 dissolved
Collected: 05/22/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By Analyzed Dt/Tm</u>
Aluminum, ICP	72.1	0.052	mg/L EL 06/20/02 18:24
Arsenic, ICP-MS	ND	0.002	mg/L JTH 06/05/02 13:54
Barium, ICP	0.011	0.003	mg/L EL 06/20/02 18:24
Cadmium, ICP	0.025	0.004	mg/L LC 06/09/02 15:35

Based 78
for 11/13/02

DATA VALIDATION WORKSHEET

Conventional Analysis

Reviewer: JA

Date: _____

DV Level: II III IV

Review Document:

- NFG/SW-846 Project QAPP/SAP
 NJDEP/SW-846 Region III/SW-846
 NFG/CLP _____

Project Name: MBS - HMI

Project Number: _____

Laboratory: Atlantic's Coast Lab

SDG No.: 0205910

Test Name: Alkalinity

Method No.: _____

1.0 General: Chain-of-Custody/Data Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Does sample preservation, collection and storage meet method requirement?	✓		
1.5	Are the sample preparation benchsheets present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓		
1.6	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes: _____

2.0 Holding Times

		Yes	No	NA
2.1	Were sample preserved as specified in the method?	✓		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		✓	

Notes: Date Collected Date Analyzed H.T.

5/21/02 6/3/02 13 days

3.0 Instrument Calibration

		Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.			✓
3.2	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.			✓
2.3	Was continuing calibration verification (CCV) analyzed every 10 field samples or every 2 hours, whichever is more frequent? If no, J(+)/UJ(-) all samples analyzed after the last passing CCV.			✓
2.4	Are all calibration standard (ICV and CCV) percent recoveries within the control limits?			✓
2.5	Were any transcription/calculation errors noted in the calibration verification data? Action: For any transcription or calculation errors, contact the laboratory for explanation/resubmittal.			✓

Notes:

4.0 Blanks (Laboratory and Field)

		Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓		
4.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		✓	
4.3	Were there any transcription/calculation errors in blank data?		✓	
4.4	Do any field equipment blanks/trip blanks have positive results?			✓
4.5	Are there field equipment blank/trip blanks associated with every sample?			✓

Notes:

MB - NP

5.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
5.1	Is the matrix spike/matrix spike duplicate recovery form present?			✓
5.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?			✓
5.3	Was a field blank used for MS/MSD analyses?			✓
5.4	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?			✓
5.5	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?			✓
5.6	Were there any transcription /calculation errors?			✓

Notes:

6.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
6.1	Is the LCS/LCSD recovery form present?			✓
6.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?			✓
6.3	Are there any %R for LCS/LCSD recoveries outside the laboratory QC limits?			✓
6.4	Are there any RPD for LCS/LCSD recoveries outside the laboratory QC limits?			✓
6.5	Were there any transcription /calculation errors?			✓

Notes:

7.0 Laboratory Duplicate

		Yes	No	NA
7.1	Were laboratory duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
7.2	Was a field blank used for duplicate analysis? If yes, use professional judgement to determine the effect on the data and note in reviewer narrative.		✓	
7.3	Are all analyte duplicate results within control limits?	✓		
7.4	Were there any transcription /calculation errors?		✓	

Notes: Lab dup - 0205907-2A 337.2/337.5 RPD = 0.1%

0205990-6D ND/ND —
 0205995-6D ~~575~~ 562/575 2.3% RPD

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
8.2	Are all analyte duplicate results within control limits? If no, contact your PM for guidance.	✓		
8.3	Were there any transcription /calculation errors noted in the duplicate data?		✓	

Notes: 126 126 - dup RPD

Alkalinity 136 135 0.7%

9.0 Sample Results/Detection Limit Verification

		Yes	No	NA
9.1	Are all sample results within the calibrated range?	✓		
9.2	If samples are not within the calibrated range, were they diluted and reanalyzed or was a high-level check standard analyzed? If not, contact laboratory. Request reanalysis if holding times have not been exceeded. If exceeded, qualify specific sample(s) J.			✓
9.3	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		
9.4	Were there any transcription /calculation errors?		✓	

Notes:

10.0 Data Completeness

		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 95%)	✓		
10.1.1	Number of samples: <u>9</u>			
10.1.2	Number of target compounds in each analysis: <u>1</u>			
10.1.3	Number of results rejected and not reported: <u>0</u>			
	% Completeness = $(10.1.1 \times 10.1.2 - 10.1.3) \times 100 / (10.1.1 \times 10.1.2)$			
	% Completeness = <u>100%</u>			

Notes:

11.0 Surrogate Recovery

		Yes	No	NA
11.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			✓
11.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?			✓
11.3	If No in Section 7.2, are these sample(s) or method blank(s) reanalyzed?			✓
11.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			✓

Notes:

DATA VALIDATION WORKSHEET

Reviewer: JA

Conventional Analysis

Project Name: MES-HMI

Date: _____

Project Number: _____

DV Level: II III IV

Laboratory: Atlantic Coast Lab

Review Document:

SDG No.: 0205910

NFG/SW-846 Project QAPP/SAP

Test Name: Anions

NJDEP/SW-846 Region III/SW-846

Method No.: 300

NFG/CLP

1.0 General: Chain-of-Custody/Data Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Does sample preservation, collection and storage meet method requirement?	✓		
1.5	Are the sample preparation benchsheets present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓		
1.6	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Were sample preserved as specified in the method?	✓		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		✓	

Notes: Date Collected Date Analyzed H.T.

5/21/02 NO₂ 5/23/02 2 days / 10

NO₃ 5/23/02 2 days

Ⓢ of the 45 samples, 21 were received with holding time expired.
9 samples were analyzed outside holding time →

3.0 Instrument Calibration

		Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
3.2	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	✓		
2.3	Was continuing calibration verification (CCV) analyzed every 10 field samples or every 2 hours, whichever is more frequent? If no, J(+)/UJ(-) all samples analyzed after the last passing CCV.	✓		
2.4	Are all calibration standard (ICV and CCV) percent recoveries within the control limits?	✓		
2.5	Were any transcription/calculation errors noted in the calibration verification data? Action: For any transcription or calculation errors, contact the laboratory for explanation/resubmittal.		✓	

Notes: *I. Cal. All r^2 were in control*
ICV/CCV All %Rs were in control (90-110%)

4.0 Blanks (Laboratory and Field)

		Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓		
4.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		✓	
4.3	Were there any transcription/calculation errors in blank data?		✓	
4.4	Do any field equipment blanks/trip blanks have positive results?			✓
4.5	Are there field equipment blank/trip blanks associated with every sample?			✓

Notes: *1 PB/CEB All < MDL.*

5.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
5.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
5.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.3	Was a field blank used for MS/MSD analyses?		✓	
5.4	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?	✓		
5.5	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits?			✓
5.6	Were there any transcription /calculation errors?		✓	

Notes: *MS - 0205910-10 (11A) Nitrate 139% ↑ (J, m only)*
↳ All NDs in associated samples, OK.
Cl and SO₄ → Sample conc > 4x spiking conc. OK

Atlantic Coast Laboratories, Inc.
General Chemistry Quality Control Summary

Client: Maryland Environmental Services
Project: Hart Miller Island
Date: May 2002

0205910 0205997
 0205990 0205B34
 0205995 0206243

Ion Chromatography

Analyte/ Sample	ICV/CCV(%)-ICB/CCB(mg/L)							Sample Result	Duplicate Result	% RPD	Matrix Spike	% Recovery
	Bromide	Chloride	Fluoride	Nitrite	Nitrate	Sulfate						
Ion Chromatography	05/23/02											
ICB	0934	ND	ND	ND	ND	ND	ND					
ICV	0945	102%	102%	102%	107%	100%	102%					
LFB	0957	90%	95%	102%	99%	100%	102%					
0205910	01 1009	Bromide	40.00					2.50	3.12	-22.1%	43.41	102%
	01D 1020	Chloride	60.00 [2]					598.37	597.67	0.1%	612.40	OR
	01MS 1032	Fluoride	10.00					ND	ND	0.0%	9.70	97%
		Nitrite	12.17 [1]					ND	ND	0.0%	16.94	139%
		Nitrate	9.00					ND	ND	0.0%	9.24	103%
		Sulfate	40.00 [2]					1439.25	1430.71	0.6%	1372.77	OR
0205910	02 1043											
0205910	03 1055											
0205910	04 1107											
0205910	05 1118											
0205910	06 1130	Rerun at 50x dilution for chloride and sulfate on 5/25/02 1702										
0205910	07 1141	Rerun at 50x dilution for chloride and sulfate on 5/25/02 1714										
CCV		105%	102%	104%	105%	102%	101%	/				
CCB		ND	ND	ND	ND	ND	ND	/				
Notes:												
OR	Over range of method											
[1]	The nitrite matrix spike showed significant over-recovery. Because the retention times for chloride and nitrite are close, the high chloride concentration may cause peak overlap with the nitrite.											
[2]	The chloride and sulfate matrix spike are not valid due to the high concentration in the sample compared to the matrix spike. Sample concentrations exceed the matrix spike by >10X.											

HMI0503

⊗ Sample conc. > 4x spiking conc.
 JK

6.0 Laboratory Control Sample/Laboratory Copntrol Sample Duplicate (LCS/LCSD)

		Yes	No	NA
6.1	Is the LCS/LCSD recovery form present?	✓		
6.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Are there any %R for LCS/LCSD recoveries outside the laboratory QC limits?		✓	
6.4	Are there any RPD for LCS/LCSD recoveries outside the laboratory QC limits?		✓	
6.5	Were there any transcription /calculation errors?			✓

Notes:

LFB1) All %R's were in control.
LFB2)

7.0 Laboratory Duplicate

		Yes	No	NA
7.1	Were laboratory duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
7.2	Was a field blank used for duplicate analysis? If yes, use professional judgement to determine the effect on the data and note in reviewer narrative.		✓	
7.3	Are all analyte duplicate results within control limits?	✓		
7.4	Were there any transcription /calculation errors?		✓	

Notes:

Lab dup. - 0205910-01.

Br 2.50/3.12 RPD=22.1% (JA) → J.K.
SO4 1439.25/1430.71 ~~All N/A's~~ RPD=0.6%
Cl 598.37/597.66 RPD=0.1%

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
8.2	Are all analyte duplicate results within control limits? If no, contact your PM for guidance.		✓	
8.3	Were there any transcription /calculation errors noted in the duplicate data?		✓	

Notes:

	12b	12b-Dup.	Difference	RPD	RL
Br	0.21 u	0.21 u	-		
Cl	3.11	3.52		12.4%	
F	0.31	0.23		29.6%	
(*) → NO3	0.06 u	0.33	0.33		0.06 J/WJ
NO2	0.02 u	0.02 u			
SO4	1.52	1.09		33%	

9.0 Sample Results/Detection Limit Verification

		Yes	No	NA
9.1	Are all sample results within the calibrated range?	✓		
9.2	If samples are not within the calibrated range, were they diluted and reanalyzed or was a high-level check standard analyzed? If not, contact laboratory. Request reanalysis if holding times have not been exceeded. If exceeded, qualify specific sample(s) J.			✓
9.3	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		
9.4	Were there any transcription /calculation errors?		✓	

Notes:

10.0 Data Completeness

		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 95%)	✓		
10.1.1	Number of samples:			
10.1.2	Number of target compounds in each analysis:			
10.1.3	Number of results rejected and not reported:			
	% Completeness = $(10.1.1 \times 10.1.2 - 10.1.3) \times 100 / (10.1.1 \times 10.1.2)$			
	% Completeness =			

Notes:

11.0 Surrogate Recovery

		Yes	No	NA
11.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			✓
11.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?			✓
11.3	If No in Section 7.2, are these sample(s) or method blank(s) reanalyzed?			✓
11.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			✓

Notes:

Atlantic Coast Laboratories, Inc.

Sample Cross Reference

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring
 Date: May/June, 2002

MES Sample ID	Location	Laboratory Sample ID	Date/Time Collected
22131	11A	0205910 -01	5/21/02 10:20
22132	11B	0205910 -02	5/21/02 11:02
22133	12A	0205910 -03	5/21/02 11:40
22143	12B	0205910 -04	5/21/02 12:55
22135	12B DUP	0205910 -05	5/21/02 13:00
22136	10A	0205910 -06	5/21/02 13:30
22137	10B	0205910 -07	5/21/02 13:50
22138	9B	0205990 -01	5/22/02 9:05
22139	9A	0205990 -02	5/22/02 9:15
22140	8A	0205990 -03	5/22/02 9:40
22141	8B	0205990 -04	5/22/02 9:55
22143	Surface Site 1	0205990 -05	5/22/02 10:15
22144	Surface Site 1 Dupl	0205990 -06	5/22/02 10:15
22145	7A	0205990 -07	5/22/02 10:20
22147	Surface Site 2	0205990 -08	5/22/02 11:00
22148	CD 4B	0205990 -09	5/22/02 11:30
22149	CD 4A	0205990 -10	5/22/02 11:40
22150	CD 4A Duplicate	0205990 -11	5/22/02 11:45
22151	CD 1A	0205995 -01	5/22/02 13:30
22152	CD 3A	0205995 -02	5/22/02 13:45
22153	3A	0205995 -04	5/23/02 9:20
22154	3B	0205995 -05	5/23/02 9:05
22156	5A Duplicate	0205995 -06	5/23/02 10:00
22157	5A	0205995 -07	5/23/02 10:00
22158	CD 2A	0205995 -08	5/23/02 11:00
22159	6B	0205995 -09	5/23/02 12:15
22160	6A	0205995 -10	5/23/02 12:30
22162	4A	0205995 -11	5/23/02 13:05
22163	2B	0205997 -01	5/23/02 13:35
22164	2A	0205997 -02	5/23/02 13:45
22146	7B	0205B34 -01	5/28/02 8:10
22165	Surface 3	0205B34 -02	5/24/02 9:30
22166	SC 1B	0205B34 -03	5/24/02 10:20
22168	SC 1A	0205B34 -04	5/24/02 11:00
22169	Surface 4	0205B34 -05	5/24/02 9:50
22174	CD 3B	0205B34 -06	5/28/02 8:20
22175	1B	0205B34 -07	5/28/02 8:50

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Overview

This narrative reviews the final analytical data according to requirements of the individual methods and guidelines established by the US EPA Region III for validation of inorganic data (*Innovative Approaches for the Validation of Organic and Inorganic Data-Standard Operating Procedures, June, 1995*). US EPA Region III, Analytical Services and Quality Assurance Branch, 201 Defense Highway, Suite 200, Annapolis, MD. It should be noted that this data validation document should be considered useful for general guidance only since many of the required methods and analytes are not specifically covered by the data validation guidelines.

General Comments

The laboratory encountered significant problems with certain methods or analytes that were directly related to high dissolved solids content of the samples (up to about 1% total dissolved solids). For metals, the high levels of certain metal analytes (Ca, Na, Mg, and K) resulted in numerous problems such as carryover, signal suppression, and extreme salt buildup on the ICP/OES and ICP/MS torch and nebulizer. Virtually all samples required dilution for quantitation of these metals. Also, most samples would be better determined with dilution, but we attempted to run all samples without dilution to achieve low and consistent detection limits for the other metals. Similarly, the levels of chloride and sulfate in most samples were well beyond the calibration range of the methods, resulting in difficulty in achieving any, let alone acceptable, matrix spike recovery for these ions. The high chloride content of the samples also created difficulty in the determination of nitrite ion because the huge chloride peak overlapped the retention time of nitrite. In most spiked samples for this project, we were unable to distinguish the nitrite spike from the chloride spike. Each procedure is reviewed individually in the following narrative.

Metals

Digestion Batches-5/28/02 and 5/31/02 Initial Analyses

The 5/28/02 digestion batch contained samples 0205910-01 through -07 and the 5/31/02 digestion batch contained samples 0205990-01 through -11 and 0205997-01 and -02.

Initial and Continuing Calibration Standards

ICV	ICP/OES	06/01/02-06/01/02	All analytes 90-110%
	ICP/OES	06/09/02-06/09/02	All analytes 90-100%
	ICP/MS	06/04/02-06/05/02	All analytes 90-110%
CCV	ICP/OES	06/01/02-06/01/02	All analytes 90-110%
	ICP/OES	06/09/02-06/09/02	All analytes 90-100% except Al, CCV8-111%
	ICP/MS	06/04/02-06/05/02	All analytes 90-110% except Ag, CCV9-83% ✓

Blanks

ICB	ICP/OES	06/01/02-06/01/02	All analytes < MDL
	ICP/OES	06/09/02-06/09/02	All analytes < MDL
	ICP/MSS	06/04/02-06/05/02	All analytes < MDL

Preparation Blank-05/28/02

ICP/OES	06/01/02-06/01/02	All analytes < MDL except Mg-0.009 mg/L ✓
ICP/MS	06/04/02-06/05/02	All analytes < MDL

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
 Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Preparation Blank-05/31/02

	ICP/OES	06/09/02-06/09/02	All analytes < MDL
	ICP/MS	06/04/02-06/05/02	All analytes < MDL
CCB	ICP/OES	06/01/02-06/01/02	All analytes < MDL
	ICP/OES	06/09/02-06/09/02	All analytes < MDL except as follows: CCB1-Mg, 0.006 CCB3-K, 1.649, Mg, 0.005 CCB8-Mg, 0.034 CCB9-0.025 CCB10-0.010
	ICP/MS	06/04/02-06/05/02	All analytes < MDL

Duplicates and Matrix Spikes

Sample 0205910-01A	ICP/OES	All MS recoveries 75-125% % RPD < 20% for samples > 5X MDL (Ba,Ca,Fe,K,Mg,and Na-see note for Ca, Mg) % RPD 0% or N/A for Al, Cd, Cr,Cu, Zn
	ICP/MS	All MS recoveries 75-125% except As (71%) ✓ % RPD < 20% for As % RPD 0% or N/A for Pb and Ag
Sample 0205990-09E	ICP/OES	All MS recoveries 75-125% % RPD < 20% for samples > 5X MDL (Ba,Ca,Fe,K,Mg,and Na) % RPD 0%, <20%, or N/A for Al, Cd, Cr, Cu, Zn
	ICP/MS	All MS recoveries 75-125% % RPD < 20% for As % RPD 0% or N/A for Pb and Ag
Sample 0205997-01E	ICP/OES	All MS recoveries 75-125% % RPD < 20% for samples > 5X MDL (Ba,Ca,Fe,K,Mg,and Na) % RPD 0%, <20%, or N/A for Al, Cd, Cr,Cu, Zn
	ICP/MS	All MS recoveries 75-125% % RPD < 20% for As % RPD 0% or N/A for Pb and Ag

Laboratory Control Standards

LFB 1	5/28/02	ICP/OES	All recoveries 80-120%
		ICP/MS	All recoveries 80-120%
LFB 1	5/31/02	ICP/OES	All recoveries 80-120%
		ICP/MS	All recoveries 80-120%
LFB 2	5/31/02	ICP/OES	All recoveries 80-120%
		ICP/MS	All recoveries 80-120%

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
 Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

ICP/OES Interference Check Standard

ICS	ICP/OES	06/01/02-06/01/02	Initial-all recoveries 80-120% Final-all recoveries 80-120%
ICS	ICP/OES	06/09/02-06/09/02	Initial-all recoveries 80-120% Final-all recoveries 80-120%

ICP/OES Serial Dilution

Sample 0205910-01A	% difference <10% for all analytes except Ca, Mg Ca, Mg reported from dilution
Sample 0205990-09E	% difference < 10% for all analytes
Sample 0205997-01E	% difference < 10% for all analytes

Digestion Batch-6/01/02 Initial Analyses

The 6/01/02 digestion batch contained samples 0205995-01 through -11.

Initial and Continuing Calibration Standards

ICV	ICP/OES	06/12/02-06/12/02	All analytes 90-110%
	ICP/OES	06/13/02-06/13/02	All analytes 90-110%
	ICP/MS	06/06/02-06/07/02	All analytes 90-110%
CCV	ICP/OES	06/12/02-06/12/02	All analytes 90-110% except as follows: CCV5-Al-112%,Ca-124%,Cd-114%,Cr-120% Fe-119%, Mg-122%, Na-113%, Zn-116% CCV6-Al-113%, Ca-130%, Cd-117%, Cr-123% Fe-122%, Mg-127%, Na-111%, Zn-119%

Note: Samples 0205995-01E/F and 0205995-02E/F were affected by this CCV failure and were not run again at a 1x dilution. Elements reported from this analysis for those four samples were Al, Ba, Cd, Cr, Cu, Fe, K, and Zn. The elements noted below that had CCV failures were compared to the ICP/MS data and the ICP/OES data was judged to be reportable despite the CCV failures. The CCV failures would have caused a high bias to the ICP/OES data.

<u>Sample ID</u>	<u>ICP/OES (mg/L)</u>	<u>ICP/MS (mg/L)</u>
	06/12/02 1803	06/07/02 0416
0205995-01E	Al <0.052	0.027
	Cd <0.004	<0.0005
	Cr <0.008	0.004
	Cu 0.010	0.021
	Fe 45.8	32.7
	Zn <0.003	0.028

Note: Fe was determined to be 47.6 mg/L from the 20x dilution run by ICP/OES on 6/12/02 at 1357.

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
 Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

		06/12/02 1809	06/07/02 0620
0205995-01F	Al	<0.052	<0.005
	Cd	<0.004	<0.0005
	Cr	<0.008	0.011
	Cu	0.010	0.017
	Fe	0.013	0.965
	Zn	<0.003	0.026

		06/12/02 1752	06/07/02 0424
0205995-02E	Al	<0.052	0.023
	Cd	<0.004	<0.0005
	Cr	<0.008	0.002
	Cu	<0.003	0.013
	Fe	30.3	28.8
	Zn	<0.003	0.018

Note: Fe was determined to be 30.5 mg/L from the 20x dilution run by ICP/OES on 6/12/02 at 1403.

		06/12/02 1758	06/07/02 0628
0205995-02E	Al	<0.052	<0.005
	Cd	<0.004	<0.0005
	Cr	<0.008	0.022
	Cu	<0.003	0.010
	Fe	0.041	0.470
	Zn	<0.003	0.019

CCV	ICP/OES	06/13/02-06/13/02	All analytes 90-110%
	ICP/MS	06/06/02-06/07/02	All analytes 90-110%

Blanks

ICB	ICP/OES	06/12/02-06/12/02	All analytes < MDL except K-0.881
	ICP/OES	06/13/02-06/13/02	All analytes < MDL except Cu-0.003
	ICP/MS	06/06/02-06/07/02	All analytes < MDL

Preparation Blank-06/01/02

ICP/OES	06/12/02-06/12/02	All analytes < MDL except Mg-0.005 mg/L
ICP/MS	06/06/02-06/07/02	All analytes < MDL

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
 Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

CCB	ICP/OES	06/12/02-06/12/02	All analytes < MDL except as follows: CCB1-K-0.599 CCB3-Mg-0.004 CCB4-Mg-0.005 CCB6-Fe-0.010
	ICP/OES	06/13/02-06/13/02	All analytes < MDL except as follows: CCB4-Mg, 0.020 CCB5-Mg, 0.011
	ICP/MS	06/06/02-06/07/02	All analytes < MDL

Duplicates and Matrix Spikes

Sample 0205A14-01A (Batch QC; not an HMI sample)	ICP/OES		All MS recoveries 75-125% % RPD < 20% for samples > 5X MDL (Al,Ba,Ca,Cu,Fe,K,Mg,Na, Zn)
	ICP/MS		% RPD 0% or N/A for Cd, Cr All MS recoveries 75-125% % RPD < 20% for Pb % RPD 0% or N/A for As and Ag

Sample 0205995-09E	ICP/OES		All MS recoveries 75-125% except as follows: Mg-47%, Na-3% (concentrations > 4x MS) % RPD < 20% for sample > 5X MDL (Ba,Ca,Fe,K,Mg,Na)
	ICP/MS		Na and Mg reported from dilutions on 6/25/02. MS recovery on diluted samples was invalid due to high concentratons > 4X MS % RPD 0% or N/A for Al, Cd, Cr, Cu, Zn All MS recoveries 75-125% % RPD 0% or N/A for As, Pb, and Ag

Laboratory Control Standards

LFB 1	06/01/02	ICP/OES ICP/MS	All recoveries 80-120% All recoveries 80-120%
LFB 2	06/01/02	ICP/OES ICP/MS	All recoveries 80-120% All recoveries 80-120%

ICP/OES Interference Check Standard

ICS	ICP/OES	06/12/02-06/12/02	Initial-all recoveries 80-120% Final-all recoveries 80-120% except Ca-123%
ICS	ICP/OES	06/13/02-06/13/02	Initial-all recoveries 80-120% Final-all recoveries 80-120% except Mg-76%

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

ICP/OES Serial Dilution

Sample 0205A14-01A % difference <10% for all analytes except Mg (11.7%)
Sample 0205995-09E % difference < 10% for all analytes except Mg and Na
Mg and Na reported from dilution

Digestion Batches-6/05/02 Initial Analyses

The 6/05/02 digestion batch contained samples 0205B34-01 through -11.

Initial and Continuing Calibration Standards

ICV	ICP/OES	06/14/02-06/14/02	All analytes 90-110%
	ICP/MS	06/11/02-06/12/02	All analytes 90-110%
CCV	ICP/OES	06/14/02-06/14/02	All analytes 90-110%
	ICP/MS	06/11/02-06/12/02	All analytes 90-110% except Ag, CCV9-83%

Blanks

ICB	ICP/OES	06/14/02-06/14/02	All analytes < MDL except K-0.866 and Cu-0.006
	ICP/MS	06/11/02-06/12/02	All analytes < MDL

Preparation Blank-06/05/02

	ICP/OES	06/14/02-06/14/02	All analytes < MDL except Mg-0.006 mg/L
	ICP/MS	06/11/02-06/12/02	All analytes < MDL
CCB	ICP/OES	06/14/02-06/14/02	All analytes < MDL except as follows: CCB1-Cu, 0.003; K, 0.483 CCB3-K, 0.452; Mg, 0.013 CCB4-Cu, 0.004; K, 0.873; Mg, 0.006 CCB5-Cu, 0.006; K, 1.099 CCB6-Cu, 0.004; K, 0.854; Mg, 0.005
	ICP/MS	06/11/02-06/12/02	All analytes < MDL

Duplicates and Matrix Spikes

Sample 0205C62-01A (Batch QC; not an HMI sample)	ICP/OES	All MS recoveries 75-125% % RPD < 20% for samples > 5X MDL (Al, Ba, Ca, Cu, Fe, K, Mg, Na, Zn)
	ICP/MS	% RPD 0% or N/A for Cd, Cr All MS recoveries 75-125% % RPD 0% or N/A for As, Pb, and Ag

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Sample 0205B34-11E ICP/OES All MS recoveries 75-125%
% RPD < 20% for samples > 5X MDL
(Ba,Ca,Fe,K,Mg,and Na)
ICP/MS % RPD 0% or N/A for Al, Cd, Cr, Cu, Zn
All MS recoveries 75-125%
% RPD 0% or N/A for As, Pb, and Ag

Laboratory Control Standards

LFB 1 06/05/02 ICP/OES All recoveries 80-120%
ICP/MS All recoveries 80-120%
LFB 2 06/05/02 ICP/OES All recoveries 80-120%
ICP/MS All recoveries 80-120%

ICP/OES Interference Check Standard

ICS ICP/OES 06/14/02-06/14/02 Initial-all recoveries 80-120%
Final-all recoveries 80-120% except Mg-79%

ICP/OES Serial Dilution

Sample 0205C62-01A % difference <10% for all analytes except as follows:
Cr-23.3% (concentration < 50x MDL)
Mg-12.5%
Sample 0205B34-11E % difference < 10% for all analytes except as follows:
Mg-14.6%

Digestion Batch-6/12/02 Initial Analyses

The 6/12/02 digestion batch contained samples 0206243-01 through -04.

Initial and Continuing Calibration Standards

ICV ICP/OES 06/18/02-06/18/02 All analytes 90-110%
ICP/MS 06/14/02-06/15/02 All analytes 90-110%
CCV ICP/OES 06/18/02-06/18/02 All analytes 90-110%
ICP/MS 06/14/02-06/15/02 All analytes 90-110%

Blanks

ICB ICP/OES 06/18/02-06/18/02 All analytes < MDL
ICP/MS 06/14/02-06/15/02 All analytes < MDL

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Preparation Blank-06/12/02

	ICP/OES	06/18/02-06/18/02	All analytes < MDL except as follows: Cu-0.003; Fe-0.011; K-0.759; Mg-0.007
	ICP/MS	06/14/02-06/15/02	All analytes < MDL
CCB	ICP/OES	06/18/02-06/18/02	All analytes < MDL except as follows: CCB2-Mg-0.007 CCB4-K-0.498; Mg-0.006 CCB5-K-0.553; Mg-0.012
	ICP/MS	06/14/02-06/15/02	All analytes < MDL

Duplicates and Matrix Spikes

Sample 0206243-01A	ICP/OES	All MS recoveries 75-125% % RPD < 20% for sample > 5X MDL (Ba,Ca,Fe,K,Mg,Na)
	ICP/MS	% RPD 0% or N/A for Al, Cd, Cr, Cu, Zn All MS recoveries 75-125% % RPD 0% or N/A for As, Pb, and Ag

Laboratory Control Standards

LFB 1	06/12/02	ICP/OES	All recoveries 80-120% except Mg (78%)
		ICP/MS	All recoveries 80-120%

ICP/OES Interference Check Standard

ICS	ICP/OES	06/18/02-06/18/02	Initial-all recoveries 80-120% except Mg (78%) Final-all recoveries 80-120%
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ICP/OES Serial Dilution

Sample 0206243-01A	% difference < 10% for all analytes
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Digestion Batch-6/12/02 Initial Analyses

The 6/12/02 digestion batch contained samples 0206243-01 through -04.

Initial and Continuing Calibration Standards

ICV	ICP/OES	06/19/02-06/19/02	All analytes 90-110%
CCV	ICP/OES	06/19/02-06/19/02	All analytes 90-110% except as follows: CCV4-Ca, 113% CCV7-Al-111%; Ca-134%; Cd-118%; Cr-126%; Fe-124%; Mg-128%; Zn-124%

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Note: The final CCV and ICS were affected by a power outage. See notes in QC summary. Ca, Mg, and Na were reported from the ICP/OES run of 6/18/02 on appropriate dilutions. Elements potentially affected by the CCV failure were Al, Cd, Cr, Fe, and Zn which were reported from this run for samples 0206243-03B, -04A, and -04B. These samples were not run at this dilution in prior or subsequent runs. A comparison with ICP/MS follows.

	<u>ICP/OES</u>	<u>ICP/MS</u>
0206243-03B	6/19/02 1547	6/14/02 1737
Al	<0.052	<0.005
Cd	<0.004	<0.0005
Cr	<0.008	0.012
Fe	0.405	0.903
Zn	<0.003	0.010
0206243-04A	6/19/02 1552	6/14/02 1711
Al	<0.052	0.008
Cd	<0.004	<0.0005
Cr	<0.008	<0.002
Fe	18.9	20.9
Zn	<0.003	0.012
0206243-04B	6/19/02 1559	6/14/02 1745
Al	<0.052	<0.005
Cd	<0.004	<0.0005
Cr	<0.008	0.047
Fe	<0.009	0.421
Zn	<0.003	0.012

Blanks

ICB	ICP/OES	06/19/02-06/19/02	All analytes < MDL
CCB	ICP/OES	06/19/02-06/19/02	All analytes < MDL except as follows: CCB2-K-0.779; CCB4-K-0.697; CCB5-K-0.468; CCB6-K-0.397

Duplicates and Matrix Spikes and Laboratory Control Standards

Analyzed on 6/18/02

ICP/OES Interference Check Standard

ICS	ICP/OES	06/19/02-06/19/02	Initial-all recoveries 80-120% Final-all recoveries 80-120% except as follows: Ca-125%
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ICP/OES Serial Dilution

Sample 0206243-01A	% difference <10% for all analytes
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Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

ICP/OES Run 06/04/02-06/04/02 Reanalysis/dilutions for Ca, Mg, Na

Initial and Continuing Calibration Standards

ICV ICP/OES 06/04/02-06/04/02 All analytes 90-110%
CCV ICP/OES 06/04/02-06/04/02 All analytes 90-110%

Blanks

ICB ICP/OES 06/04/02-06/04/02 All blanks < MDL
CCB ICP/OES 06/04/02-06/04/02 All blanks < MDL

ICP/OES Interference Check Standard

ICS ICP/OES 06/04/02-06/04/02 Initial-all recoveries 80-120%
Final-all recoveries 80-120%

ICP/OES Run 06/20/02-06/20/02 Reanalysis/dilutions for Al, Ba, K, Na

Initial and Continuing Calibration Standards

ICV ICP/OES 06/20/02-06/20/02 All analytes 90-110%
CCV ICP/OES 06/20/02-06/20/02 All analytes 90-110%

Blanks

ICB ICP/OES 06/20/02-06/20/02 All blanks < MDL
CCB ICP/OES 06/20/02-06/20/02 All blanks < MDL except as follows:
CCB2-Mg-0.007
CCB3-Mg-0.017

ICP/OES Interference Check Standard

ICS ICP/OES 06/20/02-06/20/02 Initial-all recoveries 80-120%
Final-all recoveries 80-120%

ICP/OES Run 06/25/02-06/25/02 Reanalysis/dilutions for Ca, Mg, Na

Initial and Continuing Calibration Standards

ICV ICP/OES 06/25/02-06/25/02 All analytes 90-110%
CCV ICP/OES 06/25/02-06/25/02 All analytes 90-110%
CCV5-Ca-125%; Mg-121%

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Blanks

ICB	ICP/OES	06/25/02-06/25/02	All blanks < MDL
CCB	ICP/OES	06/25/02-06/25/02	All blanks < MDL except as follows: CCB3-Mg-0.005

ICP/OES Interference Check Standard

ICS	ICP/OES	06/25/02-06/25/02	Initial-all recoveries 80-120% Final-all recoveries 80-120% except Ca-125%
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ICP/OES Run 06/27/02-06/27/02 Reanalysis/dilutions for Al, Ba, Cr, Ca, Mg

Initial and Continuing Calibration Standards

ICV	ICP/OES	06/27/02-06/27/02	All analytes 90-110%
CCV	ICP/OES	06/27/02-06/27/02	All analytes 90-110%

Blanks

ICB	ICP/OES	06/27/02-06/27/02	All blanks < MDL
CCB	ICP/OES	06/27/02-06/27/02	All blanks < MDL except as follows: CCB2-Mg-0.046 CCB3-Mg-0.018 CCB4-Mg-0.068 CCB5-Mg-0.060 CCB6-Mg-0.008

ICP/OES Interference Check Standard

ICS	ICP/OES	06/27/02-06/27/02	Initial-all recoveries 80-120% Final-all recoveries 80-120%
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ICP/OES Run 07/01/02-07/01/02 Reanalysis/dilutions for Ca and K

Initial and Continuing Calibration Standards

ICV	ICP/OES	07/01/02-07/01/02	All analytes 90-110%
CCV	ICP/OES	07/01/02-07/01/02	All analytes 90-110%

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
 Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Blanks

ICB ICP/OES 07/01/02-07/01/02 All blanks < MDL
 CCB ICP/OES 07/01/02-07/01/02 All blanks < MDL except as follows:

ICP/OES Interference Check Standard

ICS ICP/OES 07/01/02-07/01/02 Initial-all recoveries 80-120%
 Final-all recoveries 80-120%

Total Organic Carbon

All analyses were conducted within holding times. ✓

QC Summary

	<u>Run Date 05/29/02</u>	<u>Run Date 06/05/02</u>	<u>Run Date 06/06/02</u>	<u>Run Date 06/10/02</u>
ICV	All 90-110%	All 90-110%	All 90-110%	All 90-110%
LFB	All 90-110%	All 90-110%	All 90-110%	All 90-110%
CCV	All 90-110% ✓	All 90-110%	All 90-110%	All 90-110%
		To CCV3; samples RR		
ICB	All < 1 mg/L	1.0	2.4	1.0
CCB	CCB1 (1.1) ✓ CCB2 < 1.0 CCB3 (1.1) ✓ CCB4 < 1.0 CCB5 < 1.0 CCB6 (1.0) ✓	CCB1 < 1.0 CCB2 < 1.0 CCB3 < 1.0 CCB4 < 1.0 CCB5 < 1.0 CCB6 < 1.0	CCB1-2.0 CCB2-2.0 CCB3-2.1	CCB1 < 1.0 CCB2 < 1.0 CCB3 < 1.0 CCB4 < 1.0 CCB5 < 1.0 CCB6 < 1.0 CCB7 < 1.0 CCB8 < 1.0 CCB9 < 1.0 CCB10 < 1.0 CCB11 < 1.0 ✓
<u>Duplicates</u>	0205903-01B* 6.7% RPD 0205905-09B* 2.3% RPD	0205990-01 18% RPD 0205990-06 2.2% RPD 0205995-06/ 5.8% RPD	0205B34-04 5.7% RPD ✓ 0205B96-01* 1.9% RPD	0206243-04 1.3% RPD ✓
<u>Matrix Spikes</u>	0205903-01B* 104% 0205904-09B* 105%	0205990-01 N/A 0205990-06 79% 0205995-06 94%	0205B34-04 96% ✓ 0205B96-01* 91%	0206243-04 68% ✓

* Batch QC; not an HMI sample

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Ammonia

All analyses were conducted within holding times.

QC Summary

	<u>Run Date 05/30/02</u>	<u>Run Date 05/31/02</u>	<u>Run Date 06/10/02</u>
ICV	All 90-110%	All 90-110%	All 90-110%
ICB	All < MDL	All < MDL	All < MDL
CCV	All 90-110%	All 90-110%	All 90-110%
CCB	All <MDL	All < MDL	All < MDL
LFB	All 90-110%	All 90-110%	All 90-110%

Duplicates

0205845-06* 11.4% RPD	0205990-01 1.7% RPD	0205C70-03B* 1.5% RPD
	0205990-10 0.6% RPD	0205B34-10B 0.7% RPD
	0205995-11 0.3% RPD	0205997-01 3.9% RPD

Matrix Spikes

0205845-06* 99%	0205990-01 93%	0205C70-03B* 94%
	0205990-10 80%	0205B34-10B 93%
	MS overrange	0205997-01 95%
	0205995-11 98%	

* Batch QC; not an HMI sample

Run Date 06/11/02

ICV	All 90-110%
ICB	All < MDL
CCV	All 90-110%
CCB	All <MDL
LFB	All 90-110%

Duplicates

0206109-01B*	1.4% RPD
0206243-04C	1.7% RPD

Matrix Spikes

0206109-01B*	92%
0206243-04C	97%

* Batch QC; not an HMI sample

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
 Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

	<u>Run Date 05/30/02</u>	<u>Run Date 05/31/02</u>	<u>Run Date 06/12/02</u>
<u>Duplicates</u>	0205A95-10* 0.0% 0205B34-10 0.0%	0205B07-05* 17.3% 0207990-07 0.0% 0205995-11 40%	0206330-04* 0.6%
<u>Matrix Spikes</u>	0205A95-01* 95% 0205B34-10 115%	0205B07-05* 102% 0207990-07 115% 0205995-11 108%	0206330-04* 96%

* Not an HMI sample; batch QC.

Ion Chromatography

All samples were run within holding time except as noted in the following table. Status is noted in the "comment" column as follows: OK-samples run within holding time; AOHT-analyzed outside of holding time; ROHT-received outside of holding time. Of the 45 samples, 21 were received with holding times expired. Nine samples were analyzed outside holding times; samples were loaded onto the IC within 48 hours and run sequentially, but analysis times for these samples were between 48 and 72 hours.

<u>Sample ID</u>	<u>Collection D/T</u>	<u>Receipt D/T</u>	<u>NO2 Analysis D/T</u>	<u>NO3 Analysis D/T</u>	<u>Comments</u>
0205910-01	5/21/02 1020	5/22/02 1500	5/23/02 1009	5/23/02 1009	OK
0205910-02	5/21/02 1102	5/22/02 1500	5/23/02 1043	5/23/02 1043	OK
0205910-03	5/21/02 1140	5/22/02 1500	5/23/02 1055	5/23/02 1055	OK
0205910-04	5/21/02 1255	5/22/02 1500	5/23/02 1107	5/23/02 1107	OK
0205910-05	5/21/02 1300	5/22/02 1500	5/23/02 1118	5/23/02 1118	OK
0205910-06	5/21/02 1330	5/22/02 1500	5/23/02 1130	5/23/02 1130	OK
0205910-07	5/21/02 1350	5/22/02 1500	5/23/02 1141	5/23/02 1141	OK
0205990-01	5/22/02 0905	5/24/02 1400	5/25/02 1748	5/25/02 1748	ROHT
0205990-02	5/22/02 0915	5/24/02 1400	5/25/02 1823	5/25/02 1823	ROHT
0205990-03	5/22/02 0940	5/24/02 1400	5/25/02 1835	5/25/02 1835	ROHT
0205990-04	5/22/02 0955	5/24/02 1400	5/25/02 1846	5/25/02 1846	ROHT
0205990-05	5/22/02 1015	5/24/02 1400	5/25/02 1858	5/25/02 1858	ROHT
0205990-06	5/22/02 1015	5/24/02 1400	5/25/02 1909	5/25/02 1909	ROHT
0205990-07	5/22/02 1020	5/24/02 1400	5/25/02 1921	5/25/02 1921	ROHT
0205990-08	5/22/02 1100	5/24/02 1400	5/25/02 1933	5/25/02 1933	ROHT
0205990-09	5/22/02 1130	5/24/02 1400	5/25/02 1944	5/25/02 1944	ROHT
0205990-10	5/22/02 1140	5/24/02 1400	5/25/02 1956	5/25/02 1956	ROHT
0205990-11	5/22/02 1145	5/24/02 1400	5/25/02 2031	5/25/02 2031	ROHT
0205995-01	5/22/02 1330	5/24/02 1400	5/25/02 2105	5/25/02 2105	ROHT
0205995-02	5/22/02 1345	5/24/02 1400	5/25/02 2117	5/25/02 2117	ROHT
0205995-04	5/23/02 0920	5/24/02 1400	5/25/02 2129	5/25/02 2129	OK
0205995-05	5/23/02 0905	5/24/02 1400	5/25/02 2140	5/25/02 2140	OK
0205995-06	5/23/02 1000	5/24/02 1400	5/25/02 2152	5/25/02 2152	OK
0205995-07	5/23/02 1000	5/24/02 1400	5/25/02 2203	5/25/02 2203	OK
0205995-08	5/23/02 1100	5/24/02 1400	5/25/02 2215	5/25/02 2215	OK

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
 Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Alkalinity

All analyses were conducted within holding times.

All sample duplicates had % RPD < 10%.

Sulfide

All analyses were conducted within holding times. ✓

QC Summary	Run Date 5/28/02	Run Date 06/07/02
Blank	0.06 mg/L	<0.03
LFB	All 90-110%	All 90-110%
Duplicate	0205968-01* 22% RPD 0205990-01 13% RPD 0205990-11 4.1% RPD 0205995-11 20% RPD	0205C06-01A 0% RPD 0205B34-08 35% RPD Samples ND
Matrix Spike	0205968-01* 33% 0205990-01 80% 0205990-11 85% 0205995-11 66%	0205C06-01A 82% 0205B34-08 89%

* Batch QC; not an HMI sample.

Ortho-Phosphate

All samples were run outside of holding time. The reasons for samples run outside of holding times are indicated in the "comment" column as follows: AOHT-analyzed outside of holding time; ROHT-received outside of holding time. Of a total of 45 samples, 22 were received with holding times expired.

Sample ID	Collection D/T	Receipt D/T	Analysis D/T	Comments
0205910-01	5/21/02 1020	5/22/02 1500	5/30/02 0950	AOHT
0205910-02	5/21/02 1102	5/22/02 1500	5/30/02 0950	AOHT
0205910-03	5/21/02 1140	5/22/02 1500	5/30/02 0950	AOHT
0205910-04	5/21/02 1255	5/22/02 1500	5/30/02 0950	AOHT
0205910-05	5/21/02 1300	5/22/02 1500	5/30/02 0950	AOHT
0205910-06	5/21/02 1330	5/22/02 1500	5/30/02 0950	AOHT
0205910-07	5/21/02 1350	5/22/02 1500	5/30/02 0950	AOHT
0205990-01	5/22/02 0905	5/24/02 1400	5/31/02 0710	ROHT
0205990-02	5/22/02 0915	5/24/02 1400	5/31/02 0710	ROHT
0205990-03	5/22/02 0940	5/24/02 1400	5/31/02 0710	ROHT
0205990-04	5/22/02 0955	5/24/02 1400	5/31/02 0710	ROHT
0205990-05	5/22/02 1015	5/24/02 1400	5/31/02 0710	ROHT
0205990-06	5/22/02 1015	5/24/02 1400	5/31/02 0710	ROHT
0205990-07	5/22/02 1020	5/24/02 1400	5/31/02 0710	ROHT

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
 Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Sample ID	Collection D/T	Receipt D/T	NO2 Analysis D/T	NO3 Analysis D/T	Comments
0205995-09	5/23/02 1215	5/24/02 1400	5/25/02 2227	5/25/02 2227	OK
0205995-10	5/23/02 1230	5/24/02 1400	5/25/02 2238	5/25/02 2238	OK
0205995-11	5/23/02 1305	5/24/02 1400	5/25/02 2313	5/25/02 2313	OK
0205997-01	5/23/02 1335	5/24/02 1400	5/25/02 2348	5/25/02 2348	AOHT
0205997-02	5/23/02 1345	5/24/02 1400	5/25/02 2359	5/25/02 2359	AOHT
0205B34-01	5/28/02 0810	5/29/02 1500	5/30/02 2345	5/30/02 2345	AOHT
0205B34-02	5/24/02 0930	5/29/02 1500	5/30/02 2356	5/30/02 2356	ROHT
0205B34-03	5/24/02 1020	5/29/02 1500	5/31/02 0008	5/31/02 0008	ROHT
0205B34-04	5/24/02 1100	5/29/02 1500	5/31/02 0019	5/31/02 0019	ROHT
0205B34-05	5/24/02 0950	5/29/02 1500	5/31/02 0031	5/31/02 0031	ROHT
0205B34-06	5/28/02 0820	5/29/02 1500	5/31/02 0043	5/31/02 0043	AOHT
0205B34-07	5/28/02 0850	5/29/02 1500	5/31/02 0054	5/31/02 0054	AOHT
0205B34-08	5/28/02 0900	5/29/02 1500	5/31/02 0106	5/31/02 0106	AOHT
0205B34-09	5/28/02 1005	5/29/02 1500	5/31/02 0141	5/31/02 0141	AOHT
0205B34-10	5/28/02 1035	5/29/02 1500	5/31/02 0215	5/31/02 0215	AOHT
0205B34-11	5/28/02 1040	5/29/02 1500	5/31/02 0227	5/31/02 0227	AOHT
0206243-01	5/31/02 0820	6/06/02 1345	6/08/02 1541	6/08/02 1541	ROHT
0206243-02	5/31/02 0915	6/06/02 1345	6/08/02 1553	6/08/02 1553	ROHT
0206243-03	5/31/02 0920	6/06/02 1345	6/08/02 1605	6/08/02 1605	ROHT
0206243-04	5/31/02 0950	6/06/02 1345	6/08/02 1616	6/08/02 1616	ROHT

QC Summary

IC Run-5/23/02-05/23/02

This run contained initial analysis of samples 0205910-01 through -07.

Initial and Continuing Calibration Verification

ICV All 90-110%
 CCV All 90-110%

Blanks

ICB All < MDL
 CCB All < MDL

Laboratory Fortified Blanks (LFB)

LFB 0957 All 90-110%

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
 Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
 Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Duplicates Sample 0205990-11 Bromide 3.4%
 Chloride Over-range; not applicable
 Fluoride 0.0%
 Nitrite 0.0% [1]
 Nitrate 0.0%
 Sulfate 5.5%

Duplicates Sample 0205995-11 Bromide 1.3%
 Chloride Over-range; not applicable
 Fluoride 0.0%
 Nitrite 0.0% [1]
 Nitrate 0.0%
 Sulfate Over-range; not applicable

Matrix Spikes Sample 0205990-01 Bromide 93%
 Chloride Over-range; not applicable
 Fluoride 98%
 Nitrite 0.0% [1]
 Nitrate 101%
 Sulfate 98%

 Sample 0205990-11 Bromide 96%
 Chloride Over-range; not applicable
 Fluoride 107%
 Nitrite 0.0% [1]
 Nitrate 104%
 Sulfate 102%

 Sample 0205995-11 Bromide 95%
 Chloride Over-range; not applicable
 Fluoride 109%
 Nitrite 0.0% [1]
 Nitrate 100%
 Sulfate Over-range; not applicable

Note [1]: The high chloride concentrations resulted in peak overlap with nitrite, obscuring the peak. In this case, the nitrite MS could not be calculated.

IC Run-5/30/02-05/31/02

This run contained initial analysis of samples 0205B34-01 through -12. Dilutions for chloride and sulfate are noted in the QC summary.

Initial and Continuing Calibration Verification

ICV All 90-110%
 CCV All 90-110%

Blanks

ICB All < MDL
 CCB All < MDL

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Laboratory Fortified Blanks (LFB)

LFB 1711 All 90-110%
LFB 2235 All 90-110%

Duplicates Sample 0205B50-01*
* Batch QC; not an
HMI sample

Bromide	0.0%
Chloride	0.5%
Flouride	0.0%
Nitrite	0.8%
Nitrate	0.6%
Sulfate	2.1%

Duplicates Sample 0205B34-09

Bromide	0.4%
Chloride	Over-range; not applicable
Flouride	0.0%
Nitrite	0.0% [1]
Nitrate	0.0%
Sulfate	Over-range;not applicable

Matrix Spikes Sample 0205B50-01*

Bromide	95%
Chloride	94%
Fluoride	103%
Nitrite	97%
Nitrate	93%
Sulfate	98%

Sample 0205B34-09

Bromide	90%
Chloride	Over-range; not applicable
Fluoride	111%
Nitrite	0.0% [1]
Nitrate	100%
Sulfate	Over-range; not applicable

Note [1]: The high chloride concentrations resulted in peak overlap with nitrite, obscuring the peak. In this case, the nitrite MS could not be calculated.

IC Run-5/31/02-06/01/02

This run contained dilutions for chloride and sulfate as noted in the QC summary.

Initial and Continuing Calibration Verification

ICV All 90-110%
CCV All 90-110%

Blanks

ICB All < MDL
CCB All < MDL

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

Laboratory Fortified Blanks (LFB)

LFB 1749 All 90-110%

<u>Duplicates</u>	Sample 0205C32-01* * Batch QC; not an HMI sample	Chloride	0.8%
		Sulfate	0.7%

<u>Matrix Spikes</u>	Sample 0205C32-01*	Chloride	94%
		Sulfate	102%

IC Run-6/07/02-6/08/02

This run contained initial analysis of samples 0206243-01 through -04. Dilutions for chloride and sulfate are noted in the QC summary.

Initial and Continuing Calibration Verification

ICV All 90-110%
CCV All 90-110%

Blanks

ICB All < MDL
CCB All < MDL

Laboratory Fortified Blanks (LFB)

LFB 1558 All 90-110%
LFB 1714 All 90-110%

<u>Duplicates</u>	Sample 0206230-05* * Batch QC; not an HMI sample	Bromide	0.0%
		Chloride	0.7%
		Flouride	14.2%
		Nitrite	0.0%
		Nitrate	1.5%
		Sulfate	3.9%

<u>Matrix Spikes</u>	Sample 0206230-05*	Bromide	107%
		Chloride	99%
		Flouride	97%
		Nitrite	110%
		Nitrate	104%
		Sulfate	108%

Atlantic Coast Laboratories, Inc.

Case Narrative

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

IC Run-6/11/02-6/12/02

This run contained dilutions for chloride as noted in the QC summary.

Initial and Continuing Calibration Verification

ICV All 90-110%
CCV All 90-110%

Blanks

ICB All < MDL
CCB All < MDL

Laboratory Fortified Blanks (LFB)

LFB 2140 All 90-110%

Duplicates None performed

Matrix Spikes None performed

IC Run-6/19/02-6/20/02

This run contained dilutions for chloride as noted in the QC summary.

Initial and Continuing Calibration Verification

ICV All 90-110%
CCV All 90-110%

Blanks

ICB All < MDL
CCB All < MDL

Laboratory Fortified Blanks (LFB)

LFB 1516 All 90-110%
LFB 0020 All 90-110%

Duplicates None performed

Matrix Spikes None performed

IC Run-6/28/02-6/29/02

This run contained dilutions for sulfate as noted in the QC summary.

Initial and Continuing Calibration Verification

ICV All 90-110%
CCV All 90-110%

Blanks

ICB All < MDL
CCB All < MDL

Laboratory Fortified Blanks (LFB)

LFB 1804 All 90-110%

Duplicates None performed

Matrix Spikes None performed

Atlantic Coast Laboratories, Inc.

Analysis Reports

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243

MARYLAND ENVIRONMENTAL SERVICE
 SAMPLE CHAIN OF CUSTODY
 ATLANTIC LABS

COC#: 2219

0205910

COST CENTER#: 792-7305

SUB #: 1400

PROJECT: HART-MILLER ISLAND D.M.C.F.

SAMPLE PURPOSE: Groundwater well study

SAMPLE#	DATE \ TIME	LOCATION	TYPE	ANALYSIS REQUIRED	# OF CONT.
22131	05/21/2002 1020	11A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22132	05/21/2002 1102	11B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22133	05/21/2002 1140	12A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22134	05/21/2002 1255	12B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22135	05/21/2002 1300	12B-Dup	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22136	05/21/2002 1330	10A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22137	05/21/2002 1350	10B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
TOTAL NUMBER OF CONTAINERS:					35

CHILLED TO 4 DEGREES? YES

ANALYSIS REQUIRED

1-500 ML HNO3 PRES:
 EPA METHOD#S

Metals: Ag, As, Cu, Pb, Zn, Al, Cd, Cr, Fe
 272.2, 206.2, 220.2, 239.2, 289.2, 200.7

Cations: Sodium, Calcium, Barium, Magnesium, Potassium

1- 500 ML UNPRESERVED
 METHOD#S

DISSOLVED METALS

Ag, As, Cu, Pb, Zn, Al, Cd, Cr, Fe
 272.2, 206.2, 220.2, 239.2, 289.2, 270.2, 245.1 All other metals 200.7 respectively

Anions: Chloride, Bromide, Fluoride, Phosphate, Sulfate

1- 500 ML H2SO4
 METHOD#S

TOC
 415.1

Other Analysis required:

Nitrate Sulfide
 Nitrite Ammonia
 Hardness Alkalinity

RELINQUISHED BY: *BIT-6*
 DATE: 5/21/02 TIME: 1445

ACCEPTED BY: *gnathalan*
 DATE: 5/21/02 TIME: 1445

RELINQUISHED BY: *gnathalan*
 DATE: 6/22/02 TIME: 1400

ACCEPTED BY: *gnathalan*
 DATE: 5/22/02 TIME: 1500

CMR Jensen

MARYLAND ENVIRONMENTAL SERVICE
 SAMPLE CHAIN OF CUSTODY
 ATLANTIC LABS

COC#: 2220

COST CENTER#: 792-7305

SUB #: 1400

PROJECT: HART-MILLER ISLAND D.M.G.F.

SAMPLE PURPOSE: Groundwater well study

SAMPLE#	DATE \ TIME	LOCATION	TYPE	ANALYSIS REQUIRED	# OF CONT.
22138	05/22/2002 0905	9 B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22139	05/22/2002 0915	9 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22140	05/22/2002 0940	8 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22141	05/22/2002 0955	8 B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22143	05/22/2002 1015	Surface site 1	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22144	05/22/2002 1015	Surface site 1 dupl.	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22145	05/22/2002 1020	7 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22147	05/22/2002 1100	Surface site 2	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22148	05/22/2002 1130	CD 4 B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22149	05/22/2002 1140	CD 4 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22150	05/22/2002 1145	CD 4 A Duplicate	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22151	05/22/2002 1330	CD 1A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22152	05/22/2002 1345	CD 3 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22153	05/23/2002 0920	3A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22154	05/23/2002 0905	3B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22156	05/23/2002 1000	5 A Duplicate	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22157	05/23/2002 1000	5A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22158	05/23/2002 1100	CD 2 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22159	05/23/2002 1215	6 B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22160	05/23/2002 1230	6 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22162	05/23/2002 1305	4 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22163	05/23/2002 1335	2B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22164	05/23/2002 1345	2A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
TOTAL NUMBER OF CONTAINERS:					115

0205990

0205995

0205997

1- 500 ML H2SO4
 METHOD#S

TOC
 415.1

SAMPLES FROZEN? NO

Other Analysis required:

- Nitrate
- Nitrite
- Hardness
- Sulfide
- Ammonia
- Alkalinity

RELINQUISHED BY:

DATE: 5-23-02 TIME: 1600

RELINQUISHED BY: Jenn Harlan

ACCEPTED BY: [Signature]

DATE: 5/24/02 TIME: 0945

ACCEPTED BY: [Signature]

MARYLAND ENVIRONMENTAL SERVICE
 SAMPLE CHAIN OF CUSTODY
 ATLANTIC LABS

COC#: 2221

COST CENTER#: 792-7305

SUB #: 1400

PROJECT: HART-MILLER ISLAND D.M.C.F.

SAMPLE PURPOSE: Groundwater well study

SAMPLE#	DATE \ TIME	LOCATION	TYPE	ANALYSIS REQUIRED	# OF CONT.
22146	05/28/2002 0810	7 B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22165	05/24/2002 0930	surface 3	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22166	05/24/2002 1020	SC 1 B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22168	05/24/2002 1100	SC 1 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22169	05/24/2002 0950	surface 4	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22174	05/28/2002 0820	CD 3 B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22175	05/28/2002 0850	1 B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22176	05/28/2002 0900	1 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22178	05/28/2002 1005	CD 1 A	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22180	05/28/2002 1035	CD 1 B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22181	05/28/2002 1040	CD 1 B duplicate	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
TOTAL NUMBER OF CONTAINERS:					55

SAMPLES FROZEN? NO

ANALYSIS REQUIRED

1-500 ML HNO3 PRES:
EPA METHOD#S

Metals: Ag, As, Cu, Pb, Zn, Al, Cd, Cr, Fe
 272.2, 206.2, 220.2, 239.2, 289.2, 200.7

Cations: Sodium, Calcium, Barium, Magnesium, Potassium

DISSOLVED METALS

Ag, As, Cu, Pb, Zn, Al, Cd, Cr, Fe
 272.2, 206.2, 220.2, 239.2, 289.2, 270.2, 245.1

All other metals 200.7 respectively

Anions: Chloride, Bromide, Fluoride, Phosphate, Sulfate

1- 500 ML H2SO4
METHOD#S

TOC
415.1

Other Analysis required:

Nitrate	Sulfide
Nitrite	Ammonia
Hardness	Alkalinity

RELINQUISHED BY: *[Signature]*
 DATE: 5/29/02 TIME: 1500
 RELINQUISHED BY: *[Signature]*
 DATE: 7/29 TIME: *[Signature]*

ACCEPTED BY: *[Signature]*
 DATE: 5/29 TIME: *[Signature]*
 ACCEPTED BY: *[Signature]*
 DATE: *[Signature]* TIME: *[Signature]*

MARYLAND ENVIRONMENTAL SERVICE
 SAMPLE CHAIN OF CUSTODY
 ATLANTIC LABS

COC#: 2222

0206243

COST CENTER#: 792-7305
 SUB #: 1400
 PROJECT: HART-MILLER ISLAND D.M.C.F.
 SAMPLE PURPOSE: Groundwater well study

SAMPLE#	DATE \ TIME	LOCATION	TYPE	ANALYSIS REQUIRED	# OF CONT.
22185	05/31/2002 0820	CD 2B	GRAB	PLEASE SEE SECTION BELOW FOR REQUIRED ANALYSIS	5
22186	05/31/2002 0915	5B		""	5
22187	05/31/2002 0920	5B dup		""	5
22188	05/31/2002 0950	4B		""	5
TOTAL NUMBER OF CONTAINERS:					20

SAMPLES FROZEN? NO

ANALYSIS REQUIRED

1-500 ML HNO3 PRES: EPA METHOD#S
 Metals: Ag, As, Cu, Pb, Zn, Al, Cd, Cr, Fe
 272.2, 206.2, 220.2, 239.2, 289.2, 200.7
 Cations: Sodium, Calcium, Barium, Magnesium, Potassium
DISSOLVED METALS
 Ag, As, Cu, Pb, Zn, Al, Cd, Cr, Fe
 272.2, 206.2, 220.2, 239.2, 289.2, 270.2, 245.1 All other met:
 Anions: Chloride, Bromide, Fluoride, Phosphate, Sulfate

1- 500 MI UNPRESERVED METHOD#S

1- 500 ML H2SO4 METHOD#S
TOC
 415.1

Other Analysis required:
 Nitrate Sulfide
 Nitrite Ammonia
 Hardness Alkalinity

Jim [Signature]

RELINQUISHED BY:
 DATE: TIME:

ACCEPTED BY: *[Signature]*
 DATE: 6/6/02 TIME: 13:45

RELINQUISHED BY:
 DATE: 6/6/02 TIME: 13:45

ACCEPTED BY:
 DATE: TIME:

Handwritten notes:
 200 out of 20
 hold for 1/24
 0/3

**APPENDIX E:
LABORATORY SUMMARY REPORTS**

Atlantic Coast Laboratories, Inc.

Analysis Reports

Client: Maryland Environmental Service
Project: Hart-Miller Island Groundwater Monitoring-May/June, 2002
Work Orders: 0205910, 0205990, 0205995, 0205997, 0205B34, 0206243



ATLANTIC COAST
Laboratories, Incorporated

630 Churchmans Road
Newark, Delaware 19702
302-266-9121 • 454-8720 (FAX)

REPORT OF ANALYSIS

Maryland Environmental Svc
2011 Commerce Park Drive
Annapolis, MD 21401

Attn: Mr. Rex A. Lloyd

Order #: 02-05-910
Date: 08/13/02 13:07
Work ID: Hart-Miller Island DCMF
Date Received: 05/22/02
Date Completed: 06/21/02

Purchase Order: 98-04-11/1-01 Act:2170292
Invoice Number: 96286

Client Code: MES_AB

SAMPLE IDENTIFICATION

<u>Sample Number</u>	<u>Sample Description</u>	<u>Sample Number</u>	<u>Sample Description</u>
01	22131 11a	05	22135 12b dup
02	22132 11b	06	22136 10a
03	22133 12a	07	22137 10b
04	22134 12b		

This cover page is an integral part of the analytical report.

Laboratory Certifications: DE DE00011 PA 68-335
MD 138 NJ DE568

Certified By
Warren Van Arsdall

TEST RESULTS BY SAMPLE

Sample: 01A 22131 11a
Collected: 05/21/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02	15:51
Arsenic, ICP-MS	0.004	0.002	mg/L	JTH	06/05/02	02:45
Barium, ICP	0.049	0.003	mg/L	EL	06/01/02	15:51
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02	15:51
Calcium, ICP	247	0.800	mg/L	EL	06/01/02	16:01
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02	15:51
Copper, ICP	0.006	0.003	mg/L	EL	06/01/02	15:51
Digestion, Aqueous, 200.2	05/28/02		date prepared	EL	05/28/02	18:00
Iron, ICP	11.3	0.009	mg/L	EL	06/01/02	15:51
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	02:45
Magnesium, ICP	158	0.040	mg/L	EL	06/01/02	16:01
Metals, ICP/MS	06/05/02		date analyzed			
Metals, ICP/OES	06/01/02		date analyzed			
Potassium, ICP	33.5	0.39	mg/L	EL	06/01/02	15:51
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	02:45
Sodium, ICP	490	2.00	mg/L	EL	06/01/02	16:01
Total Hardness, Calculation	1270	5.0	mg/L as CaCO3	EL	06/01/02	16:01
Zinc, ICP	0.007	0.003	mg/L	EL	06/01/02	15:51

Sample: 01B 22131 11a dissolved
Collected: 05/21/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02	16:20
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	07:24
Barium, ICP	0.048	0.003	mg/L	EL	06/01/02	16:20
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02	16:20
Calcium, ICP	256	0.800	mg/L	EL	06/01/02	16:04
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02	16:20
Copper, ICP	0.007	0.003	mg/L	EL	06/01/02	16:20
Iron, ICP	ND	0.009	mg/L	EL	06/01/02	16:20
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	07:24
Magnesium, ICP	164	0.040	mg/L	EL	06/01/02	16:04
Metals, ICP/MS	06/05/02		date analyzed			
Metals, ICP/OES	06/01/02		date analyzed			
Potassium, ICP	34.7	0.39	mg/L	EL	06/01/02	16:20
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	07:24
Sodium, ICP	511	2.00	mg/L	EL	06/01/02	16:04
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02	16:20

Sample: 01C 22131 11a
Collected: 05/21/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	2.50	0.21	mg/L	MSO	05/23/02	10:09
Chloride, Ion Chrom.	598	0.39	mg/L	MSO	05/23/02	10:09
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02	10:09

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ion chromatography	05/23/02		date complete		
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/23/02 10:09
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 10:09
Phosphate, Ortho	0.35	0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	1440	0.38	mg/L	MSO	05/23/02 10:09
Total Alkalinity-Titration	33	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

Sample: 01D 22131 11a
Collected: 05/21/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	0.29	0.20	mg/L as N	BLT	05/30/02 11:48
Total Organic Carbon, Aq	1.4	1.0	mg/L	KS	05/29/02 11:19

Sample: 01E 22131 11a
Collected: 05/21/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	05/28/02 08:00

Sample: 02A 22132 11b
Collected: 05/21/02 11:02

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:23
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:16
Barium, ICP	0.055	0.003	mg/L	EL	06/01/02 16:23
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:23
Calcium, ICP	21.4	0.080	mg/L	EL	06/01/02 16:23
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:23
Copper, ICP	ND	0.003	mg/L	EL	06/01/02 16:23
Digestion, Aqueous, 200.2	05/28/02		date prepared EL 05/28/02 18:00		
Iron, ICP	9.17	0.009	mg/L	EL	06/01/02 16:23
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:16
Magnesium, ICP	9.21	0.004	mg/L	EL	06/01/02 16:23
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/01/02		date analyzed		
Potassium, ICP	0.735	0.39	mg/L	EL	06/01/02 16:23
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 03:16
Sodium, ICP	6.24	0.20	mg/L	EL	06/01/02 16:23
Total Hardness, Calculation	91.4	0.50	mg/L as CaCO3	EL	06/01/02 16:23
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:23

Sample: 02B 22132 11b
Collected: 05/21/02 11:02

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:26
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:32
Barium, ICP	0.026	0.003	mg/L	EL	06/01/02 16:26
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:26

TEST RESULTS BY SAMPLE

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Calcium, ICP	21.0	J,S 0.080	mg/L	EL	06/01/02 16:26
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:26
Copper, ICP	ND	0.003	mg/L	EL	06/01/02 16:26
Iron, ICP	0.019	J,f 0.009	mg/L	EL	06/01/02 16:26
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:32
Magnesium, ICP	9.16	J,S 0.004	mg/L	EL	06/01/02 16:26
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/01/02				date analyzed
Potassium, ICP	1.71	0.39	mg/L	EL	06/01/02 16:26
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 07:32
Sodium, ICP	5.41	0.20	mg/L	EL	06/01/02 16:26
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:26

Sample: 02C 22132 11b
Collected: 05/21/02 11:02

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 10:43
Chloride, Ion Chrom	2.49	0.39	mg/L	MSO	05/23/02 10:43
Fluoride, Ion Chrom	0.70	0.21	mg/L	MSO	05/23/02 10:43
Ion chromatography	05/23/02				date complete
Nitrate, Ion Chrom	ND	W,f 0.06	mg/L as N	MSO	05/23/02 10:43
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 10:43
Phosphate, Ortho	0.02	J,h 0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	ND	0.38	mg/L	MSO	05/23/02 10:43
Total Alkalinity-Titration	117	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

Sample: 02D 22132 11b
Collected: 05/21/02 11:02

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Ammonia, Automated Phenate	5.7	0.20	mg/L as N	BLT	05/30/02 11:48
Total Organic Carbon, Aq	3.0	B,o 1.0	mg/L	KS	05/29/02 11:19

Sample: 02E 22132 11b
Collected: 05/21/02 11:02

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Sulfide, colorimetric	0.05	B,p 0.03	mg/L	MSO	05/28/02 08:00

Sample: 03A 22133 12a
Collected: 05/21/02 11:40

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:29
Arsenic, ICP-MS	0.006	L,m 0.002	mg/L	JTH	06/05/02 03:24
Barium, ICP	0.033	0.003	mg/L	EL	06/01/02 16:29
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:29
Calcium, ICP	218	J,S 0.800	mg/L	EL	06/04/02 20:12
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:29
Copper, ICP	ND	0.003	mg/L	EL	06/01/02 16:29

Revised
td 11/13/02

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TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Digestion, Aqueous, 200.2	05/28/02			date prepared	EL 05/28/02 18:00
Iron, ICP	42.9	0.009	mg/L	EL	06/01/02 16:29
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:24
Magnesium, ICP	156	0.040	mg/L	EL	06/04/02 20:12
Metals, ICP/MS	06/05/02			date analyzed	
Metals, ICP/OES	06/04/02			date analyzed	
Potassium, ICP	30.1	0.39	mg/L	EL	06/01/02 16:29
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 03:24
Sodium, ICP	506	2.0	mg/L	EL	06/04/02 20:12
Total Hardness, Calculation	1186	5.0	mg/L as CaCO3	EL	06/04/02 20:12
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:29

Sample: 03B 22133 12a
Collected: 05/21/02 11:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:32
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:40
Barium, ICP	0.033	0.003	mg/L	EL	06/01/02 16:32
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:32
Calcium, ICP	223	0.800	mg/L	EL	06/04/02 20:16
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:32
Copper, ICP	0.005	0.003	mg/L	EL	06/01/02 16:32
Iron, ICP	8.90	0.009	mg/L	EL	06/01/02 16:32
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:40
Magnesium, ICP	158	0.040	mg/L	EL	06/04/02 20:16
Metals, ICP/MS	06/05/02			date analyzed	
Metals, ICP/OES	06/04/02			date analyzed	
Potassium, ICP	32.4	0.39	mg/L	EL	06/01/02 16:32
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 07:40
Sodium, ICP	511	2.0	mg/L	EL	06/04/02 20:16
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:32

Sample: 03C 22133 12a
Collected: 05/21/02 11:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	3.50	0.21	mg/L	MSO	05/23/02 10:55
Chloride, Ion Chrom	789	0.39	mg/L	MSO	05/23/02 10:55
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 10:55
Ion chromatography	05/23/02			date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/23/02 10:55
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 10:55
Phosphate, Ortho	0.01	0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	1512	0.38	mg/L	MSO	05/23/02 10:55
Total Alkalinity-Titration	ND	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

TEST RESULTS BY SAMPLE

Sample: 03D 22133 12a
Collected: 05/21/02 11:40

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Ammonia, Automated Phenate	0.84	0.20	mg/L as N	BLT	05/30/02 11:48
Total Organic Carbon, Aq	1.3	1.0	mg/L	KS	05/29/02 11:19

Sample: 03E 22133
Collected: 05/21/02 11:40

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Sulfide, colorimetric	0.04	0.03	mg/L	MSO	05/28/02 08:00

Sample: 04A 22134 12b
Collected: 05/21/02 12:55

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Aluminum, ICP	0.081	0.052	mg/L	EL	06/01/02 16:35
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:32
Barium, ICP	0.080	0.003	mg/L	EL	06/01/02 16:35
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:35
Calcium, ICP	24.9	0.080	mg/L	EL	06/01/02 16:35
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:35
Copper, ICP	0.006	0.003	mg/L	EL	06/01/02 16:35
Digestion, Aqueous, 200.2	05/28/02		date prepared	EL	05/28/02 18:00
Iron, ICP	3.76	0.009	mg/L	EL	06/01/02 16:35
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:32
Magnesium, ICP	7.85	0.004	mg/L	EL	06/01/02 16:35
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/01/02		date analyzed		
Potassium, ICP	7.81	0.39	mg/L	EL	06/01/02 16:35
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 03:32
Sodium, ICP	11.8	0.20	mg/L	EL	06/01/02 16:35
Total Hardness, Calculation	94.4	0.50	mg/L as CaCO3	EL	06/01/02 16:35
Zinc, ICP	0.010	0.003	mg/L	EL	06/01/02 16:35

Sample: 04B 22134 12b
Collected: 05/21/02 12:55

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Aluminum, ICP	0.057	0.052	mg/L	EL	06/01/02 16:38
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:48
Barium, ICP	0.047	0.003	mg/L	EL	06/01/02 16:38
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:38
Calcium, ICP	24.3	0.080	mg/L	EL	06/01/02 16:38
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:38
Copper, ICP	ND	0.003	mg/L	EL	06/01/02 16:38
Iron, ICP	0.103	0.009	mg/L	EL	06/01/02 16:38
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:48
Magnesium, ICP	7.77	0.004	mg/L	EL	06/01/02 16:38
Metals, ICP/MS	06/05/02		date analyzed		

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TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Metals, ICP/OES	06/01/02				date analyzed
Potassium, ICP	6.48	0.39	mg/L	EL	06/01/02 16:38
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 07:48
Sodium, ICP	11.1	0.20	mg/L	EL	06/01/02 16:38
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:38

Sample: 04C 22134 12b
Collected: 05/21/02 12:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 11:07
Chloride, Ion Chrom	3.11	0.39	mg/L	MSO	05/23/02 11:07
Fluoride, Ion Chrom	0.31	0.21	mg/L	MSO	05/23/02 11:07
Ion chromatography	05/23/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/23/02 11:07
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 11:07
Phosphate, Ortho	0.20	0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	1.52	0.38	mg/L	MSO	05/23/02 11:07
Total Alkalinity-Titration	136	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

Sample: 04D 22134 12b
Collected: 05/21/02 12:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	5.1	0.20	mg/L as N	BLT	05/30/02 11:48
Total Organic Carbon, Aq	2.8	1.0	mg/L	KS	05/29/02 11:19

Sample: 04E 22134 12b
Collected: 05/22/02 12:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	05/28/02 08:00

Sample: 05A 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.078	0.052	mg/L	EL	06/01/02 16:41
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:40
Barium, ICP	0.082	0.003	mg/L	EL	06/01/02 16:41
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:41
Calcium, ICP	25.4	0.080	mg/L	EL	06/01/02 16:41
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:41
Copper, ICP	0.004	0.003	mg/L	EL	06/01/02 16:41
Digestion, Aqueous, 200.2	05/28/02				date prepared EL 05/28/02 18:00
Iron, ICP	3.87	0.009	mg/L	EL	06/01/02 16:41
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 03:40
Magnesium, ICP	7.91	0.004	mg/L	EL	06/01/02 16:41
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/01/02				date analyzed
Potassium, ICP	8.07	0.39	mg/L	EL	06/01/02 16:41

TEST RESULTS BY SAMPLE

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 03:40
Sodium, ICP	11.4	0.20	mg/L	EL	06/01/02 16:41
Total Hardness, Calculation	96.1	0.50	mg/L as CaCO3	EL	06/01/02 16:41
Zinc, ICP	ND <i>U,f</i>	0.003	mg/L	EL	06/01/02 16:41

Sample: 05B 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:44
Arsenic, ICP-MS	ND <i>U,mp</i>	0.002	mg/L	JTH	06/05/02 07:55
Barium, ICP	0.052	0.003	mg/L	EL	06/01/02 16:44
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:44
Calcium, ICP	25.1 <i>J,S</i>	0.080	mg/L	EL	06/01/02 16:44
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:44
Copper, ICP	ND	0.003	mg/L	EL	06/01/02 16:44
Iron, ICP	0.293 <i>J,f</i>	0.009	mg/L	EL	06/01/02 16:44
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 07:55
Magnesium, ICP	7.79 <i>J,S</i>	0.004	mg/L	EL	06/01/02 16:44
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/01/02				date analyzed
Potassium, ICP	7.17	0.39	mg/L	EL	06/01/02 16:44
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 07:55
Sodium, ICP	11.7	0.20	mg/L	EL	06/01/02 16:44
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 16:44

Sample: 05C 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 11:18
Chloride, Ion Chrom	3.52	0.39	mg/L	MSO	05/23/02 11:18
Fluoride, Ion Chrom	0.23	0.21	mg/L	MSO	05/23/02 11:18
Ion chromatography	05/23/02				date complete
Nitrate, Ion Chrom	0.33 <i>J,f</i>	0.06	mg/L as N	MSO	05/23/02 11:18
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02 11:18
Phosphate, Ortho	0.22 <i>J,h</i>	0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	1.09	0.38	mg/L	MSO	05/23/02 11:18
Total Alkalinity-Titration	135	1.0	mg/L as CaCO3	TLC	06/03/02 08:45

Sample: 05D 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed DL/Tm
Ammonia, Automated Phenate	5.1	0.20	mg/L as N	BLT	05/30/02 11:48
Total Organic Carbon, Aq	3.0 <i>B,0</i>	1.0	mg/L	KS	05/29/02 11:19

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*Revised
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TEST RESULTS BY SAMPLE

Sample: 05B 22135 12b dup
Collected: 05/21/02 13:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.13	0.03	mg/L	MSO	05/28/02 08:00

Sample: 06A 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 16:58
Arsenic, ICP-MS	0.003	0.002	mg/L	JTH	06/05/02 04:03
Barium, ICP	0.020	0.003	mg/L	EL	06/01/02 16:58
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 16:58
Calcium, ICP	436	3.20	mg/L	EL	06/04/02 20:19
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 16:58
Copper, ICP	0.014	0.003	mg/L	EL	06/01/02 16:58
Digestion, Aqueous, 200.2	05/28/02		date prepared	EL	05/28/02 18:00
Iron, ICP	15.2	0.009	mg/L	EL	06/01/02 16:58
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 04:03
Magnesium, ICP	414	0.160	mg/L	EL	06/04/02 20:19
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/04/02		date analyzed		
Potassium, ICP	84.0	0.39	mg/L	EL	06/01/02 16:58
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 04:03
Sodium, ICP	1396	8.00	mg/L	EL	06/04/02 20:19
Total Hardness, Calculation	2794	20	mg/L as CaCO3	EL	06/04/02 20:19
Zinc, ICP	0.465	0.003	mg/L	EL	06/01/02 16:58

Sample: 06B 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 17:01
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 08:03
Barium, ICP	0.019	0.003	mg/L	EL	06/01/02 17:01
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 17:01
Calcium, ICP	429	3.30	mg/L	EL	06/04/02 20:22
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 17:01
Copper, ICP	0.009	0.003	mg/L	EL	06/01/02 17:01
Iron, ICP	ND	0.009	mg/L	EL	06/01/02 17:01
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 08:03
Magnesium, ICP	409	0.165	mg/L	EL	06/04/02 20:22
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/04/02		date analyzed		
Potassium, ICP	84.6	0.39	mg/L	EL	06/01/02 17:01
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 08:03
Sodium, ICP	1394	8.24	mg/L	EL	06/04/02 20:22
Zinc, ICP	0.418	0.003	mg/L	EL	06/01/02 17:01

TEST RESULTS BY SAMPLE

Sample: 06C 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	10.4	0.21	mg/L	MSO	05/23/02	11:30
Chloride, Ion Chrom	3725	0.39	mg/L	MSO	05/25/02	17:02
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02	11:30
Ion chromatography	05/25/02				date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/23/02	11:30
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/23/02	11:30
Phosphate, Ortho	0.09	0.01	mg/L as P	BLT	05/30/02	09:50
Sulfate, Ion Chrom	5929	0.38	mg/L	MSO	05/25/02	17:02
Total Alkalinity-Titration	26	1.0	mg/L as CaCO3	TLC	06/03/02	08:45

Sample: 06D 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Ammonia, Automated Phenate	3.5	0.20	mg/L as N	BLT	05/30/02	11:48
Total Organic Carbon, Aq	3.4	1.0	mg/L	KS	05/29/02	11:19

Sample: 06E 22136 10a
Collected: 05/21/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	05/28/02	08:00

Sample: 07A 22137 10b
Collected: 05/21/02 13:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02	17:04
Arsenic, ICP-MS	0.003	0.002	mg/L	JTH	06/05/02	04:10
Barium, ICP	0.107	0.003	mg/L	EL	06/01/02	17:04
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02	17:04
Calcium, ICP	356	3.20	mg/L	EL	06/04/02	20:25
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02	17:04
Copper, ICP	ND	0.003	mg/L	EL	06/01/02	17:04
Digestion, Aqueous, 200.2	05/28/02			date prepared	EL	05/28/02 18:00
Iron, ICP	17.2	0.009	mg/L	EL	06/01/02	17:04
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	04:10
Magnesium, ICP	311	0.160	mg/L	EL	06/04/02	20:25
Metals, ICP/MS	06/05/02			date analyzed		
Metals, ICP/OES	06/04/02			date analyzed		
Potassium, ICP	60.1	0.39	mg/L	EL	06/01/02	17:04
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	04:10
Sodium, ICP	1299	8.00	mg/L	EL	06/04/02	20:25
Total Hardness, Calculation	2171	20	mg/L as CaCO3	EL	06/04/02	20:25
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02	17:04

TEST RESULTS BY SAMPLE

Sample: 07B 22137 10b
Collected: 05/21/02 13:50

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Aluminum, ICP	ND	0.052	mg/L	EL	06/01/02 17:07
Arsenic, ICP-MS	0.003	L,M 0.002	mg/L	JTH	06/05/02 08:11
Barium, ICP	0.084	0.003	mg/L	EL	06/01/02 17:07
Cadmium, ICP	ND	0.004	mg/L	EL	06/01/02 17:07
Calcium, ICP	355	J,S 3.30	mg/L	EL	06/04/02 20:28
Chromium, ICP	ND	0.008	mg/L	EL	06/01/02 17:07
Copper, ICP	0.009	0.003	mg/L	EL	06/01/02 17:07
Iron, ICP	ND	W,f 0.009	mg/L	EL	06/01/02 17:07
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 08:11
Magnesium, ICP	306	J,S 0.165	mg/L	EL	06/04/02 20:28
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/04/02				date analyzed
Potassium, ICP	61.2	0.39	mg/L	EL	06/01/02 17:07
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 08:11
Sodium, ICP	1282	8.24	mg/L	EL	06/04/02 20:28
Zinc, ICP	ND	0.003	mg/L	EL	06/01/02 17:07

Sample: 07C 22137 10b
Collected: 05/21/02 13:50

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Bromide, Ion Chrom	11.3	J,K 0.21	mg/L	MSO	05/23/02 11:41
Chloride, Ion Chrom	4193	0.39	mg/L	MSO	05/25/02 17:14
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/23/02 11:41
Ion chromatography	05/25/02				date complete
Nitrate, Ion Chrom	ND	W,f 0.06	mg/L	as N MSO	05/23/02 11:41
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/23/02 11:41
Phosphate, Ortho	0.46	J,h 0.01	mg/L	as P BLT	05/30/02 09:50
Sulfate, Ion Chrom	4240	0.38	mg/L	MSO	05/25/02 17:14
Total Alkalinity-Titration	132	1.0	mg/L	as CaCO3 TLC	06/03/02 08:45

Sample: 07D 22137 10b
Collected: 05/21/02 13:50

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Ammonia, Automated Phenate	7.1	0.20	mg/L	as N BLT	05/30/02 11:48
Total Organic Carbon, Aq	4.2	B,O 1.0	mg/L	KS	05/29/02 11:19

Sample: 07E 22137 10b
Collected: 05/22/02 13:50

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Sulfide, colorimetric	0.05	B,p 0.03	mg/L	MSO	05/28/02 08:00

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for 11/13/02*

TEST METHODOLOGIES

Silver (Ag) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Aluminum (Al) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Arsenic (As) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Barium (Ba) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Calcium (Ca) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Cadmium (Cd) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Chromium (Cr) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Copper (Cu) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Digestion Method 200.2

Iron (Fe) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Hardness, Total SM2340B ICP, Calculation

ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
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09/27/02 15:28

 TEST METHODOLOGIES

RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
ICP/MS (Inductively Coupled Argon Plasma Mass Spectrometry)	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Potassium (K) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Magnesium (Mg) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Sodium (Na) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Lead (Pb) - ICP-MS	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Zinc (Zn) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Total Organic Carbon, Aqueous	EPA Method 415.1 SW-846 Method 9060
Total Alkalinity	SM 2320B (titrimetric)
Bromide by IC	USEPA 300.0
Chloride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Fluoride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Ammonia	SM 4500-NH3-G 19th ed. Automated phenate EPA Method 350.1
Nitrite, Ion Chromatography	

TEST METHODOLOGIES

Drinking water, wastewater Method 300.0
Groundwater, RCRA wastes SW-846 Method 9056

Nitrate, Ion Chromatography
Drinking water, wastewater
Groundwater, RCRA wastes

Method 300.0
SW-846 Method 9056

Phosphate, Ortho

EPA Method 365.3
(colorimetric, ascorbic acid)

Sulfide in Aqueous Samples

EPA Method 376.2 - Methylene Blue Method

Sulfate, Ion Chromatography
Drinking water, wastewater
Groundwater, RCRA wastes

Method 300.0
SW-846 Method 9056



ATLANTIC COAST
Laboratories, Incorporated

630 Churchmans Road
Newark, Delaware 19702
302-266-9121 • 454-8720 (FAX)

REPORT OF ANALYSIS

Maryland Environmental Svc
2011 Commerce Park Drive
Annapolis, MD 21401

Order #: 02-05-990
Date: 08/13/02 13:07
Work ID: Hart-Miller Island GW Well
Date Received: 05/24/02
Date Completed: 07/01/02

Attn: Mr. Rex A. Lloyd

Purchase Order: 98-04-11/1-01 Act:2170292
Invoice Number: 96418

Client Code: MES_AB

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	22138	07	22145
02	22139	08	22147
03	22140	09	22148
04	22141	10	22149
05	22143	11	22150
06	22144		

This cover page is an integral part of the analytical report.

Laboratory Certifications: DE DE00011 PA 68-335
MD 138 NJ DE568

Certified By
Warren Van Arsdall

TEST RESULTS BY SAMPLE

Sample: 01B 22138 9b
Collected: 05/22/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	22	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	9.0	1.0	mg/L	WV	06/10/02 10:37

Sample: 01C 22138 9b
Collected: 05/22/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.40	0.03	mg/L	MSO	05/28/02 08:00

Sample: 01D 22138 9b
Collected: 05/22/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	16.0	0.21	mg/L	MSO	05/25/02 17:48
Chloride, Ion Chrom	4412	0.39	mg/L	MSO	05/31/02 18:35
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 17:48
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02 17:48
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02 17:48
Phosphate, Ortho	1.3	0.10	mg/L as P	BLT	05/31/02 07:10
Sulfate, Ion Chrom	35.2	0.38	mg/L	MSO	05/25/02 17:48
Total Alkalinity-Titration	622	1.0	mg/L as CaCO3	TLC	06/04/02 07:35

Sample: 01E 22138 9b
Collected: 05/22/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02 14:28
Arsenic, ICP-MS	0.015	0.002	mg/L	JTH	06/05/02 09:29
Barium, ICP	0.263	0.003	mg/L	LC	06/09/02 14:28
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 14:28
Calcium, ICP	163	0.800	mg/L	LC	06/09/02 10:06
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 14:28
Copper, ICP	0.012	0.003	mg/L	LC	06/09/02 14:28
Digestion, Aqueous, 200.2	05/31/02				date prepared EL 05/31/02 16:45
Iron, ICP	4.15	0.009	mg/L	LC	06/09/02 14:28
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 09:29
Magnesium, ICP	250	0.040	mg/L	LC	06/09/02 10:06
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/09/02				date analyzed
Potassium, ICP	58.7	0.39	mg/L	LC	06/09/02 14:28
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 09:29
Sodium, ICP	2066	2.0	mg/L	LC	06/09/02 10:06
Total Hardness, Calculation	1437	5.0	mg/L as CaCO3	LC	06/09/02 10:06
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 14:28

Order # 02-05-990
11/13/02 13:12

TEST RESULTS BY SAMPLE

Sample: 01F 22138 9b dissolved
Collected: 05/22/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02 14:32
Arsenic, ICP-MS	0.014	0.002	mg/L	JTH	06/05/02 12:44
Barium, ICP	0.190	0.003	mg/L	LC	06/09/02 14:32
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 14:32
Calcium, ICP	159	0.800	mg/L	LC	06/09/02 10:19
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 14:32
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 14:32
Iron, ICP	0.027	0.009	mg/L	LC	06/09/02 14:32
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 12:44
Magnesium, ICP	246	0.040	mg/L	LC	06/09/02 10:19
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/09/02				date analyzed
Potassium, ICP	58.6	0.39	mg/L	LC	06/09/02 14:32
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 12:44
Sodium, ICP	2027	2.0	mg/L	LC	06/09/02 10:19
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 14:32

Sample: 02B 22139 9a
Collected: 05/22/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	6.0	0.20	mg/L	as N BLT	05/31/02 06:53
Total Organic Carbon, Aq	3.9	1.0	mg/L	WV	06/05/02 09:50

Sample: 02C 22139 9a
Collected: 05/22/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.06	0.03	mg/L	MSO	05/28/02 08:00

Sample: 02D 22139 9a
Collected: 05/22/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	6.48	0.21	mg/L	MSO	05/25/02 18:23
Chloride, Ion Chrom	1686	0.39	mg/L	MSO	05/31/02 18:47
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 18:23
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/25/02 18:23
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/25/02 18:23
Phosphate, Ortho	0.05	0.01	mg/L	as P BLT	05/31/02 07:10
Sulfate, Ion Chrom	2266	0.38	mg/L	MSO	05/31/02 18:47
Total Alkalinity-Titration	128	1.0	mg/L	as CaCO3 TLC	06/04/02 07:35

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Riviera
at 11/13/02

TEST RESULTS BY SAMPLE

Sample: 02E 22139 9a
Collected: 05/29/22 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02 14:36
Arsenic, ICP-MS	0.010	0.002	mg/L	JTH	06/05/02 09:37
Barium, ICP	0.065	0.003	mg/L	LC	06/09/02 14:36
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 14:36
Calcium, ICP	400	0.800	mg/L	LC	06/09/02 10:22
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 14:36
Copper, ICP	0.033	0.003	mg/L	LC	06/09/02 14:36
Digestion, Aqueous, 200.2	05/31/02		date prepared	EL	05/31/02 16:45
Iron, ICP	25.5	0.009	mg/L	LC	06/09/02 14:36
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 09:37
Magnesium, ICP	293	0.040	mg/L	LC	06/09/02 10:22
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/09/02		date analyzed		
Potassium, ICP	67.9	0.39	mg/L	LC	06/09/02 14:36
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 09:37
Sodium, ICP	1163	2.0	mg/L	LC	06/09/02 10:22
Total Hardness, Calculation	2204	5.0	mg/L as CaCO3	LC	06/09/02 10:22
Zinc, ICP	0.018	0.003	mg/L	LC	06/09/02 14:36

Sample: 02F 22139 9a dissolved
Collected: 05/29/22 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02 14:40
Arsenic, ICP-MS	0.003	0.002	mg/L	JTH	06/05/02 12:52
Barium, ICP	0.055	0.003	mg/L	LC	06/09/02 14:40
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 14:40
Calcium, ICP	374	0.800	mg/L	LC	06/09/02 10:25
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 14:40
Copper, ICP	0.006	0.003	mg/L	LC	06/09/02 14:40
Iron, ICP	ND	0.009	mg/L	LC	06/09/02 14:40
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 12:52
Magnesium, ICP	275	0.040	mg/L	LC	06/09/02 10:25
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/09/02		date analyzed		
Potassium, ICP	66.0	0.39	mg/L	LC	06/09/02 14:40
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 12:52
Sodium, ICP	1103	2.0	mg/L	LC	06/09/02 10:25
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 14:40

Sample: 03B 22140 8a
Collected: 05/22/02 09:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	8.2	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	3.9	1.0	mg/L	WV	06/05/02 09:50

TEST RESULTS BY SAMPLE

Sample: 03C 22140 8a
Collected: 05/22/02 09:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	0.05	0.03	mg/L	MSO	05/28/02	08:00

Sample: 03D 22140 8a
Collected: 05/22/02 09:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	11.0	0.21	mg/L	MSO	05/25/02	18:35
Chloride, Ion Chrom	3258	0.39	mg/L	MSO	05/31/02	18:58
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02	18:35
ion chromatography	05/31/02				date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02	18:35
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02	18:35
Phosphate, Ortho	0.03	0.01	mg/L as P	BLT	05/31/02	07:10
Sulfate, Ion Chrom	1970	0.38	mg/L	MSO	05/31/02	18:58
Total Alkalinity-Titration	284	1.0	mg/L as CaCO3	TLC	06/04/02	07:35

Sample: 03E 22140 8a
Collected: 05/22/02 09:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	IC	06/09/02	14:44
Arsenic, ICP-MS	0.011	0.002	mg/L	JTH	06/05/02	09:44
Barium, ICP	0.085	0.003	mg/L	LC	06/09/02	14:44
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02	14:44
Calcium, ICP	304	0.800	mg/L	LC	06/09/02	10:28
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02	14:44
Copper, ICP	0.008	0.003	mg/L	LC	06/09/02	14:44
Digestion, Aqueous, 200.2	05/31/02				date prepared	EL 05/31/02 16:45
Iron, ICP	24.4	0.009	mg/L	LC	06/09/02	14:44
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	09:44
Magnesium, ICP	328	0.040	mg/L	LC	06/09/02	10:28
Metals, ICP/MS	06/05/02				date analyzed	
Metals, ICP/OES	06/09/02				date analyzed	
Potassium, ICP	86.4	0.39	mg/L	LC	06/09/02	14:44
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	09:44
Sodium, ICP	1803	2.0	mg/L	LC	06/09/02	10:28
Total Hardness, Calculation	2111	5.0	mg/L as CaCO3	LC	06/09/02	10:28
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02	14:44

Sample: 03F 22140 8a dissolved
Collected: 05/22/02 09:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02	14:48
Arsenic, ICP-MS	0.006	0.002	mg/L	JTH	06/05/02	13:00
Barium, ICP	0.063	0.003	mg/L	LC	06/09/02	14:48
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02	14:48

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Kb, 11/13/02
Rued

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Calcium, ICP	314	0.800	mg/L LC	06/09/02 10:31
Chromium, ICP	ND	0.008	mg/L LC	06/09/02 14:48
Copper, ICP	0.003	0.003	mg/L LC	06/09/02 14:48
Iron, ICP	ND	0.009	mg/L LC	06/09/02 14:48
Lead, ICP-MS	ND	0.002	mg/L JTH	06/05/02 13:00
Magnesium, ICP	335	0.040	mg/L LC	06/09/02 10:31
Metals, ICP/MS	06/05/02			date analyzed
Metals, ICP/OES	06/09/02			date analyzed
Potassium, ICP	77.9	0.39	mg/L LC	06/09/02 14:48
Silver, ICP-MS	ND	0.001	mg/L JTH	06/05/02 13:00
Sodium, ICP	1682	2.0	mg/L LC	06/09/02 10:31
Zinc, ICP	ND	0.003	mg/L LC	06/09/02 14:48

Sample: 04B 22141 8b
Collected: 05/22/02 09:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	8.0	0.20	mg/L as N BLT	05/31/02 06:53
Total Organic Carbon, Aq	5.6	1.0	mg/L WV	06/05/02 09:50

Sample: 04C 22141 8b
Collected: 05/22/02 09:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.03	0.03	mg/L MSO	05/28/02 08:00

Sample: 04D 22141 8b
Collected: 05/22/02 09:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	2.45	0.21	mg/L MSO	05/25/02 18:46
Chloride, Ion Chrom	481	0.39	mg/L MSO	05/25/02 18:46
Fluoride, Ion Chrom	1.29	0.21	mg/L MSO	05/25/02 18:46
Ion chromatography	05/25/02			date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N MSO	05/25/02 18:46
Nitrite, Ion Chrom	ND	0.02	mg/L as N MSO	05/25/02 18:46
Phosphate, Ortho	0.02	0.01	mg/L as P BLT	05/31/02 07:10
Sulfate, Ion Chrom	ND	0.38	mg/L MSO	05/25/02 18:46
Total Alkalinity-Titration	152	1.0	mg/L as CaCO3 TLC	06/04/02 07:35

Sample: 04E 22141 8b
Collected: 05/22/02 09:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L EL	06/20/02 18:00
Arsenic, ICP-MS	0.004	0.002	mg/L JTH	06/05/02 09:52
Barium, ICP	0.179	0.003	mg/L EL	06/20/02 18:00
Cadmium, ICP	ND	0.004	mg/L LC	06/09/02 15:00
Calcium, ICP	187	0.800	mg/L LC	06/09/02 10:31
Chromium, ICP	ND	0.008	mg/L EL	06/28/02 01:32
Copper, ICP	ND	0.003	mg/L LC	06/09/02 15:00

*Revised
06/11/02*

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TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Digestion, Aqueous, 200.2	05/31/02		date prepared	EL	05/31/02 16:45
Iron, ICP	27.2	0.009	mg/L	LC	06/09/02 15:00
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 09:52
Magnesium, ICP	26.5	0.004	mg/L	EL	06/28/02 01:32
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/28/02		date analyzed		
Potassium, ICP	6.50	0.39	mg/L	EL	06/20/02 18:00
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 09:52
Sodium, ICP	129	0.20	mg/L	EL	06/20/02 18:00
Total Hardness, Calculation	597	5.0	mg/L as CaCO3	LC	06/09/02 10:34
Zinc, ICP	0.009	0.003	mg/L	LC	06/09/02 15:00

Sample: 04F 22141 8b dissolved
Collected: 05/22/02 09:55

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/28/02 01:37
Arsenic, ICP-MS	0.002	0.002	mg/L	JTH	06/05/02 13:08
Barium, ICP	0.128	0.003	mg/L	EL	06/20/02 18:05
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 15:04
Calcium, ICP	176	0.800	mg/L	LC	06/09/02 10:37
Chromium, ICP	ND	0.008	mg/L	EL	06/28/02 01:37
Copper, ICP	0.007	0.003	mg/L	LC	06/09/02 15:04
Iron, ICP	0.024	0.009	mg/L	LC	06/09/02 15:04
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 13:08
Magnesium, ICP	25.9	0.004	mg/L	EL	06/28/02 01:37
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/28/02		date analyzed		
Potassium, ICP	5.86	0.39	mg/L	EL	06/20/02 18:05
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 13:08
Sodium, ICP	124	0.20	mg/L	EL	06/20/02 18:05
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 15:04

Sample: 05B 22143 Surface Site 1
Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	2.9	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	4.9	1.0	mg/L	WV	06/05/02 09:50

Sample: 05C 22143 Surface Site 1
Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	05/28/02 08:00

Sample: 05D 22143 Surface Site 1
Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	8.45	0.21	mg/L	MSO	05/25/02 18:58

09/27/02 15:28

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Chloride, Ion Chrom	3665	0.39	mg/L	MSO	05/31/02	19:10
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02	18:58
Ion chromatography	05/31/02				date complete	
Nitrate, Ion Chrom	0.53	0.06	mg/L as N	MSO	05/25/02	18:58
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02	18:58
Phosphate, Ortho	0.04	0.01	mg/L as P	BLT	05/31/02	07:10
Sulfate, Ion Chrom	6527	0.38	mg/L	MSO	05/31/02	19:10
Total Alkalinity-Titration	ND	1.0	mg/L as CaCO3	TLC	06/04/02	07:35

Sample: 05E 22143 Surface Site 1
 Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	7.67	0.052	mg/L	EL	06/27/02	23:37
Arsenic, ICP-MS	0.002	0.002	mg/L	JTH	06/05/02	10:15
Barium, ICP	0.032	0.003	mg/L	EL	06/27/02	23:37
Cadmium, ICP	0.007	0.004	mg/L	LC	06/09/02	15:08
Calcium, ICP	445	0.800	mg/L	LC	06/09/02	10:40
Chromium, ICP	0.008	0.008	mg/L	EL	06/27/02	23:37
Copper, ICP	0.049	0.003	mg/L	EL	06/09/02	15:08
Digestion, Aqueous, 200.2	05/31/02			date prepared	EL	05/31/02 16:45
Iron, ICP	6.59	0.009	mg/L	LC	06/09/02	15:08
Lead, ICP-MS	0.007	0.002	mg/L	JTH	06/05/02	10:15
Magnesium, ICP	419	0.040	mg/L	LC	06/09/02	10:40
Metals, ICP/MS	06/05/02			date analyzed		
Metals, ICP/OES	06/27/02			date analyzed		
Potassium, ICP	95.9	0.39	mg/L	LC	06/09/02	15:08
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	10:15
Sodium, ICP	1433	2.0	mg/L	LC	06/09/02	10:40
Total Hardness, Calculation	2836	5.0	mg/L as CaCO3	LC	06/09/02	10:40
Zinc, ICP	3.31	0.003	mg/L	LC	06/09/02	15:08

Sample: 05F 22143 Surface Site 1 diss.
 Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	7.66	0.052	mg/L	EL	06/20/02	18:10
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	13:31
Barium, ICP	0.033	0.003	mg/L	EL	06/20/02	08:20
Cadmium, ICP	0.006	0.004	mg/L	LC	06/09/02	15:12
Calcium, ICP	423	0.800	mg/L	LC	06/09/02	10:54
Chromium, ICP	ND	0.008	mg/L	EL	06/27/02	23:43
Copper, ICP	0.044	0.003	mg/L	LC	06/09/02	15:12
Iron, ICP	ND	0.009	mg/L	LC	06/09/02	15:12
Lead, ICP-MS	0.005	0.002	mg/L	JTH	06/05/02	13:31
Magnesium, ICP	401	0.040	mg/L	LC	06/09/02	10:54
Metals, ICP/MS	06/12/02			date analyzed		
Metals, ICP/OES	06/27/02			date analyzed		
Potassium, ICP	97.6	0.39	mg/L	LC	06/09/02	15:12
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02	12:49
Sodium, ICP	1390	2.0	mg/L	LC	06/09/02	10:54

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Zinc, ICP	3.41	0.003	mg/L LC	06/09/02 15:12

Sample: 06B 22144 Surf. Site 1 Dup
Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	3.0	0.20	mg/L as N BLT	05/31/02 06:53
Total Organic Carbon, Aq	4.7	1.0	mg/L WV	06/05/02 09:50

Sample: 06C 22144 Surf. Site 1 Dup
Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L MSO	05/28/02 08:00

Sample: 06D 22144 Surf. Site 1 Dup.
Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	7.01	0.21	mg/L MSO	05/25/02 19:09
Chloride, Ion Chrom	2256	0.39	mg/L MSO	05/31/02 19:21
Fluoride, Ion Chrom	ND	0.21	mg/L MSO	05/25/02 19:09
Ion chromatography	05/31/02		date complete	
Nitrate, Ion Chrom	0.426	0.06	mg/L as N MSO	05/25/02 19:09
Nitrite, Ion Chrom	ND	0.02	mg/L as N MSO	05/25/02 19:09
Phosphate, Ortho	0.05	0.01	mg/L as P BLT	05/31/02 07:10
Sulfate, Ion Chrom	4171	0.38	mg/L MSO	05/31/02 19:21
Total Alkalinity-Titration	ND	1.0	mg/L as CaCO3 TLC	06/04/02 07:35

Sample: 06E 22144 Surf. Site 1 dup.
Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	7.59	0.052	mg/L EL	06/27/02 23:59
Arsenic, ICP-MS	0.002	0.002	mg/L JTH	06/05/02 10:23
Barium, ICP	0.031	0.003	mg/L EL	06/27/02 23:59
Cadmium, ICP	0.007	0.004	mg/L LC	06/09/02 15:15
Calcium, ICP	442	0.800	mg/L LC	06/09/02 10:59
Chromium, ICP	0.009	0.008	mg/L EL	06/27/02 23:59
Copper, ICP	0.049	0.003	mg/L LC	06/09/02 15:15
Digestion, Aqueous, 200.2	05/31/02		date prepared	EL 05/31/02 16:45
Iron, ICP	7.17	0.009	mg/L LC	06/09/02 15:15
Lead, ICP-MS	0.006	0.002	mg/L JTH	06/05/02 10:23
Magnesium, ICP	414	0.040	mg/L LC	06/09/02 10:59
Metals, ICP/MS	06/05/02		date analyzed	
Metals, ICP/OES	06/28/02		date analyzed	
Potassium, ICP	101	0.39	mg/L LC	06/09/02 15:15
Silver, ICP-MS	ND	0.001	mg/L JTH	06/05/02 10:23
Sodium, ICP	1401	2.0	mg/L LC	06/09/02 10:59
Total Hardness, Calculation	2809	5.0	mg/L as CaCO3 LC	06/09/02 10:59
Zinc, ICP	3.42	0.003	mg/L LC	06/09/02 15:15

TEST RESULTS BY SAMPLE

Sample: 06F 22144 SS1 dup dissolved
Collected: 05/22/02 10:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	7.68	0.052	mg/L	EL	06/20/02 18:14
Arsenic, ICP-MS	0.002	0.002	mg/L	JTH	06/05/02 13:39
Barium, ICP	0.033	0.003	mg/L	EL	06/20/02 18:14
Cadmium, ICP	0.007	0.004	mg/L	LC	06/09/02 15:19
Calcium, ICP	425	0.800	mg/L	LC	06/09/02 11:11
Chromium, ICP	ND	0.008	mg/L	EL	06/28/02 00:05
Copper, ICP	0.042	0.003	mg/L	LC	06/09/02 15:19
Iron, ICP	ND	0.009	mg/L	LC	06/09/02 15:19
Lead, ICP-MS	0.011	0.002	mg/L	JTH	06/05/02 13:39
Magnesium, ICP	403	0.040	mg/L	LC	06/09/02 11:11
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	06/27/02				date analyzed
Potassium, ICP	94.5	0.39	mg/L	LC	06/09/02 15:19
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 12:57
Sodium, ICP	1379	2.0	mg/L	LC	06/09/02 11:11
Zinc, ICP	3.26	0.003	mg/L	LC	06/09/02 15:19

Sample: 07B 22145 7a
Collected: 05/22/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	13	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	4.6	1.0	mg/L	WV	06/05/02 09:50

Sample: 07C 22145 7a
Collected: 05/22/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.08	0.03	mg/L	MSO	05/28/02 08:00

Sample: 07D 22145 7a
Collected: 05/22/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	8.99	0.21	mg/L	MSO	05/25/02 19:21
Chloride, Ion Chrom	2108	0.39	mg/L	MSO	05/31/02 19:33
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 19:21
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02 19:21
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02 19:21
Phosphate, Ortho	0.03	0.01	mg/L as P	BLT	05/31/02 07:10
Sulfate, Ion Chrom	1538	0.38	mg/L	MSO	05/31/02 19:33
Total Alkalinity-Titration	385	1.0	mg/L as CaCO3	TLC	06/04/02 07:35

TEST RESULTS BY SAMPLE

Sample: 07E 22145 7a
Collected: 05/22/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/28/02 00:23
Arsenic, ICP-MS	0.010	0.002	mg/L	JTH	06/05/02 10:31
Barium, ICP	0.124	0.003	mg/L	EL	06/28/02 00:23
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 15:23
Calcium, ICP	298	0.800	mg/L	LC	06/09/02 11:14
Chromium, ICP	ND	0.008	mg/L	EL	06/28/02 00:23
Copper, ICP	0.006	0.003	mg/L	LC	06/09/02 15:23
Digestion, Aqueous, 200.2	05/31/02		date prepared	EL	05/31/02 16:45
Iron, ICP	13.0	0.009	mg/L	LC	06/09/02 15:23
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 10:31
Magnesium, ICP	321	0.040	mg/L	LC	06/09/02 11:14
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/28/02		date analyzed		
Potassium, ICP	87.6	0.39	mg/L	LC	06/09/02 15:23
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 10:31
Sodium, ICP	1590	2.0	mg/L	LC	06/09/02 11:14
Total Hardness, Calculation	2066	5.0	mg/L as CaCO3	LC	06/09/02 11:14
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 15:23

Sample: 07F 22145 7a dissolved
Collected: 05/22/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/20/02 18:19
Arsenic, ICP-MS	0.006	0.002	mg/L	JTH	06/05/02 13:47
Barium, ICP	0.107	0.003	mg/L	EL	06/20/02 18:19
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 15:27
Calcium, ICP	310	0.800	mg/L	LC	06/09/02 11:17
Chromium, ICP	ND	0.008	mg/L	EL	06/28/02 00:28
Copper, ICP	0.005	0.003	mg/L	LC	06/09/02 15:27
Iron, ICP	ND	0.009	mg/L	LC	06/09/02 15:27
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 13:47
Magnesium, ICP	334	0.040	mg/L	LC	06/09/02 11:17
Metals, ICP/MS	06/12/02		date analyzed		
Metals, ICP/OES	06/28/02		date analyzed		
Potassium, ICP	88.8	0.39	mg/L	LC	06/09/02 15:27
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 13:05
Sodium, ICP	1642	2.0	mg/L	LC	06/09/02 11:17
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 15:27

Sample: 08B 22147 Surface Site 2
Collected: 05/22/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	0.72	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	8.0	1.0	mg/L	WV	06/05/02 09:50

Order # 02 05 990
11/13/02 13:12

TEST RESULTS BY SAMPLE

Sample: 08C 22147 Surface Site 2
Collected: 05/22/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.03	0.03	mg/L MSO 05/28/02 08:00

Sample: 08D 22147 Surface Site 2
Collected: 05/22/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By Analyzed Dt/Tm</u>
Bromide, Ion Chrom	3.24	0.21	mg/L MSO 05/25/02 19:33
Chloride, Ion Chrom	666	0.39	mg/L MSO 05/25/02 19:33
Fluoride, Ion Chrom	3.00	0.21	mg/L MSO 05/25/02 19:33
Ion chromatography	06/29/02		date complete MSO
Nitrate, Ion Chrom	0.51	0.06	mg/L as N MSO 05/25/02 19:33
Nitrite, Ion Chrom	ND	0.02	mg/L as N MSO 05/25/02 19:33
Phosphate, Ortho	0.06	0.01	mg/L as P BLT 05/31/02 07:10
Sulfate, Ion Chrom	5220	0.38	mg/L MSO 06/29/02 03:52
Total Alkalinity-Titration	ND	1.0	mg/L as CaCO3 TLC 06/04/02 07:35

Sample: 08E 22147 Surface Site 2
Collected: 05/22/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By Analyzed Dt/Tm</u>
Aluminum, ICP	65.9	0.052	mg/L EL 06/28/02 00:34
Arsenic, ICP-MS	ND	0.002	mg/L JTH 06/05/02 10:39
Barium, ICP	0.010	0.003	mg/L EL 06/28/02 00:34
Cadmium, ICP	0.023	0.004	mg/L LC 06/09/02 15:31
Calcium, ICP	466	0.800	mg/L LC 06/09/02 11:20
Chromium, ICP	0.023	0.008	mg/L EL 06/28/02 00:34
Copper, ICP	0.131	0.003	mg/L LC 06/09/02 15:31
Digestion, Aqueous, 200.2	05/31/02		date prepared EL 05/31/02 16:45
Iron, ICP	36.7	0.009	mg/L LC 06/09/02 15:31
Lead, ICP-MS	0.007	0.002	mg/L JTH 06/05/02 10:39
Magnesium, ICP	321	0.040	mg/L LC 06/09/02 11:20
Metals, ICP/MS	06/05/02		date analyzed
Metals, ICP/OES	06/28/02		date analyzed
Potassium, ICP	52.2	0.39	mg/L LC 06/09/02 15:31
Silver, ICP-MS	ND	0.001	mg/L JTH 06/05/02 10:39
Sodium, ICP	545	2.0	mg/L LC 06/09/02 11:20
Total Hardness, Calculation	2484	5.0	mg/L as CaCO3 LC 06/09/02 11:20
Zinc, ICP	8.59	0.003	mg/L LC 06/09/02 15:31

Sample: 08F 22147 SS2 dissolved
Collected: 05/22/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By Analyzed Dt/Tm</u>
Aluminum, ICP	72.1	0.052	mg/L EL 06/20/02 18:24
Arsenic, ICP-MS	ND	0.002	mg/L JTH 06/05/02 13:54
Barium, ICP	0.011	0.003	mg/L EL 06/20/02 18:24
Cadmium, ICP	0.025	0.004	mg/L LC 06/09/02 15:35

*Based
on 11/13/02* 78

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Calcium, ICP	465	0.800	mg/L	LC	06/09/02 11:23
Chromium, ICP	0.022	0.008	mg/L	EL	06/28/02 00:39
Copper, ICP	0.138	0.003	mg/L	LC	06/09/02 15:35
Iron, ICP	15.5	0.009	mg/L	LC	06/09/02 15:35
Lead, ICP-MS	0.005	0.002	mg/L	JTH	06/05/02 13:54
Magnesium, ICP	321	0.040	mg/L	LC	06/09/02 11:23
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	06/28/02				date analyzed
Potassium, ICP	55.4	0.39	mg/L	LC	06/09/02 15:35
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 13:13
Sodium, ICP	553	2.0	mg/L	LC	06/09/02 11:23
Zinc, ICP	9.05	0.003	mg/L	LC	06/09/02 15:35

Sample: 09B 22148 cd4b
Collected: 05/22/02 11:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	7.7	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	2.1	1.0	mg/L	WV	06/05/02 09:50

Sample: 09C 22148 cd4b
Collected: 05/22/02 11:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.13	0.03	mg/L	MSO	05/28/02 08:00

Sample: 09D 22148 cd4b
Collected: 05/22/02 11:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	4.04	0.21	mg/L	MSO	05/25/02 19:44
Chloride, Ion Chrom	974	0.39	mg/L	MSO	05/25/02 19:44
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 19:44
Ion chromatography	05/25/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02 19:44
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02 19:44
Phosphate, Ortho	0.05	0.01	mg/L as P	BLT	05/31/02 07:10
Sulfate, Ion Chrom	ND	0.38	mg/L	MSO	05/25/02 19:44
Total Alkalinity-Titration	81	1.0	mg/L as CaCO3	TLC	06/04/02 07:35

Sample: 09E 22148 cd4b
Collected: 05/22/02 11:30

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.097	0.052	mg/L	LC	06/09/02 11:30
Arsenic, ICP-MS	0.004	0.002	mg/L	JTH	06/05/02 10:55
Barium, ICP	0.113	0.003	mg/L	LC	06/09/02 11:30
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 11:30
Calcium, ICP	196	0.080	mg/L	EL	06/28/02 00:55
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 11:30
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 11:30

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Digestion, Aqueous, 200.2	05/31/02		date prepared	EL	05/31/02 16:45
Iron, ICP	10.8	0.009	mg/L	LC	06/09/02 11:30
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 10:55
Magnesium, ICP	9.83	0.004	mg/L	LC	06/09/02 11:30
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/28/02		date analyzed		
Potassium, ICP	9.38	0.39	mg/L	LC	06/09/02 11:30
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 10:55
Sodium, ICP	371	0.20	mg/L	LC	06/09/02 11:30
Total Hardness, Calculation	529	0.50	mg/L as CaCO3	EL	06/28/02 00:55
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 11:30

Sample: 09F 22148 cd4b dissolved
Collected: 05/22/02 11:30

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02 12:42
Arsenic, ICP-MS	0.003	0.002	mg/L	JTH	06/05/02 14:02
Barium, ICP	0.094	0.003	mg/L	LC	06/09/02 12:42
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 12:42
Calcium, ICP	188	0.080	mg/L	EL	06/28/02 01:00
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 12:42
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 12:42
Copper, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 14:02
Iron, ICP	0.034	0.009	mg/L	LC	06/09/02 12:42
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 14:02
Magnesium, ICP	9.32	0.004	mg/L	LC	06/09/02 12:42
Metals, ICP/MS	06/12/02		date analyzed		
Metals, ICP/OES	06/28/02		date analyzed		
Potassium, ICP	9.23	0.39	mg/L	LC	06/09/02 12:42
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 13:21
Sodium, ICP	357	0.20	mg/L	LC	06/09/02 12:42
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 12:42
Zinc, ICP-MS	0.004	0.002	mg/L	JTH	06/05/02 14:02

Sample: 10B 22149 cd4a
Collected: 05/22/02 11:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	20	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	11	1.0	mg/L	WV	06/05/02 09:50

Sample: 10C 22149 cd4a
Collected: 05/22/02 11:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.07	0.03	mg/L	MSO	05/28/02 08:00

TEST RESULTS BY SAMPLE

Sample: 10D 22149 cd4a
Collected: 05/22/02 11:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	15.6	0.21	mg/L	MSO	05/25/02	19:56
Chloride, Ion Chrom	3746	0.39	mg/L	MSO	05/31/02	19:45
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02	19:56
Ion chromatography	05/31/02				date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02	19:56
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02	19:56
Phosphate, Ortho	0.05	0.01	mg/L as P	BLT	05/31/02	07:10
Sulfate, Ion Chrom	10.3	0.38	mg/L	MSO	05/25/02	19:56
Total Alkalinity-Titration	682	1.0	mg/L as CaCO3	TLC	06/04/02	07:35

Sample: 10E 22149 cd4a
Collected: 05/22/02 11:40

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/28/02	01:06
Arsenic, ICP-MS	0.019	0.002	mg/L	JTH	06/05/02	11:33
Barium, ICP	0.697	0.003	mg/L	EL	06/28/02	01:06
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02	15:48
Calcium, ICP	90.9	0.080	mg/L	LC	06/09/02	15:48
Chromium, ICP	ND	0.008	mg/L	EL	06/28/02	01:06
Copper, ICP	0.006	0.003	mg/L	LC	06/09/02	15:48
Digestion, Aqueous, 200.2	05/31/02				date prepared EL 05/31/02 16:45	
Iron, ICP	12.5	0.009	mg/L	LC	06/09/02	15:48
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	11:33
Magnesium, ICP	241	0.040	mg/L	LC	06/09/02	12:46
Metals, ICP/MS	06/05/02				date analyzed	
Metals, ICP/OES	06/28/02				date analyzed	
Potassium, ICP	75.2	0.39	mg/L	LC	06/09/02	15:48
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02	11:33
Sodium, ICP	2145	2.0	mg/L	LC	06/09/02	12:46
Total Hardness, Calculation	1218	5.0	mg/L as CaCO3	LC	06/09/02	12:46
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02	15:48

Sample: 10F 22149 cd4a dissolved
Collected: 05/22/02 11:40

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/28/02	01:12
Arsenic, ICP-MS	0.014	0.002	mg/L	JTH	06/05/02	14:10
Barium, ICP	0.613	0.003	mg/L	EL	06/28/02	01:12
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02	15:52
Calcium, ICP	93.9	0.080	mg/L	LC	06/09/02	15:52
Chromium, ICP	ND	0.008	mg/L	EL	06/28/02	01:12
Copper, ICP	ND	0.003	mg/L	LC	06/09/02	15:52
Copper, ICP-MS	0.006	0.002	mg/L	JTH	06/05/02	14:10
Iron, ICP	0.016	0.009	mg/L	LC	06/05/02	15:52
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02	14:10

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Magnesium, ICP	246	0.040	mg/L	LC	06/09/02 12:49
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	06/28/02				date analyzed
Potassium, ICP	76.4	0.39	mg/L	LC	06/09/02 15:52
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 13:30
Sodium, ICP	2213	2.0	mg/L	LC	06/09/02 12:49
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 15:52
Zinc, ICP-MS	0.011	0.002	mg/L	JTH	06/05/02 14:10

Sample: 11B 22150 cd4a dup
Collected: 05/22/02 11:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	19	0.20	mg/L	as N BLT	05/31/02 06:53
Total Organic Carbon, Aq	11	1.0	mg/L	WV	06/05/02 09:50

Sample: 11C 22150 cd4a
Collected: 05/22/02 11:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.10	0.03	mg/L	MSO	05/28/02 08:00

Sample: 11D 22150 cd4a
Collected: 05/22/02 11:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	16.3	0.21	mg/L	MSO	05/25/02 20:31
Chloride, Ion Chrom	5830	0.39	mg/L	MSO	05/31/02 19:56
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 20:31
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/25/02 20:31
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/25/02 20:31
Phosphate, Ortho	0.47	0.10	mg/L	as P BLT	05/31/02 07:10
Sulfate, Ion Chrom	11.4	0.38	mg/L	MSO	05/25/02 20:31
Total Alkalinity-Titration	645	1.0	mg/L	as CaCO3 TLC	06/04/02 07:35

Sample: 11E 22150 cd4a
Collected: 05/22/02 11:45

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/28/02 01:20
Arsenic, ICP-MS	0.021	0.002	mg/L	JTH	06/05/02 11:57
Barium, ICP	0.800	0.003	mg/L	EL	06/28/02 01:20
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 15:56
Calcium, ICP	91.7	0.080	mg/L	LC	06/09/02 15:56
Chromium, ICP	ND	0.008	mg/L	EL	06/28/02 01:20
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 15:56
Digestion, Aqueous, 200.2	05/31/02				date prepared
Iron, ICP	18.6	0.009	mg/L	LC	06/09/02 15:56
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 11:57
Magnesium, ICP	252	0.040	mg/L	LC	06/09/02 12:52

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/28/02				date analyzed
Potassium, ICP	73.9	0.39	mg/L	LC	06/09/02 15:56
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 11:57
Sodium, ICP	2183	2.0	mg/L	LC	06/09/02 12:52
Total Hardness, Calculation	1276	5.0	mg/L as CaCO3	LC	06/09/02 12:52
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 15:56

Sample: 11F 22150 cd4a dissolved
Collected: 05/22/02 11:45

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/28/02 01:26
Arsenic, ICP-MS	0.016	0.002	mg/L	JTH	06/05/02 14:18
Barium, ICP	0.621	0.003	mg/L	EL	06/28/02 01:26
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 16:00
Calcium, ICP	89.1	0.080	mg/L	LC	06/09/02 16:00
Chromium, ICP	ND	0.008	mg/L	EL	06/28/02 01:26
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 16:00
Iron, ICP	0.023	0.009	mg/L	LC	06/09/02 16:00
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 14:18
Magnesium, ICP	243	0.040	mg/L	LC	06/09/02 12:55
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	06/28/02				date analyzed
Potassium, ICP	70.1	0.39	mg/L	LC	06/09/02 16:00
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 13:38
Sodium, ICP	2161	2.0	mg/L	LC	06/09/02 12:55
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 16:00



ATLANTIC COAST
Laboratories, Incorporated

630 Churchmans Road
Newark, Delaware 19702
302-266-9121 • 454-8720 (FAX)

REPORT OF ANALYSIS

Maryland Environmental Svc
2011 Commerce Park Drive
Annapolis, MD 21401

Order #: 02-05-995
Date: 08/13/02 13:07
Work ID: Hart-Miller Island GW Well
Date Received: 05/24/02
Date Completed: 07/09/02

Attn: Mr. Rex A. Lloyd

Purchase Order: 98-04-11/1-01 Act:2170292
Invoice Number: 96485

Client Code: MES_AB

SAMPLE IDENTIFICATION

<u>Sample Number</u>	<u>Sample Description</u>	<u>Sample Number</u>	<u>Sample Description</u>
01	22151	07	22157
02	22152	08	22158
04	22153	09	22159
05	22154	10	22160
06	22156	11	22162

This cover page is an integral part of the analytical report.

Laboratory Certifications: DE DE00011 PA 68-335
MD 138 NJ DE568

Certified By
Warren Van Arsdall

TEST RESULTS BY SAMPLE

Sample: 01B 22151 cd1a
Collected: 05/22/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	46	1.0	mg/L as N	BLT	05/31/02 08:56
Total Organic Carbon, Aq	24	1.0	mg/L	WV	06/05/02 09:50

Sample: 01C 22151 cd1a
Collected: 05/22/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.18	0.03	mg/L	MSO	05/28/02 08:00

Sample: 01D 22151 cd1a
Collected: 05/22/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	26.8	0.21	mg/L	MSO	05/25/02 21:05
Chloride, Ion Chrom	9921	0.39	mg/L	MSO	05/31/02 20:08
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 21:05
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02 21:05
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02 21:05
Phosphate, Ortho	ND	0.05	mg/L as P	BLT	05/31/02 11:10
Sulfate, Ion Chrom	4680	0.38	mg/L	MSO	05/31/02 20:08
Total Alkalinity-Titration	1655	1.0	mg/L as CaCO3	TLC	06/04/02 07:35

Sample: 01E 22151 cd1a
Collected: 05/22/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/12/02 18:03
Arsenic, ICP-MS	0.026	0.002	mg/L	JTH	06/07/02 04:16
Barium, ICP	0.122	0.003	mg/L	EL	06/12/02 18:03
Cadmium, ICP	ND	0.004	mg/L	EL	06/12/02 18:03
Calcium, ICP	645	1.60	mg/L	EL	06/12/02 13:57
Chromium, ICP	ND	0.008	mg/L	EL	06/12/02 18:03
Copper, ICP	0.010	0.003	mg/L	EL	06/12/02 18:03
Digestion, Aqueous, 200.2	06/01/02				date prepared EL 06/01/02 17:45
Iron, ICP	45.8	0.009	mg/L	EL	06/12/02 18:03
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 04:16
Magnesium, ICP	834	0.080	mg/L	EL	06/12/02 13:57
Metals, ICP/MS	06/07/02				date analyzed
Metals, ICP/OES	06/12/02				date analyzed
Potassium, ICP	158	0.39	mg/L	EL	06/12/02 18:03
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 04:16
Sodium, ICP	3828	4.00	mg/L	EL	06/12/02 13:57
Total Hardness, Calculation	5044	10	mg/L as CaCO3	EL	06/12/02 13:57
Zinc, ICP	ND	0.003	mg/L	EL	06/12/02 18:03

TEST RESULTS BY SAMPLE

Sample: 01F 22151 cd1a dissolved
Collected: 05/22/02 13:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/12/02 18:09
Arsenic, ICP-MS	0.016	0.002	mg/L	JTH	06/07/02 06:20
Barium, ICP	0.066	0.003	mg/L	EL	06/12/02 18:09
Cadmium, ICP	ND	0.004	mg/L	EL	06/12/02 18:09
Calcium, ICP	629	1.65	mg/L	EL	06/12/02 14:00
Chromium, ICP	ND	0.008	mg/L	EL	06/12/02 18:09
Copper, ICP	0.010	0.003	mg/L	EL	06/12/02 18:09
Iron, ICP	0.013	0.009	mg/L	EL	06/12/02 18:09
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 06:20
Magnesium, ICP	338	0.004	mg/L	EL	06/12/02 18:09
Metals, ICP/MS	06/07/02				date analyzed
Metals, ICP/OES	06/12/02				date analyzed
Potassium, ICP	159	0.39	mg/L	EL	06/12/02 18:09
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 06:20
Sodium, ICP	3907	4.12	mg/L	EL	06/12/02 14:00
Zinc, ICP	ND	0.003	mg/L	EL	06/12/02 18:09

Sample: 02B 22152 cd3a
Collected: 05/22/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	48	1.0	mg/L as N	BLT	05/31/02 08:56
Total Organic Carbon, Aq	23	1.0	mg/L	WV	06/05/02 09:50

Sample: 02C 22152 cd3a
Collected: 05/22/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.31	0.03	mg/L	MSO	05/28/02 08:00

Sample: 02D 22152 cd3a
Collected: 05/22/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	24.6	0.21	mg/L	MSO	05/25/02 21:17
Chloride, Ion Chrom	5395	0.39	mg/L	MSO	05/31/02 20:43
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 21:17
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	1.31	0.06	mg/L as N	MSO	05/25/02 21:17
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02 21:17
Phosphate, Ortho	0.10	0.02	mg/L as P	BLT	05/31/02 11:10
Sulfate, Ion Chrom	249	0.38	mg/L	MSO	05/25/02 21:17
Total Alkalinity-Titration	1502	1.0	mg/L as CaCO3	TLC	06/04/02 07:35

TEST RESULTS BY SAMPLE

Sample: 02E 22152 cd3a
Collected: 05/22/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/12/02	17:52
Arsenic, ICP-MS	0.038	0.002	mg/L	JTH	06/07/02	04:24
Barium, ICP	0.103	0.003	mg/L	EL	06/12/02	17:52
Cadmium, ICP	ND	0.004	mg/L	EL	06/12/02	17:52
Calcium, ICP	227	1.600	mg/L	EL	06/12/02	14:03
Chromium, ICP	ND	0.008	mg/L	EL	06/12/02	17:52
Copper, ICP	ND	0.003	mg/L	EL	06/12/02	17:52
Digestion, Aqueous, 200.2	06/01/02		date prepared	EL	06/01/02	17:45
Iron, ICP	30.3	0.009	mg/L	EL	06/12/02	17:52
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02	04:24
Magnesium, ICP	387	0.080	mg/L	EL	06/12/02	14:03
Metals, ICP/MS	06/07/02		date analyzed			
Metals, ICP/OES	06/12/02		date analyzed			
Potassium, ICP	116	0.39	mg/L	EL	06/12/02	17:52
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02	04:24
Sodium, ICP	2660	4.00	mg/L	EL	06/12/02	14:03
Total Hardness, Calculation	2160	10	mg/L as CaCO3	EL	06/12/02	14:03
Zinc, ICP	ND	0.003	mg/L	EL	06/12/02	17:52

Sample: 02F 22152 cd3a dissolved
Collected: 05/22/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/12/02	17:58
Arsenic, ICP-MS	0.020	0.002	mg/L	JTH	06/07/02	06:28
Barium, ICP	0.041	0.003	mg/L	EL	06/12/02	17:58
Cadmium, ICP	ND	0.004	mg/L	EL	06/12/02	17:58
Calcium, ICP	228	1.65	mg/L	EL	06/12/02	14:06
Chromium, ICP	ND	0.008	mg/L	EL	06/12/02	17:58
Copper, ICP	ND	0.003	mg/L	EL	06/12/02	17:58
Iron, ICP	0.041	0.009	mg/L	EL	06/12/02	17:58
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02	06:28
Magnesium, ICP	396	0.082	mg/L	EL	06/12/02	14:06
Metals, ICP/MS	06/07/02		date analyzed			
Metals, ICP/OES	06/12/02		date analyzed			
Potassium, ICP	116	0.39	mg/L	EL	06/12/02	17:58
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02	06:28
Sodium, ICP	2660	4.12	mg/L	EL	06/12/02	14:06
Zinc, ICP	ND	0.003	mg/L	EL	06/12/02	17:58

Sample: 04B 22153 3a
Collected: 05/23/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Ammonia, Automated Phenate	0.32	0.20	mg/L as N	BLT	05/31/02	06:53
Total Organic Carbon, Aq	3.9	1.0	mg/L	WV	06/05/02	09:50

TEST RESULTS BY SAMPLE

Sample: 04C 22153 3a
Collected: 05/23/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	0.06	0.03	mg/L	MSO	05/28/02	08:00

Sample: 04D 22153 3a
Collected: 05/23/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	8.29	0.21	mg/L	MSO	05/25/02	21:29
Chloride, Ion Chrom	1472	0.39	mg/L	MSO	05/31/02	21:17
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02	21:29
Ion chromatography	05/31/02				date complete	
Nitrate, Ion Chrom	0.84	0.06	mg/L	as N MSO	05/25/02	21:29
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/25/02	21:29
Phosphate, Ortho	0.03	0.01	mg/L	as P BLT	05/31/02	11:10
Sulfate, Ion Chrom	1512	0.38	mg/L	MSO	05/31/02	21:17
Total Alkalinity-Titration	379	1.0	mg/L	as CaCO3 TLC	06/04/02	07:35

Sample: 04E 22153 3a
Collected: 05/23/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02	19:10
Arsenic, ICP-MS	0.008	0.002	mg/L	JTH	06/07/02	05:57
Barium, ICP	0.082	0.003	mg/L	EL	06/13/02	19:10
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02	19:10
Calcium, ICP	450	1.60	mg/L	EL	06/13/02	17:56
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02	19:10
Copper, ICP	0.039	0.003	mg/L	EL	06/13/02	19:10
Digestion, Aqueous, 200.2	06/01/02			date prepared	EL	06/01/02 17:45
Iron, ICP	41.9	0.009	mg/L	EL	06/13/02	19:10
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02	05:57
Magnesium, ICP	278	0.080	mg/L	EL	06/13/02	17:56
Metals, ICP/MS	06/07/02			date analyzed		
Metals, ICP/OES	06/13/02			date analyzed		
Potassium, ICP	61.3	0.39	mg/L	EL	06/13/02	19:10
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02	05:57
Sodium, ICP	1319	4.00	mg/L	EL	06/13/02	17:56
Total Hardness, Calculation	2268	10	mg/L	as CaCO3	EL	06/13/02 17:56
Zinc, ICP	0.082	0.003	mg/L	EL	06/13/02	19:10

Sample: 04F 22153 3a dissolved
Collected: 05/23/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02	19:14
Arsenic, ICP-MS	0.005	0.002	mg/L	JTH	06/07/02	07:31
Barium, ICP	0.062	0.003	mg/L	EL	06/13/02	19:14
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02	19:14

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Calcium, ICP	470	1.65	mg/L	EL	06/13/02	17:59
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02	19:14
Copper, ICP	ND	0.003	mg/L	EL	06/13/02	19:14
Iron, ICP	ND	0.009	mg/L	EL	06/13/02	19:14
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02	07:31
Magnesium, ICP	291	0.082	mg/L	EL	06/13/02	17:59
Metals, ICP/MS	06/07/02				date analyzed	
Metals, ICP/OES	06/13/02				date analyzed	
Potassium, ICP	60.3	0.39	mg/L	EL	06/13/02	19:14
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02	07:31
Sodium, ICP	1341	4.00	mg/L	EL	06/13/02	17:59
Zinc, ICP	0.038	0.003	mg/L	EL	06/13/02	19:14

Sample: 05B 22154 3b
Collected: 05/23/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Ammonia, Automated Phenate	2.6	0.20	mg/L	as N BLT	05/31/02	06:53
Total Organic Carbon, Aq	2.9	1.0	mg/L	WV	06/05/02	09:50

Sample: 05C 22154 3b
Collected: 05/23/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	0.27	0.03	mg/L	MSO	05/28/02	08:00

Sample: 05D 22154 3b
Collected: 05/23/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	14.6	0.21	mg/L	MSO	05/25/02	21:40
Chloride, Ion Chrom	5398	0.39	mg/L	MSO	05/31/02	21:29
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02	21:40
Ion chromatography	05/31/02				date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/25/02	21:40
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/25/02	21:40
Phosphate, Ortho	0.04	0.01	mg/L	as P BLT	05/31/02	11:10
Sulfate, Ion Chrom	68.1	0.38	mg/L	MSO	05/25/02	21:40
Total Alkalinity-Titration	620	1.0	mg/L	as CaCO3 TLC	06/04/02	07:35

Sample: 05E 22154 3b
Collected: 05/23/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02	18:30
Arsenic, ICP-MS	0.016	0.002	mg/L	JTH	06/07/02	05:25
Barium, ICP	0.282	0.003	mg/L	EL	06/13/02	18:30
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02	18:30
Calcium, ICP	140	0.080	mg/L	EL	06/13/02	18:30
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02	18:30
Copper, ICP	ND	0.003	mg/L	EL	06/13/02	18:30

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Digestion, Aqueous, 200.2	06/01/02		date prepared	EL	06/01/02 17:45
Iron, ICP	11.4	0.009	mg/L	EL	06/13/02 18:30
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 05:25
Magnesium, ICP	261	0.080	mg/L	EL	06/13/02 17:21
Metals, ICP/MS	06/07/02		date analyzed		
Metals, ICP/OES	06/13/02		date analyzed		
Potassium, ICP	37.3	0.39	mg/L	EL	06/13/02 18:30
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 05:25
Sodium, ICP	2009	4.00	mg/L	EL	06/13/02 17:21
Total Hardness, Calculation	1411	10	mg/L as CaCO3	EL	06/13/02 17:21
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02 18:30

Sample: 05F 22154 3b dissolved
Collected: 05/23/02 09:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02 18:34
Arsenic, ICP-MS	0.014	0.002	mg/L	JTH	06/07/02 06:59
Barium, ICP	0.267	0.003	mg/L	EL	06/13/02 18:34
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02 18:34
Calcium, ICP	144	0.080	mg/L	EL	06/13/02 18:34
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02 18:34
Copper, ICP	ND	0.003	mg/L	EL	06/13/02 18:34
Iron, ICP	ND	0.009	mg/L	EL	06/13/02 18:34
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 06:59
Magnesium, ICP	261	0.082	mg/L	EL	06/13/02 17:24
Metals, ICP/MS	06/07/02		date analyzed		
Metals, ICP/OES	06/13/02		date analyzed		
Potassium, ICP	37.0	0.39	mg/L	EL	06/13/02 18:34
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 06:59
Sodium, ICP	2009	4.12	mg/L	EL	06/13/02 17:24
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02 18:34

Sample: 06B 22156 5a dup
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	20	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	10	1.0	mg/L	WV	06/05/02 09:50

Sample: 06C 22156 5a dup
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.09	0.03	mg/L	MSO	05/28/02 08:00

Sample: 06D 22156 3b
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	11.2	0.21	mg/L	MSO	05/25/02 21:52

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Chloride, Ion Chrom	5230	0.39	mg/L	MSO	05/31/02	21:41
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02	21:52
Ion chromatography	05/31/02				date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02	21:52
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02	21:52
Phosphate, Ortho	0.05	0.01	mg/L as P	BLT	05/31/02	11:10
Sulfate, Ion Chrom	4171	0.38	mg/L	MSO	05/31/02	21:41
Total Alkalinity-Titration	562	1.0	mg/L as CaCO3	TLC	06/04/02	07:35

Sample: 06E 22156 3b
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02	18:37
Arsenic, ICP-MS	0.008	0.002	mg/L	JTH	06/07/02	05:33
Barium, ICP	0.061	0.003	mg/L	EL	06/13/02	18:37
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02	18:37
Calcium, ICP	324	1.60	mg/L	EL	06/13/02	17:38
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02	18:37
Copper, ICP	ND	0.003	mg/L	EL	06/13/02	18:37
Digestion, Aqueous, 200.2	06/01/02			date prepared	EL	06/01/02 17:45
Iron, ICP	67.1	0.009	mg/L	EL	06/13/02	18:37
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02	05:33
Magnesium, ICP	355	0.080	mg/L	EL	06/13/02	17:38
Metals, ICP/MS	06/07/02			date analyzed		
Metals, ICP/OES	06/13/02			date analyzed		
Potassium, ICP	87.3	0.39	mg/L	EL	06/13/02	18:37
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02	05:33
Sodium, ICP	1470	4.00	mg/L	EL	06/13/02	17:38
Total Hardness, Calculation	2269	10	mg/L as CaCO3	EL	06/13/02	17:38
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02	18:37

Sample: 06F 22156 3b dissolved
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02	18:41
Arsenic, ICP-MS	0.006	0.002	mg/L	JTH	06/07/02	07:07
Barium, ICP	0.035	0.003	mg/L	EL	06/13/02	18:41
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02	18:41
Calcium, ICP	328	1.65	mg/L	EL	06/13/02	17:41
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02	18:41
Copper, ICP	ND	0.003	mg/L	EL	06/13/02	18:41
Iron, ICP	ND	0.009	mg/L	EL	06/13/02	18:41
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02	07:07
Magnesium, ICP	366	0.082	mg/L	EL	06/13/02	17:41
Metals, ICP/MS	06/07/02			date analyzed		
Metals, ICP/OES	06/13/02			date analyzed		
Potassium, ICP	90.0	0.39	mg/L	EL	06/13/02	18:41
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02	07:07
Sodium, ICP	1554	4.12	mg/L	EL	06/13/02	17:41

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Zinc, ICP	ND	0.003	mg/L EL	06/13/02 18:41

Sample: 07B 22157 5a
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	20	0.20	mg/L as N BLT	05/31/02 06:53
Total Organic Carbon, Aq	10	1.0	mg/L WV	06/05/02 09:50

Sample: 07C 22157 5a
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.11	0.03	mg/L MSO	05/28/02 08:00

Sample: 07D 22157 5a
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	11.2	0.21	mg/L MSO	05/25/02 22:03
Chloride, Ion Chrom	3498	0.39	mg/L MSO	05/31/02 21:52
Fluoride, Ion Chrom	ND	0.21	mg/L MSO	05/25/02 22:03
Ion chromatography	05/31/02		date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L as N MSO	05/25/02 22:03
Nitrite, Ion Chrom	ND	0.02	mg/L as N MSO	05/25/02 22:03
Phosphate, Ortho	ND	0.05	mg/L as P BLT	05/31/02 11:10
Sulfate, Ion Chrom	3390	0.38	mg/L MSO	05/31/02 21:52
Total Alkalinity-Titration	483	1.0	mg/L as CaCO3 TLC	06/04/02 07:35

Sample: 07E 22157 5a
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L EL	06/13/02 18:45
Arsenic, ICP-MS	0.008	0.002	mg/L JTH	06/07/02 05:41
Barium, ICP	0.059	0.003	mg/L EL	06/13/02 18:45
Cadmium, ICP	ND	0.004	mg/L EL	06/13/02 18:45
Calcium, ICP	340	1.60	mg/L EL	06/13/02 17:44
Chromium, ICP	ND	0.008	mg/L EL	06/13/02 18:45
Copper, ICP	ND	0.003	mg/L EL	06/13/02 18:45
Digestion, Aqueous, 200.2	06/01/02		date prepared	EL 06/01/02 17:45
Iron, ICP	65.3	0.009	mg/L EL	06/13/02 18:45
Lead, ICP-MS	ND	0.002	mg/L JTH	06/07/02 05:41
Magnesium, ICP	369	0.080	mg/L EL	06/13/02 17:44
Metals, ICP/MS	06/07/02		date analyzed	
Metals, ICP/OES	06/13/02		date analyzed	
Potassium, ICP	87.5	0.39	mg/L EL	06/13/02 18:45
Silver, ICP-MS	ND	0.001	mg/L JTH	06/07/02 05:41
Sodium, ICP	1544	4.00	mg/L EL	06/13/02 17:44
Total Hardness, Calculation	2368	10	mg/L as CaCO3 EL	06/13/02 17:44
Zinc, ICP	ND	0.003	mg/L EL	06/13/02 18:45

TEST RESULTS BY SAMPLE

Sample: 07F 22157 5a dissolved
Collected: 05/23/02 10:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02	18:49
Arsenic, ICP-MS	0.006	0.002	mg/L	JTH	06/07/02	07:15
Barium, ICP	0.033	0.003	mg/L	EL	06/13/02	18:49
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02	18:49
Calcium, ICP	324	1.65	mg/L	EL	06/13/02	17:47
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02	18:49
Copper, ICP	ND	0.003	mg/L	EL	06/13/02	18:49
Copper, ICP-MS	0.007	0.002	mg/L	JTH	06/07/02	07:15
Iron, ICP	ND	0.009	mg/L	EL	06/13/02	18:49
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02	07:15
Magnesium, ICP	362	0.082	mg/L	EL	06/13/02	17:47
Metals, ICP/MS	06/07/02				date analyzed	
Metals, ICP/OES	06/13/02				date analyzed	
Potassium, ICP	85.8	0.39	mg/L	EL	06/13/02	18:49
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02	07:15
Sodium, ICP	1510	4.12	mg/L	EL	06/13/02	17:47
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02	18:49
Zinc, ICP-MS	0.013	0.002	mg/L	JTH	06/07/02	07:15

Sample: 08B 22158 cd2a
Collected: 05/23/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Ammonia, Automated Phenate	13	0.20	mg/L	as N BLT	05/31/02	06:53
Total Organic Carbon, Aq	9.9	1.0	mg/L	WV	06/05/02	09:50

Sample: 08C 22158 cd2a
Collected: 05/23/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	0.32	0.03	mg/L	MSO	05/28/02	08:00

Sample: 08D 22158 cd2a
Collected: 05/23/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	16.7	0.21	mg/L	MSO	05/25/02	22:15
Chloride, Ion Chrom	7197	0.39	mg/L	MSO	05/31/02	22:04
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02	22:15
Ion chromatography	05/31/02				date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/25/02	22:15
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/25/02	22:15
Phosphate, Ortho	0.04	0.01	mg/L	as P BLT	05/31/02	11:10
Sulfate, Ion Chrom	44.2	0.38	mg/L	MSO	05/25/02	22:15
Total Alkalinity-Titration	728	1.0	mg/L	as CaCO3 TLC	06/04/02	07:35

TEST RESULTS BY SAMPLE

Sample: 08E 22158 cd2a
Collected: 05/23/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02 19:02
Arsenic, ICP-MS	0.024	0.002	mg/L	JTH	06/07/02 05:49
Barium, ICP	0.914	0.003	mg/L	EL	06/13/02 19:02
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02 19:02
Calcium, ICP	139	0.080	mg/L	EL	06/13/02 19:02
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02 19:02
Copper, ICP	0.005	0.003	mg/L	EL	06/13/02 19:02
Digestion, Aqueous, 200.2	06/01/02		date prepared	EL	06/01/02 17:45
Iron, ICP	14.4	0.009	mg/L	EL	06/13/02 19:02
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 05:49
Magnesium, ICP	188	0.080	mg/L	EL	06/13/02 17:50
Metals, ICP/MS	06/07/02		date analyzed		
Metals, ICP/OES	06/13/02		date analyzed		
Potassium, ICP	71.0	0.39	mg/L	EL	06/13/02 19:02
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 05:49
Sodium, ICP	2009	4.00	mg/L	EL	06/13/02 17:50
Total Hardness, Calculation	1118	10	mg/L as CaCO3	EL	06/13/02 17:50
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02 19:02

Sample: 08F 22158 cd2a dissolved
Collected: 05/23/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02 19:06
Arsenic, ICP-MS	0.014	0.002	mg/L	JTH	06/07/02 07:23
Barium, ICP	0.763	0.003	mg/L	EL	06/13/02 19:06
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02 19:06
Calcium, ICP	139	0.080	mg/L	EL	06/13/02 19:06
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02 19:06
Copper, ICP	ND	0.003	mg/L	EL	06/13/02 19:06
Copper, ICP-MS	0.005	0.002	mg/L	JTH	06/07/02 07:23
Iron, ICP	ND	0.009	mg/L	EL	06/13/02 19:06
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 07:23
Magnesium, ICP	197	0.082	mg/L	EL	06/13/02 17:53
Metals, ICP/MS	06/07/02		date analyzed		
Metals, ICP/OES	06/13/02		date analyzed		
Potassium, ICP	71.6	0.39	mg/L	EL	06/13/02 19:06
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 07:23
Sodium, ICP	2058	4.00	mg/L	EL	06/13/02 17:53
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02 19:06
Zinc, ICP-MS	0.009	0.002	mg/L	JTH	06/07/02 07:23

Sample: 09B 22159 6b
Collected: 05/23/02 12:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	3.7	0.20	mg/L as N	BLT	05/31/02 06:53

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Total Organic Carbon, Aq	1.5	1.0	mg/L WV	06/05/02 09:50

Sample: 09C 22159 6b
Collected: 05/23/02 12:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.16	0.03	mg/L MSO	05/28/02 08:00

Sample: 09D 22159 6b
Collected: 05/23/02 12:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	13.9	0.21	mg/L MSO	05/25/02 22:27
Chloride, Ion Chrom	2265	0.39	mg/L MSO	05/31/02 22:15
Fluoride, Ion Chrom	ND	0.21	mg/L MSO	05/25/02 22:27
Ion chromatography	05/31/02		date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L as N MSO	05/25/02 22:27
Nitrite, Ion Chrom	ND	0.02	mg/L as N MSO	05/25/02 22:27
Phosphate, Ortho	0.03	0.01	mg/L as P BLT	05/31/02 11:10
Sulfate, Ion Chrom	250	0.38	mg/L MSO	05/25/02 22:27
Total Alkalinity-Titration	111	1.0	mg/L as CaCO3 TLC	06/04/02 07:35

Sample: 09E 22159 6b
Collected: 05/23/02 12:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L EL	06/13/02 17:00
Arsenic, ICP-MS	0.010	0.002	mg/L JTH	06/07/02 04:39
Barium, ICP	0.121	0.003	mg/L EL	06/13/02 17:00
Cadmium, ICP	ND	0.004	mg/L EL	06/13/02 17:00
Calcium, ICP	84.0	0.080	mg/L EL	06/13/02 17:00
Chromium, ICP	ND	0.008	mg/L EL	06/13/02 17:00
Copper, ICP	ND	0.003	mg/L EL	06/13/02 17:00
Digestion, Aqueous, 200.2	06/01/02		date prepared EL	06/01/02 17:45
Iron, ICP	32.5	0.009	mg/L EL	06/13/02 17:00
Lead, ICP-MS	ND	0.002	mg/L JTH	06/07/02 04:39
Magnesium, ICP	188	0.040	mg/L LC	06/25/02 16:13
Metals, ICP/MS	06/07/02		date analyzed	
Metals, ICP/OES	06/25/02		date analyzed	
Potassium, ICP	44.6	0.39	mg/L EL	06/13/02 17:00
Silver, ICP-MS	ND	0.001	mg/L JTH	06/07/02 04:39
Sodium, ICP	1769	2.0	mg/L LC	06/25/02 16:13
Total Hardness, Calculation	1003	0.50	mg/L as CaCO3 LC	06/25/02 16:13
Zinc, ICP	ND	0.003	mg/L EL	06/13/02 17:00

Sample: 09F 22159 6b dissolved
Collected: 05/23/02 12:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L EL	06/13/02 17:17
Arsenic, ICP-MS	0.009	0.002	mg/L JTH	06/07/02 06:51

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Barium, ICP	0.114	0.003	mg/L	EL	06/13/02	17:17
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02	17:17
Calcium, ICP	86.3	0.080	mg/L	EL	06/13/02	17:17
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02	17:17
Copper, ICP	ND	0.003	mg/L	EL	06/13/02	17:17
Copper, ICP-MS	0.005	0.002	mg/L	JTH	06/07/02	06:51
Iron, ICP	ND	0.009	mg/L	EL	06/13/02	17:17
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02	06:51
Magnesium, ICP	194	0.040	mg/L	LC	06/25/02	16:46
Metals, ICP/MS	06/07/02				date analyzed	
Metals, ICP/OES	06/25/02				date analyzed	
Potassium, ICP	45.2	0.39	mg/L	EL	06/13/02	17:17
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02	06:51
Sodium, ICP	1764	2.0	mg/L	LC	06/25/02	16:46
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02	17:17
Zinc, ICP-MS	0.009	0.002	mg/L	JTH	06/07/02	06:51

Sample: 10B 22160 6a
Collected: 05/23/02 12:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Ammonia, Automated Phenate	15	0.20	mg/L	as N BLT	06/06/02	11:19
Total Organic Carbon, Aq	7.6	1.0	mg/L	WV	06/05/02	09:50

Sample: 10C 22160 6a
Collected: 05/23/02 12:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	0.32	0.03	mg/L	MSO	05/28/02	08:00

Sample: 10D 22160 6a
Collected: 05/23/02 12:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	14.0	0.21	mg/L	MSO	05/25/02	22:38
Chloride, Ion Chrom	8167	0.39	mg/L	MSO	05/31/02	22:27
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02	22:38
Ion chromatography	06/11/02				date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/25/02	22:38
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/25/02	22:38
Phosphate, Ortho	0.02	0.01	mg/L	as P BLT	05/31/02	11:10
Sulfate, Ion Chrom	341	0.38	mg/L	MSO	05/25/02	22:38
Total Alkalinity-Titration	872	1.0	mg/L	as CaCO3 TLC	06/04/02	07:35

Sample: 10E 22160 6a
Collected: 05/23/02 12:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02	19:18
Arsenic, ICP-MS	0.017	0.002	mg/L	JTH	06/07/02	06:05
Barium, ICP	0.227	0.003	mg/L	EL	06/13/02	19:18

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02 19:18
Calcium, ICP	131	0.080	mg/L	EL	06/13/02 19:18
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02 19:18
Copper, ICP	ND	0.003	mg/L	EL	06/13/02 19:18
Digestion, Aqueous, 200.2	06/01/02		date prepared	EL	06/01/02 17:45
Iron, ICP	16.5	0.009	mg/L	EL	06/13/02 19:18
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 06:05
Magnesium, ICP	306	0.080	mg/L	EL	06/13/02 18:02
Metals, ICP/MS	06/07/02		date analyzed		
Metals, ICP/OES	06/13/02		date analyzed		
Potassium, ICP	64.3	0.39	mg/L	EL	06/13/02 19:18
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 06:05
Sodium, ICP	1896	4.00	mg/L	EL	06/13/02 18:02
Total Hardness, Calculation	1651	10	mg/L as CaCO3	EL	06/13/02 18:02
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02 19:18

Sample: 10F 22160 6a dissolved
Collected: 05/23/02 12:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02 19:22
Arsenic, ICP-MS	0.012	0.002	mg/L	JTH	06/07/02 07:39
Barium, ICP	0.191	0.003	mg/L	EL	06/13/02 19:22
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02 19:22
Calcium, ICP	135	0.080	mg/L	EL	06/13/02 19:22
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02 19:22
Copper, ICP	ND	0.003	mg/L	EL	06/13/02 19:22
Copper, ICP-MS	0.007	0.002	mg/L	JTH	06/07/02 07:39
Iron, ICP	ND	0.009	mg/L	EL	06/13/02 19:22
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 07:39
Magnesium, ICP	311	0.082	mg/L	EL	06/13/02 18:05
Metals, ICP/MS	06/07/02		date analyzed		
Metals, ICP/OES	06/13/02		date analyzed		
Potassium, ICP	66.8	0.39	mg/L	EL	06/13/02 19:22
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 07:39
Sodium, ICP	1896	4.00	mg/L	EL	06/13/02 18:05
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02 19:22
Zinc, ICP-MS	0.012	0.002	mg/L	JTH	06/07/02 07:39

Sample: 11B 22162 4a
Collected: 05/23/02 13:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	9.0	0.20	mg/L as N	BLT	05/31/02 06:53
Total Organic Carbon, Aq	6.2	1.0	mg/L	WV	06/05/02 09:50

Sample: 11C 22162 4a
Collected: 05/23/02 13:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.07	0.03	mg/L	MSO	05/28/02 08:00

TEST RESULTS BY SAMPLE

Sample: 11D 22162 4a
Collected: 05/23/02 13:05

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Bromide, Ion Chrom	10.5	0.21	mg/L	MSO	05/25/02 23:13
Chloride, Ion Chrom	2946	0.39	mg/L	MSO	05/31/02 22:39
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 23:13
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/25/02 23:13
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/25/02 23:13
Phosphate, Ortho	0.02	0.01	mg/L as P	BLT	05/31/02 11:10
Sulfate, Ion Chrom	1299	0.38	mg/L	MSO	05/31/02 22:39
Total Alkalinity-Titration	445	1.0	mg/L as CaCO3	TLC	06/04/02 07:35

Sample: 11E 22162 4a
Collected: 05/23/02 13:05

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02 19:26
Arsenic, ICP-MS	0.012	0.002	mg/L	JTH	06/07/02 06:13
Barium, ICP	0.133	0.003	mg/L	EL	06/13/02 19:26
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02 19:26
Calcium, ICP	308	1.60	mg/L	EL	06/13/02 18:18
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02 19:26
Copper, ICP	ND	0.003	mg/L	EL	06/13/02 19:26
Digestion, Aqueous, 200.2	06/01/02				date prepared EL 06/01/02 17:45
Iron, ICP	7.23	0.009	mg/L	EL	06/13/02 19:26
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 06:13
Magnesium, ICP	237	0.080	mg/L	EL	06/13/02 18:18
Metals, ICP/MS	06/07/02				date analyzed
Metals, ICP/OES	06/13/02				date analyzed
Potassium, ICP	73.5	0.39	mg/L	EL	06/13/02 19:26
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 06:13
Sodium, ICP	1655	4.00	mg/L	EL	06/13/02 18:18
Total Hardness, Calculation	1745	10	mg/L as CaCO3	EL	06/13/02 18:18
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02 19:26

Sample: 11F 22162 4a dissolved
Collected: 05/23/02 13:05

Category: GW

Test Description	Result	Det Limit	Units	By	Analyzed Dt/Tm
Aluminum, ICP	ND	0.052	mg/L	EL	06/13/02 19:29
Arsenic, ICP-MS	0.008	0.002	mg/L	JTH	06/07/02 07:46
Barium, ICP	0.119	0.003	mg/L	EL	06/13/02 19:29
Cadmium, ICP	ND	0.004	mg/L	EL	06/13/02 19:29
Calcium, ICP	306	1.65	mg/L	EL	06/13/02 18:21
Chromium, ICP	ND	0.008	mg/L	EL	06/13/02 19:29
Copper, ICP	ND	0.003	mg/L	EL	06/13/02 19:29
Copper, ICP-MS	0.005	0.002	mg/L	JTH	06/07/02 07:46
Iron, ICP	ND	0.009	mg/L	EL	06/13/02 19:29
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/07/02 07:46

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Magnesium, ICP	234	0.082	mg/L	EL	06/13/02 18:21
Metals, ICP/MS	06/07/02				date analyzed
Metals, ICP/OES	06/13/02				date analyzed
Potassium, ICP	69.8	0.39	mg/L	EL	06/13/02 19:29
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/07/02 07:46
Sodium, ICP	1642	4.00	mg/L	EL	06/13/02 18:21
Zinc, ICP	ND	0.003	mg/L	EL	06/13/02 19:29
Zinc, ICP-MS	0.008	0.002	mg/L	JTH	06/07/02 07:46

TEST METHODOLOGIES

Silver (Ag) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Aluminum (Al) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Arsenic (As) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Barium (Ba) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Calcium (Ca) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Cadmium (Cd) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Chromium (Cr) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Copper (Cu) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Digestion Method 200.2

Iron (Fe) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Hardness, Total SM2340B ICP, Calculation

ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
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TEST METHODOLOGIES

RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

ICP/MS (Inductively Coupled Argon Plasma Mass Spectrometry)
Wastewater & drinking water EPA Method 200.8
RCRA TCLP & groundwater SW 846 Method 6020
Solids SW 846 Method 6020

Potassium (K) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Magnesium (Mg) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Sodium (Na) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Lead (Pb) - ICP-MS
Wastewater & drinking water EPA Method 200.8
RCRA TCLP & groundwater SW 846 Method 6020
Solids SW 846 Method 6020

Zinc (Zn) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)
Wastewater & drinking water EPA (1983) Method 200.7
RCRA TCLP & groundwater SW 846 Method 6010
Solids SW 846 Method 6010

Total Alkalinity SM 2320B (titrimetric)

Bromide by IC USEPA 300.0

Chloride, Ion Chromatography
Drinking water, wastewater Method 300.0
Groundwater, RCRA wastes SW-846 Method 9056

Fluoride, Ion Chromatography
Drinking water, wastewater Method 300.0
Groundwater, RCRA wastes SW-846 Method 9056

Ammonia SM 4500-NH3-G 19th ed. Automated phenate
EPA Method 350.1

Nitrite, Ion Chromatography
Drinking water, wastewater Method 300.0
Groundwater, RCRA wastes SW-846 Method 9056

TEST METHODOLOGIES

Nitrate, Ion Chromatography
Drinking water, wastewater
Groundwater, RCRA wastes

Method 300.0
SW-846 Method 9056

Phosphate, Ortho

EPA Method 365.3
(colorimetric, ascorbic acid)

Sulfide in Aqueous Samples

EPA Method 376.2 - Methylene Blue Method

Sulfate, Ion Chromatography
Drinking water, wastewater
Groundwater, RCRA wastes

Method 300.0
SW-846 Method 9056



ATLANTIC COAST
Laboratories, Incorporated

630 Churchmans Road
Newark, Delaware 19702
302-266-9121 • 454-8720 (FAX)

REPORT OF ANALYSIS

Maryland Environmental Svc
2011 Commerce Park Drive
Annapolis, MD 21401

Order #: 02-05-997
Date: 08/13/02 13:07
Work ID: Hart-Miller Island GW Well
Date Received: 05/24/02
Date Completed: 06/21/02

Attn: Mr. Rex A. Lloyd

Purchase Order: 98-04-11/1-01 Act:2170292
Invoice Number: 96286

Client Code: MES_AB

SAMPLE IDENTIFICATION

<u>Sample</u>	<u>Sample</u>	<u>Sample</u>	<u>Sample</u>
<u>Number</u>	<u>Description</u>	<u>Number</u>	<u>Description</u>
01	22163	02	22164

This cover page is an integral part of the analytical report.

Laboratory Certifications: DE DE00011 PA 68-335
MD 138 NJ DE568

Certified By
Warren Van Arsdall

TEST RESULTS BY SAMPLE

Sample: 01B 22163 2b
Collected: 05/23/02 13:35

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	3.9	0.20	mg/L as N IM	06/10/02 11:29
Total Organic Carbon, Aq	2.0	1.0	mg/L WV	06/10/02 10:37

Sample: 01C 22163 2b
Collected: 05/23/02 13:35

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L MSO	05/28/02 08:00

Sample: 01D 22163 2b
Collected: 05/23/02 13:35

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	1.61	0.21	mg/L MSO	05/25/02 23:48
Chloride, Ion Chrom	279	0.39	mg/L MSO	06/11/02 11:45
Fluoride, Ion Chrom	ND	0.21	mg/L MSO	05/25/02 23:48
Ion chromatography	06/11/02		date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L as N MSO	05/25/02 23:48
Nitrite, Ion Chrom	ND	0.02	mg/L as N MSO	05/25/02 23:48
Phosphate, Ortho	0.16	0.01	mg/L as P BLT	05/31/02 07:10
Sulfate, Ion Chrom	4.30	0.38	mg/L MSO	05/25/02 23:48
Total Alkalinity-Titration	195	1.0	mg/L as CaCO3 TLC	06/04/02 07:35

Sample: 01E 22163 2b
Collected: 05/23/02 13:35

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L LC	06/09/02 09:44
Arsenic, ICP-MS	ND	0.002	mg/L JTH	06/05/02 08:50
Barium, ICP	0.065	0.003	mg/L LC	06/09/02 09:44
Cadmium, ICP	ND	0.004	mg/L LC	06/09/02 09:44
Calcium, ICP	185	0.400	mg/L LC	06/09/02 13:01
Chromium, ICP	ND	0.008	mg/L LC	06/09/02 09:44
Copper, ICP	0.003	0.003	mg/L LC	06/09/02 09:44
Digestion, Aqueous, 200.2	05/31/02		date prepared	EL 05/31/02 16:45
Iron, ICP	16.6	0.009	mg/L LC	06/09/02 09:44
Lead, ICP-MS	ND	0.002	mg/L JTH	06/05/02 08:50
Magnesium, ICP	6.57	0.004	mg/L LC	06/09/02 09:44
Metals, ICP/MS	06/05/02		date analyzed	
Metals, ICP/OES	06/09/02		date analyzed	
Potassium, ICP	2.90	0.39	mg/L LC	06/09/02 09:44
Silver, ICP-MS	ND	0.001	mg/L JTH	06/05/02 08:50
Sodium, ICP	31.7	0.20	mg/L LC	06/09/02 09:44
Total Hardness, Calculation	489	2.5	mg/L as CaCO3 LC	06/09/02 13:01
Zinc, ICP	0.004	0.003	mg/L LC	06/09/02 09:44

TEST RESULTS BY SAMPLE

Sample: 01F 22163 2b dissolved
Collected: 05/23/02 13:35

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02 09:57
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 12:28
Barium, ICP	0.042	0.003	mg/L	LC	06/09/02 09:57
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 09:57
Calcium, ICP	165	0.080	mg/L	LC	06/09/02 09:57
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 09:57
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 09:57
Iron, ICP	ND	0.009	mg/L	LC	06/09/02 09:57
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 12:28
Magnesium, ICP	6.67	0.004	mg/L	LC	06/09/02 09:57
Metals, ICP/MS	06/05/02				date analyzed
Metals, ICP/OES	06/09/02				date analyzed
Potassium, ICP	2.60	0.39	mg/L	LC	06/09/02 09:57
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 12:28
Sodium, ICP	30.2	0.20	mg/L	LC	06/09/02 09:57
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 09:57

Sample: 02B 22164 2a
Collected: 05/23/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	2.0	0.20	mg/L	as N IM	06/10/02 11:29
Total Organic Carbon, Aq	4.9	1.0	mg/L	WV	06/10/02 10:37

Sample: 02C 22164 2a
Collected: 05/23/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.08	0.03	mg/L	MSO	05/28/02 08:00

Sample: 02D 22164 2a
Collected: 05/23/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	14.8	0.21	mg/L	MSO	05/25/02 23:59
Chloride, Ion Chrom	4110	0.39	mg/L	MSO	05/31/02 22:50
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/25/02 23:59
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/25/02 23:59
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/25/02 23:59
Phosphate, Ortho	0.28	0.01	mg/L	as P BLT	05/31/02 07:10
Sulfate, Ion Chrom	512	0.38	mg/L	MSO	05/31/02 22:50
Total Alkalinity-Titration	3.6	1.0	mg/L	as CaCO3 TLC	06/04/02 07:35

TEST RESULTS BY SAMPLE

Sample: 02E 22164 2a
Collected: 05/23/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02 14:21
Arsenic, ICP-MS	0.009	0.002	mg/L	JTH	06/05/02 09:21
Barium, ICP	0.037	0.003	mg/L	LC	06/09/02 14:21
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 14:21
Calcium, ICP	113	0.800	mg/L	LC	06/09/02 10:00
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 14:21
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 14:21
Digestion, Aqueous, 200.2	05/31/02		date prepared	EL	05/31/02 16:45
Iron, ICP	122	0.090	mg/L	LC	06/09/02 10:00
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 09:21
Magnesium, ICP	238	0.040	mg/L	LC	06/09/02 10:00
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/09/02		date analyzed		
Potassium, ICP	6.13	0.39	mg/L	LC	06/09/02 14:21
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 09:21
Sodium, ICP	2243	2.0	mg/L	LC	06/09/02 10:00
Total Hardness, Calculation	1263	5.0	mg/L as CaCO3	LC	06/09/02 10:00
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 14:21

Sample: 02F 22164 2a dissolved
Collected: 05/23/02 13:45

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/09/02 14:25
Arsenic, ICP-MS	0.009	0.002	mg/L	JTH	06/05/02 12:36
Barium, ICP	0.037	0.003	mg/L	LC	06/09/02 14:25
Cadmium, ICP	ND	0.004	mg/L	LC	06/09/02 14:25
Calcium, ICP	109	0.800	mg/L	LC	06/09/02 10:03
Chromium, ICP	ND	0.008	mg/L	LC	06/09/02 14:25
Copper, ICP	ND	0.003	mg/L	LC	06/09/02 14:25
Iron, ICP	85.9	0.009	mg/L	LC	06/09/02 14:25
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/05/02 12:36
Magnesium, ICP	232	0.040	mg/L	LC	06/09/02 10:03
Metals, ICP/MS	06/05/02		date analyzed		
Metals, ICP/OES	06/09/02		date analyzed		
Potassium, ICP	5.30	0.39	mg/L	LC	06/09/02 14:25
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/05/02 12:36
Sodium, ICP	2205	2.0	mg/L	LC	06/09/02 10:03
Zinc, ICP	ND	0.003	mg/L	LC	06/09/02 14:25

TEST METHODOLOGIES

Silver (Ag) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Aluminum (Al) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Arsenic (As) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Barium (Ba) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Calcium (Ca) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Cadmium (Cd) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Chromium (Cr) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Copper (Cu) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Digestion Method 200.2

Iron (Fe) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Hardness, Total SM2340B ICP, Calculation

ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
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TEST METHODOLOGIES

RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
ICP/MS (Inductively Coupled Argon Plasma Mass Spectrometry)	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Potassium (K) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Magnesium (Mg) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Sodium (Na) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Lead (Pb) - ICP-MS	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Zinc (Zn) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Total Alkalinity	SM 2320B (titrimetric)
Bromide by IC	USEPA 300.0
Chloride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Fluoride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Ammonia	SM 4500-NH3-G 19th ed. Automated phenate EPA Method 350.1
Nitrite, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056

TEST METHODOLOGIES

Nitrate, Ion Chromatography

Drinking water, wastewater
Groundwater, RCRA wastes

Method 300.0
SW-846 Method 9056

Phosphate, Ortho

EPA Method 365.3
(colorimetric, ascorbic acid)

Sulfide in Aqueous Samples

EPA Method 376.2 - Methylene Blue Method

Sulfate, Ion Chromatography

Drinking water, wastewater
Groundwater, RCRA wastes

Method 300.0
SW-846 Method 9056



REPORT OF ANALYSIS

Maryland Environmental Svc
2011 Commerce Park Drive
Annapolis, MD 21401

Order #: 02-05-B34
Date: 08/13/02 13:06
Work ID: Hart-Miller Island DMCF GW
Date Received: 05/29/02
Date Completed: 07/11/02

Attn: Mr. Rex A. Lloyd

Purchase Order: 98-04-11/1-01 Act:2170292
Invoice Number: 96600

Client Code: MES_AB

SAMPLE IDENTIFICATION

<u>Sample Number</u>	<u>Sample Description</u>	<u>Sample Number</u>	<u>Sample Description</u>
01	22146	07	22175
02	22165	08	22176
03	22166	09	22178
04	22168	10	22180
05	22169	11	22181
06	22174		

This cover page is an integral part of the analytical report.

Laboratory Certifications: DE DE00011 PA 68-335
MD 138 NJ DE568

Certified By
Warren Van Arsdall

TEST RESULTS BY SAMPLE

Sample: 01B 22146 7b
Collected: 05/28/02 08:10

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	6.6	0.20	mg/L	as N IM	06/10/02 11:29
Total Organic Carbon, Aq	11	1.0	mg/L	WV	06/05/02 09:50

Sample: 01C 22146 7b
Collected: 05/28/02 08:10

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.03	0.03	mg/L	MSO	06/07/02 07:30

Sample: 01D 22146 7b
Collected: 05/28/02 08:10

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	1.90	0.21	mg/L	MSO	05/30/02 23:45
Chloride, Ion Chrom	518	0.39	mg/L	MSO	05/30/02 23:45
Fluoride, Ion Chrom	1.15	0.21	mg/L	MSO	05/30/02 23:45
Ion chromatography	05/30/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/30/02 23:45
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/30/02 23:45
Phosphate, Ortho	0.06	0.05	mg/L	as P BLT	05/30/02 09:50
Sulfate, Ion Chrom	58.7	0.38	mg/L	MSO	05/30/02 23:45
Total Alkalinity-Titration	183	1.0	mg/L	as CaCO3 TLC	06/05/02 08:34

Sample: 01E 22146 7b
Collected: 05/28/02 08:10

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.294	0.052	mg/L	LC	06/14/02 12:04
Arsenic, ICP-MS	0.002	0.002	mg/L	JTH	06/11/02 21:07
Barium, ICP	0.166	0.003	mg/L	LC	06/14/02 12:04
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 12:04
Calcium, ICP	172	0.800	mg/L	LC	07/01/02 08:04
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 12:04
Copper, ICP	0.016	0.003	mg/L	LC	06/14/02 12:04
Digestion, Aqueous, 200.2	06/05/02				date prepared EL 06/05/02 15:45
Iron, ICP	21.3	0.009	mg/L	LC	06/14/02 12:04
Lead, ICP-MS	0.004	0.002	mg/L	JTH	06/11/02 21:07
Magnesium, ICP	28.8	0.004	mg/L	LC	06/14/02 12:04
Metals, ICP/MS	06/11/02				date analyzed
Metals, ICP/OES	07/01/02				date analyzed
Potassium, ICP	6.80	0.39	mg/L	LC	06/14/02 12:04
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02 21:07
Sodium, ICP	116	0.20	mg/L	LC	06/14/02 12:04
Total Hardness, Calculation	567	5.0	mg/L	as CaCO3 LG	07/01/02 08:04
Zinc, ICP	0.017	0.003	mg/L	LC	06/14/02 12:04

TEST RESULTS BY SAMPLE

Sample: 01F 22146 7b dissolved
Collected: 05/28/02 08:10

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02	12:07
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/11/02	23:57
Barium, ICP	0.131	0.003	mg/L	LC	06/14/02	12:07
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02	12:07
Calcium, ICP	171	0.800	mg/L	LC	07/01/02	08:08
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02	12:07
Copper, ICP	0.003	0.003	mg/L	LC	06/14/02	12:07
Iron, ICP	ND	0.009	mg/L	LC	06/14/02	12:07
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/11/02	23:57
Magnesium, ICP	28.8	0.004	mg/L	LC	06/14/02	12:07
Metals, ICP/MS	06/11/02				date analyzed	
Metals, ICP/OES	07/01/02				date analyzed	
Potassium, ICP	6.72	0.39	mg/L	LC	06/14/02	12:07
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02	23:57
Sodium, ICP	112	0.20	mg/L	LC	06/14/02	12:07
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02	12:07

Sample: 02B 22165 surface 3
Collected: 05/24/02 09:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Ammonia, Automated Phenate	ND	0.20	mg/L	as N IM	06/10/02	11:29
Total Organic Carbon, Aq	3.1	1.0	mg/L	WV	06/05/02	09:50

Sample: 02C 22165 surface 3
Collected: 05/24/02 09:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	0.04	0.03	mg/L	MSO	06/07/02	07:30

Sample: 02D 22165 surface 3
Collected: 05/24/02 09:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	3.54	0.21	mg/L	MSO	05/30/02	23:56
Chloride, Ion Chrom	833	0.39	mg/L	MSO	05/30/02	23:56
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/30/02	23:56
Ion chromatography	06/11/02				date complete	
Nitrate, Ion Chrom	0.441	0.06	mg/L	as N MSO	05/30/02	23:56
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/30/02	23:56
Phosphate, Ortho	ND	0.01	mg/L	as P BLT	05/30/02	09:50
Sulfate, Ion Chrom	1626	0.38	mg/L	MSO	05/30/02	23:56
Total Alkalinity-Titration	ND	1.0	mg/L	as CaCO3 TLC	06/05/02	08:34

TEST RESULTS BY SAMPLE

Sample: 02E 22165 surface 3
Collected: 05/24/02 09:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.309	0.052	mg/L	LC	06/14/02 10:05
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/11/02 21:15
Barium, ICP	0.009	0.003	mg/L	LC	06/14/02 10:05
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 10:05
Calcium, ICP	262	3.20	mg/L	LC	06/25/02 17:16
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 10:05
Copper, ICP	0.010	0.003	mg/L	LC	06/14/02 10:05
Digestion, Aqueous, 200.2	06/05/02		date prepared	EL	06/05/02 15:45
Iron, ICP	0.203	0.009	mg/L	LC	06/14/02 10:05
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/11/02 21:15
Magnesium, ICP	168	0.160	mg/L	LC	06/25/02 17:16
Metals, ICP/MS	06/11/02		date analyzed		
Metals, ICP/OES	06/25/02		date analyzed		
Potassium, ICP	37.1	0.39	mg/L	LC	06/14/02 10:05
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02 21:15
Sodium, ICP	554	8.0	mg/L	LC	06/25/02 17:16
Total Hardness, Calculation	1344	20	mg/L as CaCO3	LC	06/25/02 17:16
Zinc, ICP	0.382	0.003	mg/L	LC	06/14/02 10:05

Sample: 02F 22165 surf. 3 dissolved
Collected: 05/24/02 09:30

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02 10:09
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 00:05
Barium, ICP	0.009	0.003	mg/L	LC	06/14/02 10:09
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 10:09
Calcium, ICP	265	3.30	mg/L	LC	06/25/02 17:19
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 10:09
Copper, ICP	0.006	0.003	mg/L	LC	06/14/02 10:09
Iron, ICP	ND	0.009	mg/L	LC	06/14/02 10:09
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 00:05
Magnesium, ICP	49.6	0.165	mg/L	LC	06/25/02 17:19
Metals, ICP/MS	06/12/02		date analyzed		
Metals, ICP/OES	06/25/02		date analyzed		
Potassium, ICP	37.7	0.39	mg/L	LC	06/14/02 10:09
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 00:05
Sodium, ICP	556	8.24	mg/L	LC	06/25/02 17:19
Zinc, ICP	0.339	0.003	mg/L	LC	06/14/02 10:09

Sample: 03B 22166 sclb
Collected: 05/24/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	0.39	0.20	mg/L as N	IM	06/10/02 11:29
Total Organic Carbon, Aq	1.9	1.0	mg/L	WV	06/05/02 09:50

TEST RESULTS BY SAMPLE

Sample: 03C 22166 sclb
Collected: 05/24/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	0.08	0.03	mg/L	MSO	06/07/02	07:30

Sample: 03D 22166 sclb
Collected: 05/24/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/31/02	00:08
Chloride, Ion Chrom	12.7	0.39	mg/L	MSO	05/31/02	00:08
Fluoride, Ion Chrom	0.38	0.21	mg/L	MSO	05/31/02	00:08
Ion chromatography	05/31/02				date complete	
Nitrate, Ion Chrom	1.31	0.06	mg/L as N	MSO	05/31/02	00:08
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/31/02	00:08
Phosphate, Ortho	ND	0.01	mg/L as P	BLT	05/30/02	09:50
Sulfate, Ion Chrom	ND	0.38	mg/L	MSO	05/31/02	00:08
Total Alkalinity-Titration	109	1.0	mg/L as CaCO3	TLC	06/05/02	08:34

Sample: 03E 22166 sclb
Collected: 05/24/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	0.471	0.052	mg/L	LC	06/14/02	10:22
Arsenic, ICP-MS	0.007	0.002	mg/L	JTH	06/11/02	21:38
Barium, ICP	0.038	0.003	mg/L	LC	06/14/02	10:22
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02	10:22
Calcium, ICP	33.3	0.080	mg/L	LC	06/14/02	10:22
Chromium, ICP	0.012	0.008	mg/L	LC	06/14/02	10:22
Copper, ICP	0.013	0.003	mg/L	LC	06/14/02	10:22
Digestion, Aqueous, 200.2	06/05/02			date prepared	EL	06/05/02 15:45
Iron, ICP	3.90	0.009	mg/L	LC	06/14/02	10:22
Lead, ICP-MS	0.004	0.002	mg/L	JTH	06/11/02	21:38
Magnesium, ICP	2.04	0.004	mg/L	LC	06/14/02	10:22
Metals, ICP/MS	06/11/02			date analyzed		
Metals, ICP/OES	06/14/02			date analyzed		
Potassium, ICP	2.88	0.39	mg/L	LC	06/14/02	10:22
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02	21:38
Sodium, ICP	12.8	0.20	mg/L	LC	06/14/02	10:22
Total Hardness, Calculation	91.4	0.50	mg/L as CaCO3	LC	06/14/02	10:22
Zinc, ICP	0.004	0.003	mg/L	LC	06/14/02	10:22

Sample: 03F 22166 sclb dissolved
Collected: 05/24/02 10:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02	10:26
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/12/02	00:12
Barium, ICP	0.030	0.003	mg/L	LC	06/14/02	10:26
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02	10:26

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Calcium, ICP	32.0	0.080	mg/L	LC	06/14/02 10:26
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 10:26
Copper, ICP	ND	0.003	mg/L	LC	06/14/02 10:26
Iron, ICP	ND	0.009	mg/L	LC	06/14/02 10:26
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 00:12
Magnesium, ICP	1.94	0.004	mg/L	LC	06/14/02 10:26
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	06/14/02				date analyzed
Potassium, ICP	0.724	0.39	mg/L	LC	06/14/02 10:26
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 00:12
Sodium, ICP	12.4	0.20	mg/L	LC	06/14/02 10:26
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 10:26

Sample: 04B 22168 scla
Collected: 05/24/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	47	1.0	mg/L as N	IM	06/10/02 11:29
Total Organic Carbon, Aq	22	1.0	mg/L	WV	06/06/02 14:30

Sample: 04C 22168 scla
Collected: 05/24/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.21	0.03	mg/L	MSO	06/07/02 07:30

Sample: 04D 22168 scla
Collected: 05/24/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	16.2	0.21	mg/L	MSO	05/31/02 00:19
Chloride, Ion Chrom	5221	0.39	mg/L	MSO	05/31/02 23:25
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/31/02 00:19
Ion chromatography	06/11/02				date complete MSO
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/31/02 00:19
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/31/02 00:19
Phosphate, Ortho	0.06	0.05	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	44.0	0.38	mg/L	MSO	05/31/02 00:19
Total Alkalinity-Titration	1138	1.0	mg/L as CaCO3	TLC	06/05/02 08:34

Sample: 04E 22168 scla
Collected: 05/24/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02 12:25
Arsenic, ICP-MS	0.021	0.002	mg/L	JTH	06/11/02 21:45
Barium, ICP	0.218	0.003	mg/L	LÇ	06/14/02 12:25
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 12:25
Calcium, ICP	137	0.800	mg/L	LC	06/14/02 10:30
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 12:25
Copper, ICP	0.005	0.003	mg/L	LC	06/14/02 12:25

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Digestion, Aqueous, 200.2	06/05/02		date prepared	EL	06/05/02 15:45
Iron, ICP	12.6	0.009	mg/L	LC	06/14/02 12:25
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/11/02 21:45
Magnesium, ICP	290	0.040	mg/L	LC	06/14/02 10:30
Metals, ICP/MS	06/11/02		date analyzed		
Metals, ICP/OES	06/14/02		date analyzed		
Potassium, ICP	85.3	0.39	mg/L	LC	06/14/02 12:25
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02 21:45
Sodium, ICP	2558	2.0	mg/L	LC	06/14/02 10:30
Total Hardness, Calculation	1534	5.0	mg/L as CaCO3	LC	06/14/02 10:30
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 12:25

Sample: 04F 22168 scla dissolved
Collected: 05/24/02 11:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02 12:29
Arsenic, ICP-MS	0.016	0.002	mg/L	JTH	06/12/02 00:20
Barium, ICP	0.126	0.003	mg/L	LC	06/14/02 12:29
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 12:29
Calcium, ICP	134	0.800	mg/L	LC	06/14/02 10:33
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 12:29
Copper, ICP	ND	0.003	mg/L	LC	06/14/02 12:29
Iron, ICP	0.044	0.009	mg/L	LC	06/14/02 12:29
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 00:20
Magnesium, ICP	285	0.040	mg/L	LC	06/14/02 10:33
Metals, ICP/MS	06/12/02		date analyzed		
Metals, ICP/OES	06/14/02		date analyzed		
Potassium, ICP	83.0	0.39	mg/L	LC	06/14/02 12:29
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 00:20
Sodium, ICP	2445	2.0	mg/L	LC	06/14/02 10:33
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 12:29

Sample: 05B 22169 surface 4
Collected: 05/24/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	ND	0.20	mg/L as N	IM	06/10/02 11:29
Total Organic Carbon, Aq	4.1	1.0	mg/L	WV	06/06/02 14:30

Sample: 05C 22169 surface 4
Collected: 05/24/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	06/07/02 07:30

Sample: 05D 22169 surface 4
Collected: 05/24/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	3.08	0.21	mg/L	MSO	05/31/02 00:31

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Chloride, Ion Chrom	736	0.39	mg/L	MSO	05/31/02 00:31
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/31/02 00:31
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	0.46	0.06	mg/L as N	MSO	05/31/02 00:31
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/31/02 00:31
Phosphate, Ortho	ND	0.01	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	127	0.38	mg/L	MSO	05/31/02 00:31
Total Alkalinity-Titration	22	1.0	mg/L as CaCO3	TLC	06/05/02 08:34

Sample: 05E 22169 surface 4
Collected: 05/24/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.652	0.052	mg/L	LC	06/14/02 11:08
Arsenic, ICP-MS	0.003	0.002	mg/L	JTH	06/11/02 22:32
Barium, ICP	0.019	0.003	mg/L	LC	06/14/02 11:08
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 11:08
Calcium, ICP	23.6	0.080	mg/L	LC	06/14/02 11:08
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 11:08
Copper, ICP	0.007	0.003	mg/L	LC	06/14/02 11:08
Digestion, Aqueous, 200.2	06/05/02				date prepared EL 06/05/02 15:45
Iron, ICP	0.461	0.009	mg/L	LC	06/14/02 11:08
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/11/02 22:32
Magnesium, ICP	51.9	0.004	mg/L	LC	06/14/02 11:08
Metals, ICP/MS	06/11/02				date analyzed
Metals, ICP/OES	06/25/02				date analyzed
Potassium, ICP	18.8	0.39	mg/L	LC	06/14/02 11:08
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02 22:32
Sodium, ICP	487	8.0	mg/L	LC	06/25/02 17:22
Total Hardness, Calculation	272	0.50	mg/L as CaCO3	LC	06/14/02 11:08
Zinc, ICP	0.011	0.003	mg/L	LC	06/14/02 11:08

Sample: 05F 22169 surface 4 dissolved
Collected: 05/24/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02 11:11
Arsenic, ICP-MS	0.003	0.002	mg/L	JTH	06/12/02 00:43
Barium, ICP	0.016	0.003	mg/L	LC	06/14/02 11:11
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 11:11
Calcium, ICP	23.0	0.080	mg/L	LC	06/14/02 11:11
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 11:11
Copper, ICP	0.009	0.003	mg/L	LC	06/14/02 11:11
Iron, ICP	ND	0.009	mg/L	LC	06/14/02 11:11
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 00:43
Magnesium, ICP	51.6	0.004	mg/L	LC	06/14/02 11:11
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	06/25/02				date analyzed
Potassium, ICP	18.9	0.39	mg/L	LC	06/14/02 11:11
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 00:43
Sodium, ICP	466	8.24	mg/L	LC	06/25/02 17:25

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Zinc, ICP	0.025	0.003	mg/L	LC	06/14/02 11:11

Sample: 06B 22174 cd3b
Collected: 05/28/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	3.9	0.20	mg/L	as N IM	06/10/02 11:29
Total Organic Carbon, Aq	6.8	1.0	mg/L	WV	06/06/02 14:30

Sample: 06C 22174 cd3b
Collected: 05/28/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.10	0.03	mg/L	MSO	06/07/02 07:30

Sample: 06D 22174 cd3b
Collected: 05/28/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/31/02 00:43
Chloride, Ion Chrom	170	0.39	mg/L	MSO	05/31/02 00:43
Fluoride, Ion Chrom	0.69	0.21	mg/L	MSO	05/31/02 00:43
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/31/02 00:43
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/31/02 00:43
Phosphate, Ortho	0.02	0.01	mg/L	as P BLT	05/30/02 09:50
Sulfate, Ion Chrom	ND	0.38	mg/L	MSO	05/31/02 00:43
Total Alkalinity-Titration	177	1.0	mg/L	as CaCO3 TLC	06/05/02 08:34

Sample: 06E 22174 cd3b
Collected: 05/28/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.169	0.052	mg/L	LC	06/14/02 11:15
Arsenic, ICP-MS	0.004	0.002	mg/L	JTH	06/11/02 22:40
Barium, ICP	0.092	0.003	mg/L	LC	06/14/02 11:15
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 11:15
Calcium, ICP	81.9	0.080	mg/L	LC	06/14/02 11:15
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 11:15
Copper, ICP	0.088	0.003	mg/L	LC	06/14/02 11:15
Digestion, Aqueous, 200.2	06/05/02				date prepared EL 06/05/02 15:45
Iron, ICP	7.91	0.009	mg/L	LC	06/14/02 11:15
Lead, ICP-MS	0.003	0.002	mg/L	JTH	06/11/02 22:40
Magnesium, ICP	12.9	0.004	mg/L	LC	06/14/02 11:15
Metals, ICP/MS	06/11/02				date analyzed
Metals, ICP/OES	06/14/02				date analyzed
Potassium, ICP	4.90	0.39	mg/L	LC	06/14/02 11:15
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02 22:40
Sodium, ICP	64.6	0.20	mg/L	LC	06/14/02 11:15
Total Hardness, Calculation	258	0.50	mg/L	as CaCO3 LC	06/14/02 11:15
Zinc, ICP	0.075	0.003	mg/L	LC	06/14/02 11:15

TEST RESULTS BY SAMPLE

Sample: 06F 22174 cd3b dissolved
Collected: 05/28/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02 11:19
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 00:51
Barium, ICP	0.073	0.003	mg/L	LC	06/14/02 11:19
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 11:19
Calcium, ICP	82.3	0.080	mg/L	LC	06/14/02 11:19
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 11:19
Copper, ICP	0.008	0.003	mg/L	LC	06/14/02 11:19
Iron, ICP	ND	0.009	mg/L	LC	06/14/02 11:19
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 00:51
Magnesium, ICP	13.2	0.004	mg/L	LC	06/14/02 11:19
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	07/01/02				date analyzed
Potassium, ICP	4.16	0.39	mg/L	LC	07/01/02 08:23
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 00:51
Sodium, ICP	62.0	0.20	mg/L	LC	06/14/02 11:19
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 11:19

Sample: 07B 22175 1b
Collected: 05/28/02 08:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	4.5	0.20	mg/L	as N IM	06/10/02 11:29
Total Organic Carbon, Aq	4.9	1.0	mg/L	WV	06/06/02 14:30

Sample: 07C 22175 1b
Collected: 05/28/02 08:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	06/07/02 07:30

Sample: 07D 22175 1b
Collected: 05/28/02 08:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/31/02 00:54
Chloride, Ion Chrom	359	0.39	mg/L	MSO	05/31/02 00:54
Fluoride, Ion Chrom	0.34	0.21	mg/L	MSO	05/31/02 00:54
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/31/02 00:54
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/31/02 00:54
Phosphate, Ortho	0.04	0.01	mg/L	as P BLT	05/30/02 09:50
Sulfate, Ion Chrom	2.40	0.38	mg/L	MSO	05/31/02 00:54
Total Alkalinity-Titration	189	1.0	mg/L	as CaCO3 TLC	06/05/02 08:34

TEST RESULTS BY SAMPLE

Sample: 07E 22175 1b
Collected: 05/28/02 08:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.115	0.052	mg/L	LC	06/14/02 11:23
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/11/02 22:48
Barium, ICP	0.123	0.003	mg/L	LC	06/14/02 11:23
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 11:23
Calcium, ICP	218	0.800	mg/L	LC	06/25/02 17:28
Chromium, ICP	0.008	0.008	mg/L	LC	06/14/02 11:23
Copper, ICP	ND	0.003	mg/L	LC	06/14/02 11:23
Digestion, Aqueous, 200.2	06/05/02		date prepared	EL	06/05/02 15:45
Iron, ICP	33.6	0.009	mg/L	LC	06/14/02 11:23
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/11/02 22:48
Magnesium, ICP	8.31	0.004	mg/L	LC	06/14/02 11:23
Metals, ICP/MS	06/11/02		date analyzed		
Metals, ICP/OES	06/25/02		date analyzed		
Potassium, ICP	4.36	0.39	mg/L	LC	06/14/02 11:23
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02 22:48
Sodium, ICP	66.8	0.20	mg/L	LC	06/14/02 11:23
Total Hardness, Calculation	579	5.0	mg/L as CaCO3	LC	06/25/02 17:28
Zinc, ICP	0.004	0.003	mg/L	LC	06/14/02 11:23

Sample: 07F 22175 1b dissolved
Collected: 05/28/02 08:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.058	0.052	mg/L	LC	06/14/02 11:36
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 00:59
Barium, ICP	0.082	0.003	mg/L	LC	06/14/02 11:36
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 11:36
Calcium, ICP	212	0.800	mg/L	LC	06/25/02 17:31
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 11:36
Copper, ICP	0.007	0.003	mg/L	LC	06/14/02 11:36
Iron, ICP	ND	0.009	mg/L	LC	06/14/02 11:36
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 00:59
Magnesium, ICP	8.31	0.004	mg/L	LC	06/14/02 11:36
Metals, ICP/MS	06/12/02		date analyzed		
Metals, ICP/OES	06/25/02		date analyzed		
Potassium, ICP	4.84	0.39	mg/L	LC	06/14/02 11:36
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 00:59
Sodium, ICP	65.3	0.20	mg/L	LC	06/14/02 11:36
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 11:36

Sample: 08B 22176 1a
Collected: 05/28/02 09:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	14	2.0	mg/L as N	IM	06/10/02 11:29
Total Organic Carbon, Aq	11	1.0	mg/L	WV	06/06/02 14:30

09/27/02 15:31

TEST RESULTS BY SAMPLE

Sample: 08C 22176 1a
Collected: 05/28/02 09:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	06/07/02 07:30

Sample: 08D 22176 1a
Collected: 05/28/02 09:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	10.3	0.21	mg/L	MSO	05/31/02 01:06
Chloride, Ion Chrom	3078	0.39	mg/L	MSO	06/01/02 00:00
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/31/02 01:06
Ion chromatography	06/01/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/31/02 01:06
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/31/02 01:06
Phosphate, Ortho	0.42	0.10	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	3776	0.38	mg/L	MSO	06/01/02 00:00
Total Alkalinity-Titration	818	1.0	mg/L as CaCO3	TLC	06/05/02 08:34

Sample: 08E 22176 1a
Collected: 05/28/02 09:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	13.5	0.052	mg/L	LC	06/14/02 12:34
Arsenic, ICP-MS	0.019	0.002	mg/L	JTH	06/11/02 23:11
Barium, ICP	0.248	0.003	mg/L	LC	06/14/02 12:34
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 12:34
Calcium, ICP	671	0.800	mg/L	LC	06/14/02 11:40
Chromium, ICP	0.064	0.008	mg/L	LC	06/14/02 12:34
Copper, ICP	0.064	0.003	mg/L	LC	06/14/02 12:34
Digestion, Aqueous, 200.2	06/05/02				date prepared EL 06/05/02 15:45
Iron, ICP	159	0.090	mg/L	LC	06/14/02 11:40
Lead, ICP-MS	0.055	0.002	mg/L	JTH	06/11/02 23:11
Magnesium, ICP	393	0.040	mg/L	LC	06/14/02 11:40
Metals, ICP/MS	06/11/02				date analyzed
Metals, ICP/OES	06/14/02				date analyzed
Potassium, ICP	76.2	0.39	mg/L	LC	06/14/02 12:34
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02 23:11
Sodium, ICP	1665	2.0	mg/L	LC	06/14/02 11:40
Total Hardness, Calculation	3291	5.0	mg/L as CaCO3	LC	06/14/02 11:40
Zinc, ICP	0.146	0.003	mg/L	LC	06/14/02 12:34

Sample: 08F 22176 1a dissolved
Collected: 05/28/02 09:00

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC,	06/14/02 12:39
Arsenic, ICP-MS	0.003	0.002	mg/L	JTH	06/12/02 01:06
Barium, ICP	0.036	0.003	mg/L	LC	06/14/02 12:39
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 12:39

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Calcium, ICP	637	0.800	mg/L	LC	06/14/02 12:39
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 12:39
Copper, ICP	0.004	0.003	mg/L	LC	06/14/02 12:39
Iron, ICP	ND	0.009	mg/L	LC	06/14/02 12:39
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 01:06
Magnesium, ICP	391	0.040	mg/L	LC	06/14/02 11:44
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	06/14/02				date analyzed
Potassium, ICP	74.5	0.39	mg/L	LC	06/14/02 12:39
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 01:06
Sodium, ICP	1686	2.0	mg/L	LC	06/14/02 11:44
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 12:39

Sample: 09B 22178 cd 1a
Collected: 05/28/02 10:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	45	2.0	mg/L as N	IM	06/10/02 11:29
Total Organic Carbon, Aq	24	1.0	mg/L	WV	06/06/02 14:30

Sample: 09C 22178 cd1a
Collected: 05/28/02 10:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.15	0.03	mg/L	MSO	06/07/02 07:30

Sample: 09D 22178 cd1a
Collected: 05/28/02 10:05

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	25.6	0.21	mg/L	MSO	05/31/02 01:41
Chloride, Ion Chrom	9162	0.39	mg/L	MSO	06/01/02 00:11
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	05/31/02 01:41
Ion chromatography	06/01/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/31/02 01:41
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/31/02 01:41
Phosphate, Ortho	ND	0.05	mg/L as P	BLT	05/30/02 09:50
Sulfate, Ion Chrom	3924	0.38	mg/L	MSO	06/01/02 00:11
Total Alkalinity-Titration	1742	1.0	mg/L as CaCO3	TLC	06/05/02 08:34

Sample: 09E 22178 cd1a
Collected: 05/28/02 10:05

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02 12:44
Arsenic, ICP-MS	0.023	0.002	mg/L	JTH	06/11/02 23:18
Barium, ICP	0.105	0.003	mg/L	LC	06/14/02 12:44
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 12:44
Calcium, ICP	572	0.800	mg/L	LC	06/14/02 11:48
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 12:44
Copper, ICP	ND	0.003	mg/L	LC	06/14/02 12:44

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Digestion, Aqueous, 200.2	06/05/02		date prepared	EL	06/05/02 15:45
Iron, ICP	34.8	0.009	mg/L	LC	06/14/02 12:44
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/11/02 23:18
Magnesium, ICP	708	0.040	mg/L	LC	06/14/02 11:48
Metals, ICP/MS	06/11/02		date analyzed		
Metals, ICP/OES	06/14/02		date analyzed		
Potassium, ICP	152	3.90	mg/L	LC	06/14/02 11:48
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02 23:18
Sodium, ICP	3620	2.0	mg/L	LC	06/14/02 11:48
Total Hardness, Calculation	4343	5.0	mg/L as CaCO3	LC	06/14/02 11:48
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 12:44

Sample: 09F 22178 cd1a dissolved
Collected: 05/28/02 10:05

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02 12:48
Arsenic, ICP-MS	0.015	0.002	mg/L	JTH	06/12/02 01:14
Barium, ICP	0.066	0.003	mg/L	LC	06/14/02 12:48
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 12:48
Calcium, ICP	560	0.800	mg/L	LC	06/14/02 11:52
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 12:48
Copper, ICP	0.007	0.003	mg/L	LC	06/14/02 12:48
Copper, ICP-MS	0.016	0.002	mg/L	JTH	06/12/02 01:14
Iron, ICP	0.027	0.009	mg/L	LC	06/14/02 12:48
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 01:14
Magnesium, ICP	708	0.040	mg/L	LC	06/14/02 11:52
Metals, ICP/MS	06/12/02		date analyzed		
Metals, ICP/OES	06/14/02		date analyzed		
Potassium, ICP	153	3.9	mg/L	LC	06/14/02 11:52
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 01:14
Sodium, ICP	1371	2.0	mg/L	LC	06/14/02 12:48
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 12:48
Zinc, ICP-MS	0.029	0.002	mg/L	JTH	06/12/02 01:14

Sample: 10B 22180 cd1b
Collected: 05/28/02 10:35

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	5.4	0.20	mg/L as N	IM	06/10/02 11:29
Total Organic Carbon, Aq	5.0	1.0	mg/L	WV	06/06/02 14:30

Sample: 10C 22180 cd1b
Collected: 05/28/02 10:35

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	0.10	0.03	mg/L	MŞO	06/07/02 07:30

TEST RESULTS BY SAMPLE

Sample: 10D 22180 cd1b
Collected: 05/28/02 10:35

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/31/02	02:15
Chloride, Ion Chrom	387	0.39	mg/L	MSO	05/31/02	02:15
Fluoride, Ion Chrom	0.56	0.21	mg/L	MSO	05/31/02	02:15
Ion chromatography	05/31/02				date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	05/31/02	02:15
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	05/31/02	02:15
Phosphate, Ortho	0.01	0.01	mg/L as P	BLT	05/30/02	09:50
Sulfate, Ion Chrom	2.76	0.38	mg/L	MSO	05/31/02	02:15
Total Alkalinity-Titration	165	1.0	mg/L as CaCO3	TLC	06/05/02	08:34

Sample: 10E 22180 cd1b
Collected: 05/28/02 10:35

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02	11:56
Arsenic, ICP-MS	0.005	0.002	mg/L	JTH	06/11/02	23:26
Barium, ICP	0.094	0.003	mg/L	LC	06/14/02	11:56
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02	11:56
Calcium, ICP	142	0.800	mg/L	LC	07/01/02	08:12
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02	11:56
Copper, ICP	ND	0.003	mg/L	LC	06/14/02	11:56
Digestion, Aqueous, 200.2	06/05/02			date prepared	EL	06/05/02 15:45
Iron, ICP	16.0	0.009	mg/L	LC	06/14/02	11:56
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/11/02	23:26
Magnesium, ICP	18.2	0.004	mg/L	LC	06/14/02	11:56
Metals, ICP/MS	06/11/02			date analyzed		
Metals, ICP/OES	07/01/02			date analyzed		
Potassium, ICP	4.97	0.39	mg/L	LC	06/14/02	11:56
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02	23:26
Sodium, ICP	101	0.20	mg/L	LC	06/14/02	11:56
Total Hardness, Calculation	435	5.0	mg/L as CaCO3	LC	07/01/02	08:12
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02	11:56

Sample: 10F 22180 cd1b dissolved
Collected: 05/28/02 10:35

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02	12:00
Arsenic, ICP-MS	0.003	0.002	mg/L	JTH	06/12/02	01:22
Barium, ICP	0.072	0.003	mg/L	LC	06/14/02	12:00
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02	12:00
Calcium, ICP	136	0.800	mg/L	LC	07/01/02	08:15
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02	12:00
Copper, ICP	ND	0.003	mg/L	LC	06/14/02	12:00
Copper, ICP-MS	ND	0.002	mg/L	JTH	06/12/02	01:22
Iron, ICP	ND	0.009	mg/L	LC	06/14/02	12:00
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02	01:22

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Magnesium, ICP	17.8	0.004	mg/L	LC	06/14/02 12:00
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	07/01/02				date analyzed
Potassium, ICP	4.76	0.39	mg/L	LC	06/14/02 12:00
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 01:22
Sodium, ICP	97.8	0.20	mg/L	LC	06/14/02 12:00
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 12:00
Zinc, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 01:22

Sample: 11B 22181 cdlb dup
Collected: 05/28/02 10:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	5.4	0.20	mg/L	as N IM	06/10/02 11:29
Total Organic Carbon, Aq	4.4	1.0	mg/L	WV	06/06/02 14:30

Sample: 11C 22181 cdlb dup
Collected: 05/28/02 10:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	06/07/02 07:30

Sample: 11D 22181 cdlb dup
Collected: 05/28/02 10:40

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	05/31/02 02:27
Chloride, Ion Chrom	361	0.39	mg/L	MSO	05/31/02 02:27
Fluoride, Ion Chrom	0.43	0.21	mg/L	MSO	05/31/02 02:27
Ion chromatography	05/31/02				date complete
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	05/31/02 02:27
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	05/31/02 02:27
Phosphate, Ortho	0.03	0.01	mg/L	as P BLT	05/30/02 09:50
Sulfate, Ion Chrom	ND	0.38	mg/L	MSO	05/31/02 02:27
Total Alkalinity-Titration	166	1.0	mg/L	as CaCO3 TLC	06/05/02 08:34

Sample: 11E 22181 cdlb dup
Collected: 05/28/02 10:40

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02 10:51
Arsenic, ICP-MS	0.003	0.002	mg/L	JTH	06/11/02 22:01
Barium, ICP	0.095	0.003	mg/L	LC	06/14/02 10:51
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 10:51
Calcium, ICP	137	0.800	mg/L	LC	06/25/02 17:34
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 10:51
Copper, ICP	0.004	0.003	mg/L	LC	06/14/02 10:51
Digestion, Aqueous, 200.2	06/05/02				date prepared EL
Iron, ICP	15.5	0.009	mg/L	LC	06/14/02 10:51
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/11/02 22:01
Magnesium, ICP	17.6	0.004	mg/L	LC	06/14/02 10:51

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Metals, ICP/MS	06/11/02				date analyzed
Metals, ICP/OES	06/25/02				date analyzed
Potassium, ICP	5.01	0.39	mg/L	LC	06/14/02 10:51
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/11/02 22:01
Sodium, ICP	98.9	0.20	mg/L	LC	06/14/02 10:51
Total Hardness, Calculation	420	5.0	mg/L as CaCO3	LC	06/25/02 17:34
Zinc, ICP	0.004	0.003	mg/L	LC	06/14/02 10:51

Sample: 11F 22181 cd1b dup dissolved
Collected: 05/28/02 10:40

Category: WW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	LC	06/14/02 11:04
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 01:30
Barium, ICP	0.075	0.003	mg/L	LC	06/14/02 11:04
Cadmium, ICP	ND	0.004	mg/L	LC	06/14/02 11:04
Calcium, ICP	136	0.800	mg/L	LC	06/25/02 17:37
Chromium, ICP	ND	0.008	mg/L	LC	06/14/02 11:04
Copper, ICP	0.005	0.003	mg/L	LC	06/14/02 11:04
Iron, ICP	ND	0.009	mg/L	LC	06/14/02 11:04
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/12/02 01:30
Magnesium, ICP	17.9	0.004	mg/L	LC	06/14/02 11:04
Metals, ICP/MS	06/12/02				date analyzed
Metals, ICP/OES	06/25/02				date analyzed
Potassium, ICP	5.41	0.39	mg/L	LC	06/14/02 11:04
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/12/02 01:30
Sodium, ICP	98.4	0.20	mg/L	LC	06/14/02 11:04
Zinc, ICP	ND	0.003	mg/L	LC	06/14/02 11:04

TEST METHODOLOGIES

Silver (Ag) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Aluminum (Al) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Arsenic (As) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Barium (Ba) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Calcium (Ca) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Cadmium (Cd) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Chromium (Cr) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Copper (Cu) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Digestion Method 200.2

Iron (Fe) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Hardness, Total SM2340B ICP, Calculation

ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
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TEST METHODOLOGIES

RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
ICP/MS (Inductively Coupled Argon Plasma Mass Spectrometry)	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Potassium (K) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Magnesium (Mg) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Sodium (Na) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Lead (Pb) - ICP-MS	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Zinc (Zn) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Total Organic Carbon, Aqueous	EPA Method 415.1 SW-846 Method 9060
Total Alkalinity	SM 2320B (titrimetric)
Bromide by IC	USEPA 300.0
Chloride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes.	SW-846 Method 9056
Fluoride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Ammonia	SM 4500-NH3-G 19th ed. Automated phenate EPA Method 350.1
Nitrite, Ion Chromatography	

TEST METHODOLOGIES

Drinking water, wastewater Method 300.0
Groundwater, RCRA wastes SW-846 Method 9056

Nitrate, Ion Chromatography

Drinking water, wastewater Method 300.0
Groundwater, RCRA wastes SW-846 Method 9056

Phosphate, Ortho

EPA Method 365.3
(colorimetric, ascorbic acid)

Sulfide in Aqueous Samples

EPA Method 376.2 - Methylene Blue Method

Sulfate, Ion Chromatography

Drinking water, wastewater Method 300.0
Groundwater, RCRA wastes SW-846 Method 9056



ATLANTIC COAST
Laboratories, Incorporated

630 Churchmans Road
Newark, Delaware 19702
302-266-9121 • 454-8720 (FAX)

REPORT OF ANALYSIS

Maryland Environmental Svc
2011 Commerce Park Drive
Annapolis, MD 21401

Order #: 02-06-243
Date: 08/13/02 13:07
Work ID: Hart-Miller well study
Date Received: 06/06/02
Date Completed: 07/10/02

Attn: Mr. Rex A. Lloyd

Purchase Order: 98-04-11/1-01 Act:2170292
Invoice Number: 96600

Client Code: MES_AB

SAMPLE IDENTIFICATION

<u>Sample</u> <u>Number</u>	<u>Sample</u> <u>Description</u>	<u>Sample</u> <u>Number</u>	<u>Sample</u> <u>Description</u>
01	22185 2B	03	22187 5B dup
02	22186 5B	04	22188 4B

This cover page is an integral part of the analytical report.

Laboratory Certifications: DE DE00011 PA 68-335
MD 138 NJ DE568

Certified By
Warren Van Arsdall

TEST RESULTS BY SAMPLE

Sample: 01A 22185 2B
Collected: 05/31/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.084	0.052	mg/L	EL	06/18/02 17:13
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/14/02 16:09
Barium, ICP	0.073	0.003	mg/L	EL	06/18/02 17:13
Cadmium, ICP	ND	0.004	mg/L	EL	06/18/02 17:13
Calcium, ICP	116	0.080	mg/L	EL	06/18/02 17:13
Chromium, ICP	ND	0.008	mg/L	EL	06/18/02 17:13
Copper, ICP	0.004	0.003	mg/L	EL	06/18/02 17:13
Digestion, Aqueous, 200.2	06/12/02		date prepared	LC	06/12/02 08:00
Iron, ICP	16.3	0.009	mg/L	EL	06/18/02 17:13
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/14/02 16:09
Magnesium, ICP	17.0	0.004	mg/L	EL	06/18/02 17:13
Metals, ICP/MS	06/14/02		date analyzed		
Metals, ICP/OES	06/18/02		date analyzed		
Potassium, ICP	7.60	0.39	mg/L	EL	06/18/02 17:13
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/14/02 16:09
Sodium, ICP	111	0.20	mg/L	EL	06/18/02 17:13
Total Hardness, Calculation	359	0.50	mg/L as CaCO3	EL	06/18/02 17:13
Zinc, ICP	ND	0.003	mg/L	EL	06/18/02 17:13

Sample: 01B 22185 2B dissolved
Collected: 05/31/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	0.053	0.052	mg/L	EL	06/18/02 17:27
Arsenic, ICP-MS	ND	0.002	mg/L	JTH	06/14/02 17:21
Barium, ICP	0.056	0.003	mg/L	EL	06/18/02 17:27
Cadmium, ICP	ND	0.004	mg/L	EL	06/18/02 17:27
Calcium, ICP	120	0.080	mg/L	EL	06/18/02 17:27
Chromium, ICP	ND	0.008	mg/L	EL	06/18/02 17:27
Copper, ICP	0.003	0.003	mg/L	EL	06/18/02 17:27
Iron, ICP	ND	0.009	mg/L	EL	06/18/02 17:27
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/14/02 17:21
Magnesium, ICP	17.5	0.004	mg/L	EL	06/18/02 17:27
Metals, ICP/MS	06/14/02		date analyzed		
Metals, ICP/OES	06/18/02		date analyzed		
Potassium, ICP	6.66	0.39	mg/L	EL	06/18/02 17:27
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/14/02 17:21
Sodium, ICP	111	0.20	mg/L	EL	06/18/02 17:27
Zinc, ICP	ND	0.003	mg/L	EL	06/18/02 17:27

Sample: 01C 22185 2B
Collected: 05/31/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	5.3	0.20	mg/L as N	IM	06/11/02 09:37
Total Organic Carbon, Aq	1.3	1.0	mg/L	WV	06/10/02 10:37

09/27/02 15:32

TEST RESULTS BY SAMPLE

Sample: 01D 22185 2B
Collected: 05/31/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Bromide, Ion Chrom	ND	0.21	mg/L	MSO	06/08/02	15:41
Chloride, Ion Chrom	393	0.39	mg/L	MSO	06/08/02	15:41
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	06/08/02	15:41
Ion chromatography	06/08/02				date complete	MSO
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	06/08/02	15:41
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	06/08/02	15:41
Phosphate, Ortho	0.03	0.01	mg/L as P	IM	06/12/02	07:00
Sulfate, Ion Chrom	3.41	0.38	mg/L	MSO	06/08/02	15:41
Total Alkalinity-Titration	136	1.0	mg/L as CaCO3	TLC	06/14/02	08:00

Sample: 01E 22185 2B
Collected: 05/31/02 08:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Sulfide, colorimetric	0.04	0.03	mg/L	MSO	06/07/02	07:30

Sample: 02A 22186 5B
Collected: 05/31/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	0.057	0.052	mg/L	EL	06/18/02	17:31
Arsenic, ICP-MS	0.011	0.002	mg/L	JTH	06/14/02	16:56
Barium, ICP	0.107	0.003	mg/L	EL	06/18/02	17:31
Cadmium, ICP	ND	0.004	mg/L	EL	06/18/02	17:31
Calcium, ICP	109	0.080	mg/L	EL	06/18/02	17:31
Chromium, ICP	ND	0.008	mg/L	EL	06/18/02	17:31
Copper, ICP	ND	0.003	mg/L	EL	06/18/02	17:31
Digestion, Aqueous, 200.2	06/12/02				date prepared	LC 06/12/02 08:00
Iron, ICP	61.4	0.009	mg/L	EL	06/18/02	17:31
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/14/02	16:56
Magnesium, ICP	163	0.004	mg/L	EL	06/18/02	19:11
Metals, ICP/MS	06/14/02				date analyzed	
Metals, ICP/OES	06/18/02				date analyzed	
Potassium, ICP	30.6	0.39	mg/L	EL	06/18/02	17:31
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/14/02	16:56
Sodium, ICP	1679	0.20	mg/L	EL	06/18/02	19:11
Total Hardness, Calculation	960	10	mg/L as CaCO3	EL	06/18/02	19:11
Zinc, ICP	ND	0.003	mg/L	EL	06/18/02	17:31

Sample: 02B 22186 5B dissolved
Collected: 05/31/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed</u>	<u>Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/18/02	17:35
Arsenic, ICP-MS	0.008	0.002	mg/L	JTH	06/14/02	17:29
Barium, ICP	0.100	0.003	mg/L	EL	06/18/02	17:35
Cadmium, ICP	ND	0.004	mg/L	EL	06/18/02	17:35

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Calcium, ICP	109	0.080	mg/L	EL	06/18/02 17:35
Chromium, ICP	ND	0.008	mg/L	EL	06/18/02 17:35
Copper, ICP	0.005	0.003	mg/L	EL	06/18/02 17:35
Iron, ICP	0.918	0.009	mg/L	EL	06/18/02 17:35
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/14/02 17:29
Magnesium, ICP	158	0.004	mg/L	EL	06/18/02 19:18
Metals, ICP/MS	06/14/02				date analyzed
Metals, ICP/OES	06/18/02				date analyzed
Potassium, ICP	30.9	0.39	mg/L	EL	06/18/02 17:35
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/14/02 17:29
Sodium, ICP	1653	0.20	mg/L	EL	06/18/02 19:18
Zinc, ICP	ND	0.003	mg/L	EL	06/18/02 17:35

Sample: 02C 22186 5B
Collected: 05/31/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	3.5	0.20	mg/L	as N IM	06/11/02 09:37
Total Organic Carbon, Aq	ND	1.0	mg/L	WV	06/10/02 10:37

Sample: 02D 22186 5B
Collected: 05/31/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	12.2	0.21	mg/L	MSO	06/08/02 15:53
Chloride, Ion Chrom	154	0.39	mg/L	MSO	06/20/02 11:10
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	06/08/02 15:53
Ion chromatography	06/20/02				date complete MSO
Nitrate, Ion Chrom	2.26	0.06	mg/L	as N MSO	06/08/02 15:53
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	06/08/02 15:53
Phosphate, Ortho	0.60	0.01	mg/L	as P IM	06/12/02 07:00
Sulfate, Ion Chrom	187	0.38	mg/L	MSO	06/08/02 15:53
Total Alkalinity-Titration	95	1.0	mg/L	as CaCO3 TLC	06/14/02 08:00

Sample: 02E 22186 5B
Collected: 05/31/02 09:15

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	06/07/02 07:30

Sample: 03A 22187 5B dup
Collected: 05/31/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/18/02 17:39
Arsenic, ICP-MS	0.013	0.002	mg/L	JTH	06/14/02 17:04
Barium, ICP	0.100	0.003	mg/L	EL	06/18/02 17:39
Cadmium, ICP	ND	0.004	mg/L	EL	06/18/02 17:39
Calcium, ICP	121	0.080	mg/L	EL	06/18/02 19:21
Chromium, ICP	ND	0.008	mg/L	EL	06/18/02 17:39
Copper, ICP	ND	0.003	mg/L	EL	06/18/02 17:39

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Digestion, Aqueous, 200.2	06/12/02		date prepared	LC	06/12/02 08:00
Iron, ICP	64.2	0.009	mg/L	EL	06/18/02 17:39
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/14/02 17:04
Magnesium, ICP	169	0.004	mg/L	EL	06/18/02 19:21
Metals, ICP/MS	06/14/02		date analyzed		
Metals, ICP/OES	06/18/02		date analyzed		
Potassium, ICP	30.4	0.39	mg/L	EL	06/18/02 17:39
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/14/02 17:04
Sodium, ICP	1706	4.0	mg/L	EL	06/18/02 19:21
Total Hardness, Calculation	999	10	mg/L as CaCO3	EL	06/18/02 19:21
Zinc, ICP	ND	0.003	mg/L	EL	06/18/02 17:39

Sample: 03B 22187 5B dup dissolved
Collected: 05/31/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/19/02 15:47
Arsenic, ICP-MS	0.009	0.002	mg/L	JTH	06/14/02 17:37
Barium, ICP	0.093	0.003	mg/L	EL	06/19/02 15:47
Cadmium, ICP	ND	0.004	mg/L	EL	06/19/02 15:47
Calcium, ICP	115	0.080	mg/L	EL	06/18/02 19:24
Chromium, ICP	ND	0.008	mg/L	EL	06/19/02 15:47
Copper, ICP	ND	0.003	mg/L	EL	06/19/02 15:47
Iron, ICP	0.405	0.009	mg/L	EL	06/19/02 15:47
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/14/02 17:37
Magnesium, ICP	163	0.004	mg/L	EL	06/18/02 19:24
Metals, ICP/MS	06/14/02		date analyzed		
Metals, ICP/OES	07/08/02		date analyzed		
Potassium, ICP	32.0	0.39	mg/L	EL	06/19/02 15:47
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/14/02 17:37
Sodium, ICP	1698	0.20	mg/L	EL	06/18/02 19:24
Zinc, ICP	ND	0.003	mg/L	EL	06/19/02 15:47

Sample: 03C 22187 5B dup
Collected: 05/31/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	3.4	0.20	mg/L as N	IM	06/11/02 09:37
Total Organic Carbon, Aq	ND	1.0	mg/L	WV	06/10/02 10:37

Sample: 03D 22187 5B dup
Collected: 05/31/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	14.8	0.21	mg/L	MSO	06/08/02 16:05
Chloride, Ion Chrom	3744	0.39	mg/L	MSO	06/20/02 11:22
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	06/08/02 16:05
Ion chromatography	06/20/02		date complete		
Nitrate, Ion Chrom	ND	0.06	mg/L as N	MSO	06/08/02 16:05
Nitrite, Ion Chrom	ND	0.02	mg/L as N	MSO	06/08/02 16:05
Phosphate, Ortho	0.01	0.01	mg/L as P	IM	06/12/02 07:00

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfate, Ion Chrom	194	0.38	mg/L	MSO	06/08/02 16:05
Total Alkalinity-Titration	90	1.0	mg/L as CaCO3	TLC	06/14/02 08:00

Sample: 03E 22187 5B dup
Collected: 05/31/02 09:20

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	06/07/02 07:30

Sample: 04A 22188 4B
Collected: 05/31/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/19/02 15:52
Arsenic, ICP-MS	0.018	0.002	mg/L	JTH	06/14/02 17:11
Barium, ICP	0.668	0.003	mg/L	EL	06/19/02 15:52
Cadmium, ICP	ND	0.004	mg/L	EL	06/19/02 15:52
Calcium, ICP	90.2	0.080	mg/L	EL	06/18/02 19:34
Chromium, ICP	ND	0.008	mg/L	EL	06/19/02 15:52
Copper, ICP	ND	0.003	mg/L	EL	06/19/02 15:52
Digestion, Aqueous, 200.2	06/12/02		date prepared	LC	06/12/02 08:00
Iron, ICP	18.1	0.009	mg/L	EL	06/19/02 15:52
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/14/02 17:11
Magnesium, ICP	275	0.080	mg/L	EL	06/18/02 19:34
Metals, ICP/MS	06/14/02		date analyzed		
Metals, ICP/OES	06/19/02		date analyzed		
Potassium, ICP	59.8	0.39	mg/L	EL	06/19/02 15:52
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/14/02 17:11
Sodium, ICP	2108	0.20	mg/L	EL	06/18/02 19:34
Total Hardness, Calculation	1311	10	mg/L as CaCO3	EL	06/18/02 19:27
Zinc, ICP	ND	0.003	mg/L	EL	06/19/02 15:52

Sample: 04B 22188 4B dissolved
Collected: 05/31/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Aluminum, ICP	ND	0.052	mg/L	EL	06/19/02 15:59
Arsenic, ICP-MS	0.013	0.002	mg/L	JTH	06/14/02 17:45
Barium, ICP	0.522	0.003	mg/L	EL	06/19/02 15:59
Cadmium, ICP	ND	0.004	mg/L	EL	06/19/02 15:59
Calcium, ICP	90.4	0.080	mg/L	EL	06/18/02 19:37
Chromium, ICP	ND	0.008	mg/L	EL	06/19/02 15:59
Copper, ICP	ND	0.003	mg/L	EL	06/19/02 15:59
Iron, ICP	ND	0.009	mg/L	EL	06/19/02 15:59
Lead, ICP-MS	ND	0.002	mg/L	JTH	06/14/02 17:45
Magnesium, ICP	274	0.004	mg/L	EL	06/18/02 19:37
Metals, ICP/MS	06/14/02		date analyzed		
Metals, ICP/OES	07/06/02		date analyzed		
Potassium, ICP	59.0	0.39	mg/L	EL	06/19/02 15:59
Silver, ICP-MS	ND	0.001	mg/L	JTH	06/14/02 17:45
Sodium, ICP	2113	0.20	mg/L	EL	06/18/02 19:37

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Zinc, ICP	ND	0.003	mg/L	EL	06/19/02 15:59

Sample: 04C 22188 4B
Collected: 05/31/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Ammonia, Automated Phenate	5.7	0.20	mg/L	as N IM	06/11/02 09:37
Total Organic Carbon, Aq	9.0	1.0	mg/L	WV	06/10/02 10:37

Sample: 04D 22188 4B
Collected: 05/31/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Bromide, Ion Chrom	19.9	0.21	mg/L	MSO	06/08/02 16:16
Chloride, Ion Chrom	4647	0.39	mg/L	MSO	06/20/02 11:33
Fluoride, Ion Chrom	ND	0.21	mg/L	MSO	06/08/02 16:16
Ion chromatography	06/20/02			date complete	
Nitrate, Ion Chrom	ND	0.06	mg/L	as N MSO	06/08/02 16:16
Nitrite, Ion Chrom	ND	0.02	mg/L	as N MSO	06/08/02 16:16
Phosphate, Ortho	0.02	0.01	mg/L	as P IM	06/12/02 07:00
Sulfate, Ion Chrom	14.1	0.38	mg/L	MSO	06/08/02 16:16
Total Alkalinity-Titration	705	1.0	mg/L	as CaCO3 TLC	06/14/02 08:00

Sample: 04E 22188 4B
Collected: 05/31/02 09:50

Category: GW

<u>Test Description</u>	<u>Result</u>	<u>Det Limit</u>	<u>Units</u>	<u>By</u>	<u>Analyzed Dt/Tm</u>
Sulfide, colorimetric	ND	0.03	mg/L	MSO	06/07/02 07:30

TEST METHODOLOGIES

Silver (Ag) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Aluminum (Al) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Arsenic (As) - ICP-MS

Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020

Barium (Ba) - ICP (Inductively Coupled Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Calcium (Ca) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Cadmium (Cd) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Chromium (Cr) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Copper (Cu) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Digestion Method 200.2

Iron (Fe) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010

Hardness, Total SM2340B ICP, Calculation

ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)

Wastewater & drinking water	EPA Method 200.7
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TEST METHODOLOGIES

RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
ICP/MS (Inductively Coupled Argon Plasma Mass Spectrometry)	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Potassium (K) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Magnesium (Mg) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Sodium (Na) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Lead (Pb) - ICP-MS	
Wastewater & drinking water	EPA Method 200.8
RCRA TCLP & groundwater	SW 846 Method 6020
Solids	SW 846 Method 6020
Zinc (Zn) - ICP (Inductively Coupled Argon Plasma Emission Spectroscopy)	
Wastewater & drinking water	EPA (1983) Method 200.7
RCRA TCLP & groundwater	SW 846 Method 6010
Solids	SW 846 Method 6010
Total Organic Carbon, Aqueous	EPA Method 415.1 SW-846 Method 9060
Total Alkalinity	SM 2320B (titrimetric)
Bromide by IC	USEPA 300.0
Chloride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Fluoride, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Ammonia	SM 4500-NH3-G 19th ed.. Automated phenate EPA Method 350.1
Nitrite, Ion Chromatography	

TEST METHODOLOGIES

Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Nitrate, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056
Phosphate, Ortho	
	EPA Method 365.3 (colorimetric, ascorbic acid)
Sulfide in Aqueous Samples	EPA Method 376.2 - Methylene Blue Method
Sulfate, Ion Chromatography	
Drinking water, wastewater	Method 300.0
Groundwater, RCRA wastes	SW-846 Method 9056