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FIELD STUDY OF DISPOSED WASTES FROM ADVANCED COAL PROCESSES

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1.0 OBJECTIVES

The Department of Energy/Morgantown Energy Technology Center (DOE/METC) has initiated research on the disposal of solid wastes from advanced coal processes. The objective of this research is to develop information to be used by private industry and government agencies for planning waste disposal practices associated with advanced coal processes. To accomplish this objective, DOE has contracted Radian Corporation and the North Dakota Energy & Environmental Research Center (EERC) to design, construct, and monitor a limited number of field disposal tests with advanced coal process wastes. These field tests will be monitored over a three year period with the emphasis on collecting data on the field disposal of these wastes.

There has been considerable research on the characteristics and laboratory leaching behavior of coal wastes -- a lesser amount on wastes from advanced coal processes. However, very little information exists on the field disposal behavior of these wastes. Information on field disposal behavior is needed a) as input to predictive models being developed, b) as input to the development of rule of thumb design guidelines for the disposal of these wastes, and c) as evidence of the behavior of these wastes in the natural environment.

2.0 SUMMARY OF PREVIOUS WORK

This study is organized into four major tasks. Tasks 1 and 2 were devoted to planning the Task 3 field study. Task 4 uses the results of the field testing to produce an Engineering Design Manual for the utilities and industrial users who manage wastes from advanced coal combustion technologies.

Task 1 identified and rated test design options. A Test Design Manual was prepared and submitted to METC in 1988. Specific test procedures suitable for each design option were identified under Task 2. These test methods were documented in a

Test Procedures Manual, submitted to METC in 1988. Also under Task 2, test sites were selected and site access was negotiated. Sites in Illinois and North Dakota were delayed at this stage, and the North Dakota site was dropped from consideration. Task 2 was completed and Final Test Plans were submitted to METC for three sites in 1988.

Task 3 progress for each of the test sites is summarized below.

2.1 Colorado

The test cell was constructed in June, 1989 with CFBC ash from a low sulfur western coal. The ash has low lime and sulfate content. Core samples were collected in June and December 1989, in March, June and December of 1990, in June 1991, and most recently in June 1992. No groundwater or porewater samples have been recovered; one surface runoff sample was collected. At this time the three year monitoring period at the Colorado site is completed. The DOE plans further field monitoring at this site on an annual basis. A draft site assessment report, based on the initial three years of monitoring, was completed in December, 1992.

The strength of core samples from the Colorado site is low to moderate (200 psi to 900 psi), with permeabilities of 2×10^{-3} to 3×10^{-4} cm/sec. Laboratory leachates show moderate concentrations of calcium, sulfate, and other common ions. Trace element concentrations in test leachates are low compared to regulatory limits. No leachate has been generated from the test cell at this site.

2.2 Ohio

Two test cells were constructed, in February and April of 1989, using LIMB ash from an Ohio coal with 2.4% sulfur. The ash has a high lime and sulfate content. Test Case 1 (north cell) was constructed with 25% moisture; Test Case 2 (south cell) was constructed with 38% moisture to optimize compaction. The wastes expanded,

heaved, and fractured during the first year, particularly in the south cell. Mineralogical changes in the wastes with hydration and weathering are the primary cause. Core strength is low to moderate (< 100 psi to 2000 psi) and highly variable because of fracturing. Field measurements of permeability vary from 3×10^{-3} to 5×10^{-5} cm/sec. Permeabilities are lowest in the north cell.

Large amounts of water were bound in the wastes in the first year as the waste saturated and hydrated. Starting in the second year, leachate appears to have migrated out of the south cell into one downgradient well. The leachate at the bottom of the test cell contains up to several thousand mg/L of sulfate, chloride, potassium, and sodium, with somewhat lower concentrations of calcium and silicon. Trace metal concentrations are generally low compared to regulatory limits, but a few samples contain arsenic at concentrations of up to 0.35 mg/L.

Core samples were first collected in June, 1989, and quarterly and annual core sampling events have taken place according to schedule since that time. Water samples have been collected on a quarterly basis since October, 1989. Final core sampling for the three year monitoring period took place in August, 1992. A final site report will be prepared in early 1993. Further monitoring, on an annual basis, is planned by the DOE.

2.3 Illinois

The first Illinois test cell was completed in April, 1991, with BFBC ash from a Illinois coal with 3.1% sulfur. A large excess of limestone is used in the combustor; the ash is high in lime relative to most FBC wastes, containing up to 30% CaO. The ash also contains abundant sulfate, but has relatively low concentrations of typical coal ash constituents compared to other wastes included in this study. The two test cells planned for the second Illinois test case will evaluate the effects of added coal ash on cementitious reactions in the waste. Laboratory studies to define the optimum mix of

FBC waste and coal fly ash are completed. Cell construction, planned for late fall, 1992, has been delayed until spring, 1993 because of permit complications..

The initial cell was instrumented and sampled in June 1991. Water samples and additional cores were collected in August and November, 1991, and February and May, 1992. No expansion has been noted at the site. The wastes are solidified with unconfined compressive strength between approximately 150 and 550 psi, although some fracture zones may be present in the waste and may reduce overall strength. The permeability measured on cores recovered from the test cell ranges from 1×10^6 to 2×10^4 cm/sec; field permeability measurements range from a high of 3×10^3 cm/sec near the surface to a low of 2×10^5 cm/sec at depth in the test cell.

3.0 OBJECTIVES FOR THE CURRENT REPORTING PERIOD

The specific objectives for the reporting period of October, 1992 to December, 1992 were as follows:

- Finish analyzing leachates from the third annual core samples from the Ohio site, collected in August 1992;
- Collect and analyze the sixth quarterly water samples from the first Illinois test case in August, 1992. Make field measurements and collect data from the data logger;
- Begin construction of the second Illinois test case;
- Continue production of a video presentation on the project;
- Load all remaining EERC data on the Colorado and Ohio sites into the project database;
- Finalize plans with METC for continued monitoring at the Colorado and Ohio sites beyond the initial three year period, and
- Submit the Final Case Report on the Colorado site to the DOE and EPRI.

4.0 ACTIVITIES FOR THE REPORTING PERIOD

4.1 Colorado Ute Site

The Final Case Report on the Colorado Ute test site was prepared in December, 1992 and was submitted to METC and EPRI for comments. This report summarizes data collected from the test site over a three year monitoring period, in fulfillment of reporting requirements under Subtask 3.4 for the Colorado test site.

Continued monitoring of the Colorado test site is planned on an annual basis for at least one year. Continued monitoring will be restricted to in situ permeability measurement and core sample collection for determination of physical, mineralogical, and chemical properties.

4.2 Ohio Site

The analytical results from deionized water leachates of the third annual set of core samples, collected in late August, 1992, are presented in Table 1. Cores 92AUGOH02 and 92AUGOH03 are from the south cell. Cores 92AUGOH05 and 92AUGOH06 are from the north cell. Results from cores from locations within the landfilled ash are presented separately from those for samples of the cover and base soils. The last set of digits in each sample ID represents the sample depth in feet.

Detailed discussion of these results will be included in the Final Case Report on the Ohio test site, which is in preparation. Deionized water leachates of core samples from both the north cell and the south cell appear to have significantly lower concentrations of most major ions than leachates from similar core locations did a year ago. Average conductivity values for north cell leachates dropped from 4773 umhos/cm in 1991 to 2464 umhos/cm in 1992. In the south cell the change was somewhat less pronounced, with leachate conductivities dropping from 3813 umhos/cm in 1991 to 2369

umhos/cm in 1992. The pH of leachates from both test cells has remained constant, averaging approximately 11.5 in both cells each year. Figure 1 shows the changes in average leachable concentrations of several major elements for all depths in the three sets of annual core samples. Figures 2, 3, and 4 show depth profiles of the same three analytes for 1992, 1991, and 1990, respectively.

Both leaching of soluble elements out of the test cell and continued mineralogical transformations of the waste constituents may be involved in the decline in leachable major element concentrations. Both of these possibilities will be considered when the complete data for the test site is compiled for the final site report.

4.3 Illinois Site

The sixth set of quarterly water samples was collected in November, 1992. The analytical results for water samples are shown in Table 2. Major element concentrations in groundwater samples from upgradient and downgradient monitoring wells at the Illinois site are illustrated in Figure 5. Concentrations of sulfate in shallow wells ILMW-03 and ILMW-06 in the sixth quarter samples are lower than in the initial samples taken in August, 1991, and are also lower than samples from August, 1992. These variations in major element chemistry may reflect an annual hydrological cycle.

4.3.1 Porewater Chemistry

Several new lysimeters installed in the Illinois site have yielded sufficient sample for complete analysis. The porewater samples collected within the ash are characterized by a pH of 11 to 12, contain less than 300 mg/L of calcium, 750 to 2300 mg/L sulfate, and up to 1200 mg/L each of sodium and potassium. Dissolved silicon concentrations in the porewaters vary widely, from less than 25 mg/L to 1100 mg/L. Figure 6 shows the analytical results for porewater samples from lysimeters installed in the test cell. All depths are relative to the top of the ash, which is presently covered by

Figure 1. Chemistry of deionized water leachates of Ohio cores. Values shown are averages for samples from all depths in the ash.

Figure 2. Deionized water leachates of August, 1992 core samples from the South Cell (left) and North Cell (right). The test cells consist of cover soil from 0-2 feet, LIMB ash from 2-10 feet, and base soils below 10 feet.

Figure 3. Deionized water leachates of August, 1991 core samples from the South Cell (left) and North Cell (right). The test cells consist of cover soil from 0-2 feet, LIMB ash from 2-10 feet, and base soils below 10 feet.

Figure 4. Deionized water leachates of August, 1990 core samples from the South Cell (left) and North Cell (right). In 1990 the test cells were uncovered; LIMB ash extends from 0-8 feet.

Downgradient Wells

Upgradient Wells

Calcium Chloride Sodium Sulfate Magnesium

Figure 5. Major Element Concentrations in Groundwater Samples from Wells Upgradient and Downgradient of the Illinois Test Cell for All Sampling Events

Event 6 Lysimeter Concentrations

Event 6 Lysimeter Concentrations

Figure 6. Chemistry of porewater samples from the Illinois test cell. All depths are relative to the top of the ash, which extends from 0-8 feet depth.

2 feet of vegetated soil. Most of the major and trace elements shown have a similar distribution; concentrations in the surface zone are generally lower than at the two foot depth, and concentrations at a depth of 7.5 feet, just above the base of the test cell at 8 feet, are lower than at 2 feet. Potassium and silicon concentrations show a somewhat different distribution, and were highest in ILLY05 at 1 foot depth.

In the base soil, at 10.5 feet depth, porewater concentrations of all analytes appear to be at background values. Base soil porewater has a near neutral pH and much lower concentrations of soluble elements such as chloride, potassium, and sodium than are found in porewaters within the test cell. Magnesium, which is not detected in any of the porewater samples from within the ash, is present in the base soil porewater at a concentration similar to that in monitor well ILMW03, the shallowest of the down-gradient wells.

During this quarter construction plans for Test Case 5 work were finalized and construction work was scheduled to begin. However, the approval of permit modifications was delayed and still has not been received. Radian has recommended that construction begin as soon as practical in the spring; cold weather construction was not recommended because of potential adverse impacts on the material properties of the landfill materials.

5.0 ACTIVITIES PLANNED FOR THE NEXT QUARTER

The following activities are planned for the period of January, 1993 through March 1993:

- The plans for continued monitoring at the Ohio site will be finalized;
- The seventh quarterly water samples from the first Illinois test case will be collected in February and submitted for analysis; other field measurements will also be made at that time;

- Construction of the second Illinois test case will begin, dependant on permit approval and weather conditions;
- Radian will continue production of a short video presentation on the advanced coal wastes test program;
- EERC data will continue to be loaded onto the project database and reported as available; and
- The Final Case Report on the Ohio test case will be prepared.

Table 1-A

Chemical Characteristics of Deionized Water Leachates of Ohio Ash, Event 12

		Site ID / Location ID							
		Sample ID							
		Log Date							
		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02	
		92AUGOH02-2		92AUGOH02-2.5		92AUGOH02-4		92AUGOH02-5	
		8/27/92		8/27/92		8/27/92		8/27/92	
Parameter	Units								

Anions									
Chloride	mg/L	3.3	(0.052)	5.8	(0.052)	90	(0.26)	46	(0.26)
Sulfate	mg/L	360	(0.50)	110	(0.10)	680	(1.0)	420	(0.50)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	121.24	(0.2)	64.35	(0.2)	51.65	(0.2)	43.74	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	0.42	a (0.20)	0.96	a (0.20)	0.75	a (0.20)	0.92	a (0.20)
Arsenic	mg/L	0.0078	a (0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.028	a (0.010)	0.091	(0.010)	0.060	(0.010)	0.037	a (0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	170	(1.0)	100	(1.0)	220	(1.0)	120	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	0.015	(0.0030)	0.013	a (0.0030)	0.0082	a (0.0030)	0.014	a (0.0030)
Magnesium	mg/L	ND	(1.0)	ND	(1.0)	ND	(1.0)	ND	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	ND	(0.050)	0.070	a (0.050)	0.18	a (0.050)	0.088	a (0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	3.4	a (3.0)	6.7	a (3.0)	260	(3.0)	160	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	4.9	a (1.0)	3.5	a (1.0)	4.1	a (1.0)	3.2	a (1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	3.1	a (1.0)	3.3	a (1.0)	50	(1.0)	28	(1.0)
Strontium	mg/L	0.32	(0.0030)	0.98	(0.0030)	1.4	(0.0030)	0.78	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

D2-1

Table 1-A

(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02	
		92AUGOH02-2		92AUGOH02-2.5		92AUGOH02-4		92AUGOH02-5	
Parameter	Units	8/27/92		8/27/92		8/27/92		8/27/92	

Elements by ICPEs or AA, cont.									
Vanadium	mg/L	0.031	Ⓢ (0.020)	ND	(0.020)	ND	(0.020)	0.022	Ⓢ (0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	751	(5)	782	(5)	1996	(5)	1103	(5)
pH	pH units	10.32	()	11.38	()	11.34	()	10.7	()

Table 1-A

(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH03	
		92AUGOH02-6.5		92AUGOH02-7.5		92AUGOH02-9.5		92AUGOH03-2	
		8/27/92		8/27/92		8/27/92		8/27/92	
Parameter	Units								
Anions									
Chloride	mg/L	120	(0.26)	120	(0.52)	180	(1.3)	11	(0.026)
Sulfate	mg/L	330	(0.50)	430	(0.50)	460	(0.50)	200	(0.50)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	66.96	(0.2)	84.87	(0.2)	83.84	(0.2)	77.81	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	ND	(0.20)	0.84 a	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.20	(0.010)	0.13	(0.010)	0.087	(0.010)	0.055	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	280	(1.0)	440	(1.0)	280	(1.0)	89	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	0.012 a	(0.0030)	0.0054 a	(0.0030)	0.0049 a	(0.0030)	0.015	(0.0030)
Magnesium	mg/L	ND	(1.0)	ND	(1.0)	ND	(1.0)	ND	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	0.17 a	(0.050)	0.15 a	(0.050)	0.15 a	(0.050)	0.079 a	(0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	210	(3.0)	260	(3.0)	420	(3.0)	24	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	1.4 a	(1.0)	ND	(1.0)	1.1 a	(1.0)	5.1	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	40	(1.0)	49	(1.0)	65	(1.0)	5.3	(1.0)
Strontium	mg/L	3.5	(0.0030)	3.5	(0.0030)	2.9	(0.0030)	0.92	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

D2 3

Table 1-A

(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH03	
		92AUGOH02-6.5		92AUGOH02-7.5		92AUGOH02-9.5		92AUGOH03-2	
		8/27/92		8/27/92		8/27/92		8/27/92	
Parameter	Units								

Elements by ICPES or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	2970	(5)	4440	(5)	4010	(5)	718	(5)
pH	pH units	11.95	()	12.24	()	12.15	()	11.06	()

Table 1-A

(Continued)

Parameter	Units	Site ID / Location ID							
		Sample ID		Log Date					
		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03	
		92AUGOH03-2.5		92AUGOH03-3.5		92AUGOH03-5		92AUGOH03-7	
		8/27/92		8/27/92		8/27/92		8/27/92	
Anions									
Chloride	mg/L	44	(0.13)	59	(0.26)	54	(0.26)	180	(1.3)
Sulfate	mg/L	340	(0.25)	450	(0.50)	530	(0.50)	400	(2.5)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	59.79	(0.2)	50.72	(0.2)	48.75	(0.2)	83.59	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	0.89	a (0.20)	1.6	(0.20)	1.1	(0.20)	ND	(0.20)
Arsenic	mg/L	0.0070	a (0.0040)	0.0089	a (0.0040)	0.0057	a (0.0040)	ND	(0.0040)
Barium	mg/L	0.045	a (0.010)	0.051	(0.010)	0.058	(0.010)	0.098	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	110	(1.0)	130	(1.0)	140	(1.0)	290	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	0.012	a (0.0030)	0.016	(0.0030)	0.0091	a (0.0030)	0.0070	a (0.0030)
Magnesium	mg/L	ND	(1.0)	ND	(1.0)	ND	(1.0)	ND	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	0.086	a (0.050)	0.13	a (0.050)	0.15	a (0.050)	0.14	a (0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	86	(3.0)	160	(3.0)	160	(3.0)	380	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	4.1	a (1.0)	3.5	a (1.0)	3.0	a (1.0)	ND	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	16	(1.0)	30	(1.0)	30	(1.0)	63	(1.0)
Strontium	mg/L	0.81	(0.0030)	0.85	(0.0030)	0.79	(0.0030)	3.2	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

D2-5

Table 1-A

(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03	
		92AUGOH03-2.5		92AUGOH03-3.5		92AUGOH03-5		92AUGOH03-7	
Parameter	Units	8/27/92		8/27/92		8/27/92		8/27/92	
-----	-----	-----		-----		-----		-----	
Elements by ICPES or AA, cont.									
Vanadium	mg/L	ND	(0.020)	0.023	a (0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	948	(5)	1255	(5)	1403	(5)	4900	(5)
pH	pH units	10.65	()	10.65	()	10.73	()	12.34	()

Table 1-A

(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH05	
		92AUGOH03-8		92AUGOH03-9		92AUGOH03-9.5		92AUGOH05-2.5	
		8/27/92		8/27/92		8/27/92		8/29/92	
Parameter	Units								
<hr/>									
Anions									
Chloride	mg/L	160	(1.3)	190	(1.3)	110	(0.52)	7.1	(0.026)
Sulfate	mg/L	340	(2.5)	210	(2.5)	120	(1.0)	170	(0.50)
<hr/>									
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	82.39	(0.2)	95.7	(0.2)	69.21	(0.2)	42.96	(0.2)
<hr/>									
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	0.65 a	(0.20)	0.59 a	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	0.016 a	(0.0040)
Barium	mg/L	0.072	(0.010)	0.17	(0.010)	0.10	(0.010)	0.034 a	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	240	(1.0)	200	(1.0)	90	(1.0)	150	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	0.0065 a	(0.0030)	0.0068 a	(0.0030)	0.0061 a	(0.0030)	0.0052 a	(0.0030)
Magnesium	mg/L	ND	(1.0)	ND	(1.0)	ND	(1.0)	ND	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	0.10 a	(0.050)	0.13 a	(0.050)	0.13 a	(0.050)	ND	(0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	360	(3.0)	400	(3.0)	220	(3.0)	36	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	ND	(1.0)	1.2 a	(1.0)	2.4 a	(1.0)	3.9 a	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	57	(1.0)	70	(1.0)	42	(1.0)	11	(1.0)
Strontium	mg/L	3.0	(0.0030)	3.1	(0.0030)	1.4	(0.0030)	0.64	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

D2-7

Table 1-A

(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH05	
		92AUGOH03-8		92AUGOH03-9		92AUGOH03-9.5		92AUGOH05-2.5	
Parameter	Units	8/27/92		8/27/92		8/27/92		8/29/92	
-----	-----	-----		-----		-----		-----	
Elements by ICPES or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	0.025	a (0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	3960	(5)	4120	(5)	2180	(5)	820	(5)
pH	pH units	12.25	()	12.24	()	11.92	()	10.25	()

Table 1-A

(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
		OH / 92AUGOH05		OH / 92AUGOH05		OH / 92AUGOH05		OH / 92AUGOH05	
		92AUGOH05-3		92AUGOH05-4.5		92AUGOH05-6.5		92AUGOH05-8.5	
		8/29/92		8/29/92		8/29/92		8/29/92	
Parameter	Units								
<hr/>									
Anions									
Chloride	mg/L	15	(0.13)	59	(0.26)	250	(1.3)	370	(2.6)
Sulfate	mg/L	270	(0.25)	160	(0.50)	580	(2.5)	890	(5.0)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	68.67	(0.2)	61.21	(0.2)	82.79	(0.2)	75.18	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	0.97	a (0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.066	(0.010)	0.15	(0.010)	0.076	(0.010)	0.055	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	130	(1.0)	170	(1.0)	190	(1.0)	200	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)
Magnesium	mg/L	ND	(1.0)	ND	(1.0)	ND	(1.0)	ND	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	0.12	a (0.050)	0.093	a (0.050)	0.099	a (0.050)	0.11	a (0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	50	(3.0)	150	(3.0)	440	(3.0)	750	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	0.010	a (0.0050)	0.0067	a (0.0050)
Silicon	mg/L	4.5	a (1.0)	1.9	a (1.0)	2.7	a (1.0)	2.1	a (1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	13	(1.0)	30	(1.0)	110	(1.0)	170	(1.0)
Strontium	mg/L	1.3	(0.0030)	4.1	(0.0030)	1.7	(0.0030)	2.0	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

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Table 1-A

(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
		OH / 92AUGOH05		OH / 92AUGOH05		OH / 92AUGOH05		OH / 92AUGOH05	
		92AUGOH05-3		92AUGOH05-4.5		92AUGOH05-6.5		92AUGOH05-8.5	
Parameter	Units	8/29/92		8/29/92		8/29/92		8/29/92	
-----	-----	-----		-----		-----		-----	
Elements by ICPEs or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	1003	(5)	2420	(5)	3550	(5)	5370	(5)
pH	pH units	11.27	()	11.99	()	11.88	()	12.14	()

Table 1-A

(Continued)

		Site ID / Location ID							
		Sample ID							
		Log Date							
		OH / 92AUGOH06		OH / 92AUGOH06		OH / 92AUGOH06		OH / 92AUGOH06	
		92AUGOH06-2		92AUGOH06-2.5		92AUGOH06-4		92AUGOH06-5.5	
		8/29/92		8/29/92		8/29/92		8/29/92	
Parameter	Units								

Anions									
Chloride	mg/L	6.9	(0.052)	13	(0.052)	68	(0.26)	130	(0.52)
Sulfate	mg/L	540	(2.5)	190	(0.25)	400	(0.50)	360	(0.50)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	46.22	(0.2)	73.79	(0.2)	75.06	(0.2)	60.18	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	0.21 a	(0.20)	ND	(0.20)	ND	(0.20)	0.47 a	(0.20)
Arsenic	mg/L	0.051	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.036 a	(0.010)	0.093	(0.010)	0.11	(0.010)	0.031 a	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	0.64 a	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	240	(1.0)	250	(1.0)	270	(1.0)	67	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)
Magnesium	mg/L	1.4 a	(1.0)	ND	(1.0)	ND	(1.0)	ND	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	ND	(0.050)	0.11 a	(0.050)	0.094 a	(0.050)	0.094 a	(0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	17	(3.0)	22	(3.0)	160	(3.0)	270	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	0.0078 a	(0.0050)
Silicon	mg/L	4.1 a	(1.0)	1.5 a	(1.0)	1.5 a	(1.0)	2.2 a	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	5.5	(1.0)	4.7 a	(1.0)	33	(1.0)	60	(1.0)
Strontium	mg/L	0.56	(0.0030)	1.7	(0.0030)	2.9	(0.0030)	0.59	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

D2-11

Table 1-A
(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
		OH / 92AUGOH06		OH / 92AUGOH06		OH / 92AUGOH06		OH / 92AUGOH06	
		92AUGOH06-2		92AUGOH06-2.5		92AUGOH06-4		92AUGOH06-5.5	
Parameter	Units	8/29/92		8/29/92		8/29/92		8/29/92	
-----	-----	-----		-----		-----		-----	
Elements by ICPES or AA, cont.									
Vanadium	mg/L	0.042	a (0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	0.021	a (0.020)	0.020	a (0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	1038	(5)	2140	(5)	2770	(5)	1704	(5)
pH	pH units	9.79	()	11.87	()	11.98	()	11.28	()

Table 1-A

(Continued)

		Site ID / Location ID	
		Sample ID	
		Log Date	
		</	

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

Table 1-A

(Continued)

		Site ID / Location ID			
		Sample ID		Log Date	
		OH / 92AUGOH06 92AUGOH06-7.5 8/29/92		OH / 92AUGOH06 92AUGOH06-9.5 8/29/92	
Parameter	Units	-----		-----	
-----	-----				
Elements by ICPES or AA, cont.					
Vanadium	mg/L	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)
Field measurements					
Conductivity	umhos/cm	3060	(5)	3230	(5)
pH	pH units	11.97	()	12.1	()

Table 1-B

Chemical Characteristics of Deionized Water Leachates of Ohio Soils, Event 12

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02	
		92AUGOH02-.5		92AUGOH02-10		92AUGOH02-10.5		92AUGOH02-11	
		0 - .5		9.75 - 10		10 - 10.5		10.5 - 11	
Anions									
Chloride	mg/L	1.3	(0.026)	180	(1.3)	9.6	(0.026)	7.8	(0.13)
Sulfate	mg/L	33	(0.050)	340	(0.50)	37	(0.050)	36	(0.25)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	40.12	(0.2)	81.54	(0.2)	0.29 a	(0.2)	0.3 a	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	1.2	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.017 a	(0.010)	0.090	(0.010)	0.011 a	(0.010)	ND	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	27	(1.0)	210	(1.0)	11	(1.0)	9.4	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	0.23 a	(0.050)	ND	(0.050)	1.4	(0.050)	0.067 a	(0.050)
Lead	mg/L	0.014 a	(0.0030)	0.0051 a	(0.0030)	0.015	(0.0030)	0.016	(0.0030)
Magnesium	mg/L	4.8 a	(1.0)	ND	(1.0)	4.4 a	(1.0)	3.6 a	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	ND	(0.050)	0.14 a	(0.050)	ND	(0.050)	ND	(0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	ND	(3.0)	390	(3.0)	ND	(3.0)	ND	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	3.8 a	(1.0)	1.3 a	(1.0)	2.7 a	(1.0)	1.4 a	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	3.9 a	(1.0)	62	(1.0)	5.5	(1.0)	4.8 a	(1.0)
Strontium	mg/L	0.084	(0.0030)	2.5	(0.0030)	0.039	(0.0030)	0.032	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

D2-1

Table 1-B

(Continued)

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02		OH / 92AUGOH02	
		92AUGOH02-.5		92AUGOH02-10		92AUGOH02-10.5		92AUGOH02-11	
Parameter	Units	0 - .5		9.75 - 10		10 - 10.5		10.5 - 11	
-----	-----	-----		-----		-----		-----	
Elements by ICPES or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	207	(5)	3550	(5)	132	(5)	110	(5)
pH	pH units	8.16	()	12.1	()	9.2	()	8.81	()

Table 1-B

(Continued)

Parameter	Units	Site ID / Location ID Sample ID Beg. Depth - End Depth (ft.)							
		OH / 92AUGOH02 92AUGOH02-12.5 12 - 12.5		OH / 92AUGOH02 92AUGOH02-15 14.5 - 15		OH / 92AUGOH02 92AUGOH02-16 15.5 - 16		OH / 92AUGOH02 92AUGOH02-16.5 16 - 16.5	
		-----		-----		-----		-----	
Anions									
Chloride	mg/L	2.1	(0.026)	2.1	(0.026)	NA		1.4	(0.026)
Sulfate	mg/L	66	(0.050)	310	(0.50)	NA		240	(0.50)
Bulk chemistry									
CaCO ₃ Equivalents	mg CO ₃ /g	0.2	a (0.2)	ND	(0.2)	ND	(0.2)	NA	
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	NA		0.78	a (0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	NA		0.0044	a (0.0040)
Barium	mg/L	ND	(0.010)	ND	(0.010)	NA		ND	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	NA		ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	NA		ND	(0.60)
Calcium	mg/L	12	(1.0)	72	(1.0)	NA		39	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	NA		ND	(0.010)
Cobalt	mg/L	ND	(0.010)	0.042	a (0.010)	NA		0.37	(0.010)
Copper	mg/L	ND	(0.020)	0.20	(0.020)	NA		ND	(0.020)
Iron	mg/L	ND	(0.050)	0.11	a (0.050)	NA		8.6	(0.050)
Lead	mg/L	0.0046	a (0.0030)	0.0043	a (0.0030)	NA		0.018	(0.0030)
Magnesium	mg/L	5.9	(1.0)	25	(1.0)	NA		21	(1.0)
Manganese	mg/L	ND	(0.010)	0.20	(0.010)	NA		0.44	(0.010)
Molybdenum	mg/L	ND	(0.050)	ND	(0.050)	NA		ND	(0.050)
Nickel	mg/L	ND	(0.020)	0.085	a (0.020)	NA		0.55	(0.020)
Potassium	mg/L	ND	(3.0)	6.6	a (3.0)	NA		11	a (3.0)
Selenium	mg/L	ND	(0.0050)	0.0084	a (0.0050)	NA		0.0050	a (0.0050)
Silicon	mg/L	1.4	a (1.0)	1.5	a (1.0)	NA		3.6	a (1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	NA		ND	(0.010)
Sodium	mg/L	9.6	(1.0)	10	(1.0)	NA		6.8	(1.0)
Strontium	mg/L	0.039	(0.0030)	0.14	(0.0030)	NA		0.13	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	NA		ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < SX Det. Limit

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Table 1-B

(Continued)

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH02 92AUGOH02-12.5		OH / 92AUGOH02 92AUGOH02-15		OH / 92AUGOH02 92AUGOH02-16		OH / 92AUGOH02 92AUGOH02-16.5	
		12 - 12.5		14.5 - 15		15.5 - 16		16 - 16.5	

Elements by ICPES or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	NA		ND	(0.020)
Zinc	mg/L	ND	(0.020)	0.071	a (0.020)	NA		0.97	(0.020)
Field measurements									
Conductivity	umhos/cm	165	(5)	649	(5)	535	(5)	NA	
pH	pH units	8.84	()	4.76	()	4.68	()	NA	

Table 1-B

(Continued)

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH02 92AUGOH02-18 17.5 - 18		OH / 92AUGOH03 92AUGOH03-1 .5 - 1		OH / 92AUGOH03 92AUGOH03-10 9.75 - 10		OH / 92AUGOH03 92AUGOH03-10.5 10 - 10.5	
Anions									
Chloride	mg/L	1.1	(0.026)	0.57	(0.026)	6.5	(0.026)	5.9	(0.026)
Sulfate	mg/L	170	(0.50)	91	(0.25)	73	(0.10)	190	(0.50)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	0.24	a (0.2)	45.18	(0.2)	14.2	(0.2)	24.28	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	0.23	a (0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.014	a (0.010)	0.013	a (0.010)	ND	(0.010)	ND	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	34	(1.0)	33	(1.0)	22	(1.0)	70	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	0.22	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	1.8	(0.050)	0.060	a (0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	0.0064	a (0.0030)	0.0044	a (0.0030)	0.0075	a (0.0030)	0.0031	a (0.0030)
Magnesium	mg/L	15	(1.0)	6.6	(1.0)	3.8	a (1.0)	10	(1.0)
Manganese	mg/L	0.27	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Nickel	mg/L	0.29	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	10	a (3.0)	ND	(3.0)	17	(3.0)	ND	(3.0)
Selenium	mg/L	0.0059	a (0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	2.8	a (1.0)	2.9	a (1.0)	ND	(1.0)	ND	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	6.9	(1.0)	3.6	a (1.0)	6.9	(1.0)	4.8	a (1.0)
Strontium	mg/L	0.11	(0.0030)	0.092	(0.0030)	0.066	(0.0030)	0.13	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

02-5

Table 1-B

(Continued)

		Site ID / Location ID Sample ID Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH02 92AUGOH02-18 17.5 - 18		OH / 92AUGOH03 92AUGOH03-1 .5 - 1		OH / 92AUGOH03 92AUGOH03-10 9.75 - 10		OH / 92AUGOH03 92AUGOH03-10.5 10 - 10.5	
		-----		-----		-----		-----	
Elements by ICPES or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	0.99	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	408	(5)	287	(5)	248	(5)	468	(5)
pH	pH units	5.29	()	8.07	()	7.93	()	8.42	()

Table 1-B

(Continued)

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03	
		92AUGOH03-12		92AUGOH03-14		92AUGOH03-16.5		92AUGOH03-18	
Parameter	Units	11.5 - 12		13.5 - 14		16 - 16.5		17.5 - 18	

Anions									
Chloride	mg/L	2.4	(0.026)	1.5	(0.026)	0.11 a	(0.026)	0.43	(0.026)
Sulfate	mg/L	360	(1.0)	370	(1.0)	280	(0.50)	210	(0.50)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	5.39	(0.2)	14.14	(0.2)	0.68 a	(0.2)	1.04	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	0.39 a	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	ND	(0.010)	ND	(0.010)	0.010 a	(0.010)	0.010 a	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	130	(1.0)	140	(1.0)	68	(1.0)	47	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	0.16	(0.010)	0.060	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	ND	(0.050)	5.6	(0.050)	0.17 a	(0.050)
Lead	mg/L	ND	(0.0030)	0.0062 a	(0.0030)	0.028	(0.0030)	0.057	(0.0030)
Magnesium	mg/L	18	(1.0)	21	(1.0)	22	(1.0)	18	(1.0)
Manganese	mg/L	ND	(0.010)	0.097	(0.010)	0.41	(0.010)	0.35	(0.010)
Molybdenum	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Nickel	mg/L	ND	(0.020)	0.063 a	(0.020)	1.1	(0.020)	0.50	(0.020)
Potassium	mg/L	ND	(3.0)	5.1 a	(3.0)	9.2 a	(3.0)	8.3 a	(3.0)
Selenium	mg/L	ND	(0.0050)	0.031	(0.0050)	0.11	(0.010)	0.054	(0.0050)
Silicon	mg/L	ND	(1.0)	ND	(1.0)	2.9 a	(1.0)	1.8 a	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	5.0	(1.0)	4.9 a	(1.0)	6.9	(1.0)	6.1	(1.0)
Strontium	mg/L	0.23	(0.0030)	0.27	(0.0030)	0.26	(0.0030)	0.17	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

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Table 1-B

(Continued)

		Site ID / Location ID							
		Sample ID				Beg. Depth - End Depth (ft.)			
		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03		OH / 92AUGOH03	
		92AUGOH03-12		92AUGOH03-14		92AUGOH03-16.5		92AUGOH03-18	
Parameter	Units	11.5 - 12		13.5 - 14		16 - 16.5		17.5 - 18	
-----	-----	-----		-----		-----		-----	
Elements by ICPES or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	2.7	(0.020)	0.038 a	(0.020)
Field measurements									
Conductivity	umhos/cm	746	(5)	780	(5)	594	(5)	479	(5)
pH	pH units	7.87	()	7.43	()	4.76	()	5.17	()

Table 1-B
(Continued)

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH05 92AUGOH05-1.5		OH / 92AUGOH05 92AUGOH05-10.5		OH / 92AUGOH05 92AUGOH05-11.5		OH / 92AUGOH05 92AUGOH05-12	
		1 - 1.5		10 - 10.5		11 - 11.5		11.5 - 12	
<hr/>									
Anions									
Chloride	mg/L	ND	(0.026)	210	(0.52)	150	(0.52)	110	(0.26)
Sulfate	mg/L	10	(0.050)	590	(0.50)	350	(0.50)	230	(0.50)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	0.82	a (0.2)	75.99	(0.2)	82.32	(0.2)	79.94	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	0.23	a (0.20)	0.23	a (0.20)	ND	(0.20)	0.61	a (0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.011	a (0.010)	0.040	a (0.010)	0.064	(0.010)	0.069	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	17	(1.0)	140	(1.0)	280	(1.0)	360	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	0.24	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	0.15	(0.020)
Iron	mg/L	0.53	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	0.0030	a (0.0030)	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)
Magnesium	mg/L	2.6	a (1.0)	ND	(1.0)	ND	(1.0)	ND	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	ND	(0.050)	0.15	a (0.050)	0.12	a (0.050)	0.11	a (0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	ND	(3.0)	510	(3.0)	340	(3.0)	200	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	1.7	a (1.0)	1.1	a (1.0)	ND	(1.0)	ND	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	2.0	a (1.0)	99	(1.0)	76	(1.0)	50	(1.0)
Strontium	mg/L	0.042	(0.0030)	1.8	(0.0030)	3.1	(0.0030)	3.5	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

Table 1-B

(Continued)

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH05 92AUGOH05-1.5		OH / 92AUGOH05 92AUGOH05-10.5		OH / 92AUGOH05 92AUGOH05-11.5		OH / 92AUGOH05 92AUGOH05-12	
		1 - 1.5		10 - 10.5		11 - 11.5		11.5 - 12	

Elements by ICPEs or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	0.022	a (0.020)	ND	(0.020)	12	(0.020)
Field measurements									
Conductivity	umhos/cm	112	(5)	3490	(5)	4060	(5)	4040	(5)
pH	pH units	7.66	()	11.89	()	12.05	()	12.09	()

Table 1-B

(Continued)

		Site ID / Location ID Sample ID Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH05 92AUGOH05-12.5 12 - 12.5		OH / 92AUGOH05 92AUGOH05-13 12.5 - 13		OH / 92AUGOH05 92AUGOH05-14.5 14 - 14.5		OH / 92AUGOH05 92AUGOH05-16.5 16 - 16.5	
Anions									
Chloride	mg/L	8.6	(0.026)	12	(0.026)	2.7	(0.026)	0.48	(0.026)
Sulfate	mg/L	19	(0.050)	40	(0.050)	38	(0.050)	79	(0.10)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	3.12	(0.2)	12.98	(0.2)	25.59	(0.2)	47.45	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	0.66	a (0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	0.021	a (0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	ND	(1.0)	6.5	(1.0)	21	(1.0)	37	(1.0)
Chromium	mg/L	0.016	a (0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	0.53	(0.050)	0.15	a (0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	0.0042	a (0.0030)	0.0091	a (0.0030)	0.0037	a (0.0030)	0.0055	a (0.0030)
Magnesium	mg/L	ND	(1.0)	1.1	a (1.0)	4.0	a (1.0)	7.7	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	0.031	a (0.010)
Molybdenum	mg/L	0.088	a (0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	22	(3.0)	25	(3.0)	ND	(3.0)	4.1	a (3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	1.7	a (1.0)	1.2	a (1.0)	1.4	a (1.0)	ND	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	7.2	(1.0)	11	(1.0)	1.8	a (1.0)	2.0	a (1.0)
Strontium	mg/L	0.0075	a (0.0030)	0.025	(0.0030)	0.065	(0.0030)	0.15	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

02-11

Table 1-B

(Continued)

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH05 92AUGOH05-12.5		OH / 92AUGOH05 92AUGOH05-13		OH / 92AUGOH05 92AUGOH05-14.5		OH / 92AUGOH05 92AUGOH05-16.5	
		12 - 12.5		12.5 - 13		14 - 14.5		16 - 16.5	

Elements by ICPEs or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	0.80	(0.020)	0.26	(0.020)	0.059 a	(0.020)	0.029 a	(0.020)
Field measurements									
Conductivity	umhos/cm	888	(5)	200	(5)	224	(5)	320	(5)
pH	pH units	9.39	()	9.09	()	9.04	()	8.43	()

Table 1-B

(Continued)

		Site ID / Location ID Sample ID Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH05 92AUGOH05-18.5 18 - 18.5		OH / 92AUGOH05 92AUGOH05-20 19.5 - 20		OH / 92AUGOH06 92AUGOH06-.5 0 - .5		OH / 92AUGOH06 92AUGOH06-11 10.5 - 11	
<hr/>									
Anions									
Chloride	mg/L	0.43	(0.026)	0.39	(0.026)	0.33	(0.052)	110	(0.26)
Sulfate	mg/L	120	(0.10)	48	(0.050)	7.5	(0.10)	260	(0.50)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	49.05	(0.2)	52.2	(0.2)	9.62	(0.2)	80.44	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.023 a	(0.010)	0.025 a	(0.010)	ND	(0.010)	0.073	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	48	(1.0)	23	(1.0)	11	(1.0)	210	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	ND	(0.050)	0.92	(0.050)	ND	(0.050)
Lead	mg/L	0.0050 a	(0.0030)	0.0091 a	(0.0030)	0.0047 a	(0.0030)	0.0057 a	(0.0030)
Magnesium	mg/L	9.5	(1.0)	5.7	(1.0)	1.8 a	(1.0)	ND	(1.0)
Manganese	mg/L	0.023 a	(0.010)	0.012 a	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	0.11 a	(0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	5.3 a	(3.0)	3.8 a	(3.0)	ND	(3.0)	280	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	ND	(1.0)	1.0 a	(1.0)	1.2 a	(1.0)	1.4 a	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	2.3 a	(1.0)	2.8 a	(1.0)	ND	(1.0)	59	(1.0)
Strontium	mg/L	0.20	(0.0030)	0.15	(0.0030)	0.032	(0.0030)	2.4	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

D2-13

Table 1-B

(Continued)

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
		OH / 92AUGOH05		OH / 92AUGOH05		OH / 92AUGOH06		OH / 92AUGOH06	
		92AUGOH05-18.5		92AUGOH05-20		92AUGOH06-.5		92AUGOH06-11	
Parameter	Units	18 - 18.5		19.5 - 20		0 - .5		10.5'- 11	
-----	-----	-----		-----		-----		-----	
Elements by ICPEs or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	0.041	a (0.020)	ND	(0.020)	0.021	a (0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	379	(5)	218	(5)	195	(5)	3500	(5)
pH	pH units	8.78	()	8.9	()	7.67	()	12.22	()

Table 1-B

(Continued)

		Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
Parameter	Units	OH / 92AUGOH06 92AUGOH06-11.5		OH / 92AUGOH06 92AUGOH06-12		OH / 92AUGOH06 92AUGOH06-12.5		OH / 92AUGOH06 92AUGOH06-14	
		11 - 11.5		11.5 - 12		12 - 12.5		13.5 - 14	

Anions									
Chloride	mg/L	130	(0.52)	5.2	(0.026)	5.9	(0.026)	1.2	(0.026)
Sulfate	mg/L	190	(1.0)	11	(0.050)	25	(0.050)	68	(0.050)
Bulk chemistry									
CaCO3 Equivalents	mg CO3/g	78.3	(0.2)	0.46 a	(0.2)	0.35 a	(0.2)	6.91	(0.2)
Elements by ICPEs or AA									
Aluminum	mg/L	0.74 a	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.061	(0.010)	ND	(0.010)	0.025 a	(0.010)	0.012 a	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	68	(1.0)	5.0	(1.0)	11	(1.0)	27	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	0.37	(0.050)	0.42	(0.050)	ND	(0.050)
Lead	mg/L	0.0051 a	(0.0030)	0.016	(0.0030)	0.014 a	(0.0030)	0.020	(0.0030)
Magnesium	mg/L	ND	(1.0)	ND	(1.0)	1.8 a	(1.0)	5.7	(1.0)
Manganese	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	0.16 a	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	360	(3.0)	ND	(3.0)	ND	(3.0)	ND	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	0.0069 a	(0.0050)
Silicon	mg/L	2.4 a	(1.0)	1.2 a	(1.0)	1.6 a	(1.0)	ND	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	82	(1.0)	3.7 a	(1.0)	3.9 a	(1.0)	1.9 a	(1.0)
Strontium	mg/L	1.1	(0.0030)	0.012 a	(0.0030)	0.022	(0.0030)	0.067	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

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Table 1-B

(Continued)

Parameter	Units	Site ID / Location ID							
		Sample ID							
		Beg. Depth - End Depth (ft.)							
		OH / 92AUGOH06 92AUGOH06-11.5 11 - 11.5		OH / 92AUGOH06 92AUGOH06-12 11.5 - 12		OH / 92AUGOH06 92AUGOH06-12.5 12 - 12.5		OH / 92AUGOH06 92AUGOH06-14 13.5 - 14	
<hr/>									
Elements by ICPES or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	2920	(5)	648	(5)	104	(5)	212	(5)
pH	pH units	12.13	()	9.03	()	7.5	()	8.6	()

Table 1-B
(Continued)

		Site ID / Location ID					
		Sample ID					
		Beg. Depth - End Depth (ft.)					
Parameter	Units	OH / 92AUGOH06		OH / 92AUGOH06		OH / 92AUGOH06	
		92AUGOH06-16		92AUGOH06-18		92AUGOH06-20	
		15.5 - 16		17.5 - 18		19.5 - 20	

Anions							
Chloride	mg/L	0.64	(0.026)	0.54	(0.026)	0.67	(0.026)
Sulfate	mg/L	110	(0.10)	100	(0.25)	130	(0.25)
Bulk chemistry							
CaCO3 Equivalents	mg CO3/g	36.39	(0.2)	37.35	(0.2)	49.42	(0.2)
Elements by ICPEs or AA							
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.014 a	(0.010)	0.016 a	(0.010)	0.022 a	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)
Calcium	mg/L	41	(1.0)	46	(1.0)	60	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)
Lead	mg/L	0.013 a	(0.0030)	0.0077 a	(0.0030)	0.0098 a	(0.0030)
Magnesium	mg/L	7.9	(1.0)	8.2	(1.0)	10	(1.0)
Manganese	mg/L	0.024 a	(0.010)	0.038 a	(0.010)	0.057	(0.010)
Molybdenum	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	ND	(3.0)	6.6 a	(3.0)	13 a	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	ND	(1.0)	ND	(1.0)	ND	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	1.2 a	(1.0)	1.6 a	(1.0)	2.6 a	(1.0)
Strontium	mg/L	0.096	(0.0030)	0.12	(0.0030)	0.16	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

Table 1-B

(Continued)

Parameter -----	Units -----	Site ID / Location ID Sample ID Beg. Depth - End Depth (ft.)					
		OH / 92AUGOH06 92AUGOH06-16 15.5 - 16		OH / 92AUGOH06 92AUGOH06-18 17.5 - 18		OH / 92AUGOH06 92AUGOH06-20 19.5 - 20	
		-----		-----		-----	
Elements by ICPEs or AA, cont.							
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	0.020 a	(0.020)
Field measurements							
Conductivity	umhos/cm	286	(5)	327	(5)	389	(5)
pH	pH units	8.17	()	8.14	()	7.97	()

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

Table 2

Chemical Characteristics of Liquid From Illinois, Event 6

		Site ID / Location ID							
		Sample ID							
		Log Date							
		IL / ILMW01		IL / ILMW02		IL / ILMW03		IL / ILMW04	
		IL112		IL113		IL114		IL115	
		11/22/92		11/22/92		11/22/92		11/22/92	
Parameter	Units								
-----	-----	-----		-----		-----		-----	
Anions									
Chloride	mg/L	20	(0.26)	14	(0.26)	51	(0.26)	17	(0.26)
Fluoride	mg/L	0.22	(0.020)	0.19	(0.020)	0.12	(0.020)	0.24	(0.020)
Sulfate	mg/L	430	(0.50)	1400	(5.0)	1000	(2.5)	340	(0.50)
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	0.0046 a	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.025 a	(0.010)	ND	(0.010)	0.020 a	(0.010)	0.016 a	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	1.2 a	(0.60)	ND	(0.60)	0.64 a	(0.60)	1.3 a	(0.60)
Cadmium	mg/L	ND	(0.0010)	ND	(0.0010)	ND	(0.0010)	ND	(0.0010)
Calcium	mg/L	170	(1.0)	430	(1.0)	430	(1.0)	150	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	1.1	(0.050)	ND	(0.050)	ND	(0.050)	0.76	(0.050)
Lead	mg/L	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)
Magnesium	mg/L	95	(1.0)	230	(1.0)	20	(1.0)	79	(1.0)
Manganese	mg/L	1.3	(0.010)	4.2	(0.010)	0.16	(0.010)	0.33	(0.010)
Mercury	mg/L	ND	(0.00018)	ND	(0.00018)	ND	(0.00018)	ND	(0.00018)
Molybdenum	mg/L	ND	(0.050)	ND	(0.050)	0.050 a	(0.050)	ND	(0.050)
Nickel	mg/L	ND	(0.020)	0.030 a	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	7.6 a	(3.0)	4.6 a	(3.0)	17	(3.0)	6.8 a	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	7.2	(1.0)	7.1	(1.0)	3.1 a	(1.0)	6.8	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	120	(1.0)	67	(1.0)	79	(1.0)	160	(1.0)
Strontium	mg/L	1.5	(0.0030)	0.91	(0.0030)	2.0	(0.0030)	1.5	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

C1-1

Table 2
(Continued)

Parameter	Units	Site ID / Location ID							
		Sample ID		Sample ID		Sample ID		Sample ID	
		Log Date		Log Date		Log Date		Log Date	
		IL / ILMW01		IL / ILMW02		IL / ILMW03		IL / ILMW04	
		IL112		IL113		IL114		IL115	
		11/22/92		11/22/92		11/22/92		11/22/92	

Elements by ICPEs or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	0.023 a	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	2080	(5)	3050	(5)	2400	(5)	2020	(5)
Filterable Residue	mg/L	1358	(1)	3116	(1)	2068	(1)	1319	(1)
Redox (Eh)	mV	8.8	()	1.9	()	-25.7	()	7.6	()
Temperature	deg. C	12.9	()	13.3	()	12.5	()	12.1	()
Total Alkalinity	meq/L	12.4	(0.03)	10.3	(0.03)	.8	(0.03)	14.5	(0.03)
pH	pH units	6.65	()	6.77	()	7.27	()	6.66	()

Table 2
(Continued)

		Site ID / Location ID							
		Sample ID							
		Log Date							
		IL / ILMW05		IL / ILMW06		IL / ILMW07		IL / ILMW07	
		IL116		IL117		IL118		IL122	
Parameter	Units	11/22/92		11/22/92		11/22/92		11/22/92	

Anions									
Chloride	mg/L	16	(0.26)	22	(0.26)	33	(0.26)	32	(0.26)
Fluoride	mg/L	0.24	(0.020)	0.13	(0.020)	0.35	(0.020)	0.35	(0.020)
Sulfate	mg/L	340	(0.50)	1200	(5.0)	220	(0.50)	210	(0.50)
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.015 a	(0.010)	0.014 a	(0.010)	0.028 a	(0.010)	0.030 a	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	1.3 a	(0.60)	1.1 a	(0.60)	1.7 a	(0.60)	1.7 a	(0.60)
Cadmium	mg/L	ND	(0.0010)	ND	(0.0010)	ND	(0.0010)	ND	(0.0010)
Calcium	mg/L	150	(1.0)	360	(1.0)	110	(1.0)	120	(1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	0.77	(0.050)	ND	(0.050)	1.7	(0.050)	1.7	(0.050)
Lead	mg/L	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)
Magnesium	mg/L	83	(1.0)	210	(1.0)	64	(1.0)	66	(1.0)
Manganese	mg/L	0.35	(0.010)	1.4	(0.010)	0.31	(0.010)	0.32	(0.010)
Mercury	mg/L	ND	(0.00018)	ND	(0.00018)	ND	(0.00018)	ND	(0.00018)
Molybdenum	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Nickel	mg/L	ND	(0.020)	0.029 a	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	6.7 a	(3.0)	16	(3.0)	5.7 a	(3.0)	6.4 a	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	7.0	(1.0)	7.2	(1.0)	7.7	(1.0)	7.9	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	170	(1.0)	160	(1.0)	150	(1.0)	160	(1.0)
Strontium	mg/L	1.6	(0.0030)	2.7	(0.0030)	1.3	(0.0030)	1.3	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

C1-3

Table 2
(Continued)

Parameter	Units	Site ID / Location ID							
		Sample ID				Log Date			
		IL / ILMW05		IL / ILMW06		IL / ILMW07		IL / ILMW07	
		IL116		IL117		IL118		IL122	
-----	-----	11/22/92		11/22/92		11/22/92		11/22/92	

Elements by ICPEs or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	2080	(5)	3000	(5)	2380	(5)	2400	(5)
Filterable Residue	mg/L	1284	(1)	3025	(1)	1063	(1)	1051	(1)
Redox (Eh)	mV	7.3	()	20.2	()	-0.5	()	1.5	()
Temperature	deg. C	11.9	()	12.1	()	12.0	()	12.0	()
Total Alkalinity	meq/L	14.4	(0.03)	15.6	(0.03)	12.5	(0.03)	12.4	(0.03)
pH	pH units	6.66	()	6.49	()	6.80	()	6.80	()

() = Detection Limit ND = Not Detected NA = Not Analyzed @ = < 5X Det. Limit

C1-4

Table 2
(Continued)

		Site ID / Location ID							
		Sample ID				Log Date			
Parameter	Units	IL / ILMW08		IL / ILMW09		IL / ILBLNK		IL / ILLY05	
		IL119		IL120		IL121		IL127	
		11/22/92		11/22/92		11/22/92		11/22/92	
<hr/>									
Anions									
Chloride	mg/L	11	(0.13)	8.4	(0.13)	0.27	(0.026)	36	(0.26)
Fluoride	mg/L	0.19	(0.020)	0.17	(0.020)	ND	(0.020)	0.13	(0.020)
Sulfate	mg/L	1200	(5.0)	2100	(5.0)	1.7	(0.050)	750	(2.5)
<hr/>									
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.017	a (0.010)	0.034	a (0.010)	ND	(0.010)	ND	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Cadmium	mg/L	ND	(0.0010)	ND	(0.0010)	0.0014	a (0.0010)	ND	(0.0010)
Calcium	mg/L	340	(1.0)	370	(1.0)	ND	(1.0)	1.00	a (1.0)
Chromium	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	0.076	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	0.027	a (0.020)
Iron	mg/L	0.085	a (0.050)	ND	(0.050)	ND	(0.050)	0.16	a (0.050)
Lead	mg/L	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)
Magnesium	mg/L	220	(1.0)	490	(1.0)	ND	(1.0)	ND	(1.0)
Manganese	mg/L	1.9	(0.010)	5.4	(0.010)	ND	(0.010)	ND	(0.010)
Mercury	mg/L	ND	(0.00018)	ND	(0.00018)	ND	(0.00018)	NA	
Molybdenum	mg/L	ND	(0.050)	ND	(0.050)	ND	(0.050)	0.14	a (0.050)
Nickel	mg/L	ND	(0.020)	0.032	a (0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	3.0	a (3.0)	8.5	a (3.0)	ND	(3.0)	1200	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	7.7	(1.0)	6.0	(1.0)	ND	(1.0)	1100	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	49	(1.0)	55	(1.0)	ND	(1.0)	430	(1.0)
Strontium	mg/L	0.41	(0.0030)	1.4	(0.0030)	ND	(0.0030)	0.0092	a (0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

C1-5

Table 2
(Continued)

Parameter	Units	Site ID / Location ID							
		Sample ID		Sample ID		Sample ID		Sample ID	
		Log Date		Log Date		Log Date		Log Date	
		IL / ILMW08		IL / ILMW09		IL / ILBLNK		IL / ILLY05	
		IL119		IL120		IL121		IL127	
		11/22/92		11/22/92		11/22/92		11/22/92	

Elements by ICPEs or AA, cont.									
Vanadium	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	0.034 @	(0.020)
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	0.020 @	(0.020)
Field measurements									
Conductivity	umhos/cm	2730	(5)	3450	(5)	230	(5)	4300	(5)
Filterable Residue	mg/L	2666	(1)	3791	(1)	11	(1)	NA	
Redox (Eh)	mV	8.2	()	15.3	()	-22.0	()	-235.2	()
Temperature	deg. C	12.8	()	13.8	()	13.2	()	11.5	()
Total Alkalinity	meq/L	11	(0.03)	9.4	(0.03)	.1	(0.03)	NA	
pH	pH units	6.64	()	6.52	()	6.98	()	11.10	()

Table 2
(Continued)

		Site ID / Location ID							
		Sample ID							
		Log Date							
		IL / ILLY12		IL / ILLY18		IL / ILLY19		IL / ILLY23	
		IL133		IL134		IL135		IL136	
		11/22/92		11/22/92		11/22/92		11/22/92	
Parameter	Units								
-----	-----	-----		-----		-----		-----	
Anions									
Chloride	mg/L	30	(0.26)	370	(2.6)	110	(1.3)	160	(1.3)
Fluoride	mg/L	0.27	(0.020)	0.45	(0.020)	0.15	(0.020)	0.25	(0.020)
Sulfate	mg/L	1100	(2.5)	2300	(5.0)	1100	(2.5)	1400	(2.5)
Elements by ICPEs or AA									
Aluminum	mg/L	ND	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Arsenic	mg/L	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)	ND	(0.0040)
Barium	mg/L	0.017	a (0.010)	ND	(0.010)	0.015	a (0.010)	ND	(0.010)
Beryllium	mg/L	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)	ND	(0.0020)
Boron	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Cadmium	mg/L	ND	(0.0010)	ND	(0.0010)	ND	(0.0010)	ND	(0.0010)
Calcium	mg/L	410	(1.0)	53	(1.0)	290	(1.0)	66	(1.0)
Chromium	mg/L	ND	(0.010)	0.063	(0.010)	0.023	a (0.010)	ND	(0.010)
Cobalt	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Copper	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Iron	mg/L	0.050	a (0.050)	ND	(0.050)	ND	(0.050)	0.11	a (0.050)
Lead	mg/L	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)
Magnesium	mg/L	97	(1.0)	ND	(1.0)	ND	(1.0)	ND	(1.0)
Manganese	mg/L	0.067	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Molybdenum	mg/L	0.050	a (0.050)	0.70	(0.050)	0.28	(0.050)	0.53	(0.050)
Nickel	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Potassium	mg/L	15	(3.0)	1100	(3.0)	280	(3.0)	660	(3.0)
Selenium	mg/L	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)	ND	(0.0050)
Silicon	mg/L	41	(1.0)	300	(1.0)	23	(1.0)	180	(1.0)
Silver	mg/L	ND	(0.010)	ND	(0.010)	ND	(0.010)	ND	(0.010)
Sodium	mg/L	38	(1.0)	1000	(1.0)	410	(1.0)	570	(1.0)
Strontium	mg/L	1.5	(0.0030)	4.2	(0.0030)	21	(0.0030)	14	(0.0030)
Tin	mg/L	ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Vanadium	mg/L	ND	(0.020)	0.045	a (0.020)	ND	(0.020)	0.035	a (0.020)

() = Detection Limit ND = Not Detected NA = Not Analyzed a = < 5X Det. Limit

Table 2
(Continued)

		Site ID / Location ID							
		Sample ID							
		Log Date							
Parameter	Units	IL / ILLY12		IL / ILLY18		IL / ILLY19		IL / ILLY23	
		IL133		IL134		IL135		IL136	
-----	----	11/22/92		11/22/92		11/22/92		11/22/92	
Elements by ICPEs or AA, cont.									
Zinc	mg/L	ND	(0.020)	ND	(0.020)	ND	(0.020)	ND	(0.020)
Field measurements									
Conductivity	umhos/cm	2500	(5)	6400	(5)	3480	(5)	4450	(5)
Filterable Residue	mg/L	NA		NA		2953	(1)	3951	(1)
Redox (Eh)	mV	-70.1	()	-227.6	()	-287.4	()	-244.3	()
Temperature	deg. C	14.9	()	12.6	()	12.1	()	15.7	()
Total Alkalinity	meq/L	NA		NA		6.5	(0.03)	7.8	(0.03)
pH	pH units	8.03	()	10.86	()	11.89	()	11.17	()

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