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**FIELD STUDY OF DISPOSED WASTES
FROM ADVANCED COAL PROCESSES
DE-AC21-86MC22118
DOE Quarterly Technical
Progress Report**

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TABLE OF CONTENTS

	Page
1.0 OBJECTIVES	1
2.0 SUMMARY OF PREVIOUS WORK	1
2.1 Colorado	2
2.2 Ohio	2
2.3 Illinois	3
3.0 OBJECTIVES FOR THE CURRENT REPORTING PERIOD	4
4.0 ACTIVITIES FOR THE REPORTING PERIOD	4
4.1 Colorado Ute Site	4
4.2 Ohio Site	5
4.3 Illinois Site	5
4.3.1 Groundwater Chemistry	5
4.3.2 Porewater Chemistry	8
4.4 Chemistry of Initial Ash Placed in New Test Cells	12
4.5 Physical and Mineralogical Properties of Soil and Ash	12
5.0 ACTIVITIES PLANNED FOR THE NEXT QUARTER	13
APPENDIX I: IN-SITU MOISTURE	36

LIST OF FIGURES

	Page
1 Major Cation Concentrations in Groundwater from the Illinois Site	6
2 Major Anion Concentrations in Groundwater from the Illinois Site	7
3 Major Element Concentrations in Groundwater Downgradient from the Newly Installed Illinois Test Cell	9
4 Major Species Concentrations in Near Surface Porewater from the First Illinois Test Cell	10
5 Depth Trends in 9th Quarter Pore Composition	11

LIST OF TABLES

	Page
1A Chemical Characteristics of Illinois Groundwater, Event 9	14
1B Chemical Characteristics of Illinois Test Cell 1 Lysimeter Water, Event 9	20
2 Initial Chemical Characteristics of Ash from Illinois	26
3 Sample Log for Illinois Soil and Ash Cores	30
4 Physical Properties of Illinois Soil and Ash	33
5 X-Ray Diffraction Mineralogy of Illinois Ash	35

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} . 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 is in preparation. 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 an 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, was completed in June, 1993 due to permit complications.

The first test 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} ; field permeability measurements range from a high of 3×10^{-3} near the surface to a low of 2×10^{-5} at depth in the test cell. Two years of sampling has been completed at the site.

3.0 OBJECTIVES FOR THE CURRENT REPORTING PERIOD

The specific objectives for the reporting period of April, 1993 to June, 1993 were as follows:

- Completion of the Ohio site report;
- Finalizing of Year 4 funding and contract modifications;
- Starting Year 4 sampling and analysis.

4.0 ACTIVITIES FOR THE REPORTING PERIOD

4.1 Colorado Ute Site

Year 4 sampling and analysis will be started following approval of the revised cost proposal that was submitted to the DOE last quarter. The draft Final Site Report will be completed as a final document and data delivered in electronic format pending receipt of comments on the draft document from the DOE.

4.2 Ohio Site

Year 4 sampling and analysis are pending approval of the revised cost proposal that was submitted to the DOE last quarter. The draft Final Site Report is undergoing final internal review.

4.3 Illinois site

The ninth set of quarterly water samples was collected in August, 1993. The analytical results for these water samples are shown in Table 1A and 1B. Initial ash data are shown in Table 2, and physical characteristics of ash and soil cores are outlined in Table 3 through Table 5 and Appendix I.

4.3.1 Groundwater Chemistry

Major element concentrations in groundwater samples from monitoring wells upgradient and downgradient of the first Illinois test cell (North Cell) are illustrated in Figures 1 and 2. Chemical data for these wells are given in Table 1A. With the exception of chloride and sodium, the data indicate no departures from the pattern described in the previous quarterly report. Chloride and sodium in the shallow downgradient well, ILMW-3, showed sudden increases in concentration in this quarter's sample. The downgradient concentrations of the major analytes calcium, magnesium, sulfate, and alkalinity are variable with depth and over time, especially for ILMW-3. Variability of these analytes in the upgradient wells is much lower. In the upgradient wells the concentrations of calcium, magnesium, and sulfate are highest in the shallow well; alkalinity, chloride, and sodium concentrations vary little with depth. The concentrations of calcium, magnesium, and sulfate are consistently higher in the downgradient mid-depth well, ILMW-2, than in the upgradient mid-depth well, ILMW-5. Upgradient and downgradient concentrations of these species in the deep well are comparable.

Downgradient

Calcium, mg/L

Upgradient

Calcium, mg/L

Magnesium, mg/L

Magnesium, mg/L

Sodium, mg/L

Sodium, mg/L

Figure 1. Major cation concentrations in groundwater from the Illinois site. The numbers shown in the legends indicate the approximate elevation at the bottom of the screened interval in each well in feet above mean sea level.

Downgradient

Chloride, mg/L

Upgradient

Chloride, mg/L

Sulfate, mg/L

Sulfate, mg/L

Total alkalinity, mg/L as HCO₃

Total alkalinity, mg/L as HCO₃

Figure 2. Major anion concentrations in groundwater from the Illinois site. The numbers shown in the legends indicate the approximate elevation at the bottom of the screened interval in each well in feet above mean sea level.

Major element concentrations in groundwater samples from monitoring wells downgradient of test cell 2 at the Illinois site are illustrated in Figure 3. Chemical data for these wells are given in Table 1A. Sulfate, calcium, and magnesium are the major species in the groundwater downgradient of this test cell (alkalinity data are only available from the sixth quarter on). Concentrations of these analytes generally decrease with the depth of the well. The most noticeable exception to this is the concentration of sulfate in the sample collected from the deep well (ILMW-7) during the first quarter, which exhibited the highest sulfate level in groundwater from this site. This anomalously high concentration may be the result of field or laboratory contamination. Concentrations of sodium and chloride are highest in the deep well, ILMW-7. The concentration of chloride shows little variation between the mid-depth well, ILMW-8, and the shallow well, ILMW-9. The concentration of sodium, as with calcium, follows the same trend in the shallow and mid-depth wells, with slightly higher concentrations in the shallow well.

There appears to be a seasonal trend in the concentrations of some of the major analytes in the two shallowest wells downgradient of the second test cell. A nearby marshy area may affect the chemistry of the groundwater in this area.

4.3.2 Porewater Chemistry

Six of the lysimeters installed in the Illinois site which yielded sufficient sample for complete testing were analyzed this quarter. A total of 11 lysimeter samples were collected as wet conditions continued at the site; the six samples which were selected for analysis were chosen to represent a complete depth profile through the test cell. Field analytes (pH, conductivity, temperature, and Eh) are reported for the remaining five. Porewater chemistry data are shown in Table 1B.

Figures 4 and 5 show trends in porewater composition with depth and over time. Figure 4 shows the continued downward trend of the major analytes over time in near surface porewaters at the test site. The potassium concentration in shallow pore-

Figure 3. Major element concentrations in groundwater downgradient from the newly installed Illinois test cell. The numbers shown in the legends indicate the approximate elevation at the bottom of the screened interval in each well in feet above mean sea level.

Figure 4. Major species concentrations in near surface porewater from the first Illinois test cell. Concentrations shown represent the average concentrations from all lysimeters at one foot depth in the ash.

Figure 5. Depth trends in 9th quarter pore composition. Values shown represent concentrations in individual lysimeters except for the 7.5 foot interval where two results were averaged.

water, which has been generally declining since the first quarter, increased slightly during the ninth quarter. Chloride and sulfate concentrations (data shown only from the sixth quarter on) are very stable relative to other species. Figure 5 shows the variation of concentrations of ninth quarter porewater samples with depth in the test cell. All depths are relative to the top of the ash, which is presently covered by two feet of vegetated soil. As with eighth quarter data, the major analytes tend to be very low near the top of the ash and exhibit two main peaks, in this case at four feet and 9.5 feet beneath the top of the ash. Calcium data (not shown in Figure 5) are highly variable. The sample from the 11 foot interval is underlying soil and generally contains low concentrations of the major analytes, and a significantly lower pH.

4.4 Chemistry of Initial Ash Placed in New Test Cells

The chemistry of the initial ash that was placed in the newly constructed test cells is shown in Table 2. The Midwest Grain ash has a much higher available lime index and an order of magnitude more calcium in the bulk ash than the Duck Creek fly ash. The bulk sample of the Duck Creek fly ash was found to have greater concentrations of aluminum, iron, potassium, silicon, sodium, and most trace elements than the bulk Midwest Grain ash. ASTM leachates of both ash types contained mostly calcium and sulfate, with significant amounts of chloride, sodium, potassium, and boron in the fly ash. Metals in TCLP leachate from Duck Creek fly ash were present at consistently higher concentrations than metals in TCLP leachate from the Midwest Grain ash.

4.5 Physical and Mineralogical Properties of Soil and Ash

Table 3 describes the soil and ash cores collected from the first Illinois test cell during September. Tables 4 and 5 show the physical and mineralogical characteristics of soil and ash from this cell. In situ moisture and permeability data are given in Appendix 1.

The physical properties of soil and ash from the first test cell are given in Table 4. The oven-dried moisture content of the ash has increased fairly steadily with time. This trend is also seen in the in situ moisture data from the site. Laboratory permeability measurements of ash from the first Illinois test cell have remained fairly stable over time. In situ permeability measurements of ash decrease over time and are generally lower than laboratory permeability measurements. Unconfined compressive strength (UCS) is lowest in the most recent ash samples.

X-ray diffraction data show that ettringite is the predominant mineral in the ash from the first test cell (Table 5). Significant quantities of gypsum, quartz, calcite, and portlandite were also identified in the ash by this method. Crystalline material accounts for approximately two-thirds of most of the samples.

5.0 ACTIVITIES PLANNED FOR THE NEXT QUARTER

The following activities are planned for the period of July, 1993 through October, 1993:

- Completion of the Ohio site report;
- Finalizing of Year 4 funding and contract modifications; and
- Starting Year 4 sampling and analysis.

Table 1A

Chemical Characteristics of Illinois Groundwater, Event 9

		Site ID / Location ID					
		Sample ID					
		Log Date					
		IL4 / ILMW04		IL4 / ILMW05		IL4 / ILMW06	
		IL205		IL206		IL207	
		9/07/93		9/07/93		9/07/93	
Parameter	Units						
<hr/>							
Anions							
Chloride	mg/L	18.9	(0.100)	18.4	(0.100)	23.8	(0.100)
Fluoride	mg/L	0.256	(0.0500)	0.264	(0.0500)	0.136	(0.0500)
Sulfate	mg/L	470	(2.50)	482	(2.50)	1750	(2.50)
Elements by ICPEs or AA							
Aluminum	mg/L	NR	(0.200)	NR	(0.200)	NR	(0.200)
Arsenic	mg/L	< DL	(0.00400)	ND	(0.00400)	ND	(0.00400)
Barium	mg/L	0.0166	(0.0100)	0.0150	(0.0100)	0.0120	(0.0100)
Beryllium	mg/L	NR	(0.00200)	NR	(0.00200)	NR	(0.00200)
Boron	mg/L	1.32	(0.600)	1.23	(0.600)	1.15	(0.600)
Cadmium	mg/L	NR	(0.00100)	< DL	(0.00100)	< DL	(0.00100)
Calcium	mg/L	178	(1.00)	169	(1.00)	408	(1.00)
Chromium	mg/L	< DL	(0.0100)	< DL	(0.0100)	NR	(0.0100)
Cobalt	mg/L	NR	(0.0100)	NR	(0.0100)	NR	(0.0100)
Copper	mg/L	< DL	(0.0200)	< DL	(0.0200)	< DL	(0.0200)
Iron	mg/L	0.853	(0.0500)	0.814	(0.0500)	ND	(0.0500)
Lead	mg/L	0.0100	(0.00300)	0.00300	(0.00300)	NR	(0.00300)
Magnesium	mg/L	95.6	(1.00)	91.3	(1.00)	258	(1.00)
Manganese	mg/L	0.383	(0.0100)	0.379	(0.0100)	1.44	(0.0100)
Molybdenum	mg/L	< DL	(0.0500)	< DL	(0.0500)	ND	(0.0500)
Nickel	mg/L	< DL	(0.0200)	ND	(0.0200)	0.0339	(0.0200)
Potassium	mg/L	6.97	(3.00)	6.47	(3.00)	14.5	(3.00)
Selenium	mg/L	NR	(0.00500)	NR	(0.00500)	< DL	(0.00500)
Silicon	mg/L	7.37	(1.00)	6.79	(1.00)	6.45	(1.00)
Silver	mg/L	< DL	(0.0100)	< DL	(0.0100)	ND	(0.0100)
Sodium	mg/L	166	(1.00)	154	(1.00)	160	(1.00)
Strontium	mg/L	1.79	(0.00300)	1.69	(0.00300)	3.01	(0.00300)
Tin	mg/L	< DL	(0.600)	< DL	(0.600)	< DL	(0.600)
Vanadium	mg/L	NR	(0.0200)	NR	(0.0200)	NR	(0.0200)

() = Reporting Limit

C1-1

Table 1A
(Continued)

		Site ID / Location ID					
		Sample ID					
		Log Date					
		IL5 / ILMW01		IL5 / ILMW02		IL5 / ILMW03	
		IL202		IL203		IL204	
		9/06/93		9/06/93		9/06/93	
Parameter	Units						

Anions							
Chloride	mg/L	27.1	(0.100)	17.2	(0.100)	251	(0.100)
Fluoride	mg/L	0.235	(0.0500)	0.157	(0.0500)	0.127	(0.0500)
Sulfate	mg/L	451	(2.50)	1570	(2.50)	1460	(2.50)
Elements by ICPEs or AA							
Aluminum	mg/L	NR	(0.200)	NR	(0.200)	0.328	(0.200)
Arsenic	mg/L	NR	(0.00400)	ND	(0.00400)	ND	(0.00400)
Barium	mg/L	0.0226	(0.0100)	0.0113	(0.0100)	0.0813	(0.0100)
Beryllium	mg/L	NR	(0.00200)	NR	(0.00200)	0.00820	(0.00200)
Boron	mg/L	1.23	(0.600)	NR	(0.600)	NR	(0.600)
Cadmium	mg/L	ND	(0.00100)	NR	(0.00100)	NR	(0.00100)
Calcium	mg/L	171	(1.00)	413	(1.00)	477	(1.00)
Chromium	mg/L	NR	(0.0100)	< DL	(0.0100)	< DL	(0.0100)
Cobalt	mg/L	NR	(0.0100)	< DL	(0.0100)	0.0238	(0.0100)
Copper	mg/L	< DL	(0.0200)	NR	(0.0200)	< DL	(0.0200)
Iron	mg/L	1.12	(0.0500)	ND	(0.0500)	0.114	(0.0500)
Lead	mg/L	NR	(0.00300)	0.00800	(0.00300)	0.00400	(0.00300)
Magnesium	mg/L	92.0	(1.00)	217	(1.00)	33.6	(1.00)
Manganese	mg/L	1.10	(0.0100)	2.14	(0.0100)	0.909	(0.0100)
Mercury	mg/L	ND	(0.000200)	ND	(0.000200)	ND	(0.000200)
Molybdenum	mg/L	< DL	(0.0500)	< DL	(0.0500)	0.0602	(0.0500)
Nickel	mg/L	< DL	(0.0200)	NR	(0.0200)	0.0457 J	(0.0200)
Potassium	mg/L	7.25	(3.00)	4.12	(3.00)	31.5	(3.00)
Selenium	mg/L	< DL	(0.00500)	NR	(0.00500)	NR	(0.00500)
Silicon	mg/L	6.81	(1.00)	6.47	(1.00)	5.56	(1.00)
Silver	mg/L	ND	(0.0100)	ND	(0.0100)	< DL	(0.0100)
Sodium	mg/L	118	(1.00)	67.6	(1.00)	303	(1.00)
Strontium	mg/L	1.48	(0.00300)	0.899	(0.00300)	2.16	(0.00300)
Tin	mg/L	< DL	(0.600)	< DL	(0.600)	< DL	(0.600)

() = Reporting Limit

C1-1

Table 1A

(Continued)

Parameter	Units	Site ID / Location ID					
		IL4 / ILMW04		IL4 / ILMW05		IL4 / ILMW06	
		IL205		IL206		IL207	
		9/07/93		9/07/93		9/07/93	
-----	-----	-----		-----		-----	
Elements by ICPEs or AA, cont.							
Zinc	mg/L	NR	(0.0200)	NR	(0.0200)	NR	(0.0200)
Field measurements							
Alkalinity	meq/L	14	(.03)	14.4	(.03)	15	(.03)
Conductivity	umhos/cm	2120	(5)	2275	(5)	3475	(5)
Filterable Residue	mg/L	1400	(1)	1360	(1)	3009	(1)
Redox (Eh)	mV	8.7	()	8.7	()	15.6	()
Temperature	deg. C	12.9	()	13.2	()	13.5	()
pH	pH units	6.54	()	6.62	()	6.49	()

() = Reporting Limit

C1-2

Table 1A

(Continued)

Parameter	Units	Site ID / Location ID					
		ILS / ILMW01		ILS / ILMW02		ILS / ILMW03	
		IL202		IL203		IL204	
		9/06/93		9/06/93		9/06/93	
Elements by ICPEs or AA, cont.							
Vanadium	mg/L	NR	(0.0200)	NR	(0.0200)	< DL	(0.0200)
Zinc	mg/L	NR	(0.0200)	NR	(0.0200)	NR	(0.0200)
Field measurements							
Alkalinity	meq/L	13	(.03)	9	(.03)	1.75	(.03)
Conductivity	umhos/cm	2050	(5)	3025	(5)	3100	(5)
Filterable Residue	mg/L	1230	(1)	2980	(1)	2760	(1)
Redox (Eh)	mV	6.7	()	13.6	()	10.1	()
Temperature	deg. C	13.8	()	13.8	()	17.2	()
pH	pH units	6.74	()	6.65	()	7.02	()

() = Reporting Limit

C1-2

Table 1A

(Continued)

		Site ID / Location ID					
		Sample ID					
		Log Date					
Parameter	Units	IL6 / ILMW07		IL6 / ILMW08		IL6 / ILMW09	
		IL208		IL209		IL210	
		9/06/93		9/06/93		9/06/93	
<hr/>							
Anions							
Chloride	mg/L	41.8	(0.100)	12.9	(0.100)	21.7	(0.100)
Fluoride	mg/L	0.379	(0.0500)	0.206	(0.0500)	0.214	(0.0500)
Sulfate	mg/L	252	(2.50)	1610	(2.50)	2010	(2.50)
<hr/>							
Elements by ICPEs or AA							
Aluminum	mg/L	NR	(0.200)	NR	(0.200)	< DL	(0.200)
Arsenic	mg/L	< DL	(0.00400)	ND	(0.00400)	ND	(0.00400)
Barium	mg/L	0.0292	(0.0100)	0.0131	(0.0100)	0.0222	(0.0100)
Beryllium	mg/L	NR	(0.00200)	NR	(0.00200)	NR	(0.00200)
Boron	mg/L	1.64	(0.600)	NR	(0.600)	1.05	(0.600)
Cadmium	mg/L	NR	(0.00100)	NR	(0.00100)	< DL	(0.00100)
Calcium	mg/L	118	(1.00)	375	(1.00)	423	(1.00)
Chromium	mg/L	ND	(0.0100)	< DL	(0.0100)	ND	(0.0100)
Cobalt	mg/L	< DL	(0.0100)	< DL	(0.0100)	NR	(0.0100)
Copper	mg/L	< DL	(0.0200)	< DL	(0.0200)	< DL	(0.0200)
Iron	mg/L	1.38	(0.0500)	ND	(0.0500)	0.0928	(0.0500)
Lead	mg/L	0.00400	(0.00300)	0.00600	(0.00300)	NR	(0.00300)
Magnesium	mg/L	65.5	(1.00)	254	(1.00)	336	(1.00)
Manganese	mg/L	0.365	(0.0100)	1.54	(0.0100)	5.20	(0.0100)
Mercury	mg/L	< DL	(0.000200)	< DL	(0.000200)	NR	(0.000200)
Molybdenum	mg/L	< DL	(0.0500)	ND	(0.0500)	NR	(0.0500)
Nickel	mg/L	NR	(0.0200)	NR	(0.0200)	0.0243	(0.0200)
Potassium	mg/L	5.07	(3.00)	NR	(3.00)	9.31	(3.00)
Selenium	mg/L	NR	(0.00500)	NR	(0.00500)	< DL	(0.00500)
Silicon	mg/L	7.38	(1.00)	7.24	(1.00)	5.95	(1.00)
Silver	mg/L	ND	(0.0100)	ND	(0.0100)	ND	(0.0100)
Sodium	mg/L	152	(1.00)	52.2	(1.00)	68.2	(1.00)
Strontium	mg/L	1.24	(0.00300)	0.470	(0.00300)	1.12	(0.00300)
Tin	mg/L	ND	(0.600)	< DL	(0.600)	< DL	(0.600)

() = Reporting Limit

Table 1A
(Continued)

Parameter	Units	Site ID / Location ID			
		Sample ID		Log Date	
		IL6 / ILMW07		IL6 / ILMW08	
		IL208	IL209	IL210	IL210
		9/06/93	9/06/93	9/06/93	9/06/93

Elements by ICPES or AA, cont.					
Vanadium	mg/L	< DL	(0.0200)	NR	(0.0200)
Zinc	mg/L	NR	(0.0200)	NR	(0.0200)
Field measurements					
Alkalinity	meq/L	12.5	(.03)	11.2	(.03)
Conductivity	umhos/cm	1950	(5)	3050	(5)
Filterable Residue	mg/L	1060	(1)	3140	(1)
Redox (Eh)	mV	1.3	()	11.3	()
Temperature	deg. C	14.9	()	14.8	()
pH	pH units	6.84	()	6.70	()

19

Table 1B

Chemical Characteristics of Illinois Test Cell 1 Lysimeter Water, Event 9

		Site ID / Location ID					
		Sample ID		Log Date			
Parameter	Units	IL1 / ILLY04		IL1 / ILLY13		IL1 / ILLY14	
		IL214		IL219		IL220	IL222
		9/07/93		9/07/93		9/07/93	9/07/93

Anions							
Chloride	mg/L	NA		NA		26.8 (0.100)	1020 (0.100)
Fluoride	mg/L	NA		NA		0.368 (0.0500)	0.196 (0.0500)
Sulfate	mg/L	NA		NA		2360 (2.50)	6870 (2.50)
Elements by ICPEs or AA							
Aluminum	mg/L	NA		NA		NR (0.200)	2.04 (0.200)
Arsenic	mg/L	NA		NA		< DL (0.00400)	ND (0.00400)
Barium	mg/L	NA		NA		0.0189 (0.0100)	0.0194 (0.0100)
Beryllium	mg/L	NA		NA		NR (0.00200)	NR (0.00200)
Boron	mg/L	NA		NA		NR (0.600)	NR (0.600)
Cadmium	mg/L	NA		NA		NR (0.00100)	0.00660 X (0.00100)
Calcium	mg/L	NA		NA		498 (1.00)	2.24 (1.00)
Chromium	mg/L	NA		NA		ND (0.0100)	0.0114 (0.0100)
Cobalt	mg/L	NA		NA		ND (0.0100)	< DL (0.0100)
Copper	mg/L	NA		NA		< DL (0.0200)	0.0225 (0.0200)
Iron	mg/L	NA		NA		ND (0.0500)	NR (0.0500)
Lead	mg/L	NA		NA		0.00500 (0.00300)	ND (0.00300)
Magnesium	mg/L	NA		NA		163 (1.00)	NR (1.00)
Manganese	mg/L	NA		NA		0.0342 (0.0100)	NR (0.0100)
Molybdenum	mg/L	NA		NA		NR (0.0500)	2.00 (0.0500)
Nickel	mg/L	NA		NA		< DL (0.0200)	< DL (0.0200)
Potassium	mg/L	NA		NA		7.18 (3.00)	4570 (3.00)
Selenium	mg/L	NA		NA		NR (0.00500)	NR (0.00500)
Silicon	mg/L	NA		NA		35.3 (1.00)	1220 (1.00)
Silver	mg/L	NA		NA		ND (0.0100)	< DL (0.0100)
Sodium	mg/L	NA		NA		243 (1.00)	4080 (1.00)
Strontium	mg/L	NA		NA		1.16 (0.00300)	6.48 (0.00300)
Tin	mg/L	NA		NA		< DL (0.600)	ND (0.600)
Vanadium	mg/L	NA		NA		NR (0.0200)	0.0508 (0.0200)

() = Reporting Limit

C1-1

Table 1B

(Continued)

Parameter	Units	Site ID / Location ID							
		IL1 / ILLY04		IL1 / ILLY13		IL1 / ILLY14		IL1 / ILLY17	
		IL214		IL219		IL220		IL222	
		9/07/93		9/07/93		9/07/93		9/07/93	
Elements by ICPEs or AA, cont.									
Zinc	mg/L	NA		NA		NR	(0.0200)	NR	(0.0200)
Field measurements									
Alkalinity	meq/L	NA		NA		2.75	(.03)	126.5	(.03)
Conductivity	umhos/cm	16300	(5)	9490	(5)	3750	(5)	32000	(5)
Filterable Residue	mg/L	NA		NA		260	(1)	24400	(1)
Redox (Eh)	mV	-334.4	()	-304.8	()	-97.4	()	-341.2	()
Temperature	deg. C	21	()	19.6	()	18.5	()	21.0	()
pH	pH units	12.95	()	12.56	()	8.83	()	13.09	()

21

Table 1B

(Continued)

		Site ID / Location ID							
		Sample ID							
		Log Date							
		IL1 / ILLY19		IL1 / ILLY22		IL1 / ILLY23		IL1 / ILLY24	
		IL223		IL226		IL227		IL228	
		9/07/93		9/07/93				9/07/93	
Parameter	Units								

Anions									
Chloride	mg/L	37.3	(0.100)	16.0	(0.100)	117	(0.100)	NA	
Fluoride	mg/L	0.0662	(0.0500)	0.199	(0.0500)	0.270	(0.0500)	NA	
Sulfate	mg/L	848	(2.50)	1090	(2.50)	922	(2.50)	NA	
Elements by ICPEs or AA									
Aluminum	mg/L	NR	(0.200)	0.225	(0.200)	NR	(0.200)	NA	
Arsenic	mg/L	ND	(0.00400)	NR	(0.00400)	ND	(0.00400)	NA	
Barium	mg/L	0.0529	(0.0100)	0.0780	(0.0100)	NR	(0.0100)	NA	
Beryllium	mg/L	NR	(0.00200)	NR	(0.00200)	NR	(0.00200)	NA	
Boron	mg/L	NR	(0.600)	NR	(0.600)	NR	(0.600)	NA	
Cadmium	mg/L	NR	(0.00100)	< DL	(0.00100)	NR	(0.00100)	NA	
Calcium	mg/L	79.9	(1.00)	1160	(1.00)	2.66	(1.00)	NA	
Chromium	mg/L	0.0508	(0.0100)	0.0146	(0.0100)	0.0189	(0.0100)	NA	
Cobalt	mg/L	< DL	(0.0100)	< DL	(0.0100)	< DL	(0.0100)	NA	
Copper	mg/L	NR	(0.0200)	0.0443	(0.0200)	NR	(0.0200)	NA	
Iron	mg/L	< DL	(0.0500)	< DL	(0.0500)	< DL	(0.0500)	NA	
Lead	mg/L	0.00400	(0.00300)	0.00900	(0.00300)	NR	(0.00300)	NA	
Magnesium	mg/L	NR	(1.00)	ND	(1.00)	< DL	(1.00)	NA	
Manganese	mg/L	NR	(0.0100)	NR	(0.0100)	NR	(0.0100)	NA	
Molybdenum	mg/L	0.172	(0.0500)	0.150	(0.0500)	0.195	(0.0500)	NA	
Nickel	mg/L	NR	(0.0200)	0.0412	(0.0200)	< DL	(0.0200)	NA	
Potassium	mg/L	400	(3.00)	108	(3.00)	745	(3.00)	NA	
Selenium	mg/L	< DL	(0.00500)	NR	(0.00500)	NR	(0.00500)	NA	
Silicon	mg/L	134	(1.00)	2.11	(1.00)	841	(1.00)	NA	
Silver	mg/L	< DL	(0.0100)	ND	(0.0100)	ND	(0.0100)	NA	
Sodium	mg/L	144	(1.00)	72.7	(1.00)	818	(1.00)	NA	
Strontium	mg/L	11.4	(0.00300)	8.74	(0.00300)	1.78	(0.00300)	NA	
Tin	mg/L	ND	(0.600)	NR	(0.600)	ND	(0.600)	NA	
Vanadium	mg/L	NR	(0.0200)	0.0333	(0.0200)	0.0292	(0.0200)	NA	

() = Reporting Limit

C1-3

Table 1B
(Continued)

Parameter	Units	Site ID / Location ID							
		Sample ID				Log Date			
		IL1 / ILLY19		IL1 / ILLY22		IL1 / ILLY23		IL1 / ILLY24	
		IL223		IL226		IL227		IL228	
		9/07/93		9/07/93				9/07/93	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Elements by ICPEs or AA, cont.									
Zinc	mg/L	< DL	(0.0200)	0.132	(0.0200)	NR	(0.0200)	NA	
Field measurements									
Alkalinity	meq/L	5.5	(.03)	34.5	(.03)	NA		NA	
Conductivity	umhos/cm	2550	(5)	8450	(5)	NA		2400	(5)
Filterable Residue	mg/L	260	(1)	2160	(1)	NA		NA	
Redox (Eh)	mV	-208.3	()	-326.1	()	NA		-232.7	()
Temperature	deg. C	22.7	()	18.8	()	NA		23.5	()
pH	pH units	10.57	()	12.79	()	NA		11.06	()

23

Table 1B

(Continued)

		Site ID / Location ID			
		Sample ID		Log Date	
Parameter	Units	IL1 / ILLY25	IL1 / ILLY26	IL1 / ILLY27	
		IL229 9/07/93	IL230 9/06/93	IL231 9/07/93	

Anions					
Chloride	mg/L	NA	NA	432	(0.100)
Fluoride	mg/L	NA	NA	0.291	(0.0500)
Sulfate	mg/L	NA	NA	3060	(2.50)
Elements by ICPEs or AA					
Aluminum	mg/L	NA	NA	0.684	(0.200)
Arsenic	mg/L	NA	NA	ND	(0.00400)
Barium	mg/L	NA	NA	NR	(0.0100)
Beryllium	mg/L	NA	NA	NR	(0.00200)
Boron	mg/L	NA	NA	NR	(0.600)
Cadmium	mg/L	NA	NA	0.00314	(0.00100)
Calcium	mg/L	NA	NA	NR	(1.00)
Chromium	mg/L	NA	NA	0.0156	(0.0100)
Cobalt	mg/L	NA	NA	ND	(0.0100)
Copper	mg/L	NA	NA	NR	(0.0200)
Iron	mg/L	NA	NA	NR	(0.0500)
Lead	mg/L	NA	NA	NR	(0.00300)
Magnesium	mg/L	NA	NA	ND	(1.00)
Manganese	mg/L	NA	NA	NR	(0.0100)
Molybdenum	mg/L	NA	NA	0.852	(0.0500)
Nickel	mg/L	NA	NA	< DL	(0.0200)
Potassium	mg/L	NA	NA	2140	(3.00)
Selenium	mg/L	NA	NA	NR	(0.00500)
Silicon	mg/L	NA	NA	1210	(1.00)
Silver	mg/L	NA	NA	ND	(0.0100)
Sodium	mg/L	NA	NA	2130	(1.00)
Strontium	mg/L	NA	NA	1.14	(0.00300)
Tin	mg/L	NA	NA	ND	(0.600)
Vanadium	mg/L	NA	NA	0.0368	(0.0200)

() = Reporting Limit

Table 1B
(Continued)

Parameter	Units	Site ID / Location ID					
		IL1 / ILLY25		IL1 / ILLY26		IL1 / ILLY27	
		IL229		IL230		IL231	
		9/07/93		9/06/93		9/07/93	
-----	-----	-----	-----	-----	-----	-----	-----
Elements by ICPEs or AA, cont.							
Zinc	mg/L	NA		NA		NR	(0.0200)
Field measurements							
Alkalinity	meq/L	42	(.03)	NA		96.3	(.03)
Conductivity	umhos/cm	6125	(5)	1300	(5)	17700	(5)
Filterable Residue	mg/L	5130	(1)	NA		12990	(1)
Redox (Eh)	mV	-279.5	()	-45.2	()	-328.0	()
Temperature	deg. C	23.1	()	23.1	()	19.1	()
pH	pH units	11.91	()	7.70	()	12.90	()

() = Reporting Limit

C1-6

Table 2

Initial Chemical Characteristics of Ash from Illinois

		Site ID / Location ID			
		Sample ID			
		Beg. Depth - End Depth (ft.)			
Parameter	Units	IL / INITIAL ASH DUCK CREEK FLY ASH		IL / INITIAL ASH MIDWEST GRAIN ASH	
		-		-	

Bulk chemistry					
Available lime index as Ca(OH2	percent	2.7	()	36.0	()
CaCO3 Equivalents	mg/g	1.48	(.2)	86.7	(.2)
Loss on ignition	percent	3.3	()	15.7	()
Total chromatographable orgs.	ug/g	2.62	(2.50)	5.57	(2.50)
Elements by ICPEs or AA					
Aluminum	mg/kg	82500	(20.0)	16500	(20.0)
Antimony	mg/kg	ND	(10.0)	ND	(10.0)
Arsenic	mg/kg	23.1	(0.400)	3.54	(0.400)
Barium	mg/kg	369	(1.00)	84.1	(1.00)
Cadmium	mg/kg	4.77	(0.100)	1.12	(0.100)
Calcium	mg/kg	36200	(100)	315000	(100)
Chromium	mg/kg	228	(1.00)	38.4 J	(1.00)
Copper	mg/kg	70.5	(2.00)	9.04 J	(2.00)
Iron	mg/kg	114000	(5.00)	29200	(5.00)
Lead	mg/kg	31.1	(0.300)	4.25	(0.300)
Magnesium	mg/kg	4950	(100)	3440	(100)
Manganese	mg/kg	396	(1.00)	705	(1.00)
Molybdenum	mg/kg	94.1	(5.00)	42.3 J	(5.00)
Nickel	mg/kg	149	(2.00)	30.5 J	(2.00)
Potassium	mg/kg	15600	(300)	3260 J	(300)
Selenium	mg/kg	2.72	(0.500)	3.02	(0.500)
Silicon	mg/kg	225000	(100)	62300	(100)
Silver	mg/kg	ND	(1.00)	ND	(1.00)
Sodium	mg/kg	10100	(100)	2500	(100)
Strontium	mg/kg	289	(0.300)	253	(0.300)
Tin	mg/kg	ND	(60.0)	< DL	(60.0)

() = Reporting Limit

02-1

Table 2
(Continued)

		Site ID / Location ID			
		Sample ID			
		Beg. Depth - End Depth (ft.)			
Parameter	Units	IL / INITIAL ASH DUCK CREEK FLY ASH		IL / INITIAL ASH MIDWEST GRAIN ASH	
-----	-----	-----		-----	
Elements by ICPEs or AA, cont.					
Titanium	mg/kg	4860	(5.00)	1000	(5.00)
Zinc	mg/kg	436	(2.00)	70.8	(2.00)
ADIS					
Anions					
Sulfate	mg/L	36.4	(2.50)	268	(2.50)
ASTM					
Anions					
Chloride	mg/L	4.79	(0.100)	97.6	(0.100)
Sulfate	mg/L	870	(2.50)	1320	(2.50)
Elements by ICPEs or AA					
Aluminum	mg/L	NR	(0.200)	< DL	(0.200)
Arsenic	mg/L	< DL	(0.00400)	0.00760 S	(0.00400)
Barium	mg/L	0.878	(0.0100)	0.265	(0.0100)
Beryllium	mg/L	< DL	(0.00200)	< DL	(0.00200)
Boron	mg/L	79.7	(0.600)	0.626	(0.600)
Cadmium	mg/L	0.00114	(0.00100)	NR	(0.00100)
Calcium	mg/L	1170	(1.00)	1430	(1.00)
Chromium	mg/L	0.0978	(0.0100)	0.0242	(0.0100)
Cobalt	mg/L	< DL	(0.0100)	< DL	(0.0100)
Copper	mg/L	NR	(0.0200)	NR	(0.0200)
Iron	mg/L	NR	(0.0500)	NR	(0.0500)
Lead	mg/L	ND	(0.00300)	< DL	(0.00300)

() = Reporting Limit

Table 2

(Continued)

Parameter	Units	Site ID / Location ID			
		Sample ID			
		Beg. Depth - End Depth (ft.)			
		IL / INITIAL ASH DUCK CREEK FLY ASH		IL / INITIAL ASH MIDWEST GRAIN ASH	
-----	-----	-----	-----	-----	-----
ASTM, cont.					
Elements by ICPES or AA, cont.					
Magnesium	mg/L	NR	(1.00)	ND	(1.00)
Manganese	mg/L	NR	(0.0100)	NR	(0.0100)
Mercury	mg/L	ND	(0.000180)	ND	(0.000180)
Molybdenum	mg/L	3.77	(0.0500)	0.179	(0.0500)
Nickel	mg/L	< DL	(0.0200)	< DL	(0.0200)
Potassium	mg/L	55.7	(3.00)	17.2	(3.00)
Selenium	mg/L	0.0691	(0.00500)	< DL	(0.00500)
Silicon	mg/L	3.33	(1.00)	NR	(1.00)
Silver	mg/L	ND	(0.0100)	ND	(0.0100)
Sodium	mg/L	222	(1.00)	30.0	(1.00)
Strontium	mg/L	3.33	(0.00300)	5.68	(0.00300)
Tin	mg/L	< DL	(0.600)	< DL	(0.600)
Vanadium	mg/L	0.160	(0.0200)	0.0391	(0.0200)
Zinc	mg/L	0.0315	(0.0200)	NR	(0.0200)
Field measurements					
Conductivity	umhos/cm	9430	(5)	4140	(5)
pH	pH units	12.10	()	12.30	()
TCLP					
Elements by ICPES or AA					
Arsenic	mg/L	0.176	(0.00400)	0.00820 S	(0.00400)
Barium	mg/L	0.412	(0.0100)	0.298	(0.0100)
Cadmium	mg/L	0.0992	(0.00100)	0.00263	(0.00100)
Chromium	mg/L	1.20	(0.0100)	0.0130	(0.0100)
Lead	mg/L	0.0154	(0.00300)	NR	(0.00300)

() = Reporting Limit

Table 2
(Continued)

		Site ID / Location ID Sample ID Beg. Depth - End Depth (ft.)			
Parameter	Units	IL / INITIAL ASH DUCK CREEK FLY ASH -		IL / INITIAL ASH MIDWEST GRAIN ASH -	
-----	-----	-----		-----	
TCLP, cont.					
Elements by ICPEs or AA, cont.					
Mercury	mg/L	ND	(0.000180)	ND	(0.000180)
Selenium	mg/L	0.0466	(0.00500)	ND	(0.00500)
Silver	mg/L	ND	(0.0100)	ND	(0.0100)
Field measurements					
pH	pH units	4.42	()	11.8	()
WDIS					
Anions					
Chloride	mg/L	0.448	(0.100)	0.505	(0.100)
Fluoride	mg/L	0.0785	(0.0500)	0.111	(0.0500)
Sulfate	mg/L	31.2	(2.50)	140	(2.50)
Bulk chemistry					
Total inorganic carbon	mg/g	5.34	()	6.28	()

() = Reporting Limit

D2-4

Table 3

Sample Log for Illinois Soil and Ash Cores

Sample I.D.	Depth Interval	Description	
93SEPIL2-0.5	0'-0.5'	Flyash:	Generally comprised of darker matrix material with abundant & diffuse white inclusions. Ash matrix; med dark gray (N4), s. moist, v. hard, brittle, indurated (clay-silt sized). Inclusions; white, soft, calcareous (fine-coarse sand sized).
93SEPIL2-1.0	0.5'-1'	Flyash:	As above, hard, consolidated.
93SEPIL2-1.5	1'-1.5'	Flyash:	As above, v. moist, hard, consolidated.
93SEPIL2-2.0	1.5'-2'	Flyash:	Darker matrix material with abundant & diffuse white inclusions. Med dark gray (N3), slightly. moist, v. hard, brittle, indurated, abundant, diffuse white calcareous inclusions in a med dark gray (N3), v. hard, brittle indurated matrix. Ash matrix; med dark gray (N4), v. moist, semi-hard/friable,solid (clay-silt sized). Inclusions; abundant & diffuse, white, soft, calcareous (fine-coarse sand sized).
93SEPIL2-2.5	2'-2.5'	Flyash:	As above.
93SEPIL2-3.0	2.5'-3'	Flyash:	As above.
93SEPIL2-3.5	3'-3.5'	Flyash:	As above.
93SEPIL2-4.0	3.5'-4'	Flyash:	Darker matrix material with abundant & diffuse white inclusions. Ash matrix; med dark gray (N4), moist, friable (clay-silt sized). Inclusions; abundant & diffuse, white, soft, calcareous (fine-coarse sand sized). Apparent stress induced parting along horizontal planes.
93SEPIL2-4.5	4'-4.5'	Flyash:	As above; moist, v. hard, brittle, indurated.
93SEPIL2-5.0	4.5'-5'	Flyash:	As above.
93SEPIL2-5.5	5'-5.5'	Flyash:	As above.
93SEPIL2-6.0	5.5'-5.2'	Flyash:	As above.
	5.2'-6'	Soil:	Spoil (disturbed sediments); mod yellowish brn, v. moist/wet, sandy clay, semi-plastic to friable, mod yellowish brn (10Y 5/4), disseminated coarse sand, gravel & coal clasts.
93SEPIL2-6.5	6'-6.5'	Soil:	Spoil (disturbed sediments); mod yellowish brn, v. moist/wet, sandy clay, semi plastic - friable, mod yellowish brn (10Y 5/4), disseminated coarse sand, gravel & coal clasts.
93SEPIL2-7.0	6.5'-7'	Soil:	As above.
93SEPIL3-0.5	0'-0.5'	Flyash:	No recovery.

Table 3

(Continued)

Sample I.D.	Depth Interval	Description	
93SEPIL3-1.0	0.5'-1'	Flyash:	Generally comprised of darker matrix material with abundant & diffuse white inclusions. Ash matrix; med dark gray (N4), s. moist, v. hard, brittle, indurated (clay-silt sized). Inclusions; white, soft, calcareous (fine-coarse sand sized). Apparent stress induced parting along horizontal planes.
93SEPIL3-1.5	1'-1.5'	Flyash:	As above.
93SEPIL3-2.0	1.5'-2'	Flyash:	As above, moist.
93SEPIL3-2.5	2'-2.5'	Flyash:	As above, v. moist.
93SEPIL3-3.0	2.5'-3'	Flyash:	As above.
93SEPIL3-3.5	3'-3.5'	Flyash:	Darker matrix material with abundant & diffuse white inclusions. Med dark gray (N3), slightly moist, v. hard, brittle, indurated, abundant, diffuse white Calcareous inclusions in a med dark gray (N3), v. hard, brittle indurated matrix. Ash matrix; dark gray (N3), moist, friable (clay-silt sized). Inclusions; abundant & diffuse, white, soft, calcareous (fine-coarse sand sized). Apparent stress induced parting along horizontal planes.
93SEPIL3-4.0	3.5'-4'	Flyash:	No recovery.
93SEPIL3-4.5	4'-4.5'	Soil:	Spoil (disturbed sediments); mod yellowish brn (10Y 5/4), v. moist/wet, sandy clay, semi-plastic to friable, disseminated coarse sand, gravel & coal clasts.
93SEPIL3-5.0	4.5'-5'	Soil:	No recovery.
93SEPIL3-5.5	5'-5.5'	Soil:	Spoil (disturbed sediments); mod yellowish brn (10Y 5/4), v. moist/wet, sandy clay, semi-plastic to friable, disseminated coarse sand, gravel & coal clasts.
93SEPIL4-0.5	0'-0.5'	Flyash:	No recovery.
93SEPIL4-1.0	0.5'-1'	Flyash:	No recovery.
93SEPIL4-1.5	1'-1.5'	Flyash:	Generally comprised of darker matrix material with abundant & diffuse white inclusions. Med dark gray (N3), slightly moist, v. hard, brittle, indurated, abundant, diffuse white Calcareous inclusions in a med dark gray (N3), v. hard, brittle indurated matrix. Ash matrix; med dark gray (N4), s. moist, v. hard, brittle, indurated (clay-silt sized). Inclusions; abundant & diffuse, white, soft, calcareous (fine-coarse sand sized). Apparent stress induced parting along horizontal planes.

Table 3
(Continued)

Sample I.D.	Depth Interval	Description	
93SEPIL4-2.0	1.5'-2'	Flyash:	As above, slightly moist.
93SEPIL4-2.5	2'-2.5'	Flyash:	As above, moist.
93SEPIL4-3.0	2.5'-3'	Flyash:	As above.
93SEPIL4-3.5	3'-3.5'	Flyash:	As above.
93SEPIL4-4.0	3.5'-4'	Flyash:	As above.
93SEPIL4-4.5	4'-4.5'	Flyash:	As above.
93SEPIL4-5.0	4.5'-5'	Soil:	Spoil (disturbed sediments); mod yellowish brn (10y 5/4), v. moist/wet, sandy clay, semi Plastic to friable, disseminated coarse sand, gravel & coal clasts.
93SEPIL4-5.5	5'-5.5'	Soil:	Spoil (disturbed sediments); olive gray (5Y 4/1), v. moist/wet, sandy clay, semi -friable, disseminated coarse sand, gravel & coal clasts.
93SEPIL4-6.0	5.5'-6'	Soil:	Spoil (disturbed sediments); mod yellowish brn (10y 5/4), v. moist/wet, sandy clay, semi plastic to friable, disseminated coarse sand, gravel & coal clasts.
93SEPIL4-6.5	6'-6.5'	Soil:	Ss above.
93SEPIL4-7.0	6.5'-7'	Soil:	As above.

Table 4

Sample Log for Illinois Soil and Ash Cores

Sample ID	Depth (ft)	Top (ft)	Bottom (ft)	Matrix	Moisture (dry) (%)	UCS (psi)	Permeability (cm/s)	Bulk Density (pcf)	Comment
92FEBIL2-1,1.5	0-2'	0	2	Ash	60.0		2.6e-05		FP
92FEBIL2-2.5,3	2-4'	2	4	Ash	56.3	117.5	2.2e-05		
92FEBIL2-5,6	4-6'	4	6	Ash	42.2	233.4	2.1e-05		
92FEBIL2-7,7.5	6-8'	6	8	Ash	46.6	217.4	1.2e-05		
92FEBIL2-9.5,10	8-10'	8	10	Soil	14.6				FP
92MAYIL3-1	0-2'	0	2	Ash		111.5			
92MAYIL3-2	0-2'	0	2	Ash	51.9		4.1e-05		
92MAYIL3-3	2-4'	2	4	Ash		117.7			
92MAYIL3-3.5	2-4'	2	4	Ash	62.8		2.4e-05		
92MAYIL3-5.5	4-6'	4	6	Ash	44.2				FP
92MAYIL3-7	6-8'	6	8	Ash	38.4	245.5	2.5e-05		
92MAYIL3-8.5	8-10'	8	10	Ash	44.2	336.0	6.7e-06		
92MAYIL3-11.5	10-12'	10	12	Soil	17.4		3.5e-07		
92MAYIL3-13.5	12-14'	12	14	Soil	19.8		7.8e-08		
92MAYIL3-15.5	14-16'	14	16	Soil	17.2		5.1e-08		
92MAYIL4-1	0-2'	0	2	Ash		70.9			
92MAYIL4-1.5	0-2'	0	2	Ash	58.2		3.6e-05		
92MAYIL4-3	2-4'	2	4	Ash	56.3		1.1e-04		
92MAYIL4-5.5	4-6'	4	6	Ash	39.9	126.6			FP
92MAYIL4-7	6-8'	6	8	Ash		320.7			
92MAYIL4-7.5	6-8'	6	8	Ash	47.3		7.8e-06		
92MAYIL4-8.5	8-10'	8	10	Soil		269.7			
92MAYIL4-9	8-10'	8	10	Soil	47.9		4.1e-06		
92MAYIL4-11	10-12'	10	12	Soil	17.4		9.8e-08		
92MAYIL4-13	12-14'	12	14	Soil	22.4		7.0e-08		
92MAYIL4-16	14-16'	14	16	Soil	20.0		3.5e-07		
93MAYIL1-1	0-2'	0	2	Soil	15.1		2.4e-06		
93MAYIL1-3	2-4'	2	4	Ash	78.2	32.0	1.1e-05		
93MAYIL1-5	4-6'	4	6	Ash	78.7	60.0	1.5e-05		
93MAYIL1-7	6-8'	6	8	Ash	71.7	10.0	1.6e-05		
93MAYIL1-9	8-10'	8	10	Ash	75.2	75.0	1.2e-05		
93MAYIL1-11	10-12'	10	12	Soil	16.4		5.8e-07		
93MAYIL1-13	12-14'	12	14	Soil	21.7		4.2e-07		
93MAYIL1-15	14-16'	14	16	Soil	13.4		1.7e-07		
93MAYIL1-17	16-18'	16	18	Soil	14.4		2.3e-07		

Table 4
(Continued)

Sample ID	Depth (ft)	Top (ft)	Bottom (ft)	Matrix	Moisture (dry) (%)	UCS (psi)	Permeability (cm/s)	Bulk Density (pcf)	Comment
93MAYIL2-1	0-2'	0	2	Soil	13.0		7.3e-07		
93MAYIL2-3	2-4'	2	4	Ash	95.9	90.0	3.5e-05		
93MAYIL2-5	4-6'	4	6	Ash					FP
93MAYIL2-7	6-8'	6	8	Ash	66.9	10.0	6.8e-05		
93MAYIL2-9	8-10'	8	10	Ash	81.2	85.0	9.6e-06		
93MAYIL2-10.5	10-11'	10	11	Ash	83.4	12.0	9.0e-06		
93MAYIL2-11.5	11-12'	11	12	Soil	15.2		1.1e-04		
93MAYIL2-13	12-14'	12	14	Soil	55.7		2.7e-03		
93MAYIL2-15	14-16'	14	16	Soil	16.9		4.8e-07		
93MAYIL2-17	16-18'	16	18	Soil	17.3		2.9e-07		
N-05-03	Cell #3			Ash		1163.0		93.5	
S-13-08	Cell #2			Ash		1564.0		105.6	

FP = Fractured or poorly consolidated

Table 5

X-Ray Diffraction Mineralogy of Illinois Ash

Sample ID	Location	Wt. Percent									
		Gypsum	Etringite	Thaumasite	Anhydrite	Quartz	Calcite	Portlandite	Lime	Fe-Spinel	Sum
93MAYIL1-3	N-Cell	3.0	31.0	?	0.00	17.2	4.7	12.4	0.0		68.3
93MAYIL1-7	N-Cell	9.0	23.0		0.00	4.6	5.8	17.3	0.0		59.7
93MAYIL1-11	N-Cell	13.0	28.0		0.00	6.9	7.5	13.1	0.0		68.5
93MAYIL1-14	N-Cell	11.0	25.0		0.00	6.4	7.8	11.3	0.0		61.5
93MAYIL1-19	N-Cell	9.0	24.0	?	0.00	7.2	9.5	13.3	0.0		63.0
93MAYIL2-2B	N-Cell	15.0	37.0		0.00	5.6	7.8	18.6	0.0		84.0
93MAYIL2-7	N-Cell	10.0	25.0		0.00	7.7	6.7	12.3	0.0		61.7
93MAYIL2-12	N-Cell	11.0	32.0	?	0.00	6.7	9.1	8.3	0.0		67.1
93MAYIL2-16B	N-Cell	11.0	31.0		0.00	7.0	6.2	13.2	0.0		68.4
93MAYIL2-20A	N-Cell	9.0	22.0		0.00	14.3	5.5	13.4	0.0		64.2

APPENDIX I
In-Situ Moisture

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

											RATIO- Cnts/min ----- Std Cnts	Volumetric Moisture Content (% Vol H2O)			Volumetric Moisture Content (% Vol H2O)
ACCESS TUBE		LOCATION	QUAD	DEPTH (ft)	TYPE	COUNTS UP	COUNTS DOWN	AVG. COUNT	% MEA DEV.			DATE	ACCESS TUBE		
06/06/91	ILNT-1	N.-Cell	N.W.	TOA	Ash	....	....	....	...	.....	.....	06/06/91	ILNT-1	TOA	
06/06/91	ILNT-1	N.-Cell	N.W.	-1	Ash	313	301	307	3.9	0.3690	15.67	06/06/91	ILNT-1	-1	15.67
06/06/91	ILNT-1	N.-Cell	N.W.	-2	Ash	473	476	475	0.8	0.5703	23.57	06/06/91	ILNT-1	-2	23.57
06/06/91	ILNT-1	N.-Cell	N.W.	-3	Ash	449	453	451	0.9	0.5421	22.46	06/06/91	ILNT-1	-3	22.46
06/06/91	ILNT-1	N.-Cell	N.W.	-4	Ash	146	146	146	0.0	0.1755	8.07	06/06/91	ILNT-1	-4	8.07
06/06/91	ILNT-1	N.-Cell	N.W.	-5	Ash	174	176	175	1.1	0.2103	9.44	06/06/91	ILNT-1	-5	9.44
06/06/91	ILNT-1	N.-Cell	N.W.	-6	Ash	459	452	456	1.5	0.5475	22.67	06/06/91	ILNT-1	-6	22.67
06/06/91	ILNT-1	N.-Cell	N.W.	-7	Ash	564	549	557	2.7	0.6889	27.44	06/06/91	ILNT-1	-7	27.44
06/06/91	ILNT-1	N.-Cell	N.W.	-8	Ash	559	550	555	1.6	0.6665	27.35	06/06/91	ILNT-1	-8	27.35
06/06/91	ILNT-1	N.-Cell	N.W.	-9	Ash/Soil	....	....	....	...	.....	.....	06/06/91	ILNT-1	-9	
06/06/91	ILNT-2	N.-Cell	N.E.	TOA	Ash	....	....	....	...	.....	.....	06/06/91	ILNT-2	TOA	
06/06/91	ILNT-2	N.-Cell	N.E.	-1	Ash	452	441	447	2.5	0.5367	22.25	06/06/91	ILNT-2	-1	22.25
06/06/91	ILNT-2	N.-Cell	N.E.	-2	Ash	534	543	539	1.7	0.6472	26.59	06/06/91	ILNT-2	-2	26.59
06/06/91	ILNT-2	N.-Cell	N.E.	-3	Ash	268	276	272	2.9	0.3269	14.01	06/06/91	ILNT-2	-3	14.01
06/06/91	ILNT-2	N.-Cell	N.E.	-4	Ash	333	343	338	3.0	0.4063	17.13	06/06/91	ILNT-2	-4	17.13
06/06/91	ILNT-2	N.-Cell	N.E.	-5	Ash	537	546	542	1.7	0.6508	26.73	06/06/91	ILNT-2	-5	26.73
06/06/91	ILNT-2	N.-Cell	N.E.	-6	Ash	539	520	530	3.6	0.6364	26.17	06/06/91	ILNT-2	-6	26.17
06/06/91	ILNT-2	N.-Cell	N.E.	-7	Ash	512	514	513	0.4	0.6166	25.39	06/06/91	ILNT-2	-7	25.39
06/06/91	ILNT-2	N.-Cell	N.E.	-8	Ash	567	573	570	1.1	0.6851	28.08	06/06/91	ILNT-2	-8	28.08
06/06/91	ILNT-2	N.-Cell	N.E.	-9	Ash/Soil	522	509	516	2.5	0.6196	25.51	06/06/91	ILNT-2	-9	25.51
06/06/91	ILNT-3	N.-Cell	S.E.	TOA	Ash	....	....	....	...	.....	.....	06/06/91	ILNT-3	TOA	
06/06/91	ILNT-3	N.-Cell	S.E.	-1	Ash	571	579	575	1.4	0.6911	28.31	06/06/91	ILNT-3	-1	28.31
06/06/91	ILNT-3	N.-Cell	S.E.	-2	Ash	521	521	521	0.0	0.6262	25.76	06/06/91	ILNT-3	-2	25.76
06/06/91	ILNT-3	N.-Cell	S.E.	-3	Ash	306	327	317	6.6	0.3804	16.11	06/06/91	ILNT-3	-3	16.11
06/06/91	ILNT-3	N.-Cell	S.E.	-4	Ash	335	347	341	3.5	0.4099	17.27	06/06/91	ILNT-3	-4	17.27
06/06/91	ILNT-3	N.-Cell	S.E.	-5	Ash	526	524	525	0.4	0.6310	25.95	06/06/91	ILNT-3	-5	25.95
06/06/91	ILNT-3	N.-Cell	S.E.	-6	Ash	511	508	510	0.6	0.6124	25.22	06/06/91	ILNT-3	-6	25.22
06/06/91	ILNT-3	N.-Cell	S.E.	-7	Ash	496	504	500	1.6	0.6010	24.77	06/06/91	ILNT-3	-7	24.77
06/06/91	ILNT-3	N.-Cell	S.E.	-8	Ash	482	483	483	0.2	0.5799	23.95	06/06/91	ILNT-3	-8	23.95
06/06/91	ILNT-3	N.-Cell	S.E.	-9	Ash/Soil	553	562	558	1.6	0.6701	27.49	06/06/91	ILNT-3	-9	27.49
06/06/91	ILNT-4	N.-Cell	S.W.	TOA	Ash	....	....	....	...	.....	.....	06/06/91	ILNT-4	TOA	

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

												RATIO- Cnts/min -----		Volumetric Moisture Content (% Vol H2O)				Volumetric Moisture Content (% Vol H2O)	
ACCESS			DEPTH			COUNTS	COUNTS	AVG.	% MEA				DATE	ACCESS					
TUBE	LOCATION	QUAD	(ft)	TYPE	UP	DOWN	COUNT	DEV.	Std Cnts				TUBE						
08/08/91	ILNT-4	N.-Cell	S.W.	-1	Ash	517	540	529	4.4	0.6352	26.12	08/08/91	ILNT-4	-1	26.12				
08/08/91	ILNT-4	N.-Cell	S.W.	-2	Ash	433	416	425	4.0	0.5102	21.21	08/08/91	ILNT-4	-2	21.21				
08/08/91	ILNT-4	N.-Cell	S.W.	-3	Ash	209	211	210	1.0	0.2524	11.09	08/08/91	ILNT-4	-3	11.09				
08/08/91	ILNT-4	N.-Cell	S.W.	-4	Ash	133	131	132	1.5	0.1587	7.41	08/08/91	ILNT-4	-4	7.41				
08/08/91	ILNT-4	N.-Cell	S.W.	-5	Ash	407	400	404	1.7	0.4850	20.22	08/08/91	ILNT-4	-5	20.22				
08/08/91	ILNT-4	N.-Cell	S.W.	-6	Ash	528	526	527	0.4	0.6334	26.05	08/08/91	ILNT-4	-6	26.05				
08/08/91	ILNT-4	N.-Cell	S.W.	-7	Ash	500	517	509	3.3	0.6112	25.17	08/08/91	ILNT-4	-7	25.17				
08/08/91	ILNT-4	N.-Cell	S.W.	-8	Ash	483	482	483	0.2	0.5799	23.95	08/08/91	ILNT-4	-8	23.95				
08/08/91	ILNT-4	N.-Cell	S.W.	-9	Ash/Soil	535	531	533	0.8	0.6406	26.33	08/08/91	ILNT-4	-9	26.33				
												::							
08/16/91	ILNT-1	N.-Cell	N.W.	TOA	Ash	....	....	....	...	.....	.....	08/16/91	ILNT-1	TOA					
08/16/91	ILNT-1	N.-Cell	N.W.	-1	Ash	592	584	588	1.4	0.7119	29.13	08/16/91	ILNT-1	-1	29.13				
08/16/91	ILNT-1	N.-Cell	N.W.	-2	Ash	606	597	602	1.5	0.7282	29.77	08/16/91	ILNT-1	-2	29.77				
08/16/91	ILNT-1	N.-Cell	N.W.	-3	Ash	495	498	497	0.6	0.6011	24.78	08/16/91	ILNT-1	-3	24.78				
08/16/91	ILNT-1	N.-Cell	N.W.	-4	Ash	153	156	155	1.9	0.1870	8.52	08/16/91	ILNT-1	-4	8.52				
08/16/91	ILNT-1	N.-Cell	N.W.	-5	Ash	187	187	187	0.0	0.2264	10.07	08/16/91	ILNT-1	-5	10.07				
08/16/91	ILNT-1	N.-Cell	N.W.	-6	Ash	517	519	518	0.4	0.6271	25.80	08/16/91	ILNT-1	-6	25.80				
08/16/91	ILNT-1	N.-Cell	N.W.	-7	Ash	577	591	584	2.4	0.7070	28.94	08/16/91	ILNT-1	-7	28.94				
08/16/91	ILNT-1	N.-Cell	N.W.	-8	Ash	592	597	595	0.8	0.7197	29.44	08/16/91	ILNT-1	-8	29.44				
08/16/91	ILNT-1	N.-Cell	N.W.	-9	Ash/Soil	....	....	....	...	.....	.....	08/16/91	ILNT-1	-9					
08/16/91	ILNT-2	N.-Cell	N.E.	TOA	Ash	....	....	....	...	.....	.....	08/16/91	ILNT-2	TOA					
08/16/91	ILNT-2	N.-Cell	N.E.	-1	Ash	611	597	604	2.3	0.7312	29.89	08/16/91	ILNT-2	-1	29.89				
08/16/91	ILNT-2	N.-Cell	N.E.	-2	Ash	597	611	604	2.3	0.7312	29.89	08/16/91	ILNT-2	-2	29.89				
08/16/91	ILNT-2	N.-Cell	N.E.	-3	Ash	521	532	527	2.1	0.6374	26.20	08/16/91	ILNT-2	-3	26.20				
08/16/91	ILNT-2	N.-Cell	N.E.	-4	Ash	456	467	462	2.4	0.5587	23.11	08/16/91	ILNT-2	-4	23.11				
08/16/91	ILNT-2	N.-Cell	N.E.	-5	Ash	546	539	543	1.3	0.6568	26.97	08/16/91	ILNT-2	-5	26.97				
08/16/91	ILNT-2	N.-Cell	N.E.	-6	Ash	557	551	554	1.1	0.6707	27.51	08/16/91	ILNT-2	-6	27.51				
08/16/91	ILNT-2	N.-Cell	N.E.	-7	Ash	580	568	574	2.1	0.6949	28.46	08/16/91	ILNT-2	-7	28.46				
08/16/91	ILNT-2	N.-Cell	N.E.	-8	Ash	604	618	611	2.3	0.7397	30.22	08/16/91	ILNT-2	-8	30.22				
08/16/91	ILNT-2	N.-Cell	N.E.	-9	Ash/Soil	513	524	519	2.1	0.6277	25.82	08/16/91	ILNT-2	-9	25.82				
08/16/91	ILNT-3	N.-Cell	S.E.	TOA	Ash	....	....	....	...	.....	.....	08/16/91	ILNT-3	TOA					
08/16/91	ILNT-3	N.-Cell	S.E.	-1	Ash	692	678	685	2.0	0.8293	33.74	08/16/91	ILNT-3	-1	33.74				

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 % Moisture = (cnts ratio-0.029973)/0.025468

											RATIO- Cnts/min ----- Std Cnts	Volumetric Moisture Content (% Vol H2O)	DATE	ACCESS TUBE	Volumetric Moisture Content (% Vol H2O)	
ACCESS		LOCATION		DEPTH	TYPE	COUNTS	COUNTS	AVG.	% MEA							
TUBE			QUAD	(ft)		UP	DOWN	COUNT	DEV.							
08/16/91	ILNT-3	N.-Cell	S.E.	-2	Ash	602	607	605	0.8	0.7318	29.91	08/16/91	ILNT-3	-2	29.91	
08/16/91	ILNT-3	N.-Cell	S.E.	-3	Ash	517	515	516	0.4	0.6247	25.71	08/16/91	ILNT-3	-3	25.71	
08/16/91	ILNT-3	N.-Cell	S.E.	-4	Ash	411	412	412	0.2	0.4982	20.74	08/16/91	ILNT-3	-4	20.74	
08/16/91	ILNT-3	N.-Cell	S.E.	-5	Ash	545	541	543	0.7	0.6574	26.99	08/16/91	ILNT-3	-5	26.99	
08/16/91	ILNT-3	N.-Cell	S.E.	-6	Ash	515	508	512	1.4	0.6192	25.49	08/16/91	ILNT-3	-6	25.49	
08/16/91	ILNT-3	N.-Cell	S.E.	-7	Ash	503	506	505	0.6	0.6108	25.16	08/16/91	ILNT-3	-7	25.16	
08/16/91	ILNT-3	N.-Cell	S.E.	-8	Ash	474	480	477	1.3	0.5775	23.85	08/16/91	ILNT-3	-8	23.85	
08/16/91	ILNT-3	N.-Cell	S.E.	-9	Ash/Soil	537	545	541	1.5	0.6550	26.89	08/16/91	ILNT-3	-9	26.89	
08/16/91	ILNT-4	N.-Cell	S.W.	TOA	Ash	....	....	....	...	.....	.....	08/16/91	ILNT-4	TOA		
08/16/91	ILNT-4	N.-Cell	S.W.	-1	Ash	625	613	619	1.9	0.7494	30.60	08/16/91	ILNT-4	-1	30.60	
08/16/91	ILNT-4	N.-Cell	S.W.	-2	Ash	513	519	516	1.2	0.6247	25.71	08/16/91	ILNT-4	-2	25.71	
08/16/91	ILNT-4	N.-Cell	S.W.	-3	Ash	205	216	211	5.2	0.2548	11.18	08/16/91	ILNT-4	-3	11.18	
08/16/91	ILNT-4	N.-Cell	S.W.	-4	Ash	114	118	116	3.4	0.1404	6.69	08/16/91	ILNT-4	-4	6.69	
08/16/91	ILNT-4	N.-Cell	S.W.	-5	Ash	422	431	427	2.1	0.5163	21.45	08/16/91	ILNT-4	-5	21.45	
08/16/91	ILNT-4	N.-Cell	S.W.	-6	Ash	550	551	551	0.2	0.6665	27.35	08/16/91	ILNT-4	-6	27.35	
08/16/91	ILNT-4	N.-Cell	S.W.	-7	Ash	512	514	513	0.4	0.6211	25.56	08/16/91	ILNT-4	-7	25.56	
08/16/91	ILNT-4	N.-Cell	S.W.	-8	Ash	478	486	482	1.7	0.5835	24.09	08/16/91	ILNT-4	-8	24.09	
08/16/91	ILNT-4	N.-Cell	S.W.	-9	Ash/Soil	534	536	535	0.4	0.6477	26.61	08/16/91	ILNT-4	-9	26.61	
												::				
11/13/91	ILNT-1	N.-Cell	N.W.	TOA	Ash	....	....	....	...	.....	.....	11/13/91	ILNT-1	TOA		
11/13/91	ILNT-1	N.-Cell	N.W.	-1	Ash	704	702	703	0.3	0.8460	34.39	11/13/91	ILNT-1	-1	34.39	
11/13/91	ILNT-1	N.-Cell	N.W.	-2	Ash	678	692	685	2.0	0.8243	33.54	11/13/91	ILNT-1	-2	33.54	
11/13/91	ILNT-1	N.-Cell	N.W.	-3	Ash	631	634	633	0.5	0.7611	31.06	11/13/91	ILNT-1	-3	31.06	
11/13/91	ILNT-1	N.-Cell	N.W.	-4	Ash	404	420	412	3.9	0.4958	20.64	11/13/91	ILNT-1	-4	20.64	
11/13/91	ILNT-1	N.-Cell	N.W.	-5	Ash	208	204	206	1.9	0.2479	10.91	11/13/91	ILNT-1	-5	10.91	
11/13/91	ILNT-1	N.-Cell	N.W.	-6	Ash	551	540	546	2.0	0.6564	26.95	11/13/91	ILNT-1	-6	26.95	
11/13/91	ILNT-1	N.-Cell	N.W.	-7	Ash	602	593	598	1.5	0.7190	29.41	11/13/91	ILNT-1	-7	29.41	
11/13/91	ILNT-1	N.-Cell	N.W.	-8	Ash	616	614	615	0.3	0.7401	30.24	11/13/91	ILNT-1	-8	30.24	
11/13/91	ILNT-1	N.-Cell	N.W.	-9	Ash/Soil	....	....	....	...	.....	.....	11/13/91	ILNT-1	-9		
11/13/91	ILNT-2	N.-Cell	N.E.	TOA	Ash	....	....	....	...	.....	.....	11/13/91	ILNT-2	TOA		
11/13/91	ILNT-2	N.-Cell	N.E.	-1	Ash	712	697	705	2.1	0.8478	34.46	11/13/91	ILNT-2	-1	34.46	
11/13/91	ILNT-2	N.-Cell	N.E.	-2	Ash	723	713	718	1.4	0.8640	35.10	11/13/91	ILNT-2	-2	35.10	

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

											RATIO- Cnts/min ----- Std Cnts	Volumetric Moisture Content (% Vol H2O)			Volumetric Moisture Content (% Vol H2O)
ACCESS			DEPTH		COUNTS		COUNTS	AVG.	% MEA			DATE	ACCESS		
TUBE	LOCATION	QUAD	(ft)	TYPE	UP	DOWN	COUNT	DEV.					TUBE		
11/13/91	ILNT-2	N.-Cell	N.E.	-3	Ash	637	648	643	1.7	0.7732	31.54	11/13/91	ILNT-2	-3	31.54
11/13/91	ILNT-2	N.-Cell	N.E.	-4	Ash	569	596	583	4.6	0.7010	28.70	11/13/91	ILNT-2	-4	28.70
11/13/91	ILNT-2	N.-Cell	N.E.	-5	Ash	632	623	628	1.4	0.7551	30.83	11/13/91	ILNT-2	-5	30.83
11/13/91	ILNT-2	N.-Cell	N.E.	-6	Ash	603	603	603	0.0	0.7256	29.67	11/13/91	ILNT-2	-6	29.67
11/13/91	ILNT-2	N.-Cell	N.E.	-7	Ash	571	580	576	1.6	0.6925	28.37	11/13/91	ILNT-2	-7	28.37
11/13/91	ILNT-2	N.-Cell	N.E.	-8	Ash	615	618	617	0.5	0.7419	30.31	11/13/91	ILNT-2	-8	30.31
11/13/91	ILNT-2	N.-Cell	N.E.	-9	Ash/Soil	534	519	527	2.8	0.6336	26.05	11/13/91	ILNT-2	-9	26.05
11/13/91	ILNT-3	N.-Cell	S.E.	TOA	Ash	....	....	....	...	.....	.....	11/13/91	ILNT-3	TOA	
11/13/91	ILNT-3	N.-Cell	S.E.	-1	Ash	784	772	778	1.5	0.9362	37.94	11/13/91	ILNT-3	-1	37.94
11/13/91	ILNT-3	N.-Cell	S.E.	-2	Ash	692	698	695	0.9	0.8363	34.02	11/13/91	ILNT-3	-2	34.02
11/13/91	ILNT-3	N.-Cell	S.E.	-3	Ash	686	680	683	0.9	0.8219	33.45	11/13/91	ILNT-3	-3	33.45
11/13/91	ILNT-3	N.-Cell	S.E.	-4	Ash	620	609	615	1.8	0.7395	30.21	11/13/91	ILNT-3	-4	30.21
11/13/91	ILNT-3	N.-Cell	S.E.	-5	Ash	629	634	632	0.8	0.7599	31.02	11/13/91	ILNT-3	-5	31.02
11/13/91	ILNT-3	N.-Cell	S.E.	-6	Ash	547	547	547	0.0	0.6582	27.02	11/13/91	ILNT-3	-6	27.02
11/13/91	ILNT-3	N.-Cell	S.E.	-7	Ash	526	543	535	3.2	0.6432	26.43	11/13/91	ILNT-3	-7	26.43
11/13/91	ILNT-3	N.-Cell	S.E.	-8	Ash	493	498	496	1.0	0.5963	24.59	11/13/91	ILNT-3	-8	24.59
11/13/91	ILNT-3	N.-Cell	S.E.	-9	Ash/Soil	530	534	532	0.8	0.6402	26.31	11/13/91	ILNT-3	-9	26.31
11/13/91	ILNT-4	N.-Cell	S.W.	TOA	Ash	....	....	....	...	.....	.....	11/13/91	ILNT-4	TOA	
11/13/91	ILNT-4	N.-Cell	S.W.	-1	Ash	731	719	725	1.7	0.8724	35.43	11/13/91	ILNT-4	-1	35.43
11/13/91	ILNT-4	N.-Cell	S.W.	-2	Ash	632	628	630	0.6	0.7581	30.94	11/13/91	ILNT-4	-2	30.94
11/13/91	ILNT-4	N.-Cell	S.W.	-3	Ash	476	461	469	3.2	0.5638	23.31	11/13/91	ILNT-4	-3	23.31
11/13/91	ILNT-4	N.-Cell	S.W.	-4	Ash	128	130	129	1.6	0.1552	7.27	11/13/91	ILNT-4	-4	7.27
11/13/91	ILNT-4	N.-Cell	S.W.	-5	Ash	452	444	448	1.8	0.5391	22.35	11/13/91	ILNT-4	-5	22.35
11/13/91	ILNT-4	N.-Cell	S.W.	-6	Ash	573	555	564	3.2	0.6787	27.83	11/13/91	ILNT-4	-6	27.83
11/13/91	ILNT-4	N.-Cell	S.W.	-7	Ash	515	520	518	1.0	0.6227	25.63	11/13/91	ILNT-4	-7	25.63
11/13/91	ILNT-4	N.-Cell	S.W.	-8	Ash	500	495	498	1.0	0.5987	24.68	11/13/91	ILNT-4	-8	24.68
11/13/91	ILNT-4	N.-Cell	S.W.	-9	Ash/Soil	522	537	530	2.8	0.6372	26.20	11/13/91	ILNT-4	-9	26.20
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02/20/92	ILNT-1	N.-Cell	N.W.	TOA	Ash				...			02/20/92	ILNT-1	TOA	
02/20/92	ILNT-1	N.-Cell	N.W.	-1	Ash	747	734	741	1.8	0.8922	36.21	02/20/92	ILNT-1	-1	36.21
02/20/92	ILNT-1	N.-Cell	N.W.	-2	Ash	757	753	755	0.5	0.9096	36.89	02/20/92	ILNT-1	-2	36.89
02/20/92	ILNT-1	N.-Cell	N.W.	-3	Ash	688	670	679	2.7	0.8181	33.30	02/20/92	ILNT-1	-3	33.30

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

										RATIO- Cnts/min -----	Volumetric Moisture Content			Volumetric Moisture Content	
ACCESS		DEPTH		COUNTS UP	COUNTS DOWN	AVG. COUNT	% MEA DEV.	Std Cnts	Volumetric Moisture Content (% Vol H2O)	DATE	ACCESS TUBE	Volumetric Moisture Content (% Vol H2O)			
TUBE	LOCATION QUAD	(ft)	TYPE												
02/20/92	ILNT-1	N.-Cell	N.W.	-4	Ash	593	587	590	1.0	0.7108	29.09	02/20/92	ILNT-1	-4	29.09
02/20/92	ILNT-1	N.-Cell	N.W.	-5	Ash	601	570	586	5.3	0.7054	28.88	02/20/92	ILNT-1	-5	28.88
02/20/92	ILNT-1	N.-Cell	N.W.	-6	Ash	719	723	721	0.6	0.8687	35.29	02/20/92	ILNT-1	-6	35.29
02/20/92	ILNT-1	N.-Cell	N.W.	-7	Ash	640	630	635	1.6	0.7651	31.22	02/20/92	ILNT-1	-7	31.22
02/20/92	ILNT-1	N.-Cell	N.W.	-8	Ash	673	654	664	2.9	0.7994	32.57	02/20/92	ILNT-1	-8	32.57
02/20/92	ILNT-1	N.-Cell	N.W.	-9	Ash/Soil	....	....	....	...	.....	.....	02/20/92	ILNT-1	-9	
02/20/92	ILNT-2	N.-Cell	N.E.	TOA	Ash	....	....	....	...	.....	.....	02/20/92	ILNT-2	TOA	
02/20/92	ILNT-2	N.-Cell	N.E.	-1	Ash	780	785	783	0.6	0.9428	38.19	02/20/92	ILNT-2	-1	38.19
02/20/92	ILNT-2	N.-Cell	N.E.	-2	Ash	771	804	788	4.2	0.9488	38.43	02/20/92	ILNT-2	-2	38.43
02/20/92	ILNT-2	N.-Cell	N.E.	-3	Ash	725	709	717	2.2	0.8639	35.10	02/20/92	ILNT-2	-3	35.10
02/20/92	ILNT-2	N.-Cell	N.E.	-4	Ash	700	666	683	5.0	0.8229	33.49	02/20/92	ILNT-2	-4	33.49
02/20/92	ILNT-2	N.-Cell	N.E.	-5	Ash	755	748	752	0.9	0.9054	36.73	02/20/92	ILNT-2	-5	36.73
02/20/92	ILNT-2	N.-Cell	N.E.	-6	Ash	711	714	713	0.4	0.8584	34.88	02/20/92	ILNT-2	-6	34.88
02/20/92	ILNT-2	N.-Cell	N.E.	-7	Ash	709	711	710	0.3	0.8554	34.76	02/20/92	ILNT-2	-7	34.76
02/20/92	ILNT-2	N.-Cell	N.E.	-8	Ash	841	845	843	0.5	1.0157	41.06	02/20/92	ILNT-2	-8	41.06
02/20/92	ILNT-2	N.-Cell	N.E.	-9	Ash/Soil	595	613	604	3.0	0.7277	29.75	02/20/92	ILNT-2	-9	29.75
02/20/92	ILNT-3	N.-Cell	S.E.	TOA	Ash	....	....	....	...	.....	.....	02/20/92	ILNT-3	TOA	
02/20/92	ILNT-3	N.-Cell	S.E.	-1	Ash	792	808	800	2.0	0.9639	39.02	02/20/92	ILNT-3	-1	39.02
02/20/92	ILNT-3	N.-Cell	S.E.	-2	Ash	735	722	729	1.8	0.8777	35.64	02/20/92	ILNT-3	-2	35.64
02/20/92	ILNT-3	N.-Cell	S.E.	-3	Ash	752	755	754	0.4	0.9078	36.82	02/20/92	ILNT-3	-3	36.82
02/20/92	ILNT-3	N.-Cell	S.E.	-4	Ash	717	719	718	0.3	0.8651	35.14	02/20/92	ILNT-3	-4	35.14
02/20/92	ILNT-3	N.-Cell	S.E.	-5	Ash	717	719	718	0.3	0.8651	35.14	02/20/92	ILNT-3	-5	35.14
02/20/92	ILNT-3	N.-Cell	S.E.	-6	Ash	675	653	664	3.3	0.8000	32.59	02/20/92	ILNT-3	-6	32.59
02/20/92	ILNT-3	N.-Cell	S.E.	-7	Ash	740	739	740	0.1	0.8910	36.16	02/20/92	ILNT-3	-7	36.16
02/20/92	ILNT-3	N.-Cell	S.E.	-8	Ash	620	618	619	0.3	0.7458	30.46	02/20/92	ILNT-3	-8	30.46
02/20/92	ILNT-3	N.-Cell	S.E.	-9	Ash/Soil	549	539	544	1.8	0.6554	26.91	02/20/92	ILNT-3	-9	26.91
02/20/92	ILNT-4	N.-Cell	S.W.	TOA	Ash	....	....	....	...	.....	.....	02/20/92	ILNT-4	TOA	
02/20/92	ILNT-4	N.-Cell	S.W.	-1	Ash	761	740	751	2.8	0.9042	36.68	02/20/92	ILNT-4	-1	36.68
02/20/92	ILNT-4	N.-Cell	S.W.	-2	Ash	639	625	632	2.2	0.7614	31.08	02/20/92	ILNT-4	-2	31.08
02/20/92	ILNT-4	N.-Cell	S.W.	-3	Ash	559	551	555	1.4	0.6687	27.43	02/20/92	ILNT-4	-3	27.43
02/20/92	ILNT-4	N.-Cell	S.W.	-4	Ash	360	364	362	1.1	0.4361	18.30	02/20/92	ILNT-4	-4	18.30

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

											RATIO- Cnts/min ----- Std Cnts	Volumetric Moisture Content (% Vol H2O)	DATE	ACCESS TUBE	Volumetric Moisture Content (% Vol H2O)	
ACCESS		LOCATION QUAD		DEPTH	TYPE	COUNTS	COUNTS	AVG.	% MEA							
TUBE				(ft)		UP	DOWN	COUNT	DEV.							
02/20/92	ILNT-4	N.-Cell	S.W.	-5	Ash	468	453	461	3.3	0.5548		22.96	02/20/92	ILNT-4	-5	22.96
02/20/92	ILNT-4	N.-Cell	S.W.	-6	Ash	571	584	578	2.3	0.6958		28.50	02/20/92	ILNT-4	-6	28.50
02/20/92	ILNT-4	N.-Cell	S.W.	-7	Ash	510	517	514	1.4	0.6187		25.47	02/20/92	ILNT-4	-7	25.47
02/20/92	ILNT-4	N.-Cell	S.W.	-8	Ash	489	469	479	4.2	0.5771		23.84	02/20/92	ILNT-4	-8	23.84
02/20/92	ILNT-4	N.-Cell	S.W.	-9	Ash/Soil	518	531	525	2.5	0.6319		25.99	02/20/92	ILNT-4	-9	25.99
													::			
05/16/92	ILNT-1	N.-Cell	N.W.	TOA	Ash	....	....	....	...	.....		.....	05/16/92	ILNT-1	TOA	
05/16/92	ILNT-1	N.-Cell	N.W.	-1	Ash	697	709	703	1.7	0.8470		34.43	05/16/92	ILNT-1	-1	34.43
05/16/92	ILNT-1	N.-Cell	N.W.	-2	Ash	749	743	746	0.8	0.8988		36.47	05/16/92	ILNT-1	-2	36.47
05/16/92	ILNT-1	N.-Cell	N.W.	-3	Ash	687	685	686	0.3	0.8265		33.63	05/16/92	ILNT-1	-3	33.63
05/16/92	ILNT-1	N.-Cell	N.W.	-4	Ash	615	640	628	4.0	0.7560		30.86	05/16/92	ILNT-1	-4	30.86
05/16/92	ILNT-1	N.-Cell	N.W.	-5	Ash	675	665	670	1.5	0.8072		32.87	05/16/92	ILNT-1	-5	32.87
05/16/92	ILNT-1	N.-Cell	N.W.	-6	Ash	769	754	762	2.0	0.9175		37.20	05/16/92	ILNT-1	-6	37.20
05/16/92	ILNT-1	N.-Cell	N.W.	-7	Ash	670	674	672	0.6	0.8096		32.97	05/16/92	ILNT-1	-7	32.97
05/16/92	ILNT-1	N.-Cell	N.W.	-8	Ash	718	746	732	3.8	0.8819		35.81	05/16/92	ILNT-1	-8	35.81
05/16/92	ILNT-1	N.-Cell	N.W.	-9	Ash/Soil	....	....	....	...	.....		.....	05/16/92	ILNT-1	-9	
05/16/92	ILNT-2	N.-Cell	N.E.	TOA	Ash	....	....	....	...	.....		.....	05/16/92	ILNT-2	TOA	
05/16/92	ILNT-2	N.-Cell	N.E.	-1	Ash	770	765	768	0.7	0.9247		37.49	05/16/92	ILNT-2	-1	37.49
05/16/92	ILNT-2	N.-Cell	N.E.	-2	Ash	801	781	791	2.5	0.9530		38.60	05/16/92	ILNT-2	-2	38.60
05/16/92	ILNT-2	N.-Cell	N.E.	-3	Ash	726	716	721	1.4	0.8687		35.29	05/16/92	ILNT-2	-3	35.29
05/16/92	ILNT-2	N.-Cell	N.E.	-4	Ash	710	702	706	1.1	0.8506		34.58	05/16/92	ILNT-2	-4	34.58
05/16/92	ILNT-2	N.-Cell	N.E.	-5	Ash	763	747	755	2.1	0.9096		36.89	05/16/92	ILNT-2	-5	36.89
05/16/92	ILNT-2	N.-Cell	N.E.	-6	Ash	756	751	754	0.7	0.9078		36.82	05/16/92	ILNT-2	-6	36.82
05/16/92	ILNT-2	N.-Cell	N.E.	-7	Ash	624	613	619	1.8	0.7452		30.44	05/16/92	ILNT-2	-7	30.44
05/16/92	ILNT-2	N.-Cell	N.E.	-8	Ash	849	880	865	3.6	1.0416		42.07	05/16/92	ILNT-2	-8	42.07
05/16/92	ILNT-2	N.-Cell	N.E.	-9	Ash/Soil	628	609	619	3.1	0.7452		30.44	05/16/92	ILNT-2	-9	30.44
05/16/92	ILNT-3	N.-Cell	S.E.	TOA	Ash	....	....	....	...	.....		.....	05/16/92	ILNT-3	TOA	
05/16/92	ILNT-3	N.-Cell	S.E.	-1	Ash	793	793	793	0.0	0.9554		38.69	05/16/92	ILNT-3	-1	38.69
05/16/92	ILNT-3	N.-Cell	S.E.	-2	Ash	740	727	734	1.8	0.8837		35.88	05/16/92	ILNT-3	-2	35.88
05/16/92	ILNT-3	N.-Cell	S.E.	-3	Ash	779	759	769	2.6	0.9265		37.56	05/16/92	ILNT-3	-3	37.56
05/16/92	ILNT-3	N.-Cell	S.E.	-4	Ash	740	730	735	1.4	0.8855		35.95	05/16/92	ILNT-3	-4	35.95
05/16/92	ILNT-3	N.-Cell	S.E.	-5	Ash	738	736	737	0.3	0.8880		36.04	05/16/92	ILNT-3	-5	36.04

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

ACCESS	DEPTH	COUNTS	COUNTS	AVG.	% MEA	RATIO-	Volumetric			Volumetric
TUBE	LOCATION QUAD (ft)	UP	DOWN	COUNT	DEV.	Cnts/min	Moisture	DATE	ACCESS	Moisture
						-----	Content		TUBE	Content
						Std Cnts	(% Vol H2O)			(% Vol H2O)
05/16/92 ILNT-3	N.-Cell S.E. -6 Ash	668	681	675	1.9	0.8127	33.09	05/16/92	ILNT-3	-6 33.09
05/16/92 ILNT-3	N.-Cell S.E. -7 Ash	790	766	778	3.1	0.9373	37.98	05/16/92	ILNT-3	-7 37.98
05/16/92 ILNT-3	N.-Cell S.E. -8 Ash	707	711	709	0.6	0.8542	34.72	05/16/92	ILNT-3	-8 34.72
05/16/92 ILNT-3	N.-Cell S.E. -9 Ash/Soil	549	558	554	1.6	0.6669	27.36	05/16/92	ILNT-3	-9 27.36
05/16/92 ILNT-4	N.-Cell S.W. TOA Ash	....	....	....	...	.....	.....	05/16/92	ILNT-4	TOA
05/16/92 ILNT-4	N.-Cell S.W. -1 Ash	717	726	722	1.2	0.8693	35.31	05/16/92	ILNT-4	-1 35.31
05/16/92 ILNT-4	N.-Cell S.W. -2 Ash	646	644	645	0.3	0.7771	31.69	05/16/92	ILNT-4	-2 31.69
05/16/92 ILNT-4	N.-Cell S.W. -3 Ash	574	551	563	4.1	0.6777	27.79	05/16/92	ILNT-4	-3 27.79
05/16/92 ILNT-4	N.-Cell S.W. -4 Ash	540	542	541	0.4	0.6518	26.77	05/16/92	ILNT-4	-4 26.77
05/16/92 ILNT-4	N.-Cell S.W. -5 Ash	582	588	585	1.0	0.7048	28.85	05/16/92	ILNT-4	-5 28.85
05/16/92 ILNT-4	N.-Cell S.W. -6 Ash	639	615	627	3.8	0.7554	30.84	05/16/92	ILNT-4	-6 30.84
05/16/92 ILNT-4	N.-Cell S.W. -7 Ash	525	577	551	9.4	0.6639	27.24	05/16/92	ILNT-4	-7 27.24
05/16/92 ILNT-4	N.-Cell S.W. -8 Ash	484	467	476	3.6	0.5729	23.67	05/16/92	ILNT-4	-8 23.67
05/16/92 ILNT-4	N.-Cell S.W. -9 Ash/Soil	509	522	516	2.5	0.6211	25.56	05/16/92	ILNT-4	-9 25.56
08/18/92 ILNT-1	N.-Cell N.W. TOA Ash	....	....	....	...	.....	.....	08/18/92	ILNT-1	TOA
08/18/92 ILNT-1	N.-Cell N.W. -1 Ash	546	541	544	0.9	0.6661	27.33	08/18/92	ILNT-1	-1 27.33
08/18/92 ILNT-1	N.-Cell N.W. -2 Ash	691	705	698	2.0	0.8554	34.76	08/18/92	ILNT-1	-2 34.76
08/18/92 ILNT-1	N.-Cell N.W. -3 Ash	783	776	780	0.9	0.9553	38.69	08/18/92	ILNT-1	-3 38.69
08/18/92 ILNT-1	N.-Cell N.W. -4 Ash	687	694	691	1.0	0.8462	34.40	08/18/92	ILNT-1	-4 34.40
08/18/92 ILNT-1	N.-Cell N.W. -5 Ash	649	648	649	0.2	0.7947	32.38	08/18/92	ILNT-1	-5 32.38
08/18/92 ILNT-1	N.-Cell N.W. -6 Ash	701	701	701	0.0	0.8591	34.91	08/18/92	ILNT-1	-6 34.91
08/18/92 ILNT-1	N.-Cell N.W. -7 Ash	732	750	741	2.4	0.9081	36.83	08/18/92	ILNT-1	-7 36.83
08/18/92 ILNT-1	N.-Cell N.W. -8 Ash	724	731	728	1.0	0.8915	36.18	08/18/92	ILNT-1	-8 36.18
08/18/92 ILNT-1	N.-Cell N.W. -9 Ash/Soil	....	....	....	...	.....	.....	08/18/92	ILNT-1	-9
08/18/92 ILNT-2	N.-Cell N.E. TOA Ash	....	....	....	...	.....	.....	08/18/92	ILNT-2	TOA
08/18/92 ILNT-2	N.-Cell N.E. -1 Ash	206	220	213	6.6	0.2617	11.45	08/18/92	ILNT-2	-1 11.45
08/18/92 ILNT-2	N.-Cell N.E. -2 Ash	778	781	780	0.4	0.9576	38.78	08/18/92	ILNT-2	-2 38.78
08/18/92 ILNT-2	N.-Cell N.E. -3 Ash	724	715	720	1.3	0.8839	35.88	08/18/92	ILNT-2	-3 35.88
08/18/92 ILNT-2	N.-Cell N.E. -4 Ash	676	681	679	0.7	0.8335	33.91	08/18/92	ILNT-2	-4 33.91
08/18/92 ILNT-2	N.-Cell N.E. -5 Ash	713	714	714	0.1	0.8765	35.59	08/18/92	ILNT-2	-5 35.59
08/18/92 ILNT-2	N.-Cell N.E. -6 Ash	744	746	745	0.3	0.9152	37.11	08/18/92	ILNT-2	-6 37.11

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

										RATIO- Cnts/min -----	Volumetric Moisture Content			Volumetric Moisture Content	
ACCESS				DEPTH		COUNTS	COUNTS	AVG.	% MEA			DATE	ACCESS		
TUBE	LOCATION	QUAD	(ft)	TYPE		UP	DOWN	COUNT	DEV.	Std Cnts	(% Vol H2O)		TUBE		(% Vol H2O)
08/18/92	ILNT-2	N.-Cell	N.E.	-7	Ash	723	723	723	0.0	0.8882	36.05	08/18/92	ILNT-2	-7	36.05
08/18/92	ILNT-2	N.-Cell	N.E.	-8	Ash	797	807	802	1.2	0.9853	39.86	08/18/92	ILNT-2	-8	39.86
08/18/92	ILNT-2	N.-Cell	N.E.	-9	Ash/Soil	....	....	....	...	.....	.....	08/18/92	ILNT-2	-9	
08/18/92	ILNT-3	N.-Cell	S.E.	TOA	Ash	....	....	....	...	.....	.....	08/18/92	ILNT-3	TOA	
08/18/92	ILNT-3	N.-Cell	S.E.	-1	Ash	653	641	647	1.9	0.7910	32.23	08/18/92	ILNT-3	-1	32.23
08/18/92	ILNT-3	N.-Cell	S.E.	-2	Ash	767	757	762	1.3	0.9315	37.75	08/18/92	ILNT-3	-2	37.75
08/18/92	ILNT-3	N.-Cell	S.E.	-3	Ash	734	731	733	0.4	0.8955	36.34	08/18/92	ILNT-3	-3	36.34
08/18/92	ILNT-3	N.-Cell	S.E.	-4	Ash	682	694	688	1.7	0.8411	34.20	08/18/92	ILNT-3	-4	34.20
08/18/92	ILNT-3	N.-Cell	S.E.	-5	Ash	759	756	758	0.4	0.9260	37.54	08/18/92	ILNT-3	-5	37.54
08/18/92	ILNT-3	N.-Cell	S.E.	-6	Ash	727	737	732	1.4	0.8949	36.31	08/18/92	ILNT-3	-6	36.31
08/18/92	ILNT-3	N.-Cell	S.E.	-7	Ash	659	678	669	2.8	0.8172	33.27	08/18/92	ILNT-3	-7	33.27
08/18/92	ILNT-3	N.-Cell	S.E.	-8	Ash	756	768	762	1.6	0.9315	37.75	08/18/92	ILNT-3	-8	37.75
08/18/92	ILNT-3	N.-Cell	S.E.	-9	Ash/Soil	....	....	....	...	.....	.....	08/18/92	ILNT-3	-9	
08/18/92	ILNT-4	N.-Cell	S.W.	TOA	Ash	....	....	....	...	.....	.....	08/18/92	ILNT-4	TOA	
08/18/92	ILNT-4	N.-Cell	S.W.	-1	Ash	221	222	222	0.5	0.2701	11.78	08/18/92	ILNT-4	-1	11.78
08/18/92	ILNT-4	N.-Cell	S.W.	-2	Ash	731	715	723	2.2	0.8817	35.80	08/18/92	ILNT-4	-2	35.80
08/18/92	ILNT-4	N.-Cell	S.W.	-3	Ash	631	651	641	3.1	0.7817	31.87	08/18/92	ILNT-4	-3	31.87
08/18/92	ILNT-4	N.-Cell	S.W.	-4	Ash	579	582	581	0.5	0.7079	28.97	08/18/92	ILNT-4	-4	28.97
08/18/92	ILNT-4	N.-Cell	S.W.	-5	Ash	607	600	604	1.2	0.7360	30.07	08/18/92	ILNT-4	-5	30.07
08/18/92	ILNT-4	N.-Cell	S.W.	-6	Ash	623	655	639	5.0	0.7793	31.77	08/18/92	ILNT-4	-6	31.77
08/18/92	ILNT-4	N.-Cell	S.W.	-7	Ash	613	614	614	0.2	0.7482	30.55	08/18/92	ILNT-4	-7	30.55
08/18/92	ILNT-4	N.-Cell	S.W.	-8	Ash	623	617	620	1.0	0.7561	30.87	08/18/92	ILNT-4	-8	30.87
08/18/92	ILNT-4	N.-Cell	S.W.	-9	Ash/Soil	....	....	....	...	.....	.....	08/18/92	ILNT-4	-9	
													::		
11/18/92	ILNT-1	N.-Cell	N.W.	+ 1	Cap	....	....	....	...	.....	.....	11/18/92	ILNT-1	+ 1	
11/18/92	ILNT-1	N.-Cell	N.W.	TOA	Ash	391	405	398	3.5	0.4693	19.61	11/18/92	ILNT-1	TOA	19.61
11/18/92	ILNT-1	N.-Cell	N.W.	-1	Ash	710	709	710	0.1	0.8367	34.03	11/18/92	ILNT-1	-1	34.03
11/18/92	ILNT-1	N.-Cell	N.W.	-2	Ash	777	765	771	1.6	0.9092	36.88	11/18/92	ILNT-1	-2	36.88
11/18/92	ILNT-1	N.-Cell	N.W.	-3	Ash	822	822	822	0.0	0.9693	39.24	11/18/92	ILNT-1	-3	39.24
11/18/92	ILNT-1	N.-Cell	N.W.	-4	Ash	719	708	714	1.5	0.8414	34.21	11/18/92	ILNT-1	-4	34.21
11/18/92	ILNT-1	N.-Cell	N.W.	-5	Ash	686	682	684	0.6	0.8066	32.85	11/18/92	ILNT-1	-5	32.85
11/18/92	ILNT-1	N.-Cell	N.W.	-6	Ash	710	707	709	0.4	0.8355	33.98	11/18/92	ILNT-1	-6	33.98

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

ACCESS		DEPTH		COUNTS UP	COUNTS DOWN	AVG. COUNT	% MEA DEV.	RATIO- Cnts/min ----- Std Cnts	Volumetric Moisture Content (% Vol H2O)	DATE	ACCESS TUBE	Volumetric Moisture Content (% Vol H2O)
TUBE	LOCATION QUAD	(ft)	TYPE								TUBE	
11/18/92 ILNT-1	N.-Cell	N.W.	-7 Ash	753	742	748	1.5	0.8815	35.79	11/18/92	ILNT-1	-7 35.79
11/18/92 ILNT-1	N.-Cell	N.W.	-8 Ash	712	713	713	0.1	0.8402	34.17	11/18/92	ILNT-1	-8 34.17
11/18/92 ILNT-1	N.-Cell	N.W.	-9 Ash/Soil	....	....	....	...	.....	.....	11/18/92	ILNT-1	-9
11/18/92 ILNT-2	N.-Cell	N.E.	+1 Cap	....	....	....	...	.....	.....	11/18/92	ILNT-2	+1
11/18/92 ILNT-2	N.-Cell	N.E.	TOA Ash	260	250	255	3.9	0.3007	12.98	11/18/92	ILNT-2	TOA 12.98
11/18/92 ILNT-2	N.-Cell	N.E.	-1 Ash	440	421	431	4.4	0.5077	21.11	11/18/92	ILNT-2	-1 21.11
11/18/92 ILNT-2	N.-Cell	N.E.	-2 Ash	823	824	824	0.1	0.9711	39.31	11/18/92	ILNT-2	-2 39.31
11/18/92 ILNT-2	N.-Cell	N.E.	-3 Ash	749	753	751	0.5	0.8856	35.95	11/18/92	ILNT-2	-3 35.95
11/18/92 ILNT-2	N.-Cell	N.E.	-4 Ash	722	716	719	0.8	0.8479	34.47	11/18/92	ILNT-2	-4 34.47
11/18/92 ILNT-2	N.-Cell	N.E.	-5 Ash	730	709	720	2.9	0.8485	34.49	11/18/92	ILNT-2	-5 34.49
11/18/92 ILNT-2	N.-Cell	N.E.	-6 Ash	750	753	752	0.4	0.8862	35.97	11/18/92	ILNT-2	-6 35.97
11/18/92 ILNT-2	N.-Cell	N.E.	-7 Ash	725	724	725	0.1	0.8544	34.72	11/18/92	ILNT-2	-7 34.72
11/18/92 ILNT-2	N.-Cell	N.E.	-8 Ash	714	703	709	1.6	0.8355	33.98	11/18/92	ILNT-2	-8 33.98
11/18/92 ILNT-2	N.-Cell	N.E.	-9 Ash/Soil	....	....	....	...	.....	.....	11/18/92	ILNT-2	-9
11/18/92 ILNT-3	N.-Cell	S.E.	+1 Cap	....	....	....	...	.....	.....	11/18/92	ILNT-3	+1
11/18/92 ILNT-3	N.-Cell	S.E.	TOA Ash	245	253	249	3.2	0.2936	12.71	11/18/92	ILNT-3	TOA 12.71
11/18/92 ILNT-3	N.-Cell	S.E.	-1 Ash	736	722	729	1.9	0.8597	34.93	11/18/92	ILNT-3	-1 34.93
11/18/92 ILNT-3	N.-Cell	S.E.	-2 Ash	831	809	820	2.7	0.9670	39.15	11/18/92	ILNT-3	-2 39.15
11/18/92 ILNT-3	N.-Cell	S.E.	-3 Ash	773	755	764	2.4	0.9009	36.55	11/18/92	ILNT-3	-3 36.55
11/18/92 ILNT-3	N.-Cell	S.E.	-4 Ash	737	716	727	2.9	0.8567	34.82	11/18/92	ILNT-3	-4 34.82
11/18/92 ILNT-3	N.-Cell	S.E.	-5 Ash	774	774	774	0.0	0.9127	37.02	11/18/92	ILNT-3	-5 37.02
11/18/92 ILNT-3	N.-Cell	S.E.	-6 Ash	762	757	760	0.7	0.8956	36.34	11/18/92	ILNT-3	-6 36.34
11/18/92 ILNT-3	N.-Cell	S.E.	-7 Ash	669	681	675	1.8	0.7960	32.43	11/18/92	ILNT-3	-7 32.43
11/18/92 ILNT-3	N.-Cell	S.E.	-8 Ash	773	771	772	0.3	0.9104	36.92	11/18/92	ILNT-3	-8 36.92
11/18/92 ILNT-3	N.-Cell	S.E.	-9 Ash/Soil	....	....	....	...	.....	.....	11/18/92	ILNT-3	-9
11/18/92 ILNT-4	N.-Cell	S.W.	+1 Cap	....	....	....	...	.....	.....	11/18/92	ILNT-4	+1
11/18/92 ILNT-4	N.-Cell	S.W.	TOA Ash	258	257	258	0.4	0.3037	13.10	11/18/92	ILNT-4	TOA 13.10
11/18/92 ILNT-4	N.-Cell	S.W.	-1 Ash	400	399	400	0.3	0.4711	19.67	11/18/92	ILNT-4	-1 19.67
11/18/92 ILNT-4	N.-Cell	S.W.	-2 Ash	830	816	823	1.7	0.9705	39.28	11/18/92	ILNT-4	-2 39.28
11/18/92 ILNT-4	N.-Cell	S.W.	-3 Ash	717	696	707	3.0	0.8331	33.89	11/18/92	ILNT-4	-3 33.89
11/18/92 ILNT-4	N.-Cell	S.W.	-4 Ash	814	813	814	0.1	0.9593	38.84	11/18/92	ILNT-4	-4 38.84

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)

OPERATOR: EERC / University of North Dakota

Update: 09/27/93

REPORT: Moisture Density Profiles - Neutron attenuation

INSTRUMENT: TROXLER Model #4300 Hydroprobe

LOTUS FILE NAME: IL1-NPR.WK3

** TROXLER calib curve **

% Moisture = (cnts ratio-0.029973)/0.025468

ACCESS		LOCATION	QUAD	DEPTH (ft)	TYPE	COUNTS		AVG. COUNT	% MEA DEV.	RATIO- Cnts/min		Volumetric Moisture Content (% Vol H2O)	DATE	ACCESS TUBE	Volumetric Moisture Content (% Vol H2O)	
TUBE						UP	DOWN			----- Std Cnts						
11/18/92	ILNT-4	N.-Cell	S.W.	-5	Ash	707	705	706	0.3	0.8325		33.87	11/18/92	ILNT-4	-5	33.87
11/18/92	ILNT-4	N.-Cell	S.W.	-6	Ash	617	645	631	4.4	0.7441		30.39	11/18/92	ILNT-4	-6	30.39
11/18/92	ILNT-4	N.-Cell	S.W.	-7	Ash	665	651	658	2.1	0.7759		31.64	11/18/92	ILNT-4	-7	31.64
11/18/92	ILNT-4	N.-Cell	S.W.	-8	Ash	645	637	641	1.2	0.7559		30.86	11/18/92	ILNT-4	-8	30.86
11/18/92	ILNT-4	N.-Cell	S.W.	-9	Ash/Soil	....	....	....	...	.....		....	11/18/92	ILNT-4	-9	....
::																
03/04/93	ILNT-1	N.-Cell	N.W.	+1	Cap	....	....	....	...	.....		....	03/04/93	ILNT-1	+1	....
03/04/93	ILNT-1	N.-Cell	N.W.	TOA	Ash	407	403	405	1.0	0.4880		20.34	03/04/93	ILNT-1	TOA	20.34
03/04/93	ILNT-1	N.-Cell	N.W.	-1	Ash	828	822	825	0.7	0.9940		40.21	03/04/93	ILNT-1	-1	40.21
03/04/93	ILNT-1	N.-Cell	N.W.	-2	Ash	819	835	827	1.9	0.9964		40.30	03/04/93	ILNT-1	-2	40.30
03/04/93	ILNT-1	N.-Cell	N.W.	-3	Ash	860	859	860	0.1	1.0355		41.84	03/04/93	ILNT-1	-3	41.84
03/04/93	ILNT-1	N.-Cell	N.W.	-4	Ash	803	791	797	1.5	0.9602		38.88	03/04/93	ILNT-1	-4	38.88
03/04/93	ILNT-1	N.-Cell	N.W.	-5	Ash	795	771	783	3.1	0.9434		38.22	03/04/93	ILNT-1	-5	38.22
03/04/93	ILNT-1	N.-Cell	N.W.	-6	Ash	814	828	821	1.7	0.9892		40.02	03/04/93	ILNT-1	-6	40.02
03/04/93	ILNT-1	N.-Cell	N.W.	-7	Ash	836	835	836	0.1	1.0066		40.70	03/04/93	ILNT-1	-7	40.70
03/04/93	ILNT-1	N.-Cell	N.W.	-8	Ash	882	878	880	0.5	1.0602		42.81	03/04/93	ILNT-1	-8	42.81
03/04/93	ILNT-1	N.-Cell	N.W.	-9	Ash/Soil	....	....	....	...	.....		....	03/04/93	ILNT-1	-9	....
::																
03/04/93	ILNT-2	N.-Cell	N.E.	+1	Cap	....	....	....	...	.....		....	03/04/93	ILNT-2	+1	....
03/04/93	ILNT-2	N.-Cell	N.E.	TOA	Ash	295	300	298	1.7	0.3584		15.25	03/04/93	ILNT-2	TOA	15.25
03/04/93	ILNT-2	N.-Cell	N.E.	-1	Ash	633	636	635	0.5	0.7645		31.19	03/04/93	ILNT-2	-1	31.19
03/04/93	ILNT-2	N.-Cell	N.E.	-2	Ash	858	860	859	0.2	1.0349		41.81	03/04/93	ILNT-2	-2	41.81
03/04/93	ILNT-2	N.-Cell	N.E.	-3	Ash	849	853	851	0.5	1.0253		41.44	03/04/93	ILNT-2	-3	41.44
03/04/93	ILNT-2	N.-Cell	N.E.	-4	Ash	797	790	794	0.9	0.9560		38.72	03/04/93	ILNT-2	-4	38.72
03/04/93	ILNT-2	N.-Cell	N.E.	-5	Ash	818	832	825	1.7	0.9940		40.21	03/04/93	ILNT-2	-5	40.21
03/04/93	ILNT-2	N.-Cell	N.E.	-6	Ash	869	854	862	1.7	1.0380		41.93	03/04/93	ILNT-2	-6	41.93
03/04/93	ILNT-2	N.-Cell	N.E.	-7	Ash	814	837	826	2.8	0.9946		40.23	03/04/93	ILNT-2	-7	40.23
03/04/93	ILNT-2	N.-Cell	N.E.	-8	Ash	895	861	878	3.9	1.0578		42.71	03/04/93	ILNT-2	-8	42.71
03/04/93	ILNT-2	N.-Cell	N.E.	-9	Ash/Soil	....	....	....	...	.....		....	03/04/93	ILNT-2	-9	....
::																
03/04/93	ILNT-3	N.-Cell	S.E.	+1	Cap	....	....	....	...	.....		....	03/04/93	ILNT-3	+1	....
03/04/93	ILNT-3	N.-Cell	S.E.	TOA	Ash	215	207	211	3.8	0.2542		11.16	03/04/93	ILNT-3	TOA	11.16
03/04/93	ILNT-3	N.-Cell	S.E.	-1	Ash	827	816	822	1.3	0.9898		40.04	03/04/93	ILNT-3	-1	40.04
03/04/93	ILNT-3	N.-Cell	S.E.	-2	Ash	870	866	868	0.5	1.0458		42.24	03/04/93	ILNT-3	-2	42.24

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025488$

	ACCESS		QUAD	DEPTH (ft)	TYPE	COUNTS UP	COUNTS DOWN	AVG. COUNT	% MEA DEV.	RATIO- Cnts/min	Volumetric Moisture	DATE	ACCESS TUBE	Volumetric Moisture	
	TUBE	LOCATION								----- Std Cnts	Content (% Vol H2O)			Content (% Vol H2O)	
03/04/93	ILNT-3	N.-Cell	S.E.	-3	Ash	827	827	827	0.0	0.9964	40.30	03/04/93	ILNT-3	-3	40.30
03/04/93	ILNT-3	N.-Cell	S.E.	-4	Ash	764	777	771	1.7	0.9283	37.63	03/04/93	ILNT-3	-4	37.63
03/04/93	ILNT-3	N.-Cell	S.E.	-5	Ash	856	857	857	0.1	1.0319	41.70	03/04/93	ILNT-3	-5	41.70
03/04/93	ILNT-3	N.-Cell	S.E.	-6	Ash	828	824	826	0.5	0.9952	40.25	03/04/93	ILNT-3	-6	40.25
03/04/93	ILNT-3	N.-Cell	S.E.	-7	Ash	816	805	811	1.4	0.9765	39.52	03/04/93	ILNT-3	-7	39.52
03/04/93	ILNT-3	N.-Cell	S.E.	-8	Ash	907	896	902	1.2	1.0861	43.82	03/04/93	ILNT-3	-8	43.82
03/04/93	ILNT-3	N.-Cell	S.E.	-9	Ash/Soil	....	....	....	...	.....	.....	03/04/93	ILNT-3	-9	
::															
03/04/93	ILNT-4	N.-Cell	S.W.	+ 1	Cap	....	....	....	...	.....	.....	03/04/93	ILNT-4	+ 1	
03/04/93	ILNT-4	N.-Cell	S.W.	TOA	Ash	302	314	308	3.9	0.3711	15.75	03/04/93	ILNT-4	TOA	15.75
03/04/93	ILNT-4	N.-Cell	S.W.	-1	Ash	556	551	554	0.9	0.6669	27.36	03/04/93	ILNT-4	-1	27.36
03/04/93	ILNT-4	N.-Cell	S.W.	-2	Ash	847	842	845	0.6	1.0175	41.13	03/04/93	ILNT-4	-2	41.13
03/04/93	ILNT-4	N.-Cell	S.W.	-3	Ash	736	742	739	0.8	0.8904	36.14	03/04/93	ILNT-4	-3	36.14
03/04/93	ILNT-4	N.-Cell	S.W.	-4	Ash	679	661	670	2.7	0.8072	32.87	03/04/93	ILNT-4	-4	32.87
03/04/93	ILNT-4	N.-Cell	S.W.	-5	Ash	746	731	739	2.0	0.8898	36.11	03/04/93	ILNT-4	-5	36.11
03/04/93	ILNT-4	N.-Cell	S.W.	-6	Ash	728	757	743	3.9	0.8946	36.30	03/04/93	ILNT-4	-6	36.30
03/04/93	ILNT-4	N.-Cell	S.W.	-7	Ash	739	730	735	1.2	0.8849	35.92	03/04/93	ILNT-4	-7	35.92
03/04/93	ILNT-4	N.-Cell	S.W.	-8	Ash	837	832	835	0.6	1.0054	40.65	03/04/93	ILNT-4	-8	40.65
03/04/93	ILNT-4	N.-Cell	S.W.	-9	Ash/Soil	....	....	....	...	.....	.....	03/04/93	ILNT-4	-9	
::															
05/08/93	ILNT-1	N.-Cell	N.W.	+ 1	Cap	....	....	....	...	.....	.....	05/08/93	ILNT-1	+ 1	
05/08/93	ILNT-1	N.-Cell	N.W.	TOA	Ash	504	489	497	3.0	0.6033	24.86	05/08/93	ILNT-1	TOA	24.86
05/08/93	ILNT-1	N.-Cell	N.W.	-1	Ash	909	913	911	0.4	1.1069	44.64	05/08/93	ILNT-1	-1	44.64
05/08/93	ILNT-1	N.-Cell	N.W.	-2	Ash	898	919	909	2.3	1.1039	44.52	05/08/93	ILNT-1	-2	44.52
05/08/93	ILNT-1	N.-Cell	N.W.	-3	Ash	905	895	900	1.1	1.0936	44.12	05/08/93	ILNT-1	-3	44.12
05/08/93	ILNT-1	N.-Cell	N.W.	-4	Ash	856	862	859	0.7	1.0437	42.16	05/08/93	ILNT-1	-4	42.16
05/08/93	ILNT-1	N.-Cell	N.W.	-5	Ash	876	876	876	0.0	1.0644	42.97	05/08/93	ILNT-1	-5	42.97
05/08/93	ILNT-1	N.-Cell	N.W.	-6	Ash	888	892	890	0.4	1.0814	43.64	05/08/93	ILNT-1	-6	43.64
05/08/93	ILNT-1	N.-Cell	N.W.	-7	Ash	869	871	870	0.2	1.0571	42.68	05/08/93	ILNT-1	-7	42.68
05/08/93	ILNT-1	N.-Cell	N.W.	-8	Ash	871	873	872	0.2	1.0595	42.78	05/08/93	ILNT-1	-8	42.78
05/08/93	ILNT-1	N.-Cell	N.W.	-9	Ash/Soil	....	....	....	...	.....	.....	05/08/93	ILNT-1	-9	
::															
05/08/93	ILNT-2	N.-Cell	N.E.	+ 1	Cap	....	....	....	...	.....	.....	05/08/93	ILNT-2	+ 1	
05/08/93	ILNT-2	N.-Cell	N.E.	TOA	Ash	415	418	417	0.7	0.5061	21.05	05/08/93	ILNT-2	TOA	21.05

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

ACCESS		LOCATION	QUAD	DEPTH (ft)	TYPE	COUNTS UP	COUNTS DOWN	AVG. COUNT	% MEA DEV.	RATIO- Cnts/min		Volumetric Moisture Content (% Vol H2O)	DATE	ACCESS TUBE	Volumetric Moisture Content (% Vol H2O)	
TUBE										----- Std Cnts						
05/08/93	ILNT-2	N.-Cell	N.E.	-1	Ash	802	807	805	0.6	0.9775		39.56	05/08/93	ILNT-2	-1	39.56
05/08/93	ILNT-2	N.-Cell	N.E.	-2	Ash	924	927	926	0.3	1.1245		45.33	05/08/93	ILNT-2	-2	45.33
05/08/93	ILNT-2	N.-Cell	N.E.	-3	Ash	894	894	894	0.0	1.0863		43.83	05/08/93	ILNT-2	-3	43.83
05/08/93	ILNT-2	N.-Cell	N.E.	-4	Ash	850	853	852	0.4	1.0348		41.80	05/08/93	ILNT-2	-4	41.80
05/08/93	ILNT-2	N.-Cell	N.E.	-5	Ash	877	885	881	0.9	1.0705		43.21	05/08/93	ILNT-2	-5	43.21
05/08/93	ILNT-2	N.-Cell	N.E.	-6	Ash	905	892	899	1.4	1.0917		44.04	05/08/93	ILNT-2	-6	44.04
05/08/93	ILNT-2	N.-Cell	N.E.	-7	Ash	872	874	873	0.2	1.0608		42.83	05/08/93	ILNT-2	-7	42.83
05/08/93	ILNT-2	N.-Cell	N.E.	-8	Ash	863	869	866	0.7	1.0522		42.49	05/08/93	ILNT-2	-8	42.49
05/08/93	ILNT-2	N.-Cell	N.E.	-9	Ash/Soil	....	....	....	...	.....		.....	05/08/93	ILNT-2	-9	
05/08/93	ILNT-3	N.-Cell	S.E.	+1	Cap	....	....	....	...	.....		.....	05/08/93	ILNT-3	+1	
05/08/93	ILNT-3	N.-Cell	S.E.	TOA	Ash	452	459	456	1.5	0.5535		22.91	05/08/93	ILNT-3	TOA	22.91
05/08/93	ILNT-3	N.-Cell	S.E.	-1	Ash	917	920	919	0.3	1.1160		45.00	05/08/93	ILNT-3	-1	45.00
05/08/93	ILNT-3	N.-Cell	S.E.	-2	Ash	913	903	908	1.1	1.1033		44.50	05/08/93	ILNT-3	-2	44.50
05/08/93	ILNT-3	N.-Cell	S.E.	-3	Ash	861	873	867	1.4	1.0535		42.54	05/08/93	ILNT-3	-3	42.54
05/08/93	ILNT-3	N.-Cell	S.E.	-4	Ash	778	798	788	2.5	0.9575		38.77	05/08/93	ILNT-3	-4	38.77
05/08/93	ILNT-3	N.-Cell	S.E.	-5	Ash	878	889	884	1.2	1.0735		43.33	05/08/93	ILNT-3	-5	43.33
05/08/93	ILNT-3	N.-Cell	S.E.	-6	Ash	873	868	871	0.6	1.0577		42.71	05/08/93	ILNT-3	-6	42.71
05/08/93	ILNT-3	N.-Cell	S.E.	-7	Ash	873	879	876	0.7	1.0644		42.97	05/08/93	ILNT-3	-7	42.97
05/08/93	ILNT-3	N.-Cell	S.E.	-8	Ash	891	883	887	0.9	1.0778		43.50	05/08/93	ILNT-3	-8	43.50
05/08/93	ILNT-3	N.-Cell	S.E.	-9	Ash/Soil	....	....	....	...	.....		.....	05/08/93	ILNT-3	-9	
05/08/93	ILNT-4	N.-Cell	S.W.	+1	Cap	....	....	....	...	.....		.....	05/08/93	ILNT-4	+1	
05/08/93	ILNT-4	N.-Cell	S.W.	TOA	Ash	321	350	336	8.6	0.4077		17.18	05/08/93	ILNT-4	TOA	17.18
05/08/93	ILNT-4	N.-Cell	S.W.	-1	Ash	599	588	594	1.9	0.7211		29.49	05/08/93	ILNT-4	-1	29.49
05/08/93	ILNT-4	N.-Cell	S.W.	-2	Ash	887	896	892	1.0	1.0832		43.71	05/08/93	ILNT-4	-2	43.71
05/08/93	ILNT-4	N.-Cell	S.W.	-3	Ash	783	798	791	1.9	0.9605		38.89	05/08/93	ILNT-4	-3	38.89
05/08/93	ILNT-4	N.-Cell	S.W.	-4	Ash	775	778	777	0.4	0.9435		38.22	05/08/93	ILNT-4	-4	38.22
05/08/93	ILNT-4	N.-Cell	S.W.	-5	Ash	828	816	822	1.5	0.9988		40.39	05/08/93	ILNT-4	-5	40.39
05/08/93	ILNT-4	N.-Cell	S.W.	-6	Ash	812	812	812	0.0	0.9866		39.92	05/08/93	ILNT-4	-6	39.92
05/08/93	ILNT-4	N.-Cell	S.W.	-7	Ash	778	766	772	1.6	0.9380		38.01	05/08/93	ILNT-4	-7	38.01
05/08/93	ILNT-4	N.-Cell	S.W.	-8	Ash	905	905	905	0.0	1.0996		44.35	05/08/93	ILNT-4	-8	44.35
05/08/93	ILNT-4	N.-Cell	S.W.	-9	Ash/Soil	....	....	....	...	.....		.....	05/08/93	ILNT-4	-9	

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

											RATIO- Cnts/min	Volumetric Moisture Content			Volumetric Moisture Content
ACCESS		DEPTH		COUNTS UP	COUNTS DOWN	AVG. COUNT	% MEA DEV.	-----		DATE	ACCESS TUBE	Content (% Vol H2O)	Content (% Vol H2O)		
TUBE	LOCATION QUAD	(ft)	TYPE					Std Cnts	(% Vol H2O)						
09/05/93	ILNT-1	N.-Cell	N.W.	+ 1	Cap	147	151	149	2.7	0.1810	18.85	09/05/93	ILNT-1	+ 1	18.85
09/05/93	ILNT-1	N.-Cell	N.W.	TOA	Ash	370	371	371	0.3	0.4502	25.91	09/05/93	ILNT-1	TOA	25.91
09/05/93	ILNT-1	N.-Cell	N.W.	-1	Ash	520	517	519	0.6	0.6300	44.54	09/05/93	ILNT-1	-1	44.54
09/05/93	ILNT-1	N.-Cell	N.W.	-2	Ash	907	911	909	0.4	1.1045	43.92	09/05/93	ILNT-1	-2	43.92
09/05/93	ILNT-1	N.-Cell	N.W.	-3	Ash	898	894	896	0.4	1.0887	44.16	09/05/93	ILNT-1	-3	44.16
09/05/93	ILNT-1	N.-Cell	N.W.	-4	Ash	899	903	901	0.4	1.0948	43.73	09/05/93	ILNT-1	-4	43.73
09/05/93	ILNT-1	N.-Cell	N.W.	-5	Ash	893	891	892	0.2	1.0838	43.97	09/05/93	ILNT-1	-5	43.97
09/05/93	ILNT-1	N.-Cell	N.W.	-6	Ash	890	904	897	1.6	1.0899	43.64	09/05/93	ILNT-1	-6	43.64
09/05/93	ILNT-1	N.-Cell	N.W.	-7	Ash	891	889	890	0.2	1.0814	42.04	09/05/93	ILNT-1	-7	42.04
09/05/93	ILNT-1	N.-Cell	N.W.	-8	Ash	853	860	857	0.8	1.0407	41.52	09/05/93	ILNT-1	-8	41.52
09/05/93	ILNT-1	N.-Cell	N.W.	-9	Ash/Soil	850	841	846	1.1	1.0273	sat.	09/05/93	ILNT-1	-9	
09/05/93	ILNT-2	N.-Cell	N.E.	+ 1	Cap	191	207	199	8.0	0.2418	13.99	09/05/93	ILNT-2	+ 1	13.99
09/05/93	ILNT-2	N.-Cell	N.E.	TOA	Ash	267	270	269	1.1	0.3262	18.30	09/05/93	ILNT-2	TOA	18.30
09/05/93	ILNT-2	N.-Cell	N.E.	-1	Ash	361	357	359	1.1	0.4362	43.66	09/05/93	ILNT-2	-1	43.66
09/05/93	ILNT-2	N.-Cell	N.E.	-2	Ash	892	889	891	0.3	1.0820	44.85	09/05/93	ILNT-2	-2	44.85
09/05/93	ILNT-2	N.-Cell	N.E.	-3	Ash	912	919	916	0.8	1.1124	41.21	09/05/93	ILNT-2	-3	41.21
09/05/93	ILNT-2	N.-Cell	N.E.	-4	Ash	839	839	839	0.0	1.0194	42.35	09/05/93	ILNT-2	-4	42.35
09/05/93	ILNT-2	N.-Cell	N.E.	-5	Ash	865	861	863	0.5	1.0486	44.43	09/05/93	ILNT-2	-5	44.43
09/05/93	ILNT-2	N.-Cell	N.E.	-6	Ash	905	908	907	0.3	1.1015	44.14	09/05/93	ILNT-2	-6	44.14
09/05/93	ILNT-2	N.-Cell	N.E.	-7	Ash	903	898	901	0.6	1.0942	41.30	09/05/93	ILNT-2	-7	41.30
09/05/93	ILNT-2	N.-Cell	N.E.	-8	Ash	843	839	841	0.5	1.0219	40.13	09/05/93	ILNT-2	-8	40.13
09/05/93	ILNT-2	N.-Cell	N.E.	-9	Ash/Soil	814	819	817	0.6	0.9921	sat.	09/05/93	ILNT-2	-9	
09/05/93	ILNT-3	N.-Cell	S.E.	+ 1	Cap	250	248	249	0.8	0.3026	13.06	09/05/93	ILNT-3	+ 1	13.06
09/05/93	ILNT-3	N.-Cell	S.E.	TOA	Ash	558	584	571	4.6	0.6938	28.42	09/05/93	ILNT-3	TOA	28.42
09/05/93	ILNT-3	N.-Cell	S.E.	-1	Ash	908	908	908	0.0	1.1033	44.50	09/05/93	ILNT-3	-1	44.50
09/05/93	ILNT-3	N.-Cell	S.E.	-2	Ash	851	830	841	2.5	1.0213	41.28	09/05/93	ILNT-3	-2	41.28
09/05/93	ILNT-3	N.-Cell	S.E.	-3	Ash	872	865	869	0.8	1.0553	42.61	09/05/93	ILNT-3	-3	42.61
09/05/93	ILNT-3	N.-Cell	S.E.	-4	Ash	816	817	817	0.1	0.9921	40.13	09/05/93	ILNT-3	-4	40.13
09/05/93	ILNT-3	N.-Cell	S.E.	-5	Ash	867	863	865	0.5	1.0510	42.45	09/05/93	ILNT-3	-5	42.45
09/05/93	ILNT-3	N.-Cell	S.E.	-6	Ash	868	852	860	1.9	1.0450	42.21	09/05/93	ILNT-3	-6	42.21
09/05/93	ILNT-3	N.-Cell	S.E.	-7	Ash	888	879	884	1.0	1.0735	43.33	09/05/93	ILNT-3	-7	43.33
09/05/93	ILNT-3	N.-Cell	S.E.	-8	Ash						sat.	09/05/93	ILNT-3	-8	

***** FIELD TESTING-SOLID WASTE DISPOSAL *****

LOCATION: ILLINOIS - CELL#1 (North cell, original)
 OPERATOR: EERC / University of North Dakota
 REPORT: Moisture Density Profiles - Neutron attenuation
 INSTRUMENT: TROXLER Model #4300 Hydroprobe
 LOTUS FILE NAME: IL1-NPR.WK3

Update: 09/27/93

** TROXLER calib curve **
 $\% \text{ Moisture} = (\text{cnts ratio} - 0.029973) / 0.025468$

ACCESS				DEPTH		COUNTS	COUNTS	AVG.	% MEA	RATIO-	Volumetric			Volumetric	
TUBE	LOCATION	QUAD	(ft)	TYPE	UP	DOWN	COUNT	DEV.	-----	Cnts/min	Moisture	DATE	ACCESS	Moisture	
										Std Cnts	Content		TUBE	Content	
09/05/93	ILNT-3	N.-Cell	S.E.	-9	Ash/Soil	....	....	....	...	.....	(% Vol H2O)			(% Vol H2O)	
											sat.	09/05/93	ILNT-3	-9	
09/05/93	ILNT-4	N.-Cell	S.W.	+1	Cap	229	234	232	2.2	0.2813	12.22	09/05/93	ILNT-4	+1	12.22
09/05/93	ILNT-4	N.-Cell	S.W.	TOA	Ash	206	210	208	1.9	0.2527	11.10	09/05/93	ILNT-4	TOA	11.10
09/05/93	ILNT-4	N.-Cell	S.W.	-1	Ash	271	280	276	3.3	0.3348	14.32	09/05/93	ILNT-4	-1	14.32
09/05/93	ILNT-4	N.-Cell	S.W.	-2	Ash	899	887	893	1.3	1.0851	43.78	09/05/93	ILNT-4	-2	43.78
09/05/93	ILNT-4	N.-Cell	S.W.	-3	Ash	864	870	867	0.7	1.0535	42.54	09/05/93	ILNT-4	-3	42.54
09/05/93	ILNT-4	N.-Cell	S.W.	-4	Ash	826	821	824	0.6	1.0006	40.47	09/05/93	ILNT-4	-4	40.47
09/05/93	ILNT-4	N.-Cell	S.W.	-5	Ash	816	817	817	0.1	0.9921	40.13	09/05/93	ILNT-4	-5	40.13
09/05/93	ILNT-4	N.-Cell	S.W.	-6	Ash	856	870	863	1.6	1.0486	42.35	09/05/93	ILNT-4	-6	42.35
09/05/93	ILNT-4	N.-Cell	S.W.	-7	Ash	835	834	835	0.1	1.0140	40.99	09/05/93	ILNT-4	-7	40.99
09/05/93	ILNT-4	N.-Cell	S.W.	-8	Ash	908	910	909	0.2	1.1045	44.54	09/05/93	ILNT-4	-8	44.54
09/05/93	ILNT-4	N.-Cell	S.W.	-9	Ash/Soil	933	925	929	0.9	1.1288	45.50	09/05/93	ILNT-4	-9	45.50
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***** FIELD TESTING- SOLID WASTE DISPOSAL *****
 *** IN-SITU, FIELD SATURATED HYDRAULIC CONDUCTIVITY ***

LOCATION: ILLINOIS - Cell#1(North), original cell, Midwest ash
 REPORT: In Situ permeabilities, Calculations
 INSTRUMENT: GUELPH Constant Head - Well Permeameter [CHWP]
 LAST UPDATE: 09/27/93

Field Sat. Hydraulic Conductivity (Kfs)
 - Laplace Analysis -

$$Kfs = \frac{C * Qt}{2 * \pi * H^2 [1 + (C/2)(H/a)^2]}$$

Qt = flow (CC/sec)
 a = hole radius(cm)
 T = elapsed time(sec)
 F = total flow (CC)
 H = head level(cm)
 $C = 0.22(H/a) + 1.1$

DATE	TEST ID		INTERVAL TESTED (ft) (ref)	TOTAL DEPTH (ft)	COMMENTS	Kfs (cm/s)	Kfs (m/year)
06/03/91	ILN1BP-1	S.W.	.5-1.25' TOA	1.25	unwetted.....	1.06E-03	334.98
06/03/91	ILN1BP-2	N.E.	.5-0.92' TOA	0.92	unwetted.....	1.81E-03	572.20
06/03/91	ILN1BP-2a	N.E.	.33-.92' TOA	0.92	wetted.....	1.12E-03	353.90
06/03/91	ILN1BP-3	S.E.	.42-1.0' TOA	1.00	unwetted.....	1.43E-03	450.28
06/03/91	ILN1BP-4	S.W.	.33-.83' TOA	0.83	unwetted.....	2.89E-03	912.90
08/19/91	ILN1BP-5	N.W.	.83-1.8' TOA	1.83	unwetted.....	2.02E-03	638.27
08/19/91	ILN1BP-5a	N.W.	1.2-1.8' TOA	1.83	wetted.....	1.14E-03	360.07
08/19/91	ILN1BP-6	S.W.	0.3-0.8' TOA	0.79	unwetted.....	2.57E-03	809.87
08/19/91	ILN1BP-6a	S.W.	0.3-0.8' TOA	0.79	wetted.....	2.06E-03	650.39
02/27/93	ILN1BP-40	N.W.	.26-1.67' TOA	0.17	unwetted.....	2.93E-04	92.48
02/27/93	ILN1BP-41	N.W.	2.0-4.0' TOA	4.00	unwetted.....	9.07E-05	28.59
02/27/93	ILN1BP-42	N.W.	4.0-6.0' TOA	6.00	unwetted.....	1.21E-04	38.23
02/28/93	ILN1BP-43	N.W.	6.0-8.3' TOA	8.30	unwetted.....	6.64E-05	20.93
05/08/93	ILN1LBP-44	N.E.	1.0-1.5' TOA	1.50	unwetted.....	1.46E-04	46.03
05/08/93	ILN1BP-45	N.E.	2.0-3.0' TOA	3.00	unwetted.....	1.16E-04	36.45
05/08/93	ILN1BP-46	N.E.	3.0-5.0' TOA	5.00	unwetted.....	5.04E-05	15.89
05/09/93	ILN1BP-47	N.E.	4.5-7.0' TOA	7.00	unwetted.....	4.54E-05	14.31
05/09/93	ILN1BP-48	N.E.	6.5-9.0' TOA	9.00	unwetted.....	5.78E-05	18.22

END

DATE

FILMED

3/3/94