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94 RF 10725

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ORGAN, R V		
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IZZUTO, V M		
ISING, T L		
ANDLIN, N B		
CHWARTZ, J K		
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ACTION ITEM STATUS
☑ PARTIAL/OPEN
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October 20 1994 94 RF 10725

Kurt Muenchow
Environmental Restoration Division
DOE, RFFO

OPERABLE UNIT (OU) NO 5 WOMAN CREEK PRIORITY DRAINAGE, ADDENDUM TO THE FIELD SAMPLING PLAN TECH MEMO NO 15 BEDROCK MONITORING WELL PROPOSAL
CAB 057 94

Action Propose locations to the Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE)

In response to EPA (PRC comments) concerns regarding the lack of bedrock data, both geologic and hydrogeologic in OU5 and their request for several bedrock wells the following technical proposal is attached On the basis of the existing site data and current hydrogeologic understanding of OU5 the purpose siting rationale and methodology for installing bedrock monitoring wells is presented

Three bedrock monitoring wells are to be installed in OU5 to evaluate the potential for hydraulic interaction between the groundwater from the Upper Hydrostratigraphic Unit (UHSU) consisting of alluvial and weathered bedrock materials and the Lower Hydrostratigraphic Unit (LHSU) unweathered bedrock materials The bedrock monitoring wells will be installed in an attempt to identify possible sandstone units fracture zones, or other potentially water bearing intervals in the LHSU

The siting rationale is as follows Figure 1 is attached which proposes the three bedrock monitoring well locations around IHSS 115 (the old landfill) The justification for targeting IHSS 115 over IHSS 133 (ashpits) is the known presence of impacted UHSU groundwater specifically with metals and volatile organics whereas IHSS 133 lacks known UHSU impacted groundwater There will be three wells installed one upgradient at point A, and two downgradient at points B and C In addition the bedrock wells are located near UHSU wells or mini wells for evaluation of vertical hydraulic gradients

There is one deep bedrock soil boring (Boring 42692 attached) located on the north side of IHSS 115 Boring 42692 was drilled and geophysically logged to a total depth of 158 feet. On the basis of Boring 42692 there may be two possible targets one a sandy claystone between 78 to 86 feet which was dry when drilled and two an interbedded siltstone and silty to sandy claystone interval from approximately 120 to 130 feet which was slightly damp when drilled However due to the uncertainty associated with lateral lithologic changes the borings will be advanced to a depth of approximately 150 feet to evaluate potential permeable zones in the bedrock

ADMIN RECORD

A-OU05-000439

The methodology to be use is as follows A 6 inch nominal diameter schedule 80 polyvinyl chloride surface casing will be grouted a minimum of 2 feet into unweathered bedrock Based on Boring 42692 this depth would be at approximately 40 feet As stated above the borings will be advanced to an approximate depth of 150 feet or 15 feet past a potential water bearing interval The boring will then be geophysically logged using the following open hole logging techniques neutron natural gamma gamma gamma density induction caliper guard resistivity and single point resistivity (the last two methods only if groundwater is encountered in the bedrock) On the basis of the recovered core and the geophysical logs a screen interval will be selected and the monitoring well constructed All field activities will be conducted in accordance with the appropriate Environmental Restoration Standard Operating Procedures and the procedures described in TM15 throughout the completion of this task

In summary the purpose of the bedrock monitoring wells is to evaluate the potential for hydraulic interaction between the UHSU and the LHSU in OU5 The bedrock monitoring wells will be drilled to accomplish the following one confirm that the screen interval is in the LHSU two evaluate the bedrock hydrogeologic setting beneath OU5 and three on the basis of four quarters of groundwater sampling remove any concerns regarding IHSS 115 UHSU groundwater impacting LHSU groundwater

If you have any questions please contact me at 966 9100 or Mark Wood at 966-8784

For

Carol A Bicher
Operable Unit No 5 Project Manager
Environmental Restoration Program Division

MRW cb

Attachment
As Stated

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT)	6041 18	PROJECT NUMBER-	SITEWIDE	LOG OF BORING NUMBER
NORTH	748037	AREA SITEWIDE	CASING DIAMETER (IN)		GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN)	10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

AMPL NUMBE	SAMPLE GRAIN SIZE (0% 50% 100% 1% 100%)	PERCE RECOVE	RECO INTE AL	DA UM T	DEP	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
				6021	20				
BH0296EB			1 50 /2.30	6020	21				
BH0297EB								NO SAMPLE	No recovery
				6019	22				
								GC	Sandy Gravel with some Clay and trace Silt Same as above (reference interval 17 0 to 21 5)
			1 60 /2.00	6018	23				
				6017	24			NO SAMPLE	No recovery
								GC	Sandy Gravel with some Clay and trace Silt Same as above (reference interval 17 0' to 21 5)
			2.60 /1.60	6016	25				
BH0298EB									
				6015	26				
BH0300EB									
BH0301EB									
				6014	27				
			2.60 /4.10						
BH0299EB				6013	28				
								NO SAMPLE	No recovery
				6012	29				
					30				

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT)	6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	748037	AREA SITEWIDE	CASING DIAMETER (IN)		GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN)	10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92.

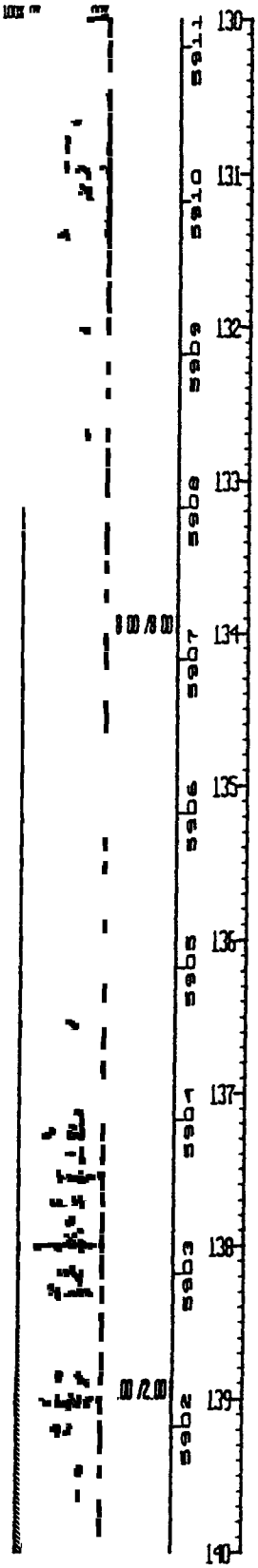
SAMP NUMBE	SAMPLE GRAIN SIZE	PERCE ECOV	R CO E Y I T AL	DA UM	DE	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
	0% 50% 100%	0% 100%		5891	150				
				5890	151				
				5889	152			NO SAMPLE	No recovery
				5888	153				
			2 00 /8 00	5887	154				
				5886	155				
				5885	156				
				5884	157				
				5883	158				Total Drilled Depth 158 0
				5882	159				
					160				

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT)	6041 18	PROJECT NUMBER:	SITEWIDE	LOG OF BORING NUMBER:
NORTH	748037	AREA SITEWIDE	CASING DIAMETER (IN)		GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN)	10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

SAMPLE GRAIN SIZE	RECOVERY	DEPTH	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
0% 50% 100%		130				
		131				
		132				
		133				
	8 00 /8 00	134				
		135				
		136				
		137				
		138				
	.00 /2.00	139				
		140				

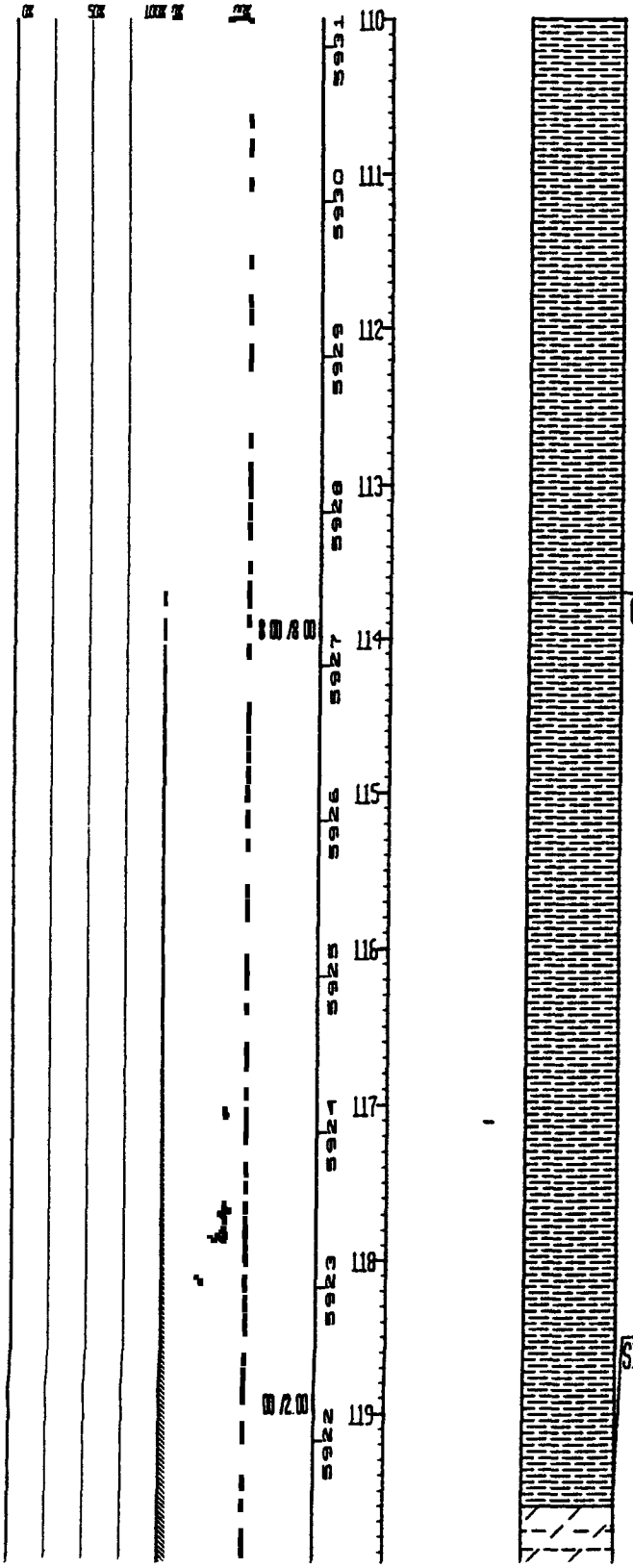
CLAYSTONE Claystone with some Silt Pred olive black (5 Y 2/1) with some light olive gray (5 Y 6/1) mottling and laminae Indicated inclined bedding at approx 6 degrees Core pred claystone at top Silt gradationally increases with depth Core is dry dense and indurated, non-friable Some silt stone nodules (sparse) in top half of interval Some carbon throughout
10% silt, 90% clay



STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	748037	AREA SITEWIDE	CASING DIAMETER (IN)	GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

SAMPLE NUMBER | SAMPLE GRAIN SIZE (0% 50% 100% 0% 100%) | PERC RECOVER | RECO AL | DA UM | DE | WELL OR PIEZOMETER CONSTRUCTION | LITHOLOGY | UNIFIED SOILS CLASSIFICATION OR ROCK TYPE | DESCRIPTION



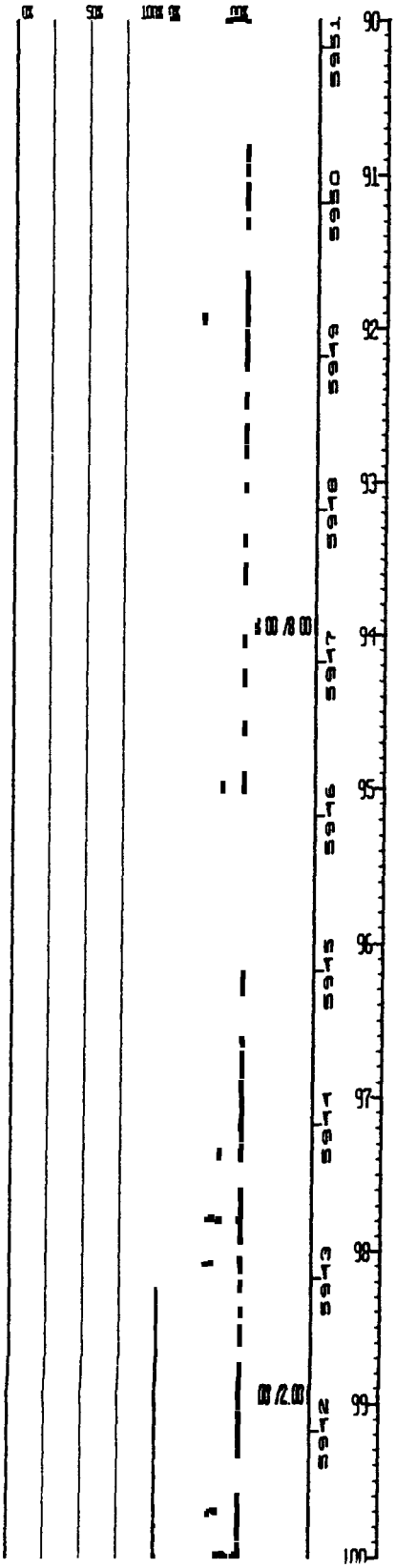
CLAYSTONE — Claystone with some Silt Same as above (reference interval 107 75 to 113 7) except decrease in silt content and bedding dipping at approx 7 degrees and some possible low angle (11 degrees) fractures (questionable) 10% silt 90% clay

SILTY CLAYSTONE — Silty Claystone Olive black (5 Y 2/1) with light olive gray (5 Y 6/1) silty lenses or laminae Interval laminated coarsens downward with trace of sand in lower half Indications of soft sediment deformation Contact with overlying sediments gradational Lower contact distinct Core slightly damp, mod indurated, mod friable >/ 20% silt <-80% clay

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 604L 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	749037	AREA SITEWIDE	CASING DIAMETER (IN)	GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Sinco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Haley Borehole filled with bentonite grout and abandoned on 5/5/92

SAMPLE NUMBER	SAMPLE GRAIN SIZE	PERCENT	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
					SANDY CLAYSTONE	Sandy Claystone with some Silt Light olive gray (5 Y 6/1) with med dark gray (N4) claystone laminae Interval laminated, indicated soft sediment deformation or slumping Sand well sorted, f g sub-angular quartz Some carbon 21% sand, 20% silt 59% clay
					CLAYSTONE	Claystone with some Silt Olive black (5 Y 2/1) to olive gray (5 Y 4/1) Core varies from dense and indurated to fractured and slightly damp and slightly friable Indicated 30 degree fracture (no slickensides) at 91 8 Extensively fractured core below 91 8 No well defined bedding Some carbon 10-15% silt 85-90% clay
					SILTY CLAYSTONE	Silty Claystone Olive gray (5 Y 4/1) with light olive gray (5 Y 6/1) mottling Core dry indurated, slightly friable Some carbon 30% silt 70% clay
					CLAYSTONE	Claystone with some Silt Olive black (5 Y 2/1) Dense and indurated, dry non-friable No apparent bedding Some carbon 10% silt 90% clay
					CLAYSTONE	Claystone with some Silt and trace Sand Olive black (5 Y 2/1) with light olive gray (5 Y 6/1) mottling (silty lenses) Entire interval extensively fractured (lower 0 1 of interval intact) Evidence of fractures and breccia and/or disturbed sediments Core fragments dry dense and indurated Non- to slightly friable <2% sand, 20% silt, 80% clay
					CLAYSTONE	Claystone with some Silt Olive black (5 Y 2/1) with olive gray (5 Y 4/1) and light olive gray (5 Y 6/1) lenses or laminae Silt occurs primarily in interbedded silty claystone beds of lenses Some slightly sandy lenses Core dry dense, and indurated Non-friable to slightly friable in silty intervals No indicated fractures Indicated near horiz bedding Some carbon throughout interval 15% silt, 85% clay



STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	748037	AREA SITEWIDE	CASING DIAMETER (IN)	GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

CHEMICAL SAMPL DEPT
L MN CAL SAMPL DE
MP NUMB

SAMPLE GRAIN SIZE: 0% 50% 100% 0% 100%

C COV

CO E AL

DA UM DE

WELL OR PIEZOMETER CONSTRUCTION

LITHOLOGY

UNIFIED SOILS CLASSIFICATION OR ROCK TYPE

DESCRIPTION

Depth	Sample	Unified Soils Classification or Rock Type	Description
60	5981	SILTSTONE	Calcareous Siltstone Very light gray (N8) Apparent 60 degree healed fracture full length of interval "Distinct upper and lower contacts No sieve analysis
61	5980	CLAYSTONE	Claystone Same as above (reference interval 59 1 to 60 7) Extensively fractured Siltstone nodules in top 1 foot of interval >90% clay
62	5979		
63	5978		
64	5977		
65	5976	NO SAMPLE	No recovery
66	5975		
67	5974		
68	5973	CLAYSTONE	Claystone with some Silt Olive gray (5 Y 4/1) to olive black (5 Y 2/1) Silt content varies, otherwise interval very consistent Core dry, dense and indurated Slightly to non-friable Inidcated possible horiz bedding No apparent fractures (natural) Trace to some carbon 10% silt 90% clay
69	5972		
70			

5 20 /8 00

2.00 /2.00

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT)	6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	749037	AREA SITEWIDE	CASING DIAMETER (IN)		GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN)	10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

SAMPLE NUMBER	SAMPLE GRAIN SIZE	CE CO	ECO I AL	DA UM	DE T	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
	0% 50% 100%			5991	50				
				5990	51				
				5989	52				
				5988	53			CLAYSTONE	Claystone with some Silt Light olive gray (5 Y 6/1) with some olive gray (5 Y 4/1) mottling Core massive dry dense and indurated Slightly friable 20% silt, 80% clay
			4 20 /8 00	5987	54			CLAYSTONE	Claystone with some Silt Dark gray (N3) Indicated 60 degree and 80 degree fractures with possible breccia Core slightly damp dense and indurated Slightly friable Bottom 2 in of core silty claystone 10% silt 90% clay
				5986	55			NO SAMPLE	No recovery
				5985	56				
				5984	57				
				5983	58			SILTY CLAYSTONE	Silty Claystone Olive gray (5 Y 4/1) to light olive gray (5 Y 6/1) with olive black (5 Y 2/1) claystone lenses Core dry, dense and indurated Slightly friable No apparent bedding 25% silt 75% clay
			2 00 /2 00	5982	59			CLAYSTONE	Claystone Brownish gray (5 YR 4/1) to olive black (5 Y 2/1) Extensively fractured Indications of 45 degree fracture near top of interval 60 degree and vertical fractures in lower foot of interval >90% clay
					60				

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
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EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Moley Borehole filled with bentonite grout and abandoned on 5/5/92

AMP	SAMPLE GRAIN SIZE	CO	DA UM	DE	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
3H00294EB	0% 50% 100% 0% 100%		6031	10				
		1 90 /1 70	6030	11			SM	Silty Sand with some Clay and trace Gravel Light brown (5 YR 5/6) Sand well graded Pred m g and f g sub-angular quartz Abundt feldspar trace to some mica, increase in quantity in f g fraction Low plasticity weathered, sample dry Non-calcareous 5% gravel, 67% sand, 18% silt 10% clay NOTE 0 3 extra core recovery from 11 7 to 13 8
			6029	12			GC	Sandy Gravel with some Clay and trace Silt Light brown (5 YR 5/6) to grayish orange (10 YR 7/4) Gravel well graded, max pebble size 2 75 in Dom lithology quartzite, sub-angular Sand same as lithology in interval from 5 0 to 9 3 Core weathered, slightly damp, low plasticity Some calcareous zones (gc-gw) 60% gravel 30% sand, 4% silt 6% clay NOTE 0 1 extra core recovery from 13 8 to 15 3
		? 40 /2 10	6028	13				
3H00293EB			6027	14				
		60 /1 50	6026	15				
3H00295EB							NO SAMPLE	No recovery
		0 00 /1 70	6025	16				
			6024	17			GC	Sandy Gravel with some Clay and trace Silt Pred mod brown (5 YR 4/4) with some dark yellowish orange (10 YR 6/6), grayish orange (10 YR 7/4) and very pale orange (10 YR 8/2) Gravel well graded, max pebble size 2 25 in Dom lithology quartzite, sub-angular to angular Sand is well graded, pred sub-angular to angular quartz, some quartzite and feldspar Some mica in m g and f g fraction Matrix had low plasticity Some Fe staining and trace Mn in some clayey zones Interval dry to slightly damp Well weathered (oxidized) Non-calcareous 50% gravel 37% sand, 5% silt 8% clay
		1 60 /2 30	6023	18				
			6022	19				
		0 70 /0 70						

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 6041 18	PROJECT NUMBER SITEWIDE	LOG OF BORING NUMBER
NORTH	748037	AREA SITEWIDE	CASING DIAMETER (IN)	GEOLOGIST F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED 04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

CHEMICAL SPEC DEPTH BE HN CAL SAMPL DE	AMPL NUMB	SAMPLE GRAIN SIZE 0% 50% 100%	AL	UM	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
	BH00288EB		1 00 /2 00	6041 6040			SM	Gravelly Sand with some Silt and trace Clay Mod brown (5 YR 3/4) Sand well graded, pred quartz, some quartzite and feldspar Gravel to 1 in quartzite and weathered granite fragments Mod root development Low plasticity weathered, non-calcareous (sm-sw) 35% gravel 52% sand, 7% silt 5% clay
							NO SAMPLE	No recovery
	BH00289EB			6039 6038			GM	Sandy Gravel with some Silt and trace Clay Mod brown (5 YR 4/4) Gravel well graded, max pebble size 2 5 in Dom lithology quartzite, sub-angular Sand same as above, (reference interval 0 0 to 1 0), c g fraction sub-angular quartz and quartzite M g and F g fractions pred sub-angular to angular quartz with some feldspar Low plasticity, weathered, non-calcareous 0 to 3 4 dry (gm-gw) 60% gravel 30% sand, 6% silt 4% clay
			1 40 /3 90	6037			NO SAMPLE	No recovery
				6036 6035 6034			SC	Clayey Sand with some Silt Yellowish gray (5 Y 7/2) with white (N9) calcareous (caliche) clasts or zones Some dark yellowish orange (10 YR 6/6) streaks of FeO staining Core is well cemented and dense (argillaceous) Calcareous intervals consist of clasts or zones of sediments with caliche randomly scattered throughout interval Clay plasticity high Overall matrix plasticity med to low Interval weathered, core dry Sand well graded, consists pred of sub-angular quartz Trace quartzite in c g fraction Some feldspar (partially altered) in m g and F g fraction 54% sand 14% silt 32% clay NOTE 0 9 extra core recovered from 5 9 to 10 0
			00 /4 10	6033				
	BH00292EB			6032			GC	Sandy Gravel with some Clay and Silt Yellowish gray (5 Y 7/2) to grayish orange (10 YR 7/4) Calcareous, some Fe staining Gravel well graded, max pebble size to 2 25 in Dom lithology quartzite, angular to sub-angular Sand and plasticity same as above (reference interval 5 0 to 9 3) Interval weathered Core dry 50% gravel, 35% sand, 6% silt 9% clay NOTE 0 2 extra core recovery from 10 0 to 11 7
	BH00291EB							

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	748037	AREA SITEWIDE	CASING DIAMETER (IN)	GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

SAMPLE GRAIN SIZE	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
0% 50% 100% 0% 100%				
0 00 /0 40			NO SAMPLE	Expansion Plug
			SILTY CLAYSTONE	Silty Claystone with some Sand Grayish orange (10 YR 7/4) to dark yellowish brown (10 YR 4/2), some med light gray (N6) silty lenses and dark yellowish orange (10 YR 6/6) FeO staining Silt and sand occuring in lenses Some hematite nodules occuring in lower half of interval Core consists of intact segments and fragmented intervals Intact core is slightly damp, dense and mod indurated Slightly friable Some laminated zones Some Mn staining 7% sand, 20% silt 73% clay
			CLAYSTONE	Claystone with some Silt Dark gray (N3) with some light olive gray (5 Y 6/1) lenses (silty) Top half of interval contains some grayish orange (10 YR 7/4) FeO stained zones Top half also laminated at 10 degree dip Intact core is dry dense and indurated Non-friable Lower half fragmented with indications of disturbed sediments >10% silt 90% clay
1 20 /7 60			NO SAMPLE	No recovery
			CLAYSTONE	Claystone Dusky yellowish brown (10 YR 2/2) to brownish black (5 YR 2/1) Core slightly damp to damp soft and pliable Interval extensively broken 45 degree fracture at 51 9 95% clay
00 /2.00				

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0		GROUND ELEVATION (FT)	6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	748037	AREA SITEWIDE		CASING DIAMETER (IN)		GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER	I8	BOREHOLE DIAMETER (IN)	10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

AMP NUM	SAMPLE GRAIN SIZE	PE CO	DA UM	DE	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
	0% 50% 100%	0% 100%						
			5971	70				
			5970	71				
			5969	72				
			5968	73				
		50 /8 00	5967	74				
			5966	75				
			5965	76				
			5964	77				
			5963	78				
		J /2 00	5962	79				

NO SAMPLE No recovery

SANDY CLAYSTONE Sandy Claystone with some Silt Olive gray (5 Y 4/1) with some light olive gray (5 Y 6/1) sandy to silty lenses Grades to greenish gray (5 G 6/1) wint light greenish gray (5 GY 8/1) lenses Color change to brownish black (5 YR 2/1) with yellowish gray (5 Y 7/2) sandy to silty lenses in bottom 1 5 of interval All color changes gradational Lower 1 5 of interval contains mod abundt carbonaceous material Entire core is dry well cemented (argillaceous) and slightly friable Silt and sand occuring in lenses Core has coarsely laminated appearance Interval is massive no apparent bedding No fractures Sand is well sorted, f g, sub-angular quartz 23% sand, 20% silt 57% clay

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT)	6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	748037	AREA SITEWIDE	CASING DIAMETER (IN)		GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN)	10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

ETI	HN LAL	P NUMB	SAMPLE GRAIN SIZE	RCE COV	O	AL	UM	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
			0% 50% 100%				80				
							81				
							82				
							83				
				1	6 30 /8 00		84				
							85				
							86				
							87			NO SAMPLE	No recovery
							88			CLAYSTONE	Claystone with some Silt Olive black (5 Y 2/1) Core dry dense and indurated Generally non-friable to slightly friable Vertical fractures extending from approx 88 5 to 89 8 Mod abundt carbon Good leaf imprints below 85 8 No distinct bedding Well defined contact with underlying sediments 10% silt 90% clay
					2.00 /2.00		89				

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	748037	AREA SITEWIDE	CASING DIAMETER (IN)	GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

CHEMICAL SAMPLE DEPTH HN AL AM AMP UMB

SAMPLE GRAIN SIZE 0% 50% 100% 0% 100%

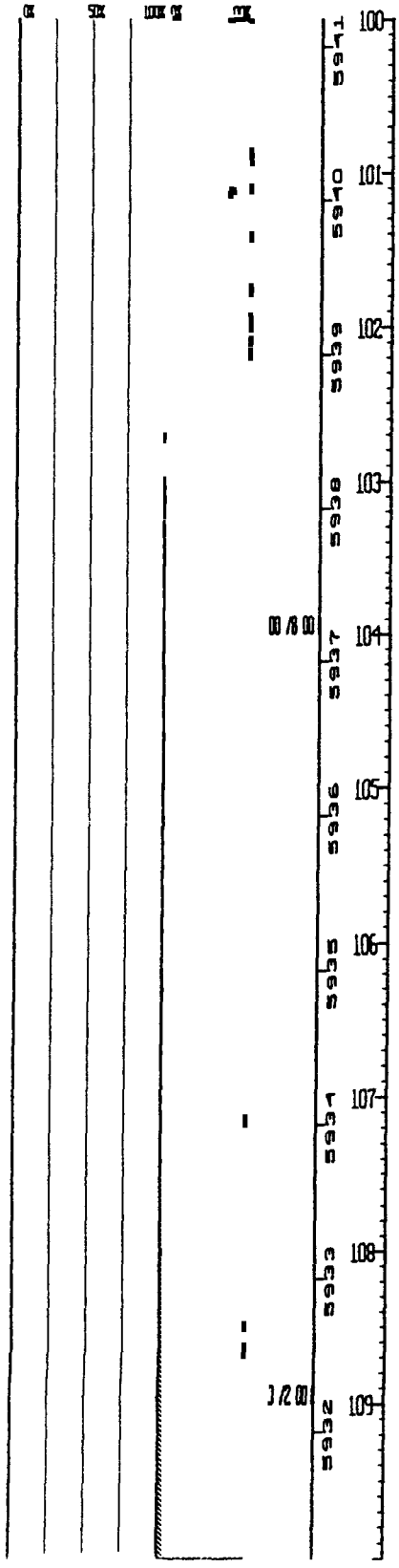
CE E AL UM

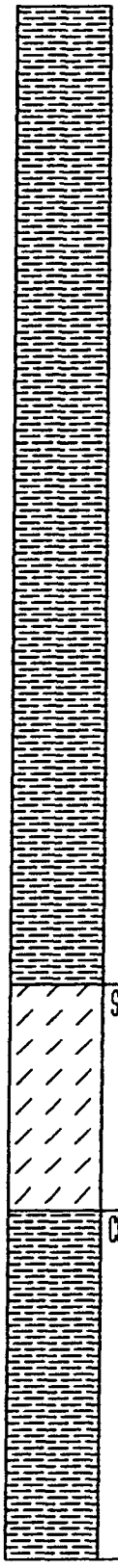
WELL OR PIEZOMETER CONSTRUCTION

LITHOLOGY

UNIFIED SOILS CLASSIFICATION OR ROCK TYPE

DESCRIPTION





SILTSTONE	Calcareous Siltstone Very light gray (N8) with med gray (N5) claystone laminae Core dry, hard (well cemented) non-friable Distinct upper and lower contacts No sieve analysis
CLAYSTONE	Claystone with some Silt Olive black (5 Y 2/1) to light olive gray (5 Y 6/1) Core dry dense and indurated, slightly friable Silt occurs in lenses and some intervals appear laminated No apparent natural fractures Indications of approx horiz to possible slightly dipping bedding Some carbon 15% silt 85% clay

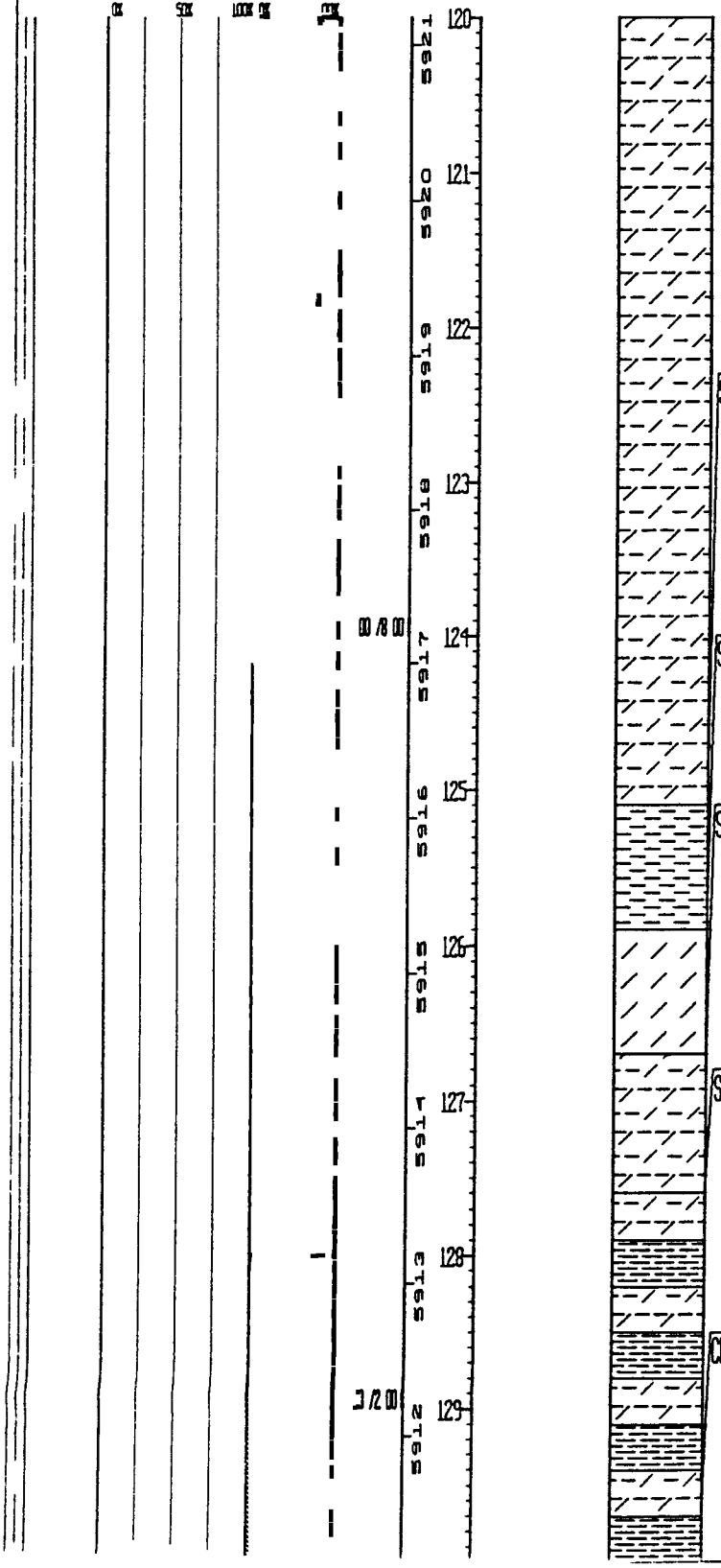
STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	749037	AREA SITEWIDE	CASING DIAMETER (IN)	GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER I8	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

CHEMICAL SAMPLE DEPTH CHN AL HP DL PL NUMB

SAMPLE GRAIN SIZE 0% 50% 100% 0% CE E OV CO AL DA UM E

WELL OR PIEZOMETER CONSTRUCTION | LITHOLOGY | UNIFIED SOILS CLASSIFICATION OR ROCK TYPE | DESCRIPTION



UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
SANDY CLAYSTONE	Sandy Claystone with some Silt Light olive gray (5 Y 6/1) with some olive gray (5 Y 4/1) laminae Core varies from well laminated to bedded or massive Slightly damp mod well cemented (argillaceous) mod friable 2 in claystone (some silt at bottom of interval) at contact with underlying sediments Visual porosity <10% Trace carbon Sand well sorted, f g , sub-angular quartz 35% sand, 13% silt 52% clay
SILTSTONE	Calcareous Siltstone Light gray (N7) with olive gray (5 Y 4/1) laminations Core well cemented (calcareous) Heavily laminated, some cross laminations Non-friable, some carbon Distinct upper and lower contacts No sieve analysis
SILTY CLAYSTONE	Silty Claystone with trace Sand Light olive gray (5 Y 6/1) and olive gray (5 Y 4/1) with dark olive black (5 Y 2/1) claystone laminae Top 0 3 of interval is consistent silty claystone bed bounded on top by calcareous unit and on bottom by 5 in claystone bed dipping at 20 degrees Interval below Claystone coarsely laminated and bioturbated Core is slightly damp to dry indurated, slightly friable <2% sand, 20% silt >78% clay
SILTY CLAYSTONE	Silty Claystone Light olive gray (5 Y 6/1) with some olive black (5 Y 2/1) claystone beds and/or lenses Some interbedded Claystone dipping approx 18 degrees Most of interval coarsely laminated Indications of soft sediment deformation and possible bioturbation Core dry indurated, slightly friable Fracture at top of interval Some carbon 30% silt 70% clay
CLAYSTONE	Claystone with some Silt Same as above (reference interval 127 6 to 129 7) except decrease in silt content and apparent dom horiz bedding Inferred 45 degree fracture (healed) at approx 130 5 Some carbon Core dry indurated, slightly friable Some siltstone nodules in bottom foot of interval 15% silt 85% clay

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	749037	AREA SITEWIDE	CASING DIAMETER (IN)	GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER 18	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED	04/30/92	

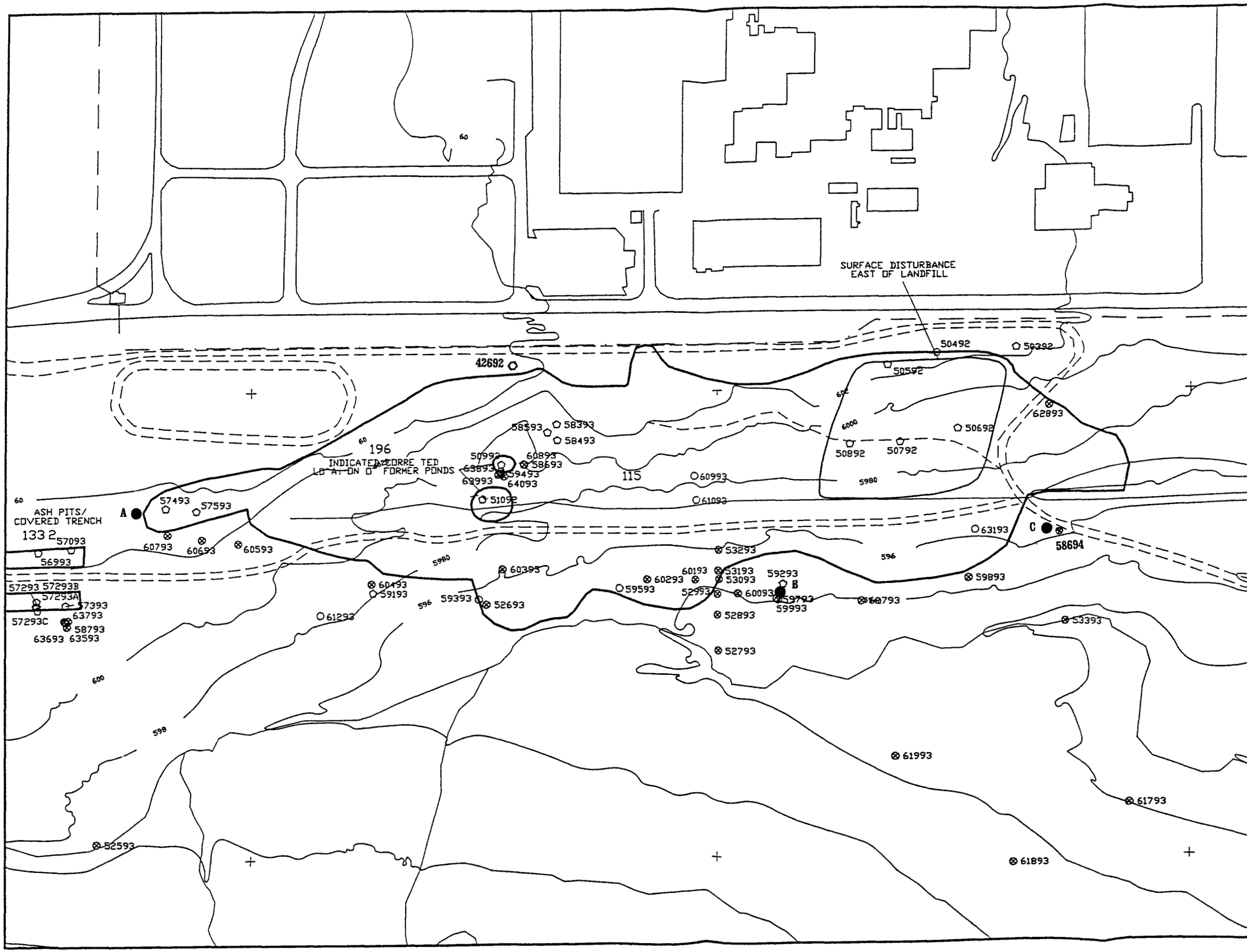
REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

| SAMPLE GRADIN SIZE | | |

STATE PLANE COORDINATE		TOTAL DEPTH (FT) 158 0	GROUND ELEVATION (FT) 6041 18	PROJECT NUMBER	SITEWIDE	LOG OF BORING NUMBER
NORTH	749037	AREA SITEWIDE	CASING DIAMETER (IN)	GEOLOGIST	F GRIGSBY	42692
EAST	2081555	LOCATOR NUMBER 18	BOREHOLE DIAMETER (IN) 10 0/3 75	DATE DRILLED	04/30/92	

REMARKS Drilling Equipment CME 75 ATV Simco 2800 ASI Geologist Fred Grigsby EBASCO Geologist K Maley Borehole filled with bentonite grout and abandoned on 5/5/92

SAMPLE GRAIN SIZE	5	WELL OR PIEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROCK TYPE	DESCRIPTION
	30			SANDY CLAYSTONE	Top of Bedrock at 30 0 Sandy Claystone with some Silt Yellowish gray (5 Y 7/2) with pale yellowish orange (10 YR 8/6) Core slightly damp poorly cemented (argillaceous) and friable Interval weathered Trace alluvial material at top of core Some Fe staining and trace of Mn stain Sand v f g well sorted, sub-angular quartz 30% sand, 21% silt 49% clay
	31				
150/120	32				
	33			SILTY CLAYSTONE	Silty Claystone with some Sand Yellowish gray (5 Y 7/2) with grayish orange (10 YR 7/4) Sand occuring in sandy claystone lenses Core mod well cemented, mod friable, slightly damp Vertical, healed fractures at 34 5 Some Mn staining in lower half of interval and some carbon in lower foot (approx) of interval No apparent bedding 5% sand, 20% silt 75% clay
	34				
	35				
	36			CLAYSTONE	Claystone with some Silt Yellowish gray (5 Y 7/2) grading to med dark gray (N4) and olive gray (5 Y 4/1) with some dark yellowish orange (10 YR 6/6) and grayish orange (10 YR 7/4) mottling and staining (FeO) Silt occuring as silty claystone lenses Core mod well cemented Slightly damp, friable to mod friable in silty zones, to slightly friable in claystones Abundt carbon in some intervals to trace amounts in most of core Some laminated zones No apparent bedding Fracture at bottom of core 15% silt, 85% clay NOTE Extra core recovery
00/100	37				
	38				
000/100	39			NO SAMPLE	No recovery



MAP LEGEND

- STREAMS, DITCHES, DRAINAGE FEATURES
- PAVED ROADS
- DIRT ROADS
- 133 1 — INDIVIDUAL HAZARDOUS SUBSTANCE SITES
- 60993 — WELL LOCATION
- 62893 — WELL POINT LOCATION
- 56093C — BOREHOLE LOCATION
- A — PROPOSED BEDROCK WELL LOCATION

D		9/3/94
Ch k d		10/4/94
App o d EG&G		10/24/94
Appr d DOE		

PROPOSED BEDROCK WELL LOCATION MAP IHSS 115

OCTOBER 3 1994

OU5 PHASE I RFI/RI IMPLEMENTATION

EG&G

FIGURE 1

FIG1A.DWG