UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DATA FROM TEST DRILLING TO TRACE MOVEMENT OF GROUND WATER IN COAL-BEARING ROCKS NEAR FISHTRAP LAKE IN PIKE COUNTY, KENTUCKY

By R. W. Davis

Open-File Report 86-535

Prepared in cooperation with the
U.S. OFFICE OF SURFACE MINING

Louisville, Kentucky
1986

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DATA FROM TEST DRILLING TO TRACE MOVEMENT OF GROUND WATER IN COAL-BEARING ROCKS NEAR FISHTRAP LAKE IN PIKE COUNTY, KENTUCKY

By
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SUMMARY

In the summer of 1985 the U.S. Geological Survey, in cooperation with the U.S. Office of Surface Mining and assisted by personnel of the Kentucky Geological Survey, conducted a study at a site in the Eastern Kentucky coal field (fig. 1) to trace the movement of ground water in a typical coal-bearing sequence of Pennsylvanian age rocks. Eight test holes were drilled at different altitudes on a hill slope and 1,272 feet of NX(3 in. outside diameter) core was collected.

Water was injected at 58 fractured horizons, selected by examination of the cores, to test the zones of greatest permeability caused by stress-relief fracturing. Rhodamine WT dye was injected in a hilltop well in October 1985, and concentrations of dye in the observation wells at lower altitudes were measured five times, ending in March 1986.

The report contains the data that were collected during the study. The data are:

1. Contractor's logs of test holes and core descriptions.
2. Description of well construction for all observation wells.
3. Data on injection of water in fractured or permeable zones.
4. Precipitation as measured at Fishtrap Dam by U.S. Army Corps of Engineers.
5. "Slug" test data from each well site.
6. Dye concentrations and water levels in observation wells after injection on October 24, 1985, of one liter of 20 percent solution of rhodamine WT dye, followed by 200 gallons of water for flushing.

Table 1.--Lithologic logs of test holes as logged by drilling contractor's geologist

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D-0009 PROJECT Fishtrap Lake H&G BORING NO. 1-Injection
LOCATION _____ COORDINATES N/A
DATE STARTED 7 July '85 DATE COMPLETED _____ GROUND EL. 1357
INSPECTOR Scott L. Murray DRILLER Fred Horton EL. DATUM MSL
SAMPLER HAMMER WT. N/A DROP N/A CASING HAMMER WT. N/A DROP N/A
CORE DATA – TYPE BARREL NX Double Tube DRILLING FLUID H_2O
HOLE SEALED Open Hole BAGS OF CEMENT 1 ■ VERTICAL ☐ INCLINED

GROUND WATER		
DEPTH	DATE	TIME
		COMPL.
		24 HOURS

CASING USED	
TYPE & SIZE	FEET
3¼" Flush Joint	

DRILLING AND SAMPLING BITS USED		
TYPE & SIZE	FROM	TO
4" Tricone Bit	0.0	5.25
NX- Diamond Bit- Triple	5.25	61.0

DRILLING RIG USED – TYPE AND NO.
Sprague & Henwood 40CL - Skid Mounted

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
		Box Dp.	RBD Dp.	Time Pen.	%RBD REC.	TOP OF BORING	
						Overburden.	
	5.25	5.25				START OF CORING	
			0	0:06	100	SANDSTONE, soft, medium grained, brown, thin bedded, very weathered with occassional clay filled cracks.	
	7.80		7.25	2.0	2.0		
			32	0:05	100	SILTSTONE, soft, light brown, very weathered and broken.	
			9.80	1.55	1.55		
	10		0	0:07	88	(0.3' core loss)	10
		1	11.2	2.4	2.1		
	15.1						
	15.4					SHALE, soft, light gray, silty, with mud and clay streaks and zones	
	16.0						
	17.2					COAL	
	18.3					FIRECLAY, soft, light gray	
	19.3					SANDSTONE, soft, medium grained, gray, rooted, very weathered.	
	20	20.3	22	0:25	48	SANDSTONE, moderately hard, medium grained, rooted, micaceous, very weathered	100% loss of drilling fluid @ ~ 19.8
			21.0	9.8	8.6	SILTSTONE, soft, brown, with clay zones throughout, severely weathered. (1.2' core loss).	
						SANDSTONE, moderately hard, light gray, micaceous, coarse grained, thick bedded, vuggy zones noted throughout, moderately weathered with red, swirling iron stains.	return 100% circulation @ ~ 33.0'
		2	29	0:20	100		lost 100% fluid @ ~ 43.3'
	30		30.8	9.8	9.8		
	35.35					fracture zones at 24.1 to 27.6, 29.2 to 30.8 and 42.0 to 43.9. Heavy iron staining and generally vuggy in fracture areas.	
			100	0:25	100		
	40		41.0	10.2	10.2		
		3				36.0-37.5 → non-weathered zone - no staining, fine grained	
	50						

SOILS
ORDER OF FIELD CLASSIFICATION
1.- MAIN CLASSIFICATION
2.- COLOR
3.- PLASTICITY – non-plastic, sl. plastic, or plastic.
4.- MOISTURE CONTENT – dry, damp, moist, or wet.
5.- CONSISTENCY – vs. soft, soft, medium stiff, vs. stiff, or hard.
SANDS & GRAVELS – loose, compact, or dense
6.- (A) re. frags. (1) amount – 40%-80% – numerous; 30%-40% – many; 20%-30% – few; 10%-20% – scattered; 0%-10% – occasional; (2) max. size; (3) weathering
(B) – roots
(C) – lenses
(D) – seams, etc.
7.- ROCK TYPE
Remarks Column
1 – WATER – perch table, water bearing lense, ground water.
2 – All other pertinent information

BORING NO 1-injection Cont. - over SHEET 1 OF 2

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG — SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0009 PROJECT FISHTRAP LAKE H&G BORING NO. 1-injection

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
		50.45	73 / 51.0	0:30 / 10.0	100 / 10.0	Previous Page	
	54.3						
	55.3	4				SANDSTONE, hard, light gray, medium grained, thin bedded, micaceous, with coal streaks and laminea, moderately weathered	
						SANDSTONE, hard, light gray, medium grained, thin bedded, micaceous, with occassional coal streaks, weathered (iron stains) to 56.6	return 100% water @ ~ 58.0
	59.6 / 60.0		90	0:45	100		
	61.0	61.0	61.0	10.0	10.0	SANDSTONE (conglomerate), light gray, medium grained, hard, micaceous, thin bedded, with mud spots and coal streaks, not weathered.	
						SHALE, soft, dark gray, silty, thin bedded with sandstone streaks. not weathered,	

BORING NO. 1-injection End SHEET 2 OF 2

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0009 PROJECT FISHTRAP LAKE H&G BORING NO. 1
LOCATION ______ COORDINATES N/A
DATE STARTED JUNE 13, 1985 DATE COMPLETED ______ GROUND EL. 1357
INSPECTOR A.P. HIGNLEY, S. MURRAY DRILLER FRED HORTON EL. DATUM MSL
SAMPLER HAMMER WT. N/A DROP N/A CASING HAMMER WT. N/A DROP N/A
CORE DATA – TYPE BARREL NX DOUBLE TUBE DRILLING FLUID H_2O
HOLE SEALED ______ BAGS OF CEMENT 8 ■ VERTICAL ☐ INCLINED

GROUND WATER		
DEPTH	DATE	TIME
		COMPL.
		24 HOURS

CASING USED	
TYPE & SIZE	FEET
3¼" FLUSH JOINT	5.2

DRILLING AND SAMPLING BITS USED		
TYPE & SIZE	FROM	TO
4½" TRICONE BIT	0.0	5.1
NX DIAMOND IMPREG. BIT	5.1	400.2

DRILLING RIG USED – TYPE AND NO.
SPRAGUE & HENWOOD 40 LL - SKID MOUNTED

ELEV.	DEPTH FT. 0.0	NO. (Box / Dp.)	BLOWS (R.Q.D / Dp.)	PEN. (Time / Penc.)	REC. (% Rec. / Rec.)	DESCRIPTION OF MATERIAL TOP OF BORING	REMARKS
						Overburden	
	5.1					START OF CORING	
	5.8, 6.6		52 / 7.0	0:05 / 1.9	100 / 1.9	SANDSTONE, moderately hard, med. grained, brown, micaceous, very thin bedded, clay filled vert fracture full length of stratum mod. weathered.	
			0 / 9.0	0:06 / 2.0	85 / 1.7	SILTSTONE, soft, brown and gray, thin bedded, clay-filled high angle frac. 6.3-6.6. mod. wea.	
	10		20 / 10.9	0:06 / 1.9	100 / 1.9	SANDSTONE, moderately hard, as above weathered & broken	
	12.0	1	14 / 14.4	0:15 / 3.5	100 / 3.5	SILTSTONE, soft, brown and gray, thin bedded, moderately weathered and broken.	
	15.2, 15.8, 16.2, 17.0		25 / 16.0	0:10 / 1.6	100 / 1.6	SHALE, soft, gray with brown staining, silty, very thin bedded moderately weathered & broken	
						COAL	
	18.0, 19.5, 20.4	20.7	30 / 20.7	0:20 / 4.7	94 / 4.4	SHALE, soft, dark gray & black, silty, very thin bedded, carbonaceous, moderately weathered	
	21.3					SILTSTONE, soft, dark gray to brown, thin bedded, moderately weathered, slickened sided @ 16.7 and 17.5	lost H_2O @ 29.0
						SANDSTONE, moderately hard, medium grained, gray-brown, thin bedded, micaceous.	horizontal slicken sides @ 29
						SILTSTONE, as above.	regained H_2O @ 40.0
		2				SANDSTONE, as above. vertical fracture 20.4 to 21.2	
	30		57 / 30.7	0:18 / 10.0	100 / 10.0	SANDSTONE, hard, medium grained, gray with iron staining, micaceous, thin bedded. High angle fractures at 25.4 to 26.7 and 28.0 to 30.0, slightly weathrred. Becoming cross bedded at 30.2	
		35.9					
	40		98 / 41.0	0:22 / 10.3	98 / 10.1	no staining 34.8-35.7, 36.3 - 38.7, and 43.9 - 46.1	
		3				vuggy zones 31.1-31.3 (1001)	
	50		66 / 50.4	0:21 / 9.4	100 / 9.4	fracture 39.1 - 39.9, 47.2 - 47.3, 52.6 - 52.7	

SOILS
ORDER OF FIELD CLASSIFICATION
1.- MAIN CLASSIFICATION
2.- COLOR
3.- PLASTICITY – non-plastic, sl. plastic, or plastic.
4.- MOISTURE CONTENT – dry, damp, moist, or wet.
5.- CONSISTENCY – vs. soft, soft, medium, stiff, vs. stiff, or hard.
6.- SANDS & GRAVELS – loose, compact, or dense
- ⊕ – rx. frags (1) amount – 40%-50% – numerous, 30%-40% – many, 20%-30% – few, 10%-20% – scattered, 0%-10% – occasional
- (2) max. size
- (3) weathering
- ● – roots
- ○ – lenses
- ◐ – seams, etc.

7.- ROCK TYPE

Remarks Column
1.- WATER – perch table, water bearing lense, ground water.
2.- All other pertinent information

BORING NO. 1 CONT. - OVER SHEET 1 OF 8

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG — SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0009 PROJECT Fishtrap Lake H&G BORING NO. 1

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
		50.4	50.4	9.4	9.4		
						SANDSTONE, hard, medium grained, gray, micaceous, thin bedded with occasional carbonaceous streaks beginning at 52.1. Not Weathered.	6-17-85 STATIC WATER LEVEL = 45.0'
		4					
	59.8		97 59.8	0:25 9.4	100 9.4		
			100 61.7	0:05 1.9	100 1.9		water circulation lost
						SHALE, soft, dark gray, sandy, thick bedded, with many sandstone streaks. Not Weathered.	
		65.4					Water loss @ ~ 66.2'
	70.2						
			94 71.8	0:26 10.1	100 10.1	SANDSTONE, hard, fine grained, gray, micaceous, thin bedded, moderate weathering	iron stains
						SHALE, soft, dark gray, sandy, thick bedded, with many sandstone streaks. Not Weathered. (Sandstone % increasing with depth beginning @ 79.2)	Regained Water @ ~72.5'
		5					
		80.6	85 81.6	0:40 9.8	100 9.8		
	86.7						
		6				SANDSTONE, hard, medium grained gray, thick bedded, moderate weathering (iron stains)	Bedding Plane @ 86.7 stained carbonate cemented (fizzes)
	91.0		92 91.8	0:30 10.2	100 10.2	SANDSTONE, hard, medium grained thick bedded, with many dark gray shale streaks, moderate weathering. (High angle fracture zone from 92.7 to 93.8 - highly stained, weathered, broken)	
	95.8	95.6					
	97.6					SHALE, moderately hard, dark gray silty, cross-bedded. High angle fracture from 95.9 to 96.7	stained @ fracture zone
		7				SHALE (dark gray) AND INTERBEDDED SANDSTONE (gray), moderately hard Burrowed, laminated.	

BORING NO. 1 — CONT. OVER — SHEET 2 OF 8

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0009 PROJECT FISHTRAP LAKE H&G BORING NO. 1

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
		7	95 101.7	0:25 9.9	100 9.9	SHALE (dark gray) AND INTERBEDDED SANDSTONE (gray) moderately hard, laminated bedding. Not Weathered.	
	109.4						
		110.6	77 111.7	0:45 10.0	100 10.0	SHALE, moderately hard, black, with occassional coal streaks. (Highly fractured - vertically)	weathered along fracture areas
	113.5						
		8				COAL, Binders @ 114.5	
	121.0		121.2	0:16 9.5	100 9.5		
	121.5					FIRECLAY, soft, dark gray	
		125.9				SHALE, moderately hard, black, thick bedded, with a few sandstone streaks. Not Weathered.	Lost water @ 124.5 regained all @ 125.0 (gradually)
		9	87 131.4	0:45 10.2	100 10.2		lost water @ 127.0 regained all @ 127.4 (gradually)
							lost water @ 135.0 regained all @ 135.4 (gradually)
	138.5						
	139.1					COAL, 0.1' of FIRECLAY (gray) @ 138.5 ft	138.6
		141.2	90 141.6	0:35 10.2	100 10.2	SANDSTONE, hard, fine-grained gray, micaceous, thick bedded, with occasional shale streaks, grading into sandy siltstone with depth.	6-29-85 (8:45 a.m.) STATIC WATER LEVEL = 119.8
							No Return Water from Drilling During Core Run (141.6-151.8)

BORING NO. 1 Cont - Over SHEET 3 OF 8

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0009 PROJECT FISHTRAP LAKE H&G BORING NO. 1

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
			92 151.8	0:28 10.2	98 10.0	SILTSTONE, moderately hard, dark gray, shaley, thick bedded, not weathered. (0.2 core loss at 151.3 to 151.5 – possible clay seam)	regained 100% water circulation at 163.8
		10					
	156.3						
			96 161.8	0:35 10.0	100 10.0	SANDSTONE, hard, fine to medium grained, light gray, micaceous, thick bedded, with many shale streaks and laminae, very minor weathering (iron stains). Coal streaks beginning at 172.8	159.2 = bedding contact, moderately weathered (iron stains) (Horizontal fracture)
		11				vertical fracture noted at 159.5 to 160.9 (weathered – iron stains: carbonaceous in fracture area)	ADDED SPACE block at 159.2 to spare fracture
	170.5		99 171.8	0:30 10.0	100 10.0	minor carbonate cementing noted at 171.8 to 172.8	carbonaceous appearance in fracture and weathered areas
		12					
			92 181.8	0:30 10.0	100 10.0		lost water (100%) at 181.8
	185.6						
			95 191.7	0:33 9.9	100 9.9		
		13					

BORING NO. 1 Cont - over SHEET 4 OF 8

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0029 PROJECT FISHTRAP LAKE H&G BORING NO. 1

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
		200.8	100	0:28	100		
			201.9	10.2	10.2		regained ~ 30% circulation at 208.0
	203.4					SANDSTONE, hard, fine grained, light gray, rooted (lamination disturbed) (probably same unit as previous)	
		14				SANDSTONE, hard, fine to medium grained, light gray, micaceous, thick bedded, with many shale and coal streaks. (Vertical fracture from 208.4 to 209.0 – weathered, iron stains, carbonaceous)	
			94	0:22	99		
			211.9	10.0	9.9		
	215.8					Additional weathering stains noted at 209.9 to 210.4	
						core loss (0.1') at 210 to 210.1	
						occassional rooted zones, coal streaks decreasing with depth	
			100	0:28	100		
			221.9	10.0	10.0		
		15					6-20-85 7:55 a.m. static water level: 208.9
							No drill water return (all day) 100% loss of water
			96	0:33	100		
		230.9	131.8	9.9	9.9		
	233.7						
						SHALE and INTERBEDDED SANDSTONE, moderately hard, gray, thin-bedded, with a few clay seams. Not weathered.	
		16				Vertical fracture (conjugate set) noted from 242.5 to 243.3. Calcite cement throughout fracture zone.	
			100	0:30	100		
			241.9	10.1	10.1		
	243.4						
		246.0				SANDSTONE and INTERBEDDED SHALE, moderately hard, thin bedded, light gray, calcite cement throughout sandstone. (sandstone - micaceous)	

BORING NO. 1 CONT. -OVER SHEET 5 OF 8

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0009 PROJECT FISHTRAP LAKE H&G BORING NO. 1

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
			100 251.8	0:35 9.9	100 9.9		no return circulation
	252.8						
	254.6	17				SHALE, moderately hard, sandy, gray, thin bedded with sandstone streaks. not weathered	
						SHALE, moderately hard, sandy, gray, thin bedded, (lamination interrupted) not weathered	
						SHALE, moderately hard, silty, gray, thick bedded, with occasional sandstone streaks decreasing with depth. Not Weathered	
			97 261.6	0:38 9.8	100 9.8		
	261.1						
	266.0						
		18				SHALE, moderately hard, silty, thick bedded, dark gray, Not weathered.	fossiliferous in part
			97 271.9	0:45 10.3	100 10.3	crustacean shells grading into carbonate cement (from 266.0 to 273.0)	
	276.2						no return circulation
							6-21-85 7:45 a.m. static water level = 196.5
			93 282.0	0:43 10.1	100 10.1		
		19				same	
	291.5		97 292.0	0:42 10.0	100 10.0		no return circulation
						same	

BORING NO. 1 Cont - Over SHEET 6 OF 8

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0009 PROJECT FISHTRAP LAKE H&G BORING NO. 1

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
			97	0:48	100		6-24-85 8:45 a.m. static water level = 200.5
			302.0	10.0	10.0		
		20				light gray sandstone streaks from 305.0 to 306.0	
	306.7						return circulation @ 307.0
			100	0:65	100		
			312.1	10.1	10.1		
		21				lamination disturbed (wormy) from 316.7 to 318.2 and from 320.7 to 321.4 vertical fracture from 316.1 to 316.5	
						coal streaks (laminae) near bottom.	
			?				
			98	0:60	99		6-26-85 8:15 am static water level = 198.2
	321.9		322.0	9.9	9.8		~ 322.6 → hard fossilic chert plane
	323.5					SANDSTONE, hard, fine grained, gray, thin bedded, with shale and coal streaks (Rooted) not weathered	
	325.6					SHALE, soft, dark gray, thin bedded, silty, with occassional coal partings and clay streaks not weathered.	
		22					
			91	0:55	100	coal laminae at 330.9 to 331.0 and 331.4 to 331.5	
			331.8	9.8	9.8	sandstone laminae with depth	
	334.7						
						COAL	
	336.6						
		337.1				SHALE (Possible mudstone), very soft, dark gray, thin bedded with clay streaks (wormy) sandstone streaks with depth not weathered	
	339.9						
			74	0:50	100	SILTSTONE, moderately hard, thin bedded, sandy, with clay streaks near top, grading into sandstone.	
			342.0	10.2	10.2		
		23					
	344.3					SANDSTONE, hard, fine grained, thin bedded, light gray with dark gray shale laminea.	
	346.6						
						SANDSTONE, hard, coarse, very grained, cross-bedded, micaceous	

BORING NO. 1 Cont. - Over SHEET 7 OF 8

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0009 PROJECT FISHTRAP LAKE H&G BORING NO. 1

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
			100	0:30	100		
			352.1	10.1	10.1		
							354.4 to 354.9 USGS sample Taken (Spacer in box)
			95	0:32	100	coal streaks & laminae noted from 353.8 to 355.0 and from 364.1 to 364.8 and from 367.0 to 367.4 (Brown pebbles noted in these areas - conglomerate areas)	
			361.8	9.7	9.7		
						Vertical fracture 368.9 to 369.6 - probable coring break, no smoothness or weathering noted	water loss 100% at 368.5
		367.2					
	368.4						
			90	0:38	100	SHALE, moderately hard, black, silty, thick bedded with occassional light gray sandstone streaks. Brown clay deposits (balls) noted with depth. Not Weathered	
			372.0	10.2	10.2		
							6-27-85 8:10 am. static water level = 193.8
			100	0:50	100		
			382.0	10.0	10.0		
	385.5						
						SANDSTONE, moderately hard, fine grained, thin bedded, silty not weathered.	
	388.7						
			100	0:50	100	SHALE AND INTERBEDDED SANDSTONE, moderately hard, dark gray, thin bedded, not weathered.	regained 100% circulation at 393.7
			391.7	9.7	9.7		
	395.6						
	398.1					SANDSTONE, hard, light gray, thin bedded, micaceous, with occassional shale streaks. Not weathered.	
						SANDSTONE AND INTERBEDDED SHALE laminae, hard, gray, thin bedded.	

BORING NO. 1 400.3 8.6 100 96 END SHEET 8 OF 8

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D-0009 PROJECT Fishtrap Lake H&G BORING NO. 2
LOCATION Pike Co., Ky. COORDINATES n/a
DATE STARTED 7-24-85 DATE COMPLETED 7-29-85 GROUND EL. 1058
INSPECTOR P. Highley DRILLER E. Horton EL. DATUM n/a
SAMPLER HAMMER WT. n/a DROP n/a CASING HAMMER WT. n/a DROP n/a
CORE DATA – TYPE BARREL NX - double tube DRILLING FLUID H2O
HOLE SEALED PIEZO. BAGS OF CEMENT ____ ■ VERTICAL ☐ INCLINED

GROUND WATER			CASING USED		DRILLING AND SAMPLING BITS USED		
DEPTH	DATE	TIME	TYPE & SIZE	FEET	TYPE & SIZE	FROM	TO
56'	7-29	COMPL.	4" Flush Joint	6.0	4½" Tricone	0.0	6.2
74.5	7-30	24 HOURS			NX Diamond Bit	6.2	201.5

DRILLING RIG USED – TYPE AND NO. S&H 40CL

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
	0.0					TOP OF BORING	
						OVERBURDEN	
	6.2	Run No.	RQD Pc.	Time Pene.	% Rec. Rec.		
			88	0:08	100	SANDSTONE, moderately hard, fine grained, gray, shaly, thin-bedded, w/occ. coal streaks	
			7.9	1.7	1.7		
			79	0:17	100		
	10		11.3	3.4	3.4		
		1					
			91	0:16	100		
	20	21.3	21.3	10.0	10.0		
	21.8					COAL	
	24.1		58	0:24	100	SILTSTONE, moderately hard, gray, thin-bedded, fresh	
	26.8	2				SHALE, dark gray, soft, clayey, thinbedded, fresh	
	29.8					SILTSTONE, moderately hard, gray, thin bedded, fresh	
	30		31.3	10.0	10.0		
		36.5	100	0:40	100		
	40		41.4	10.1	10.1		
	43.5	3				SANDSTONE, hard, gray, thin bedded, fresh, w/occ. coal streaks	
			93	0:40	100		
	50						

SOILS
ORDER OF FIELD CLASSIFICATION
1.– MAIN CLASSIFICATION
2.– COLOR
3.– PLASTICITY – non-plastic, sl. plastic, or plastic.
4.– MOISTURE CONTENT – dry, damp, moist, or wet.
5.– CONSISTENCY – vs. soft, soft, medium, stiff, vs. stiff, or hard. SANDS & GRAVELS – loose, compact, or dense
6.– ⊕ – rx. frags. (1) amount – 40%-50% – numerous, 30%-40% – many, 20%-30% – few, 10%-20% – scattered, 0%-10% – occasional; (2) max. size; (3) weathering
Ⓡ – roots
Ⓛ – lenses
Ⓢ – seams, etc.
7.– ROCK TYPE

Remarks Column
1.– WATER – perch table, water bearing lense, ground water.
2.– All other pertinent information

BORING NO. 2 CONT. – OVER SHEET 1 OF 5

ORH FORM 2093 1 APR 74 1 APR 68 EDITION OBSOLETE

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D-0009 PROJECT Eichtrop Lake H&G BORING NO. 2

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL Sheet #1 - CONT.	REMARKS
		51.5	51.5	10.1	10.1		
56.6		4	98	0:50	100	SHALE, moderately hard, black, thin-bedded, clayey, fresh, w/occ. siltstone streaks	
			61.3	9.8	9.8		
		66.5	100	0:45	100		
	71.8		71.4	10.1	10.1		
	73.1					SILTSTONE, moderately hard, gray, thin-bedded, fresh, w/shaly zones	
		5	95	0:46	100	SHALE, moderately hard, black, thin-bedded, clayey, fresh, w/occ. siltstone streaks	
	79.9						
	80.9		81.4	10.0	10.0	SILTSTONE, hard, gray, thin-bedded, fresh, fracture 81.2-81.4	
	82.9	6	100	0:33	100	SHALE, moderately hard, dark gray, thin-bedded, w/inter bedded gray siltstone, fresh	
			91.3	9.9	9.9		
	95.4		97	0:42	100	SILTSTONE, moderately hard, gray, thin-bedded, w/shale streaks, fresh	
		97.2					

BORING NO. 2 CONT. - OVER SHEET 2 OF 5

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D-0009 PROJECT Fishtrap Lake H&G BORING NO. 2

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL Sheet #2-cont.	REMARKS
		7	104.1	10.1	10.1		
	106.7					COAL	
	107.6		86	0:51	100	SANDSTONE, moderately hard, dark gray thin-bedded, fresh	
	109.9					SILTSTONE, moderately hard, light gray, thick-bedded, fresh, w/shale streaks	
			111.5	10.1	10.1		
	112.6	112.4					
		8	100	0:51	100	SHALE, moderately hard, dark gray, thin-bedded, w/siltstone streaks, fresh	
			121.6	10.1	10.1		
	124.7						
		1224	100	0:37	100	SILTSTONE, moderately hard, dark gray, thick-bedded, w/shale streaks, fresh	
	129.0						
			131.3	9.7	9.7	SHALE, moderately hard, dark gray, thin-bedded, w/siltstone streaks, fresh	
	135.1	9					
			93	0:35	100	SILTSTONE, moderately hard, dark gray, thick-bedded, w/shale streaks, fresh	
	138.0						
						SHALE, moderately hard, dark gray, thin-bedded, w/siltstone streaks, fresh	
			141.6	10.3	10.3		
		1427					
			100	0:38	100		
		10					

BORING NO. 2 CONT.-OVER SHEET 3 OF 5

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-86-D-0009 PROJECT Fishtrap Lake H&G BORING NO. 2

ELEV.	DEPTH FT. 189.0	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL Sheet #3-cont.	REMARKS
			151.5	9.9	9.9		
153.4							
		10				COAL	
154.8						FIRECLAY, soft, gray, thin-bedded	
155.4			74	0:46	100	SHALE, moderately hard, dark gray, thin-bedded, w/siltstone streaks, fresh, slickensides at 155.6 & 162.4	
		158.1					
			161.3	9.8	9.8		
		11					
			95	0:53	100		
			171.4	10.1	10.1		
		173.5					
			78	0:45	100		
179.8		12				SHALE, soft, gray, fractured, w/clay seams	
180.0						COAL	
181.5			181.5	10.1	10.1		
182.4						SANDSTONE, hard, dark gray, fine grained, fresh, clean seepage	
						SANDSTONE, hard, light gray, thick-bedded, medium grained, fresh	
			100	0:31	100		
		188.8					
		13					
			100	0:38	100		

BORING NO. 2 CONT. OVER SHEET 4 OF 5

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D-0009 PROJECT Fishtrap Lake H&G BORING NO. 2

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
						Sheet #4 - cont.	
	201.6	201.6	201.6	9.9	9.9		
						BOTTOM OF BORING	

BORING NO. 2 SHEET 5 OF 5

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D-0009 PROJECT Fishtrap Lake H&G BORING NO. 3
LOCATION ______ COORDINATES N/A
DATE STARTED 7 July 1985 DATE COMPLETED ______ GROUND EL. 1136
INSPECTOR Scott L. Murray DRILLER Fred Horton EL. DATUM MSL
SAMPLER HAMMER WT. N/A DROP N/A CASING HAMMER WT. N/A DROP N/A
CORE DATA – TYPE BARREL NX Double Barrel DRILLING FLUID H₂O
HOLE SEALED ______ BAGS OF CEMENT ______ ■ VERTICAL ☐ INCLINED

GROUND WATER		
DEPTH	DATE	TIME
		COMPL.
		24 HOURS

CASING USED	
TYPE & SIZE	FEET
3 1/2" Flush Joint	

DRILLING AND SAMPLING BITS USED		
TYPE & SIZE	FROM	TO
4" Tricone Bit	0.0	4.7
NX Diamond Impreg. Bit		

DRILLING RIG USED – TYPE AND NO. ______

ELEV.	DEPTH FT. 0.0	NO. (Box / Dp.)	BLOWS (RQD / Dp.)	PEN. (Time / Pen.)	REC. (Rec. / Rec.)	DESCRIPTION OF MATERIAL (Top of Boring)	REMARKS
						Overburden	
	4.7					Start of Coring	
			42 / 6.7	0:05 / 2.0	95 / 1.9	SANDSTONE, soft, medium grained, gray, slightly micaceous, thin bedded with occassional clay and mud filled cracks and seams. Somewhat rooted. very weathered, fracture zone from 6.3-7.9. Conjugate fractures from 8.4-9.8 (core loss = 0.1')	fresh roots noted. 100% drilling fluid loss @ ~6.7'
			0 / 8.8	0:05 / 2.1	100 / 2.1		
	9.8		26 / 10.7	0:05 / 1.9	95 / 1.8	SILTSTONE, soft, sandy, gray, rooted with occassional coal streaks horizontal fracture @ 10.35 - iron stained	
	11.7	1				SANDSTONE moderately hard, fine grained, gray, rooted, micaceous, moderately weathered. Horizontal fractures throughout. Vert. fractures @ 11.9 to 12.4 and 13.8 to 14.2	carbonate cementing apparent in fracture areas (fizzes)
	14.8					SILTSTONE, soft, gray, sandy, horizontal bedding, moderately weathered, horizontal fractures & staining noted throughout	
	16.4						
	17.1					SANDSTONE, moderately hard, medium grained, gray, slightly micaceous, thin bedded, moderately weathered, Horizontal fracture @ 16.7 → fizzes.	0.2' core loss
	20	20.15	72 / 20.4	0:22 / 9.7	98 / 9.5	SILTSTONE, soft, gray, sandy. soft zone (possible clay seam) noted @ 16.9. Horizontal fractures and staining @ 16.2 and 17.0 (medium grained)	
		2				Major vertical fracture zone from 28.0 - 32.0 + weathered and stained.	
	30		80 / 30.7	0:40 / 10.3	100 / 10.3		
	33.2	34.5				SILTSTONE, moderately hard, very fine grained, dark gray, fossiliferous (crustacean shells) in part. Calcite cemented	
	40	3	70 / 40.7	0:45 / 10.0	100 / 10.0	fractures noted at 33.2 to 33.7, 34.3 to 34.5, 35.1 to 35.5 all moderately weathered. grades into very fine grained mudstone with depth. occassional clay and sandstone streaks.	
	50	49.8					

SOILS
ORDER OF FIELD CLASSIFICATION
1.- MAIN CLASSIFICATION
2.- COLOR
3.- PLASTICITY – non-plastic, sl. plastic, or plastic.
4.- MOISTURE CONTENT – dry, damp, moist, or wet.
5.- CONSISTENCY – vs. soft, soft, medium, stiff, vs. stiff, or hard.
SANDS & GRAVELS – loose, compact, or dense
6.- ⚬ – rx. frags. (1) amount – 40%-50%-numerous, 30%-40%-many, 20%-30%-few, 10%-20%-scattered, 0%-10%-occasional
(2) max. size
(3) weathering
● – roots
○ – lenses
⊖ – seams, etc.
7.- ROCK TYPE

Remarks Column
1.- WATER – perch table, water bearing lense, ground water.
2.- All other pertinent information

BORING NO. 3 Cont - Over SHEET 1 OF 6

ORH FORM 2093 1 APR 74 1 APR 68 EDITION OBSOLETE

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

DACW69-85-
CONTRACT NO. D-0009 PROJECT FISHTRAP LAKE H&G BORING NO. 3

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
			100 50.7	0:43 10.0	100 10.0		
		4	100 60.5	0:35 9.8	100 9.8	Sandstone streaks and laminae @ 74.8 to 77.3 and coal streaks.	water @ 47.5' 50.7 depth of hole Return 70% H_2O @ ~ 79.5
	65.05						
		5	100 70.5	0:41 10.0	100 10.0		
	80.25		100 80.7	0:50 10.2	100 10.2		
	81.5					SHALE, moderately hard, dark gray, silty, with occassional coal streaks, occassional pyrite deposits. Calcite cemented to 86.7. not weathered.	
		6	96 92.7	0:63 9.0	100 9.0		
	94.0						
	74.8					SANDSTONE, hard, light gray, thin bedded, occ. coal	streaks.
	95.3					SILTSTONE, moderately hard, light gray, sandy, thin bedded, not weathered. (occassional rooted areas) Grades into shale @ ~ 100	
		7	100.0	0:50 10.3	100 10.3		

BORING NO. 3 Cont. - Over SHEET 2 OF 6

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85 D-0009 PROJECT FISHTRAP LAKE H&G BORING NO. 3

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
		7					
	107.1						
			62	0:40	97	COAL (0.3' core loss)	
	111.1	110.5	110.3	10.3	10.0		
	111.4	111.75				SANDSTONE, hard, medium grained, dark gray, thin bedded with coal streaks.	
		111.95					
		112.2					
		112.7					
						MUDSTONE, moderately hard, fine grained dark gray.	
	116.6					COAL	
		8				MUDSTONE As above.	
						COAL	
			50	0:37	100		
	122.0		120.4	10.1	10.1	MUDSTONE, soft, medium grained, silty, dark gray to 116.0 then weathered brown with increasing sand content and sandstone streaks to 116.6. MANY mud and clay streaks and occassional coal streaks. vertical fracture – 116.0-116.6	
		126.5					
	128.0					SANDSTONE, moderately hard, coarse grained, light gray, slightly micaceous, highly weathered and broken, stained. Vertical fractures 116.6 to 118.3 and 119.9 to 120.4	
			70	0:30	100		
			130.4	10.0	10.0		
		9				SANDSTONE, hard, medium grained, light gray, thin bedded with mud and coal streaks, micaceous. (conglomerate - mud spots and pebbles 122.0-122.2) vertical fracture zone 126.0-127.4 - stained & weathered.	
			98	0:61	100		
			140.1	10.2	10.2	SHALE, soft, black, thin bedded with occassional coal streaks and pyrite deposits. Sandy zones 136.5 to 137.1 and 140.6 to 141.3. clay streaks with depth.	
		141.05					
	145.1						
		10				SANDSTONE, hard, very fine grained, light gray, slightly micaceous, cross bedded, moderately weathered and stained. 147.6 to 148.3 shale streaks 145.5 to 147.8 vertical cemented frac. stained. Grades into siltstone @ 148.3 to 149.2 horizontal frac. @ 147.1 - stained	
			90	0:45	100		
			160.7	10.1	10.1		

BORING NO. 3 Cont. - Over SHEET 3 OF 10

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D-0009 PROJECT Fishtrap Lake H&G BORING NO. 3

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL Sheet No. 3 - Cont.	REMARKS
		10					
	155.2		89	0:42	100		
		155.2				SANDSTONE, hard, light gray, fine-grained, slightly micaceous, thick-bedded, occasional shale streaks, slightly weathered	
						many horizontal fractures throughout	
			160.7	10.0	10.0	cemented vertical fracture 159.8-163.9	
		11					
	163.9						
			92	0:57	100	SHALE, soft, dark gray, thin-bedded, with sandstone streaks, slightly weathered	
		170.7	170.7	10.0	10.0		
	173.6					weathered & stained contact	
			60	0:48	100	SHALE & INTERBEDDED SANDSTONE, moderately hard, light gray, fine-grained, thin-bedded	
		12					
						many stained vertical fractures 173.9 - 176.8	
			180.7	10.0	10.0		
		185.5					
			98	0:45	100		
	190.6		190.7	10.0	10.0		
		13				SHALE, moderately hard, black, silty, thin-bedded, fresh	
						slickensides at 195.0	
						many fractures 195.2 - 196.9	
	196.9		54	0:42	100		
						COAL, shaly at 198.3	
	198.5						

BORING NO. 3 CONT.-OVER SHEET 4 OF 6

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D0009 PROJECT Fishtrap Lake H&G BORING NO. 3

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL Sheet # 2 - Cont.	REMARKS
	200.8		20/0	10.3	10.3	SANDSTONE - moderately hard, gray, fine-grained, thin-bedded, micaceous, fresh	
	203.0						
	205.8		85	0:31	100	SANDSTONE & INTERBEDDED SHALE, moderately hard, fine-grained, gray, & dark gray, thin-bedded, fresh	
		14				as above, borrowed	
	210.2		210.6	9.6	9.6	SHALE, moderately hard, dark gray, sandy, thin-bedded, w/sandstone streaks, fresh	
			100	0:36	100		
		215.9					
			220.8	10.2	10.2		
		15					
	223.4						
	224.7					COAL	
	225.7		73	0:41	100	SHALE, soft, gray, clayey, thin-bedded, fresh	
						SHALE, soft, gray, silty, thin-bedded, w/sandstone streaks, fresh	
	231.5	231.3	230.8	10.0	10.0		
			97	0:38	100	SANDSTONE & INTERBEDDED SHALE, moderately hard, gray & dark gray, thin-bedded, fresh	
		16					
	240.5		240.5	9.7	9.7		
			99	0:35	100	SHALE, moderately hard, dark gray, silty, thin-bedded, w/sandstone streaks, fresh seams of nearly clean sandstone 244.8 - 245.6 246.7 - 248.3	
		244.5					
	250.0						

BORING NO. 3 CONT.-OVER SHEET 5 OF 6

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D-0009 PROJECT Fishtrap Lake H&G BORING NO. 3

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL (Sheet 5-Coal)	REMARKS
	260.0		250.7	10.2	10.2		
	265.5	17	76	0:37	100	COAL	
	266.8					SANDSTONE, moderately hard, shaly, thin-bedded, brash	
	268.0					SANDSTONE, hard, fine-grained, gray, thick-bedded, fresh	
			260.9	10.2	10.2		
		261.7					
			100	0:26	100		
		18					
			270.9	10.0	10.0		
			98	0:26	100		
		278.9					
			281.1	10.2	10.2		
		19					
			100	0:24	100		
	291.7	291.7	296.2	10.1	10.1		
						BOTTOM OF BORING	

BORING NO. 3 SHEET 6 OF 6

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW69-85-D-0009 PROJECT Fishtrap Lake H&G BORING NO. 3
LOCATION Pike Co., Ky. COORDINATES n/a
DATE STARTED 7-22-85 DATE COMPLETED 7-22-85 GROUND EL. n/a
INSPECTOR R. Highley DRILLER F. Horton EL. DATUM n/a
SAMPLER HAMMER WT. n/a DROP n/a CASING HAMMER WT. n/a DROP n/a
CORE DATA – TYPE BARREL NX double tube DRILLING FLUID H_2O
HOLE SEALED 7-23-85 BAGS OF CEMENT — ■ VERTICAL ☐ INCLINED

GROUND WATER		
DEPTH	DATE	TIME
5.6	7-22	COMPL.
6.0	7-23	24 HOURS

CASING USED	
TYPE & SIZE	FEET
4" Flush Joint	5.0

DRILLING AND SAMPLING BITS USED		
TYPE & SIZE	FROM	TO
4½" Tricone	0.0	5.0
NX Diamond Bit	5.0	11.1

DRILLING RIG USED – TYPE AND NO.: Sprague & Henwood 40 CL

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
	0.0					TOP OF BORING	
						OVERBURDEN	
	5.0	Box # / Dp.	RQD / Dp.	Time / Pene.	% Rec. / Rec.		
		1	43 / 7.1	0:05 / 2.1	90 / 1.9	SANDSTONE, moderately hard, fine grained, greyish-brown, thin bedded, moderately weathered, high angle fracture 5.5-5.9	
			37 / 9.0	0:08 / 1.9	95 / 1.8		
	9.7		24 / 11.1	0:06 / 2.1	100 / 2.1	SILTSTONE, moderately hard, grey & brown, thin bedded, moderately weathered, fracture 9.7-10.0	
	11.1					BOTTOM OF BORING	

SOILS
ORDER OF FIELD CLASSIFICATION

1.– MAIN CLASSIFICATION
2– COLOR
3.– PLASTICITY – non-plastic, sl. plastic, or plastic.
4.– MOISTURE CONTENT – dry, damp, moist, or wet.
5.– CONSISTENCY – vs. soft, soft, medium, stiff, vs. stiff, or hard.
SANDS & GRAVELS – loose, compact, or dense
6.–
⊕ – rx. frags. (1) amount–
40%–50%–numerous
30%–40%–many
20%–30%–few
10%–20%–scattered
0%–10%–occasional
(2) max. size
(3) weathering
● – roots
○ – lenses
◐ – seams, etc.
7.– ROCK TYPE

Remarks Column
1– WATER – perch table, water bearing lense, ground water.
2 – All other pertinent information

BORING NO. 3 SHEET 1 OF 1

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW 69-85-R-0019 PROJECT Fishtrap Lake H/C BORING NO. 4
LOCATION _____ COORDINATES _____
DATE STARTED 7-31-85 DATE COMPLETED 7-31-85 GROUND EL. 887
INSPECTOR Michael Johnston DRILLER Fred Horton EL. DATUM _____
SAMPLER HAMMER WT. – DROP – CASING HAMMER WT. – DROP –
CORE DATA – TYPE BARREL 3" core barrel NX DRILLING FLUID _____
HOLE SEALED _____ BAGS OF CEMENT _____ ☑ VERTICAL ☐ INCLINED

GROUND WATER		
DEPTH	DATE	TIME
		COMPL.
		24 HOURS
13.5	7/31/85	

CASING USED	
TYPE & SIZE	FEET
4" flush joint	8.0

DRILLING AND SAMPLING BITS USED		
TYPE & SIZE	FROM	TO
4" auger	0.0	8.0
diamond bit NX	8.0	42.1

DRILLING RIG USED – TYPE AND NO.
SIH 40 CL

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
						Drilling Zone No coring	8.0 Ft casing
	8.0	Box No Depth	RQD Depth	Time Pen	% Rec Rec		TOP of Rock
	10		19	:20	82	Shale, soft, dark gray, sandy laminations, broken and weathered near top.	10
			10.4	2.4	2.0		
			45	:14	90		
	12.7		12.4	2.0	1.8		
	14.9	Box 1				Sandstone ± shale laminations, med hard, gray, fine grain, fractured within 13.9' Ft	
	17.9		69	:29	100	Sandstone = occasional shale laminations, hard, gray, fine grain, thinly bedded	
	18.6					Siltstone, hard, dark gray, sandy, thinly bedded	
	20		20.9	8.5	8.5	Sandstone, hard, gray, medium grained, micaceous, crossbedded, occasional carb stringers.	20
		23.15					
			100	:32	100		
			28.5	7.6	7.6		
	30	Box 2	88	:17	100		
	31.4		31.8	3.3	3.3		
	32.3					Coal 1.3'	
	33.65					claystone, soft, dark gray, occ slickensides, fossil, broken	
	35.05					shale, mod hard, gray, fossils, arenaceous,	
			81	:39	100	Sandstone, hard, gray, micaceous, fine grained,	
	38.85	38.4					
	40	Box 3				Sandstone, hard, gray, micaceous, medium to coarse grained, thick bedded	
	42.1	42.1	42.1	10.3	10.3		
						Total Depth 42.1 ft	
	50						50

SOILS 50
ORDER OF FIELD CLASSIFICATION
1.- MAIN CLASSIFICATION
2- COLOR
3.- PLASTICITY – non-plastic, sl. plastic, or plastic.
4.- MOISTURE CONTENT – dry, damp, moist, or wet.
5.- CONSISTENCY – vs. soft, soft, medium, stiff, vs. stiff, or hard.
6.- SANDS & GRAVELS – loose, compact, or dense
A – re. frags. (1) amount –
40%-50% – numerous
30%-40% – many
20%-30% – few
10%-20% – scattered
0%-10% – occasional
(2) max. size
(3) weathering
B – roots
C – lenses
D – seams, etc.
7.- ROCK TYPE

Remarks Column
1.- WATER – perch table, water bearing lense, ground water.
2 – All other pertinent information 50

BORING NO. 4 SHEET 1 OF 1

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW 69 85-B-0009 PROJECT Fishtrap Lake H&G BORING NO. 6
LOCATION Pike Co, Ky. COORDINATES n/a
DATE STARTED 8-5-85 DATE COMPLETED 8-6-85 GROUND EL. 1092
INSPECTOR Michael Johnston DRILLER Fred Horton EL. DATUM MSL
SAMPLER HAMMER WT. n/a DROP n/a CASING HAMMER WT. n/a DROP n/a
CORE DATA – TYPE BARREL 3" core barrel diamond DRILLING FLUID H2O
HOLE SEALED piezo. BAGS OF CEMENT ____ ■ VERTICAL ☐ INCLINED

GROUND WATER		
DEPTH	DATE	TIME
		COMPL.
		24 HOURS
53.5	8-6-85	

CASING USED	
TYPE & SIZE	FEET
4" Flush joint	11.0

DRILLING AND SAMPLING BITS USED		
TYPE & SIZE	FROM	TO
4" Tri-cone	0.0	11.0
diamond bit NX	11.0	100

DRILLING RIG USED – TYPE AND NO. SIH 40 CL

ELEV.	DEPTH FT.	NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
	0.0–11.0					Casing No coring	Top of Rock
	11.0	Box No. Depth	RQD Depth	Time Pen	% Rec Rec	Shale, moderately hard, dark gray, micaceous, broken, weathered and ironstained top .9 Ft.	
		Box 1	90	0:28	100		
			21.0	10.0	10.0	Small fracture at 23.4 ft.	
	25.5	26.2	87	0:34	100	Shale, moderately hard, gray, micaceous, interbedded siltstone laminations, good fissility	
	27.3					Shale, moderately hard, gray, micaceous, sandy lams, good fissility	
			31.0	10.0	10.0		
		Box 2	93	0:39	100		
	37.2						
	37.8					Shale, soft to medium hard, dark gray, fractured, iron stained	
						Shale, soft, dark gray, micaceous, poor fissility.	
		41.3	41.2	10.2	10.2		
	45.85	Box 3	72	0:42	100	Shale, soft, dark gray, fossiliferous, occ sandy laminations	

SOILS
ORDER OF FIELD CLASSIFICATION
1.- MAIN CLASSIFICATION
2- COLOR
3.- PLASTICITY – non-plastic, sl. plastic, or plastic.
4.- MOISTURE CONTENT – dry, damp, moist, or wet
5.- CONSISTENCY – vs. soft, soft, medium, stiff, vs. stiff, or hard.
SANDS & GRAVELS – loose, compact, or dense
6.- ½
⊕ – ra. frags. (1) amount – 40%-50% – numerous, 30%-40% – many, 20%-30% – few, 10%-20% – scattered, 0%-10% – occasional
(2) max. size
(3) weathering
● – roots
○ – lenses
⊙ – seams, etc.
7.- ROCK TYPE

Remarks Column
1.- WATER – perch table, water bearing lenses, ground water.
2 – All other pertinent information

BORING NO. 6 SHEET 1 OF 2

ORH FORM 2093 1 APR 74 1 APR 66 EDITION OBSOLETE

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. Dacw 69 85-A-0009 PROJECT Fishtrap Lake Hi G BORING NO. 6

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
	50.35		51.1	9.9	9.9	Shale, soft, black, carbonaceous, fossiliferous broken	
	51.7					Coal 2.25 ft.	
	53.95						
	54.30					Shale, soft, black, carbonaceous, slicks, fossiliferous	
	56.8	56.8	63	0:40	100	shale, soft, gray, fossiliferous, argillaceous	
	59.5					Shale, hard, gray, sandy, micaceous	
	61.25	Box 4	61.25	9.9	9.9	Sandstone, hard, gray, micaceous, Fine grain, laminated	
	62.55						
	63.05					Sandstone, hard, dark gray, micaceous, Fine grained, broken & stained	
	64.85					Sandstone, hard, tan, micaceous, medium to coarse grain, iron stain.	
			59	0:41	100	Sandstone, hard, tan, coarse grain, mica, iron stained, fractured, mud at 68.7 thru 69.95 Ft.	
			69.95	8.7	8.7		
	71.70	71.85					
			38	0:39	100	Sandstone, hard, tan, coarse grain, micaceous, iron stained, extensive Fracturing, 71.45 thru 74.45 Ft. mud within fractured zones.	
		Box 5					
			80.0	10.05	10.05	Severe weathering & Fractured zone 76.45 thru 81.0 Ft.	
	81.0					Sandstone, hard, tan, coarse grain, coal stringers, fracturing.	
	84.5						
			35	0:38	98	Sandstone, hard, tan coarse grain, micaceous, iron stain, Severe fracturing & weathering	
	86.0						
	86.75	87.25				Sandstone, hard, gray, medium grain, micaceous	
	87.70					Siltstone, hard, dark gray, laminations micaceous	
			98.0	10.0	9.8	Sandstone, hard, gray, iron stained, medium grain, fractured 88.0 thru 90.0 Ft.	
	91.7						
		Box 6	100	0:37	100	Shale, moderately hard, dark gray, laminated, fossiliferous,	
	100.0	100.0	100.0	10.0	10.0		

BORING NO. 6 SHEET 2 OF 2

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW 69-85 A-0019 PROJECT Fishtrap Lake H&G BORING NO. 7
LOCATION _____ COORDINATES _____
DATE STARTED 8-9-85 DATE COMPLETED 8-13-85 GROUND EL. 1168
INSPECTOR Michael Johnston DRILLER Fred Horton EL. DATUM m.s.l.
SAMPLER HAMMER WT. – DROP – CASING HAMMER WT. – DROP –
CORE DATA – TYPE BARREL NX 3" diamond DRILLING FLUID water
HOLE SEALED Bentonite BAGS OF CEMENT _____ ■ VERTICAL ☐ INCLINED

GROUND WATER		
DEPTH	DATE	TIME
		COMPL.
		24 HOURS
64.5	8-14-85	Initial

CASING USED	
TYPE & SIZE	FEET
4" flush joint	1.0

DRILLING AND SAMPLING BITS USED		
TYPE & SIZE	FROM	TO
4" rotary	0.0	1.0
diamond 3" NX	1.0	110.8

DRILLING RIG USED – TYPE AND NO. 5:H 40 CL

ELEV.	DEPTH FT.	SAMPLE DATA NO	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
	1.0	Box #1 Dp	RQD Dp	Time Pen	% Rec Rec	Casing	Top of Rock
			20	0:12	85	Shale, moderately hard, dark gray, mica, sandy, broken ; weathered at top	
			3.0	2.0	1.7		
			86	0:20	100	Fractured zone 6.1 thru 7.1	
			6.5	3.5	3.5		
	8.5	Box 1	29	0:22	100		
	10					Siltstone, moderately hard, gray, mica, fractured & broken	10
	11.2		10.6	4.1	4.1		
						Siltstone, hard, gray, shale laminations, good fissility.	
		16.3	93	0:23	98		
	20						20
			20.9	10.3	10.05		
		Box 2					
			100	0:39	100		
	30						
		31.65	31.1	10.2	10.2	Shale, hard, gray, sandy laminations, occasional ironstone, good fissility.	
			100	0:37	100		
		Box 3					
	40		40.8	9.7	9.7		
			100	0:46	100		
		46.9					
	50						50

SOILS
ORDER OF FIELD CLASSIFICATION
1.- MAIN CLASSIFICATION
2- COLOR
3.- PLASTICITY – non-plastic, sl. plastic, or plastic.
4.- MOISTURE CONTENT – dry, damp, moist, or wet.
5.- CONSISTENCY – vs. soft, soft, medium stiff, vs. stiff, or hard.
6.- 6 SANDS & GRAVELS – loose, compact, or dense
(1) – rs. frags. (1) amount –
40%-50% – numerous
30%-40% – many
20%-30% – few
10%-20% – scattered
0%-10% – occasional
(2) max. size
(3) weathering
● – roots
○ – lenses
● – seams, etc.
7.- ROCK TYPE
Remarks Column
1.- WATER – perch table, water bearing lense, ground water.
2 – All other pertinent information

BORING NO. 7 SHEET 1 OF 3

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW-69-85 A-0019 PROJECT Fishtrap Lake H&G BORING NO. 7

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
	50.35		50/4.5	4.85	4.85	Shale, moderately hard, gray, mica, fossiliferous, organic material, poor fissility	
	54.55	Box 4					
	55.85		100	0:44	100	Sandstone, hard, dark gray, shaley laminations mica	
	60		61.0	10.35	10.35	Shale, moderately hard, gray, sandy laminations, good fissility.	
	62.3	62.2					
	63.5					Shale, soft gray, coal laminations, pyrite flakes occasional ironstone	
						COAL 2.25	
	65.75		50	1:05	100	Shale, moderately hard, gray, fossiliferous, occasional coal stringers,	
	68.85	Box 5					
			71.0	10.0	10.0	Sandstone, hard, gray, fine grain, micaceous, crossbedded	
	72.75						
	77.5	77.4	90	0:40	100	Sandstone, hard, tan, fine to medium grain, micaceous, iron stain, occasional coal lens	Fracture 73.75' thru 74.4'
	80.9		80.9	9.9	9.9	Sandstone, hard, gray, medium grain, mica, ironstain, small Fracture at 80.5 ft	
	85.6	Box 6				Sandstone, hard, gray, coarse grain, mica small Fracture, ironstain, coal stringers at 85 ft.	
	91.0		91.0	10.1	10.1	Sandstone, hard, tan, coarse grain, mica, iron stain, fracture at 88 ft.- 88.5 ft.	
		92.5					
	96.5	Box 7	89	0:50	100	Sandstone, hard, gray, ironstained, shale pebbles coal spars.	
						Sandstone, hard, gray, coal; shale streaks few shale pebbles.	

BORING NO. 7 SHEET 2 OF 3

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW-69-85 R-0019 PROJECT Fishtrap Lake H; G BORING NO. 7

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
			101	10.0	10.0		
	104.6						
	106.25		71	7:01	100	Shale, moderately hard, dark gray, fossiliferous thick bedded, thin sandy laminations	
		Box B				Shale, moderately hard, black, ironstone & pyrite bands.	
	110.8		110.8	9.8	9.8		
						Total depth 110.8'	

BORING NO. 7 SHEET 5 OF 3

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW 69-85A-0019 PROJECT Fishtrap Lake H:G BORING NO. 8
LOCATION - COORDINATES -
DATE STARTED 8-15-85 DATE COMPLETED 8-15-85 GROUND EL. 1232
INSPECTOR Michael Johnston DRILLER Fred Horter EL. DATUM M.S.L
SAMPLER HAMMER WT. - DROP - CASING HAMMER WT. - DROP -
CORE DATA – TYPE BARREL NX - 3" DRILLING FLUID water
HOLE SEALED ____ BAGS OF CEMENT ____ ■ VERTICAL ☐ INCLINED

GROUND WATER		
DEPTH	DATE	TIME
		COMPL.
		24 HOURS
28.15	8-13-85	Initial

CASING USED	
TYPE & SIZE	FEET
4" Flush joint	3.0

DRILLING AND SAMPLING BITS USED		
TYPE & SIZE	FROM	TO
Rotary	0.0	3.0
diamond bit NX	3.0	50.5

DRILLING RIG USED – TYPE AND NO. S:H 40 CL

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
	3.0	Box No Dp	RQD Dp	Time Pen	% Rec Rec	Casing	Top of Rock
	3.4	Box 1	47 / 4.7	0:11 / 1.7	100 / 1.7	Claystone, soft, grey, Fossiliferous, broken; fractured	
	6.2		81 / 6.8	0:11 / 2.1	100 / 2.1	Sandstone, hard, tan to grey, broken, fractured, weathered near top, ironstained	
			56 / 8.5	0:10 / 1.7	100 / 1.7	Sandstone, hard, grey, fine to medium grain, micaceous, crossbedded, occasional ironstain; Fractures.	core loss 0.1 10.4 Ft. Fracture 10.3' – 10.5'
	10		80 / 10.5	0:13 / 2.0	95 / 1.9		
	12.0		60	0:50	100	Shale, moderately hard, grey, occasional fractures, ironstone.	
	16.55	17.95				Shale, soft, grey, argillaceous, ironstone pebbles, fractured	
	18.95		20.4	9.9	9.9	Sandstone, hard, tan to grey, ironstain, micaceous, Fine to med grain, cavities, Fractured	
	21.2	Box 2				Shale, moderately hard, tan, sandy laminations, cavities, ironstain.	
	22.3					Sandstone, hard, tan, ironstain, micaceous, cavities, fractures	
	25.7		52 / 30.4	0:39 / 10.0	100 / 10.0	Sandstone, hard, grey, ± occasional ironstain, crossbedded, shale; carbonaceous lams.	
	30	32.95					
		Box 3	87 / 40.4	0:34 / 10.0	100 / 10.0	ironstain, small Fracture at 34.6'	
	40		95	0:59	100	Small Fracture 41.4 Ft. isolated ironstain	
	50						

SOILS
ORDER OF FIELD CLASSIFICATION
1.– MAIN CLASSIFICATION
2.– COLOR
3.– PLASTICITY – non-plastic, sl. plastic, or plastic.
4.– MOISTURE CONTENT – dry, damp, moist, or wet.
5.– CONSISTENCY – vs. soft, soft, medium, stiff, vs. stiff, or hard.
6.– SANDS & GRAVELS – loose, compact, or dense
● – rx. frags. (1) amount – 40%–50% – numerous, 30%–40% – many, 20%–30% – few, 10%–20% – scattered, 0%–10% – occasional
(2) max. size
(3) weathering
● – roots
◐ – lenses
◑ – seams, etc.
7.– ROCK TYPE

Remarks Column
1.– WATER – perch table, water bearing lenses, ground water.
2.– All other pertinent information

BORING NO. 8 SHEET 1 OF 2

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DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW 69-85A-0019 PROJECT Fishtrap Lake H:G BORING NO. 8

ELEV.	DEPTH FT.	SAMPLE DATA NO.	BLOWS	PEN.	REC.	DESCRIPTION OF MATERIAL	REMARKS
			50.50	10.1	10.1		
	50.5					Total Depth 50.5 Ft.	

BORING NO. 8 SHEET 2 OF 2

ORH FORM 1 APR 66 2093a

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
FIELD LOG – SUBSURFACE EXPLORATION

CONTRACT NO. DACW 69-85-A-0019 PROJECT Fishtrap Lake H&G BORING NO. 9
LOCATION ______ COORDINATES –
DATE STARTED 8-14-85 DATE COMPLETED 8-14-85 GROUND EL. 1316
INSPECTOR Michael Johnston DRILLER ______ EL. DATUM m.s.l.
SAMPLER HAMMER WT. – DROP – CASING HAMMER WT. – DROP –
CORE DATA – TYPE BARREL NX - 3" DRILLING FLUID water
HOLE SEALED ______ BAGS OF CEMENT ______ ■ VERTICAL ☐ INCLINED

GROUND WATER		
DEPTH	DATE	TIME
		COMPL.
		24 HOURS
31.8	8-15-85	Initial

CASING USED	
TYPE & SIZE	FEET
4" flushjoint	2.0

DRILLING AND SAMPLING BITS USED		
TYPE & SIZE	FROM	TO
Rotary 4"	0.0	2.0
diamond bit NX	2.0	50.0

DRILLING RIG USED – TYPE AND NO. S:H 40 CL

ELEV.	DEPTH FT.	SAMPLE DATA NO. (Box No. Depth)	BLOWS (RQD Depth)	PEN. (Time Pen.)	REC. (% Rec Rec)	DESCRIPTION OF MATERIAL	REMARKS
	2.0					Casing	Top of Rock
		Box 1	0 / 3.8	0:12 / 1.8	100 / 1.8	Siltstone, soft, tan, ironstained, weathered fractured & broken.	
	6.2		20 / 5.8	0:13 / 2.0	95 / 1.9	mud at 6.0'	
	7.6		0 / 7.4	0:10 / 1.6	100 / 1.6	Sandstone, gray to tan, moderately hard, ironstained, fractured, cavities, crossbedded	
	10.1		19 / 10.1	0:11 / 2.7	81 / 2.2	claystone, soft, tan, weathered, broken, numerous fossils.	
	13.6					Sandstone & shale laminations, moderately hard, tan, micaceous, ironstained, fractured, numerous cavities.	Lost water at 14.8 ft.
	19.3	17.3	32 / 20.1	0:30 / 10.0	100 / 10.0	Sandstone & occasional shale laminations, moderately hard, tan, fine to medium grain micaceous, iron stained, fractured, numerous cavities.	
	20.29					Shale, moderately hard, black, sandy laminations, micaceous, ironstained fractured	
	22.6					Sandstone, moderately hard, tan, mica, shale lams, fractured, cavities, iron stain	
	26.8	Box 2	51	1:10	100	Shale & interbedded sandstone, moderately hard, gray, micaceous, fractured iron stained. Fractures 24.1 - 25.1' 22.1 - 22.9'	
	29.6		30.1	10.0	10.0	Shale & sandy laminations, moderately hard gray, micaceous, fractured ironstain. 29.6' - 30.1'	
	32.9	32.6				Shale & sandy laminations, moderately hard, tan, iron stained, severely fractured	
		Box 3	38 / 39.9	0:35 / 9.8	100 / 9.8	Shale, moderately hard, black, ironstone laminations, good fissility	
			80 / 50.0	1:05 / 10.1	100 / 10.1	Fracture 41.05 - 42.05	

SOILS
ORDER OF FIELD CLASSIFICATION
1.- MAIN CLASSIFICATION
2.- COLOR
3.- PLASTICITY – non-plastic, sl. plastic, or plastic.
4.- MOISTURE CONTENT – dry, damp, moist, or wet.
5.- CONSISTENCY – vs. soft, soft, medium stiff, vs. stiff, or hard.
6.- / SANDS & GRAVELS – loose, compact, or dense
(a) – rx. frags. (1) amount –
40%-50% – numerous
30%-40% – many
20%-30% – few
10%-20% – scattered
0%-10% – occasional
(2) max. size
(3) weathering
(b) – roots
(c) – lenses
(d) – seams, etc.
7.- ROCK TYPE

Remarks Column
1.- WATER – perch table, water bearing lense, ground water.
2 – All other pertinent information

BORING NO. 9 SHEET 1 OF 1

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Table 2.--Data on injection of water tests in fractured or permeable zones in test holes

SUBSURFACE EXPLORATION
PRESSURE TEST DATA

BORING SIZE	ELEVATION TOP OF HOLE	ELEVATION TOP OF ROCK	STATIC WATER LEVEL
NX - 2.980"	1357 ft.		

PUMP CAPACITY	METER TYPE	METER SERIAL NUMBER
20 - gpm	Aqua Gauge - 1"	83001698

FIELD TEST DATA

TEST SECTION TOP DEPTH	TEST SECTION BOTTOM DEPTH	GAUGE READING (P.S.I.) TARGET	GAUGE READING (P.S.I.) ATTAINED	TIME OF TEST START	TIME OF TEST END	TIME OF TEST INTERVAL (Min.-Sec.)	METER READING START OF TEST	METER READING END OF TEST	TOTAL WATER (Gal.)	C. F. M.
74.0	79.0	37	37							
		Psi after 1min = 37		No	Pumping	Required				
374.0	379.0	50	50							
		Psi after 1min = 48		No	Pumping	Required				
354.0	359.0	50	50							
		Psi after 1min: 43		No	Pumping	Required				
333.0	338.0	50	50							
		immed. pressure loss		3:00	3:05	5.0 min	2930.0	2971.2	41.2	1.10
300.0	305.0	50	50							
		Psi after 1min: 50		No	Pumping	Required				
206.0	211.0	50	50							
		immed. pressure loss		4:00	4:05	5.0 min	3330.0	3391.0	61.0	1.63
117.0	122.0	50	50	Coal Wash Out - Ruptured Gland						
68.0	73.0	34	34							
		Psi after 1min: 34		No	Pumping	Required				

PROJECT	BORING NO.	INSPECTOR	DATE
Fishtrap Lake H & G	1	S. Murray	7-2-85

ORH FORM 1 DEC 68 2142 (HED Pam 1110.1-1)

SUBSURFACE EXPLORATION
PRESSURE TEST DATA

BORING SIZE	ELEVATION TOP OF HOLE	ELEVATION TOP OF ROCK	STATIC WATER LEVEL
NX - 2.980"	1357 ft.		

PUMP CAPACITY	METER TYPE	METER SERIAL NUMBER
20 - gpm	Aqua - Gauge - 1"	83001698

FIELD TEST DATA

TEST SECTION		GAUGE READING (P.S.I.)		TIME OF TEST			METER READING		TOTAL WATER (Gal.)	C. F. M.
TOP DEPTH	BOTTOM DEPTH			START	END	INTERVAL (Min.-Sec.)	START OF TEST	END OF TEST		
42.0	47.0	22	22							
		immed. pressure loss		6:15	6:20	5.0 min	3880.0	3905.0	25.0	0.67
26.0	31.0	14	14							
		immed. pressure loss		6:34	6:39	5.0 min	4030.0	4082.6	52.6	1.41

PROJECT	BORING NO.	INSPECTOR	DATE
FISHTRAP LAKE H&G	1	S. MURRAY	7-2-85

ORH FORM 2142 1 DEC 68 (HED Pam 1110-1-1)

SUBSURFACE EXPLORATION
PRESSURE TEST DATA

BORING SIZE	ELEVATION TOP OF HOLE	ELEVATION TOP OF ROCK	STATIC WATER LEVEL
NX-3"	1058 ft.		

PUMP CAPACITY	METER TYPE	METER SERIAL NUMBER
20 GPM	Kent C-700	

FIELD TEST DATA

TEST SECTION		GAUGE READING (P.S.I.)	TIME OF TEST			METER READING		TOTAL WATER (Gal.)	C. F. M.
TOP DEPTH	BOTTOM DEPTH		START	END	INTERVAL (Min.-Sec.)	START OF TEST	END OF TEST		
10.0	15.0	t=7 a=7	8:21	8:22	1-00	no pressure no take		loss	
20.0	25.0	t=12 a=12	8:32	8:33	1-00	no pressure no take		loss	
31.0	32.0	t=17 a=17	8:52	8:53	1-00	3 psi loss in 1 minute no take			
60.0	65.0	t=31 a=31	9:06	9:07	1-00	8 psi loss in 1 minute no take			
102.0	107.0	t=50 a=50	9:24	9:34	10-00	40 psi loss in 1 minute 6140.05	6160.0	19.95	0.53
127.0	132.0	t=50 a=50	10:00	10:05	5-00	23 psi loss in 1 minute 6168.65	6169.35	0.70	0.02
152.0	157.0	t=50 a=50	10:31	10:36	5-00	10 psi loss in 1 minute 6172.9	6174.9	2.0	0.05
170.0	175.0	t=50 a=54	10:43	10:44	1-00	no pressure loss no take			
178.0	183.0	t=50 a=50	11:05	11:10	5-00	1 psi loss in 1 minute 6175.4	6175.9	0.5	0.01
190.0	195.0	t=50 a=50	11:22	11:23	1-00	no pressure loss no take			
		t= target pressure a= actual pressure attained							

PROJECT	BORING NO.	INSPECTOR	DATE
Fishtrap Lake H&G	2	P. Highley	7-30-85

ORH FORM 2142 1 DEC 68 (HED Pam 1110-1-1)

SUBSURFACE EXPLORATION
PRESSURE TEST DATA

meter at ground level

BORING SIZE	ELEVATION TOP OF HOLE	ELEVATION TOP OF ROCK	STATIC WATER LEVEL
NX	1136 ft.		

PUMP CAPACITY	METER TYPE	METER SERIAL NUMBER
20 GPM	Kent C-700	

FIELD TEST DATA

TEST SECTION		GAUGE READING (P.S.I.)	TIME OF TEST			METER READING		TOTAL WATER (Gal.)	C. F. M.
TOP DEPTH	BOTTOM DEPTH		START	END	INTERVAL (Min.-Sec.)	START OF TEST	END OF TEST		
263.0	268.0	t=50 a=50	7-18-85 11:59	12:00	1-00	no pressure	loss		0
253.0	258.0	t=50 a=50	12:16	12:21	5-00	4112.1	4141.3	29.2	0.73
245.0	250.0	t=50 a=50	12:33	12:38	5-00	4152.0	4154.25	2.25	0.06
173.0	178.0	t=50 a=50	2:12	2:17	5-00	4265.2	4303.8	38.6	1.03
144.0	149.0	t=50 a=50	2:52	2:57	5-00	4331.1	4338.0	6.9	0.18
135.0	140.0	t=50 a=50	4:25	4:30	5-00	4540.8	4615.8	75.0	2.00
129.5	134.5	t=50 a=50	4:44	4:45	1-00	pressure no take	loss = 2 psi	0	0
115.5	120.5	t=50 a=50	7-22-85 11:46	11:51	5-00	4830.0	4901.0	71.0	1.13
106.5	111.5	t=50 a=50	11:28	11:33	5-00	4671.0	4763.3	92.3	2.47
27.5	32.5	t=15 a=15	11:08	11:09	1-00	no pressure	loss		0
73.5	78.5	t=38 a=38	7-23-85 11:04	11:05	1-00	no pressure	loss		0
213.5	218.5	t=50 a=50	11:36	11:37	1-00	no take			0
232.0	237.0	t=50 a=50	11:46	11:47	1-00	no take			0

PROJECT	BORING NO.	INSPECTOR	DATE
Fishtrap Lake H&G	3	P. Highley	see above

ORH FORM 1 DEC 68 2142 (HED Pam 1110-1-1)

SUBSURFACE EXPLORATION
PRESSURE TEST DATA

water meter at ground level

BORING SIZE	ELEVATION TOP OF HOLE	ELEVATION TOP OF ROCK	STATIC WATER LEVEL
NX	887 ft.		

PUMP CAPACITY	METER TYPE	METER SERIAL NUMBER
20 GPM	Kent C-100	

FIELD TEST DATA

TEST SECTION		GAUGE READING (P.S.I.)	TIME OF TEST			METER READING		TOTAL WATER (Gal.)	C. F. M.
TOP DEPTH	BOTTOM DEPTH		START	END	INTERVAL (Min.-Sec.)	START OF TEST	END OF TEST		
10.0	15.0	t = 15 q = 15	3:01	3:06	5-00	pressure 6200.0	loss = 15 PSI 6224.4	24.4	0.65
17.5	22.5	t = 15 q = 15	3:14	3:15	1-00	No pressure loss No take			
30.0	35.0	t = 25 q = 23	3:25	3:26	1-00	No pressure loss No take			
34.5	39.5	t = 25 q = 25	3:33	3:34	1-00	No pressure loss No take			

PROJECT	BORING NO.	INSPECTOR	DATE
Fishtrap Lake H & G	4	Michael Johnston	7-31-85

ORH FORM 1 DEC 68 2142 (HED Pam 1110.1-1)

SUBSURFACE EXPLORATION
PRESSURE TEST DATA

CASING SIZE	ELEVATION TOP OF HOLE	ELEVATION TOP OF ROCK	STATIC WATER LEVEL
NX - 3"	1092 ft.		

PUMP CAPACITY	METER TYPE	METER SERIAL NUMBER
20 GPM	Kent C-100	

FIELD TEST DATA

TEST SECTION		GAUGE READING (P.S.I.)	TIME OF TEST			METER READING		TOTAL WATER (Gal.)	C. F. M.
TOP DEPTH	BOTTOM DEPTH		START	END	INTERVAL (Min.-Sec.)	START OF TEST	END OF TEST		
23.5	28.5	t = 15 a = 15	1:59	2:04	5-00		No pressure loss No take		
35.0	40.0	t = 18 a = 18	2:12	2:13	1-00		No pressure loss No take		
50.0	55.0	t = 25 a = 25	2:27	2:32	5-00	25 6233.3	PSI loss 6315.6	in 1 minute 82.3	2.20
55.0	60.0	t = 27 a = 27	2:38	2:43	5-00	6 6319.5	PSI loss 6332.2	in 1 minute 12.7	.34
59.7	64.7	t = 30 a = 30	3:28	3:33	5-00	30 6327.1	PSI loss 6345.8	10 sec. 18.7	.50
65.0	70.0	t = 32 a = 32	3:42	3:47	5-00	32 6354.0	PSI loss 6477.2	instantly 123.2	3.29
70.0	75.0	t = 35 a = 10	3:57	4:02	5-00	10 6478.0	PSI loss 6580.1	1 minute 102.1	2.73
75.0	80.0	t = 37 a = 8	4:08	4:13	5-00	8 6580.1	PSI loss 6694.2	15 Sec 114.1	3.05
82.0	87.0	t = 42 a = 43	4:20	4:25	5-00	43 6695.5	PSI loss 6788.6	1 minute 93.1	2.49
87.0	92.0	t = 45 a = 50	4:34	4:39	5-00	50 6791.0	PSI loss 6936.8	1 minute 145.8	3.90
92.0	97.0	t = 50 a = 50	4:48	4:53	5-00	26 6940.1	PSI loss 6947.0	1minute 6.9	.18

PROJECT	BORING NO.	INSPECTOR	DATE
Fishtrap Lake H & G	6	Michael Johnston	8-6-85

SUBSURFACE EXPLORATION
PRESSURE TEST DATA

BORING SIZE	ELEVATION TOP OF HOLE	ELEVATION TOP OF ROCK	STATIC WATER LEVEL
NX - 3"	1104 ft.		

PUMP CAPACITY	METER TYPE	METER SERIAL NUMBER
20 GPM	Kent C-700	

FIELD TEST DATA

TEST SECTION		GAUGE READING (P.S.I.)	TIME OF TEST			METER READING		TOTAL WATER (Gal.)	C. F. M.
TOP DEPTH	BOTTOM DEPTH		START	END	INTERVAL (Min.-Sec.)	START OF TEST	END OF TEST		
62.0	67.0	t=31 a=31	12:33	12:38	5-00	6952.8 PSI LOSS 7 in 1 MIN	6953.3	0.5	0.01
87.0	92.0	t=50 a=48	12:51	12:57	6-00	7005.9 PSI loss 48 in 33 Sec	7024.0	18.1	0.48

PROJECT	BORING NO.	INSPECTOR	DATE
Fishtrap Lake G & H	7	Jim Kipp Engineer	8-13-85

ORH FORM 1 DEC 68 2142 (HED Pam 1110-1-1)

SUBSURFACE EXPLORATION
PRESSURE TEST DATA

BORING SIZE	ELEVATION TOP OF HOLE	ELEVATION TOP OF ROCK	STATIC WATER LEVEL
NX 3"	1232 ft.		

PUMP CAPACITY	METER TYPE	METER SERIAL NUMBER
20 GPM	Kent C-700	

FIELD TEST DATA

TEST SECTION		GAUGE READING (P.S.I.)	TIME OF TEST			METER READING		TOTAL WATER (Gal.)	C. F. M.
TOP DEPTH	BOTTOM DEPTH		START	END	INTERVAL (Min.-Sec.)	START OF TEST	END OF TEST		
5.0	10.0	t = 7 q = 8	8:43	8:48	5-00	PSI Loss 7238.0	8 in 30 Sec 7247.5	9.5	.25
22.0	27.0	t = 13 q = 14	8:28	8:33	5-00	PSI Loss 7190.0	14 instantly 7234.5	44.5	1.19
39.0	44.0	t = 21 q = 23	8:13	8:18	5-00	No Take 7186.0	No pressure loss 7186.0	—	-

PROJECT	BORING NO.	INSPECTOR	DATE
Fishtrap Lake H; G	8	Michael Johnston	8-16-85

ORH FORM 1 DEC 68 2142 (HED Pam 1110-1-1)

SUBSURFACE EXPLORATION
PRESSURE TEST DATA

BORING SIZE	ELEVATION TOP OF HOLE	ELEVATION TOP OF ROCK	STATIC WATER LEVEL
NX - 3"	1316 ft.		

PUMP CAPACITY	METER TYPE	METER SERIAL NUMBER
20 GPm	Kent C 700	

FIELD TEST DATA

TEST SECTION		GAUGE READING (P.S.I.)	TIME OF TEST			METER READING		TOTAL WATER (Gal.)	C. F. M.
TOP DEPTH	BOTTOM DEPTH		START	END	INTERVAL (Min.-Sec.)	START OF TEST	END OF TEST		
11.0	16.0	t = 7 q = 10	8:22	8:27	5-00	PSI Loss 10 6980.0	instantly 7013.6	33.6	.90
17.0	22.0	t = 10 q = 8	8:35	8:40	5-00	PSI Loss 8 7016.5	instantly 7106.3	89.8	2.40
29.0	34.0	t = 16 q = 18	8:47	8:52	5-00	PSI loss 7109.5	10 in 1 min 7113.2	5.7	.15
34.0	39.0	t = 19 q = 20	8:58	9:03	5-00	PSI loss 7114.0	5 in 1 min 7120.1	6.1	.16
40.0	45.0	t = 23 q = 22	9:10	9:15	5-00	PSI loss 7121.0	3 in 1 min 7132.6	11.6	.31

PROJECT	BORING NO.	INSPECTOR	DATE
Fishtrap Lake	9	Michael Johnston	8-15-85

ORH FORM 2142 1 DEC 68 (HED Pam 1110_1_1)

Table 3.--Water levels below measuring point in observation wells during slug tests.

Well 1 OH:

Time, minutes after injection	Depth to water in feet
Static	57.20
Injection	46.42
0.60	47.21
1.05	47.46
1.80	47.75
2.50	47.96
3.50	48.00
9.00	48.25
12.00	48.29
17.00	48.37

Well 1 PD:

Time, minutes after injection	Depth to water in feet
Static	219.8
Injection	140.08
0.50	140.96
1.02	do.
2.00	141.04
3.00	141.12
4.00	141.21
5.00	141.33
6.00	141.42
7.00	141.54
8.00	141.58
9.00	141.71
10.00	141.75
35.00	143.67
44.50	144.37

Well 2 OH:

Time, minutes after injection	Depth to water in feet
Static	12.50
Injection	.12
0.50	1.62
1.00	2.00
1.50	2.25
2.00	2.58
2.50	2.92
3.00	3.17
3.50	3.42
4.00	3.67
4.50	3.79
5.00	4.00
6.00	4.25
7.00	4.50
8.00	4.71
9.00	4.83
10.00	4.96
12.00	5.12
14.00	5.25
16.00	5.33
18.00	5.42
20.00	5.46

Well 2 P:

Time, minutes after injection	Depth to water in feet
Static	175.40
Injection	97.62
0.5	97.75
1.00	97.71
1.5	97.83
2.00	97.87
2.5	98.00
3.00	98.08
3.5	98.21
4.00	98.33
5.00	98.50
6.00	98.71
7.00	98.87
8.00	99.04
9.00	99.21
10.00	99.42
12.00	99.81
14.00	100.12
16.00	100.46
18.00	100.87
20.00	101.21
25.00	102.08
30.00	102.92
35.00	103.75
40.00	104.58
45.00	105.33
50.00	106.08
55.00	106.83
60.00	107.58
65.00	108.25
70.00	109.00
75.00	109.67
106.5	113.71

Well 3 PD:

Time, minutes after injection	Depth to water in feet
Static	251.60
Injection	151.83
0.75	152.75
1.50	153.04
2.50	153.50
3.50	153.83
5.00	154.54
6.00	155
7.00	155.46
8.00	155.83
9.00	156.29
10.00	156.75
15.00	159.75
20.00	160.67
25.00	162.58
30.00	164.00

Well 4 OH:

Time, minutes after injection	Depth to water in feet
Static	Dry at 14.67
Injection	0.75
0.5	3.67
1.00	6.96
1.5	8.67
2.00	10.12
2.5	11.46
3.00	12.21
3.5	12.54
4.00	12.71
4.5	12.92
5.00	13.08
5.5	13.25
6.00	13.33
6.5	13.42
7.00	13.54
7.5	13.71
8.00	13.71
8.5	13.75
9.00	13.83
9.5	13.87
12.00	14.04
14.00	14.04

Well 4 P:

Time, minutes after injection	Depth to water in feet
Static	26.92
Injection	0.75
0.5	5.46
1.00	7.96
1.5	9.58
2.00	10.96
2.5	12.33
3.00	13.71
3.5	14.75
4.00	15.83
4.5	16.79
5.00	17.58
5.5	18.46
6.00	19.04
6.5	19.67
7.00	20.33
7.5	21.04
8.5	21.92
9.00	22.21
10.00	22.92
12.00	24.17
14.00	25.08
16.00	25.62
18.00	26.00
20.00	26.25
42.00	26.67

Well 6 OH:

Time, minutes after injection	Depth to water in feet
Static	Dry at 18 1/
Injection	0.12
0.5	2.42
1.00	4.21
1.5	5.75
2.00	7.08
2.5	8.12
3.00	9.00
3.5	9.62
4.00	10.12
4.5	10.5
5.00	10.75
6.00	11.00
7.00	11.08
9.00	11.19
10.00	11.33
11.00	11.42
13.00	11.62
15.00	11.83
17.00	12.04
19.00	12.17
20.00	12.25

1/ Obstruction to tape at 18 ft.

Well 6 PS:

Time, minutes after injection	Depth to water in feet
Static	55.30
Injection	0.12
0.5	9.17
1.1	25.25
1.9	46.92
2.5	50.46
3.00	52.17
3.5	52.92
4.00	53.50
4.5	54.00
5.00	54.12
6.00	54.37
7.00	54.50
8.00	do
9.00	do

Well 7 P:

Time, minutes after injection	Depth to water in feet
Static	92.80
Injection	0.08
0.75	6.83
1.25	9.33
2.00	13.27
3.00	17.27
4.00	21.25
5.00	24.83
6.00	27.83
7.00	30.71
8.00	34.00
9.00	36.79
10.00	39.46
12.00	44.67
16.00	54.00
18.00	59.50
22.00	65.29
30.00	84.58

Well 9 P:

Time, minutes after injection	Depth to water in feet
Static	42.60
Injection	19.58
0.5	21.83
1.00	23.37
2.00	26.08
3.00	28.25
4.00	29.83
5.00	31.00
6.00	32.17
7.00	32.75
8.00	33.33
9.00	33.75
10.00	34.17
12.00	34.83
16.00	35.67
20.00	36.29

Well 8 P:

Time, minutes after injection	Depth to water in feet
Static	38.50
Injection	0.04
0.25	7.00
.75	9.17
1.5	10.92
2.00	11.83
3.00	13.58
4.00	14.75
5.00	15.75
6.00	16.71
7.00	17.62
8.00	18.33
9.25	19.21
10.00	19.58
12.00	20.83
14.00	21.87
16.00	22.62
18.00	23.37
20.00	23.79
25.00	24.83
30.00	25.33
35.00	25.62
40.00	25.71
45.00	25.83

Table 4.--Water levels and dye concentrations in observation wells

[Well type; OH-open hole, P-piezometer; S-shallow, D-deep. M.P.=Measuring point, top of exterior casing. NW=No water. Dashes (--) = No measurements.]

Well number and type	Well depth in feet below land surface	1985 9-11	1985 9-25	1985 10-9	1985 10-24	1985 11-7	1985 11-14	1986 1-9	1986 2-6	1986 3-26
		Depth to water in feet below M.P.								
		Dye concentration in micrograms per liter								
1 OH	61.0	57	57	57	57.2	51.5	--	57.3	--	50.6
		--	--	--	<.1	875	890	495	--	300
1 PS	209.5	208	208.9	205.3	191.4	197.3	--	NW	NW	NW
		--	--	--	<.1	1.20	1.15	--	--	--
1 PD	333.5	217	218.5	219.8	190.2	199.4	--	213.6	213.4	214.5
		--	--	--	.12	.55	.90	1.13	1.12	1.20
2 OH	25	9.7	11.3	12.5	9.2	7.9	--	8.5	8.7	7.3
		--	--	--	<.1	3.55	.72	.15	.10	.05
2 P	183	--	175.3	175.4	175.3	174.8	--	174.8	174.1	174
		--	--	--	<.1	1.81	10.8	15	14.8	15.4
3 OH	42	NW	NW	NW	NW	NW	NW	40.6	34.5	35.8
		--	--	--	--	--	--	0	0	.09
3 PS	125	121	121.2	121.3	121.5	120.8	--	121.1	121.2	120.6
		--	--	--	<.1	.54	.40	.21	.28	.23
3 PD	257	251	252	251.6	243.9	244.8	--	245.7	246	245.3
		--	--	--	.11	1.68	.43	.15	.15	.13
4 OH	18	NW	NW	NW	12.9	11.1	--	11.8	10.9	11.2
		--	--	--	--	.90	.10	0	0	0
4 P	32.7	26.3	26.8	26.8	27.1	26.8	--	26	26	25
		--	--	--	<.1	1.78	8.30	6.60	6.90	6.80
6 OH	44	NW	NW	NW	NW	13.5	NW	17	13.8	12.6
		--	--	--	--	.75	--	0	0	0
6 PS	55	55	55.3	55.3	55.3	55.3	--	54.8	54.8	54.4
		--	--	--	<.1	7.07	4.80	.45	.18	.40
6 PD	91	84.5	84.9	85	84.9	84.8	--	84.6	84.1	83.8
		--	--	--	<.1	2.97	14.8	28	9.90	23
7 P	110	89.5	91.2	92.8	93.3	94.3	--	93.1	90.5	90.9
		--	--	--	<.1	.42	.92	.12	.01	.03
8 P	50.5	--	37.8	38.5	38.6	37.8	--	34.2	27.8	27.7
		--	--	--	<.1	.77	.10	0	.02	.02
9 P	50	42.0	45.2	42.6	41.7	34.3	--	42.9	31.6	41.4
		--	--	--	<.1	.20	.05	0	.03	.03

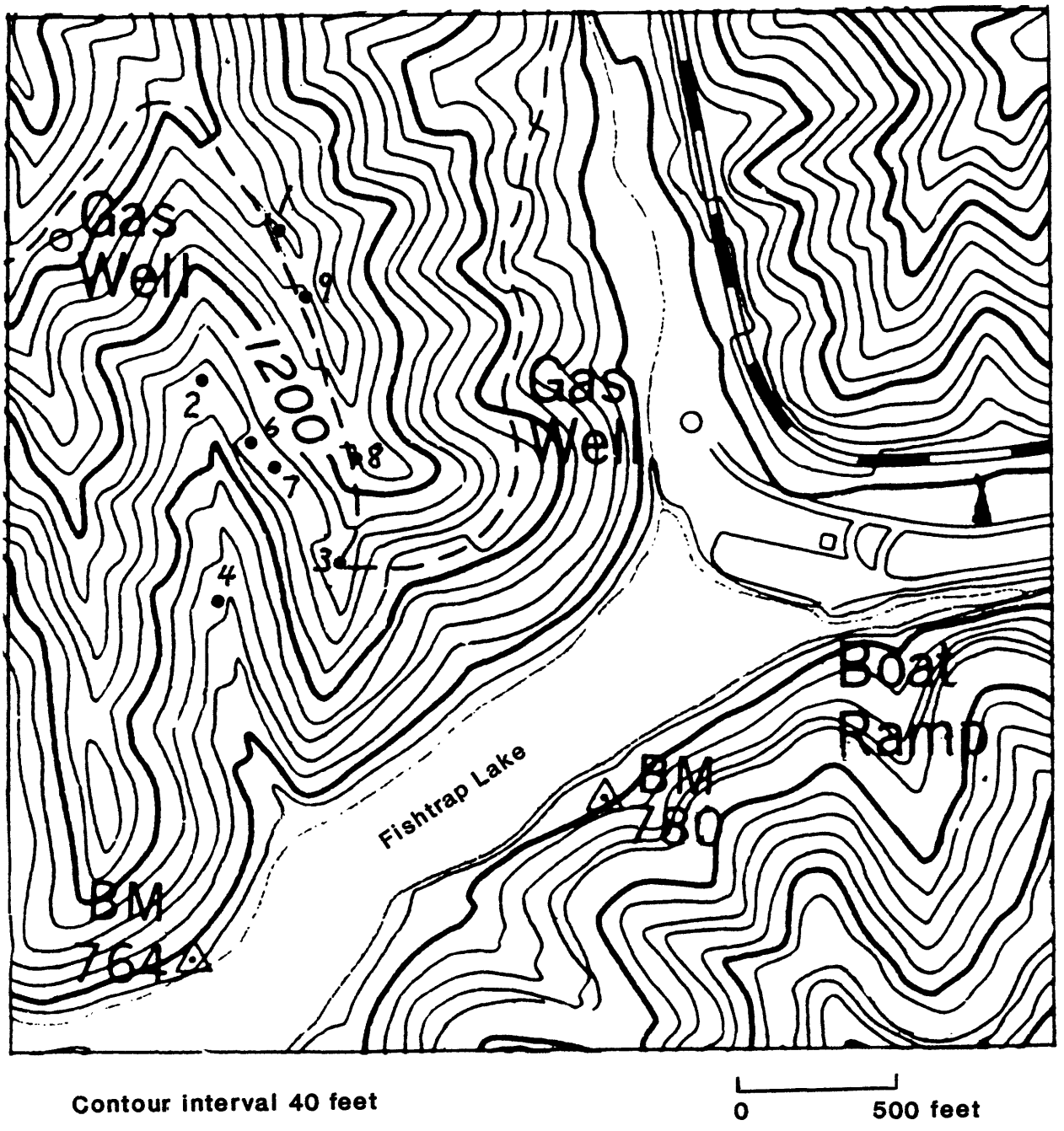


Figure 2. Study area and well locations.

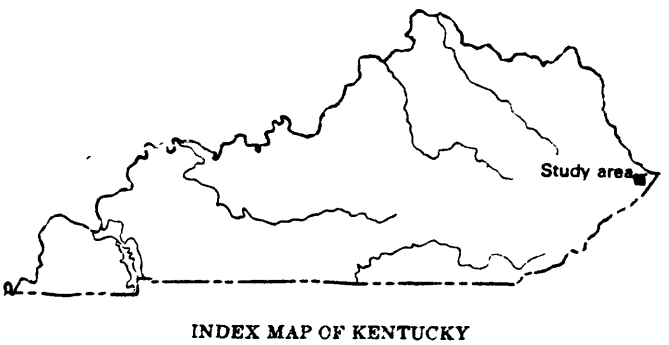


Figure 1. Location of the study area.

Figure 3.--Construction data for observation wells

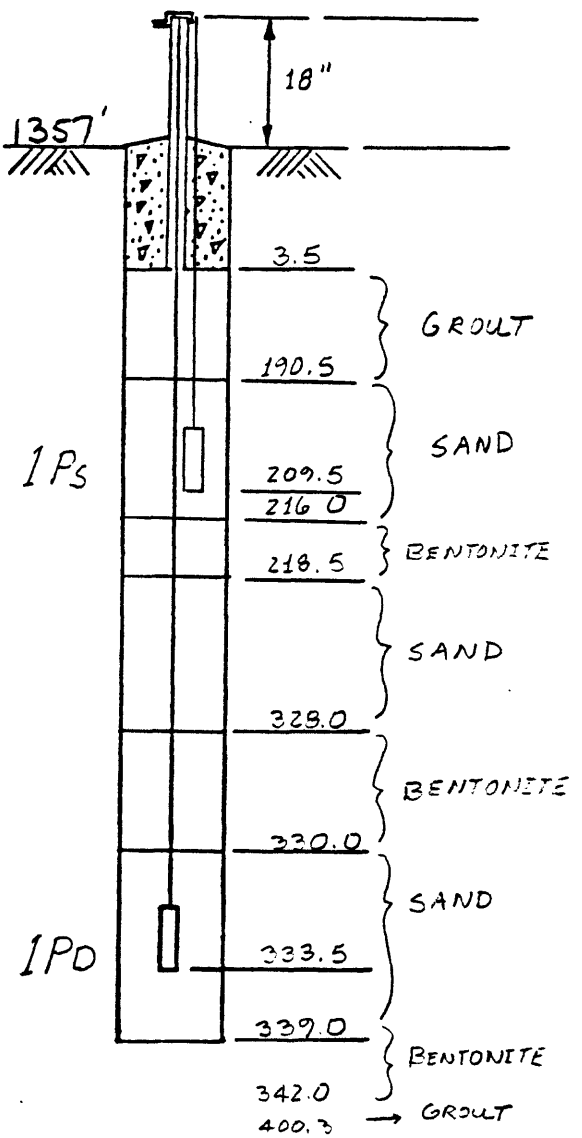
PIEZOMETER INSTALLATION REPORT

(OPEN TUBE TYPE - SINGLE)

PROJECT FISHTRAP LAKE HYDRO & GEOLOGIC INVESTIGATION
PIEZOMETER NUMBER 1PD and 1PS
PIEZOMETER LOCATION AT 333.5' DEPTH - at lower ELKHORN COAL (207' depth)
DATE INSTALLED 7-9-85
TYPE OF PIEZOMETER DOUBLE
DESCRIPTION OF SOIL AT SENSING ZONE COAL - #1 , SANDSTONE - #2
PIEZOMETER INSTALLED BY RHODES & ASSOCIATES, INC.
INSPECTOR SCOTT MURRAY
DRILLER FRED HORTON
TYPE OF DRILL RIG SPRAGUE & HENWOOD 40 CL
SIZE (DIA.) OF DRILLED HOLE NXCORE - 2.980 inches
PIEZOMETER READING AFTER INSTALLATION
GROUND WATER ELEVATION

NOTE:
SHOW ELEVATIONS OF ALL INTERFACES IN BACKFILL AND BACKFILL TYPE

REMARKS:



WATER LEVELS

DATE	DEPTH
7-10-85	75.3
7-11-85	90.6
7-15-85	170.3

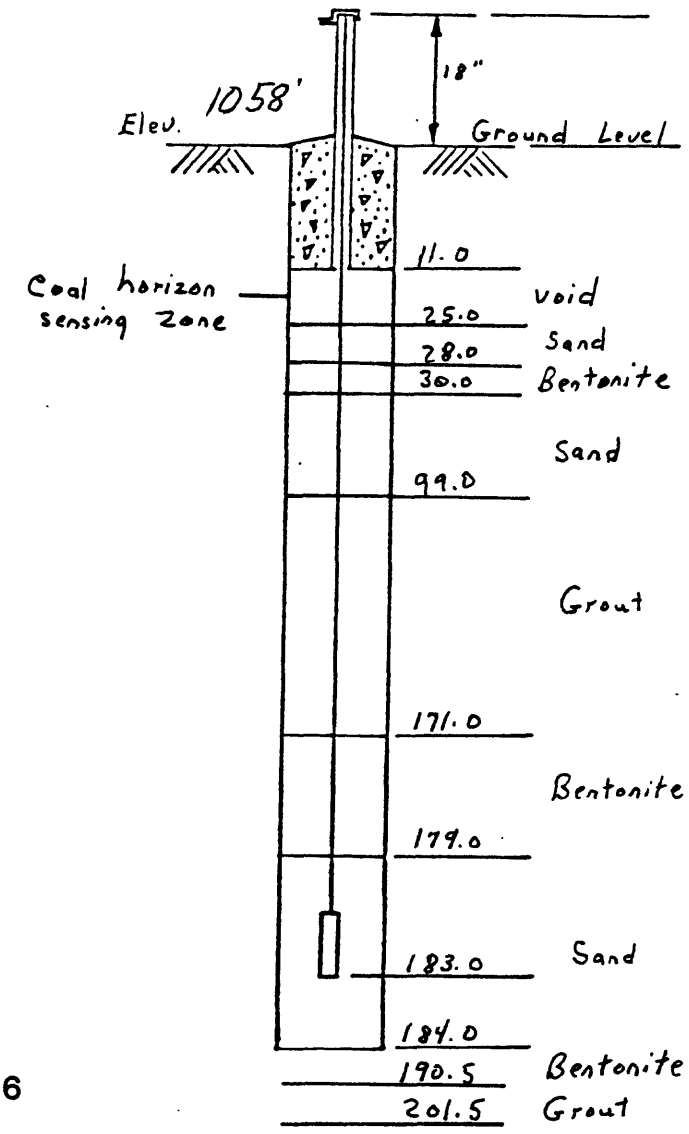
PIEZOMETER INSTALLATION REPORT

(OPEN TUBE TYPE - SINGLE)

PROJECT Fishtrap Lake H & G
PIEZOMETER NUMBER 2 P
PIEZOMETER LOCATION 183 Ft
DATE INSTALLED 8-7-85
TYPE OF PIEZOMETER Open Porous tube
DESCRIPTION OF SOIL AT SENSING ZONE Shale & Coal
PIEZOMETER INSTALLED BY Rhodes & Associates
INSPECTOR Michael Johnston
DRILLER Fred Horton
TYPE OF DRILL RIG S&H 40 CL
SIZE (DIA.) OF DRILLED HOLE NX 3"
PIEZOMETER READING AFTER INSTALLATION
GROUND WATER ELEVATION

NOTE:
SHOW ELEVATIONS OF ALL
INTERFACES IN BACKFILL
AND BACKFILL TYPE

REMARKS:

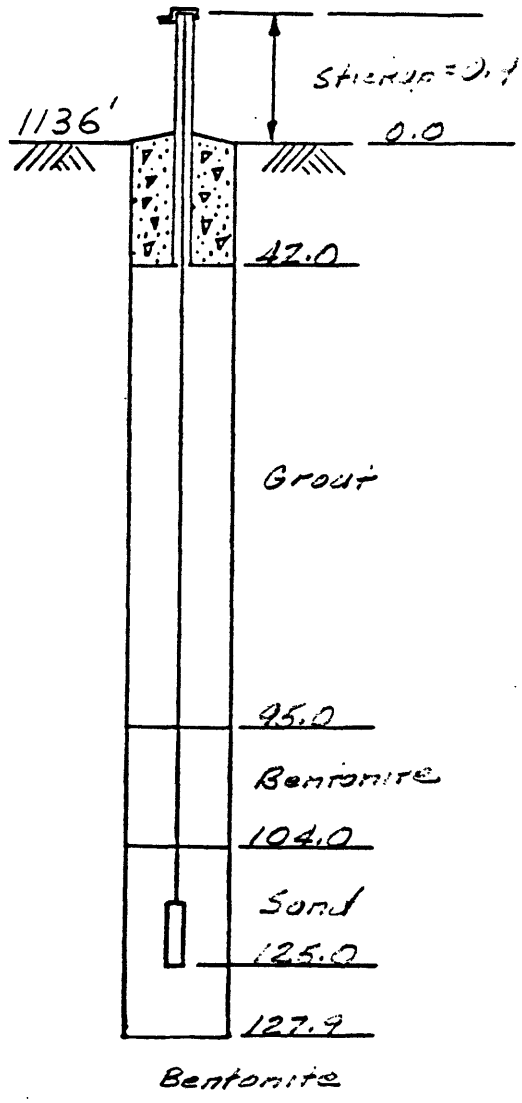


PIEZOMETER INSTALLATION REPORT

(OPEN TUBE TYPE - SINGLE)

PROJECT Fishtrap Lake H+G
PIEZOMETER NUMBER 3Ps
PIEZOMETER LOCATION
DATE INSTALLED 7-24-85
TYPE OF PIEZOMETER double
DESCRIPTION OF SOIL AT SENSING ZONE cool
PIEZOMETER INSTALLED BY Rhodes + Assoc.
INSPECTOR P. Highley
DRILLER E. Horton
TYPE OF DRILL RIG 5+H 40 CL
SIZE (DIA.) OF DRILLED HOLE NX - 3"
PIEZOMETER READING AFTER INSTALLATION
GROUND WATER ELEVATION

NOTE:
SHOW ELEVATIONS OF ALL INTERFACES IN BACKFILL AND BACKFILL TYPE



REMARKS:

Water Levels

Date	Depth
7-24	116.5
7-25	112.0
7-26	120.6
7-29	122.1
7-30	122.1

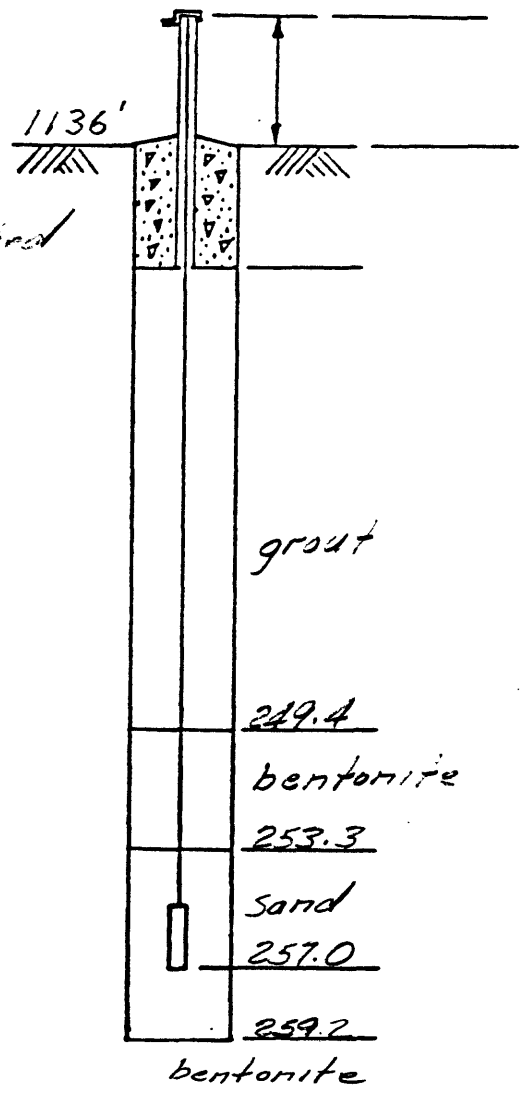
PIEZOMETER INSTALLATION REPORT

(OPEN TUBE TYPE - SINGLE)

PROJECT Fishtrap Lake H&G
PIEZOMETER NUMBER 3PD
PIEZOMETER LOCATION lower
DATE INSTALLED 7-23-85
TYPE OF PIEZOMETER double
DESCRIPTION OF SOIL AT SENSING ZONE coal
PIEZOMETER INSTALLED BY Rhodes & Associates
INSPECTOR P. Highley
DRILLER F. Horton
TYPE OF DRILL RIG SSH 40 CL
SIZE (DIA.) OF DRILLED HOLE NX (3")
PIEZOMETER READING AFTER INSTALLATION
GROUND WATER ELEVATION

NOTE:
SHOW ELEVATIONS OF ALL
INTERFACES IN BACKFILL
AND BACKFILL TYPE

REMARKS:
Data for lower piezometer.
Upper piezometer data presented
on another sheet.



PIEZOMETER INSTALLATION REPORT

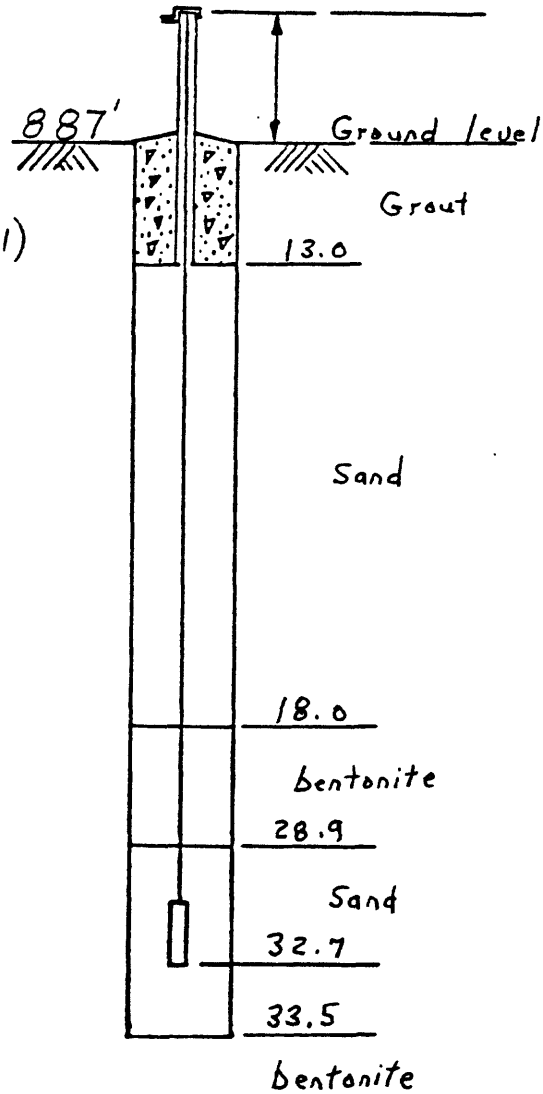
(OPEN TUBE TYPE - SINGLE)

PROJECT Fishtrap Lake H & G
PIEZOMETER NUMBER 4P
PIEZOMETER LOCATION
DATE INSTALLED 7-31-85
TYPE OF PIEZOMETER open porous tube
DESCRIPTION OF SOIL AT SENSING ZONE Sandstone, Coal, Claystone
PIEZOMETER INSTALLED BY Rhodes & Associates
INSPECTOR Michael Johnston
DRILLER Fred Horton
TYPE OF DRILL RIG S&H 40 CL
SIZE (DIA.) OF DRILLED HOLE NX 3"
PIEZOMETER READING AFTER INSTALLATION
GROUND WATER ELEVATION

NOTE:
SHOW ELEVATIONS OF ALL
INTERFACES IN BACKFILL
AND BACKFILL TYPE

REMARKS:

10 ft plastic 2" pipe & 2 Ft 2" pipe (steel) used in assembly cover



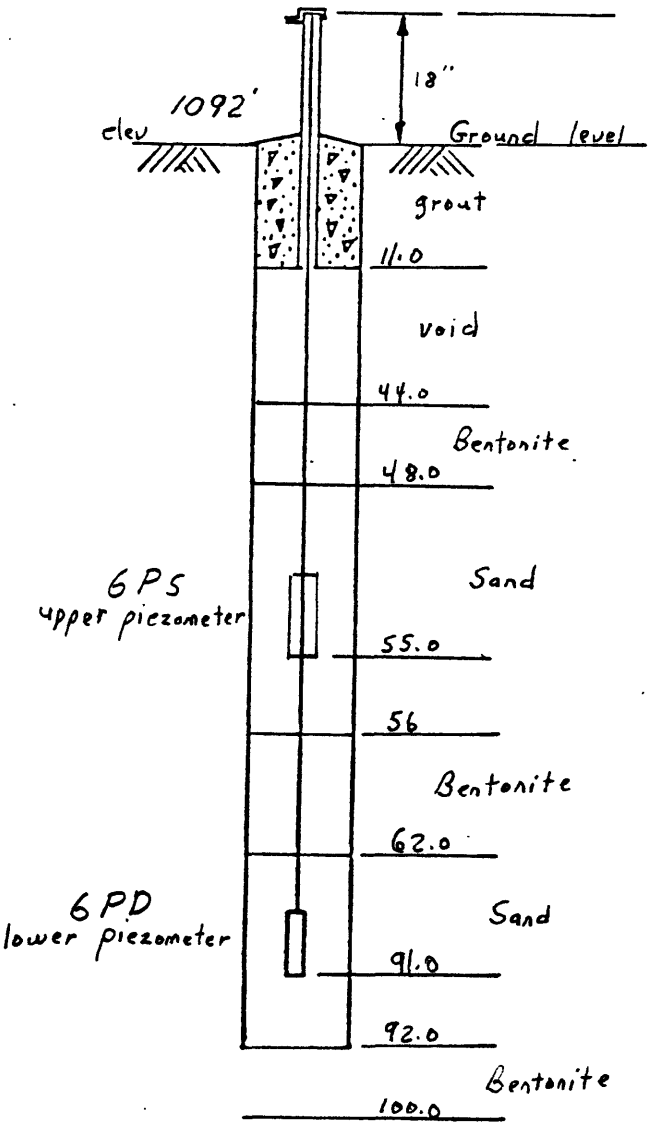
PIEZOMETER INSTALLATION REPORT

(OPEN TUBE TYPE - SINGLE)

PROJECT Fishtrap Lake H & G
PIEZOMETER NUMBER 6PS and 6PD
PIEZOMETER LOCATION upper 55 Ft. lower 91
DATE INSTALLED 8-8-85
TYPE OF PIEZOMETER Open Porous tube
DESCRIPTION OF SOIL AT SENSING ZONE upper Shale & Coal lower Sandstone
PIEZOMETER INSTALLED BY Rhodes & Associates
INSPECTOR Michael Johnston
DRILLER Fred Horton
TYPE OF DRILL RIG 5 H 40 CL
SIZE (DIA.) OF DRILLED HOLE NX 3"
PIEZOMETER READING AFTER INSTALLATION
GROUND WATER ELEVATION

NOTE:
SHOW ELEVATIONS OF ALL
INTERFACES IN BACKFILL
AND BACKFILL TYPE

REMARKS:



PIEZOMETER INSTALLATION REPORT

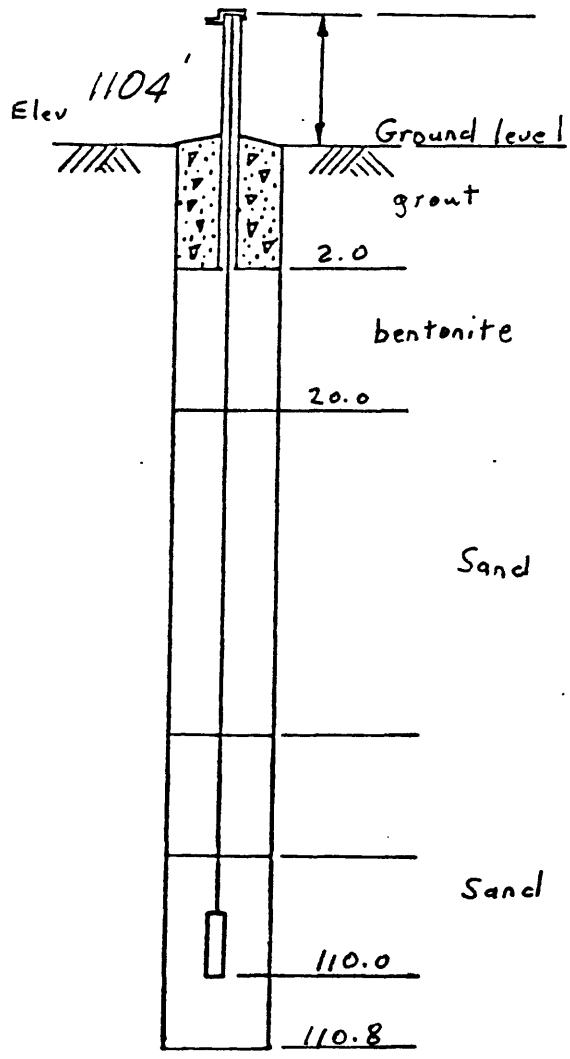
(OPEN TUBE TYPE - SINGLE)

PROJECT Fishtrap Lake H & G
PIEZOMETER NUMBER 7P
PIEZOMETER LOCATION
DATE INSTALLED 8-13-85
TYPE OF PIEZOMETER Open Porous Tube
DESCRIPTION OF SOIL AT SENSING ZONE Shale, Siltstone, Sandstone
PIEZOMETER INSTALLED BY Rhodes & Assc
INSPECTOR Jim Kipp
DRILLER Fred Horton
TYPE OF DRILL RIG S-H 40 CL
SIZE (DIA.) OF DRILLED HOLE NX 3"
PIEZOMETER READING AFTER INSTALLATION
GROUND WATER ELEVATION

NOTE:
SHOW ELEVATIONS OF ALL
INTERFACES IN BACKFILL
AND BACKFILL TYPE

REMARKS:

Sensing zone will include
20 Ft depth - 110.8 Ft depth



PIEZOMETER INSTALLATION REPORT

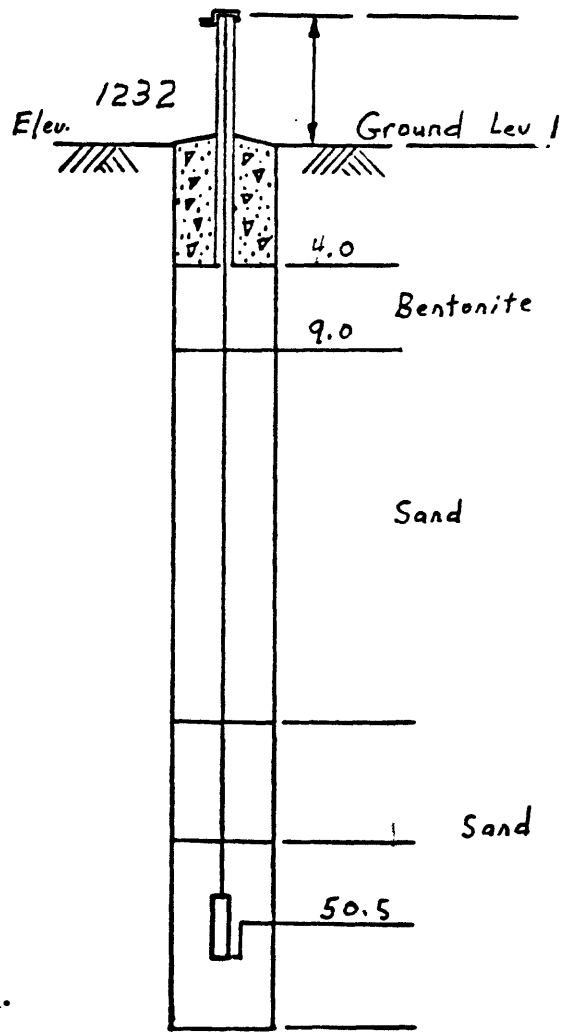
(OPEN TUBE TYPE - SINGLE)

PROJECT Fishtrap Lake H & G
PIEZOMETER NUMBER 8P
PIEZOMETER LOCATION
DATE INSTALLED 8-16-85
TYPE OF PIEZOMETER Open Tube
DESCRIPTION OF SOIL AT SENSING ZONE Shale & Sandstones
PIEZOMETER INSTALLED BY Rhodes & Associates
INSPECTOR Michael Johnston
DRILLER Fred Horton
TYPE OF DRILL RIG S&H 40 CL
SIZE (DIA.) OF DRILLED HOLE NX 3"
PIEZOMETER READING AFTER INSTALLATION
GROUND WATER ELEVATION

NOTE:
SHOW ELEVATIONS OF ALL
INTERFACES IN BACKFILL
AND BACKFILL TYPE

REMARKS:

Sensing zone 9.0 - 50.5 ft.
piezometer set at bottom
of boring



PIEZOMETER INSTALLATION REPORT

(OPEN TUBE TYPE - SINGLE)

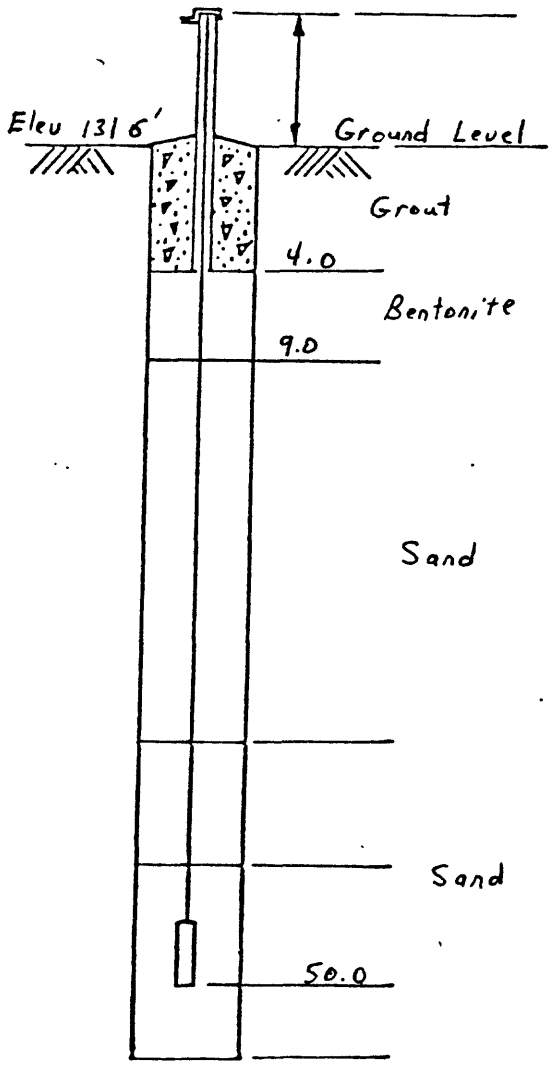
PROJECT Fishtrap Lake H & G
PIEZOMETER NUMBER 9P
PIEZOMETER LOCATION
DATE INSTALLED 8-15-85
TYPE OF PIEZOMETER Open tube
DESCRIPTION OF SOIL AT SENSING ZONE Shale & sandstones
PIEZOMETER INSTALLED BY Rhodes & Associates
INSPECTOR Michael Johnston
DRILLER Fred Horton
TYPE OF DRILL RIG S&H 40 CL
SIZE (DIA.) OF DRILLED HOLE NX 3"
PIEZOMETER READING AFTER INSTALLATION
GROUND WATER ELEVATION

NOTE:
SHOW ELEVATIONS OF ALL INTERFACES IN BACKFILL AND BACKFILL TYPE

REMARKS:

Piezometer tube set at bottom of boring

Sensing Zone 9.0 - 50 Ft.



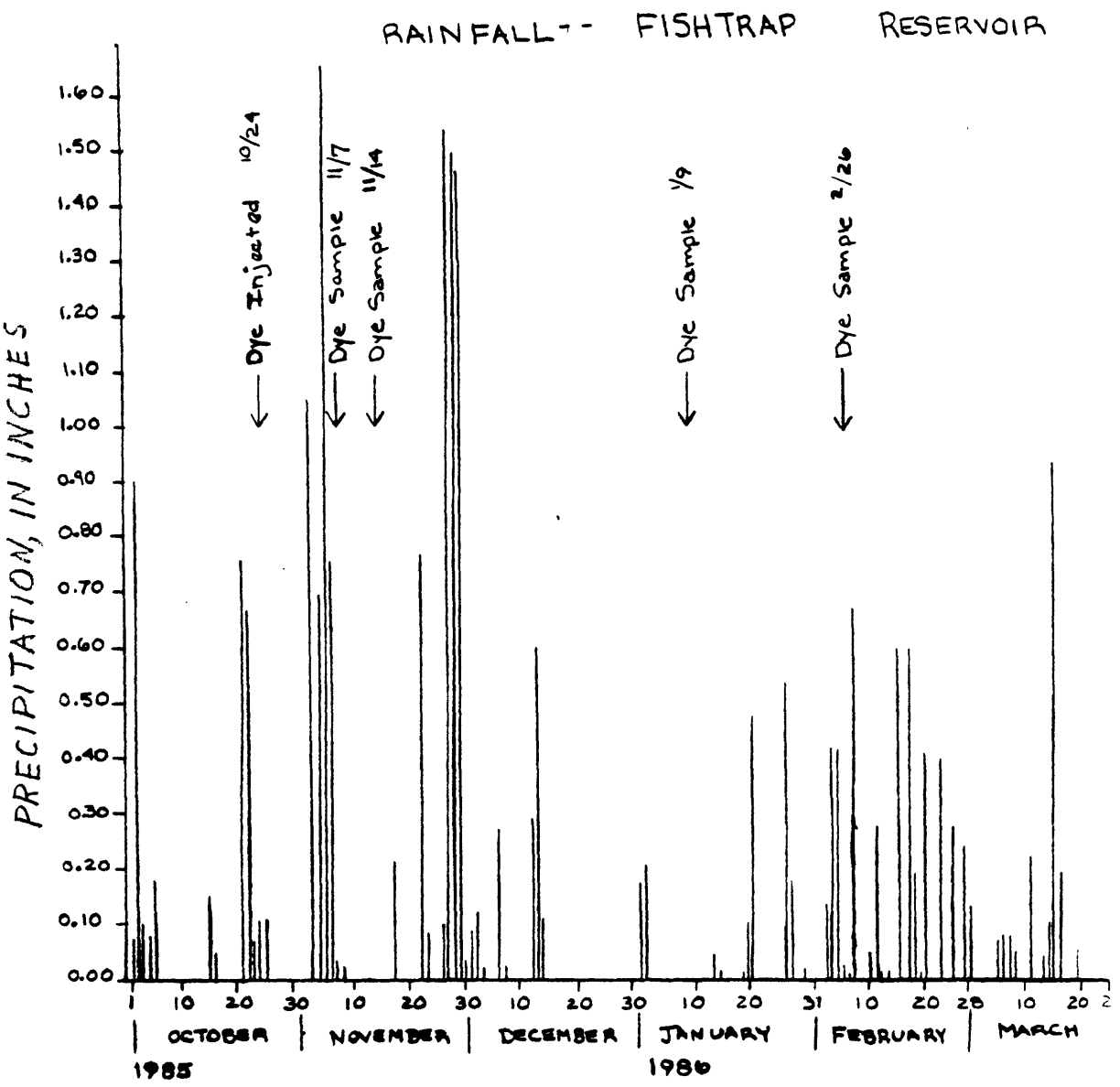


Figure 4.--Precipitation data at Fishtrap Dam
(Source: U.S. Army Corps of Engineers