1.0 INTRODUCTION

This progress report summarizes findings of the ground-water quality study being performed for Ferroxcube, Inc., Saugerties, New York.

The information contained herein has been assembled for submittal to the New York State Department of Environmental Conservation to fulfill requirements set forth in the "Schedule of Compliance for Effluent Limitations" provided in the Ferroxcube S.P.D.E.S. permit. The report primarily addresses local subsurface geologic and ground-water conditions determined from data from five recently installed onsite monitoring wells. A discussion of the extent of possible ground-water contamination by volatile organics will be presented at a later date based on the collection of additional data from water quality analyses and additional monitoring wells.

The original scope of services for the ground-water quality study was discussed at a January 4, 1983, meeting at the Ferroxcube offices. Based on the discussion at the meeting, a DGC proposal dated January 14, 1983, was submitted to Ferroxcube and subsequently accepted.

2.0 PURPOSE

The purpose of the project to date has been to conduct a hydrogeologic evaluation of ground-water quality and flow direction at the north and east end of Building 2 at the Ferroxcube facility.

3.0 SCOPE OF THE PROJECT

The project scope has consisted of drilling five initial borings, converting them to monitoring wells, measuring static water levels, collecting ground-water samples, performing water quality analyses, and evaluating the data. A second round of water sampling has been performed to confirm the preliminary results and to obtain a broader data base.

Additional monitoring wells will be installed at various locations onsite, depending upon the laboratory results of the second round of sampling.

4.0 PROJECT PERSONNEL

Mr. D. Theodore Clark, Senior Hydrogeolgist, is the Dunn Geoscience Project Manager responsible for the development of the project scope, coordination of field investigations and the review and evaluation of the data, conclusions, and recommendations. Mr. William E. Cutcliffe, President and Senior Geologist, is the Corporate reviewer and advisor. Preliminary evaluation of the data and field direction of drilling, monitoring well installation, static water level measurements and collection of ground-water samples was performed by Mr. John E. Gansfuss, Staff Engineering Geologist. Surveying of monitoring well elevations was performed under the direction of Mr. Robert W. Shuey. Ms. Gretchen R. Rich, Staff Geologist, assisted with the drilling program and Mr. Gary D. Casper, Staff Geologist, assisted with the ground-water sampling and field water quality testing.

The drilling and monitoring well installation contractor was Soil and Material Testing, Inc. of Castleton, New York. Water analyses were performed by EnviroTest Laboratories, Inc. of Newburgh, New York.

5.0 SCHEDULE

The drilling and installation of monitoring wells #1s, 1d, 2, 3, and 4 was begun on February 2, 1983 and completed on February 10, 1983. Wells were bailed on February 12-13, March 10, March 15 and April 20-21. Initial ground-water samples were collected and delivered to the testing laboratory on March 15, 1983. Follow-up sampling to confirm the initial laboratory analyes was performed on April 21, 1983.

6.0 SUBSURFACE GEOLOGIC AND GROUND-WATER CONDITIONS

The location of the study area and configuration of the buried bedrock surface are shown in Figure 1. Generalized geologic sections are shown in Figure 2. Boring logs #1, #2, #3, and #4 are presented in the Appendix. Note that one boring log, labeled #1, is presented for monitoring wells #1s and #1d.

A. Soils

The subsurface geology consists of 23.9 feet to 50.5 feet of fine grained soil overlying bedrock. The soil is predominantly interlayered (varved), soft silts and clays deposited in glacial Lake Albany. The spacing and thickness of the silty layers is variable and ranges from less than 1/16 inch to greater than two feet. Silty sand layers are generally infrequent but do occur occasionally. A seven foot thick silty sand layer was encountered at a depth of 17 feet in Boring #1d and a 0.5 feet thick layer was noted at 6.5 feet in Boring #3. In addition, 0.5 feet to 2.9 feet of silty sand or gravel is present immediately above bedrock at the locations of monitoring wells #1d, #3, and #4.

The upper 11.5 feet to 18 feet of the soil deposits are irregularly weathered and oxidized to a brownish color, in contrast to the deeper unweatherd gray to reddish-gray deposits. The upper brown soils are generally stiffer than the underlying soft to very soft soils.

B. Bedrock

As shown in Figure 2, the buried bedrock surface in the study area is somewhat irregular. The shallowest bedrock occurs near Boring #3 and the deepest at Boring #1. The contour lines indicate that the local bedrock surface is generally sloping to the northwest at a grade of approximately 20 feet per 100 feet ie. 20% slope. However, a component of slope also exists to the northeast from Boring #3 to #2.

Boring logs, available regional data, and nearby rock outcrops suggest that the Onondaga Limestone underlies the study area. The Onondaga cherty limestone formation is approximately 100 feet thick in the area. Underlying the Onondaga is a 650 to 700 foot thick sequence of Helderberg Group argillaceous limestones, siltstones-shales, and dolomites. The Schoharie argillaceous limestone and Esopus siltstone-shale, each approximately 100 feet thick, lie conformably below the Onondaga limestone and outcrop to the east of the site. The Hamilton Group shales and sandstones overlie the Onondaga and outcrop on the western edge of the valley. Although the regional bedrock dip is westward, local variations may occur.

C. Ground-Water

Table 1 summarizes monitoring well construction details. Table 2 presents a compilation of ground-water elevation measurements. Note that the elevations are based on an arbitrary datum of 100.00 feet, taken as the top of the exterior steps at the nearby northeast end of Building 2. Figure 3 shows the typical monitoring well construction.

1. The depth to the water table below ground surface varied from 4.4 feet to 10.9 feet in the monitoring wells during the period of observation from February 12, to April 21, 1983. The observed ranges in each monitoring well were as follows:

Well #1s	7.5' to 9.0'
Well #1d	7.6' to 9.7'
Well #2	5.6' to 8.5'
Well #3	7.6' to 10.9'
Well #4	4.4' to 6.3'

2. Water elevation contour maps have been generated for each of the four dates of complete data, February 12, March 10, March 15, and April 21, 1983. Because all four show substantially the same flow direction, only the results of one data set are plotted in Figure 4.

3. The water level data indicate that the flow of ground-water in the soil deposits in the study area during the period of observation was toward the northwest under a hydraulic gradient of approximately .033.

   Furthermore, the well cluster comprised of monitoring wells #1s (shallow) and #1d (deep) indicates that there is a vertical component of flow from shallow to deep. This relationship is shown by the difference in water levels at these two wells on Geologic Section A-A' on Figure 2. The head difference between the shallow and deep portion of the soil deposits is typically 0.7 to 0.8 ft.

7.0 GROUND-WATER QUALITY

Some preliminary ground-water samples were collected with new PVC bailers on March 15, 1983. A different bailer was used for sampling each well to avoid the possibility of cross-contamination. In addition, each well was bailed-to-waste prior to sampling. One of the wells, #3, was arbitrarily sampled twice to serve as a duplicate to evaluate laboratory quality control. Immediately after sampling, field measurements of four chemical parameters were made with portable field testing equipment and the samples were delivered to the testing laboratory.

8.0 CONCLUSIONS

Available information collected from the five existing monitoring wells and preliminary water quality analyses are insufficient to determine the extent of possible contamination by volatile organics at the plant site. The results of additional water quality analyses and data from the installation of additional monitoring wells must be evaluated before the source, distribution, and flow direction of possible contaminants can be determined.

Ferroxcube, Inc.
415-1-2622

TABLE 1

MONITORING WELL CONSTRUCTION DETAILS

Monitoring Well No.	Stick-up and Elevation of Top of Steel Casing Ft.	Elevation of Ground Surface, Ft.	Depth and Elevation of Bedrock, Ft.	Depth and Elevation Bottom of Hole, Ft.	Depth and Elevation of Screen, Ft.	Depth and Elevation of Sand Pack, Ft.
1s	1.98 (97.31)	-- (95.33)	-- --	23.0 (72.33)	8-23 (87-72)	6-23 (89-72)
1d	1.81 (97.08)	-- (95.27)	50.5 (44.8)	51.5 (43.77)	40-50 (55-45)	36-50 (59-45)
2	2.90 (99.48)	-- (97.58)	29.8 (67.8)	31.0 (66.58)	15-30 (83-68)	9-30 (89-68)
3	1.35 (100.88)	-- (99.53)	23.9 (75.6)	26.0 (73.53)	6-26 (97-74)	5-26 (95-74)
4	2.52 (100.67)	-- (98.15)	26.5 (71.6)	27.5 (70.65)	7.8-17.8, 21.8-26.8 (90.4-80.4, 76.4-71.4)	6-26.8 (92-71.4)

NOTES:

1. Elevations are in parentheses.

2. Wells consist of 2-inch diameter PVC riser pipe and pre-slotted (0.010-inch) screens, with #2 sand pack, bentonite seal, and protective steel standpipe.

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415-1-2622

TABLE 2

GROUND-WATER LEVELS IN MONITORING WELLS

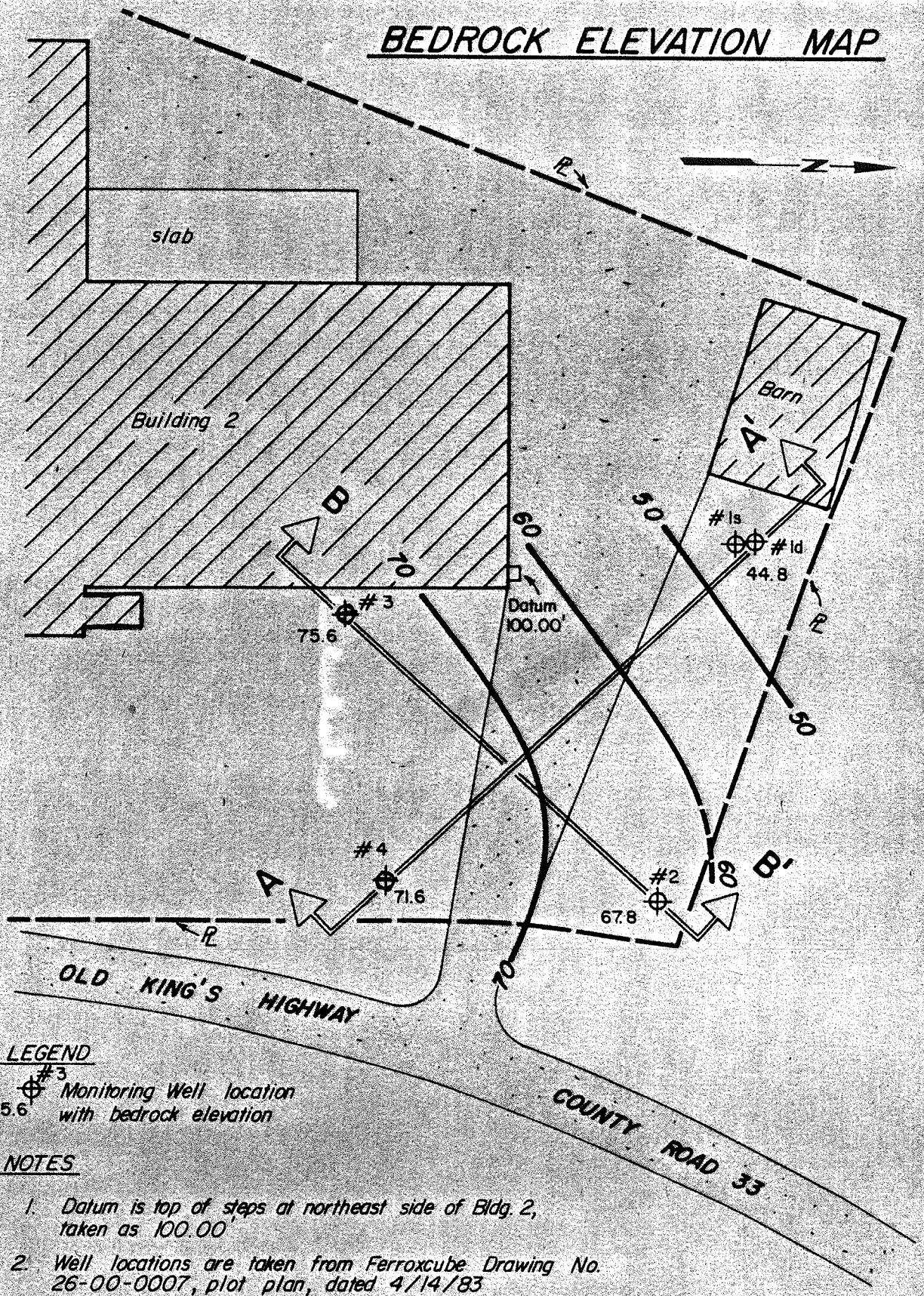
	1s	1d	2	3	4
DATE	97.20 [1]	97.00	99.40	100.76	100.63
2/4/83	—	87.67	—	—	—
2/7/83	—	87.35	89.38	—	—
2/8/83	—	87.27	89.38	—	—
2/9/83	—	87.14	89.33	—	—
2/10/83	—	—	—	89.78	—
2/12/83	86.28 [2]	85.59	89.04	88.65	91.85
3/10/83	87.57	85.80	90.85	91.08	93.30
3/15/83	86.90	86.10	91.24	90.55	93.15
4/20/83	87.79	87.10	92.01	91.89	93.76

NOTES:

1. Relative elevation of top of PVC riser pipe, used as measuring point. Top of steps at north end of Building 2 is the datum, taken as 100.00 ft.

2. All water level elevations are based on the 100.00 ft. datum

BEDROCK ELEVATION MAP



LEGEND

#3
75.6 ⊕ Monitoring Well location with bedrock elevation

NOTES

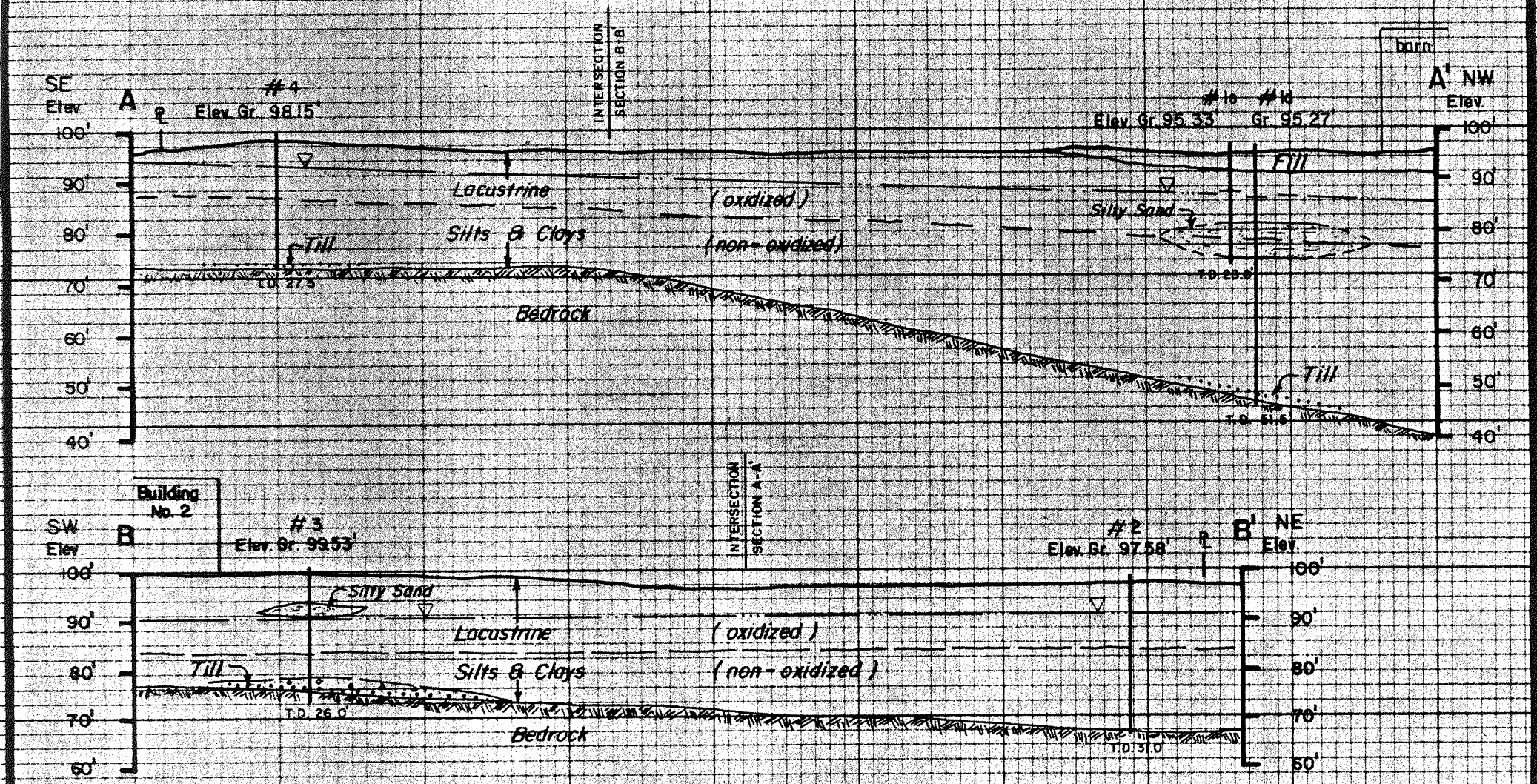
1. Datum is top of steps at northeast side of Bldg. 2, taken as 100.00'
2. Well locations are taken from Ferroxcube Drawing No. 26-00-0007, plot plan, dated 4/14/83

Scale: 1" = 60'
April 27, 1983

DUNN GEOSCIENCE CORP

FIGURE 1

GEOLOGIC SECTIONS



NOTES:

1. Elevations refer to arbitrary datum of 100.00' assigned to top of steps at northeast side of Building No. 2.
2. Water levels shown are based on data from 3/15/83. Average water level between monitoring well #1s(shallow well) and #1d(deep screen) was used to sketch water table slope in Section A-A'.

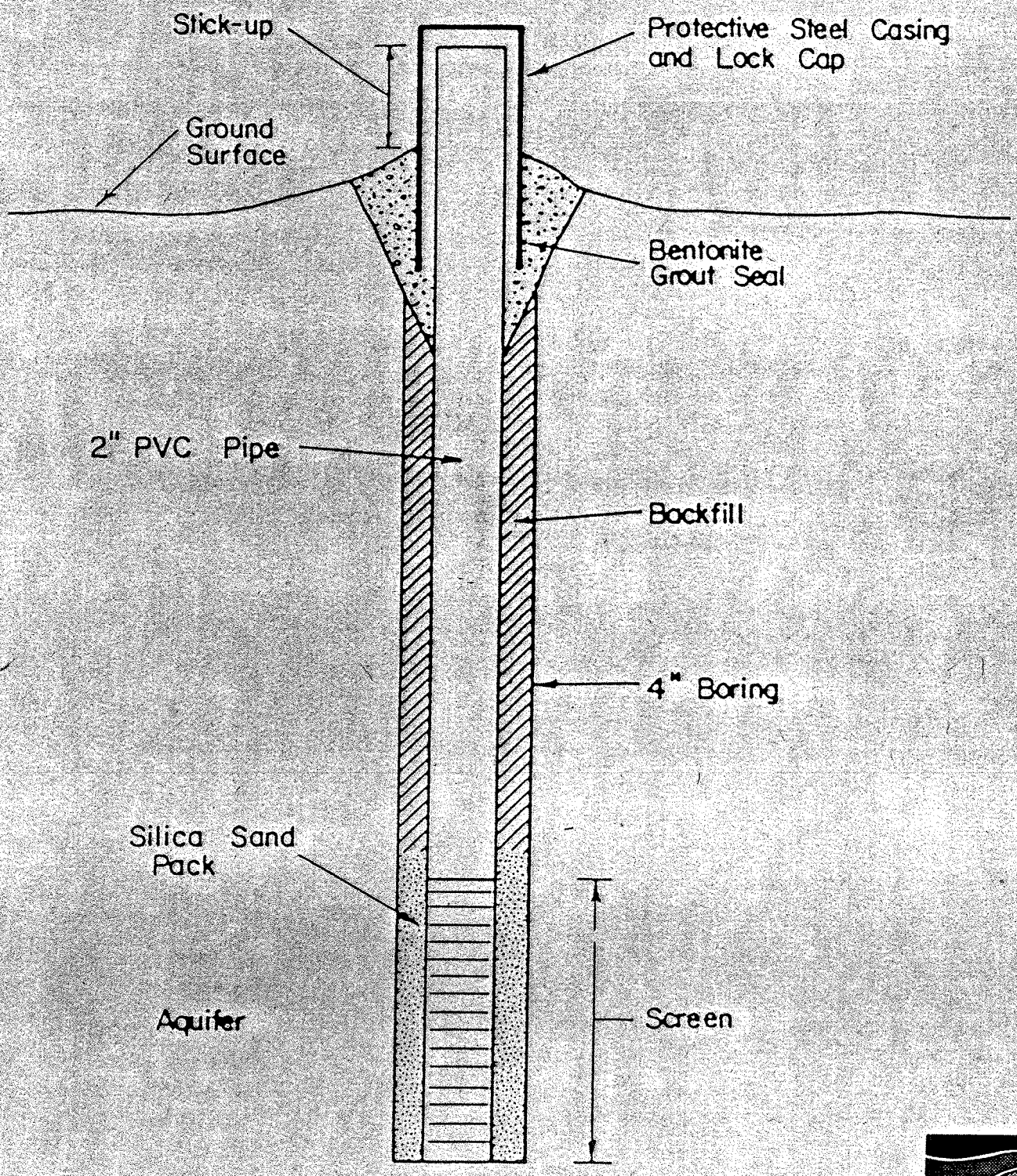
FERROXCUBE, INC
Saugerties, N.Y.
April 28, 1983

Horizontal & Vertical Scale: 1" = 30'

GEOSCIENCE CORP.

FIGURE 2

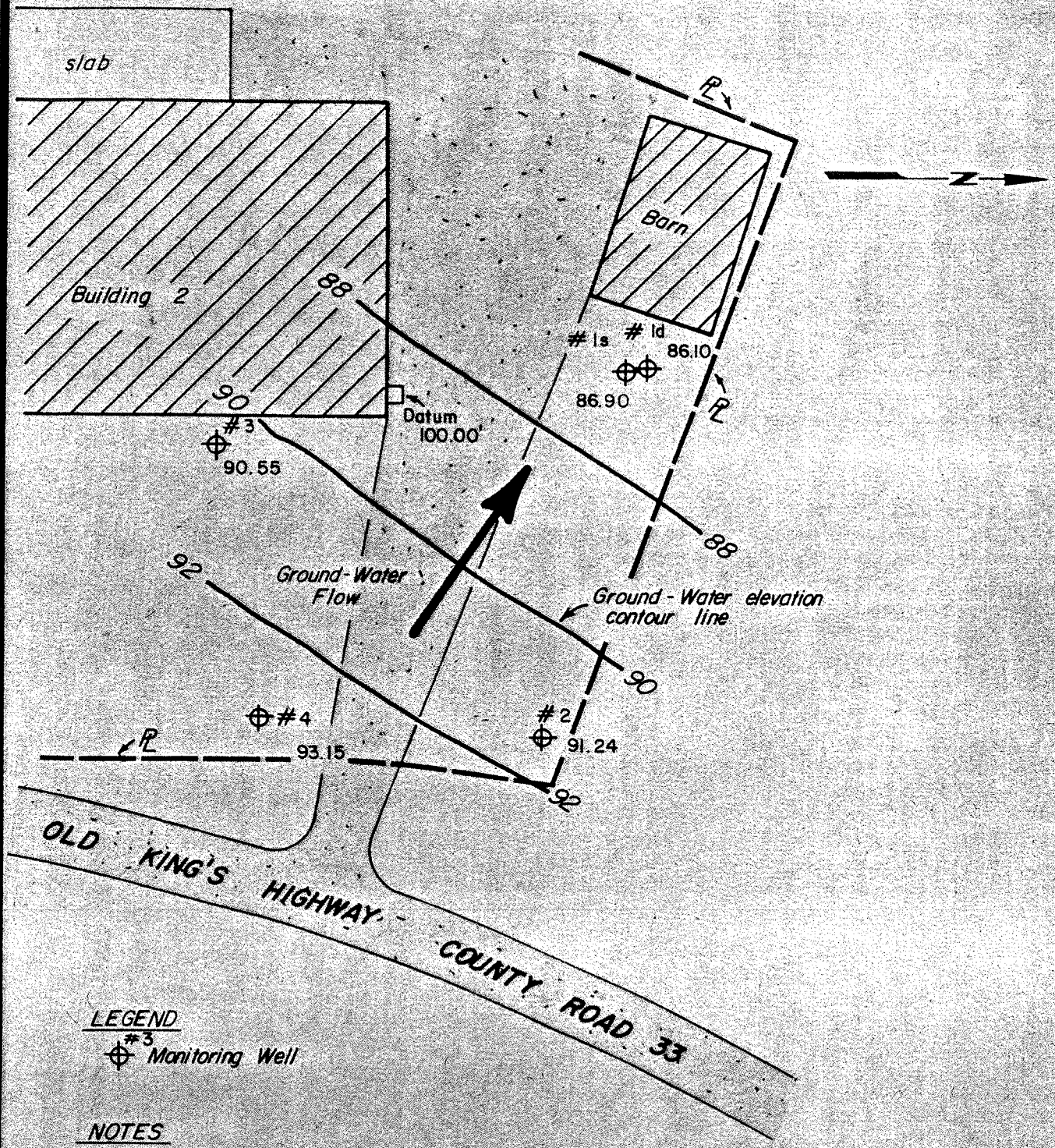
TYPICAL MONITORING WELL CONSTRUCTION



DUNN GEOSCIENCE CORP.

FIGURE 3

GROUND-WATER LEVELS



LEGEND

#3 ⊕ Monitoring Well

NOTES

1. Water levels, 3/15/83, using electric water level indicator
2. Datum is top of steps at northeast side of Bldg. 2, taken as 100.00'
3. Hydraulic gradient, i, 4'/120' = .033

Scale: 1" = 60'
April 12, 1983

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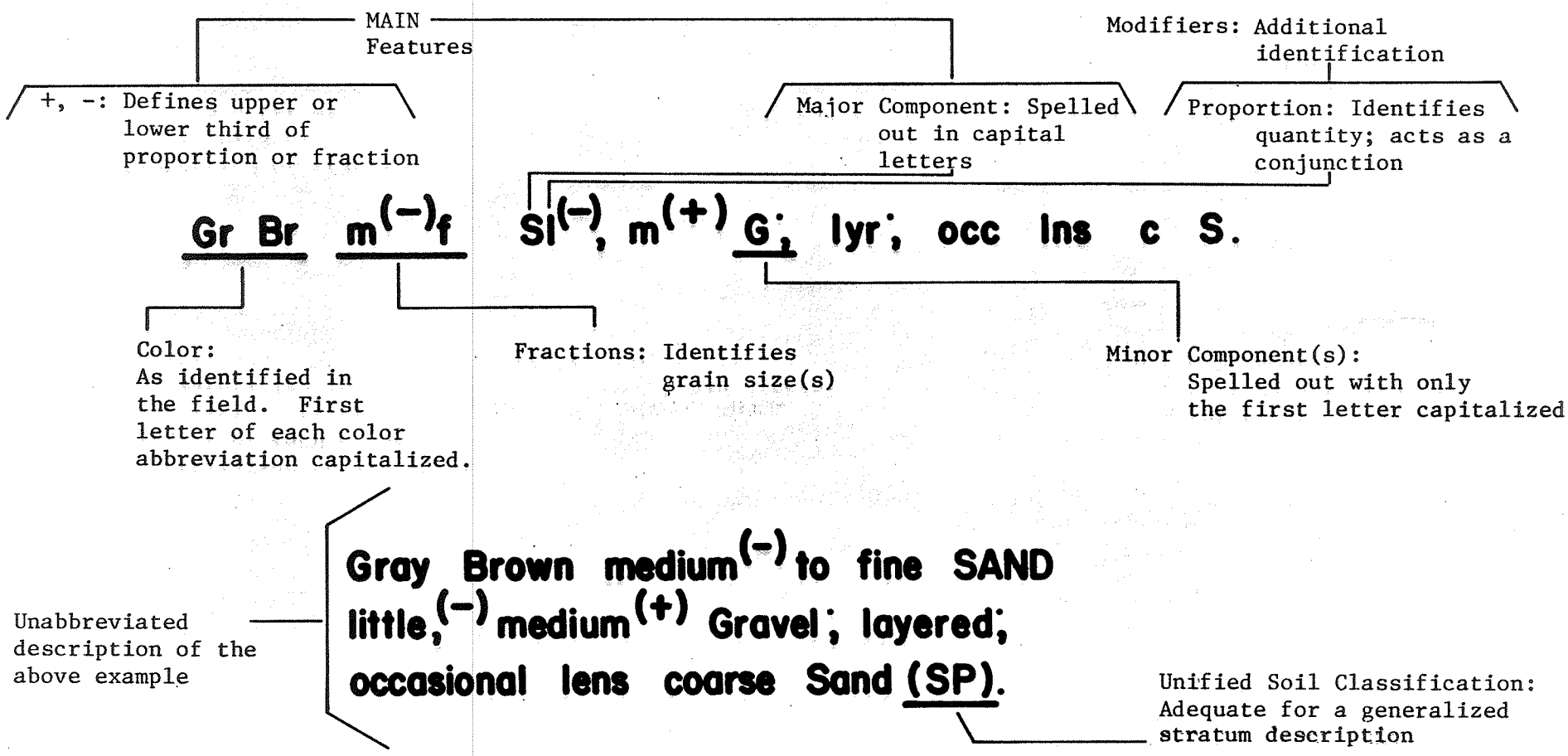
FIGURE 4

APPENDIX

Soil Borings Logs

MODIFIED BURMISTER SYSTEM



Dunn Geoscience Corporation uses a modified Burmister System for detailed identification of soil components, fractions, and proportions. The Unified Soil Classification is also presented in an unabbreviated form and is based upon the Burmister System collected field data.

VISUAL IDENTIFICATION OF SAMPLES

The samples were identified in accordance with the American Society for Engineering Education System of Definition.

I. Definition of Soil Components and Fractions

Material	Symbol	Fraction	Sieve Size	Definition
Boulders	Bldr	—	9" +	Material retained on 9" sieve.
Cobbles	Cbl	—	3" to 9"	Material passing the 9" sieve and retained on the 3" sieve.
Gravel	G	coarse (c) medium (m) fine (f)	1" to 3" ⅜" to 1" No. 10 to ⅜"	Material passing the 3" sieve and retained on the No. 10 sieve.
Sand	S	coarse (c) medium (m) fine (f)	No. 30 to No. 10 No. 60 to No. 30 No. 200 to No. 60	Material passing the No. 10 sieve and retained on the No. 200 sieve.
Silt	$	—	Passing No. 200 (0.074 mm)	Material passing the No. 200 sieve that is non-plastic in character and exhibits little or no strength when air dried.

Organic Silt (O$)
Material passing the No. 200 sieve which exhibits plastic properties within a certain range of moisture content, and exhibits fine granular and organic characteristics.

		Plasticity	Plasticity Index
Clayey SILT	Cy$	Slight (Sl)	1 to 5
SILT & CLAY	$&C	Low (L)	5 to 10
CLAY & SILT	C&$	Medium (M)	10 to 20
Silty CLAY	$yC	High (H)	20 to 40
CLAY	C	Very High (VH)	40 plus

Clay-Soil
Material passing the No. 200 sieve which can be made to exhibit plasticity and clay qualities within a certain range of moisture content, and which exhibits considerable strength when air-dried.

II. Definition of Component Proportions

Component	Written	Proportions	Symbol	Percentage Range by Weight *
Principal	CAPITALS	—		50 or more
Minor	Lower Case	and	a.	35 to 50
		some	s.	20 to 35
		little	l.	10 to 20
		trace	t.	1 to 10

* Minus sign (—) lower limit, plus sign (+) upper limit, no sign middle range.

III. Glossary of Modifying Abbreviations

Category	Symbol	Term	Symbol	Term	Symbol	Term
A. Borings	U/D	Undisturbed	B	Exploratory	A	Auger
B. Samples	C	Casing	L	Lost	U	Undisturbed
	D	Denison	S	Spoon	W	Wash
	O.E.	Open End				
C. Colors	bk	black	gn	green	wh	white
	bl	blue	or	orange	yw	yellow
	br	brown	rd	red	dk	dark
	gr	gray	tn	tan	lt	light
D. Organic Soils	dec	decayed	o	organic	veg	vegetation
	dec'g	decaying	rts	roots	pt	peat
	lig	lignite	ts	topsoil		
E. Rocks	LS	Limestone	rk	rock	Shst	Schist
	Gns	Gneiss	SS	Sandstone	Sh	Shale
F. Fill and Miscellaneous Materials	bldr (s)	boulder (s)	cbl (s)	cobble(s)	gls	glass
	brk (s)	brick (s)	wd	wood	misc	miscellaneous
	cndr (s)	cinder (s)	dbr	debris	rbl	rubble
G. Miscellaneous Terms	do	ditto	pp	pocket penetrometer	ref	refusal
	el, El	elevation			sm	small
	fgmt (s)	fragment(s)	P. I.	Plasticity Index	W. L.	water level
	frqt	frequent			W. H.	weight of hammer
	lrg	large	P	pushed pressed	W. R.	weight of rods
	mtld	mottled				
	no rec	no recovery	pc (s)	piece (s)		
	pen	penetration	rec or R	recovered		
H. Stratified Soils	alt	alternating				
	thk	thick				
	thn	thin				
	w	with				
	prt	parting	— 0 to 1/16" thickness			
	seam	seam	— 1/16 to ½" thickness			
	lyr	layer	— ½ to 12" thickness			
	stra	stratum	— greater than 12" thickness			
	vvd c	varved Clay	— alternating seams or layers of sand, silt and clay			
	pkt	pocket	— small, erratic deposit, usually less than 1 foot			
	lns	lens	— lenticular deposit			
	occ	occasional	— one or less per foot of thickness			
	freq	frequent	— more than one per foot of thickness			

DUNN GEOSCIENCE CORPORATION LATHAM, NEW YORK (518) 783-8102	TEST BORING LOG	BORING NO. B-1
PROJECT Ground Water Quality Study		
CLIENT Ferroxcube, Inc., Saugerties, NY		SHEET 1 OF 3
DRILLING CONTRACTOR Soil & Material Testing, Inc.		JOB NO. 415-1-2622
PURPOSE Monitoring Well Installation		ELEVATION 95.3' (local datum)

GROUNDWATER					CASING	SAMPLE	CORE
DATE	TIME	DEPTH	CASING	TYPE		SS	
				DIAMETER		2" o.d.	
2/4/83	9:10 A	7.6'	3.67'	WEIGHT		140#	
2/7/83	11:00 A	7.92'	3.67	FALL		30"	

DATUM Ground Surface
DATE STARTED 2/2/83
DATE FINISHED 2/4/83
DRILLER D. Rappold
INSPECTOR J. Gansfuss

DEPTH FT.	CASING BLOWS	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	IDENTIFICATION	REMARKS
		S-1	7 13 15 12	ML		Br Cy$ l, mfS, t mfG, mottled, very stiff-hard, roots, (FILL)	Rec.= 1.3' Damp-Moist pp>4.5 tsf
		S-2	12 22 17 17	ML-CL		Br $&C a, cfS, smfG, G heterogeneous, hard, piece cellopane, (FILL) 4.0'	Rec.= 1.3' Damp-Moist
		S-3A	13 15	ML		Dk Br Gr Cy $ l, cfS, tfG, very stiff, roots, (BURIED TOPSOIL) 5'	Rec.= 1.2' Damp-Moist
5		S-3B	18 21	ML-CL		Lt Br $&C t, mfS, mottled, hard (LACUSTRINE)	pp>4.5 tsf
		S-4	33 40 57 63	ML-CL		Med Lt Br $&C, alt. $y and Cy seams and layers w/ diff. colors, breaks along $y partings, hard, vrvd? (LACUSTRINE)	Rec.= 1.4' Damp-Moist pp>4.5 tsf
		S-5	12 14 25 24	CL		Lt Br vvd Clay & Silt (CL-ML) Br $yC t, mfS, t fG, as above, occ Gn Gr layer, very stiff-hard, (LACUSTRINE)	Rec.= 1.6' Moist pp= 3.75 tsf
10	•	S-6	10 14 16 19	CL		1st Attempt NO RECOVERY 2nd Attempt Br $yC t, fG, tr organics, occ Tn, Gn Gr layer, as above, very stiff (LACUSTRINE) 12.0'	Rec.=0.0' Rec.=1.5' Moist pp= 2.0 tsf
		S-7	8 8 9 10	ML		Br Cy$ s, mfS, tr fG, med. stiff-stiff	Rec.= 1.6' WET-Moist pp= 0.75 tsf
		S-8A	3 4	ML-CL		Lt Br $&C t, fS, occ Dk Br fS layers, vrvd, stiff 15.0'	Rec.= 1.3' Moist-WET
15		S-8B	3 5	SM		Med Dk Br fS, s$, occ Sy layers, loose	WET
		S-9	5 5 4 3	SM		Same	Rec.= 0.5' WET
		S-10A	1 2	SM		Dk Red Gr fS, a $&C, loose, bottom 2" (S-10B) Red-Gr cfS, l $, grains bk, loose	Rec.= 0.8' WET
		S-10B	2 2			Slight Circ Loss (Driller)	
20							

DUNN GEOSCIENCE CORPORATION LATHAM, NEW YORK (518) 783-8102	TEST BORING LOG	BORING NO. B-1
PROJECT Ground Water Quality Study		SHEET 2 OF 3
CLIENT Ferroxcube, Inc.		JOB NO. 415-1-2622

DEPTH FT.	CASING BLOWS	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	IDENTIFICATION	REMARKS
20		S-11	1 WHR WHR 6	SM		Dk Red Gr f S, s(+)$, Loose 22.0'	Rec.= 1.0' WET
		S-12	WHR WHR WHR 2	CL-ML		Dk Red Gr C&$ t, fG, alt. seams and layers Red Gr Cy$ and Gr $yC, very soft and "toothpasty"	Rec.= 2.0' WET
25		S-13	WHR WHR WHR WHR	CL-ML		As above; layers are ½" to 2", Cy$ seams appear wetter and softer than $yC seams	Rec.= 2.0' WET
		S-14	1 1 1 WHR	CL-ML		As above Dk Gr vvd Clay & Silt (CL-ML)	Rec.= 2.0' WET
		S-15	WHR WHR WHR WHR	CL-ML		As above	Rec.= 2.0' WET
30		S-16	WHR WHR WHR WHR	CL-ML		As above	Rec.= 2.0' WET
		S-17	WHR WHR WHR WHR	CL-ML		As above; thinner, ½" layers in bottom 6"	Rec.= 2.0' WET
35		S-18	WHR WHR WHR WHR	CL-ML		As above; conspicuous ½" red-br f Sy silt seam w/ strong dilatency at 35.0'	Rec.= 1.0 WET
		S-19	WHR WHR WHR WHR	CL-ML		As above; occ ½" Lt Br $yC seams	Rec.= 2.0' WET
40		S-20	WHR WHR WHR WHR	CL-ML		As above	Rec.= 1.5' WET
		S-21	WHR WHR WHR WHR	CL-ML		As above	Rec.= 1.0' WET
		S-22	WHR WHR WHR WHR	CL-ML		As above	Rec.= 2.0' WET
45		S-23	WHR WHR	CL-ML		As above	Rec.= 1.2' WET

DUNN GEOSCIENCE CORPORATION LATHAM, NEW YORK (518) 783-8102	TEST BORING LOG	BORING NO. B-1
PROJECT Ground Water Quality Study		SHEET 3 OF 3
CLIENT Ferroxcube, Inc.		JOB NO. 415-1-2622

DEPTH FT.	CASING BLOWS	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	IDENTIFICATION	REMARKS
45		S-23	WHR WHR				
		S-24	WHR 7 5 5	ML-CL		As above, but slightly siltier, stiff	Rec.= 2.0' WET
		S-25	WHR WHR WHR WHR	CL-ML		Dk Gr $yC, slightly darker and stiffer than above; red layers absent	Rec.= 1.0' WET pp= 0.5 tsf
50		S-26	100/0.5'	GM		Gr $&C s, mfG (Till) 50.0' Bedrock Roller Bit 50.5'-51.5' 51.5'	Rec.= 0.2' Moist
						Bottom of hole 51.5' at 11:00 AM on WL at 11:00 AM 5.7 b.g. Hole flushed Well installation: B-1d 2/9/83 Cement Grout 0-3' Cement/Bentonite Slurry 3-36' Sand Pack 36-50' Screen 40-50' Protective Casing Stick-up 1.75' Well installation: B-1s 2/9/83 (Located 5.5' southeast of B-1d) Cement Grout 0-5' Bentonite Pellets 5-6' Sand Pack 6-23' Screen 8-23' Protective Casing Stick-up 1.8'	2/4/83
55							
60							
65							
70							

*Local datum is top of steps at north end of Building 2, taken as 100.00 ft.

DUNN GEOSCIENCE CORPORATION LATHAM, NEW YORK (518) 783-8102	TEST BORING LOG	BORING NO. B-2
PROJECT Ground-Water Quality Study		
CLIENT Ferroxcube, Inc. Saugerties, NY		SHEET 1 OF 2
DRILLING CONTRACTOR Soil & Material Testing		JOB NO. 415-1-2622
PURPOSE Monitoring Well Installation		ELEVATION 97.6 (local datum)

GROUNDWATER					CASING	SAMPLE	CORE
DATE	TIME	DEPTH	CASING	TYPE		SS	
2/4/83	3:00 P	0.0'	Screen	DIAMETER		2" o.d.	
2/7/83	11:00 A	8.2'	Screen	WEIGHT		140#	
2/8/83	9:45 A	8.2'	Screen	FALL		30#	

DATUM Ground Surface
DATE STARTED 2/4/83
DATE FINISHED 2/4/83
DRILLER Dick Rappold
INSPECTOR John Gansfuss

DEPTH FT.	CASING BLOWS	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	IDENTIFICATION	REMARKS
		S-1	2 3 7 8	ML-CL		Br $&C t, mfS, mottled, roots, stiff (TOPSOIL) 1.0'	Rec.= 0.5' Damp-Moist
						Lt Br $&C tr, bl specks	
5		S-2	9 12 13 19	CL-ML		Lt Br C&$ tr, bl specks, vvd; alt laminae, seams, layers of Cy$ and $yC, prtgs along $y laminae, vari-colored rd, gr, olive; v. stiff	Rec.= 1.9' Moist-WET PP= 2.25 tsf
						Drilling water, turned from brown to gray at 8.5', but sample S-3 was brown	
10		S-3	4 4 8 10	CL-ML		As above, occ 2" $ layer, stiff- V stiff Br C&$, vvd (CL-ML) (LACUSTRINE) 13.5'	Rec.= 2.0' WET pp= 1.75 tsf
15		S-4	WHR 2 3 5	CL-ML		Dk Gr C&$, vvd, vari-colored, soft-med stiff	Rec.= 2.0' WET PP= 0.25 tsf
						Dk Gr C&$, vvd (CL-ML) (LACUSTRINE)	
20							

DUNN GEOSCIENCE CORPORATION LATHAM, NEW YORK (518) 783-8102	TEST BORING LOG	BORING NO. B-2
PROJECT Ground-Water Quality Study.		SHEET 2 OF 2
CLIENT Ferroxcube, Inc. Saugerties, NY		JOB NO. 415-1-2622

DEPTH FT.	CASING BLOWS	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	IDENTIFICATION	REMARKS
20		S-5	WHR WHR WHR WHR	CL-ML		As above; very soft Note- no $yS layer encountered in this hole (Driller). WL in hole dropped only 3" during lunch hour. No S in wash water.	Rec.= 2.0' WET
25		S-6	WHR WHR WHR WHR	CL-ML		As above, but siltier and fewer reddish layers	Rec.= 2.0' WET
30					XXXXX	29.8' Bedrock 31.0'	Roller bit 29.8'-31.0'
35						Bottom of Hole 31.0' at 2:00P on Hole Flushed. Well Installation: 2/4/83 Bentonite/BackFill 0-8' Bentonite Pellets 8-9' Sand Pack 9-30' Screen 15-30' Bentonite BackFill 30-31' PVC Stick-up 1.8' Local datum is top of steps at north end of Building 2, taken as 100.000 ft.	2/4/83
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DUNN GEOSCIENCE CORPORATION LATHAM, NEW YORK (518) 783-8102	TEST BORING LOG	BORING NO. B-3
PROJECT Ground-Water Quality Study		
CLIENT Ferroxcube, Inc. Saugerties, NY		SHEET 1 OF 2
DRILLING CONTRACTOR Soil & Material Testing, Inc.		JOB NO. 415-1-2622
PURPOSE Monitoring Well Installation		ELEVATION 99.5 (local datum)

GROUNDWATER					CASING	SAMPLE	CORE
DATE	TIME	DEPTH	CASING	TYPE	Flush Joint	SS	
2/10/83	5:15 P	9:75'	Screen	DIAMETER	4"	2" od	
2/12/83	12:00P	10.88'	Screen	WEIGHT	300 #	140 #	
				FALL	30 #	30 #	

DATUM Ground Surface
DATE STARTED 2/9/83
DATE FINISHED 2/10/83
DRILLER Dick Rappold
INSPECTOR John Gansfuss

DEPTH FT.	CASING BLOWS	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	IDENTIFICATION	REMARKS
		S-1	14 16 20 22	ML-CL		Br $&C tr, bk concretions; mottled Lt Br and Tan, freq. alt seams $&C, vvd; Hard	Rec.= 1.7' Moist PP= >4.5 tsf
						Br $&C; occ. seams and layers of Br mfS, s $&C (ML-CL, SM) (LACUSTRINE)	
5		S-2A	8 13	CL-ML		Br C&$ t, fmG; freq. $y fS seams, Damp (S-2A); 1' layer Br mfS, s $&C, in bottom, moist (S-2B)	Rec.= 1.7' Moist PP= 4.0 tsf
		S-2B	14 16	SM			
						Wash water turns Gray 9.5'	
10		S-3	5 9 11 11	ML-CL		Gr Br $&C, freq. alt seams and layers Gr and Br $yC and Cy$, vvd	Rec.= 2.0' WET PP= 2.75 tsf
						Gr Br Cy$, vvd (CL-ML) (LACUSTRINE)	
15		S-4A	4 4	ML		Gr Br &Yel Br $&C, freq. alt. seams and layers of Cy$, $yC, and $y mfS (1") vvd. 16.0'	Rec.= 1.7' WET PP= 0.75 tsf
		S-4B	6 7	ML-CL		Gr & Yel Br $&C 1, fS, vvd	
20							

DUNN GEOSCIENCE CORPORATION LATHAM, NEW YORK (518) 783-8102	TEST BORING LOG	BORING NO. B-3
PROJECT Ground Water Quality Study		SHEET 2 OF 2
CLIENT Ferroxcube Inc.		JOB NO. 415-1-2622

DEPTH FT.	CASING BLOWS	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	IDENTIFICATION	REMARKS
20		S-5A	6 10	CL-ML		Br Gr & Lt Br C&$, mottled, vvd; grades to Br Cy$ (S-5A) 21.0'	Rec.= 0.8' WET-Moist PP= 2.5 tsf
		S-5B	30 18	SM		Gr fS, s $, amfG, moist (Till) (SM) Some circ. loss at 23.2' 23.9'	
25		S-6				Dk and Lt Gr Limestone, tr fG in upper portion (from roller bit cuttings) 26.0'	
						Bottom of Hole 26.0' at 11:00 AM on	2/10/83
						Drive casing to 23.4' Hole flushed. Well installation 2/10/83 Cement Grout 0-3.5' Sand Pack 5-26.0' Screen 6-26.0' Protective Casing Stick Up 1.3'	
30							
						*Local datum is top of steps at north end of Building 2, taken as 100.0 ft.	
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DUNN GEOSCIENCE CORPORATION
LATHAM, NEW YORK (518) 783-8102

TEST BORING LOG

BORING NO. B-4

PROJECT Ground-Water Quality Study

CLIENT Ferroxcube, Inc. Saugerties, NY

SHEET 1 OF 2

DRILLING CONTRACTOR Soil & Material Testing, Inc.

JOB NO. 415-1-2622

PURPOSE Monitoring Well Installation

ELEVATION 98.2 (local datum)*

DATUM Ground Surface

DATE STARTED 2/10/83

DATE FINISHED 2/10/83

DRILLER Dick Rappold

INSPECTOR John Gansfuss

GROUNDWATER					CASING	SAMPLE	CORE
DATE	TIME	DEPTH	CASING	TYPE		SS	
2/10/83	5:15 P	0.5'	Screen	DIAMETER		2" o.d.	
2/12/83	12:10 P	6.30'	Screen	WEIGHT		140#	
2/13/83	3:30 P	6.33'	Screen	FALL		30"	

DEPTH FT.	CASING BLOWS	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	IDENTIFICATION	REMARKS
						Br $&Ct, cfS, tmfG; tr bk concretions, roots	
			11			1.5'	
		S-1	15	ML-CL		Lt Br $&C t, CfS, tmfG; tr bk concretions	Rec.= 1.0' Moist pp> 4.5 tsf
			14				
			23				
5		S-2	7	CL-ML		Lt Br C&$, varicolored, vvd, freq Cy$ seams, 2" layer Rd Br $y fS in tip	Rec.= 2.0' Moist-WET pp= 3.25 tsf
			10				
			15				
			19				
						Br $&C, vvd (CL-ML) (LACUSTRINE)	
10		S-3A	6	ML-CL		Br $&C, As Above, vvd; freq $ seams, (S-3A)	Rec.= 2.0' WET pp= 2.75 tsf
			7				
		S-3B	9	CL-ML		11.5' Gr C&$ s, fS, vvd.	
			6				
						Wash water turned gray at 13.5'	
15		S-4	2	CL-ML		Gr C&$, freq Cy$ seams, vvd. "toothpaste" consistency	Rec.= 2.0' WET pp= 0.5 tsf
			1				
			2				
			2				
20							

DUNN GEOSCIENCE CORPORATION LATHAM, NEW YORK (518) 783-8102	TEST BORING LOG	BORING NO. B-4
PROJECT Ground Water Quality Study		SHEET 2 OF 2
CLIENT Ferroxcube, Inc.		JOB NO. 415-1-2622

DEPTH FT.	CASING BLOWS	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	IDENTIFICATION	REMARKS
20		S-5	WRH 1 1 2	CL-ML		Gr C&$, vvd; "toothpaste" consistency Gr $&C, vvd (ML-CL) (LACUSTRINE)	Rec.= 2.0' WET pp= 0.25 tsf
25		S-6	WR WR	ML-CL		Gr $&C in top 2" of Spoon 25.7'	Rec.= 0.7' WET
			Roller Bit	GM		Gr mFG a, cf$, s $ (Till) 26.5'	
		S-7	Roller Bit 100/0"			Bedrock 27.5'	
30						Bottom of Hole 27.5' at 3:30 P on Hole Flushed Well Installation: Cement Grout 0-5' Bentonite Pellets 5-6' Sand Pack 6-26.8' Blank PVC 17.8-21.8' Screen 7.8-17.8', 21.8-26.8' Protective Casing Stick up 2.5'	2/10/83
35						*Local datum is top of steps at north end of Building 2, taken as 100.00 ft.	
40							