

METRIC
Corporation ENVIRONMENTAL ENGINEERING AND SCIENCE

8429 WASHINGTON PLACE NE, SUITE A
ALBUQUERQUE, NEW MEXICO 87109
(505) 828-2801

December 8, 1988

RECEIVED
DEC 14 1988
HAZARDOUS WASTE SECTION

Ms. Suzanne Moore-Mane
Hazardous Waste Section
1190 St. Francis Drive
Harold Runnels Building
Santa Fe, New Mexico 87503

Dear Ms. Mane:

Enclosed are the descriptions of MW-19, MW-20, MW-21, and MW-22 at Sparton Technology's Coors Road Plant which you requested.

If you have questions concerning these wells or other matters, please contact us.

Sincerely,



Gary L. Richardson, P.E.
Executive Vice President

GLR:kc

enclosures

cc: Mr. Jay Mabrey
Mr. Blair Thompson
Mr. Richard Mico
Mr. Jon DeWitt
Mr. Ven Samala

II FIELD ACTIVITIES

1. Equipment Set-Up

Prior to the set-up of the drilling rig on the prospective well site, all underground utilities were located to assure that the borings would not encounter any buried power, gas, or telephone lines. Additionally, all drilling equipment was cleaned with a high pressure steam cleaning machine to remove any material which could contaminate the well.

2. Drilling and Soil Sample Collection

Borings MW-19 and MW-20 were drilled using a Mayhew 1000 rotary wash drill rig. The rotary wash drilling process involves the use of drilling fluid to suspend and remove drill cuttings obtained by the advancement of a tri-cone drill bit into unconsolidated formations. A bentonite and water mixture was used as a drilling fluid to a depth not more than 5 feet above the screen zone. A drilling fluid consisting of a biodegradable mud and water mixture was then used to complete the borings.

Samples of the formations encountered during drilling of MW-19 and MW-20 were obtained by collecting cuttings suspended in the drilling mud and (in MW-20) by using a 2-inch O.D. by 1-1/4-inch I.D. split-spoon sampler 18-inches in length. Additional data was obtained by noting the rate and ease of drilling penetration.

Boring MW-19 was terminated between the upper and lower aquitards at a depth of 110 feet. Boring MW-20 was terminated at the top of the lower aquitard.

A Central Mining Equipment (CME) 55 hollow stem auger drilling rig was used to drill borings MW-21, MW-22 and MW-23. Soil samples were collected with a 60-inch continuous sampler (3-inch O.D., 2.75-inch I.D.) that extended below the drill bit and was driven downward by turning the auger.

Borings MW-21, MW-22 and MW-23 were augered below the water table to the top of the aquitard (the base of the upper flow zone). When flowing sand conditions were encountered below the water table, tap water was poured into the augers to create a positive internal pressure to prevent sand from blocking the hollow stem.

The boring logs and monitoring well construction details are shown on Plates 2 through 9. The log of MW-18 is also presented (Plate 3). Laboratory analyses were later performed on certain samples for soil identification and particle size distribution. The results are shown on Plates 10 through 13.

All samples were checked for volatile organic vapors with a photoionization detector (PID) manufactured by HNU Systems, Inc. (Model 101, benzene referenced). Readings were taken by cutting open

a small crack or by making a hole in a sample and placing the detector intake tube in the opening. Several readings were taken on each sample, and the highest reading was recorded. An 11.7 ev probe is normally used with a 10.2 ev probe as a back-up. The PID readings, which are presented in the Logs of Borings, were taken with the 11.7 ev probe except where noted in the logs.

3. Handling of Drill Cuttings and Fluids

The samples and drill cuttings were checked with the PID meter for traces of contamination throughout the field investigation. The meter is calibrated to read tenths of a part per million (ppm) against a benzene reference. The cuttings and excess sample material were placed in plastic 50-gallon open-top drums. The soil was later checked with the PID meter and, if no contamination was found, was discarded on the surface. All contaminated soils were sealed in the drums for proper disposal.

Drilling fluids were pumped into open-top drums and allowed to settle overnight. The fluids were checked for contamination with the PID meter during drilling operations and after settling. No contamination was detected in the drilling fluids, and the fluids were siphoned into the city sewer. The cuttings which had settled to the bottom of the barrels were discarded on the surface after no contamination was detected with the PID meter.

To minimize loss of cuttings on the ground surface while augering, a 4-foot by 8-foot sheet of plywood with a hole cut in the center was laid over the borehole with a sheet of 6-mil plastic underneath. During rotary wash drilling, 6-mil plastic sheets were placed around the borehole and under the mud pit to minimize the loss of cuttings and fluids on the ground surface. Plastic was also placed beneath all the barrels and beneath the sampler when opened for sample inspection and collection.

4. Decontamination Procedures

Sampling and drilling equipment were cleaned with a portable, high-pressure steam cleaner prior to any field work and between drilling of borings to prevent cross-contamination between the boreholes. A decontamination area was constructed by nailing multiple layers of 6-mil plastic sheets over a 6-inch-high, rectangular wooden frame measuring 16 feet by 16 feet. Augers and samplers were set on saw horses to facilitate cleaning. Upper layers of the plastic were removed if they were overly soiled or torn during decontamination.

Prior to leaving the work site, the drilling equipment and samplers were steam cleaned so that no contamination was carried off the site.

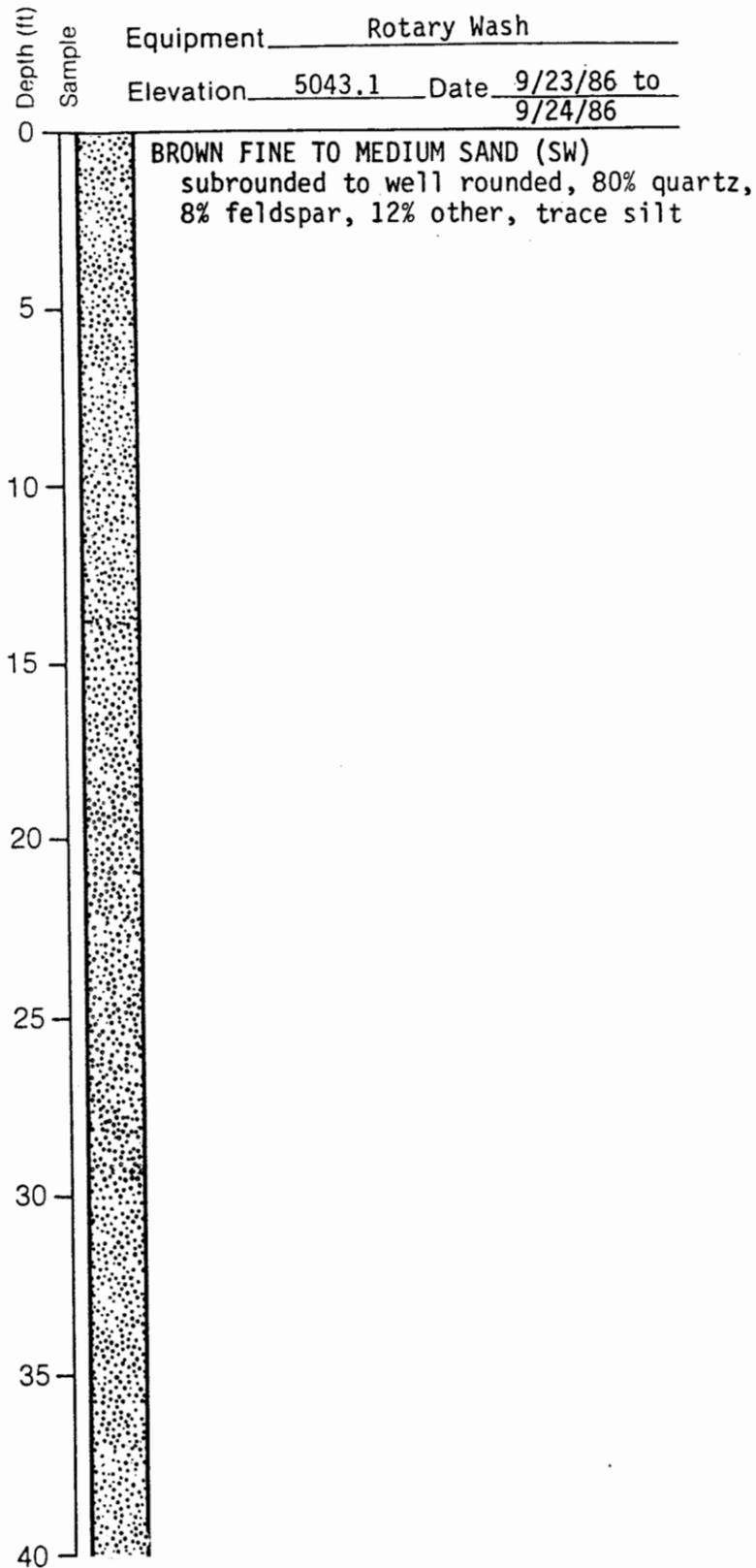
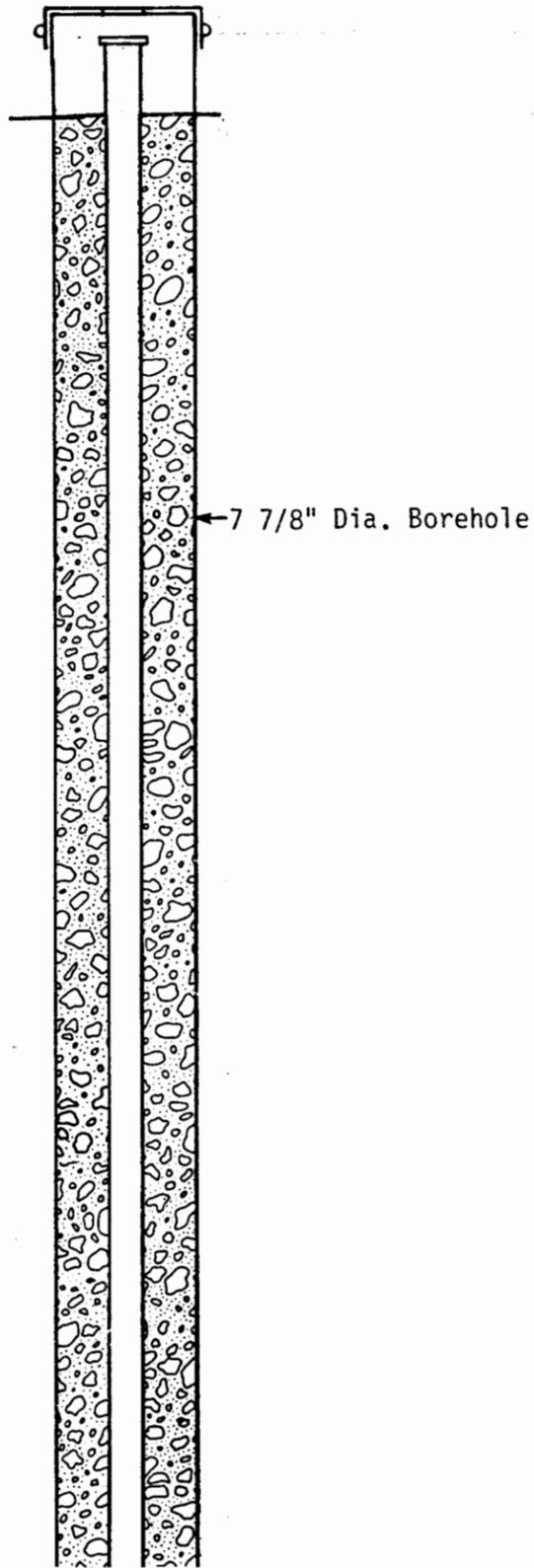
5. Well Construction

Following completion of each boring, a monitoring well was installed using Schedule 40, flush-jointed PVC casing. Five feet of 0.020-inch continuous slot stainless steel well screen was installed at the bottom of wells MW-21, MW-22 and MW-23. Ten feet of 0.020-inch slot Schedule 40 PVC well screen was installed at the bottom of wells MW-19 and MW-20. All flush joints were sealed with a rubber O-ring.

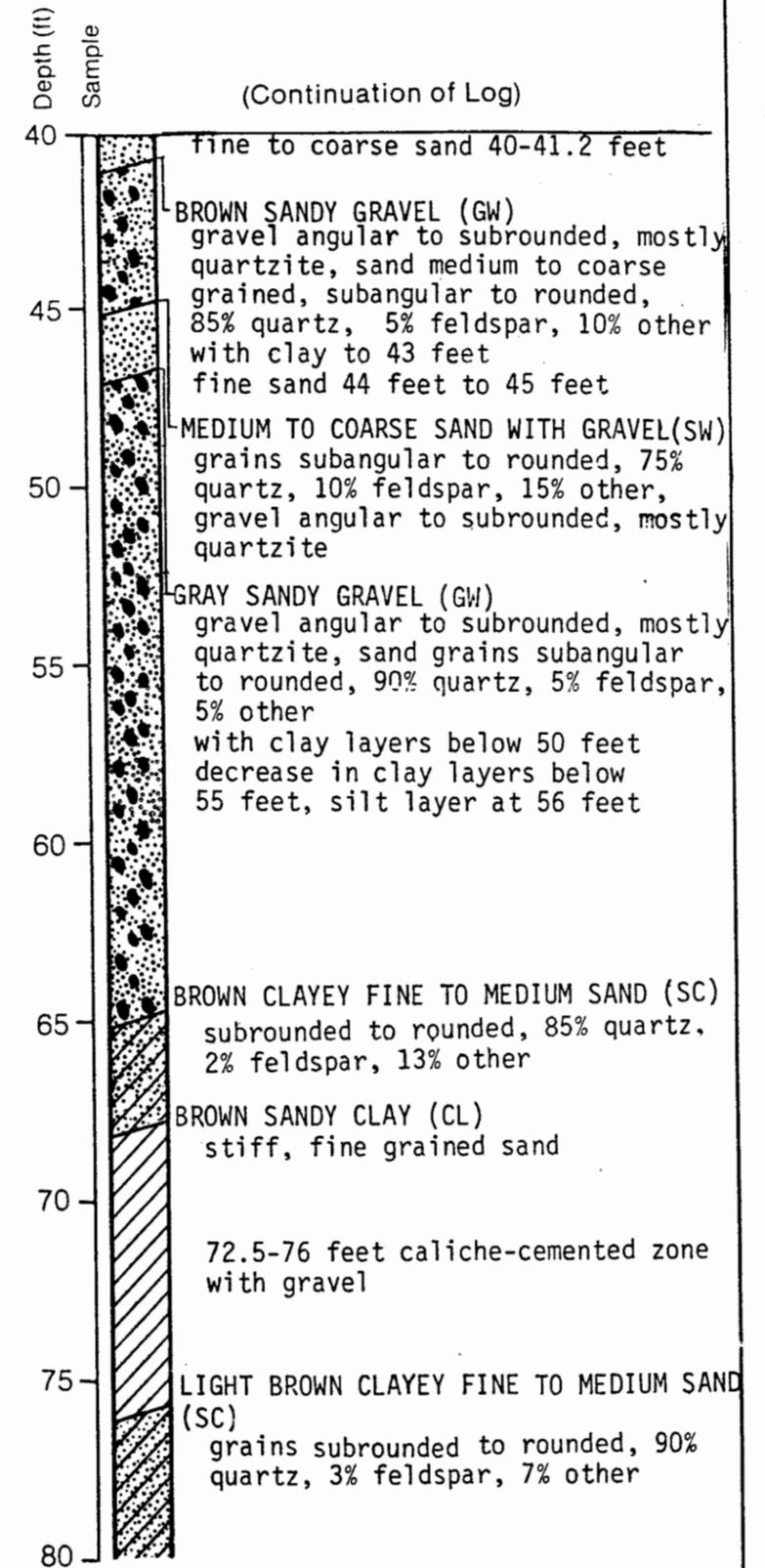
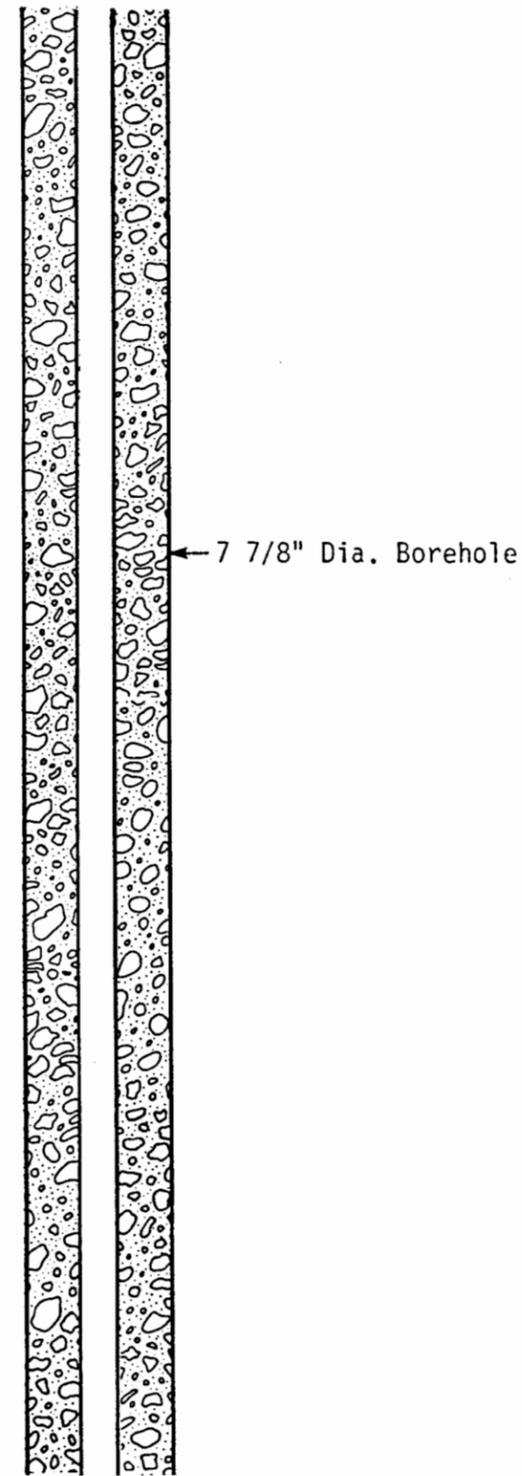
Specially graded (10-20) sand was used to pack the annular space from the bottom of the boring to at least two feet above the top of the well screen. A minimum 2-foot seal of bentonite pellets (MW-19 and MW-20) or granules (MW-21, MW-22 and MW-23) was then placed above the sand pack.

The wells were completed by placing a portland cement/bentonite grout seal from the top of the bentonite seal to the ground surface. A steel protective casing with a locking cap was placed over the top of each well.

MONITORING WELL DETAIL



MONITORING WELL DETAIL
(CONT.)



Harding Lawson Associates
 Engineers, Geologists
 & Geophysicists

LOG OF BORING/MONITORING WELL MW-19
 Sparton Technology, Inc.
 Albuquerque, New Mexico

PLATE

5

DRAWN
 E.S.

JOB NUMBER
 6310,033.12

APPROVED
 S.P.

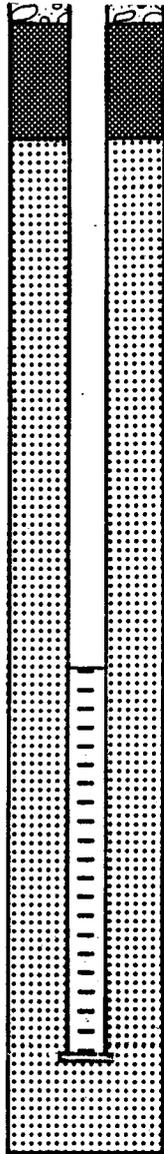
DATE
 11/18/86

REVISED

DATE

MW-19

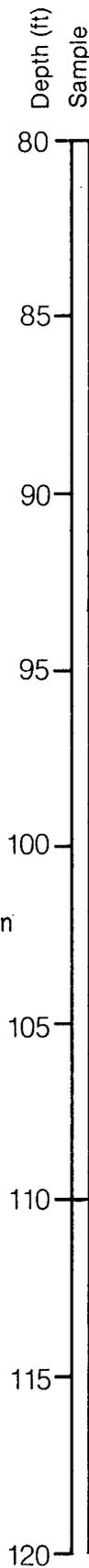
MONITORING WELL DETAIL
(CONT.)



←7-7/8" Dia. Borehole

←4" Dia. PVC Wellscreen

(Continuation of Log)



GRAY FINE TO COARSE SAND (SW)
angular to subrounded, 80% quartz,
5% feldspar, 15% other
trace small gravel, angular to
subrounded, mostly quartzite

larger gravel 100 - 100.7 feet

End of Boring at 110 feet



Harding Lawson Associates
Engineers, Geologists
& Geophysicists

LOG OF BORING/MONITORING WELL MW-19
Sparton Technology, Inc.
Albuquerque, New Mexico

(CONT.)

PLATE

5a

DRAWN

ES

JOB NUMBER

6310,033.12

APPROVED

SWP

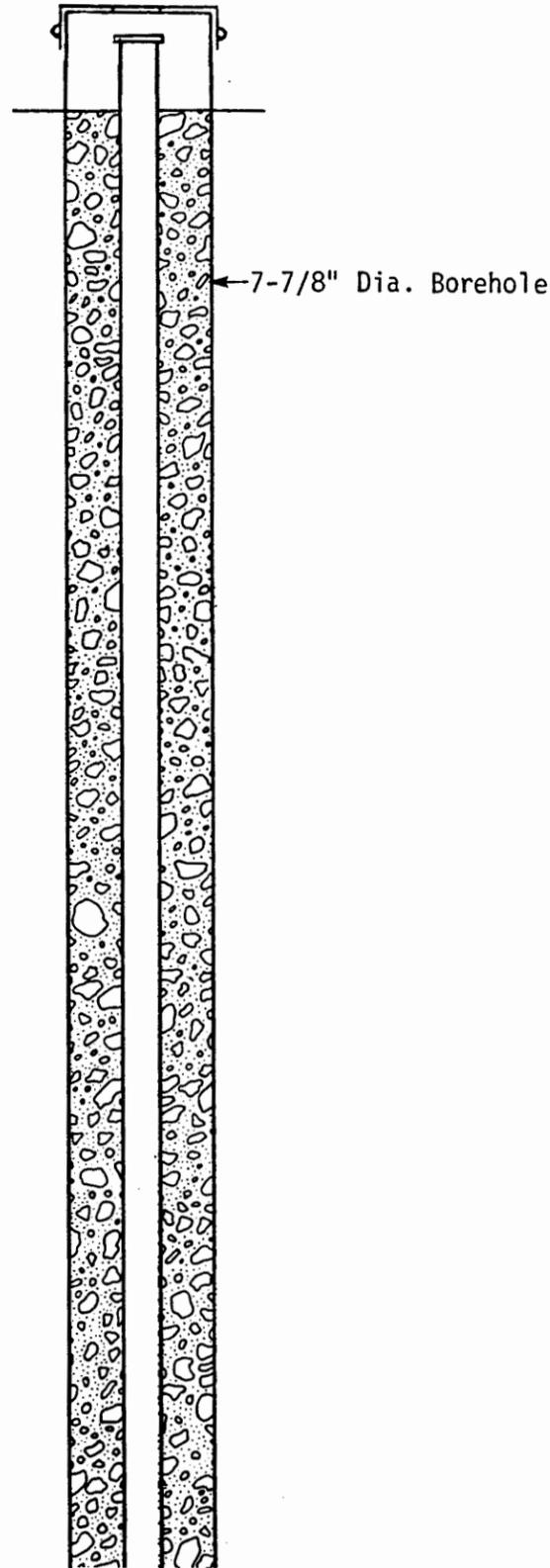
DATE

11/18/86

REVISED

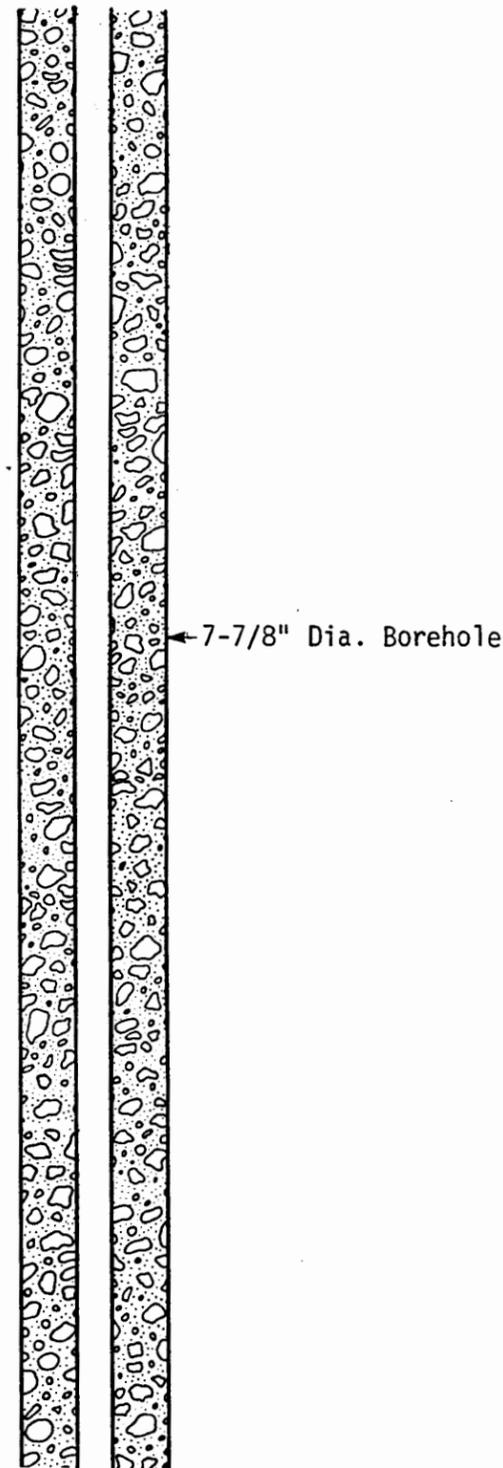
DATE

MONITORING WELL DETAIL



Depth (ft)	Sample	Equipment	RotaryWash
0		Elevation	5042.9
		Date	9/25/86 to 9/27/86
0 - 3.5		GRAY FINE TO COARSE SAND (SW) rounded to well rounded, 80% quartz, 10% feldspar, 10% other	
3.5 - 5.5		BROWN SILTY FINE TO COARSE SAND (SM) rounded to well rounded, 85% quartz, 7% feldspar, 8% other	
5.5 - 10		BROWN FINE TO MEDIUM SAND WITH SILT (SW-SM) rounded to well rounded, 90% quartz, 3% feldspar, 7% other	
10 - 16		fine to coarse grained 16 to 18 feet	
16 - 22		trace silt below 22 feet	
22 - 27		FINE TO MEDIUM SAND (SW) rounded to well rounded, 95% quartz, 2% feldspar, 3% other, trace silt	
27 - 30		no silt 27 to 30 feet	
30 - 39		39 to 40 feet sandy clay	
39 - 40			

MONITORING WELL DETAIL (CONT.)



Depth (ft)	Sample	(Continuation of Log)
40 - 44		BROWN SANDY GRAVEL WITH CLAY (GW-GC) gravel angular to subangular, mostly quartzite, sand rounded to well rounded, 90% quartz, 2% feldspar, 8% other
44 - 45		thin clay lenses 44 to 45 feet
45 - 54		BROWN SANDY GRAVEL (GW), gravel angular to subangular, mostly quartzite, sand rounded to well rounded, 90% quartz, 2% feldspar, 8% other
54 - 59		clay layers 54 to 59 feet
59 - 67.5		BROWN FINE TO MEDIUM SAND WITH SILT (SW-SM) subangular to subrounded, 90% quartz, 3% feldspar, 7% other
67.5 - 69.2		silty sand 67.5 to 69.2 feet
69.2 - 72		BROWN SANDY CLAY (CL) fine sand
72 - 72.5		hard drilling 72 to 72.5 feet
72.5 - 75		and 75 to 75.3 feet
75 - 80		BROWN SANDY SILT (ML) fine sand, subangular to subrounded, 95% quartz, 2% feldspar, 3% other,



Harding Lawson Associates
Engineers, Geologists
& Geophysicists

LOG OF BORING/MONITORING WELL MW-20
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE

6

DRAWN
Ed

JOB NUMBER
6310,033.12

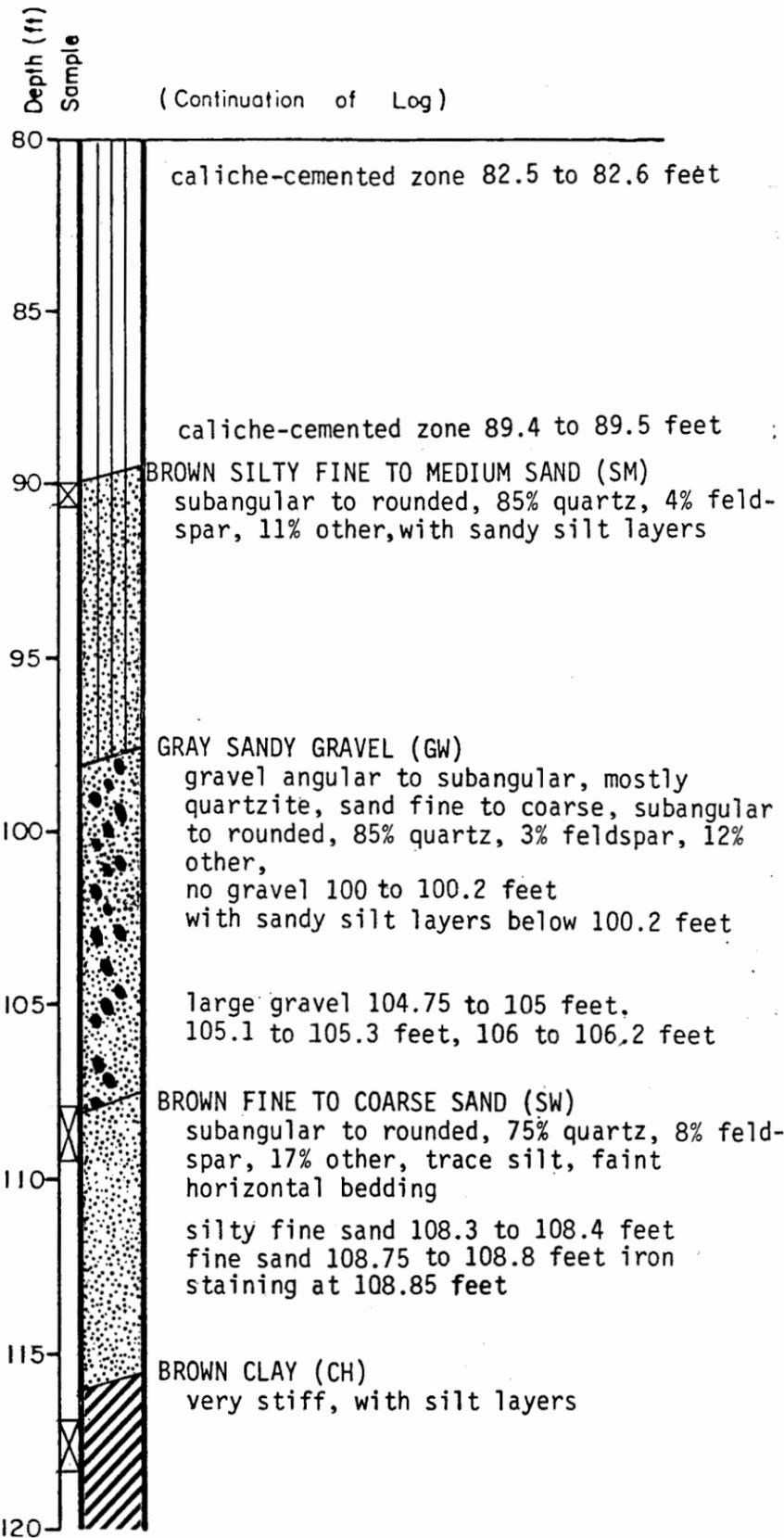
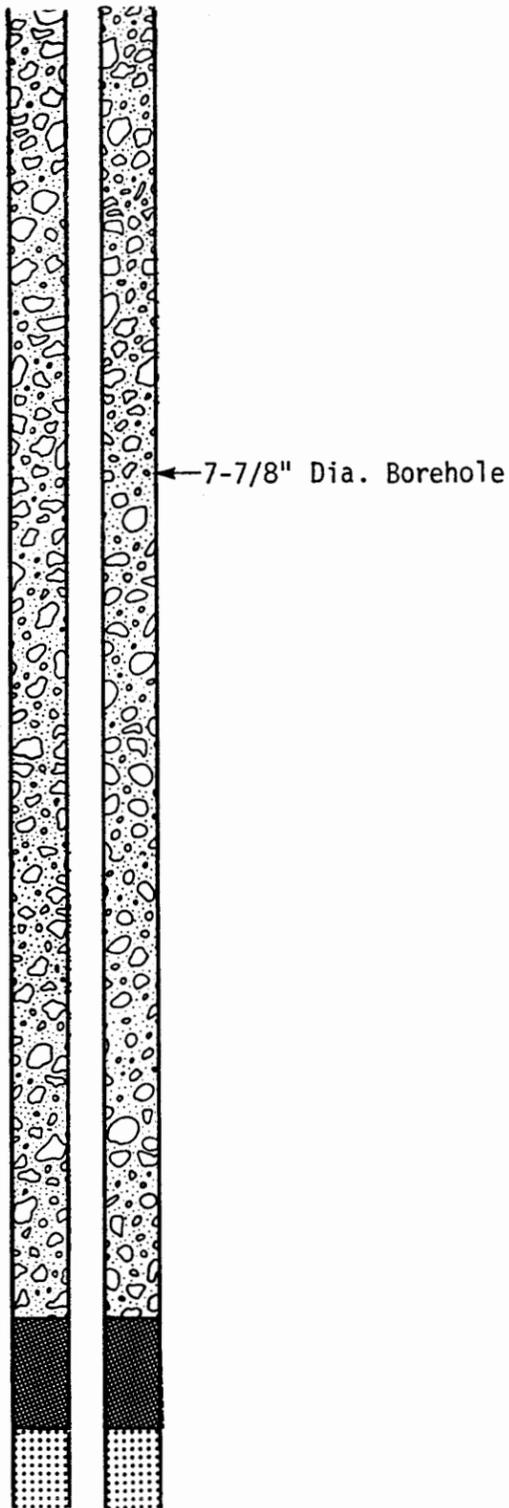
APPROVED
SPS

DATE
11/18/86

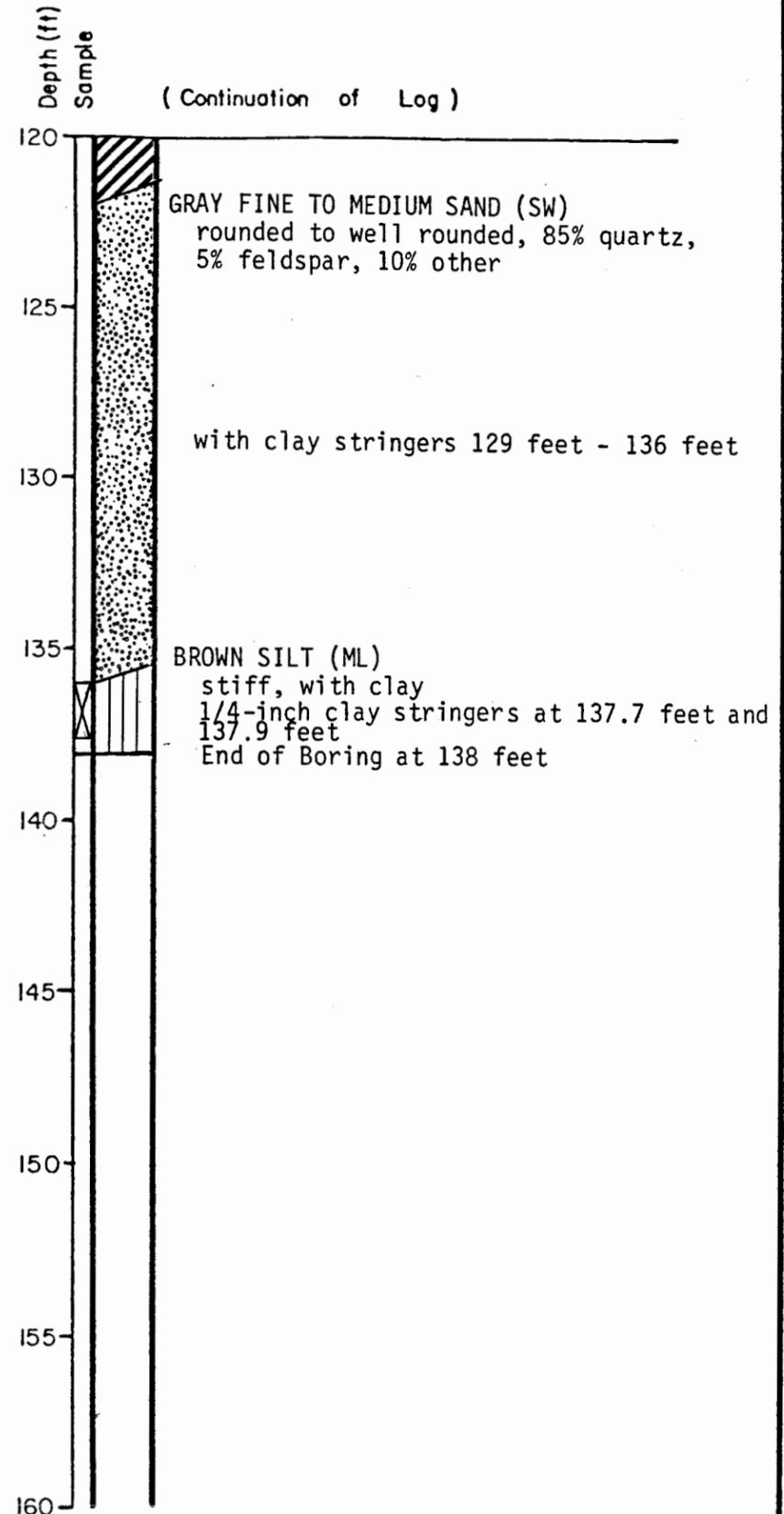
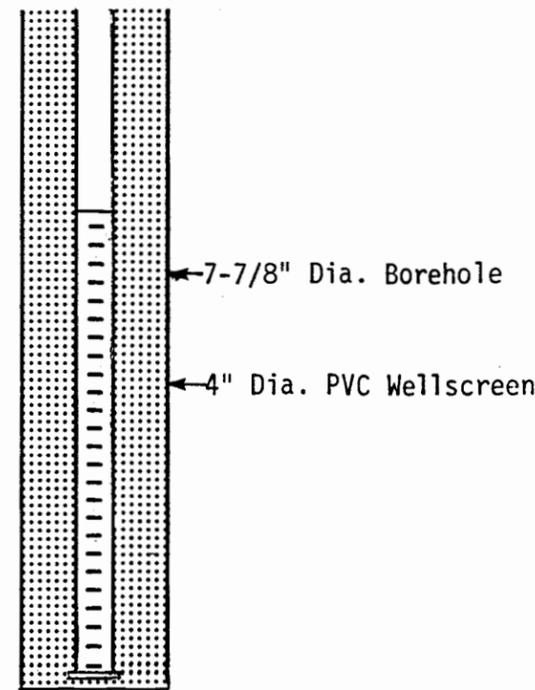
REVISED

DATE

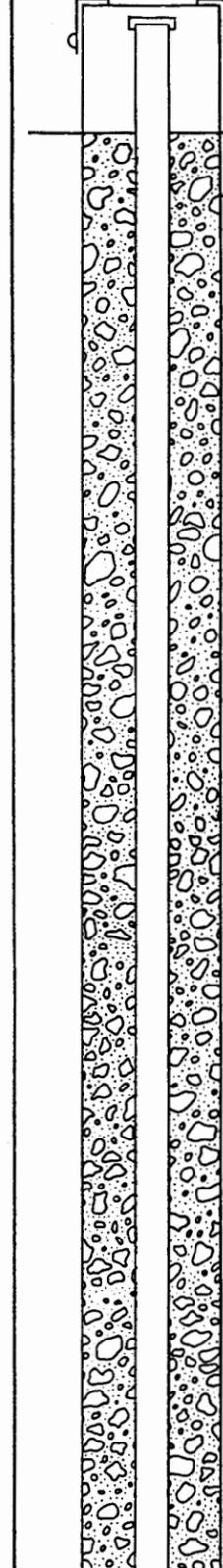
MONITORING WELL DETAIL (CONT.)



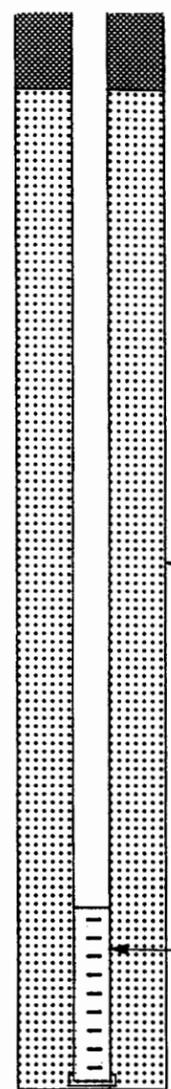
MONITORING WELL DETAIL (CONT.)



MONITORING WELL DETAIL

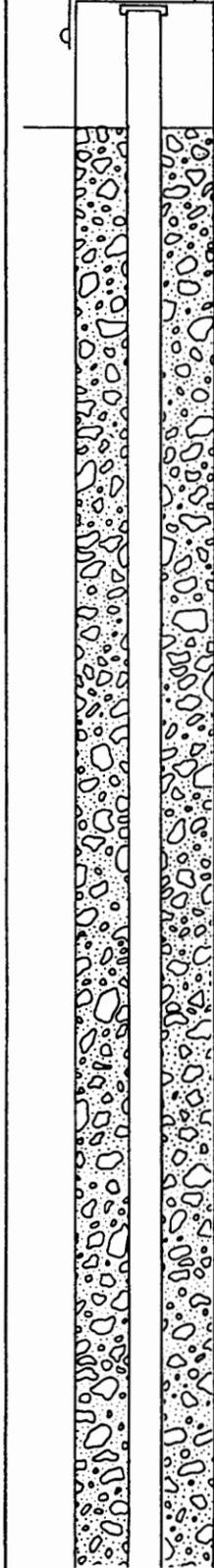


Depth (ft)	Sample	Equipment	Elevation	Date	PID Sample (ppm)	PID Background (ppm)
0	BROWN SILTY FINE TO MEDIUM SAND (SM) moist	Hollow-Stem-Auger	5044.8	8/5/86 to 8/6/86		
5	BROWN CLAYEY SILT (ML) moist, with fine grained sand BROWN SILTY CLAY (CL) moist, with fine grained sand				0.0	0.0
10	LIGHT BROWN SILTY FINE TO MEDIUM SAND (SM) moist, grains angular to subrounded, 85% quartz, 13% feldspar, 2% other, with clay, faint horizontal bedding interlayered with LIGHT GRAY MEDIUM SAND (SP) grains subangular to well rounded, 95% quartz, 3% feldspar, 2% other				0.2	0.0
15	LIGHT GRAY TO FINE MEDIUM SAND (SW) moist, grains subangular to well rounded, 94% quartz, 4% feldspar, 2% other, trace silt				0.6	0.0
20	LIGHT BROWN SILTY FINE SAND (SM), moist, grains angular to subrounded, 93% quartz, 6% feldspar, 1% other, some darker mottling near top				0.2	0.0
25	LIGHT BROWN MEDIUM SAND (SP), moist, grains subrounded to subangular, 95% quartz, 5% feldspar, 3% other, trace silt				2.4	0.0
30					11.6	0.0
35	color change to gray at 33 feet, grains 96% quartz, 2% feldspar, 2% other				1.8	0.0
40	driller's note: thin clay at 42 feet				3.9	0.0

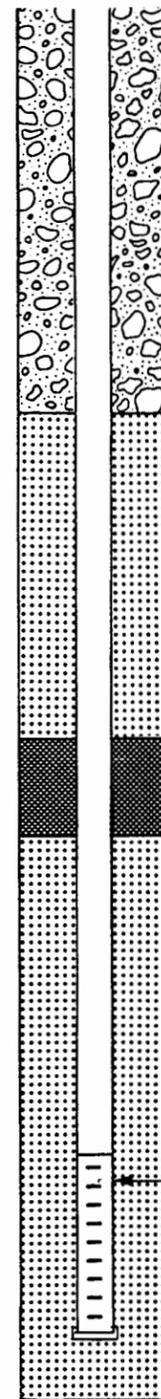


Depth (ft)	Sample	PID Sample (ppm)	PID Background (ppm)
40	LIGHT BROWN MEDIUM TO COARSE SAND (SW) moist, with gravel, grains subangular to well rounded, 90% quartz, 4% feldspar, 6% other, gravel subangular to well rounded, 98% quartzite, 2% other	2.6	0.0
45	GRAY SANDY GRAVEL (GW) moist, subangular to well rounded, mainly quartzite, sand grains subangular to well rounded, medium to coarse grained, 90% quartz, 4% feldspar, 6% other	1.4	0.0
50	decreased gravel content 45 feet to 48 feet clayey gravel 49 feet to 49.5 feet coarse sand from 49.5 to 50 feet	10.5	0.0
55	INTERLAYERED LIGHT BROWN COARSE SAND AND GRAVEL LENSES (SP)(GW) sand subrounded to well rounded, 80% quartz, 14% feldspar, 6% other, gravel subangular to well rounded, mainly quartzite	2.0	0.0
60			
63.5	seepage encountered at 63.5 feet		
65	BROWN SILTY FINE GRAINED SAND (SM) saturated, grains subangular to well rounded, 92% quartz, 3% feldspar, 5% other BROWN MEDIUM TO COARSE SAND (SP) saturated, grains subrounded to well rounded, 90% quartz, 6% feldspar, 4% other, with silt	3.0	0.0
70	BROWN SILTY FINE SAND (SM) saturated, grains subangular to well rounded, 93% quartz, 3% feldspar, 4% other		
75	End of Boring at 69.5 feet		
80			

MONITORING WELL DETAIL



PID Sample (ppm)	PID Background (ppm)	Depth (ft)	Sample	Equipment	Elevation	Date
				Hollow Stem-Auger	5045.1	8/7/86 to 8/8/86
0.0	0.0	0	LIGHT BROWN SILTY FINE TO MEDIUM SAND (SP) moist, grains subangular to rounded, 94% quartz, 2% feldspar, 4% other			
		5	silty fine sand 5.1 feet to 5.5 feet moist, grains subangular to rounded 94% quartz, 3% feldspar, 3% other			
0.1	0.0	10				
0.0	0.0	15	BROWN MEDIUM TO COARSE SAND (SW) moist, with gravel, grains subangular to rounded, 85% quartz, 10% feldspar, 5% other gravel angular to subrounded, mostly granite with caliche at 15.5 feet			
0.0	0.0	20				
0.0	0.0	25				
0.0	0.0	30				
0.2	0.0	35				
1.5	0.0	39	with trace silt, no gravel at 35.5 feet to 39 feet and 39.5 feet to 40.3 feet			
1.9	0.0	43.3	faint cross bedding from 39 to 43.3 feet			



PID Sample (ppm)	PID Background (ppm)	Depth (ft)	Sample	Equipment	Elevation	Date
				Hollow Stem-Auger	5045.1	8/7/86 to 8/8/86
9.2	0.0	40	LIGHT BROWN TO MEDIUM SAND (SP) moist, grains subangular to well rounded, 88% quartz, 5% feldspar, 7% other			
		45	silty fine sand lenses with horizontal bedding 43.5 to 43.8 feet, 44.3 to 44.5 feet, 45.1 to 45.3 feet, and 45.6 to 45.9 feet, grains subrounded to well rounded, 80% quartz, 10% feldspar, 10% other fine sand below 50 feet			
2.2	0.0	50	silty clay at 50 to 50.1 feet silty sand at 50.1 to 50.3 feet, and 50.4 to 50.8 feet			
3.0	0.0	55	sand grains rounded to well rounded, 90% quartz, 3% feldspar, 2% other			
0.7	0.0	60	LIGHT BROWN SILTY SAND (SM) moist, grains subangular to well rounded, 94% quartz, 2% feldspar, 4% other			
0.5	0.0	65	LIGHT BROWN MEDIUM SAND (SW) moist, grains subangular to well rounded, 95% quartz, 3% feldspar, 2% other			
		66	poorly graded sand with trace silt below 59 feet			
		68.2	seepage encountered at 66 feet trace gravel below 68.2 feet, gravel rounded, mainly quartzite			
0.5	0.0	70	BROWN FINE TO MEDIUM SAND (SP) grains subangular to rounded, 95% quartz, 2% feldspar, 3% other, with trace silt			
0.5	0.0	75	sandy silt from 71.5 to 72 feet, and 73.2 to 74.2 feet, gravelly from 74.2 to 74.6 feet, sand grains subangular to rounded, 92% quartz, 5% feldspar, 2% other			
		80	2% other, gravel subrounded to rounded, mainly quartzite			
			LIGHT BROWN SILTY FINE SAND (SM) dense, saturated, grains subangular to rounded			

Harding Lawson Associates **LOG OF BORING/MONITORING WELL MW-22** PLATE 8
 Engineers, Geologists & Geophysicists
 Sparton Technology, Inc.
 Albuquerque, New Mexico

DRAWN: *ES.* JOB NUMBER: 6310,033.12 APPROVED: *SDP* DATE: 11/18/86 REVISED: DATE:

MW-22

Depth (ft)
Sample

(Continuation of Log)

80	granite fragment at 75.5 feet to 75.6 feet
	hard drilling to bottom of hole
85	Note: Above 48 feet the 11.7 ev PID probe was used. Below 48 feet the 10.2 ev PID probe was used.
	End of Boring at 78 feet
90	
95	
100	
105	
110	
115	
120	



Harding Lawson Associates
Engineers, Geologists
& Geophysicists

LOG OF BORING/MONITORING WELL MW-22
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE
(CONT.)
8a