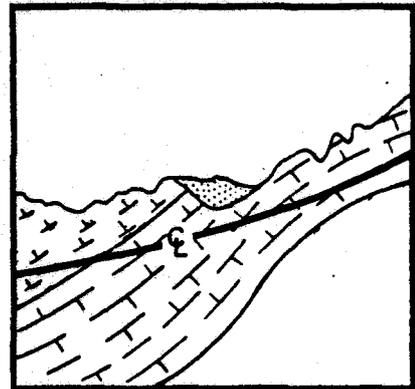
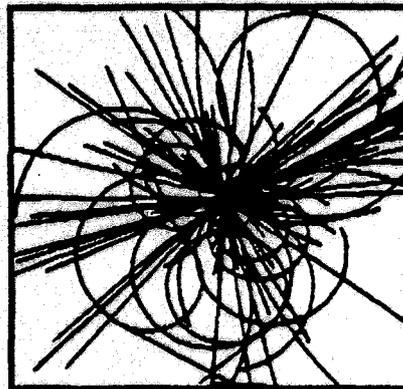


Data Report for Structure Study Zone SE 1.2 and Rotary Wash Borings SE 1.2A and SE 1.2B



Prepared by:  **The Earth Technology Corporation**
Long Beach, California

Prepared for: **RTK** a joint venture
Oakland, California

FOREWORD

The goal of the geotechnical studies at the Texas Superconducting Super Collider (SSC) site is to allow the geologist and engineer to build their level of knowledge and confidence about the geologic structures and geotechnical properties of the site materials to the point at which there remains only a realistically small risk of encountering geotechnical conditions during construction that would significantly increase construction costs or delay construction schedules. To do this, a characterization program has been designed to meet the following objectives:

- To confirm the site's suitability and optimize the ring location (the "footprint") and hall positions on the ring
- To provide data for a preliminary structural design
- To provide a rational framework within which construction contracts and schedules can be formulated
- To maximize the use of the site-specific data already gathered by the proposer.

The geotechnical program to meet these objectives has been divided into the following three phases of study:

- Footprint location data (the present phase)
- Global data (planned)
- Structure-specific data (planned).

The primary purpose of the present footprint location phase is to quickly assess whether individual components of the collider footprint, or the entire footprint, need to be relocated because of geotechnical constraints. Accordingly, the following areas have been assessed:

- Areas on the western side of the footprint where the geologic structure brings the Eagle Ford Shale close to the depth of the tunnel and experimental halls, thus presenting potential constraints due to weak, deformable rock.
- Areas where the tunnel placement is shallow and/or there are nearby sources of vibration such as major highways and railroads that may represent a problem due to unacceptable vibrations at tunnel depth.
- Zones of potentially poor rock quality and high water inflow in the rock that should be avoided for the experimental hall excavations.

This is one in a series of data reports prepared for the footprint phase of geotechnical characterization at the SSC site. Each data report includes the results of both field and laboratory tests for a specific drilling and sampling site. Interpretations of these data will be covered in topical reports, including three planned reports, as follows:

- Train-, traffic-, and quarry-caused vibrations
- Geomechanical properties of the Eagle Ford Shale
- Structure and stratigraphy of the near-cluster.

Future planned program phases--global and structure-specific data collection--will concentrate on (1) evaluating ring areas where few geotechnical data are currently available and (2) conducting more detailed studies at the sites of the injector and experimental halls.

DATA REPORT

Site Designator: SE1.2

Objective: To constrain existence and location of a fault based on geologic mapping and stratigraphic correlations between borings (determined from wire-line logs).

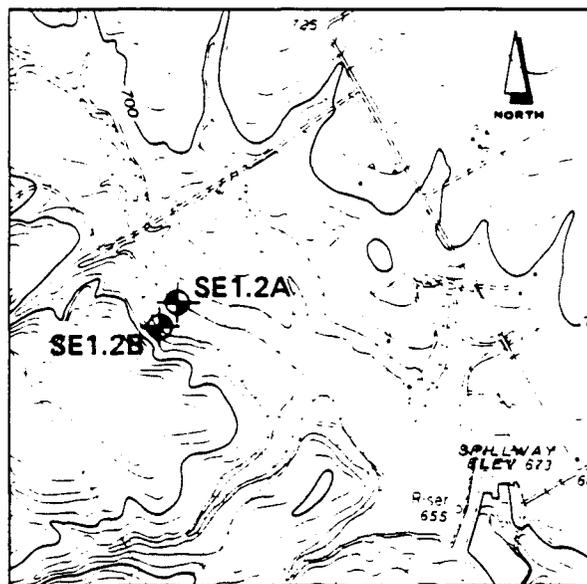
Hole No. SE1.2A

Location: North 264,110.5 feet
East 2,171,656.1 feet
Surface Elevation 666.4 feet

Hole No. SE1.2B

Location: North 263,856.0 feet
East 2,171,463.1 feet
Surface Elevation 669.3 feet

SE1.2A and SE1.2B are located on the western side of the ring, about 2 miles north of FM 1446.



SCALE 1:24,000



Scope and Schedule: Geologic Mapping

May 26 to June 1, 1989

SE1.2A: Rotary Wash Boring

June 21, 1989

Wire-line Logging

June 21, 1989

Plugging and Abandonment

June 21, 1989

SE1.2B: Rotary Wash Boring

June 20, 1989

Wire-line Logging

June 20, 1989

Plugging and Abandonment

June 21, 1989

Geologic Mapping: A north 50° west-trending lineament on aerial photographs was ground-checked by observing outcropping bedrock over a 0.6 mile length of the lineament (see Appendix A). No faults were observed; however, very few bedrock exposures are available to determine the presence or absence of a fault along the significant photographic lineament.

Hole No. SE1.2A

Conditions Encountered:

Total Hole Depth 85.0 feet

Soil 0.0 to 8.0 feet

Austin Chalk 8.0 to 85.0 feet
(see lithologic log, Appendix B)

Wire-line logs indicated no fault offset between borings SE1.2A and SE1.2B.

Geophysical Logging: (See wire-line logs, Appendix C)

Spontaneous Potential
Normal Resistivity (short)
Guarded Resistivity (long)
Natural Gamma
Compensated Density (caliper)
Sonic Velocity (full wave)

Hole Status: Cemented and abandoned.
(See plugging report, Appendix D)

Hole No. SE1.2B

Conditions Encountered:

Total Hole Depth 85.0 feet

Soil 0.0 to 32.0 feet

Austin Chalk 32.0 to 85.0 feet
(see lithologic log, Appendix B)

Wire-line logs indicated no fault offset between borings SE1.2A and SE1.2B.

Geophysical Logging: (See wire-line logs, Appendix C)

Spontaneous Potential
Normal Resistivity (short)
Guarded Resistivity (long)
Natural Gamma
Compensated Density (caliper)
Sonic Velocity (full wave)

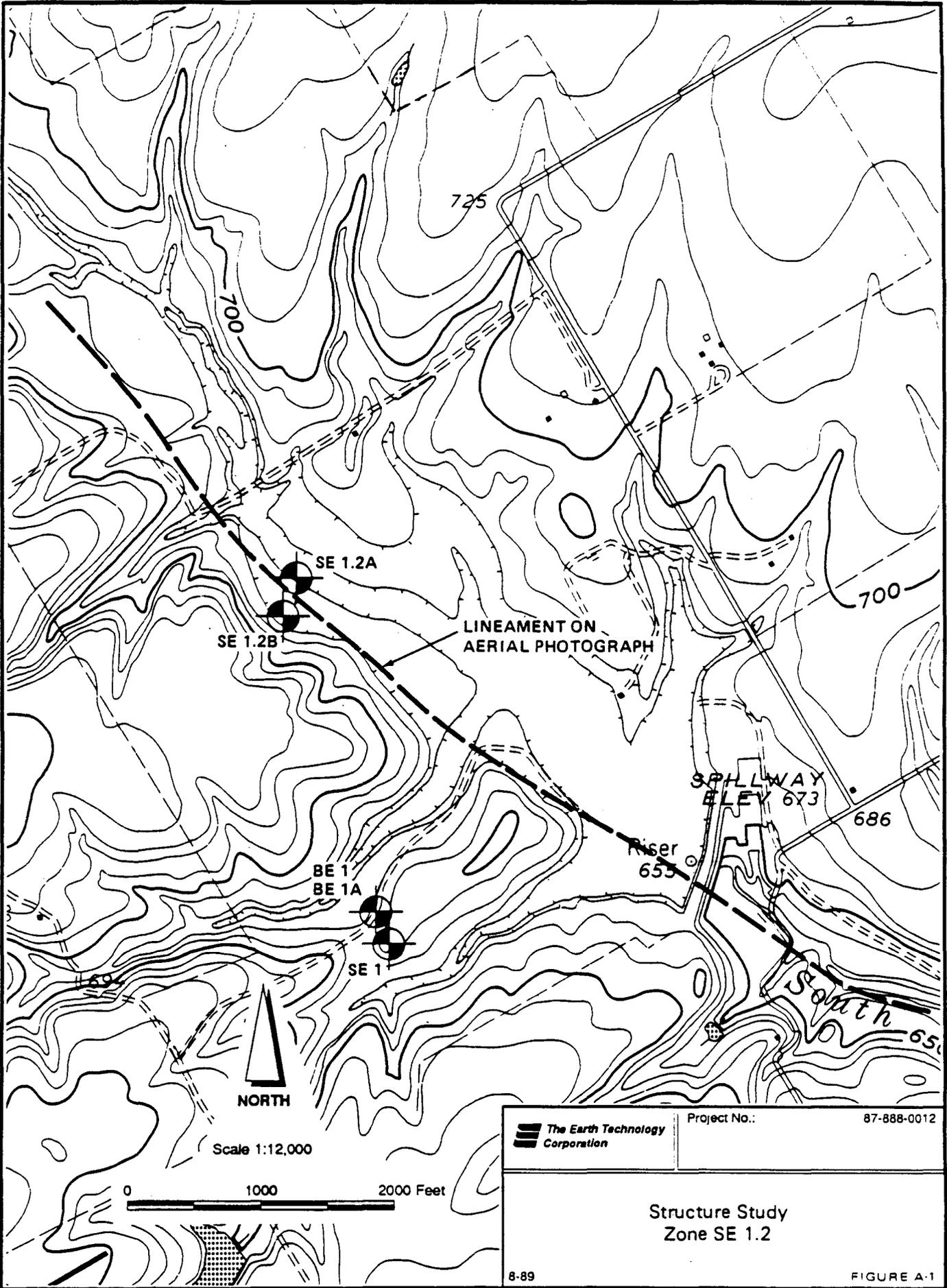
Hole Status: Cemented and abandoned.
(See plugging report, Appendix D)

APPENDIX A
STRUCTURE ZONE MAP

STRUCTURE STUDY ZONE SE1.2

The major lineament of Structure Study Zone SE1.2 as mapped on aerial photographs is about 2 miles in length and trends north 40° - 55° west. The feature was delineated based on a very linear segment of South Prong Creek, alignment of trees, and tonal changes in the soil parallel to the creek.

Field geologic mapping was primarily conducted southeast of the reservoir on South Prong Creek (see Figure A-1) because of flooding and a lack of outcropping bedrock along the lineament northwest of the dam. About 0.6 mile was traversed in the stream drainage and no evidence of faulting was observed in the few locations of outcropping bedrock. Evaluation of the wire-line logs of borings SE1.2A and SE1.2B indicated no fault offset between the holes.



APPENDIX B

LITHOLOGIC LOGS

LOG OF BORING

PROJECT: TEXAS SSC SITE
 CLIENT: The Earth Technology Corporation
 TASK NO.: 12

BORING NO: SE1.2A PG 1 OF 3
 LOCATION: N 264,110.5 feet
 E 2,171,656.1 feet
 GROUND EL: 666.4 feet

DATE: 6/21/89 TYPE: Water Rotary CASED TO: N/A CONTRACTOR: SwL (89-192)

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE		PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	SAMPLE LEGEND	WATER INFORMATION
			TOP	BOT.					S = SPLIT SPOON T = 2" THIN WALL TUBE U = 3" THIN WALL TUBE C = NX ROCK CORE	Not available, began drilling with water immediately
DESCRIPTION OF STRATUM										
									CLAY, silty, medium to stiff, trace roots, brown to dark brown	
									3.0	
									CLAY, silty, stiff, embedded limestone fragments, tan to brown	
									8.0	
									LIMESTONE (Austin Chalk), severely weathered, occasional clay layers, tan	
									11.0	
									LIMESTONE (Austin Chalk), fresh, occasional thin shaly limestone layers, light gray to dark gray	
									-interbedded thin layers of bentonite and shale at 19.5'-20.5'	

DRILLING GEOLOGIST S. Wood ASSISTANT N/A CHECKED BY B. Bailey

LOG OF BORING

BORING NO: SE1.2A PG 2 OF 3

PROJECT: TEXAS SSC SITE

LOCATION: N 264,110.5 feet
E 2,171,656.1 feet

CLIENT: The Earth Technology Corporation

GROUND EL: 666.4 feet

TASK NO.: 12

DATE: 6/21/89 TYPE: Water Rotary CASED TO: N/A CONTRACTOR: SwL (89-192)

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE		PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	SAMPLE LEGEND	WATER INFORMATION
			TOP	BOT.					S = SPLIT SPOON T = 2" THIN WALL TUBE U = 3" THIN WALL TUBE C = NX ROCK CORE	see page 1 of 3
DESCRIPTION OF STRATUM										
-45	[Brick Pattern]								LIMESTONE (Austin Chalk), fresh, occasional thin shaly limestone layers, light gray to dark gray	
-50	[Brick Pattern]									
-55	[Brick Pattern]									
-60	[Brick Pattern]									
-65	[Brick Pattern]									
-70	[Brick Pattern]									
-75	[Brick Pattern]									
-80	[Brick Pattern]									

DRILLING GEOLOGIST S. Wood ASSISTANT N/A CHECKED BY B. Bailey

LOG OF BORING

PROJECT: TEXAS SSC SITE
 CLIENT: The Earth Technology Corporation
 TASK NO.: 12

BORING NO: SE1.2A PG 3 OF 3
 LOCATION: N 264,110.5 feet
 E 2,171,656.1 feet
 GROUND EL: 666.4 feet

DATE: 6/21/89 TYPE: Water Rotary CASED TO: N/A CONTRACTOR: SwL (89-192)

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE		PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	SAMPLE LEGEND	WATER INFORMATION
			TOP	BOT.					S = SPLIT SPOON T = 2" THIN WALL TUBE U = 3" THIN WALL TUBE C = NX ROCK CORE	see page 1 of 3
DESCRIPTION OF STRATUM										
85	[Brick pattern symbol]									LIMESTONE (Austin Chalk), fresh, occasional thin shaly limestone layers, light gray to dark gray
90										Bottom of Exploration at 85.0'
95										NOTE: Borehole grouted after completion.
100										
105										
110										
115										
120										

DRILLING GEOLOGIST S. Wood ASSISTANT N/A CHECKED BY B. Bailey

LOG OF BORING

PROJECT: TEXAS SSC SITE CLIENT: The Earth Technology Corporation TASK NO.: 12	BORING NO: SE1.2B PG 1 OF 3 LOCATION: N 263,856.0 feet E 2,171,463.1 feet GROUND EL: 669.3 feet
--	---

DATE: 6/20/89 **TYPE:** Air/Fluid Inj. Rotary **CASED TO:** 35.0' **CONTRACTOR:** SwL (89-192)

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE		PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	SAMPLE LEGEND	WATER INFORMATION
			TOP	BOT.					S = SPLIT SPOON T = 2" THIN WALL TUBE U = 3" THIN WALL TUBE C = NX ROCK CORE	No groundwater encountered.
DESCRIPTION OF STRATUM										
- 5	//									CLAY, silty, medium to stiff, embedded limestone fragments, brown to tan -switch to fluid injection at 10.0'
- 10	//									
- 15	//									
- 20	//									
- 25	//									
- 30	//									
- 32.0	//									
- 35	■								Limestone (Austin Chalk), severely weathered, occasional clay layers, tan	
- 35.0	■								Limestone (Austin Chalk), fresh, occasional thin shaly limestone layers, light gray to dark gray -shale, dark gray at 39.5'-39.8'	
- 40	■									

DRILLING GEOLOGIST S. Wood **ASSISTANT** NA **CHECKED BY** B. Bailey

LOG OF BORING

PROJECT: TEXAS SSC SITE CLIENT: The Earth Technology Corporation TASK NO.: 12	BORING NO: SE1.2B PG 2 OF 3 LOCATION: N 263,856.0 feet E 2,171,463.1 feet GROUND EL: 669.3 feet
--	---

DATE: 6/20/89 TYPE: Air/Fluid Inj. Rotary CASED TO: 35.0' CONTRACTOR: SwL (89-192)

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE		PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	SAMPLE LEGEND	WATER INFORMATION
			TOP	BOT.					S = SPLIT SPOON T = 2" THIN WALL TUBE U = 3" THIN WALL TUBE C = NX ROCK CORE	See page 1 of 3
DESCRIPTION OF STRATUM										
-45	[Brick Pattern]									LIMESTONE (Austin Chalk), fresh, occasional thin shaly limestone layers, light gray to dark gray
-50	[Brick Pattern]									
-55	[Brick Pattern]									
-60	[Brick Pattern]									
-65	[Brick Pattern]									
-70	[Brick Pattern]									
-75	[Brick Pattern]									
-80	[Brick Pattern]									
	[Brick Pattern]									
	[Brick Pattern]									

DRILLING GEOLOGIST S. Wood ASSISTANT N/A CHECKED BY B. Bailey

LOG OF BORING

PROJECT: TEXAS SSC SITE
 CLIENT: The Earth Technology Corporation
 TASK NO.: 12

BORING NO: SE1.2B PG 3 OF 3
 LOCATION: N 263,856.0 feet
 E 2,171,463.1 feet
 GROUND EL: 669.3 feet

DATE: 6/20/89 TYPE: Air/Fluid Inj. Rotary CASED TO: 35.0' CONTRACTOR: SwL (89-192)

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE		PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	SAMPLE LEGEND	WATER INFORMATION
			TOP	BOT.					S = SPLIT SPOON T = 2" THIN WALL TUBE U = 3" THIN WALL TUBE C = NX ROCK CORE	see page 1 of 3
DESCRIPTION OF STRATUM										
85	[Brick Pattern]								LIMESTONE (Austin Chalk), fresh, occasional thin shaly limestone layers, light gray to dark gray	
90									Bottom of Exploration at 85.0'	
95									NOTE: Borehole grouted after completion.	
100										
105										
110										
115										
120										

DRILLING GEOLOGIST S. Wood ASSISTANT N/A CHECKED BY B. Bailey

APPENDIX C
WIRE-LINE LOGS

WIRE-LINE LOGGING PARAMETERS

Hole No. SE1.2A

Log Measured From: Ground Level

Drilling Parameters

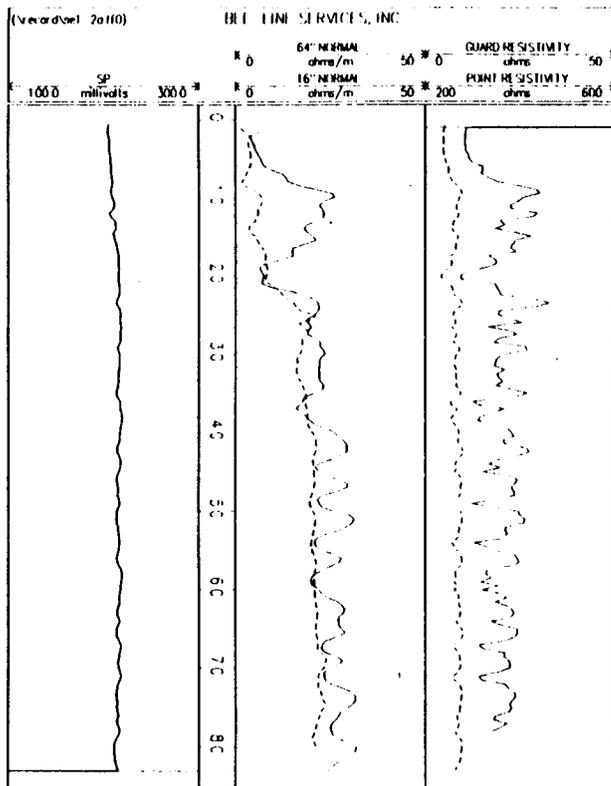
Depth 85 feet
Bit Diameter 4.75 inches

<u>Logging Parameters</u>	<u>Electrical Log</u>	<u>Gamma Log</u>	<u>Sonic Log</u>
Date	June 21, 1989	June 21, 1989	June 21, 1989
Depth	82.8 feet	82.8 feet	82.8 feet
Bottom Log Interval	83.5 feet	83.5 feet	79.6 feet
Top Log Interval	surface	surface	surface
Type of Fluid in Hole	boring fluid	boring fluid	boring fluid
Time Since Circulation Stop	30 minutes	30 minutes	30 minutes
Probe Type/S.N.	ALP-4979	XAP-4383	CLP-4877A
Module Type/S.N.	ALM-4979	XAM-4383	CLM-4877A
Logging Speed	15 feet/min.	15 feet/min.	5 feet/min.
Sample Interval	0.5 feet	0.5 feet	0.5 feet

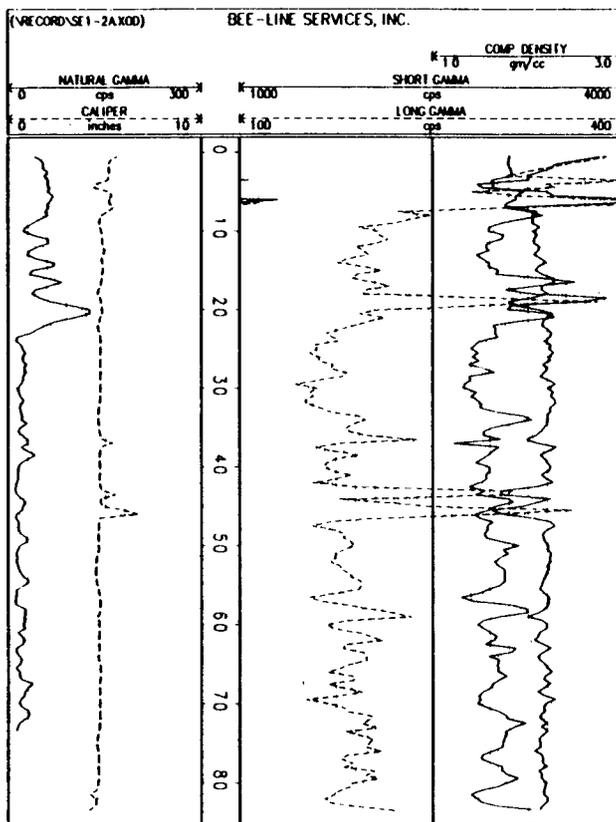
Logged by: BEE-LINE SERVICES, INC.
P.O. Box 2096
Corsicana, TX 75151

SE1.2A Wire-line logs run June 21, 1989. Surface elevation 666.4 feet.

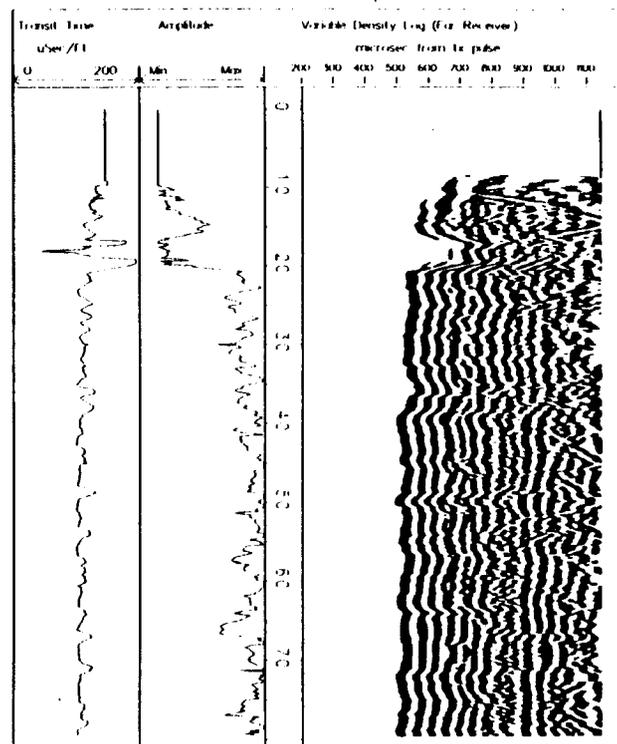
ELECTRICAL LOG



GAMMA LOG



SONIC LOG



WIRE-LINE LOGGING PARAMETERS

Hole No. SE1.2B

Log Measured From: Ground Level

Drilling Parameters

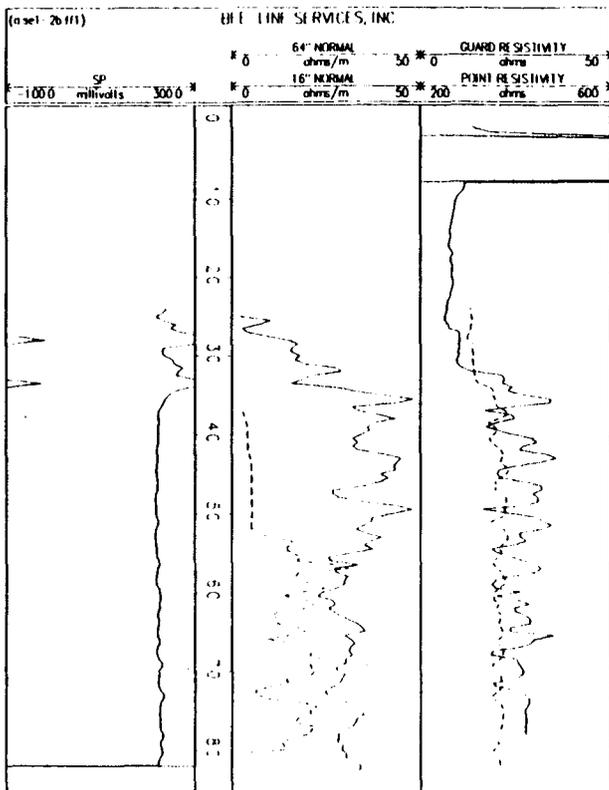
Depth 85 feet
Bit Diameter 4.75 inches

<u>Logging Parameters</u>	<u>Electrical Log</u>	<u>Gamma Log</u>	<u>Sonic Log</u>
Date	June 20, 1989	June 20, 1989	June 20, 1989
Depth	82.9 feet	82.9 feet	82.9 feet
Bottom Log Interval	83.0 feet	83.5 feet	78.8 feet
Top Log Interval	surface	surface	surface
Type of Fluid in Hole	water	water	water
Time Since Circulation Stop	30 minutes	30 minutes	30 minutes
Probe Type/S.N.	ALP-4979	XAP-4383	CLP-4877A
Module Type/S.N.	ALM-4979	XAM-4383	CLM-4877A
Logging Speed	15 feet/min.	15 feet/min.	5 feet/min.
Sample Interval	0.5 feet	0.5 feet	0.1 feet

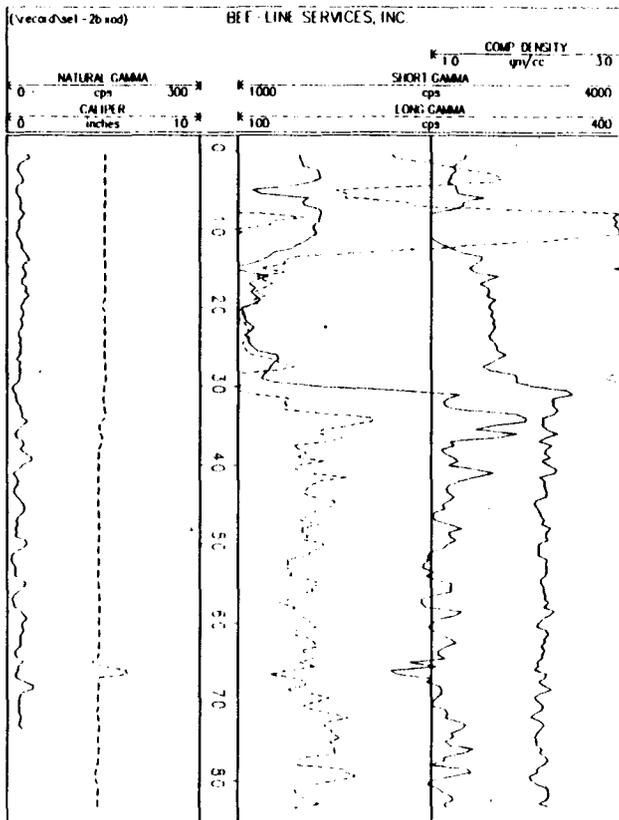
Logged by: BEE-LINE SERVICES, INC.
P.O. Box 2096
Corsicana, TX 75151

SE1.2B Wire-line logs run June 20, 1989. Surface elevation 669.3 feet.

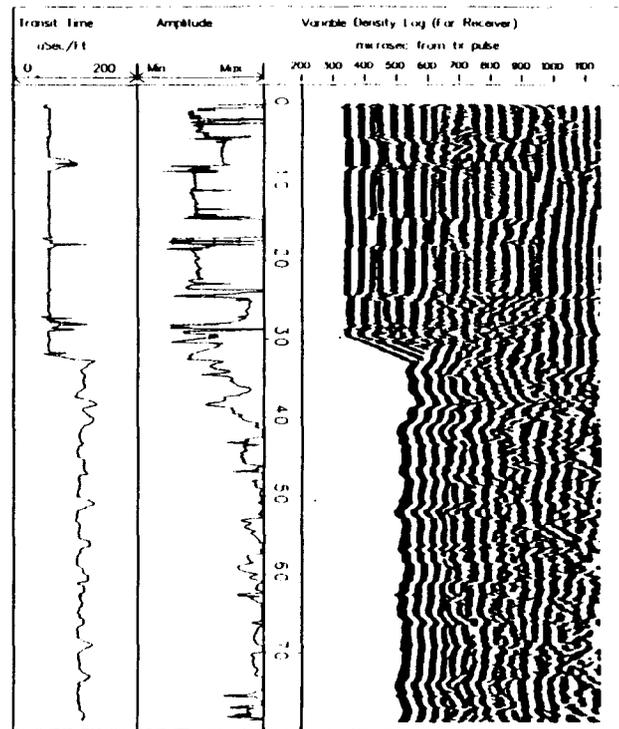
ELECTRICAL LOG



GAMMA LOG



SONIC LOG



APPENDIX D

PLUGGING REPORTS

SSC BOREHOLE PLUGGING REPORT

TETC Project No. 87-88-0012

Task No. 12

Boring No. SE 1.2A

Texas Coordination Location: N 264,110.5 feet
E 2,171,656.1 feet

Surface Elevation: 666.4 feet

Total Boring Depth: 85.0'

Date Drilled: 6-21-89

Date Plugged: 6-21-89

Time Completed: 3:00 p.m.

Remarks:

101 gallons of grout was used to completely cement boring from bottom to top. 10 sacks of Portland Cement and 1 sack of Polygel Bentonite combined with water comprised the total grout mixture. Water/cement ratio was approximately 9 gallons per sack.

Drilling Geologist: Shawn D. Wood
SwL Coordinator: Bruce Bailey
SwL Report No. 89-192

SSC BOREHOLE PLUGGING REPORT

TETC Project No. 87-88-0012

Task No. 12

Boring No. SE 1.2B

Texas Coordination Location: N 263,856.0 feet
E 2,171,463.1 feet

Surface Elevation: 669.3 feet

Total Boring Depth: 85.0'

Date Drilled: 6-20-89

Date Plugged: 6-21-89

Time Completed: 9:30 a.m.

Remarks:

101 gallons of grout was used to completely cement boring from bottom to top. 10 sacks of Portland Cement and 1 sack of Polygel Bentonite combined with water comprised the total grout mixture. Water/cement ratio was approximately 9 gallons per sack.

Drilling Geologist: Shawn D. Wood
SWL Coordinator: Bruce Bailey
SWL Report No. 89-192