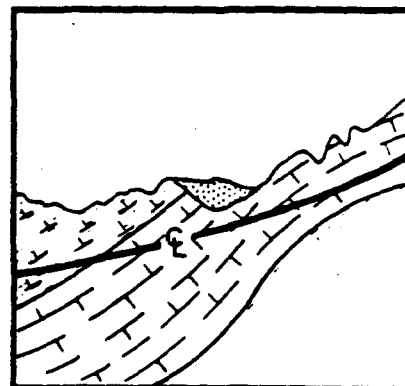
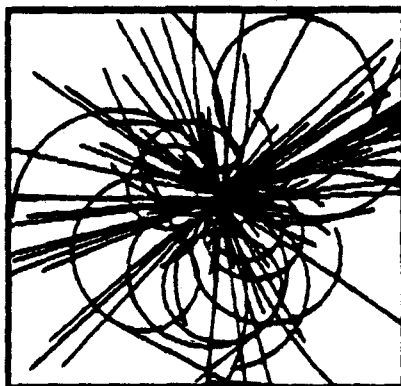


# Data Report for Structure Study Zone SF 10.6 and Rotary Wash Borings SF 10.6A and SF 10.6B



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: SF10.6**

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

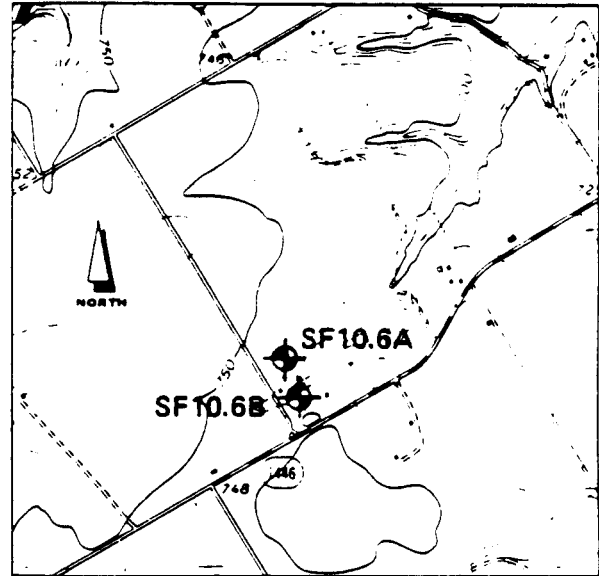
**Hole No. SF10.6A**

**Location:** North 254,182.8 feet  
East 2,172,909 feet  
Surface Elevation 737.4 feet

**Hole No. SF10.6B**

**Location:** North 254,025.5 feet  
East 2,172,923.2 feet  
Surface Elevation 733.2 feet

SF10.6A and SF10.6B are located on the western side of the ring, where the proposed tunnel location crosses under FM 1446.



SCALE 1:24,000

1000 0 1000 2000 3000 FEET

CONTOUR INTERVAL 10 FEET

<b>Scope and Schedule: Geologic Mapping</b>	May 22 to June 5, 1989
<b>SF10.6A: Rotary Wash Boring</b>	June 20, 1989
<b>Wire-line Logging</b>	June 20, 1989
<b>Plugging and Abandonment</b>	June 20, 1989
<b>SF10.6B: Rotary Wash Boring</b>	June 20, 1989
<b>Wire-line Logging</b>	June 20, 1989
<b>Plugging and Abandonment</b>	June 20, 1989

**Geologic Mapping:** A north 35° east-trending aerial photograph lineament was ground-checked by mapping outcropping bedrock over a 2-mile length of the lineament. Adequate outcrops were located to indicate the presence of a fault and constrain its location (see structure zone map, Appendix A).

**Hole No. SF10.6A**

**Conditions Encountered:**

**Total Hole Depth** 75.0 feet

**Soil** 0.0 to 1.0 feet

**Austin Chalk** 1.0 to 75.0 feet  
(see lithologic log, Appendix B)

Vertical offset on the fault, based on wire-line logs, appears to be about 10 feet, with the strata in SF10.6B (south of the fault) higher than the same strata in SF10.6A (north of the fault).

**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 in and abandoned.  
(See plugging report, Appendix D)

**Hole No. SF10.6B**

**Conditions Encountered:**

**Total Hole Depth** 75.0 feet

**Soil** 0.0 to 6.0 feet

**Austin Chalk** 6.0 to 75.0 feet  
(see lithologic log, Appendix B)

Vertical offset on the fault, based on wire-line logs, appears to be about 10 feet, with the strata in SF10.6B (south of the fault) higher than the same strata in SF10.6A (north of the fault).

**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)

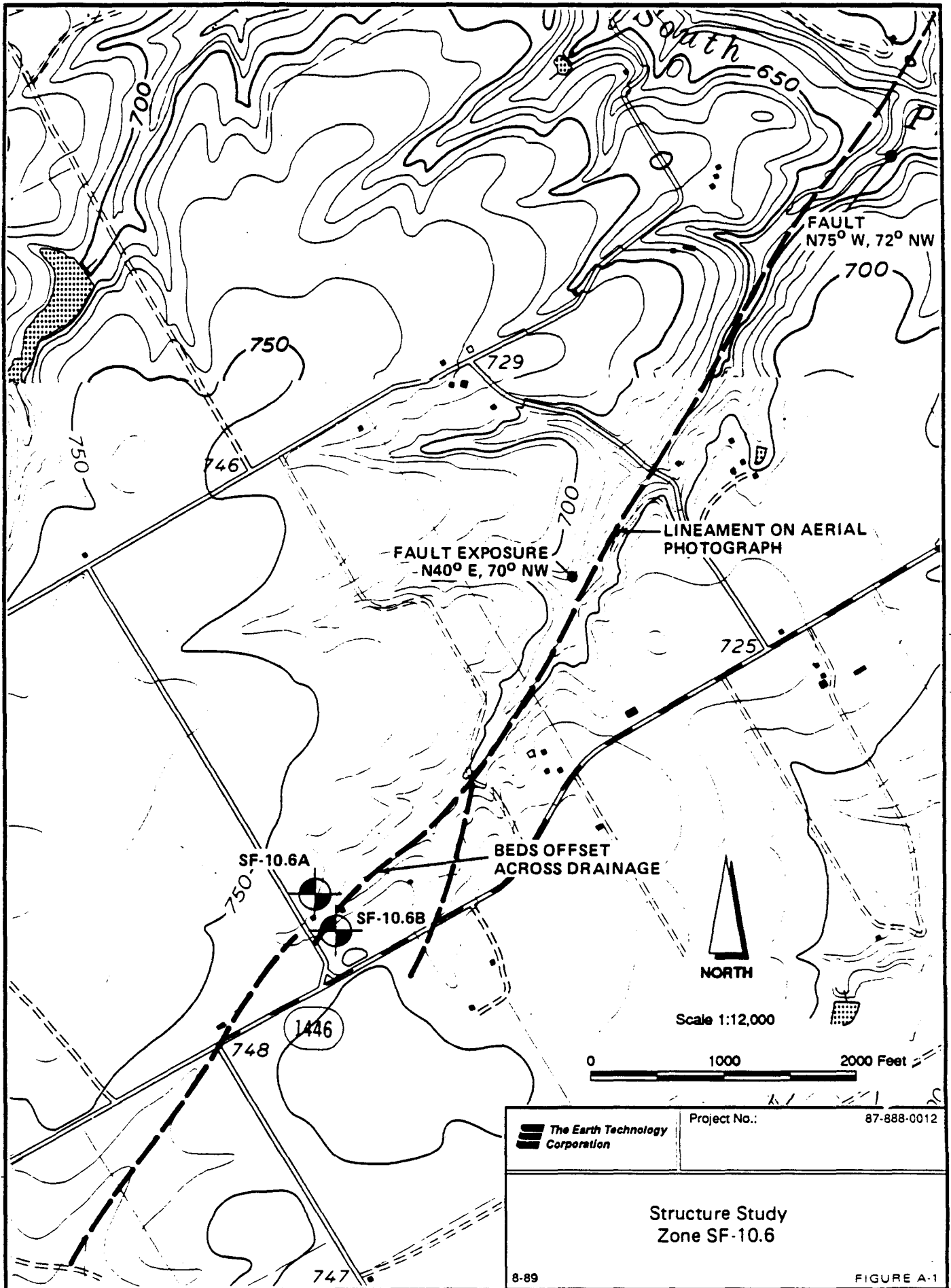
**Hole Status:** Cemented in and abandoned.  
(See plugging report, Appendix D)

**APPENDIX A**  
**STRUCTURE ZONE MAP**

## STRUCTURE STUDY ZONE SF10.6

Structure Study Zone SF10.6 consists of a 2-mile long aerial photograph lineament mapped primarily along a north 35° east-trending tributary of South Prong Creek. The lineation was delineated based on the straightness of the creek and a substantial change in the tone of soil in the fields along the southwestern extent. During the geologic field mapping the fault was observed in two locations along the creek (Figure A-1). At the northernmost of these locations, minor amounts of in-situ calcite vein mineralizations were observed along the drainage. Calcite float was also found in several locations along the drainage. Additionally, an unknown amount of vertical offset in the chalk bedding planes was noted across the drainage channel in at least two locations. The dominant fracture trend is north 10° - 20° east, dipping 80° - 90°.

Based on the geologic mapping, the fault was constrained to a width of less than 180 feet near the intersection of Hoyt Road and FM 1446, where the borings were drilled. Vertical offset between the borings, based on evaluation of wire-line logs, is about 10 feet, with strata in SF10.6B (south of the fault) higher than the same strata in SF10.6A (north of the fault).



**APPENDIX B**  
**LITHOLOGIC LOGS**



## LOG OF BORING

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

BORING NO: SF10.6APG 1 OF 2  
 LOCATION: N 254,182.8 feet  
 E 2,172,909 feet  
 GROUND EL: 737.4 feet

DATE: 6/20/89 TYPE: Air 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	No groundwater encountered.
DESCRIPTION OF STRATUM										
	[Symbol: Diagonal Hatching]								1.0	CLAY, soft, silty, embedded limestone fragments, trace roots, brown
- 5	[Symbol: Stippled]									LIMESTONE (Austin Chalk); severely weathered, occasional clay layers, tan
- 10	[Symbol: Stippled]								9.5	LIMESTONE (Austin Chalk); fresh, occasional thin shaly limestone layers, light gray to dark gray
- 15	[Symbol: Stippled]									
- 20	[Symbol: Stippled]									
- 25	[Symbol: Stippled]									
- 30	[Symbol: Stippled]									
- 35	[Symbol: Stippled]									
- 40	[Symbol: Stippled]									
										-shale, dark gray at 23.0'-23.5'

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

# LOG OF BORING

<b>PROJECT:</b> TEXAS SSC SITE <b>CLIENT:</b> The Earth Technology Corporation <b>TASK NO.:</b> 12	<b>BORING NO:</b> SF10.6APG 2 OF 2 <b>LOCATION:</b> N 254,182.8 feet E 2,172,909 feet <b>GROUND EL:</b> 737.4 feet
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**DATE:** 6/20/89    **TYPE:** Air 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 2
DESCRIPTION OF STRATUM										
-45	[Brick Pattern]									LIMESTONE (Austin Chalk); fresh, occasional thin shaly limestone layers, light gray to dark gray
-50	[Brick Pattern]									-shale, dark gray at 49.0'-49.3'
-55	[Brick Pattern]									
-60	[Brick Pattern]									
-65	[Brick Pattern]									-shale, dark gray at 68.0'-69.0'
-70	[Brick Pattern]									-shale, dark gray at 72.0'-72.8'
-75	[Brick Pattern]									Bottom of Exploration at 75.0'  NOTE: Borehole grouted after completion.
-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: SF10.6BPG 1 OF 2  
 LOCATION: N 254,025.5 feet  
 E 2,172,923.2 feet  
 GROUND EL: 733.2 feet

DATE: 6/20/89 TYPE: Air 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	Water encountered at 6.0'
									DESCRIPTION OF STRATUM	
	/ / / /								2.0	CLAY, medium to stiff, embedded calcareous fragments, dark gray
- 5	/ / / /								6.0	CLAY, stiff, silty, mottled, tan and gray
- 10	[ ] [ ] [ ] [ ]								21.0	LIMESTONE (Austin Chalk), severely weathered, occasional thin clay layers, tan
- 15	[ ] [ ] [ ] [ ]									
- 20	[ ] [ ] [ ] [ ]									
- 25	[ ] [ ] [ ] [ ]									
- 30	[ ] [ ] [ ] [ ]									
- 35	[ ] [ ] [ ] [ ]									
- 40	[ ] [ ] [ ] [ ]									

DRILLING GEOLOGIST E. C. Nicholas ASSISTANT N/A CHECKED BY B. Bailey

# LOG OF BORING

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

BORING NO: SF10.6B PG 2 OF 2  
 LOCATION: N 254,025.5 feet  
 E 2,172,923.2 feet  
 GROUND EL: 733.2 feet

DATE: 6/20/89 TYPE: Air 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 2	
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]										
											Bottom of Exploration at 75.0'  NOTE: Borehole grouted after completion.

DRILLING GEOLOGIST E.C. Nicholas ASSISTANT N/A CHECKED BY B. Bailey

**APPENDIX C**

**WIRE-LINE LOGS**

# WIRE-LINE LOGGING PARAMETERS

Hole No. SF10.6A

Log Measured From: Ground level

## Drilling Parameters

Depth 75 feet  
Bit Diameter 4.75 inches

## Logging Parameters

## Electrical Log

## Gamma Log

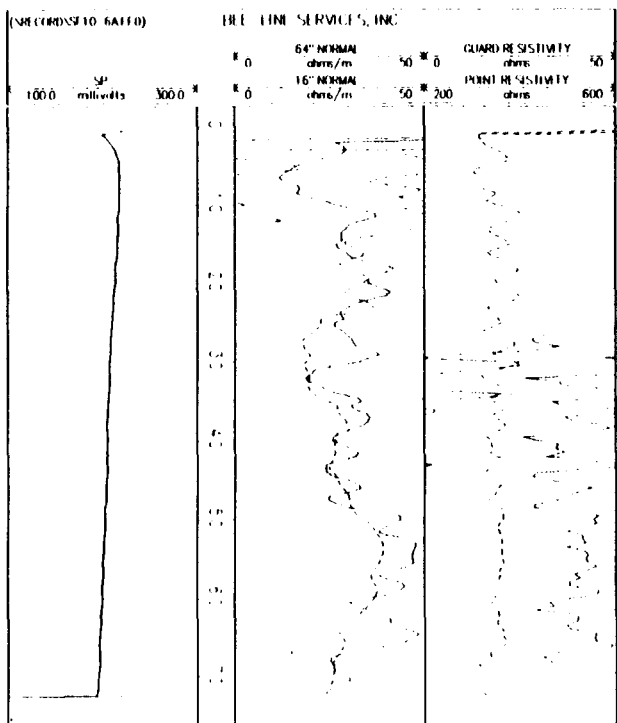
## Sonic Log

Date	June 20, 1989	June 20, 1989	June 20, 1989
Bottom Log Interval	73.5 feet	74 feet	69.8 feet
Top Log Interval	surface	surface	surface
Type of Fluid in Hole	water	water	water
Time Since Circulation Stop	4 hours	4 hours	4 hours
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

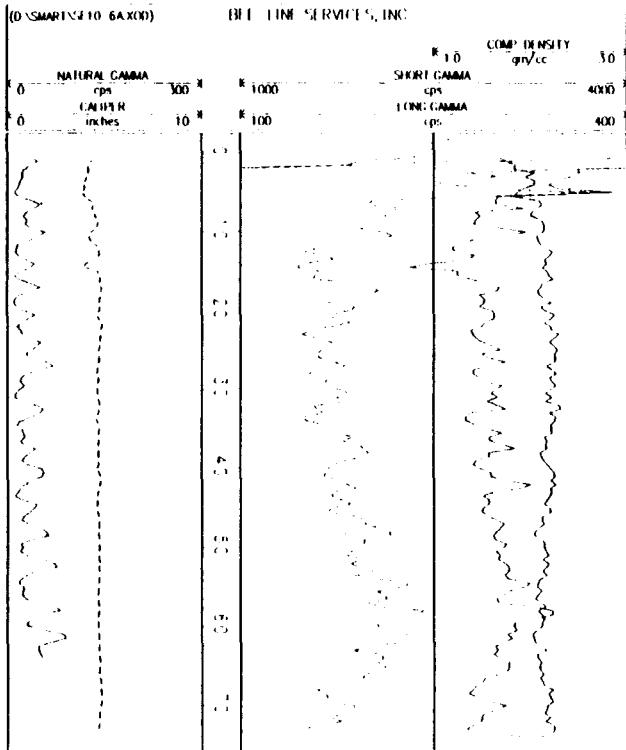
Logged by: BEE-LINE SERVICES, INC.  
P.O. Box 2096  
Corsicana, TX 75151

SF 10.6A Wire-line logs run June 20, 1989 . Surface elevation 737.4 feet.

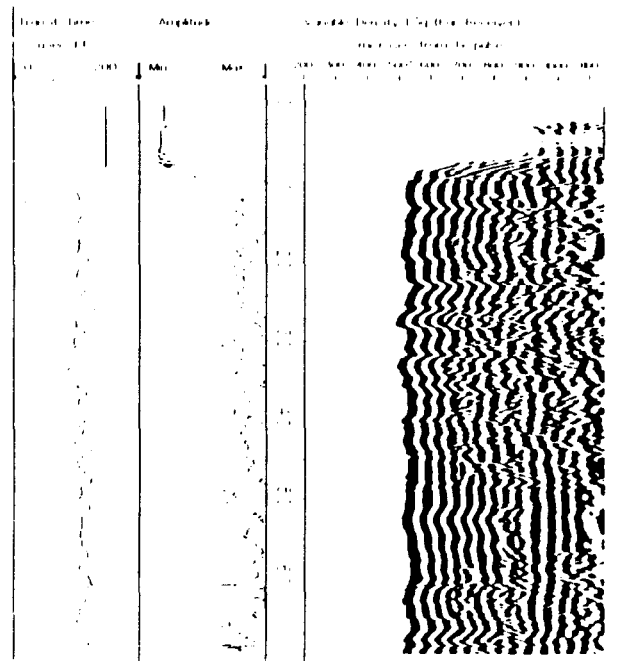
**ELECTRICAL LOG**



**GAMMA LOG**



**SONIC LOG**



# WIRE-LINE LOGGING PARAMETERS

Hole No. SF10.6B

Log Measured From: Ground level

## Drilling Parameters

Depth 75 feet  
Bit Diameter 4.75 inches

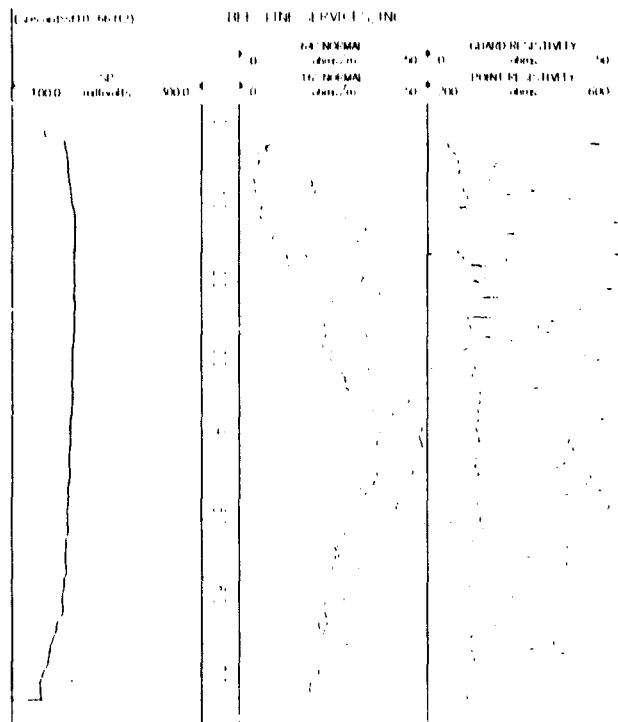
<u>Logging Parameters</u>	<u>Electrical Log</u>	<u>Gamma Log</u>	<u>Sonic Log</u>
Date	June 20, 1989	June 20, 1989	June 20, 1989
Bottom Log Interval	73.5 feet	74 feet	70.1 feet
Top Log Interval	surface	surface	surface
Type of Fluid in Hole	boring fluid	boring fluid	boring fluid
Time Since Circulation Stop	1.5 hours	1.5 hours	1.5 hours
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

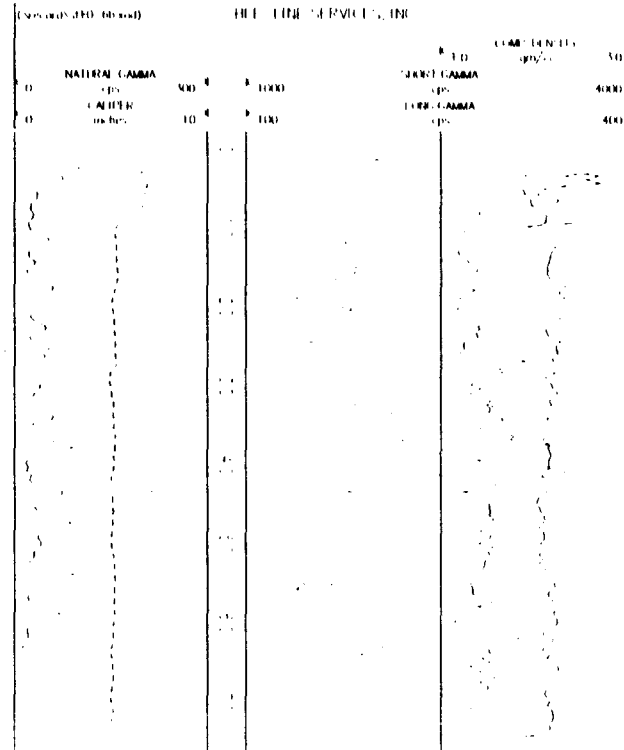


SF 10.6B Wire-line logs run June 20, 1989 . Surface elevation 733.2 feet.

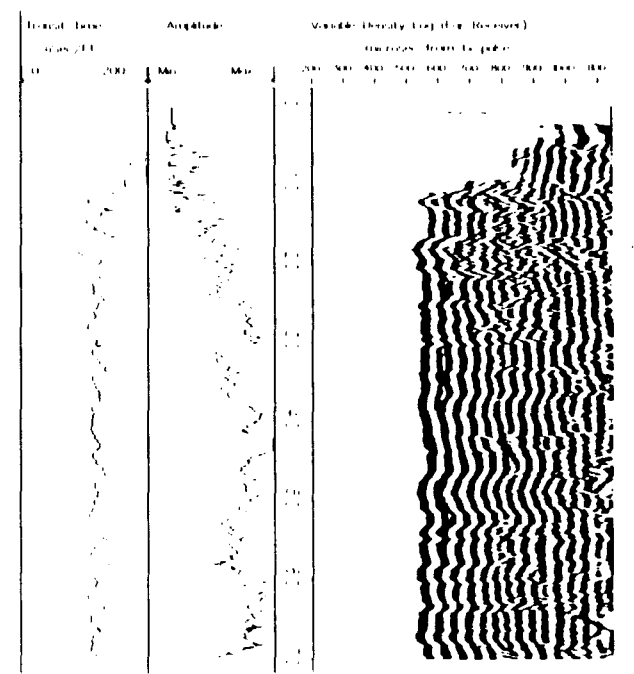
### ELECTRICAL LOG



### GAMMA LOG



### SONIC LOG



**APPENDIX D**  
**PLUGGING REPORTS**

## SSC BOREHOLE PLUGGING REPORT

TETC Project No. 87-88-0017

Task No. 12

Boring No. SF 10.6A

Texas Coordination Location: N 254,182.8 feet  
E 2,172,909 feet

Surface Elevation: 737.4 feet

Total Boring Depth: 75.0'

Date Drilled: 6-20-89

Date Plugged: 6-20-89

Time Completed: 4:15 p.m.

## Remarks:

88 gallons of grout was used to completely cement boring from bottom to top. 11 sacks of Portland Cement and 1 sack of Polygel Bentonite combined with water comprised the total grout mixture. Water/cement ratio was approximately 8 gallons per sack.

Drilling Geologist: E.C. Nicholas  
SwL Coordinator: Bruce Bailey  
SwL Report No. 89-192

## SSC BOREHOLE PLUGGING REPORT

TETC Project No. 87-88-0017

Task No. 12

Boring No. SF 10.6B

Texas Coordination Location: N 254,025.5 feet  
E 2,172,923.2 feet

Surface Elevation: 733.2 feet

Total Boring Depth: 75.0'

Date Drilled: 6-20-89

Date Plugged: 6-20-89

Time Completed: 2:45 p.m.

## Remarks:

88 gallons of grout was used to completely cement boring from bottom to top. 11 sacks of Portland Cement and 1 sack of Polygel Bentonite combined with water comprised the total grout mixture. Water/cement ratio was approximately 8 gallons per sack.

Drilling Geologist: E.C. Nicholas  
SwL Coordinator: Bruce Bailey  
SwL Report No. 89-192