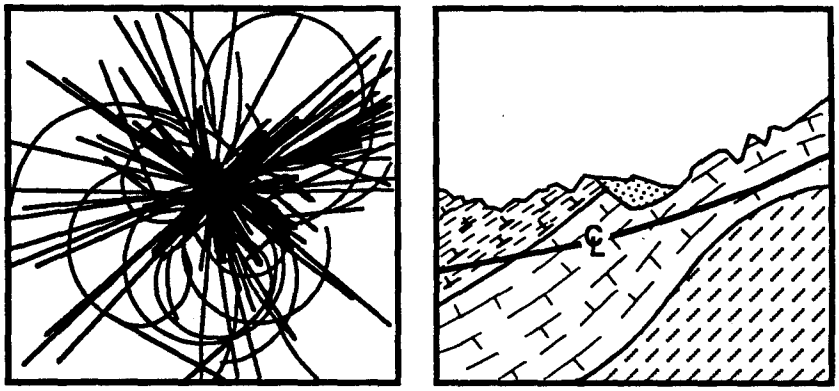
SSCL-SR-1111
Project No. 87-888-0012
Report No. SSC-GR-52
June 1990

GR-52

Data Report for Structure Study Zone SF 8.3 and Boreholes SF 8.3A, SF 8.3B, SF 8.3C, SF 8.3E, and SF 8.3F



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
- Structure-specific data
- Global data.

This is one in a series of data reports prepared for the global data phase of geotechnical characterization at the SSC site. Data collection for this study phase focused on drillhole-based geological, geohydrological, geophysical, and geotechnical tests in the near vicinity of the E and F access shaft sites. Additionally, several coreholes were drilled where the main tunnel is expected to penetrate geotechnically significant as well as possible stratigraphic and structural intervals. The global data set has three key attributes: (1) uniform geographic distribution over the site footprint, (2) complete coverage of all of the strata through which the SSC tunnels and shafts will pass, and (3) consistency of the data from sampling site to sampling site throughout the SSC site. In combination with data from the other phases, these data will allow conceptual designs of construction methods. Each data report includes the results of both field and laboratory tests for specific drilling and sampling site(s).

DATA REPORT

Site Designator: SF 8.3

Objective: The objectives for drilling at this location are to better define the location and nature of the geologic structure identified in surface geologic mapping and from previous borings.

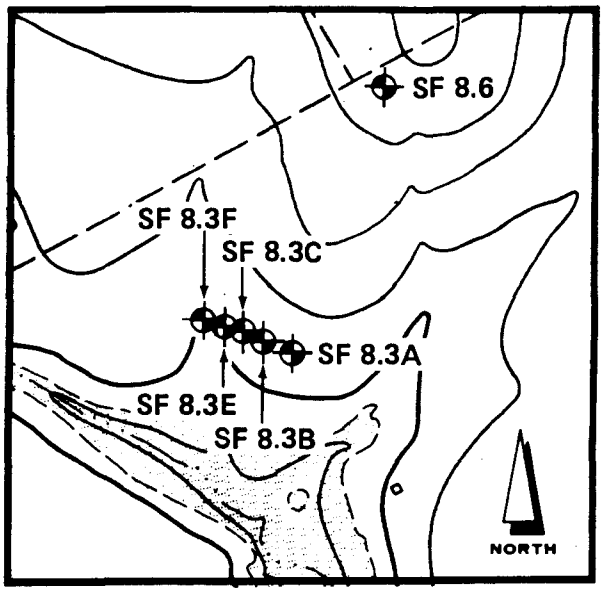
Structure Study Zone **SF 8.3** is located on the southern side of the ring approximately 2.7 miles southeast of Forreston, Texas.

A total of five borings (air rotary holes) were drilled.

SCALE 1:12,000

0 500 1000 1500 2000 Feet

CONTOUR INTERVAL 10 FEET



Boring Locations:

Boring	Northing (feet)	Easting (feet)	Surface Elevation (feet)
SF 8.3A	205,652	2,206,212	510.4
SF 8.3B	205,706	2,206,056	507.0
SF 8.3C	205,738	2,205,962	501.7
SF 8.3E	205,771	2,205,867	501.2
SF 8.3F	205,805	2,205,768	500.0

Note: Boring designation SF 8.3D has been reserved for the angled boring through fault SF 8.3. However, the angle hole is on hold until it can be sited more accurately. (see Appendix C)

Scope and Schedule:

- Borings

Boring	Drilling	Wire-Line Logging	Plugging
SF 8.3A	Mar. 13, 1990	Not Done	Mar. 17, 1990
SF 8.3B	Mar. 13, 1990	Mar. 14, 1990	Mar. 17, 1990
SF 8.3C	Mar. 15, 1990	Mar. 16, 1990	Mar. 16, 1990
SF 8.3E	Mar. 15, 1990	Mar. 16, 1990	Mar. 16, 1990
SF 8.3F	Mar. 15, 1990	Mar. 16, 1990	Mar. 16, 1990

- Geologic Mapping - February 22, 1990 to March 15, 1990

Conditions Encountered: (see lithologic logs, Appendix A)

Boring	Total Depth (feet)	Soil (feet)	Weathered Austin Chalk (feet)	Fresh Austin Chalk (feet)
SF 8.3A	50.0	0.0 to 22.0	22.0 to 30.2	30.2 to 50.0
SF 8.3B	50.0	0.0 to 15.5	15.5 to 31.0	31.0 to 50.0
SF 8.3C	50.0	0.0 to 20.5	20.5 to 28.0	28.0 to 50.0
SF 8.3E	50.0	0.0 to 17.9	17.9 to 26.5	26.5 to 50.0
SF 8.3F	50.0	0.0 to 16.5	16.5 to 25.0	25.0 to 50.0

Geophysical Logging: (see wire-line logs, Appendix B)

Boring	Spontaneous Potential	Normal Resistivity (Short & Long)	Guard Resistivity	Point Resistance	Natural Gamma	Short & Long Gamma	Compensated Density (caliper)	Sonic Velocity (full wave)
SF 8.3A	Hole caved in before it could be logged							
SF 8.3B	X	X	X	X	X	X	X	X
SF 8.3C	X	X	X	X	X	X	X	Note 1
SF 8.3E	X	X	X	X	X	X	X	Note 1
SF 8.3F	X	X	X	X	X	X	X	Note 1

Note 1: Tool malfunction; sonic velocity data missing

Geologic Mapping Results Summary: (see also Appendix C)

Geologic mapping identified exposed bedrock at numerous areas around the structure study zone. Along Big Onion Creek, 4,500 feet north of SF 8.3, Taylor Marl is in fault contact with Austin Chalk. Two prominent linears trend south toward the ring profile. Calcite in float, while scattered throughout the cultivated field, is concentrated along the linears.

Previous boring SF 8.6 is located about 1,500 feet north of structure study zone SF 8.3. Field mapping and analysis of boring logs from boring SF 8.6 suggests the presence of a fault with approximately 25 to 30 feet of displacement.

Five shallow air rotary borings were drilled in an attempt to locate the fault. The five borings crossed one small fault with about 10 feet of down to the west displacement. The main fault, with approximately 25 to 30 feet of down to the east displacement, was never encountered.

Hole Status: (see also plugging reports, Appendix D)

All holes were plugged with cement grout and abandoned.

APPENDIX A

LITHOLOGIC LOGS

LITHOLOGIC LOG

BORING SF 8.3A

LOG OF BORING

BORING NO: SF 8.3A PG 1 OF 2

PROJECT: Superconducting Supercollider

CLIENT: The Earth Technology Corporation

TASK NO.: 12

LOCATION: N 205,652 ft.
E 2,206,212 ft.

GROUND EL: 510.4 ft.

DATE: 3-13-90 TYPE: Air Rotary CASED TO: N/A CONTRACTOR: SwL 89-192

SAMPLE LEGEND
S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION
Seepage 20.0'

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	DESCRIPTION OF STRATUM
5									CLAY, silty, dark brown with traces of roots, organic debris and limestone pebbles. 5.5
10									CLAY, silty, light brown with traces of calcium carbonate. 17.0
15									
20									CLAY, silty, light brown, to tan with some weathered limestone fragments. 22.0
25									LIMESTONE (Austin Chalk) severely weathered, moderately to severely fractured, tan. 30.2
30									
35									LIMESTONE (Austin Chalk) medium hard, fresh, light gray
40									

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

LOG OF BORING

BORING NO: SF 8.3A PG 2 OF 2

PROJECT: Superconducting Supercollider

CLIENT: The Earth Technology Corporation

LOCATION: N 205,652 ft. E 2,206,212 ft.

TASK NO.: 12

GROUND EL: 510.4 ft.

DATE: 3-13-90 TYPE: Air Rotary CASED TO: N/A CONTRACTOR: SwL 89-192

SAMPLE LEGEND

S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION

See p. 1 of 2

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES		HAND PEN. TSF.	DESCRIPTION OF STRATUM
45										LIMESTONE (Austin Chalk) medium hard, fresh, light gray
50										Bottom of Exploration at 50.0'
55										
60										
65										
70										
75										
80										

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

LITHOLOGIC LOG

BORING SF 8.3B

LOG OF BORING

PROJECT: Superconducting Supercollider
CLIENT: The Earth Technology Corporation
TASK NO.: 12

BORING NO: SF 8.3B PG 1 OF 2
LOCATION: N 205,706 ft.
E 2,206,056 ft.
GROUND EL: 507.0 ft.

DATE: 3-13-90 TYPE: Air Rotary CASED TO: N/A CONTRACTOR: SwL 89-192

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	DESCRIPTION OF STRATUM
									SAMPLE LEGEND: S= SPLIT SPOON; T= 2" THIN WALL TUBE; U= 3" THIN WALL TUBE; C= NX ROCK CORE
									WATER INFORMATION: No surface ground water encountered.
									CLAY, silty, dark brown with traces of roots, organic debris, and limestone pebbles.
4.0									
5									CLAY, silty, light brown with traces of calcium carbonate.
10									
15									
15.0									
20									LIMESTONE (Austin Chalk) severely weathered, moderately to severely fractured, tan.
25									
30									
31.0									
35									LIMESTONE (Austin Chalk) medium hard, fresh, light gray
40									

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

LOG OF BORING

BORING NO: SF 8.38 PG 2 OF 2

PROJECT: Superconducting Supercollider

LOCATION: N 205,706 ft. E 2,206,056 ft.

CLIENT: The Earth Technology Corporation

GROUND EL: 507.0 ft.

TASK NO.: 12

DATE: 3-13-90 TYPE: Air Rotary CASED TO: N/A CONTRACTOR: SwL 89-192

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES		HAND PEN. TSF.	SAMPLE LEGEND / DESCRIPTION OF STRATUM
										SAMPLE LEGEND: S= SPLIT SPOON; T= 2" THIN WALL TUBE; U= 3" THIN WALL TUBE; C= NX ROCK CORE
										WATER INFORMATION: See p. 1 of 2
45										LIMESTONE (Austin Chalk) medium hard, fresh, light gray
50										Bottom of Exploration at 50.0'
55										
60										
65										
70										
75										
80										

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

LITHOLOGIC LOG

BORING SF 8.3C

LOG OF BORING

BORING NO: SF 8.3C PG 1 OF 2

PROJECT: Superconducting Supercollider

CLIENT: The Earth Technology Corporation

TASK NO.: 12

LOCATION: N 205,738 ft. E 2,205,962 ft.

GROUND EL: 501.7 ft.

DATE: 3-15-90 TYPE: Air Rotary CASED TO: 5.0' CONTRACTOR: SwL 89-192

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES		HAND PEN. TSF.	DESCRIPTION OF STRATUM
										SAMPLE LEGEND: S= SPLIT SPOON; T= 2" THIN WALL TUBE; U= 3" THIN WALL TUBE; C= NX ROCK CORE
										WATER INFORMATION: Groundwater at surface. Boring located in marsh area.
										CLAY, silty, dark brown with traces of roots, organic debris and limestone pebbles.
5										5.0
										CLAY, silty, light brown with traces of calcium carbonate.
										9.5
10										CLAY, silty, light brown to tan with traces of weathered limestone fragments.
15										
20										20.5
										LIMESTONE (Austin Chalk) severely weathered, moderately to severely fractured, tan.
25										28.0
										LIMESTONE (Austin Chalk) medium hard, fresh, light gray
30										
35										
40										

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

LOG OF BORING

BORING NO: SF 8.3C PG 2 OF 2

PROJECT: Superconducting Supercollider

CLIENT: The Earth Technology Corporation

LOCATION: N 205,738 ft. E 2,205,962 ft.

TASK NO.: 12

GROUND EL: 501.7 ft.

DATE: 3-15-90 TYPE: Air Rotary CASED TO: 5.0' CONTRACTOR: SwL 89-192

SAMPLE LEGEND

S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION

See p. 1 of 2

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES		HAND PEN. TSF.	DESCRIPTION OF STRATUM
45										LIMESTONE (Austin Chalk) medium hard, fresh, light gray
50										Bottom of Exploration at 50.0'
55										
60										
65										
70										
75										
80										

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

LITHOLOGIC LOG

BORING SF 8.3E

LOG OF BORING

BORING NO: SF 8.3E PG 1 OF 2

PROJECT: Superconducting Supercollider

CLIENT: The Earth Technology Corporation

LOCATION: N 205,771 ft.
E 2,205,867 ft.

TASK NO.: 12

GROUND EL: 501.2 ft.

DATE: 3-15-90 TYPE: Air Rotary CASED TO: 5.0' CONTRACTOR: SwL 89-192

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	DESCRIPTION OF STRATUM
									CLAY, silty, dark brown with traces of roots, organic debris and limestone pebbles.
									4.0
5									CLAY, silty, light brown with traces of calcium carbonate.
									9.5
10									CLAY, silty, light brown to tan with traces of weathered limestone fragments.
15									17.9
20									LIMESTONE (Austin Chalk) severely weathered, moderately to severely fractured, tan.
25									26.5
30									LIMESTONE (Austin Chalk) medium hard, fresh, light gray
35									
40									

SAMPLE LEGEND

S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION

Groundwater at surface.
Boring located in marsh area.

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

LOG OF BORING

BORING NO: SF 8.3E PG 2 OF 2

PROJECT: Superconducting Supercollider

CLIENT: The Earth Technology Corporation

TASK NO.: 12

LOCATION: N 205,771 ft.
E 2,205,867 ft.

GROUND EL: 501.2 ft.

DATE: 3-15-90 TYPE: Air Rotary CASED TO: 5.0' CONTRACTOR: SwL 89-192

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	SAMPLE LEGEND / DESCRIPTION OF STRATUM	WATER INFORMATION
									S= SPLIT SPOON T= 2" THIN WALL TUBE U= 3" THIN WALL TUBE C= NX ROCK CORE	See p. 1 of 2
45									LIMESTONE (Austin Chalk) medium hard, fresh, light gray	
50									Bottom of Exploration at 50.0'	
55										
60										
65										
70										
75										
80										

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

LITHOLOGIC LOG

BORING SF 8.3F

LOG OF BORING

BORING NO: SF 8.3F PG 1 OF 2

PROJECT: Superconducting Supercollider

CLIENT: The Earth Technology Corporation

TASK NO.: 12

LOCATION: N 205,805 ft.
E 2,205,768 ft.

GROUND EL: 500.0 ft.

DATE: 3-15-90 TYPE: Air Rotary CASED TO: 5.0' CONTRACTOR: SwL 89-192

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	DESCRIPTION OF STRATUM
									SAMPLE LEGEND: S= SPLIT SPOON; T= 2" THIN WALL TUBE; U= 3" THIN WALL TUBE; C= NX ROCK CORE
									WATER INFORMATION: Seepage at 20.0'
									2.5 CLAY, silty, dark brown with traces of roots, organic debris and limestone pebbles.
5									CLAY, silty, light brown with traces of calcium carbonate. 5.5
10									CLAY, silty, light brown to tan with occasional limestone pebble layers. -limestone pebble layer at 9.5'-10.5' 12.5
15									CLAY, silty, light brown. 16.5
20									LIMESTONE (Austin Chalk) severely weathered, moderately to severely fractured, tan. 25.0
25									LIMESTONE (Austin Chalk) medium hard, fresh, light gray
30									
35									
40									

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

LOG OF BORING

BORING NO: SF 8.3F PG 2 OF 2

PROJECT: Superconducting Supercollider

CLIENT: The Earth Technology Corporation

TASK NO.: 12

LOCATION: N 205,805 ft.
E 2,205,768 ft.

GROUND EL: 500.0 ft.

DATE: 3-15-90 TYPE: Air Rotary CASED TO: 5.0' CONTRACTOR: SwL 89-192

SAMPLE LEGEND

S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION

See p. 1 of 2

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT ROD.	STANDARD PENETRATION TEST PER 6 INCHES		HAND PEN. TSF.	DESCRIPTION OF STRATUM
45										LIMESTONE (Austin Chalk) medium hard, fresh, light gray
50										Bottom of Exploration 50.0'
55										
60										
65										
70										
75										
80										

DRILLING GEOLOGIST Mike Granger ASSISTANT _____ CHECKED BY Shawn Wood

APPENDIX B

WIRE-LINE LOGS

WIRE-LINE LOGGING PARAMETERS

Hole No. SF 8.3B **Log Measured From:** Ground Level

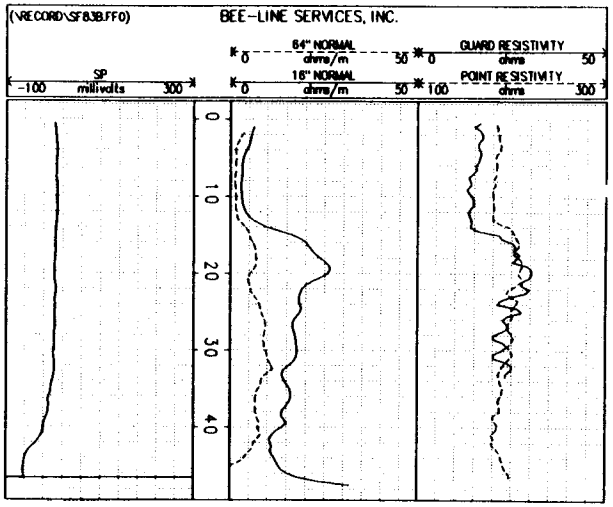
Drilling Parameters
Depth 50 feet
Bit Diameter 4.75 inches

Logging Parameters	Electrical Log	Gamma Log	Sonic Log
Date	March 14, 1990	March 14, 1990	March 14, 1990
Bottom Log Interval	47.5 feet	39.0 feet	27.7 feet
Top Log Interval	surface	surface	surface
Type of Fluid in Hole	water	water	water
Time Since Circulation Stop	17 hours	17 hours	17 hours
Probe Type/S.N.	ALP-4979	XAP-4383	CLP-4877A
Module Type/S.N.	ALM-4979	XAM-4383	CLM-4877A
Logging Speed	40 feet/min.	20 feet/min.	20 feet/min.
Sample Interval	0.5 foot	0.5 foot	0.5 foot

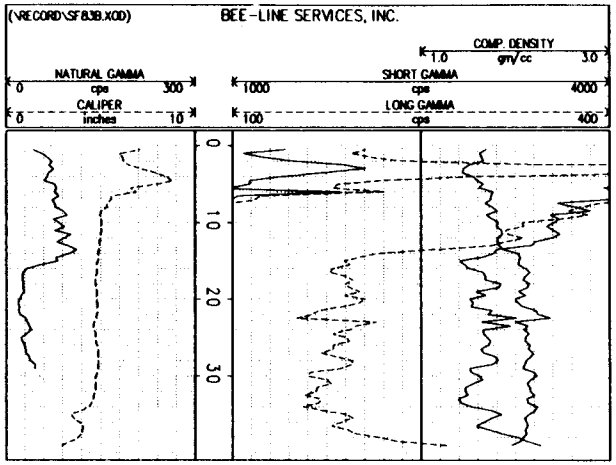
Logged by: BEE-LINE SERVICES, INC.
P. O. Box 2096
Corsicana, TX 75151

SF 8.3B Wire-line logs run March 14, 1990. Surface elevation 507.0 feet.

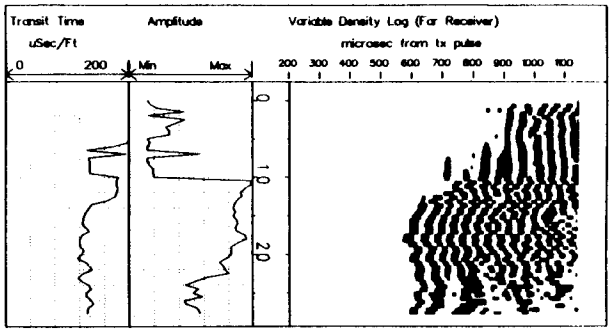
ELECTRICAL LOG



GAMMA LOG



SONIC LOG



WIRE-LINE LOGGING PARAMETERS

Hole No. SF 8.3C **Log Measured From:** Ground Level

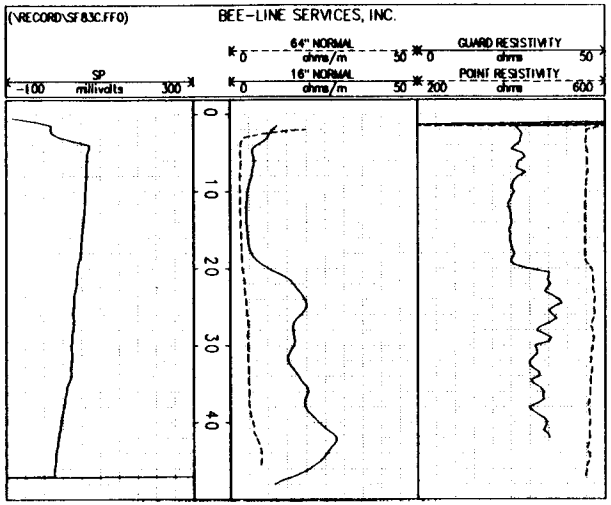
Drilling Parameters
Depth 50.0 feet
Bit Diameter 4.75 inches

Logging Parameters	Electrical Log	Gamma Log	Sonic Log
Date	March 16, 1990	March 16, 1990	Tool Malfunction
Bottom Log Interval	48.0 feet	47.5 feet	
Top Log Interval	surface	surface	
Type of Fluid in Hole	water	water	
Time Since Circulation Stop	30 hours	30 hours	
Probe Type/S.N.	ALP-4979	XAP-4383	
Module Type/S.N.	ALM-4979	XAM-4383	
Logging Speed	40 feet/min.	20 feet/min.	
Sample Interval	0.5 foot	0.5 foot	

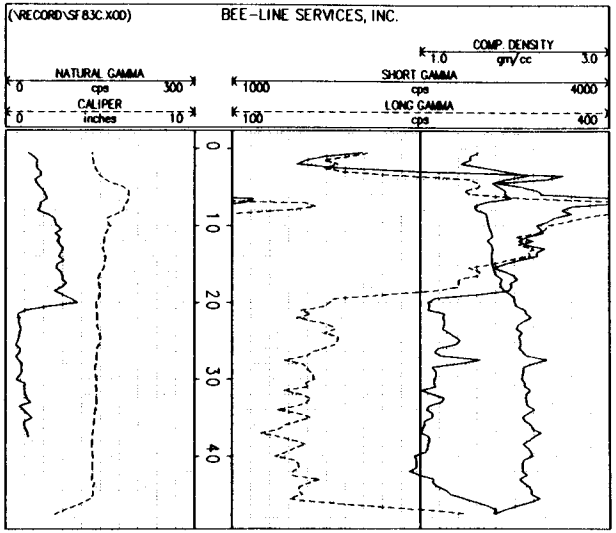
Logged by: BEE-LINE SERVICES, INC.
P. O. Box 2096
Corsicana, TX 75151

SF 8.3C Wire-line logs run March 16, 1990. Surface elevation 501.7 feet.

ELECTRICAL LOG



GAMMA LOG



WIRE-LINE LOGGING PARAMETERS

Hole No. SF 8.3E **Log Measured From:** Ground Level

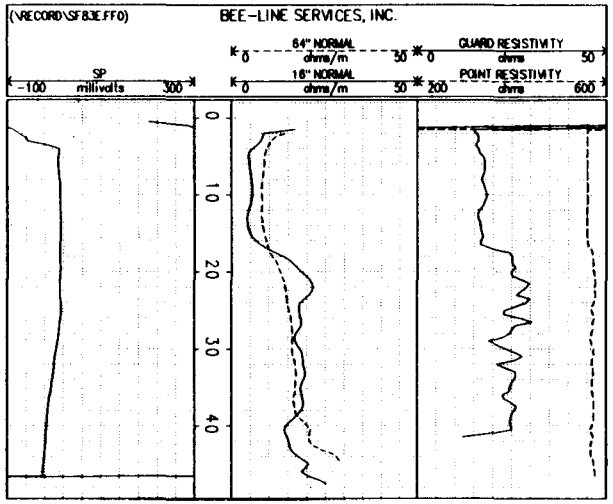
Drilling Parameters
Depth 50 feet
Bit Diameter 4.75 inches

Logging Parameters	Electrical Log	Gamma Log	Sonic Log
Date	March 16, 1990	March 16, 1990	Tool Malfunction
Bottom Log Interval	47.5 feet	47.0 feet	
Top Log Interval	surface	surface	
Type of Fluid in Hole	water	water	
Time Since Circulation Stop	28 hours	28 hours	
Probe Type/S.N.	ALP-4979	XAP-4383	
Module Type/S.N.	ALM-4979	XAM-4383	
Logging Speed	40 feet/min.	20 feet/min.	
Sample Interval	0.5 foot	0.5 foot	

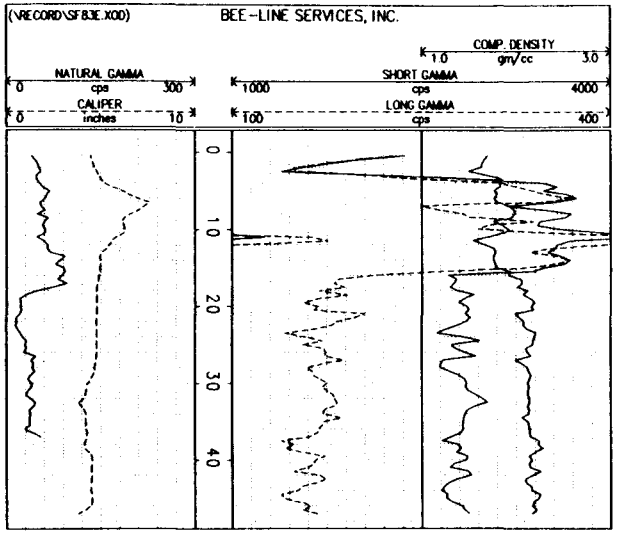
Logged by: BEE-LINE SERVICES, INC.
P. O. Box 2096
Corsicana, TX 75151

SF 8.3E Wire-line logs run March 16, 1990. Surface elevation 501.2 feet.

ELECTRICAL LOG



GAMMA LOG



WIRE-LINE LOGGING PARAMETERS

Hole No. SF 8.3F **Log Measured From:** Ground Level

Drilling Parameters

Depth 50.0 feet

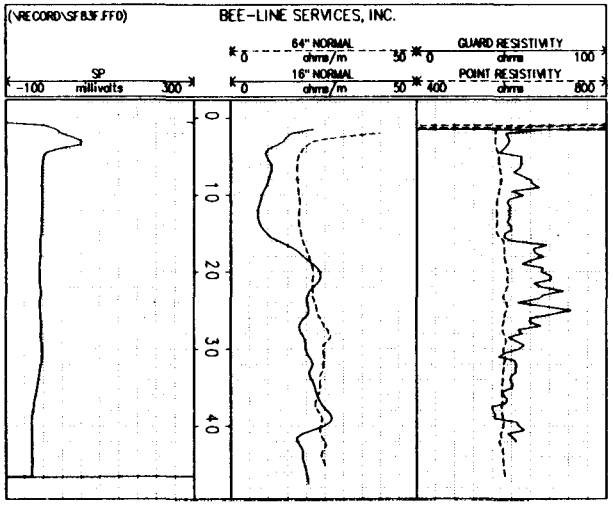
Bit Diameter 4.75 inches

Logging Parameters	Electrical Log	Gamma Log	Sonic Log
Date	March 16, 1990	March 16, 1990	Tool Malfunction
Bottom Log Interval	47.5 feet	47.5 feet	
Top Log Interval	surface	surface	
Type of Fluid in Hole	water	water	
Time Since Circulation Stop	24 hours	24 hours	
Probe Type/S.N.	ALP-4979	XAP-4383	
Module Type/S.N.	ALM-4979	XAM-4383	
Logging Speed	40 feet/min.	20 feet/min.	
Sample Interval	0.5 foot	0.5 foot	

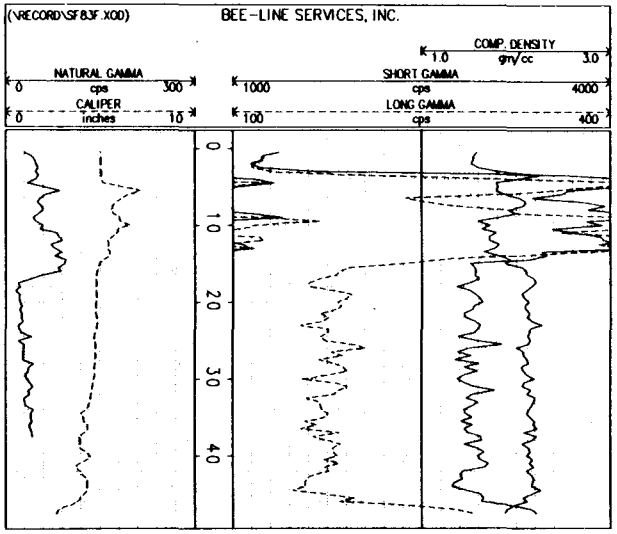
Logged by: BEE-LINE SERVICES, INC.
P. O. Box 2096
Corsicana, TX 75151

SF 8.3F Wire-line logs run March 16, 1990. Surface elevation 500.0 feet.

ELECTRICAL LOG



GAMMA LOG



APPENDIX C

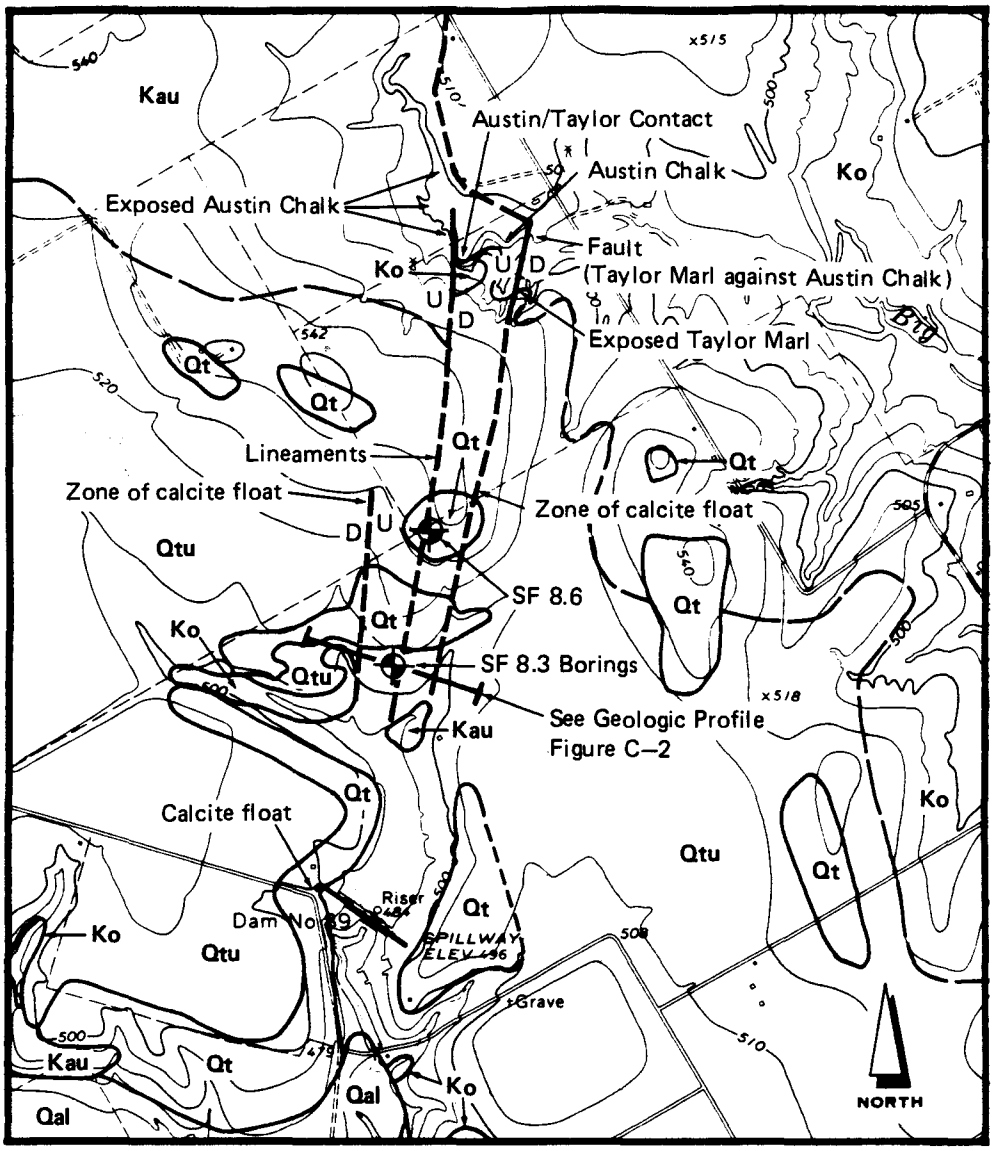
STRUCTURE STUDY ZONE

APPENDIX C

STRUCTURE STUDY ZONE SF 8.3

Field mapping of the structure study zones consisted primarily of locating and noting areas of loose calcite fragments (float). Crystalline and fibrous calcite formed in fractures are primary indicators of faulting in the SSC study area. Outcrops of juxtaposed Austin Chalk and Taylor Marl at Big Onion Creek help to further define the occurrence of faults.

- Surface Geology: The contact between the Austin Chalk and Taylor Marl is exposed in Big Onion Creek, approximately 4,500 feet north of SF 8.3. Beds trend roughly N2°W and locally dip about 4°SW. East of the exposed contact, a N20°E trending fault juxtaposes Taylor Marl against Austin Chalk with the east side down. West of the exposed contact, a small fault again places Austin Chalk against Taylor Marl with the east side down. Therefore, the block containing the exposed Austin-Taylor contact is presumed to be rotated such that the beds dip west. Extension of these faults south toward the ring is complicated by Quaternary terrace deposits that cover a large portion of the area and calcite float that has been reworked by extensive cultivation. Isolated exposures of Austin Chalk and Taylor Marl can be found in shallow drainages south and west of SF 8.3 (see Geologic Map, Figure C-1).
- Surface Expression: Two 6,000-feet long, parallel trending topographic lineaments identified on the aerial photography and on the topographic map can be traced south from the fault through the ring alignment.
- Trend: Due north to N5°E.
- Calcite Float: Calcite float is common throughout the cultivated field. However, dense concentrations of crystalline and slickensided calcite float are found along traces of the topographic lineaments and between borings SF 8.3B and SF 8.3C on the west side of the cultivated field.
- Offset in borings: A previous boring (SF 8.6) 1,500 feet north-northwest of SF 8.3 encountered Austin Chalk at 459.3 feet above mean sea level (MSL). Field mapping identified exposed Austin Chalk at approximately 490 feet above MSL south of the ring. Five air rotary borings were drilled in an attempt to locate the fault. These borings were located in an area that, based on surface mapping, photo-interpretation, and the presence of calcite float, should have crossed the intersection of the fault at the ring alignment. All five borings encountered Austin Chalk approximately 30 feet higher than was encountered in boring SF 8.6 (based on projections of regional dip). Correlation of lithologic and wire-line logs of the rotary borings suggest borings SF 8.3B and SF 8.3C crossed a small fault with about 10 feet of down to the west offset. However, the main fault (with approximately 25 to 30 feet of down to the east offset) appears, from the present information, to be farther east than originally contemplated (see Geologic Map, Figure C-1 and Geologic Profile, Figure C-2). The angle boring originally planned for fault SF 8.3 will not be attempted until the geology is better understood.



SCALE 1:24,000

0 1000 2000 3000 4000 Feet

CONTOUR INTERVAL 10 FEET

LEGEND

U/D – –	Fault, dashed where inferred; U, upthrown block; D, downthrown block
——– – –	Contact, dashed where inferred
Kau	Austin Chalk
Ko	Taylor Marl
Qal	Quaternary Alluivum
Qt	Gravel terrace deposits
Qtu	Undifferentiated Quaternary terrace deposits and cut terrace surfaces

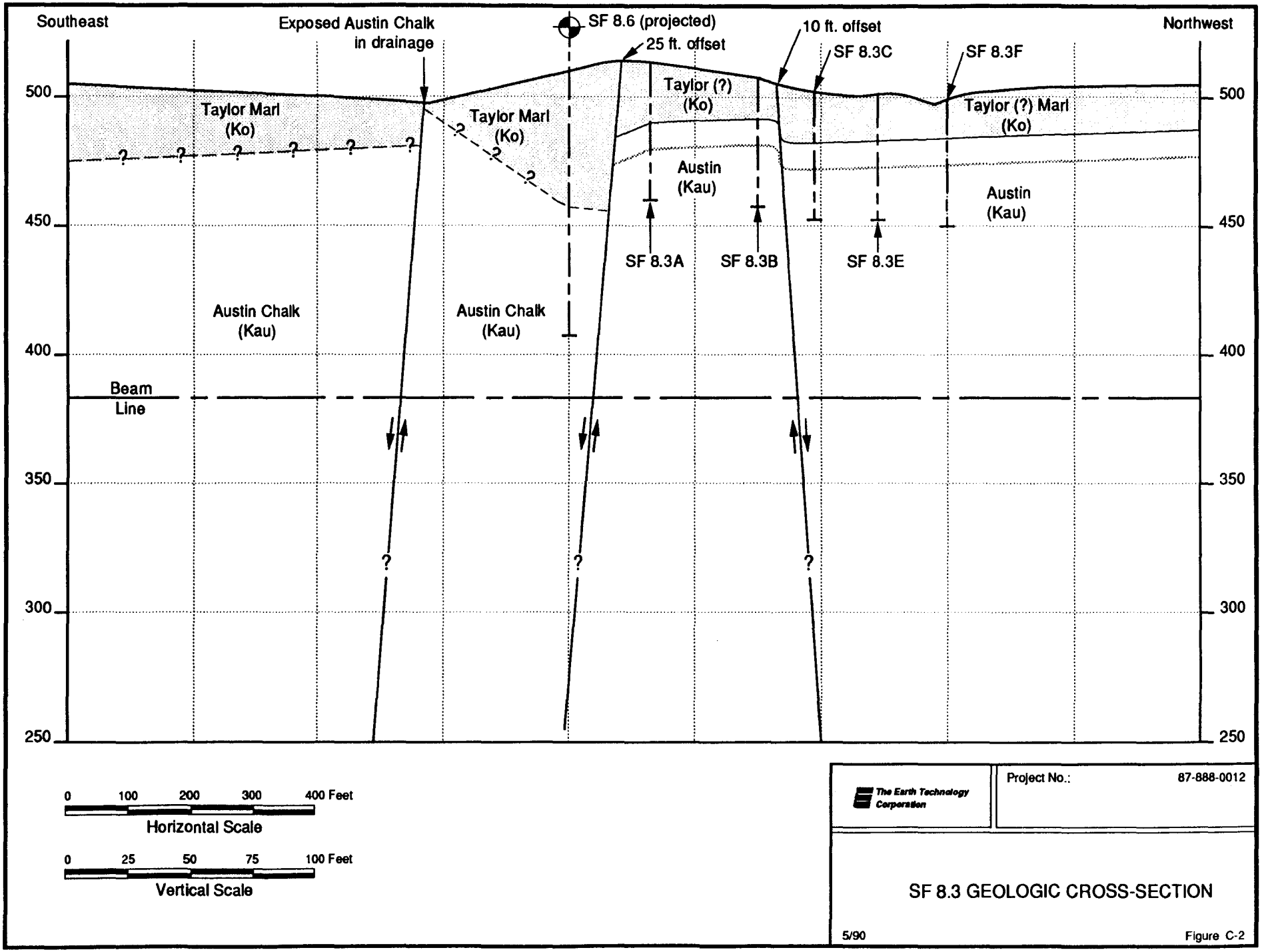
The Earth Technology Corporation

Project No.: 87-888-0012

Structure Study Zone
SF 8.3

4/90

Figure C-1


Southeast
Exposed Austin Chalk in drainage
SF 8.6 (projected)
25 ft. offset
10 ft. offset
SF 8.3C
SF 8.3F
Northwest
500
450
400
350
300
250
Taylor Marl (Ko)
Taylor Marl (Ko)
Taylor (?) (Ko)
Taylor (?) Marl (Ko)
Austin (Kau)
Austin (Kau)
SF 8.3A
SF 8.3B
SF 8.3E
Austin Chalk (Kau)
Austin Chalk (Kau)
Beam Line
0 100 200 300 400 Feet
Horizontal Scale
0 25 50 75 100 Feet
Vertical Scale
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Project No.: 87-888-0012
SF 8.3 GEOLOGIC CROSS-SECTION
5/90
Figure C-2

APPENDIX D

BOREHOLE PLUGGING REPORTS

SSC BOREHOLE PLUGGING REPORT

Project No. 87-888

Task No. 12

Boring No. SF 8.3A

Texas Coordination Location: N 205,652
E 2,206,212

Surface Elevation: 510.4 feet

Total Boring Depth: 50.0 feet

Date Drilled: 3/13/90

Date Plugged: 3/17/90

Time Completed: 12:00 a.m.

Remarks:

54 gallons of grout (tremie placed) was used to completely cement boring from bottom to top. Water/cement ratio was approximately 7 gallons per sack.

Drilling geologist: Mike Granger
Coordinator: Shawn Wood
SwL Report No. 89-192

SSC BOREHOLE PLUGGING REPORT

Project No. 87-888

Task No. 12

Boring No. SF 8.3B

Texas Coordination Location: N 205,706
E 2,206,056

Surface Elevation: 507.0 feet

Total Boring Depth: 50.0 feet

Date Drilled: 3/13/90

Date Plugged: 3/17/90

Time Completed: 10:00 a.m.

Remarks:

54 gallons of grout (tremie placed) was used to completely cement boring from bottom to top. Water/cement ratio was approximately 7 gallons per sack.

Drilling geologist: Mike Granger
Coordinator: Shawn Wood
SwL Report No. 89-192

SSC BOREHOLE PLUGGING REPORT

Project No. 87-888

Task No. 12

Boring No. SF 8.3C

Texas Coordination Location: N 205,738
E 2,205,962

Surface Elevation: 501.7 feet

Total Boring Depth: 50.0 feet

Date Drilled: 3/15/90

Date Plugged: 3/16/90

Time Completed: 5:00 p.m.

Remarks:

54 gallons of grout (tremie placed) was used to completely cement boring from bottom to top. Water/cement ratio was approximately 7 gallons per sack.

Drilling geologist: Mike Granger
Coordinator: Shawn Wood
SwL Report No. 89-192

SSC BOREHOLE PLUGGING REPORT

Project No. 87-888

Task No. 12

Boring No. SF 8.3E

Texas Coordination Location: N 205,771
E 2,205,867

Surface Elevation: 501.2 feet

Total Boring Depth: 50.0 feet

Date Drilled: 3/15/90

Date Plugged: 3/16/90

Time Completed: 3:30 p.m.

Remarks:

54 gallons of grout (tremie placed) was used to completely cement boring from bottom to top. Water/cement ratio was approximately 7 gallons per sack.

Drilling geologist: Mike Granger
Coordinator: Shawn Wood
SwL Report No. 89-192

SSC BOREHOLE PLUGGING REPORT

Project No. 87-888

Task No. 12

Boring No. SF 8.3F

Texas Coordination Location: N 205,805
E 2,205,768

Surface Elevation: 500.0 feet

Total Boring Depth: 50.0 feet

Date Drilled: 3/15/90

Date Plugged: 3/16/90

Time Completed: 2:30 p.m.

Remarks:

54 gallons of grout (tremie placed) was used to completely cement boring from bottom to top. Water/cement ratio was approximately 7 gallons per sack.

Drilling geologist: Mike Granger
Coordinator: Shawn Wood
SwL Report No. 89-192