Lithologic logs of auger holes and analytical data for auger samples from the Four Notch, Graham Creek, and Chambers Ferry Roadless Areas, Walker, Angelina, Jasper, and Sabine Counties, eastern Texas

By
B. B. Houser

Open-File Report 84-0826
1984

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature

1Denver, Colorado
CONTENTS

Introduction................................................................. 1
References cited............................................................ 1
Lithologic logs.............................................................. 2
  Auger holes 37-48...................................................... 2
  Auger holes 49-60...................................................... 8
  Auger holes 61-66...................................................... 15

TABLES

Table 1. Major and trace element compositions of auger samples from the Four Notch Roadless Area, Walker County, Texas.......................... 7

2. Major and trace element compositions of auger samples from the Graham Creek Roadless Area, Angelina and Jasper Counties, Texas......................... 14

3. Major and trace element compositions of auger samples from the Chambers Ferry Roadless Area, Sabine County, Texas.............................. 18
INTRODUCTION

During February and March, 1982, thirty auger holes were drilled in and near the Four Notch, Graham Creek, and Chambers Ferry Roadless Areas in eastern Texas as part of an evaluation of the mineral resource potential of the areas conducted by the U.S. Geological Survey. The holes were drilled using a truck-mounted power auger and auger stems 4 in. in diameter. Seventy-one auger samples of silt and clay were submitted to U.S. Geological Survey laboratories for trace element analysis by semiquantitative spectrographic methods.

This report presents the lithologic logs of the auger holes, and tables of analytical data for each of the three areas (table 1, Four Notch Roadless Area; table 2, Graham Creek Roadless Area; and table 3, Chambers Ferry Roadless Area). Additional data, including location maps of the auger holes, were given in the mineral resource potential maps of the roadless areas (Houser and Ryan, 1983a, 1983b, 1983c).

In the logs that follow, the notation AA means "as above" and refers to the immediately preceding described unit; where numbers (footages) in parentheses follow AA, they refer to the unit described above at that footage. TD is the standard abbreviation for total depth.

REFERENCES CITED


LITHOLOGIC LOGS

Auger holes 37-48

Four Notch Roadless Area (Houser and Ryan, 1983a)
Sam Houston National Forest
Walker County, Texas
New Waverly, Oakhurst, and Phelps quadrangles; 1:24,000

37-New W-TW

Lat. 30°37'15"
Long. 95°23'19"
Elev. of ground surface, 297 ft
Willis Fm., 0-9 ft depth
Top of Fleming Fm., 9 ft (288 ft elev.)

0-5 stiff sandy silty clay, yellowish-gray (5Y 7/2); upper 3 ft finely mottled red
5-9 yellowish-gray stiff clay, some manganese concretions in upper half; one pebble
9-11 stiff yellowish gray clay; small calcareous nodules <1/4 in. across
12-22 AA; fewer calcareous nodules
22-27 very fine sandy stiff yellowish-gray clay; calcite nodules <1/4 in. across; powdery granular calcareous lenses 1/2 in. thick
27-32 stiff, dusky yellow, calcareous fine sandy clay with 1/4 in. calcareous nodules; minor softer, clayey very fine sand
32-37 AA with chunky texture; dry hackly clay; calcareous nodules 1/2 in. across
37 TD

38-OAK-TW

Lat. 30°39'25"
Long. 95°21'50"
Elev. of ground surface, 353 ft
Willis Fm., 0-30 ft depth
Top of Fleming Fm., 30 ft (323 ft elev.)

0-4 light brown (5YR 5/6) to moderate reddish-brown (10R 4/6), oxidized fine sandy clay
4-7 mottled moderate reddish-brown (10R 4/6) and light olive gray (5Y 6/1) fine sandy stiff clay
7-10 light olive gray clayey fine to medium sand
10-14 thin interbeds (?) of above and stiff dark yellowish-orange (10YR 6/6) and yellowish-gray (5Y 8/2) clay; minor sand in clay
14-21 (5Y 7/2) slightly sandy clay
21-30 (5Y 7/2) fine grained, muddy liquifiable sand
30-32 mottled red, gray, and black, slightly sandy clay; oxidized zone (paleosol)
32-35 mottled gray and yellowish-brown clay with black Mn oxide
35-36 AA; lighter colors with small calcareous nodules <1/2 in.
36-37 loose fragments of yellow gray calcareous clay and calcareous nodules
37 TD
39-PHE-TW

Lat. 30°41'19"
Long. 95°23'50"
Elev. of ground surface, 408 ft
Willis Fm., 0-11 ft depth
Top of Fleming Fm., 11 ft (397 ft elev.)

0-2 soil and moderate brown (5YR 3/4) clay
2-7 yellowish-gray (5Y 7/2) crumbly sandy clay
7-11 grayish orange (10YR 7/4) very fine muddy sand with minor clay blebs
11-17 mottled light brown (5YR 5/6) and moderate brown (5YR 4/4) and light yellowish-gray, fine sandy clay; stiff; black Mn oxide present
17-22 moderate yellow-brown (10YR 5/4), crumbly calcareous clayey sand or sandy clay with round calcareous nodules <1/4 in.
22-32 light brown (5YR 5/6) calcareous, stiff but crumbly, clay with calcareous nodules; minor gray mottling
32 TD

40-PHE-TW

Lat. 30°41'33"
Long. 95°23'54"
Elev. of ground surface, 413 ft
Willis Fm., 0-10 ft depth
Top of Fleming Fm., 10 ft (403 ft elev.)

0-5 stiff gray and red mottled sandy clay
5-8 yellowish gray, stiff, slightly sandy clay
8-10 yellowish-gray and black mottled, slightly sandy clay
10-11 yellow gray-brown, crumbly, calcareous clay with calcareous blebs <1/4 in. across
11-14 pale yellowish-brown (10YR 6/2), crumbly, muddy fine sand
14-20 yellowish-gray and dark yellowish-orange mottled, crumbly clay
20-27 mottled? red and gray calcareous clay; calcareous areas are soft, not nodular
27 TD

41-PHE-TW

Lat. 30°38'12"
Long. 95°23'19"
Elev. of ground surface, 362 ft
Willis Fm., 0-58 ft
Top of Fleming Fm., 58 ft (304 ft elev.)

0-5 A-horizon; dark yellowish orange (10YR 6/6), clayey sand
5-7 B-horizon; mottled red-gray and yellow-orange sandy clay
8-10 moderate red-brown (10R 4/6) and yellow-gray, stiff clayey sand
10-13 moderate yellow-brown (10YR 5/4) slightly clayey, fine to medium sand with 10% gray clay blebs
13-16 (10YR 5/4) clean, fine to medium sand
16-26 pale yellow-orange (10YR 8/6), fine to medium clean sand
26-27 yellow-gray fine to medium clean sand with clay blebs and black speckled coloration disseminated throughout
27-31 moderate yellow-brown (10YR 5/4), slightly clayey fine to medium sand with 15% clay blebs
31-37 grayish-orange (10YR 7/4), moderately stiff clayey sand or sandy clay with minor gray clay blebs; uncommon black (MnO?) particles <1/8 in. across
37-40 fairly soft clayey sand (10YR 7/4)
40-58 slightly muddy, liquifiable, fine to medium sand; gray-orange (10YR 7/4) to pale yellow brown (10YR 6/2); minor small (1/8 in.) flat clay fragments
58-65 yellow gray (5Y 7/2) stiff clay
65-73 yellow-gray to orange-brown, stiff calcareous clay; slightly crumbly; calcareous nodules in upper 2-3 ft
73-77 (10R 4/6 to 10YR 6/2, mottled with gray) slightly silty, noncalcareous clay
77 TD

42-PHE-TW

Lat. 30°39'07"
Long. 95°24'53"
Elev. of ground surface, 379 ft
Willis Fm., 0-52 ft depth
Top of Fleming Fm., 52 ft depth (327 ft elev.)

0-3 leached, stiff sandy clay
3-16 very stiff, medium sandy clay, mottled yellowish-gray and red orange-brown (10R 5/6)
16-20 yellowish-gray, stiff medium sandy clay
20-30 slightly clayey, soft medium sand; (10R 5/6)
30-32 medium sandy clay; gray and red-orange with black mottling
32-52 yellow gray, soft clayey sand and sandy clay
52-62 light brown (5YR 5/6) and gray, crumbly clay; very slightly calcareous
62-72 dark yellowish-orange (10YR 6/6) and yellowish-gray mottled sandy clay; fairly soft; not calcareous
72-87 grayish-red to pale yellow-brown, mottled with yellowish-gray soft clay; very slightly calcareous; no nodules
87 TD

43-OAK-TW

Lat. 30°38'23"
Long. 95°21'53"
Elev. of ground surface, 354 ft
Willis Fm., 0-50 ft
Top of Fleming Fm., 50 ft (304 ft elev.)

3-6 B-horizon; gray and red medium sandy clay
6-10 yellowish-gray with minor red, fine sandy, stiff clay
10-21 slightly muddy, fine sand
21-23 stiff, yellow gray clay
23-43 AA (10-21)
43-44 stiff, yellowish-gray clay with orange-yellow mottling
44-47 AA (10-21)
47-50 stiff clay; pale brown, gray and yellowish-orange with black MnO(?)
50-63 yellowish-gray clay; mottled grayish-orange (10YR 7/4) and dark yellowish-orange (10YR 6/6); calcareous with minor calcareous nodules
63 TD

44-PHE-TW

Lat. 30°40'36"
Long. 95°22'02"
Elev. of ground surface, 411 ft
Willis Fm., 0-48 ft depth
Top of Fleming Fm., 48 ft (363 ft elev.)

0-8 A-, B-, and C-soil horizons
8-14 slightly clayey, fine to medium sand; moderate red-orange to moderate red-brown
14-20 fine to medium loose sand; mottled gray-pink (5YR 7/2) and moderate red-orange (10R 6/6)
20-29 moderate red-orange (10R 6/6) muddy, slightly clayey sand
29-32 AA (14-20)
32-42 AA (20-29)
42-47 moderate yellow-brown (10YR 6/6), extremely stiff, medium sandy clay
47-48 pale yellow-brown (10YR 6/2), muddy medium sand
48-50 stiff clay; mottled yellowish-gray, dark yellowish-orange and black (Mn oxide)
50-53 stiff, yellowish-gray and light brown (5YR 5/6) clay; noncalcareous
53-62 AA with calcareous lenses enclosed by gray clay, and minor calcareous nodules
62 TD

45-PHE-TW

Lat. 30°42'22"
Long. 95°24'23"
Elev. of ground surface, 371 ft
Willis Fm., not present (0-1 ft soil)
Top of Fleming Fm., 1 ft (370 ft elev.)

0-1 sand
1-6 yellowish-gray, slightly sandy clay
6-8 AA with calc nodules 1 in. across and speckled with black Mn oxide
8-17 yellow-gray and light brown, very stiff, calcareous clay
17 TD

46-PHE-TW

Lat. 30°42'50"
Long. 95°24'30"
Elev. of ground surface, 395 ft
Willis Fm., 0-60 ft depth
Top of Fleming Fm., 60 ft (335 ft elev.)
0-1 sand
1-4 gray and red mottled, stiff fine sandy clay
4-7 gray and red-orange mottled, clayey sand
7-16 yellowish-gray, slightly muddy fine sand
16-17 pale red, slightly sandy stiff clay
17-40 slightly muddy fine sand; minor pale red clay stringers
40-42 moderately stiff, yellowish-gray clay with minor black Mn oxide; probably has fine sand interbeds
42-60 gray fine to medium sand
60-62 stiff clay; yellowish gray with black Mn oxide
62-67 mostly orange-brown with some yellowish-gray, stiff calcareous clay; minor small nodules
67-72 stiff gray noncalcareous clay with some Mn oxide; minor sand
72 TD

47-PHE-TW

Lat. 30°42′14″
Long. 95°23′51″
Elev. of ground surface, 392 ft
Willis Fm., not present
Top of Fleming Fm., 0 ft (392 ft elev.)

0-3 stiff clayey sand with minor soft calcareous areas; yellowish gray and orange brown
3-6 red-brown and yellowish-gray, stiff clay with soft calcareous areas about 1 in. across
6-7 AA with 50% calcareous areas (caliche?)
7-9 red-brown stiff calcareous clay with yellowish gray veining and minor black Mn oxide spots
9-15 loose calcareous silt with calcareous nodules, about 1 in. across in zone in center
15-17 AA, (7-9)
17 TD

48-PHE-TW

Lat. 30°40′18″
Long. 95°24′58″
Elev. of ground surface, 320 ft
Quaternary alluvium, 0-10 ft
Willis Fm., not present
Top of Fleming Fm., 10 ft (310 ft elev.)

0-10 stiff clayey sand or sandy clay; dark gray and orange brown with black Mn oxide; quartz pebbles at 7-10
10-12 gray and orange, stiff sandy clay; calcareous areas
12-13 very stiff, calcareous clay; yellowish gray, light brown, and orange brown with black Mn oxide
13-17 light pink-brown and gray-green, very stiff calcareous clay
17 TD
Table 1.—Major and trace element composition of auger samples from the Four Notch Roadless Area, Walker County, Texas

<table>
<thead>
<tr>
<th>Auger hole number</th>
<th>Depth interval (ft)</th>
<th>Fe%</th>
<th>Mg%</th>
<th>Ca%</th>
<th>Ti%</th>
<th>Mn</th>
<th>B</th>
<th>Ba</th>
<th>Be</th>
<th>Co</th>
<th>Cr</th>
<th>Cu</th>
<th>La</th>
<th>Ni</th>
<th>Pb</th>
<th>Sc</th>
<th>Sr</th>
<th>V</th>
<th>Y</th>
<th>Zr</th>
</tr>
</thead>
<tbody>
<tr>
<td>37-New W-TW</td>
<td>1-6</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>150</td>
<td>100</td>
<td>200</td>
<td>1.5</td>
<td>15</td>
<td>50</td>
<td>100</td>
<td>70</td>
<td>50</td>
<td>20</td>
<td>100</td>
<td>50</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>1.5</td>
<td>0.7</td>
<td>0.5</td>
<td>300</td>
<td>100</td>
<td>200</td>
<td>2.0</td>
<td>15</td>
<td>50</td>
<td>100</td>
<td>70</td>
<td>50</td>
<td>20</td>
<td>100</td>
<td>50</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>9-22</td>
<td>5.0</td>
<td>1.0</td>
<td>3.0</td>
<td>0.5</td>
<td>300</td>
<td>100</td>
<td>300</td>
<td>1.5</td>
<td>15</td>
<td>100</td>
<td>50</td>
<td>70</td>
<td>50</td>
<td>50</td>
<td>15</td>
<td>150</td>
<td>150</td>
<td>50</td>
<td>150</td>
</tr>
<tr>
<td>39-PHE-TW</td>
<td>11-17</td>
<td>2.0</td>
<td>1.0</td>
<td>0.5</td>
<td>0.5</td>
<td>1500</td>
<td>100</td>
<td>1000</td>
<td>3.0</td>
<td>20</td>
<td>150</td>
<td>50</td>
<td>100</td>
<td>70</td>
<td>70</td>
<td>15</td>
<td>L</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>17-22</td>
<td>2.0</td>
<td>0.5</td>
<td>3.0</td>
<td>0.3</td>
<td>1000</td>
<td>100</td>
<td>700</td>
<td>1.0</td>
<td>15</td>
<td>70</td>
<td>20</td>
<td>50</td>
<td>20</td>
<td>50</td>
<td>7</td>
<td>L</td>
<td>70</td>
<td>30</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>22-27</td>
<td>2.0</td>
<td>0.5</td>
<td>3.0</td>
<td>0.5</td>
<td>700</td>
<td>70</td>
<td>1000</td>
<td>1.0</td>
<td>10</td>
<td>50</td>
<td>20</td>
<td>50</td>
<td>20</td>
<td>30</td>
<td>7</td>
<td>150</td>
<td>100</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>27-37</td>
<td>3.0</td>
<td>1.0</td>
<td>3.0</td>
<td>0.5</td>
<td>500</td>
<td>100</td>
<td>500</td>
<td>2.0</td>
<td>15</td>
<td>70</td>
<td>30</td>
<td>50</td>
<td>30</td>
<td>15</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>42-PHE-TW</td>
<td>32-52</td>
<td>1.5</td>
<td>0.3</td>
<td>0.5</td>
<td>0.3</td>
<td>100</td>
<td>70</td>
<td>500</td>
<td>2.0</td>
<td>10</td>
<td>20</td>
<td>10</td>
<td>50</td>
<td>20</td>
<td>10</td>
<td>5</td>
<td>N</td>
<td>70</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>52-62</td>
<td>3.0</td>
<td>0.7</td>
<td>1.0</td>
<td>0.5</td>
<td>300</td>
<td>100</td>
<td>700</td>
<td>2.0</td>
<td>20</td>
<td>70</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>30</td>
<td>10</td>
<td>L</td>
<td>150</td>
<td>50</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>62-72</td>
<td>2.0</td>
<td>0.7</td>
<td>0.5</td>
<td>0.5</td>
<td>1000</td>
<td>100</td>
<td>500</td>
<td>2.0</td>
<td>20</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>20</td>
<td>10</td>
<td>L</td>
<td>150</td>
<td>30</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>72-87</td>
<td>5.0</td>
<td>1.5</td>
<td>1.0</td>
<td>0.5</td>
<td>500</td>
<td>100</td>
<td>500</td>
<td>2.0</td>
<td>20</td>
<td>100</td>
<td>50</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>L</td>
<td>150</td>
<td>50</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>45-PHE-TW</td>
<td>1-6</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>150</td>
<td>100</td>
<td>2000</td>
<td>1.5</td>
<td>20</td>
<td>70</td>
<td>20</td>
<td>50</td>
<td>20</td>
<td>50</td>
<td>10</td>
<td>L</td>
<td>100</td>
<td>30</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>6-7</td>
<td>2.0</td>
<td>0.7</td>
<td>1.0</td>
<td>0.5</td>
<td>700</td>
<td>100</td>
<td>700</td>
<td>1.5</td>
<td>20</td>
<td>100</td>
<td>20</td>
<td>70</td>
<td>30</td>
<td>30</td>
<td>10</td>
<td>L</td>
<td>100</td>
<td>50</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>8-11</td>
<td>2.0</td>
<td>1.0</td>
<td>5.0</td>
<td>0.5</td>
<td>1000</td>
<td>70</td>
<td>700</td>
<td>1.5</td>
<td>20</td>
<td>70</td>
<td>15</td>
<td>50</td>
<td>20</td>
<td>20</td>
<td>10</td>
<td>200</td>
<td>150</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>14-17</td>
<td>3.0</td>
<td>1.5</td>
<td>5.0</td>
<td>0.5</td>
<td>700</td>
<td>100</td>
<td>1500</td>
<td>1.0</td>
<td>20</td>
<td>150</td>
<td>50</td>
<td>70</td>
<td>50</td>
<td>70</td>
<td>20</td>
<td>300</td>
<td>150</td>
<td>50</td>
<td>150</td>
</tr>
<tr>
<td>46-PHE-TW</td>
<td>60-62</td>
<td>2.0</td>
<td>1.0</td>
<td>0.7</td>
<td>0.5</td>
<td>1500</td>
<td>100</td>
<td>500</td>
<td>3.0</td>
<td>10</td>
<td>100</td>
<td>20</td>
<td>70</td>
<td>30</td>
<td>30</td>
<td>15</td>
<td>L</td>
<td>150</td>
<td>50</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>62-67</td>
<td>2.0</td>
<td>1.0</td>
<td>10.0</td>
<td>0.5</td>
<td>700</td>
<td>100</td>
<td>300</td>
<td>1.0</td>
<td>10</td>
<td>100</td>
<td>30</td>
<td>50</td>
<td>30</td>
<td>30</td>
<td>10</td>
<td>300</td>
<td>150</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>67-72</td>
<td>2.0</td>
<td>0.7</td>
<td>0.5</td>
<td>0.5</td>
<td>300</td>
<td>100</td>
<td>300</td>
<td>1.0</td>
<td>10</td>
<td>50</td>
<td>20</td>
<td>50</td>
<td>20</td>
<td>20</td>
<td>10</td>
<td>L</td>
<td>100</td>
<td>30</td>
<td>300</td>
</tr>
</tbody>
</table>

Remarks: Fe, Mg, Ca, and Ti reported in percent; all other elements reported in parts per million.
Results are in the series 1, 1.5, 2, 3, 5, 7, 10, etc.
N = Not detected at limit of detection.
L = Detected, but below limit of determination.
Auger holes 49-60

Graham Creek Roadless Area (Houser and Ryan, 1983b)
Angelina National Forest
Angelina and Jasper Counties, Texas
Zavalla quadrangle; 1:62,500

49-ZAV-TW

Lat.  31°04'36"
Long.  94°20'52"
Elev. of ground surface, 258 ft
Catahoula Fm., 0-20 ft depth
Elev. of top of Whitsett Fm., 238 ft

0-10  light brown (5YR 5/6), clayey, fine to medium sand
10-14  dark yellowish-orange (10YR 6/6), clayey, fine to medium sand with
       quartz pebbles about 1 in. in diameter
14-20  AA with minor pale yellowish-brown (10YR 6/2) stringers
20-24  stiff yellowish-gray (5Y 7/2) clay
24-31  AA with black marbling (minor)
31-33  greenish-gray (5G 6/1) stiff, crumbly, silty clay
33-35  AA, dark greenish gray (5G 4/1)
35-37  silty lignite; dry, crumbly
37-42  AA (31-33)
42    TD

50-ZAV-TW

Lat.  31°03'52"
Long.  94°19'32"
Elev. of ground surface, 226 ft
Catahoula Fm., 0-60 ft
Elev. of top of Whitsett Fm., 166 ft

0-5  yellowish-gray (5Y 7/2), clean, very fine to fine sand
5-8  slightly clayey sand; mottled light brown (5YR 5/6) and moderate
     red-brown (10R 4/6)
8-12  AA (0-5); mottled with light brown (5YR 5/6)
12-15  clean, light gray (N7) fine sand
15-17  marbled light gray (5Y 6/1), dark yellowish-orange (10YR 6/6) and
       moderate red-brown (10R 5/6), stiff clay
17-32  clean fine sand; dark yellowish to grayish orange (10YR 6/6-
       10YR 7/4), and very light gray (N8)
32-52  clean fine sand; moderate to grayish yellow (5Y 8/4-7/6), grayish
       orange (10YR 7/4), and pale to dark yellowish orange (10YR 8/6-6/6);
       clay seam a few inches thick at 50 ft
52-60  no recovery
60-61  dark gray (N3), lignitic, silty clay
61-70  alternating olive gray (5Y 2/1), fine sand and greenish gray
       (5G 6/1) sandy clay
70-72  dark gray lignitic clay and silt
72    TD
51-ZAV-TW

Lat. 31°03'01"
Long. 94°21'48"
Elev. of ground surface, 205 ft
Catahoula Fm., 0-40 ft depth
Elev. of top of Whitsett Fm., 165 ft

0-10 light brown (5YR 5/6), fairly clean, fine sand
10 layer of quartz pebbles about 1 in. across
10-23 light brown (5YR 6/4), slightly clayey, medium to coarse sand, with minor pebbles
23-26 grayish-orange (10YR 6/4), pebbly medium sand
26-32 slightly clayey fine sand; very pale orange (10YR 8/2) to grayish orange (10YR 7/9)
32-40 AA with minor 1/2 in. thick, light gray clay stringers
40-50 dark greenish-gray (5G 4/1) clay with stringers of light gray silt; may be interbedded with greenish-gray medium sand
50-58 dark greenish-gray (5G 4/1) brittle clay with light gray silt stringers; minor pyrite nodules
58-61 AA but crumbly and softer; minor pyrite zones and nodules
61-62 greenish-gray (5G 6/1), clean, fine to medium sand
62 TD

52-ZAV-TW

Lat. 31°02'35"
Long. 94°21'29"
Elev. of ground surface, 125 ft
Quaternary alluvium 0-2 ft depth
Elev. of top of Whitsett Fm., 123 ft

0-2 pale yellow-brown (10YR 6/2) fine sand
2-7 mottled weathered (5YR 4/2) clay with minor silt stringers; lignitic
7-9 grayish-brown (5YR 3/2), soft clay
9-13 pale yellowish brown (10YR 6/2) fine to medium sand
13-20 yellowish-gray (5Y 7/2) clay, with grayish-yellow (5Y 8/4) and moderate yellow (5Y 7/6) silty streaks and mottling
20-24 dark greenish-gray (5G 6/1) stiff clay with minor plant fragments
24-28 dark gray clay with dark gray fine sand
28-32 dark greenish-gray (5G 6/1) clay; crumbly
32-40 AA with light gray silt stringers
40-44 fine to medium sandy clay (5G 4/1)
44-46 brownish-black (5YR 2/1) lignitic clay
46-52 slightly clayey medium sand (5G 4/1) with minor lignitic zones
52-57 olive gray (5Y 4/1) stiff silty clay
57-61 olive gray (5Y 4/1) waxy hard clay
61-62 brownish-black (5YR 2/1) lignitic clay (may be mostly lignite)
62-67 greenish gray (5G 6/1) crumbly sandy clay; minor lignite
67-71 dry semi-indurated, grayish-olive (10Y 4/2) silt with lignitic coatings
71 rock---refused bit
71 TD
53-ZAV-TW
Lat. 31°02'55"
Long. 94°23'15"
Elev. of ground surface, 108 ft
Quaternary alluvium, 0-10 ft depth
Elev. of top of Whitsett Fm., 98 ft

0-6 pale yellowish-brown (10YR 6/2) fine sand
6-10 dark yellowish-brown (10YR 4/2) fine sandy silt
10-12 dark gray (5Y 4/1) fine sand and silt
12-15 dark gray (5G 4/1) fine sand
15-17 dark gray (5Y 4/1) fine sand with clay stringers
17 TD

54-ZAV-TW
Lat. 31°03'43"
Long. 94°22'42"
Elev. of ground surface, 200 ft
Catahoula Fm., 0-22 ft depth
Elev. of top of Whitsett Fm., 178 ft

0-7 light brown (5YR 5/6), slightly clayey fine sand
7-22 fine sand, various yellow or gray colors
22-24 pale yellowish-brown clay—probably as 2-3 in. thick stringers laminated with fine sand
25-30 yellow gray, clayey fine sand or sandy clay
30-35 pale yellow-brown (10YR 6/2) to light olive-gray (5Y 6/1) stiff clay with very thin orange silt stringers
35-38 greenish-gray, slightly silty clay
39-41 greenish-gray, very fine sandy silt
41-44 dark greenish-gray silty clay with fine sand laminae
44-47 greenish black, clayey, silty fine sand, and clay with silt and sand stringers
47 TD

55-ZAV-TW
Lat. 31°05'07"
Long. 94°20'37"
Elev. of ground surface, 204 ft
Catahoula Fm. not present
Whitsett Fm., 0-47 ft(?) depth
Elev. of top of Manning Fm., 157 ft(?)

0-7 yellow gray, crumbly, stiff clay
7-17 yellowish-brown (10YR 5/2) stiff clay with thin laminae of silt and fine sand (yellow and light gray)
17-29 AA, perhaps a little siltier at the bottom. Grades to dark yellowish brown (10YR 4/2)
29-47 dark greenish-gray (5GY 4/1) stiff clay with thin laminae of silt and fine sand
47-62 dark greenish-gray, stiff silty clay with sparse fine sand laminae
62-107 greenish black (5G 2/1) slightly silty clay—sparse fine sand laminae and abundant layers of thin-walled shell material
107 TD

56-ZAV-TW

Lat. 31°06′01″
Long. 94°21′59″
Elev. of ground surface, 185 ft
Catahoula and Whitsett Fms. not present
Elev. of top of Manning Fm., 185 ft

0-2 pale yellowish-brown, fine sand
2-14 pale yellowish-brown (10YR 6/2), stiff clay, with thin stringers of fine sand and silt
14-16 yellowish-gray, crumbly clay
16-17 very pale orange (10YR 8/2), crumbly clay
17-23 moderate yellow brown (10YR 5/4) stiff clay with uncommon silt stringers
23-25 AA with lenses of dark greenish-gray clay (5GY 4/1) and pockets of gypsum crystals
25-29 dark greenish-gray clay with moderate yellow-brown lenses
29-42 dark greenish-gray clay with uncommon silt and fine sand stringers
42-57 dark greenish-gray clay with silt and fine sand stringers
57-102 AA (29-42)
102-107 stiffer (brittle) clay, olive gray (5Y 4/1) with uncommon silt stringers
107 TD

57-ZAV-TW

Lat. 31°03′07″
Long. 94°20′34″
Elev. of ground surface, 242 ft
Catahoula Fm., 0-79 ft depth
Elev. of top of Whitsett Fm., 163 ft

0-10 dark yellow-orange, fine sand
10-14 light brown (5YR 5/6), medium sand, slightly clayey
14-17 AA with quartz pebbles
17-20 grayish-orange, clean, fine sand
20-27 AA (10-14) fining downward
27-37 poor recovery—had to pull augers out with reverse rotation; light brown (5YR 5/6), medium to coarse clayey sand with one yellowish-gray clay stringer about 1/2 in. thick
37-47 clayey medium to coarse sand, marbled very pale, grayish-, and dark yellowish-orange (10YR 8/2, 10YR 7/4 and 10YR 6/6)
47-67 grayish-orange (10YR 7/4), muddy medium sand
67-71 AA with one light gray (N7) clay stringer
71-76 grayish-orange (10YR 7/4) clayey medium sand
76-79 stiff, clayey, medium to coarse sand; medium blue-gray (5B 5/1) mottled grayish-orange (10YR 7/4)
79-81 greenish-gray (5G 6/1) clay with abundant sand laminae
81–85 dark greenish-gray to greenish-black (5G 4/1 to 5G 2/1) stiff clay with minor lignite pods; sandy around the lignite
85–87 greenish-gray (5G 6/1) silty clay
87–92 dark greenish-gray (5G 4/1) fine sandy clay
92 TD

58-ZAV-TW

Lat. 31°04’25"
Long. 94°19’32"
Elev. of ground surface, 161 ft
Catahoula Fm. not present
Whitsett Fm., 0–42 ft (?) depth
Elev. of top of Manning Fm., 119 ft

0–3 light brown-gray fine sand
3–7 yellowish-gray, brittle silty clay
7–12 yellowish-gray to pale yellow-brown (10YR 6/2) stiff brittle clay, minor rusty zones (10R 4/6 and 5YR 5/6) in upper half
12–26 pale yellow-brown (10YR 6/2) with pale yellow-orange (10R 8/6) laminae, stiff brittle clay; gypsum crystals in upper half in cavities
26–28 dark yellow-brown (10YR 4/2) and olive gray (5Y 4/1) marbled, stiff clay with silt laminae
28–31 dark green-gray (5G 4/1), stiff clay
31–42 olive black clay with abundant olive gray silt laminae, upper 1/3 marbled olive black and olive gray
42–45 olive black stiff clay
45–72 dark green-gray (5GY 4/1) stiff clay with uncommon silt laminae
72 TD

59-ZAV-TW

Lat. 31°02’47"
Long. 94°19’35"
Elev. of ground surface, 165 ft
Catahoula Fm., 0–17 ft depth
Elev. of top of Whitsett Fm., 148 ft

0–4 clean medium sand (soil)
4–7 red-orange and yellow, clayey, coarse sand
7–13 AA, light brown (5YR 5/6)
13–17 light gray (N7) coarse sandy clay or clayey coarse sand
17–22 yellowish-gray, stiff, brittle clay
22–30 crumbly, semi-indurated silty clay; yellowish gray to pale yellowish brown (10YR 6/2)
30–32 light bluish-gray, dry powdery material
32–35 greenish-gray (5G 6/1), stiff brittle clay with fine sand laminae
35–37 greenish-gray, slightly darker than 32–35, and more brittle; little or no sand laminae
37 TD
60-ZAV-TW

Lat. 31°01'13"
Long. 94°22'32"

Elev. of ground surface, 115 ft
Catahoula Fm., 0-23 ft
Elev. of top of Whitsett Fm., 92 ft

<table>
<thead>
<tr>
<th>Interval</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-7</td>
<td>pale yellow-brown (10YR 6/2) and dark yellow (10YR 6/6) fine sand</td>
</tr>
<tr>
<td>7-12</td>
<td>dark yellow (10YR 6/6) fine sand</td>
</tr>
<tr>
<td>12-21</td>
<td>light gray (N7) fine sand</td>
</tr>
<tr>
<td>21-23</td>
<td>light gray, fine to medium sand, with common small pebbles</td>
</tr>
<tr>
<td>23-32</td>
<td>greenish-gray (5G 6/1) fine sandy clay or clayey sand</td>
</tr>
<tr>
<td>31-35</td>
<td>(5G 6/1) silty clay</td>
</tr>
<tr>
<td>35-38</td>
<td>(5G 6/1) sandy clay</td>
</tr>
<tr>
<td>38-44</td>
<td>(5G 4/1) clayey medium sand with carbonized wood at base</td>
</tr>
<tr>
<td>44-47</td>
<td>(5G 6/1) crumbly silty clay</td>
</tr>
<tr>
<td>47-50</td>
<td>(5G 6/1) fine sandy silty clay</td>
</tr>
<tr>
<td>50-62</td>
<td>(5G 6/1) dry crumbly silt</td>
</tr>
<tr>
<td>62-63</td>
<td>no recovery</td>
</tr>
<tr>
<td>63-67</td>
<td>dark greenish-gray, lithified waxy clay; couldn't penetrate any farther with clay bit</td>
</tr>
<tr>
<td>70-74</td>
<td>rock bit—light gray (N7) indurated sandy silty material</td>
</tr>
<tr>
<td>67-70</td>
<td>greenish gray (5GY 6/1) at the top and clayey</td>
</tr>
<tr>
<td>74-82</td>
<td>(5G 6/1) silty crumbly clay, gray powdery areas</td>
</tr>
<tr>
<td>82</td>
<td>TD</td>
</tr>
<tr>
<td>Depth of Auger Hole</td>
<td>52-ZAV-TW</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>17-20</td>
<td>1.0</td>
</tr>
<tr>
<td>28-32</td>
<td>1.5</td>
</tr>
<tr>
<td>44-46</td>
<td>0.7</td>
</tr>
<tr>
<td>57-61</td>
<td>0.5</td>
</tr>
<tr>
<td>7-17</td>
<td>0.7</td>
</tr>
<tr>
<td>29-32</td>
<td>0.7</td>
</tr>
<tr>
<td>47-62</td>
<td>1.5</td>
</tr>
<tr>
<td>62-75</td>
<td>0.5</td>
</tr>
<tr>
<td>82-92</td>
<td>1.0</td>
</tr>
<tr>
<td>102-107</td>
<td>0.7</td>
</tr>
<tr>
<td>17-23</td>
<td>1.0</td>
</tr>
<tr>
<td>25-29</td>
<td>0.7</td>
</tr>
<tr>
<td>29-42</td>
<td>1.0</td>
</tr>
<tr>
<td>42-57</td>
<td>1.5</td>
</tr>
<tr>
<td>57-75</td>
<td>1.5</td>
</tr>
<tr>
<td>92-102</td>
<td>1.0</td>
</tr>
<tr>
<td>102-107</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Remarks: Fe, Mg, Ca, and Ti reported in percent; all other elements reported in parts per million.
Results are in the series 1, 1.5, 2, 3, 5, 7, 10, etc.
N = Not detected at limit of detection.
L = Detected, but below limit of determination.
Auger holes 61-66

Chambers Ferry Roadless Area (Houser and Ryan, 1983c)
Sabine National Forest
Sabine County
Patroon quadrangle; 1:62,500

61-PAT-TW

Lat. 31°34'13"
Long. 93°51'14"
Elev. of ground surface, 275 ft

0-4 soil
4-8 grayish-orange (10YR 7/4), very fine silty sand
8-18 finely laminated silt and clay, grading from grayish orange and yellowish gray (weathered) to olive gray (5Y 4/1) and light gray (N7)
18-26 olive gray and light gray, finely laminated silt and clay
26-27 silty lignite
27-30 laminated lignitic clay and silt
30-33 clayey lignite
33-37 lignitic, laminated silt and clay
37-56 light gray (or light olive gray, 5Y 5/1), fine sand
56-57 sandstone--refused bit at 57
57 TD

62-PAT-TW

Lat. 31°33'02"
Long. 93°49'00"
Elev. of ground surface, 230 ft

0-7 gray and orange, clean very fine sand
7-12 gray and orange, partly lithified, clayey fine sand with iron oxide(?) nodules
12-32 finely laminated dark gray clay and dark greenish-gray fine sand and silt; upper 2 ft weathered orange and dark brown
32-46 olive-black (5Y 2/1) silt
46-48 olive-black to olive-gray silt and clay; finely laminated
48-50 olive-black clay and lignite laminae
50-52 mascerated clay, lignite and sand
52-72 olive-gray (5Y 4/1) finely laminated silty clay or clayey silt
72 TD

63-PAT-TW

Lat. 31°35'26"
Long. 93°53'32"
Elev. of ground surface, 265 ft

0-7 light brown fine sand
7-20 dark yellow (10YR 6/6), slightly muddy fine to medium sand
20-23 moderate gray and brownish-gray laminated silt, sand and clay
23-25  lignite
25-27  lignitic silt and clay
27-42  olive gray (5Y 4/1) silty fine sand, laminated
42-54  AA, becoming more clayey downward; slightly lignitic
54-57  lignitic silty clay with 1 ft thick layer of lignite
57-70  olive-gray micaceous, dirty fine sand, grading downward to sandy
       silt; minor lignitic areas
70-72  brownish-black (5YR 2/1) silty lignitic clay
72-76  brownish-black and olive-gray laminated silt, fine sand, and clay
76-80  brownish-black clayey silt
80-87  olive-gray, micaceous, dirty fine sand
87-102 AA (72-76)
102  TD

64-PAT-TW

Lat.  31°33'15"
Long.  93°53'10"
Elev. of ground surface, 263 ft

0-7  weathered, light brown fine sand and silt
7-17  finely laminated, olive-gray clayey silt and fine silty sand
17-27  olive-black (5Y 2/1) fine to medium clayey sand with common
       olive-gray silt nodules
27-31  olive-black clayey silt, and moderate brown (5YR 4/4) dirty sand
31-37  moderate yellow-brown (10YR 5/4) fine sand
37-50  AA, grading from moderate brown (5YR 4/4) to dusky yellow (5Y 6/4)
       to medium gray (N5)
50-52  lignite
52-67  olive-gray (5Y 4/1) micaceous silty fine sand
67-82  olive-gray and dark gray sandy silt
82  TD

65-PAT-TW

Lat.  31°33'35"
Long.  93°52'11"
Elev. of ground surface, 185 ft

0-18  dark yellow (10YR 6/6) grading to yellowish-gray fine sand
18-21  moderate yellow-brown (10YR 5/4) slightly clayey fine sand
21-28  medium dark gray and greenish-black clayey, silty fine sand
28-31  AA with cemented light gray silt nodules
31-47  olive-black (5Y 2/1) massive clayey silt
47-50  brownish-black, slightly lignitic, laminated silt
50-54  olive-gray (5Y 4/1) micaceous silty sand
54-70  olive-gray and medium gray laminated silt and fine sand
70-81  olive-black, stiff clayey silt (bioturbated?) with wispy fine sand
81  sandstone(?) - refused bit - TD
66-PAT-TW

Lat. 31° 34' 46"
Long. 93° 50' 36"
Elev. of ground surface, 245 ft

0-3  gray and orange, stiff clay
3-8  very fine (5Y 7/3) clean sand
8-18 grayish-yellow to dusky yellow fine clean sand
18-21 dark yellow (10YR 6/6) fine sand; a little dirty
21-24 transition; sand (AA), with blebs of dark gray clay about 1/4 in. across
24-33 medium dark gray (N4) micaceous silt
33-47 AA with lighter gray areas; may be disrupted fine sand laminae
47-51 brown-black clayey silt
51-58 olive-gray fine sandy silt; grading downward to fine silty sand
58-73 olive-black (5Y 7/1) clayey silt with wispy, fine sandy silt lenses
73 TD
Table 3.—Major and trace element composition of auger samples from the Chambers Ferry Roadless Area, Sabine County, Texas

| Auger hole number | Depth interval (ft) | Fe (%) | Mg (%) | Ca (%) | Ti (%) | Mn | B | Ba | Be | Co | Cr | Cu | La | Ni | Pb | Sc | Sr | V | Y | Zr |
|-------------------|---------------------|--------|--------|--------|--------|-----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 61-PAT-TW         | 14-18               | 3      | 1.5    | 0.2    | 0.5    | 300 | 150| 700 | 1.5 | 20  | 100 | 30 | 50 | 70 | 30 | 15 | 150 | 150 | 30 | 200 |
|                   | 18-26               | 5      | 1.5    | 0.15   | 0.5    | 500 | 150| 700 | 1.5 | 20  | 150 | 50 | 50 | 30 | 20 | 15 | L   | 150 | 30 | 150 |
|                   | 27-30               | 2      | 1.0    | 0.15   | 0.7    | 150 | 200| 1000| 1.0 | 7   | 150 | 15 | 70 | 20 | 50 | 50 | 15 | L   | 100 | 20 | 200 |
| 62-PAT-TW         | 12-22               | 3      | 1.0    | 0.15   | 0.3    | 300 | 150| 500 | 1.5 | 30  | 70  | 20 | 50 | 30 | 30 | 15 | 150 | 100 | 30 | 300 |
|                   | 22-32               | 5      | 1.0    | 0.15   | 0.5    | 700 | 150| 500 | 1.5 | 20  | 150 | 50 | 50 | 30 | 50 | 15 | 200 | 100 | 50 | 150 |
|                   | 32-42               | 3      | 1.5    | 0.30   | 0.3    | 1000| 150| 700 | 1.5 | 30  | 100 | 30 | 50 | 70 | 15 | 70 | 200 | 100 | 30 | 200 |
|                   | 46-48               | 3      | 1.0    | 0.20   | 0.5    | 500 | 150| 500 | 1.5 | 20  | 100 | 30 | 50 | 30 | 50 | 15 | 200 | 150 | 30 | 150 |
|                   | 52-62               | 3      | 1.0    | 0.30   | 0.5    | 700 | 150| 700 | 1.0 | 20  | 150 | 30 | 50 | 30 | 50 | 15 | 200 | 100 | 30 | 200 |
|                   | 62-72               | 3      | 1.0    | 0.20   | 0.5    | 500 | 150| 700 | 1.0 | 15  | 150 | 30 | 50 | 30 | 30 | 15 | 200 | 100 | 50 | 150 |
| 63-PAT-TW         | 20-23               | 2      | 1.0    | 0.20   | 0.5    | 200 | 150| 700 | 1.0 | 30  | 150 | 30 | 50 | 50 | 50 | 15 | 150 | 100 | 50 | 300 |
|                   | 42-54               | 3      | 1.0    | 0.20   | 0.5    | 700 | 150| 700 | 1.0 | 30  | 150 | 20 | 50 | 70 | 50 | 15 | 150 | 100 | 30 | 200 |
|                   | 54-57               | 3      | 1.5    | 0.20   | 0.5    | 500 | 150| 700 | 1.5 | 20  | 150 | 30 | 50 | 70 | 50 | 15 | 200 | 150 | 30 | 150 |
|                   | 76-80               | 3      | 1.5    | 0.30   | 0.5    | 300 | 150| 700 | 1.0 | 20  | 150 | 30 | 50 | 50 | 50 | 15 | 300 | 150 | 30 | 100 |
| 64-PAT-TW         | 7-17                | 3      | 1.0    | 0.10   | 0.5    | 200 | 150| 700 | 1.5 | 30  | 150 | 20 | 50 | 70 | 50 | 15 | 150 | 150 | 30 | 150 |
| 65-PAT-TW         | 31-43               | 3      | 1.0    | 0.30   | 0.5    | 500 | 100| 700 | 1.0 | 20  | 150 | 30 | 50 | 70 | 30 | 15 | 200 | 150 | 30 | 150 |
|                   | 70-81               | 10     | 1.5    | 0.50   | 0.5    | 700 | 150| 700 | 1.5 | 20  | 150 | 70 | 50 | 100| 50 | 20 | 300 | 200 | 30 | 200 |
| 66-PAT-TW         | 33-43               | 5      | 1.5    | 0.20   | 0.5    | 700 | 150| 700 | 1.0 | 20  | 150 | 30 | 50 | 50 | 50 | 15 | 200 | 150 | 30 | 100 |
|                   | 58-73               | 5      | 0.7    | 0.20   | 0.3    | 700 | 150| 700 | 1.0 | 20  | 70  | 20 | 50 | 30 | 50 | 10 | L   | 100 | 50 | 150 |

Remarks: Fe, Mg, Ca, and Ti reported in percent; all other elements reported in parts per million. Results are in the series 1, 1.5, 2, 3, 5, 7, 10, etc. N = Not detected at limit of detection. L = Detected, but below limit of determination.