

United States Department of the Interior

U.S. Geological Survey

Lithologic and geophysical logs from three coal exploratory test holes drilled
in 1977 and 1979 in the Maverick Spring quadrangle, Fremont County, Wyoming

By

Ralph C. Warlow

Open-File Report 81-727

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

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Introduction

From October 1977 to November 1979 three test holes (Dh-W-9, Dh-U, and Dh-t) were drilled in the Maverick Spring quadrangle. This drilling, in conjunction with drilling in other study areas, was undertaken as part of a U.S. Geological Survey - U.S. Bureau of Indian Affairs program to assess mineral resources on the Wind River Indian Reservation. A preliminary report of other drilling on the Wind River Indian Reservation is available in an earlier report (Windolph and others, 1980). The geology of the Maverick Spring quadrangle was mapped in 1979 by the author (Warlow, in press). The entire area is within the boundary of the Wind River Indian Reservation.

This report presents geophysical logs and lithologic descriptions corrected in depth intervals to correlate with the lithologic logs of the three test holes. Because of the instability of penetrated shales at hole W-9, only a partial geophysical log could be run. Figure 1 shows the location of the Maverick Spring quadrangle within the Wind River Indian Reservation and Figure 2 shows the locations of the three test holes on the topographic quadrangle sheet.

A conventional rotary drill was employed using air and foam to return cuttings. Continuous 5-foot samples were collected and logged at the drilling site.

Geophysical logging was done under contract by Strata Surveys, Steamboat Springs, Colorado whose procedure was to log each hole twice. The first run logged natural gamma, gamma gamma (density), and resistivity. The borehole diameter was recorded on the second run by a caliper tool. No measurements of borehole diameter were made on Dh-W-9.

Approximately 35 in. coal was penetrated in hole W-9, but it was not cored. Hole T penetrated no significant coal so only one core sample was obtained, that being from hole U. A twin hole was drilled adjacent to the logged test

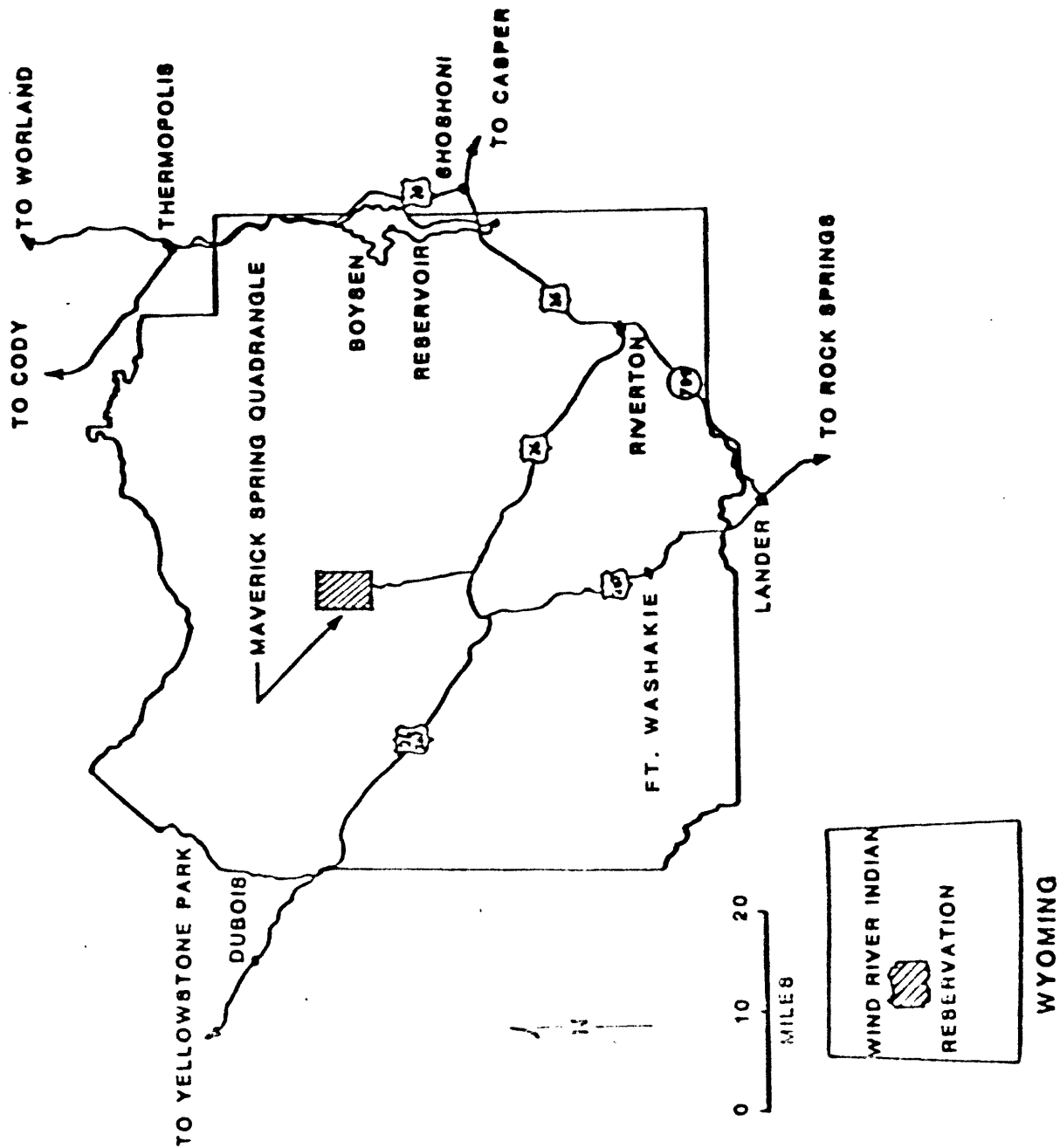


FIGURE 1 - - Location of the Maverick Spring quadrangle in the Wind River Indian Reservation .

109°00'
43°30'

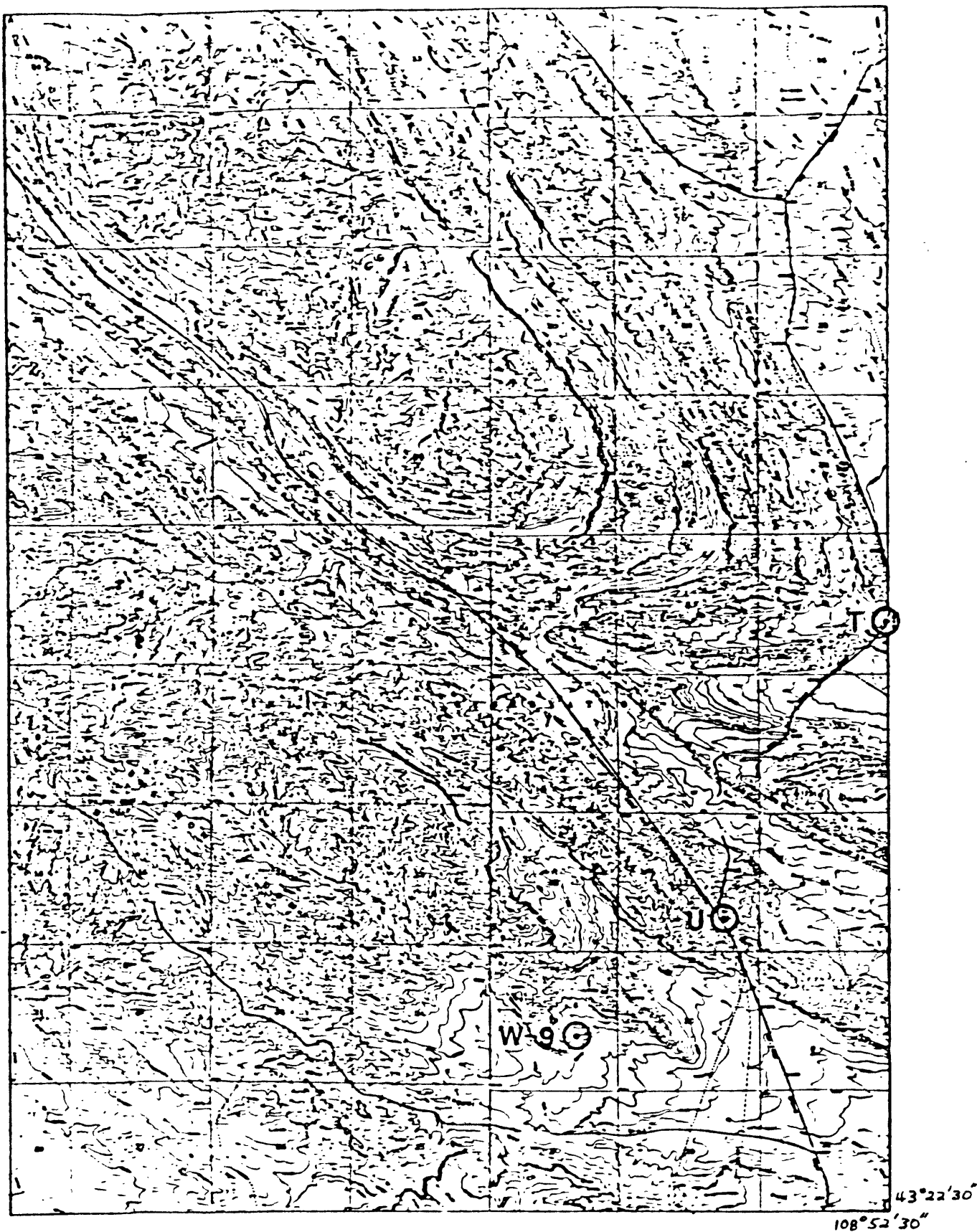


FIGURE 2.--Location of USGS coal test holes in the Maverick Spring quadrangle, Fremont County, Wyoming.

hole to obtain a sample of the coal interval. The core samples included the coal bed, roof, and floor rock. The core was measured, described, packaged, and submitted for analysis to the USGS analytical laboratories, Lakewood, Colorado. Results of this analysis were not available at the time of this report, but will be published at a later date. Test holes W-9 and U penetrated the lower part of the Cretaceous Mesaverde Formation and hole T penetrated the upper part of the Cretaceous Frontier Formation. Test hole W-9 intersected a 35 in. coal bed at 737 ft, hole T had no shows of coal, although a slight flow of gas occurred, and hole U intersected 31 in. of coal at 200 ft; this bed is part of the Maverick Spring coal zone. Dips of the beds range from about 28° at hole W-9 to about 12° at hole T with an extreme of about 70° overturned at hole U. No attempt has been made to correct the lithologic or geophysical logs for dip.


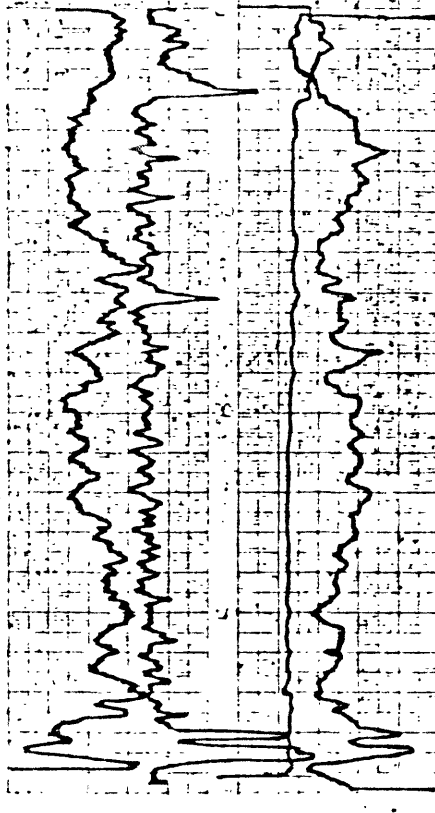
Fieldwork including core description was carried out by John F. Windolph, Nelson L. Hickling, Martina Johnson, Mark A. Person, and Ralph C. Warlow, all of the USGS.

References cited

- Windolph, J. F., Hickling, N. L., and Warlow, R. C., 1980, Report of 1978-1979 Field Investigations of Coal Resources in Wind River Indian Reservation, Fremont County, Wyoming, U.S. Geological Survey Open-file Report OF-80-674.
- Warlow, R. C., Geologic map and coal resources of the Maverick Spring quadrangle, Fremont County, Wyoming, U.S. Geological Survey Coal Investigations map (in press).

LITHOLOGIC AND GEOPHYSICAL LOG

LOCATION NUMBER U Sec. 17
 T. 5 N. R. 1 W. Quad Maricopa Spring
 COUNTY Fremont STATE Wyoming Total Depth 197
 Cored; yes X no interval(s) 128 Ft. - 103 Ft.
 Drilling Medium; Air Foam Mud y
 Bedding Attitude; Strike NW Dip 70° NE OVERTURNED

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--|---------------|---|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 0-5 | Surface material, light-brown, silty |  | 10 |  | | | |
| 5-10 | Siltstone, medium-gray, slightly carbonaceous | | 50 | | | | |
| 10-15 | Siltstone, medium-gray, slightly carbonaceous | | 20 | | | | |
| 15-20 | Siltstone, medium-gray, about 50% carbonaceous shale | | 100 | | | | |
| 20-25 | Shale, light-brown, carbonaceous | | 40 | | | | |
| 25-30 | Shale, light-brown, carbonaceous | | 150 | | | | |
| 30-35 | Sandstone, light-grayish-brown, very fine-grained, very silty | | 50 | | | | |
| 35-40 | Sandstone, light-grayish-brown, very fine-grained, very silty | | 200 | | | | |
| 40-45 | Sandstone, light-grayish-brown, very fine-grained, very silty | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 45-50 | Sandstone, light-grayish-brown, very fine-grained, very silty | | | | | | |
| 50-55 | Sandstone, light-grayish-brown, very fine-grained, very silty | | | | | | |
| 55-60 | Siltstone, medium-gray | | | | | | |
| 60-65 | Siltstone, medium-gray | | | | | | |
| 65-70 | Siltstone, medium-gray | | | | | | |
| 70-75 | Coal, about 60% carbonaceous shale | | | | | | |
| 75-80 | Siltstone, dark-gray | | | | | | |
| 80-85 | Siltstone, medium-gray | | | | | | |
| 85-90 | Shale, medium- to dark-brown, carbonaceous, few coal chips | | | | | | |
| 90-95 | Siltstone, medium-gray | | | | | | |
| 95-100 | Sandstone, medium-gray, very fine-grained, silty | | | | | | |
| 100-105 | Siltstone, medium-gray, sandy | | | | | | |
| 105-110 | Siltstone, medium-gray, sandy | | | | | | |
| 110-115 | Sandstone, medium gray, very fine-grained, silty | | | | | | |
| 115-120 | Siltstone, medium-gray | | | | | | |
| 120-125 | Siltstone, medium-gray | | | | | | |
| 125-130 | Siltstone, medium-gray | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 130-135 | Siltstone, medium-gray | | | | | | |
| 135-140 | Siltstone, medium-gray | | | | | | |
| 140-145 | Siltstone, medium-gray | | | | | | |
| 145-150 | Siltstone, medium-gray | | | | | | |
| 150-155 | Siltstone, dark-gray | | | | | | |
| 155-160 | Siltstone, light-gray | | | | | | |
| 160-165 | Siltstone, medium-gray | | | | | | |
| 165-170 | Siltstone, medium-gray | | | | | | |
| 170-175 | Siltstone, medium-gray | | | | | | |
| 175-180 | Sandstone, medium-gray, very fine-grained, few coal chips | | | | | | |
| 180-185 | Coal, bright, hard, about 15% sandstone | | | | | | |
| 185-190 | Coal, bright, hard | | | | | | |
| 190-195 | Siltstone, medium-gray | | | | | | |
| 195-200 | Siltstone, medium-gray | | | | | | |
| BOTTOM OF HOLE | | | | | | | |

Descriptions of Core from Drill Hole U

Total depth - 197 feet

cored interval - 178 to 193 ft. 4 in.

True coal thickness - 2 ft. 7 in.

Bedding Altitude - strike NW dip 70°NE (overturned)

Lithologic Description

| | Thickness | Depth |
|---|-----------|-----------|
| | (ft. in.) | (ft. in.) |
| Sandstone, medium-dark-gray, very fine to fine-grained, scattered dark and light mineral grains, poorly bedded, silty, very carbonaceous in basal 2 in..... | 4-3 | 178-0 |
| Coal, bright and dull attritus, fractured, scattered resin and pyrite..... | 2-4 | 184-7 |
| Underclay, medium brownish-gray, carbonaceous... | 0-3 | 184-10 |
| Coal, bright and dull attritus scattered resin and pyrite, hard..... | 3-3 | 188-1 |
| Underclay, medium to medium-dark-gray, few scattered plant fossils, very silty | 0-9 | 188-10 |
| Core loss..... | 4-6 | 193-4 |

LITHOLOGIC AND GEOPHYSICAL LOG

LOCATION NUMBER W-9 Sec. 19
 T. 5 N. R. 1 W. Quad Maverick Spring
 COUNTY Fremont STATE Wyoming Total Depth 660 Ft.
 Cored; yes no X interval(s)
 Drilling Medium; Air Foam X Mud
 Bedding Attitude; Strike NW Dip 28 NE
 Logged to 385 Ft. only

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|
| | | | | Gamma | Den | Res |
| 0-5 | Surface material, shale, light-olive-gray, silty, about 50% sandstone, very fine-grained | | | | | |
| 5-10 | Shale, light-olive-gray, about 50% sandstone, white, very fine-grained, silty | | | | | |
| 10-15 | Shale, light-olive-gray, about 50% sandstone, white, very fine-grained, silty | | | | | |
| 15-20 | Sandstone, medium-light-gray, very fine-grained, silty | | | | | |
| 20-25 | Shale, medium-gray, silty, few sandstone chips | | | | | |
| 25-30 | Sandstone, medium-light-gray to olive-gray, silty, few dark shale chips | | | | | |
| 30-35 | Shale, medium-dark-gray to light-olive-gray, few very fine-grained sandstone chips | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|
| | | | | Gamma | Den | Res |
| 35-40 | Shale, light-olive-gray, silty, few carbonaceous shale chips | | 300-90 | | | |
| 40-45 | Shale, light-olive-gray, silty | | 100 | | | |
| 45-50 | Sandstone, light-to medium-gray, fine-grained, 40% light-olive to dark-gray shale | | 350-110 | | | |
| 50-55 | Sandstone, medium-grayish-green, very fine-to fine-grained | | 400-120 | | | |
| 55-60 | Shale, medium-gray to black, silty, few carbonaceous chips | | | | | |
| 60-65 | Shale, dark-gray, silty | | | | | |
| 65-70 | Shale, dark-gray, silty | | | | | |
| 70-75 | Shale, dark-gray, silty | | | | | |
| 75-80 | Sandstone, medium-gray, very fine-grained | | | | | |
| 80-85 | Sandstone, medium-gray, very fine-grained, abundant dark and light mineral grains | | | | | |
| 85-90 | Sandstone, medium-gray, very calcareous, few dark-gray shale chips | | | | | |
| 90-95 | Shale, medium-gray, very silty, about 10% light-brownish-gray sandstone chips | | | | | |
| 95-100 | Sandstone, medium-gray, very fine-grained, very silty | | | | | |
| 100-105 | Shale, medium-gray, slightly silty | | | | | |
| 105-110 | Shale, medium-gray slightly silty | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 110-115 | Shale, medium-gray, silty, very calcareous, few coal chips | | | | | | |
| 115-120 | Shale, medium-gray, silty, few coal chips | | | | | | |
| 120-125 | Shale, medium-gray | | | | | | |
| 125-130 | Shale, medium-gray | | | | | | |
| 130-135 | Shale, medium-gray, about 20% very fine grained sandstone | | | | | | |
| 135-140 | Shale, medium- to dark- gray, rosin, few coal chips | | | | | | |
| 140-145 | Sandstone, medium-gray, very fine-grained, silty, scattered coal chips, calcareous | | | | | | |
| 145-150 | Sandstone, medium-gray, very fine-grained, silty, scattered coal chips, calcareous | | | | | | |
| 150-155 | Sandstone, medium- gray, very fine- grained, silty, scattered coal chips, very calcareous | | | | | | |
| 155-160 | Sandstone, medium-gray, very fine-grained, silty, few scattered coal chips, calcareous | | | | | | |
| 160-165 | Shale, medium- to medium-dark-gray, few sandstone chips, very calcareous | | | | | | |
| 165-170 | Shale, medium-gray, silty, scattered plant fossils | | | | | | |
| 170-175 | Shale, medium-gray, silty, scattered plant fossils | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 175-180 | Shale, medium-gray, silty, scattered plant fossils | | | | | | |
| 180-185 | Shale, medium-gray, silty, few carbonaceous shale chips | | | | | | |
| 185-190 | Shale, medium- to medium-dark-gray, very silty, few sandstone chips, scattered resin fragments | | | | | | |
| 190-195 | Shale, medium- to medium-dark-gray, silty, few sandstone chips | | | | | | |
| 195-200 | Shale, medium-gray, scattered coal chips | | | | | | |
| 200-205 | Shale, medium-gray, very silty, few very calcareous sandstone chips | | | | | | |
| 205-210 | Sandstone, medium-gray, very fine-grained, very silty, calcareous, about 15% medium-gray shale | | | | | | |
| 210-215 | Sandstone, medium-gray, very fine- to fine-grained, silty, about 50% olive-gray shale | | | | | | |
| 215-220 | Sandstone, medium-gray, very fine-grained, silty, about 50% olive-gray very silty shale | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 220-225 | Shale, medium- to medium-dark-gray, slightly silty, few scattered carbonaceous chips | | | | | | |
| 225-230 | Shale, medium-gray, few coal chips | | | | | | |
| 230-235 | Sandstone, medium-light-gray, very fine-grained, very silty | | | | | | |
| 235-240 | Sandstone, medium-light-gray, very fine-grained, very silty, very calcareous, about 20% variegated shale | | | | | | |
| 240-245 | Shale variegated, silty, very calcareous | | | | | | |
| 245-250 | Shale variegated, silty, very calcareous | | | | | | |
| 250-255 | Sandstone, light-gray, very fine-grained, very calcareous | | | | | | |
| 255-260 | Sandstone, medium-gray, very fine-grained, silty, very calcareous, few variegated shale chips | | | | | | |
| 260-265 | Shale, variegated, silty, calcareous | | | | | | |
| 265-270 | Shale, variegated, silty, calcareous | | | | | | |
| 270-275 | Sandstone, medium-gray, very fine-grained, silty, calcareous, friable | | | | | | |
| 275-280 | Sandstone, medium-gray, very fine-grained, very silty, slightly calcareous about 20% grayish-green shale | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 280-285 | Sandstone, medium-gray, very fine grained, very silty, about 20% grayish-green shale | | | | | | |
| 285-290 | Shale, variegated, slightly silty, very calcareous | | | | | | |
| 290-295 | Sandstone, medium-light-gray, very fine grained, about 30% variegated shale | | | | | | |
| 295-300 | Shale, variegated | | | | | | |
| 300-305 | Shale, variegated | | | | | | |
| 305-310 | Shale, variegated, silty | | | | | | |
| 310-315 | Shale, variegated, silty | | | | | | |
| 315-320 | Shale, variegated, silty, slightly calcareous | | | | | | |
| 320-325 | Shale, variegated, silty, about 30% medium-dark-gray shale | | | | | | |
| 325-330 | Sandstone, light-gray, very fine grained, very silty, 40% variegated shale | | | | | | |
| 330-335 | Shale, variegated, silty | | | | | | |
| 335-340 | Shale, variegated, silty | | | | | | |
| 340-345 | Shale, variegated, silty, few, light-gray, very-fine-grained sandstone chips | | | | | | |
| 345-365 | Circulation lost | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 345-350 | Shale, variegated, silty, calcareous, about 10% very fine grained sandstone | | | | | | |
| 350-355 | Shale, variegated, silty, calcareous, about 10% very fine grained sandstone | | | | | | |
| 355-360 | Shale, variegated, silty, calcareous, about 10% very fine grained sandstone | | | | | | |
| 360-365 | Shale, variegated, silty, calcareous, about 10% very fine grained sandstone | | | | | | |
| 365-370 | Sandstone, light-gray, very fine grained, about 50% variegated shale | | | | | | |
| 370-375 | Sandstone, light-gray, about 10% variegated shale | | | | | | |
| 375-380 | Underclay(?), dark-gray to black, carbonaceous, bentonitic | | | | | | |
| 380-385 | Shale, black, carbo- naceous, about 15% ben- tonitic medium-gray underclay(?) | | | | | | |
| 385-390 | Shale, black, carbo- naceous, about 20% ben- tonitic, medium-gray underclay | | | | | | |
| 390-395 | Shale, black, carbo- naceous, about 20% ben- tonitic medium-gray underclay | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 395-400 | Shale, black, carbonaceous, about 40% variegated shale | | | | | | |
| 400-405 | Conglomerate, rounded quartzite fragments, about 20% variegated shale, about 20% black carbonaceous shale | | | | | | |
| 405-410 | Sandstone, light-gray, very fine-grained, about 50% variegated shale | | | | | | |
| 410-415 | Sandstone, light-gray, very fine-to fine-grained, about 20% | | | | | | |
| 415-420 | Shale, variegated, about 40% very fine-grained light-green sandstone | | | | | | |
| 420-425 | Sandstone, light-gray, very fine-grained, about 40% variegated shale | | | | | | |
| 425-430 | Sandstone, light-gray, very fine-grained, about 40% variegated shale | | | | | | |
| 430-435 | Sandstone, light-grayish-green, very fine-grained, few carbonaceous shale chips | | | | | | |
| 435-440 | Sandstone, light-gray to white, about 30% variegated shale | | | | | | |
| 440-445 | Shale, variegated, about 20% light-gray, very fine-grained sandstone | | | | | | |
| 445-450 | Sandstone, light-gray, very fine-grained, about 40% variegated shale | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 450-455 | Shale, variegated, about 30% light-gray sandstone | | | | | | |
| 455-460 | Shale, variegated, shale, medium-gray, carbonaceous about 30% | | | | | | |
| 460-465 | Shale, variegated, few coal chips | | | | | | |
| 465-470 | Sandstone, light-gray, fine-grained | | | | | | |
| 470-475 | Sandstone, light-gray, fine-grained | | | | | | |
| 475-480 | Shale, black, very carbonaceous, few plant fossils | | | | | | |
| 480-485 | Shale, medium-dark-gray, about 10% variegated shale, few light-gray sandstone chips | | | | | | |
| 485-490 | Shale, medium-dark-gray, about 10% variegated shale | | | | | | |
| 490-495 | Sandstone, light-gray, very fine-grained, about 20% variegated shale | | | | | | |
| 495-500 | Shale, medium-dark-gray, about 40% light-gray sandstone | | | | | | |
| 500-505 | Shale, medium-dark-gray, about 40% light-gray sandstone | | | | | | |
| 505-510 | Sandstone, light-gray, very fine-grained, about 40% variegated shale | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 510-515 | Shale, medium- to dark-gray, few light-gray sandstone chips | | | | | | |
| 515-520 | Sandstone, light-gray, very fine-grained, about 40% variegated shale | | | | | | |
| 520-525 | Shale, medium-dark-gray, sandy, about 10% light-gray sandstone | | | | | | |
| 525-530 | Sandstone, light-gray, fine-grained, about 10% variegated shale | | | | | | |
| 530-535 | Shale, variegated, about 15% black carbonaceous shale | | | | | | |
| 535-540 | Shale, medium-gray | | | | | | |
| 540-545 | Sandstone, light-gray, fine-grained, about 40% medium-gray shale | | | | | | |
| 545-550 | Shale, medium-gray, few siltstone chips | | | | | | |
| 550-555 | Shale, medium-gray | | | | | | |
| 555-560 | Shale, medium-gray, few scattered coal chips | | | | | | |
| 560-565 | Shale, medium- to dark-gray, silty, about 10% medium-gray, fine-grained sandstone chips | | | | | | |
| 565-570 | Shale, medium- to dark-gray, silty, about 5% medium-gray, fine-grained sandstone chips | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 570-575 | Shale, medium-gray, slightly silty, about 20% medium gray, very fine-grained sandstone chips | | | | | | |
| 575-580 | Shale, medium- to dark-gray, silty | | | | | | |
| 580-585 | Shale, medium-gray, silty, about 40% medium-gray, very fine-grained sandstone | | | | | | |
| 585-590 | Sandstone, medium-gray, fine-grained, silty, calcareous, about 25% medium-gray shale | | | | | | |
| 590-595 | Shale, medium-gray, very silty, very calcareous about 25% medium-gray shale | | | | | | |
| 595-600 | Sandstone, medium-gray, fine-grained, slightly calcareous | | | | | | |
| 600-605 | Shale, medium-gray, silty, very calcareous | | | | | | |
| 605-610 | Sandstone, medium-gray, very fine-grained, very silty | | | | | | |
| 610-615 | Shale, medium-gray, very silty, very calcareous | | | | | | |
| 615-620 | Shale, medium-light-gray few sandstone chips | | | | | | |
| 620-625 | Shale, medium- to dark-brownish-gray | | | | | | |
| 625-630 | Sandstone, medium-light-gray, very fine-grained | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 630-635 | Sandstone, medium-gray, very fine-grained, very silty, about 50% coal | | | | | | |
| 635-640 | Shale, medium-dark-gray, very silty, about 35% very fine-grained sand- stone, about 15% coal chips | | | | | | |
| 640-645 | Shale, medium-gray, very calcareous, about 5% very-fine grained sand- stone chips | | | | | | |
| 645-650 | Shale, medium-gray | | | | | | |
| 650-655 | Shale, medium-to medium- dark-gray, sandy | | | | | | |
| 655-660 | Shale, medium-to medium- dark- gray | | | | | | |

BOTTOM OF HOLE

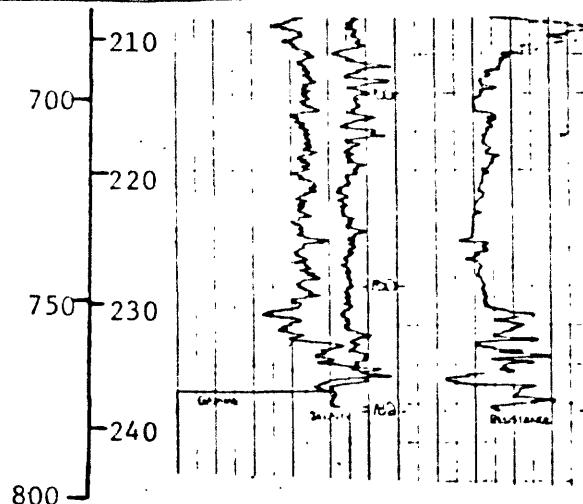
LITHOLOGIC AND GEOPHYSICAL LOG

LOCATION NUMBER T Sec. 4
T. 5 N. R. 1 W. Quad Maverick Spring
COUNTY Fremont STATE Wyoming Total Depth 782
Cored; yes no X interval(s) _____
Drilling Medium; Air _____ Foam _____ Mud X _____
Bedding Attitude; Strike NE Dip 12 SW

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|-----------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 0-40 | Surface material, sandy, highly weathered | | 10 | | | | |
| 40-45 | Sandstone, medium- gray, very fine- to fine-grained, sulfurous ground water | | 50 20 | | | | |
| 45-50 | Sandstone, medium- gray, very fine-to fine-grained, sulfurous ground water | | 100 30 40 | | | | |
| 50-55 | Sandstone, medium- gray, very fine- grained | | 150 50 | | | | |
| 55-60 | Sandstone, medium gray, very fine- grained | | 200 60 | | | | |
| 60-65 | Sandstone, medium- gray, very fine- grained | | 70 | | | | |
| 65-70 | Sandstone, medium- gray, fine-grained, about 20% dark gray shale | | 250 80 | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 70-75 | Sandstone, medium-gray, fine-grained, about 20% dark-gray shale | | 300-90 | | | | |
| 75-80 | Shale, dark-gray | | 100-350 | | | | |
| 80-85 | Shale, dark-gray | | 110 | | | | |
| 85-90 | Shale, dark-gray | | 120 | | | | |
| 90-95 | Shale, dark-gray | | 400-120 | | | | |
| 95-100 | Shale, dark-gray, about 20% medium-gray sandstone | | 130 | | | | |
| 100-105 | Shale, medium-gray, silty, few carbonaceous shale chips | | 450-140 | | | | |
| 105-110 | Siltstone, medium-gray | | 150 | | | | |
| 110-115 | Shale, medium-gray, silty | | 500-160 | | | | |
| 115-120 | Siltstone, medium-gray, sandy | | 170 | | | | |
| 120-125 | Siltstone, medium-gray, sandy | | 550-180 | | | | |
| 125-130 | Shale, medium-gray, silty | | 190 | | | | |
| 130-135 | Siltstone, medium-gray | | 600-200 | | | | |
| 135-140 | Siltstone, medium-gray | | | | | | |
| 140-145 | Sandstone, light-gray, very fine-grained | | | | | | |
| 145-150 | Sandstone, light-gray, very fine-grained | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 150-155 | Sandstone, very fine- to fine-grained, few carbonaceous shale chips | | 210 700 | | | | |
| 155-160 | Sandstone, very fine- to fine-grained, few carbonaceous shale chips | | 220 | | | | |
| 160-165 | Sandstone, very fine- to fine-grained, few carbonaceous shale chips | | 750 230 | | | | |
| 165-170 | Sandstone, very fine- to fine-grained, few carbonaceous shale chips | | 240 800 | | | | |
| 170-175 | Sandstone, very fine- to fine-grained, few carbonaceous shale chips | | | | | | |
| 175-180 | Siltstone, light-gray, sandy | | | | | | |
| 180-185 | Siltstone, light-gray, sandy | | | | | | |
| 185-190 | Siltstone, light-gray, sandy | | | | | | |
| 190-195 | Sandstone, light-gray, fine-grained, very silty | | | | | | |
| 195-200 | Sandstone, light-gray, fine-grained, very silty | | | | | | |
| 200-205 | Sandstone, medium-gray, very fine-grained | | | | | | |
| 205-210 | Sandstone, medium-gray, very fine-grained | | | | | | |
| 210-215 | Sandstone, medium-gray, very fine-grained | | | | | | |



| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 215-220 | Sandstone, medium-gray, very fine-grained | | | | | | |
| 220-225 | Sandstone, medium-gray, very fine-grained | | | | | | |
| 225-230 | Sandstone, medium-gray, very fine-grained | | | | | | |
| 230-235 | Sandstone, medium-dark- gray, very fine-grained, silty | | | | | | |
| 235-240 | Shale, very dark-gray, fissile | | | | | | |
| 240-245 | Shale, very dark-gray, fissile | | | | | | |
| 245-250 | Shale, very dark-gray, fissile | | | | | | |
| 250-255 | Shale, very dark-gray, fissile | | | | | | |
| 255-260 | Shale, very dark-gray, fissile | | | | | | |
| 260-265 | Shale, medium-dark gray, soft | | | | | | |
| 265-270 | Shale, dark-gray | | | | | | |
| 270-275 | Shale, dark-gray | | | | | | |
| 275-280 | Shale, very dark-gray, very silty, hard | | | | | | |
| 280-285 | Siltstone, very dark- gray | | | | | | |
| 285-290 | Shale, black, carbonaceous, silty | | | | | | |
| 290-295 | Shale, black, silty, about 30% variegated shale | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 295-300 | Shale, black, silty, 30% variegated shale | | | | | | |
| 300-305 | Claystone, variegated | | | | | | |
| 305-310 | Claystone, variegated | | | | | | |
| 310-315 | Sandstone, light-gray, very fine-grained | | | | | | |
| 315-320 | Sandstone, light-gray, very fine-grained, about 30% medium-gray shale | | | | | | |
| 320-325 | Sandstone, light-gray, very fine-grained, about 30% medium-gray shale | | | | | | |
| 325-330 | Sandstone, light-gray, very fine-grained, about 30% medium-gray shale | | | | | | |
| 330-335 | Sandstone, light-gray, very fine-grained, about 30% medium-gray shale | | | | | | |
| 335-340 | Shale, very dark-gray, silty | | | | | | |
| 340-345 | Shale, very dark-gray, silty | | | | | | |
| 345-350 | Shale, very dark-gray, silty | | | | | | |
| 350-355 | Shale, very dark-gray, silty | | | | | | |
| 355-360 | Sandstone, light-gray, fine-grained | | | | | | |
| 360-365 | Sandstone, light-gray, fine-grained | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 365-370 | Shale, light-gray, soft | | | | | | |
| 370-375 | Shale, light-gray, soft | | | | | | |
| 375-380 | Shale, medium-dark-gray, silty | | | | | | |
| 380-385 | Shale, medium-gray, very silty | | | | | | |
| 385-390 | Shale, light-gray, soft, about 20% medium-gray sandstone | | | | | | |
| 390-395 | Shale, light-gray, soft, about 20% sandstone, medium-gray | | | | | | |
| 395-400 | Shale, light-gray, soft, about 20% sandstone, medium-gray | | | | | | |
| 400-405 | Shale, medium-dark-gray, few sandstone chips | | | | | | |
| 405-410 | Shale, medium-dark-gray, few sandstone chips | | | | | | |
| 410-415 | Shale, medium-dark-gray, few sandstone chips | | | | | | |
| 415-420 | Shale, medium-dark-gray | | | | | | |
| 420-425 | Shale, medium-dark-gray | | | | | | |
| 425-430 | Shale, medium-dark-gray | | | | | | |
| 430-435 | Shale, medium-dark-gray | | | | | | |
| 435-440 | Shale, light-gray, about 50% light-gray sandstone | | | | | | |
| 440-445 | Sandstone, medium-gray, fine-grained | | | | | | |
| 445-450 | Sandstone, medium-gray, fine-grained | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 450-455 | Sandstone, light-gray, fine-grained, scattered black mineral grains | | | | | | |
| 455-460 | Claystone, light-gray | | | | | | |
| 460-465 | Claystone, light-gray | | | | | | |
| 465-470 | Claystone, light-gray. | | | | | | |
| 470-475 | Claystone, light-gray | | | | | | |
| 475-480 | Claystone, light-gray | | | | | | |
| 480-485 | Claystone, light-gray | | | | | | |
| 485-490 | Sandstone, light-gray, very fine-grained, silty | | | | | | |
| 490-495 | Sandstone, light-gray, very fine-grained, about 30% carbonaceous shale | | | | | | |
| 495-500 | Shale, dark-gray, car- bonaceous, bentonitic | | | | | | |
| 500-505 | Bentonite, light- greenish-gray | | | | | | |
| 505-510 | Bentonite, light- greenish-gray | | | | | | |
| 510-515 | Sandstone, variegated, fine-grained | | | | | | |
| 515-520 | Sandstone, variegated, fine-grained | | | | | | |
| 520-525 | Sandstone, light-gray, fine-grained | | | | | | |
| 525-530 | Claystone, light-gray | | | | | | |
| 530-535 | Claystone, light-gray | | | | | | |
| 535-540 | Claystone, light-gray | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 540-545 | Sandstone, fine-grained, silty, friable | | | | | | |
| 545-550 | Shale, light-gray, bentonitic | | | | | | |
| 550-555 | Shale, light-gray, silty | | | | | | |
| 555-560 | Sandstone, light-gray, very fine-grained | | | | | | |
| 560-565 | Sandstone, light-gray, very fine-grained | | | | | | |
| 565-570 | Sandstone, light-gray, very fine-grained | | | | | | |
| 570-575 | Sandstone, light-gray, very fine-grained | | | | | | |
| 575-580 | Siltstone, very light-gray, soft | | | | | | |
| 580-585 | Sandstone, light-gray, very fine-grained, about 50% light-gray shale | | | | | | |
| 585-590 | Sandstone, light-gray, very fine-grained, about 50% light-gray shale | | | | | | |
| 590-595 | Sandstone, light-gray, very fine-grained, about 50% light-gray shale | | | | | | |
| 595-600 | Shale, very dark-gray to black, silty, fissile | | | | | | |
| 600-605 | Shale, very dark-gray to black, silty, fissile | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|--|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 605-610 | Shale, very dark-gray to black, silty, fissile | | | | | | |
| 610-615 | Shale, very dark-gray to black, silty, fissile | | | | | | |
| 615-620 | Shale, very dark-gray to black, silty, fissile | | | | | | |
| 620-625 | Shale, very dark-gray, carbonaceous | | | | | | |
| 625-630 | Shale, very dark-gray, carbonaceous | | | | | | |
| 630-635 | Shale, very dark-gray, carbonaceous | | | | | | |
| 635-640 | Shale, very dark-gray, carbonaceous | | | | | | |
| 640-645 | Shale, black, silty | | | | | | |
| 645-650 | Shale, black, silty | | | | | | |
| 650-655 | Shale, black, silty | | | | | | |
| 665-670 | Shale, black, silty | | | | | | |
| 670-675 | Shale, black, silty | | | | | | |
| 675-680 | Shale, black, silty | | | | | | |
| 680-685 | Shale, black, silty | | | | | | |
| 685-690 | Shale, black, silty | | | | | | |
| 690-695 | Siltstone, black, carbonaceous, hard | | | | | | |
| 695-700 | Siltstone, black, carbonaceous, hard | | | | | | |
| 700-705 | Siltstone, dark-gray to black, hard | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | Geophysical logs | | | |
|--------------------|---|--------------|---------------|------------------|-----|-----|-----|
| | | | | Gamma | Den | Cal | Res |
| 705-710 | Siltstone, dark-gray to black, hard | | | | | | |
| 710-715 | Siltstone, dark-gray to black, very hard | | | | | | |
| 715-720 | Siltstone, dark-gray to black, hard | | | | | | |
| 720-725 | Shale, dark-gray to black, silty, very hard | | | | | | |
| 725-730 | Shale, dark-gray to black, silty, very hard | | | | | | |
| 735-740 | Shale, dark-gray to black, silty, very hard | | | | | | |
| 740-745 | Shale, dark-gray to black, silty, very hard | | | | | | |
| 745-750 | Shale, dark-gray to black, silty, very hard | | | | | | |
| 750-755 | Shale, dark-gray to black, silty, very hard | | | | | | |
| 755-760 | Shale, dark-gray to black, silty, very hard | | | | | | |
| 760-765 | Shale, dark-gray to black, silty, hard, about 20% light-gray, very fine-grained sandstone | | | | | | |

| Interval (feet) | Lithology | Strip Log | Depth ft M | | Geophysical logs | | | |
|--------------------|---|--------------|---------------|--|------------------|-----|-----|-----|
| | | | | | Gamma | Den | Cal | Res |
| 765-770 | Shale, dark-gray to black, silty, hard, about 20% light-gray, very fine-grained sandstone | | | | | | | |
| 770-775 | Shale, dark-gray to black, silty, hard, about 20% light-gray, very fine-grained sandstone | | | | | | | |
| 775-780 | Shale, dark-gray to black, silty, hard, about 20% light-gray, very fine-grained sandstone | | | | | | | |
| 780-785 | Shale, dark-gray to black, silty, hard, about 20% light-gray, very fine-grained sandstone | | | | | | | |
| BOTTOM OF HOLE | | | | | | | | |