

DIAMOND DRILL HOLE RECORD
INTERNATIONAL SALT COMPANY

Glade Spring No. 1

Location: 7,500 ft. S 16° W of Plasterco P. O., Virginia
 Elevation: 1940 approx.
 Angle and bearing: Vertical
 Finished drilling: 8-22-57
 Drill Contractor: Sprague & Henwood Co. Driller: Porter
 Farm: Nutter
 Logged by: H. W. Ferguson
 See Figure for graphic log.

<u>Depth</u>	<u>Thickness</u>	<u>Formation</u>
0.0 - 4.0	4.0	(Overburden)
4.0 - 233.8	234.8	Beekmantown fm., lower dolomite member
233.8 - 252.4	13.6	Chepultepec limestone
252.4 - 590.2	337.8	Copper Ridge dolomite, upper sandy member
590.2 - 1419.0	828.8	Copper Ridge dolomite, lower member
1419.0 - 1963.0	544.0	Nolichucky shale
1963.0 - 2301.0	338.0	Honaker dolomite
2301.0 - 2400.0	99.0	Honaker dolomite - brecciated Saltville fault reported at 2400.0 ft.
2400.0 - 2715.0	315.0	Maccrady shale - not logged, 20 ft. of high grade gypsum, 20 ft. of low grade gypsum, to deep for access.

INTERVAL SHEET

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VDMR Well No.: 690

Date 1/30/63

443 Sample Interval: from 47' to 2715'

PROP: Nutter

Total depth 2715'

COMP: Sprague & Henwood Co.

Oil Gas Water Exploratory X

COUNTY: Washington

Cuttings X Core X Other

From-To	From-To	From-To	From-To	From-To
46.5 - 48.0	142 - 148	272.9 - 278	368.5 - 370.5	464 - 468.5
48.0 - 49.0	148 - 154	278 - 280	370.5 - 374	468.5 - 473.7
49.0 - 51.7	154 - 156.2	280 - 281.5	374 - 377.5	473.7 - 478
51.7 - 53.2	156.2 - 163	281.5 - 285.7	377.5 - 384	478 - 481.5
53.2 - 58.5	163 - 168.8	285.7 - 289.3	384 - 388.3	481.5 - 485.5
58.5 - 59.5	168.8 - 175.5	289.3 - 294	388.3 - 392.8	485.5 - 489.5
59.5 - 62.0	175.5 - 177.5	294 - 299	392.8 - 396.3	489.5 - 492.5
62.0 - 68.0	177.5 - 181	299 - 305	396.3 - 400	492.5 - 496
68.5 - -	181 - 183.8	305 - 309	400 - 403	496 - 498.5
68.5 - 71.5	183.8 - 188	309 - 314	403 - 403.8	498.5 - 499.5
71.5 - 76.0	188 - 193	314 - 319	403.0 - 409	499.5 - 503
72.5 - -	193 - 198	319 - 324	409 - 414	503 - 505
76.0 - 77.5	198 - 204.3	324 - 329	414 - 416	505 - 510
77.5 - 78.5	204.3 - 209	329 - 333.5	416 - 421	510 - 514.5
78.5 - 80.0	209 - 214	333.5 - 334.5	421 - 426.5	514.5 - 519
80.0 - 85.5	214 - 222	334.5 - 335	426.5 - 430.5	519 - 523
85.5 - 94.0	222 - 224	335 - 336.5	430.5 - 432.5	523 - 527
91.5 - -	224 - 229	336.5 - 340	432.5 - 436	527 - 531
92.5 - -	229 - 234	340 - 341.5	436 - 436.5	531 - 535.7
94.0 - 100	234 - 240	341.5 - 342.5	436.5 - 440	535.7 - 538.5
100.0 - 104.0	240 - 242	342.5 - 344.9	440 - 440.3	538.5 - 542
104.0 - 110.0	242 - 243	344.9 - 349	440.3 - 443.7	542 - 546
111.3 - 114.4	243 - 244	349 - 353	443.7 - 448	546 - 548.8
114.4 - 117.1	244 - 249	353 - 354.5	448 - 450	548.8 - 550.5
117.1 - 119.5	249 - 252.5	354.5 - 355.5	450 - 451	550.5 - 551
119.5 - 123	252.5 - 255.7	355.5 - 358	451 - 454	551 - 555
127 - 132	255.7 - 261.5	358 - 362	454 - 455.7	555 - 556.6
132 - 136.2	261.5 - 264.7	362 - 364	455.7 - 457	556.6 - 558.7
136.2 - 139.2	264.7 - 268	364 - 368	457 - 460	558.7 - 564
139.2 - 142.0	268 - 272.8	368 - 368.5	460 - 464	564 - 570

INTERVAL SHEET

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VDMR Well No.: 690

Date 1/30/63

Sample Interval: from 47' to 2715'

PROP: Nutter

Total depth 2715'

COMP: Sprague & Henwood Co.

Oil Gas Water Exploratory X

COUNTY: Washington

Cuttings X Core X Other

From-To	From-To	From-To	From-To	From-To
570 - 571.8	680 - 684.8	835.5 - 843.1	978 - 980.8	1105 - 1114
571.8 - 578.5	684.8 - 691.8	843.1 - 847	980.8 - 984.4	1114 - 1120
578.5 - 582.1	691.8 - 693.9	847 - 851.6	984.4 - 990	1120 - 1129
582.1 - 582.6	693.9 - 698.8	851.6 - 853	990 - 991	1129 - 1142
582.6 - 584.9	698.8 - 703	853 - 855	991 - 995.5	1142 - 1149
584.9 - 592	703 - 714	855 - 861.8	995.5 - 1000	1149 - 1157
592 - 598	714 - 715	861.8 - 865.1	1000 - 1002.3	1157 - 1163
598 - 602.9	715 - 730.7	865.1 - 869	1002.3 - 1011	1163 - 1175
602.9 - 607	730.7 - 735	869 - 896.5	1011 - 1014.5	1175 - 1177
607 - 608.3	735 - 738.2	896.5 - 897.5	1014.5 - 1017	1177 - 1185
608.3 - 614	738.2 - 739.7	897.5 - 900.5	1017 - 1020.5	1185 - 1195
614 - 616.2	739.7 - 742	900.5 - 906.8	1020.5 - 1024	1195 - 1205
616.2 - 620.9	742 - 750	906.8 - 914.8	1024 - 1030	1205 - 1210
620.9 - 621.2	750 - 750.3	914.8 - 917.8	1030 - 1032.4	1210 - 1212
621.2 - 626	750.3 - 760.5	917.8 - 921.8	1032.4 - 1035.5	1212 - 1226
626 - 627.5	767.0 - 767.5	921.8 - 927.7	1035.5 - 1040.5	1226 - 1247
627.5 - 630	767.5 - 774	927.7 - 931.3	1040.5 - 1044	1247 - 1251
630 - 632.3	774 - 781	931.3 - 940	1044 - 1050.5	1251 - 1262
632.3 - 633.9	781 - 787.5	940 - 943.9	1050.4 - 1060	1262 - 1270
633.9 - 637.9	787.5 - 788	943.9 - 946.9	1060 - 1065	1270 - 1271
637.9 - 639.4	788 - 791	946.9 - 948	1065 - 1071	1071 - 1282
639.4 - 650	791 - 795	948 - 950	1071 - 1074.8	1282 - 1284
650 - 651.7	795 - 804.3	950 - 955.6	1074.8 - 1077	1284 - 1285
651.7 - 657	804.3 - 817.8	955.6 - 959.5	1077 - 1079.5	1285 - 1292
657 - 659	817.8 - 820	959.5 - 959.8	1079.5 - 1082.7	1292 - 1300
659 - 664	820 - 823.1	959.8 - 961.8	1082.7 - 1087.5	1300 - 1314
664 - 664.5	823.1 - 824	961.8 - 962.8	1087.5 - 1091	1314 - 1320
664.5 - 670.3	824 - 828	962.8 - 967	1091 - 1095	1320 - 1323
670.3 - 675.4	828 - 831.5	967 - 977	1095 - 1100	1323 - 1330
675.4 - 680	831.5 - 835.5	977 - 978	1100 - 1105	1330 - 1338

INTERVAL SHEET

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Date 1/30/63

PROP: Nutter
 COMP: Sprague & Henwood Co.
 COUNTY: Washington

690

VDMR Well No.: _____

Sample Interval: from 47' to 2715'

Total depth 2715'

Oil _____ Gas _____ Water _____ Exploratory X

Cuttings X Core X Other _____

From-To	From-To	From-To	From-To	From-To
1338 - 1346	1467 - 1472	1812.5 - 1817	2168 - 2184	2474 - 2478
1346 - 1351.3	1472 - 1476	1817 - 1823	2196 - 2206	2478 - 2488
1351.3 - 1352.5	1476 - 1485	Cuttings	2256 - 2269	2488 - 2497
1352.5 - 1356.4	1485 - 1490	1828 -	2269 - 2279	2497 - 2508
1356.4 - 1357.5	1490 - 1496	1833 -	2279 - 2289	2508 - 2513
		1838		
		1843		
1357.5 - 1363.9	1496 - 1501	1848 -	2289 - 2301	2513 - 2518
1363.9 - 1366	1501 - 1506	1853 -	2301 - 2322	2518 - 2528
1366 - 1371	1506 - 1512	1858 -	2322 - 2329	2528 - 2535
1371 - 1376.2	1512 - 1518	1863 -	2329 - 2334	2535 - 2543
1376.2 - 1376.6	-	1868 -	2334 - 2340	2543 - 2557
		1873		
1376.6 - 1384.6	1523 - 1528	1874 - 1890	2340 - 2344	2557 - 2563
1384.6 - 1385.6	1528 - 1533	1890 - 1894	2344 - 2357	2563 - 2578
1385.6 - 1387.6	1533 - 1538	Cuttings	2357 - 2360	2578 - 2590
1387.6 - 1388	1538 - 1543	1899 -	2360 - 2362	2590 - 2598
1388 - 1391	1543 - 1548	1907 -	2362 - 2371	2598 - 2606
1391 - 1395.3	1548 - 1556	1915 - 1923	2371 - 2377	2606 - 2615
1395.3 - 1399	1556 - 1559	1923 - 1929	2377 - 2383	2615 - 2621
1399 - 1402	1559 - 1562	1929 - 1937	2383 - 2389	2628 - 2642
1402 - 1407	1562 - 1565	1937 - 1940	2389 - 2397	2642 - 2647
1407 - 1411	1565 - 1570	1940 - 1952	2397 - 2405	2647 - 2652
1411 - 1419	1570 - 1581	1952 - 1957	2405 - 2410	2652 - 2663
1419 - 1424	1711 - 1719	1957 - 1958	2410 - 2416	2663 - 2673
1424 - 1429	-	1958 - 1963	2416 - 2422	2673 - 2683
1429 - 1434	-	1967 - 1967	2422 - 2428	2683 - 2693
1434 - 1438	-	1967 - 1974	2428 - 2438	2693 - 2703
1438 - 1445	1789 - 1795	1974 - 1986	2438 - 2446	2703 - 2715
1445 - 1451	1795 - 1800	1986 - 1996	2446 - 2450	-
1451 - 1456	1800 - 1805	2008 - 2013	2450 - 2458	-
1456 - 1461	1805 - 1810	2061 - 2065	2458 - 2466	-
1461 - 1467	1810 - 1812.5	2115 - 2118	2466 - 2474	-

County: WASHINGTON
VDMR WELL #: W-690

Well: Glade Spring No. 1

Farm: Nutter

Driller Contractor: Sprague & Henwood Co. Driller: Porter

Location: 7,500 ft. 516° W. of Plasterco P.O., Virginia

Elevation: 1940 approx.

Total depth: 2715 ft.

Started Drilling:

Finished drilling: 8-22-57

Sample description by: Eugene K. Rader, Virginia Division of Mineral Resources.

GEOLOGIC SUMMARY

Depth	Thickness	Formation (and remarks)
0.0 - 4.0	4	No samples.
4.0 - 238	234	Beekmantown formation: dolomite, light to dark gray, fine-to medium-gray, with chert and oolitic zones, some clay material, brecciation minor, fractured.
238 - 252.5	14.5	Chepultepec limestone: limestone and dolomite, light to medium gray, fine-to medium-grained, highly fractured.
252.5 - 590	337.5	Copper Ridge dolomite, upper sandy member: interbedded light to dark gray, fine-to medium-grained, sandy dolomite and sandstone.
590 - 1419	829	Copper Ridge dolomite, lower member: dolomite, medium to dark gray, fine-to medium grained, minor sandstone and limestone, mottled in places, algal (?).
1419 - 1963	544	Nolichucky shale: interbedded fine-grained, dark gray limestone and black to tan shale.
1963 - 2400	437	Honaker dolomite: dolomite, dark gray, fine-grained, brecciated from 2301 ft.
2400		Saltville fault:
2400 - 2715	315	Maccrady shale: breccia, red and green shale and dolomite fragments in a red to gray gypsiferous dolomite, 22 ft. of high grade gypsum, 34 ft. of low grade gypsum.

Depth	Thickness	Description
0 - 4	4	No samples.
4 - 12.5	8.5	Dolomite, dark gray, medium-grained; cut by white calcite filled fractures, to $\frac{1}{4}$ "; blebs of light gray clay in lower 1.5'; bedding horizontal.
12.5 - 15.8	3.3	Dolomite, light gray, fine-grained; cut by very small white calcite veins, less than $\frac{1}{16}$ "; minor clay laminations; basal 0.2' sandy dlm. cgl.
15.8 - 29	13.2	Dolomite, mottled, dark gray dlm. medium-grained, light gray dlm. fine-grained; cut by calcite filled fractures, to $\frac{1}{8}$ "; blebs of white calcite and quartz to 1"; 2 to 3 inches of calcareous clay (gouge) at bottom.
29 - 40.4	11.4	Dolomite, light to medium gray, fine-grained; fractured, fractures filled with white carbonate and iron stained; minor carbonate blebs, to $\frac{1}{2}$ inch; laminated, lower 0.3'.
40.4 - 40.6	0.2	Clay, greenish-gray, calcareous; (gouge).
40.6 - 43.1	2.5	Dolomite, mottled, black dlm. fine-to medium-grained; light gray dlm. fine-grained.
43.1 - 48		Dolomite, light to medium gray, fine-grained, cut by calcite veins, to $\frac{1}{4}$ "; laminated, laminae black, to $\frac{1}{16}$ ' thick; becomes dark in lower part.
46.5 - 48.0	1.5	Dolomite, medium gray, fine-grained, fractured with stylolites, white blebs of quartz and carbonate calcite filled veins, some Fe stains.
48.0 - 49.0	1.0	Dolomite, medium gray, fine-grained, poorly laminated, fractured with intraformational breccia, stylolites, small blebs of chert, calcite filled veins, fractured.
49.0 - 51.7	1.7	Dolomite, medium gray, fine-grained, intraformational breccia, fractured, stylolitic seam with heavy concentration of limonite, fracture surfaces iron stained, white blebs of <u>carbonate</u> .

51.7 - 53.2	1.5	Breccia, large angular fragments of med. gr., fine-grained, stratified dolomite in a darker gray dolomite; fractured; fractures filled with iron stained dolomite; small amount of limonite; well leached.
53.2 - 58.5	5.2	Dolomite, light to medium gray, weathered, fine-grained, highly fractured; fractures filled with calcite, vugs w/ calcite xls, small blebs of chert.
58.5 - 59.5	1.0	Dolomite, medium gray, fine-grained, with light to medium-gray chert. Dolomite weathered, some secondary calcite.
59.5 - 62	2.5	Dolomite, medium gray, fine-grained, highly fractured; calcite filled fractures, some to 1 inch, weathered, small blebs of chert.
62 - 71.5	9.5	Dolomite, medium gray, silicious, fine-grained, fractured, calcite in fractures, some iron staining. Clay at 69.0 - 69.1, two inches thick, gray, plastic. Clay: illite, chlorite, kaolinite, quartz, feldspar, dolomite,. (X-ray)
71.5 - 76.0	4.5	Breccia, angular fragments of medium gray dolomite in a dark gray to black dolomite, blebs of white dolomite and quartz near top. 72.5 argillaceous dolomite very similar to the clay at 69.0'.
76 - 77.5	1.5	Dolomite, medium gray, fine-grained; small amount of argillaceous material;
77.5 - 78.5	1.0	Dolomite, medium gray, fine-grained; weathered; iron stained; fractured.
78.5 - 80.0	1.5	Dolomite, medium gray, fine-grained, argillaceous; intraformational breccia with angular fragments of light gray, argillaceous dolomite; fractured.
80 - 85.5	5.5	Dolomite, light gray, fine-grained, iron stained fracture surfaces, argillaceous in places.
85.5 - 94	8.5	Dolomite, medium gray, fine-grained, fractured, fractures filled with white calcite and dolomite, quartz (?). Clay material at 91.5' and 92.5'.

94 - 110	16	Dolomite, light to medium gray, fine-grained, styliolite at 99.5. fractured, white calcite and dolomite in fractures. Becomes darker gray near bottom.
110 - 111.3	1.3	Limestone, medium gray, fine-grained, laminated, minor fracturing, white dolomite and quartz in fractures.
111.3 - 114.4	3.1	Dolomite, light to medium gray, fine to medium-grained, minor fracturing, white dolomite, calcite, and quartz in fractures.
114.4 - 117.1	2.7	Dolomite, light gray, fine-grained, laminated; clay and calcite at 116.8'.
117.1 - 119.5	2.4	Dolomite, medium gray, fine to medium-grained; laminated at bottom.
119.5 - 123	3.5	Dolomite, light gray, fine-grained, fractured, filled with calcite.
123 - 127	4.0	Cavern
127 - 136.2	9.2	Dolomite, light gray, fine-grained, fractured.
136.2 - 139.2	3.0	Dolomite, medium gray, fine-to medium-grained.
139.2 - 142	2.8	Dolomite, light to medium gray, fine-grained; interbedded clay material, badly weathered in places.
142 - 156.2	14.2	Dolomite, light to medium gray, fine-grained badly weathered in places; crushed between 148 - 149.9; chert, black, 154.6'; highly fractured, fractures filled with quartz and calcite.
156.2 - 168.8	12.6	Dolomite, medium to dark gray, fine to medium-grained, fractured, fractures filled with calcite and quartz.
168.8 - 175.5	6.7	Dolomite, medium to dark gray, fine-grained, crushed, highly fractured, fractures filled with quartz and calcite.
175.5 - 177.5	2.0	Chert, black, glassy, fractured, with minor clay; core crushed.
177.5 - 183.8	6.3	Dolomite, medium gray, fine-grained, fractured, fractures filled with calcite and quartz.

183.8 - 204.3	20.5	Breccia, angular fragments of light gray chert and minor light gray, fine-grained dolomite, blebs of white quartz and carbonate, brown stylolites, white carbonate, filling between fragments; core crushed 188 - 204.
204.3 - 214	9.7	Chert, light gray with light gray dolomite, badly leached, dolomite weathered to clay material, core crushed 204 - 210.
214 - 222	8.0	Dolomite, siliceous, medium gray, fine-grained, highly fractured, core crushed 214 - 217.
222 - 224	2.0	Breccia, angular fragments of chert in white carbonate; core recovery poor.
224 - 238	14	Dolomite, medium to dark gray, medium-grained, highly fractured, fractures filled with white carbonate.
238 - 242	4.0	Limestone, medium-grained, dark gray and very fine-grained, light gray, highly fractured, with white calcite fracture fillings.
242 - 247	5.0	Dolomite, calcareous, medium gray with pinkish cast, fine-grained, with black chert, highly fractured, fractures filled with white carbonates; basal part sandy.
247 - 252.5	5.5	Limestone, medium gray with a pinkish color in places, fine-grained, highly fracture, fractures filled with white calcite, calcareous clay from 249.
252.5 - 255.7	3.2	Dolomite, siliceous, medium to dark gray, fine-to medium-grained, fractured, with white carbonate fillings; black chert nodules.
255.7 - 264.7	9.0	Dolomite, medium-to fine-grained, medium gray, fractured, with white carbonate fillings, core crushed at 260' to 264.7'.
264.7 - 272.9	8.2	Dolomite, light to medium gray, fine-grained, fractured, with white carbonate fillings.
272.9 - 280	7.1	Siltstone, weathered, light gray to pinkish, fine-grained, with chert blebs, lower portion of core crushed.
280 - 281.5	1.5	Breccia, angular fragments of medium-gray, fine-grained dolomite in a white, coarse-grained carbonate. Core recovery 0.8'.

281.5 - 285.7	4.2	Dolomite, light gray, fine-grained, fractured, leached.
285.7 - 299.0	14.3	Dolomite, medium to dark gray, fine-to medium-grained, a few tightly seal fractures at top, highly fractured at 293', and 297', chert 295' to 296', faintly laminated 298.7 to 301.7'.
299 - 305	6	Dolomite, light gray, fine-grained, fractured, core recovery poor.
305 - 329	24	Dolomite, medium to dark gray, medium-grained, fractured, fractures filled with white, coarse-grained carbonate and quartz, white carbonate blebs; basal portion sandy.
329 - 333.5	4.5	Dolomite, light gray, fine-grained.
333.5 - 334.5	1.0	Dolomite, light gray, medium-grained.
334.5 - 335	0.5	Dolomite, light gray, fine-grained, leached along fractures.
335 - 336.5	1.5	Dolomite, medium gray, medium-grained, fractured, with white carbonate.
336.5 - 340.0	3.5	Dolomite, light gray, fine-grained, iron stained fractures.
340 - 341.5	1.5	Dolomite, medium gray, fine-to medium-gray, blebs of white carbonate.
341.5 - 342.5	1.0	Dolomite, light gray, fine-grained.
342.5 - 344.9	2.4	Dolomite, medium gray, fine-to medium gray, fractured, fractures filled with white, coarse-grained carbonate, core crush at bottom, clay material top 0.1'.
344.9 - 353	8.1	Dolomite, light gray, fine-grained fractured, fractures iron stained, blebs of white carbonate, basal portion sandy.
353 - 354.5	1.5	Dolomite, mottled, medium gray to black, medium-grained; sandy.
354.5 - 355.5	1.0	Dolomite, light gray, fine-grained.
355.5 - 358	2.5	Dolomite, light gray, coarse-grained.
358 - 362	4.0	Dolomite, light gray, fine-grained.
362 - 364	2.0	Dolomite, medium gray, medium-to coarse-grained.

364 - 368	4	Dolomite, medium gray, fine-grained, fractured, fractures iron stained.
368 - 368.5	0.5	Dolomite, medium to dark gray, medium-grained, fractured, blebs of white calcite, grains of black chert.
368.5 - 370.5	2.0	Dolomite, light gray, fine-grained, fractured, with iron stained calcite in fractures; sandy.
370.5 - 377.5	7.0	Dolomite, mottled, medium-grained, mottling due to clay material, small blebs of white calcite; lowers 3 feet somewhat finer-grained and lighter gray.
377.5 - 384	6.5	Dolomite, light to medium gray, fine-to medium-grained, fractured, fractures iron stained, small amount of white carbonate in fractures.
384 - 388.3	4.3	Dolomite, medium to dark gray, medium-grained, fractured, with white carbonate and quartz in fractures, white chert in lower portion.
388.3 - 392.8	4.5	Dolomite, fine-grained, medium to dark gray.
392.8 - 396.3	3.5	Dolomite, arenaceous, light to medium gray, fine-to coarse-grained, coarse-grained portions interbedded with finer-grained dolomite, minor kaolinite; sandy.
396.3 - 403	7.3	Siltstone, light gray, fine-grained; laminated, laminations buff colored, a few medium-grained dlm. stringers in bottom 1 foot.
403 - 403.8	0.8	Dolomite, medium gray, medium-to coarse-grained; silty.
403.8 - 414	10.2	Sandstone, dolomite, medium gray, fine-grained, with coarse-grained, dark gray dolomite pebbles, weathered to a clay in places.
414 - 416	2.0	Dolomite, dark gray, coarse-to medium-grained, siliceous.
416 - 421	5.0	Dolomite, medium to dark gray, fine-grained, stringers of coarse-grained dolomite, laminated, somewhat mottled in places, laminations buff colored.
421 - 426.5	5.5	Dolomite, dark gray mottled fine-grained, faintly laminated, coarse-grained beds to 0.3'.
426.5 - 430.5	4.0	Dolomite, medium gray, fine-grained, laminated, lamination weathered buff.

430.5 - 432.5	2.0	Dolomite, medium gray, fine-grained, blebs of white carbonate.
432.5 - 443.7	11.2	Dolomite, light to medium gray, fine-grained, with beds of medium to dark gray, medium-to coarse-grained dolomite; breccia zone, 0.5', at 436', voids filled with iron stained calcite crystals and white calcite, fragments angular; fractured, fractures filled with white carbonate, breccia 0.3', at 440'.
443.7 - 450	6.3	Dolomite, light gray, fine-grained, fractured, fractures filled with white calcite; chert, dark gray, at 448'.
450 - 451	1.0	Dolomite, medium to dark gray, medium-to coarse-grained, fractured, fractures filled with white carbonate; sandy.
451 - 454	3.0	Dolomite, light gray, fine-grained, laminated, laminations buff colored; minor beds of coarse-grained, dark gray dolomite, to $\frac{1}{4}$ "; zone of clay material at 454, less than 1" thick.
454 - 455.7	1.7	Dolomite, medium gray, fine-grained, fractured, fractures filled with white carbonate.
455.7 - 457	1.3	Dolomite, light gray, fine-grained; somewhat weathered; with a few coarse-grained beds.
457 - 460	3.0	Sandstone, light to medium gray, medium-to coarse-grained; fractured, fractures filled with white calcite.
460 - 468.5	8.5	Dolomite, light gray, fine-grained, laminated, laminations weathered to a gray clay-like material; distinct clay zone at 466.5, about 1" thick; beds of coarse-grained sandstone below clay zone.
468.5 - 473.7	5.2	Dolomite, light gray, coarse-grained, with laminations of light-gray weathered sandstone; minor fractures, with white calcite.
473.7 - 481.5	7.8	Dolomite, dark gray, coarse-grained, oolitic, fractured, fractures filled with white calcite; some dark gray, fine-grained dolomite below 477.5'.
481.5 - 489.5	8.0	Dolomite, light gray, fine-to medium-grained; leached; several small clay zones less than 1" thick; minor fractures, filled with white calcite; sandy.
489.5 - 492.5	3.0	Dolomite, dark gray, medium-grained.

492.5 - 496	3.5	Dolomite, light gray, fine-grained; leached; fractured, fractures filled with white calcite.
496 - 498.5	2.5	Sandstone, light gray, coarse-grained; (core crushed); white calcite blebs.
498.5 - 499.5	1.0	Dolomite, dark gray, medium-to coarse-grained; fractured, fractures filled with white calcite.
499.5 - 505	5.5	Sandstone, light gray, medium-to coarse-grained; fractured, fractures filled with white calcite; leached; core badly broken.
505 - 514.5	9.5	Dolomite, light gray, fine-to medium-grained; fractured, fractures filled with white calcite; siliceous near top.
514.5 - 523	8.5	Dolomite, black, medium-grained; with white carbonate and quartz; fractured, fractures slightly leached.
523 - 531	8	Dolomite, light gray, fine grained; fractured, fractures filled with white calcite. Core crushed, 524" to 526.5'.
531 - 535.7	4.7	Dolomite, dark gray, fine-to medium-grained; minor fracturing, fractures filled with white calcite.
535.7 - 538.5	2.8	Dolomite, dark gray, medium-to coarse-grained; fractured, fractures filled with calcite, some iron staining.
538.5 - 542	3.5	Dolomite, light to medium gray, coarse-grained; few stringers of fine-grained dolomite.
542 - 546	4.0	Siltstone, fine-grained, medium gray.
546 - 548.8	2.8	Limestone, dark gray to black, fine-grained.
548.8 - 550.5	1.7	Dolomite, light gray, medium-to coarse-grained, minor fracturing.
550.5 - 551	0.5	Dolomite, medium to dark gray, fine-grained, laminated, slightly calcareous.
551 - 555	4.0	Dolomite, light gray, fine-to medium-grained, laminated, laminations very light gray clay.
555 - 556.6	1.6	Dolomite, medium gray, fine-grained.
556.6 - 558.7	2.1	Dolomite, black, medium-to coarse-grained, with blebs of black chert.
558.7 - 570	11.3	Limestone, black, fine-grained, fractured, with calcite fillings.

570 - 571.8	1.8	Sandstone, medium gray, coarse-grained, fractured, fractures filled with white calcite.
571.8 - 578.5	6.7	Limestone, medium gray, fine-grained, porous in places, fractured, fractures filled with calcite.
578.5 - 582.1	3.6	Dolomite, dark gray, medium-grained, core badly crushed.
582.1 - 582.6	0.5	Clay material, light gray to buff, fine-grained.
582.6 - 590	7.4	Sandstone, light gray, fine-grained, fractured, fractures filled with calcite.
590 - 592	2.0	Dolomite, light to medium gray, medium-grained, porous, with abundant secondary calcite.
592 - 598	6.0	Dolomite, light to medium gray, fine-grained, porous, fractured, abundant secondary calcite.
598 - 602.9	4.9	Dolomite, medium gray, fine-grained, core recovery poor.
602.9 - 607	4.1	Dolomite, medium to light gray, fine-to medium-grained at top, fine-grained lower, laminated, buff laminations, fractured, fractures filled with white calcite.
607 - 608.3	1.3	Dolomite, dark gray to black, fine-grained, core crushed.
608.3 - 614	5.7	Dolomite, medium gray, fine-grained, fractured, with white calcite.
614 - 616.2	2.2	Dolomite, light to medium gray, medium-grained.
616.2 - 620.9	4.7	Dolomite, medium gray, fine-grained, fractured, fractures filled with white calcite.
620.9 - 621.2	0.3	Dolomite, dark gray to black, fine-grained, core badly broken.
621.2 - 630	8.8	Dolomite, medium gray, fine-to medium-grained, core badly broken in places, laminated in places, bluish-gray blebs of chert.
630 - 632.3	2.3	Dolomite, light gray, fine-grained, core badly broken.
632.3 - 670.3	48.0	Dolomite, medium gray, fine-grained; core badly broken, recovery poor; intensely fractured, minor white calcite, 664' to 664.5'; oolitic, black chert.

670.3 - 684.8	14.5	Dolomite, dark gray, fine-grained; core badly broken, intensely fractured, very minor calcite.
684.8 - 691.8	7.0	Breccia, fragments, angular, fine-grained, medium gray dolomite; matrix fine-grained calcite; fragments to $\frac{1}{4}$ ".
691.8 - 714	22.2	Dolomite, dark gray, fine-grained, siliceous; minor breccia 695'; core badly broken, intensely fractured.
714 - 730.7	16.7	Chert, bluish gray to black, fine-grained, intensely fractured; recovery 4'.
730.7 - 739.7	9.0	Dolomite, calcareous, medium to dark gray, fine-grained, laminated, laminae buff, bedding horizontal; black, porous chert at 635'.
739.7 - 742	2.3	Dolomite, mottled, dark gray, medium-grained dolomite; medium gray, fine-grained dolomite; minor blebs of white dlm.
742 760.5	18.5	Dolomite, brownish gray, fine-grained; fracturing minor, some calcite in fractures; breccia 750.1' to 750.2'; $\frac{1}{2}$ " chert at 750.2'; core badly broken in places
760.5 - 767	6.5	Dolomite, black, medium-grained, siliceous; some laminations of light to medium gray, fine-grained dolomite; core badly broken.
767 - 767.5	0.5	Breccia, fragments angular, fine-grained, light gray dolomite and chert; cemented by medium-grained, black, siliceous dolomite.
767.5 - 788	20.5	Dolomite, dark gray, fine-grained; laminated, laminae vary from light gray to black and brown; oolitic, black chert in lower .5'.
788 - 791	3.0	Dolomite, dark gray to black, siliceous, fine-grained, faint black laminae.
791 - 861.8	70.8	Dolomite, medium to dark gray, medium-to fine-grained; laminated, laminae light gray, black, brown; black, oolitic chert at 851.6' to 853'; core badly broken; laminae at 30°, 791' to 975'; laminae horizontal to 5°, 820' to 823.1'.
861.8 - 914.8	53.0	Dolomite, medium to dark gray, medium-grained; very badly broken, few exceptions; intensely fractured, white calcite in fractures, fractures iron stained.
914.8 - 917.8	3.0	Dolomite, black, medium-grained, minor fractures, calcite in fractures, core recovery 1 foot.

917.8 - 943.9	26.1	Dolomite, light to medium gray, fine-grained; fractured, white calcite in fractures; core badly broken.
943.9 - 946.9	3.0	Dolomite, dark gray, fine-grained; bluish gray, cryptocrystalline chert.
946.9 - 948	1.1	Dolomite, gray, fine-grained; fractured, calcite in fractures; core badly broken.
948 - 950	2.0	Dolomite, black, fine-to medium-grained; fractured, calcite in fractures.
950 - 955.6	5.6	Dolomite, dark gray to black, fine-grained; laminated; laminae, black, 10° - 15° from horizontal; minor fractures, calcite in fractures.
955.6 - 959.5	3.9	Dolomite, medium gray, fine-grained; faint black laminations.
959.5 - 959.8	0.3	Chert, angular fragments of cryptocrystalline, bluish gray to black chert cemented by white to gray quartz.
959.8 - 961.8	2.0	Dolomite, medium gray, fine-grained; minor fractures, calcite in fractures.
961.8 - 962.8	1.0	Chert and dolomite, chert, angular bluish gray to black, cryptocrystalline in white to gray quartz; dolomite, medium gray, fine-grained; fractured, calcite in fractures.
962.8 - 980.8	18.0	Dolomite, medium to dark gray, fine-grained; fractured, calcite in fractures; core badly broken in lower portion; blebs of bluish gray chert.
980.8 - 984.4	3.6	Dolomite, light gray, fine-grained; very minor fractures, some calcite in fractures.
984.4 - 990	5.6	Dolomite, medium gray, fine-grained; intensely fractured, brecciated at approximately 987', calcite in fractures and breccia; core badly broken.
990 - 991	1.0	Dolomite, dark gray to black, fine-grained; with stringers of black, oolitic chert; core badly broken.
991 - 1000	9.0	Dolomite, medium gray, fine-grained; laminated, laminae, tan, 5° from horizontal; intensely fractured in places, calcite in fractures; core badly broken.

1000 - 1002.3	2.3	Dolomite breccia, fragments angular-to $\frac{1}{4}$ ", fracture filled by white dolomite; fragments cemented by tan dolomite; few fragments of chert.
1002.3 - 1011	8.7	Dolomite, medium to dark gray, fine-grained; core badly broken; calcite on fracture surfaces.
1011 - 1014.5	3.5	Dolomite light to medium gray, fine-grained; intensely fractured; core broken.
1014.5 - 1017	2.5	Dolomite, dark gray to black, fine- to medium-grained; core badly broken.
1017 - 1020.5	3.5	Chert, dolomitic, medium to light gray, fine-grained; fractured, dolomite in fractures; core broken; some stringers of black, oolitic chert.
1020.5 - 1024	315	Dolomite, black, fine-grained; faintly laminated; core broken.
1024 - 1030	6.0	Dolomite, medium gray, fine-grained; black oolitic and light gray chert in lower portion; core broken.
1030 - 1032.4	2.4	Dolomite, black, fine-to medium-grained, siliceous; light gray laminations; blebs of bluish gray chert.
1032.4 - 1035.5	3.1	Dolomite, medium gray, fine-grained; blebs of gray quartz and white dolomite.
1035.5 - 1040.5	5.0	Dolomite, dark gray, fine-grained; siliceous; minor fractures, fractures iron stained; black, oolitic chert at 1039.5'.
1040.5 - 1044	3.5	Dolomite, light gray, medium-to coarse-grained, recrystalline; core broken; fine-grained dolomite in places.
1044 - 1050.5	6.5	Dolomite, medium to dark gray, medium-to coarse-grained, minor fractures, white calcite in fractures.
1050.5 - 1060	9.5	Dolomite, light gray, medium to coarse-grained, recrystalline; few fractures, fracture surfaces iron stained and with minor calcite.
1060 - 1065	5.0	Dolomite, dark gray to black, medium-grained; core broken in places.
1065 - 1074.8	9.8	Dolomite, light to medium gray, medium-to coarse-grained, recrystalline; core badly broken in places.

1074.8 - 1077	2.2	Dolomite, dark gray to black, fine-to medium-grained; core badly broken, less than 1' of core recovered.
1077 - 1079.5	2.5	Dolomite, light to medium gray, fine-to medium-grained; minor fractures; some white calcite blebs and in fractures.
1079.5 - 1082.7	3.2	Dolomite, black, fine-to medium-grained; mottled by white calcite and dolomite; algal?
1082.7 - 1087.5	4.8	Dolomite, medium gray, fine-grained; minor fractures, filled with white calcite.
1087.5 - 1091	2.5	Dolomite, medium gray, fine-grained; mud seam; core badly broken.
1091 - 1129	38.0	Dolomite, dark gray to black, fine-to medium-grained; small blebs of white calcite and dolomite, algal? minor fractures, with white calcite; core recovery poor 1121' - 1129'.
1129 - 1142	13	Dolomite, medium gray, fine-grained; core recovery 2.5'.
1142 - 1175	33	Dolomite, dark gray to black, fine-to medium-grained; small blebs of white calcite and dolomite, algal?; core badly broken.
1175 - 1177	2.0	Dolomite, medium to dark gray, fine-grained; shows some leeching.
1177 - 1185	8.0	Dolomite, dark gray to black, fine-to medium-grained; small blebs of white calcite and dolomite, algal?; core badly broken.
1185 - 1205	20	Dolomite, medium gray; fine-grained, distorted laminae; core badly broken.
1205 - 1210	5.0	Dolomite, dark gray to black, fine-to medium-grained; small blebs of white calcite and dolomite, algal?
1210 - 1212	2.0	Dolomite, medium gray, fine-grained; few small blebs of white calcite and dolomite, algal?
1212 - 1247	35	Dolomite, dark gray to black, fine-to medium-grained; small blebs of white calcite and dolomite, algal?; core recovery poor.
1247 - 1251	4.0	Dolomite, light gray, fine-grained; core recovery 0.5'.
1251 - 1262	9.0	Dolomite, dark gray to black, fine-to medium-grained; small blebs of white calcite and dolomite, algal?; 2' of core recovered.

1262 - 1270	8.0	Dolomite, light gray, fine-grained; slightly distorted laminae, at 10° ; 2' of core recovered.
1270 - 1271	1.0	Dolomite, light gray, medium-to coarse-grained; porous; recrystalline.
1271 - 1282	9.0	Dolomite, medium gray, fine-grained; less than 1' core recovered.
1282 - 1284	2.0	Dolomite, light gray to tan, fine-grained.
1284 - 1285	1.0	Dolomite, light gray, medium-grained; recrystalline.
1285 - 1292	7.0	Dolomite, light gray to tan, fine-grained; 3' of core recovered.
1292 - 1323	31.0	Dolomite, dark gray to black, fine-to medium-grained; laminated, laminae at 10°; core badly broken.
1323 - 1346	23.0	Dolomite, light to medium gray, fine-grained; laminae about horizontal.
1346 - 1351.3	5.3	Dolomite, dark gray to black, fine-grained; minor fracturing; slightly calcareous; breccia at bottom about 0.3".
1351.3 - 1352.5	1.2	Sandstone, light gray, fine-grained; siliceous cement; core broken.
1352.5 - 1356.4	3.9	Dolomite, light to medium gray, fine-grained; core somewhat broken.
1356.4 - 1357.5	1.1	Sandstone, light gray, fine-grained; siliceous cement.
1357.5 - 1363.9	6.4	Dolomite, mottled, black or dark gray to white; algal?; fine-to medium-grained; core badly broken.
1363.9 - 1366	2.1	Sandstone, light gray, fine-grained; siliceous cement; core broken.
1366 - 1371	5.0	Dolomite, light gray, fine-grained; slightly calcareous; core broken.
1371 - 1376.2	5.2	Dolomite, dark gray, fine-grained; fractured 1374' - 1375.5' with white calcite fillings; calcareous shale, 0.4', about 1376.2'; some sandstone stringers 1375.5' - 1376.2'.
1376.2 - 1376.6	0.4	Limestone, oolitic, dolomitic, black, fine-grained; very minor quartz (X-ray).

1376.6 - 1384	8.0	Dolomite, calcareous, medium gray, fine-grained; laminated; core broken.
1384.6 - 1385.6	1.0	Limestone, oolitic, dolomitic, slightly siliceous; black to dark gray, medium-to fine-grained; core badly broken; some shaly partings.
1385.6 - 1387.6	2.0	Dolomite, calcareous, medium gray, fine-grained; laminated.
1387.6 - 1388	0.4	Limestone, oolitic, dolomitic, black, medium-to fine-grained; core badly broken.
1388 - 1391	3.0	Dolomite, medium gray, fine-grained; with light gray, fine-to medium-grained sandstone stringers; 1388.5' to 1389', breccia, angular fragments of dolomite with white calcite.
1391 - 1395.3	4.3	Dolomite, mottled, medium gray to white, fine-to medium-grained; algal?; core broken.
1395.3 - 1399	3.7	Limestone, dolomitic, black, fine-to medium-gray; with interbedded light gray, fine-grained sandstone.
1399 - 1402	3.0	Dolomite, calcareous, medium gray, fine-grained.
1402 - 1411	9.0	Dolomite, calcareous, medium gray, fine-grained; with interbedded light gray to black fine-grained sandstone; black laminations; laminae regular, at about 5°.
1411 - 1419	8.0	Dolomite, calcareous (or dolomitic limestone), medium gray, fine-grained, black laminations, somewhat irregular. <u>Base of Copper Ridge dolomite.</u>
1419 - 1438	19.0	Limestone, dolomitic, dark gray, fine-grained, with black to tan shaly laminations; laminations contorted, at about 5°; small zones of medium-grained black oolitic limestone.
1438 - 1445	7.0	Limestone, dark gray to black, fine-to medium-grained, oolitic; slightly laminated; somewhat conglomeratic at 1443; pebbles subrounded, fine-grained, dark gray limestone.
1445 - 1485	40.0	Limestone, dolomitic, medium gray, fine-grained; black and tan siltstone partings, calcareous and dolomitic; some small zones of medium-grained conglomeratic limestone; fracturing minor; white calcite in fractures; some minor oolitic zones.
1485 - 1496	11.0	Limestone, medium to dark gray, fine-to medium-grained; black siltstone partings; nodular; fracturing minor, white calcite in fractures.

1496 - 1518	22.0	Limestone, dark gray to black, fine-to medium-grained; black siltstone partings; conglomeratic in places; oolitic in conglomeratic zones; core badly broken.
1518 - 1556	38.0	Limestone, dark gray, fine-to medium-grained, black siltstone partings; minor conglomeratic zones; core broken.
1556 - 1559	3.0	Shale or siltstone, calcareous, black, very fine-grained; bedding about horizontal.
1559 - 1562	3.0	Limestone, dark gray to black, medium-grained, oolitic, slightly conglomeratic.
1562 - 1565	3.0	Limestone, medium gray, fine-grained; black shale or siltstone partings, sparse.
1565 - 1594	29.0	Shale or siltstone, calcareous, black, very fine-grained; core badly broken 1581' to 1594'.
1594 - 1711	117.0	No core.
1711 - 1719	8.0	Limestone, dark gray, fine-grained, black shale partings; two conglomeratic zones with oolitic limestone; core broken.
1719 - 1789	70.0	No core.
1789 - 1810	21.0	Limestone, medium to dark gray, fine-grained, sparse shale partings.
1810 - 1812.5	2.5	Breccia, angular fragment of medium gray, fine-grained limestone, white calcites in fractures.
1812.5 - 1823	10.5	Limestone, dark gray, fine-grained, sparse black shale partings.
1823 - 1874	51.0	No core, some cuttings at 5' intervals. Limestone, dolomitic, with shale partings. (X-ray)
1874 - 1894	20.0	Limestone, dark gray, fine-grained, contorted black shale partings; conglomerate at 1882' to 1882.3'.
1894 - 1915	21.0	No core, cuttings, two samples, 1899', 1907'. Limestone, dolomitic, with shale partings. (X-ray)
1915 - 1937	22.0	Limestone, dark gray, fine-grained, sparse black shale partings; fractured 1928.7', fractures with white calcite.
1937 - 1940	3.0	Dolomite, calcareous, medium to dark gray, fine-grained; core badly broken.

1940 - 1952	12.0	Limestone, dark gray, fine-grained, black shale partings; core badly broken.
1952 - 1957	5.0	Dolomite, dark gray, medium-to coarse-grained; finer-grained toward bottom; core broken.
1957 - 1958	1.0	Shale, calcareous, black to dark gray, fine-grained.
1958 - 1963	5.0	Dolomite, calcareous, dark gray fine-grained; black shale partings sparse.
1963 - 1966	33.0	Dolomite, dark gray to black, fine-to medium-grained; calcareous in places; core badly broken.
1996 - 2008	12.0	No core, bit plugged.
2008 - 2013	5.0	Dolomite, dark gray to black, fine-to medium-grained; core badly broken; less than 1' recovered.
2013 - 2061	48.0	No core, bit plugged.
2061 - 2065	4.0	Dolomite, dark gray to black, fine-to medium-grained; core badly broken; less than 1' recovered.
2065 - 2115	50.0	No core, bit plugged.
2115 - 2118	3.0	Dolomite, dark gray, fine-grained; black shaly partings; bedding horizontal; core broken.
2118 - 2168	50.0	No core, bit plugged.
2168 - 2184	16.0	Dolomite, dark gray, fine-grained; 2' of core recovered, badly broken.
2184 - 2196	12.0	No core, bit plugged.
2196 - 2206	10.0	Dolomite, dark gray, fine-grained; 1' of core recovered, badly broken.
2206 - 2256	50.0	No core, bit plugged.
2256 - 2279	23.0	Dolomite, dark gray, fine-grained; 1' of core recovered; badly broken.
2279 - 2289	10.0	Limestone, dark gray, fine-grained, banded; 2286' to 2288' maybe calcareous gouge.
2289 - 2322	33.0	Dolomite, dark gray, fine-grained; 2' of core recovered, badly broken.
2322 - 2334	12.0	Gouge, calcareous, partical size less than 0.1" in diameter.

2334 - 2357	23.0	Dolomite, dark gray, fine-grained; core very badly broken.
2357 - 2360	3.0	Limestone, dark gray, fine-grained; some black shaly bands; core badly broken.
2360 - 2362	2.0	Gouge, calcareous, partical size less than 0.1" in diameter.
2362 - 2377	15.0	Limestone breccia, dark gray, fine-grained, angular fragments; core badly broken.
2377 - 2397	20.0	Dolomite, dark gray, fine-grained; fractured, with white calcite; below 2387' intensely fractured.
2397 - 2405	8.0	Breccia and gouge; Saltville fault; breccia fragments angular, small, subrounded, fine-grained, dark gray dolomite in fine-grained calcite; gouge, very-fine-grained carbonate and clay; gypsum content increases in lower 2'. Maccrady shale
2405 - 2416	11.0	Gypsum, gray to white, coarse-grained; high grade.
2416 - 2446	30.0	Gypsum, gray to white, coarse-to fine-grained; impure; calcareous, brecciated from 2438-2446.
2446 - 2450	4.0	Gypsum, gray to white, coarse-grained; high grade.
2450 - 2474	24.0	Breccia, fine-grained, green and red shale (dolomite) fragments in a dark gray impure gypsum.
2474 - 2478	4.0	Gypsum, shaly, impure, dolomitic, gray, medium-to fine-grained.
2478 - 2528	50.0	Breccia, fragments red and green shale (dolomite) in a gray to red dolomite and impure gypsum; crumbly.
2528 - 2535	7.0	Gypsum, gray to white, coarse-grained; high grade.
2535 - 2715	180.0	Breccia, fine-grained, green and red shale (dolomite) fragments in a gray to red dolomite and impure gypsum; very crumbly.