

Operator: United Producing Co., Inc.
 Farm: J. M. Hoge
 Well No.: 1-1532
 Location: Burkes Garden Dome Tazewell Co.
 7400' North of 37°05'
 700' East of 81°20' approximate
 Elevation: 3052.4' Ground
 Total Depth: 5632' (Driller)
 Commenced: May 1948
 Completed: October 1950
 Result: Dry and Abandoned

Samples examined by
 Warren J. Souder
 Virginia Division of
 Mineral Resources
 July, 1965

Geologic Rock Cuttings Log

Samples are available from the surface to 5595'.
 The drillers total depth was 5632'. (Note:
 Drilling was done by cable tools. Most of the
 rock cuttings are well pulverized.)

<u>Depth in Feet</u>	<u>Thickness in Feet</u>	<u>Lithology</u>
0-52	52	<p><u>Limestone</u>, dark gray, fine crystalline, dense, slightly argillaceous, some interbedded light gray, fairly argillaceous limestone and some calcite veins.</p> <p>33-42 - with light gray, mottled, fragmental limestone.</p> <p>44-48 - with increase in argillaceous content in limestone.</p> <p>48-52 - with considerable argillaceous content in limestone.</p>
52-88	36	<p><u>Limestone</u>, dark gray, fine crystalline, dense, fairly argillaceous with considerable black chert.</p> <p>78-83 - with gray, medium coarsely crystalline, fragmental, argillaceous limestone.</p>
88-384	296	<p>For this interval the samples are not diagnostic; driller states limestone cavern encountered at this depth.</p> <p>88-125 - underground cavern. The sample is: limestone, black, fine crystalline, dense, with black and dull white chert containing a few vugs, and yellow clay containing chips of black limestone and black chert fragments.</p>

125-155 - no sample

155-177 - with large black and yellowish brown chert blocks.

177-350 - no sample

350-370 - with limestone chips in cement.

370-384 - no sample

384-431 47 Limestone, gray to gray-green and dark red, fine crystalline, dense, argillaceous with black chert.

405-411 - with a few calcite veins and varicolored chert.

431-462 31 Limestone, light gray-white, dolomitic, fine crystalline, dense, with some dark gray and red, finely crystalline, dense, dolomitic limestone, and considerable white to black, varicolored, chert.

462-505 43 Limestone-dolomite, gray and white, gray-white mottled, medium to fine crystalline, some fine grained granular white dolomite and some sucrosic, calcarenitic, some black chert, and some calcite and dolomite veins.

(Note: The samples are mostly pulverized; porosities can not be estimated. In this sample interval the lithologies are so intimately mixed that it is practical to name the lithology limestone dolomite.)

505-515 10 Limestone, gray-brown, fine crystalline, dense, slightly argillaceous, with a few pieces of black shale and dark gray-brown chert.

515-550 35 Limestone-dolomite, gray and white, gray-white mottled, medium to fine crystalline, dense, some fine grained granular white dolomite and some sucrosic and black chert occasionally in large nodules.

514-550 - with some greenish tinted, argillaceous limestone.

550-583	33	<p><u>Dolomite</u>, gray-brown, medium to fine crystalline, dense, some granular, some sucrosic, and gray-brown, black, and milky chert.</p> <p>564-583 - with light gray, gray-brown, dolomite; no chert.</p>
583-605	22	<p><u>Limestone-dolomite</u>, gray with gray-brown tints, fine crystalline, sucrosic and light gray whitish medium to fine granular dolomite.</p> <p>591-598 - with interbedded maroon, very argillaceous limestone.</p> <p>598-605 - with milky and black chert.</p>
605-656	51	<p><u>Limestone-dolomite</u>, light gray to gray-brown, some mottled, fine crystalline to dense, some sucrosic and siliceous.</p> <p>619-656 - with black and milky chert.</p> <p>633-643 - with very fine sand grains impregnated.</p> <p>643-656 - with considerable light gray-white, granular limestone-dolomite.</p>
656-672	16	<p><u>Dolomite</u>, gray-brown, fine crystalline, dense, and white, medium to fine crystalline, sucrosic to granular and black chert.</p>
672-733	61	<p><u>Limestone-dolomite</u>, light gray, fine crystalline, dense with a few pieces of dark gray argillaceous limestone and green shale.</p> <p>684-733 - with light gray-brown and milky chert.</p> <p>698-711 - with considerable light gray-brown and milky chert.</p>
733-752	19	<p><u>Dolomite</u>, gray-brown, fine crystalline, dense, slightly siliceous and light gray-white, sucrosic to granular, with a few frosted sand grains, slight amount of pyrite and some green calcareous shale.</p>

752-783	31	<p><u>Limestone-dolomite</u>, light gray to whitish, fine crystalline, dense, sucrosic to granular, with some coarse, frosted sand grains, and a few calcareous, green shale chips.</p> <p>759-783 - with dark red argillaceous limestone, and much milky to varicolored chert.</p> <p>766-776 - with small amounts of pyrite.</p>
783-848	65	<p><u>Limestone-dolomite</u>, light gray-brown with some reddish and greenish tints.</p> <p>783-790 - with some varicolored chert.</p> <p>790-796 - with red, gray-green, varicolored mottled limestone-dolomite.</p> <p>813-831 - with considerable red and varicolored limestone-dolomite.</p> <p>831-848 - with some varicolored limestone-dolomite.</p>
848-864	16	<p><u>Dolomite</u>, light gray-brown, granular, siliceous, with a small amount of clear and milky chert.</p>
864-899	35	<p><u>Dolomite</u>, light gray-brown, fine crystalline dense, with gray-brown and white creamy chert.</p> <p>882-894 - with much white creamy chert. (This chert may be a silicified calcareous mudstone.)</p>
899-1013	114	<p><u>Dolomite</u>, light gray-brown, granular and dull white, coarse crystalline.</p> <p>905-914 - with much light gray-brown and milky chert.</p> <p>919-923 - with some red limestone-dolomite.</p> <p>923-933 - the dolomite is medium to fine crystalline; some black chert.</p> <p>933-951 - the dolomite is coarse crystalline.</p>

939-951 - with much gray-brown and white, creamy chert.

951-956 - with some gray-brown and white creamy chert.

951-1003 - the dolomite is medium fine granular to sucrosic.

974-989 - with a few chips of red and gray-green shale.

995-1003 - with red and greenish limestone-dolomite and few pieces of green shale.

1008-1013 - with medium coarse to fine crystalline dolomite.

1013-1037 24

Dolomite, dull white, fine crystalline, dense with milky chert.

1031-1037 - with small amount of red shale; reddish tints in the dolomite.

1037-1052 15

Dolomite, white, fine grained granular and sucrosic, with a few frosted medium size sand grains.

1052-1139 87

Dolomite, light gray-brown, white, fine crystalline, dense.

1052-1065 - with some milky and black chert.

1086-1109 - with a fair amount of milky and light gray-brown chert and a few frosted sub-rounded sand grains.

1109-1113 - no samples

1113-1139 - with a fair amount of milky and light gray-brown chert and a few frosted sub-rounded sand grains.

1139-1231 92

Dolomite, light reddish-pink and light gray-whitish with some green tints, medium to fine crystalline, dense with a fair amount of smoky and black chert, and a few frosted sand grains.

1152-1156 - with less pink color.
(The color varies.)

1166-1173 - with much varicolored chert.

1173-1209 - with some varicolored chert.

1209-1231 - with a fair to considerable
amount of varicolored chert.

1231-1299 68 Limestone-dolomite, gray, light gray to
dull white, argillaceous and some black,
slightly calcareous shale.

1241-1246 - with much dark gray, clay,
calcareous shale.

1253-1260 - with interbedded, very
argillaceous, dark gray dolomite.

1257-1274 - with milky chert.

1266-1274 - with argillaceous dark gray
dolomite.

1274-1281 - no samples

1281-1299 - with predominantly, light-
gray dolomite.

1299-1323 24 Dolomite, dull white, medium fine granular.

1307-1312 - with medium coarse, rose
tinted dolomite.

1307-1323 - with some white chert.

1323-1348 25 Dolomite, light gray to dull white, coarse
crystalline to fine granular with consider-
able milky and light gray chert.

1348-1366 18 Dolomite, gray, slightly argillaceous, to
light gray, fine crystalline, dense to
medium coarse crystalline and some fine
grained crystalline, granular dolomite with
much milky chert.

1359-1366 - with predominantly light
gray-dull white dolomite and less chert.

1366-1379	13	<u>Dolomite</u> , gray, coarse to fine crystalline, dense, argillaceous and some milky chert. 1375-1379 - with considerable argillaceous content in dolomite.
1379-1403	24	<u>Dolomite</u> , gray, medium to fine grained, granular, siliceous, silty, some very fine grained sand and considerable milky chert. 1386-1403 - with less siliceousness and less chert.
1403-1420	17	<u>Dolomite</u> , light gray-whitish, fine grained granular with some milky chert.
1420-1442	22	<u>Limestone-dolomite</u> , dull white, medium fine to granular, slightly argillaceous.
1442-1465	23	<u>Limestone-dolomite</u> , gray, medium fine crystalline to granular, siliceous to silty, and some black, very argillaceous dolomite. 1449-1457 - no samples
1465-1535	70	<u>Dolomite</u> , dull white, fine grained, granular, slightly argillaceous, siliceous to silty. 1483-1491 - with light gray dolomite. 1491-1497 - no samples 1497-1503 - with light gray dolomite. 1503-1508 - with considerable argillaceous content in dolomite. 1508-1523 - with black, calcareous shale.
1535-1586	51	<u>Dolomite</u> , gray, fine grained granular and light gray, fine crystalline, siliceous, silty with a few sand grains and some dark gray argillaceous dolomite. 1550-1554 - with silt and very fine grained sand. 1558-1566 - no samples

1566-1586 - with dark gray, argillaceous, dolomite and a fair amount of silt, and very fine to fine grained sand.

1586-1598	12	<u>Dolomite</u> , white, medium fine grained granular and black, argillaceous to shaly dolomite.
1598-1610	12	No samples
1610-1634	24	<u>Dolomite</u> , gray to dull white, fine crystalline, dense, argillaceous, some fine granular, silty to sandy (with some of the sand, fine grained and frosted), some milky chert possibly containing small oolites, and some very thin, interbedded, black shale.
1634-1650	16	<u>Dolomite</u> , white and light gray, very fine crystalline, sucrosic, siliceous and sandy with some large frosted grains, much creamy chert that is partially oolitic and thin, interbedded black shale.
1650-1735	85	<u>Dolomite</u> , gray, light gray, dull white and white in alternating beds, medium crystalline to very fine crystalline, sucrosic, granular with occasional silty to sandy beds and some frosted sand grains. 1659-1666 - with the dolomite being light gray-whitish, with a small amount of creamy chert, & silty with some larger frosted sand grains. 1666-1674 - with the dolomite being gray, granular. 1674-1683 - with the dolomite being white, very fine granular, sucrosic. 1683-1691 - with the dolomite being gray, granular. 1691-1698 - with the dolomite being gray, and light gray fine grained granular, sucrosic, siliceous to silty with some frosted sand grains. 1698-1710 - with considerable dark gray, argillaceous dolomite and some dark gray shale.

1710-1720 - with the dolomite being gray and light gray mottled, slightly argillaceous.

1727-1731 - with the dolomite being whitish, fine grained granular and sucrosic.

1735-1824	89	<p><u>Dolomite</u>, dark gray, fine crystalline, dense, argillaceous and light gray, very fine crystalline, sucrosic and with variable amounts of black and brown chert having conchoidal fracture.</p> <p>1751-1760 - with siliceous dolomite, silt and some fine grained sand.</p> <p>1775-1786 - with fair amounts of black and light gray chert, slightly oolitic.</p>
1824-1830	6	<p><u>Dolomite</u>, white, medium coarse crystalline to medium granular.</p>
1830-1904	74	<p><u>Dolomite</u>, gray, gray-brown, fine granular, slightly argillaceous, with small amounts of gray-brown, black and creamy chert.</p> <p>1865-1874 - with light gray, dense, slightly argillaceous dolomite.</p> <p>1890-1900 - with dark gray, argillaceous, siliceous to silty dolomite.</p>
1904-2000	96	<p><u>Dolomite</u>, gray, medium crystalline and some fine grained granular with variable amounts of silt and traces of gray, black and creamy chert.</p> <p>1920-1925 - no sample</p> <p>1925-1930 - with light gray, oolitic chert.</p> <p>1952-1957 - no samples</p> <p>1957-1979 - with dark gray, fine crystalline, slightly argillaceous, dense dolomite.</p>
2000-2013	13	<p><u>Dolomite</u>, white, fine crystalline, granular, sucrosic.</p>

2013-2045	32	<u>Dolomite</u> , gray, gray-brown, fine grained, granular, slightly argillaceous, some black dolomite which is very argillaceous to shaly and is interbedded with some milky and brown chert. 2020-2028 - no samples
2045-2072	27	<u>Dolomite</u> , gray to dark and light gray, dense, fine crystalline, siliceous and argillaceous with some black, gray and light gray chert.
2072-2092	20	<u>Dolomite</u> , white and very light-gray, fine crystalline, fine granular with pale blue chert.
2092-2110	18	<u>Dolomite</u> , dark gray to gray, medium crystalline to dense, sucrosic, slightly argillaceous with brown chert. 2000-2010 - with white, medium grained granular dolomite.
2110-2179	69	<u>Dolomite</u> , white, medium coarse, crystalline. 2133-2144 - no samples 2144-2155 - with some interbedded gray, medium coarse, crystalline dolomite. 2162-2167 - with some interbedded gray, medium coarse, crystalline dolomite.
2179-2187	8	<u>Dolomite</u> , dark to light gray, gray-brown, fine crystalline, sucrosic, dense with gray-brown and black chert.
2187-2262	75	<u>Dolomite</u> , gray-brown mottled with white, coarse crystalline, and fine grained granular. 2210-2218 - with some vermillion shale. 2225-2237 - with black and pale blue chert. 2237-2244 - no samples

2262-2272	10	<u>Dolomite</u> , white, fine crystalline and fine grained granular, gray-brown, fine grained granular and both slightly argillaceous. 2267-2272 - with the dolomite having a bluish tint.
2272-2292	20	<u>Dolomite</u> , gray, gray-brown, mottled by white crystals, coarse crystalline, coarse to fine granular, slightly argillaceous. 2287-2292 - with a slight amount of gray and black chert.
2292-2306	14	<u>Dolomite</u> , gray and white, fine crystalline, dense, argillaceous.
2306-2351	45	<u>Dolomite</u> , gray and dull white, fine crystalline dense, slightly argillaceous. 2315-2324 - with dark gray, medium crystalline, dolomite and considerable bluish, oolitic chert and light brown oolitic chert. 2324-2334 - with white, very fine granular, slightly argillaceous dolomite. 2342-2351 - with black very argillaceous to shaly dolomite.
2351-2406	55	No samples
2406-2416	10	<u>Dolomite</u> , gray and white, fine crystalline, dense, fairly argillaceous and black dolomitic and/or calcareous shale.
2416-2426	10	No samples
2426-2436	10	<u>Dolomite</u> , dark gray, dense, fairly argillaceous with light blue very oolitic chert.
2436-2453	17	<u>Dolomite</u> , gray and light gray mottled, fine crystalline, dense, slightly argillaceous with light blue oolitic chert.
2453-2468	15	<u>Dolomite</u> , dark gray to gray, fine crystalline, dense, argillaceous.

2468-2506	38	<u>Dolomite</u> , gray, light gray mottled, medium fine crystalline to medium fine granular, slightly argillaceous. 2496-2501 - no samples 2501-2506 - with some gray-brown tints in the dolomite.
2506-2514	8	No samples
2514-2541	27	<u>Dolomite</u> , dark gray and light gray, fine crystalline, dense, argillaceous. 2523-2532 - no samples
2541-2557	16	No samples
2557-2612	55	<u>Limestone</u> , dark gray, very argillaceous to shaly with small amount of olive green shale and some light gray to dull white, argillaceous dolomite. 2583-2602 - with gray-white mottled coarse crystalline dolomite with considerable pyrite. 2602-2607 - no samples
2612-2619	7	No samples
2619-2631	12	<u>Dolomite</u> , light gray-brown, medium fine granular.
2631-2665	34	No samples
2665-2699	34	<u>Dolomite</u> , dark gray and light gray, fine crystalline, dense with some black and a few red shale chips. 2676-2683 - with fine grained sand interdisseminated in the dolomite and with some gray and milky chert. 2688-2697 - with light blue, oolitic chert. (Note: From 2665-2700' the available samples in the envelopes are meager in amount and scarcely enough for accurate descriptions. Furthermore there are two sets of samples for this interval that do not correspond.)

2699-2740	41	<u>Dolomite</u> , light gray-brown and gray-brown, medium to coarse crystalline, granular.
2740-2789	49	<u>Dolomite</u> , dark gray to gray, medium to fine crystalline, granular and some light gray-brown and considerable black argillaceous dolomite and black shale.
2789-2800	11	<u>Dolomite</u> , gray and light gray, coarse crystalline and coarse granular.
2800-2845	45	<u>Dolomite</u> , white, fine grained, granular and with a few frosted sand grains. 2800-2812 - with some dark gray granular to coarse crystalline. 2825-2831 - with some reddish shale. 2831-2845 - with an increase in the amount of sand.
2845-2858	13	No samples (Note: The 7" casing was set at 2859')
2858-2868	10	<u>Sandstone</u> , white, medium coarse grained, sub rounded, with some grains frosted and some dull reddish shale.
2868-2878	10	No samples
2878-2888	10	<u>Dolomite</u> , gray and light gray, fine grained, granular.
2888-2907	19	<u>Dolomite</u> , dull white to light gray, fine grained, granular, very silty and with very fine grained sand.
2907-2912	5	<u>Dolomite</u> , dark gray, medium fine crystalline, dense, slightly argillaceous.
2912-3065	53	<u>Dolomite</u> , dull white, fine grained, granular. 2928-2944 - with the dolomite being slightly siliceous. 2953-2960 - no samples 3012-3014 - with silt and some dark gray chert.

		3014-3028 - with the dolomite being slightly siliceous.
		3028-3033 - with silt.
		3033-3040 - with the dolomite having a light blue tint.
		3040-3045 - with silt.
		3045-3052 - with the dolomite having a light blue tint.
		3052-3065 - with the dolomite being siliceous and slightly silty.
3065-3097	32	<u>Dolomite</u> , gray to light gray-brown, fine granular to dense, slightly argillaceous.
		3069-3072 - with black, waxy shale.
		3085-3091 - with some black shale, not waxy.
3097-3122	25	<u>Dolomite</u> , dull white to very light gray, medium granular.
		3104-3108 - with gray to light gray dolomite.
3122-3140	18	<u>Dolomite</u> , light gray to gray, fine crystalline, dense, argillaceous.
		3125-3130 - with silt and black shale.
		3130-3140 - with silt.
3140-3146	6	<u>Dolomite</u> , white, fine grained, granular.
3146-3156	10	No samples
3156-3166	10	<u>Dolomite</u> , light gray and gray-brown, fine granular, argillaceous.
3166-3202	36	<u>Dolomite</u> , dark gray-brown, fine crystalline, granular argillaceous.
		3175-3189 - with silt.
		3189-3193 - with light gray-brown dolomite and silt.
		3193-3202 - with silt and some fine grained sand.

3202-3212	10	No samples
3212-3218	6	<u>Dolomite</u> , black and dark gray-brown, fine granular, argillaceous.
3218-3224	6	<u>Dolomite</u> , dark gray and light gray, fine crystalline, dense, fairly argillaceous.
3224-3512	288	<u>Dolomite</u> , black, and dark gray-brown, fine crystalline, dense, fine granular, argillaceous. 3286-3295 - with light blue and black chert. 3314-3323 - with silt and chert. 3323-3356 - with a slight amount of silt. 3386-3392 - with an increase in argillaceous content. 3421-3429 - with an increase in argillaceous content. 3444-3452 - with an increase in argillaceous content. 3467-3475 - with an increase in argillaceous content. 3487-3493 - with an increase in argillaceous content.
3512-3519	7	<u>Dolomite</u> , gray-brown, fine crystalline, dense, argillaceous, and light gray, fine crystalline, dense, argillaceous dolomite.
3519-3544	25	<u>Dolomite</u> , dark gray, fine crystalline, dense, argillaceous. 3523-3536 - with light gray, argillaceous dolomite. 3536-3544 - sample contaminated.
3544-3576	32	<u>Dolomite</u> , dark gray, fine crystalline, dense, argillaceous, interdisseminated, with dull light gray dolomite.

		3561-3564 - with gray-brown dolomite.
		3573-3576 - with gray-brown dolomite.
3576-3593	17	<u>Dolomite</u> , dark gray, fine crystalline, dense, argillaceous, and light gray, fine crystalline, dense, argillaceous, dolomite with some fine grained granular dolomite. 3590-3593 - with some gray-brown dolomite.
3593-3611	18	<u>Limestone</u> , light gray, bluish tinted, fine crystalline, dense, argillaceous.
3611-3619	8	<u>Dolomite</u> , dark gray-black, and gray-brown, medium crystalline, with some fine granular, fairly argillaceous dolomite.
3619-3629	10	<u>Dolomite</u> , dark gray-black, and gray-brown, medium crystalline with some fine granular fairly argillaceous, dolomite.
3629-3644	15	<u>Dolomite</u> , dark gray-brown, fine granular, argillaceous. 3640-3644 - with light and dark gray, mottled, oolitic, dolomite.
3644-3660	16	<u>Dolomite</u> , dark gray-black, fine crystalline, dense, fairly argillaceous. 3653-3660 - with much argillaceous content in dolomite.
3660-3682	22	<u>Dolomite</u> , dark gray and dull gray, fine granular, (mealy) dense, fairly argillaceous.
3682-3694	12	<u>Dolomite</u> , dark gray-black, fine crystalline, dense, very argillaceous.
3694-3824	130	<u>Dolomite</u> , dark gray-brown, and dull gray to light gray, fine granular, argillaceous dolomite. 3698 -3724 - with brown, smoky and opaque chert.

3706-3724 - with a slight amount of silt.

3760-3771 - with a slight amount of silt.

3786-3824 - with a fair amount of argillaceous content in dolomite.

3804-3810 - with some black, argillaceous, shaly, dolomite.

3824-3849	25	<p><u>Dolomite</u>, dark gray-brown, slightly argillaceous and black fine crystalline, dense, fairly argillaceous dolomite.</p> <p>3837-3849 - with some veining filled with dolomite crystals.</p>
3849-3866	17	<p><u>Dolomite</u>, dark gray, fine crystalline, dense, fairly argillaceous, and dull light gray, fine granular, argillaceous, dolomite.</p>
3866-3891	25	<p><u>Dolomite</u>, dark gray-brown, fine granular, dense, with some black, dense, argillaceous dolomite and light gray fine granular, argillaceous dolomite.</p>
3891-3895	4	<p><u>Dolomite</u>, black, fine crystalline, dense, fairly argillaceous and dull gray to light gray, fine granular, dense, argillaceous dolomite.</p>
3895-3916	21	<p>Dolomite, dark gray-brown, fine granular, argillaceous, with dark gray-black, dense, argillaceous dolomite and dull gray-light gray, fine granular, argillaceous dolomite.</p>
3916-3943	27	<p><u>Dolomite</u>, black, fine crystalline, dense.</p> <p>3916-3925 - with black, fine crystalline, dense, fairly argillaceous dolomite.</p> <p>3925-3929 - with dark gray-brown dolomite.</p> <p>3929-3932 - with black, fine crystalline, dense, argillaceous dolomite.</p>

3943-3997	54	<p><u>Dolomite</u>, dark gray-brown, fine crystalline, dense, and dull, light gray, fine crystalline dense to fine granular, argillaceous dolomite.</p> <p>3951-3960 - with this interval being fairly argillaceous.</p> <p>3965-3969 - with some dark gray, light gray mottled dolomite, having the appearance of pellets.</p> <p>3980-3991 - with black, fine crystalline, dense, argillaceous dolomite.</p> <p>3991-3997 - with a fair amount of argillaceous content in the dolomite and a few thin veins filled with dolomite crystals.</p>
3997-4026	29	<p><u>Dolomite</u>, dark gray-black, fine crystalline, dense, fairly argillaceous and dull, light gray, fine crystalline, dense to fine granular, argillaceous dolomite.</p>
4026-4065	39	<p><u>Shale</u>, dark red and dark green, clay, fine mica flakes, soft.</p>
4065-4095	30	<p><u>Shale</u>, dark green-gray, clay, fine mica flakes, soft.</p>
4095-4114	19	<p><u>Shale</u>, dark gray-black, clay, fine mica flakes, soft and thin interbedded dark gray-black, dense, argillaceous dolomite.</p> <p>4104-4114 - with some greenish tints.</p>
4114-4123	9	<p><u>Dolomite</u>, dark gray and light gray, medium fine crystalline, sucrosic, slightly argillaceous.</p>
4123-4143	20	<p><u>Dolomite</u>, dark gray, black, fine crystalline, dense, fairly argillaceous to shaly.</p> <p>4128-4132 - sample contaminated</p>
4143-4160	17	<p><u>Shale</u>, dark red-vermillion, clay, fine mica flakes, with some green, clay, soft shale and red partially dolomitic shale.</p> <p>4150-4160 - with large amount dark green shale.</p>

4160-4172	12	<u>Dolomite</u> , gray and light gray, dense, fairly argillaceous.
4172-4184	12	<u>Shale</u> , dark gray, clay, dolomitic, soft.
4184-4213	29	<u>Dolomite</u> , gray and dull gray, fine crystalline, dense, argillaceous. 4190-4197 - with dark gray, very argillaceous to shaly dolomite and a few thin veins with dolomite crystals. 4197-4204 - with much black shale, soft. 4204-4213 - with dull, light gray, fine granular, fairly argillaceous dolomite.
4213-4240	27	<u>Dolomite</u> , black, medium fine crystalline with some dull, light gray, granular, argillaceous dolomite.
4240-4244	4	<u>Shale</u> , dark red, vermillion, and dark green, clay, fine mica flakes; with red, medium crystalline, very siliceous to cherty, dolomite.
4244-4279	35	<u>Shale</u> , dark gray, dark green tinted, clay, dolomitic with some dark red, clay, dolomitic shale.
4279-4300	21	<u>Dolomite</u> , dark gray, fine crystalline, dense, very argillaceous and dull light gray, fine granular, argillaceous dolomite and a trace of glauconite. 4290-4300 - dolomite with gray-brown tints.
4300-4316	16	<u>Dolomite</u> , gray-brown, fine granular, dark gray fine crystalline, dense, very argillaceous.
4316-4332	16	<u>Dolomite</u> , dull light gray-brown, fine crystalline, dense, argillaceous and dark gray-brown, fairly argillaceous dolomite. 4326-4332 - varies from argillaceous dolomite to shaly.

4332-4387	55	<p><u>Dolomite</u>, gray-brown, fine crystalline, dense, to fine granular, with some argillaceous content.</p> <p>4332-4336 - with dull light gray, fine granular, argillaceous dolomite.</p> <p>4350-4373 - with dull light gray and gray, granular, fairly argillaceous dolomite.</p>
4387-4432	45	<p><u>Shale</u>, dark gray, fairly soft, with thin interbedded, gray, dolomitic limestone.</p> <p>4387-4407 - with a thin, gray, interbedded, dolomitic limestone.</p> <p>4425-4432 - with a thin, gray, coarse crystalline limestone.</p>
4432-4461	29	<p><u>Shale</u>, black, clay, soft and dark gray-brown, very argillaceous dolomite.</p>
4461-4466	5	<p><u>Dolomite</u>, dark gray-brown, fine crystalline to fine granular, fairly argillaceous.</p>
4466-4472	6	<p><u>Limestone-dolomite</u>, light gray-brown, fine crystalline, dense, fairly argillaceous.</p>
4472-4510	38	<p><u>Dolomite</u>, gray-brown, fine granular, argillaceous.</p>
4510-4600	90	<p><u>Shale</u>, dark gray-black, with variable amounts of interbedded gray, medium fine crystalline, dolomite.</p> <p>4532-4544 - with traces of dark red shale.</p> <p>4544-4560 - with considerably less dolomite, almost all shale.</p> <p>4560-4580 - with medium fine crystalline, dark gray dolomite.</p> <p>4571-4580 - with some brownish tints in dolomite.</p> <p>4580-4600 - with black, fine granular, very argillaceous dolomite.</p>

4600-4609	9	<u>Dolomite</u> , light gray-brown, whitish, fine crystalline, argillaceous.
4609-4641	32	<u>Dolomite</u> , gray-brown to dark gray-brown, medium crystalline to fine granular, slightly argillaceous.
4641-4656	15	<u>Shale</u> , black, clay, dolomitic.
4656-4676	20	<u>Dolomite</u> , dark gray, fine crystalline, dense, very argillaceous and black, clay shale.
4676-4688	12	<u>Shale</u> , dark red, clay, slightly calcareous and dark green, clay, slightly calcareous shale. 4683-4688 - with interbedded, thin, granular, red, dolomite.
4688-4706	18	<u>Dolomite</u> , dark gray to dark reddish-brown, dense, argillaceous to granular, and with sucrosic, fairly argillaceous dolomite.
4706-4713	7	No samples
4713-4769	56	<u>Shale</u> , dark gray-black, clay, slightly calcareous, soft. 4718-4723 - no samples 4723-4728 - with very dark red shale.
4769-4778	9	<u>Dolomite</u> , light gray, fine crystalline, dense, argillaceous with interbedded black shale.
4778-4783	5	<u>Dolomite</u> , light bluish-gray, medium crystalline and medium granular light bluish-gray, dolomite.
4783-4816	33	<u>Limestone</u> , light gray-green, fine crystalline, dense, fairly argillaceous.
4816-4828	12	<u>Shale</u> , dark gray, clay, calcareous, soft.
4828-4865	37	<u>Shale</u> , dark red and dark green, with a few medium to fine sand grains.

4833-4838 - with light gray-green, slightly calcareous shale.

4843-4852 - with a fair amount of anhydrite.

4852-4859 - with light gray-green, clay calcareous shale.

4859-4865 - with dark gray-brown, calcareous shale.

4865-4877	12	<u>Dolomite</u> , light gray-brown, dense, argillaceous, and with fine crystalline, dense, argillaceous, dolomite.
4877-4889	12	<u>Shale</u> , dark gray, clay, soft with dark red and some dark green shale.
4889-4923	34	<u>Shale</u> , dark red and some dark green, clay, soft.
4923-4941	18	<u>Shale</u> , black, clay, soft with thin interbedded gray-dull white mottled, crystalline, limestone. 4930-4936 - with dark green, clay, shale.
4941-4964	23	<u>Dolomite</u> , light gray-whitish, fine crystalline, calcareous, dense, with interbedded very dark green-black, clay, shale.
4964-4990	26	<u>Shale</u> , dark red and red, green and light green with greenish tinted anhydrite. 4972-4982 - with considerable increase in anhydrite. 4982-4990 - with a very, considerable increase in anhydrite.
4990-4994	4	<u>Limestone</u> , light gray, fine crystalline with anhydrite.
4994-5012	18	<u>Shale</u> , dark gray, clay, slightly calcareous with light gray-whitish very argillaceous dolomite and a few sub-rounded, frosted sand pebbles. 5001-5006 - with a trace of anhydrite.

5012-5062	50	<p><u>Dolomite</u>, dark gray, calcareous, very argillaceous and light gray-whitish to green tinted, fine crystalline dense, argillaceous dolomite.</p> <p>5039-5062 - with dark reddish and dark greenish shale.</p>
5062-5077	15	<p><u>Dolomite</u>, dark gray to light gray, fine crystalline, dense, argillaceous.</p>
5077-5110	33	<p><u>Shale</u>, dark red, green, clay and red and greenish tinted dolomite with a fair amount of varicolored anhydrite.</p>
5110-5142	32	<p><u>Dolomite</u>, light gray-whitish, reddish and green tinted, fine grained, sucrosic.</p> <p>5127-5135 - with dark gray shale.</p>
5142-5165	23	<p><u>Dolomite</u>, dark gray, light gray, fine crystalline, fairly argillaceous, with opaque chert.</p> <p>5158-5165 - with reddish-brown tinted dolomite.</p>
5165-5171	6	<p><u>Limestone</u>, whitish to light gray-brown, very fine crystalline, dense.</p>
5171-5233	62	<p><u>Dolomite</u>, dark gray, reddish tinted in part coarse crystalline.</p> <p>5207-5215 - with traces of dark brown chert.</p>
5233-5270	37	<p><u>Dolomite</u>, light gray-dull white with light bluish tints, medium to fine crystalline, some sucrosic, dense, very slightly argillaceous, with considerable white to milky chert and a few small frosted sand grains.</p> <p>5258-5267 - with milky oolitic chert and a trace of pyrite.</p>
5270-5285	15	<p><u>Dolomite</u>, dark gray and some light gray mottled, medium coarse crystalline, slightly argillaceous.</p>

5285-5302	17	<p><u>Dolomite</u>, light gray, medium fine crystalline with a trace of milky oolitic chert.</p> <p>5294-5302 - with a few small sand grains.</p> <p>5298-5302 - with some dark gray dolomite.</p>
5302-5304	2	<p><u>Dolomite</u>, dark gray and some light gray, medium coarse crystalline with a few small sand grains.</p>
5304-5327	23	<p><u>Dolomite</u>, dark gray-brown, fine crystalline, calcareous and argillaceous.</p> <p>5312-5320 - with whitish, fine crystalline, dense, argillaceous dolomite, and with a few large sand grains.</p>
5327-5353	26	<p><u>Dolomite</u>, white to light gray with light blue tints, medium coarse crystalline with some small sand grains.</p> <p>5348-5353 - with some dark fairly argillaceous dolomite.</p>
5353-5375	22	<p><u>Dolomite</u>, light gray, light blue, to whitish, fine crystalline, dense, slightly argillaceous with light gray and milky chert and a few small sand grains.</p> <p>5366-5375 - with dark fairly argillaceous dolomite.</p>
5375-5380	5	<p><u>Dolomite</u>, white, with light gray tints, medium fine crystalline.</p>
5380-5393	13	<p><u>Dolomite</u>, gray and dark gray-brown, medium coarse crystalline.</p> <p>5385-5389 - with considerable fine grained sand and silts.</p> <p>5389-5393 - with black, very argillaceous dolomite.</p>

5393-5410	17	<u>Dolomite</u> , white, light gray and light blue, tinted, medium crystalline with some gray, fine crystalline, dense, argillaceous dolomite and a few frosted sand grains.
5410-5419	9	<u>Dolomite</u> , dark gray, fine crystalline, dense, fairly argillaceous.
5419-5442	23	Dolomite-Sandstone <u>Sand</u> , coarse to very fine grained and silts, some are sub-rounded and frosted, others are angular and sharp edged. The bit has broken some of the large grains into sharp shreds. The sand appears to be imbedded in a dolomitic matrix. White to smoky chert is present. <u>Dolomite</u> , light gray-whitish, fine crystalline to fine granular and some is dense, slightly argillaceous. All of the dolomite is siliceous. 5422-5424 - with less sand. 5424-5442 - with more sand. (Note: In this sample interval the lithologies are so intimately mixed that it is practical to name the lithology dolomite-sandstone.)
5442-5464	22	<u>Dolomite</u> , light gray-brown, fine grained granular. 5450-5453 - with light blue tints. 5453-5456 - with dark gray, fine crystalline, dense, argillaceous dolomite. 5459-5464 - with light gray-brown, blue tinted dolomite.
5464-5478	14	<u>Dolomite</u> , dark gray, fine crystalline, argillaceous, and gray-brown fine granular dolomite and some black dolomitic shale. 5471-5478 - with light gray, fine crystalline, argillaceous dolomite.

5478-5485	7	<u>Dolomite</u> , dull white with brown and blue tints, medium fine granular with white, milky, oolitic chert.
5485-5510	25	<u>Dolomite</u> , gray, fine crystalline, dense, argillaceous and light gray-brown, fine granular dolomite. 5505-5510 - with both colors being medium fine crystalline.
5510-5517	7	<u>Dolomite</u> , dark gray to black, dense, argillaceous and light gray-brown, fine granular dolomite.
5517-5555	38	<u>Dolomite</u> , light gray, blue and brown tinted, dense to fine granular, slightly argillaceous. 5524-5537 - dolomite siliceous with a trace of milky chert. 5537-5540 - with dark gray, argillaceous dolomite. 5540-5555 - dolomite siliceous.
5555-5591	36	<u>Dolomite</u> , white, light blue tinted, medium fine crystalline to granular. 5577- 5585 - with a trace of milky chert and scattered small, frosted sand grains.
5591-5595	4	<u>Dolomite</u> , light gray-brown, fine granulas and some dark gray, argillaceous, dense dolomite.

Note: Well was drilled to 5632'. No samples are available below 5595' in VDMR sample repository.

Definition of Terms Used

Crystals, their size: The terms such as coarse, medium and fine crystalline are relative terms and used to convey a general relationship about the size of crystals in consolidated limestones and dolomites.

Granular: Limestones and particularly dolomites that are composed of rounded to semi-rounded particles. The size of these granules are expressed in relative terms such as coarse medium and fine granular.

Sucrosic: Sucrosic means that whenever it is has the texture of sugar. Actually, as used by many, it has little if any meaning. I have used the term sucrosic to imply the way light is reflected from grains of limestones and dolomites as crystalline, white, granulated sugar reflects light.

Fragmental: The limestone or dolomite is composed of various fragments or pieces of calcareous materials and held together by calcareous cements and finer calcareous particles.

Siliceous: Refers to some small content of silts imbedded, inconspicuously in shale, limestone or dolomite.

Silicification, refers to secondary enrichment of a strata by silica. Often limestones and dolomites are replaced or silicified by silica to form chert. Shale beds are hardened by silica and become silicified.

Slickensided, refers to scratches, groves or polishing due to possible abrasion caused by rubbing rocks together. This slickening is often caused by fault movements.