

INTERVAL SHEET

Page _____ VDMR Well No.: W-842
 Date 7/1/63 Sample Interval: from 11.6 to 342.1
 PROP: W. A. Waddle (Ceres #1) Total depth 342.1
 COMP: U. S. Steel Oil _____ Gas _____ Water _____ Exploratory X
 COUNTY: Bland Cuttings _____ Core X Other _____

From-To	From-To	From-To	From-To	From-To
-	11.6 - 16.3	74.9 - 76.7	149.4 - 150.6	215.3 - 219.0
-	16.3 - 18.8	76.7 - 77.7	150.6 - 151.1	219.0 - 224.4
-	19.9 - 27.6	77.7 - 80.9	151.1 - 154.4	224.4 - 225.5
-	27.6 - 28.3	80.9 - 86.3	154.4 - 154.7	225.5 - 226.4
-	28.3 - 30.5	86.3 - 90.2	154.7 - 158.5	226.4 - 227.2
-	30.5 - 34.0	90.2 - 93.2	158.5 - 162.0	227.2 - 227.8
-	34.0 - 35.6	93.2 - 93.4	162.0 - 162.3	227.8 - 229.0
-	35.6 - 36.3	93.4 - 95.2	162.3 - 163.1	229.0 - 231.0
-	36.3 - 38.1	95.2 - 98.3	163.1 - 164.0	231.0 - 235.4
-	38.1 - 39.0	98.3 - 101.3	164.0 - 164.6	235.4 - 241.9
-	39.0 - 42.6	101.3 - 102.5	164.6 - 167.1	241.9 - 243.5
-	42.6 - 44.1	102.5 - 104.3	167.1 - 168.7	243.5 - 244.2
-	44.1 - 47.0	104.3 - 106.7	168.7 - 171.7	244.2 - 248.0
-	47.0 - 48.5	106.7 - 108.5	171.7 - 173.7	248.0 - 252.4
-	48.5 - 49.1	108.5 - 109.3	173.7 - 174.4	252.4 - 252.8
-	49.1 - 50.6	109.3 - 114.0	174.4 - 175.6	252.8 - 253.5
-	50.6 - 51.7	114.0 - 114.3	175.6 - 177.4	253.5 - 256.0
-	51.7 - 52.6	114.3 - 115.8	177.4 - 182.8	256.0 - 257.4
-	52.6 - 55.0	115.8 - 118.5	182.8 - 186.7	257.4 - 258.1
-	55.0 - 56.8	118.5 - 120.3	186.7 - 189.8	258.1 - 258.3
-	56.8 - 60.0	120.3 - 121.2	189.8 - 190.9	258.3 - 261.5
-	60.0 - 60.5	121.2 - 124.8	190.9 - 193.2	261.5 - 261.8
-	60.5 - 61.6	124.8 - 130.2	193.2 - 194.1	261.8 - 264.1
-	61.6 - 67.2	130.2 - 136.8	194.1 - 196.4	264.1 - 266.3
-	67.2 - 70.6	136.8 - 138.1	196.4 - 200.0	266.3 - 269.0
-	70.6 - 71.1	138.1 - 138.9	200.0 - 204.7	269.0 - 270.3
-	71.1 - 72.0	138.9 - 141.5	204.7 - 205.4	270.3 - 271.1
-	72.0 - 72.9	141.5 - 143.3	205.4 - 210.1	271.1 - 274.2
-	72.9 - 74.4	143.3 - 149.1	210.1 - 212.2	274.2 - 274.8
-	74.4 - 74.9	149.1 - 149.4	212.2 - 215.3	274.8 - 276.6

INTERVAL SHEET

Page 2

VDMR Well No.: W-842

Date _____

Sample Interval: from 11.6 to 342.1

PROP: W. A. Waddle (Ceres #1)

Total depth 342.1

COMP: U. S. Steel

Oil _____ Gas _____ Water _____ Exploratory X

COUNTY: Bland

Cuttings _____ Core X Other _____

From-To	From-To	From-To	From-To	From-To
-	276.6 - 277.2	-	-	-
-	277.2 - 280.7	-	-	-
-	280.7 - 282.3	-	-	-
-	282.3 - 282.8	-	-	-
-	282.8 - 283.9	-	-	-
-	283.9 - 287.7	-	-	-
-	287.7 - 288.2	-	-	-
-	288.2 - 288.6	-	-	-
-	288.6 - 292.1	-	-	-
-	292.1 - 292.6	-	-	-
-	292.6 - 294.9	-	-	-
-	294.9 - 295.5	-	-	-
-	295.5 - 301.0	-	-	-
-	301.0 - 307.5	-	-	-
-	307.5 - 313.3	-	-	-
-	313.3 - 314.9	-	-	-
-	314.9 - 316.9	-	-	-
-	316.9 - 318.2	-	-	-
-	318.2 - 324.8	-	-	-
-	324.8 - 326.6	-	-	-
-	326.6 - 327.0	-	-	-
-	327.0 - 327.8	-	-	-
-	327.8 - 331.2	-	-	-
-	331.2 - 332.7	-	-	-
-	332.7 - 337.5	-	-	-
-	337.5 - 342.1	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

County: BLAND

VDMR Well No. 842

Well or property: CERES NO. 1

Farm: W. A. Waddle

Driller: J. Bartlett (contractor - Southeastern Drilling Co.)

Location: Garden Mountain quadrangle,

Elevation: 2579.27 feet

Total depth: 342.1 feet

Started drilling: 6/4/56

Finished drilling: 6/19/56

Sample description by: E. M. Luttrell and R. P. Crumpton

Reference: Obtained from U. S. Steel Company

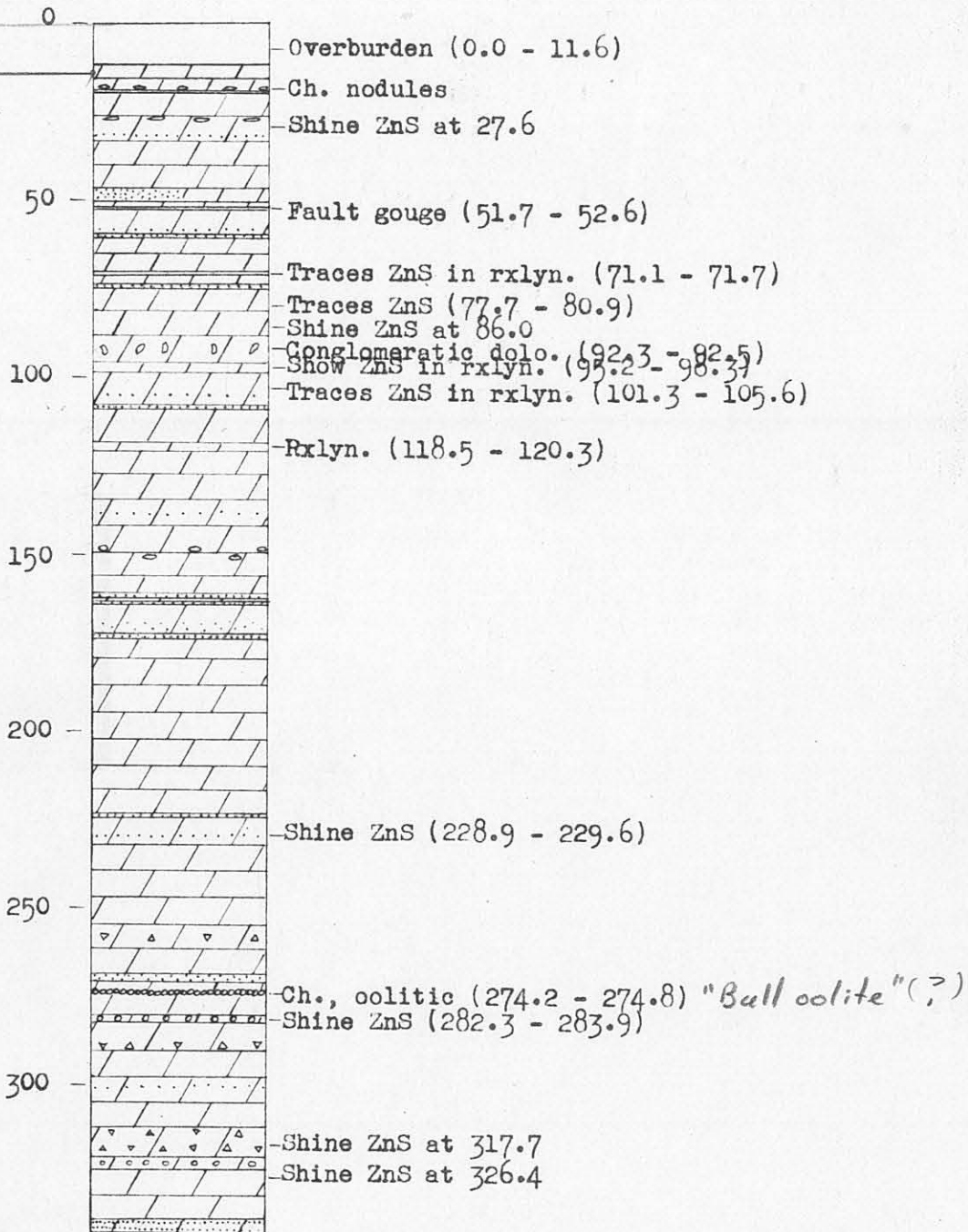
GEOLOGIC SUMMARY

<u>Depth</u>	<u>Thickness</u>	<u>Formation (and remarks)</u>
0.0 - 11.6	11.6	(Overburden)
11.6 - 13.5	1.9	Beekmantown fm. (?)
13.5 - 343.1	328.6	Copper Ridge dol., with ten shows of ZnS mineralization, one congl. dol. layer, oolitic chert horizons, a few thin sandstone layers.

GENERALIZED GRAPHIC LOG

CERES NO. 1

06
06
Ecr



DIAMOND DRILL HOLE RECORD

CERES NO. 1

Location: N-10,065.94 E-9,127.86
 Elevation: 2579.27
 Angle & Bearing: 60°, N 40° W
 Core Size: 11.6' to 13.5' BX Core, 13.5' to 342.1' AX Core.
 Started Drilling: 6-4-56 Finished Drilling: 6-19-56
 Drill Contractor: Southeastern Drilling Co. Driller: J. Bartlett
 Logged By: E. W. Luttrell and R. P. Crompton
 Total Depth: 342.1 feet
 Classification of Hole: Show

<u>From</u>	<u>To</u>	<u>Description</u>
✓ 0.0	11.6	Overburden
✓ 11.6	13.5	Dolo., dense, dk. gray, sparsely disseminated FeS from 11.6 to 12.4. Shaly from 12.4 to 12.9. Cherty and ch. breccia from 13.1 to 13.4, dk. and light gray ch. Small white dolo. eyes at 12.9. Dolo. is much denser from 11.6 to 12.4 becoming very fine grn. at 12.9. Hairline fractures, dolo. filled.
Top of Scr?		
✓ 13.5	14.8	Dolo., dense, gray with thin lt. gray bands; hairline fractures, dolo. filled.
✓ 14.8	15.7	Dolo., same as above; sparsely cherty at 14.8; ch. breccia 15.2 to 15.4; gray shale 0.01' thick at 15.7.
✓ 15.7	16.0	Dolo., dense, gray; shaly and cherty 15.8-16.0, not along bedding.
✓ 16.0	16.3	Dolo., same, vuggy; 0.02' of col. ch. at 16.0.
✓ 16.3	16.6	Dolo., dense, lt. gray; cherty at 16.4; stylolitic.
✓ 16.6	16.8	No core.
✓ 16.8	18.8	Dolo., dense, gray, ch. nod. at top; sparsely sandy 16.8-17.5; ch. nod. at 17.7; cgl. 17.8-18.0; sparse sand grns. at 18.3; cgl. at 18.8.
✓ 18.8	19.9	Opening - no core.
✓ 19.9	21.8	Dolo., same; wh. dolo. eyes lower part; cherty at 20.2.
✓ 21.8	27.6	Dolo., dense, fn. grn., dk. gray; dk. sh. laminae, xaline lower foot.
✓ 27.6	28.3	Dolo., xaline & cherty; salt & pepper lower part; ch. fault gouge (?);
		<u>MINERALIZATION:</u> traces of disseminated FeS, one crystal of ZnS.
✓ 28.3	30.5	Dolo., finely xaline, dk. gray; dk. ch. at 28.5, lt. ch. at 29.3 and 30.4.
✓ 30.5	32.3	Dolo., dense, dk. gray.

CERES NO. 1 (cont.)

<u>From</u>	<u>To</u>	<u>Description</u>
✓ 32.3	32.8	Dolo., shly., sandy from 32.5 to 32.8.
✓ 32.8	34.0	Dolo., gray, dense; trace FeS lower half.
✓ 34.0	35.6	Dolo., finely xaline, dk. gray; FeS along fractures with white dolo.
✓ 35.6	37.1	Dolo., dense, lt. gray.
✓ 37.1	37.3	Dolo., dense, dk. gray.
✓ 37.3	38.1	Dolo., dense, dk. gray, fractured.
✓ 38.1	38.3	Dolo., sandy.
✓ 38.3	39.0	Dolo., fine grn., gray.
✓ 39.0	42.6	Dolo., dense, gray, fractured.
✓ 42.6	44.1	Dolo., dense to finely xaline in lower part, dk. gray.
✓ 44.1	46.7	Dolo., dense, lt. gray; sparse ss. grns. at 45.4, 45.8.
✓ 46.7	47.0	Dolo., dense, gray; some sand grns.
✓ 47.0	50.6	Dolo., sandy and ss.
✓ 50.6	51.7	Dolo., dense, gray.
✓ 51.7	52.6	Breccia or gouge zone.
✓ 52.6	55.0	Dolo., xaline, dk. gray, mottled.
✓ 55.0	56.8	Dolo., finely xaline, gray.
✓ 56.8	58.7	Dolo., gray, xaline, sandy; w/white dolo., weathered FeS.
✓ 58.7	59.4	Dolo., same; lt. blue ch. from 58.7 to 59.0.
✓ 59.4	60.0	Dolo., fine grn., gray, sandy.
✓ 60.0	60.5	Ss., conglomeritic; ool. ch. at top.
✓ 60.5	61.6	Dolo., gray, xaline.
✓ 61.6	67.2	Same, becoming darker basal 1.5'.
✓ 67.2	70.6	Dolo., finely xaline, dk. gray, with sparse white dolo. eyes and black sh. partings.
✓ 70.6	71.1	Dolo., dense, gray.
71.1	71.7	Dolo., rexaline, gray, mottled;
<u>MINERALIZATION:</u> traces yellow ZnS.		
71.7	72.0	Dolo. cgl., sparsely sandy.

CERES NO. 1 (Cont.)

<u>From</u>	<u>To</u>	<u>Description</u>
✓ 72.0	72.9	Dolo., fn. grn., dk. gray.
✓ 72.9	74.4	Dolo., dense, lt. gray.
✓ 74.4	74.9	Sandstone.
✓ 74.9	76.7	Dolo., dense, lt. gray, sparse sand stringers and cgl.
✓ 76.7	77.7	Dolo., xaline, gray to dk. gray.
✓ 77.7	80.9	Dolo., xaline, gray; secondary silica at 78.0-78.1;
		<u>MINERALIZATION:</u> traces of yellow ZnS crystals.
✓ 80.9	86.3	Dolo., xaline to rexaline, dk. gray to black, mottled, sparse white dolo. eyes;
		<u>MINERALIZATION:</u> ZnS crystal at 86.0.
✓ 86.3	92.3	Dolo., same, becoming fn. grn.; some white dolo. eyes.
✓ 92.3	92.5	Cgl., sandy lower half.
✓ 92.5	95.2	Dolo., dense becoming fn. grn. lower part, lt. gray.
✓ 95.2	98.3	Dolo., rexaline, gray; sandy from 96.0-96.2; 0.03' good gray shale at 96.2;
		<u>MINERALIZATION:</u> show of ZnS from 95.4-97.4.
✓ 98.3	101.3	Dolo., dense, lt. gray; sand stringers from 99.7-100.1.
✓ 101.3	105.6	Dolo., dense becoming rexaline 103.4-103.9, dk. gray; sparsely sandy 104.9 to 105.6;
		<u>MINERALIZATION:</u> traces of ZnS in rexaline.
✓ 105.6	107.5	Dolo., gray, dk. mottling, sandy 105.6, 105.7.
✓ 107.5	108.5	Dolo., dense, dk. gray to black.
✓ 108.5	109.3	Sandstone.
✓ 109.3	109.9	Dolo., dense, banded gray and dark gray.
✓ 109.9	112.3	Dolo., dense, dk. gray, very laminated; spec FeS at 110.8; 0.03' sh. parting at 112.3.
✓ 112.3	113.0	Dolo., dense, med. gray, some laminations; 0.04' sand at 112.7.
✓ 113.0	114.0	Dolo., dense, dk. gray; tr. col. ch. @ 113.8, 113.93.
✓ 114.0	114.35	Ch., upper part blue col., lower 0.01' dense lt. blue.
✓ 114.35	115.8	Dolo., dense, lt. gray, stylites; some vertical fractures filled w/white dolo.

CERES NO. 1 (cont.)

<u>From</u>	<u>To</u>	<u>Description</u>
✓ 115.8	118.5	Dolo., dense, dk. gray, laminated; some vertical fractures filled w/white dolo. offset laminae.
✓ 118.5	120.3	Dolo., rexaline (oolitic?), dk. gray.
✓ 120.3	121.2	Dolo., dk. gray, laminated; vert. fract. do not offset laminae.
✓ 121.2	124.8	Dolo., lt. gray with much brown mottling, laminated, stylolites, also vert. fractures.
✓ 124.8	130.2	Dolo., dense, lt. gray, laminated, some vert. fract., some white dolo. eyes; dk. bands from 127.5-127.7.
✓ 130.2	133.0	Dolo., dense, dk. gray, laminated, dolo. eye at 132.9.
✓ 133.0	137.8	Dolo., dense, dk. gray, laminated, few dolo. eyes; sandy at 137.8.
✓ 137.8	139.3	Dolo., finely xaline, lt. gray; sandy at 138.3; ch. nod. at 139.0.
✓ 139.3	149.1	Dolo., dense, lt. gray; fractured 140.0-140.5 and mottled brown; FeS at 139.8 along vert. fract.; thin sand laminae from 141.7-142.0; few sand grns. 144.5-146.1; 0.1' white ch. at 148.6.
✓ 149.1	149.4	Dolo., med. gray, laminated.
✓ 149.4	150.6	Dolo., med. xaline, dk. gray.
✓ 150.6	153.6	Dolo., dense, med.-dk. gray; 0.1' mottled dk. ch. at top; vert. fract. 152.8-153.1 filled w/white dolo.; becomes mottled 153.2-153.6 w/ch. nod.
✓ 153.6	154.4	Dolo., dense, very dk. gray (almost black), laminated.
✓ 154.4	154.7	Dolo., dense, very dk. gray (almost black).
✓ 154.7	158.5	Dolo., dense, med. to dk. gray, stylolitic.
✓ 158.5	158.8	Ss., dolo. matrix, sharp upper contact, gradational below.
✓ 158.8	162.0	Dolo., dense, lt. to med. gray, scattered sand grns. from 160.7-161.5; sand abundant from 161.5-162.0 as laminae and also along vert. fractures.
✓ 162.0	162.3	Ch., conglomeritic, oolitic, gray; grades into ss. below.
✓ 162.3	163.1	Ss., dolo. matrix, includes dolo. breccia frag. at 163.0.
✓ 163.1	164.0	Dolo., dense, med. gray, w/many sand laminae; some pod-like masses of sand have pinkish coloration.
✓ 164.0	164.6	Ss., dolo. matrix, lt. gray.
✓ 164.6	167.1	Dolo., dense, med. gray, laminated, some vert. fract., sandy at 165.0, 165.4; tiny ch. nod. at 166.8; 0.1' sand at 167.0-167.1.

CERES NO. 1 (cont.)

<u>From</u>	<u>To</u>	<u>Description</u>
✓ 167.1	169.8	Dolo., dense, dk. gray, laminated, sandy @ 167.9, very sandy 169.6-169.8.
✓ 169.8	171.7	Dolo., dense, med. gray, vert. fract. w/white dolo. show dk. stains (FeS); ch. nod. at 171.2.
✓ 171.7	171.8	Ch., glassy, white.
✓ 171.8	172.3	Dolo., sandy, grading into ss.; inclusion of dolo. fragment at 172.0; irregular ch. at 172.3 (0.05').
✓ 172.3	173.7	Dolo., dense, lt. gray, laminated, becoming sandy 173.5-173.7.
✓ 173.7	174.4	Ss., silica matrix.
✓ 174.4	178.6	Dolo., dense to fn. grn., lt. gray, laminated, 174.4-175.7, med. gray 175.7-177.5, lt. gray 177.5-178.6; fractured 176.4-176.5; sand mottling 177.6-177.9; 177.5-177.8 dolo. cgl./sand grns.
✓ 178.6	182.8	Dolo., dense, lt. gray, mottled 180.0-180.6.
✓ 182.8	186.7	Dolo., dense to fn. grn., med. gray, mottled 184.2-186.7.
✓ 186.7	189.8	Dolo., dense, dk. gray, laminated 186.7-188.0.
✓ 189.8	190.2	Dolo., med. crystalline, med. gray, 0.05' sh. parting at top.
✓ 190.2	194.1	Dolo., dense, lt. gray; tan mottling 190.2-193.0; laminated 193.0-194.1.
✓ 194.1	202.1	Dolo., dense, med. to dk. gray, irregularly laminated, vug at 195.5 contains dolo. crystals (green crystal?); dolo. eyes at 195.8, 201.9.
✓ 202.1	202.5	Dolo., med. xaline, dk. gray, brownish coloration, small sand nod. near top (silica cemented?).
✓ 202.5	203.5	Dolo., dense to fn. grn., med. gray.
✓ 203.5	204.7	Dolo., dense to fn. grn., dk. gray, laminated.
✓ 204.7	204.76	Sh., black.
✓ 204.76	205.4	Dolo., dense, gray and brown mottled, traces FeS along vert. fract.
✓ 205.4	210.1	Dolo., dense, med. to dk. gray, laminated; dolo. eyes at 205.5, 206.7; dolo. filled vertical fract. offsets laminae at 109.8.
✓ 210.1	215.3	Dolo., med. to fn. grn. becoming dense, dk. gray; vert. fract. filled w/white dolo. contains few small breccia fragments from 213.7 to 215.1.
✓ 215.3	217.9	Dolo., med. to fn. grn., med. gray, laminated, spec FeS at 215.45; vert. fract. from 217.2-218.2.

CORES NO. 1 (cont.)

<u>From</u>	<u>To</u>	<u>Description</u>
✓ 217.9	221.2	Dolo., dense, med. to lt. gray; laminated at 217.9-218.2, 220.0-220.3.
✓ 221.2	222.1	Dolo., dense, med. gray, few sand grns. at 221.2, 221.4, 221.5.
✓ 222.1	223.8	Dolo., med. to dk. gray, few sh. partings, laminated w/few fine kaline laminae; few vert. fract.
✓ 223.8	224.4	Dolo., dense, med.-lt. gray, sand laminae, ss. cgl. last 0.2' contains angular dolo. fragments.
✓ 224.4	225.5	Sandstone, contains few laminae and vert. fractures.
✓ 225.5	226.4	Dolo., med. to fnly. kaline, brecciated and cemented w/wh. dolo.; max. brecciation at 226.0.
✓ 226.4	227.15	Dolo., dense, med.-dk. gray, laminated, dolo. eye at 226.6.
✓ 227.15	227.8	Dolo., med.-fnly. kaline, lt. gray, mottled w/dk. curly laminae.
✓ 227.8	228.1	Dolo., fine-grn., mottled as above in upper part becoming laminated in lower part.
✓ 228.1	228.3	Dolo., dense, lt. gray; FeS specks along vert fract.
✓ 228.3	228.9	Dolo., dense, lt. gray, sh. laminae.
✓ 228.9	229.6	Dolo., dense, lt. gray, banded w/very fn. ss. laminae (about 50%); FeS at top in vert. fract.
✓ 229.6	229.9	Ss., dolomitic, lt. gray; vug at 229.7 has dolo. and FeS xtals;
<u>MINERALIZATION:</u> shines of ZnS and FeS.		
✓ 229.9	231.0	Dolo., dense, lt. gray.
✓ 231.0	233.4	Dolo., dense, lt. gray, sparsely laminated, mottled at 233.2.
✓ 233.4	235.1	Dolo., dense, lt.-med. gray w/brownish mottling, some vert. fract.
✓ 235.1	235.4	Dolo., dense, med. gray, laminated.
✓ 235.4	240.6	Dolo., dk. gray, irregularly banded and laminated w/dense dolo. and fn.-med. kaline dolo.; vert. fract. filled w/wh. dolo.
✓ 240.6	241.9	Dolo., dense to med. kaline, dk. gray, mottled appearance 240.6-241.0; wh. dolo. eye at 240.9; banded dense and med. grn. dolo. 241.1-241.5; few stylolites at 241.7.
✓ 241.9	243.5	Dolo., fnly. kaline, med.-lt. gray, mottled and laminated, very mottled w/dk. dolo. 242.0-242.6; sparly. laminated 242.6-243.3; mottled 243.5; FeS cube at 242.6; sh. part. at 242.7.
✓ 243.5	244.2	Dolo., med. grn., med. gray, mottled 243.8-244.0; vug w/wh. dolo. xtals at 243.9.

GENES NO. 1 (cont.)

<u>From</u>	<u>To</u>	<u>Description</u>
✓ 244.2	245.2	Dolo., finly. xaline, lt. gray, mottled w/dk. gray and tan; few dk. specks at 244.2 may be FeS.
✓ 245.2	248.0	Dolo., finly. xaline, lt. gray, crinkly brownish laminae; few vert. fract. upper part; large vert. fract. from 246.4-247.1 filled w/wh. dolo.
✓ 248.0	249.4	Dolo. as above but contains pinkish dolo. as eyes and mottling; pink dolo. appears weathered and is stained tan and brown.
✓ 249.4	250.0	Dolo., dense, med. gray, laminated at 30° to core; few very small sand grains.
✓ 250.0	251.9	Dolo., fine xaline, med. gray, dk. crinkly horizontal stylolites.
✓ 251.9	253.5	Dolo., dense becoming finly. xaline, med. gray, heavily stylolitic, pinkish wh. dolo. eyes 250.0-250.3.
✓ 253.5	254.0	Dolo., med. grn., med. gray, contact w/wh. dolo. section below at 45°.
✓ 254.0	254.5	Dolo., dense, med. gray, laminated, small vert. fract.
✓ 254.5	256.0	Dolo., dense, dk. gray, few vert. fract.; shly. 254.6-254.8; 0.01' band of med. xaline dolo. at 255.9.
✓ 256.0	256.4	Dolo., dense, dk. gray, laminated, vert. fract. filled w/wh. dolo.
✓ 256.4	258.1	Dolo., dense, lt.-med. gray, sheared and brecciated along ang. fract.; intensely brecciated 257.3-258.0.
✓ 258.1	258.3	Dolo., dense, med. gray, laminated.
✓ 258.3	258.9	Dolo., med. gray, very sandy, some fract. and laminations.
✓ 258.9	260.6	Dolo., dense, lt. gray, few laminations, vert. fract. upper part; large dolo. eye at 260.0.
✓ 260.6	262.8	Dolo., dense-finly. xaline, med. gray, mottled w/dk. dolo. 260.6-261.3; laminated, decreasing in intensity to 262.8.
✓ 262.8	263.9	Dolo., dense, dk. gray, sparsely laminated.
✓ 263.9	265.1	Dolo., dense, dk. gray, shly. 264.3, becoming med. xaline to 265.1; dolo.-filled vert. fract. 264.8-265.1.
✓ 265.1	265.5	Dolo., finly. xaline, med. gray, sand lenses at 265.1, 265.4.
✓ 265.5	266.3	Dolo., dense-finly. xaline, med. gray, laminated, small vert. fract.
✓ 266.3	268.4	Dolo., dense, dk. gray, sparsely laminated; mottled bluish quartzite (?); 0.05' at 268.2; 0.1' at 268.3.
✓ 268.4	269.0	Dolo., dense, med. gray, mottled w/lt. gray med. grn. dolo.

CHIEFS NO. 1 (cont.)

<u>From</u>	<u>To</u>	<u>Description</u>
✓ 269.0	271.1	Sandstone, med. gray, dolomitic but hard.
✓ 271.1	272.3	Dolo., dense, med. gray, sparsely laminated, band of med. gm. dolo., darker gray at 271.5 (0.05') and 271.6 (0.1').
✓ 272.3	273.2	Dolo., fnly. saline to dense, mottled lt. and med. gray, scattered sand grns.
✓ 273.2	274.2	Dolo., dense, med. gray, vert. fract. w/wh. dolo. filling.
✓ 274.2	274.8	Oolitic ch. and quartzitic ss., med. gray to glassy wh.; hard.
✓ 274.8	276.6	Dolo., dense, lt.-med. gray.
✓ 276.6	277.2	Dolo., fn. gm., med. gray, 0.02' bl. ch. at 277.0.
✓ 277.2	279.4	Dolo., med. gm., med. gray; vert. fract. lower part; stylolitic.
✓ 279.4	279.9	Dolo., fn. gm., med. gray, laminated, stylolitic.
✓ 279.9	280.3	Dolo., fine gm., med. gray, mottled dk. gray, stylolitic, vert. fract.
✓ 280.3	280.7	Dolo., fn. gm., med. gray, banded w/dk. gray med. gm. dolo.; vert. fract.
✓ 280.7	282.3	Dolo., fn.-med. gm., dk. gray, oolitic, vert. fract.
✓ 282.3	283.9	Dolo., fn. gm., dk. gray, stylolitic;
<u>MINERALIZATION:</u> some yellow and greenish ZnS along small vertical fracture.		
✓ 283.9	287.7	Dolo., fn. gm., lt. gray mottled med. gray, stylolitic; sparse wh. dolo. eyes; laminated lower 0.6'.
✓ 287.7	288.2	Dolo., lt.-med. gray, dense to fine gm., vert. fract.
✓ 288.2	288.6	Dolo., fn. gm., med.-dk. gray.
✓ 288.6	292.1	Dolo., fn. gm., med.-dk. gray, stylolitic, laminated; brecciated 290.0-290.6.
✓ 292.1	292.6	Dolo., fn. gm., lt. gray, stylolitic.
✓ 292.6	294.9	Dolo., fn. gm., dk. gray, some ang. fract., mottled w/wh. dolo.
✓ 294.9	295.5	Dolo., dense, lt. gray, becoming fn. gm. lower part with peculiar laminations.
✓ 295.5	296.1	Dolo., fn. gm., med. gray, upper part laminated, finer gm. 295.8-296.0; vert. stylolite.
✓ 296.1	301.0	Dolo., fn. gm., dk. gray, sparsely oolitic; mottled w/lt. gray dolo.; hair-like fracture 299.2-299.6; laminated 300.3-300.5.
✓ 301.0	303.0	Dolo., dense-fn. gm., lt. gray; sandy w/good sandy dolo. 302.4-303.0.

SESES NO. 1 (cont.)

<u>From</u>	<u>To</u>	<u>Description</u>
✓ 303.0	303.7	Dolo., fn. grn., med. gray, laminated, shly. part. at bottom.
✓ 303.7	307.5	Dolo., fn. grn., lt.-med. gray, stylolitic, vert. fract. 306.2.
✓ 307.5	313.3	Dolo., fn.-med. grn., dk. gray, sparsely stylolitic.
✓ 313.3	314.9	Dolo., oolitic, med. grn., red.-dk. gray.
✓ 314.9	316.9	Dolo., fn. grn., med.-dk. gray; breccia 315.3-315.9.
✓ 316.9	318.2	Dolo., fn. grn., dk. gray, laminated;
		<u>MINERALIZATION:</u> breccia from 317.7-318.2 with ZnS along angular fracture.
✓ 318.2	324.8	Dolo., fn. grn., dk. gray, oolitic, wh. dolo. eye at 318.6; stylolitic; strongly oolitic 321.1-324.0; small dolo. fragments 321.0-321.7.
✓ 324.8	326.6	Dolo., med. grn., gray, mottled w/wh. dolo.; stylolitic, brecciated; very sandy 324.8-325.1;
		<u>MINERALIZATION:</u> shire ZnS at 326.4.
✓ 326.6	327.0	Dolo., dense-fn. grn., lt.-med. gray.
✓ 327.0	327.8	Dolo., fn. grn., lt. gray, cgl.; stylolitic.
✓ 327.8	331.2	Dolo., dense, dk. gray.
✓ 331.2	332.7	Dolo., fn. grn., med. gray, cgl.; core badly broken.
✓ 332.7	337.3	Dolo., dense-fn. grn., med.-dk. gray, stylolitic; oolitic 337.1-337.3; sparse dolo. eyes 333.4-333.9.
✓ 337.3	337.5	Dolo., cherty.
✓ 337.5	342.1	Dolo., fn. grn., lt.-med. gray; sandy 338.0-341.2; ss. 339.0-339.5, and 340.3-340.7; cgl. pebbles 338.5-338.6; stylolitic; last 0.5' very sandy.

* * * * *

County: Bland
VDMR Well No: W-842

Well: Ceres # 1
Farm: W. A. Waddle
Driller: J. Bartlett (contractor - Southeastern Drilling Co.)
Location: Garden Mountain quadrangle

N - 10,065.94

E - 9,127.86

Elevation: 2579.27 feet

Angle and bearing: 60°, N 40° W

Total depth: 342.1

Started drilling: 6/4/56

Finished drilling: 6/19/56

Sample description log: E. K. Rader, Virginia Division
of Mineral Resources

References: Obtained from U. S. Steel Company;
Log by E. M. Luttrell and R. P. Crumpton

GEOLOGIC SUMMARY

Depth	Thickness	Formation (and remarks)
0.0-11.6	11.6	Overburden
11.6-342.1	330.5	Copper Ridge dolomite: with ten shows of sphalerite, several oolitic chert and thin sandstone layers in a light to dark gray dolomite.

Depth	Thickness	Description
0-11.6	11.6	Overburden
11.6-16.3	4.7	Dolomite, light to medium gray, fine-grained, sparse black laminae, breccia at 15.2', light gray, fine-grained, sub-rounded dolomite and chert fragments in a black silty matrix.
16.3-18.8	2.5	Dolomite, light gray, fine-grained, chert at 16.4' and 17.7', very slightly sandy, sparse blebs of white dolomite.
18.8-19.9	1.1	No core.
19.9-27.6	7.7	Dolomite, medium gray, fine-grained, sparse black wavy laminae, chert at 20.2', sparse blebs of white dolomite.
27.6-28.3	0.7	Dolomite, mottled, light to dark gray, medium-to coarse-grained, recrystalline ?, siliceous. MINERALIZATION: Pyrite and one crystal of sphalerite.
28.3-30.5	2.2	Dolomite, medium gray, fine-grained, siltstone at 28.5', chert at 29.3' and 30.4'.
30.5-34.0	3.5	Dolomite, light to medium gray, fine-grained, minor tan dolomite, sparse black laminae, sandy 32.5' to 32.8'.
34.0-35.6	1.6	Dolomite, medium to dark gray, fine-grained, sparse black laminae.
35.6-36.3	0.7	Dolomite, light gray, fine-grained.
36.3-38.1	1.8	Dolomite, medium gray, fine-grained, fractured.
38.1-39.0	0.9	Dolomite, medium gray, fine-to medium-grained, sandy, scattered pyrite.
39.0-42.6	3.6	Dolomite, light gray, fine-grained, sparse fractures.
42.6-44.1	1.5	Dolomite, medium gray, fine-grained.

Depth	Thickness	Description
44.1-47.0	2.9	Dolomite, light gray, fine-grained, sparse sandy laminae at 45.4', and 45.8'.
47.0-48.5	1.5	Sandstone, dolomitic, light gray.
48.5-49.1	0.6	Dolomite, medium-to dark gray, fine-grained.
49.1-50.6	0.7	Dolomite, sandy, light gray, fine-grained.
50.6-51.7	1.1	Dolomite, medium gray, fine-grained.
51.7-52.6	0.9	Dolomite, breccia or gouge.
52.6-55.0	2.4	Dolomite, medium gray, fine-to medium-grained, mottled.
55.0-56.8	1.8	Dolomite, light gray, medium to coarse-grained, recrystalline ?.
56.8-60.0	3.2	Dolomite, light gray, medium-to fine-grained, chert at 58.8' to 59.0', sandy.
60.0-60.5	0.5	Dolomite, light gray, medium-grained, oolitic chert at top, sandy at bottom.
60.5-61.6	1.3	Dolomite, light gray, medium-to coarse-grained, sparse oolites, sandy.
61.6-67.2	6.2	Dolomite, light gray at top becoming medium to dark gray at bottom, medium grained, sparse blebs of white dolomite.
67.2-70.6	3.4	Dolomite, dark gray, fine-to medium-grained, sparse blebs of white dolomite, abundant black Laminae.
70.6-71.1	0.5	Dolomite, light to medium gray, fine-grained.
71.1-72	0.9	Dolomite, light gray, fine-to medium-grained, conglomeratic and sandy at bottom. MINERALIZATION: Traces of yellow sphalerite.

72 -72.9	0.9	Dolomite, medium to dark gray, fine-to medium grained, stylolites at bottom.
72.9-74.4	1.5	Dolomite, light gray to tan, fine-grained, siltstone partings.
74.4-74.9	0.5	Sandstone, dolomitic, light gray, fine-grained.
74.9-76.7	1.7	Dolomite, light gray, fine-to medium-grained, conglomeratic, with medium-grained sandy dolomite; fractured, with white dolomite in fractures.
76.7-77.7	1.0	Dolomite, medium gray, fine to medium grained, sandy
77.7-80.9	3.2	Dolomite, light to medium gray, fine-grained, blebs of white dolomite. MINERALIZATION: sphalerite at 78.4', scattered pyrite.
80.9-86.3	5.8	Dolomite, dark gray-black, medium-to coarse grained, scattered bleb of white dolomite, oolitic at top, sandy. MINERALIZATION: sphalerite at 86.0.
86.3-90.2	3.9	Dolomite, dark gray-black, fine-grained, silty, with black siltstone laminae, scattered bleb of white dolomite.
90.2-93.2	3.0	Dolomite, dark gray, medium-to coarse grained, black siltstone laminae, conglomerate 92.3-92.5.
93.2-93.4	0.2	Dolomite, sandy, light gray, fine-grained.
93.4-95.2	1.8	Dolomite, light gray, fine-grained, large bleb of white dolomite, black laminae.
95.4-98.3	2.9	Dolomite, light gray, medium to coarse grained, porous, recrystalline, sandy at 97. - 97.2'. MINERALIZATION: sphalerite and pyrite scattered throughout.
98.3-101.3	3.0	Dolomite, light gray, fine-grained, black wavy stylolites, sandy.
101.3-102.5	1.2	Dolomite, light gray, fine-grained, sandy, sparse blebs of white dolomite, tan dolomite at bottom.

102.5-104.3	1.8	Dolomite, dark gray to black, fine-grained, silty, black, wavy laminae.
104.3-106.7	2.4	Dolomite, interbedded dark gray, fine-grained dolomite and dark to medium gray, medium grained, sandy dolomite. MINERALIZATION: traces of sphalerite in medium grained dolomite
106.7-108.5	1.8	Dolomite, medium to dark gray, fine-grained, black wavy laminae.
108.5-109.3	0.8	Sandstone, dolomitic, light gray, medium grained.
109.3-114.0	4.7	Dolomite, medium to dark gray, fine-grained, with interbedded medium gray dolomite and sandstone, black laminations.
114.0-114.3	0.4	Chert, oolitic and massive with minor sandy dolomite.
114.3-115.8 ⁶	1.5	Dolomite, light gray, fine-grained, stylolites, black laminae, fractured, white dolomite in fractures, fractures off-set laminae.
^{115.8} 116 -118.5	⁷ 2.5	Dolomite, medium to dark gray, fine-grained, black wavy laminae.
118.5-120.3	1.8	Dolomite, black, medium grained, lower 0.05' sandy.
120.3-121.2	0.9	Dolomite, dark gray to black, fine-grained, with some beds of medium-grained dolomite, fractured at top, fractures with white dolomite.
121.2-124.8	3.6	Dolomite, light gray to tan, fine-grained, black stylatites, some medium gray zones.
124.8-130.2	5.4	Dolomite, light to medium gray, fine-grained, with minor medium grained beds, sparse silty layers.
130.2-136.8	6.6	Dolomite, dark gray, fine-to medium-grained, silty, some large siltstone layers.

136.8-138.1	1.3	Dolomite, light to medium gray, fine-grained, slightly sandy, sparse black laminae.
138.1-138.9	0.8	Dolomite, sandy, light gray, medium-grained, silty in lower 0.4'.
138.9-141.5	2.6	Dolomite, light to medium gray or tan, fine-to medium-grained, black laminae, fractured, chert at 139'.
141.5-143.3	1.8	Dolomite, light gray, medium-grained, sparse blebs of white dolomite.
143.3-149.1	5.8	Dolomite, light gray, fine-to medium-grained, silty at top, sandy at 144.8' to 145.5', chert at 148.8' to 148.9'.
149.1-149.4	0.3	Dolomite, light to red gray, fine-grained, black, laminations.
149.4-150.6	1.2	Dolomite, medium to dark gray, fine-grained.
150.6-151.1	0.5	Dolomite, medium to dark gray, medium grained, oolitic chert at 150.9 to 151.1'.
151.1-154.4	3.3	Dolomite, medium gray, fine-to medium grained, chert, gray and oolitic at 151.5' to 151.6' and 154.3' to 154.5'
154.4-154.7	0.3	Dolomite, silty, black, fine-grained, fractured.
154.7-158.5	3.8	Dolomite, medium to dark gray, fine-grained, black laminations.
158.5-162.0	3.5	Dolomite, light gray, fine-grained, sandy, throughout sandstone, dolomitic at 158.5' to 158.8', silty partings.
162.0-162.3	0.3	Chert, oolitic, light gray, conglomeratic.
162.3-163.1	0.8	Sandstone, dolomitic, light gray, medium-grained.
163.1-164.0	0.8	Dolomitic, sandy, medium gray, fine-grained.

136.8-138.1	1.3	Dolomite, light to medium gray, fine-grained, slightly sandy, sparse black laminae.
138.1-138.9	0.8	Dolomite, sandy, light gray, medium-grained, silty in lower 0.4'.
138.9-141.5	2.6	Dolomite, light to medium gray or tan, fine-to medium-grained, black laminae, fractured, chert at 139'.
141.5-143.3	1.8	Dolomite, light gray, medium-grained, sparse blebs of white dolomite.
143.3-149.1	5.8	Dolomite, light gray, fine-to medium-grained, silty at top, sandy at 144.8' to 145.5', chert at 148.8' to 148.9'.
149.1-149.4	0.3	Dolomite, light to ^{medium} red gray, fine-grained, black, laminations.
149.4-150.6	1.2	Dolomite, medium to dark gray, fine-grained.
150.6-151.1	0.5	Dolomite, medium to dark gray, medium grained, oolitic chert at 150.9 to 151.1'.
151.1-154.4	3.3	Dolomite, medium gray, fine-to medium grained, chert, gray and oolitic at 151.5' to 151.6' and 154.3' to 154.5'
154.4-154.7	0.3	Dolomite, silty, black, fine-grained, fractured.
154.7-158.5	3.8	Dolomite, medium to dark gray, fine-grained, black laminations.
158.5-162.0	3.5	Dolomite, light gray, fine-grained, sandy, throughout sandstone, dolomitic at 158.5' to 158.8', silty partings.
162.0-162.3	0.3	Chert, oolitic, light gray, conglomeratic.
162.3-163.1	0.8	Sandstone, dolomitic, light gray, medium-grained.
163.1-164.0	0.8 ⁹	Dolomitic, sandy, medium gray, fine-grained.

164.0-164.6	0.6	Sandstone, dolomitic, light gray, fine to medium grained.
164.6-167.1	2.5	Dolomitic, light to medium gray, fine-grained, sand and chert at 165.0' 165.4', 166.8', 167.0', black laminations.
167.1-168.7	0.6	Dolomite, silty, sandy, black, fine-grained, 167.9', sandy.
168.7'-171.7	3.0	Dolomite, medium gray, fine-grained, black laminations, conglomeratic at 168.4', mottled at 169.3', Sandstone at 169.6' and 171.2', minor fracturing.
171.7-173.7	2.0	Dolomite, light gray, fine-grained, blebs of white dolomite, chert at 171.7'; lower 0.7' sandy.
173.7-174.4	0.7	Sandstone, dolomitic, light gray, fine-grained.
174.4-175.6	1.2	Dolomitic, light to medium gray, fine-to medium grained.
175.6-177.4	1.8	Dolomite, medium dark gray, fine-to medium grained, black laminations.
177.4-182.8	5.4	Dolomite, light to medium gray, fine-grained, blebs of white dolomite.
182.8-186.7	3.9	Dolomite, tan, fine-to medium-grained, mottled.
186.7-189.8	3.1	Dolomite, dark gray-black, fine-grained, black laminae in upper 1.5', fractured at 187.6'.
189.8-190.9	1.1	Dolomite, light gray, coarse-grained.
190.9-193.2	2.1	Dolomite, light gray to tan, fine-grained, mottled.
193.2-194.1	0.9	Dolomite, medium gray, fine-grained, black laminae.
194.1-196.4	2.3	Dolomite, medium gray, fine-to medium-grained, black laminae, at top, w/ quartz xl. at 195.6'.

164.0-164.6	0.6	Sandstone, dolomitic, light gray, fine to medium grained.
164.6-167.1	2.5	Dolomitic, light to medium gray, fine-grained, sand and chert at 165.0' 165.4', 166.8', 167.0', black laminations.
167.1-168.7	0.6 0.6	Dolomite, silty, sandy, black, fine-grained, 167.9', sandy.
168.7'-171.7	3.0	Dolomite, medium gray, fine-grained, black laminations, conglomeratic at 168.4', mottled at 169.3', Sandstone at 169.6' and 171.2', minor fracturing.
171.7-173.7	2.0	Dolomite, light gray, fine-grained, blebs of white dolomite, chert at 171.7'; lower 0.7' sandy.
173.7-174.4	0.7	Sandstone, dolomitic, light gray, fine-grained.
174.4-175.6	1.2	Dolomitic, light to medium gray, fine-to medium grained.
175.6-177.4	1.8	Dolomite, medium ¹⁶ dark gray, fine-to medium grained, black laminations.
177.4-182.8	5.4	Dolomite, light to medium gray, fine-grained, blebs of white dolomite.
182.8-186.7	3.9	Dolomite, tan, fine-to medium-grained, mottled.
186.7-189.8	3.1	Dolomite, dark gray-black, fine-grained, black laminae in upper 1.5', fractured at 187.6'.
189.8-190.9	1.1	Dolomite, light gray, coarse-grained.
190.9-193.2	2.1	Dolomite, light gray to tan, fine-grained, mottled.
193.2-194.1	0.9	Dolomite, medium gray, fine-grained, black laminae.
194.1-196.4	2.3	Dolomite, medium gray, fine-to medium-grained, black laminae, at top, w/ quartz xl. at 195.6'.

196.4-204.7	8.3	Dolomite, dark to medium gray, fine-to medium grained, dark laminae, interbedded, sparse blebs of white dolomite, black silty partings at bottom, sandy at 202.2'.
204.7-205.4	0.7	Dolomite, light gray and tan, mottled, fine-grained.
205.4-210.1	4.7	Dolomite, dark gray to black, fine-grained, black laminae, minor fracturing white blebs of dolomite.
210.1-212.2	2.1	Dolomite, dark gray, medium grained, sparse black laminae.
212.2-215.3	2.1	Dolomite, dark gray, fine-grained, black laminae, pyrite grain at 215.4', lower 1' fractured.
215.3-219.0	3.6	Dolomite, dark gray, fine-to medium grained, lower 1.5' fractured, lower 0.3' black siltstone.
219.0-224.4	5.4	Dolomite, medium gray, fine-grained, lower 2' silty.
224.4-225.5	1.1	Sandstone, dolomitic, light gray, fine-to medium grained.
225.5-226.4	0.9	Dolomite, light gray medium to coarse-grained, fractured.
226.4-227.2	1.2	Dolomite, medium gray, fine-grained, upper 0.3' fractured.
227.2-227.8	0.6	Dolomite, light gray, fine-to medium grained, mottled.
227.8-229.0	1.2	Dolomite, medium gray, fine to medium grained.
229.0-231.0	2.0	Dolomite, light gray, fine-grained, silty, in top 1 foot, sandy 229.6 to 230.9': MINERALIZATION: sphalerite at 229.7'
231.0-235.4	4.4	Dolomite, light to medium gray, fine-grained, mottled, sparse black laminae at bottom.

196.4-204.7	8.3	Dolomite, dark to medium gray, fine-to medium grained, dark laminae, interbedded, sparse blebs of white dolomite, black silty partings at bottom, sandy at 202.2'.
204.7-205.4	0.7	Dolomite, light gray and tan, mottled, fine-grained.
205.4-210.1	4.7	Dolomite, dark gray to black, fine-grained, black laminae, minor fracturing white blebs of dolomite.
210.1-212.2	2.1	Dolomite, dark gray, medium grained, sparse black laminae.
212.2-215.3	2.1	Dolomite, dark gray, fine-grained, black laminae, pyrite grain at 215.3', lower 1' fractured.
215.3-219.0	3.6	Dolomite, dark gray, fine-to medium grained, lower 1.5' fractured, lower 0.3' black siltstone.
219.0-224.4	5.4	Dolomite, medium gray, fine-grained, lower 2' silty.
224.4-225.5	1.1	Sandstone, dolomitic, light gray, fine-to medium grained.
225.5-226.4	0.9	Dolomite, light gray, medium to coarse-grained, fractured.
226.4-227.2	1.2	Dolomite, medium gray, fine-grained, upper 0.3' fractured.
227.2-227.8	0.6	Dolomite, light gray, fine-to medium grained, mottled.
227.8-229.0	1.2	Dolomite, medium gray, fine to medium grained.
229.0-231.0	2.0	Dolomite, light gray, fine-grained, silty, in top 1 foot, sandy 229.6 to 230.9': MINERALIZATION: sphalerite at 229.7'
231.0-235.4	4.4 4.4	Dolomite, light to medium gray, fine-grained, mottled, sparse black laminae at bottom.

235.4-241.9	6.5	Dolomite, medium dark gray, fine to medium grained banded.
242.3-243.5	1.2	Dolomite, medium gray, medium grained, siltstone, parting at bottom.
243.5-244.2	0.7	Dolomite, medium gray, fine to medium grained, with/ white dolomite crystal at 243.9, mottled
244.2-252.4	0.8	Dolomite, light gray, medium to coarse grained, recrystalline; scattered black laminae, blebs of white dolomite.
252.4-252.8	0.4	Dolomite, sandy, medium gray, fine-grained.
252.8-253.5	0.7	Dolomite, medium gray, fine-grained, black wavy conination at top.
253.5-256.0	2.5	Dolomite, dark gray to black, fine-grained, sandy at 255', black lamination at bottom, silty throughout.
256.0-257.4	1.4	Dolomite, medium to dark gray, medium grained, intensely fractured.
257.4-258.1	0.7	Dolomite, sandy, medium gray, fine-grained.
258.1-258.3	0.2	Dolomite, medium gray, fine-grained, fractured.
258.3-261.5	3.2	Dolomite, light gray, fine-grained, fractured, faint black laminae at bottom.
261.5-261.8	0.3	Dolomite, medium gray, fine-grained.
261.8-264.1	2.3	Dolomite, dark gray to black, fine-grained, silty.
264.1-266.3	2.2	Dolomite, light to medium gray, fine-to medium grained.
266.3-269.0	2.7	Dolomite, black, fine-grained, silty, lower 1.5 w/Sandstone beds to 0.1'.

235.4-241.9	6.5	Dolomite, medium dark gray, fine to medium grained banded.
242.3-243.5	^{1.9} 1.2	Dolomite, medium gray, medium grained, siltstone, parting at bottom.
243.5-244.2	0.7	Dolomite, medium gray, fine to medium grained, with/ white dolomite crystal at 243.9, mottled
244.2-252.4	^{8.2} 0.8	Dolomite, light gray, medium to coarse grained, recrystalline; scattered black laminae, blebs of white dolomite.
252.4-252.8	0.4	Dolomite, sandy, medium gray, fine-grained.
252.8-253.5	0.7	Dolomite, medium gray, fine-grained, black wavy lamination at top.
253.5-256.0	2.5	<i>LAMINATION</i> Dolomite, dark gray to black, fine-grained, sandy at 255', black lamination at bottom, silty throughout.
256.0-257.4	1.4	Dolomite, medium to dark gray, medium grained, intensely fractured.
257.4-258.1	0.7	Dolomite, sandy, medium gray, fine-grained.
258.1-258.3	0.2	Dolomite, medium gray, fine-grained, fractured.
258.3-261.5	3.2	Dolomite, light gray, fine-grained, fractured, faint black laminae at bottom.
261.5-261.8	0.3	Dolomite, medium gray, fine-grained.
261.8-264.1	2.3	Dolomite, dark gray to black, fine-grained, silty.
264.1-266.3	2.2	Dolomite, light to medium gray, fine-to medium grained.
266.3-269.0	2.7	Dolomite, black, fine-grained, silty, lower 1.5 w/Sandstone beds to 0.1'.

269.0-270.3	1.1	Dolomite, very sandy, medium gray, fine-grained
270.3-271.1	0.8	Sandstone, dolomitic, light gray, fine-grained.
271.1-274.2	3.1	Dolomite, light to medium gray, fine-grained, black laminae.
274.2-274.8	0.6	Sandstone, dolomitic, light gray, fine-grained, w/ oolitic chert zone.
274.8-276.6	1.0	Dolomite, light to medium gray, fine-grained, black laminae.
276.6-277.2	0.6	Dolomite, medium to dark gray, fine-grained, chert at 277'.
277.2-280.7	3.5	Dolomite, dark gray, fine-to medium-grained, sparse black silty partings, fractured, mottled.
280.7-282.3	1.6	Dolomite, black to dark gray, fine-to medium grained, intensely fractured, oolitic.
282.3-282.8	0.5	Dolomite, black, fine-grained, silty.
282.8-283.9	1.1	Dolomite, dark gray to black, fine-to medium grained, fractured. MINERALIZATION: traces of yellowish sphalerite.
283.9-287.7	3.8	Dolomite, light to medium gray, fine-to medium grained, mottled.
287.7-288.2	0.6	Dolomite, medium gray, fine-grained.
288.2-288.6	0.4	Dolomite, dark gray, fine-grained, silty.
288.6-292.1	3.5	Dolomite, medium to dark gray, fine-to medium grained, blebs of white dolomite, black laminae, fractured 290' to 290.6'.
292.1-292.6	0.5	Dolomite, light gray, fine-grained.
292.6-294.9	2.3	Dolomite, dark gray, fine-to medium-grained, fractured.
294.9-295.5	0.6	Dolomite, light gray, fine-grained, black, laminae.

269.0-270.3	1.1 ³	Dolomite, very sandy, medium gray, fine-grained
270.3-271.1	0.8	Sandstone, dolomitic, light gray, fine-grained.
271.1-274.2	3.1	Dolomite, light to medium gray, fine-grained, black laminae.
274.2-274.8	0.6	Sandstone, dolomitic, light gray, fine-grained, w/ oolitic chert zone.
274.8-276.6	1.0	Dolomite, light to medium gray, fine-grained, black laminae.
276.6-277.2	0.6	Dolomite, medium to dark gray, fine-grained, chert at 277'.
277.2-280.7	3.5	Dolomite, dark gray, fine-to medium-grained, sparse black silty partings, fractured, mottled.
280.7-282.3	1.6	Dolomite, black to dark gray, fine-to medium grained, intensely fractured, oolitic.
282.3-282.8	0.5	Dolomite, black, fine-grained, silty.
282.8-283.9	1.1	Dolomite, dark gray to black, fine-to medium grained, fractured. MINERALIZATION: traces of yellowish sphalerite.
283.9-287.7	3.8	Dolomite, light to medium gray, fine-to medium grained, mottled.
287.7-288.2	0.6	Dolomite, medium gray, fine-grained.
288.2-288.6	0.4	Dolomite, dark gray, fine-grained, silty.
288.6-292.1	3.5	Dolomite, medium to dark gray, fine-to medium grained, blebs of white dolomite, black laminae, fractured 290' to 290.6'.
292.1-292.6	0.5	Dolomite, light gray, fine-grained.
292.6-294.9	2.3	Dolomite, dark gray, fine-to medium-grained, fractured.
294.9-295.5	0.6	Dolomite, light gray, fine-grained, black, laminae.

295.5-301.0	5.5	Dolomite, dark gray, fine-to medium grained, black laminae.
301.0-307.5	6.5	Dolomite, light to medium gray, fine-to medium-grained, Sandstone at 30 ₂₄ to 303', chert at bottom.
307.5-313.3	5.8	Dolomite, dark gray, fine-to medium-grained.
313.3-314.9	1.6	Dolomite, medium gray, medium-grained, oolitic.
314.9-316.9	2.0	Dolomite, medium to dark gray, fine-grained.
316.9-318.2	1.3	Dolomite, dark gray, fine-grained, laminated. MINERALIZATION: sphalerite 317.7-318.2.
318.2-324.8	6.6	Dolomite, dark gray, fine-grained, oolitic, blebs of white dolomite.
324.8-326.6	1.8	Dolomite, medium gray, medium-grained, mottled, sandy, MINERALIZATION: sphalerite 326.4.
326.6-327.0	0.4	Dolomite, light to medium gray, fine-grained.
327.0-327.8	0.8	Dolomite, light gray, fine-grained.
327.8-331.2	3.4	Dolomite, dark gray, fine-grained.
331.2-332.7	1.5	Dolomite, medium gray, fine-grained, core badly broken.
332.7-337.5	4.8	Dolomite, medium to dark gray, fine-grained, core badly broken.

X-Ray Data

Depth	Dolomite	Quartz	Cal	K-feld	Mica	
11.7	1800	40	25	?		
14.5	1500	40	5	10	5	
16.1	2800	20	25	5		
16.2	60	220		50	30	shale
16.7	2300	45				
17.7	10	1700	40	10	?	sandstone
18.9	1800	10	?	20		
19.9	3700	40	5	5	?	
20.3	1800	50	5	5		
27.8	750	10	?			sphalerite-5
27.9	2600	210	10			
28.0	3500	10	10	?		
28.4	2100	5	5			
28.6	750	1400				sandstone or chert ?
30.3	1500	1500				sandstone ?
31.0	2700	35	5	5	?	
32.5	1200	60	5	10	?	
33.8	120	130		100	50	sh. and silst.
34.0	4000	40	10	5	?	
35.3	900	350	5	100	30	
35.6	1600	40		5		
37.7	2900	45	25	5	5	
38.2	1400	250	2	5	5	
40.4	2800	20				
43.7	1700	20		5		
46.0	1300	30		?		
47.2	450	750		30	5	sandstone
48.6	800	25		5	10	
50.0	2300	110		10		
52.4	1200	15				
54.0	2300	5				
55.2	3000	30		15	5	
55.8	2300	20		5	?	
58.5	1200	10		5		

58.8	20	2000				chert or sandstone
59.8	25	1100				"
60.0	1700	60		10		
60.5	3400	20	10	5	5	
61.8	4700	15	5			
67.5	1400	70		15	10	
70.5	1200	60		20	10	
71.4	1600	30		?		
72.5	1900	5	5			
73.0	1200	110		35		
73.9	360	60	?	30	40	
74.9	500	720		20		
76.0	1300	200	5	30		
77.0	2000	5				
78.7	1300	30		?		sphalerite - 120
82.0	5700	40	5			
86.2	3500	10				
87.4	1600	90	?	20	30	
89.5	4000	50		20	10	
90.5	5500	10				
93.3	2500	50		10		
93.5	1400	30		5	5	
94.8	3400	25	5	10		
96.0	5500	5				
99.3	2100	20		10	5	
100.2	1500	50		10	5	
100.4	2000	40	20	25	5	
103.0	2600	50		15	10	
104.0	425	120		50	40	shale
104.5	2700	20	10			
105.3	2700	30	5	5		
106.7	1600	160		40		
108.4	3000	70		10		
109.1	1100	625		5		

109.7	1600	80		40	10	
112.9	3000	120	5	30	5	
114.1	20	1000	70			chert
115.0	1500	60		5		
116.5	1000	80		35		
116.8	150	90		40	50	sh
118.6	6000	15	?			
120.0	1400	15		5		
120.5	1400	50		20	10	
121.5	2000	20		5		
126.0	1900	30		10		
129.9	100	240		100	40	
132.9	1600	50		30	5	
137.3	1300	30		20		
138.3	1400	190		20		
138.8	250	110		70	40	sh. dlmic
139.5	1200	40	25	30		
141.4	1600	30	?			
142.0	1100	40		20	10	
143.0	3000	60		40		
143.3	40	220		150	80	
143.8	1700	260		5	5	
145.0	700	140		20	5	
146.5	2000	25		5		
148.8 (a)	2400	10				
148.8 (b)	260	1300				
149.3	1600	40		10		
149.5	1100	40		5		
150.0	1400	25		?		
153.8	2400	70		5		
154.9	800	60		20	30	
156.0	1400	150		15		
161.0	1300	20		5		
162.2	150	900				

162.4	650	700				
163.5	1400	200			35	10
164.5	420	600				(ss)
165.5	1100	30			5	5
167.5	180	120			70	70
169.0	800	110	120		10	
171.6	900	50	5		15	
174.2	120	1800			60	
175.2	1500	90			15	
175.9	1000	70			20	
177.8	900	150			5	
184.0	1600	15			?	?
187.5	400	35			10	5
190.2	1100	40			15	10
190.6	6000	15	20			
191.2	1400	15			5	
192.9	1600	30			5	
193.6	1700	90			30	5
193.9	1600	20			10	
195.0	2400	40			15	
197.0	2600	5			?	
199.0	2100	15				
201.0	4000	60			?	
204.8	1400	20	5		5	
205.3	2400	30	5		5	
210.0	3600	20				
214.3	1400	50	5		5	5
215.5	1700	180	10		45	10
218.0	1600	550	?		60	?
219.0	100	300			110	80
219.5	1100	70	20		10	5
221.3	1100	70	5		5	
224.0	180	100			50	60
224.3	1200	450	5		10	
225.8	1300	25	5		25	

226.5	1500	210	5	50	10	
227.8	4200	150		80		
228.2	1100	50		15	10	
229.1	900	150		80	20	
230.0	4100	5		?		
234.0	3500	70	15	70	10	
238.5	2000	50		40	5	
242.3	1900	150	?	50	5	
243.1	2800	20		20	5	
243.7	2400	25	?	20	?	
244.7	6500	20	10	20		
252.5	1800	500	5	30		
253.2	1500	150	5	25	5	
254.0	2100	35		20	10	
255.8	2500	50		25		
257.6	2400	350		5	?	
258.0	7000	5	5			
260.5	2800	40	10	20		
261.0	1800	40		30	10	
263.8	2400	30		10	10	
265.0	4100	10	5	60		
267.0	600	150		80	30	
268.5	310	1400		5	5	(ss.)
269.6	1500	200	5	5		
270.4	750	2400		5		(ss.)
271.1	900	190		180	30	
274.5	1300	50		10	10	
275.3	1400	1800		40	5	(ss.)
275.5	350	1200		10	5	(ss.)
276.5	1300	45		5	5	
277.3	2600	80	5	30	5	
279.5	1600	30	5			
281.9	4700	30	5	5		
282.6	1300	110		70	20	

283.0	5000	5	?		
285.8	3000				
287.8	2400	40		10	
288.4	1800	60	5	40	10
289.0	4500	10			
292.0	5500	10		?	
292.6	6700	20			
295.0	2900	10	5		
296.1	1900	15	?	?	
296.6	1300	350		150	20
300.7	5100	15	10	5	
301.1	3200	60	35	20	
307.5	3000	25		5	
307.9	2400	25	5	5	
315.9	2100	35		10	
318.2	5000	40		?	
332.0	3700	30	5	5	
332.5	1900	80		15	
334.5	2500	35		5	
337.3	3500	15			
337.6	4000	25			
339.0	5700	30		40	
342.0	6500	10	?	5	

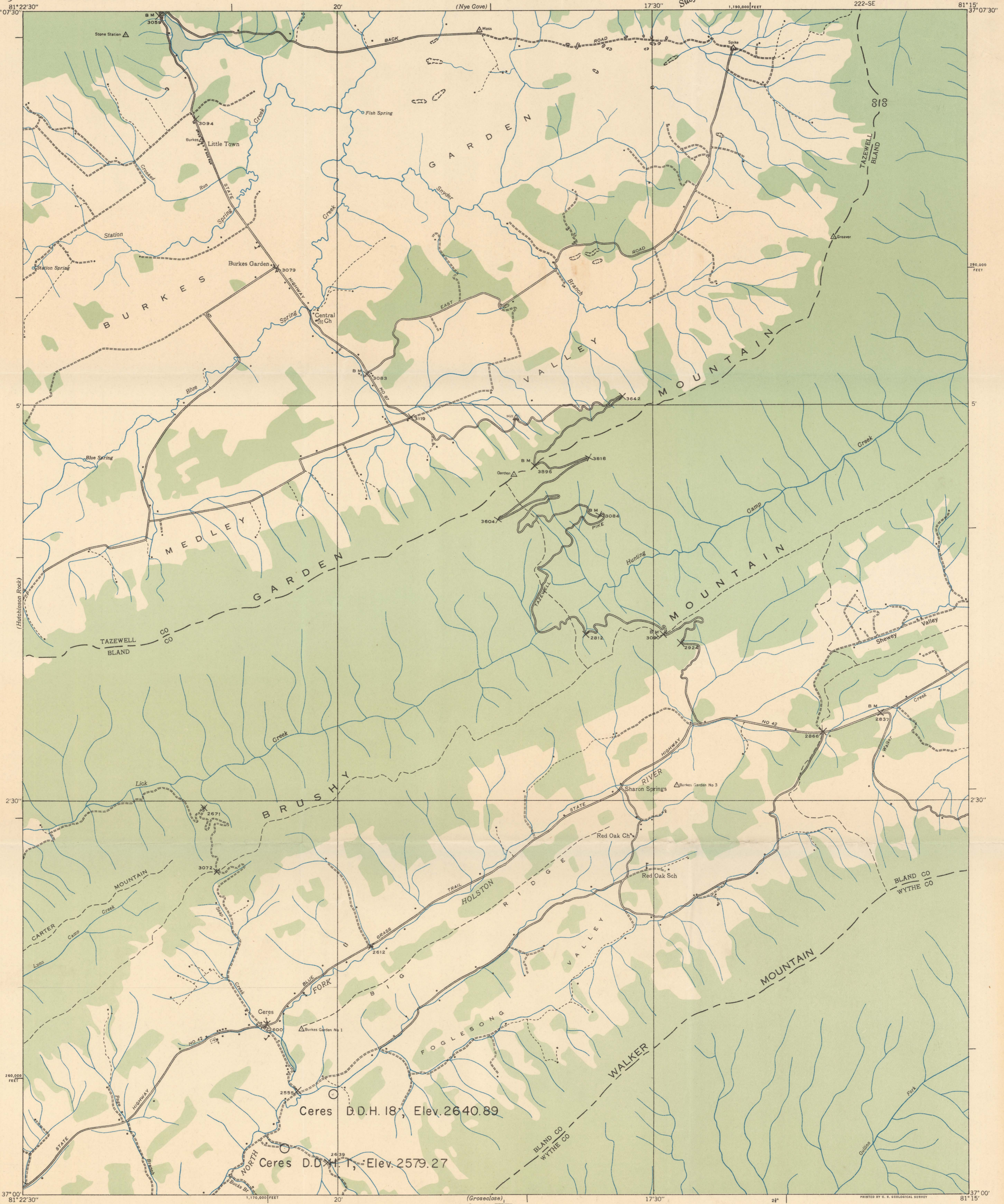
DIAMOND DRILL HOLE RECORD

CERES NO. 1

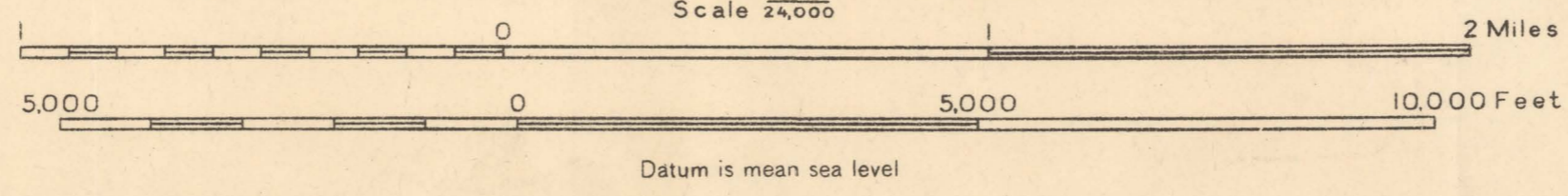
Location: N-10,065.94 E-9,127.86
Elevation: 2579.27
Angle & bearing: 60°, N 40° W
Core size: 11.6' to 13.5' BX Core, 13.5' to 342.1' AX Core.
Started drilling: 6-4-56 Finished drilling: 6-19-56
Drill contractor: Southeastern Drilling Co. Driller: J. Bartlett
Logged by: E. M. Luttrell and R. P. Crumpton
Total depth: 342.1 feet
Classification of Hole: Show

<u>Depth</u>	<u>Thickness</u>	<u>Formation</u>
0.0 - 11.6	11.6	(Overburden)
11.6 - 13.5	1.9	Beekmantown fm. (?)
13.5 - 342.1	328.6	Copper Ridge dol., with ten shows of ZnS mineralization, one congl. dol. layer, oolitic chert horizons, a few thin sandstone layers.

Advance sheet.
Subject to correction.



Albert Pike, Division Engineer
Compiled by U. S. Geological Survey from aerial photographs
Control by U. S. Geological Survey
Field examination in 1934 and 1935



PRINTED BY U. S. GEOLOGICAL SURVEY
Polyconic projection. 1927 North American datum
10,000 foot grid based on Virginia
rectangular coordinate system
Ridge line
Trail
Sinks
APPROXIMATE MEAN
DECLINATION, 1935
GARDEN MOUNTAIN, VA.
222-SE