

INTERVAL SHEET

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VDMR Well No.: Well No. 483

Date 6-20-61

Sample Interval: from 369.8' to 737

PROP: Bowers - Campbell - B 17

Total depth 737'

COMP: Tri-State P6-Zn

Oil        Gas        Water        Exploratory X

COUNTY: Rockingham

Cuttings        Core X Other       

VDMR Well No.: 483

From-To	From-To	From-To	From-To	From-To
*369.8 - 370.0				
370.6 - 370.9	423.4 - 423.6	447.7 - 447.9	473.3 - 473.6	508.9 - 509.1
370.9 - 371.2	423.6 - 423.9	448.0 - 448.3	475.3 - 475.6	510.5 - 510.6
371.7 - 372.1	423.9 - 424.1	448.6 - 448.9	476.1 - 476.3	510.6 - 510.7
372.5 - 372.8	424.1 - 424.4	449.7 - 449.9	476.7 - 477.0	511.6 - 511.7
373.0 - 373.3	427.5 - 427.7	450.1 - 450.4	477.7 - 478.0	512.8 - 513
				519.0 - 519.3
373.6 - 374.0	428.0 - 428.3	450.5 - 450.8	478.6 - 478.9	515.3 - 517.5
374.4 - 374.8	*428.7 - 429.1	451.5 - 451.8	481.8 - 482.0	535.0 - 535.2
375.2 - 375.5	430.3 - 430.6	452.3 - 452.5	482.5 - 482.7	538.5 - 538.8
376.3 - 376.6	431.7 - 432.0	454.2 - 454.4	484.9 - 485.2	541.7 - 542.0
*378.1 - 378.5	432.8 - 433.1	456.3 - 456.6	485.6 - 485.7	543.7 - 543.8
378.6 - 378.9				
379.7 - 379.9	434.3 - 434.6	456.6 - 456.9	486.3 - 486.5	*545 - 545.3
380.5 - 381.2	436.4 - 436.5	456.9 - 457.2	487.8 - 488.0	549.3 - 549.5
381.6 - 381.8	437.0 - 437.2	457.2 - 457.5	489.6 - 489.8	549.5 - 549.7
382.3 - 382.5	437.2 - 437.4	457.7 - 457.9	490.8 - 491.0	553.7 - 553.9
383.2 - 383.4	438.5 - 438.8	*457.9 - 458.1	493.0 - 493.3	556.7 - 557
383.4 - 383.6	439.8 - 440.1	458.1 - 458.5	494.3 - 494.5	558.4 - 558.7
398.0 - 398.3	441.1 - 441.3	458.6 - 458.9	*494.8 - 495.2	558.9 - 559.2
400.5 - 400.7	441.6 - 441.7	460.1 - 460.3	496.6 - 496.8	559.2 - 559.4
404.0 - 404.2	442.2 - 442.5	461.0 - 461.3	497.3 - 497.5	559.6 - 559.8
404.4 - 404.5	442.9 - 443.1	463.4 - 463.6	498.2 - 498.7	560.3 - 560.5
412.0 - 413.0	443.3 - 443.4	464.8 - 465.0	499.0 - 499.2	561.3 - 561.5
414.0 - 415.0	443.4 - 443.5	465.0 - 465.3	499.2 - 499.5	562.2 - 562.4
416.5 - 416.8	443.5 - 443.7	466.8 - 467.1	500.2 - 500.5	568.0 - 568.2
417.0 - 417.1	443.7 - 443.8	468.6 - 468.9	503.1 - 503.4	*571 - 571.1
417.9 - 418.2	443.8 - 444.0	*469.4 - 469.7	505.5 - 505.8	572.0 - 572.2
				573.1 - 573.2
				*573.2 - 573.4
419.0 - 419.3	444.0 - 444.1	469.7 - 470.0	506.1 - 506.2	573.2 - 573.4
419.4 - 419.6	444.1 - 444.2	470.0 - 470.3	506.2 - 506.4	575.9 - 576.2
420.5 - 420.7	444.2 - 444.4	*470.3 - 470.5	508.0 - 508.1	576.3 - 576.6
422.6 - 422.8	444.5 - 445.0	470.7 - 471.0	508.2 - 508.4	577.5 - 577.7
423.0 - 423.1	446.1 - 446.3	472.9 - 473.1	508.6 - 508.7	578.0 - 578.3

\* R nos.

INTERVAL SHEET

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VDMR Well No.: 483

Date 7/19/62

Sample Interval: from 369.8' to 737

PROP: Bowers - Campbell, B-17

Total depth 737'

COMP: Tri-State Zinc, Inc.

Oil        Gas        Water        Exploratory X

COUNTY: Rockingham

Cuttings        Core X Other       

From-To	From-To	From-To	From-To	From-To
-	579.7 - 580	641.2 - 641.4	697.2 - 697.3	-
-	581.0 - 581.5	643.0 - 643.3	698.2 - 698.4	-
-	589 - 591	643.3 - 643.6	699.3 - 699.5	-
-	592.1 - 592.3	643.6 - 643.9	700.5 - 700.7	-
-	594.0 - 594.2	644.6 - 644.8	-	-
-	595.3 - 596.3	651.8 - 652.1	702 - 702.1	-
-	596.3 - 597.8	-	703.2 - 703.5	-
-	599.0 - 599.3	653.5 - 653.8	704.8 - 705	-
-	600.8 - 601.0	654.2 - 654.5	705.5 - 705.8	-
-	602.2 - 602.4	-	-	-
-	603.4 - 603.5	658.1 - 658.4	706.9 - 707.1	-
-	605.5 - 605.7	660.9 - 661.2	708.3 - 708.5	-
-	606.1 - 606.3	661.9 - 662.1	711.8 - 712.0	-
-	607.6 - 607.9	662.7 - 663.0	712.1 - 712.2	-
-	609.0 - 609.2	663.0 - 663.3	-	-
-	610 - 610.3	663.4 - 663.7	712.7 - 712.8	-
-	610.9 - 611.1	664.1 - 664.3	713.2 - 713.5	-
-	611.1 - 611.4	667.1 - 667.2	-	-
-	615.5 - 615.7	668.0 - 668.3	715.8 - 716	-
-	616.7 - 617.0	669.3 - 669.5	716 - 716.2	-
-	619.4 - 619.6	-	-	-
-	621 - 621.2	671.8 - 672.0	716.2 - 716.4	-
-	621.6 - 621.9	673.3 - 673.5	717.2 - 717.4	-
-	622.4 - 622.6	674.2 - 674.5	720.0 - 720.2	-
-	622.7 - 622.9	675.5 - 675.8	721.5 - 721.8	-
-	-	676.5 - 676.8	-	-
-	-	-	723 - X-ray sample	-
-	624.6 - 624.8	685.5 - 685.7	727.5 - 727.7	-
-	629.4 - 629.6	687.8 - 689.0	-	-
-	630.8 - 630.9	692.6 - 692.8	729.5 - 729.8	-
-	632.6 - 632.8	693.1 - 693.3	730 - 730.3	-
-	635.0 - 637.0	-	731 - 731.2	-
-	-	-	732.5 - 732.8	-

County: ROCKINGHAM  
VDMR Well # W483

Well: B-17  
Farm: Bowers-Campbell  
Driller:  
Location: Broadway Quadrangle  
W. 13,200 ft of 78° 45'; 52,400 ft of 38° 40'  
3.55 miles N 62° E of Cootes Store  
1.9 miles N 39° W of center of Timberville.

Elevation: 1180' (approximate)

Total depth: 737'

Started drilling:

Finished drilling:

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

References: obtained from Tri-State Zinc, Inc.

Herbert, Paul and Young, R. S., 1956, Sulfide Mineralization in  
in the Shenandoah Valley of Virginia: Virginia Division of  
Geol. Bull. 70, p. 26-32.

#### GEOLOGIC SUMMARY

Depth	Thickness	Formation (and remarks)
0.0-370.0	370	Samples not received
370-737	367	Beekmantown fm. with 15 shows of mineralization; oolitic chert horizons; core is composed mainly of breccia cemented with dolomite.

## CORE B-17

DEPTH	THICKNESS	DESCRIPTION
370-370.2	0.2	Chert, oolitic; medium to light gray matrix with dark gray to black oolitics; crosssections of high spiral gastropods.
270.2-376.2	6.0	Dolomite, light-to medium-gray, finely crystalline; Vugs to 0.05' with white dolomite and minute quartz crystals; gray chert fragments; some dark gray coarsely crystalline dolomite; minute veins of white dolomite; minor breccia zones approximately 0.05'; carbonaceous banding (?): iron stains.
376.2-378.4	2.2	Breccia, medium to dark gray matrix of coarsely crystalline dolomite with minor white vein dolomite; fragments-fine-grained dolomite and dense chert; random orientation.
378.4-379.6	1.2	Breccia, silicified; light gray; fragments-chert and dolomite; fragments from 0.005' to 0.1'; iron stains; minor white vein dolomite, in tightly sealed fractures.
379.6-380.9	1.3	Dolomite, siliceous; light to medium gray; finely crystalline.
380.9-381.5	0.6	Chert, oolitic; medium gray matrix with black oolites; size of oolites to 0.0001'.
381.5-384.2	2.7	Dolomite, siliceous; medium to dark gray, finely crystalline; laminations.
384.2-397	12.8	<u>MISSING.</u>
397-406.5	9.5	Dolomite, siliceous; dark gray; dense; some iron stains; minor white vein dolomite; (4.2' of core recovered).
406.5-410	3.5	Dolomite, siliceous; light gray; cherty in places (0.01'); (1.5' of core recovered).
410-416.5	6.5	Dolomite, siliceous; dark to medium gray; fine to medium grained; some iron stains; white vein dolomite in fractures; (4.3' of core recovered).

416.5-429.3	12.8	<p>Breccia, angular fragments of fine-grained medium to dark gray, siliceous dolomite; white vein dolomite; stylitic contacts of pyrite between fragments and vein dolomite; fragments in random orientation; some minor zones of finely crystalline, siliceous dolomite which is intensely fractured and sealed with white vein dolomite, to 0.6' thick.</p> <p><u>MINERALIZATION:</u> Pyrite as vein fillings with minor "honey-yellow" sphalerite.</p>
429.3-435.2	5.9	Dolomite, siliceous; medium to dark gray; medium to coarsely crystalline; intensely fractured and sealed with white vein dolomite.
435.2-437.5	2.3	Dolomite, siliceous; dark gray; finely crystalline; fractured and sealed with white vein dolomite.
437.5-441.9	4.4	Dolomite, siliceous; dark gray to black; fine-grained to dense; some minor fractures which are sealed with white vein dolomite; some carbonaceous (?) bands.
441.9-443.8	1.9	Dolomite, siliceous; light to medium gray; finely crystalline; minor fractures sealed with white vein dolomite; <u>oolitic</u>
443.8-444.6	0.8	Chert, oolitic; medium gray matrix with black oolites to 0.0001'.
444.6-448	3.4	Dolomite, siliceous; medium to dark gray; coarsely crystalline; minor white vein dolomite. <u>MINERALIZATION:</u> disseminated pyrite.
448-450.7	2.7	Breccia, fragments-light gray, dense, siliceous dolomite and dark gray, coarsely crystalline dolomite; stylites; fragments mostly crystalline. <u>MINERALIZATION:</u> disseminated pyrite.
450.7-451.5	0.8	Dolomite, siliceous; light to medium gray; dense; minor white vein dolomite.

- 451.5-456.7 5.2 Dolomite, siliceous; dark gray, mottled; medium to coarsely crystalline; minor white vein dolomite.
- 456.7-457.8 1.1 Dolomite, siliceous; dark gray to black; finely crystalline to dense; one large white dolomite vein; several smaller (0.01') veins.  
MINERALIZATION: Pyrite veins
- 457.8-459.2 1.4 Dolomite, siliceous; dark gray; coarsely crystalline.  
MINERALIZATION: Pyrite to 40%; some sphalerite.
- 459.2-464.3 5.1 Dolomite, siliceous; medium gray; dense to finely crystalline; white vein dolomite as fracture fillings.
- 464.3-468.8 4.5 Breccia, fragments-fine to coarsely crystalline, light to dark gray dolomite with vein of white dolomite.  
MINERALIZATION: Pyrite crystals-cubes and pyritobedrons.
- 468.8-471.3 2.5 Dolomite, siliceous; coarsely crystalline; dark gray; minor white vein dolomite; vugs of quartz crystals.  
MINERALIZATION: Pyrite, to 90% in places, overall 35%.
- 471.3-472.3 1.0 Dolomite, siliceous; light to medium gray; finely crystalline to dense.
- 472.3-476.9 4.6 Dolomite, siliceous; dark gray; coarsely crystalline with some white vein dolomite.
- 476.9-487.8 10.9 Breccia, fragments- fine to coarsely crystalline, medium to dark gray dolomite with white vein dolomite.  
MINERALIZATION: Pyrite and sphalerite.
- 487.8-491.3 3.5 Dolomite, siliceous; dark to medium gray; dense; minor white vein dolomite on fracture fillings. (core somewhat crushed)
- 491.3 -496.6 5.3 Breccia, fragments-fine to coarsely crystalline, medium to dark gray, siliceous dolomite; cement-white vein dolomite.  
MINERALIZATION: Pyrite, crystals to 0.04'.

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496.6-497.7	1.1	Chert, black; dense; some minor veins of white dolomite.
497.7-507.3	9.6	Breccia, fragments-fine to coarsely crystalline, medium to dark gray, siliceous dolomite; cement-white vein dolomite. (Core recovery poor).
507.3-511	3.7	Dolomite with interbedded chert. Dolomite coarsely crystalline, dark gray to black, siliceous. Chert, dense, gray to black.
511-513	2.0	Breccia, fragments-fine to coarsely crystalline, medium gray, siliceous dolomite. (Core recovery poor.)
513-515.3	2.3	Dolomite, siliceous, medium gray, dense to finely crystalline; some vein dolomite. (Core recovery poor.)
515.3-558.7	43.4	Breccia, fragments-fine to coarsely crystalline, light to dark gray dolomite; and gray, dense chert; abundant white vein dolomite; pink vein dolomite (?) at 516'-517'; random orientation of fragments.
		<u>MINERALIZATION</u> : Pyrite occur throughout, disseminated. "Black jack" sphalerite at 545' from 557 to 558.7 pyrite is the major constituent of the breccia.
558.7-561.5	2.8	Chert, oolitic; medium gray matrix; black oolites to 1 mm; minor vein dolomite and fragments of non-oolitic chert. Fossil crosssections in oolitic chert.
561.5-567.5	6.0	Dolomite, siliceous; dark to medium gray; dense to finely crystalline; minor white vein dolomite.
567.5-588	20.5	Breccia, fragments-dense, gray chert; finely crystalline, gray dolomite; white vein dolomite cement. Finely brecciated zone at 578'.

MINERALIZATION: Dessiminated pyrite throughout, "Black jack" sphalerite at 568'.

See attached sheet.

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Depth-573.5': Pyrite and sphalerite associated together in a vein of coarsely crystalline white dolomite that has been slightly displaced and the displacement is marked by a stylolite.  
*Microscopically,* The sphalerite appears to be inclosed by pyrite that occurs in the vein.

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588-593.8	5.8	Dolomite, siliceous; medium gray; dense to finely crystalline; some chert and coarsely crystalline dolomite zones; minor vein dolomite.
593.8-595.3	1.5	Breccia, fragments-finely crystalline light gray dolomite with a dark gray, coarsely crystalline dolomite matrix, plus some vein dolomite  <u>MINERALIZATION:</u> Dessiminated pyrite.
595.3-596.3	1.0	Dolomite, siliceous, light gray, dense.
596.3-597.8	1.5	Chert, gray, dense, porous.
597.8-600.5	2.7	Breccia, fragments-dense to coarsely crystalline, light to dark gray, siliceous dolomite; random orientation.
600.5-601.5	1.0	Dolomite, siliceous; light gray; finely crystalline to dense; minor white vein dolomite.
601.5-602.5	1.0	Breccia, fragments-dense to coarsely crystalline, light to dark gray, siliceous dolomite; also oolitic chert; random orientation.
602.5-605.5	3.0	Dolomite, siliceous, light gray, dense; minor white vein dolomite.
605.5-605.9	0.4	Breccia, fragments-coarsely crystalline, dark gray dolomite with white vein dolomite.  <u>MINERALIZATION:</u> Pyrite to about 60%.
605.9-606.6	0.7	Dolomite, siliceous, medium gray, dense to finely crystalline with minor white vein dolomite.
606.6-622.9	16.3	Breccia, siliceous, with chert, dense dolomite and coarsely crystalline dolomite. Finely brecciated at 614 and 612.  <u>MINERALIZATION:</u> Pyrite abundant at 607', 609' and 623.

622.9-629	6.1	Dolomite, siliceous, black, dense, highly fractured; with white vein dolomite.
629-630.8	1.8	Dolomite, siliceous, coarsely crystalline dark gray.  <u>MINERALIZATION:</u> Pyrite varies from 30-50%.
630.8-631.8	1.0	Dolomite, siliceous, black, dense.
631.8-643.8	12.0	Breccia, fragments-fine to coarsely crystalline, light to dark gray, siliceous dolomite with white vein dolomite; mottled at 640'.
643.8-651	8.2	Dolomite, siliceous, medium gray, finely crystalline; highly fractured;
651-655	4.0	Dolomite, siliceous, mottled, coarsely crystalline
655-659.5	4.5	Dolomite, siliceous, medium gray, finely crystalline, highly fractured.
659.5-661	1.5	Dolomite, siliceous, light to medium gray, dense.
661-663.6	2.6	Breccia, fragments-dense to finely crystalline, siliceous, medium gray dolomite; lower portion darker and more coarsely crystalline.
663.6-665.6	2.0	Dolomite, siliceous, medium to dark gray, dense to finely crystalline.
665.6-667.1	1.5	Dolomite, siliceous, light gray, dense.
667.1-674.1	7.0	Dolomite, siliceous, dark gray, mottled, fine to coarsely crystalline.
674.1-675.6	1.5	Dolomite, siliceous, dark to medium gray, highly fractured.
675.6-680.7	5.1	Dolomite, siliceous, mottled, fine to coarsely crystalline (core recovery poor 679-680.7).
680.7-697	16.3	Breccia, fragments-light to medium gray, finely crystalline; highly fractured at 688. <u>Oolitic chert at 692.6-693.5.</u> (core recovery poor).

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697-737	40	Breccia, with a wide range of fragments size (less than 1/16" to greater than 1'), and a range in composition and texture of the fragments; cement white vein dolomite.
697-698	1.0	Dolomite, siliceous, medium gray, finely crystalline.
698-699.6	1.6	Dolomite, siliceous, mottled, fine to coarsely crystalline.
699.6-701		Dolomite, siliceous, light gray, dense, finely brecciated at 700.5'.
701-702.7	1.7	Dolomite, siliceous, dark gray, finely crystalline.
702.7-704.8	2.1	Dolomite, siliceous, dark gray, finely crystalline, highly fractured.
704.8-705.1	0.3	Dolomite, siliceous, mottled, fine to coarsely crystalline.
705.1-707.1	2.0	Dolomite, siliceous, dark gray, finely crystalline, highly fractured.
707.1-711.7	4.6	Dolomite, siliceous, light gray, dense, finely brecciated at 708'.
711.7-712	0.3	Chert, oolitic, light gray matrix, black oolites.
712-712.2	0.2	Dolomite, siliceous, mottled, fine to coarsely crystalline.
712.2-712.7	0.5	Dolomite, siliceous, light gray, dense, finely brecciated.
712.7-712.8	0.1	Dolomite, siliceous, mottled, fine to coarsely crystalline.
712.8-714.6	1.8	Dolomite, siliceous, medium gray, finely crystalline; stylolites.
714.6-715	0.4	Dolomite, siliceous, mottled fine to coarsely crystalline.
715-716	1.0	Dolomite, siliceous, medium gray, dense.

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716-716.6	0.6	Dolomite, siliceous, mottled, fine to coarsely crystalline.
716.6-720	3.4	Dolomite, siliceous, medium gray, finely crystalline.
720-721.1	1.1	Dolomite, siliceous, mottled, fine to coarsely crystalline.
721.1-721.5	0.4	Dolomite, siliceous, medium gray, finely crystalline.
721.5-729.1	7.6	Dolomite, siliceous, mixed mottled and medium gray fragments.
729.1-730	0.9	Dolomite, siliceous, medium to dark gray; stylolites.
730-730.5	0.5	Dolomite, siliceous, light gray, dense; highly fractured.
730.5-730.8	0.3	Dolomite, siliceous, mottled and white vein dolomite.
730.8-737	6.2	Dolomite, siliceous, dark gray, finely crystalline with white vein dolomite.