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FINAL REPORT

February, 1957

NEW CANTON, VIRGINIA, PROJECT

Roland F. Beers, Inc.

DMEA - 4393

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FINAL REPORT

New Canton, Virginia

Roland F. Beers, Inc.

DMEA #4393

- Introduction -

On December 27, 1956, a drilling program of 2,446 feet was completed on the New Canton, Virginia, prospect under the conditions of DMEA Contract #4393. In addition to the cooperative drilling, Roland F. Beers, Inc., drilled a total of 127 feet on the prospect. Final action on a request for termination of the contract is pending.

This report will review the geologic setting of the prospect area and the geophysical work preceding drilling, and will present a comprehensive report on the drilling results.

- Location -

New Canton lies in Buckingham County, Virginia, on the south side of the James River, one-half mile east of U.S. Route #15. The area of drilling is approximately one-half mile south of the New Canton Post Office.

Six leases held by Roland F. Beers, Inc., cover the central and northern parts of the New Canton mineralized

zone. Lease distribution is depicted on an accompanying map (Pl. 1). The following is a list of participating landowners:

Lease #5V-61:	Buckingham Mineral Syndicate, Inc.	363 acres
#5V-62:	Plummer F. and Lottie P. Jones	114.5 acres
#5V-63:	Levitt E. and Elnora Perkins	81 acres
#5V-64:	N. D. and P. B. Patteson	40 acres
#5V-65:	Cary C. and Jean W. Shipp et al	65 acres
#5V-66:	Terrell Fuqua	100 acres

- Geologic Setting -

The New Canton area is in the Piedmont Province of Virginia, and lies near the geographic center of the state. Local topography is gently rolling, with the exception of steep bluffs bordering the James River and Phelps Creek. Maximum relief in the immediate area is approximately one hundred feet.

The country rocks in the New Canton area consist of Pre-Cambrian granite-granodiorite and crystalline metasediments, Ordovician (?) slate, and Triassic diabase dikes. The mineralized zone occurs in the metasediments, near the contact of this series and the "Columbia granite". The major granitic body is separated from the true metasediments by a zone of hornblendic alteration. Within the

grid area the rocks are chlorite schist, chlorite-garnet-magnetite schist, chlorite-biotite-garnet schist, quartz-sericite schist, and diabase. The chlorite schist series has been altered from place to place by silicification.

- Geophysical Data -

Previous to application to the U.S. Government for cooperation on the New Canton prospect, the area covered by the leases cited above was surveyed by geochemical and geophysical techniques. The geophysical survey consisted of airborne and ground electromagnetics, self-potential, and magnetometer. Geochemical soil sampling covered the entire grid area. These surveys delineated several geophysical highs, most impressive of which was the "M" or "Margaret" anomaly (Pl. 2). The "J" or "Johnson" anomaly, immediately southwest along the trend, was also well defined. Because of surface geology and supporting geophysical data, most of the drilling allowed under Contract #4393 was expended on Anomaly "M".

Geophysical data were corroborated in all respects. The self-potential high and electromagnetic axis are associated with massive and disseminated complex sulfide mineralization. The magnetic high, lying slightly eastward of the EM axis, is attributed to the presence of

significant amounts of disseminated magnetite in a chlorite-garnet schist host. This magnetite seems to be related to a stage of disseminated pyrite mineralization.

Drilling results show that this combination of geophysical techniques, in addition to geochemistry, will prove to be effective and dependable in Piedmont exploration.

- Drilling Data -

Eight diamond drill holes were completed on the north grid of the New Canton, Virginia, prospect. Seven of these holes were cooperative. The locations of all drill holes are shown on Plate 2.

The following table summarizes the physical aspects of each drill hole:

Drill Hole #1:

Location: L 18 N at 1.35 E
Total depth: 350'
Inclination: 45°
Core size: Overburden: 0-18'
Bx: 18-52'
Ax: 52-350'
Cooperative drilling: 350'
Corporation drilling: 0
No. of assays: 0
Stage: I

Drill Hole #1A:

Location: L 18 N at 1.45 E
Total depth: 379'
Inclination: 45°
Core size: 0-280' (rock bit); Ax: 280-379'
Cooperative drilling: 0
Corporation drilling: 350-379'
*Longyear drilling: 0-280' (no core); 280-350'
No. of assays: 4
Stage: I

* DH-1A is a redrill of DH-1. Because of excessive core loss in DH-1, the cost of drilling DH-1A to 350' was borne by the E. J. Longyear Co.

Drill Hole #2:

Location: L 15 N at 1.55 E
Total depth: 382'
Inclination: 45°
Core size: Overburden: 0-8'; Bx: 8-20';
Ax: 20-382'
Cooperative drilling: 350'
Corporation drilling: 32'
No. of assays: 4
Stage: I

Drill Hole #3:

Location: L 10 N at 1.5 E
Total depth: 371'
Inclination: 45°
Core size: Overburden: 0-34'; Bx: 34-50';
Ax: 50-371'
Cooperative drilling: 350'
Corporation drilling: 21'
No. of assays: 1
Stage: I

Drill Hole #4:

Location: L 12.5 N at .5 E
Total depth: 208'
Inclination: 45°
Core size: Overburden: 0-20'; Bx: 20-28';
Ax: 28-208'
Cooperative drilling: 208'
Corporation drilling: 0

Drill Hole #5:

Location: L 16 N at 1.7 E
Total depth: 575'
Inclination: 60°
Core size: Overburden: 0-4'; Bx: 4-10';
Ax: 10-575'
Cooperative drilling: ~~0~~ 575'
Corporation drilling: 5
No. of assays: 5
Stage: II

Drill Hole #6:

Location: L 7 N at 1 E
Total depth: 203'
Inclination: 45°
Core size: Overburden: 0-48'; Bx: 48-52';
Ax: 52-203'
Cooperative drilling: 203'
Corporation drilling: 0
No. of assays: 7
Stage: II

Drill Hole #7:

Location: L 7 N at .25 W
Total depth: 45'
Inclination: 90°
Core size: Overburden: 0-5'; Bx: 5-16';
Ax: 16-45'
Cooperative drilling: 0
Corporation drilling: 45'
No. of assays: 1
Stage: (Not applicable)

Drill Hole #8:

Location: L 12.5 N at 1.25 E
Total depth: 410'
Inclination: 60°
Core size: Overburden: 0-25'; Bx: 25-27';
Ax: 27-410'
Cooperative drilling: 410'
Corporation drilling: 0
No. of assays: 2
Stage: II

- Mineralization -

The exploratory drilling completed under DMEA Contract #4393 revealed the presence of a copper-zinc sulfide zone 1100 feet long. This zone is known to extend to a vertical depth of 480 feet (DH-5). Application of data drawn from previous drilling (DMEA #3508; Virginia Mining Corporation) extends the length of the copper zone to a minimum of 1800 feet. The copper-bearing zone is present in true widths of up to 20 feet, and follows the schistosity (and bedding?) of the metasediments both in strike and dip.

The principal ore minerals are chalcopyrite and sphalerite; galena occurs from place to place in small amounts. Gold and silver in very minor amounts were reported in nearly all assays. All of the ore minerals are present in both massive and disseminated forms, and occur in a pyrite-pyrrhotite base.

Although the copper zone was encountered in all of the angle holes, significant massive intersections are found in only three holes; DH-2,-4, -6. The vertical and horizontal relations of these intersections are shown on accompanying maps (Pls. 3 and 4). In all cases known, the east-wall chlorite-hornblende schist sequence was host to the sulfides; the west-wall chlorite-biotite-garnet schist is basically barren. Evidence of shearing in or near the copper-bearing

area is rare and inconclusive. Thus, it appears that the fundamental control of the mineralization was stratigraphic. This basic concept does not, however, completely account for the apparent localization of the massive sulfides. Three major possibilities are apparent on the basis of available drill data, anyone of which may account for the apparent localization of the high-grade ore. First, the massive zones are individual pods, distributed at random throughout the anomaly area. Second, the massive zone is present throughout the lateral extent of the anomaly area, but appears as an irregular, anastomosing pattern in longitudinal section. If this is the situation, penetration of the zone by drilling will be purely fortuitious. Third, that although the basic control was stratigraphic, the areas of massive sulfide accumulation are related to and controlled entirely by minor structures along the trend. There is some corroborative evidence for this third possibility. From Plate 2, it can be seen that DH-6 penetrated the sulfide zone on a relatively sharp flexure in the EM axis. The massive mineralization was probably controlled by this minor flexure. The high-grade ore in DH-4 occurs in an area where the schistosity dips 82° E., a slight though possibly significant 8° departure from the general 90° dip (Pl. 4). This dip change may be related to local folding. No local structure has been defined in the area of DH-2; however, very little data are

massive sulfide areas, if controlled by local structures, may be related to a larger structure. Such a structure might be a large drag-fold with a relatively flat plunge (10-15°) as shown on Plate 3.

It is believed that the massive sulfides occupy positions of structural dilation within the overall stratigraphic section which was amenable to replacement by sulfides. Whether or not these minor structures are related to the larger structure, outlined above, has not been demonstrated.

- Assay Data -

Twenty-seven assays were made on sulfide-bearing samples cut from New Canton drill core. Table I is a complete presentation of the individual assays.

Spectrographic analyses of samples from the massive intersections in DH-2 and DH-4 revealed no more than trace (less than 0.1%) amounts of cobalt and nickel.

- Recommendations -

The drilling completed under DMEA Contract #4393 has proved the New Canton zone to be a legitimate copper-zinc prospect. The small amount of drilling done to date has accomplished little more than to prove the existence of an economically interesting mineralized trend. Anomalies "J"

and "R" south of Anomaly "M", and Anomaly "F-2" to the north are either inadequately tested or untested. It is recommended that another program, involving not less than 7,000 feet of exploratory core drilling, be inaugurated as soon as possible. In the proposed program, drilling footage should be distributed to cover all of the above cited anomalies, without restriction as to location, depth or number of drill holes.

Respectfully submitted:

Robert S. Young, Br. Mgr.

Vernon R. Geyer, Geologist

7 February, 1957

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Table I

DRILL HOLE	ASSAY NO.	INTERVAL	Au (oz/ton)	Ag (oz/ton)	Pb%	Cu%	Zn%
Stage I							
1A	227✓	344.75 - 351.25'	trace	0.2	0.01	0.21	0
1A	229✓	351.25 - 356'	trace	0.3	0.02	0.16	0.025
1A	230✓	356 - 362.5'	0	0.2	0.02	0.06	0.025
1A	211✓✓✓	362.5 - 369.25'	trace	3.58	0.71	0.45	0.30
2	213✓✓✓	335 - 340.5'	trace	1.36	1.05	1.40	0.10
2	210✓✓✓	340.5 - 345.25'	trace	3.50	1.00	0.80	0.20
2	231✓	345.25 - 349'	trace	0.2	0.03	0.16	0.10
2	212✓✓✓✓	349 - 353'	trace	2.45	0.74	1.70	0.40
3	209✓✓✓	335 - 341'	trace	1.80	0	0.60	0
Stage II							
4	214✓✓✓✓	181.5 - 186.5'	trace	1.88	0.04	1.20	0.20
4	232✓	186.5 - 188.25'	0	0.05	0.03	0.15	0.10
4	215✓✓✓✓	188.25 - 194.25'	0.015	1.78	0	1.20	0.20
5	220✓	478.5 - 482.5'	trace	0.1	0.01	0.77	0
5	233✓	482.5 - 488'	trace	0.05	0.02	0.07	0.10
5	234✓	488 - 493'	trace	0.05	0.04	0.07	0.025
5	217✓	493 - 499'	trace	0.01	0.02	0.15	trace
5	226✓	502 - 507'	trace	0.05	trace	0.25	0
6	223✓	152 - 156.5'	trace	0.05	trace	0.17	0
6	235✓	156.5 - 160.5'	trace	0.05	0.02	0.12	0
6	222✓	160.5 - 165.5'	trace	0.05	trace	0.31	0
6	224✓	165.5 - 171.0'	trace	0.05	trace	0.68	0

Photostatic copies of original assay reports are appended.

DRILL HOLE	ASSAY NO.	INTERVAL	Au (oz/ton)	Ag(oz/ton)	Pb%	Cu%	Zn%
Stage II continued -							
6	219	172.0 - 177.0	0.01	0.5	trace	1.69	0.3
6	225	177.0 - 183.0	trace	0.2	trace	0.58	1.3
6	228	183.3 - 190.5	trace	0.1	trace	0.18	1.5
MBQ (7)	216	39 - 44	0.01	0.3	trace	1.17	0
8	221	344 - 350	trace	0.1	trace	0.33	0
8	218	351 - 357	trace	0.05	trace	0.36	0

Photostatic copies of original assay reports are appended.

Location: New Canton, Virginia Angle: 45° Hole No. 1
Dep.: 350' Deflection: not measured
Elev.: Logged by: RSY

Footage	Description
0-12	soil
12-43	chlorite-garnet schist; minor disseminated pyrite; core recovery of 15 feet in the interval 13-43 feet.
43-57	chlorite-garnet schist; sulfides disseminated and in thin stringers; minor magnetite; sulfides (pyrite and chalcopyrite) estimated at less than 2%.
57-70.5	chlorite schist with thin quartz stringers; garnet zone 62-67 feet.
70.5-71	semi-massive pyrite, highly silicified; very minor sphalerite.
71-78.5	chlorite-garnet schist.
78.5-102.5	chlorite-garnet schist, very minor magnetite; silicified in places; disseminated sulfides total less than 1%; 6 inch biotite-rich zone at 88'.
102.5-135	chlorite-garnet schist; very minor sulfides; numerous quartz stringers; 1 inch quartz vein with pyrite at 121 feet.
135-137.5	silicified zone; pyrite disseminated and in stringers.
137.5-339	chlorite-garnet schist; silicified zone 145.3-147.3'; moderate disseminated pyrite-chalcopyrite (est. 3% total) 151.5-.56'; 2" heavy disseminated pyrite at 164 feet; 6" disseminated pyrite, pyrrhotite, chalcopyrite at 191.5 feet; 6" disseminated pyrite, pyrrhotite, chalcopyrite at 204 feet; ½ inch complex sulfide stringers in the interval 223-223.5 feet; 5 inches heavy disseminated pyrite at 286 feet. (6' core loss 255-272'; 17' core loss 291-311).
339-350	heavy pyrite, disseminated and in stringers; traces of chalcopyrite; moderate magnetite. Estimated 15% total sulfides.
	TDA 350'

Location: New Canton, Virginia
Dep.: 379'
Elev.

Angle: 45°
Deflection: not measured
Logged by: RSY

Hole No. 1A

Footage	Description
0-280	no core recovery, drilling with "rock" bit.
280-318.5	chlorite schist; sparse pyrite disseminated and in stringers; 6" coarse hornblende at 310'.
318.5-329	chlorite-garnet schist with moderate pyrite in stringers; some magnetite.
329-336.5	diabase dike.
336.5-348.5	chlorite-garnet-magnetite schist; silicified.
348.5-351.25	heavy disseminated pyrite. (est. 40-50%)
351.25-365.25	silicified garnet-chlorite schist; very minor magnetite; first pyrrhotite-chalcopyrite at 357'; 6" heavy pyrite-chalcopyrite 357-357.5'; 2" vein quartz at 360.6'; heavy disseminated pyrite-chalcopyrite-pyrrhotite-galena 362-365.25.
365.25-366.5	vein quartz with sparse crystals of pyrite-pyrrhotite-chalcopyrite-sphalerite.
366.5-368.5	silicified schist with pyrite-pyrrhotite-sphalerite-galena.
368.5-371	muscovite-biotite-garnet schist.
371-379	chlorite-biotite-garnet schist.

TDA 379'

Location: New Canton, Virginia
Dep.: 382'
Elev.

Angle: 45°
Deflection: not measured
Logged by RSY

Hole No. 2

Footage	Description
0-8	soil
8-57	fine-grained chlorite schist; gradational garnet zones; minor pyrite stringers.
57-60	silicified zone; very minor disseminated sulfides (core loss 1 foot 53-62').
60-72	chlorite schist.
72-91	chlorite-biotite zone; heavy fractures healed with vein quartz; pyrite-pyrrhotite-chalcopyrite bleb at 74 feet; minor pyrite stringers (core loss 4 feet 71-83').
91-94.5	chlorite schist.
94.5-99	silicified chlorite-biotite schist; 3" semi-massive pyrite-chalcopyrite at 95'; minor pyrite stringers.
99-187	chlorite schist with gradational biotite developments; 2" disseminated chalcopyrite at 174 feet and 175 feet (core loss 7 feet 123-133'; core loss 6 feet 133-143').
187-191	silicified zone, moderate disseminated sulfides, principally pyrite.
191-203	knotty chlorite-garnet-biotite schist, moderate disseminated pyrite-chalcopyrite-sphalerite (core loss 2 feet 194-203').
203-275	chlorite schist; gradational garnet zones; light disseminated pyrite throughout.
275-283	diabase dike.
283-292	chlorite schist; light pyrite dissemination.
292-331	chlorite schist; silicified for most part; moderate dissemination of pyrite and magnetite (core loss 4 feet 322-331').

Location: New Canton, Virginia
Dep.: 382'
Elev.

Angle 45°
Deflection not measured
Logged by RSY

Hole No. 2

Footage	Description
	CONTINUED -
331-344.5	chlorite schist gradational into silicified zone at about 336 feet; light to moderate dissemination of pyrite-pyrrhotite-chalcopyrite-sphalerite; semi-massive pyrite at 337.5-339.5'.
344.5-345.25	massive pyrite-pyrrhotite-chalcopyrite. cu. est. 1%.
345.25-349	barren silicified zone.
349-352.5	massive pyrrhotite-pyrite-chalcopyrite-sphalerite. cu. est. 1%.
352.5-359	muscovite-biotite-garnet schist; biotite "eyes".
359-365	chlorite-garnet schist.
365-382	spotted muscovite-biotite-garnet schist.
	TDA 382'

Location: New Canton, Virginia
Dep.: 350'
Elev.

Angle: 45°
Deflection: not measured
Logged by RSY

Hole No. 3

Footage	Description
0-32	soil
32-54	chlorite-hornblende schist (altered); very minor pyrite (core loss 12').
54-73	diabase dike.
73-77	altered chlorite schist.
77-203	diabase dike; core recovery very poor throughout.
203-210	altered chlorite schist; minor pyrrhotite and chalcopyrite.
210-334	chlorite schist; sporadic gradational garnet zones; dark development (fine-grained hornblende ?) 294-300'; silicified zones at 265-267'; 286-287'; 308-311'.
334-344	silicified chlorite schist with magnetite; disseminated pyrrhotite-pyrite-chalcopyrite.
344-348	chlorite schist, minor pyrite.
348-348.75	diabase dike.
348.75-350	chlorite schist; 4" moderate disseminated pyrite at 349'.
350-351.25	silicified zone, moderate pyrite (9" core recovery).
351.25-352.75	chlorite-garnet schist; very minor disseminated sulfides.
352.75-355.25	silicified schist, minor sulfides.
355.25-358.5	chlorite-garnet schist grading into biotite-garnet schist (silicified); light to moderate disseminated complex sulfides; best cu at 357.0-358.5'.
358.5-371	spotted chlorite-biotite-garnet schist.

TDA 371'

Location:	New Canton, Virginia	Angle: 45°	Hole No. 4
Dep.:	208'	Deflection:	not measured
Elev.		Logged by	RYS

Footage	Description
20	soil
20-22.3	silicified chlorite schist; very minor disseminated pyrite; 1" pyrite stringers at 21'.
22.3-31.5	chlorite schist with minor biotite development; very minor disseminated pyrite.
31.5-34.5	silicified zone; 3" heavy disseminated pyrite at 33'.
34.5-39.25	chlorite-hornblende schist with minor disseminated magnetite; minor pyrite in stringers.
39.25-42.5	silicified zone; minor pyrite disseminated and in stringers.
42.5-50	very coarse-grained chlorite-biotite-garnet schist with approx. 5% pyrite and very minor chalcopyrite.
50-52	silicified zone.
52-61	coarse-grained chlorite-biotite-garnet schist; decrease in grain size and increase in chlorite with depth; disseminated magnetite appears at 56'.
61-69	silicified zone; first chalcopyrite and pyrrhotite appear at 68' (no concentrations).
69-74.5	chlorite-garnet-magnetite schist; very minor pyrrhotite-chalcopyrite.
74.5-76	silicified zone.
76-77½	chlorite-garnet-magnetite schist; very minor pyrrhotite-chalcopyrite.
77½-79.75	silicified zone; schistosity reversals.
79.75-82.75	silicified chlorite-magnetite schist; 2" biotite-rich zone at 82'; minor pyrrhotite-pyrite.
82.75-86	silicified zone.
86-88.5	chlorite-garnet-magnetite schist.
88.5-89.25	silicified zone.

Location: New Canton, Va. Angle: 45° Hole No. 4
Dep. 208' Deflection not measured
Elev. Logged by RSY

Footage	Description
	CONTINUED -
89.25-91.75	coarse grained chlorite-biotite-magnetite-garnet schist.
91.75-93	silicified zone.
93-99	medium-grained chlorite-hornblende schist; silicified in part.
99-143	silicified chlorite-magnetite-garnet schist; increase in pyrite and magnetite at approx. 108' sparse pyrite-pyrrhotite; thin quartz veins parallel schistosity 142-143'.
143-153	chlorite-magnetite-garnet schist.
153-170	silicified schist.
170-171.5	chlorite-garnet schist; moderate to heavy pyrite-pyrrhotite.
171.5-184	chlorite-magnetite-garnet schist; mostly silicified; light to moderate disseminated pyrite-pyrrhotite-chalcopyrite-sphalerite.
184-186	semi-massive to massive pyrite-pyrrhotite-chalcopyrite-sphalerite.
186-188.75	chlorite-magnetite-garnet schist; moderate disseminated complex sulfides.
188.75-189.25	semi-massive complex sulfides; mainly pyrite-chalcopyrite.
189.25-190.25	silicified schist; heavy disseminated complex sulfides
190.25-192.75	semi-massive to massive pyrrhotite-pyrite-chalcopyrite-sphalerite.
192.75-194.25	silicified zone; light to moderate disseminated complex sulfides.
194.25-204	muscovite-biotite-garnet schist.
204-205	chlorite-garnet schist.
205-208	muscovite-biotite-garnet schist.
	TDA 208'

Location	New Canton, Va.	Angle 60°	Hole No. 5
Dep.	575'	Deflection not measured	
Elev.	569.75'	Logged by	RSY

Footage	Description
0-4	soil
4-30.5	fine-grained chlorite schist; minor pyrite in stringers.
30.5-36.5	silicified zone; minor disseminated pyrite.
36.5-51	chlorite schist; 4" moderate pyrite with minor chalcopyrite at 40'; 1" biotite-rich zone at 43'.
51-54	chlorite-hornblende schist, medium-grained.
54-78.5	chlorite-garnet-magnetite-pyrite schist, silicified in part; up to 5% total sulfides, very minor pyrrhotite and chalcopyrite.
78.5-79	vein quartz with coarse hornblende.
79-101.75	fine-to-medium grained chlorite-hornblende schist.
101.75-102.75	silicified zone.
102.75-118	fine-grained chlorite-hornblende schist; grain size increases 116-118'.
118-139.5	silicified zone; light to very light stringer and disseminated pyrite.
139.5-142	chlorite-biotite-garnet schist; light to moderate pyrite.
142-233	hornblende-chlorite sequence; fine-to-coarse grain gradationally; lineation good to absent; biotite in places and carries minor garnets; scattered minor pyrite.
233-257	moderately silicified schist, very minor magnetite.
257-267	chlorite schist, lightly silicified; minor magnetite and garnets.
267-274	above rock gradational into chlorite-hornblende schist carrying some biotite and light sulfides.

Location New Canton, Va. Angle 60° Hole No. 5
Dep. 575' Deflection
Elev. 569.75' Logged by RSY

Footage	Description
274-283	silicified schist.
283-294.5	medium-grained chlorite-hornblende-biotite schist.
294.5-375	chlorite schist; minor biotite; light to moderate silicification; scattered sulfides; minor magnetite silicified 371-375'.
375-457.5	medium grained chlorite-biotite-hornblende-garnet schist; 9" vein quartz at 442.5'; 2" vein quartz at 446'.
457.5-461.25	olivine diabase dike.
461.25-478.5	chlorite schist.
478.5-481.5	contorted chlorite schist with quartz "eyes"; moderate to heavy pyrrhotite-chalcopyrite. prob inclusion
481.5-494	silicified chlorite-magnetite-garnet schist; minor disseminated sulfides, principally pyrite.
494-498	silicified schist; moderate disseminated pyrite with minor chalcopyrite.
498-508	contorted chlorite-biotite-magnetite schist; some silicification; carries light disseminated pyrite-pyrrhotite-chalcopyrite.
508-519	fine-grained chlorite schist.
519-523	silicified biotite schist; light disseminated chalcopyrite.
523-528	chlorite-biotite-garnet schist; minor disseminated pyrite-chalcopyrite.
528-529.75	silicified zone.
529.75-533.5	chlorite schist.
533.5-534.5	chlorite-biotite-garnet schist; garnets up to ½".
534.5-535.5	biotite zone; large chlorite blades at base with pyrrhotite-chalcopyrite blebs and large garnets.

Location New Canton, Va. Angle 60° Hole No. 5
Dep. 575' Deflection
Elev. 569.75' Logged by RSY

Footage	Description
535.5-536.5	vein quartz with pyrrhotite stringers.
536.5-571	"spotted" chlorite-biotite-garnet schist.
571-571.5	vein quartz
571.5-575	muscovite-garnet schist.
	TDA 575'

Location: New Canton, Va. Angle 45° Hole No. 6
Dep. 203' Deflection not measured
Elev. 616.2' Logged by RSY

Footage	Description
0-48	soil
48-59	chlorite-hornblende schist.
59-61.5	hornblende-chlorite-biotite-garnet schist, coarse grained.
61.5-70	chlorite schist with minor magnetite; light disseminated sulfides(pyr-chalcopyr):6" hornblendic zone at 66' with pyrrh-pyr-chalcopyr; galena on fracture surface at 69.5'.
70-71.3	silicified zone.
71.3-89.6	chlorite-garnet-magnetite schist; minor disseminated pyr-pyrrh-chalcopyr; 1' with quartz "eyes" and vugs with secondary zinc silicate at 75'.
89.6-96.5	silicified zone beginning with 4" vein quartz.
96.5-130	chlorite-garnet-magnetite schist with minor disseminated pyr-chalcopyr; 1' silicified zone at 104'.
130-143.5	chlorite-hornblende schist, partly silicified.
143.5-170	chlorite-garnet-magnetite schist, mildly silicifi in places with minor disseminated sulfides (pyr-chalcopyr); moderate dissemination begins at 161'; 1" pyrite stringers at 167.5' and 169.5'.
170-171.25	semi-massive to massive pyr-pyrrh-chalcopyr (est. 40% total sulfides).
171.25-173	chlorite schist, disseminated sulfides.
173-174	massive pyr-pyrrh-chalcopyr-sphal; cu est. 1%.
174-179	silicified zone, minor chalcopyr.
179-180.5	massive pyr-chalcopyr-sphal;1" massive sphal at base.
180.5-188.5	chlorite-hornblende-garnet schist; light to moderate disseminated pyr-pyrrh-chalcopyr 180.5'-183.5'.

Location: New Canton, Va. Angle 45o Hole No. 6
Dep. 203' Deflection not measured
Elev. 616.2' Logged by RSY

Footage	Description
	continued-
188.5-190.5	massive pyrrh-pyr-chalcopyr-sphal.
190.5-203	"spotted" chlorite-biotite-garnet schist.
	TDA 203

Location: New Canton, Va. Angle 90o Hole No. 7
Dep. 45' Deflection not measured
Elev. 612.0' Logged by RSY

Footage	Description
0-6	soil and oxidized rock.
6-30	oxidized rock varying between pure gossan and oxidized vein quartz; relict schistosity and oxidized garnets present in lower 6'.
30-45	down schistosity of chlorite-garnet magnetite schist with moderate pyrite-chalcopyrite disseminated and in stringers; minor secondary chalcocite.

TDA 45'

Location: New Canton, Virginia
Dep. 410 feet
Elev. 541 feet

Angle 60°
Deflection: not measured
Logged by RSY

Hole No. 8

Footage	Description
0-27	soil
27-64	very fine grained chlorite schist; minor pyrite in stringers; silicified 34-37'; minor scattered magnetite.
64-65	hornblende-chlorite schist.
65-72	silicified schist with minor magnetite.
72-73	hornblende-chlorite schist.
73-96	hornblende-chlorite-biotite-garnet schist; silicified in places; medium to coarse grained.
96-121.5	chlorite-magnetite-garnet schist, biotitic in places; slightly silicified throughout; minor pyrite.
121.5-140.5	hornblende-chlorite schist with numerous random-oriented quartz veinlets; fine to medium in grain.
140.5-143.5	silicified schist.
143.5-149.5	medium to coarse grained hornblende-chlorite schist.
149.5-171	very fine grained hornblende-chlorite schist.
171-197	medium to coarse grained hornblende-chlorite schist with biotite developments.
197-248	silicified schist; some remnants of chlorite-garnet-magnetite schist, very minor pyrite.
248-265.5	chlorite-garnet-magnetite schist; silicified in places; minor pyrite.
265.5-269	silicified zone, minor pyrite.
269-271	chlorite-garnet-magnetite schist.
271-275.25	silicified schist.
275.25-290.5	chlorite-garnet-magnetite schist, minor hornblende zone at top.

Location: New Canton, Virginia
Dep. 410'
Elev. 541'

Angle 60°
Deflection not measured
Logged by: RSY

Hole No. 8

Footage	Description
290.5-293	silicified schist.
293-302.5	chlorite-garnet-magnetite schist.
302.5-307	hornblende-chlorite-garnet schist.
307-321	chlorite-garnet-magnetite schist; with minor disseminated pyrite-pyrrhotite; hornblendic in places.
321-344	fine-grained chlorite hornblende schist; very minor disseminated sulfides.
344-358	chlorite-garnet schist with light to moderate disseminated pyrite-pyrrhotite-chalcopyrite.
358-362.5	chlorite-hornblende schist.
362.5-367	silicified schist.
367-368.5	zone of coarse biotite-garnet schist.
368.5-377	"spotted" chlorite-biotite-garnet schist.
377-378	coarse chlorite-biotite zone.
378-410	"spotted" chlorite-biotite-garnet schist; 4" vein quartz at 404'.

TDA 410'

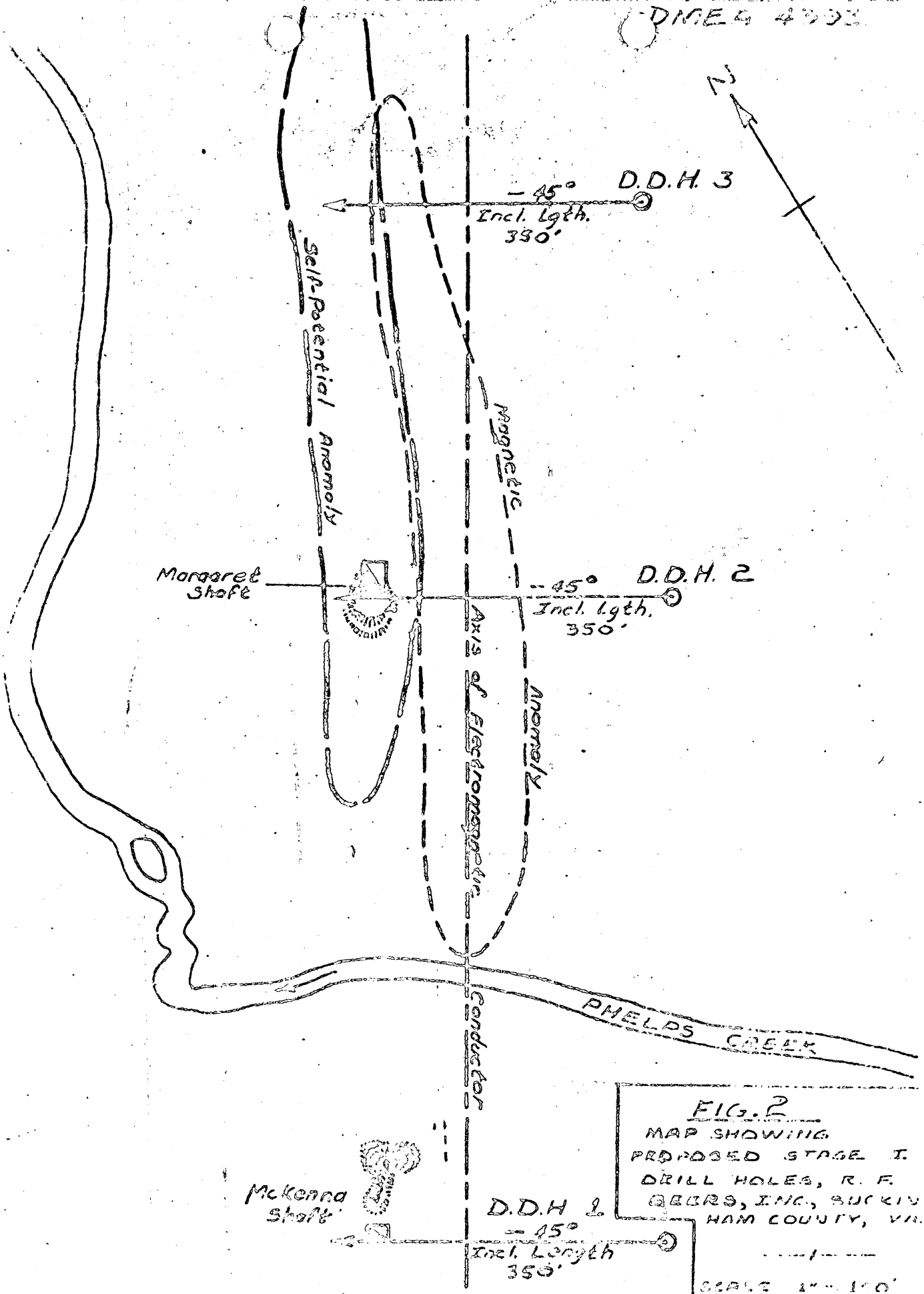

FIG. 2
MAP SHOWING
PROPOSED STAGE I.
DRILL HOLES, R. F.
BEERS, INC., BUCKING-
HAM COUNTY, VA.

SCALE 1" = 100'
AUGUST, 1956

OFFICIAL FILE COPY
DMEA
RECEIVED MAR 4 1957

DATE	INITIALS	CODE

FINAL REPORT

February, 1957

NEW CANTON, VIRGINIA, PROJECT

Roland F. Beers, Inc.

DMEA - 4393

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FINAL REPORT

New Canton, Virginia

Roland F. Beers, Inc.

DMEA #4393

- Introduction -

On December 27, 1956, a drilling program of 2,446 feet was completed on the New Canton, Virginia, prospect under the conditions of DMEA Contract #4393. In addition to the cooperative drilling, Roland F. Beers, Inc., drilled a total of 127 feet on the prospect. Final action on a request for termination of the contract is pending.

This report will review the geologic setting of the prospect area and the geophysical work preceding drilling, and will present a comprehensive report on the drilling results.

- Location -

New Canton lies in Buckingham County, Virginia, on the south side of the James River, one-half mile east of U.S. Route #15. The area of drilling is approximately one-half mile south of the New Canton Post Office.

Six leases held by Roland F. Beers, Inc., cover the central and northern parts of the New Canton mineralized

zone. Lease distribution is depicted on an accompanying map (Pl. 1). The following is a list of participating landowners:

Lease #5V-61:	Buckingham Mineral Syndicate, Inc.	363 acres
#5V-62:	Plummer F. and Lottie P. Jones	114.5 acres
#5V-63:	Levitt E. and Elnora Perkins	81 acres
#5V-64:	N. D. and P. B. Patteson	40 acres
#5V-65:	Cary C. and Jean W. Shipp et al	65 acres
#5V-66:	Terrell Fuqua	100 acres

- Geologic Setting -

The New Canton area is in the Piedmont Province of Virginia, and lies near the geographic center of the state. Local topography is gently rolling, with the exception of steep bluffs bordering the James River and Phelps Creek. Maximum relief in the immediate area is approximately one hundred feet.

The country rocks in the New Canton area consist of Pre-Cambrian granite-granodiorite and crystalline metasediments, Ordovician (?) slate, and Triassic diabase dikes. The mineralized zone occurs in the metasediments, near the contact of this series and the "Columbia granite". The major granitic body is separated from the true metasediments by a zone of hornblendic alteration. Within the

grid area the rocks are chlorite schist, chlorite-garnet-magnetite schist, chlorite-biotite-garnet schist, quartz-sericite schist, and diabase. The chlorite schist series has been altered from place to place by silicification.

- Geophysical Data -

Previous to application to the U.S. Government for cooperation on the New Canton prospect, the area covered by the leases cited above was surveyed by geochemical and geophysical techniques. The geophysical survey consisted of airborne and ground electromagnetics, self-potential, and magnetometer. Geochemical soil sampling covered the entire grid area. These surveys delineated several geophysical highs, most impressive of which was the "M" or "Margaret" anomaly (Pl. 2). The "J" or "Johnson" anomaly, immediately southwest along the trend, was also well defined. Because of surface geology and supporting geophysical data, most of the drilling allowed under Contract #4393 was expended on Anomaly "M".

Geophysical data were corroborated in all respects. The self-potential high and electromagnetic axis are associated with massive and disseminated complex sulfide mineralization. The magnetic high, lying slightly eastward of the EM axis, is attributed to the presence of

significant amounts of disseminated magnetite in a chlorite-garnet schist host. This magnetite seems to be related to a stage of disseminated pyrite mineralization.

Drilling results show that this combination of geophysical techniques, in addition to geochemistry, will prove to be effective and dependable in Piedmont exploration.

- Drilling Data -

Eight diamond drill holes were completed on the north grid of the New Canton, Virginia, prospect. Seven of these holes were cooperative. The locations of all drill holes are shown on Plate 2.

The following table summarizes the physical aspects of each drill hole:

Drill Hole #1:

Location: L 18 N at 1.35 E
Total depth: 350'
Inclination: 45°
Core size: Overburden: 0-18'
Bx: 18-52'
Ax: 52-350'
Cooperative drilling: 350'
Corporation drilling: 0
No. of assays: 0
Stage: I

Drill Hole #1A:

Location: L 18 N at 1.45 E
Total depth: 379'
Inclination: 45°
Core size: 0-280' (rock bit); Ax: 280-379'
Cooperative drilling: 0
Corporation drilling: 350-379'
*Longyear drilling: 0-280' (no core); 280-350'
No. of assays: 4
Stage: I

* DH-1A is a redrill of DH-1. Because of excessive core loss in DH-1, the cost of drilling DH-1A to 350' was borne by the E. J. Longyear Co.

Drill Hole #2:

Location: L 15 N at 1.55 E
Total depth: 382'
Inclination: 45°
Core size: Overburden: 0-8'; Bx: 8-20';
Ax: 20-382'
Cooperative drilling: 350'
Corporation drilling: 32'
No. of assays: 4
Stage: I

Drill Hole #3:

Location: L 10 N at 1.5 E
Total depth: 371'
Inclination: 45°
Core size: Overburden: 0-34'; Bx: 34-50';
Ax: 50-371'
Cooperative drilling: 350'
Corporation drilling: 21'
No. of assays: 1
Stage: I

Drill Hole #4:

Location: L 12.5 N at .5 E
Total depth: 208'
Inclination: 45°
Core size: Overburden: 0-20'; Bx: 20-28';
Ax: 28-208'
Cooperative drilling: 208'
Corporation drilling: 0
No. of assays: 3
Stage: II

Drill Hole #5:

Location: L 16 N at 1.7 E
Total depth: 575'
Inclination: 60°
Core size: Overburden: 0-4'; Bx: 4-10';
Ax: 10-575'
Cooperative drilling: ~~0~~ 575'
Corporation drilling: 5
No. of assays: 5
Stage: II

Drill Hole #6:

Location: L 7 N at 1 E
Total depth: 203'
Inclination: 45°
Core size: Overburden: 0-48'; Bx: 48-52';
Ax: 52-203'
Cooperative drilling: 203'
Corporation drilling: 0
No. of assays: 7
Stage: II

Drill Hole #7:

Location: L 7 N at .25 W
Total depth: 45'
Inclination: 90°
Core size: Overburden: 0-5'; Bx: 5-16';
Ax: 16-45'
Cooperative drilling: 0
Corporation drilling: 45'
No. of assays: 1
Stage: (Not applicable)

Drill Hole #8:

Location: L 12.5 N at 1.25 E
Total depth: 410'
Inclination: 60°
Core size: Overburden: 0-25'; Bx: 25-27';
Ax: 27-410'
Cooperative drilling: 410'
Corporation drilling: 0
No. of assays: 2
Stage: II

- Mineralization -

The exploratory drilling completed under DMEA Contract #4393 revealed the presence of a copper-zinc sulfide zone 1100 feet long. This zone is known to extend to a vertical depth of 480 feet (DH-5). Application of data drawn from previous drilling (DMEA #3508; Virginia Mining Corporation) extends the length of the copper zone to a minimum of 1800 feet. The copper-bearing zone is present in true widths of up to 20 feet, and follows the schistosity (and bedding?) of the metasediments both in strike and dip.

The principal ore minerals are chalcopyrite and sphalerite; galena occurs from place to place in small amounts. Gold and silver in very minor amounts were reported in nearly all assays. All of the ore minerals are present in both massive and disseminated forms, and occur in a pyrite-pyrrhotite base.

Although the copper zone was encountered in all of the angle holes, significant massive intersections are found in only three holes; DH-2,-4, -6. The vertical and horizontal relations of these intersections are shown on accompanying maps (Pls. 3 and 4). In all cases known, the east-wall chlorite-hornblende schist sequence was host to the sulfides; the west-wall chlorite-biotite-garnet schist is basically barren. Evidence of shearing in or near the copper-bearing

area is rare and inconclusive. Thus, it appears that the fundamental control of the mineralization was stratigraphic. This basic concept does not, however, completely account for the apparent localization of the massive sulfides. Three major possibilities are apparent on the basis of available drill data, anyone of which may account for the apparent localization of the high-grade ore. First, the massive zones are individual pods, distributed at random throughout the anomaly area. Second, the massive zone is present throughout the lateral extent of the anomaly area, but appears as an irregular, anastomosing pattern in longitudinal section. If this is the situation, penetration of the zone by drilling will be purely fortuitious. Third, that although the basic control was stratigraphic, the areas of massive sulfide accumulation are related to and controlled entirely by minor structures along the trend. There is some corroborative evidence for this third possibility. From Plate 2, it can be seen that DH-6 penetrated the sulfide zone on a relatively sharp flexure in the EM axis. The massive mineralization was probably controlled by this minor flexure. The high-grade ore in DH-4 occurs in an area where the schistosity dips 82° E., a slight though possibly significant 8° departure from the general 90° dip (Pl. 4). This dip change may be related to local folding. No local structure has been defined in the area of DH-2; however, very little data are available for this particular intersection. Further, the

massive sulfide areas, if controlled by local structures, may be related to a larger structure. Such a structure might be a large drag-fold with a relatively flat plunge (10-15°) as shown on Plate 3.

It is believed that the massive sulfides occupy positions of structural dilation within the overall stratigraphic section which was amenable to replacement by sulfides. Whether or not these minor structures are related to the larger structure, outlined above, has not been demonstrated.

- Assay Data -

Twenty-seven assays were made on sulfide-bearing samples cut from New Canton drill core. Table I is a complete presentation of the individual assays.

Spectrographic analyses of samples from the massive intersections in DH-2 and DH-4 revealed no more than trace (less than 0.1%) amounts of cobalt and nickel.

- Recommendations -

The drilling completed under DMEA Contract #4393 has proved the New Canton zone to be a legitimate copper-zinc prospect. The small amount of drilling done to date has accomplished little more than to prove the existence of an economically interesting mineralized trend. Anomalies "J"

and "R" south of Anomaly "M", and Anomaly "F-2" to the north are either inadequately tested or untested. It is recommended that another program, involving not less than 7,000 feet of exploratory core drilling, be inaugurated as soon as possible. In the proposed program, drilling footage should be distributed to cover all of the above cited anomalies, without restriction as to location, depth or number of drill holes.

Respectfully submitted:

Robert S. Young, Br. Mgr.

Vernon R. Geyer, Geologist

7 February, 1957

Roland F. Beers, Inc.,
Box 3725, University Sta.
Charlottesville, Virginia

DRILL HOLE	ASSAY NO.	INTERVAL	Au (oz/ton)	Ag (oz/ton)	Pb%	Cu%	Zn%
Stage I							
1A	227	344.75 - 351.25'	trace	0.2	0.01	0.21	0
1A	229	351.25 - 356'	trace	0.3	0.02	0.16	0.025
1A	230	356 - 362.5'	0	0.2	0.02	0.06	0.025
1A	211	362.5 - 369.25'	trace	3.58	0.71	0.45	0.30
2	213	335 - 340.5'	trace	1.36	1.05	1.40	0.10
2	210	340.5 - 345.25'	trace	3.50	1.00	0.80	0.20
2	231	345.25 - 349'	trace	0.2	0.03	0.16	0.10
2	212	349 - 353'	trace	2.45	0.74	1.70	0.40
3	209	335 - 341'	trace	1.80	0	0.60	0
Stage II							
4	214	181.5 - 186.5'	trace	1.88	0.04	1.20	0.20
4	232	186.5 - 188.25'	0	0.05	0.03	0.15	0.10
4	215	188.25 - 194.25'	0.015	1.78	0	1.20	0.20
5	220	478.5 - 482.5'	trace	0.1	0.01	0.77	0
5	233	482.5 - 488'	trace	0.05	0.02	0.07	0.10
5	234	488 - 493'	trace	0.05	0.04	0.07	0.025
5	217	493 - 499'	trace	0.01	0.02	0.15	trace
5	226	502 - 507'	trace	0.05	trace	0.25	0
6	223	152 - 156.5'	trace	0.05	trace	0.17	0
6	235	156.5 - 160.5'	trace	0.05	0.02	0.12	0
6	222	160.5 - 165.5'	trace	0.05	trace	0.31	0
6	224	165.5 - 171.0'	trace	0.05	trace	0.68	0

Photostatic copies of original assay reports are appended.

DRILL HOLE	ASSAY NO.	INTERVAL	Au (oz/ton)	Ag(oz/ton)	Pb%	Cu%	Zn%
Stage II continued -							
6	219	172.0 - 177.0	0.01	0.5	trace	1.69	0.3
6	225	177.0 - 183.0	trace	0.2	trace	0.58	1.3
6	228	183.3 - 190.5	trace	0.1	trace	0.18	1.5
Non Dmeg 7 X	216	39 - 44	0.01	0.3	trace	1.17	0
8	221	344 - 350	trace	0.1	trace	0.33	0
8	218	351 - 357	trace	0.05	trace	0.36	0

√=44

26 Photostatic copies of original assay reports are appended.

ASSAY DATA

December 16th, 1958.

Mr. Vaughn V. Hughey
Director Research,
Basic Inc.
Bottsville, O.

My Dear Vaughn.

Following are the analyses of the Sulphide samples you sent to this laboratory December 1st, 1958.

Our No.	2283-A	2283-B	2283-C	2283-D
Your No.	209	210	211	212
Zinc	nil	0.20 %	0.30 %	0.40 %
Lead	nil	1.00 %	0.71 %	0.74 %
Copper	0.60 %	0.80 %	0.46 %	1.70 %
Silver Oz. per ton	1.80	3.50	3.68 %	2.45
Gold	tr.	tr.	tr.	tr.

Our No.	2283-E	2283-F	2283-G
Your No.	213	214	215
Zinc	0.10 %	0.20 %	0.20 %
Lead	1.05 %	0.04 %	nil
Copper	1.40 %	1.20 %	1.20 %
Silver Oz. per ton	1.36	1.88	1.78
Gold * Oz. per ton	Tr.	tr.	0.015

* Trace, less than 20 cents per ton.

Sincerely

W. A. Mueller

ESTABLISHED 1870

DAVID P. DANIELSON

Certificate of Assay

THE HENRY E. WOOD ASSAYING COMPANY

TELEPHONE KEYSTONE 4-4010

DENVER 4, COLORADO

700 W. COLFAX AVE.

Dec. 12, 1956

We hereby certify that the samples assayed by Rowland F. Boots, Inc. gave the following results per ton of 2000 lb.

MARKED	GOLD OZ.	SILVER OZ.	WET LEAD PER CENT	COPPER PER CENT	ZINC PER CENT	IRON PER CENT	NICKEL PER CENT	SULPHUR PER CENT	PER CENT	VALUE
209			Lead	0.47	0.02					
210			0.03	0.51	0.03					
211			0.10	0.39	0.04					
212			0.02	1.03	0.03					
213			0.06	1.01	0.04					
214			0.03	0.91	0.03					
215			Lead	1.13	0.13					

Gold at $ _____ per ounce
Silver at _____ per ounce
Lead at _____ per lb.
Copper at _____ per lb.
Zinc at _____ per lb.

Charges
$ 32.50

The Henry E. Wood Assaying Co.

By _____

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INSPECTIONS and TESTS

The Bruce Williams Laboratories

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Telephone 710

Emporia, Kansas
321 Union St.
Telephone 3604

St. Louis, Missouri
306 Valley Drive
Telephone Hobart 7-2226

RECEIVED 5 1957

Roland F. Beers, Inc.
416 East Main Street
Charlottesville, Virginia

11-27-56

OUR NO.	MARK	DESCRIPTION				
753805	Sample #209	New Canton Mine	Hole #3	335'-341'		11-5-56
806	#210		#2	340.5'-345.45'		11-5-56
807	#211		#1A	362.5'-369.25'		11-5-56
808	#212		#2	349'-353'		11-5-56
809	#213		#2	335'-340.5'		11-5-56

		753805	753806	753807	753808	753809
Zinc	Zn	1.00	0.88	0.78	0.66	0.22
Lead	Pb	0.01	0.02	0.01	0.01	0.008
Copper	Cu	0.40	0.50	0.44	1.12	1.04
Gold	Au in oz/ton	*ND	0.04	0.04	0.02	0.02
Silver	Ag in oz/ton	0.69	0.71	1.53	24.19	1.32

*ND means None Detected.

Bruce Williams

BARCO INC. - CHICAGO

ASSAY REPORT

UNION ASSAY OFFICE, Inc.

J. V. SADLER, President
A. C. SELBY, Vice-Pres. & Treas.
LILY M. HOTTINGER, Secretary
Salt Lake City 10, Utah

Telephone Empire 2-1302 Hand Sample Serial 9905-20

Mine E. P. Moore, Inc.

Date 19, 1956

RESULTS PER TON OF 2000 POUNDS

NO.	GOLD Ozs. per Ton	SILVER Ozs. per Ton	LEAD Per Cent Wet	COPPER Per Cent	NICKEL Per Cent	ZINC Per Cent	SULPHUR Per Cent	IRON Per Cent	LIME Per Cent	Per Cent	Per Cent	VALUE GOLD
212	0.005	0.5	Trace	1.63		0.7						
214	0.010	0.4	0.01	1.22		0.9						
215	0.010	0.1	0.01	1.47		1.3						

Remarks

Charges $ 15.00

TELEPHONE 3-3302

Hand Sample Serial 9477-89

ASSAY REPORT

UNION ASSAY OFFICE, Inc.

J. V. SADLER, President
A. C. SELBY, Vice-Pres. & Treas.
A. C. SELBY, JR. Secretary

Salt Lake City 10, Utah

Mine R. F. Beero, Inc.

A 3103

Jan. 15, 1957

RESULTS PER TON OF 2000 POUNDS

NO.	GOLD Ozs. per Ton	SILVER Ozs. per ton	LEAD Per Cent Wet	COPPER Per Cent	INSOL. Per Cent	ZINC Per Cent	SULPHUR Per Cent	IRON Per Cent	LIME Per Cent	Per Cent	Per Cent	VALUE GOLD
216	0.010	0.3	Trace	1.17		None						
217	Trace	0.1	0.02	0.15		Trace						
218	Trace	0.05	Trace	0.16		None						
219	0.010	0.5	Trace	1.69		0.3						
220	Trace	0.1	0.01	0.77		None						
221	Trace	0.1	Trace	0.33		None						
222	Trace	0.05	Trace	0.31		None						
223	Trace	0.05	Trace	0.17		None						
224	Trace	0.05	Trace	0.68		None						
225	Trace	0.2	Trace	0.58		1.3						
226	Trace	0.05	Trace	0.25		None						
227	Trace	0.2	0.01	0.21		None						
228	Trace	0.1	Trace	0.18		1.5						

Remarks

Charges $ 65.00

J. Sadler

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TELEPHONE 3-3902

Hand Sample Serial 9147-53

Mine R. T. [illegible]

ASSAY REPORT

UNION ASSAY OFFICE, Inc.

J. V. [illegible], President
A. C. [illegible], Vice-Pres. & Treas.
A. C. [illegible], Jr., Secretary

Salt Lake City 10, Utah

RESULTS PER TON OF 2000 POUNDS

Jan. 23, 1957

NO.	GOLD Ozs. per Ton	SILVER Ozs. per Ton	LEAD Per Cent Wet	COPPER Per Cent	NICKEL Per Cent	ZINC Per Cent	SULPHUR Per Cent	IRON Per Cent	LIME Per Cent	Per Cent	Per Cent	VALUE GOLD
229	Trace	0.1	0.02	0.16		0.025						
230	None	0.2	0.02	0.06		0.025						
231	Trace	0.2	0.03	0.16		0.10						
232	None	0.05	0.03	0.15		0.10						
233	Trace	0.05	0.02	0.07		0.10						
234	Trace	0.05	0.02	0.07		0.025						
235	Trace	0.05	0.02	0.12		Trace						

Remarks

Charges $ 25.00

A. C. [illegible]

ENGINEERS
INSPECTIONS and TESTS

Batesville, Ark.
151 No. Central
Telephone 1309

Picher, Oklahoma
Connell Hotel Bldg.
Telephone 710

The Bruce Williams Laboratories

ESTABLISHED 1898
Main Office 618-622 Joplin Street Telephone MA 3-1556
JOPLIN, MISSOURI

CHEMISTS
INDUSTRIAL and ANALYTICAL

Emporia, Kansas
321 Union St.
Telephone 3684

St. Louis, Missouri
306 Valley Drive
Telephone Hobart 7-3226

Roland F. Beers, Inc.
416 East Main Street
Charlotteville, Virginia

11-27-56

OUR NO.	MARK	DESCRIPTION		
754231	Sample #214	New Canton Mine Hole #DH-4	181.5'-186.5'	11-8-56
	#215		188.25'-194.25'	11-8-56

		754231	754232
Zinc	Zn	0.94	1.34
Lead	Pb	1.32	1.44
Copper	Cu	1.10	1.18
Gold	Au	0.04 oz/ton	0.03 oz/ton
Silver	Ag	0.57 oz/ton	0.53 oz/ton

Bruce Williams

DARCO INC. CHICAGO

OFFICIAL FILE COPY
D M E A
RECEIVED MAR 4 1957

DATE	INITIALS	CODE

DRILL LOGS

Location: New Canton, Virginia Angle: 45° Hole No. 1
Dep.: 350' Deflection: not measured
Elev.: Logged by: RSY

Footage	Description
0-12	soil
12-43	chlorite-garnet schist; minor disseminated pyrite; core recovery of 15 feet in the interval 13-43 feet.
43-57	chlorite-garnet schist; sulfides disseminated and in thin stringers; minor magnetite; sulfides (pyrite and chalcopyrite) estimated at less than 2%.
57-70.5	chlorite schist with thin quartz stringers; garnet zone 62-67 feet.
70.5-71	semi-massive pyrite, highly silicified; very minor sphalerite.
71-78.5	chlorite-garnet schist.
78.5-102.5	chlorite-garnet schist, very minor magnetite; silicified in places; disseminated sulfides total less than 1%; 6 inch biotite-rich zone at 88'.
102.5-135	chlorite-garnet schist; very minor sulfides; numerous quartz stringers; 1 inch quartz vein with pyrite at 121 feet.
135-137.5	silicified zone; pyrite disseminated and in stringers.
137.5-339	chlorite-garnet schist; silicified zone 145.3-147.3'; moderate disseminated pyrite-chalcopyrite (est. 3% total) 151.5-.56'; 2" heavy disseminated pyrite at 164 feet; 6" disseminated pyrite, pyrrhotite, chalcopyrite at 191.5 feet; 6" disseminated pyrite, pyrrhotite, chalcopyrite at 204 feet; ½ inch complex sulfide stringers in the interval 223-223.5 feet; 5 inches heavy disseminated pyrite at 286 feet. (6' core loss 255-272'; 17' core loss 291-311).
339-350	heavy pyrite, disseminated and in stringers; traces of chalcopyrite; moderate magnetite. Estimated 15% total sulfides.

TDA 350'

Location: New Canton, Virginia
Dep.: 379'
Elev.

Angle: 45°
Hole No. 1A
Deflection: not measured
Logged by: RSY

Footage	Description
0-280	no core recovery, drilling with "rock" bit.
280-318.5	chlorite schist; sparse pyrite disseminated and in stringers; 6" coarse hornblende at 310'.
318.5-329	chlorite-garnet schist with moderate pyrite in stringers; some magnetite.
329-336.5	diabase dike.
336.5-348.5	chlorite-garnet-magnetite schist; silicified.
348.5-351.25	heavy disseminated pyrite. (est. 40-50%)
351.25-365.25	silicified garnet-chlorite schist; very minor magnetite; first pyrrhotite-chalcopyrite at 357'; 6" heavy pyrite-chalcopyrite 357-357.5'; 2" vein quartz at 360.6'; heavy disseminated pyrite-chalcopyrite-pyrrhotite-galena 362-365.25.
365.25-366.5	vein quartz with sparse crystals of pyrite-pyrrhotite-chalcopyrite-sphalerite.
366.5-368.5	silicified schist with pyrite-pyrrhotite-sphalerite-galena.
368.5-371	muscovite-biotite-garnet schist.
371-379	chlorite-biotite-garnet schist.

TDA 379'

Location: New Canton, Virginia
Dep.: 382'
Elev.

Angle: 45°
Hole No. 2
Deflection: not measured
Logged by RSY

Footage	Description
0-8	soil
8-57	fine-grained chlorite schist; gradational garnet zones; minor pyrite stringers.
57-60	silicified zone; very minor disseminated sulfides (core loss 1 foot 53-62').
60-72	chlorite schist.
72-91	chlorite-biotite zone; heavy fractures healed with vein quartz; pyrite-pyrrhotite-chalcopyrite bleb at 74 feet; minor pyrite stringers (core loss 4 feet 71-83').
91-94.5	chlorite schist.
94.5-99	silicified chlorite-biotite schist; 3" semi-massive pyrite-chalcopyrite at 95'; minor pyrite stringers.
99-187	chlorite schist with gradational biotite developments; 2" disseminated chalcopyrite at 174 feet and 175 feet (core loss 7 feet 123-133'; core loss 6 feet 133-143').
187-191	silicified zone, moderate disseminated sulfides, principally pyrite.
191-203	knotty chlorite-garnet-biotite schist, moderate disseminated pyrite-chalcopyrite-sphalerite (core loss 2 feet 194-203').
203-275	chlorite schist; gradational garnet zones; light disseminated pyrite throughout.
275-283	diabase dike.
283-292	chlorite schist; light pyrite dissemination.
292-331	chlorite schist; silicified for most part; moderate dissemination of pyrite and magnetite (core loss 4 feet 322-331').

Location: New Canton, Virginia
Dep.: 382'
Elev.

Angle 45°
Deflection not measured
Logged by RSY

Hole No. 2

Footage	Description
	CONTINUED -
331-344.5	chlorite schist gradational into silicified zone at about 336 feet; light to moderate dissemination of pyrite-pyrrhotite-chalcopyrite-sphalerite; semi-massive pyrite at 337.5-339.5'.
344.5-345.25	massive pyrite-pyrrhotite-chalcopyrite. cu. est. 1%.
345.25-349	barren silicified zone.
349-352.5	massive pyrrhotite-pyrite-chalcopyrite-sphalerite. cu. est. 1%.
352.5-359	muscovite-biotite-garnet schist; biotite "eyes".
359-365	chlorite-garnet schist.
365-382	spotted muscovite-biotite-garnet schist.

TDA 382'

Location: New Canton, Virginia
Dep.: 350'
Elev.

Angle: 45°
Deflection:
Logged by

Hole No. 3
not measured
RSY

Footage	Description
0-32	soil
32-54	chlorite-hornblende schist (altered); very minor pyrite (core loss 12').
54-73	diabase dike.
73-77	altered chlorite schist.
77-203	diabase dike; core recovery very poor throughout.
203-210	altered chlorite schist; minor pyrrhotite and chalcopyrite.
210-334	chlorite schist; sporadic gradational garnet zones; dark development (fine-grained hornblende ?) 294-300'; silicified zones at 265-267'; 286-287'; 308-311'.
334-344	silicified chlorite schist with magnetite; disseminated pyrrhotite-pyrite-chalcopyrite.
344-348	chlorite schist, minor pyrite.
348-348.75	diabase dike.
348.75-350	chlorite schist; 4" moderate disseminated pyrite at 349'.
350-351.25	silicified zone, moderate pyrite (9" core recovery).
351.25-352.75	chlorite-garnet schist; very minor disseminated sulfides.
352.75-355.25	silicified schist, minor sulfides.
355.25-358.5	chlorite-garnet schist grading into biotite-garnet schist (silicified); light to moderate disseminated complex sulfides; best cu at 357.0-358.5'.
358.5-371	spotted chlorite-biotite-garnet schist.

TDA 371'

Location:	New Canton, Virginia	Angle: 45°	Hole No. 4
Dep.:	208'	Deflection:	not measured
Elev.		Logged by	RYS

Footage	Description
20	soil
20-22.3	silicified chlorite schist; very minor disseminated pyrite; 1" pyrite stringers at 21'.
22.3-31.5	chlorite schist with minor biotite development; very minor disseminated pyrite.
31.5-34.5	silicified zone; 3" heavy disseminated pyrite at 33'.
34.5-39.25	chlorite-hornblende schist with minor disseminated magnetite; minor pyrite in stringers.
39.25-42.5	silicified zone; minor pyrite disseminated and in stringers.
42.5-50	very coarse-grained chlorite-biotite-garnet schist with approx. 5% pyrite and very minor chalcopyrite.
50-52	silicified zone.
52-61	coarse-grained chlorite-biotite-garnet schist; decrease in grain size and increase in chlorite with depth; disseminated magnetite appears at 56'.
61-69	silicified zone; first chalcopyrite and pyrrhotite appear at 68' (no concentrations).
69-74.5	chlorite-garnet-magnetite schist; very minor pyrrhotite-chalcopyrite.
74.5-76	silicified zone.
76-77½	chlorite-garnet-magnetite schist; very minor pyrrhotite-chalcopyrite.
77½-79.75	silicified zone; schistosity reversals.
79.75-82.75	silicified chlorite-magnetite schist; 2" biotite-rich zone at 82'; minor pyrrhotite-pyrite.
82.75-86	silicified zone.
86-88.5	chlorite-garnet-magnetite schist.
88.5-89.25	silicified zone.

Location: New Canton, Va. Angle: 45° Hole No. 4
Dep. 208' Deflection not measured
Elev. Logged by RSY

Footage	Description
	CONTINUED -
89.25-91.75	coarse grained chlorite-biotite-magnetite-garnet schist.
91.75-93	silicified zone.
93-99	medium-grained chlorite-hornblende schist; silicified in part.
99-143	silicified chlorite-magnetite-garnet schist; increase in pyrite and magnetite at approx. 108' sparse pyrite-pyrrhotite; thin quartz veins parallel schistosity 142-143'.
143-153	chlorite-magnetite-garnet schist.
153-170	silicified schist.
170-171.5	chlorite-garnet schist; moderate to heavy pyrite-pyrrhotite.
171.5-184	chlorite-magnetite-garnet schist; mostly silicified; light to moderate disseminated pyrite-pyrrhotite-chalcopyrite-sphalerite.
184-186	semi-massive to massive pyrite-pyrrhotite-chalcopyrite-sphalerite.
186-188.75	chlorite-magnetite-garnet schist; moderate disseminated complex sulfides.
188.75-189.25	semi-massive complex sulfides; mainly pyrite-chalcopyrite.
189.25-190.25	silicified schist; heavy disseminated complex sulfides
190.25-192.75	semi-massive to massive pyrrhotite-pyrite-chalcopyrite-sphalerite.
192.75-194.25	silicified zone; light to moderate disseminated complex sulfides.
194.25-204	muscovite-biotite-garnet schist.
204-205	chlorite-garnet schist.
205-208	muscovite-biotite-garnet schist.
	TDA 208'

Location New Canton, Va. Angle 60° Hole No. 5
Dep. 575' Deflection not measured
Elev. 569.75' Logged by RSY

Footage	Description
0-4	soil
4-30.5	fine-grained chlorite schist; minor pyrite in stringers.
30.5-36.5	silicified zone; minor disseminated pyrite.
36.5-51	chlorite schist; 4" moderate pyrite with minor chalcopyrite at 40'; 1" biotite-rich zone at 43'.
51-54	chlorite-hornblende schist, medium-grained.
54-78.5	chlorite-garnet-magnetite-pyrite schist, silicified in part; up to 5% total sulfides, very minor pyrrhotite and chalcopyrite.
78.5-79	vein quartz with coarse hornblende.
79-101.75	fine-to-medium grained chlorite-hornblende schist.
101.75-102.75	silicified zone.
102.75-118	fine-grained chlorite-hornblende schist; grain size increases 116-118'.
118-139.5	silicified zone; light to very light stringer and disseminated pyrite.
139.5-142	chlorite-biotite-garnet schist; light to moderate pyrite.
142-233	hornblende-chlorite sequence; fine-to-coarse grain gradationally; lineation good to absent; biotite in places and carries minor garnets; scattered minor pyrite.
233-257	moderately silicified schist, very minor magnetite.
257-267	chlorite schist, lightly silicified; minor magnetite and garnets.
267-274	above rock gradational into chlorite-hornblende schist carrying some biotite and light sulfides.

Location New Canton, Va. Angle 60° Hole No. 5
Dep. 575' Deflection
Elev. 569.75' Logged by RSY

Footage	Description
274-283	silicified schist.
283-294.5	medium-grained chlorite-hornblende-biotite schist.
294.5-375	chlorite schist; minor biotite; light to moderate silicification; scattered sulfides; minor magnetite silicified 371-375'.
375-457.5	medium grained chlorite-biotite-hornblende-garnet schist; 9" vein quartz at 442.5'; 2" vein quartz at 446'.
457.5-461.25	olivine diabase dike.
461.25-478.5	chlorite schist.
478.5-481.5	contorted chlorite schist with quartz "eyes"; moderate to heavy pyrrhotite-chalcopyrite.
481.5-494	silicified chlorite-magnetite-garnet schist; minor disseminated sulfides, principally pyrite.
494-498	silicified schist; moderate disseminated pyrite with minor chalcopyrite.
498-508	contorted chlorite-biotite-magnetite schist; some silicification; carries light disseminated pyrite-pyrrhotite-chalcopyrite.
508-519	fine-grained chlorite schist.
519-523	silicified biotite schist; light disseminated chalcopyrite.
523-528	chlorite-biotite-garnet schist; minor disseminated pyrite-chalcopyrite.
528-529.75	silicified zone.
529.75-533.5	chlorite schist.
533.5-534.5	chlorite-biotite-garnet schist; garnets up to ½".
534.5-535.5	biotite zone; large chlorite blades at base with pyrrhotite-chalcopyrite blebs and large garnets.

Location New Canton, Va. Angle 60° Hole No. 5
Dep. 575' Deflection
Elev. 569.75' Logged by RSY

Footage	Description
535.5-536.5	vein quartz with pyrrhotite stringers.
536.5-571	"spotted" chlorite-biotite-garnet schist.
571-571.5	vein quartz
571.5-575	muscovite-garnet schist.
	TDA 575'

Location: New Canton, Va. Angle 45° Hole No. 6
Dep. 203' Deflection not measured
Elev. 616.2' Logged by RSY

Footage	Description
0-48	soil
48-59	chlorite-hornblende schist.
59-61.5	hornblende-chlorite-biotite-garnet schist, coarse grained.
61.5-70	chlorite schist with minor magnetite; light disseminated sulfides(pyr-chalcopyr):6" hornblendic zone at 66' with pyrrh-pyr-chalcopyr; galena on fracture surface at 69.5'.
70-71.3	silicified zone.
71.3-89.6	chlorite-garnet-magnetite schist; minor disseminated pyr-pyrrh-chalcopyr; 1' with quartz "eyes" and vugs with secondary zinc silicate at 75'.
89.6-96.5	silicified zone beginning with 4" vein quartz.
96.5-130	chlorite-garnet-magnetite schist with minor disseminated pyr-chalcopyr; 1' silicified zone at 104'.
130-143.5	chlorite-hornblende schist, partly silicified.
143.5-170	chlorite-garnet-magnetite schist, mildly silicific in places with minor disseminated sulfides (pyr-chalcopyr); moderate dissemination begins at 161'; 1" pyrite stringers at 167.5' and 169.5'.
170-171.25	semi-massive to massive pyr-pyrrh-chalcopyr (est. 40% total sulfides).
171.25-173	chlorite schist, disseminated sulfides.
173-174	massive pyr-pyrrh-chalcopyr-sphal; cu est. 1%.
174-179	silicified zone, minor chalcopyr.
179-180.5	massive pyr-chalcopyr-sphal;1" massive sphal at base.
180.5-188.5	chlorite-hornblende-garnet schist; light to moderate disseminated pyr-pyrrh-chalcopyr 180.5'-183.5'.

Location: New Canton, Va. Angle 45o Hole No. 6
Dep. 203' Deflection not measured
Elev. 616.2' Logged by RSY

Footage	Description
	continued-
188.5-190.5	massive pyrrh-pyr-chalcopyr-sphal.
190.5-203	"spotted" chlorite-biotite-garnet schist.
	TDA 203

Location: New Canton, Va. Angle 90o Hole No. 7
Dep. 45' Deflection not measured
Elev. 612.0' Logged by RSY

Footage	Description
0-6	soil and oxidized rock.
6-30	oxidized rock varying between pure gossan and oxidized vein quartz; relict schistosity and oxidized garnets present in lower 6'.
30-45	down schistosity of chlorite-garnet magnetite schist with moderate pyrite-chalcopyrite disseminated and in stringers; minor secondary chalcocite.

TDA 45'

Location: New Canton, Virginia
Dep. 410 feet
Elev. 541 feet

Angle 60°
Deflection: not measured
Logged by RSY

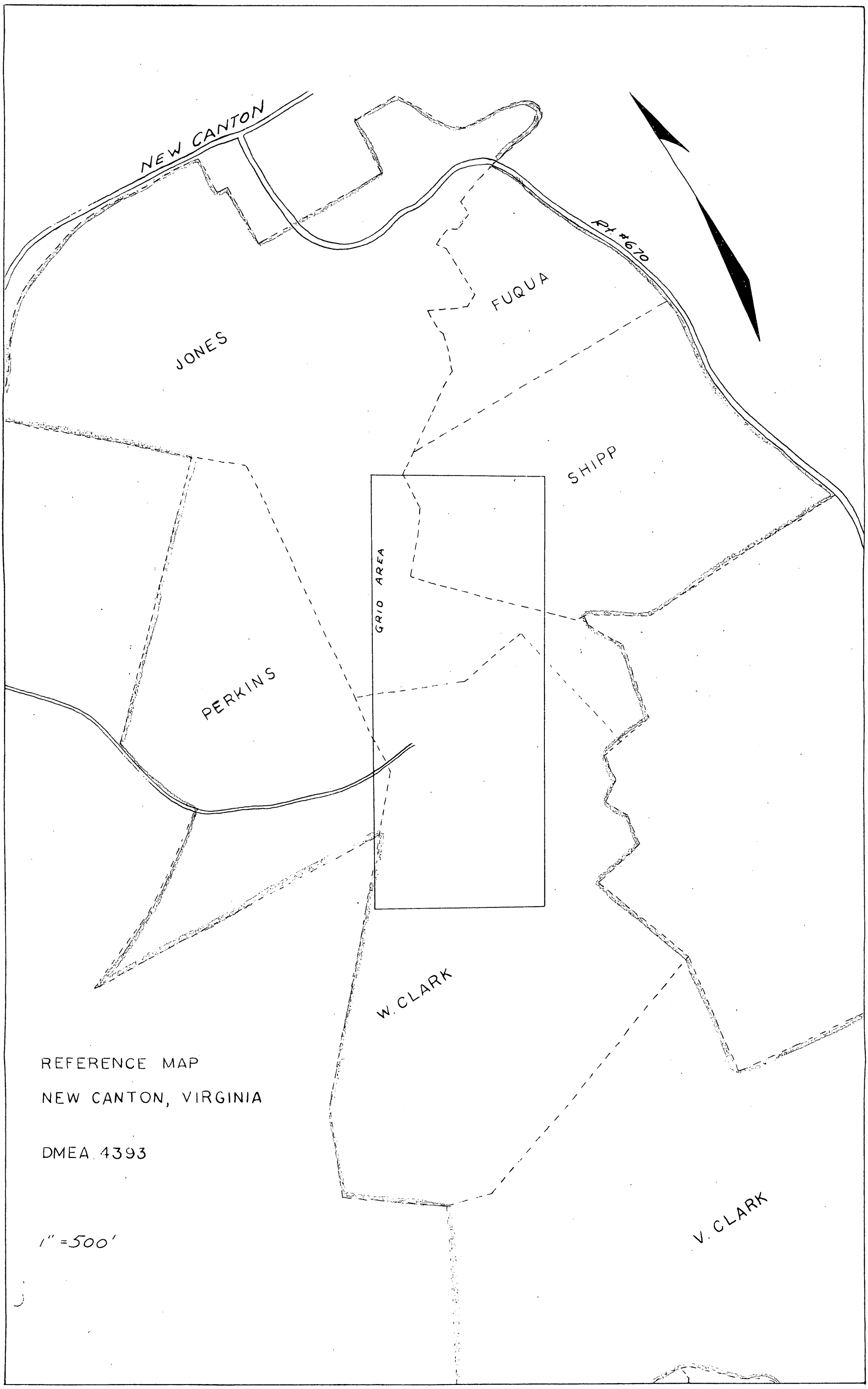
Hole No. 8

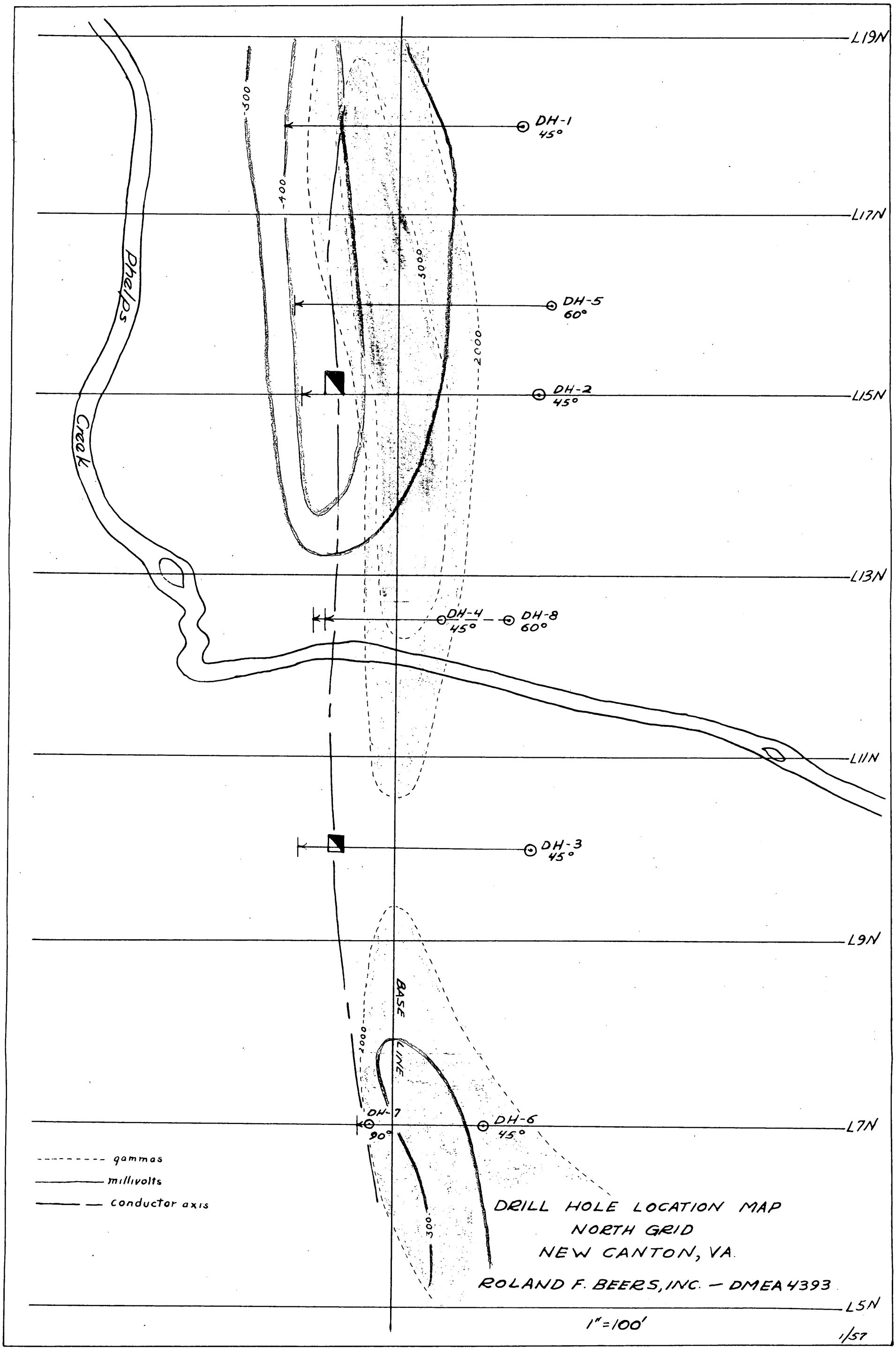
Footage	Description
0-27	soil
27-64	very fine grained chlorite schist; minor pyrite in stringers; silicified 34-37'; minor scattered magnetite.
64-65	hornblende-chlorite schist.
65-72	silicified schist with minor magnetite.
72-73	hornblende-chlorite schist.
73-96	hornblende-chlorite-biotite-garnet schist; silicified in places; medium to coarse grained.
96-121.5	chlorite-magnetite-garnet schist, biotitic in places; slightly silicified throughout; minor pyrite.
121.5-140.5	hornblende-chlorite schist with numerous random-oriented quartz veinlets; fine to medium in grain.
140.5-143.5	silicified schist.
143.5-149.5	medium to coarse grained hornblende-chlorite schist.
149.5-171	very fine grained hornblende-chlorite schist.
171-197	medium to coarse grained hornblende-chlorite schist with biotite developments.
197-248	silicified schist; some remnants of chlorite-garnet-magnetite schist, very minor pyrite.
248-265.5	chlorite-garnet-magnetite schist; silicified in places; minor pyrite.
265.5-269	silicified zone, minor pyrite.
269-271	chlorite-garnet-magnetite schist.
271-275.25	silicified schist.
275.25-290.5	chlorite-garnet-magnetite schist, minor hornblende zone at top.

Location:	New Canton, Virginia	Angle 60°	Hole No. 8
Dep.	410'	Deflection	not measured
Elev.	541'	Logged by:	RSY

Footage	Description
290.5-293	silicified schist.
293-302.5	chlorite-garnet-magnetite schist.
302.5-307	hornblende-chlorite-garnet schist.
307-321	chlorite-garnet-magnetite schist; with minor disseminated pyrite-pyrrhotite; hornblendic in places.
321-344	fine-grained chlorite hornblende schist; very minor disseminated sulfides.
344-358	chlorite-garnet schist with light to moderate disseminated pyrite-pyrrhotite-chalcopyrite.
358-362.5	chlorite-hornblende schist.
362.5-367	silicified schist.
367-368.5	zone of coarse biotite-garnet schist.
368.5-377	"spotted" chlorite-biotite-garnet schist.
377-378	coarse chlorite-biotite zone.
378-410	"spotted" chlorite-biotite-garnet schist; 4" vein quartz at 404'.

TDA 410'


NEW CANTON
Rt. #670
FUQUA
JONES
SHIPP
GRID AREA
PERKINS
W. CLARK
V. CLARK
REFERENCE MAP
NEW CANTON, VIRGINIA
DMEA 4393
1" = 500'


L19N
L17N
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DH-1
45°
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60°
DH-2
45°
DH-4
45°
DH-8
60°
DH-3
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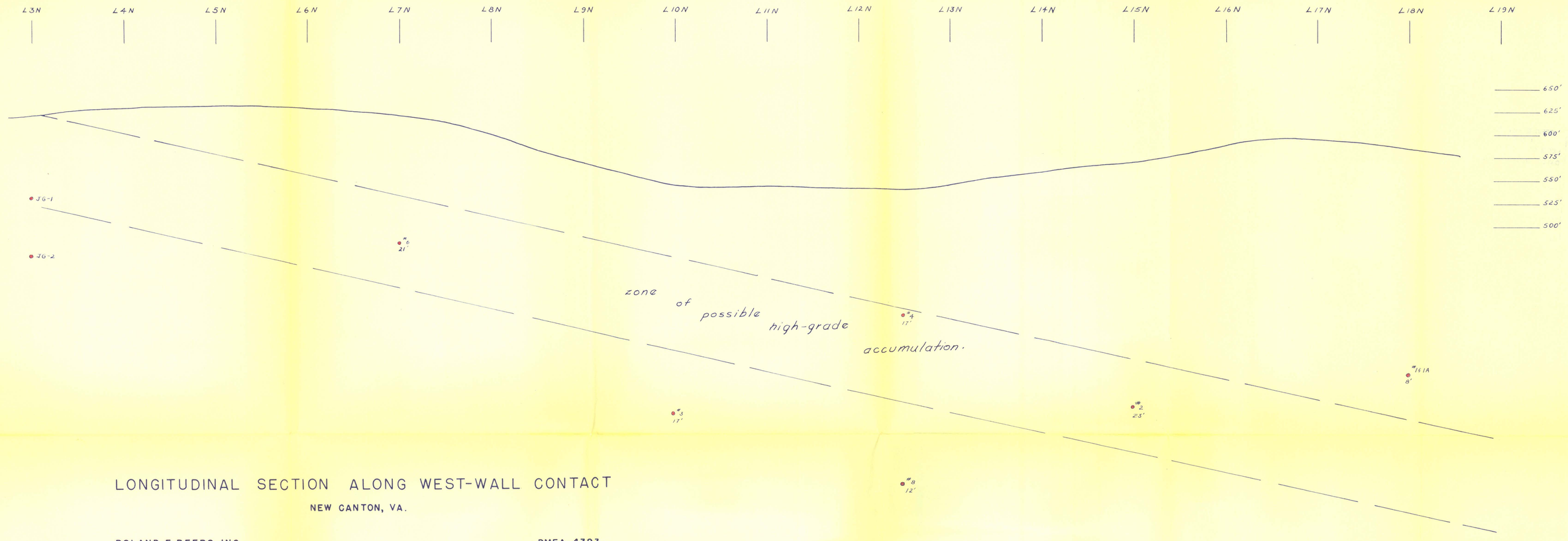
DH-7
90°
DH-6
45°
Phelps
Creek
BASE
LINE
300
400
3000
2000
gammas
millivolts
conductor axis
DRILL HOLE LOCATION MAP
NORTH GRID
NEW CANTON, VA.
ROLAND F. BEERS, INC. — DMEA 4393
1" = 100'
1/57



LONGITUDINAL SECTION ALONG WEST-WALL CONTACT

NEW CANTON, VA.

ROLAND F. BEERS, INC.

DMEA-4393

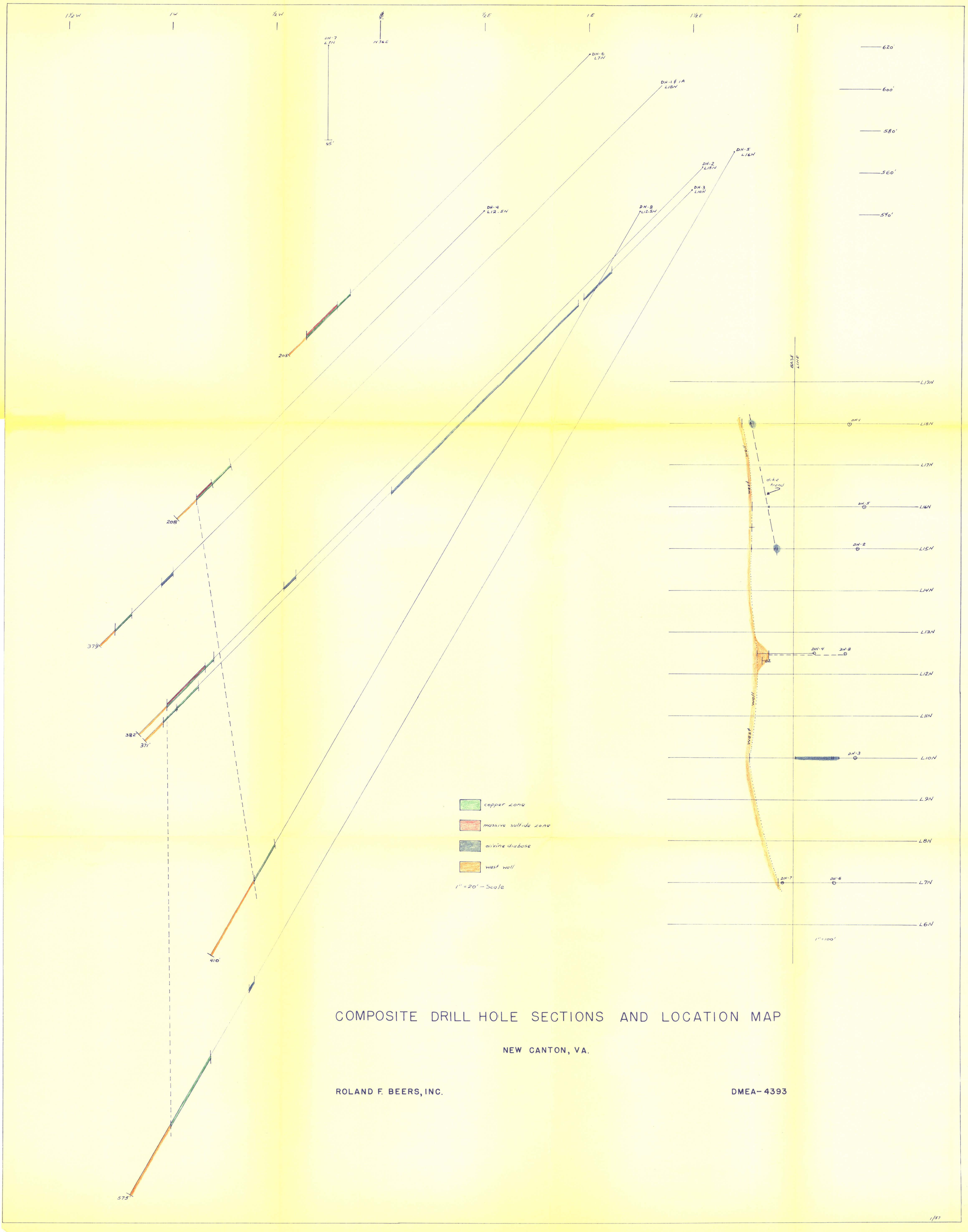
SCALE: 1" = 50'

● - Drill intersection with west-wall.

#6 - Drill hole number.

21' - Width of copper-bearing zone

JG-1 & 2 - Vimco drill holes.



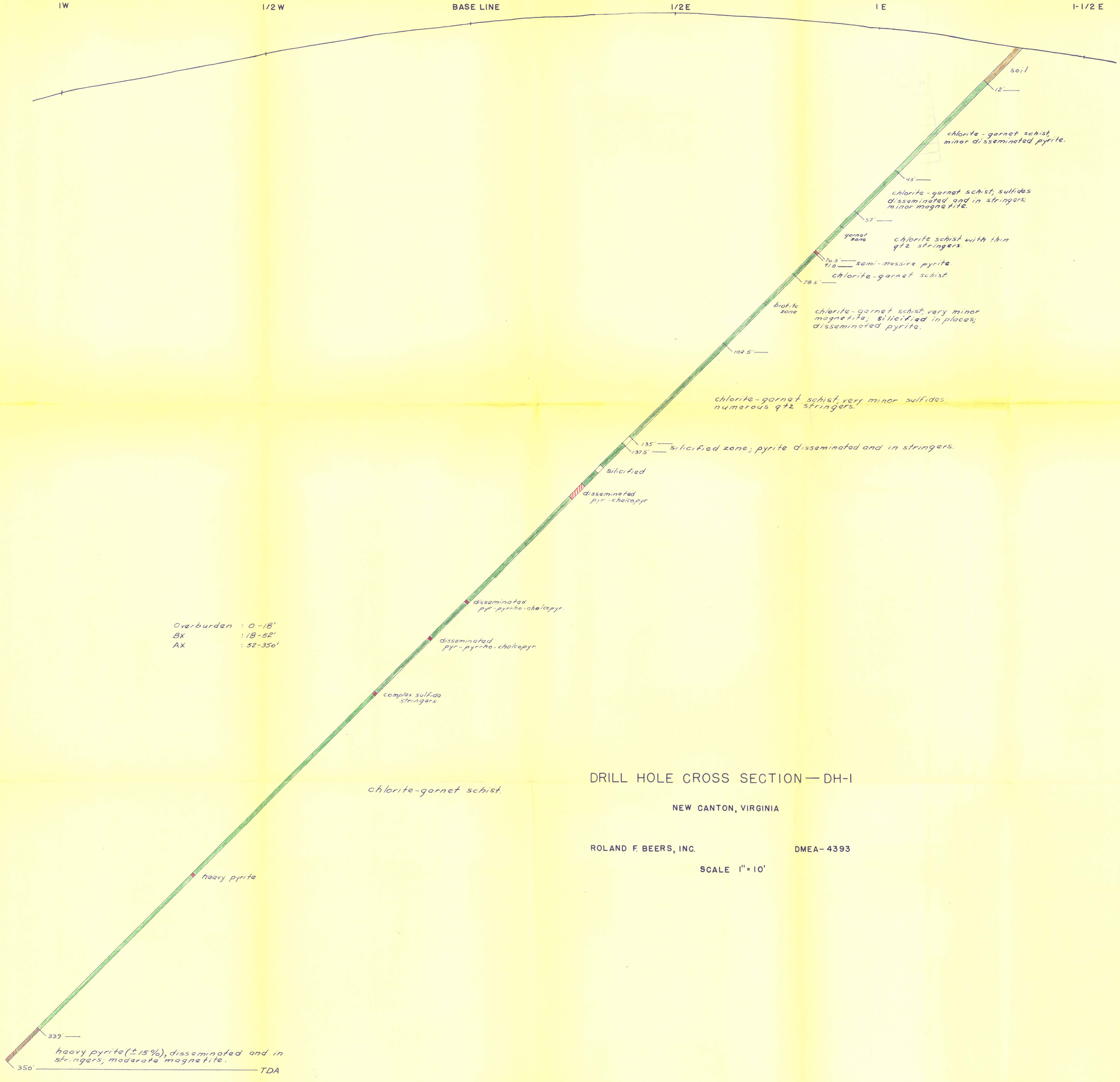
COMPOSITE DRILL HOLE SECTIONS AND LOCATION MAP

NEW CANTON, VA.

ROLAND F. BEERS, INC.

DMEA-4393

1/57



Overburden : 0-18'
BX : 18-52'
AX : 52-350'

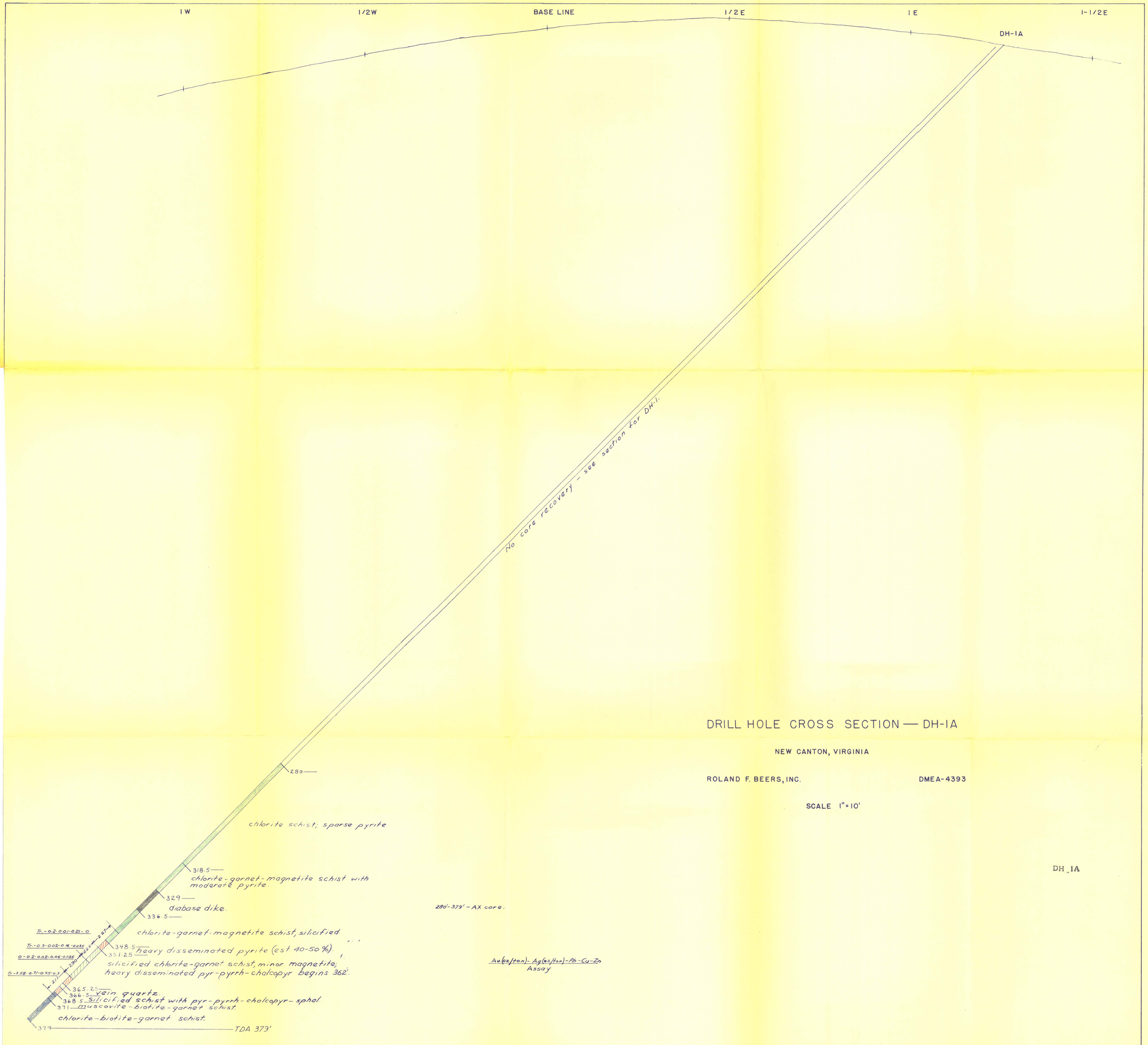
DRILL HOLE CROSS SECTION — DH-1

NEW CANTON, VIRGINIA

ROLAND F. BEERS, INC.

DMEA-4393

SCALE 1" = 10'



DRILL HOLE CROSS SECTION — DH-1A

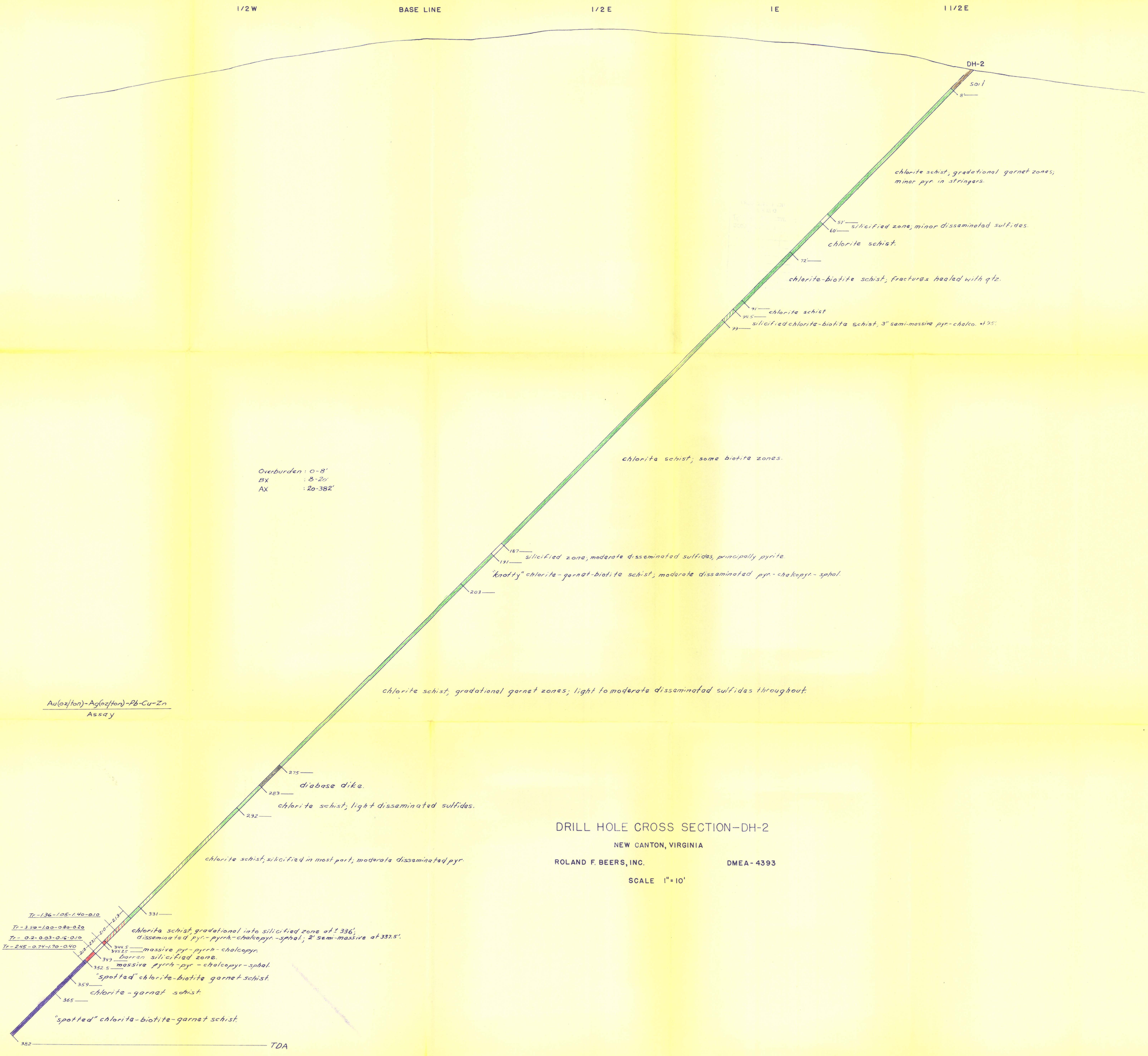
NEW CANTON, VIRGINIA

ROLAND F. BEERS, INC.

DMEA-4393

SCALE 1" = 10'

DH 1A

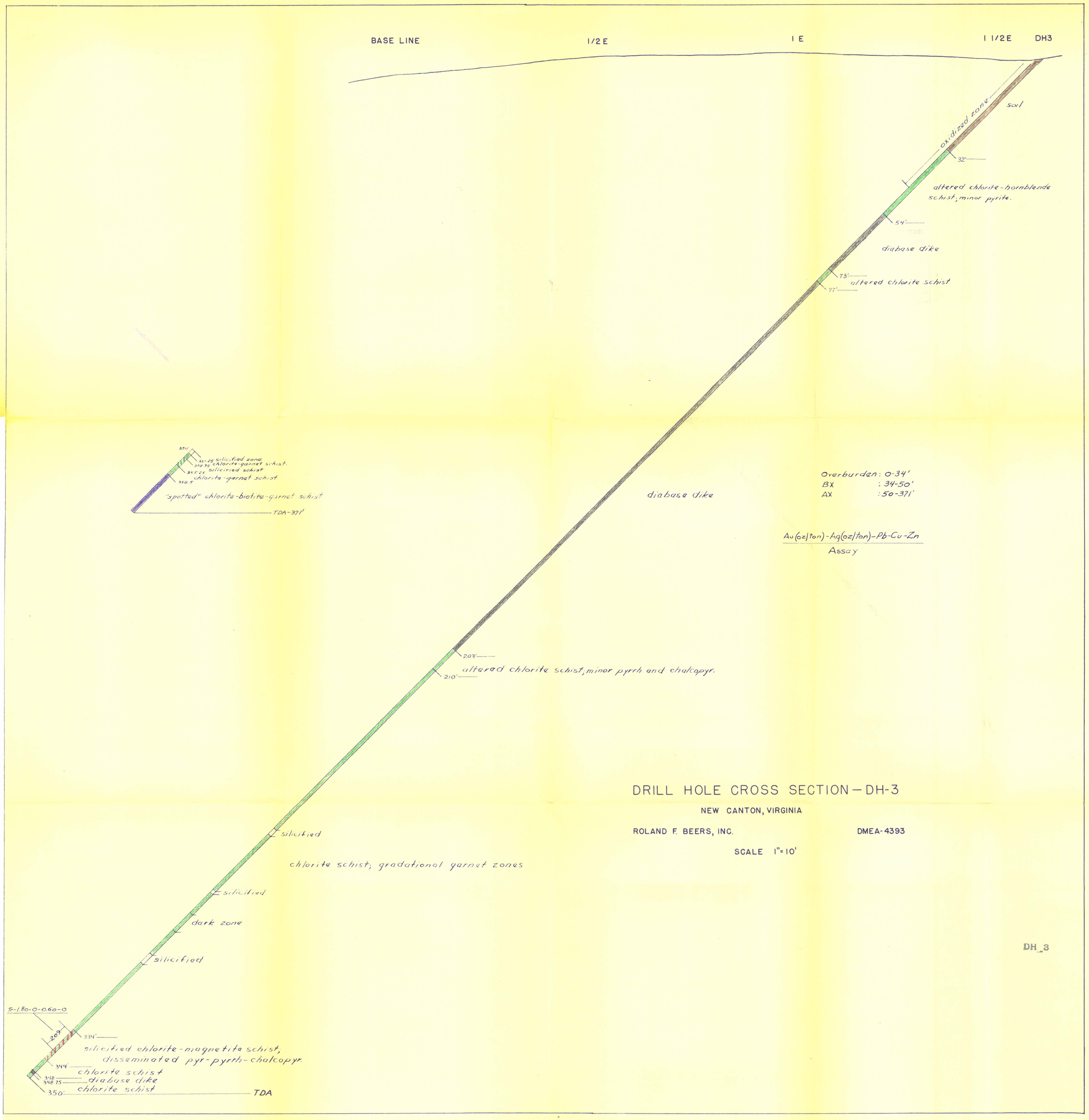


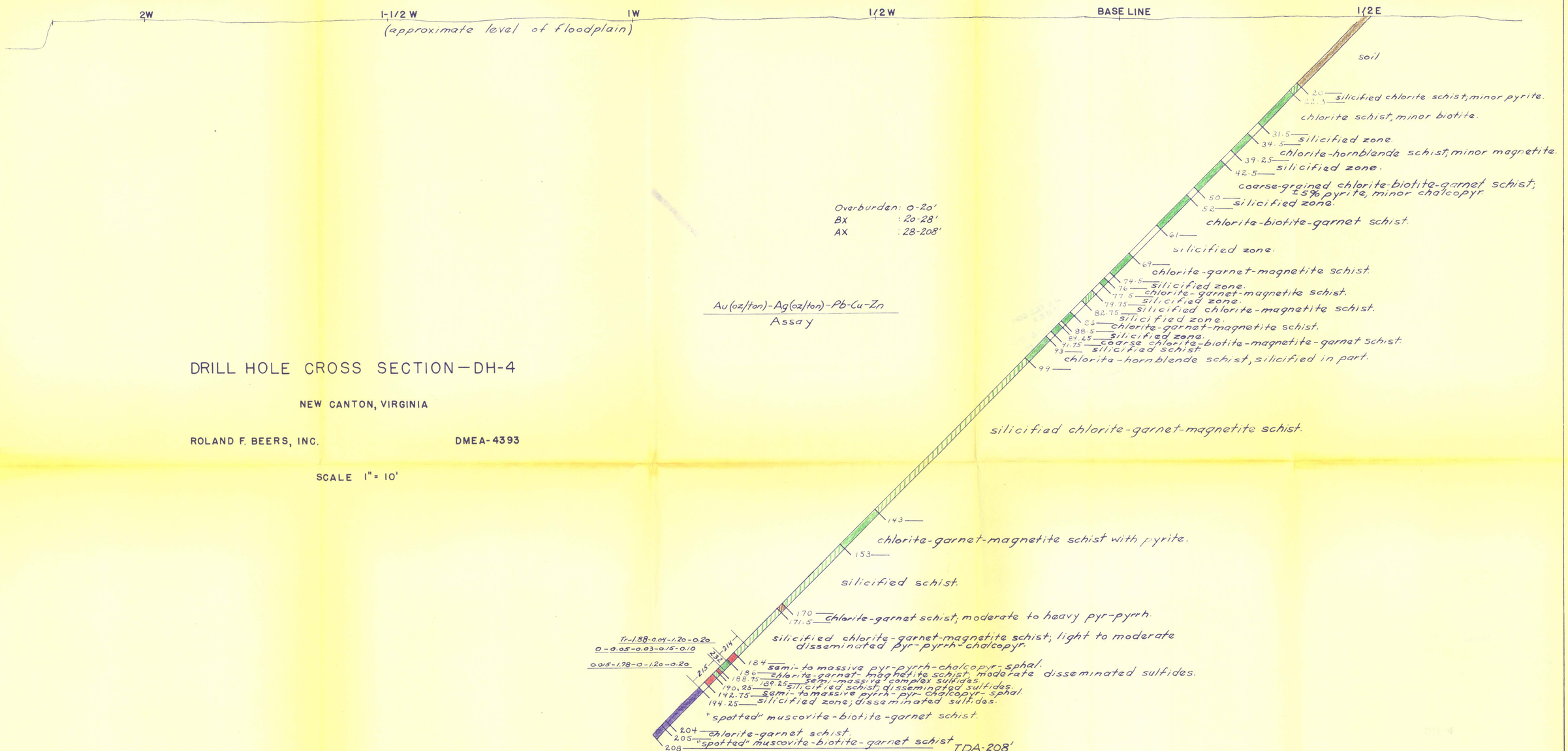
DRILL HOLE CROSS SECTION—DH-2

NEW CANTON, VIRGINIA

ROLAND F. BEERS, INC. DMEA-4393

SCALE 1" = 10'


BASE LINE
1/2 E
1 E
1 1/2 E
DH3
soil
oxidized zone
32'
altered chlorite-hornblende schist; minor pyrite.
54'
diabase dike
73'
77'
altered chlorite schist
203'
210'
altered chlorite schist; minor pyrrh. and chalcopyr.
silicified
chlorite schist; gradational garnet zones
silicified
dark zone
silicified
Tr-1.80-0.060-0
209
334'
silicified chlorite-magnetite schist, disseminated pyr-pyrrh-chalcopyr.
344'
chlorite schist
348
348.75
diabase dike
350'
chlorite schist
TDA
350'
351.25 silicified zone
352.75 chlorite-garnet schist.
355.25 silicified schist
chlorite-garnet schist
358.5
"spotted" chlorite-biotite-garnet schist
TDA-371'
diabase dike
Overburden: 0-34'
BX : 34-50'
AX : 50-371'
Au(oz/ton)-Ag(oz/ton)-Pb-Cu-Zn
Assay
DRILL HOLE CROSS SECTION — DH-3
NEW CANTON, VIRGINIA
ROLAND F. BEERS, INC.
DMEA-4393
SCALE 1"=10'
DH_3



DRILL HOLE CROSS SECTION—DH-4

NEW CANTON, VIRGINIA

ROLAND F. BEERS, INC. DMEA-4393

SCALE 1" = 10'

DRILL HOLE CROSS SECTION—DH-5

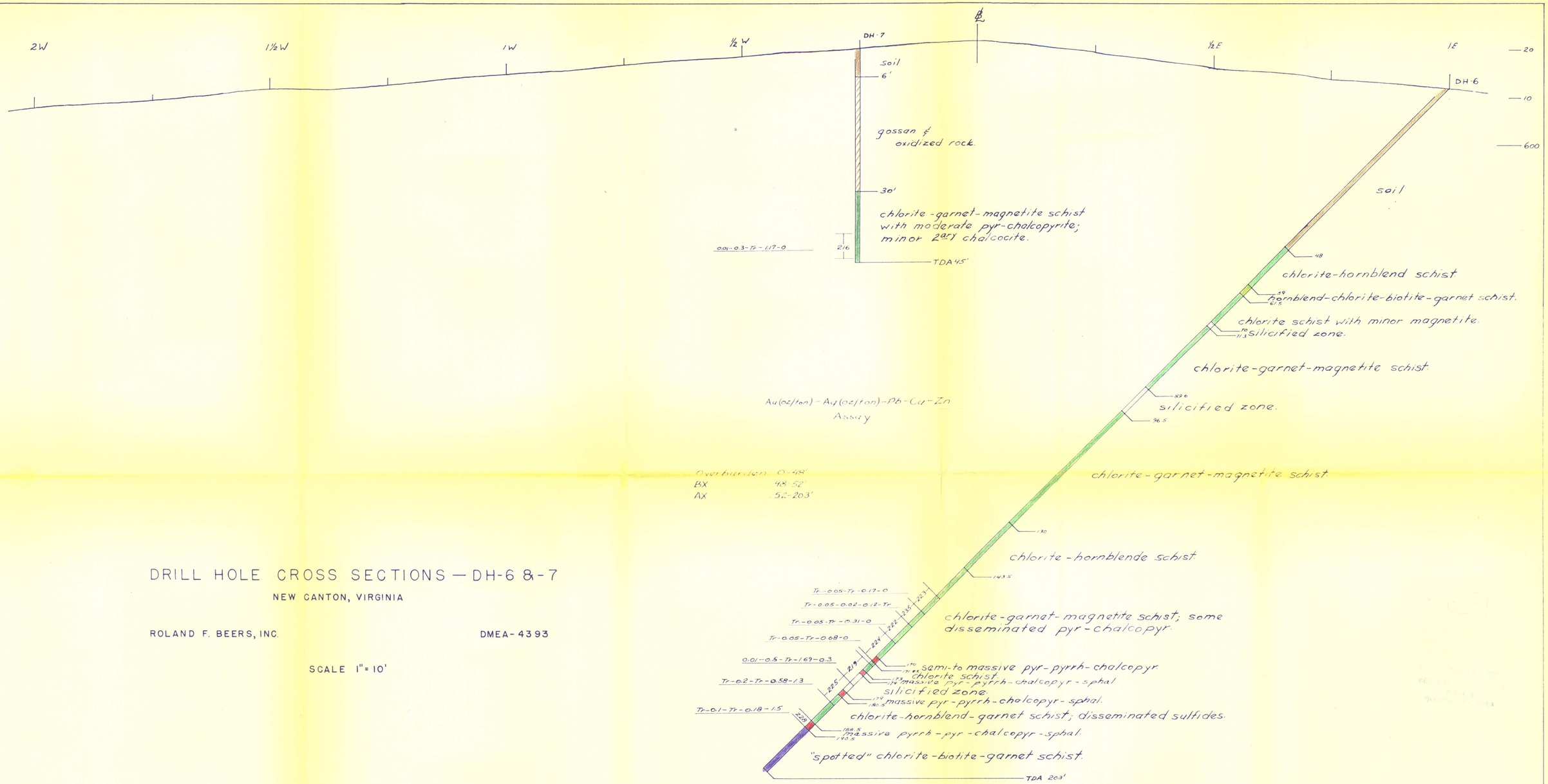
NEW CANTON, VIRGINIA

ROLAND F. BEERS, INC. DMEA-4393

SCALE 1" = 10'

Overburden : 0-4'
BX : 4-10'
AX : 10-575'

Au(oz/ton)-Ag(oz/ton)-Pb-Cu-Zn
Assay



Au(oz/ton) - Ag(oz/ton) - Pb - Cu - Zn
Assay

Overburden 0-48'
BX 48-52'
AX 52-203'

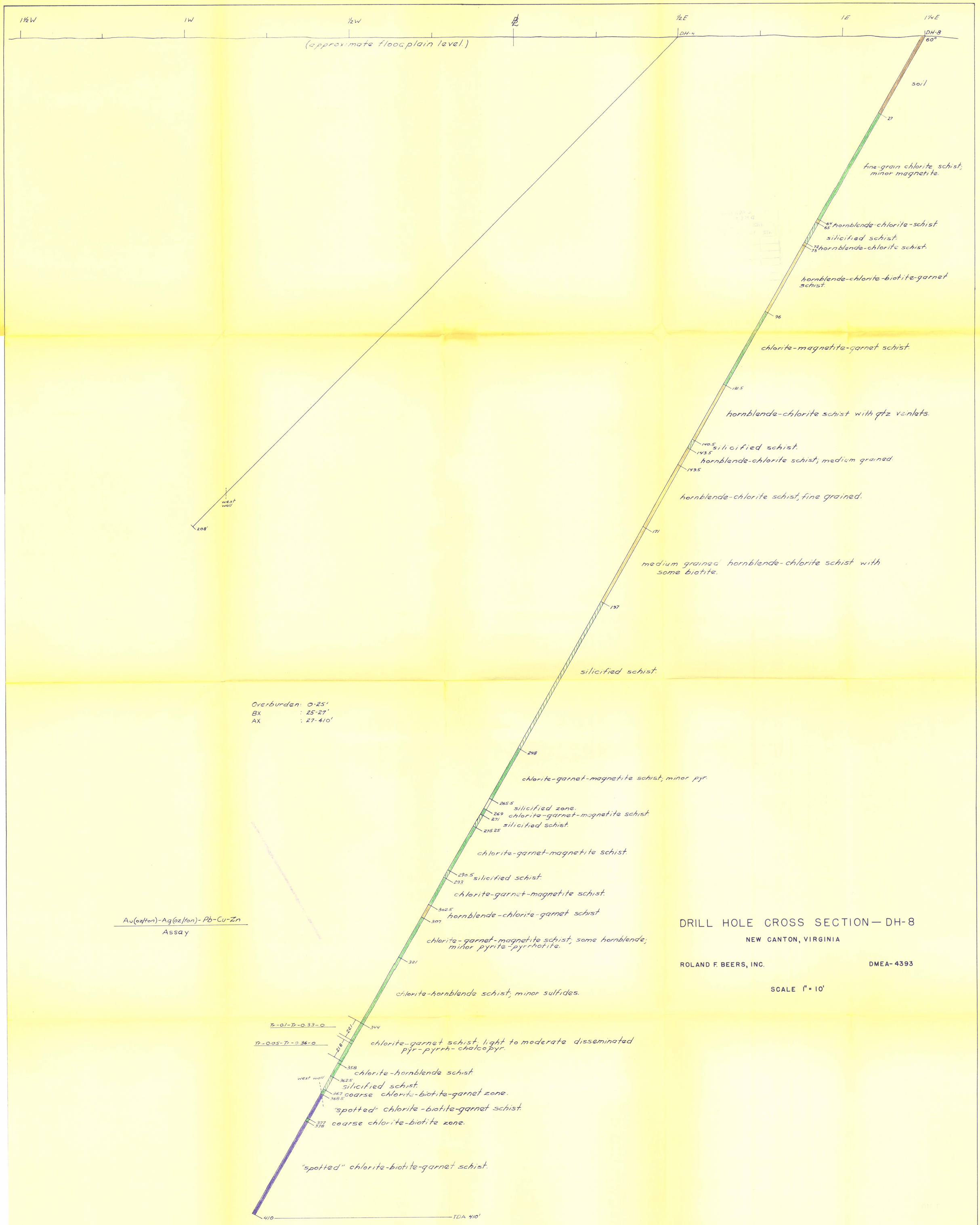
DRILL HOLE CROSS SECTIONS — DH-6 & -7

NEW CANTON, VIRGINIA

ROLAND F. BEERS, INC.

DMEA-4393

SCALE 1" = 10'



DRILL HOLE CROSS SECTION — DH-8

NEW CANTON, VIRGINIA

ROLAND F. BEERS, INC.

DMEA-4393

SCALE 1" = 10'