UMONT MINING INC.

DRILL HOLE LOG

Project: Norwich Mine Silver Bow Co., Montana

Diamond Drill Hole # 1

Location: East drift from 400 level of Plutus shaft.

Direction of hole: N 45° E., Inclination of hole + 5°
Coordinates of collar of hole: 5515 N., 5643E
Coordinates of toe of hole: apox 5575 N., 5703 E
Elevation of collar of hole: assumed 612 ±
Elevation of toe of hole: assumed 618 ±

Length of Hole: 86.5'
Size of cone: 11' Bx, 4' Ax, 71' Ex
Cone recovery: In altered country rock 25% ±
In vein structure 0.1' in 5 foot run of rods
Date hole started - 1/8/57; completed 1/22/57
Type of drill and size: Canadian Boyles Bros.

Cone sample assays: None
Cuttings or sludge sample assays:

11-14'	pannings blank	
14-20	Pannings blank	
20-26	pannings blank	
35-40	pannings blank	assays trace Ag
40-45	pannings blank	assayed 0.2 Ag
45-50	pannings blank	assayed 0.4 Ag
50-55	pannings blank	assayed 0.3 Ag
55-60	pannings blank	assayed 0.1 Ag
60-65	pannings blank	assayed 0.4 Ag
65-70	pannings blank	assayed 0.2 Ag 0.3 Mn
70-75	pannings showed few flecks Azurite, PbS, ZnS	assayed 2.8 Ag 0.4% Mn 0.01 Au tr. Pb 0.05 Zn
75-80	pannings blank	assayed 4.0 oz Ag 0.6% Mn
80-85	panned blank	assayed 0.5 Ag 0.3 Mn

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From	To	Interval -	% Recovery	Description
0	11	11	18%	Fragments even grained to pegmatitic aplite, pyrite eyes
11	15	4	30%	Coarse grained to peg. aplite some clay at 12'.
16	21	5	20%	Coarse grained to peg. aplite coned wall in spite of indicated recovery
21	26	5	16%	Even grained olive green aplite.
26	31	5	20%	Even grained olive green aplitic. Little FeS_2
31	35	4	10%	Even to coarse grained aplite. Little FeS_2

35	40	5	18%	Even to coarse grained aplite. Little FeS_2
40	45	5	16%	Even to coarse grained aplite. Some pegmatitic Qtz and FeS_2
45	50	5	16%	Coarse grained to peg aplite. Some MoS_2
50	55	5	20%	Even to coarse grained to pegmatitic aplite. Clay @ 52'
55	60	5	20%	Pegmatitic aplite. Fair amount FeS_2
60	65	5	50%	Hard, siliceous pegmatitic aplite. Small to fair FeS_2
65	69	4	87.5%	Coarse to peg. aplite. Small to fair FeS_2
69	70	1	0%	Clay-panned blank
70	75	5	0.2%	Few flecks azurite, some FeS_2 in coarse grained aplite. Sludge panned little sulfids and ~~Fe~~Mn CO_3
75	80	5	20%	Coarse to even grained granoaplite to aplite with few peg. inclusions, all somewhat sericitized.
80	85	5	40%	Coarse grained to pegmatitic aplite or granoaplite, all somewhat altered.

JUN 18 REC'D

UMONT MINING INC.

DRILL HOLE LOG

Norwich Mine DMEA Contract in Silver Bow Co., Montana

Hole # S 1

Location: On Plutus Patented claim in Sec. 15., T.3N., R.8W.
At mine coordinates 5520 N, and 5840 E.
Hole drilled vertically from surface
Collar El. assumed 991 feet
Bottom El. as of 5/31/57 assumed 648 feet
Dept drilled during May, 1957 243 feet

Size of core:

NX	5' to 10'
BX	10' to 26'
AX	26' to 243

Core Recovery Nx 60% BX 75% AX average 60%

Hole started: May 9, 1957

Monthly footage 243 feet

Type of Drill Boyles Bros. I H S

Assays:
During the month no assays were taken either of the core or sludge. Panning failed to indicate any sulfide or heavy minerals.

From	to	Interval	Core Recovery	Description of core
0'	9	9	60%	Volcanic ash, loosely consolidated with few inclusions of Biotite dacite tuff
9	29	29	75%	Biotite dacite tuff, blue grey in color. Large included fragments (+ 1 inch) near top of flow, diminishing in size near bottom of hole. Included fragments semi-angular and flattened lying parallel with flow banding all of which appears to dip about 20°.
29	37	8	75%±	Soft, semiconsolidated biotite dacite tuff; light grey in color, less than ½ inch inclusions, flattened, lost water at 37 feet, but no fault structure apparent.
37	60	23	70%+	Soft, semi consolidated biotite dacite tuff; light grey in color; variable soft included fragments of light biotite dacite tuff.

JUN 1 8 REC'D

60	100	40	70% ±	Fault clay at 60 feet, dipping 60° to hole. Possibly rhyolite tuff containing ½" or less biotite dacite tuff fragments. Some orthoclase crystals 3 mm or less. Flow banding steep, ± 60° to 75°. Rock yellowish in color with intermixed grey clay. Mud seam at 92' and at 97' Faulty clay at 100 feet dipping 60° to hole. From 60' to 100' the rock mass is highly altered and contains much unidentified, greasy, talcy mineral, pinkish when wet, and also dickite. Unit from 60' to 100' may represent rhyolite dike possibly 20 feet thick intruded along fault zone dipping 60°, the strike of which is unknown.
100	116	16	50%±	Flat lying, soft, poorly consolidated biotite dacite tuff. Small, flattened fragments included in ashlike matrix. Mud seam at 116 feet.
116	153	37	50% ±	Entire section, flat lying, poorly consolidated biotite dacite tuff. Interval 120 to 121 and interval 139 to 141, a hard reddish rock, possibly rhyodacite. (similar in appearance to like boulders found on the surface and in bulldozer cuts) inclusions embedded in soft biotite dacite tuff were observed. Most of core obtained came from harder members of the flat-lying tuffs.
153	175	22	50%±	Entire section, light colored, flat lying intercalated soft and softer biotite dacite tuffs. Inclusions all small and semi-angular, usually harder than enclosing rock which at times was a sand, the grains of which are all - 20 mesh.
175	176	1	100%	6 inches very fine (-300 mesh) grey clay. Fine grained biotite dacite tuff both above and below member.
176	243	67	50% ±	Entire section intercalated unconsolidated to loosely consolidated biotite dacite tuff. Colors grey, greenish-grey, yellowish and bluish grey. Variable quantities of inclusions but seldom more than 25% of mass is inclusions. At interval 202 feet a pea size, rounded fragment of aplite was observed, and also a small pebble of rhyolite both obviously enclosed in essentially ash.

UMONT MINING INC.

DRILL HOLE LOG

Norwich Mine DMEA Contract in Silver Bow County., Montana

Hole # S 1, continued

JUNE DRILLING

Core Recovery - AX average 69%

Hole Started May 9, 1957

Footage drilled in June 124 feet

Assays: During the month no assays were taken either of the core or sludge. Panning failed to indicate any minerals other than pyrite indigenous to the aplite drilled.

Drill Log continued: (For the interval 0-243 see May report)

From	to	Interval	Core Recovery	Description of core
243	252	9	80% ±	Relatively hard biotite dacite tuff with occasional intercalated mud seams between tuff units - Flow bands 25° to 35° to hole. Few inclusions. 243 - 244 much plagioclase.
252	260	8	100%	Even grained grey biotite dacite tuff. Flow bands 25° - 35° to hole. Many small flattened to semiangular inclusions of biotite dacite tuff. Entire section loosely consolidated.
260	268	8	85% ±	Grey to brownish loosely consolidated biotite dacite tuff. Many small (-½") inclusions. Flow bands 25° to vertical.
268	278	10	85% ±	From 268 - 276 fairly consolidated biotite dacite tuff; colored grey, many small inclusions. Some recemented fractures. Flow bands average about 35° to hole. From 276 to 278 barely consolidated.
278	288	10	75°+	Very soft, barely consolidated, brownish biotite dacite tuff, almost mud. Many small flattened inclusions (-½").
288	289	1	100%	Pegmatite aplite. Considerable oxidized pyrite in quartz "eyes". Some manganese oxide dendrites; occasional blades of black tourmaline.
289	295	6	80% ±	Pegmatite aplite, some oxidized pyrite - sulfide groups surrounded by limonitic stained halo; sparing thin tourmaline Xls. At 295' a 6" stringer of biotite dacite mud was cored, followed immediately by hard aplite.

From	to	Interval	Recovery	Description of core
295	336	25	50% ±	Oxidized pegmatitic aplite. Relect pyrite Xls in quartz eyes. Limonite and jarosite oxidation products. Possible small clay at 317'. Aplite tends to break in small pieces. Very little sericite.
320	336	16	50% ±	Principally easily fractured oxidized pegmatitic aplite. Minor biotite about 325'. From 327 - 336 apparent increase in amount of small pyrite Xls, not noticeably related to pegmatite eyes. Possible specks of chalcopyrite at 331. Pannings blank.
336	342	6	50% ±	Badly broken pegmatitic aplite, to aplite to grano-aplite. ~~Fixture~~ appears to vary from even coarse grained, to even grained and altered ferromagnesian minerals in minor amounts at 341' discolor core.
342	349	7	85% ±	Easily shattered pegmatic aplite. Most of core pale greenish due to chloritic alteration but also light sericitic alteration along some fracture lines Occasional crack coatings of fibrous, clove browm to greenish clay type of material. Pyrite, sparingly scattered thru rock not as oxidized as in upper portion of aplite mass.
349	359	10	85% ±	Coarse to even grained pegmatiric aplite. Some sections appear brittle. When wet, rock is pale olive greenish in color, due probably to chloritic alteration. Pyrite scattered thru rock rather uniformly. Unoxidized and little to no sericite observed. Speck of MoS_2 at 349.9.
359	362	3	50%	Comparatively fresh, even to coarse grained aplite. Occasional flecks biotite and unoxidized pyrite.
362	366	4	12%	Very soft drilling - for 3' no core recovery nor water return. Probable fault.
366	367	1	95%	Coarse pegmatite - aplite. Pyrite oxidized. Sharply different rock than that exposed by core ~~from that revealed by core~~ from 359 - 362.

Summary of June drilling: From 243' to 288' the core revealed intercalated, apparently flat dipping biotite dacite tuff members, similar to the beds described in the May report. From 278 - 288 the material shown by the core was very soft, barely consolidated, brownish biotite dacite tuff containing many small, flattened inclusions. At 288 (assumed elevation 703) the drill penetrated pegmatite aplite, showing considerable oxidized pyrite in the quartz "eyes". Fractures showed manganese dendrites. At 295 the drill penetrated and cored a 6" stringer of biotite dacite mud, followed immediately by hard pegmatite aplite. Aplite continued in the hole to point 362'. As depth was gained the pyrite in the aplite became fresher. Nowhere in the hole was any mineralization shown. From 363 to 366 some type of fault structure was encountered. The drilling at this point was unsatisfactory and an attempt will be made to get some information on this area when reaming goes thru the zone. The hole bottomed at 367 in hard, oxidized pegmatite aplite.

Several interpretations of the core to date may be advanced. I am inclined to believe that the hole passed into aplite fromthe volcanics at 288' displaying a normal volcanic basement complex. I am also inclined to believe that a branch of the "postulated fault" (suggested in the May report) was cut at 363 feet.

Average AX core recovery for June was 69%.

Robert H. Nelson

UMONT MINING INC.

DRILL HOLE LOG

Norwich Mine DMEA Contract in Silver Bow County, Montana

Hole # S 1, continued

JULY DRILLING

Core recovery	AX average 61%
Hole started	May 9, 1957
Hole completed	July 17, 1957
Total length of hole	495 feet
Footage drilled in July	133 feet

Assays: Two assays were taken from the core of a vein cut at 442 feet. The quartz part of the vein from 442 to 444½ assayed 6.30% Mn, 1.6oz Ag, and 0.02 oz Au. (sample DDH, S 1, # 105) The grey to white clay of the vein from 444½ to 450 assayed 1.2% Mn, and 1.0 oz Ag. (sample DDH, S 1, # 106). No other assays from the core, or sludge, were taken.

Drill Log continued: (For the interval 0 to 243 see May report, and the interval 243 to 367 see June report)

From	to	Interval	Core Recovery	Description of core
362	366	4	none	Hole was washed out at 362, reamed to 366 and thereafter washed again. Reamed cuttings carefully panned, but showed only aplite. No clay identified in cuttings.
367	368	1	100%	Hard, fractured coarse-grained aplite with quartz eyes. Fe all oxidized; little to no hydrothermal alteratinn.
368	371	3	21%	Hard but fractured oxidized, coarse and even-grained aplite. No appreciable alteration, except oxidation of pyrite in "eyes" of quartz. (small piece of biotite dacite in core, apparently caved from above).
371	376	5	45%	Oxidized, coarse-grained aplite, some clay alteration (not sericite).
376	378	2	100%	same as 371 - 376.
378	380	2	85%	Oxidized to normal coarse-grained aplite, pyrite "eyes" appear smaller than 10 ft above. Cracks in rock cause shattering of core. Lost circulation at 380 ft; possibly structure, but no fault clay in cuttings.

From	to	Interval	Core Recovery	Description of core
380	385	5	60%	Oxidized, even to coarse-grained aplite. No mineralization or appreciable sericite.
385	387	2	50%	Stringer of iron oxide stained aplite in broken oxidized aplite.
387	392	5	22%	Brecciated and broken oxidized aplite fragments. Possibly some sericite. No indications of fault clay or ore mineralization.
392	393	1	70%	Brecciated and broken oxidized normal aplite fragments. No indications of fault clay or ore mineralization.
393	396	3	65%	Brecciated and broken, oxidized coarse-grained aplite. Possibly some sericite. No mineralization.
396	398	2	90%	Broken, oxidized, and brecciated coarse-grained aplite. Corings essentially sand. No ore minerals.
398	400	2	55%	Even-grained, somewhat oxidized normal aplite. Appreciable tourmaline.
400	402	2	65%	Coarse-grained to pegmatitic aplite. Relatively considerable tourmaline, iron all oxidized, some sericite on fracture seams.
402	405	3	68%	Coarse-grained aplite. Iron all oxidized, some sericite on fracture seams.
405	407	2	80%	Coarse-grained aplite. same as 402 -- 405 some tourmaline and occasional ferromagnesian mineral.
407	410	3	92%	Even-grained aplite. Some small pyrite Xls principall oxidized -- also some mica. Some chloritic alteration in seams.
410	413	3	83%	Slightly pyritized aplite to grano-aplite. Some plagioclase; sericite and chloritic alteration suggested.
413	415	2	55%	Pyritized and chloritized aplite. Some plagioclase and few tourmaline crystals present.
415	417	2	50%	Altered (chlorite and sericite) pyritized even-grained aplite. Few tourmaline crystals.
417	420	3	40%	Same as 415-417. In addition, appreciable plagioclase.
420	422	2	30%	Same as 417-420.
422	423	1	58%	Same as 417-420.
423	426	3	32%	Chloritized and pyritized, small and even-grained aplite. Sericite on seams.

From	to	Interval	Co. Recovery	Description of core
426	430	4	30%	Crushed, pyritized, and brecciated even-grained aplite. Fault clay (± 60° to hole) at 429 feet. Some quartz, FeS_2 -- 1/8 inch pebbles in rubble -- FeS_2 only in pannings.
430	432	2	46%	Crushed, pyritized, completely altered, fine-grained aplite.
432	435	3	28%	Crushed, pyritized, completely altered, fine-grained aplite.
435	437	2	45%	Pyritized, altered, even-grained aplite with small stringers of smoky quartz and a few grains of $MnCO_3$. Sericite throughout the core.
437	442	5	67%	Pyritized, altered, even-grained aplite with small stringers of white quartz and a few grains and small seams (1/16 inch) of $MnCO_3$. Fault clay (30° to hole) at 439. Minor limonite at seams, sericite throughout the core, large grains of quartz near $MnCO_3$.
442	444½	2½	26%	White and black vein quartz with minor pyrite (± 5%) and sphalerite (± 1%). Sample DDH S 1, 105.
444½	447	2½	26%	Fault clay with fragments of vein quartz similar to 442-444½.
447	450	3	71%	Predominately light to dark grey clay. Sample DDH S 1, 106, from 444½ to 450.
450	452	2	71%	Crushed, completely altered, light grey aplite.
452	457	5	30%	Highly crushed, altered, slightly pyritized, even-grained aplite, with a few grains and stringers (1/8inch) of $MnCO_3$. Several grains of sphalerite are associated with the pyrite. From 453-457, rock is completely crushed, sericite and numerous clays are common.
457	461	4	57%	Crushed, altered, pyritized, even-grained aplite with very few stringers of $MnCO_3$ to 462 ft, and grains of sphalerite. 4 inch + medium to hard clay at 460 ft. Sericite is common.
461	463	2	100%	Chloritized and pyritized even-grained altered aplite with sericite on seams. Narrow (1/16inch) fault clays at 461.5 (45° to core) and another at 461.7 (20° to core). Limonite stains near biotite grains.
463	466	3	85%	Pyritized (1-2%) even-grained aplite with limonite staining on fractures. Highly hydrothermally altered, but rock hard enough to core well.

From	to	Interval	Core Recovery	Description of core
466	467	1	90%	Pyritized, even-grained, medium coarsely crystaline, moderately hydrothermally altered aplite with strong limonite staining along fractures and where pyrite was. Stringers of MnO_x along center of core. Color -- buff to brown and black.
467	468	1	73%	Same as 466 - 467.
468	470	2	90%	Coarse-grained to pegmatitic, slightly pyritized, altered aplite with stringers of MnO_x and weak limonite staining. Sericite along seams, orthoclase not altered noticeably.
470	472	2	90%	Slightly pyritized, coarse-grained aplite with minor stringers of MnO_x and weak limonite staining.
472	475	3	83%	Coarse-grained aplite with the 1% ± pyrite commonly oxidized to limonite.
475	480	5	90%	Weakly pyritized, coarse-grained aplite with weak limonite staining along seams, minor MnO_x.
480	495	15	93%	Pegmatitic aplite with minor seams and blebs of limonite and MnO_x staining; Rock locally contains vuggy blebs lined with quartz and orthoclase crystals. Normally light brown to grey, locally stained green by clay? development. (montmorillonite).

Notes: The logging of the July core was accomplished by Robert H. Nelson from 362 ft to 435 ft, and by Robert G. Garwood from 435 ft to 495 ft.

The rock described as pegmatitic aplite in this log is the same type rock that is called Alaskite by the U.S. Geological Survey.

Summary of July drilling: From 367 to 415-423, the rock is rather coarse-grained aplite showing oxidation and development of clay minerals. The ground from 380 on down to the bottom of the hole was fractured and the circulation was lost at many places causing the loss of sludge for study.

From 416-423 to the top of the vein at 442ft, the rock is not hydrothermally altered to any extent; the rock is a fine-grained medium grey to medium greenish-grey aplite.

At 442 and below to the bottom of the hole, the rock becomes hard in the vicinity of 466 on down. The rock is slightly more coarsely crystaline, buff in color, and has manganese and Fe oxide specks and seams. The hard pegmatitic aplite is similar to the foot wall rock found on the 400 level of the Norwich mine.

Respectfully submitted

Robert G. Garwood

Robert G. Garwood
Geologist

UMONT MINING, INC.

DRILL HOLE LOG

Norwich Mine DMEA Contract in Silver Bow County, Montana

Hole # S 2

Location: On Plutus patented claim in Sec. 15, T. 3 N., R. 8 W., at mine coordinates 5415 N, and 5755 E. Hole drilled minus 62.5° north at a collar elevation of assumed 993 ft.

Size of core:
NX 0 to 125 ft.
BX 125 to 146 ft.

Core Recovery:
NX 28%; BX 86%.

Hole Started: July 18, 1957

Hole Completed: July 23, 1957

Footage: 146 ft.

Type of Drill: Boyles Brothers I H S

Assays: No assays were taken, either of the core or sludge. No vein structure was cut and the only mineralization found was due to staining in seams and fractures.

Drill Log

From	to	Interval	Core Recovery	Description of core
0	27.5	27.5	none	Sludge shows decomposed granodiorite to biotite granodiorite. Biotite grains have been badly weathered.
27.5	29	1.5	54%	Light grey, altered, fractured, medium grained aplite. Limonite stains and sericite in seams.
29	70	41	none	Sludge shows decomposed granodiorite to biotite granodiorite which has been weathered; especially the biotite grains.
70	80	10	32%	Partially decomposed, highly altered, weathered, fractured, medium-grained biotite granodiorite. Limonite (2%+) and MnO_x (2%+) in fractures and seams; sericite is common.
80	85½	5½	36%	Weathered, fractured, coarse-grained biotite granodiorite with light-grey very fine-grained aplite dikes (1 in. wide) at 80.5 ft, 82 ft, 84ft, and 85.5 ft. Limonite and MnO_x (both 1%+) in fractures and seams. Montmorillonite clay development.
85½	95	9½	60%	Weathered, altered, fractured, medium-grained biotite granodiorite. Limonite and MnO_x (both 1%+) in fractures and seams.
95	110	15	36%	Partially decomposed, weathered, altered, fractured, medium-grained biotite granodiorite with limonite stains and minor MnO_x in seams. Five in. dike of very fine-grained light grey aplite at 109.5 ft.

110	120	10	35%	Partially decomposed, weathered, altered, fractured, medium-grained biotite granodiorite with limonite and minor MnO_x in seams. Four in. dike of very fine-grained light grey aplite at 119 ft. Light brown Fe stained fault clay at 119½-120 ft with pebble inclusions (60%) of very fine-grained aplite. Pebbles are about ½ in. in diameter.
120	125	5	28%	Partially decomposed, highly weathered fractured, redish-brown, medium to coarse-grained grano-aplite. Montmorillonite and sericite clay development. High Fe stains throughout the core.
BX core				
125	129	4	45%	Weathered, fractured, redish-brown to light grey medium-grained aplite. Montmorillonite and sericite clay; FeO_x stains in seams.
129	131	2	82%	Medium-grained, fractured, light grey aplite. Minor FeO_x in seams. Fault clay at 131 ft -- badly decomposed aplite 6 in. above and 3 in. below clay.
131	132	1	90%	Medium-grained, fractured and faulted ~~granodiorite~~ dacite tuff. Thin medium fault clays throughout the core. (40° to hole at 132').
132	133	1	85%	Redish brown, coarse-grained, altered ~~aplite~~ dacite tuff with numerous fault clays. Clays are thin and of medium consistency.
133	134	1	90%	Light grey, fine-grained dacite tuff.
134	146	12	100%	Medium-grained, highly faulted biotite dacite tuff. The core shows numerous thin (1/32 in.-1/16 in) fault clays which are pink and light grey. Rock increases in hardness from 144 to 146 and shows alignment of the biotite grains perpendicular to the core.

Summary of drilling: From 0 ft to 125 ft, the rock is a weathered, partially decomposed fractured biotite, granodiorite with small intrusions of a fine-to medium-grained aplite. The fractures and seams in the rock are filled with FeO_x and MnO_x. From 125 ft to 134 ft. the rock is a medium-grained aplite which has been fractured and weathered. From 134 ft to 146 ft, the core is a dacite tuff with numerous thin fault clays.

It is believed that the contact between the aplite and dacite tuff is a fault zone consisting of numerous small faults and no true plane of weakness which would be represented by a single, or a few clays. The north wall of the fault zone has apparently moved down in relation to the South wall, but the amount of movement has not yet been determined.

Respectfully submitted
Robert G. Garwood
Robert G. Garwood
Geologist

UMONT MINING, INC.

DRILL HOLE LOG

Norwich Mine DMEA Contract in Silver Bow County, Montana

Hole # S 2A

Location: On Plutus Patented claim in Sec 15, T. 3 N., R. 8 W., at mine coordinates N 5415 and E 5754. Hole drilled N 10° W at an angle of minus 77.5°. Surface collar elevation of 993 ft assumed.

J U L Y D R I L L I N G

Size of core: NX, 0 to 171 ft
BX, 171 to - ft.

Core Recovery: NX average 21%, BX 100%

Hole Started: July 24, 1957

Monthly footage: 180 ft.

Type of drill: Boyles Brothers I4S

Assays: No assays of the core or sludge were taken.

Drill Log

From	to	Interval	Core Recovery	Description of core
0	58	58	1%	Sludge shows decomposed, weathered, granodiorite to biotite granodiorite. Biotite grains have been weathered. At 57.5 ft, a 4 in. band of medium-grained aplite with FeO_x stains and minor biotite grains is found.
58	64	6	40%	Partially decomposed, weathered fractured, medium-grained biotite granodiorite with limonite and MnO_x (1± %) in seams and fractures. Sericite clay development.
64	75	11	46%	Weathered, fractured, medium to coarse-grained biotite granodiorite with limonite staining on seams and fractures. Sludge is sandy biotite granodiorite with FeO_x stained quartz.
75	92	17	44%	Partially to completely decomposed, fractured, weathered medium-grained granodiorite. FeO_x and MnO_x stains on seams and fractures -- quartz is limonite stained, and some mica was noticed. Fault clay at 75.5 ft (70° to hole) of red and orange medium clay. Montmorillonite clay alteration.
92	93	1	72%	Yellowish to white and grey fault clay. Clay shows numerous minor slips and is of a medium to hard consistency.
93	104	11	72%	Partially decomposed, fractured, slightly weathered medium-grained biotite granodiorite with 1%± phenocrysts (½ in. in diameter) of plagioclase. Decrease in FeO_x staining from above core, no MnO_x staining. Montmorillonite clay alteration and an increase in mica.
104	107.5	3.5	69%	Fine-grained granodiorite to rhyolite with very fine-grained

				inclusions of granodiorite (2+, about ½ in. in diameter. Rock is hard with very slight alteration; FeO_x is deposited in the fractures.
107.5	110	2.5	62%	Partially decomposed, fractured, weathered, granodiorite with FeO_x stains in fractures and seams.
110	115	5	none	Lost water at 110 ft and a 5 ft run was made with no core returned. Hole was branded and sludge was returned on the next run.
115	119	4	17%	Light grey aplite with limonite staining in seams. Rather fresh biotite blebs in core. Sludge appears to be granodiorite which indicates stringers of aplite in decomposed granodiorite. Lost water at 119 ft.
119	133	14	14%	Light grey, fine-grained aplite with FeO_x staining and minor montmorillonite clay development. Very thin, soft, fault clay at about 120 ft. No sludge returns.
133	138	5	14%	Light grey, fine-grained aplite with a few quartz "eyes" which have been oxidized. Sludge is high in quartz with minor biotite. Hole was cemented back 40 ft, then re-drilled.
138	161	23	11%	Light grey, fine-grained aplite. Core is a combination of aplite pebbles and hard layers. Aplite is slightly FeO_x stained and has quartz "eyes", biotite grains, tremolite grains and shows minor MnO_x staining. Sludge is high in quartz and contains minor, rather fresh, biotite flakes.
161	170	9	20%	Bluish grey, fine-grained aplite with sericite clay development in seams. Sludge is quartz sand with biotite flakes.
170	171	1	20%	Hydrothermally altered, tan, fine-grained aplite with sericite clay alteration and slight FeO_x staining.
EX core				
171	175	4	100%	Fine-grained, yellow to light grey aplite. Limonite and MnO_x in seams and fractures. Rock is harder and less altered than above -- Montmorillonite clay in seams. Very fine grains of pyrite in minor amounts in the rock.
175	180	5	100%	Coarse-grained, greyish, slightly altered aplite with very minor fine-grained pyrite streaks. FeO_x (1±%) and MnO_x (1± %) stains in seams and fractures.

Summary of drilling. From 0 ft to 110 ft, the rock is a weathered, partially decomposed, fractured biotite granodiorite and granodiorite. From 110 ft to 180 ft, the rock is a light grey, fine-grained aplite with fractures large enough in which the drilling water may be lost. The aplite has been weathered to a slight extent and at 170 ft, it probably has been hydrothermally altered.

At least two faults were cut by the drilling, one at 75.5 ft and the other at 92 ft. The fault at 92 ft appears to be a fault zone with numerous thin slips throught the foot-thick clay.

Respectfully submitted

Robert G. Garwood
Geologist

UMONT MINING INC.

Drill Hole Log

Norwich Mine, DMEA Contract in Silver Bow County, Montana

Hole # S2A, continued

August Drilling

Size of core: BX 171 to 395: AX 395 to 497

Core Recovery: BX 82%; AX 65%
Hole Started: July 24, 1957
Hole Completed: August 21, 1957
Monthly Footage: 317 ft
Type of Drill: Boyles Brothers IHS
Assays: Four assays were taken; two from what is believed to be the Plutus vein and two from what is believed to be the Norwich vein. Because of faulting, both veins were penetrated twice. The plutus vein assays 1.8% Mn and 0.6 oz Ag from 233 to 234', and 0.7% Mn and 1.2 oz Ag from 277 to 278.5'. The norwich vein assays 4.5% Mn, and 9.6oz Ag from 423 to 424.5', and 3.9% Mn and 0.8 oz Ag from 449 to 450.5'. Although the coring shows a wider vein structure for the Norwich vein than sampled, the sections not sampled were definitely barren of ore.

Drill Log
Core

From	To	Interval	Recovery	Description of Core
180	188	8	100%	Slightly altered, medium grained, bluish-grey aplite with 1 in. inclusions of Pegmatitic aplite at 184 and 184.2ft -- grains average ¼ in. in diameter. FeOx staining in fractures, Montmorillonite clay development in seams. 6 in. hydrothermally altered zone at 187 ft.
188	190	2	100%	Bluish-grey Pegmatitic aplite. Quartz and orthoclase grains about ¼ in. in diameter. Slight Montmorillonite clay development.
190	192	2	100%	Reddish-grey hydrothermally altered coarse-grained aplite. FeOx stain throughout the core; abundant montmorillonite clay development. Probable fault clay at 191.3 ft.
192	196	4	100%	Bluish-grey, fractured, coarse-grained aplite with very slight FeOx staining and MnOx inclusions. 3 in. band of pegmatitic aplite at 195 ft.
196	200	4	100%	Bluish-grey, fractured, medium-to coarse-grained aplite with FeOx and minor MnOx staining. 1 in. inclusions of pegmatitic aplite at 197 ft.; 1/8 to ¼ vein of quartz in center of core from 198 to 200 ft. Montmorillonite clay development.

From	To	Interval	Core Recovery	Description of Core
200	203	3	100%	Weathered, altered, fractured, medium-grained aplite. Pyrite and biotite grains have been weathered to limonite. Rock is brown in color, with abundant FeOx and minor MnOx ~~and minor~~ MnOx staining in seams and fractures. Montmorillonite clay development.
203	204.5	1.5	100%	Bluish-and yellowish grey pegmatitic aplite with grains ¼ in. in diameter and minor FeOx and MnOx. Abundant Montmorillonite clay development.
204.5	207.5	3	100%	Greenish-yellow and white, hydrothermally altered, pegmatitic aplite. Abundant montmorillonite clay development, some chlorite, and bleaching of feldspars. FeOx and minor MnOx staining.
207.5	216	8.5	95%	Bluish-grey, weathered, pegmatitic aplite. Grains range from 1/8 to ¼ in. in diameter. Pyrite completely oxidized to limonite.
216	219	3	100%	Weathered, fractured, altered, coarse-grained aplite. Increase in FeOx stains and a slight increase in MnOx stains, probable fault clay at 219 ft.
219	224	5	88%	Weathered, fractured, altered, coarse-grained to pegmatitic aplite. FeOx stains and an increase of MnOx (1%) in seams and fractures.
224	233	9	66%	Bluish-grey, fractured, coarse-grained aplite. Rock is more weathered from 229 to 233 than rest of the core. Increase in MnOx (2+%) and a decrease in FeOx. Probable fault clay at 230 ft; probable soft spots from 230 to 232 as only 33% of the core was recovered from this interval.
233	234	1	70%	Hydrothermally altered, fractured, white aplite with thin (1/8 to ¼ in.) stringers of MnOx throughout the core -- very minor FeOx. Assay No. DDH S2A 322, 1.8% Mn, 0.6 oz Ag.
234	239	5	60%	Hydrothermally altered, partially crushed, bleached, and FeOx stained fine-grained aplite. Inclusions of MnOx (2%) throughtout the core.
239	24.5	6.5	66%	Hydrothermally altered, crushed, fine-to medium-grained aplite. Rock is sandy in spots and has been faulted. FeOx and MnOx (2%) inclusions in crushed zone. ½ in. faulted vein of quartz, pyrite, limonite and minor MnOx at 245.5 ft. About 50% of the pyrite has been weathered to FeOx.

From	To	Interval	Core Recovery	Description of Core
245.5	259	13.5	80%	Slightly weathered, fractured, bluish to yellowish-grey, coarse-grained aplite. FeOx stains and minor MnOx stains in seams and fractures. Pyrite (1+%) has been partially altered to FeOx; Some sericite clay development.
259	262	3	100%	Light grey, rather fresh and hard, coarse-grained granoplite with inclusions or blebs of biotite. Small amount (1%) of fresh pyrite and a slight amount of montmorillonite clay. Thin, hard fault clay at 262 ft.
262	266	4	100%	Light grey, altered, crushed, coarse-grained granoplite. Inclusions or blebs of pyrite (1-2%) and sericite clay development. Possible thin fault clays.
266	273	7	100%	Light grey to greenish-grey, fractured, slightly altered, granoaplite. Inclusions or blebs of pyrite. Sericite clay development. 1" dark grey medium hard fault clay at 270.5 ft and thin soft clay in seams.
273	283	10	96%	Light brown, highly fractured, weathered, Coarse-grained, aplite. Abundant MnOx in seams and fractures and ¼ to 3/8" stringers at 277 ft. Blebs of pyrite have been partially weathered to FeOx Montmorillonite Clay development. Assay No. DDH S2A, 323 from 277 to 278.5; 0.7% Mn, 1.2 oz Ag.
283	286	3	67%	Light grey to white, fractured, weathered, and altered, medium-grained aplite. Pyrite almost completely altered to FeOx. No MnOx. Sericite clay development.
286	291	5	76%	Light brown, fractured, weathered, altered, medium-grained aplite. 1-2% MnOx stains in fractures. Pyrite oxidized to FeOx, sericite clay development.
291	311	20	69%	Light grey, fractured, weathered, fine-to medium-grained aplite. FeOx stains in seams, fractures, and around pyrite grains. Montmorillonite clay development.
311	314	3	0	No core or sludge. Drilled very soft--- the rods almost dropped the entire 3 ft.
314	318	4	60%	Light grey, altered, highly crushed, medium-grained aplite. Pebbles 3/8 in. across of aplite included in the core. Pyrite rather "fresh". Fault clay at 317 ft. (50° to hole); ¼" of medium hard, dark grey clay.

From	To	Interval	Core Recovery	Description of Core
318	325	7	100%	Light greenish grey, pyritized, fractured, altered, coarse-grained granoaplite. Pyrite 2-3% is in form of grains and inclusions. 1/8" fault clay at 319.5 ft Montmorillonite clay development.
325	331	6	100%	Light greenish-grey, pyritized, fractured altered, coarse-grained granoaplite to granodiorite. Pyrite is in form of fine grains in blebs, and streaks throughout the rock.
331	345	14	100%	Light greenish grey, pyritized, slightly altered, fractured granoaplite. Pyrite 2-3% in fine grained blebs and streaks and included in very thin vein quartz at all angles to the core. ½ in. vein of pyrite at 333 ft. vuggy filling of quartz ½ in. wide at 334 ft. Sericite and chloritic clay alteration.
345	349	4	100%	Light greenish grey, pyritized, altered, fractured, granoaplite. Pyrite is fine-grained in blebs throughout the rock. Sericite and chloritic clay alteration.
349	352	3	100%	Light grey, slightly pyritized, rather "fresh" coarse-grained aplite with inclusions of pegmatitic aplite. Sericite clay development.
352	368	16	81%	Light grey, altered, crushed, slightly pyritized, coarse-grained aplite to granoaplite. Highly crushed fault zones at 354 to 356 ft and 360 to 362 ft.
368	374	6	67%	Light brown, fractured, weathered, crushed, coarse-grained granoaplite with MnOx and FeOx staining on seams and fractures.
374	378	4	96%	Light greenish-grey, fractured, pyritized, coarse-grained to pegmatitic granoaplite. Slight FeOx staining from 376 to 378.
378	379	1	90%	Fractured, oxidized MnOx and FeOx stained, coarse-grained granoaplite. Pyrite almost completely oxidized.
379	388	9	55%	Fractured, slightly oxidized, medium-to coarse-grained aplite. Fault zone with numerous small fault clays and hydrothermal alteration from 384 to 385.5. Pyrite slightly oxidized to 384 ft.
388	395	7	45%	Greenish-grey, fractured, slightly pyritized medium-grained aplite. Pyrite in fine grained blebs. Thin clays at 394 ft.

SEP 16 REC'D

From	To	Interval	Core Recovery	Description of Core
AX core				
395	397	2	77%	Fractured, oxidized, medium-grained aplite with FeOx and MnOx (both 1-2%) in fractures. Pyrite completely oxidized.
397	412	15	79%	Light grey, slightly fractured, slightly hydrothermally altered, medium-grained aplite. Pyrite is fresh fine grains in clusters. Montmorillonite clay alteration; Fault clays at 399 and 403.5 ft.
412	417	5	86%	Light grey, fractured, pegmatitic aplite. FeOx stains in fractures from 413.5 to 415. Stringers of vein quartz along axis of core from 415 to 417 ft. Pyrite is fine grained in inclusions in rock.
417	427	10	84%	Light to dark grey, highly crushed, hydrothermally altered aplite with minor MnCO3, pyrite, and numerous fault clays. Rock has been crushed and altered to the extent it is sand in a matrix of clay. Small grains of MnCO3 in clay seams and apparently less than 1%. Clays at 422, 423 (6" wide), 424, and 427 ft. Assay No. DDH S2A 360 from 423 - 424.5' - 4.5% Mn, 9.6 oz Ag.
427	443	16	53%	Light grey, slightly altered and fractured, pyritized, fine- to medium-grained aplite. Pegmatitic inclusions at about 437 ft. Pyrtie (1-2%) is in crystals and small inclusions colored black because of fine grains. Very minor tremolite and chalcopyrite? grains. Montmorillonite clay development.
443	449	6	30%	Partially crushed, altered, fractured, pyritized, light greenish-grey, medium-grained aplite. Core recovery very poor in badly crushed zones. One MnCO3 grain ¼ in. in diameter at 448 ft. Fault clays at 444 and 449 ft. Pyrite is rather "fresh".
449	458	9	55%	Completely crushed aplite in a fault clay and clay matrix. MnCO3 grains in blue clay matrix from 449 to 450.5. Quartz stringers with very minor sphalerite? from 455 to 457. Pyrite grains throughout the core. Clays are medium hard. Assay No. DDH S2A 361 from 449 - 450.5' - 2.9% Mn, 0.8 oz Ag.
458	463	5	64%	Light greenish-grey slightly fractured coarse-grained aplite to granoaplite. Small inclusions of pyrite. Montmorillonite clay alteration. Pebbles from 462 to 463 ft.

SEP 16 REC'D

463	472	9	5%	Light greenish g , slightly fractured, coarse-grained aplite to granoaplite with pegmatitic inclusions. Montmorillonite clay alteration. Grain of chalcopyrite? at 471 ft. Pyrite (1-2%) is black fine-grained inclusions and yellow crystals. Slightly oxidized zone from 470 to 471 ft.
472	485	13	61%	Light yellow and pinkish-grey pegmatitic aplite with ½ in. grains of quartz and orthoclase. Pyrite (2-3%) in form of large yellow grains. Crushed zone and clay at 479 ft.
485	492	7	73%	Pinkish to dark green coarse-grained aplite to granoaplite. Pyrite is oxidized to hematite in zones from 488 to 490 ft.
492	497	5	68%	Dark green, fine-grained aplite. Pyrite altered to hematite. Rock contains abundant fine-grained quartz.

Summary of August Drilling

The hole from 180 to 497 ft was drilled completely in aplite, although the USGS would probably term the pegmatitic aplite as alaskite.

The ground through which this hole was drilled is badly fractured and contains numerous water channels and/or fracture zones. Except for 5 ft of sludge return at 397 ft, when the hole was cased with AX casing, no sludge was returned below 250 ft.

It is believed that a normal fault (strike and dip unknown) has caused both the Plutus and Norwich veins to be drilled twice by this hole.

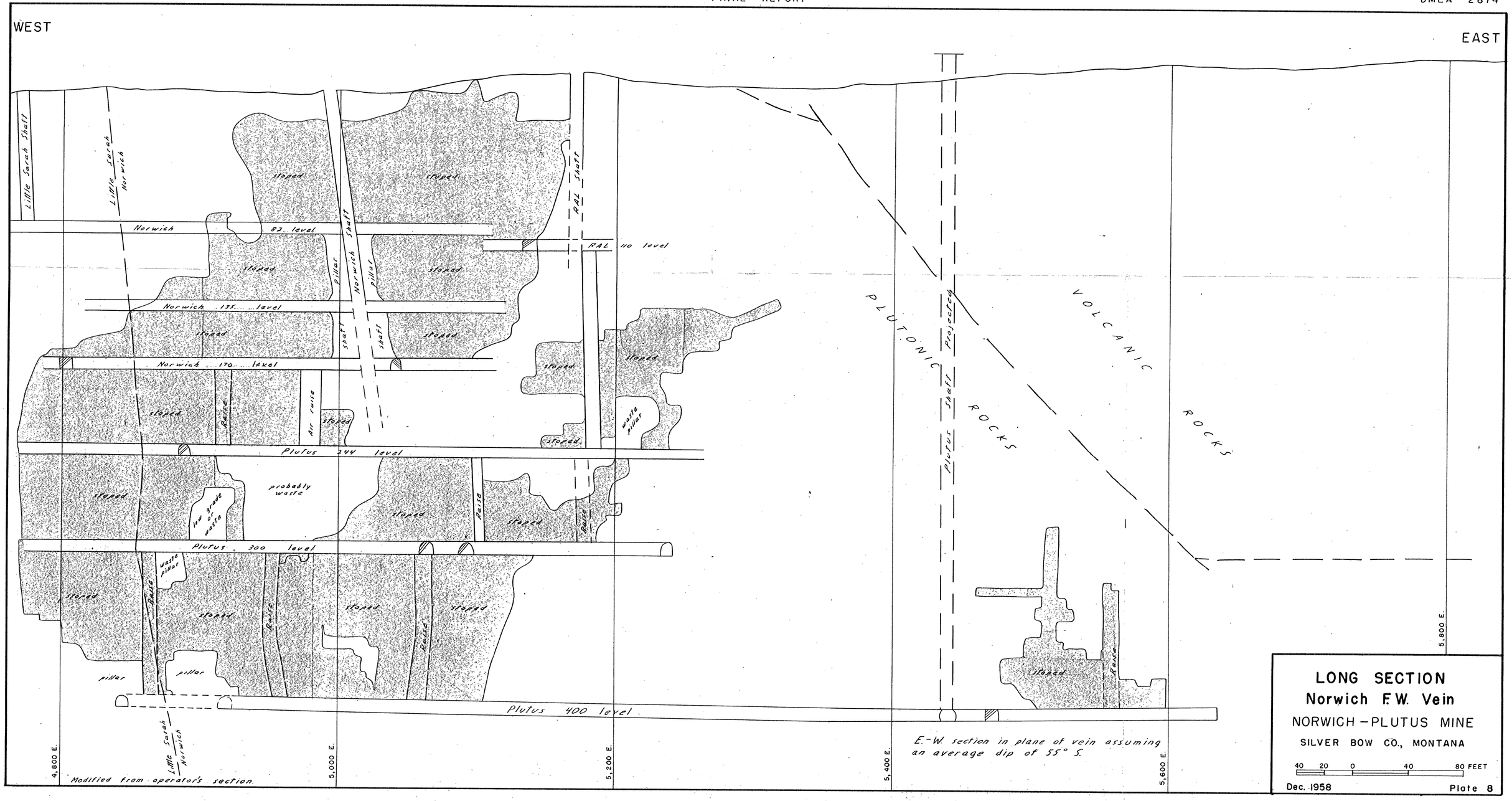
From the extent of oxidation of the pyrite grains, water in large quantities may be expected when drifting eastward from the Plutus shaft. Evidence of ground water circulation below 450 ft is seen in the oxidation of the pyrite grains to hematite in the otherwise uneffected wall rock encountered at 463 ft.

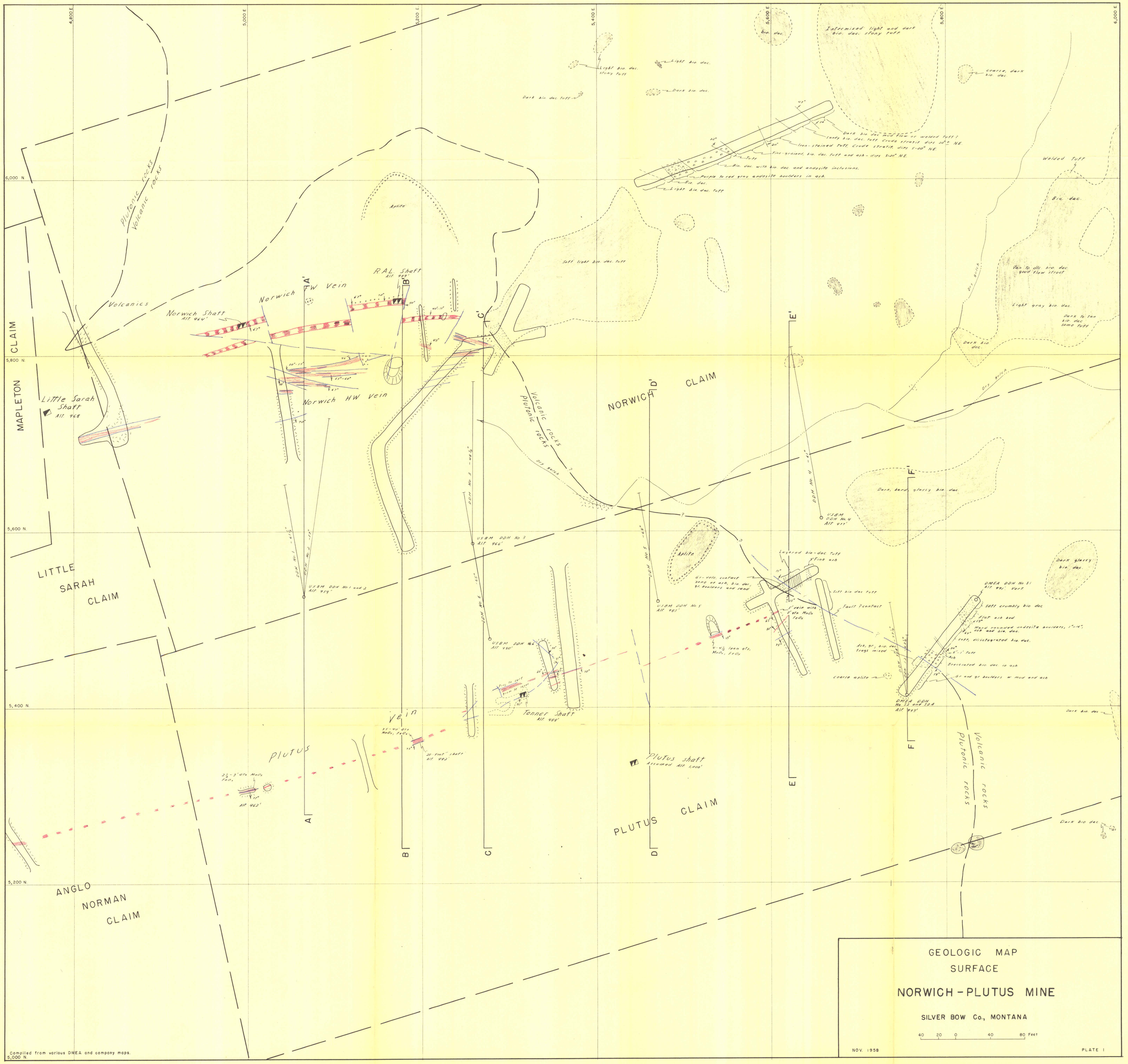
The Plutus vein was located only by stringers of MnOx in slightly altered aplite and shows very weak mineralization. A vein structure of approximately 8 ft forms the Norwich vein. It is highly faulted, hydrothermally altered, and crushed. Mineralization is lacking in any appreciable amount in the area of the drill hole. Apparently most of the MnCO3 encountered is drag ore in the wide hanging wall fault clay.

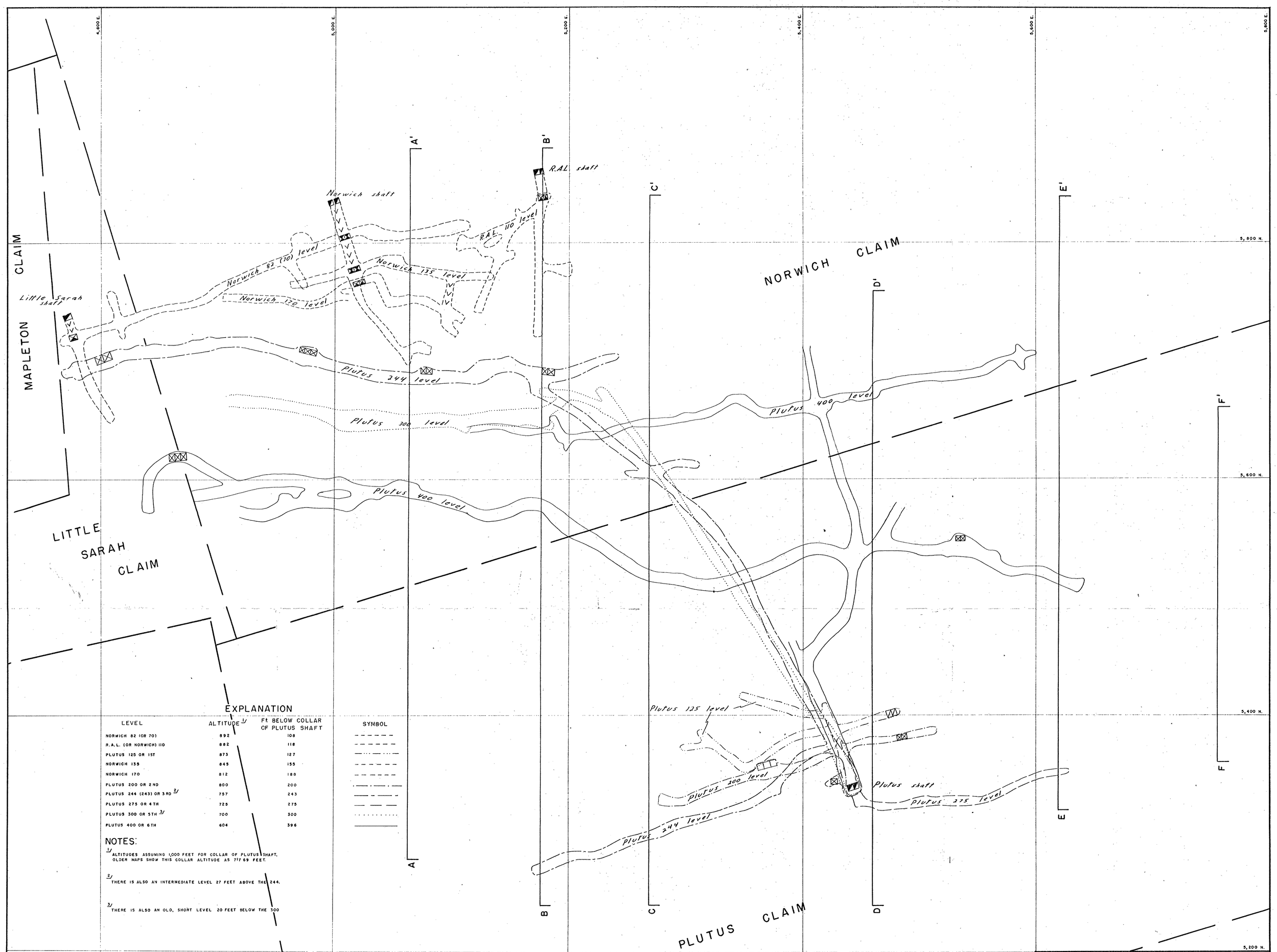
Respectfully submitted

Robert G. Garwood

Robert G. Garwood
Geologist


WEST
EAST
Little Sarah Shaft
Little Sarah
Norwich
Norwich 82 level
Norwich 135 level
Norwich 170 level
Plutus 244 level
Plutus 300 level
Plutus 400 level
Norwich Shaft
Pillar
Pillar
Shaft
Shaft
RAL Shaft
RAL 110 level
Plutus Shaft
Projected
Air raise
Raise
waste pillar
stoped
probably waste
low grade waste
pillar
PLUTONIC ROCKS
VOLCANIC ROCKS
4,800 E.
5,000 E.
5,200 E.
5,400 E.
5,600 E.
5,800 E.
E.-W. section in plane of vein assuming an average dip of 55° S.
Modified from operator's section.
LONG SECTION
Norwich F.W. Vein
NORWICH-PLUTUS MINE
SILVER BOW CO., MONTANA
40 20 0 40 80 FEET
Dec. 1958
Plate 8


GEOLOGIC MAP
SURFACE
NORWICH - PLUTUS MINE
SILVER BOW Co., MONTANA
40 20 0 40 80 Feet
NOV. 1958
PLATE I
Compiled from various DMEA and company maps.
MAPLETON CLAIM
LITTLE SARAH CLAIM
NORWICH CLAIM
PLUTUS CLAIM
ANGLO NORMAN CLAIM
Little Sarah Shaft
Alt. 968
Norwich Shaft
Alt. 964'
RAL Shaft
Alt. 968'
Norwich HW Vein
Norwich FW Vein
Plutus vein
Tonner Shaft
Alt. 988'
Plutus shaft
Assumed Alt. 1,000'
Volcanics
Plutonic rocks
Volcanic rocks
Aplite
Dry gulch
Welded tuff
Bio. dac.
Light bio. dac.
Dark bio. dac.
Dark bio. dac. tuff
Light bio. dac. stony tuff
Intermixed light and dark bio. dac. stony tuff
coarse, dark bio. dac.
Dark bio. dac. mud flow or welded tuff?
Sandy bio. dac. tuff. Crude stratif. dips 30° NE
Iron-stained Tuff. Crude stratif. dips 5-20° NE
Fine-grained, bio. dac. tuff and ash - dips 5-30° NE
Bio. dac. with bio. dac. and andesite inclusions.
Purple to red gray andesite boulders in ash.
Light bio. dac. tuff
Soft light bio. dac. tuff
Tan to dk. bro. dac. good flow struct.
Light gray bio. dac.
Dark to tan bio. dac. some tuff
Dark, hard, glassy bio. dac.
Dark glassy bio. dac.
Layered bio-dac tuff & fine ash
Gr-volc. contact some qtz, bio. dac, gr. boulders and sand
Soft bio dac tuff
Fault ? contact
5' vein with 2' qtz MnO2 FeO2
Soft crumbly bio dac
Flat ash bed
Hard rounded andesite boulders, 1'-14", ash and bio. dac.
Soft, disintegrated bio. dac.
Ash
Brecciated bio. dac in ash
Gr and qtz boulders w mud and ash
Coarse aplite
Ash, gr, bio. dac frags mixed
Dark bio. dac
USBM DDH No 1 and 2 Alt. 959'
USBM DDH No 3 Alt. 966'
USBM DDH No 4 Alt. 973'
USBM DDH No 5 Alt. 983'
USBM DDH No 6 Alt. 950'
DMEA DDH No 51 Alt. 991' Vert.
DMEA DDH No 52 and 52A Alt. 993'
30-foot shaft Alt. 983'
Alt. 962'
5,800 E
5,000 E
5,200 E
5,400 E
5,600 E
5,800 E
6,000 E
6,000 N.
5,800 N.
5,600 N.
5,400 N.
5,200 N.
5,000 N.



EXPLANATION

LEVEL	ALTITUDE 1/	Ft. BELOW COLLAR OF PLUTUS SHAFT	SYMBOL
NORWICH 82 (OR 70)	892	108	
R.A.L. (OR NORWICH) 110	882	118	
PLUTUS 125 OR 1ST	873	127	
NORWICH 135	845	155	
NORWICH 170	812	188	
PLUTUS 200 OR 2ND	800	200	
PLUTUS 244 (243) OR 3RD 2/	757	243	
PLUTUS 275 OR 4TH	725	275	
PLUTUS 300 OR 5TH 3/	700	300	
PLUTUS 400 OR 6TH	604	396	

NOTES:

1/ ALTITUDES ASSUMING 1,000 FEET FOR COLLAR OF PLUTUS SHAFT. OLDER MAPS SHOW THIS COLLAR ALTITUDE AS 717.69 FEET.

2/ THERE IS ALSO AN INTERMEDIATE LEVEL 27 FEET ABOVE THE 244.

3/ THERE IS ALSO AN OLD, SHORT LEVEL 20 FEET BELOW THE 300

COMPOSITE LEVEL MAP

NORWICH-PLUTUS MINE

SILVER BOW CO, MONTANA

40 20 0 40 80 FEET

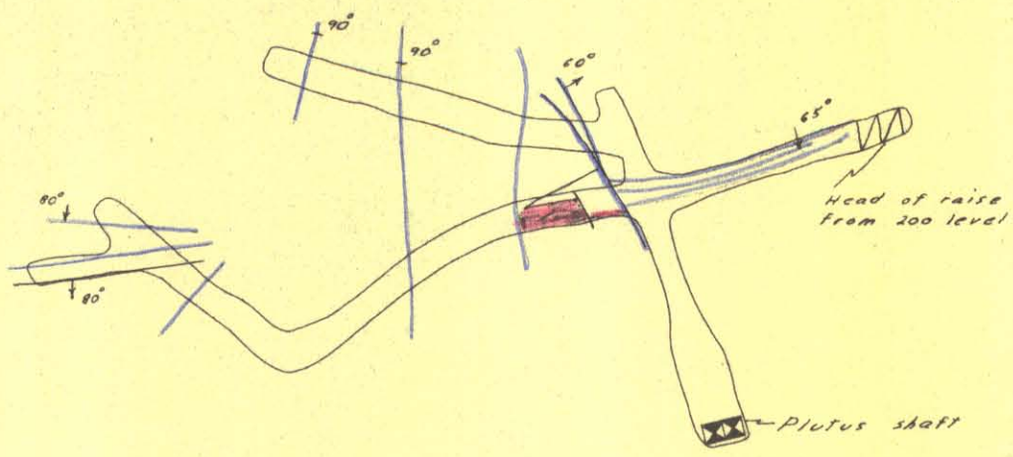
NOV. 1958

PLATE 2

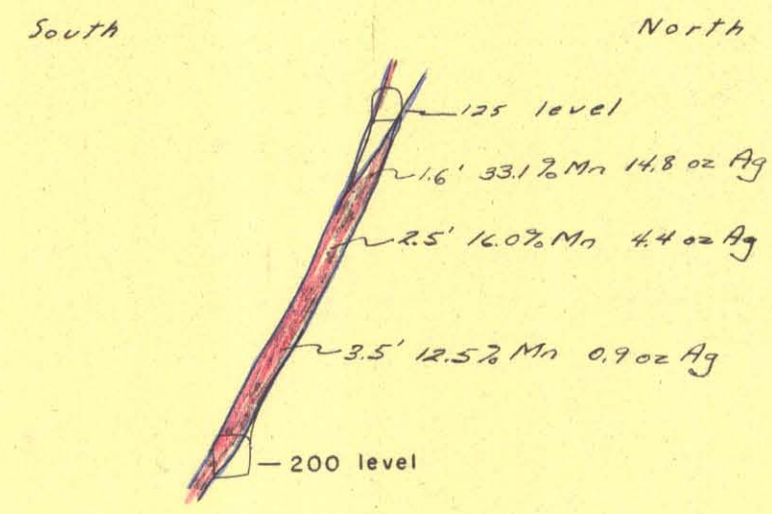
UNITED STATES
DEPARTMENT OF THE INTERIOR

PREPARED FOR
OFFICE OF MINERALS EXPLORATION
FINAL REPORT

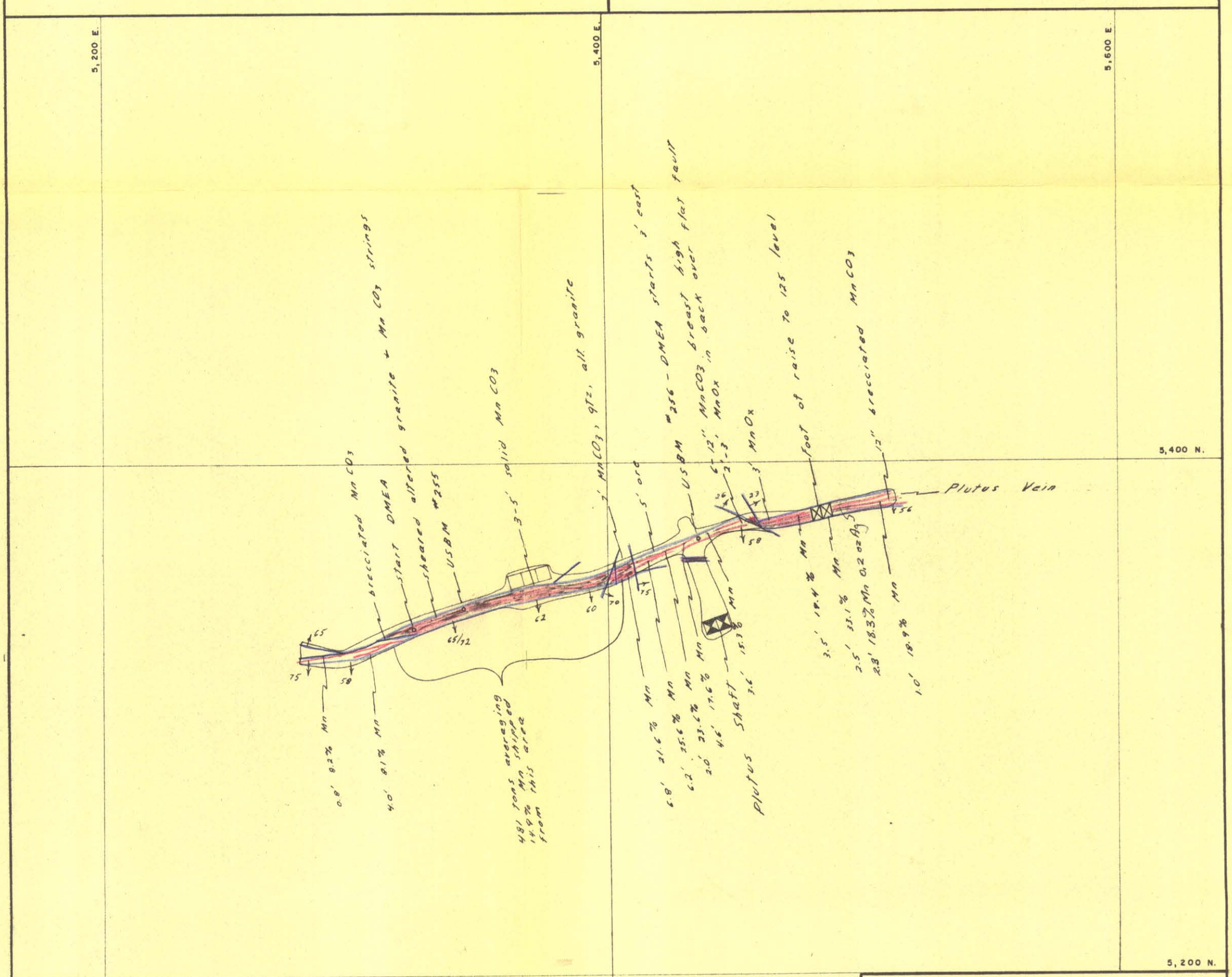
DOCKET NO.
DMEA 2874



GEOLOGIC MAP
portions of 125 level accessible from raise.



CROSS SECTION OF RAISE
from 200 to 125 level looking west.



COMPILED FROM COMPANY MAPS.

GEOLOGIC MAP

200 (2nd) Level

NORWICH - PLUTUS MINE

SILVER BOW CO., MONTANA

0 20 40 80 FEET

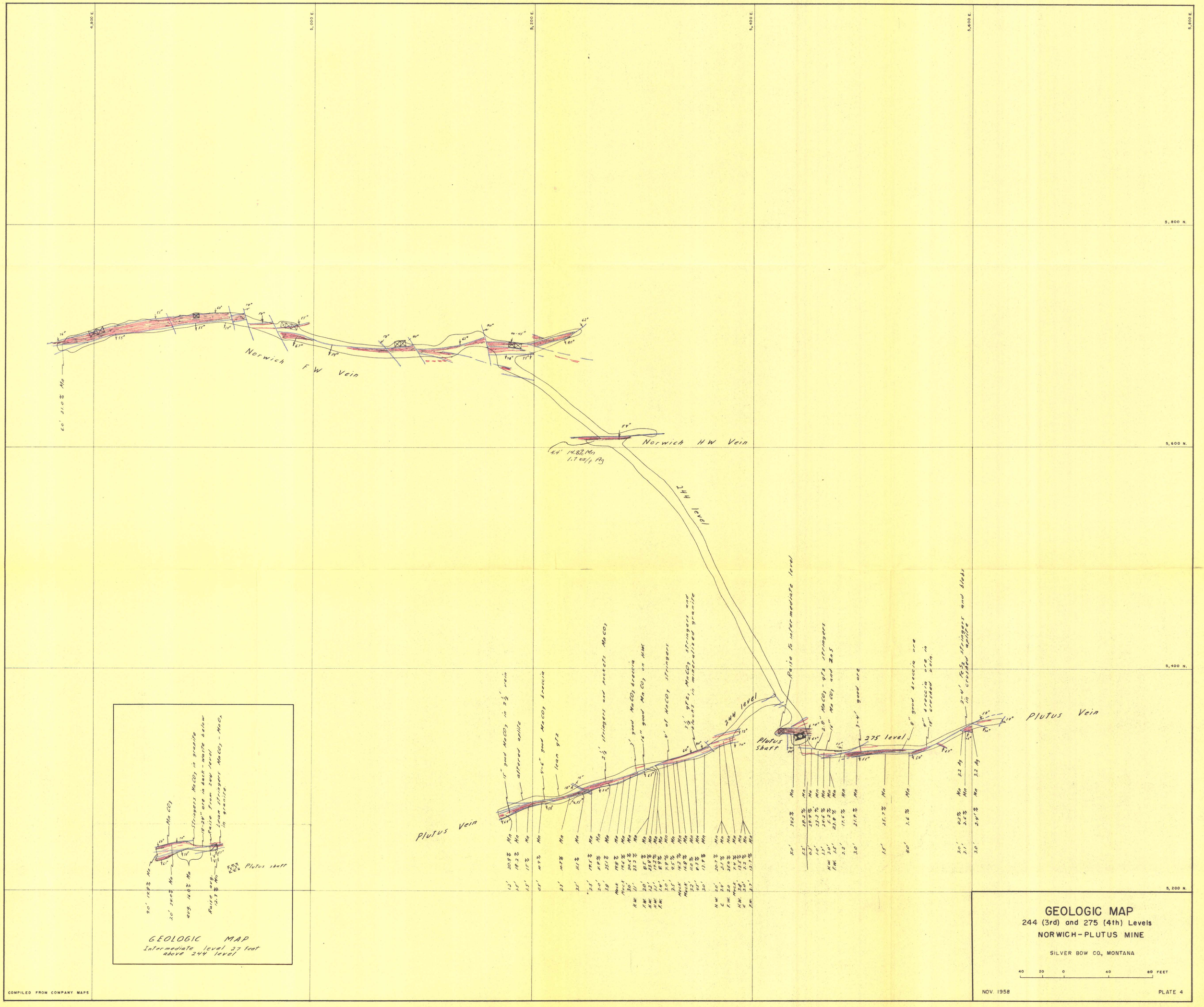
NOV. 1958

Plate 3

UNITED STATES
DEPARTMENT OF THE INTERIOR

PREPARED FOR
OFFICE OF MINERALS EXPLORATION
FINAL REPORT

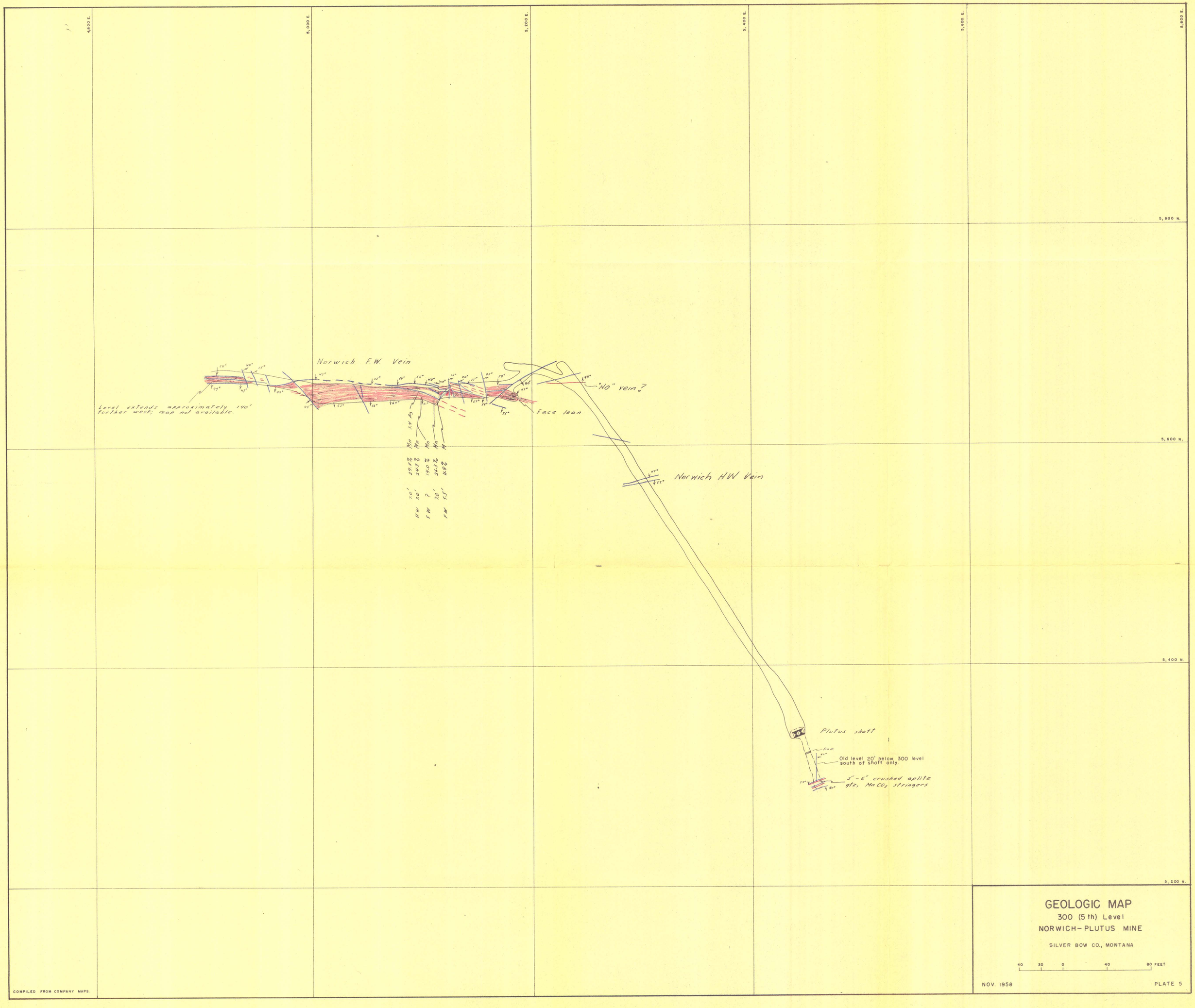
DOCKET NO. DMEA 2874

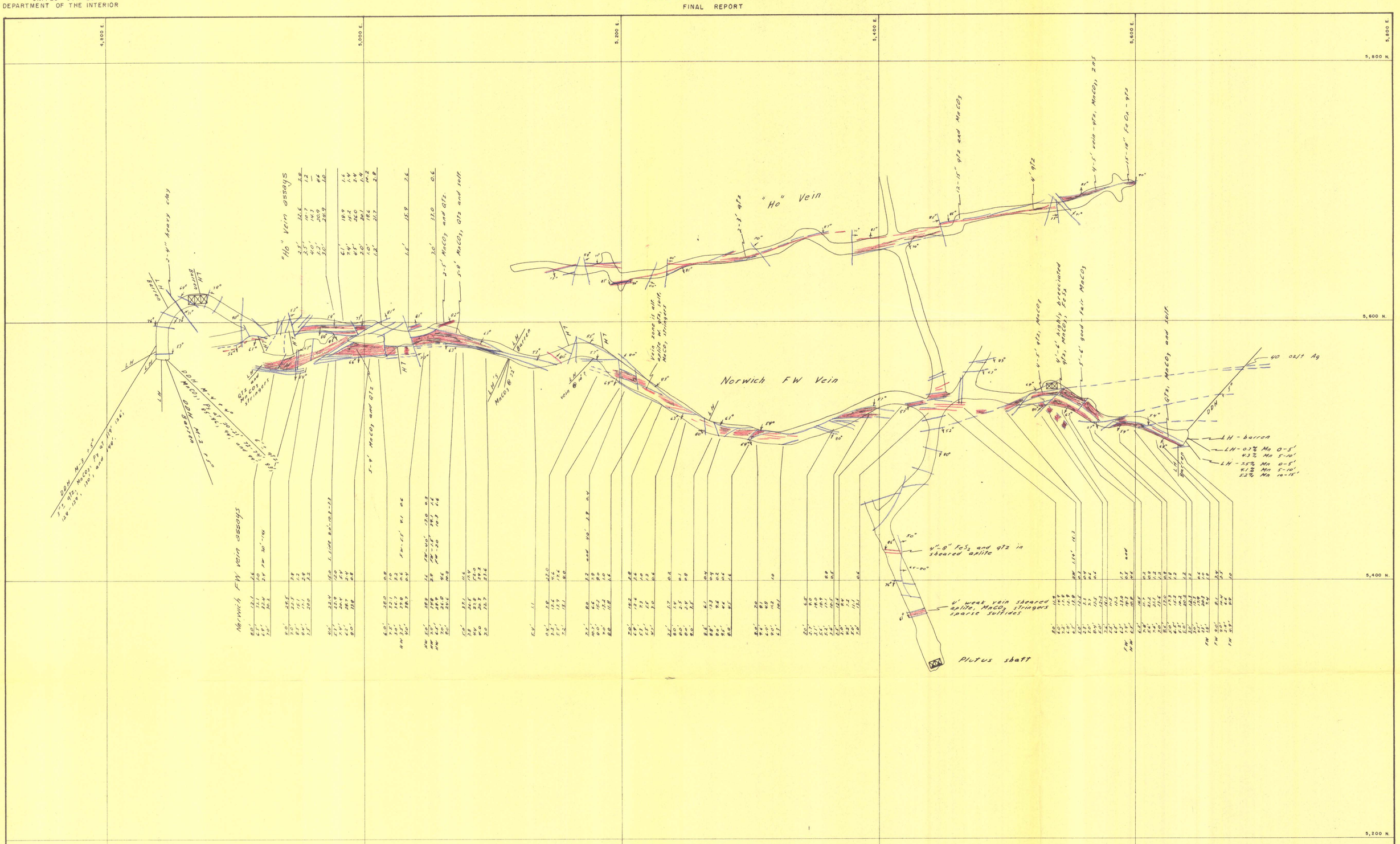


COMPILED FROM COMPANY MAPS

NOV. 1958

PLATE 4


4,900 E.
5,000 E.
5,200 E.
5,400 E.
5,600 E.
5,800 E.
5,800 N.
5,600 N.
5,400 N.
5,200 N.
Norwich F.W. Vein
Level extends approximately 140' further west; map not available.
"HO" vein?
Face lean
Norwich HW Vein
Plutus shaft
Old level 20' below 300 level south of shaft only.
2"-6" crushed aplite qtz, MnCO3 stringers
GEOLOGIC MAP
300 (5th) Level
NORWICH-PLUTUS MINE
SILVER BOW CO., MONTANA
40 20 0 40 80 FEET
NOV. 1958
PLATE 5
COMPILED FROM COMPANY MAPS.



Assay Plan

Sample width	Mn %	Ag oz/ton
8.0'	12.1	3.6

GEOLOGIC MAP

400 (6th) Level

NORWICH-PLUTUS MINE

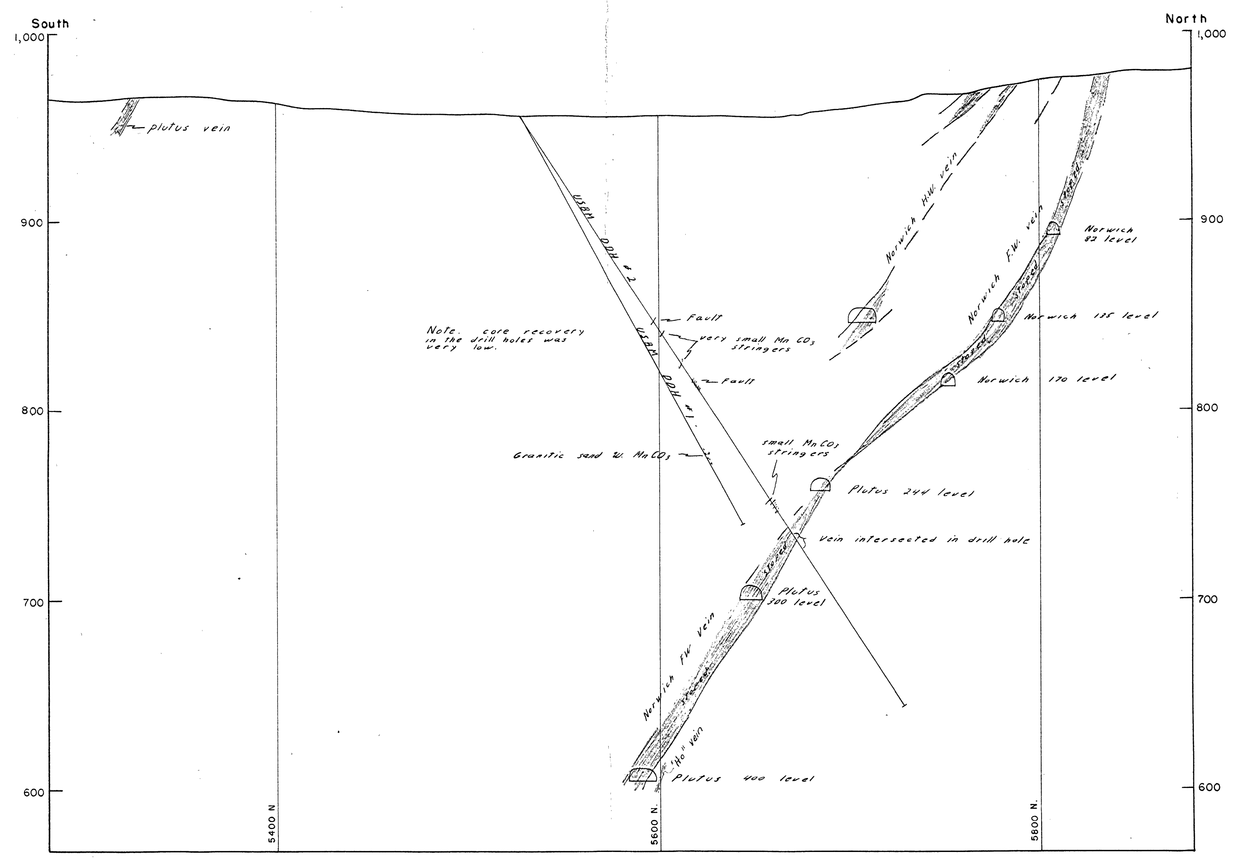
SILVER BOW CO., MONTANA

0 20 40 80 FEET

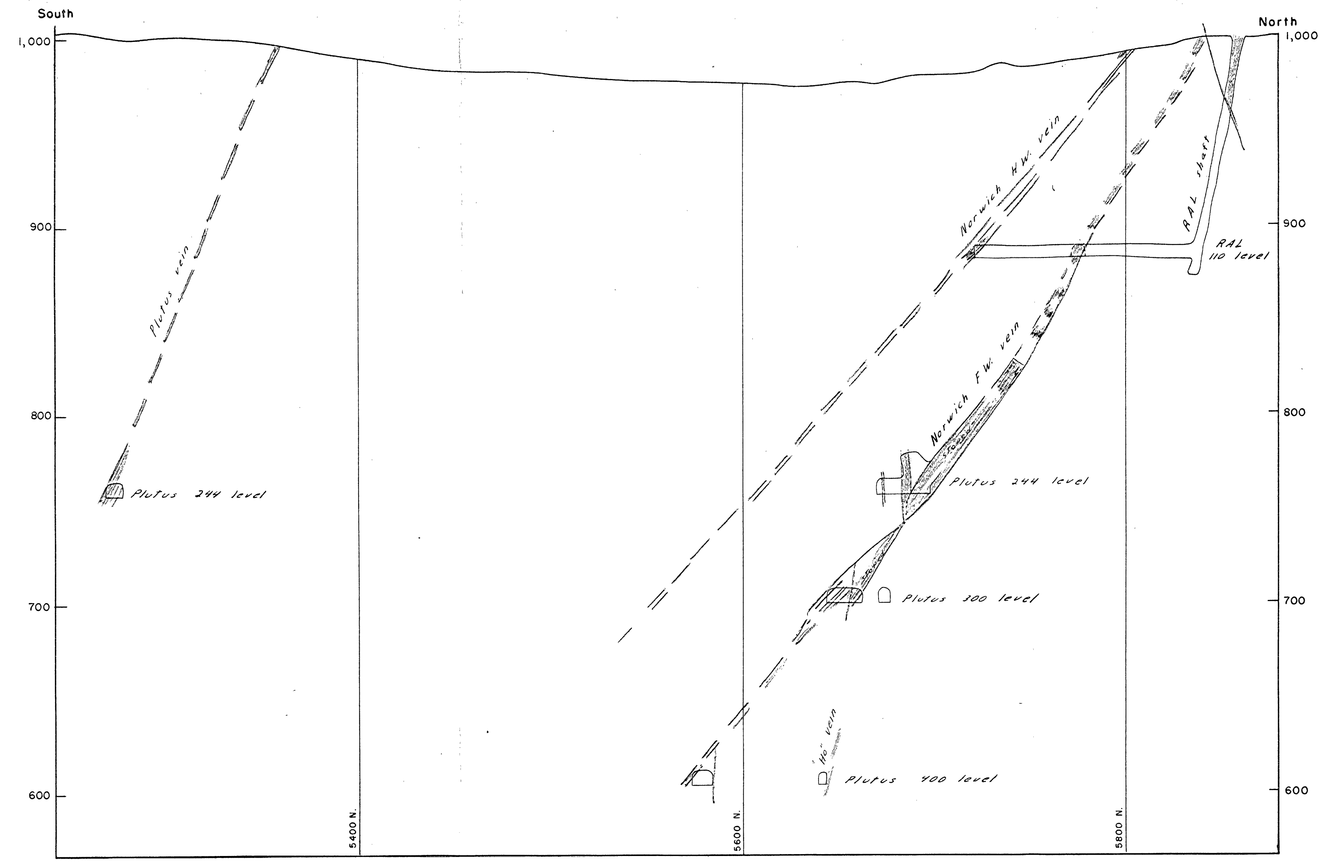
Compiled from company maps.

Nov. 1958

PLATE 6



Section A-A'



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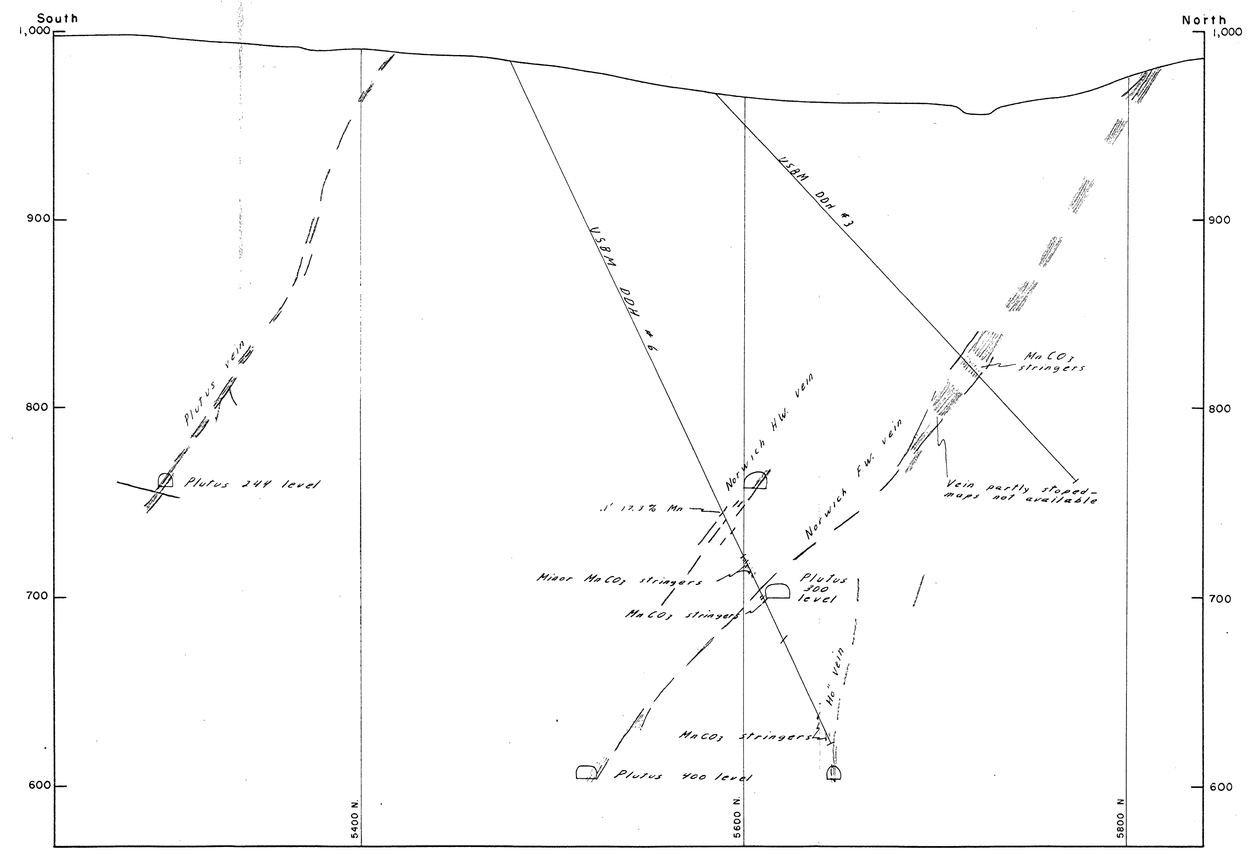
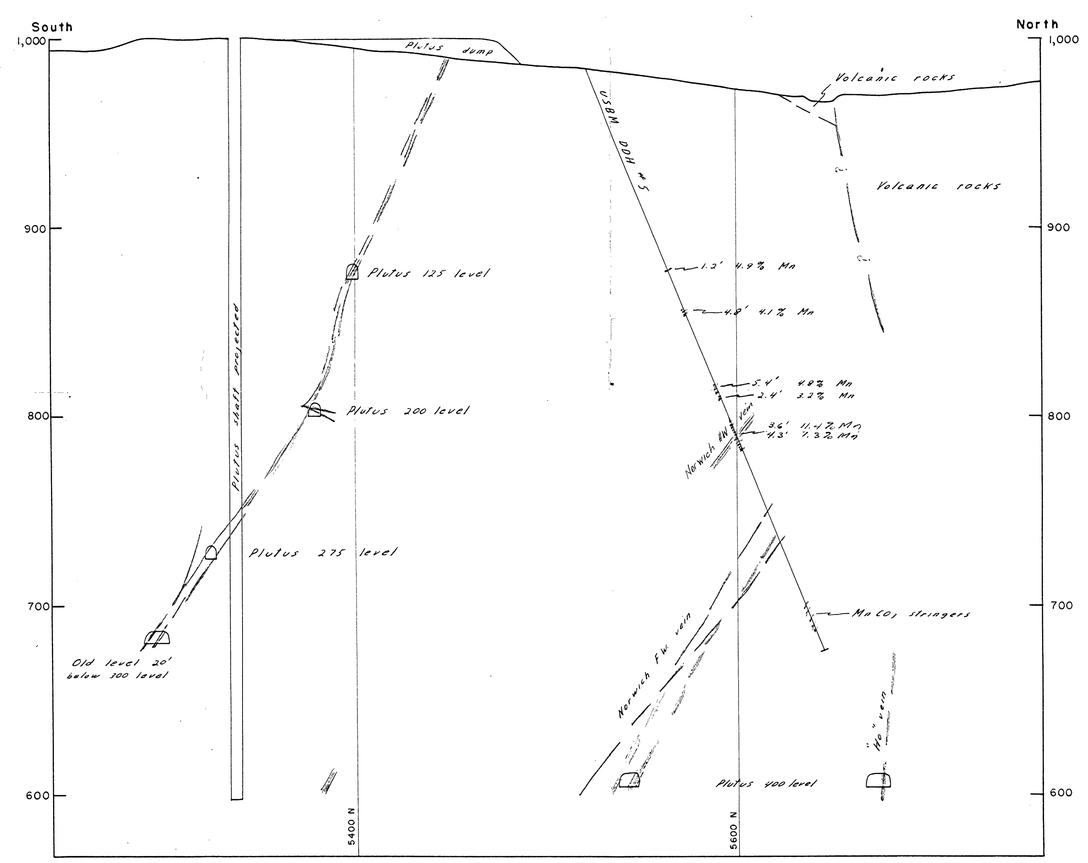
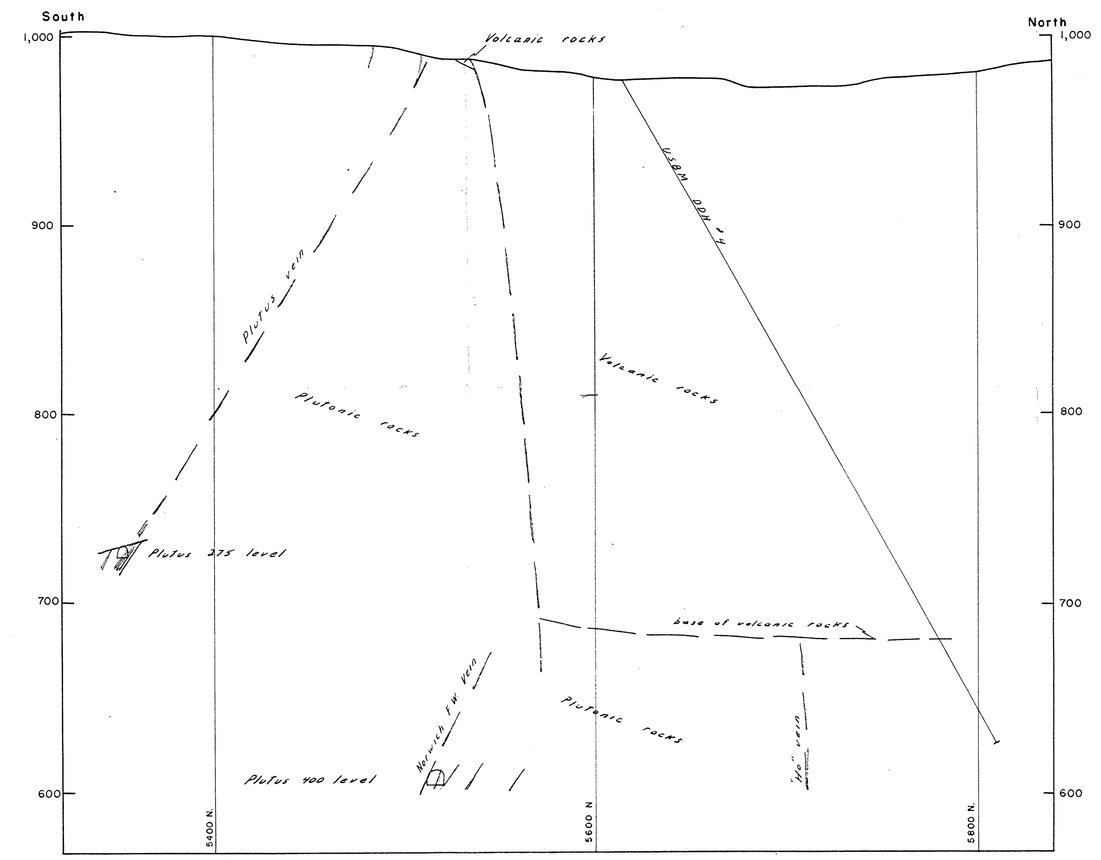


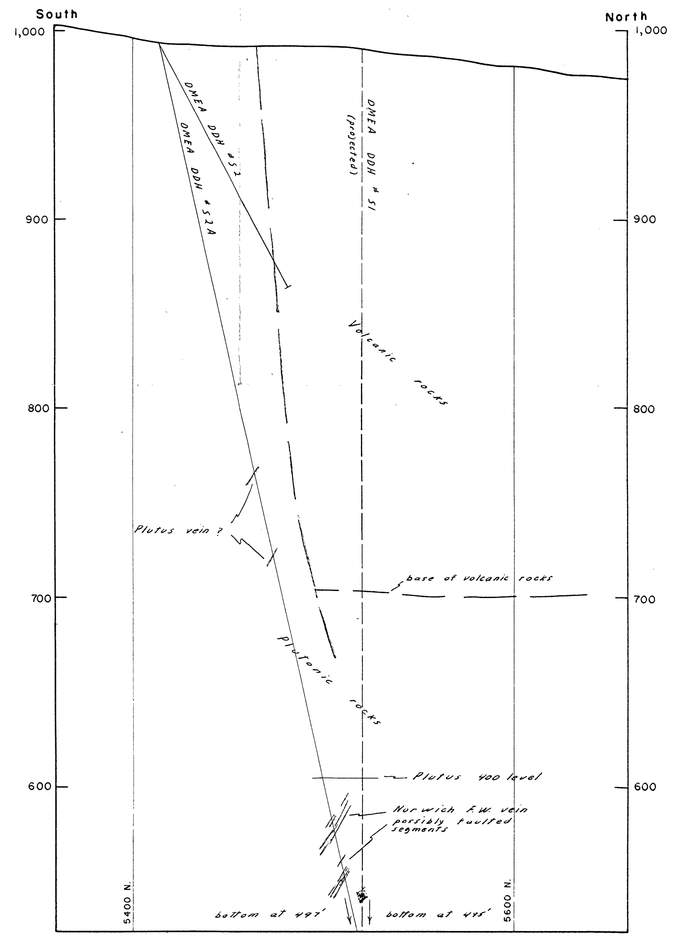
Section C-C'



Section D-D'



Section E-E'



Section F-F'

Assumed altitude of collar of Plutus shaft is 1000 feet.

GEOLOGIC CROSS SECTIONS

NORWICH-PLUTUS MINE

SILVER BOW CO., MONTANA

40 20 0 40 80 FEET

Dec. 1958

Plate 7