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FINAL REPORT

Docket OME 6236
Contract No. 14-23-090-2148
Gold Bug, et al., Phillips County, Montana

This project was started in June 1962 to determine the downward and lateral extension of gold and silver mineralization exposed by old workings in shatter zone within Tertiary porphyry. It was proposed to explore these structures by drifting, drilling and raising from 200 feet below known ore and to carry the exploration 1000 feet beyond it. The proposal was modified to contract for exploration 200 feet directly below the extent of the old workings by drifting and raising with lateral probing by drilling.

The work completed under the contract consisted of:

Drifting	—	1500 feet
Raising	—	2 raises-100 feet each
Drilling	—	2749 feet, percussion
Attendant assaying and timbering		
Site preparation		

In addition, the following work was performed from the exploration level:

Drifting	—	104 feet
Crosscutting	—	802 feet
Raising	—	140 feet
Drilling	—	3235 feet

Contract specifications were completed in September 1963, but work described continued through October. Further exploration, excavation and drilling is currently in progress upon structures and trends exposed by this work so ultimate evaluation of the OME project will depend upon future information. At present it is evident that OME work proved that ore grade mineralization projects to the lower level, that favorable structure continues along strike and that structures parallel to this trend are mineralized.

Ore Reserves:

Ore reserves estimated from exposures known to date are mostly classified as Inferred, as defined by U.S.G.S. terminology, due to length of correlation necessary, variable grade of material and the geometry of various sample intervals. Known reserves prior to OME exploration were estimated as Indicated ore amounting to 10,000 tons assaying 0.36 ounces per ton in gold and 14.3 ounces per ton in silver. Exploratory raising has strengthened this assumption, but has not been extensive enough to change classification or quantity.

Inasmuch as there is no experience data available concerning dilution, metallurgical recovery, or mining costs, ore reserve estimates at present are academic and arbitrary. Therefore the following tabulation is based upon a value of $20 per ton in place of using a factor of 13 cubic feet per ton to convert tonnage from volume. Gold valued at $35 per ounce and silver at $1.20 per ounce is the basis for valuation.

Indicated Ore

Location	Tonnage	Remarks
350 Level	10,000	280 ft. long, 8 feet wide, projected 25 ft. above and below the level. Oxidized structure.

Inferred Ore

Location	Tonnage	Remarks
350 Level	3,850	250 ft. long, 8 feet wide, 25 to 50 feet above level. Oxidized structures.
550 Level(OME adit)	11,500	250 ft. long, 8 feet wide, 60 to 135 ft. above level. Distance between levels is 160 feet back to sill. Oxidized and sulfide structures.
550 Level	3,300	100 ft. long, 5 ft. wide, 50' above level and 50' below level. Sulfide structures.
Total Inferred Tons	18,650	

The potential tonnage of immediate area covered by OME exploration could be expanded to about 4 times this figure by further exploration upon anomalies intersected in drill holes and crosscuts, but lack of definite correlation and the spread of intervals sampled prevents compilation of data into significant values.

Engineering Data:

Time elapsed	-	June 1962 thru Sept. 1963
Drift footage	-	1604
Crosscut footage	-	802
Raise footage	-	~~250~~ 340
Longhole footage	-	6084
Samples taken	-	1800 (approx.)

Average number of men underground - 4

It should be noted that the unit quantities of work exceed those specified in contract, and while the government did not participate in these expenditures the totals were used to derive unit costs. All work performed was done in the immediate area covered by the specifications and contributed to the aims of the program.

Unit Costs:

Drifting and Crosscutting	$ 55.60 per foot
Raising	$ 97.80 per foot
Longhole Drilling	1.43 per foot

These costs include all direct and indirect charges to the project such as labor, supplies, supporting facilities, equipment depreciation, supervision, assaying, taxes, and insurance. No charges were included for general geologic studies, amortization of expenditure or for capitalized equipment.

The drifts were driven with an average cross-section of 8' high x 7' wide on a 1% grade using 18 inch gage track. Crosscuts average 7'x 5' driven by a slusher without track. 21 sets of timber were installed to support the portal and blocky ground. 8 sets were used to support the drift at the base of the raises. Drifting encountered no particular problems - ravelly rock necessitated drilling short rounds and moisture required the use of electrical blasting. Water courses were intersected which hampered advance at times, but after a brief drainage period all the water flow was from the floor. About 1000 gallons per minute now flows out the portal.

Raises were driven with an average section of 15 feet along the strike of structure and 6 feet from hanging wall to footwall. They were timbered into 3 equal-size compartments with rock chutes on each end and a serviceway in the center.

Equipment used for drifting consisted of jackleg drills, alloy drill rods with integral tungsten carbide cross bits, overshot mine car loader, rocker dump cars, diesel locomotive, and axivane fans. A double drum air slusher and scraper were used for mucking crosscuts. Stoper drills and single drum air hoists were used in the raises.

Longholing was drilled with 3½ and 4 inch screw feed drifters using 2¼ inch carbide bits on 4 foot sectional drill rods. Checks between cuttings assayed and crosscut sampling seem to show that drilling results are semi-quantitative. Heavy water flows and open fractures caused some trouble in drilling and in reliability of cuttings. Geologic data was quite reliable, although silicified and highly pyritized shales are difficult to distinguish from mineralized porphyry.

Surface equipment and plant consisted of a shop and change-room building, an office and sample building, a 50 kva diesel-electric power plant, a 600 cfm diesel compressor, an HD5 front end loader, an 8 x 15 sample crusher, a gasoline powered welder, a utility pick-up truck, and miscellaneous shop tools.

The working force at the project included 4 miners, 1 mechanic, and a project supervisor during most of the program. Currently there are 6 miners and 2 mechanics and the supervisor employed at the property.

No ore has been shipped or sold from the property since the contract began.

Geologic Data:

The area examined by the project lies along the southwestern edge of the Little Rocky mountains which were formed by a laccolithic intrusion of syenite porphyry into a series of sedimentary and metamorphic rocks. A vein system occupies a shatter zone which runs from the sediments into the porphyry. Sporadic mining over the past 70 years has partially explored these veins in the porphyry and exposed mineralization on a strike length of about 500 feet extending to 250 feet in depth. Preliminary examination indicated positive possibilities that mineralization could be expected beyond the limits previously established, and the program resolved as an underground project centered about 200 feet below the lowest workings.

Surface and underground mapping showed that the trend of mineralization was about N 45° E with a steep northwesterly dip along fractures and shears running parallel to the shatter zone. Ore concentrations were erratic in grade and size, but apparently maintained an en echeleon relationship as do the individual shears.

OME exploration has added a great deal to the knowledge of this area, but many questions have not been answered and many assumptions have not been verified.

The shatter zone is bordered by a light grey silicified syenite porphyry containing abundant chalky feldspar phenocryets in a glassy matrix. The shatter zone is principally occupied by two types of porphyry which appear to be related to the syenite porphyry, but seem to have been later phases of the intrusive.

The most abundant of these is a dark grey, brittle siliceous rock with larger fresher feldspars, locally called "Big Eye" porphyry. It is usually hard and dense, but near mineralized structures it may be somewhat vesicular and contain megoscopic pyrite, fluospar and quartz. In one area of contact with sediments it appears to have cooled rapidly to form a "chilled" zone on the contact. It has been the host rock for most of the mineralization on the lower levels.

The other porphyry, termed "Possum" from its fetid odor when struck, seems to be a dike rock in texture and attitude, but some evidence indicates that it is a facies of "Big Eye". In other mines in the area it is associated with ore bodies, but no definite relationship to ore has been noted here. No "dikes" have been found on the lower level, although minor amounts of possum porphyry appear as inclusions or segregations in the Big Eye.

Sedimentary rocks, probably of the Cambrian Emerson or Flathead formation, occur as a tongue in porphyry running at least 1000 feet into the igneous rocks. Locally termed "shale", these rocks are thin bedded argillaceous sandstones. Near mineralized areas they have been highly altered by silica and pyrite, and contain ore grade mineralization in some places. It is suspected that the presence of large zenoliths of this material has had an effect upon the structural pattern of the vein system.

The shatter zone is an indefinite area several hundred feet wide and probably 3000 feet long in which "veins" have developed from shearing and fracturing. The strongest features are more or less parallel and strike N 40° to 50° E with both northwesterly and southeasterly dips within the main zone. It has not been ascertained whether the veins are arranged in a true en echelon manner or if this is merely apparent due to pinching and tightening of structure accompanied by slight changes in strike. At 1315' from the portal on the OME level 3 parallel structures are known, though only the central vein has been explored along strike to any extent.

Vein structure on the OME level is in general more evident and more continuous than on upper levels. They are characterized by open fissuring that is now breccia filled with rubble well cemented with pyrite and silica. Widths vary from a few inches to several feet. Walls are usually indefinite due to horsetailing of subsidiary structures into both walls. The degree of mineralization is usually directly proportional to the amount of pyrite. It is believed that the veins were originally open fractures and that the breccia accumulated from material dislodged up dip, as open cavities are abundant on the lower, but none were found more than 25 feet up dip.

Veins of the upper levels are accompanied by a higher degree of horsetailing and less definite walls. Mineralization shows a tendency to follow the smaller fractures in a random pattern. Brecciation is less developed and the veins have the appearance of small angular rock fragments tied together with a network of veinlets.

Contacts between shale and porphyry seem to be fault surfaces and are generally mineralized. Most contacts show silification and pyritization. The main vein structures change character and direction somewhat where they cut across contacts, but they seem to continue thru the shale. Little is yet known about the degree of mineralization along the veins in the shale sections, but ore is known to occur in shale.

Gold and silver mineralization cannot be detected except by assay in areas examined to date. On the lower levels profuse quantities of botryoidal pyrite obscures mineralization. Pyritic portions of the veins are seldom barren, though mineralization may not be ore grade. Updip the pyrite is oxidized to limonite and iron oxides, and only minor quantities of pyrite occur on the upper levels. With the exception of one specimen of tellurides no gold-silver minerals have been identified. In continuously mineralized areas gold-silver ratio varies from 1:15 to 1:47 by weight. No significant amounts of base metals occur.

Summary of Progress:

550 Level

Feet from Portal	
0	The OME adit (550 Level) was portalled at a track elevation of 4576 feet on a bearing of N 53° E to intersect projection of Gold Bug vein system. Rock formation is shale, containing no significant structure or mineralization.
40	Cut 7-10 feet of syenite porphyry. Barren. Dike-like in attitude, but probably only a stringer from main contact.
106	Shale - syenite porphyry contact. Contact dips 50° southwesterly.
210-420	Weak fractures developing in porphyry, running parallel to course of adit. Shows some pyrite, gouge and minor flourite, mineralization too weak to warrant assaying.
278	2 short crosscuts driven for storage places. Adit continues along weak structure in barren syenite porphyry.
420	Fractures cut off by shear with 2' of gouge striking N 73° E, dip 80°NW. Ground blocky and dangerous, timber required. Barren.
420-465	Syenite porphyry, blocky, barren.
465	Brecciation developing in porphyry with iron oxides on joints. No visible mineralization.
493	Strong shear zone with 6" of gouge cuts adit with strike of N 40° W, dip 80°NE. Barren. Brecciation becomes more pronounced, up to 4½' wide, following adit, dip 70°NW.
493-520	Brecciated structure in syenite porphyry. Veinlets of pyrite, marcosite and silica, with some oxidation. Structure is essentially barren.
520	2 crosscuts driven to check porphyry for parallel structures. Left crosscut (x.c.#3) cut strong structure 10 feet from adit, 2½' assayed $2.69/ton. Appears to be principal structure in brecciated zone about 20 feet wide. Zone weakly mineralized. x.c.#3 continued to 73 feet from center of adit with no significant structures or mineralization. x.c.#4 runs 61 feet to the right in blocky barren porphyry. 8 longholes totalling 688 feet were drilled ahead and above crosscuts, encountered only weak mineralization.

Feet from Portal	
525-565	Breccia zone. Somewhat mineralized, averages $1.51/ton.
565	Structure cut in x.c.#3 enters drift.
565-630	Breccia zone continues along adit. Some oxidation and pyrite, dips 75°NW. Some mineralization, averages $1.50/ton.
620	2 short crosscuts. Strong brecciation and vein structure in right hand x.c. Zone 24' wide runs $3.78/ton.
630-655	Breccia develops vein structure up to 2' wide, strikes N 35° E, dips 75° NW. Drift assays average $8.23/ton. 6" of vein assays $155/ton.
655	Vein pinches and enters left rib, apparently cut by normal fault and/or shale pendant.
655-720	Complex maze of syenite porphyry, and shale inclusions, numerous indefinite structural features. Drift assays average $1.69, no distinct structure to sample.
718	OME drill station #1 - Holes #9, 10, 11, 12, 13, 14. 3 holes more or less 100 feet in each rib, see map for geology.
720-756	Syenite porphyry, essentially barren, virtually no structure.
756	Intersect barren vertical structure strikes, N 42° E, up to 4' breccia with 1 foot strongly oxidized and gougy.
756-834	Syenite porphyry. Follow barren vertical structure, course of adit changes to N 42° E.
834	Shale contact, strikes N 80° W, dips 10° SE. Some horizontal movement on contact.
834-1075	Shale, thin bedded, limey with varying amounts of silicification with pyrite. Barren. Bedding strike averages N 80° E, with dips from 10° to 45° South. Several barren bedding plane faults.
907	OME Drill Station #2. Holes #15, 16, 17, 18, 19, 20. 3 holes in each rib, see map for geology.
1075	Big Eye porphyry contact. Strikes N 85° E, dips 30°S. Contact strongly brecciated and mineralized. Strong water flow when cut. Drift assays $17.30/ton. 2 ft. of shale on contact assays $8.45/ton.

Feet from Portal	
1078-1115	Contact changes abruptly to strike N 42° E, dip 60° SE, runs along right side of drift, swings into rib at 1115. Drift in Big Eye porphry, barren, fracturing parallel to drift.
1109	OME Drill Station #3 (labelled #4 on progress sketches). Left station in porphyry, right station in shale. Holes 21, 22, 23, 24, 25, 26, see map.
1109	G15 crosscut, runs N 45° W 49', minor structure, minor mineralization, all porphyry.
1115-1170	Barren Big Eye porphyry, pyrite filled fractures enter from left.
1170-1200	Cut series of vertical, narrow fractures striking N-S, with ¼-½ inch white talcey gouge, one fracture 1-2" wide is open.
1200-1317	Ore zone, all in Big Eye porphyry. Drift assays average $24.14/ton. A 1' channel sample at 1270 runs $492/ton (not included in average). Specimens assay $100-$150/ton. Vein formed by brecciated shears striking N 45° E, dip 60-70°SE. Shears merge and split with tight places, open cavities, breccia filled openings. Breccia is pyrite and quartz cemented. No visible valuable minerals. Some indication of possum porphyry.
1217	Hole B, bearing N, inclined 10°, 16' long. Some mineralization, all porphyry, 13-16 feet assayed $9.69/ton.
1225	Crosscut "B", runs 59 feet at N 45° W. Narrow open fractures 8-14 feet, strike N 40-60 E, dip 45-65° SE, average $3.50/ton. Intersect "chilled" Big Eye porphyry at 39 feet. Shale contact at 55 feet, strikes N 30° E, dips 30° SE.
1226	Center of OME Raise #1, bears N 53° W, inclined 65° at base, averages 71°. See below for further description.
1240	Hole A, bearing S 60° E, inclined 15°, 37 feet long, 5-9 runs $2.49, 21-25 runs $160, all porphyry.
1313	OME Drill Station #4 (#5 on progress maps). Drilled holes 27, 28, 29, 30, 31. Collared "17 NW" x.c., bears N 45° W, 117 feet from center of adit. See description below. Collared "17 SE" x.c., bears S 40° E, 210 feet from center of adit. See description below.

Feet from Portal	
1317-1340	Big Eye porphyry. 4-6 foot chilled zone on left, contacts Big Eye at 27° SE dip. Ore bearing structures tighten and splay out. Drift course changes to N 54° E. Assays average $3.57/ton.
1340-1430	Shale and chilled porphyry. Contact along drift dips 27° SE. Weak structure in shale parallel to drift dips 69° SE. Strong breccia structure developing from left rib. Drift assays average $5.51/ton. Course of drift changes to N 47° E.
1348	Hole C, bears S 45° E, inclined 16°, 8 feet long, slightly mineralized, all porphyry.
1405	Hole D, bears S 25° E, inclined 19°, 25' long. 21-25 assays $11.81/ton. All in porphyry.
1409	Hole E, bears N 23° W, inclined 14°, 24 feet long. All in shale, hole averages $6.44/ton. Pink quartz 21-24. Water flow at 13'.
1411	Collar "18" Crosscut. Bears N 85° E, 70 feet from center of adit. All in Big Eye porphyry. Vertical structures with strong gouge and talc from 36-65, do not appear to project thru to adit. Crosscut assays average $1.92/ton. Hole F at 40 feet bears S 51° E, inclined 10°, 21 feet long, assays $4.66 at 13-17 feet. Hole G in face bears N 85° E, inclined 5°, 15 feet long, assays $1.43 at 8-15 feet.
1430-1550	Ore structure. Strong breccia structure with fairly well defined hanging wall bears along course of drift. Dips S 47° E, up to 5 feet wide, abundant pyrite and silicification, some fluorite, some oxidation, numerous open cavities. All in Big Eye porphyry, some chill zone and possum porphyry. Hanging wall steepens and enters right rib. Drift assays average $8.93/ton. 5 foot channel at 1468 runs $276/ton, specimens assay over $100/ton. High grade not in averages.
1476	Center of OME Raise #2 bears N 43° W, inclined 47°, see description below.
1497	Drill Station #5. Drilled holes 33, 34, 36, 37, 38, completed OME drilling.
1500	End of OME participation in adit.
1550-1613	Footwall vein structure, dips 45° SE, abundant pyrite and silicification, some fluorite, all in Big Eye porphyry with suggestion of gradation to syenite porphyry on footwall. Drift assays average $9.63/ton.

Feet from Portal	
1613-1760	Vein structure joined by steep hanging structure and course changes to N 38° E. All in Big Eye porphyry. Drift assays average $2.59/ton. Structure at face tightening similar to Portal plus 1317.

Raise #1

0-66	Big Eye porphyry. Structure narrows and steepens into hanging wall, 8 foot longholes at 5 foot intervals in hanging wall are mineralized. Footwall holes barren. Structure too erratic to follow with raise. Raise assays average $7.82/ton over 6 feet width, highest values along and in hanging wall.
66-169	Shale. No definite structure. Shale silicified, abundant pyrite, mineralization erratic. Holes in hanging and footwalls erratically mineralized, some ore grade. Raise assays average $6.14/ton. 12 foot crosscut in hanging wall at porphyry contact assays $13.48/ton, shale silicified and brecciated, abundant pyrite. Longhole assay $197/ton 4-8 feet in hanging wall, 10 feet south of crosscut.
100	End of OME participation in Raise #1.
169-172	Syenite porphyry, oxidized zone, intersect 350 level.

Raise #2

0-70	Big Eye porphyry. Structure 4 to 6 feet wide, brecciated. No open cavities above 20 feet from sill. 8 foot longholes in both walls at 5 foot intervals, with sub-ore mineralization. Inclination averages 47°. Raise assays average $8.20/ton.
70-100	Big Eye porphyry, structure steepens abruptly to 85° and weakens. Stronger structures enter from hanging wall, dipping 60° NW. Gradational change to oxide zone on hanging wall. Raise assays average $5.35/ton. Crosscut in hanging wall at 80 feet, averages $9.82 from 0-13 feet, $129.00 from 13-17, $7.57 from 17-27, in NW dipping structures, oxidized breccia zone. End of OME participation in Raise #2.
100-107	Big Eye porphyry, thin structures.
102-170	Bean hole raise in hanging wall, inclination about 60°, will be driven to connect 350 level in 156 N drift. Oxidized zone, following NW dipping structures. Assays average $15.81/ton.

Feet from Portal

"17 NW" Crosscut (follows Hole 27)

0-46	Shale, bedding plane movement dipping 25° SE cut at 24, 28, 26 feet, brecciated and pyritized. Assays average $3.22/ton.
46	Syenite porphyry contact, strikes N 60° E, dips 20-40° SE, open fractures, pyrite and silica. 0.3 feet on contact assays $31.76/ton.
46-95	Syenite porphyry, bolcky. Assays less than $1/ton.
95	Open fractures, 4-6 inches wide, strikes N 50° E, dips 77° NW, flows about 1000 gpm artesien water. Walls silicified with some pyrite. Drift at fractures assays $4.06/ton.
95-113	Syenite porphyry, barren. Drill station for 9A,9B, 9C,10A,10B,10C,10D.

"17 SE" Crosscut (follows Hole 30)

0-78	Big Eye porphyry. Massive, blocky, essentially barren. Vertical jointing parallel to crosscut.
62	Drill Station for Holes 2A,2B,2C.
78-95	Contact zone, evidence of considerable movement, strikes about N 60° E, dips 60° SE, strong silicification and brecciation on hanging wall side. Runs $2/ton.
95-162	Shale, first 15 feet runs $3.50/ton, remainder essentially barren, bedding dips 65° SE.
110	Drill station for holes 4A,4B,4C.
162-177	Syenite porphyry, barren.
177-200	Shale, barren, bedding dips 42° SE, syenite porphyry appears in back at face.

Respectfully submitted,

J. G. Roscoe

J. G. Roscoe

RECEIVED
DEC 2 1963

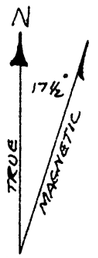
BROOKE, LINDSEY
BY SMITHSON DATE 11/3/60 & 10/61
CHKD. BY _____ DATE _____
Scale: 1" = 20'

SUBJECT SAMPLE LOCATION MAP
"MAIN" VEIN, GOLD BUG MINE,
LANDUSKY, MONTANA

SHEET NO. _____ OF _____
JOB NO. _____

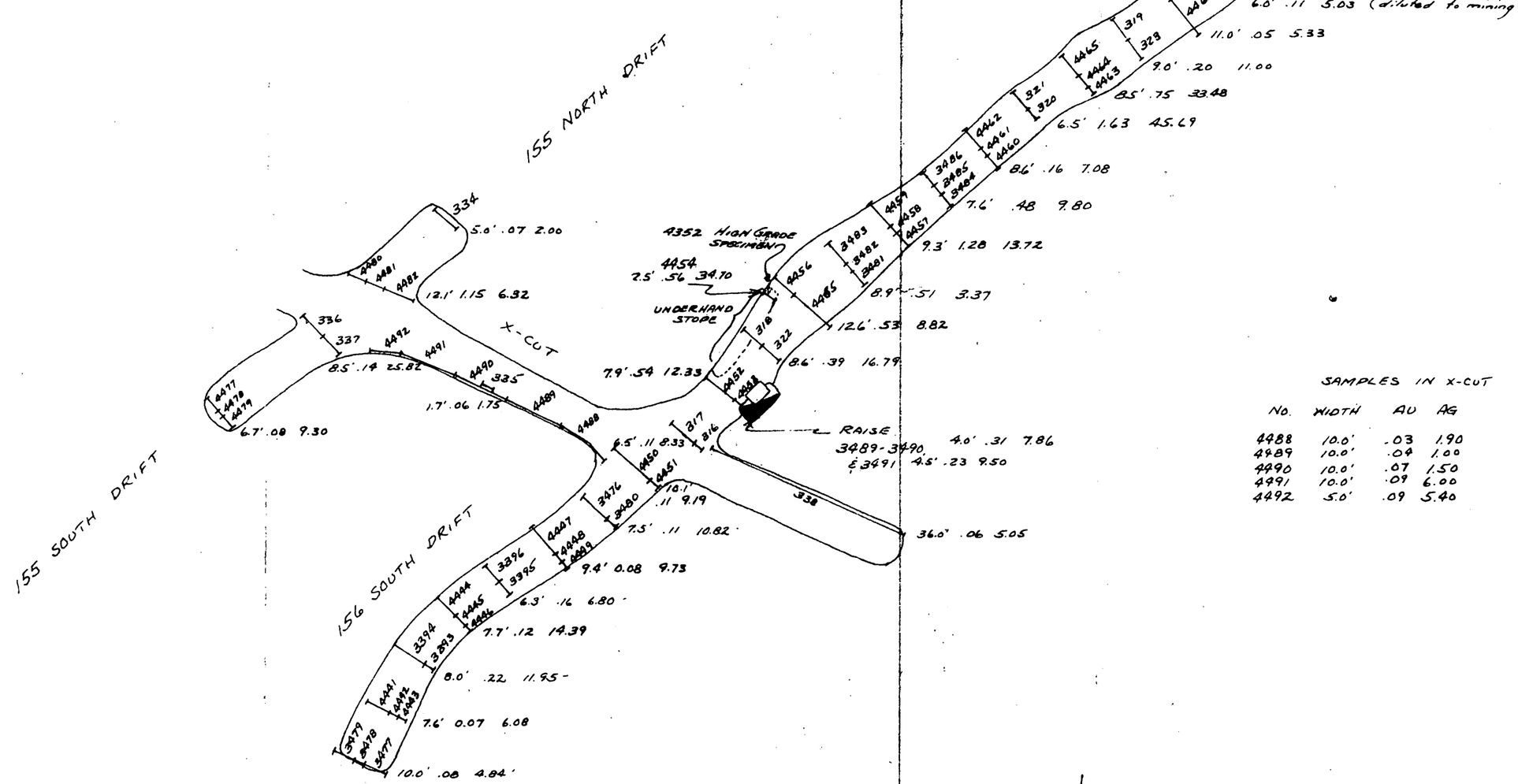
350 LEVEL (PARTIAL)

NO. 6 LEVEL
(LITTLE ROCKIES MINING & DEV. CO. LEVEL)



LEGEND

334 ← SAMPLE NO.
5.0' .07 2.00
THICKNESS
OZ. GOLD
OZ. SILVER



SAMPLES IN X-CUT

NO.	WIDTH	AU	AG
4488	10.0'	.03	1.90
4489	10.0'	.04	1.00
4490	10.0'	.07	1.50
4491	10.0'	.09	6.00
4492	5.0'	.09	5.40

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3d(5)

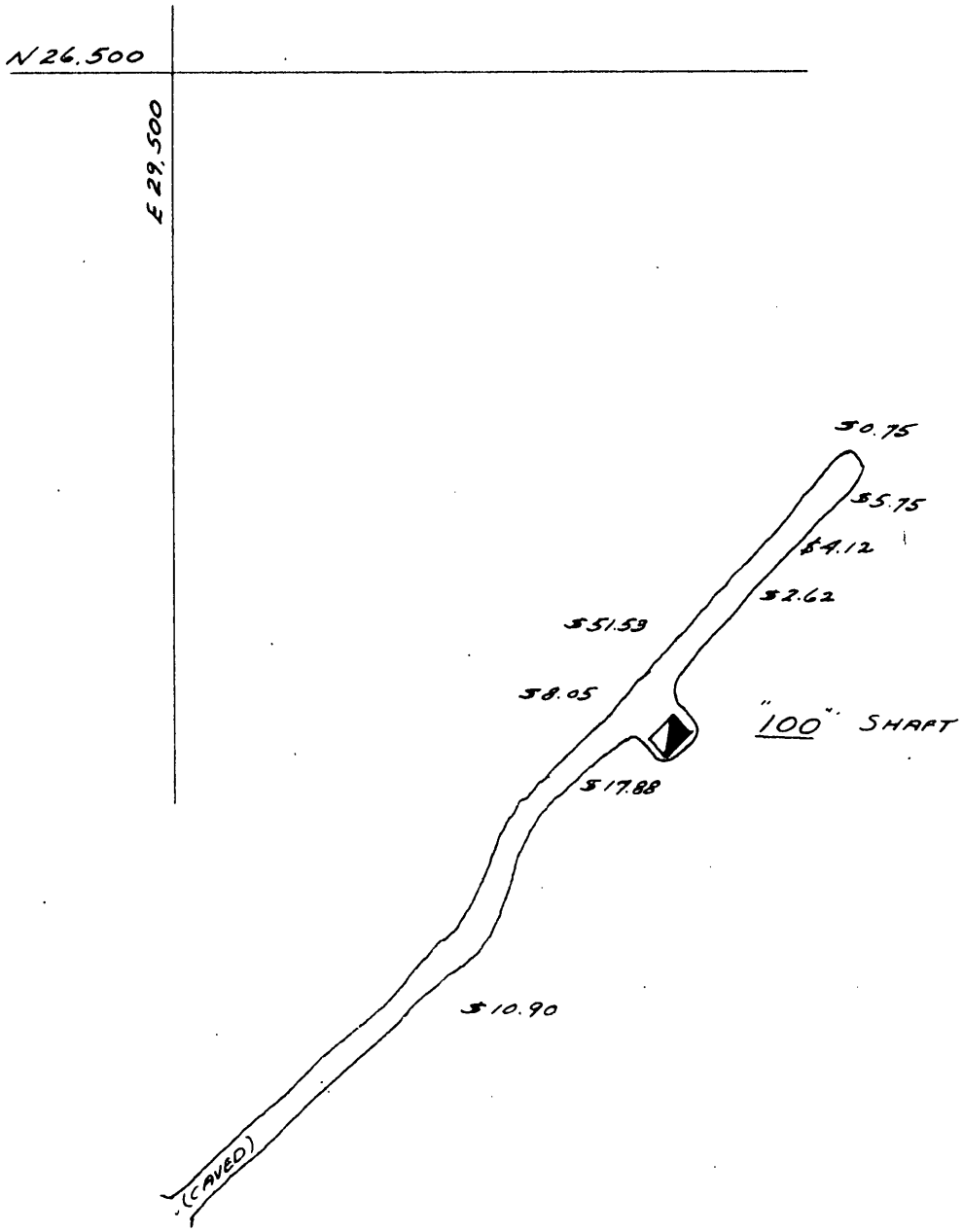
BY JGR DATE 1/30/62 SUBJECT SAMPLE MAP SHEET NO. ..... OF .....

CHKD. BY ..... DATE ..... 100 LEVEL, GOLD BUG MINE JOB NO. .....

Scale: 1 in = 50 ft. Phillips County, Montana

PREPARED FROM MAP BY M.H. GIDEL & C.E. BASS, DATED AUG., 1931

INACCESSIBLE AT PRESENT, NO SAMPLES TAKEN BY N. CONT'L.



SAMPLE VALUES FROM UNKNOWN SOURCE OR DATE, MARKED ON OLD MINE MAP.

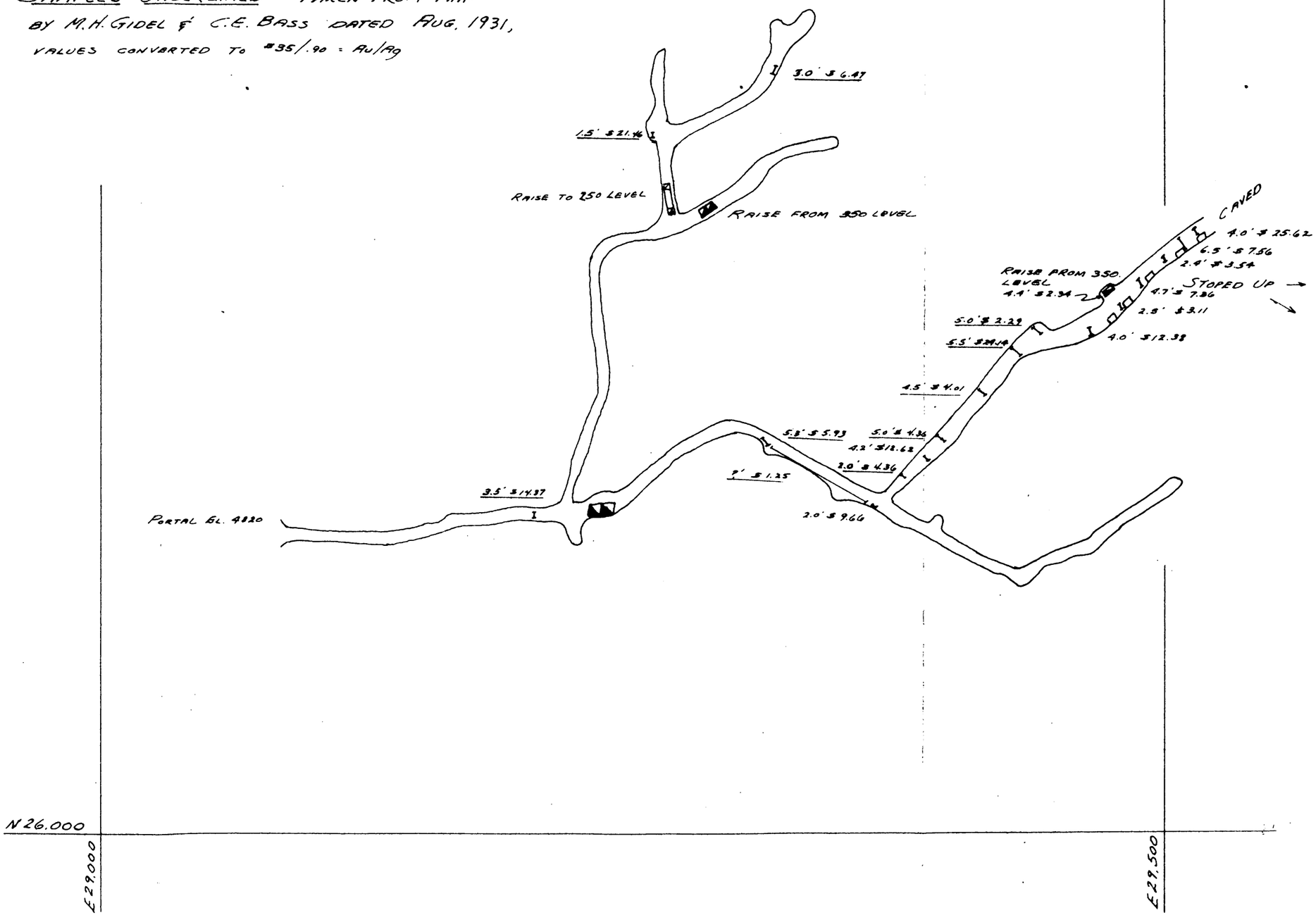
NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3d(9)

BY EHL, JGR DATE 1/30/62 SUBJECT SAMPLE MAP SHEET NO. ____ OF ____
CHKD. BY ____ DATE ____ 300 LEVEL, GOLD BUG MINE JOB NO. ____
Scale: 1 in. = 50 ft. Phillips County, Montana

REFER TO "SUMMARY OF SAMPLE DATA" FOR DETAIL OF SAMPLES. (Exh. 3d(10))

SAMPLES UNDERLINED - TAKEN FROM MAP BY M.H. GIDEL & C.E. BASS DATED AUG. 1931, VALUES CONVERTED TO $35/.90 = Au/Ag



NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3d(6)

S U M M A R Y

of

A S S A Y & S A M P L E D A T A

GOLD BUG MINE & VICINITY

Grouped by Location

See Exhibits 3a(1) and 3d(4) thru 3d(10)

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NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3d(10)

SUMMARY OF SAMPLE DATA
Grouped by Location
GOLD BUG MINE & VICINITY
350 Level

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Sample No.	Width	Assay oz.AU	Assay oz.AG	$Value @ $35.00 & $ .90	Type Sample	Description
343	2.0'	0.04	0.15	1.54	Chip	Across Vein 80' from portal HMS 11/60
341	3.5'	0.04	0.15	1.54	"	Just above contact 90' S.W. #340 Sample HMS 11/60
340	2.0'	0.075	0.20	2.70	"	Just above contact at raise, 152 Drift HMS 11/60
311	2.0'	0.21	45.20	48.03	"	Top of 20' stope, Vein dips 70°E. 154 Drift HMS 10/60
4350	.8'	0.25	49.20	53.03	"	Bottom of 20' stope, 154 Drift CHR 8/61
4477	3.0'	0.08	10.8	12.52	"	Vein(155 S.Drift) to NW Rib(H.W.),Face
4478	1.5'	0.08	12.3	13.87	"	Across Vein (155 S.Drift), Face
4479	2.2'	0.07	5.2	7.13	"	Vein(155 S.Drift) to SE Rib (F.W.),Face
Comp.	6.7'	0.08	9.30	11.17		Brooke & Lindsey 10/61
336	5.0'	0.08	18.60	17.54	"	Fractured Porphyry, Gouge, Back of 155S.at X-cut
337	3.5'	0.23	36.15	40.59	"	Fractured Porphyry, Gouge, Back of 155S.at X-cut
Comp.	8.5'	0.14	25.82	28.14		Brooke & Smithson 11/60
4480	3.7'	0.03	2.6	3.39	"	Vein(155 N.Drift) to NW Rib (H.W.), Back
4481	3.1'	4.35	19.7	169.98	"	Across Vein (155 N.Drift), Back
4482	5.3'	0.05	1.1	2.76	"	Vein(155 N.Drift) to SE Rib (F.W.), Back
Comp	12.1'	1.15	6.32	45.94		Brooke & Lindsey 10/61
334	5.0'	0.07	2.00	4.25	"	Frac. Porph., Face, 155N,4'above Sill Brooke & Smithson 11/60
335	1.7'	0.06	1.75	3.68	"	Gauge, back of X-cut between 155 and 156 Drifts Brooke & Smithson 11/60
4488	10.0'	0.03	1.9	2.76	"	Along Rib of X-cut between 155 and 156 Drifts Brooke & Lindsey 10/61
4489	10.0'	0.04	1.0	2.30	"	Along Rib of X-cut between 155 and 156 Drifts Brooke & Lindsey 10/61
4490	10.0'	0.07	1.5	3.80	"	Along Rib of X-cut between 155 and 156 Drifts Brooke & Lindsey 10/61
4491	10.0'	0.09	6.0	8.55	"	Along Rib of X-cut between 155 and 156 Drifts Brooke & Lindsey 10/61
4492	5.0'	0.09	5.4	8.01	"	Along Rib of X-cut between 155 and 156 Drifts Brooke & Lindsey 10/61
338	36.0'	0.06	5.05	6.65	"	Frac. Porph.,left rib of X-cut, E. of 156 Drift, F.W. of Main Vein Brooke & Smithson 11/60
3477	4.0'	0.09	1.20	4.23	"	Fractured Porphyry, Face, 156 S.,3' above sill
3478	2.0'	0.18	12.40	17.46	"	Fractured Porphyry, Face, 156 S.,3' above sill
3479	4.0'	0.02	3.70	4.03	"	Fractured Porphyry, Face, 156 S.,3' above sill
Comp	10.0'	0.08	4.84	7.16	"	Brooke & Smithson 11/60
4441	4.0'	0.08	6.1	8.29	"	From G.B. Vein to N.W. Rib (H.W.), Back,156 So.
4442	1.8'	0.09	10.0	12.15	"	Across G.B. Vein, Back, 156 No.
4443	1.8'	0.04	2.1	3.29	"	From G.B. Vein to S.E. Rib (F.W.), Back,156 So.
Comp.	7.6'	0.07	6.08	7.92	"	Brooke & Lindsey 10/61
3393	1.5'	0.80	7.40	34.66	"	Footwall, Gouge, Back, G.B. Vein, 156 So.
3394	6.5'	0.08	13.00	14.50	"	Hangingwall, Frac. Porph., Back, G.B. Vein, 156S.
Comp.	8.0'	0.22	11.95	8.77		Brooke & Smithson 11/60

SUMMARY OF SAMPLE DATA
Grouped by Location
GOLD BUG MINE & VICINITY
350 Level

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Sample No.	Width	Assay oz.AU	Assay oz.AG	$Value @ $35.00 & $ .90	Type Sample	Description
4444	4.2'	0.05	7.9	8.86	Chip	From G.B. Vein to N.W. Rib (H.W.), Back
4445	2.3'	0.30	22.9	31.11	"	Across G.B. Vein, Back, 156 So.
4446	1.2'	0.03	20.8	19.77	"	From G.B. Vein to S.E. Rib (F.W.), Back
Comp.	7.7	0.12	14.39	17.15	"	Brooke & Lindsey 10/61
3395	2.5'	0.41	11.20	24.43	"	Footwall, Gouge-Fractured Porph., Back, 156 So.
3396	3.8'	0.07	3.90	5.96	"	Hangingwall, Fract. Porph., Back, 156 So.
Comp.	6.3'	0.16	6.80	11.72		Brooke & Smithson 11/60
4447	6.2'	0.07	7.6	9.29	"	From G.B. Vein to N.W. Rib (H.W.), Back, 156 So.
4448	2.0'	0.15	15.5	19.20	"	Across G.B. Vein, Back, 156 So.
4449	1.2'	0.04	11.1	11.39	"	From G.B. Vein to S.E. Rib (F.W.), Back, 156 So.
Comp.	9.4'	0.08	9.73	11.56		Brooke & Lindsey 10/61
3476	6.0'	0.07	6.85	8.62	"	Hangingwall, Fractured Porphyry, Back, 156 So.
3480	1.5'	0.51	26.70	41.88	"	Footwall, Gouge, Back, 156 So.
Comp.	7.5'	0.11	10.82	13.59		Brooke & Smithson 11/60
4450	8.6'	0.08	5.7	7.93	"	From B.G. Vein to N.W. Rib (H.W.), Back, 156 So.
4451	1.5'	0.26	29.2	35.38	"	Across G.B. Vein to S.E. Rib, Back, 156 So.
Comp.	10.1'	0.11	9.19	12.12	"	Brooke & Lindsey 10/61
316	1.5'	0.16	7.95	12.76	"	Footwall, Gouge, Back, Intersection X-cut&156 Dr.
317	5.0'	0.09	8.45	10.76	"	Hangingwall, Fractured Porp., Back, Intersection
Comp.	6.5'	0.11	8.33	11.35		Brooke & Smithson 10/61
4452	6.1'	0.06	6.0	7.50	"	From G.B. Vein to N.W. Rib (H.W.), Back, 156 N.
4453	1.8'	2.18	33.8	106.72	"	Across G.B. Vein to S.E. Rib, Back, 156 N.
Comp.	7.9	0.54	12.33	30.00		Brooke & Lindsey 10/61
3489	0.5'	1.24	10.65	52.99	"	Footwall, Gouge, Raise, 21' above rail
3490	3.5'	0.18	4.60	10.44	"	Hangingwall, Fractured Porph, Raise, 21' Above R.
Comp.	4.0'	0.31	7.86	17.92		Brooke & Smithson 11/61
3491	4.5'	0.23	9.50	16.60	"	H.W. Frac. Porphy, Raise, 30' above rail, Brooke & Smithson 11/61
318	4.5'	0.68	24.70	46.03	"	Hangingwall, Fractured Porphyry, Back, 156 N.
322	4.1'	0.08	8.10	10.09	"	Footwall, Fractured Porphyry, Back, 156 N.
Comp.	8.6'	0.39	16.79	28.76		Brooke & Smithson 11/60
4454	2.5'	0.56	34.7	50.83	"	Across G.B. Vein to N.E. end of underhand stope, 8' below rail, 156 N. Brooke & Lindsey 10/61
4352	—	7.16	611.6	801.04	"	Along High grade veinlet, 156 N. C.H.R. 8/61
4455	8.3'	0.76	12.1	37.49	"	From G.B. Vein to S.E. Rib (F.W.), Back, 156 N.
4456	4.3'	0.07	2.5	4.70	"	Across G.B. Vein to N.W. Rib, Back, 156 N.
Comp.	12.6'	0.53	8.82	26.49	"	Brooke & Lindsey 10/61
3481	3.0'	0.07	5.55	7.45	"	Footwall, Fractured Porphyry, Back, 156 N.
3482	1.2'	3.22	6.80	118.82	"	Gouge, Back, 156 N.
3483	4.7'	0.09	1.10	4.14	"	Hangingwall, Fractured Porphyry, Back, 156 N.
Comp.	8.9'	0.51	3.37	20.88		Brooke & Smithson 11/60

SUMMARY OF SAMPLE DATA
Grouped by Location
GOLD BUG MINE & VICINITY
350 Level

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Sample No.	Width	Assay oz. AU	Assay oz. AG	$Value @ $35.00 & $ .90	Type Sample	Description
4457	2.4'	0.12	24.6	26.34	Chip	From G.B. Vein to S.E. Rib (F.W.), Back, 156 N.
4458	1.5'	7.56	38.5	299.25	"	Across G.B. Vein, Back, 156 N.
4459	5.4'	0.05	2.0	3.55	"	From G.B. Vein to N.W. (H.W.), Back, 156 N.
Comp.	9.3'	1.28	13.72	57.15		Brooke & Lindsey 10/61
3484	2.8'	0.13	11.05	14.51	"	Footwall, Fractured Porphyry, Back, 156 N.
3485	2.0'	1.42	20.50	68.15	"	Gouge, Back, 156 N.
3486	2.8'	0.09	0.90	3.96	"	Hangingwall, Fractured Porphyry, Back, 156 N.
Comp.	7.6'	0.48	9.80	25.62	"	Brooke & Smithson 11/60
4460	2.6'	0.12	8.1	11.49	"	From G.B. Vein to S.E. Rib (F.W.), Back, 156 N.
4461	1.2'	0.39	21.2	32.73	"	Across G.B. Vein, Back, 156 N.
4462	4.8'	0.13	3.0	7.25	"	From G.B. Vein to N.W. Rib (H.W.), Back, 156 N.
Comp.	8.6'	0.16	7.08	11.97		Brooke & Lindsey 10/61
320	2.5'	2.70	49.30	138.87	"	Footwall, Gouge, Back, 156 N.
321	4.0'	0.04	4.30	1.79	"	Hangingwall, Fractured Porphyry, Back, 156 N.
Comp.	6.5'	1.63	45.69	98.17		Brooke & Smithson 11/60
4463	1.5'	0.06	9.7	10.83	"	From G.B. Vein to S.E. Rib (F.W.), Back, 156 N.
4464	2.7'	1.81	75.0	130.85	"	Across G.B. Vein, Back, 156 N.
4465	4.3'	0.33	15.7	25.68	"	From G.B. Vein to N.W. Rib (H.W.), Back, 156 N.
Comp.	8.5'	0.75	33.48	49.88		Brooke & Lindsey 10/61
319	4.5'	0.13	12.35	15.67	"	Hangingwall, Fractured Porphyry, Back, 156 N.
323	4.5'	0.27	9.65	18.14	"	Footwall, Fractured Porphyry, Back, 156 N.
Comp.	9.0'	0.20	11.00	16.90		Brooke & Smithson 11/60
4466	7.7'	0.03	3.2	3.93	"	From G.B. Vein to S.E. Rib (F.W.), Back, 156 N.
4467	3.3'	0.10	10.3	12.77	"	Across Vein to N.W. Rib, Back, 156 N.
Comp.	11.0'	0.05	5.33	6.55		Brooke & Lindsey 10/61
3487	1.5'	0.085	2.20	31.73	"	Footwall, Fractured Porphyry, Back, 156 N.
3488	2.4'	0.22	11.20	17.78	"	Hangingwall, Fractured Porphyry, Back,Gouge,156N.
Comp.	3.9'	0.17	7.74	12.92		Brooke & Smithson 11/60
4468	2.5'	0.05	2.4	3.91	"	From G.B. Vein to S.E. Rib (F.W.), Back, 156 N.
4469	4.0'	0.32	29.1	37.39	"	Across G.B. Vein to N.W. Rib, Back, 156 N.
Comp.	6.5'	0.22	18.83	24.65		Brooke & Lindsey 10/61
3492	2.3'	0.50	7.40	24.16	"	Footwall, Fractured Porphy.,Some Gouge,Back,156N.
3493	4.5'	0.60	49.70	65.73	"	Hangingwall, Fractured Porphyry, Back, 156 N.
Comp.	6.8'	0.57	33.22	49.85		Brooke & Smithson 11/60
4470	4.4'	0.09	5.5	8.10	"	From G.B. Vein to S.E. Rib (F.W.), Back, 156 N.
4471	3.7'	1.78	126.2	175.88	"	Across G.B. Vein to N.W. Rib (H.W.), Back, 156 N.
Comp.	8.1'	0.86	60.63	84.67		Brooke & Lindsey 10/61
4472	0.4'	0.16	9.9	14.51	"	Across G.B. Vein in underhand stope,7'below rail, 156 N. Brooke & Lindsey 10/61
4473	6.8'	0.02	1.1	1.69	"	From G.B. Vein to S.E. Rib (F.W.),in above stope, 156 N. Brooke & Lindsey 10/61
329	4.9'	0.04	2.35	3.52	"	Fractured Porphyry, S.W. Face of Stope, 3' from back, 29' from Rail, 156 N. Brooke & Smithson 11/60

SUMMARY OF SAMPLE DATA
Grouped by Location
GOLD BUG MINE & VICINITY
350 Level

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Sample No.	Width	Assay oz.AU	Assay oz.AG	$Value @ $35.00 & $ .90	Type Sample	Description
3494	4.0'	0.02	0.30	.97	Chip	Fractured Porphyry, Back of Stope, 32' from rail, 156 N. Brooke & Smithson 11/60
328	4.5'	0.003	0.15	.24	"	Fractured Porphyry, N.E. Face of Stope, 3' from back, 29' from rail, 156N Brooke & Smithson 11/60
4351	7.0'	0.20	20.4	25.36	"	Frac. Porph., Back, 156N. C.H.R. 8/61
331	3.0'	0.08	3.20	5.68	"	Footwall, Fractured Porphyry, Back, 156 N.
332	0.5'	1.28	218.10	241.09	"	Gouge, Back, 156 N.
333	3.5'	0.24	2.45	10.61	"	Hangingwall, Fractured Porphyry, Back, 156 N.
Comp.	7.0'	0.25	18.18	25.11		Brooke & Smithson 11/60
4474	4.1'	0.04	11.2	11.48	"	From G.B. Vein to S.E. Rib (F.W.), Back, 156 N.
4475	3.7'	0.13	1.1	5.54	"	Across G.B. Vein, Back, 156 N.
4476	3.4'	o.08	0.7	3.43	"	From G.B. Vein to N.W. Rib (H.W.), Back, 156 N.
Comp.	11.2	0.08	4.68	7.01		Brooke & Lindsey 10/61
330	8.0'	0.05	0.65	2.34	"	Footwall to Hangingwall, Frac. Porphy., Back, 156 N. Brooke & Smithson 11/60
326	3.5'	0.04	2.20	3.38	"	Footwall, Fractured Porphyry, Back, 156 N
327	4.5'	0.06	0.10	2.19	"	Hangingwall, Fractured Porphyry, Back, 156 N.
Comp.	8.0'	0.05	0.65	2.33		Brooke & Smithson 11/60
325	7.0'	0.03	0.60	1.59	"	Frac. Porphy., Back, 156N. Brooke & Smithson 11/60
324	6.0'	0.04	1.30	2.57	"	Frac. Porphy., Face 156 N., 1' above muck Brooke & Smithson 11/60
339	—	0.03	0.70	1.68	Grab	Muck pile at face of 156 N. Drift Brooke & Smithson 11/60

SUMMARY OF SAMPLE DATA
Grouped by Location
GOLD BUG MINE & VICINITY
300 Level

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Sample No.	Width	Assay oz.AU	Assay oz.AG	$Value @ $35.00 & $ .90	Type Sample	Description
4483	2.0'	0.03	9.57	9.66	Chip	Across G.B. Vein at Drift, 300 Level (No.5), Face Brooke & Lindsey 10/61
4484	4.2'	0.11	9.74	12.62	"	Across G.B. Vein 30' from X-cut, 300 Level, Back Brooke & Lindsey 10/61
4485	4.0'	0.07	11.03	12.38	"	Across G.B. Vein 130' from X-cut, 300 Level, Back Brooke & Lindsey 10/61
4487	4.4'	0.05	0.65	2.34	"	Across Split of G.B. Vein at Raise, 300 Level, Back Brooke & Lindsey 10/61
4486	2.5'	0.02	2.68	3.11	"	Across G.B. Vein 150' from X-cut, 300 Level, Back Brooke & Lindsey 10/61
4493	4.7'	0.08	5.07	7.36	"	Across G.B. Vein 163' from X-cut, 300 Level, Back Brooke & Lindsey
4494	6.5'	0.05	6.45	7.56	"	Across G.B. Vein 188' from X-cut, 300 Level, Back Brooke & Lindsey 10/61
4495	2.4'	0.03	2.77	3.54	"	Across G.B. Vein 179' from X-cut, 300 Level, Back Brooke & Lindsey 10/61
4496	4.0'	0.35	14.85	25.62	"	Across G.B. Vein 203' from X-cut, 300 Level, Back Brooke & Lindsey 10/61

SUMMARY OF SAMPLE DATA
Grouped by Location
GOLD BUG MINE & VICINITY

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Discovery Level

Sample No.	Width	Assay oz.AU	Assay oz.AG	$Value @ $35.00 & $ .90	Type Sample	Description
4501	1.2'	1.00	5.05	39.55	Chip	Across G.B. Vein at Portal of Disc. Tunnel Brooke & Lindsey 10/61
4497	3.5'	0.05	4.45	5.76	"	Across G.B. Vein in Disc. Tunnel, Face Brooke & Lindsey 10/61
4498	1.9'	0.06	8.69	9.92	"	Across G.B. Vein in Disc. Tunnel 5' N of Stope, Back Brooke & Lindsey 10/61
4499	3.2'	0.02	0.28	.95	"	Across G.B. Vein at Face of Disc. Tunnel Brooke & Lindsey 10/61

Miscellaneous Sampling

4500	6.7'	0.04	1.06	2.35	Chip	Across G.B. Vein, outcrop, downhill from Disc. Level
4378	2.0'	0.48	4.27	20.64	"	Across Vein, incline pit, 15' deep
344	—	0.10	2.00	5.30	Grab	Tailings, Gold Bug mill pond
345	—	0.13	5.35	9.37	"	Material in bin below crusher

Mill Cut

See Exhibit 3d(11) p. 9, 10

Upper Breccia Cut

See Exhibit 3d(11) p. 10

A S S A Y C E R T I F I C A T E S

Contents 10 pages

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3 d (11)

Phone Elgin 9-9142

Harold Saltzson
Continental Materials
1740 East 17th South

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

NICHOLS LABORATORIES, INC.
ASSAYERS & CHEMISTS
C. Ivan Nichols, Mgr.
160 South West Temple Street
Salt Lake City 1, Utah

WE HAVE ASSAYED 52 SAMPLES

ASSAY PER TON OF 2000 POUNDS

DESCRIPTION	NO.	GOLD OUNCES	SILVER OUNCES	WET LEAD %	COPPER %	ZINC %	INSOL %	%	%	%	VALUE OF GOLD PER TON
	316	0.155	7.95								
	317	0.085	8.45								
	318	0.675	24.70								
	319	0.13	12.35								
	320	2.70	49.30								
	321	0.035	4.30								
	322	0.075	8.10								
	323	0.265	9.65								
	324	0.035	1.30								
	325	0.03	0.60								
	326	0.035	2.20								
	327	0.06	0.10								
	328	0.003	0.15								
	329	0.04	2.35								
	330	0.05	0.65								

November 7, 1960

C. Ivan Nichols. Jr

CHARGES $

Phone ELgin 9-9962

Harold Smithson
Continental Material
1740 East 17th South
City

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

NICHOLS LABORATORIES, INC.
ASSAYERS & CHEMISTS
C. Ivan Nichols, Mgr.
160 South West Temple Street
Salt Lake City 1, Utah

WE HAVE ASSAYED 52 cont. SAMPLES

ASSAY PER TON OF 2000 POUNDS

DESCRIPTION	NO.	GOLD OUNCES	SILVER OUNCES	WET LEAD %	COPPER %	ZINC %	INSOL %	%	%	%	VALUE OF GOLD PER TON
	331	0.075	3.20								
	332	1.28	218.10								
	333	0.24	2.45								
	334	0.07	2.00								
	335	0.06	1.75								
	336	0.08	18.60								
	337	0.23	36.15								
	338	0.06	5.05								
	339	0.03	0.70								
	340	0.075	0.20								
	341	0.035	0.15								
343	342	0.04	0.15								
	344	0.10	2.00								
	345	0.125	5.35								

November 7, 1960

CHARGES $

C. Ivan Nichols, Jr.

Phone ELgin 9-9962

Harold Smithson
Continental Materials
1740 East 17th South
City

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

NICHOLS LABORATORIES, INC.
ASSAYERS & CHEMISTS
C. Ivan Nichols, Mgr.
160 South West Temple Street
Salt Lake City 1, Utah

WE HAVE ASSAYED 52 cont. SAMPLES

ASSAY PER TON OF 2000 POUNDS

DESCRIPTION	NO.	GOLD OUNCES	SILVER OUNCES	WET LEAD %	COPPER %	ZINC %	INSOL %	%	%	%	VALUE OF GOLD PER TON
	3393	0.795	7.40								
	3394	0.08	13.00								
	3395	0.41	11.20								
	3396	0.065	3.90								
3476	3476	0.07	6.85								
	3477	0.085	~~1.20~~	1.20							
	3478	0.18	12.40								
	3479	0.02	3.70								
	3480	0.505	26.70								
	3481	0.065	5.55								
	3482	3.215	6.80								
	3483	0.09	1.10								
	3484	0.13	11.05								
	3485	1.42	20.50								
	3486	0.085	0.90								

November 7, 1960

CHARGES $

C. Ivan Nichols.

Phone ELgin 9-9962

Harold Smithson
Continental Materials
1740 East 17th South
City

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

NICHOLS LABORATORIES, INC.
ASSAYERS & CHEMISTS
C. Ivan Nichols, Mgr.
160 South West Temple Street
Salt Lake City 1, Utah

WE HAVE ASSAYED 52 Cont. SAMPLES

ASSAY PER TON OF 2000 POUNDS

DESCRIPTION	NO.	GOLD OUNCES	SILVER OUNCES	WET LEAD %	COPPER %	ZINC %	INSOL %	%	%	%	VALUE OF GOLD PER TON
	3487	0.085	0.90								
	3488	0.22	11.30								
	3489	1.24	10.65								
	3490	0.18	4.60								
	3491	0.225	9.50								
	3492	0.50	7.40								
3493	3493	0.60	49.70								
3494	3494	0.02	0.30								

November 7, 1960

CHARGES $ 104.00

C. Ivan Nichols.

C. Ivan Nichols

Minerals Assay Laborat

Date 8/25/61

349 Naland Avenue -:- Grand Junction, Colo.

Phone CH 2-8021

NAME Continental Materials Corp. ADDRESS Box #1550 Grand Junction, Colo.

LAB. No.	SAMPLE RECEIVED 8/14/61	Oz. Gold Per Ton	Oz. Silver Per Ton	PERCENT LIME % CaCO3	PERCENT TUNGSTEN OXIDE % WO3	PERCENT MOLY % MO
1378	Tag #4350 CHR 8/10/61 E. End 154 Stope	0.25	49.2			
1379	Tag #4351 CHR 8/10/61 156 Stope, Back	0.20	20.4			
1380	Tag #4352 CHR 8/10/61 156 Stope Left Rib	7.16	611.6			

R. C. Murrey
By B. Rawles

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

TOTAL CHARGES $ 615.00 Invoice #7939

~~GOODALL,~~
~~Assayer, Chemist~~

A. V. TRENT, Page 6
Assayer, Chemist

GOODALL BROTHERS

ASSAYERS AND METALLURGICAL CHEMISTS

#I

~~48-50~~ MAIN ST., HELENA, MONTANA

442-3770
~~CEL. 628~~
P. O. BOX 537

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Date OCT 26 1961

UMPIRE ASSAY..... CONTROL ASSAY..... HAND SAMPLE.....

ASSAYED FOR: Continental Materials Corp. 4 L. Brooke

MARKS: Bortman, Mont.

Sample No.	DESCRIPTION	Gold Ozs. Per Ton	Silver Ozs. Per Ton	Wet Lead Per Cent	Copper Per Cent	Zinc Per Cent	Iron Per Cent	Insol Per Cent	Per Cent	Total Val. Per Ton
4441		0.08	6.1							8.29
2		0.09	10.0							12.15
3		0.04	2.1							3.29
4		0.05	7.9							8.86
5		0.30	22.9							31.11
6		0.03	20.8							19.77
7		0.07	7.6							9.29
8		0.15	15.5							19.20
9		0.04	11.1							11.39
4450		0.08	5.7							7.93
1		0.26	29.2							35.38
2		0.06	6.0							7.50
3		2.18	33.8							106.32
4		0.56	34.7							50.83
5		0.76	12.1							37.47
6		0.07	2.5							4.70
7		0.12	24.6							26.34
8		7.56	38.5							299.25
9		0.05	2.0							3.55
4460		0.12	8.1							11.49
1		0.39	21.2							32.73
2		0.13	3.0							7.25
3		0.06	9.7							10.83
4		1.81	75.0							130.85
5		0.33	15.7							25.68
6		0.03	3.2							3.83
7		0.10	10.3							12.77
8		0.05	2.4							3.91
9		0.32	29.1							37.39

Gold not deducted:.....

Charges $.....

GOODALL BROS.,

By A. V. Trent

NPCo. Form 5—A-6064

J. GOODALL,
Assayer, Chemist

A. V. TRENT,
Assayer, Chemist

GOODALL BROTHERS

ASSAYERS AND METALLURGICAL CHEMISTS

NO. MAIN ST., HELENA, MONTANA

TEL. 628
P. O. BOX 537

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

#II

Date OCT 26 1961

UMPIRE ASSAY..... CONTROL ASSAY..... HAND SAMPLE.....

ASSAYED FOR: Continental Materials Corp.

MARKS:

Sample No.	DESCRIPTION	Gold Ozs. Per Ton	Silver Ozs. Per Ton	Wet Lead Per Cent	Copper Per Cent	Zinc Per Cent	Iron Per Cent	Insol Per Cent	Per Cent	Total Val. Per Ton
4470		0.09	5.5							8.10
1		1.78	126.2							175.88
2		0.16	9.9							14.51
3		0.02	1.1							1.69
4		0.04	11.2							11.48
5		0.13	1.1							5.54
6		0.08	0.7							3.43
7		0.08	10.8							12.52
8		0.08	12.3							13.87
9		0.07	5.2							7.13
4480		0.03	2.6							3.39
1		4.35	19.7							169.98
2		0.05	1.1							2.76
4488		0.03	1.9							2.30
4489		0.04	1.0							3.0
4490		0.07	1.5							3.80
1		0.09	6.0							8.57
2		0.09	5.4							8.01

Gold not deducted:.....
Charges $ 94.00

cc: Grand Jct., Colo.

GOODALL BROS.,
By A. V. Trent

NPCo. Form 5—A-6064

BRANCH LABORATORY: 1086 MARTIN AVENUE • SANTA CLARA • CHERRY 8-5262
BRANCH OFFICE: 61 JORDAN STREET • SAN RAFAEL • GLENWOOD 4-8650

CABLE: HANX

ABBOT A. HANKS, INC.

ESTABLISHED 1866

1300 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA • EXBROOK 7-2464

Engineers
Assayers
Chemists
Metallurgists
Spectrographers
Soils and Foundations
Consulting · Testing · Inspecting

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

REPORT OF ASSAY

November 14, 1961

Deposited by Wisser & Cox
55 New Montgomery Street
San Francisco, California

Sample of ORE

Labty. No.	Mark	GOLD, per ton of 2,000 lbs. Troy Ounces	Value at $35.00 oz.	SILVER, per ton of 2,000 lbs. Troy Ounces	Value at	Percentages
						TOTAL VALUE
C117236	4378	.48	$16.80	4.27	$ 3.84	[illegible]
C117237	4483	.03	1.05	9.57	8.61	[illegible]
C117238	4484	.11	3.85	9.74	8.77	[illegible]
C117239	4485	.07	2.45	11.03	9.93	[illegible]
C117240	4486	.02	0.70	2.68	2.41	[illegible]
C117241	4487	.05	1.75	.65	0.59	[illegible]
C117242	4493	.08	2.80	5.07	4.56	[illegible]
C117243	4494	.05	1.75	6.45	5.81	[illegible]
C117244	4495	.03	1.05	2.77	2.49	[illegible]
C117245	4496	.35	12.25	14.85	13.37	[illegible]
C117246	4497	.05	1.75	4.45	4.01	[illegible]
C117247	4498	.06	2.10	8.69	7.82	[illegible]
C117248	4499	.02	0.70	.28	0.25	[illegible]
C117249	4500	.04	1.40	1.06	0.95	[illegible]
C117250	4501	1.00	35.00	5.05	4.55	[illegible]
C117251	4502	Trace		.40	0.36	
C117252	4503	Trace		.20	0.18	

ABBOT A. HANKS, INC.
By Clifford V. Munslow
Clifford V. Munslow

lm

CA-106

~~A. P. GOODALL,~~
~~Assayer, Chemist~~

A. V. TRENT,
Assayer, Chemist

GOODALL BROTHERS

ASSAYERS AND METALLURGICAL CHEMISTS

NORTHERN CONTINENTAL ~~BUILDING~~ ~~ST.~~, HELENA, MONTANA

TEL. 628
P. O. BOX 587

P. O. BOX 1550
GRAND JUNCTION, COLORADO

Date OCT 16 1961

UMPIRE ASSAY..... CONTROL ASSAY..... HAND SAMPLE.....

ASSAYED FOR: Continental Materials Corp. by L. N. Broome Zortman, Montana

MARKS:

Sample No.	DESCRIPTION	Gold Ozs. Per Ton	Silver Ozs. Per Ton	Wet Lead Per Cent	Copper Per Cent	Zinc Per Cent	Iron Per Cent	Insol Per Cent	Per Cent	Total Val. Per Ton
4379		Trace	Trace							—
4380		Trace	0.1							0.09
4381		Trace	0.1							0.09
4382		Trace	0.1							0.09
4383		Trace	Trace							—
4384		Trace	0.2							0.18
4385		0.01	0.1							0.44
4386		0.005	0.2							0.35
4387		Trace	0.1							0.09
4388		0.005	0.1							0.26
4389		0.05	0.2							1.93
4390		0.005	0.2							0.35
4391		0.005	0.2							0.35
4392		Trace	0.1							0.09
4393		0.01	0.2							0.53
4394		Trace	0.1							0.09
4395		Trace	0.1							0.09
4396		0.005	0.2							0.35
4397		0.005	0.1							0.26
4398		Trace	0.2							0.18
4399		0.01	0.2							0.53

First sampling of mill dump cut before trenching was completed. Final sampling shown on map.

Gold not deducted:..... cc: Grand Junction, Colo.

Charges $.....

GOODALL BROS.,

By A. V. Trent

NPCo. Form 5—A-6064

A. J. GOODALL,
Assayer, Chemist

A. V. TRENT,
Assayer, Chemist

GOODALL BROTHERS

ASSAYERS AND METALLURGICAL CHEMISTS

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

SO. MAIN ST., HELENA, MONTANA

TEL. 628
P. O. BOX 537

Date OCT 16 1961

UMPIRE ASSAY..... CONTROL ASSAY..... HAND SAMPLE.....

ASSAYED FOR: Continental Materials Corp. by L. H. Broope - Zortman, Montana

MARKS:

Sample No.	DESCRIPTION	Gold Ozs. Per Ton	Silver Ozs. Per Ton	Wet Lead Per Cent	Coppor Per Cent	Zinc Per Cent	Iron Per Cent	Insol Per Cent	Per Cent	Total Val. Per Ton
4429		Trace	Trace	(Same as page 1.)						—
4430		0.06	0.15							2.23
4431		0.02	0.2							0.88
4432		0.04	0.2							1.58
4433		0.03	0.1							1.14
4434		0.01	0.1							0.44
4435		0.02	0.2							0.88
4436		0.02	0.1							0.79
4437		0.05	0.15							1.89
4438		0.02	0.2							0.88
[illegible]39		0.005	0.2							0.35
4440		Trace	0.1							0.09
	no tag canvas tag	Trace	0.1							0.09
4428	✓ ✓ paper tag small sample	0.005	0.2	(Same as page 1)						0.35

Gold not deducted:.....

Charges $ 70.00

cc: Grand Junction, Colo.

GOODALL BROS.,

By A. V. Trent

NPCo. Form 5—A-6064

Exh. 3e(1)Thru 3e(5)

BY GLB DATE 11/10/61 SUBJECT The Little Rocky Mining & Development Company Smelter Shipment Summary 1955-1958 SHEET NO. ..... OF .....

CH. BY ..... DATE ..... JOB NO. .....

Arrival Date	Dry Wt. Pounds	Tons	Au	Ag	Pb	Cu	Insol	Fe	Mn	Zn	As	Sb	CaO	Treatment Charge	NSR per Ton	NSR
5/24/55	11,221	5.61	.71	53.25	0	.02	85.8	3.7	0.1	0.5	0.15	0.18	0.5	$ 7/T	$ 61.25	$ 343.64
5/5/56	89,276	49.64	.7975	21.9	0	.03	88.4	3.6	0.1	0	0.20	0.04		7	37.26	1663.21
7/11/56	2,230)	1.11	12.71	729.6	0	.05	72.4	9.9	0.2	0.6	0.20	0.16	0.2	8.75	1035.74	1154.85
9/5/56	6,337) Conc.	3.17	5.975	464.4	0	.10				0.5				8.75	586.59	1858.61
9/29/56	5,827)	2.92	6.267	406.35	0	.05								8.75	546.34	1591.76
10/27/56	6,608)	3.30	4.402	263.05	0	.05				0				8.75	361.85	1195.55
1/7/57	45,571	22.78	1.12	36.2	0	.30	85.6	5.6	0.4	0			0.30	8.75	58.31	1328.62
4/20/57	86,318	43.16	2.75	92.9	0	.20	69.6	10.7	0.4	0	0.15	0.15	0.3	8.75	159.39	6879.11
6/10/57	121,363	60.68	1.535	74.85	0	.05				0.5				8.75	104.41	6335.76
7/22/57	44,579	22.29	.8375	44.4	0	.10				0				8.75	55.97	1247.54
8/17/57	56,265	28.14	1.18	33.9	0	.20				0.6				9.00	57.56	1619.31
8/30/57	27,494	13.75	2.57	63.4	0	.03				0				9.00	126.75	1742.43
9/3/57	86,727	43.37	.875	24.67	0.8	.10				0.5				9.00	39.84	1727.60
12/12/57	26,692	13.35	2.45	99.7	0	.05				0.5				9.00	153.25	2045.27
3/14/58	26,693	13.35	0.50	36.45	0	.10	75.0	9.3		0.5	0.50	0.25	0.1	9.00	37.73	503.56
4/15/58	30,312	15.16	.9925	52.5	0	.05				1.0				9.00	66.97	1015.00
6/26/58	31,862	15.93	1.34	57.8	0	.10				0				9.00	82.51	1314.47
9/28/58	24,428	12.21	2.766	102.6	0	.10	53.0	16.6		0	0.50	0.08	0.1	9.00	165.76	2024.59
TOTAL CRUDE		359.42														29790.11
TOTAL CONC.		10.5														5800.77
														GRAND TOTAL		35590.88

Exh. 3 c(1)

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

OFFICIAL FILE COPY
C. M. E.
RECEIVED APR 10 1992
DATE

BY EHL GLB DATE 10/29/61 SUBJECT SAMPLE MAP SHEET NO. ... OF ...

CHKD. BY ... DATE ... DISCOVERY LEVEL, GOLD BUG JOB NO. ...

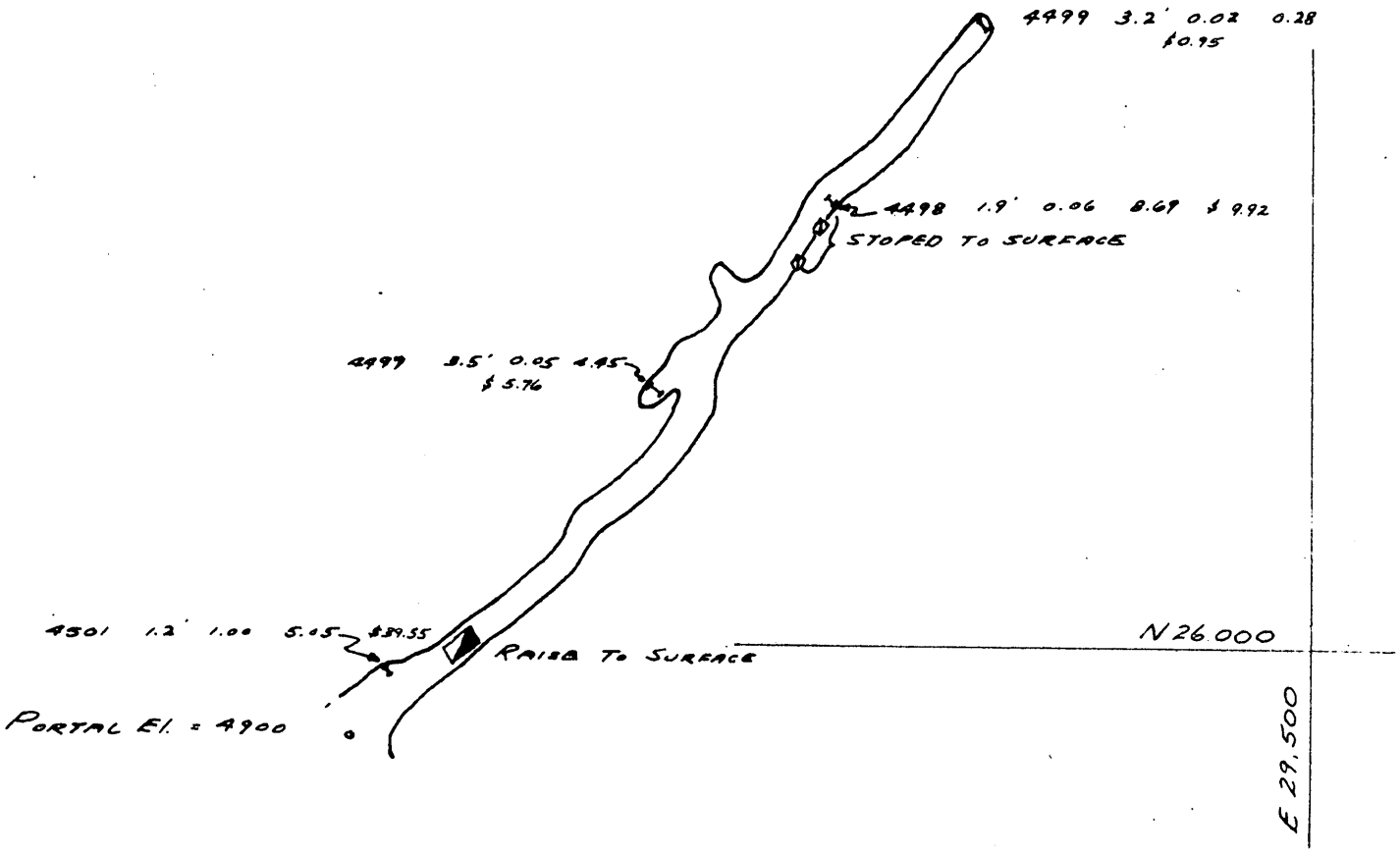
Scale: 1" = 50' VEIN, PHILLIPS CO., MONTANA

REFER TO Exh. 3 d (10) FOR DETAIL OF SAMPLES

LEGEND

SAMPLE LOCATION → 4499 3.2' 0.02 0.28 $0.95

SAMPLE No. — WIDTH — OZ. Au. — OZ. Ag — Total Value



NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3 d(8)

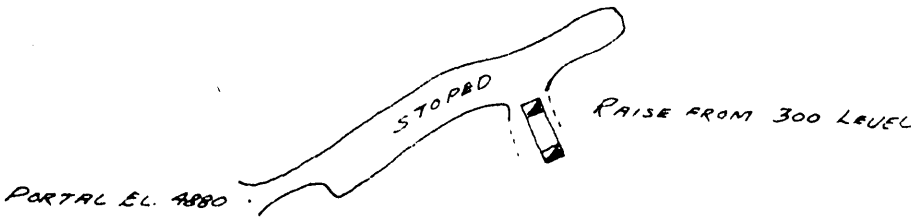
BY JGR DATE 1/31/62 SUBJECT SAMPLE MAP SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ 250 LEVEL, GOLD BUG MINE JOB NO. ____

Scale: 1 in = 50 ft PHILLIPS COUNTY, MONTANA

PREPARED FROM MAP BY M.H. GIDEL & C.E BASS, DATED AUG. 1931

NO SAMPLES TAKEN BY N. CONT'L.



NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

V 26,000

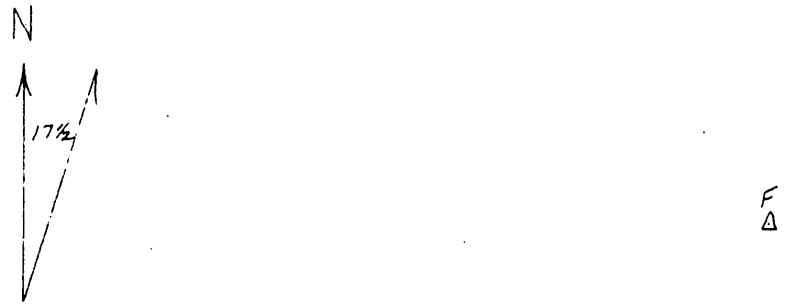
E 29,500

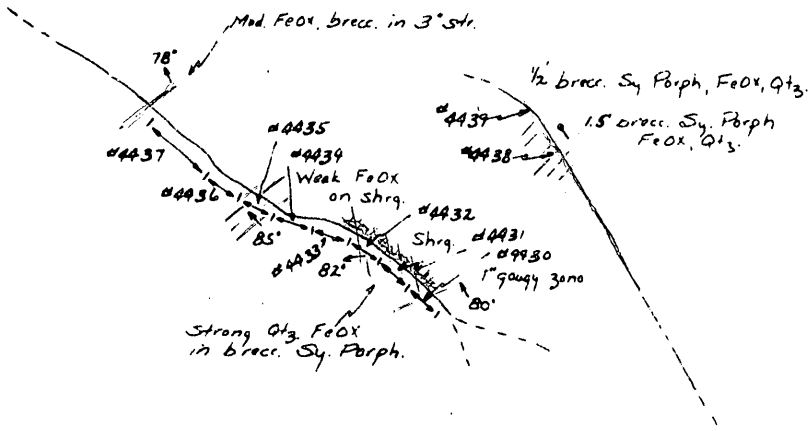
Exh. 3d(7)

BY EHL, GLB DATE 10/1/61 SUBJECT UPPER BRECCIA CUT GOLD BOY CLAIM, PHILLIPS CO., MONTANA SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ JOB NO. ____

Scale: 1" = 50'





SAMPLE DATA

NO.	WIDTH	AU	AG
4430	10'	0.06	0.15
4431	10'	0.02	0.20
4432	10'	0.04	0.20
4433	10'	0.03	0.10
4434	10'	0.01	0.10
4435	10'	0.02	0.20
4436	10'	0.02	0.10
4437	20'	0.05	0.15
4438	1.5'	0.02	0.20
4439	0.5'	0.005	0.20

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3e(5)

For Assay Cert. See Exh. 3d(11) p.10

BY GLB-EHL DATE 10/10-11/61 SUBJECT Mill Dozer Cut - Gold Bug Mine, Phillips County, Montana - Preliminary Sample Map SHEET NO. ..... OF .....

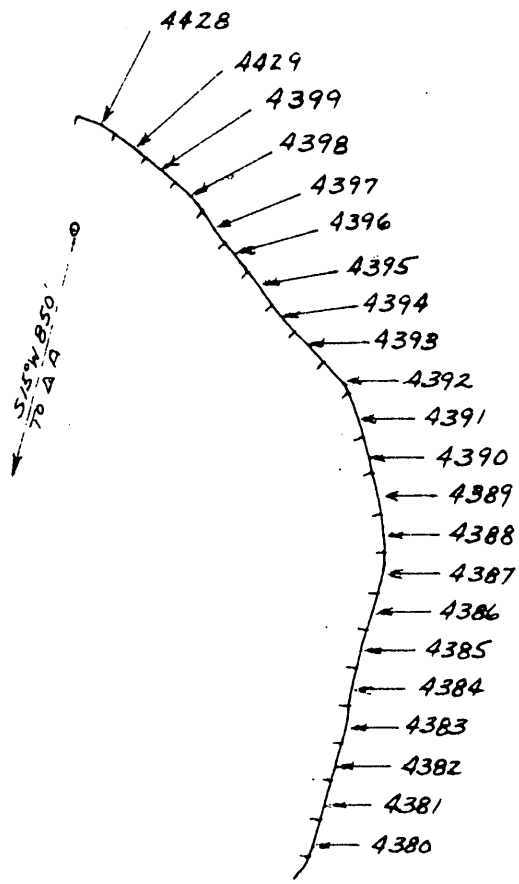
CHKD. BY ..... DATE ..... JOB NO. .....

Scale: 1" = 50'

N

Results of first sampling (before completion of cut)

Sample No.	Width	Au	Ag
4380	10'	Tr.	0.10
4381	"	Tr.	0.10
4382	"	Tr.	0.10
4383	"	Tr.	Tr.
4384	"	Tr.	0.20
4385	"	0.01	0.10
4386	"	0.005	0.20
4387	"	Tr.	0.10
4388	"	0.005	0.10
4389	"	0.05	0.20
4390	"	0.005	0.20
4391	11'	0.005	0.20
4392	10'	Tr.	0.10
4393	"	0.01	0.20
4394	"	Tr.	0.10
4395	"	Tr.	0.10
4396	"	0.005	0.20
4397	"	0.005	0.10
4398	"	Tr.	0.20
4399	"	0.01	0.20
4429	"	Tr.	Tr.
4428	"	0.005	0.20



NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

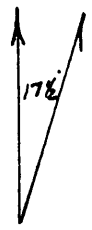
Exh. 3e(4a)

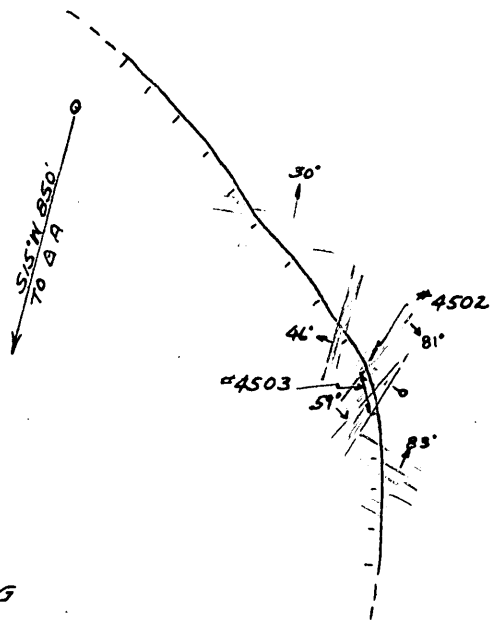
See Assay Cert. Exh. 3 d (11) p. 9, 10

BY EHL DATE 10/9/61 SUBJECT MILL CUT, GOLD BUG CLAIM, PHILLIPS CO., MONTANA SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ JOB NO. ____

Scale: 1" = 50'





SAMPLE DATA

NO.	WIDTH	AU	AG
4502	3.0'	Tr	.40
4503	10.0'	Tr	.20

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

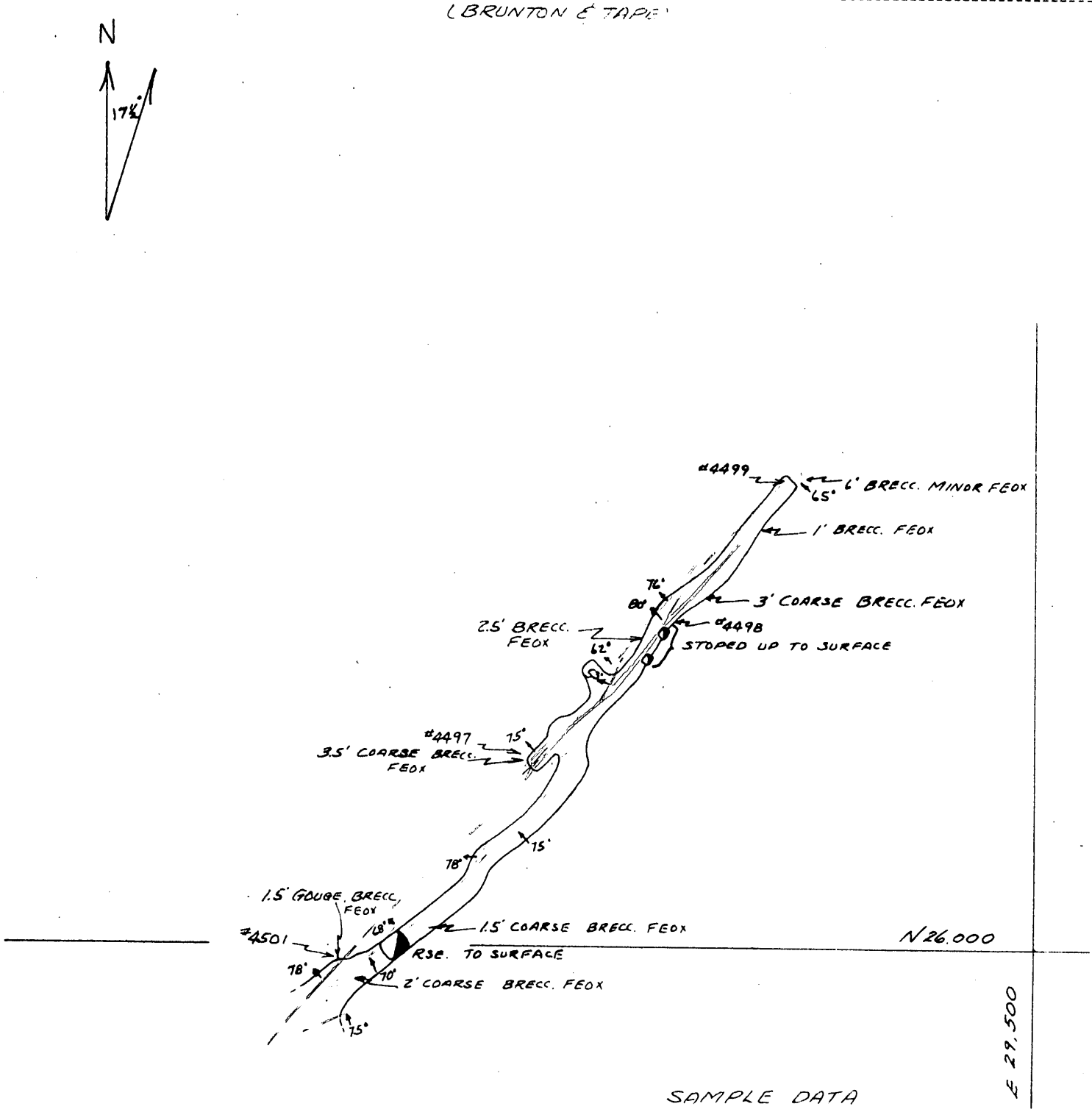
Exh. 3e (4)

For Assay Cert. See Exh. 3 d (11), p. 8

BY EHL GLB DATE 10/29/61 SUBJECT DISCOVERY TUNNEL, GOLD BUG VEIN (S.W. NO. 1 LEVEL) PHILLIPS CO., MONTANA (BRUNTON & TAPE) SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ JOB NO. ____

Scale: 1" = 50'



SAMPLE DATA

SAMPLE NO.	WIDTH	AU	AG
4497	3.5'	0.05	4.45
4498	1.9'	0.06	8.69
4499	3.2'	0.02	0.28
4501	[illegible]	[illegible]	[illegible]

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3e(3)

For Assay Cert. See Exh. 3 d(11) p. 8

Exh. 3d(1)Thru 3d(11)

Exh. 3a(2)

BY EHL DATE 10/25/61 SUBJECT GEOLOGY OF GOLD BUG 300 LEVEL, PHILLIPS CO., MONTANA (TRACED FROM AMEX GEOLOGY BY ROBERT GARWOOD) SHEET NO. ..... OF .....

CHKD. BY ..... DATE ..... JOB NO. .....

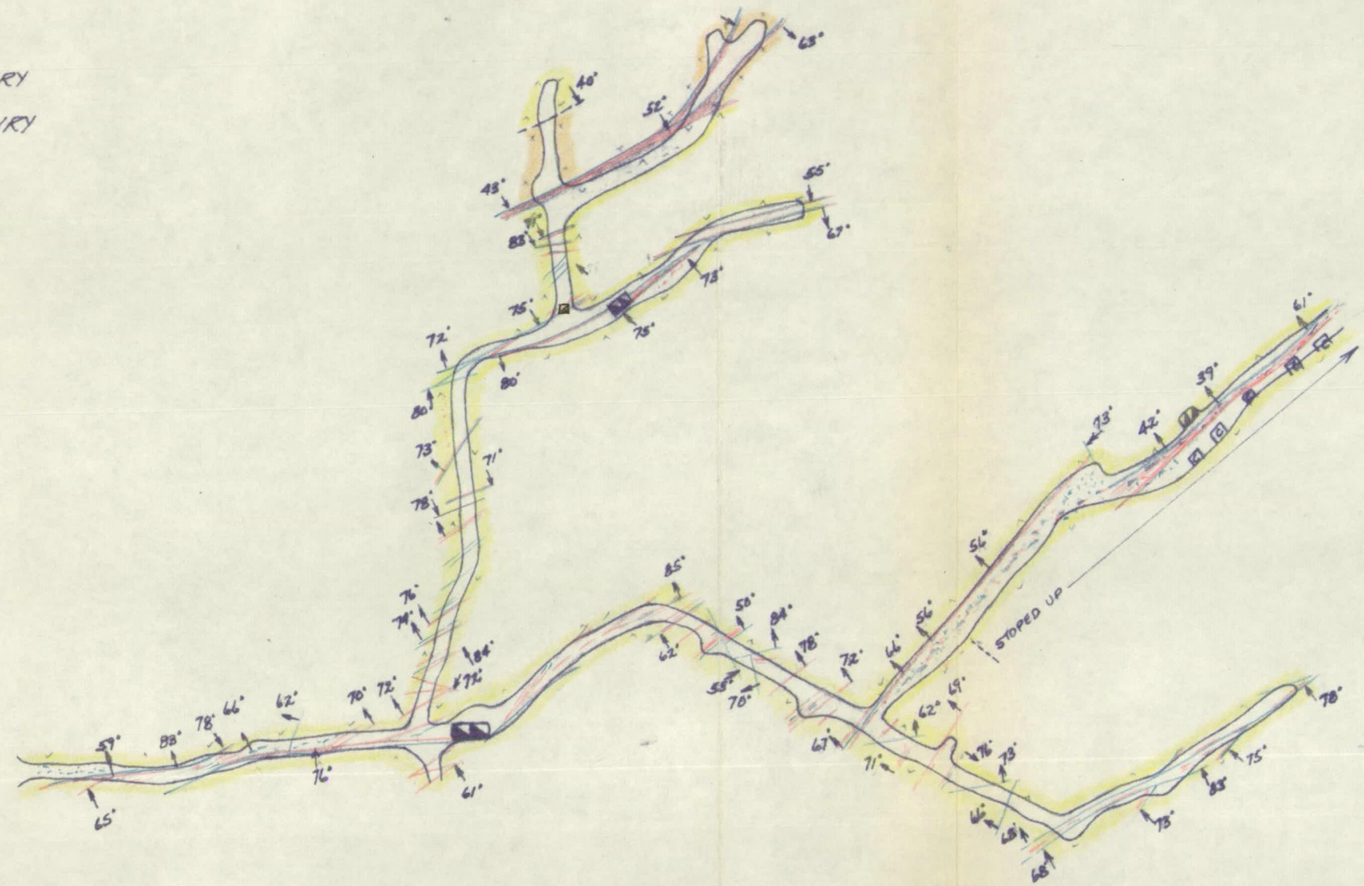
Scale: 1" = 50'

N

LEGEND

POSSUM PORPHYRY

SYENITE PORPHYRY



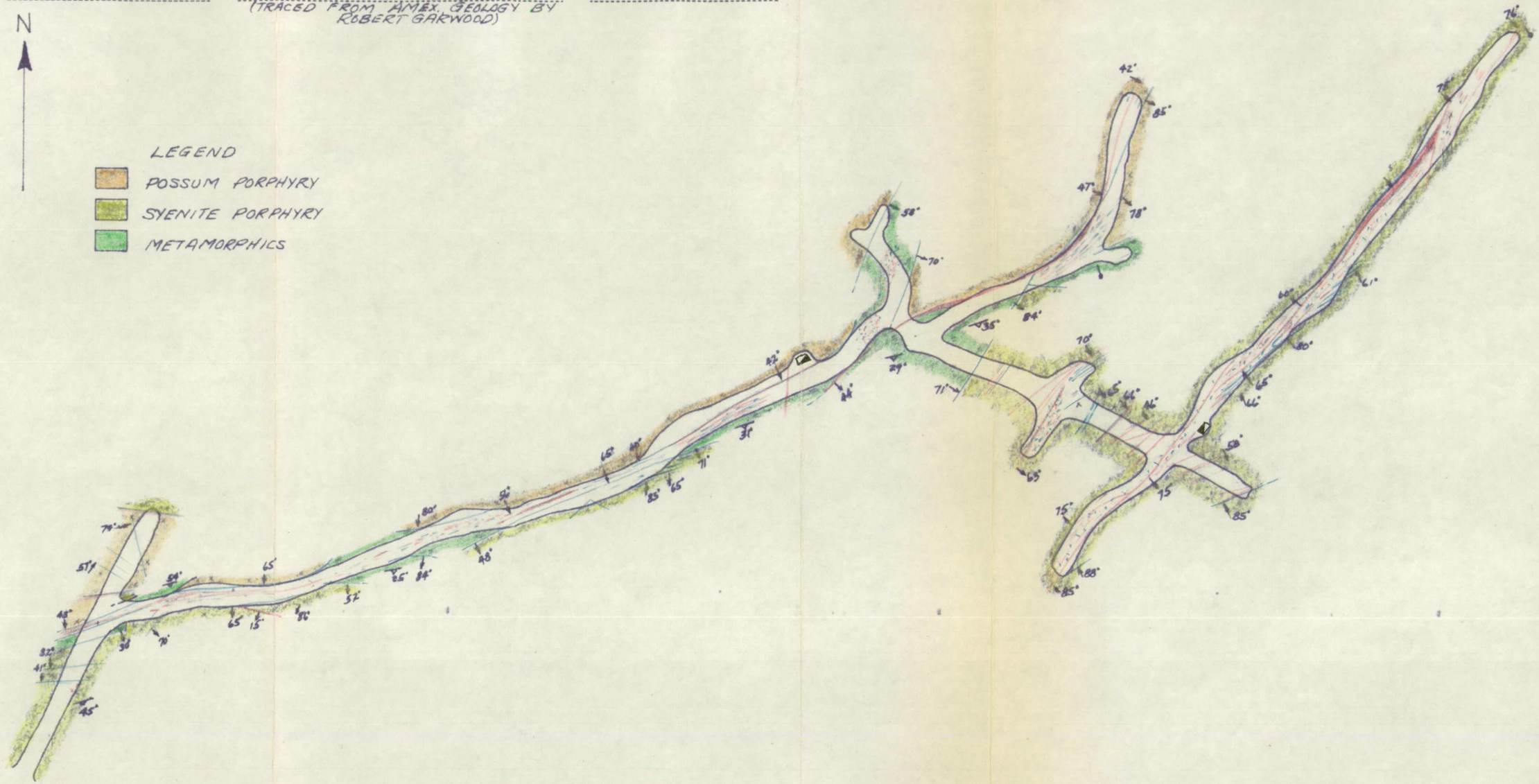
NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3e(2)

BY TRACED BY EHL DATE 10/25/61
CHKD. BY ..... DATE .....
Scale: 1" = 50'

SUBJECT GEOLOGY OF GOLD BUG
350 LEVEL, PHILLIPS CO.,
MONTANA
(TRACED FROM AMEX. GEOLOGY BY ROBERT GARWOOD)

SHEET NO. ..... OF .....
JOB NO. .....



NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

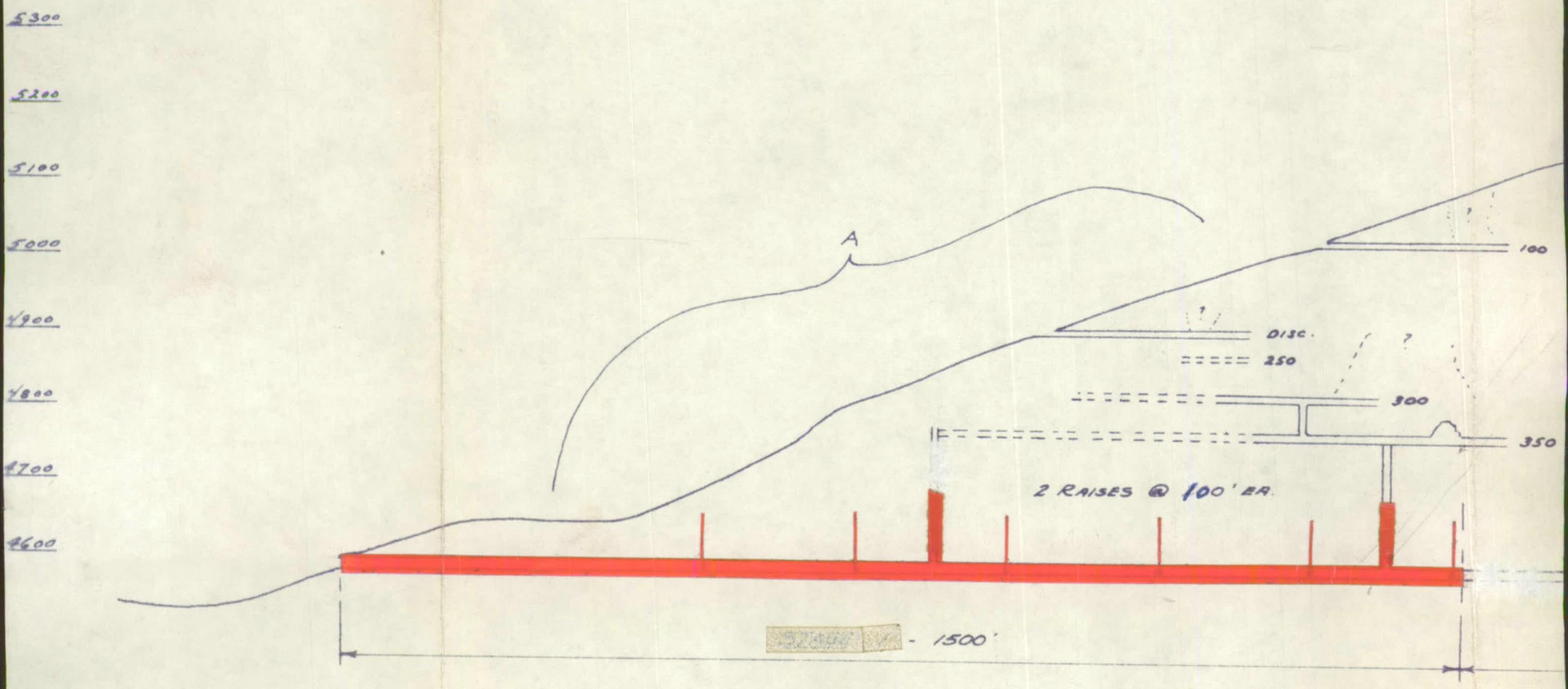
Exh. 3 e (1)

BY CHR. JGR DATE 2/1/62 SUBJECT LONGITUDINAL PROJECTION IN PLANE OF GOLD BUG VEIN SHOWING PROPOSED EXPLORATION SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ JOB NO. ____

Scale: 1 in = 200 FT

A = ANOMALOUS AREAS OVER GOLD BUG ZONE FROM GEO-CHEMICAL (AS) SURVEY.
SEE EXHIBIT 3a(1) FOR COMPLETE ANOMALIES



NOTE: SEE EXHIBIT

Plate-2

OFFICIAL FILE COPY
O. M. E
RECEIVED APR 16 1962
DATE INITIALS

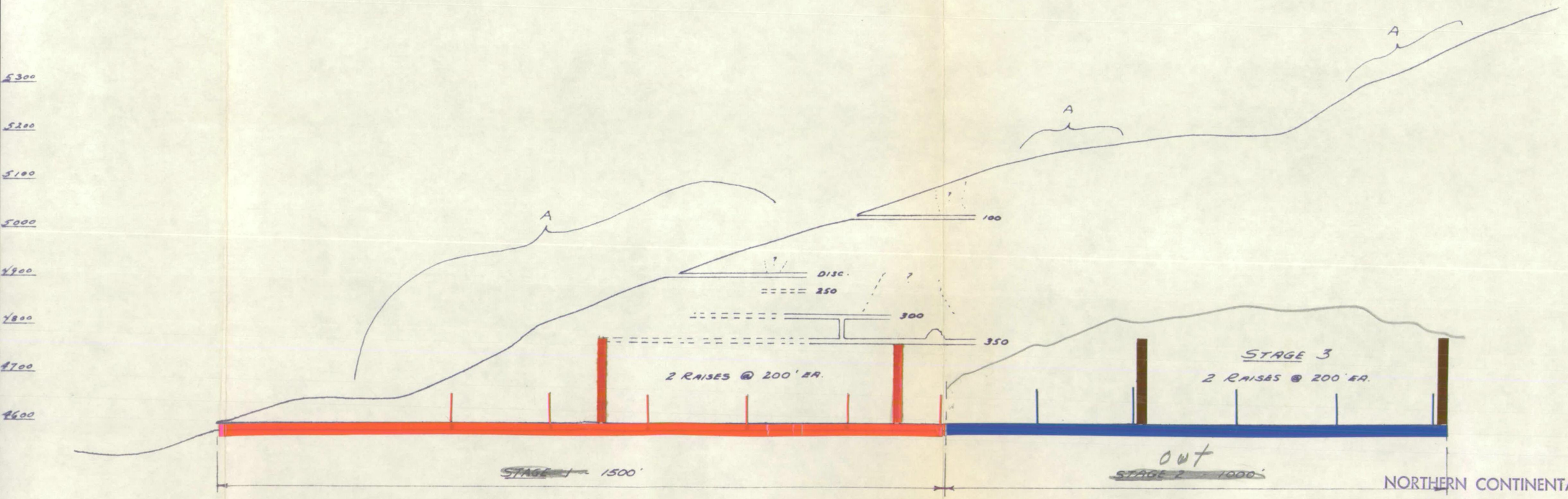
BY CHR. JGR DATE 2/1/62 SUBJECT LONGITUDINAL PROJECTION SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ IN PLANE OF GOLD BUG VEIN JOB NO. ____

Scale: 1 in = 200 FT SHOWING PROPOSED EXPLORATION

Plate 2

A = ANOMALOUS AREAS OVER GOLD BUG ZONE FROM GEO-CHEMICAL (As) SURVEY.
SEE EXHIBIT 3a(1) FOR COMPLETE ANOMALIES



NOTE: SEE EXHIBIT , SO SCALE SKETCH FOR DETAIL.

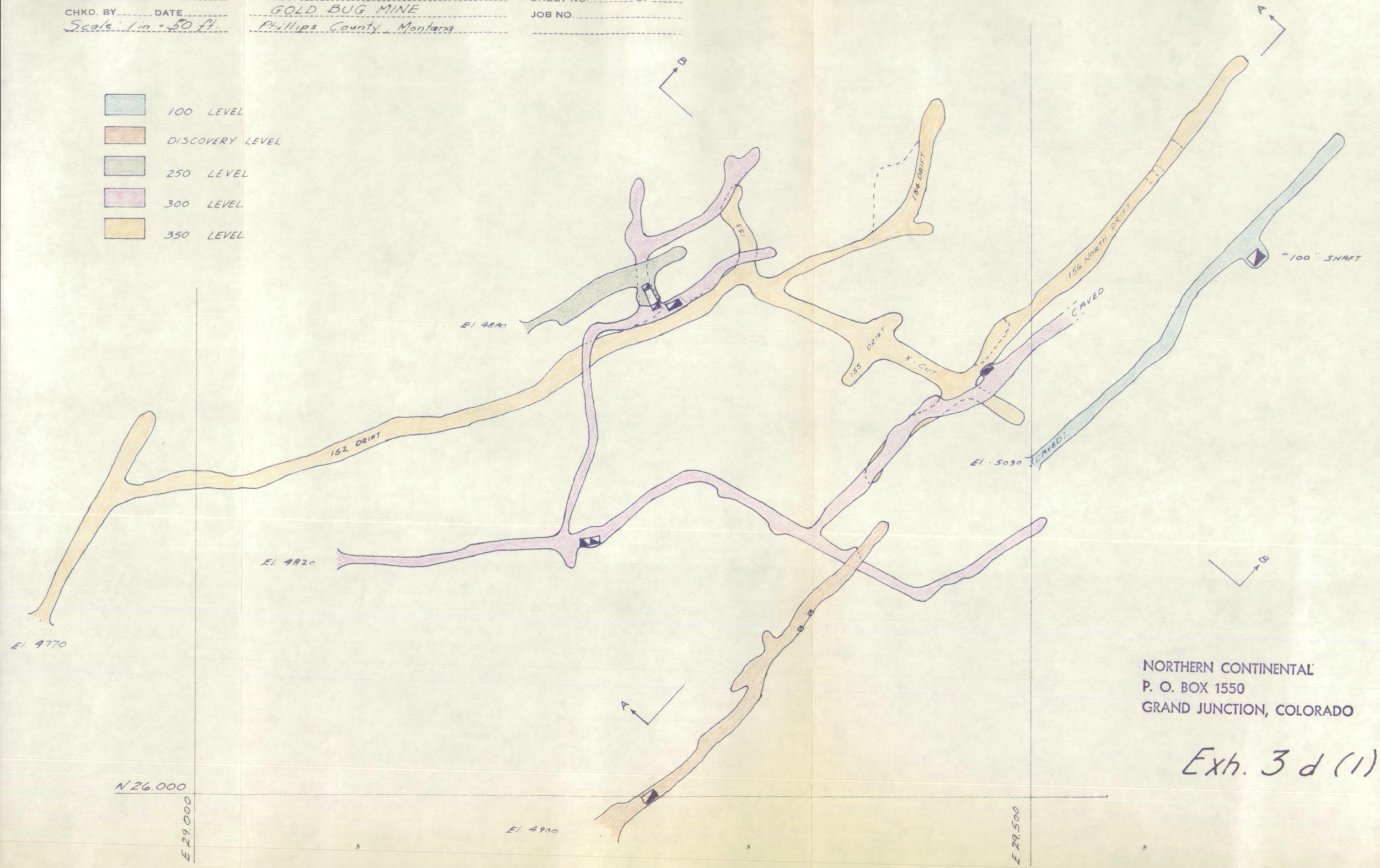
NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3d (2)

BY SGR DATE 1/31/62 SUBJECT COMPOSITE LEVEL MAP SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ GOLD BUG MINE JOB NO. ____

Scale: 1 in = 50 ft. Phillips County, Montana



NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3 d (1)

OFFICIAL FILE COPY
O. M. E
RECEIVED APR 16 1962
DATE

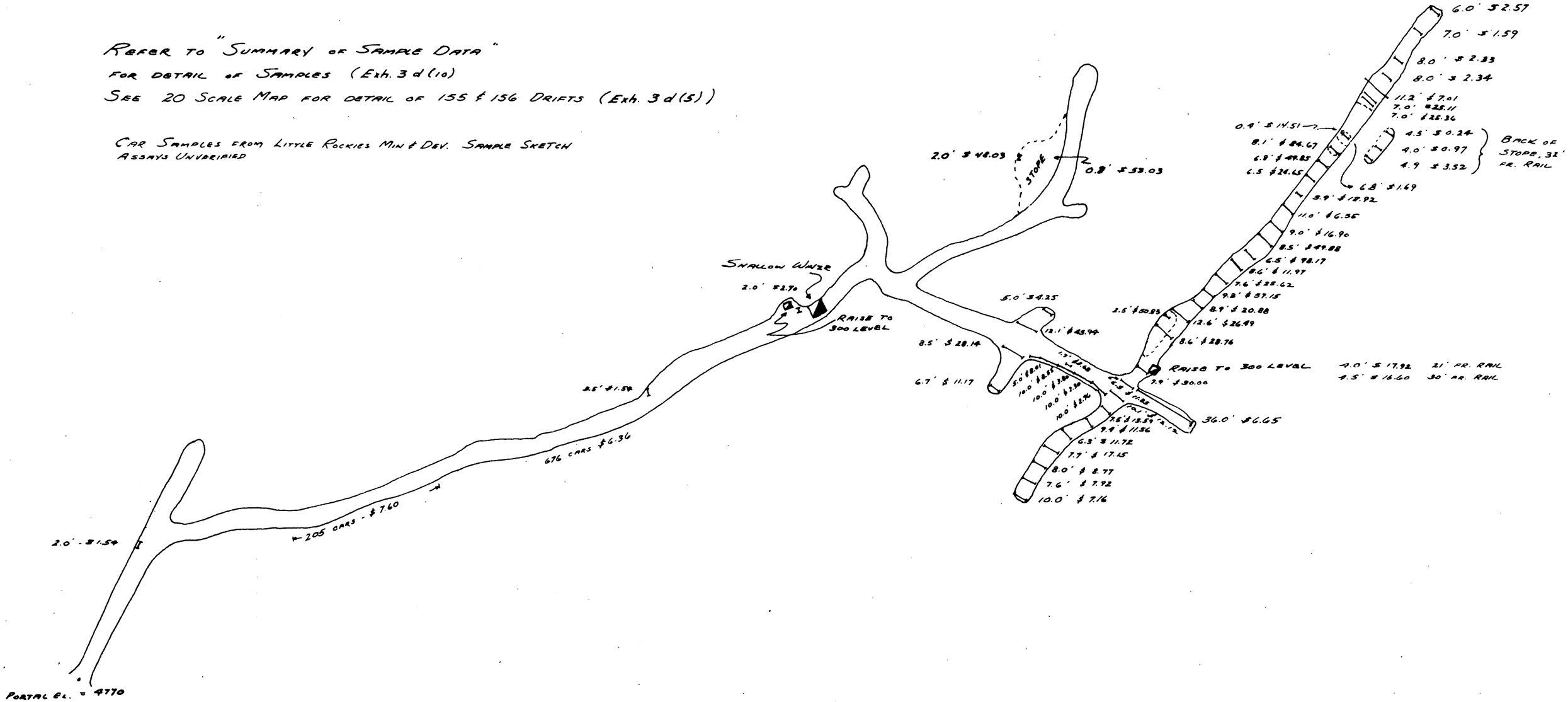
BY EHL, JGR DATE 1/30/62 SUBJECT SAMPLE MAP SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ 350 LEVEL, GOLD BUG MINE JOB NO. ____

Scale: 1 in. = 50 ft. Phillips County, Montana

REFER TO "SUMMARY OF SAMPLE DATA"
FOR DETAIL OF SAMPLES (Exh. 3 d (10)
SEE 20 SCALE MAP FOR DETAIL OF 155 & 156 DRIFTS (Exh. 3 d (5))

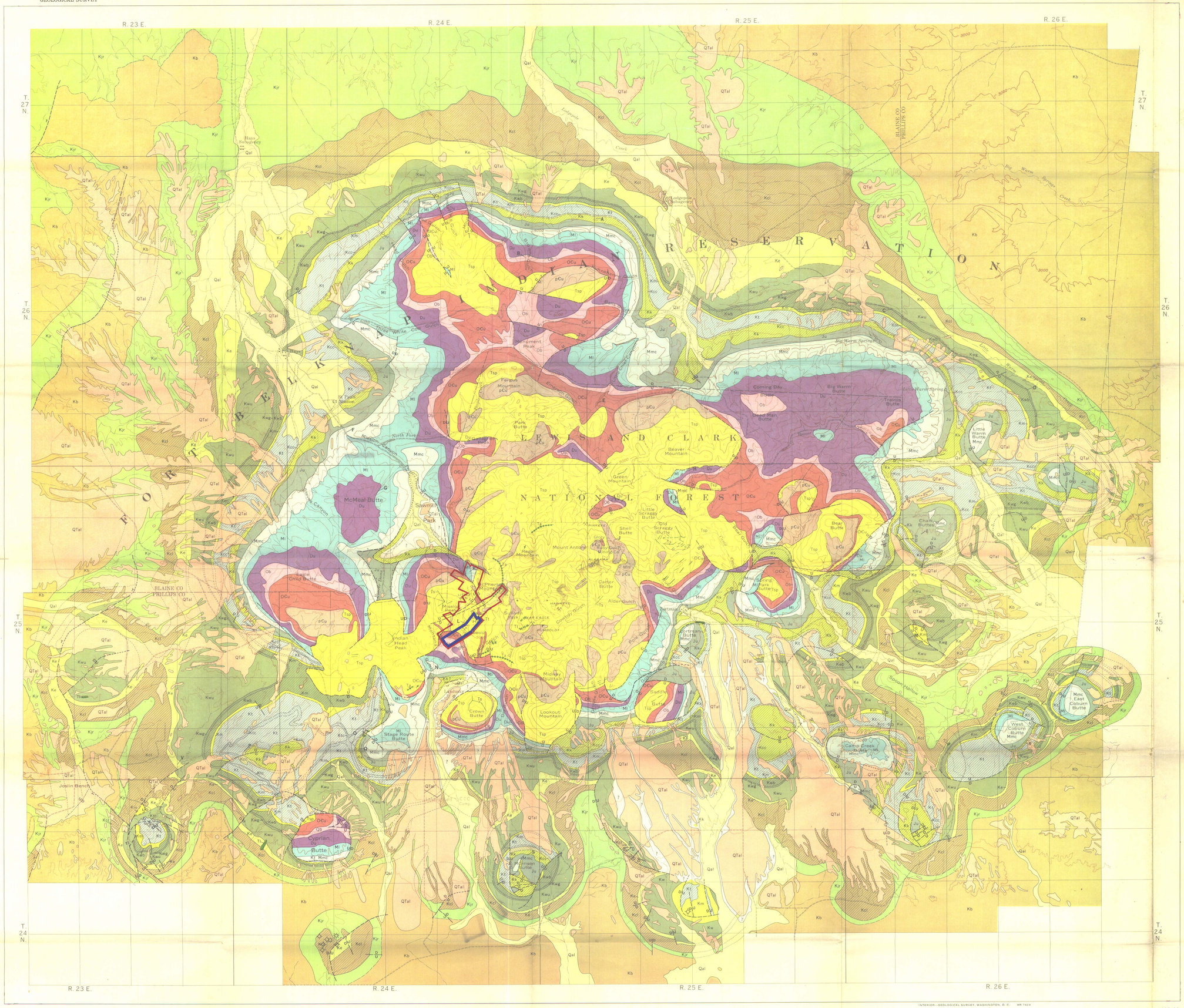
CAR SAMPLES FROM LITTLE ROCKIES MIN & DEV. SAMPLE SKETCH
ASSAYS UNVERIFIED



NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3d(4)

OFFICIAL FILE COPY
O. M. E.
RECEIVED APR 16 1962



EXPLANATION

Qal — Younger alluvium
Glacial deposits not shown

QTal — Older alluvium of gravel benches

TERTIARY(?) QUATERNARY AND QUATERNARY

Lamprophyre dike or small boss — **Trachyte porphyry dike** — **Aegirine trachyte porphyry dike** — **Syenite porphyry or quartz monzonite porphyry dike**

Tsp — Syenite porphyry

TERTIARY

Kb — **Bearpaw shale**
Dark-grey marine shale, weathering light grey; a few beds of bentonite and of sandstone, and many thin beds and lenses of cherty material and calcareous concretions

Kjr — **Judith River formation**
Interbedded light-grey to buff soft fine-grained sandstone, shale, and grey impure clay. A few thin coal beds in upper part

Kcl — **Claggett shale**
Dark-grey shale and siltstone, weathering to brownish grey, a few beds of bentonite and beds containing large bouldersize septarian concretions

Ke — **Eagle sandstone, undivided**
Upper member: chiefly grey shale with many thin beds of siltstone, sandy shale, and friable sandstone that weathers reddish tan; Virgelle sandstone member: yellow to buff sandstone, grey siltstone, and grey shale

Kwu, Kwg, Kwb, Kw — **Warm Creek shale**
Warm Creek shale, undivided, Kw. Upper member, Kwu: mainly bluish-grey shale containing many large calcareous concretions, especially in lower half. Middle calcareous member, Kwg: grey to light-brown calcareous sandstone, shale, and siltstone, weathering light brown; consists of shifting to platy sandstone containing lenticular beds of fossiliferous limestone, and an overlying unit, which is largely calcareous shale that weathers light grey. Lower shale member, Kwb (Belle Fourche shale equivalent): mainly clay and shale with a little sandstone and many limestone concretions, weathers light grey and lower part of member contains many nodules of heavy black slightly manganiferous siderite

TERTIARY(?) QUATERNARY AND QUATERNARY

Km — **Mowry shale**
Shale, mostly papery to slaty, medium- to dark-grey; weathers bright silvery grey; a thin bed of bentonite in uppermost part

Kfc, Kf — **Thermopolis shale**
Chiefly dark-bluish-grey shale containing numerous small ferruginous concretions. Near middle, in southeastern part of area mapped, is Cyprian sandstone member, Kfc, made up chiefly of sandstone, coarse grained, massively bedded, containing chalcedonic pebbles of various colors, shapes, and sizes

Kcc — **First Cat Creek sand of drillers**
Upper member: dark-grey shale, siltstone, and argillaceous sandstone. Lower member: mostly sandstone, somewhat arkosic, coarse grained, massively bedded

Kk — **Kootenai formation**
Variegated argillaceous member: clay, mottled maroon and grey, with a few thin beds and lenses of sandstone, friable, light-grey. Lower unit, or Third Cat Creek sand of drillers: largely sandstone, rather friable, light grey, with a hard coarse-grained arkosic sandstone layer at the top and a layer of dense light-grey limestone at the base

CRETACEOUS

Ju — **Upper Jurassic rocks, undifferentiated**
Comprises three formations, uppermost of which is the Morrison formation: largely light-grey sandstone and friable glauconitic sandstone, with a coal layer at the top. Swift formation (Ellis group), which underlies Morrison, is mostly shale, gypsiferous, light and dark grey, with a few layers of limestone and sandstone near the top; Rierdon formation (Ellis group) is mostly dark shale, and impure limestone in upper part. Rierdon formation (Ellis group) is mostly light- to dark-grey marly limestone weathering pale grey, with some shale

JURASSIC

Mmc — **Mission Canyon limestone**
Limestone, mostly coarse grained and massively bedded, locally crossbedded, with nodules and lenses of cherty material; numerous solution cavities in upper part

Ml — **Lodgepole limestone**
Limestone, richly fossiliferous, thin bedded, with some massive ledges, many small lenses of chert, and thin partings of shale; mostly dark to light grey, but two zones in upper half are predominantly red; at base is thin black crossbed-bearing shale of Little Chief Canyon member

MISSISSIPPIAN
CARBONIFEROUS

Du — **Devonian and Mississippian rocks, undifferentiated**
Includes three formations. Uppermost (rarely exposed) is Three Forks shale(?) (Devonian and Mississippian), which underlies Jefferson limestone (Devonian) and overlies Lodgepole limestone. The Jefferson limestone consists of an upper member: limestone and dolomite, light grey to buff, partly sandy, massively bedded but slabby where greatly weathered; a middle member: shale, siltstone and thinly laminated dolomite and limestone; and a lower member: chiefly limestone, finely crystalline, dark grey and brownish grey, weathering light grey, thin bedded, with some massive ledges, and containing a few layers of dolomite, shale, limestone, and dolomite; upper two-fifths largely bright red, lower three-fifths mainly light grey, light green, yellow, and brown; lower 3 ft is pinkish dolomite, silty, platy

DEVONIAN AND MISSISSIPPIAN

Ob — **Bighorn dolomite**
Lower half: dolomite limestone, massive, dapple grey with bluish cast in some exposures; weathered surfaces commonly pitted. Upper half: dolomite, thinly bedded, hard, gray to white

ORDOVICIAN

OCu — **Flathead sandstone and Emerson formation, undifferentiated**
The Emerson formation (Cambrian and Early Ordovician(?)) is chiefly gray to greenish-gray shale, with a few layers of limestone and sandstone near the top, and a few layers of sandstone and edgewise intraformational conglomerate. The lower formation, the Flathead sandstone (Cambrian) is mainly sandstone, light grey, green and tan, with some interbedded fine-grained conglomerate

PRECAMBRIAN
CAMBRIAN AND ORDOVICIAN(?)

pCu — **Pre-Belt metamorphic rocks, undifferentiated**
Metasedimentary rocks, chiefly biotite schist and gneiss; metavolcanic rocks, chiefly hornblende gneiss and amphibolite; and younger pre-Belt(?) ferromagnesian rocks forming a few dikes and sills

? — No exposure

Contact
Dashed where approximately located, dotted where concealed

Normal fault, approximately located
U, upthrown side; D, downthrown side; dotted where concealed

Thrust fault, approximately located
T, upper plate; dotted where concealed

Probable fault

Shaft

Mine

Spring

Dry hole

Gas well

Locality referred to in text

Base from plats of the Bureau of Land Management. Topographic contours for areas within the Fort Belknap Indian Reservation are copied from plats of the Bureau of Land Management. Those for areas outside Reservation were drawn photogrammetrically in 1938 by E. A. Schuster of the Geological Survey.

17½°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1959

GEOLOGIC MAP OF LITTLE ROCKY MOUNTAINS AND ENCIRCLING FOOTHILLS, MONTANA

Scale 1:48 000

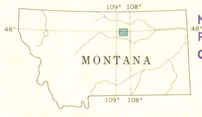
1 0 1 2 3 4 Miles

Contour interval 200 feet
Datum is mean sea level

Property Included in Application
Property Boundary

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C. MR 7424

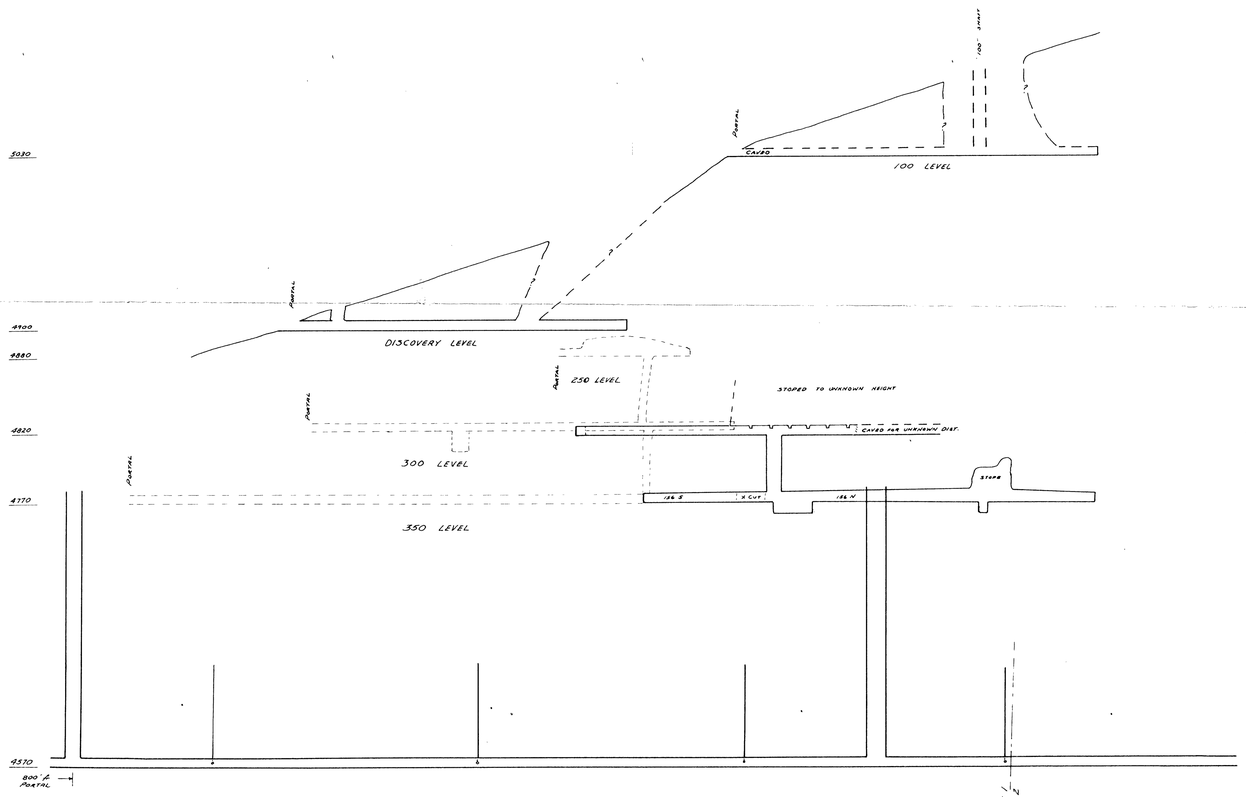
Geology mapped by Maxwell M. Knechtel, 1936–39, assisted by S. R. Brockunier, 1936, and by S. W. Hobbs, 1937 and 1938



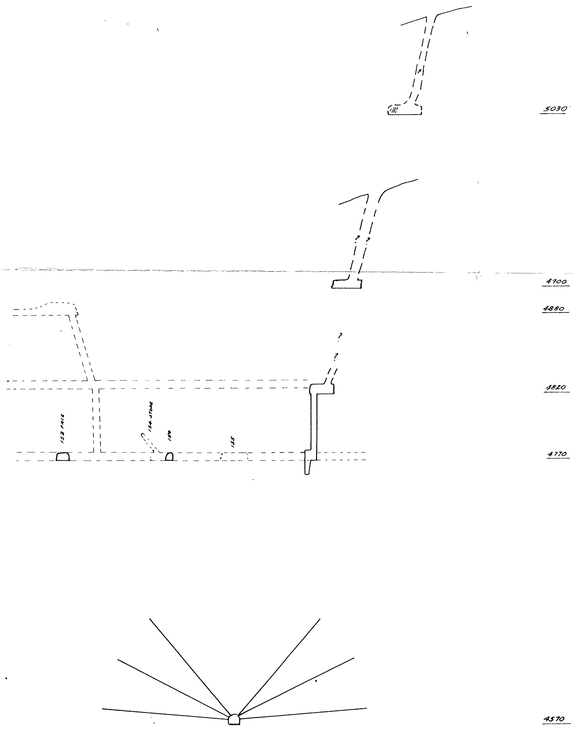
INDEX MAP SHOWING AREA MAPPED

NORTHERN CONTINENTAL
P. O. BOX 1550
GRAND JUNCTION, COLORADO

Exh. 3a(2)



LONGITUDINAL SECTION A-A
PROJECTED INTO PLANE OF GOLD BUG VEIN
Looking N 49° W



CROSS-SECTION B-B
GOLD BUG VEIN
Looking N41°E

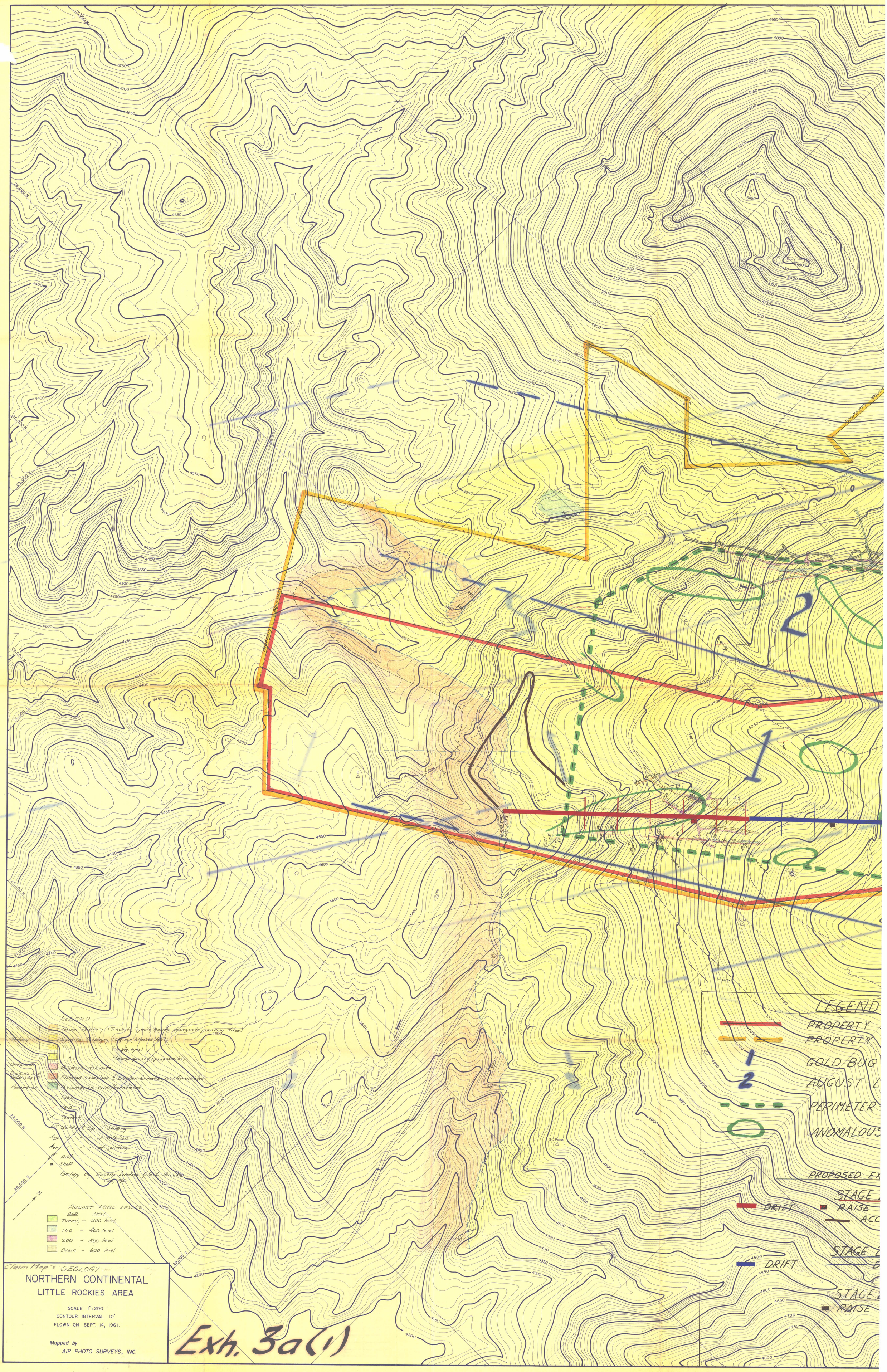
Exh. 3d(3)

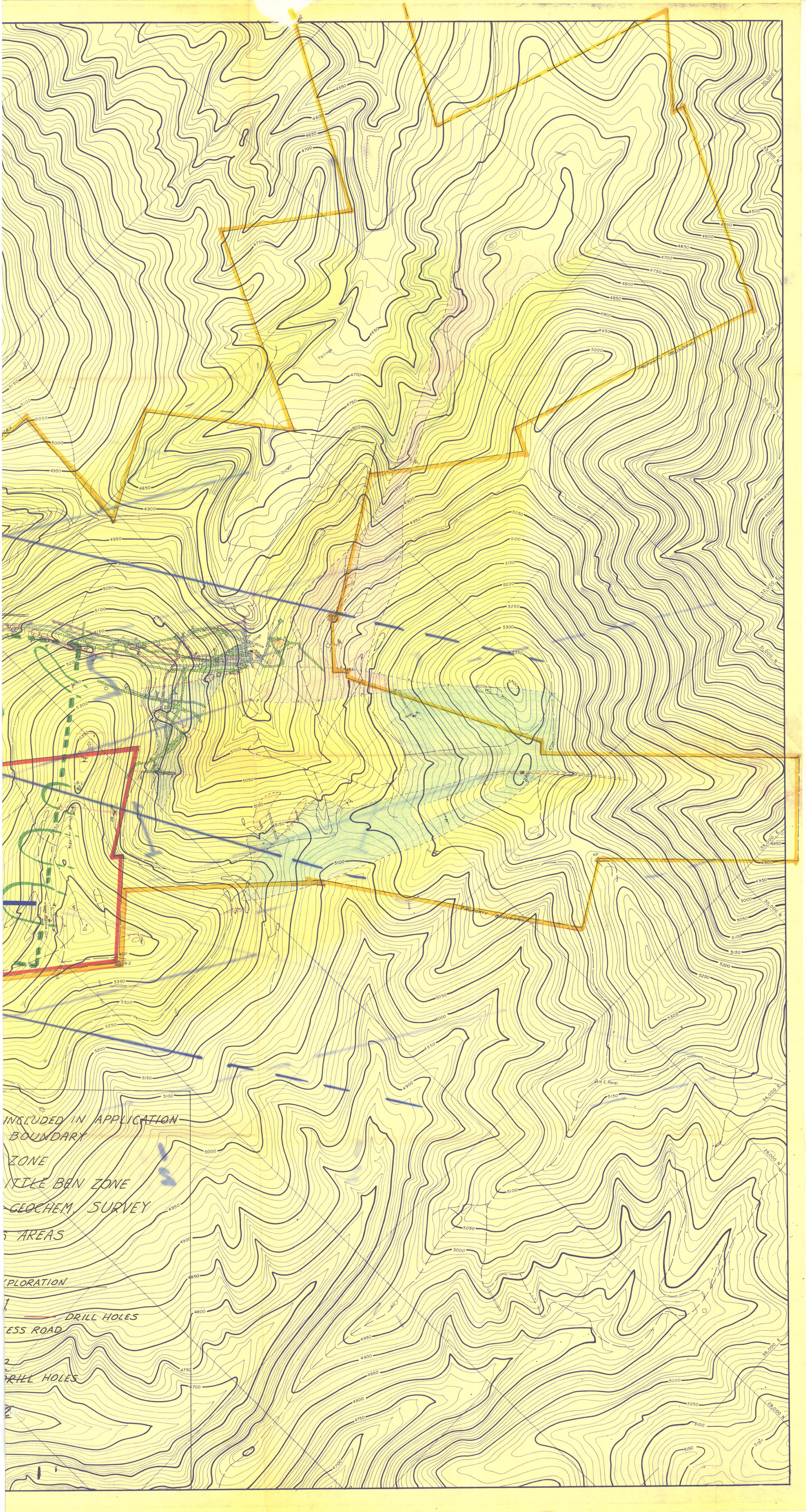
SKETCH
OF
GOLD BUG VEIN SYSTEM
&
PROPOSED EXPLORATION
(PARTIAL)

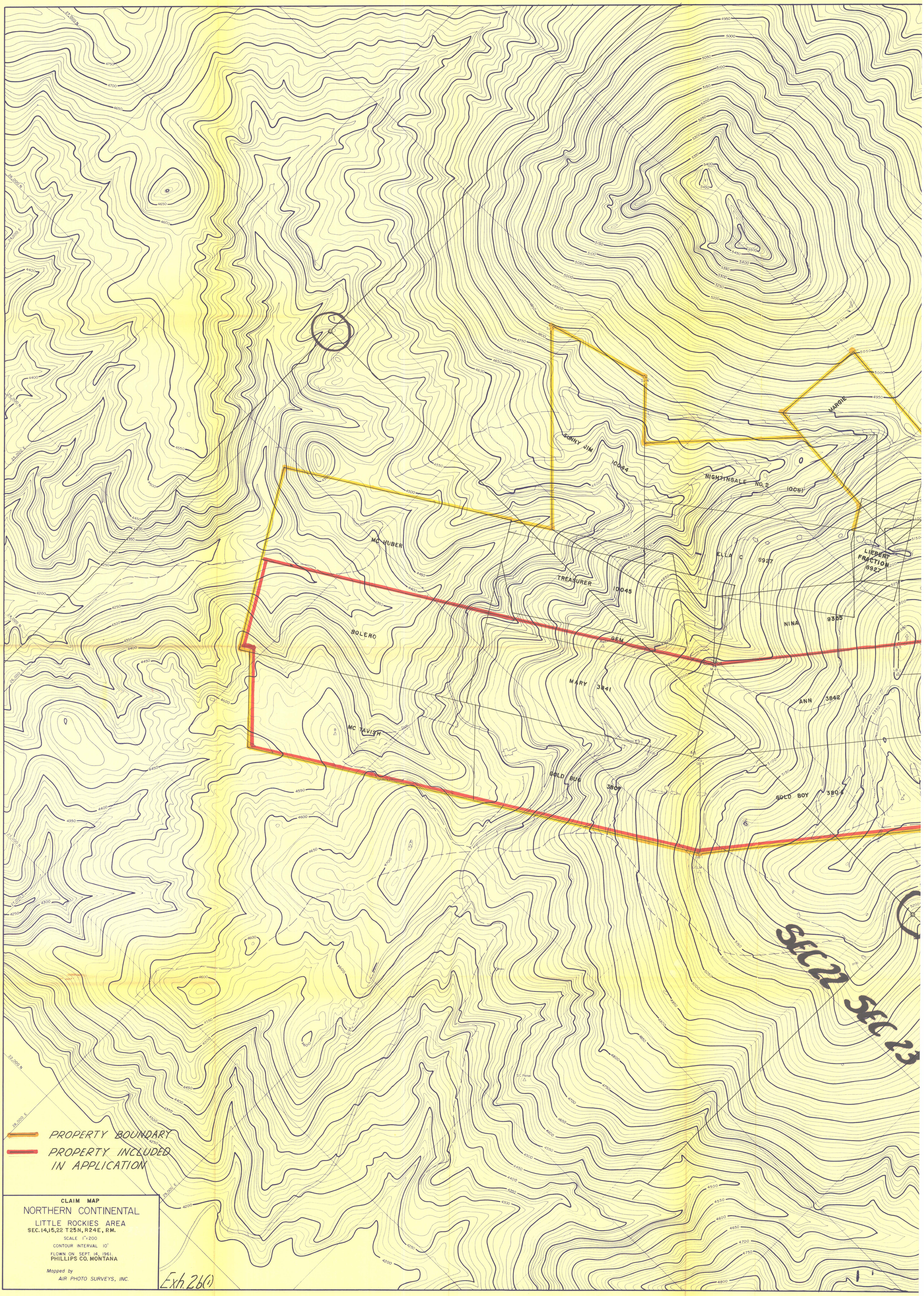
NORTHERN CONTINENTAL, INC.
BOX 1550
GRAND JUNCTION, COLO

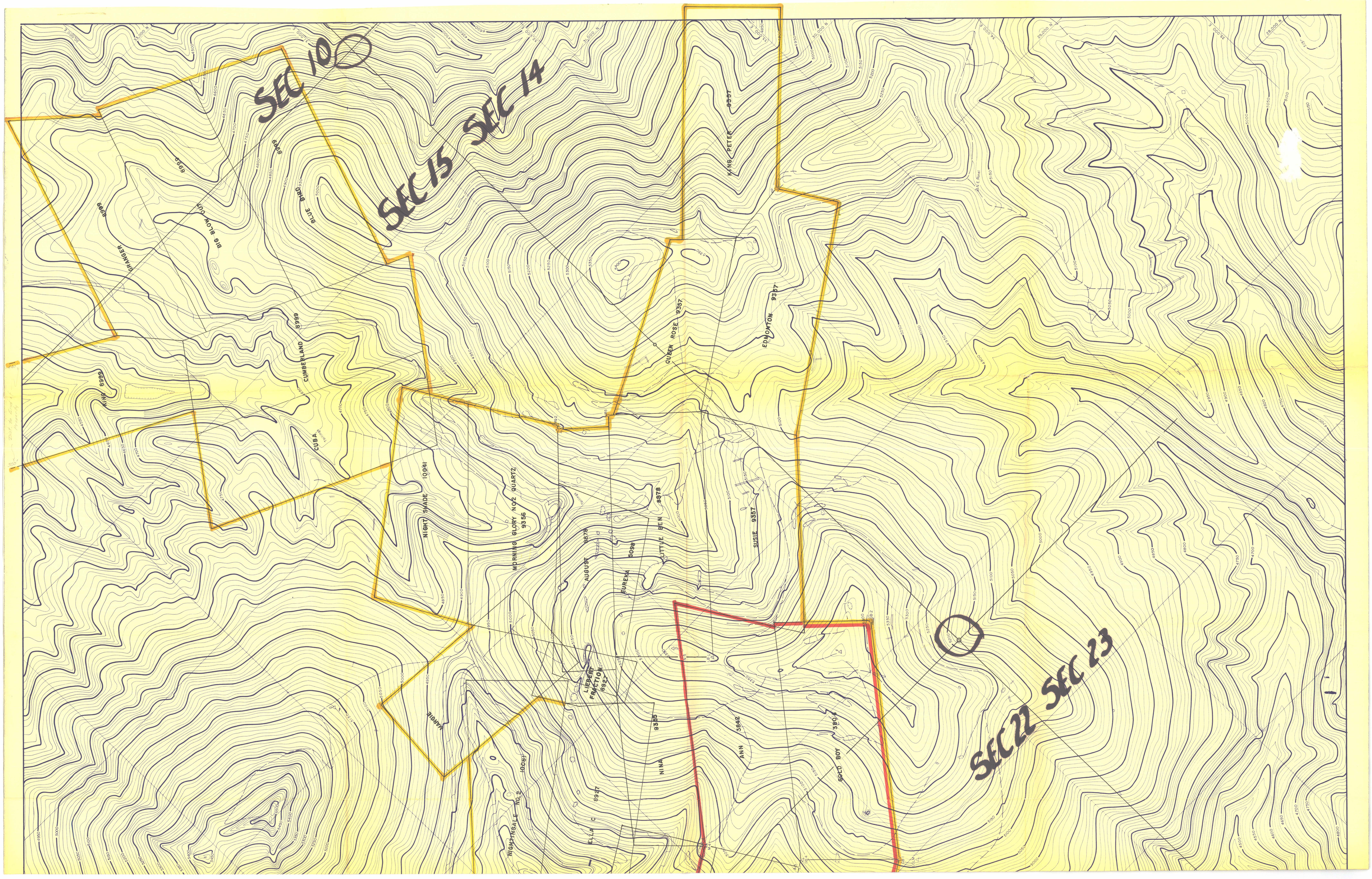
SCALE: HORIZ. -
VERT. - 1 in = 50 ft.

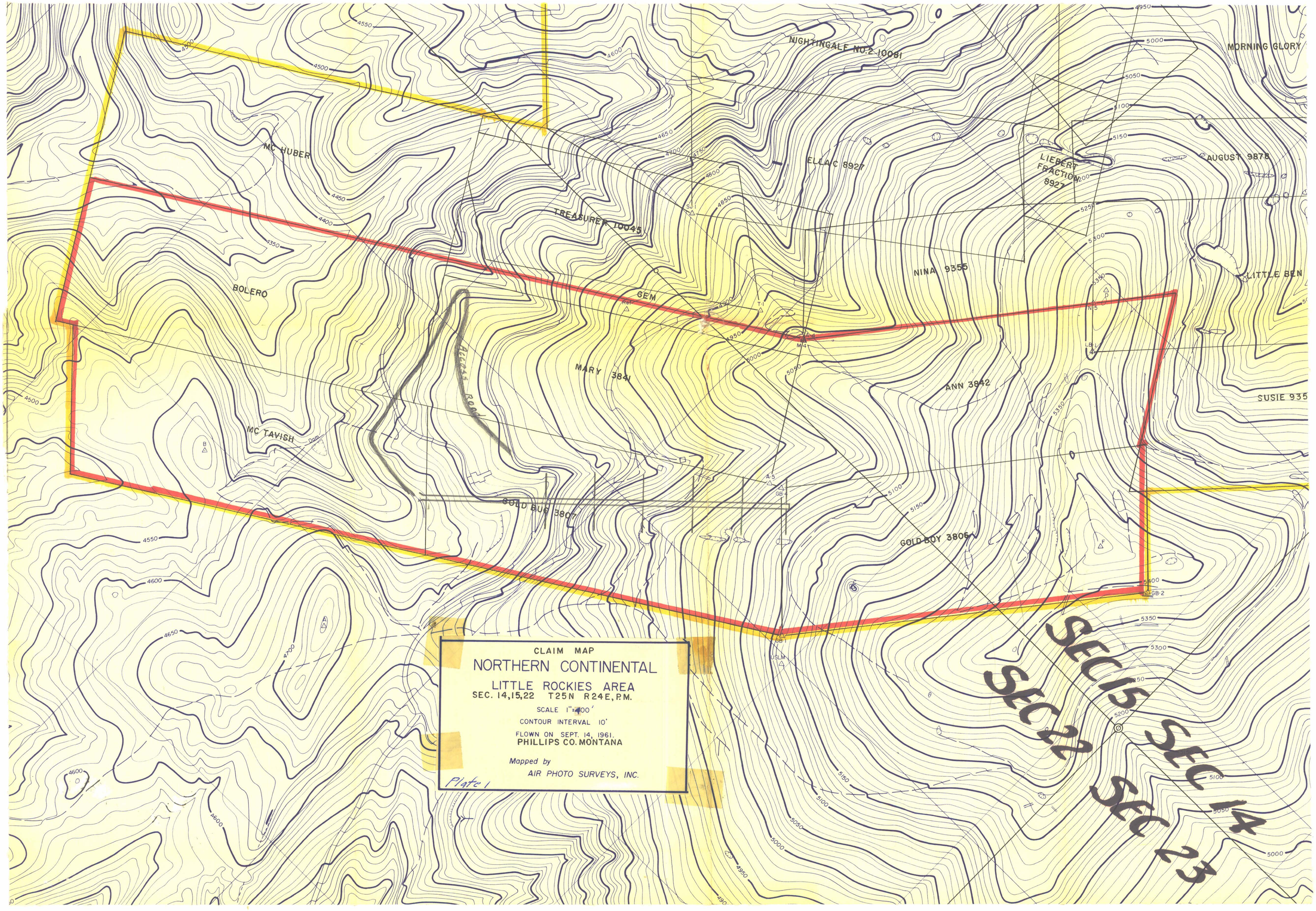
JGR
2-1-62


Claim Map & GEOLOGY
NORTHERN CONTINENTAL
LITTLE ROCKIES AREA
SCALE 1" = 200
CONTOUR INTERVAL 10'
FLOWN ON SEPT. 14, 1961.
Mapped by
AIR PHOTO SURVEYS, INC.
LEGEND
"Possum" Porphyry (Trachytic Syenite surrounding monzonite porphyry dikes)
Syenite Porphyry (glass eye, bleached ABS)
(no glass eyes)
(Coarse grained equigranular)
Tertiary
Ordovician
Cambrian and Ordovician (?)
Precambrian
Bighorn dolomite
Flathead sandstone & Emerson formation undifferentiated
Precambrian undifferentiated
Fault
Vein
Contact
Strike & dip of bedding
" " " of foliation
" " " of jointing
Adit
Shaft
Geology by Eugene Lindsay & G. L. Brook Oct. 1961
AUGUST MINE LEVELS
OLD NEW
Tunnel - 300 level
100 - 400 level
200 - 500 level
Drain - 600 level
PROPERTY BOUNDARY
LEGEND
PROPERTY
PROPERTY
GOLD BUG
AUGUST-L
PERIMETER
ANOMALOUS
PROPOSED EX
STAGE
RAISE
ACC
DRIFT
STAGE
DRIFT
STAGE
RAISE
Exh. 3a(1)


INCLUDED IN APPLICATION
BOUNDARY
ZONE
ITTLE BEN ZONE
GEOCHEM SURVEY
S AREAS
XPLORATION
DRILL HOLES
ESS ROAD
DRILL HOLES
PROPERTY BOUNDARY
Tailings
SUMP
KP
N E Portal

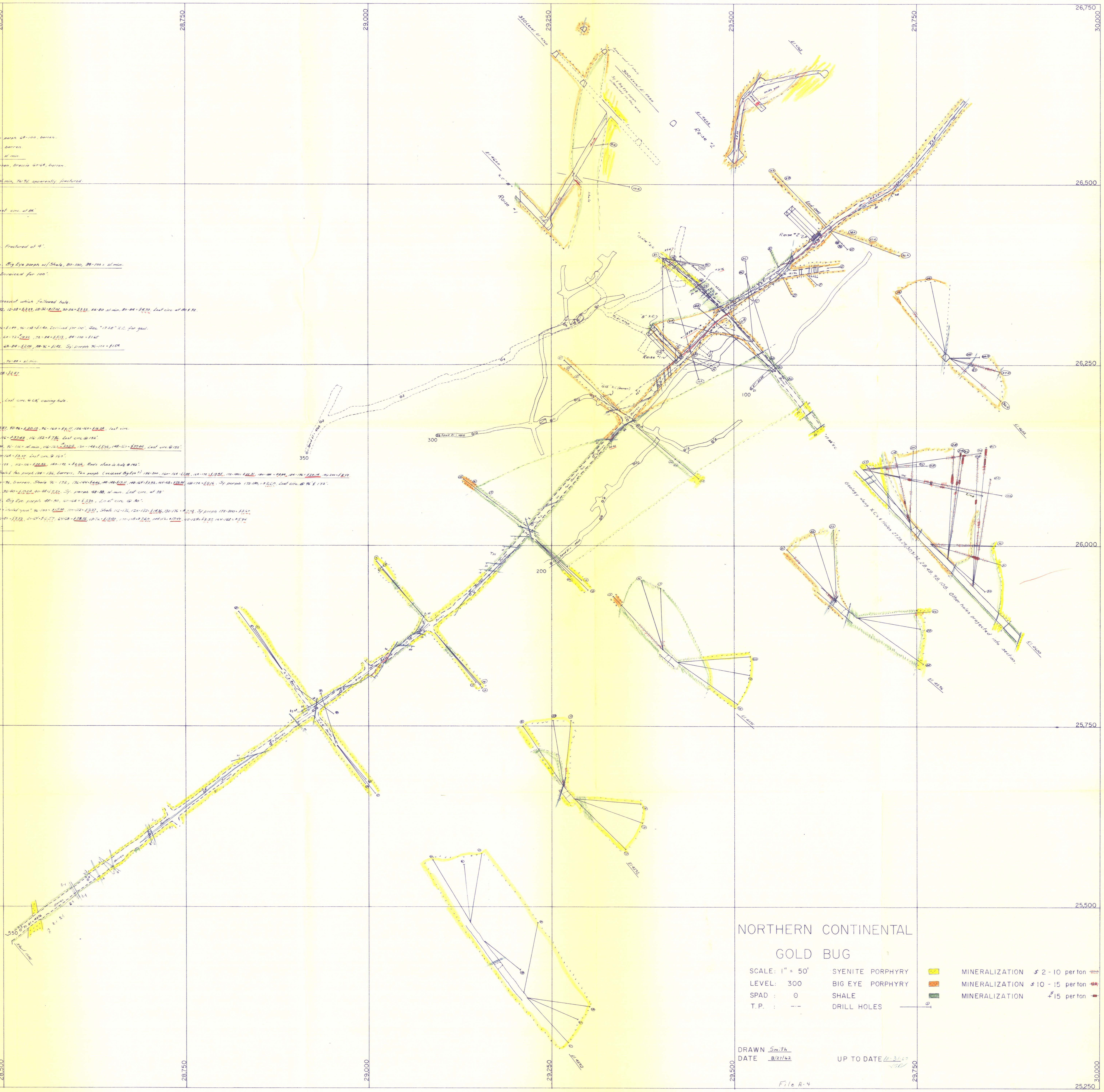

SUNNY JIM
10044
MARGIE
NIGHTINGALE NO. 2
10081
ELLA C
8927
LIEBERT FRACTION
8927
MC HUBER
TREASURER
10045
NINA
9365
BOLERO
GEM
MARY
3841
ANN
3842
MC TAVISH
GOLD BUG
3807
GOLD BOY
3804
SECT 22
SEC 23
PROPERTY BOUNDARY
PROPERTY INCLUDED IN APPLICATION
CLAIM MAP
NORTHERN CONTINENTAL
LITTLE ROCKIES AREA
SEC. 14,15,22 T25N, R24E, P.M.
SCALE 1"=200
CONTOUR INTERVAL 10'
FLOWN ON SEPT. 14, 1961.
PHILLIPS CO. MONTANA
Mapped by
AIR PHOTO SURVEYS, INC.
Exh. 26(1)


SEC 10
SEC 15
SEC 14
SEC 22
SEC 23
KING PETER 9357
QUEEN ROSE 9357
EDMONTON 9357
BLUE BIRD
BIG BLOW OUT
GRANGER
CUMBERLAND 9999
KING 9999
CUBA
NIGHT SHADE 10941
MORNING GLORY NO2 QUARTZ 9556
AUGUST 9878
EUREKA 5098
LITTLE BEN 9878
SUSIE 9357
LIEBERT FRACTION 9962
MARIE
NIGHTINGALE NO. 2 10061
ELLA C 9947
NINA 9355
ANN 3942
SOLD BOY 3870


CLAIM MAP
NORTHERN CONTINENTAL
LITTLE ROCKIES AREA
SEC. 14,15,22 T25N R24E, P.M.
SCALE 1"=400'
CONTOUR INTERVAL 10'
FLOWN ON SEPT. 14, 1961.
PHILLIPS CO. MONTANA
Mapped by
AIR PHOTO SURVEYS, INC.
Plate 1
NIGHTINGALE NO.2 10081
MORNING GLORY
MC HUBER
ELLAC 8927
LIEBERT FRACTION 8927
AUGUST 9875
TREASURER 10045
NINA 9355
LITTLE BEN
BOLERO
GEM
MARY 3841
ANN 3842
SUSIE 935
MC TAVISH
Dam
GOLD BUG 3807
GOLD BOY 3806
SEC 15
SEC 22
SEC 14
SEC 23

DRILL HOLE DATA

Station	Hole No.	O.M.E. (✓)	Length'	Incl.	Bearing	Remarks
	1		84	+5°	S33°E	All sy. porph., breccia 56-64 - slight mineralization
	2		76	+30°	S32E	All sy. porph. Barren
	3		88	+45°	S33E	" " "
	4		100	+45°	N16W	" " "
	5		100	+5°	N37W	" " Fractured 64-72 = sl. min.
	6		80	+30°	N36W	" " FeO 28-32 = sl. min.
	7		96	+45°	N35W	" " Barren
	8		64	+12°	S57E	" " "
OME Drill Sta. #1	9	✓	100	+5°	N39W	Shale 0-20, sl. min. Sy. porph. 20-52, barren. Shale 52-64, barren. Sy. porph 64-100, barren.
	10	✓	92	+30°	N39W	Sy. porph 0-16, 0-4 = $2.96. Shale 16-48, sl. min. 24-28. Sy. porph 48-92, barren.
	11	✓	92	+45°	N40W	Shale 0-8 = $3.42. Sy. porph 8-92, 20-28 = $2.17 w/FeO. Fractured 60-72, sl. min.
	12	✓	100	+5°	S41E	Sy. porph. 0-24, 0-8 = sl. min. Shale 24-40, barren. Sy. porph 40-100, barren, breccia 60-64, barren.
	13	✓	100	+30°	S39E	Sy. porph. 0-4, = $1.65. Shale 4-16, = $1.29. Sy. porph. 16-100, 24-36, sl. min.
	14	✓	92	+45°	S42E	Sy. porph. 0-4, sl. min. Shale 4-16, sl. min. Sy. porph. 16-92, 16-40 = sl. min, 76-92 apparently fractured.
OME Drill Sta. #2	15	✓	100	+5°	N53W	Shale 0-84, pyrite & green min, 4-48 = $1.69. Big Eye porph 84-100, sl. min.
	16	✓	100	+30°	N53W	All shale, 16-32 = $1.36, 32-60 = sl. min.
	17	✓	84	+45°	N50W	" ", 4-12 = $2.17, 12-28 = sl. min, 36-44 = sl. min, 52-84 = sl. min. Lost circ. at 84'.
	18	✓	100	+5°	S46E	Shale, 0-52, barren. Sy. porph. 52-100, barren.
	19	✓	100	+30°	S47E	Shale, 0-40, barren. Sy. porph. 40-100, barren.
	20	✓	100	+45°	S45E	Shale, 0-32, barren. Sy. porph. 32-100, barren.
OME Drill Sta. #3	21	✓	100	+5°	N54W	All Big Eye porph. 0-16 = $6.29, 16-32 = $1.79, 76-84 = $2.53, 84-100 = sl. min. Fractured at 4'.
	22	✓	100	+30°	N54W	" " " ", 0-4 = $11.80, 4-8 = $2.38, 40-44 = sl. min.
	23	✓	100	+45°	N54W	Big Eye porph, 0-52, 8-16 = $4.22, 20-24 = sl. min. Shale 52-80, barren. Big Eye porph w/Shale, 80-100, 84-100 = sl. min.
	24	✓	112	+5°	S51E	Shale 0-104, 24-32 = $1.71, 84-104 = $1.62. Sy. porph 104-112, barren. Invoiced for 100'.
	25	✓	88	+30°	S51E	All shale, 8-12 = $1.17, 80-84 = $1.64. Lost circ. @ 89'.
	26	✓	100	+45°	S51E	Shale 0-80, 64-68 = $1.42, 76-80 = $1.42. Sy. porph 80-100, 80-92 = $2.74
OME Drill Sta. #4	27	✓	100	+5°	N43W	High H_2O pressure past 12' obscurred cuttings. See geol & descript. of "17 NW" crosscut which followed hole.
	28	✓	92	+30°	N43W	Big Eye porph "chilled" zone 0-12, 0-8 = $5.85, 8-12 = $19.37. Big Eye porph 12-92, 12-28 = $3.39, 28-32 = $17.02, 32-56 = $3.22, 56-80 sl. min, 80-84 = $4.70. Lost circ. at 80 & 92.
	29	✓	100	+45°	N43W	All Big Eye porph. 0-8 = $3.16, 16-20 = $2.11, 20-32 = $1.48, 40-44 = $9.52, 64-72 = $3.94
	30	✓	108	+5°	S42E	Big Eye porph 0-60, 0-4 = $2.36, 28-44 = $1.86, 48-52 = $1.18. Shale 60-108, 60-76 = $1.89, 96-108 = $1.40. Invoiced for 100'. See "17 SE" X.C. for geol.
	31	✓	100	+30°	S42E	Big Eye porph 0-60, 4-24 = $1.56, 28-32 = $6.92, 36-60 = $3.10. Shale 60-100, 60-72 = $19.32, 72-84 = $5.13, 84-100 = $1.65
	32	✓	100	+45°	S42E	Big Eye porph 0-68, 0-20 = $3.00, 28-32 = $1.78, 48-60 = $5.59. Shale 68-96, 68-84 = $2.04, 88-96 = $1.42. Sy. porph 96-100 = $1.54
	33	✓	100	+7°	N39W	Sy. porph (possibly Big Eye), 0-100, 64-72 = $4.38, 72-76 = $1.92
	34	✓	100	+27°	N39W	" " " " ", 0-100, 0-24 = sl. min. 68-72 = $1.21, 72-76 = $2.42, 76-84 = sl. min.
O.M.E. Drill Sta. #5	36		28	+5°	S40E	Not completed, caving hole. Not invoiced. Big Eye porph 0-28, 24-28 = $2.87
	36A	✓	100	+5°	S69E	All Big Eye porph. 0-4 = $2.82, 56-64 = $2.62, 64-68 = $1.68
	37		36	+30°	S40E	Same as 36. 0-24 = sl. min.
	37A	✓	68	+32°	S69E	All Big Eye porph. 0-4 = $1.66, 20-24 = $1.19, 28-52 = $2.30, 56-68 = $11.22. Lost circ. @ 68', caving hole.
	38		28	+45°	S40E	Same as 36, 0-28 = sl. min.
	38A	✓	40	+45°	S67E	All Big Eye porph. 0-4 = $2.02, 16-24 = $1.52, Lost circ @ 40'.
"17 SE" X.C.	2A		160	+45°	N76W	All Big Eye porph. 40-44 = $7.72, 52-56 = $2.86, 64-68 = $2.13, 72-76 = $2.02, 84-92 = $2.87, 92-96 = $30.10, 96-160 = $6.11, 156-160 = $16.24. lost circ.
	2B		152	+45°	N44W	All Big Eye porph. 44-48 = $5.26, 76-80 = $2.70, 92-104 = $2.32, 104-108 = $145.26, 108-116 = $37.43, 116-152 = $7.86. Lost circ @ 152'.
	2C		160	+45°	N6°W	All Big Eye porph. 12-20 = $1.07, 20-24 = $5.20, 24-32 = $2.27, 56-72 = $1.96, 76-88 = $1.34, 96-116 = sl. min., 116-120 = $20.24, 120-148 = $5.66, 148-160 = $77.04, Lost circ. @ 152'.
	4A		164	+45°	N81W	Shale 0-136, 0-4 = $3.34, 64-136 = $2.82. Big Eye porph. 136-164, 136-148 = $1.15, 150-164 = $3.07. Lost circ. @ 160'.
	4B		192	+45°	N50W	Shale 0-96, 0-4 = $32.20, 44-56 = $1.14, 60-68 = $1.18, 76-96 = $3.89. Big Eye porph 96-192, 112-116 = $22.42, 140-192 = $2.66. Rods stuck in hole @ 192'.
	4C		200	+45°	N17W	Shale 0-124, 0-4 = $2.16, 20-24 = $2.28, 52-80 = $3.74, 84-88 = $15.58, 88-92 = $2.64. Shale & tan porph 124-136, barren. Tan porph (oxidized Big Eye?) 136-200, 160-164 = $2.88, 164-172 = $13.95, 172-180 = $32.31, 180-188 = $8.84, 184-196 = $20.14, 196-200 = $8.40
"17 NW" X.C.	9A		180	+48°	S	Sy. porph 0-24, 16-20 = $3.32. Shale 24-40, 36-40 = $4.74. Big Eye porph 40-96, barren. Shale 96-172, 136-144 = $4.46, 144-148 = $17.11, 148-164 = $2.32, 164-168 = $33.94, 168-172 = $5.16. Sy. porph 172-180, = $2.60. Lost circ. @ 96' & 172'.
	9B		88	+49°	S46E	Sy. porph 0-32, 8-16 = $3.74. Shale 32-36, = $15.38. Big Eye porph 36-48, 36-40 = $10.28, 40-44 = $5.50. Sy. porph 48-88, sl. min. Lost circ. at 88'
	9C		80	+47°	S80E	Sy. porph 0-40, 12-20 = $2.61, 36-40 = $2.60. Shale 40-48, 40-44 = $6.16. Big Eye porph 48-80, 60-64 = $3.30, Lost circ @ 80'.
	10A		200	+35°	S16E	Sy. porph 0-28, 8-16 = $2.94. Shale 28-44, barren. Big Eye porph 44-112, 44-48 = "chilled zone", 96-100 = $15.00, 100-112 = $3.37. Shale 112-176, 120-132 = $14.36, 132-176 = $5.13. Sy porph 172-200 = $3.60
	10B		168	+33°	S46E	Sy. porph 0-32, 8-12 = $4.42. Shale 32-36, = $5.68. Big Eye porph 36-168, 36-40 = $3.72, 60-64 = $6.57, 64-68 = $38.56, 68-72 = $13.40, 100-108 = $7.60, 108-112 = $17.44, 112-124 = $3.57, 164-168 = $5.94
	10C		56	+32°	S78E	Sy. porph 0-48, 12-16 = $6.06, 44-48 = $5.19. Shale 48-56, = $12.80. Lost circ @ 56'.
	A		37	+15°	S69E	Big Eye porph. 5-9 = $2.49, 21-25 = $1.68
	B		16	+10°	N	All Big Eye porph. 5-13 = $1.59, 13-16 = $9.69. See X.C. "B" for geol.
	C		8	+16°	S32E	All Big Eye porph. Barren.
	D		25	+17°	S25E	All Big Eye porph. 21-25 = $11.81
	E		24	+14°	N23W	All Shale, 0-5 = $11.17, 5-24 = $5.50. Fracture at 13'
	F		21	+10°	S51E	All Big Eye porph. 13-17 = $4.66
	G		15	+5°	N85E	All Big Eye porph. 8-15 = $1.43



NORTHERN CONTINENTAL

GOLD BUG

SCALE: 1" = 50'	SYENITE PORPHYRY	MINERALIZATION	$2 - 10 per ton
LEVEL: 300	BIG EYE PORPHYRY	MINERALIZATION	$10 - 15 per ton
SPAD: 0	SHALE	MINERALIZATION	+$15 per ton
T.P.: -·-	DRILL HOLES		

DRAWN Smith
DATE 8/27/62

UP TO DATE 10-31-62

File A-4