So. 157 Howard Street
Spokane 4, Washington
December 18, 1962

E
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RECEIVED
DATE

Memorandum

To: Chief, Division of Field Operations

From: Acting Field Officer, Region I

Subject: Application examination
OME-6263 (Gold-Bismuth-Tellurium)
Grand Deposit Mining Company
Excelsior, et al., Claims
Beaverhead County, Montana

INTRODUCTION

Grand Deposit Mining Company applied for OME aid to explore for gold, bismuth, and tellurium ores on the Excelsior, et al., claims situated in sec. 8, T. 8 S., R. 11 W., Bannack Mining District, Beaverhead County, Montana.

The applicant proposes a two-stage program to explore along the contact between limestone and an intrusive granodiorite by driving 1,900 feet of drift. Additional items of work included in the proposal are 24 hours of bulldozing an access road, construction of a bridge 15 feet wide and 40 feet long, construction of a 20 by 24-foot compressor and tool house, 280 feet of drift back slabbing, and installation of rail and water and air lines to existing workings. His estimated total cost is $101,080.00.

The property was visited October 8, 1962, in the company of R. K. Wyant, exploration geologist for the applicant. About six hours were spent on the property.

PROPERTY, LOCATION, AND ACCESSIBILITY

The property, comprising five patented and four unpatented claims, is about 26.8 road miles distant from Dillon, Montana. The claims are:

Patented

Claim	Patent No.
Excelsior	234A
North Excelsior	3796
Mill Site	234B
Excelsior Extension	3797
Bannack	3822

Unpatented

Claim	Book	Page
Patricia	167	123-124
Lissa	164	121-122
Michael	164	119-120
North Excelsior Extension	164	117-118

The unpatented claims are recorded in the Beaverhead County Court House, Dillon, Montana.

The property may be reached from Dillon by proceeding south on U. S. Highway 91 a distance of 4.2 miles from the Creston Motel. From here, turn right and follow paved State Highway 278 for 17.2 miles to sign proclaiming Bannack State Monument. Turn left and follow a graded graveled road for 4.7 miles, passing through the old town of Bannack to a road split. Here make a half-right turn and follow a poor mine road 0.3 miles, fording Grasshopper Creek. Just across the creek, turn right and follow poor mine road 0.4 miles to the Excelsior mine.

MINE WORKINGS AND GEOLOGY

Workings at the mine are a shaft, an adit crosscut, and a few surface trenches.

The shaft is 2½ compartment with skipway, manway, and pipeway. The skipway and pipeway compartments are boarded over, but from the manway compartment the shaft appears to be open for more than 100 feet and the timbers appear to be in good condition. An 8 by 8-inch piece of timber a few feet below the collar and loosely wedged across the manway, as well as the unknown condition of the vertical ladder, made it inadvisable to try to descend, a decision in which Mr. Wyant concurred. Wyant has not been down the shaft, but from maps accompanying the application, near the bottom of the shaft the 290 level has been driven southeasterly to pass below an old stope that has apparently been mined to the surface. How far below the stope the 290 level passes is not known by Wyant. According to the applicant's map marked Exhibit III, two raises have been run from the 290 level in barren ground, one northeasterly, the other southwesterly. A third raise, apparently vertical, was also run from the 290 level. The 250 level apparently was started from the vertical raise. At a point of unknown height, an inclined raise was run from the vertical raise and intersected the southwesterly raise from the 290 level.

On the 80 level, an adit has been driven about 330 feet southeasterly, where it cut an ore shoot that has now been stoped; apparently this is the same ore shoot mentioned above as having been stoped from above the 290 level to the surface. On the 80 level, the stope is about 50 feet long and has an average width of about 8 feet. The stope is

open below and above the level and could not be crossed; however, the walls appear to stand well. About 15 feet above the 80 level, the stope branches into a Y-shaped opening. The footwall of the stope is limestone, and along or close to the hanging wall the rock is granodiorite. In the vicinity of the stope, the attitude of the limestone beds is difficult to determine, but in general the beds strike N. 10° E. and dip 40° to 45° northwesterly. The granodiorite-limestone contact in the 80 level crosscut strikes N. 10° E. and dips about 50° to 55° southeasterly.

On Plate I, based on the applicant's map marked Exhibit II, the feature called "old stope" may represent the surfacing of the northerly branch of the stope seen on the 80 level; essentially it is a trench but there is an old cribbed raise or winze, now full of debris, near its southerly end. Near the northerly end of the "old stope," there is what appears to have been an opening of some sort to the west, but it has been carefully back-filled. The rock on the westerly side of the "old stope" is granodiorite; that on the easterly side is limestone.

The L-shaped feature south of the "old stope" also is essentially an old trench, but at the bend on the westerly side is what may be an old opening possibly connected to the south branch of the 80 level stope. Although the applicant's map indicates that the trench is entirely in granodiorite, this was found to be in error; most of the trench is in limestone, but the part east of the indicated southeast-striking fault and south of the northeast-striking fault is granodiorite--the reverse of the rock relationship observed elsewhere. About 20 feet west of the "old stope," a belt of limestone 80 to 100 feet wide was seen. The granodiorite in this area is probably the surface cropping of the apophysis of granodiorite seen on the 80 level. About 100 feet southeasterly from the L-shaped trench is an exposure of limestone in which there is evidence of recrystallization accompanied by some garnetization. Other evidence of garnetization was seen in the limestone near the granodiorite contact about 200 feet north of the "old stope" trench, but none was seen in the circular patch of limestone in this area.

The "ridge top" shown on the applicant's Exhibit II continues in a south-southwesterly direction, as indicated on Plate I, and south of the east-west grid line that passes through the "old stope" trench it is close to or along the southward continuation of the granodiorite-limestone contact. A shallow cut about 300 feet southwest of the L-shaped trench exposes the contact. A sample taken by Wyant from the limestone at the contact assayed 0.03 ounce gold and 0.5 ounce silver per ton.

Examination of the tunnel and shaft dump disclosed only occasional pieces of rock containing sulfides. There is some evidence that this dump covers an older one that could have come from a second adit to

the north of the 80 level and possibly 25 to 30 feet lower in altitude. This adit, if it exists, is covered by the present dump. However, there is no record of such an adit, and the evidence of its existence is not conclusive.

After the application had been submitted, Wyant took four samples, the assayer's report for which he had with him. The first sample is of the limestone at the contact on the surface, the assay of which is given above. The second sample, taken from dump material near the "raise" between the "old stope" and the L-shaped trench, assayed 0.49 ounce gold and 0.10 ounce silver per ton. The third was a sample of granodiorite containing specular hematite taken from the wall rock at the north end of the 80 level stope; it assayed 2.3 ounces gold and 0.5 ounce silver per ton. Finally, a sample of selected material containing pyrite and chalcopyrite taken from the shaft and 80 level dump assayed 1.45 ounces gold and 0.3 ounce silver per ton.

EXPLORATION POSSIBILITIES

According to Philip J. Shenon in "Geology and Ore Deposits of Bannack and Argenta, Montana," Montana Bureau of Mines and Geology Bulletin No. 6 (1931), pp 27-28 and 39-43, production of lode gold in the Bannack District since about 1862 has been about $2,000,000, most of which has come from six mines: Excelsior, Wadams, Wallace, Golden Leaf, Blue Grass, and Gold Bug. The estimated production from the Excelsior mine is $300,000 from one ore shoot.

"The ore deposits are at or near the contact between the granodiorite and limestone and occur chiefly along the apex of apophyses (granodiorite outliers) which extend into the limestone. * * * Although some rich deposits distant from the contact have been mined, the largest and most important ones occur as irregular bodies in limestone near the contact with the granodiorite." From this statement by Shenon (1931), the applicant's proposal to explore along the contact is well worthy of consideration, particularly to the north of the 80 level ore shoot. However, nothing was seen at the surface to indicate the existence of possible ore shoots other than the one mined, or of any apophyses south of that on which the ore occurs.

The advisability of preliminary work involving detailed mapping of the contact zone, geochemical testing, and diamond drilling was discussed with Mr. Wyant. North of the 80 level crosscut, the ground slopes steeply to the east and west, and the ridge line plunges steeply north of the circular patch of limestone. The topography here is particularly well adapted to drilling. South of the crosscut, the contact is fairly straight, and no indication of mineralized sections is known to Mr. Wyant. The topography in this area is also favorable to drilling. Soil sampling should pick up any target areas in both sections, and detailed mapping of the contact zone would aid in locating the soil samples. Soil cover is not deep, but bulldozing trenches would involve some drilling and blasting of the bedrock surface, which appears to be irregular in places.

Mr. Wyant said he had been trying to get the applicant to drill the area north of the crosscut, and he seemed to favor the suggested preliminary work. He agreed that without some preliminary surface work considerable drifting could be done without finding any ore and said he would discuss the proposal with the applicant. In a letter dated October 16, 1962, a copy of which was sent to you, Wyant stated that the Grand Deposit Mining Company would prefer the "drifting" approach and "would not care to undertake the alternative exploration plan of geochemical survey and drilling, etc." As Wyant's term, "alternative exploration plan," suggested a possible misunderstanding, the preliminary nature of geologic mapping to trace the contact, geochemical lines across the contact to locate possible exploration targets, and diamond drilling to test the target areas at drift level was emphasized in a letter to him dated November 2, 1962. Because of the terms of the company's contract with Philip J. Shenon, owner, the matter was referred to him for his comments. Shenon sent the field office a copy of his reply to Wyant. A Thermo-Fax copy of Wyant's letter of November 30, 1962, to this office and one of Shenon's letter to Wyant are enclosed. The applicant's rejection of any work preliminary to drifting leaves only the latter to be considered.

CONCLUSIONS AND RECOMMENDATIONS

In October, Grasshopper Creek was in low water, about 8 to 10 feet wide and 2 to 2.5 feet deep, and could be forded without difficulty by a sedan. The east bank is about 4 to 4.5 feet high and is abrupt; the west bank reaches approximately the same height but is more gently sloping. Bits of driftwood in the weeds and scrub growth, particularly along the west bank, indicate that there are periods of high water when the stream would be as much as 4 feet deep and 20 to 25 feet wide, too deep to ford by car or truck. The highest water would be in the spring months during the runoff of melting snow and could very well continue as long as two to three months. After heavy or frequent rainy periods during the rest of the spring and summer, the water would also be too deep to ford by vehicle. Much of the time that the stream could not be forded by car, it could be forded on foot with high boots. At such times, the miners might object or even refuse to cross, and there could be delays in getting supplies and equipment to the project. If the contractor should set up a trailer camp at the property (I do not know that such is his intention) and is judicious in keeping reasonably ahead of his supply and equipment, there might be no need of a bridge. It is recommended that this item be omitted if a contract is prepared; if the applicant insists, it could be added by amendment.

The road from Grasshopper Creek to the mine, about half a mile distant, is little more than wheel tracks and in places is so close to the creek bank as to be unsafe. It is recommended that 24 hours of D-6 bulldozer work be approved.

Buildings on the property are a combined hoist-compressor-tool house and a small shed. They are in poor condition, principally because over the years snow has caused the roofs to collapse. This has resulted in some buckling of the walls. While some of the lumber could be salvaged, the cost of repairing the present structures would probably be more than it would be worth. It is recommended that a 20'x24' compressor and tool house be approved.

Most of the 80 level crosscut is too low to permit passage of a mucking machine or, after air and water lines are installed, to permit passage of standard mine cars. It is recommended that back-slabbing be approved.

Most of the ore bodies found in the district occur along the granodiorite-limestone contact, particularly near the apex of apophyses of the granodiorite that extend into the limestone. Such an apophysis exists north of the crosscut. Another frequent ore control has been along fractures which extend into the limestone nearly at right angles to the contact. The contact, indicated by a dotted line on the applicant's exhibit II, has apparently not been accurately traced on the surface south of the crosscut. The overburden, although not deep, pretty well masks the contact trace. There may be other granodiorite apophyses in that direction, but none were known to Wyant or observed during the examination. The other possible ore control, along fractures extending into the limestone, would be rarely observable at the surface but may exist. It is concluded that drifting northerly from the crosscut along the contact to and around the surface-indicated apophyses in that area would have a good chance of finding ore and that drifting southerly, although a much longer shot on the basis of available information, is justified.

It is recommended that 1,400 feet of drifting be approved, 700 feet to the north of the crosscut as proposed by the applicant, 500 feet to the south, and 200 feet on promising fractures that extend into the limestone. The existing short drift north of the crosscut is smaller in section than the crosscut and is full of debris. The cost of cleaning it out, slabbing the corner, and enlarging the drift plus additional back-slabbing in the crosscut would probably cost nearly as much as the applicant's proposed turnoff from the crosscut.

COSTS

Road Construction

The entire 0.5 mile of road will be over loose conglomerate valley fill. No bids were submitted with the application, and the applicant has been requested to submit them. A D-6 dozer should be able to do the required work in not more than 24 hours, and the proposed rate of $12.50/hour is reasonable and possibly low. In the event bids are not received, the following is recommended:

1. Independent Contracts
D-6 Dozer, 24 hours at $12.50/hr. $300.00

2 through 7. None

Total dozing costs $300.00

Compressor-Tool House

No bids were received with the application but have been requested. In the event none are received, the following guide for cost is offered.

John Zupan, DMEA-4588:
8x10 or 80 ft.^{2}--estimated cost, $250 or $3.125/ft.^{2}

Paymaster Mines, Inc., OME-6144:
Compressor-power house 8x10=80 ft.^{2}--estimated cost $317 or $3.96 ft.^{2}
Hoist house-charge house 12x14=168 ft.^{2}--estimated cost $438 or $2.60 ft.^{2}

The average cost per square foot for these three buildings is $3.06. The unit cost will decrease as the floor area increases, but not in a straight line ratio. A unit cost of $2.75/ft.^{2} is probably not too far out of line.

1. Independent Contracts
Wooden structure, 20'x24' $1,320.00

2 through 7. None

Total building $1,320.00

Slabbing Drifts

The cost of slabbing the drift back I should think would be almost the same as for sideswiping. Certainly the bid estimate of $16.00/ft. seems very high. Sideswiping costs have ranged from $0.45 to $0.50 per foot. If the cost of installing track, air and water lines is included, $1.25 per foot should be ample allowance.

1. Independent Contracts
280 ft. back-slabbing in crosscut, plus installing track, air and water lines at $1.25/ft. $ 350.00

2 through 7. None

Total $ 350.00

Drifting

Although the observation of garnetized areas in the limestone was limited, largely due to overburden, they probably are common along the limestone-granodiorite contact. In the limited contact area observed

underground, the non-garnetized limestone is extremely hard and massive. It is therefore concluded that drilling and breaking may be more than usually difficult. However, I agree with the suggestion in your July 8, 1962, memorandum referring the application to the field that the applicant's estimate of $47.00 per foot appears to be high. This estimate is based upon a bid from Whitco Development and includes all supplies and equipment, as well as mobilization costs. The bid includes a $2.00/ft. additional cost for timbering. From what was observed, the ground stands well and little, if any, timber will be required.

There is no equipment at the property, nor, as he plans to contract the work, has the applicant furnished any list of equipment he might have that would be used if he were to do the work himself. The bidder gives no breakdown showing how he arrives at his estimated cost per foot. Therefore, there are no available data on which to base a formal cost estimate. I should think that something in the order of $42.00 to $43.00 per foot for drifting and the bidder's estimate of an additional $2.00, or $44.00 to $45.00 per foot of drift sections that might require timber, would be fair and reasonable.

1. Independent Contracts		
1,400 ft. untimbered drift at $42.50/ft.	$59,500.00	
100 ft. timbered drift at $44.50/ft.	4,450.00	$59,700.00*
2 through 6.		None
7. Assaying		
100 determinations for gold and silver at $2.50	$ 250.00	
50 determinations for bismuth at $5.00	250.00	
50 determinations for tellurium at $10.00	500.00	1,000.00
Total drift w/timber		$59,700.00*

*1,300 ft. untimbered at $42.50/ft.= $55,250.00.
100 ft. timbered at $44.50/ft. = 4,450.00.

Recapitulation

Road construction, 24 hrs. bulldozing at $12.50/hr.		$ 300.00
Compressor-tool house, 20'x24'	Job	1,320.00
Back-slabbing 280 ft. of crosscut and installing rail, water and air lines at $1.25/ft.		350.00
Drifting, 1,400 ft.		59,700.00
Assaying		1,000.00
Total estimated cost		$62,670.00
Government participation at 50%		$31,335.00

Distribution:
OME(3)
Docket
MacLaren
SRO

D. R. MacLaren

November 2[illegible], 1962

Mr. Robert F. Hyde
1720 East Flamingo Lane
Reno, Nevada

Dear Bob:

Thank you for your letter of November 23, 1962 with the attached copies of two letters from Mr. McClaren, the copy of your letter to Mr. McClaren, and the copy of your report to Mr. Stier dated October 1[illegible], 1962.

In your report you state that the production of the Excelsior mine was [illegible] in 1961 with a production of $[illegible] million dollars (of the Montana Bureau of Mines and Geology although in the basis of other areas later in [illegible] of the Anaconda Company and the known high grade of the ore) full were the gross production not have been considerably greater.

Bob, I doubt very much that [illegible] the nature of the deposits in Nevada that a geochemical survey would be of value. I have seen [illegible] over 40 [illegible] deposits in the West with [illegible] success. As you know the deposits are in limestone, certainly that the intrusive contact cut [illegible] the other [illegible], on the one hand, have [illegible] fissures in the limestone for considerable distances. After I wrote my report William Penn sinked three air-like shafts, each on the same fissure but along different [illegible] in the limestone. [illegible] one, called the [illegible] shaft, [illegible] the [illegible] the stress below it [illegible].

As you noted, very little prospecting has been done at the Excelsior. Practically all of the work was concentrated on the one shaft. My feeling is that it is logical to expect that other shafts exist, particularly because the irregular and lenses of [illegible] that are not [illegible] the limestone. [illegible] the nature of the deposits at [illegible] quite sure that [illegible] drilling, as a means of exploration, would not be profitable. I believe the practice followed by the [illegible] .

that is drifting on the contact, and following mineralized fissures into the limestone where in the past they frequently opened up into shoots some of which were very rich, is still the best prospecting procedure in Bannack. I have suggested a minimum program of drifting, 1400 feet, but if it should lead to one or more shoots I would hope that the Grand Deposits Company could continue southwestward along the contact through our Excelsior Extension and Bannack claims, and if arrangements can be made into the Montana claim, which we do not own. The contact takes a very sharp bend from our Bannack claim into the Montana claim and I have always felt that this was a particularly favorable area.

Bob, at this time I do not believe a detailed topographic map would add much. Al Taylor, formerly of The Anaconda Company, made a detailed Brunton and tape survey of the Excelsior and North Excelsior claims. I believe this mapping will sufficiently serve as a guide for the drifting I have suggested because I feel sure, due to the irregular nature of the contact, that accurate projections will be next to impossible. In other words, in my opinion at least, the most logical way to prospect deposits of this type is to stay on the contact and watch for mineralized fissures leading off into the limestone. If this is done I think the chances are reasonably good that one or more worthwhile deposits can be found.

With kindest personal regards,

Sincerely,

F. J. Shemon

F.J.S/s

cc Messrs. Charles A. Stern
D. K. MacLaren
Fred P. Shemon

EXHIBIT IV
Mont. Bur. Mines, Bull. 6

STATE OF MONTANA

M. A. BRANNON, *Chancellor, The University of Montana*

BUREAU OF MINES AND GEOLOGY

FRANCIS A. THOMSON, *Director*

MONTANA BUREAU OF MINES AND GEOLOGY BULLETIN

ISSUED QUARTERLY—PRICE 50 CENTS

No. 6 January, 1931

GEOLOGY AND ORE DEPOSITS OF BANNACK AND ARGENTA, MONTANA

by

PHILIP J. SHENON

MONTANA SCHOOL OF MINES

BUTTE, MONTANA

Entered as second class matter January, 1931, at the postoffice at Butte, Montana, under the Act of March 3, 1879.

GRAND DEPOSIT MINING CO.

mills have been dismantled. In 1914 a cyanide mill of 200 tons capacity was constructed by the Bannack Gold Mining and Milling Company. It ran only for a short period and has since been idle. A stamp-mill was built on the Hendricks property in 1920, and operated for about two years.

The silver mines of the Blue Wing mining district were discovered in 1864. Although rich, the ore was not free milling. Some of it was shipped to Wales for treatment, but after the construction of the smelters at Argenta and Bannack most of it was treated locally. In 1868 three smelters were in operation: one at Bannack, one at Argenta, and a third on Taylor Creek, between Bannack and Argenta. Eaton[34] estimates that the smelting cost was at least $38 per ton, and Keyes[35] estimates that ore of less value than $100 per ton could not be profitably smelted.

The mines at Bannack have been worked intermittently in recent years, largely by lessees, and have produced considerably from time to time. Thus within the last 15 years Mr. William Dunn has mined about $200,000 worth of ore and shipped about $100,000 from the old dumps.

PRODUCTION

The total production of the region including the yield in placer gold, lode gold, and silver is not accurately ascertainable but is estimated to be about $12,000,000. Mr. William Dunn,[36] who is probably most familiar with past production records, estimates the total placer production of the Bannack region to be roughly $8,000,000. Mr. Carl Hand,[37] who was associated with mining activities at Bannack, both as mine superintendent and private operator, for a number of years, estimates the lode gold production, excluding that of the Hendricks mine, to be over $2,000,000. The silver production, chiefly from the Blue Wing mining district, probably did not exceed $2,000,000.[38] Placer mining in the region is now insignificant, probably yielding not over $1,000 yearly, while lode production varies from a few thousands yearly to as much as $100,000, depending largely upon the activity of the lessees.

MINERALOGY OF THE ORES

Gold and silver minerals are the most important in the ores of the Bannack region, although minor amounts of lead, zinc and

34. Mineral Resources of the States and Territories west of the Rocky Mountains for 1868, p. 496.
35. Op. cit. Appendix, p. 55.
36. Personal communication.
37. Private report.
38. This figure is considerably less than Winchell's estimate, but is believed by the writer to be a reasonable one.

the surface the ore is composed largely of black porous material consisting predominantly of quartz and calcite with oxides of manganese and iron. Sulphides are reported in the lower workings. On the surface the Iron Mask vein resembles those of the Del Monte, but no specimens were secured from the lower levels.

BANNACK MINING DISTRICT

The Bannack mining district is in the southern part of the Bannack area (Pl. 1). The ore deposits are at or near the contact between granodiorite and limestone and occur chiefly along or near the apex of apophyses (granodiorite outliers) which extend into the limestone. Well-defined fracturing appears above and in front of the apophyses, as illustrated by the mineralized fractures in the Excelsior mine and in the Dollar winze and Green raise of the Wadams mine. The fact that ore bodies are present along or at the apexes of the apophyses suggests that the apophyses were intruded along zones of weakness or that their intrusion caused the fracturing, which permitted ready access to mineralizing solutions. Although some rich deposits distant from the contact have been mined, the largest and most important ones occur as irregular bodies in limestone near the contact with the granodiorite. These deposits which are almost entirely oxidized in some of the mines, are found in greater abundance on the limestone side of the garnet zones. According to Umpleby[48] this relationship is a general one. Since fractures containing ore were observed cutting both limestone and garnet rock it is believed that the ore minerals were introduced after the garnetization. Bodies of magnetite and some pyrite and chalcopyrite were observed in the garnet zone. Lindgren[49] states that the silicates and magetite are earlier than the sulphides in contact deposits but that the periods of deposition overlap. The presence of garnet, vesuvianite and certain other minerals suggests that the deposits at Bannack were formed under conditions of high temperature and pressure[50] although specularite is present the favorable temperature for the formation of which in contact deposits is supposed to be about 490°.[51]

The ore minerals in the Bannack mining district include: native gold, tetrahedrite, argentite, cerargyrite, tetradymite, galena, cerussite, anglesite, sphalerite, chalcopyrite, tenorite, chrysocolla, azurite, melanconite, native sulphur, pyrite, specularite, magnetite, iron and

47. Sinnott, F. F.: Personal communication.
48. Umpleby, J. B., Univ. of Calif. Pub. in Geol., p. 25, 1916.
49. Lindgren, Waldemar: Mineral deposits, p. 718, McGraw-Hill Pub. Co., N. Y., 1919.
50. Emmons, W. H.: Principles of Economic Geology, p. 44. McGraw-Hill Pub. Co., N. Y., 1918.
51. Butler, B. S.: Economic Geology, vol. 10, p. 400, 1928.

manganese oxides. The gangue minerals include quartz, calcite, chlorite, garnet, siderite, epidote and vesuvianite.

THE BANNACK GOLD MINING AND MILLING COMPANY

The Bannack Gold Mining and Milling Company owns 14 lode claims and five placer claims in the Bannack mining district. Most of the production has come from the Excelsior, Blue Grass, and the Golden Leaf group, (which includes the Wadams, Wallace and Golden Leaf claims). All of the claims were located in the 'sixties and 'seventies, most of them under the early-day mining regulations which provided that claims be limited to 100 feet along the lode and 25 feet on either side. All have since been relocated in accordance with the Federal laws. Philip Shenon, who operated the mines for a number of years, sold the properties to the Golden Leaf Co., Inc., in the 'nineties. This company in turn sold to the Great Western Mines & Exploration Co., and the latter sold to the present owners in 1910. The Bannack Gold Mining and Milling Co. did considerable exploration work and constructed a 200-ton cyanide mill. This mill operated for but a short time. In 1930, the I. B. Mining Co. was operating the Golden Leaf group under a bond and lease agreement.

EXCELSIOR MINE

The Excelsior mine is near the eastern border of the granodiorite intrusive. The ore shoot has been mined to a depth of about 300 feet and has produced approximately $300,000.[52] The old shaft is now inaccessible. The Excelsior ore body occurred at the contact between crystalline limestone and granodiorite; at the apex of a granodiorite aphophysis. The limestone granodiorite contact at the mines strikes N. 35 W. and dips about 45° W. The stope at the tunnel level extends for about 30 feet along the contact and is about 8 feet in width. Intense garnetization had taken place near the contact. The garnet is clear citron-brown in color, in contrast to that in the Golden Leaf mine, of a dull reddish-brown color. Coarse crystalline calcite and specularite are associated with the garnet. The gold is either free or in tetradymite and is found in a light green gangue composed chiefly of calcite, chlorite, garnet, specularite and some quartz. The ore shoot occurring chiefly on the limestone side of the garnet zone was offset to the southwest by a series of step faults[53] in the lower workings.

52. Hand, Carl: Private report.
53. Dunn, William: Personal communication.

GOLDEN LEAF GROUP

The Golden Leaf group, including the Wadams, Wallace, and Golden Leaf claims, is at the western border of the granodiorite contact. The mines are all connected by raises and ore can be delivered to the mill from any of the workings through the tunnel known as the Priscilla level. The difference in elevation between

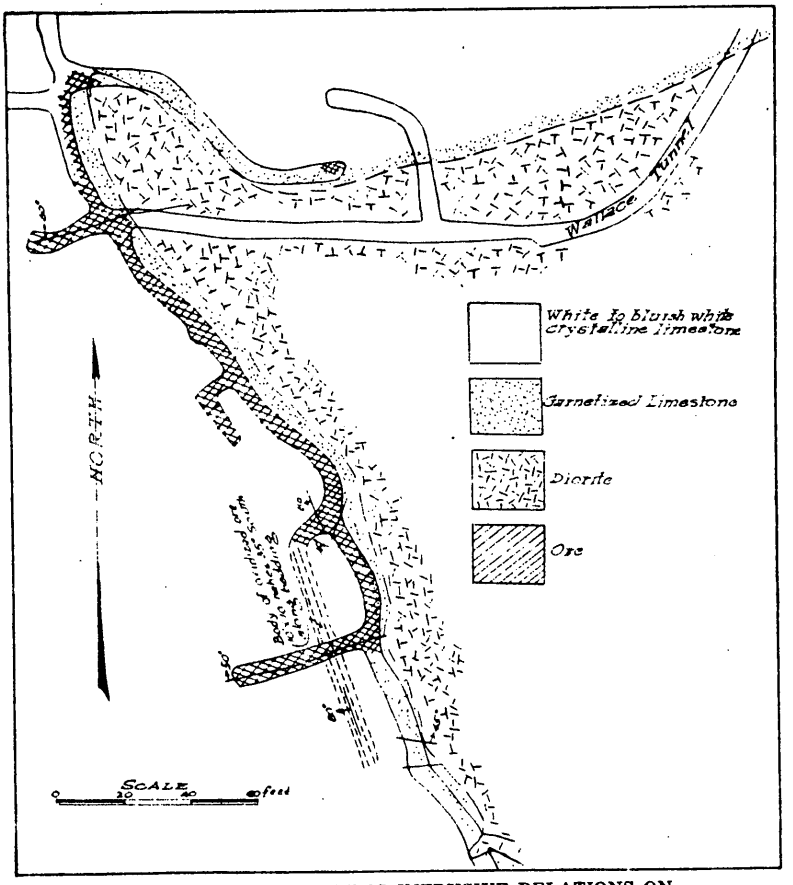

FIGURE 2. MAP SHOWING INTRUSIVE RELATIONS ON WALLACE LEVEL OF WADAMS MINE.

the Priscilla level and the upper workings of the Wadams mine is about 475 feet. The Dunn level, which is reached through an inclined winze is about 140 feet below the Priscilla level. Mr. Hand estimates the production of the Golden Leaf group to be about $1,320,000.[54]

The ore deposits are in a white or bluish-white crystalline lime-

54. Hand, Carl: op. cit.

stone at or near the contact with the granodiorite. Some of the best deposits occur along apophyses which extend out into the limestone. The deposits in the Wadams and Wallace mines are of this type (Fig. 2). The limestone is usually intensely garnetized near the contact with the granodiorite. The ore, which lies predominantly outside of the garnet zones, is almost entirely oxidized in the upper levels but the sulphides become more prominent in the lower levels. A large body of sulphide ore, about 15 feet wide, consisting largely of pyrite with lesser amounts of chalcopyrite, occurs in an intensely garnetized limestone in one of the crosscuts off the Priscilla level. The relative insolubility of the garnet gangue may account for the fact that these sulphides are quite fresh, although ore bodies in limestone on the same level are highly oxidized. Chalcopyrite and pyrite occur on the Dunn level in a dark green gangue composed largely of calcite and chlorite with lesser amounts of quartz, epidote and specularite (Pl. X, 4). Native gold with calcite was observed along fractures in the chalcopyrite (Pl. X, 3). Partly oxidized galena ore carrying silver occurs on the Priscilla level and deposits of magnetite were noted in several places along the limestone-diorite contact.

The ore minerals include native gold, tetrahedrite, chalcopyrite, malachite, azurite, chrysocolla, tenorite, galena, cerussite, anglesite, sphalerite, smithsonite, native sulphur, pyrite, specularite, magnetite, limonite, and manganese oxides.[55] The gangue minerals include calcite, quartz, siderite, garnet, epidote and vesuvianite.

BLUE GRASS AND GOLD BUG MINES

The Blue Grass mine is owned by the Bannack Gold Mining and Milling Company and the Gold Bug is owned by the Graves' estate of Bannack. The claims include a number of the earliest locations in the Bannack district. The Gold Bug embraces the original Dakota locations. Mr. Hand estimates the production of these properties to be about $550,000.[56]

The ore deposits are at or near the contact of a white crystalline limestone with a small tabular body of granodiorite. The limestone, which is intensely garnetized near the contact, contains abundant specularite. The ore is found predominantly outside of the garnet zone. These deposits occur in a region of minor folding and faulting. Gold in a quartz and calcite gangue or in tetradymite, (Pl. X, 1 and 2), is the most important metal but assays show the presence of silver. In 1925 Mr. Austin Hale opened a pipe-like

55. Shenon, P. J.: Gold at Bannack, Montana, Eng. & Min. Jour., vol. 123, p. 326, 1927.
56. Hand, Carl: op. cit.

deposit of granular pyrite which carried about $30 in gold, and in 1927 some work was done by C. W. Stalling. This deposit strikes N. 50° W., and rakes to the north at an angle of about 25 degrees.

HENDRICKS MINE

The Hendricks mine is about a quarter of a mile south of Bannack and on the opposite side of Grasshopper Creek. Two claims are included in the group, the Hendricks and the Suffield. Although the property was first located during the early days of Bannack, little ore was produced until 1918, when the Bannack Mining and Milling Company, operating under a bond and lease, put up a 5-stamp, amalgamation mill. A small ball-mill, a classifier and two cyanide tanks were added in 1919. In 1920 a new 10-stamp mill was built. It contained a ball-mill, a classifier, two agitators, four thickeners and six cyanide tanks and had a capacity of 50 tons in 24 hours. This mill was closed down in 1921. The underground workings include about 1,500 feet of drifts and one 50-foot winze. The property is now owned by the Graeter Park Realty Company of Dillon.

The ore occurs as shoots along bedding planes in limestone of Madison age which has undergone considerable minor folding. The ore of milling grade was in six different shoots within a distance of 200 feet, although the mineralization was continuous throughout.[57] Only one of the ore bodies came down as far as the working level. The shoots raked about 7° N. and dipped from 65° W., to less than 20° W., depending upon the bedding of the limestone. Ore occurred along at least two different bedding planes. The wall rock next to the ore bodies is considerably altered and some gouge was noted along bedding planes. Altered garnet was observed in the wall rock of one stope but no intrusive rocks are known underground. The ore is almost entirely oxidized and because of the oxidation about 50 per cent of the gold was saved by amalgamation.

C. W. Stallings estimates the total production of the property at $40,000.

PLACER DEPOSITS

The first important placer deposits discovered in Montana were those at Bannack in 1862. They produced $600,000 within the first year. Although some of the bench placers have been worked, the most productive were those in the stream bed of Grass-

57. Stallings, C. W.: Personal communication.

hopper Creek or along tributary gulches. Mr. Dunn[58] estimates the total placer production of the Bannack district to be about $8,000,000 distributed as follows:

Bannack Creek Placers—6,000,000 yd. @ $1 per yd.	$6,000,000
Bannack Gulch and Bench placers—4,000,000 yd. @ 30c per yd.	1,200,000
Bon Accord Placers—3,000,000 yd. @ 30c per yd.	900,000
Total	$8,100,000

Winchell estimates that Grasshopper Creek produced $3,000,000 in gold during the 'sixties.

The lode gold deposits are undoubtedly the source of the placer gold since no valuable deposits are found in Grasshopper Creek above Bannack and the gold content decreases downstream.

58. Dunn, William: Personal communication.

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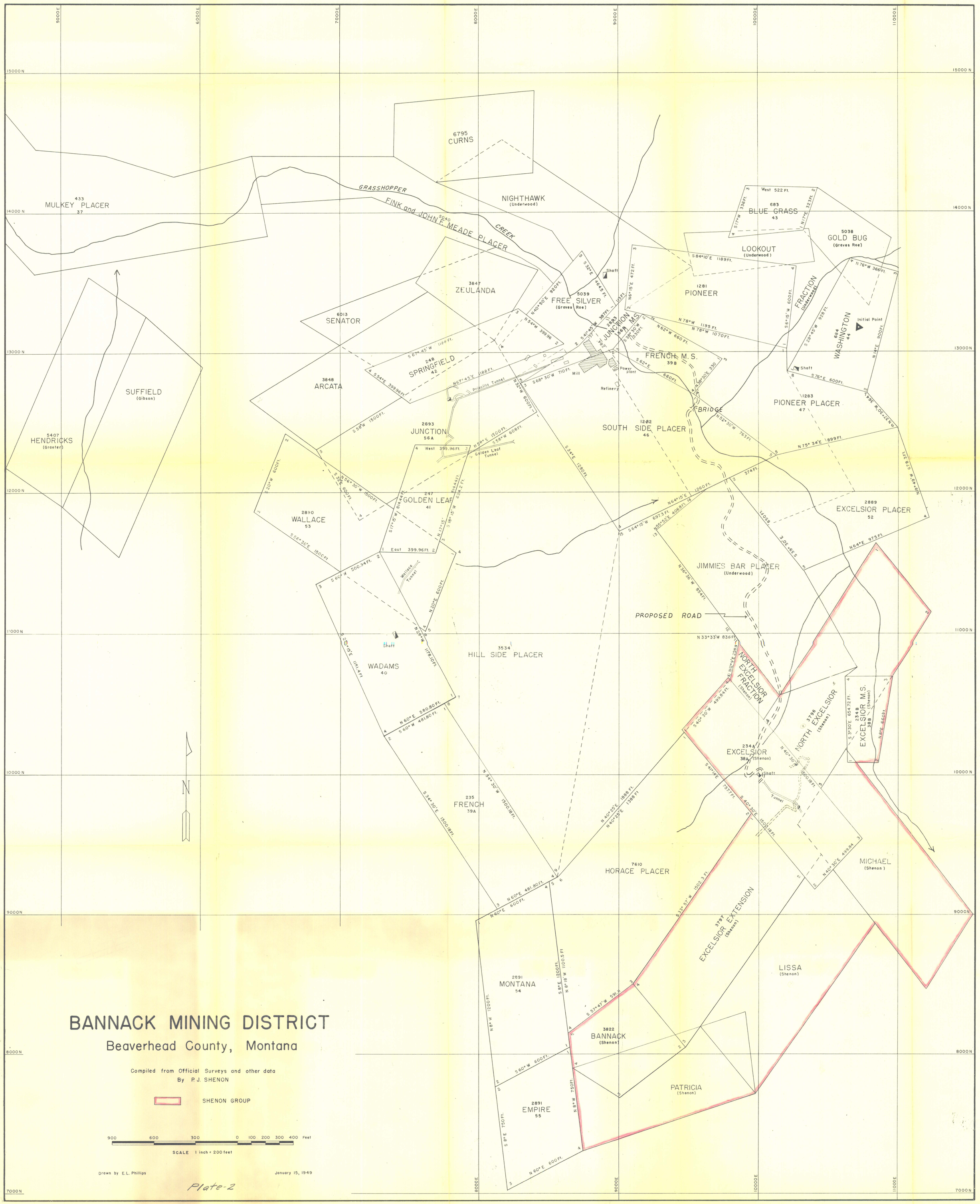
DATE


BANNACK MINING DISTRICT
Beaverhead County, Montana
Compiled from Official Surveys and other data
By P.J. SHENON
SHENON GROUP
SCALE 1 inch = 200 feet
Drawn by E.L. Phillips
January 15, 1949
Plate-2
MULKEY PLACER
433
37
6795
CURNS
NIGHTHAWK
(Underwood)
GRASSHOPPER
FINK and JOHN F. MEADE PLACER
CREEK
5040
3847
ZEULANDA
6013
SENATOR
5039
FREE SILVER
(Graves Roe)
JUNCTION M.S.
1281
PIONEER
LOOKOUT
(Underwood)
BLUE GRASS
683
43
5038
GOLD BUG
(Graves Roe)
FRACTION
(Underwood)
WASHINGTON
684
44
Initial Point
FRENCH M.S.
398
SUFFIELD
(Gibson)
5407
HENDRICKS
(Graeter)
248
SPRINGFIELD
42
3848
ARCATA
2893
JUNCTION
56A
247
GOLDEN LEAF
41
2890
WALLACE
53
WADAMS
40
Shaft
Wallace Tunnel
Golden Leaf Tunnel
Priscilla Tunnel
Mill
Power plant
Refinery
BRIDGE
1283
PIONEER PLACER
47
1282
SOUTH SIDE PLACER
46
2889
EXCELSIOR PLACER
52
JIMMIES BAR PLACER
(Underwood)
PROPOSED ROAD
3534
HILL SIDE PLACER
NORTH EXCELSIOR FRACTION
(Shenon)
3796
NORTH EXCELSIOR
(Shenon)
2348
EXCELSIOR M.S.
38B
(Shenon)
234A
EXCELSIOR
38A
(Shenon)
Tunnel
235
FRENCH
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7610
HORACE PLACER
MICHAEL
(Shenon)
3797
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(Shenon)
LISSA
(Shenon)
2891
MONTANA
54
3822
BANNACK
(Shenon)
PATRICIA
(Shenon)
2891
EMPIRE
55
N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
8000 N
7000 N
5000 E
6000 E
7000 E
8000 E
9000 E
10000 E
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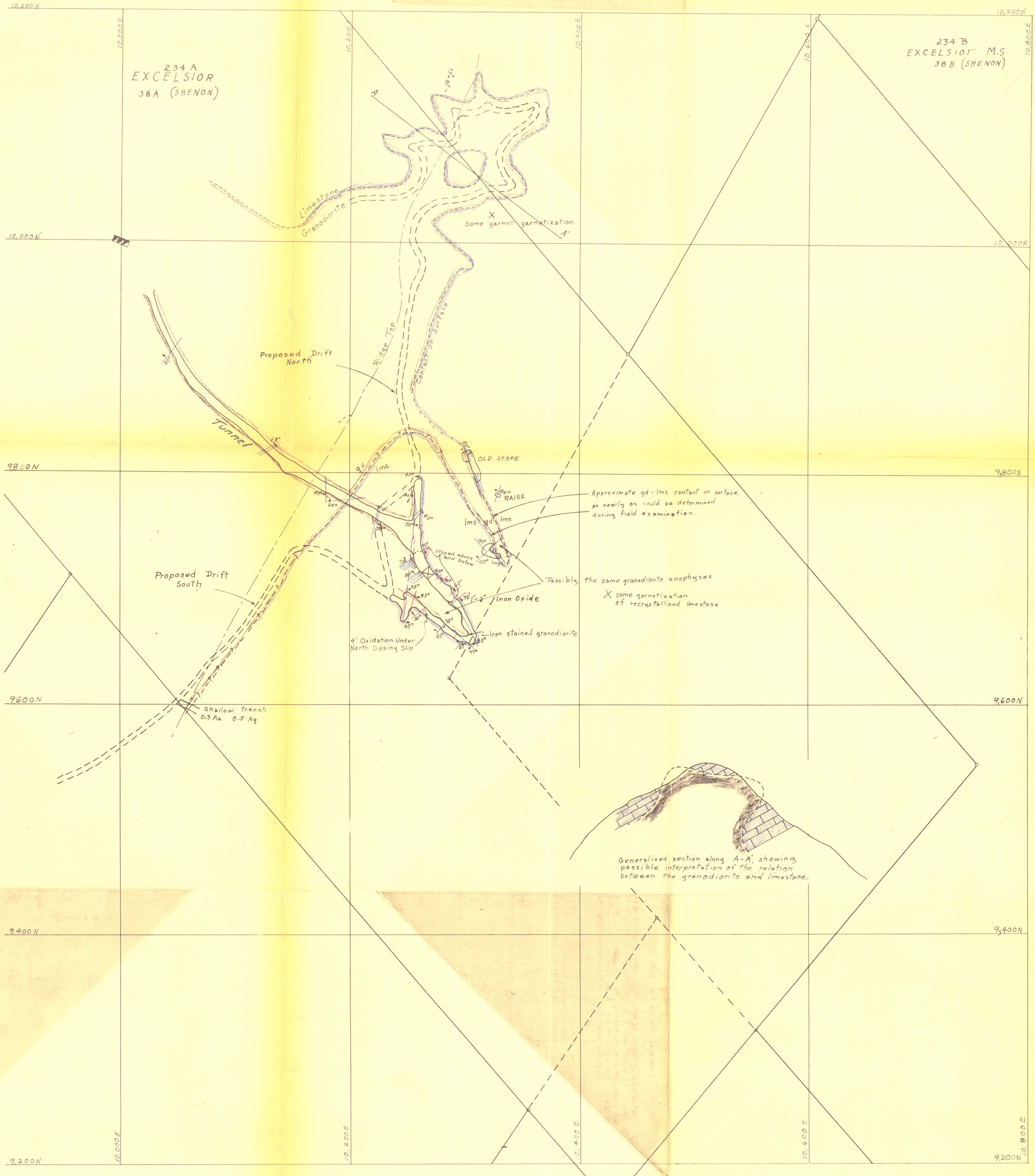
U.S Departmen of the Interior

Office of Minerals Exploration
Examination Report

O.M.E-6263



Note: Base from Exhibit II accompanying application

Explanation

gd Granodiorite

lms Limestone

Apparent Contact

Proposed Drift

Sketch Showing
Working, geologic relations as observed on the surface and proposed drifting
General Deposit Mining Company
Excelsior et al., Claims
Beaverhead County Montana

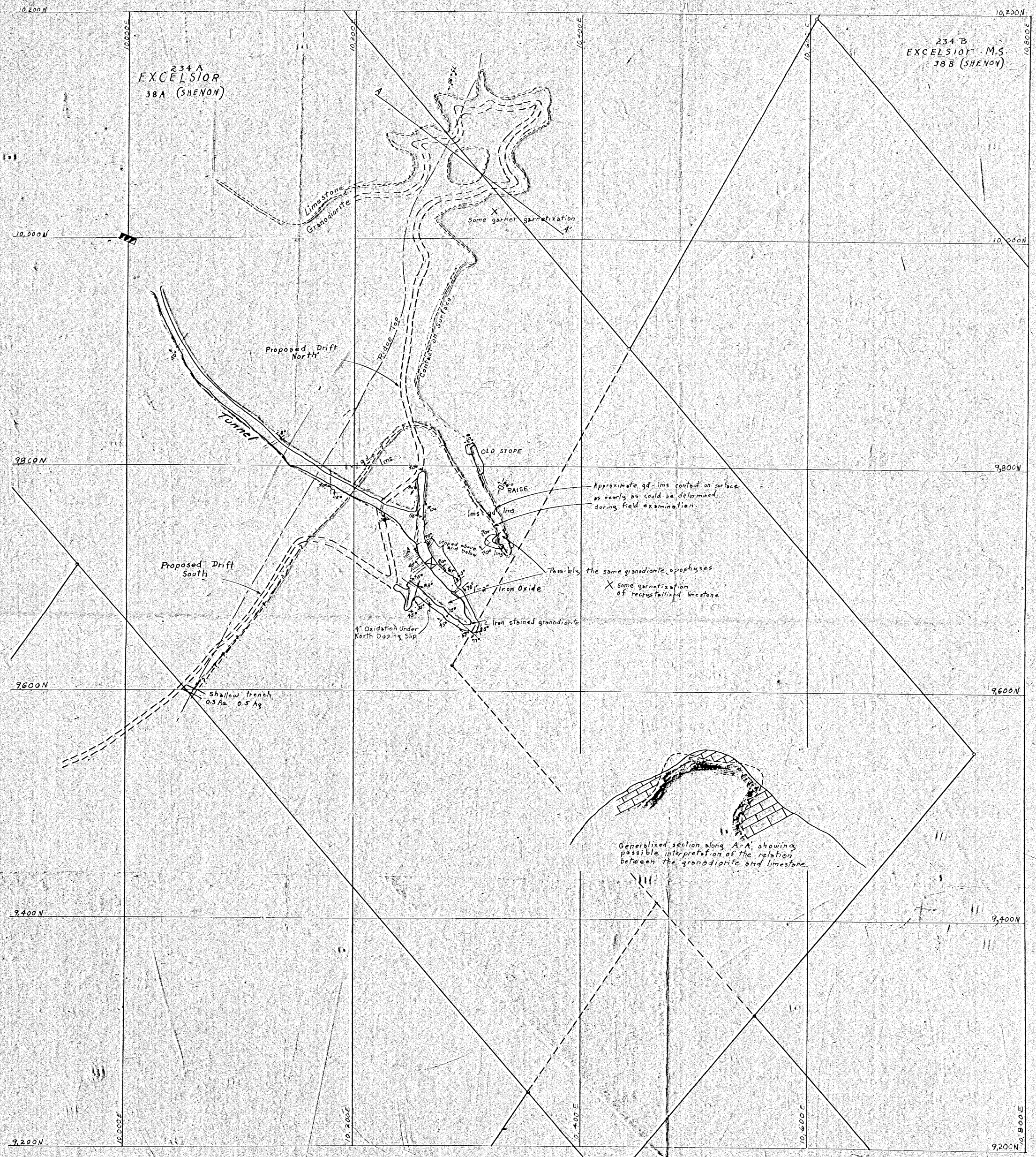
40 0 40 80 Feet

Oct. 1962
Plate I

U.S. Department of the Interior

Office of Minerals Exploration
Examination Report

O.M.E-6263



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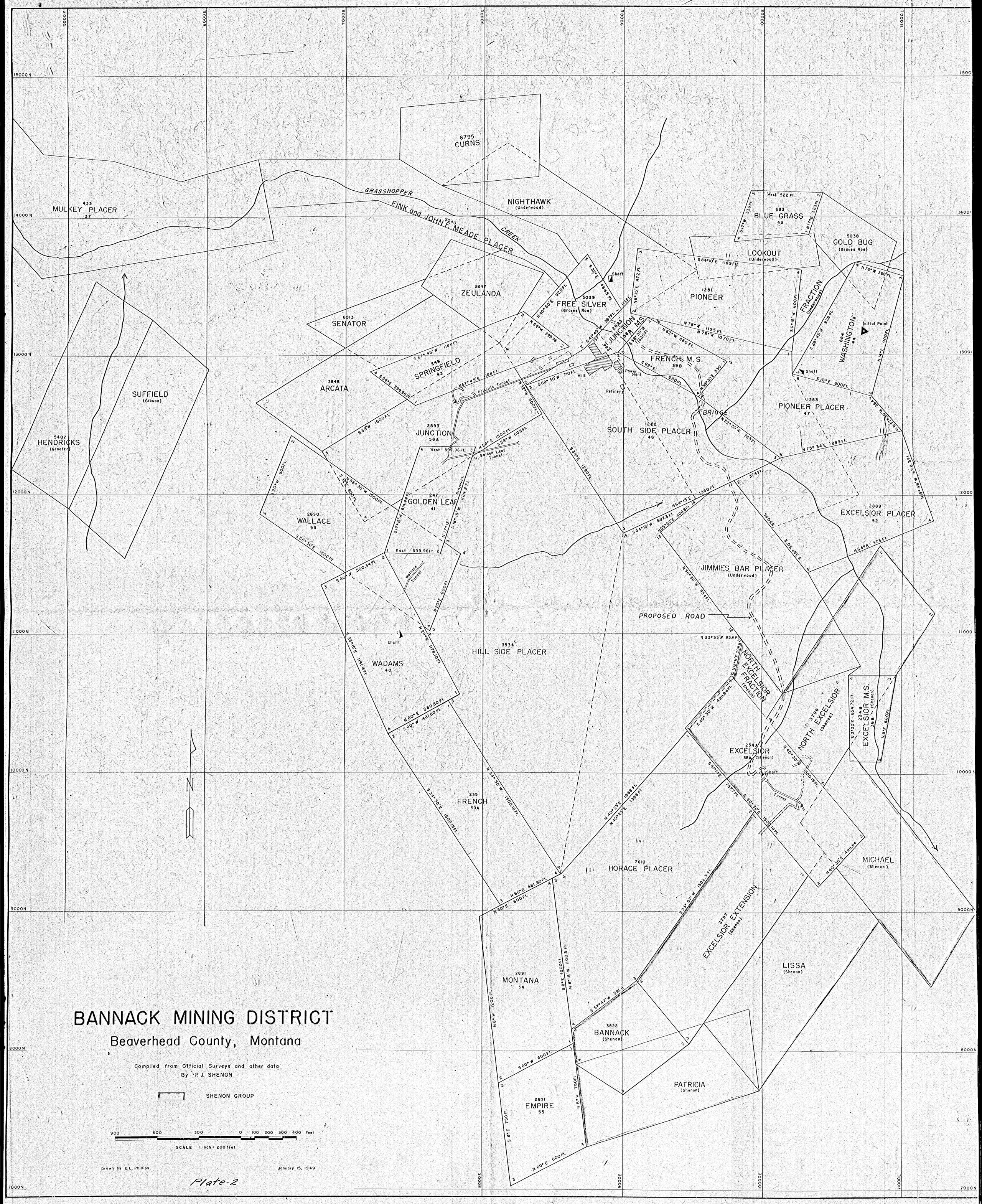
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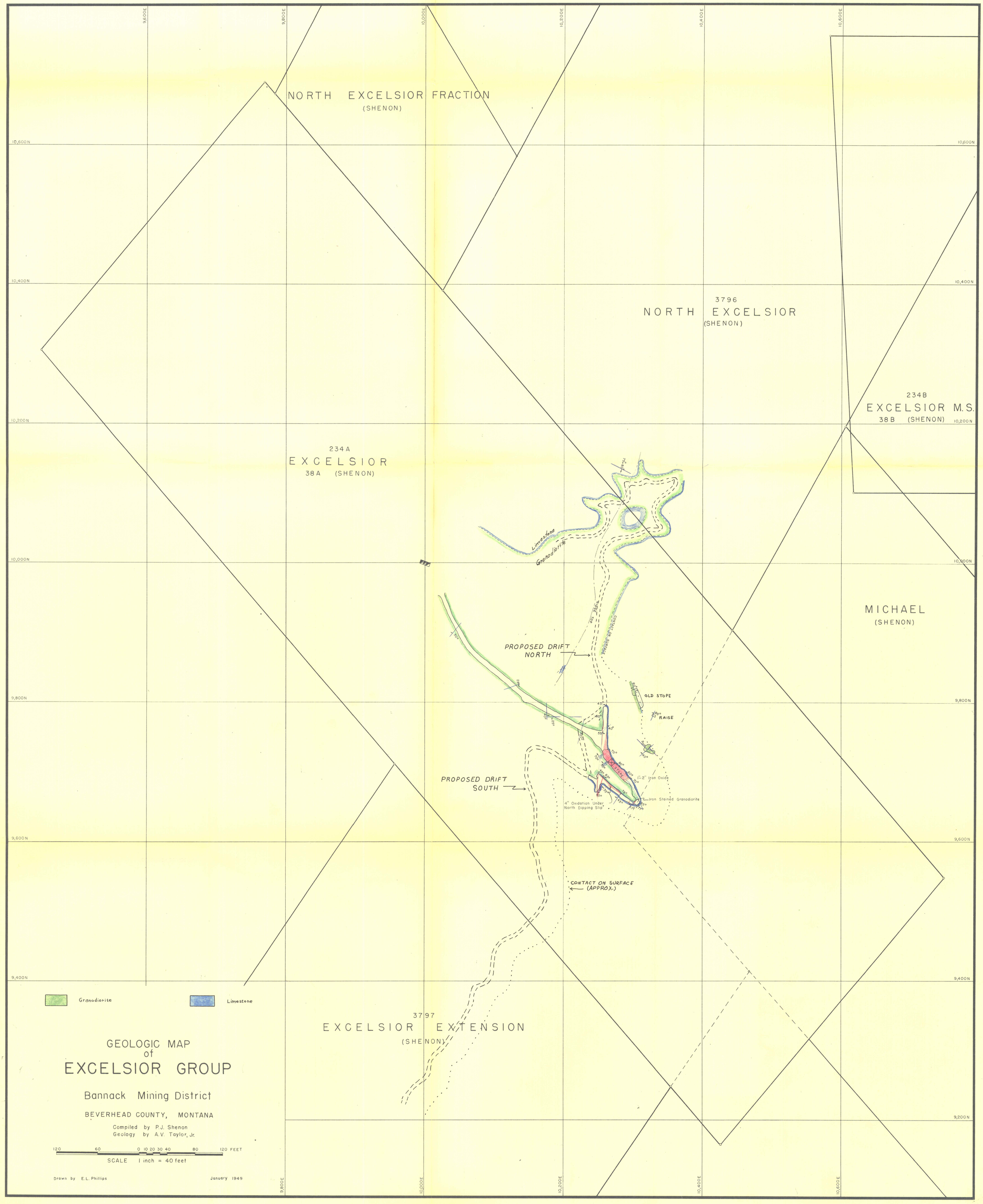
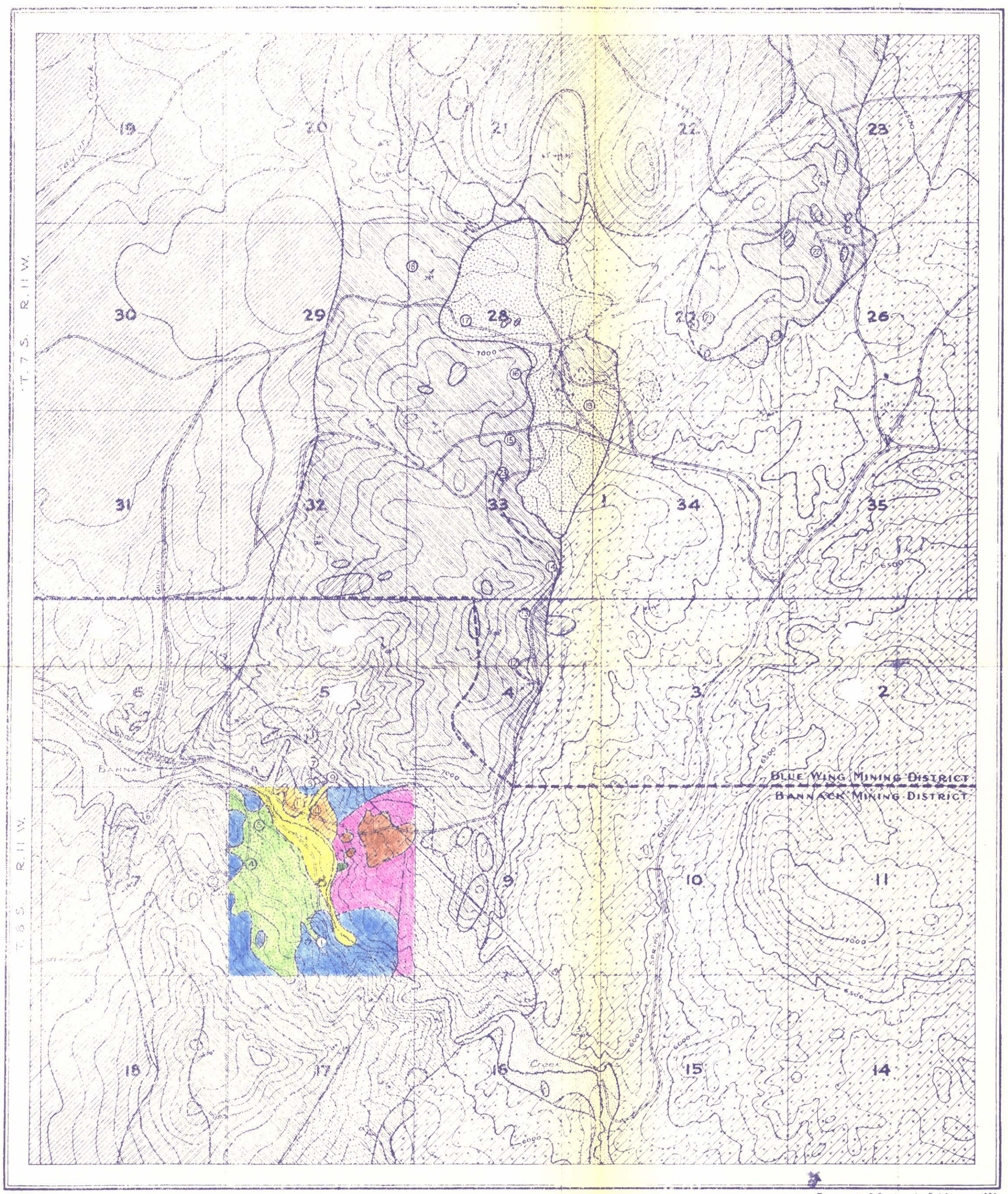
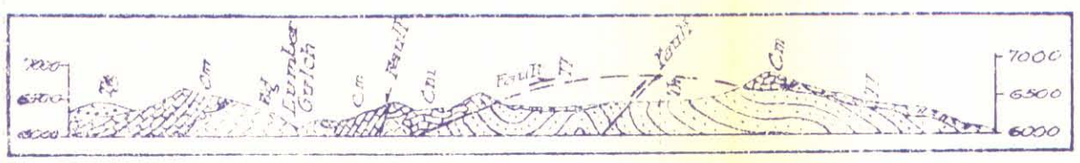

NORTH EXCELSIOR FRACTION
(SHENON)
3796
NORTH EXCELSIOR
(SHENON)
234B
EXCELSIOR M.S.
38B (SHENON)
234A
EXCELSIOR
38A (SHENON)
MICHAEL
(SHENON)
Limestone
Granodiorite
RIDGE TOP
CONTACT ON SURFACE
PROPOSED DRIFT NORTH
OLD STOPE
RAISE
STOPE
1"-2" Iron Oxide
Iron Stained Granodiorite
4" Oxidation Under North Dipping Slip"
PROPOSED DRIFT SOUTH
CONTACT ON SURFACE (APPROX.)
3797
EXCELSIOR EXTENSION
(SHENON)
9,600E
9,800E
10,000E
10,200E
10,400E
10,600E
10,600N
10,400N
10,200N
10,000N
9,800N
9,600N
9,400N
9,200N
Granodiorite
Limestone
GEOLOGIC MAP
of
EXCELSIOR GROUP
Bannack Mining District
BEVERHEAD COUNTY, MONTANA
Compiled by P.J. Shenon
Geology by A.V. Taylor, Jr.
120 60 0 10 20 30 40 80 120 FEET
SCALE 1 inch = 40 feet
Drawn by E.L. Phillips
January 1949



Topography & Geology by P. J. Shenon - 1925



Section A-B

LEGEND

Sedimentary Rocks

Quaternary

Auriferous Placers

Tertiary

Tb

Gravels

Triassic (?)

Tr

Red Beds

Carboniferous

Quadrant Quartzite

Cm

Madison Formation

Igneous Rocks

Late Cretaceous

~~Quartz Diorite~~

Granodiorite (K_2^1)

Tertiary

Tl

Volcanic Rocks

⑧

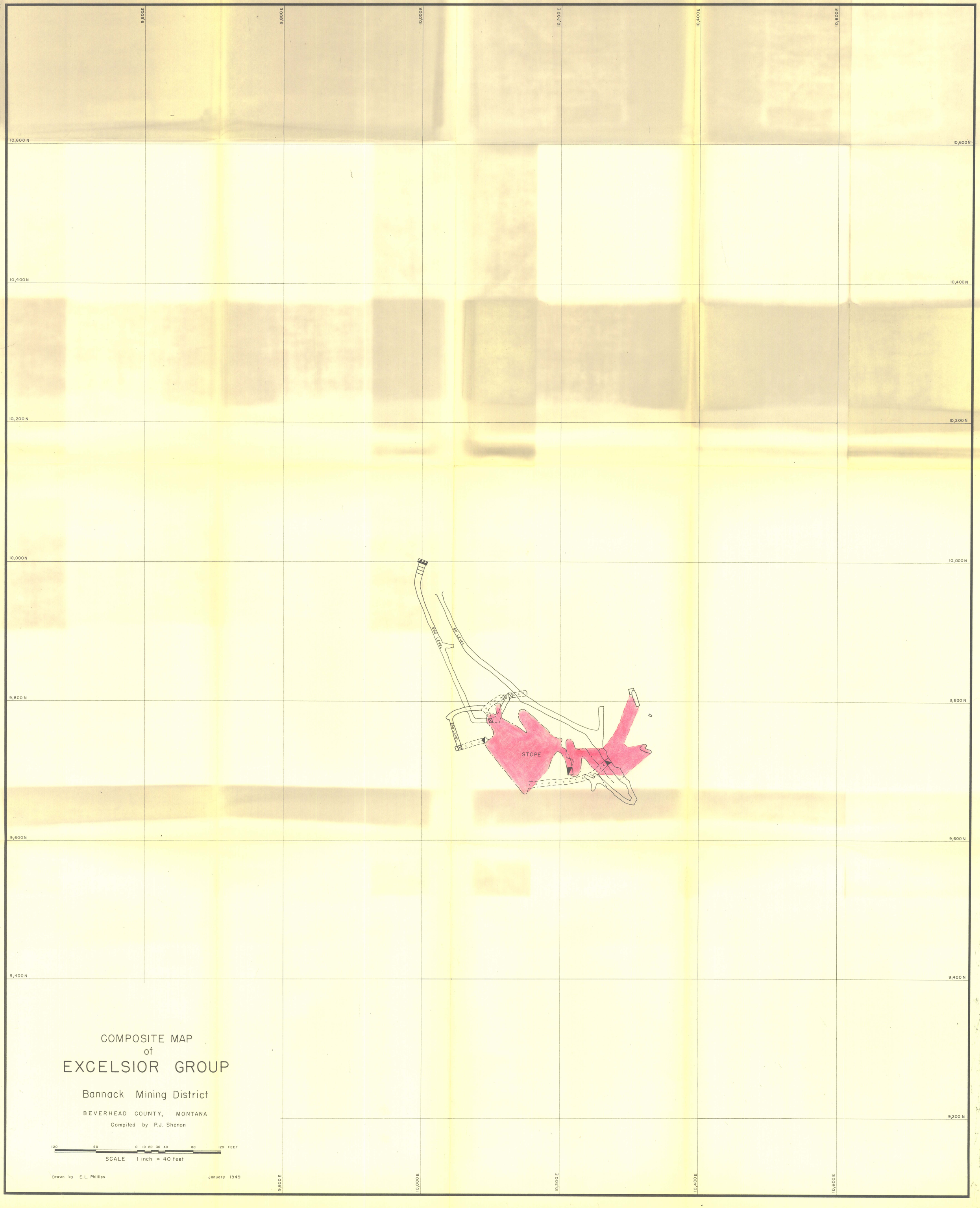
Mines

LIST OF MINING PROPERTIES

1. Excelsior
2. Wadams
3. Wallace
4. Golden Leaf
5. Priscilla
6. Hendricks
7. Blue Grass
8. Look Out
9. Gold Bug
10. Washington
11. Pioneer
12. Charter Oak
13. Ingersoll
14. Lone Star
15. Kent
16. Huron
17. Del Monte
18. Pomeroy
19. Iron Mask
20. Wheal Rose
21. Stevenson
22. New Departure
23. Randall

TOPOGRAPHIC AND GEOLOGIC MAP OF THE BANNACK DISTRICT

CONTOUR INTERVAL 100 FEET SCALE, 1 INCH EQUALS 2500 FEET.


9,600E
9,800E
10,000E
10,200E
10,400E
10,600E
10,600N
10,400N
10,200N
10,000N
9,800N
9,600N
9,400N
9,200N
230 LEVEL
80 LEVEL
130 LEVEL
STOPE
COMPOSITE MAP
of
EXCELSIOR GROUP
Bannack Mining District
BEVERHEAD COUNTY, MONTANA
Compiled by P.J. Shenon
120 60 0 10 20 30 40 80 120 FEET
SCALE 1 inch = 40 feet
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