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REPORT ON THE PRELIMINARY EXAMINATION OF A PROSPECT ON STEAMBOAT CREEK, FAIRBANKS DISTRICT, LIVENGOOD QUADRANGLE

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On October 8, 1960, I made a trip to Steamboat Creek to examine a prospect owned by Pete Smith of Fairbanks. Steamboat Creek is a tributary to Pedro Creek approximately 15 miles by road (Steese highway) north of Fairbanks. Two years ago, Pete Smith found some pieces of silver-bearing galena float in the valley of the creek. He attempted to trace the float to its bedrock source by hand-trenching and trenching with a bulldozer. One of the bulldozer trenches exposed an iron-stained zone cut by two, closely-spaced, parallel, quartz veinlets less than one inch wide. Pete believed that he could see particles of silver in the quartz, and he started sinking a prospect shaft on the two veinlets. The shaft is one mile from the road on the left limit of the creek at approximately 1480 feet altitude. It is 100 feet northeast of the place where he found the galena float. After sinking 15 feet, he drifted eastward from the bottom of the shaft following the two quartz veinlets; twelve feet from the shaft the veinlets disappeared. Pete did not know if he should continue drifting in hope of picking up the two veinlets again or if the two veinlets had any relationship to the float that he had found.

The country rock at the collar of the shaft is Birch Creek schist, but the rock exposed along the east side of the trench a few feet from the shaft is granitic rock, probably quartz monzonite. The drift from the bottom of the shaft penetrates the monzonite, and the two veinlets were cut off at the contact. Some old prospect pits a few hundred feet to the north appear to be in monzonite, and they indicate that the mass of intrusive rock has considerable width; it probably is

Fig. 1. Pete Smith and his prospect shaft. The ladder leans against the south side of the shaft.

a wide dike. The drift, if continued eastward in the intrusive rock, most likely would not encounter the veinlets again; I advised Pete of this.

The iron-stained shear zone where the shaft was sunk appears to strike north-south and to dip vertically. The shaft is five feet wide, and the zone is at least that wide. The rock within the shear zone is Birch Creek schist; aside from the conspicuous iron stain and numerous slippage planes, it appears to be the same as the wallrock. Lenses and irregular masses of quartz are scattered thinly throughout the zone. The two small veinlets that Pete was following appear to strike east-west and to dip vertically.

During this examination, a sample of the shear zone was taken by cutting a four-feet-long channel across a part of the zone five feet below the collar of the shaft. The length of the channel was limited to that part of the zone that could be reached conveniently from the ladder in the shaft. The sample assayed 0.18 ounces of gold and 3.50 ounces of silver per ton, or $9.45 per ton.

The two veinlets that attracted Pete's attention appear to be of little or no importance, however, further work in the area is justified. It is possible that the float came from an ore-shoot within the shear zone, and it is also possible that the shear zone is wide enough and rich enough to be minable. I plan to return to the prospect during the summer of 1961 to take more samples of the shear zone and also to determine if geochemical prospecting methods will aid in finding the bedrock source of the galena float.

College, Alaska
January, 1961

Robert H. Saunders
State Mining Engineer

STATE OF ALASKA
DIVISION OF MINES AND MINERALS

SAMPLING AND GEOCHEMICAL PROSPECTING AT STEAMBOAT CREEK, FAIRBANKS DISTRICT, 1961

by

Robert H. Saunders
State Mining Engineer

February
1962

INTRODUCTION

During the past three years, Mr. Pete Smith of Fairbanks has been working intermittently on a silver-lead prospect on Steamboat Creek, attempting to find the bedrock source of some large pieces of silver-bearing galena float that he picked up in 1958. I first examined his prospect on October 8, 1960, and, from notes made during that examination, wrote a report entitled REPORT ON THE PRELIMINARY EXAMINATION OF A PROSPECT ON STEAMBOAT CREEK, FAIRBANKS DISTRICT, LIVENGOOD QUADRANGLE, January, 1961.

During the 1961 field season, from June 8 to October 3, I visited the prospect several times and did the work described in this report. One objective of the 1961 work was the resampling of a shear zone to check a moderately high gold-silver assay obtained in October, 1960. The main objective was to find the bedrock source of the galena float by making a geochemical survey, following established methods for taking soil samples and testing them for heavy-metal content.

SAMPLES FROM THE SHEAR ZONE

Plate II shows the locations of bulldozer trenches, hand-dug pits, and auger holes drilled for soil samples at the prospect. The pieces of silver-bearing float that were found in 1958 were found near auger hole A-3; a bulldozer trench has been dug at that spot since the float was found.

The prospect shaft between auger holes B-4 and B-5 is 15 feet deep; from the bottom, a drift goes eastward about 20 feet and crosses a contact, going from mica schist into quartz diorite. The shaft is in a shear zone that is at least 7 feet wide; the zone appears to strike north and to dip vertically. A channel sample cut across four feet of the shear zone in October, 1960, assayed 0.18 ounces of gold and 3.50 ounces of silver per ton, or $9.45 per ton. Table I shows the assay results of three samples that were cut across the shear zone in June, 1961. Sample 1 was cut across the north side of the shaft, and samples 2 and 3 were cut end-to-end across the south side of the shaft.

TABLE I

ASSAY RESULTS OF SAMPLES

Sample Number	Length of Channel	Ounces per Ton Gold	Ounces per Ton Silver
1	6 feet	0.02	0.99
2	6 feet	0.02	1.31
3	1 foot	trace	0.70.

THE GEOCHEMICAL SURVEY

Samples for geochemical testing were obtained by drilling with a hand auger. The holes were drilled either to bedrock or to rocky rubble immediately overlying bedrock. The samples were placed in plastic "freezer" bags and were taken to the College Assay Office, where the chemical tests were run by Donald Stein, Assayer.

The soil samples were tested by using the USGS method described in University of Alaska Mining Extension Bulletin No. 2, ELEMENTARY GEOCHEMICAL PROSPECTING METHODS, by Leo Mark Anthony. In this method, the amount of a dithizone solution required to reach an end point is proportional to the heavy-metal content of the sample. The amount of solution in milliliters required for each sample is shown on Plate II.

The first soil samples were taken from auger holes 1 through 15 in line A and 1 through 15 in line B. After tests of those samples indicated a strong anomaly, line C was run uphill above line B in an attempt to pick up the northward extension of the anomaly, and line Z was run downhill below line A to pick up the southward extension. Line AA was run as an extension of line A to delimit the east boundary of the anomaly, and a sample was taken at A-16 to check the possibility of hole A-15 being on the edge of another anomaly. After the anomaly was detected in line Z, line ZZ was run to delimit the east boundary. After the tests were run on samples from line C, line Y was run midway between lines B and C in another attempt to detect a northward extension of the anomaly. When this failed, a third attempt was made by running line X midway between lines B and Y, but line X also failed to show the anomaly.

At this stage of the work, it was apparent that the anomaly terminated in the 18-feet distance between holes B-4 and X-4. It was also apparent from exposures in the bulldozer cut and in the crosscut from the bottom of the shaft that the contact between schist and quartz diorite also was between holes B-4 and X-4. It seemed likely that the contact had been the site of the galena deposition. On July 12, a trench was dug northward from hole B-4 across the contact, but no indication of a body of galena was found.

After July 12, because of other field work, I was unable to return to the prospect until October 3, when Donald Stein and I went there, taking with us the equipment necessary for testing soil samples. Testing different types of material from the trench that was dug on July 12 showed that the high readings were coming from a thin layer of earthy, brown-and-black material immediately overlying bedrock. Numerous auger holes were drilled around the trench, and tests of the soil from the holes showed that the anomaly continued uphill to a point only a foot or so from hole X-4. The uphill boundary of the anomaly was so abrupt that it could be located within a foot by drilling and testing the soil.

A pit was dug on the downhill side of hole X-4. The upper part of the quartz diorite bedrock is decompased so that it has the consistency of unconsolidated sand. The pit exposed an east-west trending, northward dipping zone of limonite-stained, earthy material within the quartz diorite. This zone could be the weathered top of a vein.

Samples of the vein filling gave a high reading when subjected to the heavy-metal test, and the filling appears to be the same as the material that gave the high readings in the trench above hole B-4. The anomaly does not extend uphill beyond the place where the vein is exposed in the pit.

A channel sample cut across the vein assayed a trace of gold and no silver. A spectroscopic analysis of the sample showed that it contained the following:

over 10%	1 to 10%	under 1%
silica	sodium	manganese
calcium	magnesium	lead 0.01%
aluminum	barium	zinc 0.001%
	potassium	
	iron	
	titanium	

CONCLUSIONS

From the assay results of the samples taken across the shear zone in 1961, it appears that the sample taken in 1960 ran erratically high and was not indicative of the average tenor of the shear zone.

The vein exposed in the pit near hole X-4 must be, at least in part, the cause of the anomaly; however, the vein filling is much different from the pieces of float that were found near hole A-3, and the low content of gold, silver, and lead shown by the assay and spectroscopic analysis is discouraging. Further work should be done on the vein. Because the anomaly does not extend uphill beyond the pit, this work should be done on that part of the vein that lies between the pit and the quartz diorite - schist contact.

Table 1. Results of Assays.

Sample Number	Length of Channel	Ounces per Ton Gold	Silver	Percent Lead	Remarks
65	Grab	0.04	27.42	25.5 to 26.0	Galena and gossan.
66	38 inches	0.01	0.82	0.5 to 1.0	Iron-stained, altered diorite in fault gouge.
67	7 "	0.01	1.75	2.5 to 3.0	Same as 66.
68	30 "	0.02	2.14	3.5 to 4.0	Same as 66.
69	Grab	0.13	7.46	14.0 to 14.5	Quartz with sulfides.
70	Grab	0.02	74.43	43.5 to 44.0	Cellular galena and cerussite.
71	Grab	0.10	187.85	46.0 to 46.5	Galena.
90	7 inches	Tr	103.50	55.32	Galena.
91	8 "	0.06	15.06	18.04	Reddish-brown gossan, some galena.
92	4 "	0.04	170.56	74.56	Galena.
93	5 "	0.02	77.86	51.16	Galena, partly oxidized.
94	10 "	0.10	58.08	13.63	Reddish-brown gossan.
95	13 "	0.04	14.22	16.90	Reddish-brown gossan.
96	23 "	0.04	25.76	31.72	Galena, partly oxidized.
97	29 "	Tr	Tr	Not Run	Iron-stained diorite and quartz.

WORK AT THE STEAMBOAT CREEK PROSPECT, FAIRBANKS DISTRICT, IN 1962

Two Division of Mines and Minerals reports have been written on the Steamboat Creek lode prospect; they are: REPORT ON THE PRELIMINARY EXAMINATION OF A PROSPECT ON STEAMBOAT CREEK, FAIRBANKS DISTRICT, LIVENGOOD QUADRANGLE, and SAMPLING AND GEOCHEMICAL PROSPECTING AT STEAMBOAT CREEK, 1961.

During 1962, Pete Smith, owner of the prospect, continued placer mining on Steamboat Creek. He and his partner, using an Allis-Chalmers H-D 10 tractor, mined upstream from the cuts mined in 1961. The placer mining occupied most of their time, and they did little work on the lode prospect. On one of the few days that they did work on the lode prospect, they found a twenty-five-pound piece of galena float similar to that found by Pete Smith in 1958 and found in approximately the same place. In 1962 they also found some galena in their placer concentrate.

I visited the lode prospect on July 17 and 19, 1962, and investigated further the vein that was found in 1961 by geochemical survey. After deepening the pit where the vein is exposed, I obtained three more samples. The samples were assayed for gold and silver, and the lead content was estimated by spectroscopic examination, at the College Assay Office by Donald Stein, assayer. The results were as follows:

Sample	Ounces per Ton		Per Cent
Number	Gold	Silver	Lead
32	Tr	0.34	0.4
33	Tr	0.24	0.2
34	Tr	0.14	0.01 to 0.1.

The relationship between the vein and the high-grade float is still unknown. Regardless of what this relationship is, it seems almost a certainty that the source of the float lies between the place where the float has been found and the uphill terminus of the geochemical anomaly. These two places are about a hundred feet apart, and, with a bulldozer, a trench could be dug exposing the bedrock bewteen them in a rather short time. Mr. Smith realizes this, but, because the placer mining provides an immediate income, it must take precedence over trenching on the lode prospect. No further work by the Division of Mines and Minerals is planned here until after the trenching has been done.

College, Alaska
February, 1963

Robert H. Saunders
State Mining Engineer

WORK AT THE STEAMBOAT CREEK PROSPECT, FAIRBANKS DISTRICT, IN 1963

The original owner of the Steamboat Creek prospect is a long-time resident of Fairbanks, who is well known locally as Pete Smith; his real name, however, is Gregory Shumeff. He now has a partner, and he and Don Rowley, also of Fairbanks, jointly own the lode claims on Steamboat Creek.

Since my first examination of the prospect in October, 1960, I have written the following reports on the property: REPORT ON THE PRELIMINARY EXAMINATION OF A PROSPECT ON STEAMBOAT CREEK, FAIRBANKS DISTRICT, LIVENGOOD QUADRANGLE; SAMPLING AND GEOCHEMICAL PROSPECTING AT STEAMBOAT CREEK, FAIRBANKS DISTRICT, 1961; and WORK AT THE STEAMBOAT CREEK PROSPECT, FAIRBANKS DISTRICT, IN 1962. The work described in these three reports resulted in the finding of several pieces of silver-bearing galena float and the outlining of a geochemical anomaly of the heavy metals content of soil. Prior to 1963 no galena had been found in place...

During July and August of 1963, the U. S. Bureau of Mines conducted an exploration program on the prospect. This work was under the supervision of Bruce I. Thomas; it included stripping with a bulldozer and trenching by hand. The geochemical anomaly outlined in 1961 was used as a guide to determine where the stripping was to begin. The work done in 1961 showed that the anomalous amounts of heavy metals are in a brown-and-black, earthy material, but additional work in 1963 showed that not all such material carries anomalous amounts of heavy metals. The metal-rich material could not be distinguished visually, and geochemical testing during the stripping provided a means of guiding the work. A vein of galena was uncovered by the stripping, and hand trenches were dug to explore the vein further.

Fig. 1 is a map of the area where the galena was found. The prospect shaft described in earlier reports was within the area, and it was filled in by the stripping. The galena vein ranges in thickness from 3 inches to 2 feet. It is a flat-lying vein, but in it are several upward and downward bends. Near the north side of the stripped area, it is cut by a southeasterly trending fault, and the vein has not been found north of the fault. On the map that was included in the 1961 report, this fault was incorrectly shown as a contact and the rock on the south side of it was incorrectly shown as schist. All the bedrock in the stripped area is diorite. North of the fault the diorite is like unconsolidated sand, but south of the fault some of it is hard and blocky. Where the hard diorite is adjacent to the fault, slippage planes have been developed in it, giving it a schistose appearance.

On Fig. 1, the profile of the northwest wall of trench A shows that the vein bends up near the fault. This upward bend could be the result of drag; however, the presence of similar bends away from the fault shows that such a bend is not necessarily drag and therefore is not a reliable indicator of direction of movement.

On the south side of the fault, many minor faults and fractures cut the diorite; these are not shown on Fig. 1. Along some of them the vein has been displaced vertically. The absence of galena in trench B is probably the result of movement along one or more of these faults. The vein segments exposed in the various trenches could be parts of more than one vein, but there is no evidence that more than one is present.

The diorite on the south side of the fault exhibits differences in color and hardness from place to place, but none of it is as soft and sand-like as that on the north side. This contrast in hardness is apparently the result of differential weathering. The difference in degree or depth of weathering could be related to differences in physical or chemical properties of different masses of diorite, but possibly it is related to the fault movement. The weathering may have been the same throughout the area before faulting, and a relative upward movement of the south block may have been accompanied by, or followed by, removal of the weathered top of that block by erosion. The direction of movement on the fault is of interest, of course, because of the possibility of a displaced vein segment lying north of the fault. If the north block moved up, at least a part of any vein segment north of the fault would have been removed by erosion, but an uneroded extension may lie farther up the hill. If the north side moved down, a north segment may be concealed in the hill at an unknown depth. A large lateral movement along the fault could have displaced a lenticular vein segment in such a way that it would have been eroded entirely.

As shown in Fig. 1, the major part of the vein is outside the geochemical anomaly. Several bedrock features in the area might have played a part in determining the rather unusual relationship between the anomaly and the vein. If a concealed segment of the vein lies north of the fault, it could be close enough to the surface to be contributing to the anomaly. The upward and downward warps in the vein may have formed channels for the movement of seepage water transverse to the slope of the hill. The major fault and numerous minor faults and fractures in the hard diorite may have controlled the movement of seepage water.

The soft diorite north of the fault should have high permeability, and water seeping through it might be dammed at the fault and funneled so that a large part of it would cross the fault at one place where a vein, a fracture zone, or a depression in top of bedrock provided a passageway.

Table 1 shows the assay results of samples that were taken in 1963. Samples 65 to 71 were taken before the trenches were dug, and some of them were taken to check for mineralization along fractures in the diorite. Samples 90 to 96 were taken after the trenches were dug to aid the owners in selecting ore for shipment. Sample 97 was taken to check for mineralization along a fracture zone. Gold and silver assays for all the samples and lead assays for samples 90 to 96 were by Donald Stein at the Fairbanks Assay Office of the Division of Mines and Minerals. Lead assays for samples 65 to 71 were by Irwin Mitchell at the Division's Anchorage Assay Office.

In the fall, the owners of the prospect rented a small tractor-mounted backhoe. They enlarged some of the trenches dug by the Bureau of Mines, dug the small trench on the north side of the fault as deep as the backhoe would dig, and dug the long trench shown near the east end of the stripped area. They also used the backhoe to mine enough galena for a trial shipment. The ore was put into 55-gallon drums; twenty-five drums containing 22,840 pounds were shipped in late November to the Bunker Hill Company smelter at Kellogg, Idaho. The shipment went by truck and barge to Seattle and by truck from Seattle to Kellogg. According to the smelter returns, the ore contained 106.0 ounces of silver and 0.02 ounces of gold per ton, 49.0 percent lead, and 0.04 percent copper. The owners plan to mine and ship the vein segment now exposed;

future shipments probably will be in bulk in carload lots. They also plan to prospect the area north of the fault for a displaced vein segment.

Fairbanks, Alaska
May, 1964

Robert H. Saunders
State Mining Engineer

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On the south side of the fault, many minor faults and fractures cut the diorite; these are now shown on Fig. 1. Along some of them the vein has been displaced vertically. The absence of galena in trench B is probably the result of movement along one or more of these faults. The vein segments exposed in the various trenches could be parts of more than one vein, but there is no evidence that more than one is present.

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Fairbanks, Alaska, May, 1964

Robert H. Saunders
State Mining Engineer

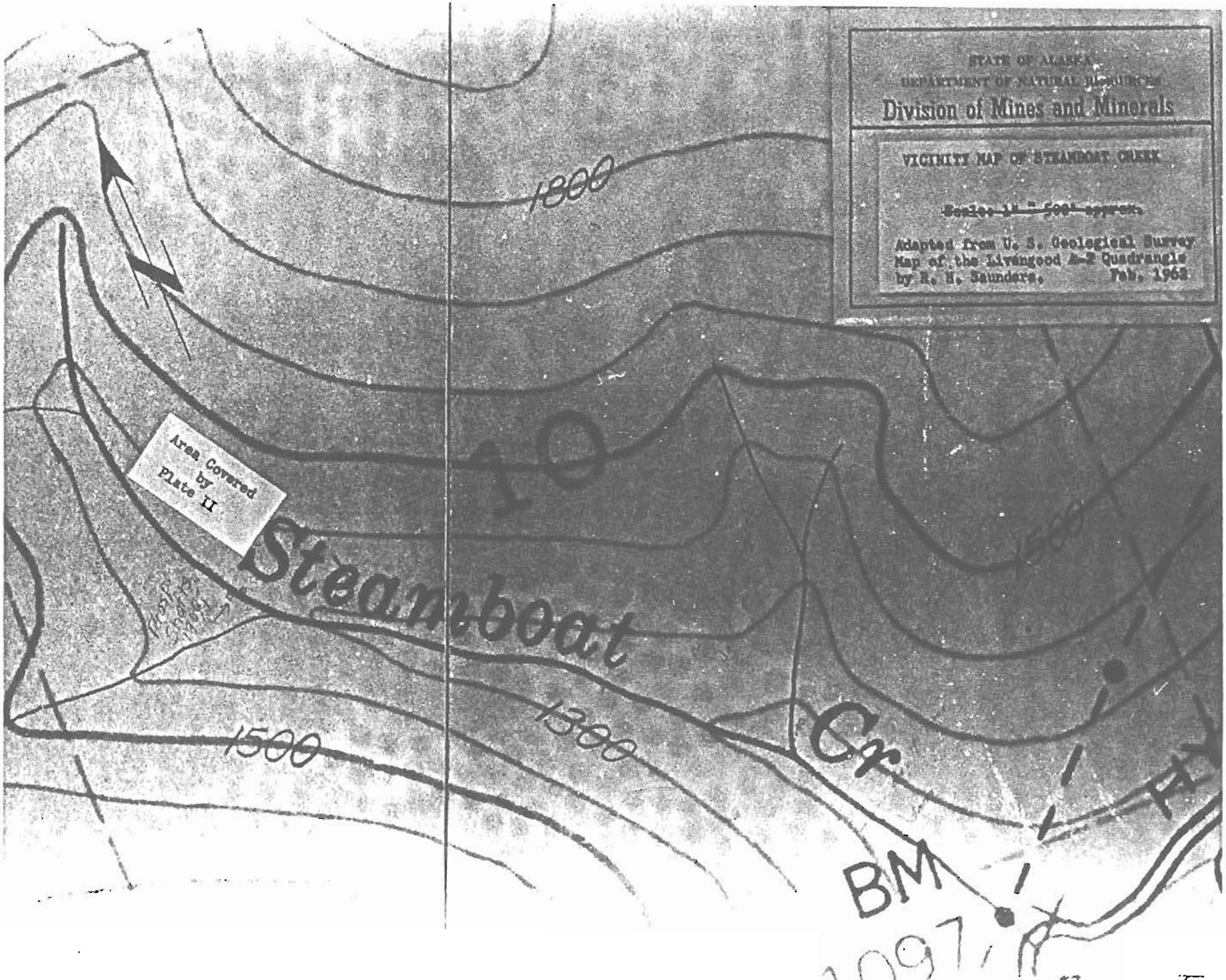
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
Division of Mines and Minerals
VICINITY MAP OF STEAMBOAT CREEK
~~Scale: 1" = 500' approx.~~
Adapted from U. S. Geological Survey Map of the Livengood A-2 Quadrangle by R. H. Saunders. Feb. 1962
Area Covered by Plate II
Steamboat Cr
10
1800
1500
1300
BM
1097

PLATE I