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CORRAL CREEK MONAZITE PLACER AREA, VALLEY COUNTY, IDAHO

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VALLEY COUNTY, IDAHO

by
M. H. Kline[1/], E. J. Carlson[2/], and H. W. Horst[2/]

INTRODUCTION

The 1950 churn-drilling program on the Big Creek deposit indicated that rich monazite gravels might be found to the south in an area known as Corral Creek. Surface panning and auger samples during the winter of 1950-51 confirmed this belief. Samples of fine gravels, up to an inch in size, taken from road cuts and drainage ditches revealed the monazite content to run several pounds per cubic yard of gravel. However, where only soils and clays were exposed, samples showed a lower monazite content. From this variable distribution of monazite values in the surface materials, it was indicated that a churn-drilling program would be necessary to evaluate the area. This program was proposed to the Atomic Energy Commission and approved early in 1951.

The objectives of the program were: (1) to determine the areal extent of the monazite-rich gravels; and (2) to determine the monazite content and other potentially valuable minerals present in the deposit.

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SUMMARY AND CONCLUSIONS

Sixty-one churn-drill holes, ranging in depth from 20 to 123 feet and aggregating 3,518 feet, were drilled in the Corral Creek area between June 21 and November 10, 1951. A total of 773 samples, weighing almost 35 tons, was obtained for testing and analyzing in the Bureau's field laboratory in Boise, Idaho, and analytical laboratories in Raleigh, North Carolina.

The area outlined by drilling was about 2 miles in length (north and south) and 1.5 miles in width. For the 61 holes drilled, the black-sand concentrates ranged from 0.29 to 14.94 pounds per cubic yard of gravel. By chemical analyses, these black sands were found to contain between 4.2 and 38.3 percent monazite by weight for the samples analyzed.

More than a third of the large area was found to have richer values of monazite in the black-sands. For this smaller area, the black sands varied from 1.87 to 14.94 pounds per cubic yard of gravel, and by chemical analyses these sands ranged from 11.4 to 37.8 percent monazite by weight.

Chemical analyses of monazite from this field indicated a content of 4.39 percent ThO_2 and 0.10 percent U_3O_8. In addition to monazite, the black sands were found to contain a large percentage of ilmenite, and much smaller percentages of magnetite, garnet, and zircon.

DESCRIPTION OF DEPOSIT

Location

The Corral Creek placer area is located near the western edge of Valley County, Idaho, in T. 13 N., R. 4 E., of the Boise meridian. Five miles northwest of the deposit is the town of Cascade, Idaho. Adjacent to this area are the Big Creek placers[3/], where bucket-line dredges have been operating to recover monazite.

Cascade, the county seat of Valley County, is 81 miles due north of Boise and 28 miles south of McCall, Idaho, on State Highway No. 15. This highway, a hard-surfaced road, passes a quarter mile west of the deposit. Graveled county roads, running east and north, cross the Corral Creek area from this highway. In addition to State Highway No. 15, a branch line of the Union Pacific serves the town of Cascade. A main power line of the Idaho Power Company crosses the Corral Creek placer.

Size

The area drilled by the Bureau is a nearly rectangular block lying north-south, approximately 2 miles in length and 1½ miles in width. The greater part of the drilling was done on undulating farm lands between the 4,750 and 4,850-foot elevations. A few holes were drilled at an elevation of 4,900 feet, or above, on the hills along the eastern edge of the valley. Granite bedrock was encountered in two holes. The depth of the holes, depending on the values indicated

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3/ Kline, M. H.; Carlson, E. J.; and Storch, R. H., Big Creek Monazite Placers, Valley County, Idaho: RME-3131, April 1951.

from panning the drill sludges during drilling operations, ranged from 20 to 123 feet and totaled 3,518 feet.

In the area drilled, more than a third was found to contain richer monazite values. This section is located in the middle of the field.

Physical Features

The climate of the area is quite severe during the winter months. Heavy snows usually begin in late October and continue until April. Light snows can occur during any month of the year. In the open valley snow will reach a depth of 4 feet or more, while in the surrounding mountains much greater depths are reached. In the mountains west of Long Valley, which rise sharply along a fault scarp to elevations of 8,000 feet, snow is evident the year round. During the winter months the temperature may drop to 20 degrees below zero for short periods of time. Frost and freezing temperatures are not uncommon during the summer months. Warm periods, often accompanied by rains, occur frequently during the winter and spring of the year which keep the snow from accumulating to great depths in the Long Valley area. In the warmer months, thunderstorms with heavy rain or hail are quite common.

The majority of drilling in the Corral Creek area was done on cultivated fields of grain, clover, and alfalfa. On the east side of the deposit are rolling hills used for grazing land. Few problems would be encountered in clearing the lands for mining operations. Corral Creek drains the foothills east of the deposit and is a small

stream about 4 miles in length. It could not provide sufficient water for a year-round dredging operation, but water for this purpose could be obtained from Big Creek, 2 miles to the north, or from the North Fork of the Payette River, about a half mile to the west.

Geology

Long Valley is a north-trending depression formed by late tertiary and pleistocene faulting. The monazite-bearing alluvium was carried into the fault troughs by streams from the east. An early depositional unit, rotated westward by renewed faulting, has been eroded into rolling topography on the east side of the basin. The general trend of the fault zone is N. 10° W. The maximum throw on the West Mountain fault is estimated at about 5,000 feet. As a result of this faulting, the mountains on the west side of the basin rise steeply from the valley floor. However, on the east side, due to block faulting, the hills rise in a series of increasing heights to the granitic mountains, which reach their highest elevations at 15 to 20 miles east of the valley.

The source of the monazite in the Corral Creek area and in other deposits investigated in Long Valley is the granitic rock of the Idaho Batholith. The rock consists of coarsely crystalline feldspar, quartz, biotite, and hornblende. Nearly all the streams that enter the southern half of Long Valley from the east carry varying amounts of monazite. Panning of the gruss, formed by the weathering of this granite porphyry, shows monazite in the concentrate. The north fork of the Payette, heading north of McCall, flows south

through Long Valley to form the main drainage system of the area. This stream carries only a trace of monazite, and its gravels consist of rock types distinctly different from those represented in the placer deposits. Stream-bed samples from the metamorphic and migmatite zone that borders Long Valley on the west carry little or no monazite. The porphyry in many areas east of Long Valley is cut by numerous aplite and pegmatite dikes. Sampling of these dikes showed that some contain considerable monazite while others are completely barren. Granite porphyry adjacent to the dikes may either run high or low in monazite. Some of the best samples of monazite were located in the granite porphyry where dikes were rare or absent. The richest sample from the porphyry indicated about a quarter pound of monazite per cubic yard. Therefore, the general conclusion is that the monazite is derived from the granite porphyry east of Long Valley. This granite porphyry is a small part of a granite complex of regional extent. The manner of origin, whether by forcible injection of viscous melt or by metasomatic alteration of pre-existing rocks, is a controversial problem. 4/

The deposits of the Corral Creek area are composed of sandy gravel, coarse and fine sand, and clay. The richer strata of monazite-bearing alluvium are located on the east side of Long Valley. The majority of monazite concentrations appear to be in the lenses of coarse sands and fine gravel, whose larger pebbles range in size from 1 to 2 inches. Between these lenses are beds of finer sands and clay, all of which carry some monazite but of much lower content. It is indicated, from the drilling and sampling by the Bureau and from the information

4/ Mackin, J. Hoover, Reconnaissance Geology of the Monazite Placers of the Long Valley District: Trace Elements Memorandum Report 473.

obtained by the dredge operators in 1952 and 1953 at Big Creek, that the richer gravels and the leaner clay beds are lenses of limited lateral extent and variable thickness. As the Bureau drilling in the Corral Creek area was conducted on 800 to 1,600-foot grid intervals, it was impossible to correlate or define the lateral extent of these lenses and beds of variable alluvial material. It was not the intent or the purpose of this program to delineate any individual lens; rather, the Bureau attempted to indicate the probable extent and depth of the deposit and so encourage development by private industry.

Mineralogy

The alluvial material in the Corral Creek placers has essentially the same composition as the granitic rocks from which it was derived. The principal constituents of the source rocks are feldspar, quartz, hornblende, and biotite. The placer deposits consist of quartz sands, iron-stained clays, and mica which make up approximately 85 percent of the alluvial material. The remainder of the alluvium consists of rounded pebbles of granitic rock and quartz, up to about 2 inches in diameter.

Similar to other placer areas drilled by the Bureau, a moderate to high magnetite content in the heavy concentrates indicates a low monazite content. Samples containing a high ilmenite content with a low magnetite content contained the best monazite values. The monazite content of a sample appears to bear no relationship to the varying amounts of garnet, zircon, or ferromagnesian minerals accompanying it. Typical examples of this feature and of the mineral content representative of the field may be noted from a petrographic analysis of

composite samples of the black sands from several drill holes.

Specie	Percent Mineral CO-6	CO-16	CO-50
Monazite	22.5	19.6	34.2
Magnetite	1.4	8.2	0.2
Ilmenite	59.6	60.1	60.0
Garnet	Trace	Trace	Trace
Zircon	1.0	0.5	0.4
Epidote	0.8	0.4	
Fe-Mags	0.3	0.4	
Quartz	12.5	9.0	4.5
Xenotime	0.1	0.1	Trace
Euxenite, Samarskite, etc.	Trace		
Fe-Filings	0.5	0.9	0.6

Trace amounts of radioactive opaque minerals were found in Corral Creek concentrates. However, over 95 percent of the radioactivity is due to the monazite and xenotime.

HISTORY

Above the present valley floor there are exposed a few remnants of a former stream channel. This older stream system appears to have crossed the area from a northwest to a southeast direction prior to the formation of the present structural and topographic features of Long Valley. The alluvium of this older stream was composed of coarse gravels and large boulders quite different in character than the granite porphyry which surrounds it. Evidences are apparent that several attempts were made to placer mine these older gravels for their gold content. These early attempts were handicapped by a shortage of water and poor values. Drilling by the Bureau in Long Valley directly below these old workings failed to show any increased gold content which could have resulted from the erosion of this older

stream channel.

In the latter part of 1950, a dredging company moved a bucket-line dredge into the Big Creek area approximately 2 miles north of Corral Creek. Dredging operations of the alluvium for monazite began in December 1950. In the following year, two additional dredges were placed in operation on the Big Creek placers by other companies. All of these dredges were originally designed for the recovery of gold. Monazite, with a lower density than gold, proved to be difficult to recover with the standard gold-saving dredge equipment. A Bureau of Mines program, sponsored by the Atomic Energy Commission was initiated to aid the operators and improve their monazite recovery. Through automatic sampling devices operated by skilled Bureau of Mines personnel on the dredges and by ore-dressing studies on monazite-bearing sands conducted at several Bureau stations, many changes were made in the general flow sheet and equipment design. As a result of these combined studies and the cooperative efforts of the dredge operators, the recovery of the monazite was increased considerably. This program was terminated in June 1953.

In the fall of 1952, Bureau of Mines personnel grab sampled a small valley a short distance northeast of the Corral Creek placers. A small intermittent stream flowing north into Big Creek traversed this valley. From the grab sample obtained in this area, it was estimated that the monazite content would run about 1½ pounds per cubic yard. On the basis of this sample, field personnel proposed this area for a future churn-drilling program to extend the limits of the Corral Creek deposit. As the purpose of all previous churn drilling undertaken by the Bureau was to indicate ore bodies rather than develop

or extend them, this proposal was never submitted for approval. It was felt that sufficient drilling had been done by the Bureau in this area. However, this information was supplied to the lessee of the property to enable him to conduct a drilling program if he so desired.

EXPLORATION

Preliminary Investigations

Samples taken from surface materials in the late fall of 1950 indicated good monazite values in the area known as Corral Creek. Only when the samples were taken from clays and soils were the monazite values low.

A program to secure deeper grab samples was planned during the winter of 1950-51. Initial plans called for sinking 5-foot deep post-auger holes at 500-foot intervals in the east side of Long Valley for a distance of 5 miles. In the spring of 1951 this plan was initiated. The distance between auger holes was shortened to 125-foot intervals when good monazite values were indicated. Large, representative 50 to 70-pound samples were obtained from these auger holes and concentrated in the Boise field laboratory. These concentrates were examined with 40-power lenses and a field geiger counter. Results from these examinations were tabulated and plotted on a map. This grab-sampling program indicated that two areas, Pearsol Creek to the north and Corral Creek to the south of Big Creek, would warrant churn-drill exploration. Both these areas were proposed for investigation to the Atomic Energy Commission and approved in the spring of 1951.

Churn Drilling

The churn-drill exploration of Corral Creek was initiated on June 21, 1951, under Contract No. Im-6843. It was terminated on November 10, 1951, with a total of 61 holes, ranging from 20 to 123 feet in depth, and totaling 3,518 feet drilled.

Initial holes were drilled in those parts of Corral Creek area where the least damage would be done to farm crops. From these holes a grid pattern was laid out with the holes on 800-foot centers. Drilling was extended to the north, south, east, and west, depending on the monazite values encountered in the previous hole. Some holes were offset because of topographic features or omitted entirely. Where good surface samples were found, the monazite values seldom extended to depth. Some holes contained little monazite at the surface, but fair monazite values were found at appreciable depths. A good example of this is Drill Hole Number CO-51, drilled to a depth of 123 feet. However, the majority of fair monazite values (minable depth) ranged between 15 and 50 feet. Bedrock was encountered in only two holes (Drill Holes CO-20 and CO-22), which were drilled at the base of the granite ridge on the eastern edge of Long Valley.

The drills used were truck mounted, using 6-inch casing with $7\frac{1}{4}$-inch drive shoes. The maximum drive was $2\frac{1}{2}$ feet with the core sample removed after each drive. Two samples were combined to represent a 5-foot vertical section of core unless stratigraphic changes made this interval inadvisable. A small portion of each sample was panned at the drill site for logging purposes and to determine from

the indicated monazite the depth to which the hole should be drilled. These pannings and concentrates were then returned to the original sample. Samples were dried and screened to 1/8-inch at the drill site. The oversize material was checked with a field geiger counter, weighed, recorded, and then discarded. The minus 1/8-inch material was sacked for shipment to the Boise Field laboratory.

Drilling Data

Number of drill holes:	61
Number of samples:	773
Actual pounds of sample weight recovered:	69,255

Mesh size of sample		Weight in pounds	Percent of size recovered	Cumulative percent of size recovered
	+1/8 inch	3,537	5.1	5.1
-1/8 inch	+16 mesh	15,608	22.5	27.6
	-16 mesh	50,110	72.4	100.0
Totals		69,255	100.0	

ANALYSES

Field Estimates

The minus 1/8-mesh material was weighed and dry screened to minus 16-mesh upon arrival at the Boise field laboratory. The plus 16-mesh material was checked for radioactivity, weighed, and discarded.

The minus 16-mesh material was then concentrated on laboratory shaking tables fed by hydraulic cone classifiers. During this process over 90 percent of the light-weight materials which were chiefly quartz, feldspar, and mica, were removed. The concentrates were

weighed and then examined with a field geiger counter, a microscope, and a mineralight. Estimates were made of the mineral content of each sample. Composites were made of individual samples to represent individual holes and were shipped to the Bureau of Mines station, Raleigh, North Carolina, for accurate chemical, radiometric, and petrographic analyses. In the field laboratory, representative slime samples were also examined for monazite loss.

Pounds of concentrate per cubic yard were calculated in the field laboratory on the basis of recovered dry weight of sample and concentrate. A factor of 2,700 pounds per cubic yard for the dry weight of in-place material was used to convert from weight to volume.

The reserves of magnetite, ilmenite, garnet, and zircon in the Corral Creek area are based on the field estimates of the individual samples weighted as to the quantity of concentrates recovered. A summary of field estimates for each drill hole with the minable depth of the hole is as follows:

Summary of Field Estimates

Weighted Average to Minable Depth of each Drill Hole

Hole No.	Total depth, feet	Minable depth, in feet	Lbs. black sand/cu.yd of gravel	Percent mineral content in black-sand conc. Magnetite	Ilmenite	Garnet	Zircon	Monazite
CO- 1	80	30	12.63	2.3	59.8	4.2	1.1	19.8
2	45	30	5.88	1.0	56.9	2.9	2.5	21.5
3	68	25	9.10	2.1	39.8	3.3	0.7	24.6
4	83	55	4.71	2.8	51.7	5.6	1.1	20.9
5	50	35	4.40	1.9	60.9	2.7	0.9	10.5
6	98	45	7.81	1.9	43.1	3.0	1.0	27.0
7	60	15	5.61	5.4	39.3	2.0	0.4	18.1
8	80	30	7.15	6.0	41.9	2.7	0.8	24.7
9	60	15	6.17	7.5	42.6	2.2	1.8	21.8
10	60	10	3.91	8.0	33.7	3.0	1.4	16.7
11	85	15	5.30	6.4	36.9	1.5	0.3	46.9
CO-12	50	20	5.70	2.6	39.9	2.0	1.5	30.0

Summary of Field Estimates(continued)

Hole No.	Total depth, feet	Minable depth, feet	Lbs. black sand/cu.yd. of gravel	Percent mineral content in black-sand conc. Magnetite	Ilmenite	Garnet	Zircon	Monazite
CO-13	60	45	3.66	2.9	46.6	2.8	1.2	18.0
14	55	35	2.37	6.2	38.5	2.6	0.9	21.7
15	45	10	5.18	6.2	38.4	1.0	1.5	39.2
16	47	15	11.26	12.7	40.7	2.0	1.2	18.6
17	50	10	4.56	1.3	39.8	2.0	1.0	23.5
18	48	20	3.65	2.0	47.1	1.9	1.5	18.7
19	50	30	8.58	5.2	45.8	2.3	2.3	18.8
20	38	25	11.28	12.3	38.8	1.9	2.0	15.5
21	50	20	3.29	3.6	47.7	3.2	2.6	13.0
22	33	20	4.49	2.5	43.2	2.2	2.7	16.5
23	45	20	2.63	8.2	28.9	1.9	3.1	13.0
24	35	20	9.99	1.1	45.8	2.1	1.3	22.3
25	50	40	4.67	1.0	42.4	1.3	2.4	20.4
26	55	45	6.95	2.9	45.5	1.6	1.7	18.6
27	45	45	2.64	3.1	49.0	0.7	2.4	9.2
28	50	15	3.59	7.6	27.0	1.0	2.4	9.7
29	50	20	14.94	0.1	48.6	1.0	0.8	39.3
30	50	25	4.02	1.5	52.3	1.0	1.1	28.9
31	45	45	1.87	2.2	55.4	1.2	2.6	19.9
32	55	35	3.96	0.7	60.9	1.0	1.6	16.8
33	55	40	2.86	1.3	66.5	1.0	2.7	14.9
34	33	15	2.61	8.3	43.0	1.1	1.7	9.1
35	40	15	9.34	0.1	48.5	1.0	1.7	42.1
36	55	15	0.29	3.2	43.3	1.3	3.6	6.3
37	71	20	4.75	3.2	34.6	1.1	1.1	37.3
38	65	20	5.38	4.7	29.9	1.0	1.3	22.8
39	90	50	6.11	2.3	52.4	1.0	0.7	28.6
40	55	25	7.97	2.9	62.6	1.2	1.9	14.9
41	55	15	5.32	4.1	49.2	1.4	2.0	11.4
42	55	30	7.83	0.7	55.0	1.0	1.7	25.7
43	55	15	8.96	3.0	58.7	1.0	1.5	23.3
44	20	20	4.26	18.9	62.6	1.0	2.4	1.5
45	60	25	4.68	1.8	74.6	1.0	1.1	10.3
46	78	35	9.33	2.0	39.0	1.1	1.4	21.2
47	65	40	5.31	4.5	54.8	1.5	1.9	10.1
48	45	45	4.19	4.0	48.9	3.2	2.6	3.9
49	50	20	7.55	5.7	54.2	1.8	1.2	8.9
50	68	20	11.55	0.7	40.5	1.1	1.1	42.0
51	123	45	7.38	2.1	51.0	0.7	1.3	23.6
52	100	100	2.60	5.4	57.9	1.4	1.7	15.4
53	50	35	10.91	1.4	57.6	3.4	0.9	14.3
54	75	45	11.67	0.8	35.8	1.6	1.7	30.3
55	55	20	5.10	2.0	45.8	1.0	2.5	30.1
56	45	15	7.32	1.6	72.2	1.0	1.0	13.9
57	40	15	10.60	1.1	49.7	0.8	2.6	28.4
58	55	25	6.52	1.5	54.2	1.0	1.1	25.6
59	60	35	4.65	2.9	45.9	1.4	1.7	6.8
60	70	30	10.65	2.7	57.1	2.0	1.6	19.3
CO-61	55	20	8.74	1.2	54.4	0.4	1.2	27.6

Chemical, Radiometric, and Mineralogical Analyses

Composite samples to the minable depth were made for each drill hole at the Boise field laboratory. These samples were shipped to the Bureau of Mines laboratory at Raleigh, North Carolina, for final analyses.

Upon arrival at the Raleigh laboratory, all samples were thoroughly mixed and a representative fraction was cut from each for grinding to about 150-mesh. Radiometric and chemical analyses were run on each of these ground fractions. Another fraction was retained in the original grain size for mineralogical analyses. A part of this petrographic study is found under "Mineralogy" in this report.

Chemical analyses of monazite from this field assays 4.39 percent ThO_2 and 0.10 percent U_3O_8, giving a ThO_2 equivalent of 4.81 percent.

Good agreement was obtained between the various analytical methods used. This fact is demonstrated in the summary of analyses which follows. It is felt that, in the few instances where good agreement was not obtained, the discrepancy is due to the presence of trace amounts of radioactive opaque minerals. Samples from holes number 36 and 41 were not analyzed because low mineral content.

Summary of Laboratory Analyses

Hole No.	Radioassay percent ThO_2 equiv.	Chemical percent ThO_2	Calculated percent U_3O_8 5/	Percent monazite in black sands, based on Radio-assay 6/	Chem-ical 7/	Mineral-ogical
CO- 1*	0.85	0.80	0.012	17.7	18.2	
2*	.92	.85	.017	19.2	19.4	
3*	.77	.70	.017	16.1	15.9	
4	.90	.84	.014	18.8	20.5	
5	.40	.36	.010	8.4	8.2	
6*	1.12	1.06	.014	23.4	24.1	22.5
7	.57	.51	.014	11.9	11.6	
8	.79	.74	.012	16.5	16.8	
9	.73	.68	.012	15.2	15.5	
10	.46	.41	.012	9.6	9.3	
11	1.48	1.41	.017	30.9	32.1	
12	1.00	.94	.014	20.9	21.4	
13	.74	.68	.014	15.4	15.5	
14	.64	.60	.010	13.4	13.7	
15	.97	.95	.005	20.3	21.6	
16*	.90	.84	.014	18.8	19.1	19.6
17	.76	.71	.012	15.9	16.2	
18*	.70	.65	.012	14.6	14.8	
19	.76	.71	.012	15.9	16.2	
20*	.80	.74	.014	16.7	16.8	
21	.52	.46	.014	10.8	10.5	
22	.61	.54	.017	12.7	12.3	
23	.43	.39	.010	8.9	8.9	
24*	.99	.96	.007	20.7	21.9	21.8
25	.78	.71	.017	16.2	16.2	
26	.70	.64	.014	14.6	14.6	
27	.40	.36	.010	8.3	8.2	
28*	.66	.58	.019	13.7	13.2	
29*	1.83	1.66	.040	38.2	37.8	
30*	1.17	1.07	.024	24.4	24.4	
31*	.98	.91	.017	20.4	20.7	
32	1.00	.92	.019	20.8	20.9	
33	.86	.78	.019	17.9	17.8	
34	.55	.50	.012	11.5	11.4	
35	1.81	1.68	.031	37.8	38.3	38.2
37*	1.53	1.46	.017	31.9	33.2	
38*	1.03	.95	.019	21.5	21.6	
39*	1.22	1.13	.021	25.5	25.7	
40*	.75	.68	.017	15.6	15.5	
41*	.85	.76	.021	17.7	17.3	
42*	1.04	.99	.012	21.7	22.5	
43	1.08	.94	.033	22.5	21.4	
45	.70	.64	.014	14.6	14.6	
CO-46*	1.19	1.10	0.021	24.8	25.0	

Summary of Laboratory Analyses (Continued)

Hole No.	Radioassay percent ThO_2 equiv.	Chemical percent ThO_2	Calculated percent U_3O_8 5/	Percent monazite in black sands, based on Radio-assay 6/	Chem-ical 7/	Mineral-ogical
CO-47	0.64	58	0 014	13.4	13.2	
48	.23	.20	.005	4.8	4.2	
49*	.56	.50	.014	11.7	11.4	
50*	1.62	1.49	.031	33.8	33.9	34.2
51*	.84	.76	.019	17.5	17.3	
52	.88	.81	.017	18.4	18.4	
53*	.71	.66	.012	14.8	15.0	
54*	1.22	1.14	.019	25.5	26.0	
55*	1.09	1.01	.019	22.7	23.0	
56*	.70	65	.012	14.6	14.8	
57*	1.20	1.10	.024	25.0	25.0	
58	1.09	.98	.026	22.7	22.3	
59	1.03	.95	.019	21.5	21.6	
60*	.85	.76	.021	17.7	17.3	
CO-61*	1.15	1.04	0.026	24.0	23.7	24.0

* ...er area with richer values of monazite.

5/ The percent U_3O_8 is obtained by subtracting the chemical percent ThO_2 from the total percent ThO_2 equivalent determined by radiometric analysis and dividing this remainder by the factor of 4.2.

6/ Radioassay X 100 divided by radioassay of monazite from this field.

7/ Chemical percent ThO_2 X 100 divided by percent ThO_2 in monazite from this field.

BENEFICIATION AND ECONOMICS

The drilling program conducted by the Bureau of Mines indicated that more than a third of the Corral Creek area which was drilled contained substantial percentages of monazite and other heavy minerals. Mining operations in the Big Creek deposit to the north have shown that the recovery of heavy minerals is possible by the use of suitably equipped bucket-line dredges. Corral Creek is not able to supply

sufficient water for dredging operations. However, a water supply is readily available. Sufficient water to support a dredging operation could be obtained by diverting water from Big Creek by ditch to the north, or by pumping it from the nearby North Fork of the Payet River. Little or no mining problems would be encountered in clearing the land for dredging operations.

A black-sand separation plant for the concentration of the heavy minerals produced by the dredges, located at Boise, Idaho demonstrated that the heavy minerals can be readily separated into individual marketable products.

In addition to monazite, the black sand concentrates were found to contain a large percentage of ilmenite, and much smaller percentages of magnetite, garnet and zircon.

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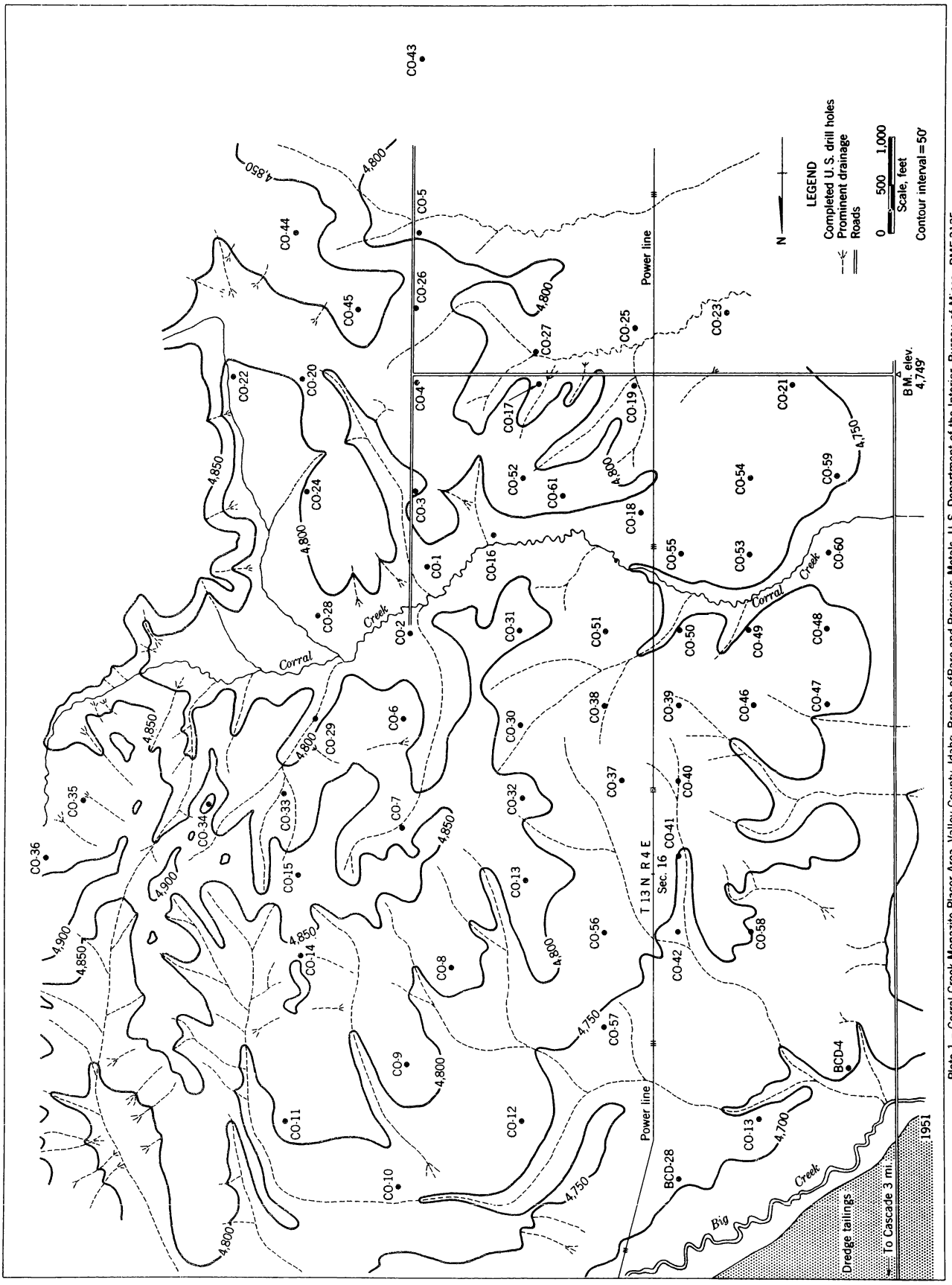

Plate 1.- Corral Creek Monazite Placer Area, Valley County, Idaho. Branch ofRare and Precious Metals, U. S. Department of the Interior, Bureau of Mines. RME-3135