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STATE OF ALASKA
DIVISION OF MINES AND MINERALS

REPORT COVERING
PRELIMINARY INVESTIGATION

OF

# McARTHUR RIVER BLACK AND WHITE SANDS DEPOSIT

AK 84-45

TYONEK AND KENAI QUADRANGLES

by

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# PRELIMINARY INVESTIGATION

# OF

# McARTHUR RIVER FLATS BLACK SANDS


## SUMMARY

The white and black sand concentrations along the McArthur River "flats" cover an extensive area, which has been estimated at a minimum of 10 square miles. The source of these sands is from the nearby granitic masses.

The topography of this area along the McArthur and Chakachatna Rivers, indicates it to have been at one time a 25 mile wide by 20 mile long embayment of Cook Inlet which was filled in with alluvium transported to large extent by these two streams.

The area selected for preliminary sampling (at 200 foot spacing along a 1200 foot line) shows an iron content ranging from 1.07 to 1.67%, for an average of 1.41% per ton. The iron content of the seven samples is too low grade to be of interest. Thickness of the white sand alluvium is unknown, as depths of sampling was limited to 37 to 40 inches.

## INTRODUCTION

A preliminary investigation of the "black" and "white" sands along the McArthur River Flats was made September 11, 1960, at request of Charles Kidder and James Marris, prospectors and locators, Anchorage residents. Mr. George S. Grimes of the U.S. - Alaska Corporation, an export-import company of Anchorage, joined in the request, having in mind the possibility of the magnetite sands being of interest to certain Japanese steel companies.

Accompanied by Mr. Marris, the trip was made by charter flight with George Spernak, of Spernak Airways.

## LOCATION AND ACCESSIBILITY

The area examined and sampled is located at approximate Long. 151°-56' and Lat. 61° -06'.

Located about 16 miles (airline) from mouth of the McArthur River , it is at present most readily accessible by plane, with "bush" pilots using a natural brush-free hard packed sand area 1500 to 2000 feet in length and several hundred feet in width as a landing strip. * At time of visit there were 8 small planes parked nearby, as the area is a favored one for big game hunting. It was reported that large military planes have landed at a number of points along the wide sand flats of the river.

The USGS topographic Map of the Kenai Quadrangle shows the Cook Inlet tide flats to extend about 2 miles off shore at mean lower low tide, for 5 miles to the southwest and 10 miles to the northeast of mouth of McArthur River. Beyond this zero contour a water depth of 60 feet in Cook Inlet is shown within ½ mile.

Shallow draft boats and barges can possibly reach mouth of McArthur River at high tide for loading or unloading freight. As an alternative, supplies and heavy equipment for a project in that area could be handled by scows, or shallow draft "landing craft" and unloaded or loaded on the tideflats at low tide.

While the map shows the river flats to be marshy, the area examined was found to be a hard-packed "white" sand having a scattered low "bush" willow growth, with indications suggesting that in recent years the river has been confined to its present channels. Viewed from the air the "flats" extending 4 miles northwest to the "braided" stream section of the river, as well as the "flats" to the north and east between the McArthur and Chakachatna Rivers appear to be of similar character.

* Refer to attached Map I.

During an effort made to get around a low overcast, flight was made due south for about 15 miles (partly following the Kustastan River), no swampy areas were noted, but scattered spruce and heavier brush growth was observed. White sands were noted in "open" areas free of brush. Turned back by increasinly poor visibility a landing was made on a narrow, "white" sandy airstrip along side of which the Kenai Air Taxi have a hunting camp.

Observations made during the in-and-outbound trip to that region suggests that truck and tractor equipment should have fair going from the river's mouth to section sampled.

CLIMATE AND WATER SUPPLY

With ice capped Mt. Spurr lying about 30 miles to the northwest and extensive glacier remnants to the west, the area is one of fairly heavy rainfall in late spring and summer, and is reported to have deep snows during the winter.

The run-off in the spring and the rainy summers suggests that the streams in that district are at high water levels most of those seasons. There is an abundant water supply for all purposes in the area.

HISTORY AND OWNERSHIP

Little is known of past prospecting in this region, but being readily accessible from Cook Inlet it seems certain that early day prospectors covered it in their search for gold. The presence of "streaks of magnetite" in the white sands as well as on the river bars could not have escaped their notice. The stream named Blacksand Creek, the main westerly tributary of Kustastan River (the latter being a lower limit branch of the McArthur River), suggests that magnetite may be more abundant in that stream than elsewhere in the district.

The claims staked by Charles Kidder and associates last summer on the McArthur River flats are the first known to have been located for their "possible" economically important magnetite content.

GEOLOGY

Geological mapping of this region has not been completed. However, alluvials in the "flats" of the McArthur River and its tributaries indicate their headwaters to be principally in a "white" granite formation. Weathering of the granite is relatively rapid. The prospectors report several exposures examined on slopes of the drainage area have weathered to depths of several inches, with the freed grains of quartz, feldspars, and other mineral constituents being carried down the slopes by snowslides and the summer rains.

The topography of the area indicates these wide "flats" at one time to have been a 25 mile wide by 20 mile long "embayment" along Cook Inlet, largely filled-in by sands and silt derived from the granite.

## Mineralization

An examination of the "white" sands obtained in sampling to depths of 36 to 38 inches shows an estimated 50% to 60% quartz, 35 to 40% feldspar, and 5 to 10% "black" minerals (including hornblende, pyroxene, biotite, and magnetite).

In the augur sampling holes the magnetite occurs principally in narrow, varying width "streaks" (1/16 inch to ¼ inch), 1½ to 3 inches apart, with some disseminated grains in the white sands. These streaks indicate periodic extreme flood stages of the several streams across the wide flats.

## Sampling

Although it was stated that greater magnetite concentrations occurred further downstream, a 1200 foot line (bearing N28E with holes at 200 foot spacing) was laid out, starting about 100 feet to north of the airstrip, for preliminary sampling on the theory that the heavier black sand concentrations should occur in upper section of the flats nearer their source.

An 8 inch diameter posthole augur was used for sampling. Seven samples were taken and each sample was reduced to about 6 lbs by passing it through a Jones Sample Splitter. With sands caving into the hole upon reaching ground water level, depth of sampling was limited to 36 to 40 inches. It was interesting to note that in almost every hole well rounded granite pebbles from ½ to 2 inches in diameter were found just below water level. A few well rounded small pebbles were found in each hole above water level, varying in size from ¼ to 3/4 inches. Results of the sampling are as follows:-

| Sample No. | Depth in.'s | Iron % * | Description |
|---|---|---|---|
| 306-A | 37" | 1.52 | 100 ft north of airstrip |
| 307-A | 37" | 1.67 | 200 ft N28E of No. 306-A |
| 308-A | 38" | 1.53 | 200 ft N28E of No. 307-A |
| 309-A | 36" | 1.43 | 200 ft N28E of No. 308-A |
| 310-A | 36" | 1.07 | 200 ft N28E of No. 309-A |
| 311-A | 40" | 1.24 | 200 ft N28E of No. 310-A |
| 312-A | 37" | 1.44 | 200 ft N28E of No. 312-A |

* The iron analyses were based on the total sample in each case, and therefore includes the iron content of the hornblende, pyroxene, and biotite. The last three basic minerals were estimated to be equal to or in greater abundance than the magnetite. The iron determinations were made by the approved acid method rather than by fusion. The iron content of the magnetite alone is therefore much less than the iron content reported above.

Colorimetric analysis of samples show $TiO_2$ content to be 0.5 tO 1%.

A screen analysis of the samples gave the following results:-

| Screen Sizes | Weight | Percentage |
|---|---|---|
| Plus 3/4" mesh | 0 grams | 0.00% |
| Plus ½" mesh | 8 grams | 1.59% |
| Plus 4 mesh | 10 grams | 1.99 |
| Plus 10 mesh | 7 grams | 1.34 |
| Plus 40 mesh | 255 grams | 45.00 |
| Plus 60 mesh | 145 grams | 28.95 |
| Plus 80 mesh | 46 grams | 9.18 |
| Plus 100 mesh | 28 grams | 5.58 |
| Plus 200 mesh | 20 grams | 3.98 |
| Minus 200 mesh | 12 grams | 2.39 |
| Total | 501 grams | 100.00% |

Samples of the sands brought in by Mr. Kidder from area a mile or so downstream showed a total iron content up to 6%.

CONCLUSIONS

The above samples are too low grade in magnetite to be of economic interest for their iron content alone. However, a more thorough and systematic sampling program holds possibility of finding an area having a higher magnetite content that may prove of interest.

With ground water level probably lying within 3 feet of the surface over the extensive "flats" of the McArthur River drainage system, and with no information concerning total thickness of the white and black sand deposit, an exploration program will require use of churn drilling or power driven or augur type equipment capable of testing to depths of 50 feet or more. With the sands caving and running into the hole below the water level casing will be required.

The finding of gravel 3 feet below surface suggests the possibility that the more or less pure sands may be limited to depths of 3 to 20 feet, with their thickness increasing with the gradually diminishing stream gradient downstream.

In event a large area can be proven with magnetite content of economic interest, the high percentage of quartz and feldspar in the sands might prove of equal or greater value. Feldspar is a major requirement in the glass, pottery, and enamel industries, with other products such as scouring powders and soaps using lesser amounts. Pure quartz sands also have many uses in various industries.

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