CAPE CREEK TIN PLACER MINE - FIELD REPORT 1979 & 1985

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UNITED STATES DEPARTMENT OF THE INTERIOR

Manuel Lujan, Jr., Secretary

BUREAU OF MINES

T S Ary, Director

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Introduction

On June 20 and 21, 1985, a brief visit was made to the placer tin mine on Cape Creek, Seward Peninsula, in order to acquaint ourselves with the mine, mine owner, Len Grothe[1], and the area's general geology. Discussions with Mr. Grothe provided new data on the placer mine and a short traverse over Cape Mountain served to illustrate the general lode potential for the area. Several concentrate samples collected along the tide line near the mouth of Cape Creek should provide comparative data to samples collected along the spit at Cape Prince of Wales.

Investigations

The Cape Creek placer mine has had intermittent tin production since 1924 (table 1). From 1924 to 1941 combined production from Cape Creek and nearby Goodwin Gulch totaled 1,300,000 lb, 400,000 lb of which is credited to Cape Creek alone. Assuming a total original inferred reserve of approximately 3,000,000 lb Sn based on Bureau of Mines drilling (Mulligan and Thorne, 1959), and subtracting known production since 1941 (1,333,295 lb) together with indicated 1985 reserves (585,600 lb) (table 2), approximately 1,100,000 lbs of this production can be credited to Cape Creek. Including this figure, then, total production from Cape Creek during the period 1924 through 1985 is estimated as approximately 2,400,000 lb Sn. Approximately 50 pct of this tin has been produced since 1979 at an annual rate of approximately 200,000 lb Sn/year.

The placer gravels are very high grade, concentrations range from 1 to several pct Sn, and include a considerable amount of coarse cassiterite. Ten pct of the cassiterite in upper Cape Creek was greater than 1.25 in; 2 pct of the cassiterite presently being mined is now larger than this size whereas 15 pct is greater than 0.5 inches. Cassiterite-bearing cobbles or boulders weighing tens to over a hundred pounds have also been found. The concentrates contain 60-72 pct Sn by weight; little else is present although Mr. Grothe indicates that there has been some interest in the mine's Ir values.

The mine's washing plant is now set up below the road in the lower-middle portion of upper Cape Creek, however actual mining appears to be now taking place below the east fork of Cape Creek. At the time of our visit, Cape Creek remained covered with ice, but Mr. Grothe expected to be mining by the first of July. The mining season ends on September 25, when the last barge headed south leaves. Based on the present position of the mining operation and previous Bureau of Mines drilling, the Cape Creek placer contains an estimated 585,600 lb of remaining tin reserves (table 2). At 200,000 lb/year this estimate

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coincides closely with Mr. Grothe's estimate that he has three years of mining left. Mr. Grothe also mentioned that the results of Bureau drilling appeared to be too optimistic for the upper portion of Cape Creek, whereas too pessimistic for the lower portion. Much of the remaining ground is very deep (70-100 ft) with a thick mining section produced by multiple periods of gravel deposition.

A short traverse over Cape Mountain showed two main intrusive phases to be present: a fine, equigranular phase and a coarse, porphyritic one. The contact between the two ranges from gradational to sharp. Contact effects adjacent to the Cape Mountain stock were observed to be very restricted, limited to the development of local minor tourmaline and anhydrous skarn minerals, however, minor amounts of cassiterite and possibly wolframite were observed in thin quartz veins within the granite, near the intrusive contact. Mr. Grothe estimated that 14,000 lb Sn had been recovered in 1984 by hand mining a small high-grade cassiterite replacement body located on the saddle at the headwaters of Cape Creek.

A series of pan concentrate samples were collected along the beach from the mouth of Cape Creek westward to the cliffs on Cape Mountain in order to examine the longitudinal transport of cassiterite along the beach, assess the beach sand's production potential, and to provide data comparative to that of samples collected on the spit at Cape Prince of Wales, to the west. Data has yet to be received.

TABLE 1. - Estimated production of Sn from the Cape Creek placer deposit

Period/year	Amount	Unit	Remarks	Reference
1924-1941	1,300,000	lb Sn	Total credited to both Cape Creek and Goodwin Gulch. 400,000 lb Sn credited to Cape Creek alone, 58,000 to Goodwin Gulch alone. 1,100,000 of total estimated from Cape Creek (see text).	MAS files
1964	5,000	lb Sn	Production from Cape Creek?	do.
1965	15,600	lb Sn	do.	do.
1966	63,075	lb Sn	Lee Brothers	do.
1967	18,000	lb Sn	do.	do.
1979	2,000	lb conc.	do.	do.
	200,000	lb conc.	Grothe & Pearson	do.
1980	192,000	lb conc.	do.	do.
1981	106,000	lb Sn	Total for Alaska, mostly from Cape Creek.	DGGS Spec. Rept. 33.
1982	198,000	lb Sn	do.	do.
1983	215,000	lb Sn	do.	do.
1984	225,000	lb Sn	do.	DGGS Spec. Rept. 38.
1985	200,000	lb Sn	Recovered but apparently not shipped.	Personal comm.

Total production, 1964-1985: 1,333,295 lb Sn, assuming concentrates contain 73 pct Sn. Total production 1924-1985 estimated at 2,400,000 lb (see text).

Estimated production of Sn from lode sources, Cape Mountain area

Period/year	Amount	Unit	Remarks	Reference
1901-1964	12,000	lb Sn	Hand-picked from rubble?	Sainsbury, 1968.
1984	14,000	lb Sn	Hand-picked ore.	Personal comm.

The Cape Creek tin placer mine was also visited in August of 1979 by J.C. Barker, Mining Engineer, AFOC. The following is taken from that trip report:

Mr. Grothe and Mr. Pearson are presently operating a tin placer mine and washing plant on upper Cape Creek with a crew of 11 people. The mine is operated on two daily shifts. Mining in the 1979 season was not possible until July 15 due to the heavy ice and snow conditions and late thaw. Mr grothe is expecting to be able to mine until late September this year.

The mine operates at between 25 and 65 cubic yards per hour depending on the grade of the material being handled. The operastor estimates that 20,000 yds^3 of pay gravel and 50,000 yds^3 of overburden will be handled this year with a production of 100,000 lbs of tin concentrate. He further estimated his entire camp operating cost to be about $275,000 for a mining cost of approximately $2.75 per pound.

The tin concentrate produced at Cape Creek is relatively free of impurities which consist of 0.1% tungsten minerals and about 2.5% pyrite. Tin nuggets up to 6 inches were seen, however the + 1.25 in. concentrate makes up only 3% of the product. The tin values come from two separate paystreaks with intervening barren sediments which were probably derived when the area was below sea level (fig 2). See the attached cross-section. The washing operation consists of sizing the materail and feeding to two jig circuits with oversize to tails. No sluicing is attempted. Figure 3 is a flow chart of the 1

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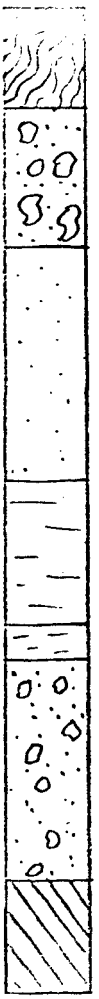
Letters

Figure 2.- Sedimentary section on upper Cape Creek.



2 - 4 feet
Tundra / clay

4 feet - Upper Paystreak
(avg. ½ lb. Sn/yd)

2 - 8 feet
fine gravels / sand
(no Sn)

4 feet
brown clay / silt

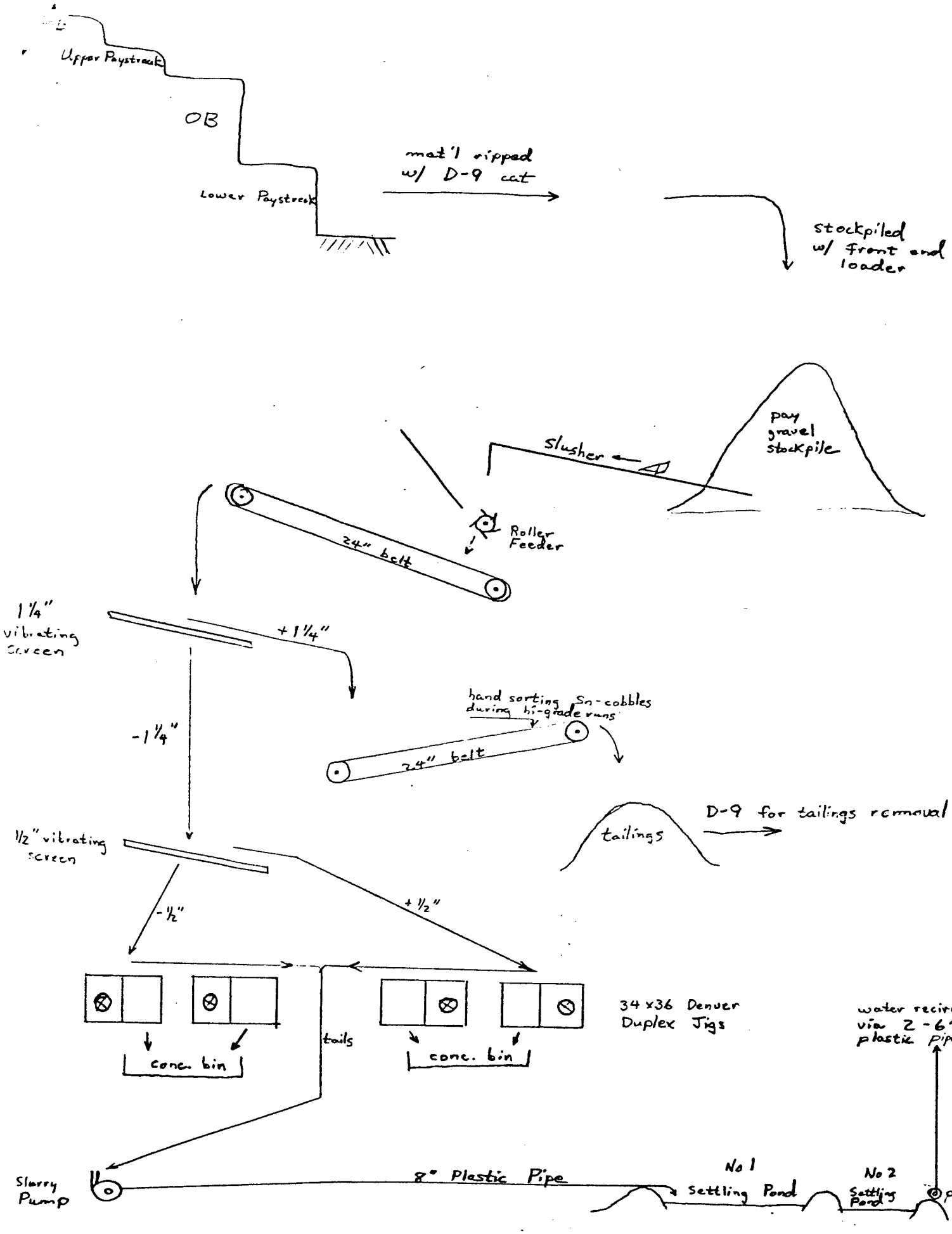
1 foot - gray clay

2 - 8 feet - Lower Paystreak

2 - 4 feet
fractured bedrock w/ Sn

Figure 2

Figure 3.- Flow chart for tin recovery at Cape Creek.


Upper Paystreak
OB
Lower Paystreak
mat'l ripped w/ D-9 cat
stockpiled w/ front end loader
pay gravel stockpile
Slusher
Roller Feeder
24" belt
1¼" vibrating screen
+1¼"
-1¼"
hand sorting Sn-cobbles during hi-grade runs
24" belt
tailings
D-9 for tailings removal
½" vibrating screen
-½"
+½"
34 x 36 Denver Duplex Jigs
conc. bin
tails
conc. bin
water recirc. via 2-6" plastic pipes
Slurry Pump
8" Plastic Pipe
No 1 Settling Pond
No 2 Settling Pond
pump

References

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Mulligan, J. J. (formerly of BuMines). Private communication, 1983; available upon request from J. D. Warner, BuMines, Fairbank, AK.

_____ and R. L. Thorne. Tin-Placer Sampling Methods and Results, Cape Mountain District, Seward Peninsula, Alaska. U.S. BuMines I.C. 7878, 1959, 69 p.

Table 2

Reserve calculation for remaining Cape Creek tin placer deposit, using Line Method following Wolf, 1969.

Line	Hole	Spacing	Thickness Pay Horizon	lbs./yd³	Thickness x Spacing	Grade x Spacing x Th	Avg. of line values × 27 / 15'
1A	9		12	2.79	600	1674	
		50					
	11		14	0.59	700	413	
					Total	2087	
					One-half	1044	33,800 lb
1	6		16	.05	210	10.5	
		70					
	8		24	3.58	1680	6014.4	
					Total	6024.9	
					One-half	3012.5	164,500 lb
2	6		20	.65	1000	650	
		50					
	8		27	2.45	2700	6615	
		50					
	10		22	.53	2640	1399.2	
		70					
	13		17	.70	1190	833	
					Total	9497	
					One-half	4749	48,000
3	6		29	.01	2175	22	
		75					
	19		25	.09	3875	349	
		80					
	12		22	.14	3300	462	
		70					
	15		21	.02	1470	29	
					Total	862	
					One-half	431	8800
3A	101		31	.01	3060	30.6	
		60					
	1		11	1.51	660	997	
					Total	1027	
					One-half	514	87,400
4	8		11	13.92	550	7656	
		50					
	10		29	2.34	3190	7465	
		60					
	12		27	1.68	1620	2722	
					Total	17843	
					One-half	8921	243,100
4A	2		9	.02	450	9	
		50					
	4		13	1.22	1040	1269	
		30					
	6		16	.35	960	336	
		30					

Line	Hole	Spacing	Thickness MS.	Gauge	[illegible]	[illegible]
4A (cont)	8	35	"	1.57	1040	1633
	10	55	9	7.07	810	5727
	14	30	1/4	1.08	1360	24531
	16		3/8	2.04	540	1102
					Tot.	34,065
					Add'l	17,333

Total indicated Sq 585,600 lb